

Document of
The World Bank

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Report No: 48477-CN

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US\$ 100 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR THE

NANNING URBAN ENVIRONMENT PROJECT

April 19, 2010

China and Mongolia Sustainable Development Unit
Sustainable Development Department
East Asia and Pacific Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective: July 1, 2009)

Currency Unit = Renminbi Yuan
RMB 1.0 = US\$ 0.147
US\$ 1.0 = Y 6.800

FISCAL YEAR

January 1 - December 31

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
A/O	Anaerobic-Aerobic
A2/O	Anaerobi-Anoxic-Aerobic
ASEAN	Association of Southeast Asian Nations
BOD	Biochemical Oxygen Demand
CAST	Controlled Atmosphere Separation Technology
CEA	Consolidated Environment Assessment
CEMP	Consolidated Environment Management Plan
CFAA	Country Financial Accountability Assessment
CNAO	China National Audit Office
COD	Chemical Oxygen Demand
DA	Designated Account
EA	Environment Assessment
EIRR	Economic Internal Rate of Return
EMP	Environment Management Plan
EPB	Environment Protection Bureau
FMS	Financial Management Specialist
GAO	Guangxi Autonomous Regional Audit Office
GDP	Gross Domestic Product
GEF	Global Environment Facility
GNWC	Guangxi Nanning Water Co., Ltd.
GUEP	Guangxi Urban Environment Project
GXFB	Guangxi Zhuang Autonomous Regional Finance Bureau
IBRD	International Bank for Reconstruction and Development
IA	Implementing Agency
IP	Indigenous People
IPP	Indigenous People's Plan
IDC	Interest During Construction
ICB	International Competitive Bidding
ICR	Implementation Completion Report
JBIC	Japan Bank for International Cooperation
MOF	Ministry of Finance
NCB	National Competitive Bidding

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NCWIC	Nanning Communication and Water Conservancy Investment Company Ltd.
NNDRC	Nanning Development and Reform Committee
NPMO	Nanning Municipal Project Management Office
NSC	Nanning Sewerage Company
NXIC	Nanning Xiangsihu Investment & Constructions Company Ltd.
O&M	Operation and Maintenance
PIU	Project Implementing Units
PLG	Project Leading Group
PMO	Project Management Office
RAP	Resettlement Action Plan
R&D	Research and Development
SA	Social Assessment
SBR	Sequencing Batch Reactor
SOE	State-Owned Enterprise
SW	Solid Waste
TA	Technical Assistance
TN	Total Nitrogen
TP	Total Phosphorus
UDIC	Urban Development Investment Company
WS	Water Supply
WTP	Willingness-to-Pay
WWTP	Waste Water Treatment Plant

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CHINA
NANNING URBAN ENVIRONMENT PROJECT

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IBRD CHN 36710, CHN 36711

CHINA NANNING URBAN ENVIRONMENT PROJECT

PROJECT APPRAISAL DOCUMENT

EAST ASIA AND PACIFIC

EASUR

Date: April 19, 2010 Country Director: Klaus Rohland Sector Manager: Ede Jorge Ijjasz-Vasquez / Vijay Jagannathan Project ID: P108627 Lending Instrument: Specific Investment Loan		Team Leader: Takuya Kamata Sectors: General water sanitation and flood protection (55%), Sewerage (45%) Themes: Pollution management and environmental health (P), Environmental policies and institutions (S) Environmental screening category: A Safeguard screening category: A					
Project Financing Data							
<input checked="" type="checkbox"/> Loan <input type="checkbox"/> Credit <input type="checkbox"/> Grant <input type="checkbox"/> Guarantee <input type="checkbox"/> Other							
For Loans/ Credits/ Others: Total Bank financing (\$ million): 100.00 Proposed Terms: A variable spread loan, with a maturity of 25 years, including a 5-year grace period, front-end fee of 0.25%.							
Financing Plan (\$ million) (Tentative Figure)							
Source of Funds	Local	Foreign	Total				
Borrower/Recipient	109.18	26.15	135.33				
International Bank for Reconstruction and Development	33.58	66.42	100.00				
Total	142.76	92.57	235.33				
Borrower: People's Republic of China							
Responsible Agency: Nanning Development and Reform Committee, Nanning Integrated Urban Environment Project Management Office, Nanning Municipal Government							
Address:							
Contact Person: Mr. Qingzuan Zeng, Director of the NPMO							
Tel: 86-771-553-5881 Fax: 86-771-553-5881 E-mail: nuepo@163.com							
Estimated Disbursements (Bank FY/ \$ million)							
FY	2010	2011	2012	2013	2014	2015	2016
Annual	2.00	13.00	22.00	26.00	25.00	10.00	2.00
Cumulative	2.00	15.00	37.00	63.00	88.00	98.00	100.00
Project Implementation period: July 1, 2010 – December 31, 2015							
Expected effectiveness date: August 13, 2010							
Expected closing date: December 31, 2015							
Does the project depart from the CAS in content or other significant respects? <i>Ref. PAD I.C</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
Does the project require any exceptions from Bank policies? <i>Translation waiver – see Paras 57 and 58</i> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>Ref. PAD IV.F</i>							
Have these been approved by Bank management? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No							

Is approval for any policy exception sought from the Board?	[] Yes [x] No
Does the project include any critical risks rated “substantial” or “high”? <i>Ref. PAD III.E</i>	[] Yes [x] No
Does the project meet the Regional criteria for readiness for implementation? <i>Ref. PAD IV.F</i>	[x] Yes [] No
Project development objective Ref. PAD II.C, Technical Annex 3	
<p>The project development objective is to assist Nanning Municipality, in Guangxi Zhuang Autonomous Region, in arresting further deterioration of surface water quality in selected urban centers by expanding the coverage of wastewater treatment services, carrying out environmental rehabilitation of rivers, and improving the institutional and regulatory capacities of the municipal agencies.</p>	
Project description Ref. PAD III.D, Technical Annex 4	
<p>This project consists of three components. The total cost is US\$ 235.33 million¹, including an IBRD loan of US\$ 100 million.</p> <p>Component 1. Wastewater Management: (\$90.64 million, of which the IBRD loan is \$64.93 million)</p> <p>(a) Expanding the treatment capacity of the existing Jiangnan Wastewater Treatment Plant from 240,000m³/day to 480,000 m³/day to reduce the discharge of untreated sewage into the Yongjiang River.</p> <p>(b) Establishing wastewater treatment facilities in the Counties of Wuming, Binyang, Hengxian, Shanglin, and Mashan, including: the rehabilitation and/or installation of primary and secondary sewers; installation of sewage lift pump stations; and construction of wastewater treatment plants.</p> <p>Component 2. River Rehabilitation: (\$105.71 million, of which the IBRD loan is \$32.77 million)</p> <p>Improving storm water drainage capacity and the environment of the Fenghuang River, Liangqing River and Lentang River through various river improvement measures, including cleaning-up river courses, restoring detention ponds, enhancing embankments, and providing sewer interceptors.</p> <p>Component 3. Technical Assistance: (\$2.05 million, of which the IBRD loan is \$2.05 million)</p> <p>(a) Establish an integrated mini river basin management (“IMRBM”) system for a section of the Yongjiang River basin within the Nanning Municipality.</p> <p>(b) Strengthen the Project management capability of Nanning Project Management Office and the Project Companies through provision of: technical assistance, training and study tours.</p>	
Which safeguard policies are triggered, if any? Ref. PAD IV.E, Technical Annex 10	
<ul style="list-style-type: none"> • Environmental Assessment • Involuntary Resettlement • Indigenous Peoples 	
Significant, non-standard conditions, if any, for: Ref. PAD III.F	
<p>Loan effectiveness: None</p> <p>Implementation Covenant:</p>	

¹ It includes contingencies and financial costs. See Annex 5.

Nanning shall: (a) maintain the Municipal Project Management Office with terms of reference, staffing and resources acceptable to the Bank; (b) implement and cause the Project Companies to implement the RAP and EMP; (c) prepare and implement resettlement action plans in accordance with the Resettlement Policy Framework in regard to the Linked Projects; and (d) monitor and evaluate the implementation of the RAP, EMP and the Resettlement Policy Framework, and furnish to the Bank semi-annual reports on the results of said monitoring and evaluation.

Disbursement Conditions:

Utility Subsidiary Loan Agreements: The wastewater utility company, the Guangxi Nanning Water Co., Ltd., will enter into utility subsidiary loan agreements with the Nanning Municipality as a condition of disbursement.

Subsidiary Agency Agreements: The companies in charge of river environment components, the Nanning Xiangsihu Investment & Constructions Company Ltd. and the Nanning Communication and Water Conservancy Investment Company Ltd., will enter into subsidiary agency agreements with the Nanning Municipality as a condition of disbursement.

Subsidiary Loan Agreement

The Subsidiary Loan Agreement will include, inter alia, the following provisions:

a) *Financial Projections:* During the project implementation period, the Guangxi Nanning Water Co., Ltd. will prepare, before September 30 each year, annual financial projections for the following years for discussions with the World Bank.

b) *Wastewater Tariffs:* The Nanning Municipality will ensure that during the implementation period the Guangxi Nanning Water Co., Ltd. will earn operating and non-operating revenues sufficient to cover its operation and maintenance costs (including depreciation charges), and any amount by which annual debt service payments exceed annual depreciation charges.

I. STRATEGIC CONTEXT AND RATIONALE

A. Country and sector issues

1. The Guangxi Zhuang Autonomous Region (Guangxi), located in the south of China, is historically one of the poorest areas in the country due in large part to the infertility of the surrounding karst hills, low levels of infrastructure, and restrictions imposed as a result of frontier issues with a neighboring country. However, the region has seen substantial growth in the last decade, driven by investments relating to development of manufacturing centers in neighboring Guangdong Province and growing trade with the ASEAN countries, as well as by the growth of tourism industries in renowned scenic areas such as Guilin in the north of the region.

2. The capital of Guangxi, Nanning, has been benefiting from this growth. Average GDP per capita grew from RMB 6,331 in 1995 to RMB 15,685 in 2007, as compared to the national average GDP per capita of RMB 18,934. The capital's population increased from 2.7 million in 1995 to 6.8 million in 2007, and is expected to grow to 7.8 million by 2020. While receiving international praise for environmentally sensible development of the city, in the face of such growth Nanning needs to keep up with environment management challenges including the degradation of water bodies. Seventeen of eighteen tributaries to the Yongjiang River, the primary water body flowing through the central urban districts of Nanning, have degraded to below Class V². Only one tributary, which had been rehabilitated under the previous IBRD-financed Guangxi Urban Environment Project, remains at Class IV.

3. The municipality is divided into 12 sections: 6 urban districts forming the urban center, surrounded by 6 counties. In the five project "county-seat towns" (the capitals of counties), populations are expected to increase from about 300,000 in 2006 to over 500,000 by 2015. Water quality of the streams in these county-seat towns is preserved at Class III for now, but the rapid growth will pose tremendous challenges to water quality management.

4. The major sources of pollution in the central urban districts of Nanning are urban wastewater (about 51 percent of the total wastewater volume generated), non-point sources (34 percent) and industrial pollution (15 percent). In the county-seat towns, over 90 percent of wastewater is generated from domestic water use.

5. In the central urban districts, urban wastewater is collected and treated in two systems. One of the largest is the Jiangnan system, which will treat 44 percent of the total urban wastewater. None of the five project county-seat towns has any wastewater collection and treatment systems; hence it is critical to develop wastewater treatment systems in these towns. Furthermore, an integrated mini-river basin management approach is required to help develop action plans to address non-point sources since industrial pollution control measures had already been developed under the previous IBRD-financed project.

² China's surface water quality standards are presented in Annex 2.

B. Rational for Bank involvement

6. The project is a continuation of the Bank's engagement with the province and would be the second of the phased programs for urban environmental management, following up on the Guangxi Urban Environment Project (GUEP, IBRD-4348-CN and IDA-3097-CN), which financed wastewater and river rehabilitation in Nanning, among other activities. Since the project is partly a repeater with a client familiar with Bank policies, it would deepen benefits of the first investments. Further, the project includes the development of innovative integrated mini-river basin management approaches which can substantially strengthen the regulatory and management capacity of the local institutions.

7. The project would complement three other on-going projects in the region: the Fourth Inland Waterways Project (IBRD-4728-CN), which upgrades river navigation conditions and generates hydropower in the area; the Liuzhou Environment Management Project (IBRD-4781-CN), which is improving wastewater treatment, industrial pollution control, municipal sanitation and solid waste services in Liuzhou; and the Guangxi Integrated Forestry Development and Conservation Project (IBRD 4844-CN), which focuses on forest resources and biodiversity conservation in the region.

8. The effects of the global financial crisis on China were partially addressed in November 2008 with the announcement of a major fiscal stimulus package. The proposed project is closely integrated with accelerated investments in the infrastructure projects planned as part of the stimulus in Nanning.

C. Higher level objectives to which the project contributes

9. The project addresses one of the key strategic pillars in the Bank's Country Partnership Strategy for China (Report No. 35435 dated May 23, 2006): To manage resource scarcity and environmental challenges by expanding urban wastewater collection and treatment facilities and solid waste management services, and piloting innovative approaches to natural resource management, which are also consistent with China's 11th Five-Year Development Plan.

II. PROJECT DESCRIPTION

A. Lending instrument

10. The lending instrument is a Specific Investment Loan. The loan will be a variable spread loan, with a maturity of 25 years, including a 5-year grace period, and a front-end fee of 25 basis points.

B. Program objective and phases

11. Not applicable

C. Project development objective(s) and key indicators

12. The project development objective is to assist Nanning Municipality, in Guangxi Zhuang Autonomous Region, in arresting further deterioration of surface water quality in selected urban centers by expanding the coverage of wastewater treatment services, carrying out environmental rehabilitation of rivers, and improving the institutional and

regulatory capacities of the municipal agencies.

13. Annex 3 contains the detailed results monitoring framework. The key intermediate outcomes for the wastewater management component are increased access to wastewater system and removal of pollutants from wastewater. For the river rehabilitation component, the key intermediate outcome is the amount of pollution discharge prevented from flowing into rivers. For the technical assistance component, the key intermediate outcomes are revision of protection regulations; and a better understanding of hydraulic dynamics of the rivers. These intermediate outcomes have been defined in a way that can be aggregated to provide the project outcome indicators. Nanning Environment Protection Bureau will carry out monitoring of all the indicators relating to water quality, and the Guangxi Nanning Water Co., Ltd. (GNWC) will monitor the service coverage of wastewater and will report its own financial performance.

D. Project components

14. This project consists of three components. The total cost is US\$ 235.33 million³, including an IBRD loan of US\$ 100 million.

Component 1. Wastewater Management: (\$90.64 million, of which the IBRD loan is \$64.93 million)

(a) Expanding the treatment capacity of the existing Jiangnan Wastewater Treatment Plant from 240,000m³/day to 480,000 m³/day to reduce the discharge of untreated sewage into the Yongjiang River.

(b) Establishing wastewater treatment facilities in the Counties of Wuming, Binyang, Hengxian, Shanglin, and Mashan, including: the rehabilitation and/or installation of primary and secondary sewers; installation of sewage lift pump stations; and construction of wastewater treatment plants.

Component 2. River Rehabilitation: (\$105.71 million, of which the IBRD loan is \$32.77 million) Improving storm water drainage capacity and the environment of the Fenghuang River, Liangqing River and Lengtang River through various river improvement measures, including cleaning-up river courses, restoring detention ponds, enhancing embankments, and providing sewer interceptors.

Component 3. Technical Assistance: (\$2.05 million, of which the IBRD loan is \$2.05 million)

(a) Establish an integrated mini river basin management (“IMRBM”) system for a section of the Yongjiang River basin within the Nanning Municipality.

(b) Strengthen the Project management capability of Nanning Project Management Office and the Project Companies through provision of: technical assistance, training and study tours.

15. Further details are included in Annex 4.

³ It includes contingencies and financial costs. See Annex 5.

E. Lessons learned and reflected in the project design

16. Serious scrutiny was given to the design parameters of the wastewater treatment facilities to avoid overestimates of demand, capacity, and costs, which have led to many cases of financially unsustainable utility operations and underutilization of loans in China. Early in the design phase, relations between baseline analysis and design assumptions were clarified. Feasibility studies were modified based on analysis of the current service coverage and standards in reality, and reasonable projections for future service requirements. Following suggestions from the task team, the client downsized the capacity of the proposed sewage treatment plant in Shanglin County from 10,000 m³ per day to 6,000 m³, and the ones in Binyang and Hexian Counties from 30,000 m³ to 20,000 m³ per day.

17. The predecessor project (GUEP) experienced a prolonged implementation period of almost 10 years, largely due to a 3-year delay in completion of detailed designs and procurement processing⁴. This delay was largely solved by several of the current municipal officials in the PMO, who will be retained in the PMO during implementation of the proposed project. Furthermore, the design process has been streamlined compared to GUEP, with the key design parameters of treatment systems agreed to prior to Appraisal, and the Design Institutes able to initiate detailed design work after domestic approval of feasibility studies.

18. There is a critical need to develop an integrated river basin management (IRBM) approach for many major water bodies in China, given the many highly visible cases of failures in achieving their environmental protection. IRBM is a process to coordinate development, management, and conservation of water, land, and related resources across sectors within a river basin in order to maximize the economic and social benefits in an equitable manner while preserving ecosystems. It integrates all aspects of activities in a holistic manner so that the planning and implementation of sector programs are well-coordinated and are pointed at achieving sustainable protection and development of the river basin area. The IRBM has been endorsed by the Ministry of Environmental Protection of China, as well as by two recent global reports: the International Lake Environment Committee's 2005 report entitled "Managing Lakes and their Basins for Sustainable Use," and the Bank's "Lessons for Managing Lake Basins for Sustainable Use" (report No. 32877).

19. The project also intends to operationalize lessons from recent other sector works, such as "Stepping Up: Improving the Performance of China's Urban Water Utilities," and the "China Urban Portfolio Review." Specifically, the "Stepping Up" report illustrated the need for realistic tariff increases. The "China Urban Portfolio Review" points to the need for mitigation of over-estimation of demand and excess design capacity.

F. Alternatives considered and reasons for rejection

20. Alternative locations of WWTPs were considered from a topographic criteria leading to final proposals where the collected wastewater can flow by gravity to avoid the

⁴ ICR (0000873), Guangxi Urban Environment Project

costs of pumping stations and pumping. Land availability and distance to possible outlets to the river were also considered.

21. The use of design-build-operate (DBO) or turnkey contracts (TC) has been rejected, as their use was not deemed integral to project success and the conditions do not yet exist in China to successfully implement these contracts. Specifically, the quality of project design was deemed high enough that DBO procurement was not needed to ensure high-quality design. The Chinese government does not have pre-approved standard bid documents or contracts for DBO or turn-key contracts, so custom documents would be needed, requiring significant preparation time.

22. The original proposals for the river component included significantly more widening of the river cross-section and the enlargement of storage ponds used as regulating lakes, following requirements of the master development plan of the municipality. These interventions were rejected because: a) they were developed with insufficient attention to hydraulic implications; b) it was unclear whether the investments would contribute to improvement of water quality; c) they would require a large scale excavation and alteration of river courses; d) they would cause higher river operational costs and technical difficulties in operating the river drainage system; and e) they would needlessly increase resettlement requirements. In addition, it is agreed that experts would be placed for design optimization of the river rehabilitation component under the project management consultant services.

23. The alternatives – with different combinations of forced drainage with pump station and increase of regulating capacity along the rivers – were analyzed to determine the better solution with the lowest capital investment and operational costs. The lowest cost solutions were adopted for the structure design, the river course cleaning up and erosion control measures. Furthermore, selection of the environment friendly materials for the embankment and selection of local species for the plantation are adopted as a design principle.

III. IMPLEMENTATION

A. Partnership arrangements (if applicable)

24. The proposed project is currently freestanding and does not have other international co-financiers.

B. Institutional and implementation arrangements

Implementation responsibilities

25. The project will be primarily managed by the Nanning Municipal Government, and its utility or investment companies. The Nanning Municipal Project Management Office (NPMO), located in the Nanning Development and Reform Committee (NNDRC), will be the executing agency for the project and assumes responsibility for overall project coordination and interaction with the Bank. It will provide quality control in planning and construction, as necessary, as well as handling of disbursement applications. The Nanning Finance Bureau will manage the Special Account through the Guangxi Zhuang

Autonomous Regional Finance Bureau. For the wastewater components, the wastewater utility company, the Guangxi Nanning Water Co., Ltd. (GNWC), is the implementation agency (IA). For the river environment management components, the IAs are the Nanning Xiangsihu Investment & Constructions Company Ltd., and the Nanning Communication and Water Conservancy Investment Company Ltd. The implementing agencies are responsible for engineering design and construction supervision, procurement and contract management, disbursement, implementation of safeguard and fiduciary measures, and monitoring and reporting.

On-lending arrangements

26. The proposed loan of \$100 million will be made to the People's Republic of China, which in turn will make the loan proceeds available through Guangxi Autonomous Region, to the project municipality, on the same terms and conditions as the Bank loan to China. For wastewater components, these proceeds will be on-lent to the wastewater utility company under utility subsidiary loan agreements with a 25-year maturity, including a 5-year grace period. For the river environment components, these proceeds will be managed by IAs under subsidiary agency agreements without on-lending arrangements. The foreign exchange risk will be borne by the wastewater utility company or the Municipal Government. (Annex 6 provides details of implementation arrangements and a description of the capacities of agencies.)

Learning and Knowledge Dissemination

27. Lessons from this operation would be shared at mayors' conferences organized by the Ministry of Construction. Implementation experiences of Bank projects are regularly shared at occasional conferences led by the National Development Commission and through the network of World Bank Project Management Offices of local governments.

C. Monitoring and evaluation of outcomes/results

28. The main outcome indicators and the principle results indicators are described in Annex 3. The NPMO will coordinate collection of the data required for monitoring and evaluation for consolidated reporting to the Bank.

D. Sustainability

29. The municipal government has previous experience with managing Bank-funded projects, including the GUEP. The implementing agency for the wastewater management component is the Guangxi Nanning Water Co., Ltd., which implemented construction of the first phase of the Jiangnan WWTP under the Guangxi UEP. In 2006, based on the operational performance of the Langdong WWTP, the other WWTP in the central urban districts, the company was awarded a "Class A Qualification for Operation of Environmental Protection Facilities" by the Ministry of Environment Protection. Sustainability of river rehabilitation component is discussed in the paragraph 22 of Section II-F.

30. GNWC is already operating with strong cash flow and the proposed tariff revisions will be adequate to make the wastewater components financially sustainable.

The structure of tariff levies makes the actual effective rate of wastewater tariffs higher than those adopted in many other municipalities in China.

E. Critical risks and possible controversial aspects

Potential Risk to Project Objectives	Risk Mitigation Measures	Risk Rating with Mitigation*
<i>To project development objectives</i>		
<p>Prolonged implementation due to :</p> <p>(i) slow development of implementation capacity at PMO;</p> <p>(ii) protracted discussion on size and treatment standards of treatment plants;</p> <p>(iii) slow development of detailed design by Design Institutes;</p> <p>(iv) lengthy preparation of and approval processes for new turn-key contracts and ICB equipment procurements;</p> <p>(v) complexity of resettlement relating to river rehabilitation. (ICR 0000873)</p>	<p>(i) Several of the current municipal officials who had implemented the previous project will be retained in the PMO for the next several years. A technical assistance subcomponent is included in the project with a focus on project management (M).</p> <p>(ii) Key design parameters of treatment systems have been agreed to during preparation. The municipality has already agreed to downsize three of the proposed WWTPs, following the task team's earlier advice (L).</p> <p>(iii) Design Institutes will be able to initiate detailed design work right after domestic approval of feasibility studies as the implementing agency has funds at hand to pay for their services (L).</p> <p>(iv) The problems associated with turn-key contract were mainly related to the qualifications of the winning bidder. To avoid delays in implementation, turn-key contract will not be adopted under this project. (L).</p> <p>(v) Resettlement requirements under the river component have been significantly downsized: but will remain moderately large. (M).</p>	<p>(i): Modest (ii): Low (iii): Low (iv): Low (v): Modest</p>
<p>Low sustainability of wastewater treatment operations due to compromises in construction quality, arising from lack of price escalation clauses in short-term civil work contracts for less than 15 months, which is commonly used in China (ICR000873).</p>	<ul style="list-style-type: none"> • Appropriate contract duration and types will be agreed to for the major civil work components. • Sudden price hikes in civil works are not envisaged because of substantial price reduction in heavy equipment leases, which account for the major portion of civil work costs, and slower growth in the domestic economy due to global economic down-turn. 	<p>Low</p>
<i>To component results</i>		
<p>Lack of improvement in water quality due to weak control of non-point pollution and industrial pollution (ICR000873)</p>	<ul style="list-style-type: none"> • Introduction of integrated mini-river basin management will addresses non-point pollution action plans. The municipality does not have industrial base in the central urban districts of the basin. The only industries – sugar cane 	<p>Modest</p>

	factories and paper mills – have already implemented pollution abatement programs under the previous program.	
Overall Risk Rating		Modest

* Probability that an outcome will not be achieved: High >75%; Substantial >50%; Modest >25%; Low <25%

F. Non-standard loan conditions and covenants

Loan effectiveness: None

Implementation Covenant:

31. Nanning shall: (a) maintain the Municipal Project Management Office with terms of reference, staffing and resources acceptable to the Bank; (b) implement and cause the Project Companies to implement the RAP and EMP; (c) prepare and implement resettlement action plans in accordance with the Resettlement Policy Framework in regard to the Linked Projects; and (d) monitor and evaluate the implementation of the RAP, EMP and the Resettlement Policy Framework, and furnish to the Bank semi-annual reports on the results of said monitoring and evaluation.

Disbursement Conditions:

32. **Utility Subsidiary Loan Agreements:** The wastewater utility company, the Guangxi Nanning Water Co., Ltd., will enter into utility subsidiary loan agreements with the Nanning Municipality as a condition of disbursement.

33. **Subsidiary Agency Agreements:** The companies in charge of river environment components, the Nanning Xiangsihu Investment & Constructions Company, Ltd., and the Nanning Communication and Water Conservancy Investment Company, Ltd., will enter into subsidiary agency agreements with the Nanning Municipality as a condition of disbursement.

Subsidiary Loan Agreement

34. The Subsidiary Loan Agreement will include, inter alia, the following provisions:

35. **Financial Projections:** During the project implementation period, the GNWC will prepare, before September 30 each year, annual financial projections for the following years for discussions with the World Bank.

36. **Wastewater Tariffs:** The Nanning Municipality will ensure that during the implementation period the GNWC will earn operating and non-operating revenues sufficient to cover its operation and maintenance costs (including depreciation charges), and any amount by which annual debt service payments exceed annual depreciation charges.

IV. APPRAISAL SUMMARY

A. Economic and Financial Analyses

Economic Analysis

37. Economic Analysis was carried out for the wastewater management and river rehabilitation components based on: (i) the least-cost methodology and (ii) quantification of benefits. Also, as a floor for the economic rate of return of the wastewater management component, its financial rate of return is reviewed. In addition, economic analyses of a comparable project are referred to. All the analyses indicate that the economic benefits exceed the investment and operation costs of the Project.

38. The least-cost analysis has demonstrated that the designs of the proposed wastewater and river rehabilitation components are based on a sound strategic rationale to achieve overall objectives, and that these objectives would be met in the most cost-effective way. The main benefits of the river rehabilitation and the wastewater components are appreciation of land values and reduction in property damages from flooding. The quantitative analysis shows that the benefits will exceed the capital expenditures and the cost of operation. For the wastewater components, the financial rate of return represents a floor for the economic return. The analysis shows that the economic return will be not lower than around 6 percent. In addition, results of comparative cost-benefit economic analyses provide very robust rates of return: 20 percent for a wastewater component and 18 percent for river rehabilitation⁵. They were carried out in 2007 with comprehensive contingent valuation survey methods for very similar wastewater and river rehabilitation projects for county towns in another province of China.

Financial Analysis

39. Financial analysis was carried out for the water supply and wastewater operations of the GNWC, which will take charge of all the water supply and wastewater operations in the central districts of Nanning City, and the new wastewater collection and treatment operations in the five county-seat towns. The analysis indicates that all the investments, operation and maintenance will be financially sustainable with projected tariff revenues, proposed capital structure and expected operational efficiency.

40. The current water supply tariffs for the central districts and county towns were introduced in 2005/2006, and are in a range from RMB 1.05/m³ to RMB 3.60/m³. The first wastewater tariff of RMB 0.13/m³ was introduced for the central districts in 1997 along with construction of the Jiangnan WWTP, which was financed under the GUEP. In October 2008 the current tariff of RMB 0.80/m³ was introduced for the entire Nanning City, including the central districts and county towns. The water supply and wastewater tariffs are expected to be revised on a regular basis at least every three years (more details of future water tariffs are included in Annex 9). An affordability analysis was conducted which demonstrates that current and projected tariffs are fully affordable for all residents in the Nanning Municipality.

⁵ Yunnan Urban Environment Project (Report No.41199-CN)

41. The company's annual total revenue from its water supply and wastewater operations will increase from RMB 400 million in 2008 to RMB 725 million in 2018 because of the increase in service volume and tariff revisions. During the period of financial projections, the company is expected to maintain strong cash flow from operations, given its well-proven efficiency in operations and its ability to manage its liquidity. Although the company would continue to carry debt obligations from the past and proposed IBRD loans and commercial bank loans, its capital structure will remain sound. Projections of income statements, balance sheets and cash flow statements are presented Annex 9. The tariff collection rate in Nanning is quite high, at over 95 percent. In the central districts, both water supply and wastewater tariffs are billed and collected by the GNWC. In the county towns, billing and collection of wastewater tariffs are carried out by the water companies of the county-seat towns and are passed on to the GNWC, which operates the wastewater collection and treatment.

Fiscal Analysis

42. The municipal fiscal analysis shows that the Nanning Municipality has sufficient financial resources to be able to afford the project. It is estimated that municipal counterpart funding from the municipal fiscal budgets constitutes just a minor part of the annual capital expenditures.

B. Technical

43. ***Wastewater Treatment:*** All cities and towns are required by domestic regulations to meet at least the Grade 1B of the Municipal Wastewater Discharge Standards. The processes that have been evaluated under this project are: (i) oxidation ditches; (ii) sequencing batch reactors; (iii) aeration biological tanks; (iv) stabilization ponds; (v) artificial wetlands; (vi) slow sand filters; and (vii) overland filters. Based on the comparison of the above-mentioned processes, the treatment technology proposed under the project is a variation of the sequencing batch reactor (SBR) process. The SBR will satisfy the following considerations: smaller land occupation and compact layout of the reaction tank compartments; capacity to remove biological nutrients; ability to produce high quality effluent; minimization of costs for civil works and operation; stable effluent quality; high efficiency of treatment; and experience in construction and operation of SBR throughout China.

44. ***River Rehabilitation:*** Alternatives were analyzed to determine the best solution with the lowest capital investment and operational costs, and are described in Section II.F. In addition to adopting a further design review and optimization, the agreement had also been reached on having more realistic implementation schedule with due consideration to the proper implementation of the Resettlement Action Plan (RAP) and proper disposal of materials removed from the rivers while no toxic materials are detected according to the EA.

C. Fiduciary

Financial Management

45. A financial management assessment has been conducted by the Bank in accordance with guidelines issued by the Financial Management Sector Board dated November 3, 2005. The Project will meet the minimum Bank financial management requirements, as stipulated in OP/BP 10.02. The Project has adequate financial management arrangement acceptable to the Bank and, as part of the overall arrangements that the borrower has in place for implementing the operation, provide reasonable assurance that the proceeds of the loan will be used for the purposes for which the loan is granted. Taking into account the risk mitigation measures proposed under the project, a “low” FM risk rating is assigned. See Annex 7 for details.

Procurement

46. An assessment of the implementing agencies’ procurement capacity concluded that the overall risk of the procurement process is average. Agencies at all levels have allocated adequate resources, including experienced staff, to implement the project. The agencies are familiar with Bank procurement guidelines, either through previous or ongoing Bank-financed projects or training provided by the Bank. Procurement for this Project will be carried out in accordance with the World Bank's *Guidelines: Procurement under IBRD and IDA Credits*, May 2004, as revised October 2006 (the Procurement Guidelines) and *Guidelines: the Selection and Employment of Consultants by the World Bank Borrowers*, May 2004, as revised October 2006 (the Consultant Guidelines) and the provisions stipulated in the Loan Agreement. See Annex 8 for details.

D. Social

47. ***Social assessment:*** The project will have significant positive social benefits as it improves the quality of the urban environment, infrastructure and flood control facilities and thereby enhances the livability of the project areas. Meanwhile, some social risks will be associated with implementation of the project, for instance, the low ability among a small number of vulnerable groups to afford the costs of improved environmental services. Based on the findings of social assessment, local governments might enhance existing domestic low-income assistance programs.

48. ***Land acquisition and resettlement:*** The major adverse impacts are related to the need for land acquisition and involuntary resettlement. Efforts have been made to minimize the resettlement impacts during project planning and design, and the resettlement impacts have been significantly reduced through optimizing the project design and implementation arrangements. The resettlement impacts include 1.35 km² of permanent land acquisition and demolishing of 3,039 m² of rural houses, 20,787 m² of community business structures, 8,449 m² of privately owned small shops, and 2801m² of enterprise structures. The resettlement impacts scattered in 15 villages of 7 townships. The project will affect 7,191 people, of whom, (i) 6,415 people are affected by permanent acquisition of the collective land; (ii) 199 people are affected by demolition of rural residential houses; and (iii) 878 people are affected by temporary land use

49. The RAPs were prepared in compliance with OP 4.12 Involuntary Resettlement and relevant domestic policies and describe in detail the impacts, affected populations, consultation process, rehabilitation measures, budget, and implementation and monitoring arrangements.

50. Resettlement linkage issues were carefully assessed. The linked projects, as per OP 4.12, will include 1) embankment of upstream Fenghuang River; 2) the dyke and pumping station associated with Liangqing and Lengtang Rivers; and 3) four landfills for disposal of wastewater sludge. Details of agreed actions are provided in Annex 10.

51. **Indigenous People:** The Zhuang minority is a majority in the project area. Free, prior and informed consultation was carried out during project preparation as part of the social assessment. It found that all minority communities are supportive of the project. Guangxi is a Zhuang Autonomous Region, where policies are firmly in place to guarantee freedom of the indigenous populations to maintain their cultural customs, manage local natural resources, arrange economic activities, and enjoy equal rights. No Indigenous People's Plan (IPP) was required since the majority of the project beneficiaries are Zhuang.

52. **Information disclosure:** Draft English versions of the Social Assessments and Resettlement Action Plan were submitted to the Bank and were disclosed in the InfoShop in April 2009. Draft RAPs were disclosed locally in January 2009 and updated versions in April 2009. Finally revised RAPs were disclosed in the InfoShop in November 2009.

E. Environment

53. The Project is classified as a "Category A" project. Environment Assessment (EA) reports were prepared in accordance with national requirements and the Bank's OP/BP/GP 4.01. The reports include an (i) EA summary, (ii) consolidated EA (CEA), and (iii) Environment Management Plan (EMP).

54. The EAs cover baseline information on environmental and socio-economic conditions. They also describe alternatives considered as part of feasibility studies for each component. The overall environmental impact of the project is positive. However, some negative impacts may arise during project implementation, such as negative but limited impacts on soil, air, water, acoustic environments, and surrounding communities, mainly during construction. These impacts will be temporary and localized, and proper mitigation measures during construction can minimize or even eliminate them. Preventive measures during the construction and operation phases were prepared and are noted in the EMP.

55. Two stages of public consultations were conducted for residents and those affected by the proposed project. The consultations took many forms: expert consultations, questionnaires, symposia, interviews and public hearings. The majority of those consulted expressed strong support for the project, and acceptance of short-term inconveniences during the construction phase, such as noise and dust. They were, overall,

supportive of measures to improve municipal wastewater treatment capacity, and river rehabilitation components.

56. Information about the project was disclosed through major local newspapers from November 2007 to November 2008. Telephone hotlines were established for the public to access relevant documents and offer comments. Disclosure of EAs was announced in Nanning Daily on November 13, 2008, and EAs were made available at the PMO, Project Implementing Units (PIUs), public libraries, and on websites. The Chinese version of the CEA/EMP and EA Summary were disclosed by Nanning Daily on April 16 2009, and the English version of the CEA/EMP and EA Summary were submitted to the Bank and disclosed through the InfoShop on April 23, 2009. Final revised English versions of those EA documents were disclosed in the InfoShop in November 2009.

F. Safeguard Policies

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP/BP 4.01)	[✓]	[]
Natural Habitats (OP/BP 4.04)	[]	[✓]
Pest Management (OP 4.09)	[]	[✓]
Physical Cultural Resources (OP/BP 4.11)	[]	[✓]
Involuntary Resettlement (OP/BP 4.12)	[✓]	[]
Indigenous Peoples (OP/BP 4.10)	[✓ *]	[]
Forests (OP/BP 4.36)	[]	[✓]
Safety of Dams (OP/BP 4.37)	[]	[✓]
Projects in Disputed Areas (OP/BP 7.60)	[]	[✓]
Projects on International Waterways (OP/BP 7.50)	[]	[✓]

*As described in Section D.4, "Social", no IPP was required

G. Policy Exceptions and Readiness

57. The Safeguard Policy on Resettlement, OP 4.12, and the Safeguard Policy on Environment Assessment, OP 4.01, require the Borrower to prepare RAPs and EA reports in a form, manner and language that are understandable to the displaced persons and local NGOs, which in this case would be Chinese. The Chinese language RAPs and EA reports for the subprojects have been reviewed by the Bank, meet the requirements of OP 4.12 on involuntary resettlement and OP 4.01 on environmental assessment, and have been publicly disclosed. An English language comprehensive summary of the RAPs and an English language comprehensive summary of the EA reports have also been prepared, reviewed and disclosed through the Bank's InfoShop.

58. Bank experience over the years has established the general practice of requesting the Borrower to provide the Bank also with the entire RAP and EA reports in English. In April 2007, Bank senior management endorsed "Guidelines for the use of English Translation of Summaries of Environmental Assessment Reports and Resettlement Action Plans in China Projects" which allowed the creation of English language comprehensive summaries of RAPs and EA reports for projects that meet certain criteria. The Regional Safeguards Secretariat has confirmed that the proposed project meets the criteria. Accordingly, English language comprehensive summaries of the RAPs and EA

reports covering all relevant parts of the Chinese-language EA reports and RAPs were created. Chinese-speaking Bank safeguard specialists have reviewed the English language comprehensive summaries of the RAPs and EA reports as well as the Chinese-language full-length safeguard documentation that had been approved and adopted by the Project Implementing Agencies, and have confirmed the consistency between the English and Chinese documentation and compliance of full set of safeguards documents with Bank policy.

Annex 1: Country and Sector Background

CHINA: Nanning Urban Environment Project

1. The city of Nanning is the capital of the Guangxi Zhuang Autonomous Region (Guangxi), historically one of the poorest areas in China due in large part to the infertility of the surrounding hills, low levels of infrastructure, and restrictions imposed as a result of frontier issues with Vietnam lasting from the 1960s through 1990. The past decade, however, has seen substantial growth in Nanning, driven by investments relating to development of manufacturing centers in neighboring Guangdong Province and growing trade with ASEAN countries, as well as by the growth of tourism industries in renowned scenic areas such as Guilin in the north of the region. Average GDP per capita grew in Nanning from RMB 6,331 in 1995 to RMB 15,685 in 2007, as compared to the national average GDP per capita of RMB 18,393. Nanning's population increased from 2.7 million in 1995 to 6.8 million in 2007, and is expected to grow to 7.8 million by 2020. Key economic activities in Nanning include food processing, electronics, machinery, chemical industry, paper making, and construction supplies. The Chinese government has recently placed a strong emphasis on development in Guangxi, largely because of (i) the current focus on the rapid urbanization of mid-size cities; (ii) the strategic location due to the shared border with Vietnam; and (iii) the large minority Zhuang population. This focus helped Nanning win an award as the national Livable City (Model City for Excellence in Water and Environment Improvement) in 2006, and the UN Livable City in 2007. Nanning was also cited by the World Bank as a model for other Chinese cities to follow, at the International Water Association Conference held in Beijing in September 2006.

2. The central urban districts of Nanning reside in a basin with the Yongjiang River creating a river valley through the center of the urban areas. The basin is formed by hills to the south and mountains, including the Qingxiu Mountain to the southeast and a northern arch of mountains starting with the Fenghuang Mountain to the west. This urban center, an area of 6,476 km², has a humid subtropical climate, earning itself a large amount of biodiversity and the name "Green City" for its abundant foliage. The Nanning City jurisdiction encompasses six urban districts (Xingning, Qingxiu, Jangnan, Xi Xiangtang, Liangqing and Yongning) and six counties (Wuming, Mashan, Shanglin, Binyang, Hengxian and Long'an) with a total population of about 6.8 million in 2007. The urban districts population of Nanning is about 2.5 million, including 1.5 million living in Nanning's core urban area, while 4.3 million is the total population of the counties.

3. In the five targeted county-seat towns (capitals of the counties located outside of the central urban districts), their 11th five-year development plans indicate that their populations are expected to increase from about 300,000 in 2006 to over 500,000 by 2015, composed of 130,000 in Wuming County, 130,000 in Binyang County, 139,000 in Heng County, 55,000 in Shanglin County, and 51,000 in Mashan County. The water quality of streams in these county towns is reasonably preserved at Class III for now, but this rapid growth will pose tremendous challenges to water quality management.

Urbanizing county-seat towns represent a major share of China's growing urban system. The number of designated towns (of all population sizes) in China grew from under 3,000 in 1980 to about 11,000 in 1990 and to 20,600 in 2002. The dramatic growth of towns was a result of a pro-town national growth policy during the 1980s. With the transition of the economy to a market mode, and migration to major metropolitan areas being actively encouraged as a solution to rural poverty, many of these towns either have to become competitive or decline. Poorly located small towns are losing population, having previously relied on now-defunct state-owned enterprises. At the same time, large towns, county capitals, and those towns close to major cities experienced growth. The capital towns of counties, which are semi-urban in nature, play significant roles in urban growth by absorbing rural populations and generating employment opportunities in agricultural processing, natural resource-based manufacturing, tourism, logistical services, and trading. Particularly in the counties surrounding provincial or regional capitals, the towns represent a buffer between the rural areas and the highly urbanized areas. In many parts of China, including Nanning, these towns still lag far behind the major cities in terms of basic urban infrastructure.

Wastewater Sector of Nanning

4. The service area for water supply and sewerage is currently 180 km² with a population of about 2.9 million. The designed capacity for water supply is 1.27 million m³/day with actual provision from 900,000 to 1,000,000 m³/day. The urban districts of Nanning are provided with an existing blend of combined and separate drainage systems. The sewerage system of the urban districts of Nanning is hydraulically divided into 17 catchment areas, of which eight are the catchment areas encompassed in the core urban area of the city. Specifically, on the north side of the Yong River are the: (i) Chaoyang Stream and Er'keng Catchment Area; (ii) Xixiang Stream Catchment Area; (iii) Nanhu Lake and Zhupai Stream Catchment Area; (iv) Luolai Catchment Area; and (v) Feng Ling Catchment Area. On the south side of the Yongjiang River are the (i) Jiangnan Catchment Area; (ii) Shangjin Catchment Area; and (iii) Xiang Sihui Catchment Area in the new development zone.

5. In the future, in accordance with the drainage master plan, the core urban area of Nanning City will be hydraulically organized into five catchment areas. The Nanhu Lake and Zuphai Stream Catchment area will be served by the Langdong WWTP, while the remaining areas will be served by Jiangnan WWTP. The current sewer pipe system provides a coverage rate that ranges among different catchment areas between 52 percent and 83 percent. The waste collected in the catchment areas is discharged, for the most part untreated, directly into the Yongjiang River and/or into the numerous existing streams, canals and ponds which convey the sewage into the same river.

6. An existing treatment capacity is provided through the operation of two facilities: (i) Langdong WWTP, with a designed treatment capacity of 200,000 m³/day completed in two phases and is currently operating at 60 percent of its full capacity; and (ii) Jiangnan WWTP, which has completed its first phase and is operating at the limit of its full capability of 240,000 m³/day. Three more phases are planned for Jiangnan WWTP to

increase its capacity up to 960,000 m³/day. The two facilities currently treat 52 percent of the total sewage volume of 643,000 m³ generated daily in the urban districts.

7. The major sources of pollution in the central urban districts of Nanning are urban wastewater (about 51 percent of the total wastewater volume generated), non-point sources (34 percent) and industrial pollution (15 percent). In the county-seat towns, over 90 percent of wastewater is generated from domestic water use.

8. The GUEP played a significant role in establishing the current wastewater sector in Nanning. The project financed the first stage of the Jiangnan WWTP, the first such plant in Nanning. The Jiangnan WWTP was originally designed as a multi-stage process, with the second stage able to double the capacity of the plant, to 480,000 m³/day. The GUEP also expanded the sewer and storm drainage network, including about 67.5 km of trunk mains, collection sewers and storm drains. At the government level, the GUEP strengthened the Regional and Municipal Environmental Protection Bureaus (EPB) with training and equipment to enhance monitoring of industries and water bodies, including increasing the frequency of monitoring.

9. Of the six county-seat towns in the Nanning District, five—Wuming, Binyang, Hengxian, Shanglin, Mashan—were selected for the project. The sixth county-seat town, Long'an, already has a state-financed wastewater project under way. The five county-seat towns included in the project are served by combined systems in disrepair, providing only limited coverage to the towns. No treatment facilities are present in the counties, so untreated sewage is discharged uncontrolled into streams, open ditches and canals within the urban areas, introducing a serious threat to the public health.

River management in Nanning

10. There are 18 rivers, as listed in the following table, serving as the storm-water discharge canals inside Nanning city proper and pouring into the Yongjiang River, one of the main tributaries of the Pearl River. Following the development and expansion of the city, the rivers also serve as wastewater discharge canals. The table below summarizes the conditions of the water quality in the rivers.

Name of River	Length , in km	Catchments Area, km ²	Water Quality	Grade of River*	Remarks	
					Location	Works Funded
01. Shiling River	10.93	35.33	Worse than V	G4		
02. Shifu River	7.52	9.00	Worse than V	G5		
03. Ximing River	13.90	33.61	Worse than V	G4		
04. Keli River	32.13	66.00	Worse than V	G4	North of the Yongjiang River	ABD Funded Domestic Funded The WB Funded JBIC Funded
05. Xinyu River	29.25	132.00	Worse than V	G3		
06. Er'keng Creek		11.00	Worse than V	G4		
07. Chaoyang Creek	13.75	25.24	IV	G4		
08. Zhupaichong River	33.50	117.00	Worse than V	G3		
09. Naping River	36.29	151.30	Worse than V	G3		
10. Sitang River	59.14	762.42	Worse than V	G3		
11. Da'anrong River	26.00	88.50	Worse than V	G4	South of the	
12. Machao River	19.10	60.86	Worse than V	G4		

Name of River	Length , in km	Catchments Area, km ²	Water Quality	Grade of River*	Remarks	
					Location	Works Funded
<u>13. Fenghuang River</u>	<u>16.75</u>	<u>25.05</u>	<u>Worse than V</u>	<u>G4</u>	Yongjiang River	<u>Project Component</u>
14. Tingzhichong River	4.50	7.96	Worse than V	G5		Planned to be carried out with local funds
15. Liangfeng River	83.00	25.05	Worse than V	G3		
<u>16. Liangqing River</u>	<u>16.50</u>	<u>581.00</u>	<u>Worse than V</u>	<u>G4</u>		<u>Project Component</u>
<u>17. Lengtangchong River</u>	<u>8.94</u>	<u>28.20</u>	<u>Worse than V</u>	<u>G4</u>		<u>Project Component</u>
18. Bachi River	126.50	11.33	Worse than V	G2		

* The grade of the river presents the importance of the river in GoM's engineering aspects, i.e. the higher the grade the more important and higher the priority.

11. Since the late 1990s, the Nanning Municipal Government has taken actions to improve the environment along the river courses with the assistance of the World Bank, Asian Development Bank and Japan Bank for International Cooperation, as shown in the above table. In December 2005, the Nanning Renaissance and Design Institute of the Pearl River Commission (Guangxi) and the Nanning Planning and Design Institute jointly completed the *Planning Report for the River Course Improvement of Rivers inside Nanning City of the Guangxi Zhuang Autonomous Region*, under the guidance of the Nanning City Development Master Plan (2008 ~ 2020). The report defined the urban development principal as "Taking Yongjiang River as an axis, to expand the city toward both eastward and westward; improving the northern part and upgrade the southern part of the city, focusing on the southern part of the city." The following issues were identified: lower drainage capacity along the rivers due to poor/unsystematic planning and improper land use and development, which causes frequent water logging in the catchment; deterioration of water quality as a result of the discharge of rural and urban wastewater, due to domestic sources, animal husbandry, fertilizer use in farms, and industrial wastewater, as well as the lack of sewer and drainage facilities; and deterioration of the environment, including soil erosion, along city rivers due to human activities.

12. The Government of Nanning had prioritized urban expansion eastward and westward on the south side of the Yongjiang River, and river environmental improvement according to the priority set in the above table, i.e., the higher grade, the earlier the improvement. The highest prioritized rivers—the Fenghuang, Liangqing and Lengtangchong— were planned for improvement in the next phase that fit into the Bank project, in terms of timing and availability of funds. The institutional management system of the mini-river basin has been fragmented and there has been little coordination to achieve common goals. These deficiencies indirectly contribute to the worsening pollution of Nanning's small river tributaries. Basin-wide enforcement of related regulations and laws at the basin-wide areas of the 18 river tributaries is inadequate; this is because the Regulation in 2003 did not clearly specify the whole mini-river basin areas of the 18 tributaries and the municipal portion of the Yongjiang River as the controlling areas. Therefore, there is no river basin Master Plan recognized by all line-bureaus and district governments with trade-offs between social and economic development and ecological environment protection.

13. The Nanning Environment Protection Committee, the government line-bureaus and district governments do not have clear responsibilities and accountabilities for the pollution control of the 18 tributary river basins (the Committee was not included in the Regulations). The environment protection bureaus at both municipal and district levels do not have authority to drive necessary changes in river basin management across all the other line-bureaus and the district governments. Implementation rules are unclear as well. Other problems include the lack of an information and data sharing agreement among different government line-bureaus regarding the pollution data and hydrological data, as well as economic development data, or water quality monitoring systems. Furthermore, a participatory approach to involve all the water users and farmers in a complete basin is missing.

Annex 2: Major Related Projects Financed by the Bank and/or other Agencies

CHINA: Nanning Urban Environment Project

Project	Sector Issue	Delivery Date	Latest ISR Ratings	
			DO	IP
Bank Financed				
China – Chongqing Small Cities Infrastructure Improvement (Cr 47940)	Infrastructure service delivery and rapid urban growth	21-Jun-05	S	MS
China – GEF Guangdong/PRD Urban Environment (CTF53359)	Rationalization of environmental service delivery in the regional plan	8-Jun-04	MS	MS
China – GEF Guangxi Integrated Forestry Development and Conservation Project (TF 57753)	Biodiversity, environmental policies and institutions	14-Dec-06	S	S
China – GEF Ningbo Water and Environment Management (TF-56692)	Quality of water and wastewater services, public health protection			
China – Guangdong/PRD Urban Environment (Cr 47420)	Rationalization of environmental service delivery in the regional plan	8-Jun-04	MS	MS
China – Guangxi Highway (Cr 45410)	Infrastructure services for private sector development; municipal governance and institution building; rural services and infrastructure	28-Mar-00	S	S
China – Guangxi Integrated Forestry Development and Conservation Project (Cr 48440)	Biodiversity, environmental policies and institutions	14-Dec-06	S	S
China – Guangxi Urban Environment Project (Cr 43480)	Water resource management, waterway management, pollution management and environmental health	16-Jun-98	S	S
China – Hai Basin Integrated Water and Environment management (GEF)	Water resource management and pollution control	15-Apr-04	S	S
China – Hebei Urban Environment (Cr 45690)	Environmental degradation of water and land resources, safe water supply	27-Jun-00	S	S
China – Hunan Urban Development (Cr 47510)	Flood protection, wastewater and air pollution	16-Sep-04	U	U
China – Inland Waterways (Cr 39106)	Waterway management and rural non-farm income generation,	20-Jun-95	S	S

China – Inland Waterways Project IV (Cr 47280)	Rural services and infrastructure and water resource management	25-Mar-04	S	MS
China – Liuzhou Environment Management (Cr 47810)	Wastewater treatment, solid waste management	24-May-05	S	S
China – Ningbo Water and Environment Management (Cr 47700)	Quality of water and wastewater services, public health protection	17-Mar-05	S	S
China – Poor Rural Communities Development (Cr 73100)	Livelihood security, and rural poor participation	21-Jun-05	MU	MU
China – Rural Water IV (Cr 44850)	Safe water supply, sanitation and health behaviors in poor rural areas	3-Jun-99	S	S
China – Sustainable Coastal Resources Development Project (Cr 43220)	Water resource management	19-May-98	S	S
China – Tai Basin Urban Environment (Cr 47480)	Water resources degradation and urban environment improvement	3-Aug-04	S	S
China – Tarim Basin II (Cr 30930)	Irrigation; water resource and land management	9-Jun-98	HS	HS
China – Water Conservation (Cr 45890)	Irrigation, water resource management and farmer incomes	19-Dec-00	HS	HS
Other MDBs and Agencies				
Guangxi Nanning Urban Environmental Upgrading (ADB)	Infrastructure Development	N/A		
Nanning – Langdong WWTP, Phase I (French Government)	Infrastructure Development	N/A		
Henan Wastewater Management and Water Supply Project (ADB)	Wastewater mgt and water supply for public health and urban environment	N/A		
Private Sector Water Supply Project in China (ADB)	Safe water supply to urban residents	N/A	N/A	N/A
Guangxi Water Supply Project (JBIC)	Water supply, Infrastructure Development	N/A	N/A	N/A
Water and Agricultural Management in Hebei (WAMH) Project (AUSAID)	Water resources management in agriculture	N/A	N/A	N/A

Annex 3: Results Framework and Monitoring

CHINA: Nanning Urban Environment Project

Based on the overall strategic objectives and proposed project components, the following impact and outcome indicators are identified.

Project Development Objectives and Overall Impact

Project development objectives	Project outcome indicators	Use of project outcome information
To assist Nanning Municipality, in Guangxi Zhuang Autonomous Region, in arresting further deterioration of surface water quality in selected urban centers by expanding the coverage of wastewater treatment services, carrying out environmental rehabilitation of rivers, and improving the institutional and regulatory capacities of the municipal agencies.	<p>Reduce pollution discharge into surface water</p> <p>Percentage of population in participating areas of Nanning Municipality served by wastewater collection and treatment services.</p> <p>Development of strategic study on ecological water environment, and implementation of pollution control action plans.</p>	<p>To measure progress toward the PDO.</p> <p>To recommend planning adjustments for the client regarding future operations or investments.</p>
Intermediate outcomes	Intermediate outcome indicators	Use of intermediate outcome monitoring
I. Wastewater management for central districts and county-seat towns		
Increased access to wastewater system and reduction in water pollution	<p>Additional population served by expanded wastewater management service in participating areas.</p> <p>Amount of pollutants removed from wastewater (BOD, COD, TP, TN)</p>	To assess effectiveness of investments in WWT systems
Maintained sustainable financial performance of the water utility company	Percent of cash flow from wastewater operations covering capital investments and debt obligations relating to wastewater operations	To help local government further maintain pricing and subsidy policies and implementation for sustainable use.
Reduced pollution load of river courses	Amount of pollution discharge (TP, TN)	To assess effectiveness of investment in river rehabilitation
III. Technical Assistance		
Improved accountability, coordination and compliance/ enforcement measures for sustainable pollution control	<p>Revision of regulations for river pollution control</p> <p>Development of strategic study on improving water ecological environment of the Yongjiang River reach</p> <p>Development of pollution control action plans for Fenghuang River, Lianqing River and Lengtang River</p>	<p>To gauge sustained commitment of key policy makers and strengthen effectiveness of policy implementation</p> <p>To determine priorities and broader work programs for local agencies and authorities</p>

Nanning Urban Environment Project
Monitoring and Evaluation Indicators

Intermediate Outcome Indicator*		Baseline 2008	CY 2010	CY 2011	CY 2012	CY 2013	CY 2014	CY 2015
I. Integrated Urban Wastewater Treatment								
Annual Net Income (after tax) of wastewater operations of the Guangxi Nanning Water Co., Ltd. (RMB million)		134.1	251.8	259.3	345.1	355.4	366.1	377.1
A. 2nd Phase of Jiangnan Wastewater Treatment Plant								
Percentage of population in urban districts who have sewer connection		52.1%	59.2%	62.8%	66.4%	70.0%	73.5%	77.1%
Removal of BOD, COD, TP, and TN by Jiangnan WWTPs - Phases I and II (ton/year)		11836	17020	18920	21489	24294	27331	31451
		24565	35546	39622	45112	51118	57628	66445
TP		279	408	456	521	593	670	775
TN		893	1505	1781	2134	2530	2967	3544
B. Nanning Municipality County Towns								
1. Wuming County								
Percentage of county-seat town population who have sewer connection		0%	0%	50%	55%	62%	70%	75%
Removal of BOD, COD, TP, and TN by WTPP (ton/year)		0	0	1325	1609	2013	2563	2816
		0	0	2032	2428	3114	3981	4389
TP		0	0	24	29	36	47	51
TN		0	0	115	144	186	243	273
2. Binyang County								
Percentage of county-seat town population who have sewer connection		0%	0%	50%	58%	65%	68%	70%
Removal of BOD, COD, TP, and TN by WTPP (ton/year)		0	0	405	492	593	657	715
		0	0	730	889	1075	1196	1305
TP		0	0	8.9	10.9	13.2	14.7	16
TN		0	0	81	100	124	140	155

3. Hengxian County											
Percentage of county-seat town population who have sewer connection											
	0%	0%	50%	58%	65%	68%	70%				
Removal of BOD, COD, TP, and TN by WTPP (ton/year)	BOD	0	0	562	672	772	828	840			
	COD	0	0	807	964	1108	1188	1205			
	TP	0	0	8	10	11	12	12			
	TN	0	0	78	93	107	115	117			
4. Mashan County											
Percentage of county-seat town population who have sewer connection											
	0%	0%	50%	55%	60%	63%	65%				
Removal of BOD, COD, TP, and TN by WTPP (ton/year)	BOD	0	0	125	144	165	181	194			
	COD	0	0	218	252	290	319	344			
	TP	0	0	2	3	3	3	4			
	TN	0	0	20	24	28	32	35			
5. Shanglin County											
Percentage of county-seat town population who have sewer connection											
	0%	0%	50%	55%	60%	63%	65%				
Removal of BOD, COD, TP, and TN by WTPP (ton/year)	BOD	0	0	121	148	160	177	192			
	COD	0	0	210	258	282	312	340			
	TP	0	0	2	3	3	3	4			
	TN	0	0	19	24	27	31	35			
II. River Rehabilitation**											
A. River Rehabilitation of the Fenghuang River											
Reduction of TP/TN at discharge point (ton/year)	TP (57.5) (2009 level)	0	0	25	25	33	33	50			
	TN (167.7) (2009 level)	0	0	66	66	88	88	132			
B/C. River Rehabilitation of the Liangqing and Lengtang Rivers											
Removal of TP/TN at discharge point (ton/year)	TP (17.7) (2009 level)	0	0	8	8	10	10	15			
	TN (82) (2009 level)	0	0	31	31	41	41	62			

III. Technical Assistance**									
Revision of regulations for river pollution control (Underway/Completed)	Initiated	Ongoing	Ongoing	Completed	Completed	Completed	Completed	Completed	Completed
Development of strategic study on improving water ecological environment of the Yongjiang River reach (Underway/Completed)	Initiated	Ongoing	Ongoing	Completed	Completed	Completed	Completed	Completed	Completed
Development of pollution control action plans for Fenghuang River, Liangqing River and Lengjiang River (Under Preparation/Completed/Under implementation)	Initiated	Preparing	Preparing	Completed	Implementing	Implementing	Implementing	Implementing	Implementing
[For Reference Purpose Only - Not monitoring indicators of intermediate project outcome]***	IV	[no target]	[no target]	[no target]	[no target]	[no target]	[no target]	[no target]	[no target]
Surface water quality of Yongjiang River at upstream boundary of the Municipality (Class I, II, III, IV, V, or worse than V)	IV	[no target]	[no target]	[no target]	[no target]	[no target]	[no target]	[no target]	[no target]
[For Reference Purpose Only - Not monitoring indicators of intermediate project outcome]***	IV	[no target]	[no target]	[no target]	[no target]	[no target]	[no target]	[no target]	[no target]
Surface water quality of Yongjiang River at downstream boundary of the Municipality (Class I, II, III, IV, V, or worse than V)	IV	[no target]	[no target]	[no target]	[no target]	[no target]	[no target]	[no target]	[no target]

*: The Guangxi Nanning Water Co., Ltd. will report the service coverage of wastewater, monitor the removal of pollutants at all the wastewater treatment plants in Jiangnan and five county towns, and report its own financial performance, which are related to the Component I of the Project. These indicators will be reported in the semi-annual project implementation progress reports to be submitted to the Bank

** : The Nanning Environment Protection Bureau (NEPB) will monitor the removal of pollutants at the three rivers included in the Component II and the progress of the integrated mini river basin management technical assistance and reference indicators of water quality of Yongjiang River relating to the Component III of the Project. NEPB has been carrying out monitoring of surface water quality of 11 streams, including the Fenghuang River, out of the 18 streams in the central districts of Nanning, as well as the surface water quality of the Yongjiang River. The only additional monitoring required under the Project is assessments of pollutant removal for the Liangqing River and the Lengtang River. Since the baseline data for these rivers are estimated, based on one-time assessment in 2009 during the project preparation, rather than three-times-a-year assessments to be carried out during the implementation, there might be minor revisions of these target data during the implementation. These indicators will be reported in the semi-annual project implementation progress reports to be submitted to the Bank.

***: Since they are for reference purpose only and have no target values, they are not included in the Project Agreement.

Annex 4: Detailed Project Description

CHINA: Nanning Urban Environment Project

Project overview

1. The project consists of three components: (i) wastewater management for central districts and county-seat towns; (ii) river rehabilitation; and (iii) integrated mini-river basin management. The total project cost is \$235.33 million, of which the IBRD loan is \$100.0 million.

Component I. Wastewater Management (\$90.64 million)

2. The component will consist of six sub-components in the Jiangnan Urban District. The project will complete Phase II of the Jiangnan Waste Water Treatment Plant (WWTP), for which the first phase was financed under the Guangxi Urban Environment Project. This sub-component will enlarge the capacity of the existing treatment facility from the actual 240,000 m³/day to the 480,000 m³/day required to meet the increased wastewater collection rate in the associated catchment areas, covering the projected population of approximately 1.2 million by the year 2012, and reducing the discharge of untreated sewage into the Yongjiang River. The treatment process is expected to be a modified Sequencing Batch Reactor process. The project will also introduce wastewater treatment capacity in five county towns that currently discharge untreated wastes into urban watercourses, reducing the flow of contaminants into the rivers. These sub-components include construction of associated facilities and sewerage systems as well as main collectors for a total capacity of 102,000 m³/day by the year 2015, covering between 65 percent to 80 percent of the projected total population of some 550,000 in the five county-seat towns of Wuming County, Binyang County, Hengxian County, Shanglin County, and Mashan County. The implementing agency for all activities in this component is the Guangxi Nanning Water Co., Ltd., which implemented construction of the first phase of the Jiangnan WWTP under the previous Bank-financed project, Guangxi Urban Environment Project.

I-1. Jiangnan Wastewater Treatment Plant - Phase II

The proposed investment will support the development of Phase 2 of the Jiangnan Wastewater Treatment Plan, which plans the enlargement of the existing treatment facility. The treatment capacity will be scaled up to 480,000 m³/day through the addition of a new 240,000 m³/day module. The extension will be built within the compound of the existing plant and will allow an increase of service coverage in the catchment areas of Chaoyang Stream – Er'keng, Xixiang Stream, Luolai, Jiangnan, Shangjin, and Xiang Sihu.

The proposed investment is to develop treatment facilities in the county-seat towns, specifically including: (i) the rehabilitation and/or installation of about 86 km of primary and secondary sewer trunk lines with diameters ranging between 300–1,650 mm; (ii) installation of 8 sewage lift pump stations with capacities ranging between 2,000–22,400 m³/day; and (iii) the establishment of treatment facilities for a total capacity of 102,000 m³/day.

I-2. Wuming County: Wastewater Collection and Treatment

The current drainage system operating in Wuming is a combined system with an extension of about 1 km, and diameters between 300–500 mm located mostly in the old district of the town. With a population of 93,000 people, the town discharges 32,880 m³/day of waste in streams and canals, which convey the untreated sewage into Wuming River. The current sewer pipes system provides a limited coverage to about 42 percent of resident population. The town is developing the China-ASEAN Economic Park which, with a population of 20,500 people, has already started to generate waste (7,075 m³/day) and that will increase dramatically the amount of both domestic and industrial wastewater in the near future.

The proposed intervention aims to upgrade and expand the existing drainage system of the town and to integrate it with the sewer pipes system currently under construction in the China-ASEAN Economic Park as well as to develop the phase 1 of wastewater treatment capacity. The investment will include the installation of about 23 km of pipes with diameters ranging between 300–1,650 mm, 5 sewage lift pump stations and the construction a wastewater treatment plant with a capacity of 50,000 m³/day. The proposed treatment facility is designed to receive the waste from both the town and the economic zone; it will be established in the China-ASEAN Economic Park area, and connected to the town through the construction of a 10 km main sewer trunk.

I-3. Binyang County: Wastewater Collection and Treatment

The development of the existing combined drainage system operating in Binyang has been characterized by lack of appropriate planning and design, so that capacity and outline are insufficient to convey adequately rainfall and wastewater to the final receiving water body. The combined system, composed mostly of open ditches, is located mostly in the old district of the town with an extension of about 35 km. With a population of 115,000, the town discharges approximately 15,820 m³/day of waste into streams and open ditches all over the urban area, creating a serious threat to public health. The uncontrolled discharge of domestic waste into road ditches and irrigation canals also has seriously polluted aquifers, which are the major source of water supply for the town.

The proposed intervention aims to upgrade and expand the existing drainage system of the town and to develop Phase 1 of wastewater treatment capacity. The investment will include the installation of about 22 km of pipes with diameters ranging between 300–500 mm, one sewage lift pump station and the construction a wastewater treatment facility with a capacity of 20,000 m³/day.

I-4. Hengxian County: Wastewater Collection and Treatment

The current drainage system operating in Hengxian is a combination of culverts and sewers that provide partial service to old districts and new developed area of the town. With an extension of about 25 km of culverts with dimensions ranging between 100x500 mm and 1000x1200 mm, and 36 km of sewers with diameters between 400–600 mm the system provide service coverage to about 65 percent of the resident population.

The proposed intervention is aimed to upgrade and expand the existing drainage system of the town and to develop Phase 1 of the wastewater treatment capacity. The investment will include the installation of about 22 Km of pipes with diameters ranging between 300–1000 mm, one sewage lift pump station and the construction of a wastewater treatment facility with a capacity of 20,000 m³/day.

I-5. Shanglin County: Wastewater Collection and Treatment

The combined drainage system operating at present in Shanglin has an extension of approximately 15 km and provides service to a total resident population of 46,200 people. The town conveys about 8,000 m³/day of untreated sewage into the Cheng and Quingshui Rivers. It is planned that the existing industrial establishments in Shanglin will be gradually relocated in Xiangshan Industrial Area or Chengtai District, where a dedicated facility (Xiangshan WWTP) will treat the wastewater generated in the industrial district before disposal into Fulong Canal.

The proposed intervention is aimed to upgrade and expand the existing drainage system of the town to create a single catchment area that discharges into Qingshui River and to develop the phase 1 of wastewater treatment capacity. The investment will include the installation of about 8.7 km of pipes with diameters ranging between 400–800 mm and the construction of a wastewater treatment facility with a capacity of 6,000 m³/day.

I-6. Mashan County: Wastewater Collection and Treatment

The current drainage operating in Hengxian is a combined system of culverts and open canals characterized by an insufficient coverage and capacity, which during rainfall season causes frequent flooding. The drainage system is divided into three catchment areas, namely: (i) Chengdong District Catchment Area characterized by domestic wastewater; (ii) Chengxi District Catchment Area characterized by domestic wastewater and wastewater from two hospitals; and (iii) Chengbei District Catchment Area with wastewater from two industries. With a limited extension of about 3.5 km of culverts and canals, the drainage system provides service to a total resident population of 43,200 people. The town conveys a total of about 8,600 m³/day of untreated sewage into Guniang River. It is planned that the wastewater generated in the industrial district of the town will be treated by a separate facility (Chengxi WWTP) located in the western part of the town.

The proposed intervention is aimed to upgrade and expand the existing drainage system of the town and to develop the phase 1 of wastewater treatment capacity. The investment will include the installation of about 9.2 km of pipes with diameters ranging between 400–800 mm, one sewage lift pump station and the construction of a wastewater treatment facility (Chengbei WWTP) with a capacity of 6,000 m³/day.

Wastewater Treatment Standards:

3. The objective of the proposed wastewater treatment is to obtain an effluent quality that meets at least the Class I B level of the *Discharge Standards for Municipal Wastewater*

(GB18918-2002) with the exception of Wuming, for which the target is Class I A, in compliance with the contaminants concentrations shown in the table below:

Table 4.1. Highest Allowable Discharge Concentration of Water Pollutants from Sewage Treatment Plants (daily average) – Unit: mg/l

Basic Controlled Indicators	Grade I Standard		Grade II Standard	Grade III Standard	
	A	B			
COD	50	60	100	120 (1)	
BOD5	10	20	30	60 (1)	
Suspended Solids (SS)	10	20	30	50	
Animal and Plant Oil	1	3	5	20	
Petroleum	1	3	5	15	
Negative Ion Surface Active Agent	0.5	1	2	5	
Total Nitrogen (as N)	15	20	-	-	
NH3-N (as N2)	5 (8)	8 (15)	25 (30)	-	
Total P (as P)	Built before Dec 2005	1	1.5	3	5
	Built before Jan 1, 2006	0.5	1	3	5
Color (dilution magnitude)	30	30	40	50	
pH	6-9				
Bacillus Coli (count/l)	1000	10000	10000	-	

- Notes: (1) Removal rate indicators shall be higher than 60% when inlet water COD is higher than 350 mg/l, higher than 50% when BOD is higher than 350 mg/l;
(2) Values outside brackets refer to controlled values when water temperature is >12 °C, those inside refer to controlled values when water temperature is ≤12 °C

For reference, surface water standards in China are provided below:

Table 4.2: Surface Water Standards in China

Classification	Grade I	Grade II	Grade III	Grade IV	Grade V
Description	Mainly applicable to water sources and national nature reserve areas	Suitable for grade I drinking water supplies, endangered fish reserves, and fish and shrimp breeding areas	Suitable for grade II drinking water supplies, general fish reserves, and swimming areas	Mainly suitable for general industrial purposes and recreational uses that do not involve direct human contact with the water	Mainly suitable for agricultural uses and general scenic purposes
BOD ⁵	<3	3	4	6	10
DO	90% (or 7.5)	6	5	3	2
Acidity (pH)	6-9	6-9	6-9	6-9	6-9
Total Phosphorus	0.02 (L/R 0.01)	0.1 (L/R 0.025)	0.2 (L/R 0.05)	0.3 (L/R 0.1)	0.4 (L/R 0.2)
Total Nitrogen	0.2	0.5	1.0	1.5	2.0
NH3-N	0.15	0.5	1.0	1.5	2.0
Fecal coliform	200	2000	10000	20000	40000

Wastewater Treatment Process Selection

4. Adequate characterization of wastewater is of fundamental importance in the design of treatment and disposal processes. The physical, chemical and biological characteristics of wastewater have been determined in the case of Jiangnan through the observation of the influent wastewater characteristics at the existing WWTP. In the case of county towns the wastewater constituent concentrations resulting from the analysis of samples collected in selected sewage outlets have been validated by statistical data from catchment areas of similar characteristics. The following table shows the wastewater constituent concentrations assumed as design parameters for wastewater treatment plants:

Table 4.3: Design Influent Constituent Concentrations (Unit: mg/l)

Subcomponent	Index	COD	BOD ₅	SS	TN	NH ₃ -N	TP
Jiangnan WWTP		400	180	230	40	30	5
Wuming County WWTP		350	200	280	35	30	4
Binyang County WWTP		300	150	180	50	25	4
Hengxian County WWTP		250	150	180	40	25	3
Shanglin County WWTP		240	120	135	40	25	3
Mashan County WWTP		240	120	135	40	25	3

5. The concentrations used to design the treatment process under this project are encompassed in low–intermediate concentration values of the range usually observed in wastewater produced in China. One of the reasons for low concentration of wastewater constituents is that septic tanks are still used between households and sewer connections. Another reason for low concentrations could be the elevated rate of infiltration of clear water into the sewerage system. The consequence would be a reduced efficiency of the process that may affect substantially the attainment of established targets. This will require special attention as well as possible corrective measures at the time the treatment facilities become operational.

6. The standards IA and IB applied under this project require a high level of removal of carbon pollution and especially of nitrogen and phosphorous, which can be achieved only through biological treatments that make use of activated sludge processes. The targeted effluent quality, together with the need to tailor the proposed technology to local market conditions, i.e. existing knowledge and available skills, have limited the technical options under the project.

7. All the treatment process options considered under the project consist of mechanical and biological treatment as well as sludge processing. The mechanical treatments are the same for all incoming water and include bar screens and aerated grit chambers. Among the biological treatments considered during project preparation there have been some variants of the A2/O process, the modified Sequencing Batch Reactor (SBR), the oxidation ditch and the Controlled Atmosphere Separation Technology

(CAST). Due to local constraints— mostly related to the limited availability of land—the comparison of options has been restricted to A²/O, SBR and CAST, with the latest taken into consideration specifically for the smaller treatment capacities required in Shanglin and Mashan counties.

8. **Jiangnan Phase II, Wuming, Binyang and Hengxian WWTPs have chosen the modified SBR process.** The modified SBR process links the A²/O process with the SBR process, and integrates the advantages of the two processes, taking small land area with compact layout of the reaction tank compartments. It provides stable and excellent dephosphorization and denitrification efficiency, as well as benefits of the lower costs of civil works and operation as well as of stable effluent quality and high efficiency of treatment. Also, there are several experiences in operation of modified SBR processes in China. The SBR system is a fill-and-draw activated-sludge treatment process that utilizes five steps in common which are carried out in sequence as follows: (i) fill; (ii) react (aeration); (iii) settle (sedimentation/clarification); (iv) draw (decant); and (v) idle. Depending on the treatment objectives, the fill operation can be fill only, fill and mix, or fill, mix and aerate. Also, a number of process modifications are associated with each step to achieve specific treatment objectives.

9. **The Shanglin and Mashan WWTPs have chosen the CAST process, which requires smaller land occupation and is more suitable for those counties given their shortage of land.** The CAST adjusts temperature and pressures in a continuous flow system so that water or chemicals can be extracted based on their chemical and physical properties. The technology has two configurations: (i) the CAST system that extracts water from the waste materials; and (ii) the RCAST system, which separates volatile compounds from water (such as solvents from industrial wastewater). By using a vacuum, sensible heat, segregation of waste streams and the chemical properties of compounds used, the CAST technology can be designed for a specific process and can separate from water a wide variety of materials from metals to volatile organic compounds.

Component II. River Rehabilitation (\$105.71 million)

10. **This component will assist Nanning to achieve the restoration of storm water drainage capacity and environment improvement of the lower reaches of three Yongjiang River tributaries, i.e., about 4.84 km of the Fenghuang River in the western and about 9.41 km of the Liangqing and Lengtang Rivers in the eastern part of the city.** This will be done through various river improvement measures, i.e., cleaning the river courses, restoring the detention ponds, enhancing the embankments, and improving the sewer interceptors and first-flush treatment facilities inside Nanning city proper prior to urban development.

II-1. Fenghuang River Rehabilitation

The scope of the subproject is to intervene along the course of the Fenghuang River in order to (i) improve storm-water drainage capacity; (ii) control soil erosion; and (iii) restore and protect river ecosystems. Although the Fenghuang River is

currently located in the western suburb of the city south of the Yongjiang River, the Nanning Development Master Plan (2005–2020) has directed the growth of the city toward the Fenghuang River catchment area.

Currently, the river is largely dry in the dry season, with only domestic or industrial wastewater pooled in uneven sections of the river. In the rainy season, the water level rises substantially because the city is located in a subtropical climate zone, which means relatively large amounts of precipitation in short durations. Fishponds and duck breeding ponds are located along the river, which narrow the discharge capacity of the river.

The major polluting sources for the river are rural and urban domestic wastewater, farmland runoff, small-scale animal farming, and industrial pollution (see table). There is currently no sewer network in the catchment area, so domestic wastewater, as well as the duck breeding ponds and fisheries, discharge directly into the river. Illegal dams on the side of the river reduce the pace of the river flow, further degrading the water quality. Of nine pollutants monitored in the Fenghuang River, levels of SS, DO, COD, BOD₅, NH₃N, and TP all exceed Class IV standards.

Table 4.4: Statistics and Analysis on Major Pollution Sources within the Survey Scope of Fenghuang River Catchment Area

Pollution Sources	COD		NH ₃ N	
	Discharge Volume (t/a)	Percentage (%)	Discharge Volume (t/a)	Percentage (%)
Rural domestic wastewater	735.4	76.4	58.8	55.6
Runoff in farmland	13.4	1.4	2.7	2.6
Small-scale animal farming	212.6	22.1	442.74	41
Industrial pollution	0.004	0.02	0.004	0.8
Total	961.4	100	104.2	100

11. In the 1970s, a flooding control sluice gate and pumping station were installed at the estuary of the Fenghuang River; these was expanded in 2003, according to the standard of maximum 24 hour precipitation of 140.99 mm under the condition of flood with 20 year recurrence.

12. The project sub-component, implemented by the Nanning Xiangsihu Investment & Constructions Company Ltd., includes: i) the rehabilitation of 4.84 km of the river course by means of river bed clean up and embankment enhancement with masonry or gabion at selected sections; ii) if water retention ponds with total storage of 1.14 million m³ are deployed, two gate structures and two weirs will be constructed to regulate the water; iii) construction of about 9.37 km of sewer interceptors and about 5.32 km of storm-water drainage pipelines, with 23 drainage outlets, along both banks of the river; and iv) about 84,000 m² of plantations along the river.

II-2. Liangqing and Lengtang Rivers Rehabilitation

The scope of the subproject is to intervene along the courses of the Liangqing and Lengtang Rivers in order to (i) improve water drainage capacity, with improvement of river cross-sections and the retention storage; (ii) control soil erosion; and (iii) restore and protect river ecosystems and water quality. The rivers are currently located in the eastern suburb of the city south of the Yongjiang River and, like the Fenghuang River, the Nanning Development Master Plan (2005–2020) has directed the growth of the city toward the Liangqing and Lengtang catchment area. The two rivers flow through the core of the Wuxiang New Area, a new strategic development zone, with a population of 240,000.

Neither river has seen any noticeable or recent flood control intervention. Both appear as small irrigation ditches upstream and downstream as natural gullies scoured out by surface runoff. The narrowest reach is 5–6 meters wide and 1.5–2 m deep. Both rivers discharge into the Yongjiang River at the same estuary, which is exposed to eroding waves, resulting in steep embankments and collapses.

The major polluting sources for the river are rural domestic wastewater, farmland runoff, and small-scale animal farming. Most banks of the rivers connect with local farmlands, and some are occupied by fish ponds. There is currently a limited but improved sewer network in the downstream catchment area, but none in the upstream area, so agricultural and domestic wastewater is directly discharged into the rivers. Livestock and domestic wastewater discharged in the south of the catchment are the main sources of pollution, lowering the discharge capacity of the rivers and deteriorating the quality of water. In the Liangqing River, levels of COD, BOD₅, and NH₃N all exceed Class IV; in the Lengtang River, only BOD₅ levels exceed Class IV.

Table 4.5: Statistics and Analysis on Major Pollution Sources within the Survey Scope of Liangqing River Catchment Area

Pollution Sources	COD		NH ₃ N	
	Discharge Volume (t/a)	Percentage (%)	Discharge Volume (t/a)	Percentage (%)
Rural domestic wastewater	292.9	18.8	23.4	18.8
Runoff in farmland	152.1	25.3	30.4	25.3
Small-scale animal farming	353.0	56.7	70.6	56.7
Total	797.9	100	124.4	100

Table 4.6: Statistics and Analysis on Major Pollution Sources within the Survey Scope of Lengtang River Catchment Area

Pollution Sources	COD		NH ₃ N	
	Discharge Volume (t/a)	Percentage (%)	Discharge Volume (t/a)	Percentage (%)
Rural domestic wastewater	275.4	37.8	22.3	37.8
Runoff in farmland	145.2	20.0	29.0	20.0
Small-scale animal farming	307.2	42.2	61.6	42.2
Total	727.8	100	113.0	100

13. This sub-component, implemented by Nanning Communication and Water Conservancy Investment Company Ltd., includes: i) the rehabilitation of about 9.41 km of river courses of the Liangqing (6.901 km) and Lengtang (2.504 km) Rivers by means of river bed clean-up, embankment enhancement with geo-textile bags and concrete bricks at selected sections, construction of access roads along the river banks, and the restoration of three regulating ponds, total storage of 1.62 million m³, with two concrete weirs; ii) construction of a total of 76 outlet structures for the storm-water drainage system; and iii) plantation and greening along the rivers.

Component III Technical Assistance (\$2.05 million)

14. This technical assistance component has two subcomponents: a) Integrated Mini River Basin Management; and b) Project Management and Design Review, including training and study tours.

III-1. Integrated Mini River Basin Management (IMRBM)

The IMRBM approach is a process to coordinate development, management, and conservation of water, land, and related resources across sectors within a basin to maximize the economic and social benefits in an equitable manner while preserving ecosystems. It integrates all aspects of activities in a holistic manner so that the planning and implementation of sector programs are well-coordinated and are pointed at achieving sustainable protection and development of the river basin area. The subcomponent will achieve the sustainable social and economic development and improved water ecological environment in the basin area of the Nanning central urban districts' section of the Yongjiang river reach, including the entire basin areas of the 18 mini-river tributaries, through the strengthened legislation and enforced implementation of the Regulations on pollution control in the basin area.

The IMRBM TA will be divided into four subcomponents: a) modifications of regulations on pollution control of the Yongjiang River Reach Basin and preparation of the detailed rules for implementing the regulations; b) preparation of the strategic study on improving water ecological environment of the Yongjiang River Reach Basin to support sustainable social and economic development of Nanning; c) the establishment of a water quality and quantity monitoring system to facilitate the above-mentioned strategic studies and routine management; and d) preparation of pilot participatory pollution control action plans for the Fenghuang, Liangqing and Lengtang River tributaries.

The Bank would provide loan financing for the proposed IMRBM TA component under the Project, with up to 100% disbursement coverage. The four subcomponents are:

Subcomponent III-1-(a): Modifications of regulations on pollution control of the Yongjiang River Reach Basin and preparation of the detailed rules for

implementing the regulations. The modification of the regulations will focus on the following main areas: i) extend the pollution control area to cover the entire river basin of the Yongjiang river reach, including river basin areas of the 18 mini-river tributaries; ii) include the leadership role and responsibilities of the existing Pollution Control Committee of Nanning for pollution control; and iii) define the responsibilities and accountabilities for pollution control of the municipal and district governments and government line bureaus. The updated version of the regulations will be reviewed and approved by the People's Congress of Nanning. Preparation of the detailed rules includes: i) more detailed definition on the legal provision of the regulations; and ii) more detailed items supplementary to the legal provision of the regulations. The detailed rules for implementing the regulations will be reviewed and approved by the People's Government of Nanning.

Subcomponent III-1-(b): Preparation of the strategic study on improving water ecological environment of the Yongjiang River Reach Basin to support sustainable social and economic development of Nanning. The strategic study will include the following areas: i) identify and analyze constraints of ecological and environmental protection of the Yongjiang River Reach Basin to the social and economic development of Nanning; ii) analyze water and environment carrying capacity of the Yongjiang river reach in comparison with scales of social and economic development of Nanning; iii) determine the objectives of the ecological and environmental protection in water environment function zones in the river reach basin; and iv) prioritize the structural and non-structural measures of ecological and environmental protection to support sustainable social and economic development.

Subcomponent III-1-(c): (This subcomponent includes purchase of computer hardware and software): Establishment of a complete system to monitor the changes of water quality and quantity for the Yongjiang river reach and its 18 river tributaries, and preparation of the water quantity and quality models as a tool to support the preparation of the strategic studies and routine management. The system will: i) analyze the existing hydrological stations and water quality monitoring stations, and propose the new stations to be added to the monitoring networks; ii) develop the hydrological and environment database to be shared by both the water and environment departments of Nanning; iii) develop water quality and quantity models to evaluate the total pollution discharge into the Yongjiang river and the water environment carrying capacity of the river reach using the data from the database established; and iv) display real-time modeling results on water quantity and quality changes on screen to facilitate the decision-making process.

Subcomponent III-1-(d): Preparation of the participatory pollution control action plans as pilots for integrated mini-river basin management in the Fenghuang, Liangqing and Lengtang river tributaries. The action plans will: i) analyze the direct and indirect factors which contribute to polluting the mini-rivers in accordance with the principles of the integrated mini-river basin management; ii) carry out field visits to the mini-river basin area to interview farmers and water users as well as other stakeholders to understand the real situations; and iii) propose the feasible actions in accordance with the legal provisions of the regulations, including who will take actions and where and when the actions will be taken.

To ensure smooth implementation of the IMRBM TA component with good coordination and cooperation among different government departments of Nanning and related county governments, two working groups will be established: the working group chaired by the municipal leader of Nanning will take primary responsibility for implementation of subcomponent 1; and another working group chaired by the regional DRC leader of Nanning will take primary responsibility for subcomponents III-1-(b), (c) and (d). The two working groups would be established before project negotiations, and the TA component will start to implement by the end of 2009.

III-2. Project Management, Engineering Design and Design Review (\$1.00 million)

The project management TA will strengthen management capability of the PMO and IAs by providing consulting services to the Nanning PMO and IAs in oversight of the project implementation, the design review, preparation of bidding documents, and contract supervision and administration. The consultant will help the Nanning PMO, IAs and DIs, if necessary, to review the preliminary design, construction drawings, and bidding documents of the works under the project. The consultant will also assist the Nanning PMO and IAs in the project implementation, including the construction supervision, contract administration, contract variations, and preparation of the project progress reports and implementation completion report at the project completion. And the training and study tour programs would be designed according to the requirements of NPMO and the implementing agencies.

Annex 5: Project Costs

CHINA: Nanning Urban Environment Project

Table 5.1.a, Summary Baseline Cost Estimate by Component:

N ^o .	Description	Amount in RMB million			Amount in US\$ million		
		Local	Foreign	Total	Local	Foreign	Total
Nanning Integrated Urban Environment Project							
Component I, Integrated Urban & County-seat Towns Wastewater Management:							
I-1	Jiangnan Wastewater Treatment Plant, Phase II:	970.79	629.45	1,600.23	142.75	92.38	235.33
I-2	Wuming County:	346.52	269.83	616.35	50.96	39.68	90.64
I-3	Binyang County:	152.21	116.85	269.06	22.38	17.18	39.57
I-4	Hengxian County:	79.73	63.86	143.60	11.73	9.39	21.12
I-5	Shanglin County:	37.76	30.46	68.22	5.55	4.48	10.03
I-6	Mashan County:	39.26	30.86	70.12	5.77	4.54	10.31
II.	Component II, River Rehabilitation:	17.91	14.00	31.91	2.63	2.06	4.69
II-1	Fenghuang River Rehabilitation:	19.64	13.81	33.45	2.89	2.03	4.92
II-2	Lengtangchong & Liangqing River Rehabilitation:	525.89	192.91	718.81	77.34	28.37	105.71
III.	Component III, Technical Assistance:	200.17	72.09	272.26	29.44	10.60	40.04
III-1	Integrated River Management	325.72	120.82	446.54	47.90	17.77	65.67
III-2	Project Design Review & Project Supervision	2.09	11.85	13.94	0.31	1.74	2.05
Total of Project Baseline Costs:		1.07	6.07	7.14	0.16	0.89	1.05
	<i>Contingencies:</i>	1.02	5.78	6.80	0.15	0.85	1.00
	Physical Contingencies:	874.51	474.59	1,349.10	128.60	69.79	198.40
	Price Contingencies:	96.28	79.16	175.44	14.14	11.45	25.80
Project Total Costs:		49.78	28.01	77.79	7.32	4.12	11.44
	<i>Project Financial Costs:</i>	46.50	51.14	97.65	6.82	7.33	14.36
	Interests During Construction:	970.79	553.75	1,524.53	142.75	81.24	224.20
	Commitment Fee:	-	75.70	75.70	-	11.13	11.13
	Front-end Fee:	-	74.00	74.00	-	10.88	10.88
Total Project Costs Required to Finance:		970.79	629.45	1,600.23	142.75	92.38	235.33

Table 5.1.b, Summary Total Project Cost Estimate by Component:

N ^o .	Description	Amount in RMB million			Amount in US\$ million		
		Local	Foreign	Total	Local	Foreign	Total
Nanning Integrated Urban Environment Project							
Component I, Integrated Urban & County-seat							
I. Towns Wastewater Management:							
I-1	Jiangnan Wastewater Treatment Plant, Phase II:	387.31	315.19	702.51	56.96	46.35	103.31
I-2	Wuming County:	172.05	138.06	310.11	25.30	20.30	45.60
I-3	Binyang County:	88.46	74.05	162.52	13.01	10.89	23.90
I-4	Hengxian County:	41.87	35.29	77.16	6.16	5.19	11.35
I-5	Shanglin County:	43.32	35.55	78.87	6.37	5.23	11.60
I-6	Mashan County:	19.86	16.23	36.09	2.92	2.39	5.31
		21.76	16.01	37.77	3.20	2.35	5.55
II. Component II, River Rehabilitation:							
II-1	Fenghuang River Rehabilitation:	581.26	225.42	806.69	85.48	33.15	118.63
II-2	Lengtangchong & Liangqing River Rehabilitation:	221.21	84.29	305.50	32.53	12.40	44.93
		360.05	141.13	501.18	52.95	20.75	73.70
III. Component III, Technical Assistance:							
III-1	Integrated River Management	2.21	13.13	15.34	0.32	1.93	2.26
III-2	Project Design Review & Project Supervision	1.13	6.71	7.84	0.17	0.99	1.15
		1.08	6.42	7.50	0.16	0.94	1.10
Project Total Costs:							
	<i>Project Financial Costs:</i>	970.79	553.75	1,524.53	142.76	81.43	224.20
	Interests During Construction:	-	75.70	75.70	-	11.13	11.13
	Commitment Fee:	-	74.00	74.00	-	10.88	10.88
	Front-end Fee:	-	-	-	-	-	-
		-	1.70	1.70	-	0.25	0.25
Total Project Costs Required to Finance:							
		970.79	629.45	1,600.23	142.76	92.57	235.33

Table 5.2.a, Summary Project Financing with Baseline Cost Estimate by Component:

N ^o .	Description	Project Financing, in US\$ million			% of WB Financing
		World Bank	Counterpart Funds	Total	
Nanning Integrated Urban Environment Project					
Component I, Integrated Urban & County-seat Towns					
I. Wastewater Management:					
I-1	Jiangnan Wastewater Treatment Plant, Phase II:	64.93	25.73	90.64	71.6%
I-2	Wuming County:	29.89	9.68	39.57	75.5%
I-3	Binyang County:	14.98	6.14	21.12	70.9%
I-4	Hengxian County:	7.04	3.01	10.03	70.2%
I-5	Shanglin County:	6.98	3.33	10.31	67.7%
I-6	Mashan County:	3.00	1.69	4.69	63.9%
		3.04	1.88	4.92	61.8%
II. Component II, River Rehabilitation:					
II-1	Fenghuang River Rehabilitation:	32.77	72.94	105.71	31.0%
II-2	Lengtangchong & Liangqing River Rehabilitation:	12.00	28.04	40.04	30.0%
		20.77	44.90	65.67	31.6%
III. Component III, Technical Assistance:					
III-1	Integrated River Management	2.05	-	2.05	100.0%
III-2	Project Design Review & Project Supervision	1.05	-	1.05	100.0%
		1.00	-	1.00	100.0%
Total of Project Baseline Costs:					
	<i>Contingencies:</i>	99.75	98.66	198.40	50.3%
	Physical Contingencies:	-	25.80	25.80	0.0%
	Price Contingencies:	-	11.44	11.44	0.0%
Project Total Costs:					
	<i>Project Financial Costs:</i>	99.75	124.46	224.20	44.5%
	Interests During Construction:	0.25	10.88	11.13	2.2%
	Commitment Fee:	-	10.88	10.88	0.0%
	Front-end Fee:	-	-	-	0.0%
		0.25	-	0.25	100.0%
Total Project Costs Required to Finance:					
		100.00	135.35	235.33	42.5%

Table 5.2.b, Summary Project Financing with Total Project Cost Estimate by Component:

N ^o .	Description	Project Financing, in US\$ million			% of WB Financing
		World Bank	Counterpart Funds	Total	
Nanning Integrated Urban Environment Project					
Component I, Integrated Urban & County-seat Towns					
I. Wastewater Management:					
I-1	Jiangnan Wastewater Treatment Plant, Phase II:	100.00	135.32	235.33	42.5%
I-2	Wuming County:	64.93	38.38	103.31	62.8%
I-3	Binyang County:	29.89	15.71	45.60	65.5%
I-4	Hengxian County:	14.98	8.92	23.90	62.7%
I-5	Shanglin County:	7.04	4.31	11.35	62.0%
I-6	Mashan County:	6.98	4.62	11.60	60.2%
		3.00	2.31	5.31	56.5%
		3.04	2.51	5.55	54.7%
II. Component II, River Rehabilitation:					
II-1	Fenghuang River Rehabilitation:	32.77	85.86	118.63	27.6%
II-2	Lengtangchong & Liangqing River Rehabilitation:	12.00	32.93	44.93	26.7%
III. Component III, Technical Assistance:					
III-1	Integrated River Management	2.05	0.20	2.26	90.9%
III-2	Project Design Review & Project Supervision	1.05	0.10	1.15	91.1%
		1.00	0.10	1.10	90.7%
Project Total Costs:					
	<i>Project Financial Costs:</i>	99.75	124.44	224.20	44.5%
	Interests During Construction:	0.25	10.88	11.13	2.2%
	Commitment Fee:	-	10.88	10.88	0.0%
	Front-end Fee:	-	-	-	0.0%
		0.25	-	0.25	100.0%
Total Project Costs Required to Finance:		100.00	135.32	235.33	42.5%

Annex 6: Implementation Arrangements

CHINA: Nanning Urban Environment Project

Institutional context of the analysis

1. The following sections describe implementing agencies. Details are included in Table 6.1 at the end of this Annex.

Implementation responsibilities

2. The project will be managed at two levels of the government through its normal chain of command: (1) provincial government; and (2) municipal government, and their utility companies or investment companies. With all of the activities located in the Nanning Municipality, the municipal government will take the primary supervisory role. During project preparation, the provincial government and the municipal government have demonstrated a high level of competency in these functions.

Provincial and Municipal Government

3. The Nanning Municipal Project Management Office (NPMO), located in the Nanning Development and Reform Committee (NNDRC), will be the executing agency for the project and assumes responsibility for overall project coordination. In particular, it will assume the primary responsibility by interacting with the Bank, providing overall policy advice, and managing arbitration if such needs arise. A supervisory Project Leading Group (PLG) has been established in Nanning, chaired by the Vice Mayor of Nanning Municipal Government. The NPMO has retained several staff who had been involved in implementation of the previous Guangxi Urban Environmental Project (GUEP). Their capacity would be augmented by additional training, and will continue strengthening their capabilities in project management, bidding, and financial management through training.

4. The NPMO will also oversee performance of implementing agencies at the county and district level. It will play a key role in providing quality control in planning and construction as necessary, as well as handling of disbursement applications. The PMO will work very closely with the construction bureau, financial bureaus, and development and reform bureaus.

Knowledge Dissemination

5. Lessons from this operation would be shared at mayors' conferences organized by the Ministry of Construction. Implementation experiences of Bank projects are regularly shared at occasional conferences led by the National Development Commission and through the network of World Bank Project Management Offices of local governments.

Component I. Wastewater Management

6. The wastewater components are all to be implemented, owned and operated by Guangxi Nanning Water Co., Ltd. (GNWC). This includes the wastewater components in the project county-seat towns. The company owns and operates the existing water and wastewater facilities including network and interceptors in Nanning City and surrounding districts. The water supply in the project county-seat towns are generally owned and operated by local government-owned

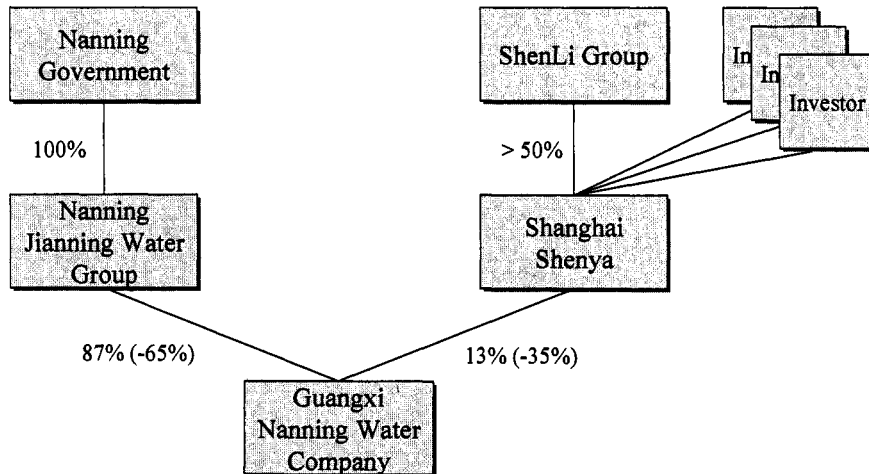
water utilities. GNWC owns and operates a smaller water supply in the ASEAN Economic Zone of Wuming County. The business scope of the company is to provide water supply and treatment of waste water including operation of relevant facilities and network. A secondary business scope is to invest in other public utilities.

7. GNWC has an origin in the GUEP. The Project originally established the Nanning Sewerage Company (NSC), and all Nanning wastewater assets were transferred to NSC. Under GUEP, NSC introduced enterprise accounting and improved financial management practices; arranged for the retention of all revenue without passing through the Finance Bureaus; and achieved financial viability. In 2004, the NSC was incorporated with the Nanning’s water supply utility to create the Nanning Jianning Water Group Ltd., which in turn was transformed in 2006 to the Guangxi Nanning Water Co., Ltd., with additional investments from a private company, Shanghai Shenya Ltd.

8. Shanghai Shenya is a private capital management company. The company brought in new expertise on company management for the purpose of obtaining listing at stock exchanges. The company was found in a search process involving several potential partners. The majority of shares of the Shanghai Shenya are owned by the ShenLi Group, which is an investment company owned by Shen Li family group and a few other minority investors.

9. The GNWC joint venture was created based on transferral of assets and liabilities from the old company and cash infusion from private investors who originally held 3 percent of private shares of GNWC. Shanghai Shenya currently has 13 percent of GNWC shares and can acquire up to 35 percent, according to the shareholder agreement.

Diagram 6.1: Investment Structure of the Guangxi Nanning Water Co., Ltd.



10. Under the GUEP, the Company successfully implemented the Jiangnan Phase I WWTP component. It was in compliance with financial covenants throughout the GUEP, which was rated “Highly Satisfactory” in the Implementation Completion Report of GUEP. Based on the operational performance of the Langdong WWTP, in 2006 the company was awarded “Class A Qualification for Operation of Environmental Protection Facilities” by the former State Environment Protection Administration (current Ministry of Environmental Protection). Designs

of these systems were reflected in the designs of the proposed Phase II of the Jiangnan WWTP and the Japan Bank for International Cooperation (JBIC)-funded Phase II of the Langdong WWTP. The company was invited by the Bank to the Fifth International Water Conference 2006 to present a best practice case of project implementation in China. The conference was jointly sponsored by the Ministry of Construction and the Bank. The presentation was furthermore published in the Bank's Urban Development Magazine. The company has extensive past experience in implementing wastewater projects funded by international sources beyond the Bank, including JBIC and the French Government.

11. The company's service area for drinking water is currently 180 km² with a population of 2.7 million and around 270,000 connections. The rainwater drainage network and the combined sewers are not the responsibility of the company. The designed capacity for water supply is 1.19 million m³/day with an actual provision from 800,000 to 900,000 m³/day. The designed capacity of the existing wastewater treatment is 440,000 m³/day with actual treatment of 420,000 m³/day. Part of the collected wastewater is currently not treated. The collection network covers the service area for water supply and includes 74 km of larger collectors and interceptors. All wastewater is as such collected. The loss in the water supply system is at a satisfactory level of less than 25 percent.

12. The company is organized into 13 departments, seven water supply plants, two wastewater treatment plants, two branch companies and three divisions (i. meter reading, fees and tariff collection, ii. network operation and maintenance, iii. equipment and plant maintenance). The company has 1,130 staff, of which 182 are dedicated to wastewater operations while 633 are dedicated to water supply operations. The billing and collection department has 135 employees, while 178 are employed at headquarters. The company has a technical staff of 19 senior engineers (covering civil works, water supply and drainage, machinery, electrical equipment), 139 engineers (covering civil works, water supply and drainage, environmental engineering, machinery, electrical equipment, automation, IT), and 118 assistant engineers.

13. The overall performance of the company is at a satisfactory level and the company is able to maintain full coverage of the expanded service area for water supply. The number of employees per thousand water connections is at a low level, below 4. The company operates with a satisfactory financial performance based on an average tariff level for water supply at RMB 1.18/m³ and a wastewater tariff at RMB 0.8/m³.

14. The new Bank Project will be implemented with the same project management team as the first Bank project. The project management team comprises 15 staff from the Finance Department, nine staff from the Operational and Technical Department, 22 staff from Capital Construction, 10 staff from Sewage Project Office, and 28 staff from Nanning Sewerage Treatment Company, an affiliated company of GNWC specializing in managing construction of wastewater sewage treatment plants.

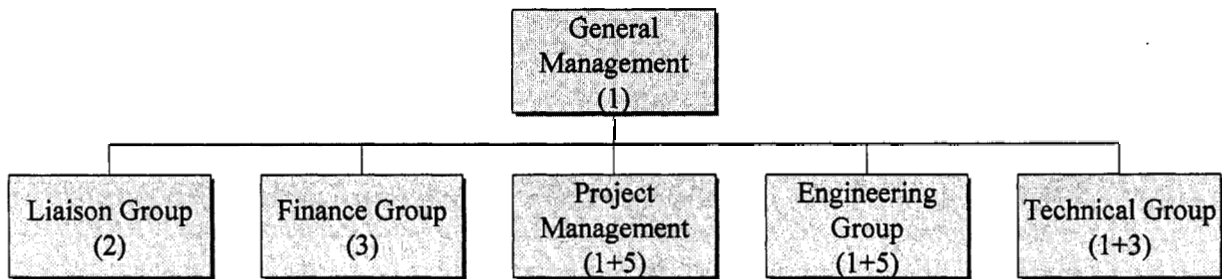
Component II. River Rehabilitation

Nanning Xiangsihu Investment & Constructions Company Ltd. (NXIC)

15. The Fenghuang River sub-component is to be implemented by Nanning Xiangsihu Investment & Constructions Company, Ltd. The company was established in 2004 as a government-owned urban development corporation, responsible for preparing and implementing infrastructure primarily in Xiangsihu New district.

16. The company has a balance of RMB 827 million with equity of RMB 354 million. The company has extensive past experience in preparing and/or implementing infrastructure projects. The past experience includes implementation of roads, bridges, water environment control infrastructure, and municipal public services. The company has participated in infrastructure projects with total costs of more than RMB 10 billion, including an ADB-funded project of RMB 90 million. The company has a staff of 25, including six senior engineers, eight engineers, and 11 other technical staff. The organizational structure is represented below.

Diagram 6.2. Nanning Xiangsihu Investment & Constructions Company Ltd.

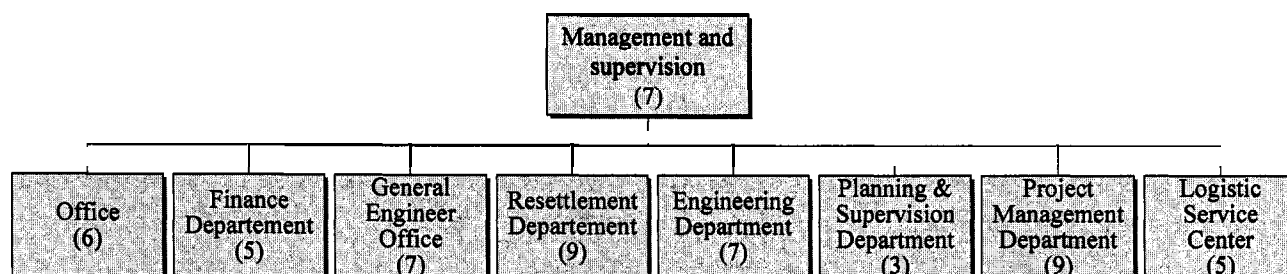


Nanning Communication and Water Conservancy Investment Company Ltd. (NCWIC)

17. The Liangqing and Lengtang Rivers sub-component will be implemented by the Nanning Communication and Water Conservancy Investment Company Ltd. The company was established in 2001 as a government-owned urban development corporation to be responsible for preparing and implementing infrastructure primarily related to the dykes along the main rivers running through Nanning. Both companies have past experience in preparing and/or implementing infrastructure projects. The past experience includes implementation of roads, bridges, water environment control infrastructure, and municipal public services.

18. The company has a balance of RMB 4.42 billion with equity of RMB 1.478 billion. The company has past experience in managing establishment of dykes and similar undertakings. The company has participated in infrastructure projects with total costs of more than RMB 6 billion. The company has a staff of 56, including senior engineers, engineers, and other technical and financial staff. It is established as an urban development investment wing of the Nanning Government to implement alternative prepare infrastructure projects.

Diagram 6.3. Nanning Communication and Water Conservancy Investment Company Ltd



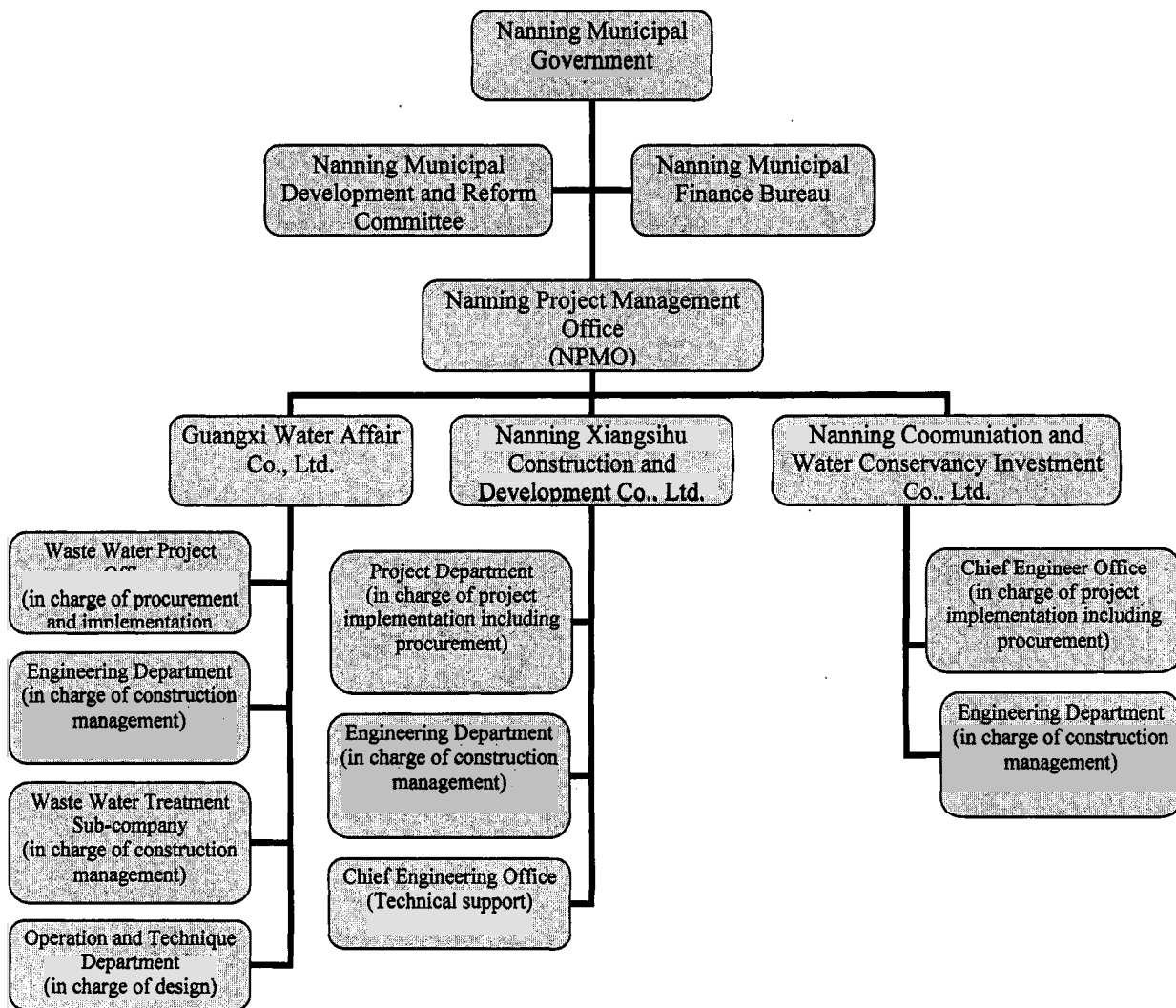
Component III: Technical Assistance

19. The Nanning PMO will be the implementing agency for the component, working in collaboration with EPB, Agriculture Bureau, Land Bureau, Urban Bureau, and Water Resource Bureau of the Nanning Municipal Government. It has implementation experience with Bank projects from the previous GUEP and has qualified staff and operating capacity.

Table 6.1: Registration Information of Implementing Agencies

Company	GNWC	NXIC	NCWIC
Company type:	Incorporated company	State-owned enterprise	State-owned enterprise
Registered capital:	RMB 410 million	RMB 353 million	RMB 100 million
Ownership:	Nanning Jianning Water Group Ltd. (87%), Shanghai Shenyang Ltd. (13%)	Nanning Municipal Government	Nanning Municipal Government
Business License:	450000000006005	4501001011917(1-1)	450100000013492
Company Charter:	April 6, 2006	June, 2008	March 11, 2009
Number of staff	1115	25	56

Diagram 6.4. Institutional Arrangement for Project Implementation



Annex 7: Financial Management and Disbursement Arrangements

CHINA: Nanning Urban Environment Project

Introduction

1. The Financial Management Specialist (FMS) has conducted an assessment of the adequacy of the project financial management system of the Nanning Urban Environment Project. The assessment, based on guidelines issued by the Financial Management Sector Board on November 3, 2005, has concluded that the project meets the minimum Bank financial management requirements, as stipulated in OP/BP 10.02. In the FMS opinion, the project has maintained adequate financial management arrangement acceptable to the Bank and, as part of the overall arrangements that the borrower has in place for implementing the operation, provide reasonable assurance that the proceeds of the loan will be used for the purposes for which the loan is granted.

2. Financial management risk is defined as the risk that World Bank loan proceeds will not be used for the purposes intended and is a combination of country, sector and project specific risk factors. Taking into account the risk mitigation measures proposed under the project, a “low” FM risk rating was assigned to the project. Funding sources for the project include a Bank loan and counterpart funds. The Bank loan proceeds will flow from the Bank into a project designated account (DA) to be set up at and managed by Guangxi Zhuang Autonomous Regional Finance Bureau (GXFB), to Nanning Municipal Finance Bureau (NFB), to various Project Implementing Units (PIUs), and finally to contractors or suppliers. The Bank loan agreement will be signed between the Bank and the People’s Republic of China through its Ministry of Finance (MOF), and on-lending agreements for the Bank loan will be signed between MOF and GXFB, and in turn between GXFB and NFB and finally between NFB and each PIU.

Country Issues

3. To date, no country financial accountability assessment (CFAA) has been carried out by the Bank for China, though dialogue with the Government of China in respect to the CFAA exercise has been initiated. However, based on studies and material produced by others, our observations of developments in the areas of public expenditures, accounting and auditing, and Bank experience with China projects for the past several years, we noted that substantial achievement in the aforementioned areas has been made and further improvement is expected in the next few years. This is a work in progress. As the 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 for fraud or corruption.

4. Due to rather unique arrangement by the Government of China, funding (particularly Bank loan/grants) of Bank projects is controlled and monitored by the MOF and its extensions at sub-national levels, (i.e. finance bureaus at provincial, municipal/prefecture and county levels). However, project activities are usually carried out by implementing entities of a specific industry or sector due to

the level and complexity of expertise involved. While this segregation of duties provides added fiduciary assurance, the above arrangement usually requires more coordination on the project, because the multi-level management of the funding and implementation mechanism sometimes works to the detriment of smooth project implementation.

Summary of Project Description

5. The estimated base cost of the proposed project is approximately US\$ 235.33 million. The proposed Bank loan is US\$ 100 million. The project development objective is to assist the Nanning Municipality in improving effectiveness and coverage of critical infrastructure services in Nanning City and five county-seat towns. This objective would be achieved by: i) supporting wastewater management through the expansion of treatment capacity for the Jiangnan Wastewater Treatment Plant, and the development of new wastewater collection and treatment facilities in five county-seat towns; (ii) the rehabilitation and environmental improvement of tributaries of Yongjiang River, including the Fenghuang River, the Liangqing River and Lengtang River; and (iii) an innovative technical assistance activity on integrated mini-river basin management as well as support for project management. For the detailed project description, please refer to the Annex 4 – Detailed Project Description in the PAD.

Audit Arrangements

6. 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 International Auditing Standards and the Government Auditing Standards of the People's Republic of China. Guangxi Autonomous Regional Audit Office (GAO) has been identified as auditors for the project. Annual audit reports will be issued by GAO and subject to reviews by the China National Audit Office (CNAO). The Bank currently accepts audit reports issued by CNAO or provincial/regional audit bureaus/offices for which CNAO is ultimately responsible.

7. The annual audit report of project financial statements will be due to the Bank within six months after the end of each calendar year. This requirement is stipulated in the loan agreement. The responsible agency and timing are summarized as follows:

Audit Report	Submitted by	Due date
Consolidated project financial statements	Nanning Municipal PMO	June 30 of each calendar year

Risk Assessment and Mitigation

8. The following risks, with corresponding mitigating measures, have been identified during the assessment:

Risk	Risk Rating Before Mitigating Measures	Incorporated Risk Mitigating Measures	Risk Rating After Mitigating Measures	Conditions of Negotiations, Board or Effectiveness
Inherent Risk				
Country level	Modest	Continuous dialogue with related government entities and technical assistance from the Bank will help the government to improve its public sector financial management. In short-term, annual audit requirements will reduce the risk that project funds are not used for intended purposes. For those areas where government system can not be used, Bank's specific requirements will be embedded into project financial management system.	Modest	None.
Entity Level	Modest	The project has 3 PIUs: Guangxi Nanning Water Co. Ltd. (GNWC), Nanning Xiangsihu Investment & Constructions Company Ltd. (NXIC), and Nanning Communication and Water Conservancy Investment Company Ltd. (NCWIC). GNWC has experience with the Bank-financed Guangxi Urban Environment Project and NXIC has experience with an ongoing ADB financed project. NCWIC, a new PIU, is an ongoing business enterprise with main business of civil works construction.	Low	None.
Project Level	Modest	Each PIU will be responsible for the execution of one to four subprojects. The project structure and components are relatively straightforward.	Low	None.
Control Risk				
Budgeting	Modest	There are existing budgeting controls at the PIUs although not specifically focused on the project activities. The FMS will work with each of the PIUs to strengthen their budgeting process over the project activities.	Modest	None.
Accounting	Modest	Accounting policies and procedures for the Bank loan are already in place. All the PIUs are experienced with maintaining accounting records and ledgers. Periodic supervision from task team will be performed to ensure these procedures are still functioning as designed.	Low	None.
Internal	Modest	Each PIU has existing internal controls and those	Modest	None.

Control		control procedures are documented in each of the PIU's existing financial management regulations.		
Funds Flow	Modest	The flow of withdrawal applications and loan proceeds will only go through GXFB and NFB, which will benefit project implementation efficiency. Both GXFB and NFB have experience with the Bank financed projects and its involvement and review function will mitigate FM risks.	Low	None.
Financial Reporting	Modest	The format and contents of financial statements have been stipulated by MOF and all the PIUs will use them for project financial reporting. Since the project only has 3 PIUs, the consolidation of the financial statements by the Nanning Municipal PMO is not complicated.	Low	None.
Auditing	Modest	The external auditor, GAO, has experience with previous Bank projects.	Low	None.
Overall	Modest		Low	

9. Therefore, the overall FM risk-rating assigned to this project at the pre-appraisal stage is low, provided the proposed mitigating measures are carried out. The FMS will monitor the effectiveness of the measures and project FM risk during project implementation.

Disbursement Arrangements

10. Four disbursement methods: advance, reimbursement, direct payment and special commitment are available for the project. Supporting documents required for Bank disbursement under different disbursement methods will be documented in the Disbursement Letter issued by the Bank. Applications will be supported by:

(a) The list of payments against the contracts, and records evidencing eligible expenditures, e.g., copies of receipts, supplier invoices, for the contracts subject to the Bank prior review indicated in the table below (pending on finalization):

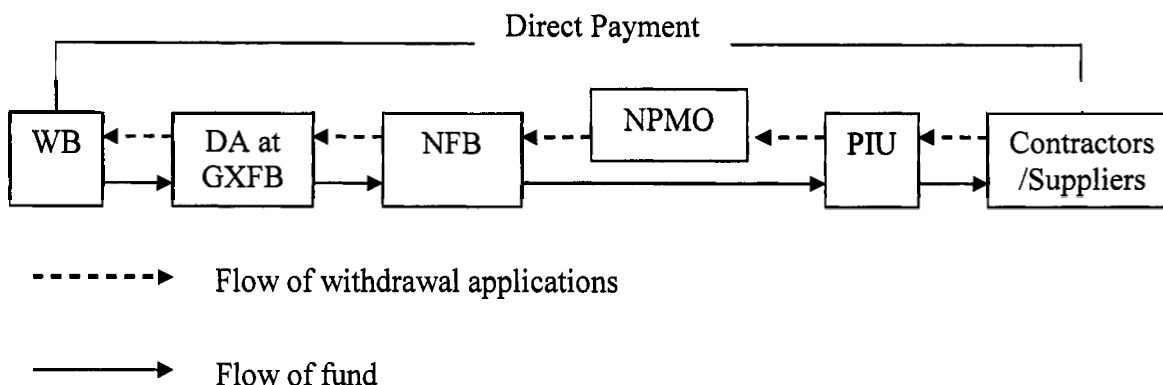
Expenditure Category	Contracts More than US\$ Equivalent
Civil Works	5,000,000
Goods	500,000
Firm Consultant	100,000
Individual Consultant	50,000

(b) Statement of Expenditures (SOEs) for any other expenditure.

11. One segregated designated account (DA) denominated in US dollars will be established at a commercial bank acceptable to the Bank and managed by GXFB. The ceiling of DA for the Bank loan

will be finalized later in the Disbursement Letter issued by the Bank.

12. GXFB will be directly responsible for the management, maintenance and reconciliation of the DA activities of the project. Supporting documents required for Bank disbursements will be prepared and submitted by respective PIUs to the Nanning Municipal PMO (NPMO) and NFB for review and approval before being sent to GXFB for further disbursement processing. The flow of funds and withdrawal applications for the loan proceeds is as follows:



13. Counterpart funds will be the contributions from local government appropriations and commercial bank loans.

14. The Bank loan would be disbursed against eligible expenditures as shown in the following table:

Table 7-2: Disbursement Schedule

Expenditure by Category	Amount of Loan Proceed (in US\$)	Percentage of Expenditure to be financed by IBRD
(1) Civil Works	60,070,000.00	81%
(2) Goods	37,630,000.00	100%
(3) Consultant Services, Training and Study Tour:	2,050,000.00	100%
(5) Front-end Fee:	250,000.00	Amount payable as per section 2.03 of Loan Agreement in accordance with Section 2.07 (b) of the General Conditions
(6) Premium for Interest Rate Cap or Interest Rate Collar	0.00	Amount payable as per section 2.07 (c) of Loan Agreement and Section 4.05(c) of the General Conditions
Total Loan Amount:	100,000,000.00	n.a.

15. Retroactive financing will be applied for the project. The date of eligible expenditures is September 15, 2009, and the amount for the retroactive financing is estimated at \$18.89 million.

Financial Management and Reporting Arrangements

16. **Strengths.** Two of the three PIUs have experience with World Bank- and ADB-financed projects. NPMO has the experience with World Bank financial project – Guangxi Urban Environment Project. GXFB and NFB are familiar with the management of designated account and withdrawal applications procedures for Bank financed projects.

17. **Weaknesses and Action Plan** . NCWIC does not have experience with Bank-financed projects. However, it is an ongoing business enterprise and has an experienced and competent financial manager who has solid accounting knowledge and experience with civil works construction.

Implementing Agencies

18. A Project Leading Group (PLG) has been established in Nanning, chaired by the Vice Mayor of Nanning Municipal Government. The members of the PLG include the representatives from Nanning Municipal Development and Reform Commission (NNDRC), NFB, Nanning Municipal Construction Bureau and Nanning Municipal Environment Protection Bureau as well as other related government agencies. Under the PLG, NPMO (which is under NNDRC) will act as a coordinating body for all the investment components implemented by the following companies: (i) Wastewater management of city and counties component – GNWC; and (ii) River rehabilitation component – NXIC and NCWIC.

Budgeting

19. The cost table has been prepared for the project and the project will prepare its annual implementing plan. The budgeting system within the project shall be well maintained or monitored, and the task team will work with the related entities to improve their budgeting system during project implementation.

Accounting

20. 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 for 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

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

- Balance sheet of the project
- Statement of sources and uses of fund by project components
- Statement of implementation of loan agreement
- Statement of designated account
- Notes to the financial statements

22. Each PIU will be managing, monitoring and maintaining their respective project accounting records for their respective components. Original supporting documents for project activities will be retained by each PIU. In addition, each PIU will prepare its own financial statements, which then will be reviewed, approved and consolidated by the NPMO before they are sent to the Bank for review and comment on a semiannual basis.

23. Each PIU is a continuing business entity and has its own financial management policies, which include internal controls, accounting procedures, fund and asset management, and financial reporting, etc. Thus, the PIUs will use their own financial management policies for the project; this is considered adequate and appropriate. In addition, the GXFB and NFB will also issue a circular to the PIUs on the withdrawal application and disbursement process, procedures and requirements for the project to ensure the smooth flow of funds and withdrawal applications. All PIUs will use their existing computerized accounting software, all of which have been deemed adequate for this project.

Internal Control and Internal Auditing

24. The related project accounting policy, procedures and regulations were issued by MOF and are reflected in their financial management manual. There is no independent Internal Audit department for the project. However, this will not impact the project's financial management because the management and monitoring from PIUs and relevant finance bureau, as well as annual external audits, will serve as the mechanism to ensure that financial management controls are functioning appropriately.

Financial Reporting

25. The format and content of the project financial statements represent the standard project financial reporting package agreed to between the Bank and MOF, and have been discussed and agreed to by all concerned parties.

26. Each implementing agency will prepare financial statements on its implemented components, which will then be used by NPMO for preparing consolidated project financial statements and will be submitted to the Bank for review and comment on a regular basis. The interim un-audited project financial statements should be submitted as part of progress reports to the Bank on a semiannual basis and are due 45 days after the semiannual period.

Financial Covenants

27. No specific financial covenants are applicable to the project except for standard financial covenants, such as project audits and interim financial reports.

Supervision Plan

28. The supervision strategy for this project is based on its FM risk rating, which will be evaluated on a regular basis by the FMS and in consultation with relevant task team leader.

Annex 8: Procurement Arrangements

CHINA: Nanning Urban Environment Project

General

1. Procurement for the proposed project will be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" dated May 2004 revised October 2006; and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated May 2004 revised October 2006, and the provisions stipulated in the Legal Agreements.

2. The general descriptions of various items under different expenditure categories are given below. For each contract to be financed by the Loan, procurement methods or consultant selection methods, the need for prequalification, estimated costs, prior review requirements, and the timeframe have been agreed between the Borrower and the Bank, and is part of the Procurement Plan. The Procurement Plan was prepared by the Nanning Project Management Office (NPMO) and will be updated at least annually or as required, to reflect the actual project implementation needs and improvements in institutional capacity.

3. **Procurement of Works.** Works procured under this project will include: construction of wastewater treatment plants and pump stations, construction or rehabilitation of sewer system and storm water system, river embankment, etc. Procurement will use the Bank's Standard Bidding Documents (SBDs) for all ICBs, and the Chinese Model Bidding Documents (MBDs), agreed with or satisfactory to the Bank for all NCBs.

4. **Procurement of Goods.** Goods procured under this project will include: equipment for pump stations, wastewater treatment plants, laboratory instruments, office equipment, etc. Procurement will use the Banks' SBDs for all ICB and the MBD agreed with or satisfactory to the Bank for all NCBs. The shopping procedure will be applied for this project, and the document seeking quotations will be prepared by the NPMO, and will be agreed by the task team prior to implementing the relevant procurement.

5. **Procurement of Combined Works and Goods Contracts.** These contracts will include civil works, equipment supply, installation and commissioning. To enhance implementation efficiency, some contracts have been packaged to include civil works, equipment supply, installation and commissioning for pump stations and wastewater treatment plants. Either Standard Bidding Documents or modified bidding documents for civil works, or for supply and installation of plant and equipment will be used for preparing the bidding documents for these contracts, subject to the agreement of the Bank on a case by case basis.

6. **Selection of Consultants:** Consulting services will include: a) Integrated Mini River Basin Management (IMRBM), with review and revision of the water related regulations; b) River Hydraulic Modeling, to be used for the optimization of the river component; and c) Project Management and Design Review, including training and study tours. All consulting services will be provided by

consulting firms or individual consultant. Short lists of consultants for services estimated to cost less than US\$ 300,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. The Qualification and Cost Based Selection (QCBS) will apply to contracts with the estimated cost of US\$ 200,000 or above each. Selection based on the Consultant's Qualification (CQS) may apply to contracts below US\$ 200,000. Quality Based Selection (QBS) may apply in case of universities and government research institutes that are selected for some consulting services, such as the sludge treatment study, study of the feasibility of the conjunctive use of natural ponds for wastewater treatment, and staff training.

7. **Training and Study Tours.** For training and study tours, detailed programs will be developed by the NPMO during project implementation, and included in the project's annual work plan, for the Bank's review. Actual expenditures incurred in accordance with the approved detailed programs would be used as the basis for reimbursement.

8. **Advertisement and Publication of Contract Award.** The General Procurement Notice (GPN) was published on April 7, 2009, on dgMarket, and will be updated as necessary. In addition to an advertisement in a national newspaper, all Special Procurement Notices (SPN) for ICB, and Requests for Expression of Interest (EOI) for consulting services exceeding US\$ 200,000, will be advertised in the UNDB online and dgMarket. The advertisement for the Request for EOI for consulting services will be made in a national newspaper, regardless of estimated contract value. Bid/proposal evaluations and contract awards will be published in accordance with paragraph 2.60 of the Guidelines for works and goods, and paragraph 2.28 of the Guidelines for consulting services.

B. Assessment of the Agency's Capacity to Implement Procurement

9. Procurement activities will be carried out by the NPMO and PIUs. The NPMO will serve as the main counterpart to the Bank, and will have overall responsibility for project implementation, in accordance with the Loan and Project Agreement.

10. An assessment of the capacity of the Implementing Agency to implement procurement actions for the project was carried out by the Bank team in November 2008. The assessment reviewed the organizational structure for implementing the project and the interaction between the staff responsible for procurement in the NPMO and PIUs. The Procurement Capacity Assessment Review (PCAR) is available in the Project Files.

11. The proposed project is the second Bank-financed urban infrastructure project to be implemented by the NPMO, having acted as the Sub-PMO for the Guangxi Urban Environment Project (Ln 4348 CHA, IDA 3097-CHA, closed on December 31, 2007). Three companies are designated as PIUs. Among these PIUs, the Guangxi Lvcheng Water Affair Co., Ltd., has implemented a sub-component of Guangxi Urban Environment Project. The other two PIUs do not have experience in implementation of Bank-financed projects. The key risk concerning procurement is therefore the insufficient experience of procurement staff of PIUs and their lack of procurement knowledge and procedures on the Bank-financed projects. Also, the Guangxi Province and Nanning Municipality have issued the related regulations on bidding and tendering, and some requirements in these official documents/regulations were identified and summarized in the PCAR. The corrective measures which

have been agreed between the Bank team and Nanning are: (i) the NPMO will prepare a Procurement Manual and issue it to all PIUs to ensure the quality, smooth preparation and implementation of procurement; (ii) the NPMO will organize procurement training on the preparation of bidding documents and bidding procedures, with assistance from an experienced international consultant; and (iii) with guidance from the Municipal Government, the bidding and tendering requirements conflicting with the Bank's guidelines will be not applicable for the proposed project. Before the project appraisal, the Nanning government has confirmed that any local bidding regulations or requirements that conflict with the Bank's procurement policies and procedure will be not applied in this project.

12. In the implementation process, the NPMO will be responsible for monitoring overall progress of project procurement and all procurement documents will be submitted to the Bank through the NPMO.

13. The overall project risk for procurement is **Moderate**.

C. Procurement Plan

14. The Borrower has developed a Procurement Plan for project implementation which provides the basis for the procurement methods. This plan was agreed between the Borrower and the task team on August 31, 2009, and is available at the NPMO's office in Nanning, China. It will also be available in the Project's database and on the Bank's external website. The Procurement Plan will be updated annually, in agreement with the task team to reflect the actual project implementation needs and improvements in institutional capacity. The Procurement Plan is provided in Table C below.

D. Advance Contracting and Retroactive Financing

15. Retroactive financing would be applied for expenditures incurred after September 15, 2009, for employment of consulting firms and other advance contracting which were agreed during project appraisal. Advance contracting will be done in accordance with Bank and project guidelines. Proposed advance contracting and retroactive financing are summarized in Table B below. The estimated expenditures are about US\$ 78.10 million, with a conservative estimate of US\$ 18.89 million in retroactive financing required, which is below the threshold of 20 percent of the total loan amount (US\$ 20 million) under the World Bank Operational Policy 12.10. The Nanning Municipality has been made aware that payments made in expectation of retroactive financing are at the Borrower's risk, and do not commit the Bank to making a loan for the project or the financing of such payments.

E. Frequency of Procurement Supervision

16. In addition to the prior reviews to be carried out by the task team on an ongoing basis, the PC one supervision mission will be carried out every 12 months.

Details of the Procurement Arrangements

Table A. Threshold for Procurement Methods and Prior Review

	Prior Review Thresholds Proposed (USD)	Procurement Method Thresholds Proposed (USD)					
		ICB	NCB	Shopping	QCBS	CQS	SSS
Goods	≥ 0.5 million	≥1.0 million	<1.0 million	<0.10 million			
Works	≥ 5million	≥20 million	<20 million	NA			
S&I of Plant, Equipment and IT	≥ 1million	All					
Consulting Services	≥0.1 million for firm, ≥0.05 million for individuals, all SSS				≥0.2 million	<0.2 million	NA
Post Review Ratio: One in 5 contracts							

In addition, the Bank will review the first contract procured by each PIU.

Table B. Contracts Eligible for Retroactive Financing

Contract No.	Construction Period (months)	Possible Eligible Retroactive Financing (US\$ Million)
WWSC1	17	1.53
WWSC2	16	0.96
WWSC3	16	0.62
WWSC4	10	0.25
WWSC5	11	0.29
WWTC1	14	1.68
WWTC2	12	0.64
WWTG1	14	1.60
WWTG2	14	1.56
WWTC3-1	18	9.41
PM-A	60	0.20
RBMC-A	50	0.08
RBMC-B	42	0.07
Total		18.89

Nanning Urban Environment Project
Procurement Packages - Civil Works, Equipment and Consulting Service
 (August 31, 2009)

1. Wastewater Component											
A. Civil Works											
	Ref. No	Description	Estimated Cost		Procurement Method	Bid Period	Review by Bank	Estimated Commence Time	Contract Duration (Month)	Pre-qualification of Bidder	
			million CNY	million USD							
1	WWSC1	Phase 1 of wastewater pipeline for Wuming (dn300-dn1200 wastewater 23.52 km, five wastewater pumping station)	55.69	8.19	NCB	29/09/2009 ~ 13/11/2009	PRIOR	30/11/2009	18	NO	
2	WWSC2	Phase 1 of wastewater pipeline for Binyang (dn300-dn1000 wastewater 22.37 km, one wastewater pumping station)	25.07	3.69	NCB	28/10/2009 ~ 19/12/2009	POST ¹	05/01/2010	18	NO	
3	WWSC3	Phase 1 of wastewater pipeline for Heng (dn300-dn1000 wastewater 22.42 km, one wastewater pumping station)	23.76	3.49	NCB	13/11/2009 ~ 03/01/2010	POST ¹	18/01/2010	18	NO	
4	WWSC4	Phase 1 of wastewater pipeline for Shanglin (dn400-dn800 wastewater 8.7 km)	7.88	1.16	NCB	13/10/2009 ~ 03/12/2009	POST ¹	18/12/2009	12	NO	
5	WWSC5	Phase 1 of wastewater pipeline for Mashan (dn400-dn800 wastewater 9.2 km, one wastewater pumping station)	12.06	1.77	NCB	28/11/2009 ~ 17/01/2010	POST ¹	01/02/2010	12	NO	
6	WWTC1	Phase 1 of WWTP for Wuming (50000m ³ /d), Shanglin (6000m ³ /d) & Mashan (6000m ³ /d)	34.45	5.06	NCB	29/09/2009 ~ 23/11/2009	PRIOR	10/12/2009	9	NO	
7	WWTC2	Phase 1 of WWTP for Binyang(20000m ³ /d) and Hengxian (20000m ³ /d)	18.50	2.67	NCB	15/09/2009 ~ 08/11/2009	POST ¹	26/11/2009	9	NO	
8	WWTC3	Ground Levelling, Access Roads and Walls of Phase 1 of WWTP for Wuming, Shanglin and Mashan	4.57	0.67	NBF	05/2009 ~ 06/2009	N/A	06/2009	6	NO	
9	WWTC4	Ground Levelling, Access Roads and Walls of Phase 1 of WWTP for Binyang and Hengxian	2.97	0.43	NBF	05/2009 ~ 06/2009	N/A	06/2009	6	NO	

Subtotal		184.94	27.19							
B. Supply and Installation of Equipment										
10	WWTG1	Supply and Installation of Equipment for WWTP for Wuming, Shanglin and Mashan	57.48	8.45	ICB	07/12/2009~11/03/2010	PRIOR	26/03/2010	9	NO
11	WWTG2	Supply and Installation of Equipment for WWTP for Binyang and Hengxian	44.82	6.59	ICB	13/11/2009~03/02/2010	PRIOR	18/02/2010	9	NO
12	WWTG3	Power supply for Wuming WWTP	1.20	0.18	NBF	11/2009~12/2009	NA	03/2010	4	NO
13	WWTG4	Power supply for Mashan WWTP	0.40	0.06	NBF	11/2009~12/2009	NA	03/2010	4	NO
14	WWTG5	Power supply for Hengxian WWTP	0.18	0.03	NBF	11/2009~12/2009	NA	03/2010	4	NO
15	WWTG6	Power supply for Shanglin WWTP	0.48	0.07	NBF	11/2009~12/2009	NA	03/2010	4	NO
Subtotal			104.56	15.38						
C. Civil Works, Supply and Installation of Equipment										
16	WWTC3-1	Civil Works, Supply and Installation of Equipment for Phase 2 of Jiangnan WWTP (240,000m3/d)	228.07	33.54	ICB	08/09/2009-10/03/2010	PRIOR	25/03/2010	18	YES
17	WWTC3-2	Site preparation and Foundation works for Phase 2 of Jiangnan WWTP	18.92	2.78	NBF	12/2008-03/2009	NA	03/2009	6	NO
Subtotal			246.99	36.76						
SUBTOTAL OF CCOMPONENT 1			536.49	78.89						
2. River Rehabilitation Component										
2.1 Fenghuang River Component										
A. Civil Works										

18	RRECI	Fenghuang River Rehabilitation (4.8km) including dam, stone weir, sewer and gate, ecological recovery, etc.	97.07	14.28	NCB	06/2010-08/2010	PRIOR	09/2010	24	N O
		Subtotal	97.07	14.28						
2.2. Liangqing River and Lengtangchong Component										
A. Civil Works										
19	RREC4	Liangqing River Rehabilitation Section I (Wuxiang Corridor - No. 1 Planning Rd., 2.334km river Rehabilitation)	40.50	5.96	NCB	07/2010 ~ 09/2010	PRIOR	10/2010	18	N O
20	RREC5	Liangqing River Rehabilitation Section II (No. 1 Planning Rd. - Pingle Corridor., 2.573km river Rehabilitation, one dam)	33.72	4.96	NCB	08/2010 ~ 10/2010	PRIOR	11/2010	18	N O
21	RREC6	Liangqing River Rehabilitation Section III (Pingle Corridor - Yudong Corridor., 1.993km river Rehabilitation, one dam)	29.32	4.31	NCB	10/2010 ~ 12/2010	POST	01/2011	12	N O
22	RREC7	Lengtangchong River Rehabilitation (2.504km river rehabilitation)	44.60	6.56	NCB	07/2010 ~ 09/2010	PRIOR	10/2010	18	N O
23	RREC8	Ecology Recovery Works for Liangqing River and Lengtangchong (6.9km and 2.504km)	18.89	2.78	NCB	01/2011 ~ 03/2011	POST	03/2011	10	N O
		Subtotal	167.02	24.56						
B. Supply and Installation of Equipment										
24	RREG3	River Management Equipment for Liangqing River and Lengtangchong	0.76	0.11	SHOPPING	07/2010 ~ 09/2010	POST	10/2010	3	N O
		Subtotal	0.76	0.11						
		SUBTOTAL OF COMPONENT 2	264.85	38.95						
3. Consulting Service Component										
A. Consulting Service and Capacity Building										
25	PM-A	Consulting service for design review, project management, contract administration	6.60	1.00	QCBS	09/2009 ~ 12/2009	PRIOR	01/2010	60	N/ A
		Capacity Building for Small River Basin Management								
26	RBMC-A	Modification to Management Regulation for Yongjiang Water Pollution Control and Preparation of Implementation rules	0.55	0.08	IC	09/2009 ~ 10/2009	PRIOR	11/2009	50	N/ A
27	RBMC-B	Study of strategy for sustainable development in river basin	0.50	0.08	CQS	11/2009 ~ 12/2009	POST ¹	01/2010	42	N/ A

28	RBMC-C	TA for Draft Action Plan of Pollution Control in Fenghuang Jiang, Liangqing River, LengtangChong	0.35	0.05	CQS	01/2010 ~ 02/2010	POST	03/2010	33	N/A
29	RBMC-D	Capacity Building for water quality monitoring in river basin	4.53	0.69	QCBS	01/2010 ~ 04/2010	PRIOR	04/2010	56	N/A
		Subtotal	12.53	1.90						
B. Supply and Installation of Equipment										
30	RMBG-1	Procurement of Equipment for Water Quality Monitoring System	1.00	0.15	NCB		POST		6	
		Subtotal	1.00	0.15						
		SUBTOTAL OF CCOMPONENT 3	13.53	2.05						

Nanning Urban & Rural Environment Improvement Project

Works Contract Packages (Total 14packages)	669.57	98.47
Goods Contract Packages (Total 4 packages)	104.06	15.30
Consulting Service (Total 5)	12.53	1.84
Bank Funded Contract Packages (Total 23)	786.16	115.61
NBF Contract Packages (Total 7)	28.72	4.22
Total (30 packages)	814.88	119.84

Note:

1. Prior review of the World Bank shall be applicable if advance contracting is assumed.
2. Power supply for Jiangnan WWTP Phase II Project is excluded as the power has already connected during the Phase I.
3. Power supply for Binyang County WWTP is excluded, because the site of WWTP is very close to the grid and the power can easily be connected.

*1 USD=6.8RMB; C.W. = Civil Works Contract ; E.Q.=Equipment Contracts; C&S&I=Civil works, Equipment Supply and Installation Contract; S&I = Equipment Supply and Installation Contract ; ICB = International Competitive Bidding ; NCB = National Competitive Bidding; QCBS = Quality and Cost-based Selection, CQS=Consultant Qualification Selection; WWTP = Wastewater Treatment Plant

Annex 9: Economic and Financial Analysis

China: Nanning Urban Environment Project

I. Economic Analysis

1. Economic Analysis was carried out for the wastewater management and river rehabilitation components based on: (i) the least-cost methodology and (ii) quantification of benefits. Also, as a floor for the economic rate of return of the wastewater management component, its financial rate of return is reviewed. In addition, economic analyses of a comparable wastewater management and river rehabilitation projects are referred to. All the analyses indicate that the economic benefits exceed the investment and operation costs of the Project.

A. Least Cost Analyses

Wastewater Management Component

2. Least cost solution is adopted for the wastewater management component. The alternative of not developing wastewater treatment and collection facilities was rejected, as wastewater from the urban areas would continue to be discharged into the rivers without treatment. For review of other types of solution options, the following factors have been considered: different locations of the treatment plants, various capacities of the treatment facilities, alternative treatment processes and several locations for effluent discharge into the waterways.

3. An example is the considerations made for the wastewater sub-component in Mashan County. Alternative locations of the WWTP were considered from a topologic criteria leading to possible alternative solutions where the collected wastewater can flow by gravity avoiding costs of pumping stations and pumping. The selection of location was furthermore qualified from land availability and distance to possible outlet to the river to minimize capital costs of construction. A higher treatment capacity of 20,000 m³/day was rejected as a capacity of 6,000 m³/day was found to be sufficient to meet the demand in the planning period, taking into account population growth, economic development and current/future water consumption patterns. In terms of alternative treatment processes, two options were reviewed for the small-scale treatment plant: CAST and anaerobic and aerobic processes (A/O). As shown in the table below the CAST process was selected because it is the least-cost solution.

Table 9.1: Treatment Process Comparison in Mashan County Town

	Alternative treatment processes	
	A/O	CAST (Selected)
<i>Annual costs (RMB):</i>		
- annualised capital costs (20 years)	1,229,100	1,203,100
- operation ¹	1,070,200	1,047,900
Total (capital costs + operation)	2,299,300	2,251,000

¹Cost of operation includes repair & maintenance, electricity, chemicals, salaries for operational staff and management

4. For larger scale treatment plants in Wuming, the selection has been made between SBR and A/O processes. For all treatment plants the SBR process has been selected based on least-cost criteria. The table below comprises least-cost evaluation for the treatment plant in Wuming with a capacity of 50,000 m³/day.

Table 9.2: Treatment Process Comparison in Wuming County

	Alternative treatment processes	
	A/O	SBR (Selected)
<i>Annual costs (RMB):</i>		
- annualised capital costs (20 years)	2,960,170	2,760,170
- operation (electricity)	5,910,800	5,734,300
Total (capital costs + operation)	8,870,970	8,494,470

River Rehabilitation Component

5. The least-cost solutions have been adopted for the River Rehabilitation component. The alternatives of not doing the river rehabilitation projects were rejected because fulfilling the objectives is a requisite for urban development. Postponing the implementation to a later stage of the urban development will add additional costs to the component. Alternatives with the different combinations of forced drainage with pump station and increase of regulating capacity along the rivers had been analyzed to determine the best solution with the lowest capital investment and operational costs. The lowest cost solutions were adopted for the structure design, the river course cleaning and erosion control measures. Furthermore, selection of environment-friendly materials for the embankment and selection of local species for the plantation are adopted as a design principle. The least cost selection is shown in the tables below.

Table 9.3: Options considered for the Fenghuang River Component

(RMB Millions)	Scheme 1* (selected)	Scheme 2
Main characteristic of differences between alternative schemes	Establishment of a regulation lake	Enhancing the pumping capacity
<i>Expenditures:</i>		
- Construction and Equipment	145.70	169.70
- Land Acquisition and Resettlement	154.73	136.65
Total investments	300.43	306.35
Annualised capital costs (40 years)	7.51	7.66
Annual cost of O&M	3.33	3.75
Annual costs (ex financial charges)	10.84	11.41

Table 9.4: Options considered for the Liangqing and Lengtang Rivers

(RMB Million)	Scheme 1	Scheme 2	Scheme 3 (Selected)
Main characteristic of differences between alternative schemes	Pumping scheme	Regulation and storage scheme	Combination of Scheme 1 + 2
<i>Expenditures:</i>			
- Construction and Equipment	357.18	324.83	314.29
- Land Acquisition and Resettlement	193.62	509.97	244.50
Total investments	550.80	834.80	558.79
Annualised capital costs (40 years)	13.77	20.87	13.97
Annual cost of O&M	6.44	4.81	5.20
Annual costs (ex financial charges)	20.21	25.68	19.17

B. Quantification of Economic Benefits

6. For both river components the quantifiable economic benefits were estimated as much as possible, although it is very difficult to estimate them precisely. For example, benefits of these components cover not only the Nanning Municipality, but also the entire downstream of the Yongjiang River. The economic benefits are comprised of flood control and land appreciation.

7. The flood control measures will significantly reduce the incidence of floods and associated economic losses for farmers, commercial activities and households. The flood control benefits have been evaluated based on surveys and data from earlier floods. As the components have been designed to prevent a 50-year flooding, the benefits from eliminating floods occurring every 4, 10, 20 and 50 years have been included. The flood control benefits are estimated on an annualized basis. The property and land value appreciation have been evaluated based on experience from other land developments. For the Fenghuang River Component, 40 percent of the land area covered by the development will be laid out for real estate purposes while the remaining part will be kept as farm land. For the Liangqing and Lengtang Rivers Component, the entire area will be laid out for real estate, although valued lower by area than the Fenghuang component because of its more distant location from Nanning.

8. As shown in the tables below, the land value appreciation is a main contributor to the economic benefits. The benefits from developing the land exceed the capital costs for both components, including land acquisition and resettlement costs. The flood control benefits are at a lower scale but also contribute significantly to the economic benefits because they are estimated on an annual basis and will increase over the years.

Table 9.5: Economic Benefits from Fenghuang River Component

Type of benefit	Basis for calculation	Value (RMB million)
Flood Control	Benefits comprise reduction in damage from floods which occur every 4, 10, 20 and 50 years.	10.68 per year
Land Appreciation	2.3 km ² land will be made available for development, of which 1.4 km ² will have an increased value of RMB 10,000/mu	20.70
	The remaining part (40%) will be developed for real estate. The average increase in value from the project is estimated to RMB 350,000/mu. The average price achievable from selling is RMB 2,000,000/mu. This estimation is made by classifying the land into several categories which have been individually estimated concerning its value.	483.76

Table 9.6: Economic Benefits from Liangqing and Lengtang Rivers Component

Type of benefit	Basis for calculation	Value (RMB million)
Flood Control	Benefits comprise reduction in damage from floods, which occur every 4, 10, 20 and 50 years.	2.60 per year
Land Appreciation	5.7 km ² of land will be made available for development The land for development will primarily be used for real estate purposes and not agriculture The increase in land value is estimated by government agencies to RMB 86,000/mu. The value of the land is at RMB 500,000/mu.	584.80

C. Floor for the Economic Rate of Return

9. Financial rate of return for the Jiangnan Phase II Treatment Plant and the new treatment and collection systems in the five county towns is estimated at 6 percent, mostly arising from increased revenues and increased treatment volume of wastewater. This value serves as a minimum floor of the economic rate of return. Details of the financial rate of return analyses are presented in Section II Financial Analysis of this Annex.

D. Economic Analyses of Comparable Project.

10. In addition, results of comparative cost-benefit economic analyses provide very robust rates of return – 20% for a wastewater component and 18 percent for river rehabilitation⁶. They were carried out in 2007 with comprehensive contingent valuation survey methods for very similar wastewater and river rehabilitation projects for county towns in another province of China.

⁶ Yunnan Urban Environment Project (Report No.41199-CN)

Box 1: Economic Cost Benefit Analyses of Comparable Projects

Comprehensive cost-benefit analysis was carried out for a similar project in another province in China. For reference, the following section illustrates the economic analysis of those comparator cases.

Wastewater

A cost-benefit economic analysis was carried out in 2007 for a wastewater component of a Bank-financed Yunnan Urban Environment Project (YUEP) in Huaping county town in Lijiang Municipality of Yunnan Province in China. The wastewater component in Huaping is similar to the ones proposed for Shanglin County and Mashan County under the Project. The beneficiary population in Huaping was 51,500, compared to the population of 46,000 in Shanglin and 43,200 in Mashan. Proposed treatment capacity was 60,000 m³ per day for Huaping, the same capacity of proposed treatment plants in Shanglin and Mashan. The Huaping component included larger sewer collection networks – construction of 28 km of new sewer and rehabilitation of 14 km of old network, compared to 8.7 km of new network in Shanglin and 9.2 km of new sewer in Mashan. Thus the capital cost was slightly higher for Huaping at RMB 48 million, compared to RMB 33 million for Shanglin and RMB 35 million for Mashan.

For cost benefit analysis, a contingent valuation method was adopted to systematically capture direct benefits and externalities in monetary terms, to the extent to which externalities are associated with the proposed project. To substantiate the valuation, a comprehensive willingness-to-pay survey of 460 households was carried out for Huaping; respondents were selected through a four-stage stratified random sampling method, out of some 10,000 households in the project area. Questionnaires were carefully designed, utilizing multiple bound discrete choice pricing method and bid likelihood matrix. Careful quality control measures were employed for selection of enumerators, use of visual aids, employment of quality controllers, pre-survey focus group discussions and provision of training.

Residents of the project areas, including the poor, perceived that it would bring significant benefits to their households from environmental improvement and provision of urban infrastructure. On average each household was estimated to be willing to pay some RMB 70 per month for the services and environmental improvement, making the total benefits for the direct beneficiary population around RMB 8.4 million. The economic internal rate of return (EIRR) was then estimated at 19.9 percent. The sensitivity analysis, presented below, underlined robustness of the economic justification of the component.

Table: EIRR and Sensitivity Analysis of Huaping County Wastewater Component

Huaping County Wastewater	Base case	Sensitivity Analysis		
		A. WTP: - 15%	B. O&M cost: + 10%	C. Combined effect of A and B
EIRR	19.9%	16.7%	18.6%	14.8%

River Rehabilitation

A similar economic analysis was carried out for a river rehabilitation component for Puzhehei Lake/River of Qiubei County in Wenshan Miao and Zhuang Autonomous Prefecture in Yunnan Province in 2007. The component was also proposed under the Bank-financed YUEP. While composition of the activities of the Qiubei County Pzhehei River/Lake rehabilitation is different from those of the river rehabilitation components of the proposed Project, it would provide a certain reference point. Qiubei County is much less developed: its GDP was only RMB 2,703 per capita in 2005, compared to over RMB 10,000 per capita in urban districts of Nanning Municipality. Puzhehei is an important source of local tourism income as it is a scenic tourism destination. The Puzhehei component is more geared to community sanitation infrastructure, including construction of river mouth wetlands, provision of latrines, provision of double chamber composting facilities, and village wastewater treatment facilities. Project cost was RMB 23.7 million. 507 households were surveyed, out of over 35,000 households in the project areas, for their willingness to pay for environmental protection. The same methodology and quality control as in the case of the Huaping County wastewater component were adopted.

Despite the residents' lower ability to afford, residents in Qiubei County demonstrated strong willingness to pay for the environment improvement. Each household was willing to making contributions, making the total benefits for all the households over RMB 10 million. The estimated EIRR was 18.2 percent as presented in the table below.

Table: EIRR and Sensitivity Analysis of Qiubei County River Rehabilitation

Qiubei County River Rehab.	Base case	Sensitivity Analysis		
		A. WTP: - 15%	B. O&M cost: + 10%	C. Combined effect of A & B
EIRR	18.2%	14.8%	17.3%	12.9%

II. Fiscal Analysis

11. A fiscal analysis was carried out for Nanning Municipality. The municipality's annual infrastructure expenditures (including capital investments and debt services⁷) represent a range between 25 percent and 60 percent of the annual budgets⁸. The counterpart funding requirements under the Project will be a very small portion of the municipality's annual budgets and its total infrastructure expenditures; thus it will be manageable. The fiscal analysis is presented in Table 9.7 below.

⁷ Operation and maintenance expenditures are no longer managed by the municipality since the municipal maintenance fees have been cancelled as per the directives from the Ministry of Finance. Utility fees for wastewater treatment and tolls for bridges and roads are directly transferred to the relevant public companies; thus are not managed as the municipality's fiscal budgets.

⁸ The annual budget forecasts do not include direct special transfer from the national government as it is not possible to predict because of significant annual variations.

Table 9.7: Nanning Municipal Government Fiscal Analysis

Unit: RMB Billion (Except otherwise mentioned)

	Actual			Budget 2009	Forecast				
	2006	2007	2008		2010	2011	2012	2013	2014
GDP									
<i>Population (Million)</i>	87.0	106.9	130.0	155.0	177.0	200.0	230.0	260.0	300.0
Tax Revenue and Budgets									
Total Tax Revenues before Transfer [1]	12.036	15.084	19.17	23.00	30.000	34.800	40.368	46.827	54.319
Total Municipal Revenues [2]	7.346	12.968	10.730	11.531	14.747	17.043	19.751	22.590	26.326
- On-budget Items	5.662	7.015	9.288	10.868	14.056	16.307	18.983	21.785	25.450
- Off-budget Items [3]	1.684	5.953	1.442	0.663	0.691	0.736	0.768	0.805	0.876
Infrastructure Expenditures									
Total Annual Infrastructure Expenditures [4]	2.072	2.665	3.680	5.451	2.648	2.713	2.894	2.993	3.213
- Annual Capital Investments [5]	1.099	0.908	1.028	1.498	1.648	1.813	1.994	2.193	2.413
- Annual Infra. Debt Service Expenditures	0.972	1.757	2.652	3.953	1.000	0.900	0.900	0.800	0.800
Liabilities									
Total Outstanding Balance of Debts	18.527	19.917	18.987	15.947	15.125	14.557	14.312	12.203	11.649
- Outstanding Balance of Local Debts	17.345	18.778	17.638	14.433	13.383	12.547	12.000	9.550	8.600
- Outstanding Balance of Foreign Debts in USD [6]	0.170	0.155	0.197	0.226	0.260	0.300	0.345	0.396	0.455
Annual Debt Service Payments	2.183	2.882	4.607	4.916	1.318	1.132	1.119	1.065	1.050

Note:

- [1] Tax revenues - general tax revenues before a portion of the revenues are transferred to the central government.
 [2] Municipal revenues do not include receipts of transfer revenue payments appropriated from higher levels of government. It cannot be estimated since the amounts vary significantly each year. Land revenues became a part of the central government funds in 2008, and are not included in the municipal revenues.
 [3] Off-budgets items include: (a) institutional incomes such as water resource fees, hospital revenues and education revenues; and (b) industry advertisement fees and land transfer fees (the land transfer fees are gradually moved to the on-budget item category after 2008)
 [4] Within the annual infrastructure expenditures, the operation and maintenance expenditures no longer appear in the municipal expenditures since "municipal maintenance fee" has been cancelled from the new budgetary accounts as per ordinances from MOF. Utility companies O&M expenditures do not appear in the municipal expenditure since "wastewater treatment fees" and "road & bridge tolls" are transferred to the utility companies and accounted for as income of these enterprises.
 [5] Annual capital investments include public expenditures in roads, bridges, river banks, parks, water supply and wastewater.
 [6] The foreign debts figures are supposed to include WB loans of GUEP and NUEP, but require further clarification.

III. Financial Analysis

12. A financial analysis was carried out for the water supply and wastewater operations of the Guangxi Nanning Water Co., Ltd., which will take charge of all the water supply and wastewater operations in the central districts of Nanning City, and the new wastewater collection and treatment operations in the five county-seat towns⁹. The preliminary analysis indicates that all the investments, operation and maintenance will be financially sustainable with projected tariff revenues, proposed capital structure and expected operational efficiency.

A. Water Supply and Wastewater Tariffs

13. *Water Supply Tariffs:* The current water supply tariffs for the central districts and county towns were introduced in 2005/2006. The residential tariff for the central districts is set for RMB 1.05 /m³. Those for commercial, institutional and industrial customers are in the range of RMB 1.09/m³ to RMB 3.60/m³. The current water supply tariffs in the five county towns are in the range of RMB 1.20/m³ to RMB 1.40/m³. The water supply tariffs are expected to increase on a regular basis every three years.

14. *Wastewater Tariffs:* The first wastewater tariff of RMB 0.13/m³ was introduced for the central districts in 1997 along with construction of the Jiangnan WWTP, which was financed under the previous IBRD project – the Guangxi Urban Environment Project. The wastewater tariff was later raised to RMB 0.25/m³ and in 2004 to RMB 0.50/m³. In October 2008, the current tariff of RMB 0.80/m³ was introduced for the entire Nanning City, including the central districts and county towns. The wastewater tariff is expected to be revised on a regular basis at least every three years. The next tariff increase is expected to be at around 30 percent, making it RMB 1.05 by the end of 2009. Unlike many other wastewater operations in China, wastewater tariffs are levied on 100 percent of the water supply volume consumed, rather than on a fraction (e.g., 75 percent to 87 percent) of the water supply consumption volume.

15. *Tariff Collection:* In the central districts, both water supply and wastewater tariffs are billed and collected by the Guangxi Water Supply Company, Ltd. In the county towns, billing and collection of wastewater tariffs are carried out by the water companies of the county-seat towns and are passed on to the Guangxi Nanning Water Co., Ltd., which operates the wastewater collection and treatment. These water supply companies charge collection fees of 1.5 percent of the total collection of wastewater revenues to the Guangxi Nanning Water Co., Ltd.

B. Financial Sustainability of Wastewater Operations

16. *Financial performance:* The wastewater and water supply operations of the Guangxi Nanning Water Co., Ltd., would be financially sustainable under the proposed Project, based on the projections of tariff revenues, capital structure, and operational efficiency. There will be no cross-subsidization between water supply operation and wastewater operation: each operation would remain independently profitable. The wastewater operations for county towns would incur small deficits due to the lack of

⁹ The water supply operations will continue to be carried out by the existing water supply companies of the county-seat towns.

economy of scale in operations; these deficits would be offset by the financial surplus from the operations in the central districts. Projections of income statements, balance sheets and cash flow statements for the entire operations of the company, including the water supply and wastewater for the central districts and county towns, are presented in the tables 9.9, 9.10, 9.11 and 9.12 at the end of this section. Projected income statements solely for wastewater operations are presented in the table 9.13. Sample income statements for wastewater operations of a county town are presented in the table 9.14. Details on assumptions and projection methods are included in the Project File. The projections have been made in constant 2008 prices.

17. The company's annual total revenue from its water supply and wastewater operations will increase from RMB 400 million in 2008 to RMB 725 million in 2018 because of the increase in service volume and tariff revisions. Revenues on wastewater operations will increase from around RMB 130 million in 2008, or about 30 percent of its total revenue, to RMB 365 million in 2018, around 50 percent of its total revenues. The ratio of annual earnings before interest charges and depreciation to the total revenues is projected to improve from 49 percent in 2008 to 55 percent in 2018. The annual profit after tax will increase from RMB 20 million in 2008, to around RMB 175 million by 2018. During the period of financial projections, the company is expected to maintain strong cash flow from operations, given its well-proven efficiency in operations and its ability to manage its liquidity (e.g., keeping its account receivable low at 2-week level, charging wastewater tariffs to 100 percent of water consumed, and high collection rate of 90 percent).

18. Although the company would continue to carry debt obligations from the past and proposed IBRD loans and commercial bank loans, its capital structure will remain sound. During the construction period, funds from operations will provide RMB 300 million (including the capital accumulations made during the pre-construction period of 2008 and 2009), the proceeds from the proposed IBRD loan and a commercial bank loan will provide around RMB 480 million and RMB 75 million, respectively, and state bonds RMB 195 million. The company's solvency—defined as the ratio of equity to total debts and equity—would improve from 27 percent in 2008 to 55 percent by 2018. The financial rate of return on equity is estimated to be higher than 10 percent.

C. Monitoring of Financial Performance

19. During the project implementation period, the Guangxi Nanning Water Co., Ltd. will prepare, before September 30 each year, annual financial projections for the following years for discussions with the World Bank. The Nanning Municipality will ensure that during the implementation period the Company will earn sufficient tariff revenues, and possibly subsidies from the Nanning municipality, to cover its operation and maintenance costs (including depreciation charges), and any amount by which annual debt service payments exceeds annual depreciation charges.

D. Affordability for Low Income Families

20. An overall analysis was conducted of low income families' ability to afford the water and wastewater tariffs. The analysis demonstrates that current and projected tariffs are fully affordable for the residents in Nanning Municipality even under a conservative planning assumption of low growth of disposable income. Specifically, the affordability analysis demonstrates that the combined water and

wastewater bill does not exceed 3 percent of household income for consumers in the lowest income bracket (the Urban MLAS Population – Minimum Living Allowance Subsidy). This lies fully within the parameters of the international ‘affordability benchmark’ of a maximum of 5 percent for combined water and wastewater bill.

Table 9.8: Affordability for low income families

	2008	2009	2010	2011	2012	2013
Water Supply tariff	1.05	1.05	1.05	1.05	1.05	1.05
Wastewater tariff	0.80	0.80	1.05	1.05	1.05	1.05
Total tariff	1.85	1.85	2.10	2.10	2.10	2.10
Water fee	172	172	172	172	172	172
Wastewater fee	131	131	172	172	172	172
Total fee payable ¹	270	270	307	307	307	307
Low family income ²	10,000	10,400	10,816	11,249	11,699	12,167
Water fee as % of income	1.7%	1.7%	1.6%	1.5%	1.5%	1.4%
Wastewater fee as % of income	1.3%	1.3%	1.6%	1.5%	1.5%	1.4%
Total fees as % of low income	2.7%	2.6%	2.8%	2.7%	2.6%	2.5%

1: Family of 4.5 members with a water consumption each of 100 litres per day

2: Family with annual income of RMB 10.000 with an annually increase of 4%

Table 9.9: Projected Water Supply and Wastewater Treatment Capacity

	Base Years		Implementation		Years of Operation							
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Water Supply in Central Dist.	1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,190
Wastewater in Central Dist. (current)	440	440	440	440	440	440	440	440	440	440	440	440
New WWTP in Central Dist.	0	0	0	0	240	240	240	240	240	240	240	240
Total WWTP in Central Dist.	440	440	440	440	680	680	680	680	680	680	680	680
WWTP in County Towns	0	0	0	0	102	102	102	102	102	102	102	102
Water Supply and Wastewater Treatment (1,000 m³/day)												
Water delivered to customers in Central District	664	701	722	744	766	789	813	838	863	889	915	943
Wastewater treated in Central District	152	385	440	440	608	656	680	680	680	680	680	680
Wastewater treated in County Towns	0	0	0	0	89	98	102	102	102	102	102	102
Water Supply and Wastewater Tariffs (RMB/m³)												
Average water tariff billed customers	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
Average wastewater tariff billed customers	0.50	0.58	0.80	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05

Table 9.10: GCCWAC Financial Projection – Income Statement (million RMB)

	Base Years		Implementation		Years of Operation							
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Operating Revenue	359	399	507	598	619	641	663	684	694	704	714	725
Gross operating revenue	359	400	508	599	619	641	664	685	695	705	715	726
- water supply	257	271	279	288	296	305	315	324	334	344	354	365
- wastewater	102	128	228	311	323	336	349	361	361	361	361	361
Other revenue	2	1	1	1	1	1	1	1	1	1	1	1
Sales Tax	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
Cost of operation	-155	-202	-234	-241	-267	-277	-284	-290	-295	-301	-306	-312
Electricity	-53	-68	-79	-81	-89	-91	-93	-95	-97	-99	-101	-103
Chemicals and additives	-6	-10	-11	-11	-16	-17	-18	-18	-18	-19	-19	-19
Raw water	-11	-13	-16	-16	-17	-17	-18	-18	-19	-19	-20	-20
Sludge handling	0	0	-1	-1	-2	-3	-3	-3	-3	-3	-3	-3
Salaries for operations	-25	-27	-28	-29	-32	-33	-33	-34	-35	-36	-37	-37
Repair & maintenance	-16	-20	-24	-27	-35	-38	-40	-42	-43	-44	-45	-45
Management and other costs	-10	-21	-29	-29	-29	-30	-30	-30	-31	-31	-31	-32
Billing and collection	-9	-11	-12	-12	-13	-13	-14	-14	-15	-15	-15	-16
Overhead	-24	-31	-35	-35	-35	-35	-35	-35	-35	-35	-35	-35
EBITDA	205	197	273	357	352	364	379	394	399	403	408	413
- margin	57%	49%	54%	60%	57%	57%	57%	58%	57%	57%	57%	57%
Depreciation	-59	-80	-82	-87	-118	-121	-124	-125	-128	-133	-135	-137
EBIT	146	117	191	270	233	243	256	269	271	270	273	276
- margin	41%	29%	38%	45%	38%	38%	39%	39%	39%	38%	38%	38%
Interest and fees	-48	-93	-72	-66	-87	-82	-77	-74	-72	-69	-65	-63
Profit before income tax	98	24	119	204	146	161	178	195	199	201	208	214
Less income tax	-15	-4	-18	-31	-22	-24	-27	-29	-30	-30	-31	-32
Net Profit	83	20	101	174	124	137	152	165	169	171	177	182

Table 9.11: GNWC Financial Projections – Balance Sheet (million RMB)

	Base Years			Implementation			Years of Operation					
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Assets											
Current Assets	463	470	279	274	335	403	486	644	800	858	1,024	1,197
Cash and cash equivalents	284	297	206	198	259	325	407	565	720	778	943	1,116
Account receivable	17	21	20	24	24	25	26	27	27	28	28	29
Other current assets	162	152	52	52	52	52	52	52	52	52	52	52
Construction in progress	320	385	310	21	18	18	18	13	14	29	13	13
Fixed and intangible assets	1,540	1,581	1,975	2,720	2,711	2,695	2,676	2,630	2,586	2,613	2,570	2,508
Total	2,324	2,435	2,563	3,015	3,064	3,115	3,179	3,287	3,400	3,500	3,606	3,718
	Equity and Liabilities											
Current Liability	769	766	458	461	462	463	463	464	464	464	464	465
Account payable	4	5	9	9	10	11	11	11	11	12	12	12
Short term bank loans	339	205	205	205	205	205	205	205	205	205	205	205
Other current liabilities	426	556	244	247	247	247	247	248	248	248	248	248
Long term loans	1,103	1,012	1,447	1,722	1,646	1,560	1,472	1,413	1,357	1,286	1,215	1,144
Equity	452	657	658	831	956	1,093	1,244	1,410	1,579	1,750	1,927	2,109
Paid in capital	367	626	626	626	626	626	626	626	626	626	626	626
Accumulated profit	85	31	32	205	329	467	618	784	953	1,124	1,301	1,483
Total	2,324	2,435	2,563	3,015	3,064	3,115	3,179	3,287	3,400	3,500	3,606	3,718

Table 9.12: GNWC Financial Projections – Cash Flow Statement (million RMB)

	Base Years			Implementation			Years of Operation					
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Sources of funds	422	483	759	698	352	364	379	394	399	403	408	413
Internally generated sources	205	197	273	357	352	364	379	394	399	403	408	413
Income	98	24	119	204	146	161	178	195	199	201	208	214
Add depreciation (and amortization)	59	80	82	87	118	121	124	125	128	133	135	137
Add interest and fees	48	93	72	66	87	82	77	74	72	69	65	63
External sources	217	285	485	341	0	0	0	0	0	0	0	0
Loans	217	26	385	341	0	0	0	0	0	0	0	0
Other sources	0	259	100	0	0	0	0	0	0	0	0	0
Application of funds	483	367	849	706	291	298	297	237	243	346	243	240
Investment in fixed assets	374	170	401	544	105	105	105	75	85	175	75	75
Debt service	110	177	128	131	164	168	165	132	128	140	137	133
Loan repayment	46	101	56	66	76	86	88	58	56	71	71	70
Interest (incl. not deductible int.)	64	76	72	66	87	82	77	74	72	69	65	63
Dividends, tax and other payments	15	4	318	31	22	24	27	29	30	30	31	32
Increase in working capital	-16	16	1	1	0	0	0	0	0	0	0	0
Cash Flow	233	13	-90	-9	61	66	82	157	155	58	165	173
Cash generated in year	50	284	297	206	198	259	325	407	565	720	778	943
Opening Balance	284	297	206	198	259	325	407	565	720	778	943	1,116
Closing Balance (incl. acc. surplus)												

Table 9.13: Wastewater Operations of Central District and All Counties – Profit and Loss Account (million RMB)

	Base Years		Implementation		Years of Operation									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018		
Revenue from wastewater tariff	102	130	228	311	323	336	349	361	361	361	361	361		
Cost of operation	-26	-54	-78	-85	-106	-112	-115	-117	-116	-116	-116	-115		
Electricity	-7	-19	-23	-23	-29	-30	-30	-30	-30	-30	-30	-30		
Chemicals and additives	0	-1	-1	-1	-5	-6	-7	-7	-7	-7	-7	-7		
Raw water	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1		
Sludge handling	0	0	-1	-1	-2	-3	-3	-3	-3	-3	-3	-3		
Salaries for operations	-4	-6	-6	-6	-8	-8	-8	-8	-8	-8	-8	-8		
Repair & maintenance	-1	-2	-4	-6	-13	-16	-17	-18	-18	-18	-18	-18		
Management and other costs	-3	-10	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18		
Billing and collection	-3	-5	-8	-11	-12	-12	-12	-13	-13	-13	-13	-13		
Overhead	-7	-10	-16	-18	-18	-18	-18	-18	-18	-18	-18	-17		
EBITDA	76	76	151	226	216	224	234	244	245	245	245	245		
- margin	74%	58%	66%	73%	67%	67%	67%	68%	68%	68%	68%	68%		
Depreciation	-17	-35	-37	-40	-70	-71	-72	-72	-72	-72	-72	-73		
EBIT	58	41	113	186	146	153	162	172	173	173	173	173		
- margin	57%	32%	50%	60%	45%	46%	46%	48%	48%	48%	48%	48%		
Interest	-23	-26	-27	-23	-44	-39	-34	-32	-29	-27	-23	-21		
Profit from operations before tax	35	16	86	163	102	114	128	141	143	146	149	152		

Table 9.14: Wastewater Operations in Binyang County - Profit and Loss Account (million RMB)

	Base Years		Implementation		Years of Operation									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018		
Revenue from wastewater tariff			5.0	7.2	8.0	8.8	9.6	10.1	10.1	10.1	10.1	10.1		
Cost of operation			-0.5	-0.5	-3.6	-3.9	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0		
Electricity			0.0	0.0	-0.9	-0.9	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		
Chemicals and additives			0.0	0.0	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2		
Raw water			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Sludge handling			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Salaries for operations			0.0	0.0	-0.4	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5		
Repair & maintenance			0.0	0.0	-1.6	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8		
Management and other costs			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Billing and collection			0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1		
Overhead			-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4		
EBITDA			4.6	6.7	4.4	4.8	5.6	6.0	6.0	6.0	6.0	6.0		
- margin			90%	93%	55%	55%	58%	60%	60%	60%	60%	60%		
Depreciation			0.0	0.0	-3.2	-3.0	-2.9	-2.7	-2.6	-2.4	-2.3	-2.2		
EBIT			4.6	6.7	1.1	1.8	2.7	3.3	3.5	3.6	3.7	3.8		
- margin			90%	93%	14%	21%	28%	33%	35%	36%	37%	38%		
Interest (only WB-facility)			0.0	0.0	-4.9	-4.9	-4.9	-4.9	-4.9	-4.9	-4.5	-4.1		
Profit from operations before tax			4.6	6.7	-3.7	-3.0	-2.2	-1.5	-1.4	-1.3	-0.8	-0.3		

Annex 10 Safeguards Policy Issues

CHINA: Nanning Urban Environment Project

A. Environmental Assessment

1. The Project is classified as a “Category A” project according to type, location, sensitivity, and scale, as well as the nature and magnitude of its potential environmental impacts. An environment assessment was carried out by Guangxi Environment Science Research Institute in accordance with national requirements and the Bank’s Safeguard Policies. The reports include: (i) EA summary; (ii) Consolidated EA (CEA); and (iii) Consolidated Environmental Management Plan (CEMP).

2. The EAs cover baseline information on environmental and socio-economic conditions. They also describe alternatives considered as part of feasibility studies for each component. The overall environmental impact of the project is positive. However, some negative impacts may arise during project implementation—mainly during construction—such as negative but limited impacts on soil, air, water, acoustic environments, and surrounding communities. These impacts will be temporary and localized, and proper mitigation measures during construction can minimize or even eliminate them. Preventive measures during the construction and operation phases were prepared and are noted in the EMP.

Environmental Benefits

3. The EA has identified and assessed, quantitatively to the extent possible, the project benefits and impacts to the natural and social environment. The EA concludes that the project will bring significant positive impacts to the natural and socioeconomic environments for Nanning city and its participating counties. The project as a whole is substantially positive in environmental terms, with the benefits greatly outweighing the negative impacts. Any potential negative impacts have been mitigated to acceptable levels, and all project investments have been designed to minimize any adverse impacts on the physical environment.

4. Establishing and expanding wastewater management services in Nanning’s counties are critical to improving urban public health and the quality of life, as well as promoting the sustainable growth of counties. The various physical investments proposed under the project will improve public health conditions and environmental protection by collecting and removing pollutant loads from sewage management. The newly-added wastewater treatment capacity will be 342,000 tons/day. This will result in a potential annual pollutant load reduction of about 39,186 tons of COD, 19,819 tons of BOD, and 2,706 tons of NH₃-N. The wastewater collection and treatment rate will be increased from zero to about 65 percent for Nanning’s county seat towns, and will be increased from 60 percent to 83 percent for Nanning city. It is expected that the local urban environment can be improved by reducing unpleasant odors and sights. Public

health can be improved by reducing human exposure to untreated wastewater and waterborne diseases, thereby potentially lowering health care costs.

Potential Environmental Impacts/ Risks and Mitigation Measures

5. The project's objective is to improve wastewater management in Nanning, thus increasing the quality of life of urban residents and complying with national and Nanning environmental plans. The overall environmental impacts are clearly positive. However, some negative short-term construction and long-term operational impacts may result from project implementation. These include limited negative impacts during construction on soil, air, water and acoustic environments, and on surrounding communities. These impacts will be temporary and localized. Further, proper mitigation measures during the construction and operation periods can minimize or eliminate them.

6. Accordingly, a series of mitigation measures have been prepared under the EMP to reduce the impacts to acceptable levels during the construction and operation phases. Mitigation monitoring procedures have been established and the organizations responsible for monitoring have been designated. The mitigation measures were discussed in the CEA/CEMP.

7. **Construction phase:** Some project components will have short-term impacts, such as noise, dust, water pollution, increased traffic, soil erosion, and worker safety and public health issues. These concerns are relatively minor, and measures to reduce them to acceptable levels, as well as to monitor their effective implementation, have been discussed and detailed in the EA and EMP. In addition, all mitigation measures related to contractors will be included in the bid documents and contracts.

8. **Operations phase.** Wastewater management and associated works will have limited impacts on the surrounding environment, such as odor from aeration, sedimentation and sludge condensation tanks, and noise from pump stations. Appropriate mitigation measures (e.g., minimum of 150 meter distance buffer zone to residential areas, use of flocculation deodorizer, and good maintenance practices) are detailed in the EMP.

Due diligence review for the WWTP and Landfill

9. The environmental safeguard related issues were carefully reviewed and assessed in the EA Report for stand-alone Bank subcomponents, as well as those subcomponents associated with other funding sources. This effort was intended to better understand potential linkages between subcomponents, and to ensure that Bank standards are met across the broader infrastructure development.

10. The Jiangnan WWTP Phase II is proposed for the Bank finance project. The EA included due diligence review for the Jiangnan WWTP Phase I, including its compliance with environmental standards for air, noise and wastewater, sludge disposal issue, etc. No major issues were found that would present a reputation risk to the Bank. In addition, potential impacts and mitigation measures for the sludge disposal from WWTP were also carefully considered and included in the EA.

11. The sludge produced from Binyang, Shanglin, Wuming and Mashan WWTPs will be transported to landfill of these counties. The EA for Binyang, Shanglin, Wuming and Mashan Landfill have been approved by Nanning and Guangxi EPB respectively. The construction of the four landfill projects will start before the construction of the respective WWTPs, and will be completed before the operation of the respective WWTPs. Due diligence review was conducted for the four landfill sites, to ensure them comply with both the domestic and Bank environmental requirements. The relevant context was added in CEA and EMP.

12. The sludge produced from Henxian County will be sent to the existing Henxian landfill for final disposal, and the sludge produced from Jiangnan II WWTP will be sent to Chengnan existing landfill for disposal. Due diligence review was conducted for both the Henxian landfill and Chengnan landfill, to ensure the operations of these landfills are environmentally sound, and comply with both the domestic and Bank environmental requirements. The relevant context was added in CEA and EMP.

Alternative Analysis

13. During project preparation, alternative locations and alternative technical processes and designs were explored and considered. The EA identified, evaluated and compared various options for sewage network system layout, WWTP location, WWTP treatment process, sludge disposal, and construction methods comparison of dredging sediments for river rehabilitation component (etc.), with the objective to avoid or otherwise minimize potential adverse environmental and social impacts and to maximize environmental benefits.

14. The EA teams have worked closely with the project planners/owners and the feasibility study teams to compare and evaluate alternatives. Optimal alternatives were selected based on the avoidance of (or least adverse) social and environmental impacts, as well as other economic, technical, and financial considerations for the least cost solutions. A “no project” scenario was also considered as an alternative to each subproject. Details are in the CEA report.

Environmental Management Plan (EMP)

15. An EMP was developed as a separate and stand-alone document. It includes policy bases, applicable environmental standards, environmental management system, mitigation measures, monitoring plans, institutional arrangements, capacity building, and estimated costs for the mitigation measures, and monitoring programs during the construction and operation phases. An EMP summary table was also designed for each subproject. The table included potential impacts, mitigation measures, implementation schedule, implementation and supervision agency, monitoring indicators, frequencies and locations, and EMP budget for the construction and operation phases. Generic measures for environmental management of construction were also designed as technical specifications to be included in contracts.

16. *Supervision and Reporting:* Contractors and supervising agencies will meet on a monthly basis to monitor progress and submit detailed reports to the PMO. The World Bank will receive a semiannual report on the EMP, along with any revisions proposed to the EMP to achieve its objectives.

17. *Training Requirements.* Prior to the commencement of physical works, Nanning PMO will provide training on environmental supervision and management intended for counties PMO, implementing agencies, and contractors.

18. *Funding Arrangement.:* The costs associated with EMP measures are included in the project cost estimates; component-specific costs are detailed in the EMP. The monitoring of air and water quality, noise levels, and odor, and water and soil conservation monitoring will be conducted by external monitoring institutes, and monitoring activities will be financed by counterpart funds. During the operation phase, costs related to mitigation and monitoring will be borne by the IAs.

19. *Monitoring.* The contractors are fully responsible for complying with the mitigation measures stipulated in their contracts and detailed in the EMP. An environmental monitoring program for the construction and operation phases is designed in the EA as a component of the EMP. The monitoring program covers air, wastewater, leachate, ground water, noise level, odor, sludge, and water and soil conservation monitoring, etc. It specifies parameters, frequencies, time, locations, responsible agencies, and estimated costs. The monitoring program further specifies reporting and response procedures to ensure appropriate follow-up actions on identified issues. Professional monitoring institutes, using standard methods recognized by regulatory authorities, will be contracted to monitor the parameters specified in the EMP. Environmental monitoring will provide key and timely information, especially on environmental impacts and mitigation, to the borrower and the Bank to evaluate the success of environmental management. This monitoring process will verify compliance with the EMP and determine further mitigation measures if the EMP is not properly implemented.

Public Consultation and Information Disclosure

20. *Public Consultations.* Two-stage public consultations were conducted with those affected by the proposed project, and included people from different groups, gender, socioeconomic and educational backgrounds, and occupations. The primary objective of the first round was to survey the public's opinion about the project, while that for the second round was to communicate the EA findings, discuss intended mitigation measures, and confirm public acceptance and satisfaction with the project. In addition, several rounds of consultations with government agencies and other stakeholders were organized to discuss site locations, project scope, and potential environmental and socioeconomic impacts of the proposed project. These consultations took many forms, including expert consultations, questionnaires, symposiums, interviews, and public hearings.

21. The majority of those consulted indicated strong support for the project and acceptance of the short-term inconveniences, such as noise and dust during the construction phase. They supported measures to improve municipal wastewater collection and treatment capacity, and welcomed the river rehabilitation components. Public concerns and opinions are detailed in the EAs, and are incorporated into the project design and environmental mitigation measures.

22. *Information Disclosure.* Information about the project was disclosed through major local newspapers from November 2007 to November 2008. Telephone hotlines were established for the public to access relevant documents and offer comments. Disclosure of EAs was announced in Nanning Daily on November 13, 2008, and EAs were made available at the PMO, PIUs, public libraries, and on websites. The Chinese version of CEA/EMP and EA Summary were disclosed by Nanning Daily on April 16, 2009, the English version of CEA/EMP and EA Summary were submitted to the Bank and disclosed through the InfoShop on April 23, 2009. The finally revised English version of those EA reports were disclosed in the InfoShop in November 2009. More details are provided in Table 10-1 below.

Table 10-1 Disclosure of Environment Safeguard Documents

number	Name of project	EA (Yes/No)	EMP (Yes/No)	Chinese/ English	Date of submission	date of disclosure	location of disclosure
0-1	Consolidated Environmental Assessment Report of NUEP (CEA)	Y	Y	C/E	C/2009-04-16 E/2009-04-16	C/2009-04-16 E/2009-04-23	C/ Nanning Daily, Nanning PMO http://fgw.nanning.gov.cn/103/index.htm
0-2	Consolidated Environment Management Plan for NUEP (CEMP)	Y	Y	C/E	C/2009-04-16 E/2009-04-16	C/2009-04-16 E/2009-04-23	C/E/ World Bank InfoShop
0-3	EA Summary for NUEP	Y	Y	C/E	C/2009-04-16 E/2009-04-16	C/2009-04-16 E/2009-04-23	C/ Nanning Daily, Nanning PMO http://fgw.nanning.gov.cn/103/index.htm
1	Jiangnan Phase II Wastewater Treatment Plant (WWTP)	Y	Y	C	2009-04-21	2009-04-23	C/ World Bank InfoShop
2	Wuming County WWTP	Y	Y	C	2009-04-21	2009-04-16	C/ Nanning Daily, Nanning PMO http://fgw.nanning.gov.cn/103/index.htm
3	Binyang County WWTP	Y	Y	C	2009-04-21	2009-04-23	C/ Nanning Daily, Nanning PMO http://fgw.nanning.gov.cn/103/index.htm
4	Hengxian County WWTP	Y	Y	C	2009-04-21	2009-04-16	C/ Nanning Daily, Nanning PMO http://fgw.nanning.gov.cn/103/index.htm
5	Shanglin County WWTP	Y	Y	C	2009-04-21	2009-04-23	C/ Nanning Daily, Nanning PMO http://fgw.nanning.gov.cn/103/index.htm
6	Mashan County WWTP	Y	Y	C	2009-04-21	2009-04-16	C/ Nanning Daily, Nanning PMO http://fgw.nanning.gov.cn/103/index.htm
7	Fenghuang River Rehabilitation Project	Y	Y	C	2009-04-21	2009-04-23	C/ Nanning Daily, Nanning PMO http://fgw.nanning.gov.cn/103/index.htm
8	Liangqing and Lengtang Rivers Rehabilitation Project	Y	Y	C	2009-04-21	2009-04-16	C/ Nanning Daily, Nanning PMO http://fgw.nanning.gov.cn/103/index.htm

B. Involuntary Resettlement

23. Nanning Urban Environment Project (NUEP) involves three components, including wastewater treatment, river rehabilitation and TA. The wastewater treatment component includes one expansion of the same water treatment plant from the prior project, as well as new waste water treatment plants in five county towns. The river rehabilitation component will rehabilitate three rivers (Fenghuang, Liangqing and Lengtang). The TA component will finance TA to help the client develop and implement an integrated mini-river basin management system to address non-point source pollution, regulatory and other institutional issues.

24. Three component Resettlement Action Plans (RAPs) were prepared in Chinese, one for wastewater treatment component, one for Fenghuang River and another for the Lengtang and Liangqing Rivers; and one summary RAP was prepared in both Chinese and English. The RAPs were prepared in compliance with OP 4.12 Involuntary Resettlement and relevant domestic laws and regulations and affected villages and communities; potential displaced persons participated in the process of resettlement planning. The resettlement impacts, affected populations, consultation process, rehabilitation measures, budget, and implementation and monitoring arrangements are provided in the RAP.

25. Resettlement linkage issues were carefully assessed. The linked projects, as per OP 4.12, will include: 1) embankment of upstream Fenghuang River; 2) the dyke and pumping station associated with Liangqing and Lengtang Rivers; and 3) four landfills for disposal of wastewater sludge.

26. In the process of project design, the project owners and design institutes determined that embankment of upstream Fenghuang River is a linked project of the Fenghuang River Rehabilitation component. Since detailed scope of linked project has not finalized by appraisal (as informed by client after pre-appraisal and confirmed during appraisal), a Resettlement Policy Framework (RPF) was prepared. In addition, the RPF will also cover any resettlement impacts involved because of technical design changes during implementation.

27. Treated wastewater sludge will be disposed of in previously constructed landfills in Hengxian, as well as to-be-constructed landfills in Binyang, Shanglin, Wuming, and Mashan counties. The sludge of the Jiangnan WWTP will be disposed in an existing landfill. The dyke, pump station associated with Lengtang and Liangqing rivers, and four to-be-constructed landfills are linked projects, as per OP 4.12, and their resettlement impacts are covered by the RAPs.

28. Efforts have been made to minimize the resettlement impacts during project planning and design. The resettlement impacts have been significantly reduced through optimizing the project design and implementation arrangements.

29. **Resettlement Impacts:** The resettlement impacts scattered in 15 villages of 7 townships. The project will affect 7,191 people, of whom: (i) 6,415 people are affected by permanent acquisition of the collective land; (ii) 199 people are affected by demolition of rural residential houses; and (iii) 878 people are affected by temporary land use (see the details in the table below):

component	Permanent collective land acquisition	Permanent state land use	Temporary land use	House demolition	Sub-total
WWTP	1197*	68	505	38*	1774
Liangqing and Lengtang	5087	/	296**	79	5087
Fenghuang	131	90	77	82	330
Sub-total	6415	158	878	199	7191

* 34 of them affected by housing demolishing as well

** 79 of them affected by both land acquisition and house demolishing

*** 50 persons affected by both land acquisition and house demolishing

30. In addition to the impacts of the project itself, linked components will affect 7,331 people by permanent land acquisition, housing demolition, and relocation of enterprises and public units (see the details in the table below):

Number of persons affected by linkage project

Linkage component	Permanent collective land acquisition	Permanent state land use	Temporary land use	House demolition	Sub-total
WWTP	4132	/	/	/	4132
Liangqing and Lengtang	1115	1946	80	153**	3199
Fenghuang	/	/	/	/	/
Sub-total	5247	1946	80	153	7331

*69 of them included in the number of people affected by permanent land acquisition

** 26 of them already included in the number of people affected by land acquisition.

31. **Policy Principles and Legal Framework:** The RAP was prepared in line with relevant Chinese laws and regulations at both national and local levels and World Bank OP 4.12 on Involuntary Resettlement. The following basic principles were adopted for resettlement planning:

- Acquisition of land and other assets, and relocation of people, will be minimized as much as possible.
- All project-affected people residing, working, doing business or cultivating land required for the project as of the date of the baseline surveys are entitled to rehabilitation measures sufficient to assist them to improve or at least maintain their pre-project living standards, income-earning capacity and production levels. Lack of legal rights to the assets lost will not bar them from entitlement to such rehabilitation measures.

- The rehabilitation measures due to land acquisition are: (i) agricultural land for land of equal productive capacity; (ii) compensation for land acquisition and resettlement subsidy for the farmers affected by land acquisition; and (iii) other forms of assistance.
- Replacement of agricultural land will be, as much as is possible, similar to the land that was lost.
- Plans for acquisition of land and other assets and provision of rehabilitation measures will be carried out in consultation with the affected people.
- Financial and physical resources for resettlement and rehabilitation will be made available as and when required.
- Institutional arrangements will ensure effective and timely design, planning, consultation and implementation of the Resettlement Plan.
- Effective and timely supervision, monitoring and evaluation of the implementation will be carried out.

32. **Compensation Standards:** The compensation for land acquisition includes land compensation, resettlement subsidy, and young crop compensation. The land acquisition compensation is calculated based on annual production value in five counties and the comprehensive land compensation standard for the land within Nanning urban planning area according to the Law of Land Administration and the local implementation guidelines of the Land Law. The compensation rates of structures are determined based on their replacement cost. The detailed compensation rates are included in the RAPs.

33. **Institutional Arrangements:** A multi-level organization has been established for the implementation of the RAPs. An independent monitor will be selected through bidding process for resettlement implementation. Details of staffing and their responsibilities are provided in the RAPs.

34. **Public Consultation and Participation:** The affected residents, business people and district governments participated in the census, inventory and formulation of the livelihood rehabilitation strategy, measures and relocation sites. Their feedback has been incorporated in determining the compensation rates and livelihood rehabilitation measures. The RAP contains a list of major consultation sessions.

35. **Complaints and Grievance:** Issues that arise with respect to the resettlement, such as compensation payment and rehabilitation measures, can be handled by following procedures established:

Step 1: Displaced persons can appeal in person or in writing to a village committee or a project demolition implementation institution if they are not satisfied with resettlement plan. For verbal appeal, the village committee and demolition institution should record the appeal in written form and solve the problems within two weeks;

Step 2: If displaced persons are still not satisfied with the decision of Phase 1, they can appeal to local PMOs/ project administration institutions after receiving the decision notice, and the latter should resolve it within two weeks;

Step 3: If displaced persons are still not satisfied with the decision of local PMOs/ project administration institutions, they can appeal to subproject leading team or local

land bureau after receiving decision notice. The latter should handle the case within two weeks;

Step 4: If displaced persons are still not satisfied with the decision of subproject leading team or local land bureau, they can bring a lawsuit to a civil law court objecting to any aspect of the resettlement plan after receiving the decision notice.

36. ***Monitoring Arrangements:*** Both internal and external monitoring mechanisms will be carried out. The project resettlement offices will carry out internal monitoring of resettlement implementation. An independent external monitor will be selected for external monitoring. The contents and time frequency of both internal and external monitoring are described in the RAPs.

37. ***Resettlement Cost and Funding Arrangements:*** Each component RAP contains a detailed resettlement cost estimate that covers all the basic costs for resettlement, management, contingencies, surveys, design and monitoring. The basic resettlement cost includes compensation for land, houses, other structures, standing crops and trees, business profit loss, reconstruction of affected infrastructure and relocation subsidies. The total resettlement budget is estimated at RMB 462 million. Resettlement costs will be covered through counterpart funds. Project owners will allocate the resettlement fund to resettlement implementation agencies. The resettlement implementation agencies will disburse the fund to affected persons or entities.

Indigenous People and Social Assessment

38. Guangxi is a Zhuang Autonomous Region. The Zhuang minority represents a majority of the population in the project area. Over 60 percent of the beneficiaries of the project are Zhuang people. Free, prior and informed consultation was carried out during project preparation as part of the social assessment. It found that the Zhuang communities are mostly economically integrated and largely culturally assimilated, will not face any adverse impacts specifically affecting them because of culture, customs, or traditional livelihoods practices, and all minority communities are supportive to the project. According to the social assessment, the Bank's Policy on Indigenous People OP 4.10 is triggered, but there is no need to prepare a separate IPP since most beneficiaries of the project are minorities.

39. The social assessment revealed that the project will have significant positive social benefits, as it improves the quality of urban environments, infrastructure and flood control facilities and thereby enhances the livability of the project areas. Meanwhile, some social risks will be associated with implementation of the project, for instance, the low ability of vulnerable groups to afford the improved environmental services. Based on the findings of social assessment, local governments will establish some low-income assistance programs which provide income transfers to help cover municipal service fees; these transfers will be adjusted to reflect the higher cost of improved services.

40. The social assessment also provided input for project design to mitigate other social risks of the project. For instance, social assessment found out that about 10 percent

of beneficiaries in five counties use self-supply water sources. This will result in difficulties to collect wastewater treatment fees from these people since wastewater treatment tariff will be collected based on quantity of water supplied through public sources.

Information Disclosure

41. RAPs were made available at the PMO, PIUs, public libraries, and on websites on April 16, 2009. Telephone hotlines were established for the public to access relevant documents and offer comments. The draft English Summary RAP was submitted to the Bank by April 16, 2009, and disclosed through the InfoShop on April 28, 2009, and revised RAPs were updated in country on August 31, 2009. Those revised RAPs were disclosed in the InfoShop in November 2009. The details of the information disclosure are in the table below:

Social Safeguards information disclosure

	Name of project	Date of disclosure	Location of disclosure	Disclosure update
1	Summary Resettlement Action Plan in Chinese	2009-04-16	Nanning Daily, Nanning PMO http://fgw.nanning.gov.cn/103/index.htm	2009-08-31
2	Summary Resettlement action plan in English	2009-04-28	World bank InfoShop	2009-08-31
3	Resettlement action plan for waste water treatment component	2009-04-16	Nanning Daily, Nanning PMO http://fgw.nanning.gov.cn/103/index.htm	2009-08-31
4	Resettlement action plan for Liangqing river and Lengtang river	2009-04-16	Nanning Daily, Nanning PMO http://fgw.nanning.gov.cn/103/index.htm	2009-08-31
5	Resettlement action plan for Fenghuang river	2009-04-16	Nanning Daily, Nanning PMO http://fgw.nanning.gov.cn/103/index.htm	2009-08-31

Dates and Names of the RAPs

1. Summary Resettlement Action Plan of Nanning Urban Environment Project, July 2009
2. Resettlement policy framework of Nanning urban environment project, February, 2009 (Appendix I of the Resettlement Action Plan, July 2009)
3. Resettlement action plan of waste water treatment component, June 18, 2009
4. Resettlement action plan of Fenghuang River, June 20, 2009
5. Resettlement of Liangqing River and Lengtang river, August 29, 2009

Annex 11: Project Preparation and Supervision

CHINA: Nanning Urban Environment Project

	Planned	Actual
PCN review	November 18, 2008	November 25, 2008
Initial PID to PIC	December 2008	December 23, 2008
Initial ISDS to PIC	December 2008	December 23, 2008
Appraisal	May 2009	May 31 - June 5, 2009
Negotiations	March 2010	April 2-7, 2010
Board/RVP approval	May 2010	-
Planned date of effectiveness	August 13, 2010	-
Planned date of mid-term review	June 30, 2013	-
Planned closing date	December 31, 2015	-

Bank staff and consultants who worked on the project include:

Name	Title	Unit
Takuya Kamata	Task Team Leader	EASIN
Shunong Hu	Senior Water Engineer	EASCS
Liping Jiang	Senior Irrigation Engineer	EASCS
Chaogang Wang	Senior Social Scientist	EASCS
Yiren Feng	Environmental Specialist	EASCS
Haixia Li	Financial Management Specialist	EAPCO
Jingrong He	Procurement Specialist	EASCO
Xujun Liu	Procurement Specialist	EASCO
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Jennifer Sara*	Sector Leader	LCSSD
William Kingdom*	Lead Water and Sanitation Specialist	SASDU
Alexander Bakalian*	Lead Water Resource Specialist	MNSSD
Vellet Fernandes	Program Assistant	EASIN
Xin Chen	Program Assistant	EACCF
Xuemei Guo	Program Assistant	EACCF
Dan Xie	Program Assistant	EACCF
Claudio Purificato	Water and Sanitation Engineer	Consultant, EASIN
Knud Lauritzen	Financial Analyst	Consultant, EASIN

*-/ Peer Reviewers

Annex 12: Documents in the Project File

CHINA: Nanning Urban Environment Project

1. **Consolidated Feasibility Study** of all physical components, submitted in November 2008, by the Guangxi Nanning Water Co., Ltd., the Nanning Xiangsihu Investment & Constructions Company Ltd., Nanning Communication and Water Conservancy Investment Company Ltd., and compiled by the Beijing Municipal Engineering Design & Research General Institute.
2. **Project Proposal**, “Nanning Urban & Rural Comprehensive Environmental Upgrading Project”, submitted in February 2008 by the Nanning Development and Reform Commission and the Nanning Engineering Consulting and Planning Office,
3. **EA summary, consolidated EA (CEA), and Environmental Management Plan (CEMP)**, submitted by the Guangxi Environment Science Research Institute in accordance with national requirements and the Bank’s Safeguard Policies.

Annex 13: Statement of Loans and Credits

Project ID	FY	Purpose	Original Amount in US\$ Millions					Difference between expected and actual disbursements		
			IBRD	IDA	SF	GEF	Cancel.	Undisb.	Orig.	Frm. Rev'd
P096556	2009	CN-Eco-Farming	120.00	0.00	0.00	0.00	0.00	120.00	0.00	0.00
P101988	2009	CN-Jiangxi Shihutang Navi & Hydropower	100.00	0.00	0.00	0.00	0.00	99.75	0.00	0.00
P096925	2008	CN- Bengbu Integrated Environment Improv	100.00	0.00	0.00	0.00	0.00	99.75	0.00	0.00
P093963	2008	CN-Guiyang Transport	100.00	0.00	0.00	0.00	0.00	94.20	12.78	0.00
P093882	2008	CN-Shandong Flue Gas Desulfurization	50.00	0.00	0.00	0.00	0.00	49.88	8.17	0.00
P092631	2008	CN-Xi'an Sustainable Urban Transport	150.00	0.00	0.00	0.00	0.00	150.00	0.00	0.00
P091949	2008	CN-Gansu Cultural & Natural Heritage	38.40	0.00	0.00	0.00	0.00	38.40	2.24	0.00
P087224	2008	CN-Han River Urban Environment	84.00	0.00	0.00	0.00	0.00	83.79	0.00	0.00
P085376	2008	CN-Migrant Skills Dev. and Employment	50.00	0.00	0.00	0.00	0.00	49.88	0.00	0.00
P084437	2008	CN-Rural Health	50.00	0.00	0.00	0.00	0.00	50.00	0.00	0.00
P084874	2008	CN- Energy Efficiency Financing	200.00	0.00	0.00	0.00	0.00	166.48	-28.83	0.00
P099062	2008	CN-ShiZheng Railway	300.00	0.00	0.00	0.00	0.00	299.25	0.00	0.00
P099112	2008	CN-Anhui Highway Rehab & Improvement	200.00	0.00	0.00	0.00	0.00	199.50	2.33	0.00
P099224	2008	CN-Liaoning Med. Cities (LMC) III	191.00	0.00	0.00	0.00	0.00	190.52	17.50	0.00
P077752	2007	CN-SHANDONG ENVMT 2	147.00	0.00	0.00	0.00	0.00	81.72	-43.62	0.00
P088964	2007	CN-Guangxi Integrated Forestry Dev	100.00	0.00	0.00	0.00	0.00	45.91	-42.25	0.00
P081776	2007	CN-GUANGDONG/PRD2	96.00	0.00	0.00	0.00	0.00	95.61	13.94	0.00
P086515	2007	CN-3rd National Railway	200.00	0.00	0.00	0.00	0.00	82.87	-55.53	0.00
P083322	2007	CN-SICHUAN URBAN DEV	180.00	0.00	0.00	0.00	0.00	150.35	66.35	0.00
P096285	2007	CN-MSE Finance	100.00	0.00	0.00	0.00	0.00	5.00	5.00	0.00
P075613	2007	CN-Shaanxi Ankang Road Development	300.00	0.00	0.00	0.00	0.00	250.51	24.62	0.00
P091020	2007	CN-Fujian Highway Sector Investment	320.00	0.00	0.00	0.00	0.00	75.66	-136.13	0.00
P092618	2007	CN-LIAONING MED CITIES INFRAS 2	173.00	0.00	0.00	0.00	0.00	162.57	5.00	0.00
P095315	2007	CN-W. Region Rural Water & Sanitation	25.00	0.00	0.00	0.00	0.00	21.94	-1.17	0.00
P085333	2006	CN-5th Inland Waterways	100.00	0.00	0.00	0.00	0.00	24.83	11.50	0.00
P096158	2006	CN-Renewable Energy II (CRESP II)	86.33	0.00	0.00	0.00	0.00	69.44	45.77	0.00
P093906	2006	CN-3rd Jiangxi Hwy	200.00	0.00	0.00	0.00	0.00	22.22	-71.95	0.00
P099992	2006	CN-Liaoning Medium Cities Infrastructure	218.00	0.00	0.00	0.00	0.00	154.73	0.89	0.00
P086629	2006	CN-Heilongjiang Dairy	100.00	0.00	0.00	0.00	0.00	86.14	45.97	33.64
P085124	2006	CN-Economic Reform Implementation	20.00	0.00	0.00	0.00	0.00	17.11	10.61	0.00
P084742	2006	CN-IAIL III	200.00	0.00	0.00	0.00	0.00	42.93	-14.22	0.00
P075732	2006	CN-SHANGHAI URBAN APL2	180.00	0.00	0.00	0.00	0.00	141.66	60.83	0.00
P081255	2006	CN-Changjiang/Pearl River Watershed Reha	100.00	0.00	0.00	0.00	0.00	89.13	30.79	0.00
P081348	2006	CN-HENAN TOWNS WATER	150.00	0.00	0.00	0.00	0.00	128.80	33.80	0.00
P070519	2006	CN-Fuzhou Nantai Island Peri-Urban Dev	100.00	0.00	0.00	0.00	0.00	94.57	36.24	0.00
P075730	2005	CN-HUNAN URBAN DEV	172.00	0.00	0.00	0.00	0.00	136.39	71.22	0.00
P071094	2005	CN - Poor Rural Communities Development	100.00	0.00	0.00	0.00	0.00	47.78	40.71	0.00
P069862	2005	CN - Agricultural Technology Transfer	100.00	0.00	0.00	0.00	0.00	60.16	40.86	0.00
P068752	2005	CN-Inner Mongolia Highway & Trade Corrid	100.00	0.00	0.00	0.00	0.00	7.73	-17.69	0.00

P057933	2005	CN-TAI BASIN URBAN ENVMT	61.00	0.00	0.00	0.00	0.00	14.84	12.32	0.00
P086505	2005	CN-NINGBO WATER & ENVMT	130.00	0.00	0.00	0.00	0.00	45.77	-10.65	0.00
P081346	2005	CN-LIUZHOU ENVIRONMENT MGMT	100.00	0.00	0.00	0.00	0.00	31.02	-2.04	0.00
P081161	2005	CN-CHONGQING SMALL CITIES	180.00	0.00	0.00	0.00	0.00	88.18	33.50	0.00
P066955	2004	CN-ZHEJIANG URBAN ENVMT	133.00	0.00	0.00	0.00	0.00	65.91	49.64	0.00
P065463	2004	CN-Jiangxi Integrated Agric. Modern.	100.00	0.00	0.00	0.00	0.00	25.47	17.39	0.00
P081749	2004	CN-Hubei Shiman Highway	200.00	0.00	0.00	0.00	1.00	0.73	1.73	0.00
P069852	2004	CN-Wuhan Urban Transport	200.00	0.00	0.00	0.00	1.00	17.32	18.32	1.26
P077137	2004	CN-4th Inland Waterways	91.00	0.00	0.00	0.00	0.46	18.61	14.98	14.48
P065035	2004	CN-Gansu & Xinjiang Pastoral Development	66.27	0.00	0.00	0.00	0.00	4.23	1.24	0.00
P075728	2004	CN-GUANGDONG/PRD UR ENVMT	128.00	0.00	0.00	0.00	0.64	67.96	55.00	0.00
P073002	2004	CN-Basic Education in Western Areas	100.00	0.00	0.00	0.00	0.00	16.92	16.92	0.00
P040599	2003	CN-TIANJIN URB DEV II	150.00	0.00	0.00	0.00	0.00	111.71	95.37	15.45
P058847	2003	CN-3rd Xinjiang Hwy Project	150.00	0.00	0.00	0.00	0.00	4.58	4.58	0.00
P068058	2003	CN-Yixing Pumped Storage Project	145.00	0.00	0.00	0.00	0.00	34.52	34.52	0.00
P070191	2003	CN-SHANGHAI URB ENVMT APL1	200.00	0.00	0.00	0.00	0.00	48.28	40.86	0.00
P076714	2003	CN-2nd Anhui Hwy	250.00	0.00	0.00	0.00	0.00	11.16	11.16	0.00
P071147	2002	CN-Tuberculosis Control Project	104.00	0.00	0.00	0.00	0.00	33.31	30.53	0.00
P064729	2002	CN-Sustainable Forestry Development	93.90	0.00	0.00	0.00	0.00	3.80	3.80	0.00
P049436	2000	CN-CHONGQING URBAN ENVMT	200.00	0.00	0.00	0.00	29.50	3.68	33.18	-1.30
P042109	2000	CN-BEIJING ENVIRONMENT II	349.00	0.00	0.00	0.00	28.02	28.76	56.78	-23.03
P051856	1999	CN-Accounting Reform & Development	27.40	5.61	0.00	0.00	0.00	3.84	3.69	3.74
P042299	1999	CN-Tec Coop Credit IV	10.00	35.00	0.00	0.00	5.84	8.02	11.24	1.03
Total:			8,469.30	40.61	0.00	0.00	66.46	4,475.78	709.79	45.27

**STATEMENT OF IFC's
Held and Disbursed Portfolio
In Millions of US Dollars**

FY Approval	Company	Committed				Disbursed			
		IFC				IFC			
		Loan	Equity	Quasi	Partic.	Loan	Equity	Quasi	Partic.
2002	ASIMCO	0.00	10.00	0.00	0.00	0.00	10.00	0.00	0.00
2006	ASIMCO	0.00	0.00	4.12	0.00	0.00	0.00	3.61	0.00
2005	BCCB	0.00	59.21	0.00	0.00	0.00	59.03	0.00	0.00
2003	BCIB	0.00	0.00	12.04	0.00	0.00	0.00	0.00	0.00
2006	BUFH	8.14	0.00	0.00	0.00	8.14	0.00	0.00	0.00
2005	Babei	0.00	5.00	0.00	0.00	0.00	5.00	0.00	0.00
	Babei Necktie	11.00	0.00	0.00	6.00	8.94	0.00	0.00	4.88
1999	Bank of Shanghai	0.00	21.76	0.00	0.00	0.00	21.76	0.00	0.00
2000	Bank of Shanghai	0.00	3.84	0.00	0.00	0.00	3.84	0.00	0.00
2002	Bank of Shanghai	0.00	24.67	0.00	0.00	0.00	24.67	0.00	0.00
2005	BioChina	0.00	3.70	0.00	0.00	0.00	3.13	0.00	0.00
2002	CDH China Fund	0.00	2.02	0.00	0.00	0.00	0.00	0.00	0.00
2005	CDH China II	0.00	17.99	0.00	0.00	0.00	11.38	0.00	0.00
2006	CDH Venture	0.00	20.00	0.00	0.00	0.00	0.51	0.00	0.00

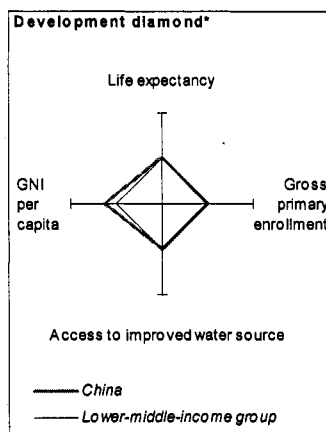
2005	CT Holdings	0.00	0.00	40.00	0.00	0.00	0.00	0.00	0.00
2004	CUNA Mutual	0.00	10.53	0.00	0.00	0.00	0.00	0.00	0.00
2006	Capital Today	0.00	25.00	0.00	0.00	0.00	0.32	0.00	0.00
2005	Changyu Group	0.00	18.07	0.00	0.00	0.00	18.07	0.00	0.00
1998	Chengdu Huarong	3.36	3.20	0.00	3.13	3.36	3.20	0.00	3.13
2004	China Green Ener	20.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00
2004	China Re Life	0.00	0.27	0.00	0.00	0.00	0.27	0.00	0.00
1994	China Walden Mgt	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00
2006	Chinasoft	0.00	0.00	15.00	0.00	0.00	0.00	10.00	0.00
2004	Colony China	0.00	15.31	0.00	0.00	0.00	9.29	0.00	0.00
2004	Colony China GP	0.00	0.84	0.00	0.00	0.00	0.49	0.00	0.00
2006	Conch	81.50	40.93	0.00	0.00	81.50	0.00	0.00	0.00
2006	Dagang NewSpring	25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2002	Darong	10.00	0.24	0.00	8.00	6.67	0.24	0.00	5.33
2006	Deqingyuan	0.00	2.85	0.00	0.00	0.00	2.85	0.00	0.00
1994	Dynamic Fund	0.00	2.21	0.00	0.00	0.00	2.01	0.00	0.00
2007	Epure	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	Fenglin	17.64	0.00	6.00	13.47	13.64	0.00	6.00	12.53
2006	Fenglin HJ MDF	0.23	0.00	0.00	3.27	0.00	0.00	0.00	0.00
2005	Five Star	0.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00
2006	GDIH	50.85	0.00	0.00	0.00	50.85	0.00	0.00	0.00
2003	Great Infotech	0.00	1.73	0.00	0.00	0.00	1.03	0.00	0.00
2006	Hangzhou RCB	0.00	10.85	0.00	0.00	0.00	0.00	0.00	0.00
2005	HiSoft Tech	0.00	4.00	0.00	0.00	0.00	3.00	0.00	0.00
2006	HiSoft Tech	0.00	4.34	0.00	0.00	0.00	1.74	0.00	0.00
2004	IB	0.00	52.18	0.00	0.00	0.00	52.18	0.00	0.00
2004	Jiangxi Chenming	40.00	12.90	0.00	18.76	40.00	12.90	0.00	18.76
2006	Launch Tech	0.00	8.35	0.00	0.00	0.00	8.33	0.00	0.00
2001	Maanshan Carbon	5.25	2.00	0.00	0.00	5.25	2.00	0.00	0.00
2005	Maanshan Carbon	11.00	1.00	0.00	0.00	5.00	1.00	0.00	0.00
2005	Minsheng	15.75	0.00	0.00	0.00	7.00	0.00	0.00	0.00
2006	Minsheng & IB	25.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2001	Minsheng Bank	0.00	23.50	0.00	0.00	0.00	23.50	0.00	0.00
2005	Minsheng Bank	0.00	2.80	0.00	0.00	0.00	2.79	0.00	0.00
2001	NCCB	0.00	8.94	0.00	0.00	0.00	8.82	0.00	0.00
1996	Nanjing Kumho	0.00	3.81	0.00	0.00	0.00	3.81	0.00	0.00
2004	Nanjing Kumho	31.38	2.23	0.00	0.00	31.38	2.23	0.00	0.00
2006	Neophotonics	0.00	0.00	10.00	0.00	0.00	0.00	10.00	0.00
2001	New China Life	0.00	5.83	0.00	0.00	0.00	5.83	0.00	0.00
2005	New Hope	0.00	0.00	45.00	0.00	0.00	0.00	0.00	0.00
1995	Newbridge Inv.	0.00	0.22	0.00	0.00	0.00	0.22	0.00	0.00
2005	North Andre	8.00	6.74	0.00	0.00	0.00	4.25	0.00	0.00
2003	PSAM	0.00	2.01	0.00	0.00	0.00	0.00	0.00	0.00
	RAK China	13.00	0.00	0.00	0.00	13.00	0.00	0.00	0.00
2006	Renaissance Sec	0.00	0.00	20.04	0.00	0.00	0.00	0.00	0.00
2006	Rongde	0.00	35.00	0.00	0.00	0.00	31.38	0.00	0.00
	SAC HK Holding	0.00	1.60	0.00	0.00	0.00	1.00	0.00	0.00
2003	SAIC	12.00	0.00	0.00	0.00	12.00	0.00	0.00	0.00
2006	SBCVC	0.00	20.00	0.00	0.00	0.00	2.00	0.00	0.00

2000	SEAF SSIF	0.00	3.74	0.00	0.00	0.00	3.37	0.00	0.00
	SH Keji IT	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	SHCT	38.18	0.00	0.00	28.64	29.04	0.00	0.00	21.78
2004	SIBFI	0.14	0.07	0.00	0.00	0.00	0.07	0.00	0.00
1998	Shanghai Krupp	19.25	0.00	0.00	36.75	19.25	0.00	0.00	36.75
2006	Shanshui Group	50.00	5.50	2.20	0.00	50.00	5.50	0.00	0.00
1999	Shanxi	12.61	0.00	0.00	0.00	12.61	0.00	0.00	0.00
	SinoSpring	0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00
	Stora Enso	20.83	0.00	0.00	4.17	11.00	0.00	0.00	0.00
2005	Stora Enso	29.17	0.00	0.00	20.83	0.00	0.00	0.00	0.00
2006	Stora Enso	50.00	0.00	0.00	175.00	0.00	0.00	0.00	0.00
2006	TBK	4.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00
2006	VeriSilicon	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
	Wanjie High-Tech	9.89	0.00	0.00	0.00	9.89	0.00	0.00	0.00
2004	Wumart	0.00	1.62	0.00	0.00	0.00	1.62	0.00	0.00
2003	XACB	0.00	17.95	0.00	0.00	0.00	0.64	0.00	0.00
2004	Xinao Gas	25.00	10.00	0.00	0.00	25.00	10.00	0.00	0.00
2006	Zhejiang Glass	50.00	24.96	0.00	18.00	0.00	0.00	0.00	0.00
2003	Zhengye-ADC	10.43	0.00	0.00	4.87	10.43	0.00	0.00	4.87
2002	Zhong Chen	0.00	4.78	0.00	0.00	0.00	4.78	0.00	0.00
2006	Zhongda_Yanjin	21.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total portfolio:		733.58	577.30	181.40	340.89	470.95	371.06	29.61	108.03

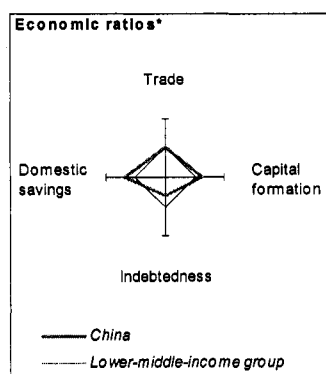
FY Approval	Company	Approvals Pending Commitment			
		Loan	Equity	Quasi	Partic.
2002	SML	0.00	0.00	0.00	0.00
2004	NCFL	0.00	0.00	0.02	0.00
2007	Xinao CTC	0.04	0.01	0.00	0.14
2004	China Green	0.00	0.00	0.01	0.00
2006	Launch Tech	0.01	0.00	0.00	0.00
2005	MS Shipping	0.00	0.01	0.00	0.00
2003	Peak Pacific 2	0.00	0.01	0.00	0.00
Total pending commitment:		0.05	0.03	0.03	0.14

Annex 14: Country at a Glance

POVERTY and SOCIAL	East Asia & Lower-middle-income		
	China	Asia & Pacific	Lower-middle-income
2007			
Population, mid-year (millions)	1,320.0	1,94	3,437
GNI per capita (Atlas method, US\$)	2,360	2,180	1,887
GNI (Atlas method, US\$ billions)	3,20.9	4,174	6,485
Average annual growth, 2001-07			
Population (%)	0.6	0.8	1.1
Labor force (%)	0.9	1.2	1.5
Most recent estimate (latest year available, 2001-07)			
Poverty (% of population below national poverty line)	..	..	..
Urban population (% of total population)	42	43	42
Life expectancy at birth (years)	72	71	69
Infant mortality (per 1,000 live births)	20	24	41
Child malnutrition (% of children under 5)	7	13	25
Access to an improved water source (% of population)	88	87	88
Literacy (% of population age 15+)	..	91	89
Gross primary enrollment (% of school-age population)	111	110	111
Male	112	111	112
Female	111	109	109

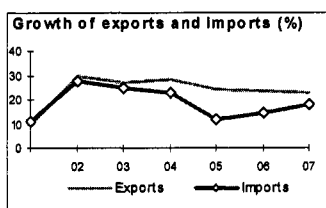
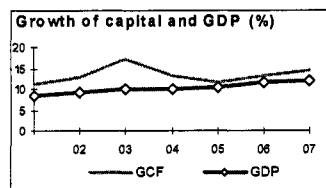


KEY ECONOMIC RATIOS and LONG-TERM TRENDS	1987 1997 2006 2007				
	GDP (US\$ billions)	268.2	952.7	2,657.9	3,280.1
Gross capital formation/GDP	37.3	37.9	44.4	..	
Exports of goods and services/GDP	16.4	21.8	39.9	..	
Gross domestic savings/GDP	37.3	42.4	52.3	..	
Gross national savings/GDP	37.3	41.8	53.8	..	
Current account balance/GDP	0.0	3.9	9.4	11.5	
Interest payments/GDP	0.4	0.6	0.1	..	
Total debt/GDP	13.2	15.4	12.1	..	
Total debt service/exports	8.5	8.5	2.4	..	
Present value of debt/GDP	..	..	11.9	..	
Present value of debt/exports	..	..	27.7	..	
(average annual growth)					
GDP	10.3	9.5	11.6	11.9	10.4
GDP per capita	8.9	8.7	11.0	11.2	9.7
Exports of goods and services	10.8	22.7	23.3	22.8	15.8



STRUCTURE of the ECONOMY

(% of GDP)	1987 1997 2006 2007				
	Agriculture	26.8	19.1	11.7	..
Industry	43.9	47.5	48.1	..	
Manufacturing	34.7	33.2	..	..
Services	29.3	34.4	40.2	..	
Household final consumption expenditure	48.7	43.4	33.5	..	
General gov't final consumption expenditure	14.0	14.2	14.2	..	
Imports of goods and services	16.4	17.3	32.1	..	
(average annual growth)					
Agriculture	4.4	3.7	5.0	4.0	
Industry	13.9	10.5	12.5	13.4	
Manufacturing	13.1	10.3	..	..
Services	9.4	10.2	12.4	12.2	
Household final consumption expenditure	9.8	3.8	-2.5	..	
General gov't final consumption expenditure	10.6	9.5	10.9	..	
Gross capital formation	12.2	11.5	13.2	14.3	
Imports of goods and services	13.0	19.1	14.3	19.2	



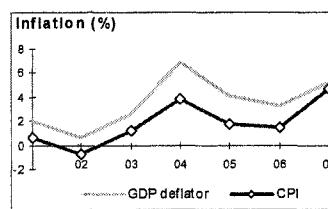
Note: 2007 data are preliminary estimates.

This table was produced from the Development Economics LDB database.

* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

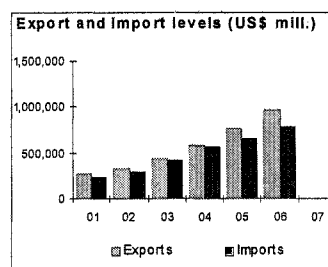
PRICES and GOVERNMENT FINANCE

	1987	1997	2006	2007
Domestic prices				
(% change)				
Consumer prices	7.3	2.8	15	4.6
Implicit GDP deflator	5.1	15	3.3	5.2
Government finance				
(% of GDP, includes current grants)				
Current revenue	0.0	110	18.3	19.4
Current budget balance	-16.7	-0.1	3.0	3.0
Overall surplus/deficit	-22.1	-17	-0.7	-0.9



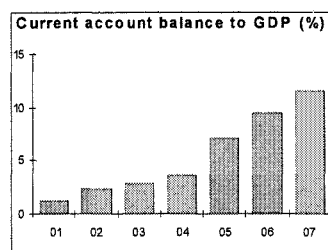
TRADE

	1987	1997	2006	2007
(US\$ millions)				
Total exports (fob)	39,437	182,792	969,073	..
Food	4,781	11,075	25,722	..
Mineral fuels, lubricants, and related materials	4,544	6,987	17,776	..
Manufactures	26,206	158,839	916,147	..
Total imports (cif)	43,216	142,370	791,614	..
Food	2,443	4,304	9,997	..
Fuel and energy	539	10,306	89,002	..
Capital goods	14,607	52,774	357,107	..
Export price index (2000=100)	68	119	107	..
Import price index (2000=100)	84	103	124	..
Terms of trade (2000=100)	81	116	87	..



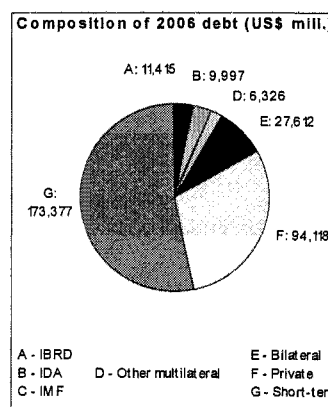
BALANCE of PAYMENTS

	1987	1997	2006	2007
(US\$ millions)				
Exports of goods and services	43,868	207,239	1,061,681	..
Imports of goods and services	43,950	164,416	852,769	..
Resource balance	-82	42,823	208,912	..
Net income	-215	-11,004	11,755	..
Net current transfers	224	5,143	29,200	..
Current account balance	-73	36,962	249,867	377.812
Financing items (net)	1,733	-1,105	-2,842	-20,000
Changes in net reserves	-1,660	-35,857	-247,025	-357.812
Memo:				
Reserves including gold (US\$ millions)	22,439	146,439	1,046,465	1,427.812
Conversion rate (DEC, local/US\$)	4.5	8.3	8.0	7.6



EXTERNAL DEBT and RESOURCE FLOWS

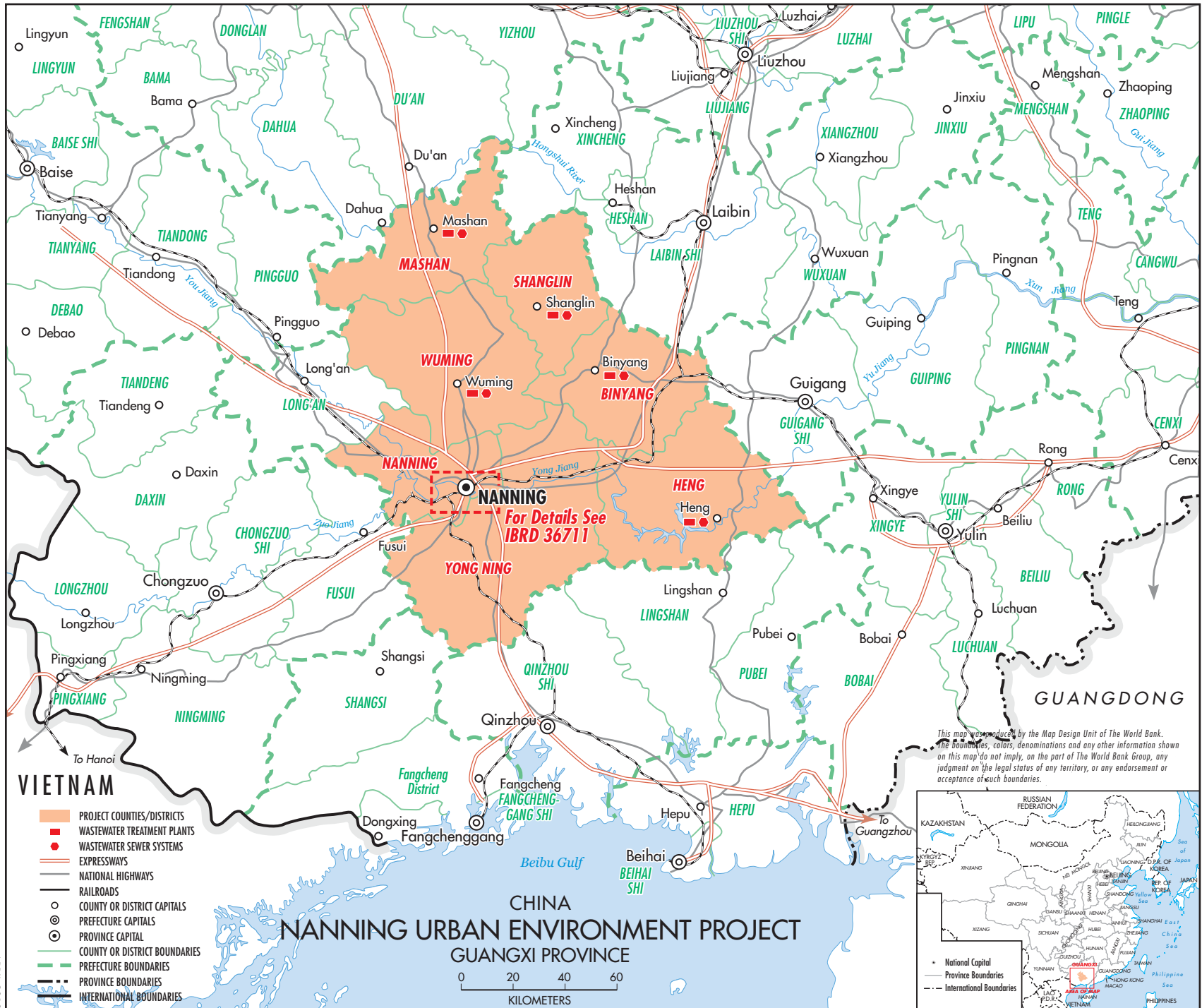
	1987	1997	2006	2007
(US\$ millions)				
Total debt outstanding and disbursed	35,340	146,697	322,845	..
IBRD	1,427	8,239	11,415	11,762
IDA	1,330	7,830	9,997	10,151
Total debt service	3,852	18,445	27,877	..
IBRD	208	858	1,443	1,561
IDA	12	81	316	349
Composition of net resource flows				
Official grants	210	266	363	..
Official creditors	626	4,315	901	..
Private creditors	5,462	8,134	7,500	..
Foreign direct investment (net inflows)	2,314	44,237	78,095	..
Portfolio equity (net inflows)	0	5,657	42,861	..
World Bank program				
Commitments	1,306	2,425	1,154	1,361
Disbursements	702	2,275	1,169	1,208
Principal repayments	97	377	144	1,164
Net flows	605	1,898	25	24
Interest payments	124	562	615	727
Net transfers	482	1,335	-590	-703



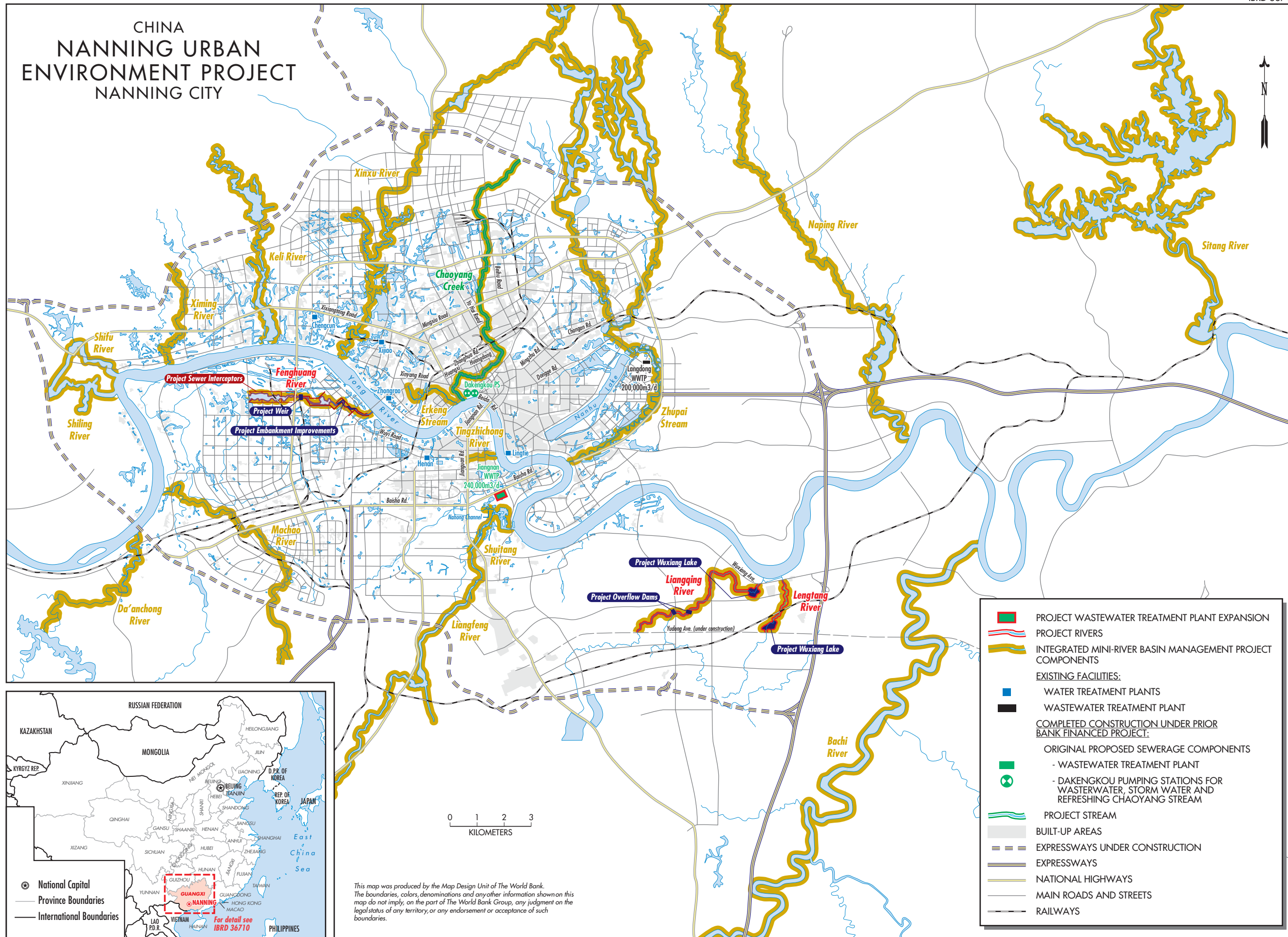
Note: This table was produced from the Development Economics LDB database.

9/24/08

MAP SECTION

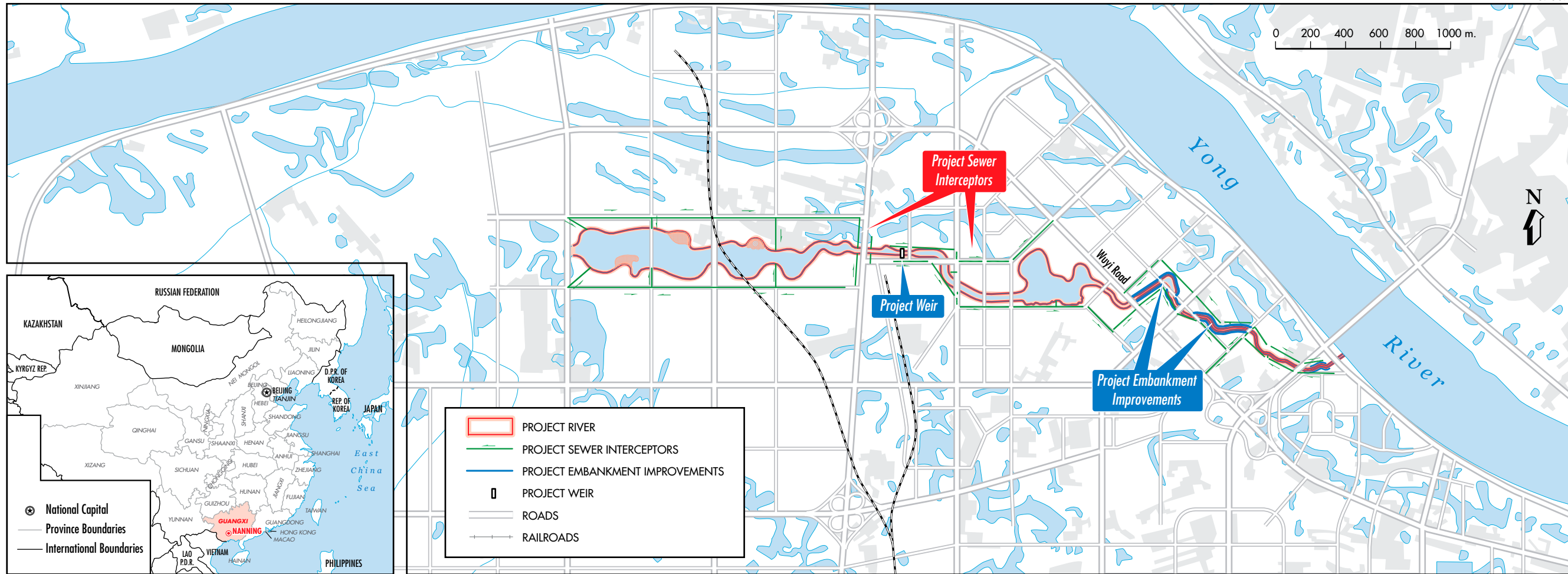


CHINA NANNING URBAN ENVIRONMENT PROJECT NANNING CITY

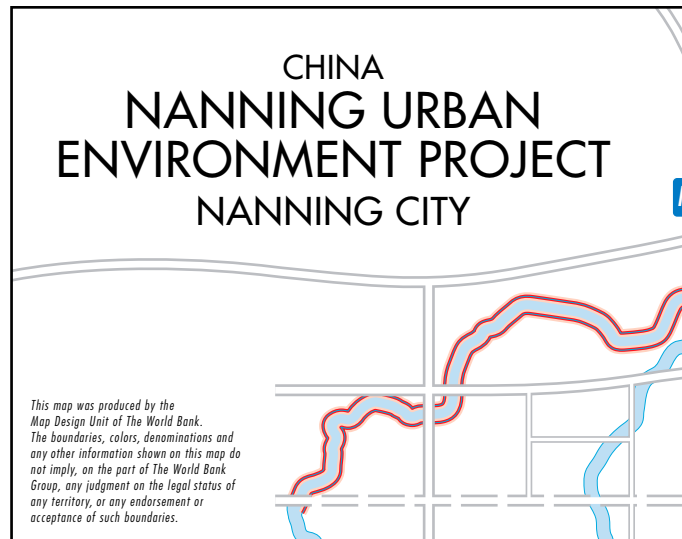
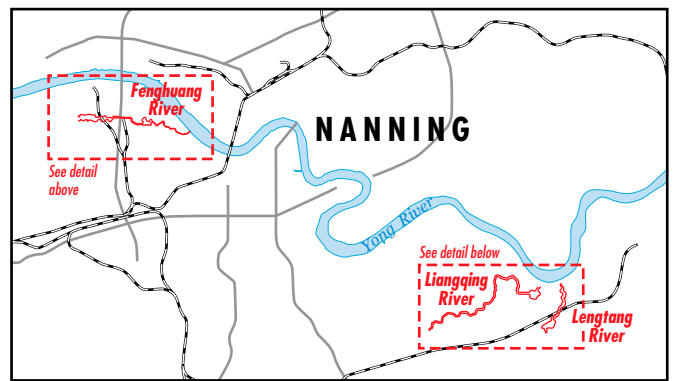


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	PROJECT WASTEWATER TREATMENT PLANT EXPANSION
	PROJECT RIVERS
	INTEGRATED MINI-RIVER BASIN MANAGEMENT PROJECT COMPONENTS
EXISTING FACILITIES:	
	WATER TREATMENT PLANTS
	WASTEWATER TREATMENT PLANT
COMPLETED CONSTRUCTION UNDER PRIOR BANK FINANCED PROJECT:	
	ORIGINAL PROPOSED SEWERAGE COMPONENTS
	- WASTEWATER TREATMENT PLANT
	- DAKENGKOU PUMPING STATIONS FOR WASTERWATER, STORM WATER AND REFRESHING CHAOYANG STREAM
	PROJECT STREAM
	BUILT-UP AREAS
	EXPRESSWAYS UNDER CONSTRUCTION
	EXPRESSWAYS
	NATIONAL HIGHWAYS
	MAIN ROADS AND STREETS
	RAILWAYS



- PROJECT RIVER
- PROJECT SEWER INTERCEPTORS
- PROJECT EMBANKMENT IMPROVEMENTS
- PROJECT WEIR
- ROADS
- RAILROADS



- PROJECT RIVER
- PROJECT LAKES
- PROJECT OVERFLOW DAMS
- ROADS
- RAILROADS

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