



Project Completion Report

PCR: PRC 32121

Suzhou Creek Rehabilitation Project (Loan 1692-PRC) In the People's Republic of China

September 2005

Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – yuan (CNY)

		At Appraisal (1 May 1999)	At Project Completion (1 September 2005)
CNY1.00	=	\$0.12	\$0.12
\$1.00	=	CNY8.28	CNY8.10

ABBREVIATIONS

ADB	–	Asian Development Bank
EIRR	–	economic internal rate of return
EOCC	–	economic opportunity cost of capital
EPB	–	Environmental Protection Bureau
FIRR	–	financial internal rate of return
ICB	–	international competitive bidding
IDC	–	interest during construction
IS	–	international shopping
LCB	–	local competitive bidding
LIBOR	–	London interbank offered rate
MBI	–	market-based instrument
MIS	–	management information system
MOF	–	Ministry of Finance
NPV	–	net present value
O&M	–	operation and maintenance
OWA	–	overall weighted average
PRC	–	People's Republic of China
RP	–	resettlement plan
RRP	–	report and recommendation of the President
SASS	–	Shanghai Academy of Social Sciences
SDB	–	State Development Bank
SEPBB	–	Shanghai Environmental Protection Bureau
SMG	–	Shanghai Municipal Government
SSRCC	–	Shanghai Suzhou Creek Rehabilitation and Construction Company
TA	–	technical assistance
WACC	–	weighted average cost of capital
WTP	–	wastewater treatment plant

WEIGHTS AND MEASURES

ha	–	hectare
l	–	liter
lcd	–	liter per capita per day
m ²	–	square meter
m ³	–	cubic meter
m ³ /d	–	cubic meter per day
mg	–	milligram

NOTES

- (i) The fiscal year (FY) of the Government coincides with the calendar year.
- (ii) In this report, "\$" refers to US dollars.

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BASIC DATA

A. Loan Identification

1.	Country	People's Republic of China
2.	Loan Number	1692-PRC
3.	Project Title	Suzhou Creek Rehabilitation Project
4.	Borrower	People's Republic of China
5.	Executing Agency	Shanghai Suzhou Creek Rehabilitation and Construction Company
6.	Amount of Loan	\$300 million
7.	Project Completion Report Number	PCR: PRC 922

B. Loan Data

1.	Appraisal	
	– Date Started	24 February 1999
	– Date Completed	9 March 1999
2.	Loan Negotiations	
	– Date Started	22 April 1999
	– Date Completed	23 April 1999
3.	Date of Board Approval	29 June 1999
4.	Date of Loan Agreement	18 August 1999
5.	Date of Loan Effectiveness	
	– In Loan Agreement	16 November 1999
	– Actual	1 February 2000
	– Number of Extensions	One
6.	Closing Date	
	– In Loan Agreement	30 September 2004
	– Actual	30 September 2005
	– Number of Extensions	1
7.	Terms of Loan	
	– Interest Rate	Variable
	– Maturity	25 years
	– Grace Period	5 years
8.	Terms of Relending (if any)	
	– Interest Rate	Variable
	– Maturity	25 years
	– Grace Period	5 years
	– Second-Step Borrower	Shanghai Municipal Government
	– Third-Step Borrower	Shanghai Suzhou Creek Rehabilitation and Construction Company

9. Disbursements

a. Dates

Initial Disbursement	Final Disbursement	Time Interval
25 May 2000	30 September 2005	64 months
Effective Date	Original Closing Date	Time Interval
1 February 2000	30 June 2005	64 months

b. Amount (\$ million)

Category or Subloan	Original Allocation	Last Revised Allocation	Amount Canceled	Net Amount Available	Amount Disbursed	Undisbursed Balance
Shidongkou	20.3	5.9	14.4	5.9	5.8	0.1
- Wastewater						
- Treatment plant						
Wu Song bridge date and pumping station	7.3		7.3			
Interceptor and pumping stations, lock and gate pumping stations, embankment rehabilitation, dredging, re-aeration, removal of garbage/nightsoil wharf	72.4	56.0	16.4	56.0	56.4	(0.4)
Equipment and materials	119.0	70.7	48.4	70.7	68.7	2.0
Training	2.2	0.7	1.6	0.7	0.5	0.1
Consulting services	2.2	3.5	(1.3)	3.5	3.0	0.5
Interest and commitment charge	50.0	28.0	22.0	28.0	27.7	0.3
Unallocated	26.6	0.3	26.3	0.3		0.3
Imprest Account	0.0	0.0	0.0	0.1	0.1	0.0
Total	300.0	165.0	135.0	165.0	162.1	2.9

10. Local Costs (Financed)

None

C. Project Data

1. Project Cost (\$ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	331.5	162.1
Local Currency Cost	544.3	679.2
Total	875.8	841.3

2. Financing Plan (\$ million)

Cost	Appraisal Estimate			Actual		
	Foreign	Local	Total	Foreign	Local	Total
Implementation Costs						
Borrower Financed	0.0	0.0	0.0	0.0	630.0	630.0
ADB Financed	250.0	0.0	250.0	134.4	0.0	134.4
Other External Financing	0.0	0.0	0.0	0.0	0.0	0.0
IDC Costs						
Borrower Financed	0.0	0.0	0.0	0.0	49.2	49.2
ADB Financed	50.0	0.0	50.0	27.7	0.0	27.7
Other External Financing	0.0	0.0	0.0	0.0	0.0	0.0
Total	300.0	0.0	300.0	162.1	679.2	841.3

ADB = Asian Development Bank, IDC = interest during construction.

3. Cost Breakdown by Project Component (\$ million)

Component	Appraisal Estimate			Actual		
	Foreign	Local	Total	Foreign	Local	Total
A. Base Cost						
Land Acquisition	0	13.6	13.6	0	32.9	32.9
Resettlement	0	200.9	200.9	0	300.8	300.8
Civil Works	105.7	159.3	265.0	62.2	249.1	311.3
Equipment and Materials	118.9	0	118.9	68.7	0	68.7
Consulting Services						
Engineering Designs	0	17.0	17.0	0	9.5	9.5
Construction Supervision	0	5.2	5.2	0	3.6	3.6
Project Management	2.1	0.0	2.1	3.0	0	3.0
Training	2.0	0.0	2.0	0.5	0	0.5
Administration	0.0	52.4	52.4		34.0	34.0
Subtotal (A)	228.7	448.4	677.1	134.4	629.9	764.3
B. Contingencies						
Physical	16.9	44.8	61.8	0	0	0
Price	9.7	20.2	29.9	0	0	0
Subtotal (B)	26.6	65.0	91.6	0	0	0
C. Interest and Other Charges						
During Construction	76.2	30.9	107.1	27.7	49.3	77.0
Subtotal (C)	76.2	30.9	107.1	27.7	49.3	77.0
Total (A+B+C)	331.5	544.3	875.8	162.1	679.2	841.3

4. Project Schedule

Item	Appraisal Estimate (Quarter)	Actual (Quarter)
Preliminary Engineering Design		
Start Date	III 1998	IV 1998
Completion Date	IV 1999	I 2003
Land Acquisition		
Start Date	IV 1998	IV 1998
Completion Date	IV 1999	I 2003
Resettlement		
Start Date	IV 1998	IV 1998
Completion Date	IV 2001	I 2003
Tendering		
Start Date	IV 1998	IV 1998
Completion Date	IV 2001	I 2003
Construction		
Start Date	I 1999	II 1999
Completion Date	III 2003	III 2004
Commissioning	III 2000–III 2004	I 2000–IV 2004
Procurement		
Start Date	I 1999	III 1999
Completion Date	IV 2002	I 2003

5. Project Performance Report Ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
From 1 Feb 2000 to 31 Dec 2000	Satisfactory	Highly Satisfactory
From 1 Jan 2001 to 31 Dec 2001	Satisfactory	Highly Satisfactory
From 1 Jan 2002 to 31 Dec 2002	Satisfactory	Satisfactory
From 1 Jan 2003 to 31 Dec 2003	Satisfactory	Highly Satisfactory
From 1 Jan 2004 to 31 Dec 2004	Satisfactory	Highly Satisfactory
From 1 Jan 2005 to 30 Apr 2005	Satisfactory	Highly Satisfactory

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members ^a
Appraisal	24 Feb–9 Mar 1999	7	97	a, b, c, d, e, h, i,
Inception	1–10 Dec 1999	2	20	f, h
Review	25–30 June 2000	2	12	f, h
Review	3–4, 8–9 Dec 2000	1	4	h
Review	13–18 May 2001	1	6	h
Midterm Review	3–14 Nov 2002	3	36	d, f, h
Review	26 Feb–1 Mar 2003	2	8	h, j
Review	14–17 Dec 2003	1	4	h
Review	2–6 Dec 2004	2	10	e, g
Project Completion ^b	5–14 Jul 2005	4	60	d, e, f, j

^a a - financial analyst, b - programs officer, c - counsel, d - staff consultant, e - urban development specialist, f - project analyst, g - project economist, h - project engineer, i - mission secretary, j - resettlement specialist.

^b The project completion report was prepared by E. Honda, Urban Development Specialist, Social Sectors Division, East and Central Asia Department.



I. PROJECT DESCRIPTION

1. Increasing urban population, industrialization, and economic development have contributed to widespread pollution in the cities of the People's Republic of China (PRC). Wastewater discharge from industrial production, rising water consumption by the urban population, and the consequent generation of municipal wastewater, have created serious water pollution problems for most cities. Shanghai—a highly urbanized industrial megacity—had limited wastewater disposal facilities. Substantial pollution loads from industries, commercial establishments, and residential areas were discharged directly into rivers and waterways without treatment, causing environmental degradation, pollution of water resources, and public health hazards. Suzhou Creek is a major natural waterway that passes through Shanghai and was the most severely polluted river in the city.

2. Based on the feasibility study carried out under technical assistance (TA) funded by the Asian Development Bank (ADB),¹ a loan² of \$300 million was approved by ADB from its ordinary capital resources on 29 June 1999. The Loan Agreement was signed on 18 August 1999 and the loan became effective on 1 February 2000. The surplus loan amount of \$135 million was cancelled in February 2003. The loan closing date was extended by 9 months from 30 September 2004 and the loan was closed on 30 June 2005.

3. The Project supported Phase I of the 12-year program to rehabilitate Suzhou Creek. The major objectives of the Project (paras. 44–46 of the report and recommendation of the President [RRP]) were to improve water quality in Suzhou Creek, strengthen water resources management, and improve flood control. These were intended to enhance health standards and quality of life for residents living in the vicinity of the creek. Originally, the Project comprised 10 components grouped under three parts (paras. 47–56 of the RRP): Part A (wastewater management) covering (i) wastewater interception on six tributaries of Suzhou Creek, (ii) wastewater interception from Hongkou Gang and Yangpu Gang, and (iii) Shidongkou wastewater treatment plant; Part B (water resources management) covering (i) locks and gates on Mudu Gang and six tributaries, (ii) integrated low-flow augmentation, (iii) rehabilitation of Hongkou Gang system, (iv) sediment dredging and disposal, and (v) re-aeration; and Part C (environmental sanitation and urban renewal) including (i) removal and relocation of nightsoil and solid waste collection wharves, and (ii) embankment reconstruction. During implementation, Part B (iv) sediment dredging was cancelled as water quality improvement targets were achieved via other components. The map gives the location of the project facilities and Appendix 1 provides a chronology of major events related to the Project. The project framework is in Appendix 2.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

4. ADB has supported the environmental management sector with emphasis on (i) environmental monitoring and enforcement, (ii) wastewater and solid waste management, (iii) public-private partnership, (iv) cost recovery, and (v) water resources conservation and environmental protection. Improved environmental management was a major theme of the Government's Ninth Five-Year Plan (1996–2000). The guiding principles of the plan included

¹ ADB. 1998. *Technical Assistance to the People's Republic of China for the Water Quality Management Planning for Suzhou Creek*. Manila.

² ADB. 1999. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Technical Assistance Grant to the People's Republic of China for the Suzhou Creek Rehabilitation Project*. Manila.

pursuing a sustainable development strategy that incorporates coordinated planning and environmental protection in economic development projects for urban and rural areas. One of the major environmental tasks was protection of the urban environment through provision of facilities to treat wastewater, and manage solid waste and nightsoil. The Project was developed in the context of the Government's and ADB's strategies for the environmental management sector.

5. Project design was sound and formulation was adequate. Stakeholders were consulted during planning, design, and implementation. The scope, cost estimates, and implementation arrangements were prepared under the project preparatory TA. Components were selected based on an assessment of alternatives, considering factors such as financial cost, technical feasibility, environmental impact, resettlement impact, and appropriate technology.

6. Shanghai Suzhou Creek Rehabilitation and Construction Company (SSRCC) introduced innovative approaches in the project design. The Meng Qing Garden, part of the embankment reconstruction component of the Project, was designed as an integrated functional facility. It serves as a landscaped leisure and recreational area, an equalization basin to store excessive rainwater in an underground storage tank, and a base for environmental and water resources protection education. Ponds and streams in the garden demonstrate self-purification mechanisms of natural water courses. The exhibition center, converted from an old beer factory, presents the history and ecological systems of Suzhou Creek. The Jing'an garbage transfer station, part of the component to remove and relocate nightsoil and solid waste collection wharves, is located in the residential area in Shanghai city center. The station was constructed as a semi-underground facility. The above-ground facilities include a landscaped garden, an educational visitor center for pre-scheduled tours, and operation control room. To minimize adverse environmental and social impacts, various innovative measures were introduced in the design of garbage collection trucks, compactor systems, and odor control and ventilation systems. Such innovative approaches, informed by overseas visits to similar facilities, serve as good examples for urban environmental improvements in large and densely populated urban centers.

7. The project scope was revised during implementation. The original ten components were reduced to nine by canceling the sediment dredging and disposal component. Since the water quality improvements were achieved by implementing other components, Shanghai Municipal Government (SMG) decided to implement this component under the next phase of the Suzhou Creek Rehabilitation program. The change was logical and reasonable, and did not alter the original objectives of the Project.

B. Project Outputs

8. The Project was implemented over 64 months from February 2000 to June 2005. The Project consisted of three major parts and 10 components (paras. 47–56 of the RRP). Most project components were completed as envisaged at appraisal. However, some components required minor modifications. These modifications were proposed by SSRCC and ADB concurred with them with a view that they would further contribute to achieving project outcomes. The outputs under the three major parts and 10 components are detailed below. Achievements against project targets are summarized in Appendix 3.

9. Part A of the Project consisted of three major components: (i) wastewater interception for six tributaries, (ii) wastewater interception for Hongkou Gang and Yangpu Gang, and (iii) Shidongkou wastewater treatment plant. Part A, component (i) was intended to construct a

48-kilometer (km) interceptor sewer, 30 km of collectors and branches, and 16 pumping stations. Actual interception achieved was 40 km of large-diameter interceptors, 165 km of collector and connection mains, and 20 pumping stations. Part A, component (ii) was intended to construct a 6-km interceptor sewer, 10 km of collectors and branches, and 19 pumping stations. Actual interception achieved was 26 km of large-diameter interceptors, 26 km of connections and branches, and 8 pumping stations. Part A, component (iii) achieved the target of constructing a sewage treatment plant with a capacity of 400,000 cubic meters per day (m³/d). For components (i) and (ii), the total length of collection sewers and the number of pumping stations had to be modified to collect sewage from the expanded service areas.

10. Part B of the Project comprised five components: (i) flow control structures on Mudu Gang and six tributaries, (ii) low-flow augmentation structures, (iii) rehabilitation of Hongkou Gang, (iv) sediment dredging, and (v) re-aeration. Part B, component (i) was intended to construct seven gates and rehabilitate three gates, construct four pumping stations, and rehabilitate two pumping stations. Seven control gates were actually constructed, while the flood control function was cancelled as it became unnecessary due to urban rezoning. Part B, component (ii) was intended to construct five pumping stations, build a new gate on Suzhou Creek, and rehabilitate the existing gate. The pumping station was constructed and the existing gate was rehabilitated, but construction of the new gate was cancelled in favor of strengthening the monitoring and control system. Part B, component (iii) was intended to construct five gates and three pumping stations on the Hongkou Gang system. Two gates and two pumping stations were actually constructed. Part B, component (iv) was intended to dredge the lower 17 km of Suzhou Creek, but this component was cancelled since the water quality objectives were achieved by implementing other components. Part B, component (v) was intended to construct nine re-aeration stations over the 35 km reach of Suzhou Creek. One re-aeration barge was actually constructed since water quality objectives were achieved by implementing other components.

11. Part C of the Project consists of two components: (i) removal and relocation of nightsoil and solid waste collection wharves, and (ii) embankment reconstruction. Part C, component (i) was intended to construct three solid waste transfer stations and two nightsoil discharge stations. Two transfer stations and a floating debris removal system were actually constructed. Part C, component (ii) was intended to reconstruct and repair 35 km of embankment wall. Only 4.3 km of the embankment wall was actually reconstructed and repaired. Further embankment reconstruction will be undertaken by district governments in the next phase of the creek rehabilitation.

C. Project Costs

12. At appraisal, the total project cost was estimated at \$875.8 million (\$331.5 million in foreign exchange and \$544.3 million equivalent in local costs), comprising \$677.1 million in base costs and \$198.7 million in contingencies and interest during construction (IDC). Of the total project cost of \$875.8 million, ADB provided a loan of \$300.0 million, covering about 34% of the total project cost and about 90% of the foreign exchange cost, including a portion of the IDC. The remaining 10% of the foreign exchange cost was to be financed by SMG. The total local cost of the Project was to be financed by the Ministry of Finance (MOF—\$132.5 million), SMG (\$102.7 million), nine districts and one county within the Shanghai Municipality (\$55.4 million), and the State Development Bank (SDB) (\$285.2 million)—(para. 61 of the RRP).

13. The actual project cost amounted to \$841.3 million (\$162.1 million in foreign exchange and \$679.2 million equivalent in local costs), comprising \$764.3 million in base costs and

\$77.0 million in IDC. ADB financed the entire foreign exchange cost of \$162.1 million (about 19% of the total project cost). Counterpart financing covered 100% of the local cost (\$679.2 million): MOF (\$130.0 million), district and/or county municipal government (\$137.2 million), SDB (\$342.6 million), and Shanghai districts and county (\$69.4 million).

D. Disbursements

14. The loan of \$300.0 million from ADB's ordinary capital resources was approved on 29 June 1999. The Borrower (PRC) relented the loan proceeds to SMG through a subsidiary loan and SMG relented the loan to SSRCC under an onlending agreement. The subsidiary loan and onlending agreement carried the same terms and conditions as the ADB loan, including other terms such as repayment period, grace period, and interest rates. Interest rate variations and foreign exchange risks were borne by SSRCC (paras. 62–65 of the RRP). Execution of the subsidiary loan and onlending agreements, including provision of satisfactory legal opinions relating to both agreements, was a condition for loan effectiveness.

15. Surplus loan funds of \$135.0 million were cancelled in February 2003 and the ADB loan was reduced by almost 45%, from \$300.0 million to \$165.0 million. The reason for the cancellation was an increase in local costs and decrease in foreign exchange costs. This resulted in an increase in counterpart financing totaling about \$135 million more than the appraisal estimate, as the Loan Agreement stipulated that ADB would finance only the foreign exchange costs. Counterpart financing was provided by MOF, SMG, districts and county, and the SDB. Other reasons for the reduction in the loan amount were (i) reduction of the project scope from 10 to 9 components, (ii) competitive bids received for both civil works and equipment, and (iii) reduction in IDC due to the switch to London interbank offered rate-based lending on 31 July 2002.

16. Loan effectiveness was delayed due to 2-month delays in signing the relending agreement between MOF and SMG, and the onlending agreement between SMG and SSRCC. The first disbursement under the loan was made in May 2000, 9 months after the loan was approved, and the last disbursement was made in September 2005. The imprest account, established in March 2001, was used mainly for local training. Proceeds of the loan were disbursed through direct payment, reimbursement, and commitment procedures in accordance with ADB's *Loan Disbursement Handbook*. At the early stages of implementation, disbursements were low. Most pre-loan effectiveness activities, including preliminary design, were carried out by the Government. During the second and third year of implementation, when major contracts were being awarded and undertaken, disbursements accelerated. By loan closing date (30 June 2005), the amount of \$162.1 million has been disbursed, and the loan balance of \$2.9 million was cancelled. Total loan cancellation amounted \$137.9 million. Throughout the project period, adequate counterpart funds were provided. Quarterly disbursements by year are in Appendix 4.

E. Project Schedule

17. The loan was approved in June 1999 and became effective in February 2000, 3 months later than the envisaged loan effectiveness of November 1999. This was due to a delay in signing the relending agreement between MOF and SMG (signed in November 1999) and the onlending agreement between SMG and SSRCC (signed in December 1999). At appraisal, project implementation was scheduled to start in November 1998 and be completed by September 2004, and the loan account was expected to close by March 2005 (para. 67 of the

RRP). Despite the delay in loan effectiveness, overall completion of the Project was not affected because of good progress made on activities prior to loan effectiveness, including preparation of detailed engineering design, preparation of draft prequalification and bidding documents, recruitment of consultants, and land acquisition and resettlement activities. The loan closing date was extended by 3 months to June 2005 to accommodate disbursements under two civil works contracts and capitalization of loan proceeds. The total implementation period was 64 months. The implementation schedule envisaged at appraisal and the actual implementation schedule are in Appendix 5.

F. Implementation Arrangements

18. The Project was implemented in line with the arrangements envisaged at appraisal (paras. 66–67 of the RRP). SSRCC, a government-owned independent limited company established on 1 September 1998, was the Executing Agency. SSRCC had registered capital of CNY1.1 billion. The leading group within SMG provided high-level policy direction and guidance for the Project. It was headed by the mayor of Shanghai and included two deputy mayors and four deputy directors as members. SSRCC was responsible for systematic liaison between the leading group and the various Shanghai commissions and bureaus involved with the Project. A technical advisory committee was formed to support and advise SSRCC—comprising specialists in wastewater management, water resources management, and environmental protection. SSRCC contracted two tendering companies to manage procurement of civil works and three tendering companies to manage procurement of equipment. SSRCC also contracted domestic subcontractors for engineering design and construction supervision. The five tendering companies and domestic subcontractors were paid out of counterpart funds.

G. Conditions and Covenants

19. In general, compliance with loan covenants was satisfactory. Major loan covenants concerning implementation, resettlement, construction quality, environmental, and tariffs were complied with. The signing of the relending agreement between MOF and SMG and the onlending agreement between SMG and SSRCC were conditions for loan effectiveness. Delays in the signing of these agreements resulted in a 3-month delay in loan effectiveness, although the delay did not affect the overall completion of the Project. Compliance with loan covenants is in Appendix 6.

20. Financial covenants included in the Loan Agreement were complied with. Sufficient counterpart funds were provided for the Project in a timely manner. Wastewater tariffs were increased on 30 June 2000 from CNY0.45/m³ to CNY0.7/m³ to cover the Project. They were raised again on 1 July 2004 to CNY0.9/m³ for domestic users and CNY1.2/m³ to fund further wastewater management and environmental improvements in Shanghai. Revenues from the CNY0.25/m³ surcharge were transferred to SSRCC each year from 2000 to 2004 (about CNY260–270 million per year, depending on the volume of wastewater sold). In line with provisions in the onlending agreement, SSRCC applied to SMG for a CNY150 million service fee on 2 August 2004.

21. SSRCC maintained records and accounts in accordance with sound accounting principles. It provided ADB with audited financial statements covering SSRCC operations and the Project (2000–2004) within the stipulated 9-month period, and the statements were acceptable.

H. Related Technical Assistance

22. To enhance project sustainability and support implementation actions identified as necessary during the policy dialogue, TA³ for Improving Environmental Management in Suzhou Creek was provided, consisting of 21 person-months international and 34 person-months of domestic consulting services. The objectives of the TA were to (i) design and implement market-based instruments (MBIs) for water quality management in Shanghai, (ii) strengthen the capacity of relevant institutions for the successful introduction and implementation of MBIs, (iii) increase public awareness of the environment, and (iv) establish baselines and dynamic water quality monitoring capabilities for Suzhou Creek. ADB provided \$0.84 million on a grant basis to cover the entire foreign exchange cost (\$0.76 million) and \$0.08 million equivalent to cover about 27% of the local currency cost (\$0.29 million). The balance of the local currency cost (\$0.21 million equivalent) was provided by SMG through the provision of office accommodation, counterpart staff, surveys, workshops, and logistical support (para. 100 of the RRP). The TA was implemented in conjunction with the loan, and was completed on May 2002. It was rated partly successful because (i) the water quality model was not calibrated properly, and (ii) design and implementation of wastewater permit trading was not fully achieved. No progress has been made on these two issues between TA completion and project completion, therefore the rating of partly successful still applies. The TA completion report⁴ is in Appendix 7.

I. Consultant Recruitment and Procurement

23. Under the Project, 75 person-months of international and 20 person-months of domestic consulting services were provided as planned, to support SSRCC in project management, implementation, and capacity building (paras. 68–69 of the RRP). The consultants provided assistance to SSRCC in procurement procedures and reporting, international specifications, tendering, bid evaluation, international contracts, quality control, and project performance monitoring system. The consultants also provided guidance and training for capacity building in project management, construction management, acceptance testing, corporate management and finance, project monitoring, and resettlement. The total cost of the consulting services was \$3.5 million. Fieldwork commenced on 21 February 2000 and services were completed on 30 July 2005.

24. Goods and services were procured from loan funds in accordance with ADB's *Guidelines for Procurement* (para. 70 of the RRP). Modes of procurement for civil works, equipment, and material supplies were largely as appraised. Procurement of 83 civil works contracts largely used local competitive bidding (LCB); out of 39 equipment contracts, 20 used international competitive bidding (ICB) and 19 used international shopping (IS); and 10 material supplies contracts were all procured using ICB. SSRCC engaged five tendering companies—Shanghai ZhongXing Construction Consultancy Co. Ltd. (civil works under Part A); Shanghai Xiangbo Tendering Co. Ltd. (civil works under Part B); Shanghai International Tendering Co. Ltd.—Joint Venture of Shang Zhongji International Tendering Co. Ltd. and Shangtou Tendering Co. Ltd.—(equipment and materials for Components A and B); and Shanghai Zhongshe International Tendering Co. Ltd. (equipment and materials for Component C). In general, tendering procedures for civil works under ICB are similar to LCB procedures, except that ICB takes longer because the tender documents must be submitted to ADB for approval and to SMG's Machinery Bureau for review and reference. The bidding period under ICB is also longer

³ ADB. 1999. *Technical Assistance to the People's Republic of China for Improving Environmental Management in Suzhou Creek*. Manila.

⁴ The report was circulated to the Board in June 2003.

than that of LCB. No problems were encountered in the packaging of contracts, preparation of bidding documents, or evaluations of bids. In the course of implementation, 22 contract addenda were processed, but no disputes or contractual difficulties were encountered.

J. Performance of Consultants, Contractors, and Suppliers

25. The performance of international consultants was satisfactory. In accordance with the terms of reference, the consultants provided services consisting of capacity building training covering project management, construction management, acceptance testing, corporate management and finance, project management and monitoring, and resettlement. The consultants also provided assistance in procurement-related activities, including preparation of technical specifications, prequalification and bidding documents, bid evaluation, international contracting, and quality control.

26. To support procurement-related activities, five domestic consultants were hired for tendering works, including prequalification of contractors, publication of bid notices, printing and selling of bid documents, bid opening, evaluation, and contract negotiations and issuing of letters of acceptance. Domestic consultants were also hired for detailed engineering design and construction supervision. SSRCC was satisfied with the performance of all domestic consultants.

27. Almost all 83 civil works contracts were procured using LCB. Of 39 equipment and materials contracts, 20 were procured under ICB and 19 under IS. No significant delays were encountered in the implementation of civil works and equipment and supplies contracts, and SSRCC was satisfied with the performance of all contractors and suppliers.

K. Performance of the Borrower and the Executing Agency

28. The performance of the borrower (MOF) and the Executing Agency (SSRCC) was highly satisfactory. They fulfilled their responsibilities and closely communicated with ADB during project implementation. SSRCC has strong technical and managerial capacity that is expected to ensure sustainability of the Project. The leading group established by SMG displayed strong leadership by providing high-level policy direction and guidance for the Project. The Shanghai Suzhou Creek Rehabilitation Project Head Office systematically liaised between SSRCC, the leading group, and the various commissions and bureaus under SMG involved in the Project. A technical advisory committee comprising specialists in wastewater management, environmental protection, and water resources management also provided SSRCC with useful advice and support.

L. Performance of the Asian Development Bank

29. The performance of ADB was considered highly satisfactory. ADB fielded a total of nine project review missions for a total of 160 staff days to monitor project implementation progress. ADB worked closely with the Government to resolve implementation issues, including cancellation of \$135 million of the loan amount. ADB provided staff training on its implementation requirements and procedures, which SSRCC considered useful for project administration. Review of tender documents, adjustments in project activities, and loan disbursement arrangements were undertaken by ADB in a timely manner.

III. EVALUATION OF PERFORMANCE

A. Relevance

30. The Project is rated highly relevant. The Project was formulated in line with the Government's strategy for environmental management improvement and ADB's country strategy for the PRC. SMG has committed to achieve long-term objectives of water quality improvement in Suzhou Creek through implementation of a 12-year program (1998–2010). The Project is regarded as the first phase of the Suzhou Creek rehabilitation program and is expected to be followed by the second and third phases, which are planned to be undertaken using SMG's own resources.

B. Efficacy in Achievement of Purpose

31. The Project is considered highly efficacious. It has achieved most project objectives as envisaged at appraisal. The immediate objectives were achieved as scheduled by December 2000: (i) removing discolored and foul-smelling water, (ii) closing down the nightsoil and solid waste collection wharves along the creek banks, and (iii) removing floating debris. The short-term objectives, to be achieved by December 2004, were achieved ahead of schedule: (i) restoring Class V water quality standards⁵ in the lower reach of 24 km of Suzhou Creek, and (ii) restoring Class IV standards⁶ on the upper reach of 29 km. The long-term objectives are expected to be achieved by December 2010:⁷ (i) restoring Class IV water quality standards in the lower 24 km of Suzhou Creek, (ii) restoring aquatic life to the creek, and (iii) extending the green space and parks along a further 14 km of the upstream creek banks.

C. Efficiency in Achievement of Outputs and Purpose

1. Efficiency of Investment

32. The Project is both financially and economically highly efficient. The financial internal rate of return (FIRR) was calculated only for the wastewater components since only these components generate cost recovery through a sewerage surcharge on top of the sewerage fee. Costs and revenues were rebased to year 2005 and incorporated actual expenditure and revenues accrued to SSRCC. The revised FIRR is 5.6% which exceeds the estimated weighted average cost of capital (WACC) of 4.4%. This is lower than the FIRR at appraisal (8.7%) but higher than the midterm review calculation (4.8%). Differences are the result of lower than forecast wastewater volumes and lower than anticipated capital and operation and maintenance (O&M) costs. Financial reevaluation is in Appendix 8.

33. The economic internal rate of return (EIRR) was recalculated using the same method as at appraisal but updating all the costs, benefits, and assumptions (including conversion factors) and adjusting the timing at which benefits were realized in accordance with the actual implementation schedule. The revised analysis uses the domestic price numeraire and 2005 prices. The calculated EIRR is 22.0%, which exceeds the economic opportunity cost of capital (EOCC) assumed to be 10%. The FIRR is higher than at midterm review (21.4%) and appraisal (17.1%)—largely due to higher than anticipated population growth and a reduction in economic costs (both capital and O&M costs). In fact, the EIRR is thought to understate the actual benefits

⁵ 2 milligrams per liter (mg/l) dissolved oxygen and 40 mg/l chemical oxygen demand, among other indicators.

⁶ 3 mg/l dissolved oxygen and 30 mg/l chemical oxygen demand, among other indicators.

⁷ If the second (2003–2005) and third phase (2006–2008) of the Suzhou Creek rehabilitation program are completed as programmed.

since property values were not used in the valuation exercise; the contingent valuation method used tends to underestimate the true worth of a project mainly because respondents cannot really comprehend or visualize the improvements that they are judging. In addition, the added economic indirect benefits are likely to be very high. Shanghai's reputation as a leading city, which is concerned about the environment and the living conditions of its inhabitants, will also have had an impact on investment decisions, attracting companies, leveraging private sector monies, and fuelling economic growth. Economic analysis is in Appendix 9.

2. Efficiency of Process

34. Project implementation was highly efficient. Consultants were recruited on time, and most civil works and supply contracts were procured as scheduled. Adequate counterpart funding was provided. Despite the delay in loan effectiveness, all project activities were implemented as scheduled or ahead of schedule because SSRCC made good progress on preparatory works prior to loan effectiveness, including preparation of detailed engineering design, preparation of draft prequalification and bidding documents, recruitment of consultants, and land acquisition and resettlement. A comprehensive management information system (MIS), established by SSRCC, contributed to efficient project management. The MIS covered contract management, including disbursement, human resources management, documentation control, financing and accounting, and corporate management and operations.

D. Preliminary Assessment of Sustainability

35. The investment is rated as highly likely to be sustainable. This rating reflects the satisfactory performance of the initial operation of the facilities and measures taken by SSRCC to ensure a smooth transition from construction to operation. The project goals—improved environmental conditions, public health standards, and urban regeneration—have been achieved.

36. The long-term sustainability of the Project is dependent on appropriate institutional responsibility and funding of ongoing O&M of facilities generated under the Project. For the solid waste management components, the assets created and responsibility for O&M have been transferred to Shanghai Municipal Environmental and Sanitary Bureau. Funding for these components will be through general budgetary appropriation. All other assets improved or created under the Project remain under SSRCC's ownership. O&M responsibility has been transferred for some components: water resource management components to the Shanghai Municipal River Gate Management office; and floodwall and greening components to the relevant districts. The remaining components remain the responsibility of SSRCC, which outsources operations through competitive bidding procedures. O&M funding is covered by the revenues transferred to SSRCC from the incremental rise in the sewerage charge of CNY0.25/m³ that was implemented in 2001. To ensure proper O&M, SSRCC established a series of guidelines and manuals, and a monitoring system, while training programs provided under the Project helped to improve the technical and managerial skills of relevant personnel.

37. SSRCC also expects to implement additional second and third phases of Suzhou Creek rehabilitation program (for an additional CNY800 million) as part of Shanghai's ongoing urban environmental and urban planning improvements. Shanghai Chengtou Corporation, an investment and stock-holding company, will provide financing for construction and operations, as it does for other urban infrastructure in Shanghai. These additional phases will build on the achievements of the Project.

E. Environmental, Sociocultural, and Other Impacts

1. Environmental Impact

38. The Project had a substantial positive environmental impact and an insignificant negative impact on the physical and natural environment. The Project contributed substantially to achieving the medium-term goal of water quality improvement—meeting Class V water quality standards in the lower reach of Suzhou Creek and Class IV standards in the upper reach by 2004. Discolored and foul-smelling waste flows were removed, future polluted discharges were prevented, and handling and disposal practices for nightsoil and solid waste were improved.

39. The adverse environmental impacts were mainly associated with the construction phase—including noise, vibration, air pollution, runoff, safety hazards, disposal of construction debris, and localized traffic congestion. Appropriate mitigation measures to minimize these effects, in conformity with relevant standards and regulations, were incorporated into the detailed engineering designs and contract documents of the construction contracts. SSRCC—in cooperation with Shanghai Environmental Protection Bureau (SEPB) and local environmental protection bureaus (EPBs)—monitored construction contracts and enforced compliance with environmental regulations and standards.

40. The removal and relocation of the solid waste collection wharves component required that solid waste be transferred to the solid waste disposal site. As the existing sanitary landfill site was reaching full capacity, SMG needed to establish additional solid waste disposal facilities. However, the provision of additional solid waste disposal facilities was not included under the Project. SSRCC has carried out a feasibility study on solid waste disposal alternatives (including landfill, composting plant, and incinerator) based on least-cost analysis. The study concluded that a sanitary landfill was the least-cost solution. Accordingly, SSRCC paid special attention to ensure synchronization of the solid waste component under the Project with the Lao Gang landfill IV expansion project.⁸

41. Dredging operations related to construction in the upper stream of Suzhou Creek involved the removal of a substantial amount of sediment. Sample tests indicated that heavy metal concentration in the sediment was within the standards for agricultural use. The sediment was disposed of at the Shanghai Second Sediment Disposal Site.

42. The environmental impact assessment at appraisal indicated that parts of Yunzao Bang might experience increased pollution for limited periods under certain flow conditions during the first year of operations of the locks and gates constructed on the tributaries of Suzhou Creek. However, there was no increased pollution in Yunzao Bang as the operation of the locks and gates were undertaken in combination with the low-flow augmentation scheme.

43. SEPB has responsibility for environmental management in SMG, including Suzhou Creek, enforcement of environmental legislation and regulations, and environmental monitoring. To ensure its own due diligence during project implementation, SSRCC established an environmental capability within the chief engineer's office. SSRCC submitted semiannual environmental reports to SEPB that covered compliance with environmental standards, unforeseen issues, and status of mitigation measures. Environmental monitoring undertaken through SEPB and local EPBs included water quality in Suzhou Creek and the tributaries,

⁸ This is a locally-financed project and was made operational in December 2004.

estuary water quality at the outfall of the wastewater treatment plant, and sediment quality surveys. SSRCC also furnished annual environmental protection management reports to ADB. An environment protection acceptance certificate for the Project was issued by the acceptance group organized by SEPB in June 2005. SEPB and local EPBs will continue environmental monitoring during the implementation of the second and third phases of the Suzhou Creek rehabilitation program.

2. Social Impact

44. The nature and scope of social benefits identified at appraisal remained unchanged. Social benefits were the result of improvements to the urban environment that cover living conditions, sanitation and public health, and access to parks and green space. According to the socioeconomic surveys conducted as part of the project performance monitoring system, satisfaction with urban environmental conditions increased from 12% at baseline survey to 71% in 2003. The level of satisfaction with water quality in Suzhou Creek was even higher, at 76% in 2003 compared with 12% at baseline survey. Results of the questionnaires to determine people's comprehension of environmental issues showed that the ratio of respondents with a good level of understanding on environmental issues in Shanghai increased from 39% at baseline survey to 44% in 2003. The socioeconomic survey in 2003 shows that about 90% of respondents thought that improved urban environment was essential to improve Shanghai's image as a modern metropolis. Among various environmental issues in Shanghai, 20% felt that pollution in watercourses was the most important, while 28% considered air pollution the most important. Some 65% of respondents were satisfied with the results of the Project. Respondents found positive impacts on living conditions (75%), economic development (74%), and public health (55%).

45. For domestic customers, the combined water and wastewater tariff is CNY1.93/m³. For the average household of 3.03 persons with average water consumption of 185 liters per capita per day (lcd), the combined household monthly bill is about CNY31 (1.0% of average household income). Taking into account the slightly larger family size for the poorest families with annual household incomes of around CNY18,700, the combined charge represents 2.0% of average household income. The incremental surcharge of CNY0.25/m³ associated with the project is only part of the overall water and wastewater bill. The surcharge accounts for 0.1% (average household) and 0.2% (poorest household) of household income.

3. Resettlement

46. The resettlement program was successful. Resettlement plans were prepared for the Project and its nine components in accordance with related the PRC laws and regulations and ADB policies. At appraisal, it was anticipated that about 114 hectares (ha) would need to be acquired permanently while another 125 ha would be temporarily needed during construction, and 2,647 households and 465 factories/public institutions would need to be relocated. Total cost for land compensation, relocation, and resettlement was estimated at \$225 million.

47. Land acquisition and resettlement were mainly carried out from 1999 to 2002. Eleven districts of Shanghai Municipality were affected. A total of 158 ha of land was permanently acquired and 287 ha was temporarily occupied. Some 58 ha of dwellings and 98 ha of structures owned by factories and/or public institutions were demolished, 6,581 households and 33 factories and/or public institutions were relocated, while 514 households and 845 factories/public institutions were partially affected. A total of 1,680 people lost jobs due to land acquisition. The actual costs for land compensation, house relocation, and resettlement

amounted to \$334 million, 49% more than the estimated amount at appraisal. The increase was due to changes in the project scope and technical designs, and increases in land acquisition requirements. The resettlement plan prepared at appraisal was updated as needed and changes were reflected in the progress reports and resettlement monitoring reports.

48. SSRCC established the Project Preparation Department for overall resettlement management and coordination, internal monitoring, and quarterly reporting to ADB. Resettlement companies were engaged at the district and township levels to undertake resettlement activities within their jurisdictions. The Shanghai Academy of Social Sciences (SASS), entrusted by SSRCC, undertook external monitoring of resettlement. External monitoring reports were prepared and submitted to ADB periodically during resettlement implementation. However, the frequency of submitting monitoring reports for each component varied with each component. SASS furnished the resettlement completion report based on the sample survey (214 households and 21 factories/public institutions) to ADB in November 2004.

49. Prior to and during the resettlement implementation, consultations were conducted with affected households and factories/public institutions. The objectives of the consultations were to inform the affected people about compensation policies and provide them with opportunities to present their options on resettlement implementation.

50. The compensation was delivered to the affected households and factories/public institutions in accordance with the resettlement plans. All resettled households were allowed to choose between a new house or cash compensation. Living conditions, housing size, and housing quality of most of the affected people have improved. Most of the affected households moved into apartment blocks served by water supply, sanitation, electricity, gas, and telephone services. After resettlement, 92% live in houses of more than 20 square meters (m²), while before resettlement 82% lived in houses of less than 15 m². Of the 1,680 people who lost jobs due to land acquisition, 1,062 received cash compensation and support in searching for new employment, including employment information and vocational training. The remaining 618 people who had reached or were reaching retirement age chose retirement or early retirement. The affected factories and/or public institutions were compensated in cash for the dismantling of buildings, interruption of business, suspension of operations, and removal of equipment. In addition, subsidies were provided for the affected enterprises to help them continue or even expand their business. A summary resettlement completion report is in Appendix 10.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

51. Overall, the Project is rated highly successful.⁹ It was highly relevant to the Government's development strategy and ADB's sector policy in the PRC. It was efficacious in achieving project purposes and objectives, and was efficient in the implementation process. The Project is rated sustainable in all aspects. The resettlement process was largely successful with most resettled households acquiring better houses and living conditions. Environmental impacts have been positive and all necessary mitigation measures were taken for negative environmental impacts. Immediate social impacts have all been positive. Institutional development and other impacts were also positive. Appendix 11 summarizes the project rating analysis.

⁹ This project completion report is part of a sample of project completion reports independently reviewed by the Operations Evaluation Department. The review has validated the methodology used and the rating given.

B. Lessons Learned

52. The Government's strong political commitment and management capability was key to the success of the Project. As the Project focused on comprehensive environmental rehabilitation and comprised many components, strong leadership to bring in all related agencies of SMG was required throughout the planning and implementation of the Project. To exercise its leadership, SMG carefully designed and established project implementation arrangements to allow it to coordinate related agencies effectively, provide guidance at the highest level when necessary, keep to schedules, and adhere to procedures.

53. Strong capacity to implement resettlement activities was essential for smooth implementation of the large-scale urban resettlement activities under the Project. Clearly defined functions and responsibilities of the Project Preparation Department established within SSRCC and resettlement companies ensured close coordination between resettlement activities and construction activities to prevent delays and maintain orderly relocation.

54. Estimates of wastewater revenues were overstated because the volume of water sold was overestimated. This is a recurring problem in similar projects in the PRC particularly where the water and/or wastewater tariff has increased substantially. Similar projects in the future should exercise caution in estimating revenues derived from water supply sales and forecasts. Where possible, price elasticity of demand should be explicitly considered or only growth from increased coverage should be incorporated. On the other hand, this is a successful case of water conservation through the introduction of a market mechanism.

55. SSRCC actively utilized the ability of the private sector in project implementation and management. Tendering companies were engaged to manage tendering works, resettlement activities were coordinated and managed by resettlement companies, and operations of some of the facilities improved and/or constructed under the Project were contracted out. This approach was effective for such a large, complicated, and multifaceted project.

C. Recommendations

1. Project Related

56. The Project provided an excellent example of environmental improvement in large and densely populated urban centers. The multifaceted approach, required to tackle complicated multifaceted problems, worked despite its complexity. The Project indicated that environmental improvements—particularly in river water quality, which is usually difficult to evaluate in economic terms due to lack of quantifiable data—can produce economic benefits such as increased land values. It is recommended that SSRCC further disseminate its experience in comprehensive and sustainable environmental improvement to cities facing similar problems in the PRC and Asia.

57. Suzhou Creek rehabilitation requires comprehensive efforts covering wastewater treatment, solid waste management, flood control, and construction of sidewalks and parks. To achieve the long-term objectives to further improve the environment in and along Suzhou Creek by 2010, it is recommended that SMG coordinate various related projects—including the second and third phases of Suzhou Creek rehabilitation program and the World Bank's projects in wastewater treatment and solid waste management.

58. Resettlement and environmental monitoring required under the government-financed second and third phases of Suzhou Creek rehabilitation program are not expected to be as strict as under the ADB-financed project. In view of successful resettlement and environmental monitoring during implementation of the Project, it is recommended that the Government apply similar policy and procedures for resettlement and environmental monitoring under the second and third phases. It is also recommended that the Government encourage community participation in the resettlement planning so that affected people have an option to relocate nearby.

59. If ADB selects the Project for a project performance audit review, the review could be undertaken in 2008 or 2009. By that time, the second and third phases of Suzhou Creek rehabilitation program are expected to be completed and the long-term objective may have been achieved.

2. General

60. The main reason for the cancellation of part of the ADB financing was an increase in counterpart financing. To avoid similar cancellations in future projects, it is recommended to increase flexibility in the percentage of ADB financing for civil works, or set a maximum amount to be borrowed rather than fixed proportions for civil works, and finance more upfront costs and/or local costs such as resettlement costs.

61. In order to avoid a substantial increase in resettlement costs during project implementation, it is recommended that resettlement specialists and related engineers work together closely at the project preparation and design stages to estimate precise resettlement costs as far as possible. Thorough social investigation at the project preparatory stage and adequate resettlement supervision by ADB during project implementation are also necessary. Lower cost options to include the affordable housing component as part of the Project could also be considered.

62. For projects with many components that require resettlement, external resettlement monitoring reports covering all the related components should be prepared throughout the resettlement process. Ideally, a biannual monitoring report for each component and annual reports covering overall resettlement monitoring should be prepared until the resettlement objectives are achieved.

CHRONOLOGY OF MAJOR EVENTS

Date	Event
November–December 1998	Loan fact-finding mission
February–March 1999	Appraisal mission
April 1999	Draft local competitive LCB and prequalification documents prepared (under advance procurement action)
June 1999	Loan approval
August 1999	Signing of the Loan Agreement
	CSC for recruitment of consultants (under advance procurement action)
November 1999	Original date of loan effectiveness
December 1999	ADB loan inception mission
	Project opening ceremony in Shanghai
	Completion of preliminary engineering design for locks and gates on Mudu Gang and other tributaries
January 2000	Contract signing with CDM International, Inc.
February 2000	Loan effectiveness
May 2000	First disbursement under the Loan
June 2000	First review mission
November 2000	Study visit to ADB Headquarters
December 2000	Second review mission
April 2001	Completion of civil works for locks and gates on Mudu Gang and other tributaries
May 2001	Third review mission
June 2001	Completion of construction on wastewater interception on SC
August 2001	Completion of preliminary engineering design for wastewater interception on Hongkou Gang and Yangpu Gang
November 2001	Completion of preliminary engineering design for rehabilitation of Hongkou Gang System
December 2001	Completion of preliminary engineering design for low-flow augmentation
	Completion of construction on wastewater interception on Hongkou Gang and Yangpu Gang
November 2002	Midterm review mission
	Completion of civil works on low-flow augmentation
December 2002	Completion of preliminary engineering design for wastewater interceptors on SC
	Completion of construction on wastewater interception on Hongkou Gang and Yangpu Gang
January 2003	Establishment ceremony for Suzhou Creek Stage 1
	Completion of preliminary engineering design for nightsoil and solid waste wharves
February 2003	Partial cancellation of \$135 million of the loan
March 2003	Fourth review mission
	Completion of preliminary engineering design for Shidongkou wastewater treatment plant
May 2003	Reallocation of loan categories
August 2003	Reallocation of loan categories
September 2003	Completion of construction on Shidongkou wastewater treatment plant
July 2004	Completion of civil works at removal/relocation of night soil/solid waste wharves
December 2004	Fifth review mission
July 2005	Project completion review mission

CSC= Consultant's Selection Committee; LCB= local competitive bidding; SC= Suzhou Creek

PROJECT FRAMEWORK

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks	Progress on Performance Targets
<p>Goal</p> <p>1.1 Improve environmental conditions in Suzhou Creek (SC) and adjacent urban areas.</p> <p>1.2 Raise public health standards.</p> <p>1.3 Promote urban renewal and socioeconomic regeneration.</p>	<p>By 2004:</p> <ul style="list-style-type: none"> • Restore Class V water quality in the lower 24 kilometers (km) and Class IV water quality in the upper 29 km of SC. • Reduce the incidence of morbidity due to viral hepatitis and dysentery in the project area to the Shanghai average (357 cases per 10,000). • Develop parks and green space along both banks of the lower 5 km of SC. 	<ul style="list-style-type: none"> • Water quality monitoring. • Socioeconomic surveys and health statistics. • Site inspections and project implementation reports. 	<ul style="list-style-type: none"> • The Taihu Baisin Authority improves the quality of SC water outside Shanghai. • Water quality improvements are effective. • Poor water quality and degraded environment are detrimental to public health and constrain urban renewal. 	<p>Achieved ahead of schedule.</p> <p>Baseline data is not available but socioeconomic survey indicates that people in the project area feel that the Project has improved public health conditions in the project area.</p> <p>Achieved. Green space increased by about 12,000 square meters (m²).</p>
<p>Purpose</p> <p>2.1 Improve wastewater management.</p> <p>2.2 Improve water resource management.</p>	<p>By 2004:</p> <ul style="list-style-type: none"> • Intercept 400,000 cubic meters per day (m³/day) of wastewater entering SC and the tributaries, and transmit to the wastewater treatment plant (WTP) for treatment and disposal. • Reduce the frequency, duration, and extent of flooding. • Maintain water quality during periods of dry weather flow. 	<ul style="list-style-type: none"> • Water quality monitoring in SC. • Flow measurements on sewers and WTP. • Laboratory testing of the final treated sewage effluent. • Reduction of the number of claims and amount of compensation paid for flood damage. • Water quality monitoring during dry weather. 	<ul style="list-style-type: none"> • Sufficient connections are installed. • Pumping stations and WTP are operated correctly. • Water management regime is designed correctly to achieve optimum water exchange. 	<p>Achieved.</p> <p>No major flooding after project completion. Flood protection area expanded from 17 m² to 21 km².</p> <p>Partially achieved.</p>

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks	Progress on Performance Targets
2.3 Improve environment, sanitation, and urban renewal.	<ul style="list-style-type: none"> • Improve the flow characteristics of SC. • Improve the handling and storage of nightsoil and solid waste. • Redevelop the riverbanks. 	<ul style="list-style-type: none"> • Flow measurements. • Socioeconomic surveys and health records. • Site inspection and project implementation reports. 	<ul style="list-style-type: none"> • Flow control structures are operated correctly. • Areas vacated by existing wharves are redeveloped as parks and green spaces. 	<p>Achieved.</p> <p>Achieved.</p> <p>Achieved.</p>
<p>Outputs</p> <p>3.1 Part A: Wastewater management</p> <p>1. Wastewater interception for six tributaries.</p> <p>2. Wastewater interception for Hongkou Gang and Yangpu Gang.</p> <p>3. Shidongkou WTP.</p> <p>3.2 Part B: Water resources management</p> <p>4. Flow control structures on Mudu Gang and six tributaries.</p> <p>5. Low-flow augmentation structures.</p>	<p>By 2004</p> <ul style="list-style-type: none"> • Construct 48 km of interceptor sewers, 30 km of collectors and branches, and 16 pumping stations. • Construct 6 km of interceptor sewers, 10 km of collectors and branches, and 19 pumping stations. • Construct 400,000 m³/d capacity sewage treatment plant. • Construct seven gates. • Rehabilitate three gates. • Construct four pumping stations. • Rehabilitate two pumping stations. • Construct five pumping stations. • Construct a new gate on SC. • Rehabilitate the existing SC gate. 	<ul style="list-style-type: none"> • Implementation reports. • Review missions. • Project performance management system. • Water quality monitoring. • Socioeconomic surveys. • Real estate values. 	<ul style="list-style-type: none"> • Land is acquired. • Resettlement is undertaken. • Design and construction are adequate. • Sewer connections are completed. • Facilities are operated and maintained correctly. 	<p>40 km of interceptor sewers, 165 km of collectors and branches, and 20 pumping stations were constructed.</p> <p>26 km of interceptor sewers, 26 km of collectors and branches, and 8 pumping stations were constructed.</p> <p>Achieved.</p> <p>Achieved.</p> <p>Cancelled. Original objective of flood control function is no longer required due to urban rezoning.</p> <p>One pumping station was constructed.</p> <p>Cancelled. Instead, monitoring and control system was strengthened.</p> <p>Achieved.</p>

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks	Progress on Performance Targets
<p>6. Rehabilitation of Hongkou Gang.</p> <p>7. Sediment dredging.</p> <p>8. Re-aeration.</p> <p>3.3 Part C: Environmental improvements, sanitation, and urban renewal</p> <p>9. Removal and relocation of nightsoil and solid waste collection wharves.</p> <p>10. Embankment reconstruction.</p>	<ul style="list-style-type: none"> • Construct five gates and three pumping stations on the Hongkou Gang system. • Dredge the lower 17 km of SC. • Construct nine re-aeration stations over 35 km reach of SC. • Construct three solid waste transfer stations and two nightsoil discharge stations. • Reconstruct and repair 35 km of embankment wall. 		<ul style="list-style-type: none"> • Land is acquired. • Resettlement is undertaken. • Design and construction are adequate. 	<p>Two gates and two pumping stations were constructed.</p> <p>Cancelled. Water quality objectives were achieved via other components.</p> <p>One re-aeration barge was constructed. Water quality objectives were achieved via other components.</p> <p>Achieved.</p> <p>4.3 km was reconstructed and repaired. Further work will be done by district governments.</p>
<p>Activities/Inputs</p> <p>4.1 Part A: Wastewater management</p> <p>Civil works equipment and materials</p> <p>4.2 Part B: Water resources management</p> <p>Civil works equipment and materials</p>	<p>\$126.20 million</p> <p>\$63.20 million</p> <p>\$129.40 million</p> <p>\$36.40 million</p>		<ul style="list-style-type: none"> • Competent contractors are selected and perform well. • Wastewater tariff reforms are accepted and implemented. • Counterpart funds and domestic cofinancing are available on time. 	<p>\$205.76 million</p> <p>\$53.25 million</p> <p>\$47.35 million</p> <p>\$7.13 million</p>

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks	Progress on Performance Targets
4.3 Part C: Environmental improvement, sanitation, and urban renewal				\$58.23 million
Civil works equipment and materials	\$9.40 million \$19.30 million			\$8.29 million
4.4 Land and resettlement	\$214.50 million <ul style="list-style-type: none"> • 249 enterprises relocated. • 10,000 affected persons provided with training and assistance to find jobs. 	<ul style="list-style-type: none"> • District resettlement offices and resettlement committees. 	<ul style="list-style-type: none"> • National and local resettlement regulations are observed. • Replacement land, jobs, new housing, training, and all entitlements are provided. 	\$333.64 million
4.5 Project management, consulting services, and training	\$4.10 million			\$50.55 million inclusive of 75 person-months of international consulting services
4.6 Others				
Physical contingency Price contingency Interest during construction and other charges	\$61.80 million \$29.90 million \$107.10 million			\$77.00 million
Total project cost ADB loan	\$876.00 million \$300.00 million			\$841.20 million \$162.05 million

SUMMARY OF PHYSICAL COMPONENTS COMPLETED

Component	Appraisal	Actual
Part A: Wastewater Management		
1. Wastewater interception for six tributaries	<p>Construction of major interceptors</p> <ul style="list-style-type: none"> • 21.1 km (800–2,000 mm) in north of SC • 27.4 km (800–2,400 mm) in south of SC <p>Construction of interceptors and sewers</p> <ul style="list-style-type: none"> • 6.8 km (300–1,350 mm) <p>Construction of collection mains</p> <ul style="list-style-type: none"> • 23.9 km (300–1,350 mm) <p>Construction of pumping stations</p> <ul style="list-style-type: none"> • 3 (1.2–3.1 m³/sec) in north of SC • 5 (1.4–5.5 m³/sec) in south of SC • 8 (0.15–1.26 m³/sec) 	<p>Construction of major interceptors</p> <ul style="list-style-type: none"> • 17.26 km (600–2,400 mm) in the north of SC • 22.96 km (600–2,400 mm) in the south of SC <p>Construction of interceptors and sewers</p> <ul style="list-style-type: none"> • 111.41 km (300–1,200 mm) <p>Construction of collection mains</p> <ul style="list-style-type: none"> • 54.0 km (300–450 mm) <p>Construction of pumping stations</p> <ul style="list-style-type: none"> • 7 (1.15–5.5 m³/sec) in SC • 13 (0.22–1.26 m³/sec) • 47 flood control PSs • 10 odor control systems <p>Rehabilitation of pumping stations</p> <ul style="list-style-type: none"> • 10 storm-water PSs
2. Wastewater interception for Hongkou Gang and Yangpu Gang	<p>Construction of interceptors</p> <ul style="list-style-type: none"> • 3.6 km (2,000–3,000 mm) in Hongkou Gang • 2.2 km (1,800–3,500 mm) in Yangpu Gang <p>Construction of collectors</p> <ul style="list-style-type: none"> • 2.9 km (2,700 mm) <p>Construction of branches</p> <ul style="list-style-type: none"> • 7.5 km (800–1,200 mm) <p>Construction of pumping stations</p> <ul style="list-style-type: none"> • 18 (0.16–5.84 m³/sec) at interceptions • 1 (12.0 m³/sec) at main lift 	<p>Construction of interceptors</p> <ul style="list-style-type: none"> • 15.16 km (1,500–3,500 mm) in Hongkou Gang • 10.58 km (1,500–3,500 mm) in Yangpu Gang <p>Construction of collectors</p> <ul style="list-style-type: none"> • 13.3 km (2,700 mm) <p>Construction of branches</p> <ul style="list-style-type: none"> • 12.6 km (300–1,200 mm) <p>Construction of pumping stations</p> <ul style="list-style-type: none"> • 7 combined PSs (6.5–8.74 m³/sec for storm-water and 0.18–1.01 m³/sec for sewerage) at interceptions • 1 (7.0–12.0 m³/sec) at main lift • 5 odor control systems <p>Rehabilitation of pumping stations</p> <ul style="list-style-type: none"> • 10 storm-water PSs
3. Shidongkou WWTP	Nominal capacity of 400,000 m ³ /day Combined aeration and digestion	Nominal capacity of 400,000 m ³ /day Aeration and sludge dewatering/drying
Part B: Water Resources Management		
4. Flow control structures on Mudu Gang and six tributaries	<p>Construction of gates</p> <ul style="list-style-type: none"> • 7 (5–12 m wide) <p>Dredging</p> <ul style="list-style-type: none"> • 11 locations (52.4 km) <p>Construction of pumping stations</p> <ul style="list-style-type: none"> • 4 (1.2–10.0 m³/sec) <p>Rehabilitation of gates</p> <ul style="list-style-type: none"> • 3 (6 m wide) <p>Rehabilitation of pumping stations</p> <ul style="list-style-type: none"> • 2 (3.6–5.0 m³/sec) 	<p>Construction of gates</p> <ul style="list-style-type: none"> • 7 (5–12 m wide) <p>Dredging: cancelled</p> <p>Construction of pumping stations: cancelled</p> <p>Rehabilitation of gates: cancelled</p> <p>Rehabilitation of pumping stations: cancelled</p>
5. Low-flow augmentation structures	<p>Construction of pumping stations</p> <ul style="list-style-type: none"> • 1 (60 m³/sec) at SC • 1 (40 m³/sec) at Taopu River • 1 (20 m³/sec) at Donggao Jing • 1 (30 m³/sec) at Dongdaying • 1 (30 m³/sec) at Mudu Gang 	<p>Construction of pumping stations</p> <ul style="list-style-type: none"> • 1 (60 m³/sec) at SC: cancelled • 1 (40 m³/sec) at Taopu River: cancelled • 1 (20 m³/sec) at Donggao Jing: cancelled • 1 (30 m³/sec) at Dongdaying: cancelled • 1 (30 m³/sec) at Mudu Gang: civil works only (combined with gate structure)

Component	Appraisal	Actual
	Construction of gates <ul style="list-style-type: none"> • 1 (60 m wide) at SC Rehabilitation of gates <ul style="list-style-type: none"> • 1 at SC Dredging <ul style="list-style-type: none"> • 14 km in Taopu River • 10.6 km from Donggao Jing to Pengyue Pu • 26.3 km in upper reach of SC River training <ul style="list-style-type: none"> • Straighten Peng Yue Pu Channel to the south of Ning railway and pumping stations Monitoring and control system	Construction of gates <ul style="list-style-type: none"> • 1 (60 m wide) at SC: cancelled Rehabilitation of gates <ul style="list-style-type: none"> • 1 at SC: electrical equipment and gate actuator only Dredging <ul style="list-style-type: none"> • 14 km in Taopu River • 10.6 km from Donggao Jing to Pengyue Pu • 26.3 km in upper reach of SC River training <ul style="list-style-type: none"> • Straightened 180 meter of Peng Yue Pu Channel to the south of Ning railway and pumping stations Monitoring and control system
6. Rehabilitation of Hongkou Gang	Construction of pumping stations <ul style="list-style-type: none"> • 3 (25–30 m³/sec) Construction of gates <ul style="list-style-type: none"> • 5 in 4 locations (2–12 m wide) Dredging <ul style="list-style-type: none"> • 31.3 km Monitoring and control system	Construction of pumping stations <ul style="list-style-type: none"> • 2 (25–30 m³/sec) Construction of gates <ul style="list-style-type: none"> • 2 in 2 locations (8–12 m wide) Dredging <ul style="list-style-type: none"> • 32.31 km Monitoring and control system
7. Sediment dredging	Dredge the east 16.7 km of SC <ul style="list-style-type: none"> • Fluid mud layer of 112,200 m³ • Substrate layer of 211,200 m³ • Cover of 404,100 m³ • Grit and stone backfill of 323,400 m³ Construction and reinforcement of flood wall <ul style="list-style-type: none"> • 7.0 km 	Dredge the east 16.7 km of SC: cancelled Construction and reinforcement of flood wall: cancelled
8. Re-aeration	Construction of re-aeration stations <ul style="list-style-type: none"> • 4 in suburban reach of SC (17 km) with 32 submerged jet aerators • 5 in urban reach of SC (18 km) with 10 liquid oxygen gasifiers Dissolved oxygen SCADA system	Construction of re-aeration stations: cancelled Dissolved oxygen monitorin system: cancelled Aeration barge
Part C: Environmental Improvements, Sanitation, and Urban Renewal		
9. Removal and relocation of nightsoil and solid waste collection wharves	Construction of solid waste transfer stations <ul style="list-style-type: none"> • 1 at Huangpu (325 t/day) • 1 at Jing'an (400 t/day) • 1 at Zhabei (300 t/day) Construction of nightsoil discharge stations <ul style="list-style-type: none"> • 1 at Zhabei (600 t/day) • 1 at Putuo (700 t/day) • 1 at Hongkou (450 t/day) SC floatable removal system <ul style="list-style-type: none"> • floatable collection vessels and rafts • 2 navigation management stations and berths 	Construction of solid waste transfer stations <ul style="list-style-type: none"> • 1 at Huangpu: cancelled • 1 at Jing'an (400 t/day) • 1 at Yuan Zao Bang (300 t/day) Construction of night soil discharge stations <ul style="list-style-type: none"> • 1 at Zhabei (600 t/day) • 1 at Putuo (700 t/day) • 1 at Hongkou (450 t/day) SC floatables removal system <ul style="list-style-type: none"> • floatable collection vessels and rafts • 2 navigation management stations and berths
10. Embankment reconstruction	Construction and repair of embankment wall <ul style="list-style-type: none"> • Improvement of flood wall (7.0 km) • Removal of old wall (1.8 km) • Removal of wall top (26.3 km) • Installation of stone fence (33.3 km) • Landscaping (20 ha) 	Construction and repair of embankment wall <ul style="list-style-type: none"> • Improvement of flood wall (4.3 km) • Removal of old wall: cancelled • Removal of wall top: cancelled • Installation of stone fence: cancelled • Landscaping (10 ha): Meng Qing Garden

PS= pumping station; SC= Suzhou Creek; WWTP= waste water treatment plant.

Source: Suzhou Creek Rehabilitation and Consturction Company

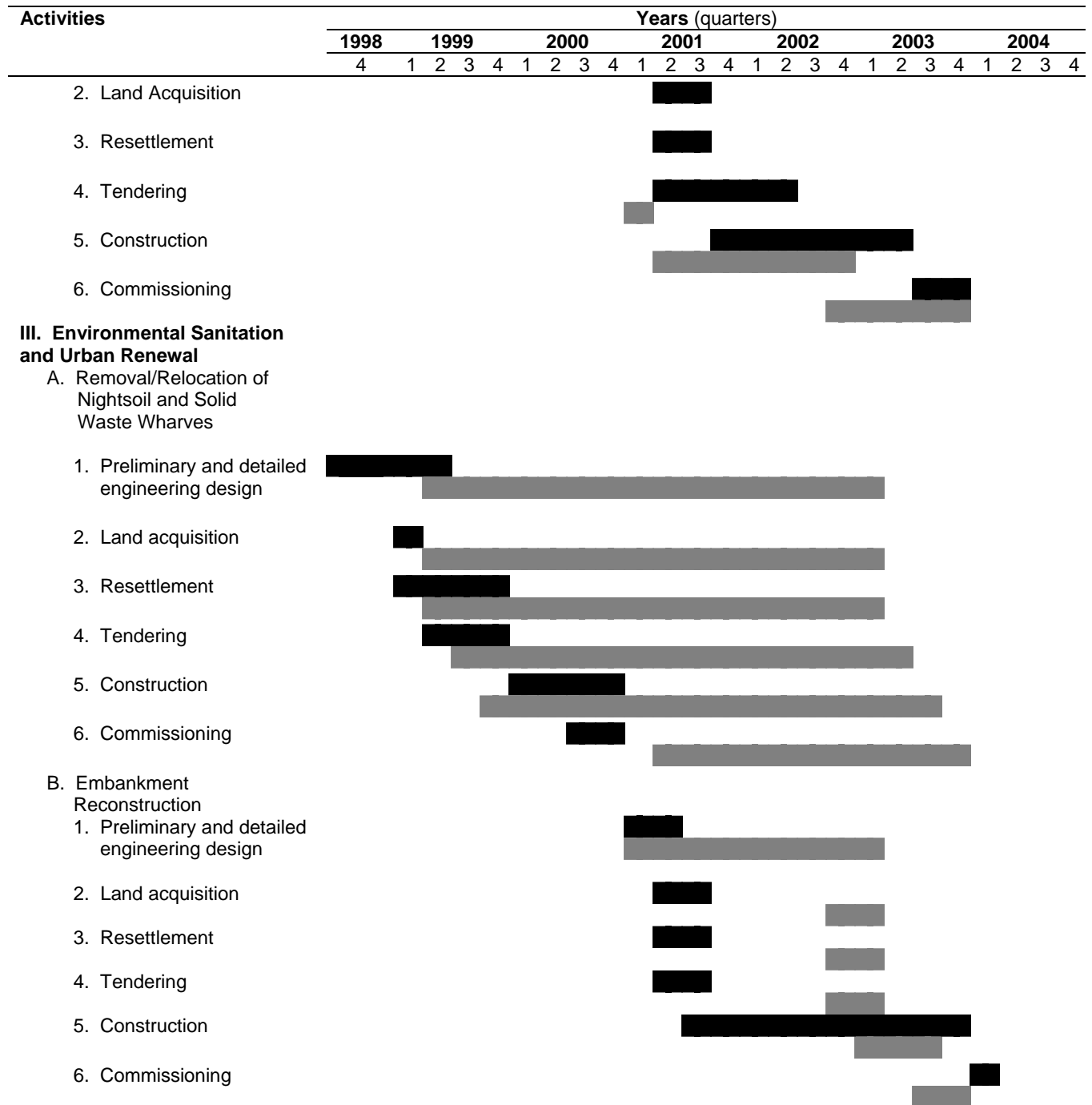
DISBURSEMENTS
(**\$**)

Year	Quarter	Projection	Actual Disbursements	Actual Cumulative Disbursements	Percent of Loan
2000	I	6.00	0.00	0.00	0.0
	II	8.00	2.65	2.65	1.6
	III	10.00	8.97	11.62	7.0
	IV	10.00	23.58	35.20	21.3
2001	I	10.00	0.15	35.35	21.4
	II	10.00	12.82	48.17	29.2
	III	10.00	7.78	55.94	33.9
	IV	10.00	17.53	73.47	44.5
2002	I	5.00	0.00	73.47	44.5
	II	6.00	8.24	81.71	49.5
	III	10.00	11.32	93.03	56.4
	IV	10.00	8.79	101.83	61.7
2003	I	8.00	4.32	106.15	64.3
	II	8.00	5.14	111.29	67.4
	III	8.00	5.92	117.20	71.0
	IV	4.00	12.06	129.27	78.3
2004	I	8.00	7.04	136.31	82.6
	II	6.00	3.19	139.50	84.5
	III	6.00	1.84	141.34	85.7
	IV	0.00	6.30	147.63	89.5
2005	I	0.00	7.00	154.64	93.7
	II	0.00	5.04	159.68	96.8

Source: Asian Development Bank, 2005.

IMPLEMENTATION SCHEDULE

Activities	Years (quarters)																															
	1998				1999				2000				2001				2002				2003				2004							
	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3				
I. Wastewater Management																																
A. Wastewater Interception on Suzhou Creek																																
1. Preliminary and detailed engineering design	█																															
2. Land acquisition	█																															
3. Resettlement	█																															
4. Tendering					█																											
5. Construction					█																											
6. Commissioning									█																							
B. Wastewater Inception in Hongkou Gang and Yangpu Gang																																
1. Preliminary and detailed engineering design	█																															
2. Land acquisition	█																															
3. Resettlement	█																															
4. Tendering	█																															
5. Construction					█																											
6. Commissioning									█																							
C. Shidongkou Wastewater Treatment Plant																																
1. Preliminary and detailed engineering design	█																															
2. Land acquisition	█																															
3. Resettlement	█																															
4. Tendering					█																											
5. Construction					█																											
6. Commissioning													█																			
II. Water Resources Management																																
A. Locks and Gates on Mudu Gang and Other Tributaries																																
1. Preliminary and detailed engineering design	█								█																							
2. Land acquisition	█																															
3. Resettlement	█																															



■ Planned
 ■ Actual

COMPLIANCE WITH LOAN COVENANTS

	Covenant	Reference in Loan Agreement	Compliance
General			
1.	Shanghai Municipal Government (SMG) to ensure that Shanghai Suzhou Creek Rehabilitation and Construction Company (SSRCC) shall carry out the Project in conformity with sound administrative, financial, engineering, environmental, and wastewater treatment practices.	Loan Agreement (LA), Article IV, Section 4.01(a)	Complied with satisfactorily.
2.	The Borrower shall make available to SMG and to the SSRCC, promptly as needed, the funds, services, equipment, land and other resources required, in addition to the proceeds of the Loan, for the carrying out of the Project.	LA, Article IV, Section 4.02	Complied with. Adequate counterpart funds were provided throughout the Project period. At completion, counterpart funds amounted to \$679.2 million (about \$135 million more than appraisal estimate of \$544.4 million).
3.	SSRCC shall carry out the Project in accordance with plans, design standards, specifications, work schedules and construction methods acceptable to the Bank. Each PIA shall furnish to the Bank such plans, standards and specifications, and work schedules promptly after their preparation.	Project Agreement (PA), Article II, Section 2.04	Complied with. A comprehensive construction quality control and safety program has been implemented.
4.	SSRCC shall maintain records and accounts of the goods and services financed out of the Loan proceeds, to disclose the use thereof in the Project, to record the progress of the Project, and to reflect operations and financial condition in accordance with sound accounting principles.	PA, Article II, Section 2.06	Complied with. Information was regularly provided through the progress reports.
5.	The Borrower shall furnish the Bank all such reports and information as the Bank shall request concerning (i) the Loan, expenditures of the proceeds and maintenance of the service thereof, (ii) the goods and services; (iii) the Project; (iv) the administration, operations and financial condition of SSRCC and operation of the Project facilities, and any other matters relating to the purposes of the Loan.	LA, Article IV, Section 4.04	Complied with. Quarterly reports provided information on expenditures, project progress, and other matters. Audited financial statements were regularly submitted.
6.	SSRCC shall furnish to the Bank quarterly reports on the execution of the Project and operation and management of Project facilities. Such reports shall be submitted within thirty (30) days of the end of each quarter.	PA, Article II, Section 2.08(b)	Complied with. Quarterly progress reports submitted to ADB, as and when due.
7.	Promptly after physical completion of the Project, but not later than three months thereafter, SMG and SSRCC shall prepare and furnish to the Bank a report on the execution and initial operation of the Project, including cost, performance by the PIA of its obligations	PA, Article II, Section 2.08(c)	Complied with. The EA's PCR was submitted in April 2005.

	Covenant	Reference in Loan Agreement	Compliance
	under Project Agreement and accomplishment of purposes of Loan.		
8.	SSRCC shall maintain separate accounts for its part of the Project and have such accounts and financial statements audited annually by independent auditors and furnish to the Bank not later than nine (9) months after the close of the fiscal year certified copies of such audited reports and financial statements, all in the English language.	PA, Article II, Section 2.09 (a)	Complied with. Audited financial statements were regularly submitted, including for FY 2004.
Implementation Arrangements			
9.	SSRCC shall be the Project Executing Agency. The Leading Group within SMG shall provide policy direction and guidance to SSRCC. The Leading Group shall be headed by the Mayor of Shanghai. Shanghai Suzhou Creek Rehabilitation Project Head Office (SSCRPHO) shall be responsible for liaison between SSRCC, the Leading Group, and Shanghai commissions and bureaus involved in the Project.	LA, Schedule 6, para. 1	Complied with. This implementation arrangement remained the same throughout the Project.
Land Acquisition and Resettlement			
10.	SMG shall ensure that all lands and rights of way required for the Project are made available in time for construction and that persons required to relocate in connection with the Project are compensated in accordance with the applicable resettlement plan	LA, Schedule 6, para. 2	Complied with. Actual costs for land compensation, house relocation, and resettlement amounted to \$334 million (about 49% higher than appraisal estimate) due to changes in project scope and technical designs, and increases in land acquisition requirements.
11.	SSRCC shall report to the Bank on the implementation of the resettlement plans through the quarterly reports mentioned in Section 2.08(b) of the Project Agreement.	LA, Schedule 6, para. 4	Complied with. Resettlement has progressed in accordance with the resettlement plans. Resettlement was completed in November 2004.
Urban Development Plan			
12.	By 31 December 2000, SMG shall complete a long-term urban development plan for Shanghai which shall incorporate the rehabilitation of Suzhou Creek.	LA, Schedule 6, para. 5	Complied with. The Suzhou Creek Rehabilitation Program was incorporated in the Tenth Shanghai Five-Year Development Plan (May 2001).
Environment			
13	SMG and SSRCC shall ensure that the Project facilities are constructed, operated, maintained	LA, Schedule 6, para. 6	Complied with. The Project had substantial positive environmental

	Covenant	Reference in Loan Agreement	Compliance
	and monitored in strict conformity with the Environmental Protection Law, the Law on the Prevention and Control of Water Pollution, the regulations on the Management of Environmental Protection in Construction Projects (1998), all other applicable national and local environmental protection regulations and standards for control of air emissions, wastewater, sediment and sludge disposal and solid waste management and the environmental mitigation measures proposed in the EIA for the Project and the EIAs for the respective Project components.		impact and an insignificant negative impact on the physical and natural environment.
14.	SSRCC shall prepare and ensure implementation of an annual environmental monitoring and mitigation work program for the Project and the operation of the Project facilities.	LA, Schedule 6 para. 7	Complied with. Shanghai Environmental Protection Bureau (SEPB) has responsibility for environmental management in SMG. The SSRCC chief engineer's office submitted semiannual environmental reports to SEPB—covering compliance with environmental standards, unforeseen issues, and mitigation measures. An environment protection acceptance of the Project was issued by the acceptance group under SEPB in June 2005. SEPB remains in charge of environmental monitoring during implementation of the second and third phases of rehabilitation.
15.	SMG shall, through the Shanghai Environmental Protection Bureau, undertake a detailed evaluation to establish and operate a system for wastewater permit trading, to commence after 1 January 2000, including establishment of the legal, regulatory and institutional framework to support such system, taking into account the recommendations made under the Technical Assistance, to encourage enterprises to achieve further reduction of pollutant discharge beyond the requirements imposed by the SMG wastewater discharge standards.	LA, Schedule 6. para. 9 a	Being complied with. SMG undertook a detailed evaluation to establish and operate a wastewater trade permit system in 2002 and concluded that introducing the system needed more work and should be approached with a long-term timeframe. The reasons for the conclusion were: (i) no standards for total load control were available; (ii) no standards, laws, and regulations existed on the fee collection based on total land control, (iii) monitoring equipment were not fully available. However, SMG has been conducting preparatory work including legal, regulatory, and institutional framework to support the system.

	Covenant	Reference in Loan Agreement	Compliance
16.	SMG shall, through the Shanghai Environmental Protection Bureau, design and implement a program to raise public environmental knowledge and awareness and install environmental good practices in the public.	LA, Schedule 6. para. 9 b	Complied with under the TA.
Solid Waste Disposal			
17.	Prior to the construction or establishment of solid waste disposal facilities, SMG shall carry out a least cost analysis among the three alternatives under consideration, namely construction and operation of an incinerator, disposal on a sanitary landfill site, or construction and operation of a solid waste composting plant.	LA, Schedule 6, para. 10	Complied with. A feasibility study report was submitted to ADB in April 2001. The report concluded that landfill is the least-cost solution for solid waste disposal.
18.	In the event that SMG decides to construct an incinerator for solid waste disposal, SSRCC shall ensure that the incinerator will be designed, installed, operated and maintained in accordance with stringent international environmental standards acceptable to the State Environmental Protection Administration and the Bank.	LA, Schedule 6. para. 11	After completion of the feasibility study, SMG decided that an incinerator will not be constructed.
19.	SMG shall issue regulations and institute measures to segregate and remove toxic and hazardous wastes from the municipal solid waste. SMG shall ensure that any sites used for disposal of solid waste, whether on a temporary or permanent basis, meet the safety and environmental standards applicable for permanent sites.	LA, Schedule 6, para. 12	Complied with. SMG issued regulations to segregate and remove toxic and hazardous wastes from the solid wastes in municipal solid wastes and these regulations were strengthened under the Circular of Methods for Hazardous Wastes Collection and Management in 2001. SMG has adopted three collection systems: (i) original separating and container collection; (ii) original separating and bio-treatment for organic wastes; and (iii) original separating and door-to-door services. Wastes are then transferred to organic wastes utilization factory, domestic wastes sorting status, and hazardous wastes sorting station for disposal and utilization.
20.	SMG shall ensure that the Shanghai Hazardous Waste Secure Landfill at Malu in Jiading District is made operational before any dredging operations in sections of the creek or tributaries with toxic sediments will commence under the Project.	LA, Schedule 6, para. 13	Complied with. Landfill for hazardous materials was constructed in December 2002.

	Covenant	Reference in Loan Agreement	Compliance
Financial Matters			
21.	The Borrower and SMG shall ensure that sufficient counterpart funds will be made available for the timely completion of the Project, including a loan from SDB in the amount of Y3,000,000,000 and grants from the Borrower, SMG and District and County governments. For this purpose, the Borrower shall make available to SMG a loan in the amount of Y1,000,000,000 and a grant in the amount of Y100,000,000 and SMG shall pay the aggregate amount of Y1,100,000,000 as equity contribution in SSRCC, before 31 December 1999.	LA, Schedule 6, para. 14	Complied with.
22.	SMG shall ensure that by January 2001 the water tariffs for all water consumers are increased by a surcharge of Y0.25 per cubic meter for wastewater collection and treatment and that the total amount of such surcharge is transferred to SSRCC to cover part of the cost of construction and operation and maintenance for the sewerage and wastewater treatment facilities financed under the Project and to meet the debt service requirements relating to these facilities.	LA, Schedule 6, para. 15	Complied with. Tariffs were increased in August 2000 and 2004. Wastewater revenues were transferred to SSRCC in 2001, 2002, and 2003.
23.	SMG and SSRCC shall determine, prior to the start of each fiscal year of SSRCC, the amount needed by SSRCC to cover the cost of (i) Project management and operation and maintenance of the Project facilities other than the sewerage and wastewater treatment facilities, and (ii) debt service in respect of the loans extended to SSRCC under the On-lending Agreement and State Development Bank (SDB) Loan Agreement, other than debt service relating to the sewerage and wastewater treatment facilities financed under the Project.	PA, Article II, para. 16	Complied with. Under the onlending agreement between SMG and SSRCC, SMG will make a provision of an average of CNY150 million per year for 22 years (a total of CNY3.3 billion) for the service fee to be paid to SSRCC. This amount is flexible and will depend on the requirements of SSRCC but SSRCC has not been in need of these funds. SSRCC first applied for this service fee in 2004, but the service fee has not been transferred since full operations have only been underway for less than a year and SSRCC is cash positive.
24.	SSRCC shall ensure that the construction of the Shidongkou wastewater treatment plant is coordinated with the installation of sewer pipes that will have been installed by the time the wastewater treatment plant is completed.	LA, Schedule 6, para. 17	Complied with. Installation of sewer pipes was completed by fourth quarter 2002 prior to completion of the Shidongkou wastewater treatment plant in third quarter 2003.

	Covenant	Reference in Loan Agreement	Compliance
25.	With a view to achieving the most efficient and effective manner to operate and maintain the Project facilities, SSRCC shall invite bids for the operation and maintenance of the Project facilities from both private sector and government agencies through open auction in accordance with applicable national bidding procedures. To the extent that the bids show that outsourcing of operation and maintenance of any of the Project facilities is cost-effective without compromising quality and safety, a contract for the operation and maintenance of the relevant facility shall be awarded through such competitive bidding. Such contract shall require full compliance with all applicable environmental and safety standards for the operation and maintenance of the relevant Project facilities. SSRCC shall remain responsible to ensure that all applicable environmental and safety standards for the operation and maintenance of the Project facilities are fully met.	LA, Schedule 6, para. 18	Complied with. Regular operation and maintenance (O&M) of the project facilities are contracted out through competitive bidding procedures.
Project Performance Monitoring System			
26.	SSRCC shall maintain a Project management information system and establish at the commencement of Project implementation, as an integrated part of the Project management information system, a Project performance monitoring system to measure Project performance and Project impact, including socioeconomic and environmental impact.	LA, Schedule 6, para. 19	Complied with. The Project Performance Monitoring System (PPMS) has been implemented from January 2001. The first report was submitted to ADB in July 2001. The report has been updated from time to time.
Training			
27.	Prior to the carrying out of any training activities to be financed under the Loan, SSRCC shall submit a training plan to the Bank for approval, indicating the subject areas of training, the domestic or international institutions to provide the training and organizations and countries to be visited, the duration of such training activities, proposed trainees selection criteria and process, and estimated expenditures for such training activities. At the completion of each training program, a report shall be furnished to the Bank, describing the training activities as well as the benefits received from such training.	LA, Schedule 6, para. 20	Complied with. All training activities under the Project were implemented through the contract with the project implementation consultants.

TECHNICAL ASSISTANCE COMPLETION REPORT

Division: ECSS

TA No. and Name: 3211-PRC: Improving Environmental Management in Suzhou Creek			Amount Approved: \$840,000		
			Revised Amount: -		
Executing Agency: Shanghai Suzhou Creek Rehabilitation Project Head Office		Source of Funding: TASF	TA Amount Undisbursed \$25,098	TA Amount Utilized \$814,902	
Date			TA Completion Date		
Approval 29 Jun 1999	Signing 14 Mar 2000	Fielding of Consultants 10 Apr 2000	Original 31 Jan 2002	Actual 31 May 2002	
			Account Closing Date		
			Original 31 Jan 2002	Actual 31 March 2003	
Description					
<p>In 1996, the Shanghai Municipal Government (SMG) established the Shanghai Suzhou Creek Rehabilitation Project Head Office (SSCRPHO) to formulate a comprehensive environmental management plan for Suzhou Creek. In 1999, in the context of policy dialogue with ADB, SMG expressed interest in obtaining technical assistance (TA) to explore the more widespread use of market-based instruments (MBIs) in Shanghai, particularly wastewater trading systems for water quality management in Suzhou Creek. This request was approved by ADB in association with the loan for the Suzhou Creek Rehabilitation Project.¹ Passing through highly urbanized areas of Shanghai, Suzhou Creek was heavily polluted by domestic and industrial wastewater dischargers. SMG was aware that MBIs, including tradable permits that allow polluters to buy and sell the right to release effluents, could contribute to improved environmental management. The design and implementation of MBIs required accurate data on environmental baselines, ambient quality targets, and accurate monitoring.</p>					
Objectives and Scope					
<p>The principal objectives of the TA were to assist SMG to (i) strengthen the capacity of relevant institutions for environmental management and pollution control; (ii) design and implement strategically important MBIs including a wastewater permit trading system for water quality management in Shanghai; (iii) increase public awareness in the environment; and (iv) establish baselines and dynamic water quality monitoring capabilities for Suzhou Creek. To achieve these objectives, the TA comprised four components: strengthening environment management; developing a wastewater permit trading system; improving public awareness; and water quality modeling. The Shanghai Environmental Protection Bureau (SEPB) was designated as the Executing Agency (EA) for the first three components, while SSCRPHO was the EA for the fourth component. However, during implementation, there was a change in executing arrangements. SSCRPHO became a side EA for the TA to better coordinate with other government agencies, particularly for the activities related to Suzhou Creek.</p>					
<p>The TA was generally well designed. The objectives represented by the four components involved discrete but interrelated activities. Improving environmental management was considered the ultimate goal of the TA and had linkages with all of the four components. The four components were properly tasked to support the achievement of this ultimate goal. The terms of reference (TOR) were comprehensive and well formulated to achieve the objectives of the TA. However, the objective of implementing the MBIs was ambitious. To implement the MBIs, SEPB required significant institutional reform in terms of management and monitoring. The capacity and readiness of SEPB was overestimated at the outset. Further, the design of this component assumed that data would be available but they were not. The availability of the data should have been examined during the preparation of the TA.</p>					
Evaluation of Inputs					
<p>The TA required 21 person-months of international consultants and 34 person-months of domestic consultants. During implementation, the international and domestic consultants' inputs were increased by 4 person-months and 2 person-months respectively, to provide necessary additional inputs to the water quality modeling and overseas training. The inputs provided were appropriate to deliver the required outputs.</p>					
<p>The consultants delivered their services in accordance with the TOR and their performance was generally satisfactory. The team leader's excellent performance was noted. Good communications were maintained between ADB, the consultants, and the EA. ADB provided comprehensive comments on the consultants' reports and participated in tripartite meetings to review the inception, interim, and draft final TA reports. The EA also provided useful comments on these reports. The EA was satisfied with the consultants' performance.</p>					

¹ ADB. 1999. Suzhou Creek Rehabilitation Project. Loan 1692-PRC. Manila.

Evaluation of Outputs

For each component, the consultants submitted regularly to ADB an inception report, an interim report, and a final report. The main deliverables under the TA included recommendations on environmental management and pollution control; a wastewater-permit trading system; means of improving public awareness and water quality modeling. However, due to the limited data obtained by the consultants, the water quality model could not be fully calibrated and was turned over to SMG for further calibration with additional data and measurements. These data were expected to come from SEPB. The data deficiencies affected accuracy of the water quality model.

Six government officials from SSCRPHO, SEPB, and the Water Authorities were trained in Denmark for about one month. This training provided an excellent opportunity for practical knowledge transfer in water quality modeling. This training equipped SSCRPHO and/or SEPB to update and recalibrate the water quality model when additional data are made available.

The TA provided relevant outputs and helped SMG to improve its environment management programs. Based on the recommendations under the four components, the consultants developed a comprehensive action plan covering over 50 major activities in the areas of monitoring, public awareness, permit trading, and laws and regulations. The action plan included basic procedures and guidelines to implement the wastewater permit trading system, developed based on the market and institutional analysis. Activities related to monitoring and public awareness have already been carried out. These include redefining parameters and locations for monitoring; establishing laboratories for monitoring; and conducting knowledge, attitude, and practice surveys. The refined decision supporting system has been used by the EA for planning a second phase of the Suzhou Creek Rehabilitation Project. The remaining activities under the action plan will be implemented in phases during the next several years.

Overall Assessment and Rating

The TA components were implemented largely as conceived. The TA was completed within the 2-year implementation period as scheduled. The person-month inputs were slightly increased but within the original budget. By the TA completion date, the TA achieved most of its principal objectives. It strengthened institutional capacities for environmental management; increased public awareness; and established environmental baselines and water quality monitoring capabilities for Suzhou Creek. However, a water quality model had been developed but further calibration was needed by SMG, based on additional data to be made available. The objective of the design and implementation of wastewater permit trading had been partially achieved. The TA had prepared a permit trading system, but this has not yet been implemented by SMG. The prospects for future development of the water quality model and the permit trading system are uncertain. While, at the TA completion date, the TA is rated as partly successful, continued development of these systems by SMG would warrant upgrading the TA to successful.

Major Lessons Learned

In retrospect, the objective of implementing wastewater permit trading was too ambitious. Adequate time should be allowed to establish a permit trading market. In Shanghai, implementing a trading program is made particularly difficult by the relatively flat plain, on which it is difficult to define watershed, and the hydraulic complexity of the basin, in which it is difficult to define an assimilative capacity.

Water quality modeling required a large amount of detailed data that often did not exist or could not be made available to the consultants because of the SMG confidentiality rules. This placed serious constraints on the calibration of the model. To implement the TA successfully, SMG should have been aware of data requirements and prepared to provide data on a timely basis to ensure the success of the TA. For similar future projects, it is important to obtain assurance from a municipal government on responsibility of data provision to enhance ownership of its TA.

Recommendations and Follow-Up Actions

As a result of the TA, an action plan for improving environmental management has been developed. Implementing the action plan is a multi-stage process. Some activities have started, while others remain to be carried out. ADB needs to monitor how this action plan will be reflected in the SMG's five-year plans and associated environmental action plans. The major tasks under the action plan include (i) improving the water quality monitoring system; (ii) improving the public awareness of environment management; and (iii) implementing the wastewater permit trading system.

Prepared by: In-Ho Keum Designation: Senior Project Specialist

FINANCIAL REEVALUATION

A. Overview

1. The Project Completion Review Mission has revised the financial analysis undertaken at appraisal and midterm review. This includes cost recovery and affordability, financial management and compliance with loan covenants, financial appraisal of the wastewater component, and financial sustainability and projections for Shanghai Suzhou Creek Rehabilitation Construction Company (SSRCC). For financial appraisal, the same assumptions have been made to compare the analyses.

B. Institutional Responsibilities

2. There have been some changes in the ownership and responsibility of the operation and maintenance (O&M) of facilities created under the Project since appraisal and midterm review. The assets of the solid waste management components have been transferred to Shanghai Municipal Environmental and Sanitary Bureau, the city's agency for solid waste management. Responsibility for ongoing O&M for several of the components has been assigned to other agencies. Table A8.1 shows a breakdown of the associated O&M costs by expenditure item from 2006 onwards and the relevant institutional responsibility, while Table A8.2 shows a breakdown of costs attributable to SSRCC from 2002 to 2006.

3. SSRCC remains responsible for the majority of assets and operations of facilities constructed/improved under the Project. However, for Phases II and III of the Suzhou Creek Rehabilitation program, Shanghai Chengtou Corporation—an investment and stock holding company—will fund project construction and operations as it does with the majority of urban infrastructure in Shanghai. SSRCC's role will be in planning and managing the project under the funding of the Shanghai Chengtou Corporation. SSRCC's future role in arrangements for wastewater and environmental management will determine long-term sustainability.

C. Cost Recovery and Affordability

4. At appraisal, two revenue streams were identified for SSRCC long-term operations. Until 2005, facilities under the project were still being constructed so long-term operations can be viewed as starting from late 2004–2005 when SSRCC must pay for both O&M of facilities under their responsibility as well as the loan repayments for two loans—one from the Asian Development Bank (ADB) and the other from the State Development Bank (SDB).

5. The first revenue stream was an incremental wastewater tariff, estimated at CNY0.25 per cubic meter (m³) which was intended to cover O&M and debt service of the Project's wastewater components. The tariff increase was implemented and was effective from 30 June 2000.¹ A further tariff increase not associated with the Project was implemented 1 July 2004.² The tariff and revenue from the incremental tariff collected by four water companies are transferred to SSRCC. Revenues have been transferred each year from 2001 onwards and correspond exactly with the revenues accrued from the incremental tariff. The annual amount is about CNY260–270 million, depending on the volume of wastewater sold.

¹ The domestic and nondomestic wastewater tariff was increased from CNY0.45/m³ to CNY0.7/m³. The tariff is applied to 90% of water supplied.

² Wastewater tariffs were increased to CNY0.9/m³ for domestic customers and CNY1.2/m³ for nondomestic customers.

SSRCC established annual estimates of wastewater revenues to 2010, which are lower than those estimated at appraisal due to lower-than-anticipated wastewater sold. At midterm review, SSRCC was not able to provide long-term forecasts for this revenue stream, so the provision of these estimates shows an improvement in the company's forward financial planning.

6. The second revenue stream was a service charge paid by Shanghai Municipal Government (SMG). This service charge was intended to cover the O&M and debt service of the remainder of the project components. An allocation for this fee is included in the onlending agreement between SMG and SSRCC—about CNY150 million per year for 22 years, giving a total of CNY3.3 billion. SMG and SSRCC are required under the loan covenants to determine on an annual basis an appropriate amount for this service fee. Since SSRCC was not required to cover O&M and debt service until 2004–2005 and the allocation is over 22 years rather than a fixed annual amount, SSRCC first applied for this service fee in 2004. However, since SSRCC had a cash surplus from the wastewater revenues, the amount requested was CNY150 million, rather than a calculated residual requirement, which appears prudent. Further discussion of the service fee and the implications of cost recovery are considered under the financial projections (para 15).

7. For domestic customers, the combined water and wastewater tariff is CNY1.93/m³. For the average household size of 3.03 persons and an average water consumption of 185 liters per capita per day (lcd), the combined household monthly bill is about CNY32. This represents 1.0% of average household income. Taking into account the slightly larger family size for the poorest families with annual household incomes of around CNY18,700, the combined charge represents 2.0% of average household income. The incremental surcharge of CNY0.25/m³ associated with the Project is only part of the overall water and wastewater bill. The surcharge accounts for 0.1% of household income for average households and 0.2% for the poorest households.

D. Financial Performance 1999–2004 and Compliance with Loan Covenants

8. Financial covenants included in the Loan Agreement have been complied with. Sufficient counterpart funds were provided for the Project in a timely manner. Two other financial covenants included in the Loan Agreement relate to cost recovery. As discussed above, wastewater tariffs were increased and SSRCC has applied for the allocated service fee. However, since full operations have only been underway for less than a year and SSRCC is cash positive, the service fee has not been transferred to date.

9. SSRCC has maintained records and accounts in accordance with sound accounting principles. It has provided ADB with audited financial statements covering SSRCC operations and the Project for 2000–2004 within the stipulated 9-month period. The statements have been acceptable.

10. A summary of the financial statements from 2000–2004 has been prepared and is shown in Tables A8.3–A8.5. For 1999, an income statement was not included since SSRCC did not receive any operational revenues during this year. The financial statements reflect SSRCC as a construction company and—in line with the practice for state-owned enterprises in the People's Republic of China (PRC)—the statements report cash flow and the balance sheet of capital construction but the income statement only covers administration and management of construction and excludes wastewater revenues which accrue on the balance sheet as current liabilities classified as other payables. SSRCC's financial management confirmed that the income and expenditure statement will give a better picture of company performance in 2005

when wastewater, service fee, and other revenues will be shown together with actual expenditures incurred for O&M, debt service, and an allocation for depreciation.

11. At the end of 2004, the cash balance stood at some CNY759 million—accumulated from financing activity and the transfer of wastewater revenues. Work in progress was CNY5.9 billion. Current liabilities were CNY2.1 billion, long term liabilities were CNY2.1 billion, and owners' equity was CNY2.0 billion. Total assets and liabilities and equity were CNY7.2 billion.

12. On the income statement, only operational expenditures showed a loss in 2000 and 2001 and a small profit in 2002–2004 (Table 4). Sales and cost of sales in 2004 refers to the fee paid for the planning and preparation of Phase II of the Suzhou Creek Rehabilitation Program.

13. The cash flow statement clearly shows SSRCC as a construction company with cash paid for investment activity, primarily financed by loans and the cash received from wastewater revenues. Loan repayments were made in 2004 for loans from SDB, ADB, and short-term working capital.

E. Financial Projections of SSRCC to 2015

14. The financial projections for SSRCC for 2005–2015 were revised using actual and projected expenditures, financing plans, and revenues. The projections are conducted in current prices. Escalation rates for operational expenses are assumed to be 2.6% (2005), 2.8% (2006), and 2.5% (2007 onwards) in line with current ADB forecasts for PRC. The end balance sheet for 2004 was used as the basis for projections. Activity under Phase II and III of the Suzhou Creek Rehabilitation program is not included. As advised by SSRCC, the net fees are very small in comparison to current operations—only CNY4.3 million (2005) and CNY1.5 million (2006) and activity is not yet fixed. Any fees due for Phases II and III are also likely to be small.

15. Wastewater revenues are based on projected wastewater volumes and revenues as provided by SSRCC. The service fee payable by SMG is based on the estimated requirement of debt repayment and O&M for the non-wastewater components of the Project, in line with the ADB loan covenant. The amount for 2004 is included in 2005 since payment has not been received. Since most of the O&M responsibilities (in terms of cost) are either for wastewater management components or have been assigned to other agencies, the operational requirement from the service fee is low—only about CNY4.3 million. The estimated total service fee over the period to 2024 is 2.1 billion lower than the 3.3 billion estimated at appraisal. Since most of this fee is required to cover the repayment of the SDB loan in the years to 2009, the calculations are made on a requirement basis as stipulated in the covenant—not an annual amount.

16. The ADB loan is based on a London interbank offered rate (LIBOR) term, assuming a 2.8% interest rate and a 20-year repayment period starting in 2004. The SDB loan is based on the fixed 6.12% interest rate (current rate) and a repayment period of 6 years starting in 2004. In line with the loan terms, the principal payment is fixed and interest payments are flexible, decreasing each year as the principal is repaid.

17. O&M costs are based on the revised estimates. Depreciation is charged at 3.5% using the straight line method in accordance with average depreciation charges advised by SSRCC, which are in accordance with PRC accounting practices. SSRCC is assumed to be exempt from the payment of business tax.

18. Revised summary income statement, cash flow, and balance sheets are shown in Table A8.6 with relevant key ratios. Projections show that the main issue for SSRCC is cash. Although the wastewater revenues of CNY260 million to CNY300 million are more than adequate to cover the ADB loan and O&M costs in the longer term, the critical years are up to 2009 when payment of debt service for the much shorter term repayment of the SDB loan is due. Although the service fee payable by SMG assists in these years, the cash balance turns negative and the debt service ratio falls below 1. SSRCC will need additional funding, most likely through a medium-term loan, to cover this period by long-term wastewater revenues.

19. The financial projections clearly show that SSRCC has limited activity in the future as a construction company, given the implementing arrangements for Phases II and III of the Suzhou Creek Rehabilitation Program. Although ratios are not particularly strong, SSRCC can remain sustainable as long as it can manage the immediate cash shortfall to fund the debt service requirements for the SDB loan. Additional management and other activities are being sought by SSRCC under future phases of the Suzhou Creek Rehabilitation Program and other environmental projects.

F. Financial Appraisal

20. The Project Completion Review Mission has updated the financial internal rate of return (FIRR) for the wastewater components. The appraisal is undertaken in January 2005 prices³ over the project life (1998–2023). Capital costs and O&M costs have been updated. Capital costs reflect the actual cost of contracts. As at appraisal and midterm review, an amount has been included for the replacement of equipment and materials, and a residual value for the civil works.

21. Wastewater revenues for 2001–2004 reflect actual payments made to SSRCC. For 2005–2010, estimates of the wastewater revenues have been provided by SSRCC based on anticipated wastewater sales and the incremental wastewater tariff of CNY0.25/m³. From 2010 onwards, an annual average increase of 2.5% is assumed. The overall forecast volumes are lower than assumed at appraisal and are more reflective of the actual volume of wastewater sales experienced in recent years.

22. The weighted average cost of capital (WACC) has been updated based on the actual financing plan for the wastewater components and revised WACC guidelines as set out in ADB's *Guidelines for the Financial Governance and Management of Investment Projects Financed by the Asian Development Bank*. Grant-financed portions are assumed to have a cost of capital of 8%. The portion financed by SDB has a fixed cost of capital of 6.12%.⁴ The ADB-funded portion is assumed to have the minimum rate of 4%⁵ since, under the LIBOR-based loan, the interest rate is below the 4% minimum rate.

23. The revised FIRR is 5.6% which exceeds the estimated WACC of 4.4%. This is lower than that at appraisal (8.7%) but higher than calculated at midterm review (4.8%). Differences are the result of lower than forecast wastewater volumes and lower than anticipated capital and O&M costs. Table A8.7 details calculation of the FIRR and Table A8.8 shows the WACC.

³ Prices were adjusted using the Index of Industrial Products, *Shanghai Statistical Yearbook*, for the years to 2003 and inflation of 4.10% for 2004.

⁴ The interest rate was 6.21% from October 1999 to January 2002, 5.76% from January 2003 to October 2004, and 6.12% thereafter. The ongoing rate has been used to calculate the WACC.

⁵ The ADB-funded portion is assumed to be 4.84% plus 0.6% basis points.

Table A8.1: Operation and Maintenance Cost 2006–2024 (CNY)

Item	Component	Labor	Utility and Power	Management	Maintenance	Chemicals	Total	
A. Wastewater Management								
1.	Wastewater Interception for Six Tributaries	2,044,900	7,328,200	3,408,500	4,260,600		17,042,200	
2.	Wastewater Interception from Hongkou Gang & Yangpu Gang	1,739,500	6,233,600	2,899,400	3,624,200		14,496,700	
3.	Shidongkou Wastewater Treatment Plant	5,140,400	21,173,800	6,855,700	10,722,500	11,928,800	55,821,200	
	Subtotal	8,924,800	34,735,600	13,163,600	18,607,300	11,928,800	87,360,100	
B. Water Resource Management								
1.	Locks and Gates	Operated and maintained by Municipal River Gate Management Office						1,374,275
2.	River Water Diversion	Operated and maintained by Municipal River Gate Management Office						499,442
3.	Rehabilitation of Hongkou Gang	Operated and maintained by Municipal River Gate Management Office						397,575
4.	Sediment Dredging	Project cancelled						
5.	Re-aeration	190,900	778,000	318,100	303,300		1,590,300	
	Subtotal	190,900	778,000	318,100	303,300		3,861,592	
C. Environmental Sanitation and Urban Renewal								
1.	Nightsoil and Garbage Wharfs	Operated and maintained by SH Municipal Environmental and Sanitary Bureau						13,190,000
2.	Reconstruction of Embankment-Meng Qing Garden	520,800	1,204,200	561,900	522,400		2,809,300	
2b.	Floodwall	Responsibility of relevant District						2,100,000
2c.	Greening	Responsibility of relevant District						60,000
	Subtotal	520,800	1,204,200	561,900	522,400	-	18,159,300	
	Total	9,636,500	36,717,800	14,043,600	19,433,000	11,928,800	109,380,992	
	Total SSRCC	9,636,500	36,717,800	14,043,600	19,433,000	11,928,800	91,759,700	

SSRCC= Shanghai Suzhou Creek Rehabilitation and Construction Company

Source: Shanghai Suzhou Creek Rehabilitation and Construction Company

Table A8.2: SSRCC Operation and Maintenance Cost (CNY)

Component	2002	2003	2004	2005	2006–2024
1. Wastewater Interception for Six Tributaries	11,184,366	10,414,402	12,586,742	16,466,330	17,042,200
2. Wastewater Interception from Hongkou Gang & Yangpu Gang	10,936,806	10,916,517	12,570,308	14,615,060	14,496,700
3. Shidongkou Wastewater Treatment Plant	920,904	20,907,771	34,636,721	45,450,590	55,821,200
4. Locks and Gates on Mudu Gang and Six Tributaries	2,511,852	804,517	806,456	Operated and maintained by Municipal River Gate Management Office with secured O&M Cost	same as year 2005
5. Pengyuepu Pump Gate	678,604	719,100	100,622		
6. Rehabilitation of Hongkou Gang Water System	265,627	590,810	336,287		
7. Sediment Dredging and Disposal			Project cancelled		
8. Re-aeration	36,579	528,867	1,090,403	1,448,820	1,590,300
9. Nightsoil and Garbage Wharfs			Operated and maintained by SH Municipal Environmental and Sanitary Bureau with secured O&M cost		
10a. Reconstruction of Embankment --Meng Qing Garden			81,985	2,509,200	2,809,300
10 b,c. Floodwall and Greening		Responsibility of relevant district			
Total	26,534,738	44,881,984	62,209,523	80,490,000	91,759,700

O&M= operation and maintenance

Source: Shanghai Suzhou Creek Rehabilitation and Construction Company

Table A8.3: Balance Sheet, as of December 31 each year (CNY million)

Item	1999	2000	2001	2002	2003	2004
Assets						
Current assets						
Cash	211	332	525	761	719	759
Advances	75	152	106	69	23	23
Other receivables	2	2	12	116	113	197
Inventories	—	11	6	1	0	0
Other	0	0	0	0	0	0
Total current assets	287	497	649	947	854	979
Long term investment						
Gross fixed assets	3	3	4	3	46	49
Less: Accumulated depreciation	1	1	2	2	4	5
Net assets	3	2	2	1	42	44
Construction in progress	1,123	2,573	3,461	4,726	5,440	5,904
Fixed assets transferred				46	46	46
Other	0	0	0	0	0	0
Total assets	1,413	3,073	4,112	5,721	6,387	7,206
Liabilities and Owner's Equity						
Current Liabilities						
Accounts payable	1	79	172	234	145	105
Short-term loans	30	322	—	135	391	1,131
Other payables	12	47	242	429	628	842
Other short-term liabilities						
Total current liabilities	43	448	414	800	1,166	2,081
Long-term loans						
Total long-term liabilities	—	887	1,808	2,943	3,240	3,132
Financial appropriations						
Paid-in capital	270	640	740	821	821	832
Capital surplus	1,100	1,100	1,100	1,100	1,100	1,100
Undistributed profit			60	60	60	60
		(2)	(10)	(3)	(0)	1
Total owner's equity	1,370	1,738	1,890	1,978	1,981	1,993
Total Liabilities and Total Equity	1,413	3,073	4,112	5,721	6,387	7,206

CNY= China yuan

Source: Suzhou Creek Rehabilitation and Construction Company

Table A8.4: Cash Flow (CNY million)

Items	1999	2000	2001	2002	2003	2004
Sales	—	—	—	—	—	3.6
Cost of sales	—	—	—	—	—	(0.1)
Profit on sales	—	—	—	—	—	3.5
Profit on other operations	—	—	—	—	0.0	-
General administrative expens	—	(2.3)	(9.0)	(3.2)	(3.1)	(4.4)
Financial interest/ expenses	—	0.2	1.0	3.5	6.8	2.3
Operating profit	—	(2.1)	(8.0)	0.4	3.7	1.4
Net Non operating income	—	—	—	(0.0)	(0.0)	0.1
Adjustment of prior year	—	—	—	6.3	(0.4)	—
Total profit	—	(2.1)	(8.0)	6.7	3.3	1.5
Income tax	—	—	—	—	—	—
Net profit	—	(2.1)	(8.0)	6.7	3.3	1.5

Table A8.5: Cash Flow (CNY million)

Items	2000	2001	2002	2003	2004
Cash flow from operating activity					
Received	0	185	191	216	228
Paid	(3)	(8)	(3)	(3)	(69)
Net cash flow from operating activity	(2)	177	188	213	159
Cash flow from investing activity					
Received	35	—	—	—	0
Paid for fixed assets	(1,419)	(653)	(1,111)	(679)	(246)
Paid for other	(23)	(4)	(62)	(1)	(228)
Net cash flow from investing activity	(1,406)	(657)	(1,173)	(680)	(473)
Cash flow from financing activities					
Received by absorbing equity	370	160	84	—	—
Received from loans	1,179	921	1,244	576	1,523
Provided by financing activities	—	5	—	3	1
Paid for loans	—	(322)	—	-	(969)
Paid for interest and other financing activity	(20)	(92)	(107)	(154)	(200)
Net cash flow from financing activities	1,530	673	1,221	425	355
Net increase in cash and cash equivalents	121	193	236	(42)	40

Source: Suzhou Creek Rehabilitation and Construction Company

Table A8.6: SSRCC Summary Projected Financial Statements, 2005–2015

Balance Sheets	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Assets											
Current assets	564	(41)	(216)	(369)	(497)	(497)	(309)	37	218	406	599
Net Fixed assets	6,163	5,960	5,743	5,526	5,309	5,092	4,875	4,658	4,441	4,224	4,007
Long Term assets	233	233	233	233	233	233	233	233	233	233	233
Total assets	6,960	6,152	5,759	5,390	5,044	5,015	4,969	4,928	4,892	4,862	4,839
Liabilities											
Current liabilities	1,849	1,067	648	649	179	181	183	185	187	189	191
Long-term liabilities	2,656	2,129	1,601	1,072	1,013	953	892	828	763	696	626
Total liabilities	4,504	3,196	2,249	1,721	1,192	1,134	1,074	1,013	950	885	818
Equity	2,456	2,956	3,510	3,669	3,852	3,882	3,895	3,915	3,943	3,978	4,021
Total liabilities and equity	6,960	6,152	5,759	5,390	5,044	5,015	4,969	4,928	4,892	4,862	4,839
Income Statements	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Operating revenues	787	979	990	566	563	381	365	374	382	391	399
Operating expenses	80	94	97	99	102	104	107	110	112	115	118
Income Before depreciation	707	884	893	466	461	276	258	264	270	275	281
Depreciation	50	203	217	217	217	217	217	217	217	217	217
Operating income	657	681	676	249	244	59	41	47	53	58	64
Net Non-operating income	(232)	(181)	(121)	(91)	(61)	(30)	(28)	(27)	(25)	(23)	(21)
Income tax expense	0	0	0	0	0	0	0	0	0	0	0
Net income	425	500	554	158	183	29	13	20	28	35	43
Cash Flow Statements	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sources of funds											
Internal cash generation	707	884	893	466	461	276	258	264	270	275	281
Government investment	38	0	0	0	0	0	0	0	0	0	0
Borrowing	176	0	0	0	0	0	0	0	0	0	0
Total sources	921	884	893	466	461	276	258	264	270	275	281
Application of funds											
Capital investment	275	0	0	0	0	0	0	0	0	0	0
Debt service	1,098	1,072	648	619	590	88	88	88	88	88	88
Change in working capital requirement	169	(4)	(1)	0	0	0	0	0	0	0	0
Total applications	1,541	1,068	647	619	590	88	88	88	88	88	88
Opening balance	759	385	(220)	(395)	(548)	(676)	(488)	(318)	(142)	40	227
Closing balance	139	201	26	(548)	(676)	(488)	(318)	(142)	40	227	420
Net change in cash	-620	(184)	246	(152)	(129)	188	170	176	181	187	193
Targets and Ratios	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Current ratio	0.31	(0.04)	(0.33)	(0.57)	(2.78)	(1.71)	(0.76)	0.20	1.17	2.15	3.13
Long-term debt to capital employed	0.69	0.52	0.42	0.34	0.22	0.21	0.20	0.19	0.18	0.16	0.15
Operating ratio (%)	17	30	32	56	57	84	89	87	86	85	84
Rate of return on average capital employed (%)	8	10	11	3	4	1	0	0	1	1	1
Rate of return on average net fixed assets (%)	16	9	9	3	3	1	0	0	1	1	1
Debt service ratio	0.6	0.8	1.4	0.8	0.8	3.1	2.9	3.0	3.0	3.1	3.2
Long-term debt/equity	1.1	0.7	0.5	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2

Source: Suzhou Creek Rehabilitation and Construction Company

Table A8.7: Revised Weighted Average Cost of Capital (WACC)

Item	ADB	MOF	SMG	Districts	SDB	Total
1. Amount (\$ million)	119	200	—	—	199	517.00
2. Weighting (%)	22.9	38.6	0	0	38.5	100.00
3. Nominal Cost ^a (%)	5.44	8.00	5.44	5.44	6.12	
4. Tax Rate (%)	0	0	0	0	0	
5. Tax Adjusted Nominal Rate (%)	5.44	8.00	5.44	8.00	6.12	
6. Inflation Rate ^b (%)	1.90	2.80	1.90	2.80	2.80	
7. Real Cost (%)	3.47	5.06	3.47	5.06	3.23	
8. Weighted Component of WACC (%)	0.80	1.95	0.80	0	1.24	
Weighted Average Cost of Capital (Real)						4.00

ADB= Asian Development Bank; MOF= Ministry of Finance; SDB= State Development Bank; SMG= Shanghai Municipal Government; WACC= weighted average cost of capital.

^a The nominal cost of equity is assumed to be 8%.

^b MUV index for 2007 and beyond is adopted for long term international inflation.

Source: Suzhou Creek Rehabilitation and Construction Company

ECONOMIC ANALYSIS

A. Economic Context

1. Although Shanghai has experienced rapid economic growth for almost 20 years, prior to the Project, the poor environment of Suzhou Creek acted as a constraint to the development potential of the heart of the city center. Much of the development was occurring in the new area of Pudong across the river from the city center proper. The environmental improvement of Suzhou Creek was considered to be one of the primary steps necessary to facilitate urban development within the city proper in addition to the already successful large-scale special economic zones outside the city. Resettlement of families and industries, and redevelopment and renewal in such an important location has acted as a positive catalyst, providing a location for quality housing and business and improving the overall image and perception of Shanghai as an international city.

2. The economic achievements of Shanghai over the last decade are impressive. Table A9.1 summarizes basic economic performance and wealth statistics. Real GDP has exceeded 10% for every year in the last decade. GDP per capita has increased more than 2.5 times; average annual household incomes are about CNY38,000, one of the highest in the People's Republic of China (PRC).

Table A9.1: Shanghai Summary Economic Statistics (1994–2003)

Year	Population (million)	Households (million)	Nominal GDP (CNY billion)	Real GDP Growth (%)	Real GDP Per Capita (CNY)
1994	13.0	4.4	197	14.3	16,683
1995	13.0	4.5	246	14.1	18,997
1996	13.0	4.6	290	13.0	21,417
1997	13.1	4.6	336	12.7	24,117
1998	13.1	4.7	369	10.1	26,531
1999	13.1	4.7	403	10.2	29,091
2000	13.2	4.8	455	10.8	32,025
2001	13.3	4.8	495	10.2	35,145
2002	13.3	4.8	541	10.9	38,769
2003	13.4	4.9	625	11.8	43,100

Source: 2004. Shanghai Statistical Yearbook.

3. In conjunction with high economic growth, SMG has been committed to improving the urban fabric and quality of the environment and public space for residents. The city master plan includes areas for parks, open space, and waterfront promenades; a modern mixed-use development within the city on a human scale. The rehabilitation of the Suzhou Creek and its environs formed and still forms (through Phases II and III of the Suzhou Creek rehabilitation program) a key component of those plans.

1. Scope

4. The economic analysis undertaken at appraisal aimed to assess the overall impact of the Project on improving citizens' economic welfare. It was undertaken using the framework for ADB's *Economic and Financial Appraisal of Urban Development Sector Projects, Guidelines for*

the Economic Analysis of Projects, and Handbook for the Economic Analysis of Water Supply Projects. Unlike the financial appraisal, which focused only on the wastewater component, the economic analysis was undertaken for the Project as a whole, incorporating the 10 components under three parts. This approach reflected the integrated nature of the project components.

5. The analysis uses the same approach and methodology adopting the domestic price numeraire and a 2005 price base. It calculates a revised economic internal rate of return (EIRR) and for comparison purposes undertakes sensitivity tests for cost increases, benefit decreases, and delays. The analysis revisits all the inputs and assumptions. It revisits the costs, using the actual capital and operation costs incurred in each year, and updates the shadow pricing assumptions. Benefits are recalculated using updated data where possible and adjusting willingness to pay estimated through the social survey under the project preparatory TA. The analysis also reconsiders benefits that were not able to be quantified or valued at appraisal.

2. The “With/Without Project Basis”

6. At appraisal, the economic analysis discusses the difficulties of estimating the conditions at the end of the project period without the Project since it would involve identifying and separating out changes that would have occurred anyway. For this project, it would have included projecting changes in factors such as water quality, which in turn would depend on factors such as population growth, consumer awareness and behavior, implementation of other projects, and the growth and changing structure of industry. Thus, for the purpose of appraisal, it was considered appropriate to use the existing situation as a proxy for the without Project basis. In fact, it was more likely that the existing situation would deteriorate over time if no action was taken as increased density of development and growth was likely to increase pollution levels. Therefore, using the current situation as the without Project basis was likely to understate rather than overstate the benefits of the Project. The same proxy was used for this appraisal, particularly in adopting the same values for willingness to pay, which compared the existing situation with the outcome anticipated under the Project.

3. Cost Effectiveness Assessment and Demand

7. Specific least-cost analysis was not undertaken during the project preparatory TA and it was not revisited at appraisal. However, it was established that the project components were chosen to complement one another to achieve the overall objective of cleaning up Suzhou Creek and its surrounding environment. During implementation, the dredging component was dropped since it was not necessary. In relation to the component to remove and relocate the solid waste collection wharves, an alternatives assessment for solid waste disposal was undertaken to compare incinerator, landfill, and composting plant; and a special report was submitted to ADB. The assessment was conducted based on the least-cost analysis and a sanitary landfill was selected.

8. Apart from resettlement, the costs of the Project were lower than estimated at appraisal. Although some of the designs and operations appeared from site visit inspection to be more state of the art than least cost, as a case study project in Shanghai, it is considered appropriate that the facilities and operations were of innovative design, achieved good quality outputs, and provided best practices in urban environmental management. Through adopting best practices, the Project has also achieved additional benefits in public education and awareness of environmental management.

9. The social survey and willingness to pay survey conducted under the project preparatory TA established both the need and the demand for the Project. Subsequent monitoring¹ has demonstrated an increase from 12% to 71% public satisfaction with the urban environment and about 60% of respondents considered that public health had improved as a result of the Project. Experience from elsewhere suggests that, as Shanghai citizens get wealthier, their urban living environment—including access to open space and amenity—will become a higher priority. Of respondents to the 2001 survey, 92% considered that the quality of municipal water was closely related to creating a good image for a modern metropolis.

B. Economic Costs

10. Economic costs were recalculated based on actual costs incurred and estimates of future O&M. Although some of the O&M responsibility has been passed from SSRCC to other agencies, the calculation of economic costs included all components. The standard conversion factor was updated to 1.01 on the advice of ADB's PRC Resident Mission. Other conversion factors for electricity and labor adopted at appraisal were considered and updated to reflect the prevailing situation where it was considered economic conversion factors should be 1, or no conversion. Economic costs excluded price contingencies, taxes (at a local tax rate of 3.41%), interest, and depreciation.

C. Economic Benefits

11. **Benefits that can be Quantified.** The assessment of benefits undertaken at appraisal was updated. The same three categories—environmental, health,² and flood control—were used. The environmental benefits were further subdivided into the (i) elimination of “black and stink”; (ii) removal of nightsoil and garbage wharves; and (iii) creation of a greenbelt on areas on either side of the creek. Using updated figures for the number of affected households and 2005 prices, the benefits were recalculated and adjusted in timing to reflect the actual delivery of benefits in implementation.

12. **Benefits that can be Identified but not Quantified – Property Values.** The change in land use either side of Suzhou Creek and the creation of green areas, particularly Meng Qing garden, has transformed the landscape. Where there were old polluting enterprises, poor quality housing, and unsanitary facilities for waste disposal, there are now high-rise, high quality residential property developments, and well-designed and integrated facilities for waste disposal. The total greenbelt is 10 kilometers (km) and greening area is about 160,000 square meters (m²). Land and property values in Shanghai have been rising and much development has been undertaken. It is evident that the majority of property development along Suzhou Creek would not have occurred without the Project. Evidence suggests that floor space along the immediate vicinity of the Creek has increased seven times (to 2002); buildings are now up to 18 floors (compared to 2 prior to 1999); price of properties near the creek have grown faster than elsewhere in Shanghai; buildings with water views are 10–15% higher than those surrounding; and the price of high-rise buildings within 500 meters (m) is 5–7% higher than those farther away (500–1,000 m). Property prices along the creek are reported to be 11–16% per annum 1999–2002 compared to negative 4–2% in Shanghai as a whole.³ SMG has adopted

¹ 2001. Project Management Monitoring System and Report for Public Survey, Shanghai Municipal Statistics Bureau.

² Health impacts are not quantifiable since it is difficult to attribute any improvement in public health to river water quality or environmental management. Health impacts are implicitly considered in estimates of environmental improvements and willingness to pay.

³ 2004. Real estate price index, residential sales, Shanghai Statistical Yearbook.

policies to contain the height and scale of redevelopment of the land adjacent to the Creek and to enable public access along its length to maximize the benefits of rehabilitation to all residents, not just the wealthy who can afford to live in the new property developments.

13. **Other Non-Valued Benefits.** The economic analysis undertaken at appraisal discussed the potential indirect tourism benefits of an improved image for Shanghai and potential riverside activities. Dragon-boating and rowing races have been held on Suzhou Creek, drawing significant crowds. The exhibition center at Meng Qing garden, explaining the history of the creek and environmental management in Shanghai, has had some 200,000 visitors in its first year. The exhibition centre is also used as an educational facility, particularly for schoolchildren to learn how their city deals with waste management and the environment.

14. Recovery of the ecosystem was implicitly included in the analysis at appraisal through consideration of water quality. Diversity and volume of aquatic life has increased—in the section at Beixinjing, volume has increased by 300%. Although health impacts must have occurred, particularly alongside the Creek where previously it was reported to have a high incidence of water borne diseases, actual statistics are very difficult to ascertain. Since the quality of housing and waste management has improved dramatically, it is considered that incidences of disease would have reduced to the average level.

15. Navigational disbenefits discussed at appraisal were then considered to be minimal and there is no evidence of major negative impacts.

D. Results

16. Table A9.2 shows the summary results of the economic analysis of all project components. Table A9.3 gives details of the calculation.

Table A9.2: Summary Results of the Economic Analysis and Sensitivity Tests

Economic Returns		EIRR (%)	NPV (CNY Billion)
Discount Rate			10%
Base Case		22.0	4.1
Costs Plus	10%	19.8	3.7
Benefits Less	10%	17.1	2.4
Costs Plus & Benefits Less	10%	15.3	1.9
Benefits Delayed By (years)	1	18.2	3.2

EIRR= economic internal rate of return; NPV= net present value.

Source: Staff estimates.

17. The revised base case delivers an EIRR of 22.0% compared to 17.1% at appraisal. This is well above the opportunity cost of capital (EOCC) which is assumed to be 10%. The net present value (NPV) is calculated to be CNY4.1 billion (equivalent to \$490 million).

18. The re-evaluation of the economic analysis clearly demonstrates that the Project was worthwhile, and in fact exceeded the expectations at appraisal despite property values not being included in the EIRR calculation. Overall, the Project is viewed as being of high economic impact and performance—whether qualitatively or quantitatively—and provides a useful case study for other environmental improvement projects.

**Table A9. 3
Revised Economic Analysis**

Economic Cost			Economic Benefits						Sensitivity Tests				
Capital	O&M	Total	Environmental			Flood Damage	Total Benefits	Net Benefits	Costs plus 10%	Benefits less 20%	Cost plus 10% & Benefits less 20%	Benefits Delayed 1 year	
			Black & Stink	Removal of Wharves	Green Belt								
Y million	Y million	Y million	Y million	Y million	Y million	Y million	Y million	Y million	10%	20%			
1998	54						0	(54)	(60)	(54)	(60)	(54)	
1999	1188						0	(1188)	(1307)	(1188)	(1307)	(1188)	
2000	1470	0					0	(1470)	(1617)	(1470)	(1617)	(1470)	
2001	1022	0		581	0	0	581	(441)	(543)	(557)	(659)	(1022)	
2002	1411	28		581	408	177	0	1167	(417)	(506)	(650)	(858)	
2003	707	50		581	408	266	51	1306	474	289	213	410	
2004	180	66		581	408	399	51	1439	1168	905	880	1060	
2005	113	95		581	408	443	51	1483	1254	979	958	1231	
2006		106		581	408	443	51	1483	1367	1081	1071	1378	
2007		128		581	408	443	51	1483	1343	1059	1046	1356	
2008		128		581	408	443	51	1483	1343	1059	1046	1356	
2009		128		581	408	443	51	1483	1343	1059	1046	1356	
2010		128		581	408	443	51	1483	1343	1059	1046	1356	
2011		128		581	408	443	51	1483	1343	1059	1046	1356	
2012		128		581	408	443	51	1483	1343	1059	1046	1356	
2013	116	128		581	408	443	51	1483	1215	943	919	1240	
2014		128		581	408	443	51	1483	1343	1059	1046	1356	
2015		128		581	408	443	51	1483	1343	1059	1046	1356	
2016		128		581	408	443	51	1483	1343	1059	1046	1356	
2017		128		581	408	443	51	1483	1343	1059	1046	1356	
2018		128		581	408	443	51	1483	1343	1059	1046	1356	
2019		128		581	408	443	51	1483	1343	1059	1046	1356	
2020		128		581	408	443	51	1483	1343	1059	1046	1356	
2021		128		581	408	443	51	1483	1343	1059	1046	1356	
2022		128		581	408	443	51	1483	1343	1059	1046	1356	
2023	(1253)	128	(1126)	581	408	443	51	1483	2722	2312	2425	2609	
Total	5,009	2,513	7,522	13,372	8,976	9,260	1,072	32,679	25,157	24,405	18,621	17,869	23,674
Net Present Value @ 10%								4,188	3,710	2,395	1,917	3,260	
EIRR								22.0%	19.8%	17.1%	15.3%	18.2%	
Sensitivity Indicator									0.99	1.11			
Switching Value									80%	44%			

EIRR= economic internal rate of return; O&M= operation and maintenance.

Notes:

Life of components (excluding civil works), is assumed to be 20 years, civil works 40 years

Analysis undertaken in constant 2005 prices, capital and operations and maintenance costs adjusted using the Index of Industrial Products to 2004, thereafter and WTP adjusted using the Retail Price Index, Shanghai Statistical Yearbook.

EVALUATION OF LAND ACQUISITION AND RESETTLEMENT ACTIVITIES

A. Background

1. The Project originally included 10 components. Since the Sediment Dredging and Disposal Component was not implemented, the Project actually consisted of nine components, of which, eight components involved land acquisition and housing relocation:

Table A10.1: Project Component

No.	Title
1	Locks and Gates on Mudu Gang and Seven Tributaries
2	Wastewater Interception for six Tributaries
3	Integrated Low-Flow Augmentation
4	Shidongkou Wastewater Treatment Plant
5	Wastewater Interception from Hongkou Gang and Yangpu Gang
6	Removal and Relocation of Nightsoil and Garbage Wharves
7	Rehabilitation of Hongkou Gang System
	Embankment and Land Reconstruction (no resettlement impacts at planning stage, but actually affected by land acquisition and housing relocation)
8	Re-aeration of Suzhou Creek (estimated to be affected by land acquisition and housing relocation at planning stage, but actually no resettlement impacts)

Source: Report and Recommendation of the President.

2. The Project's civil works started in 1999 and the Project was completed in 2003. At appraisal, a loan of \$300 million was approved by the Asian Development Bank (ADB). Through adjustment, \$165 million was actually financed by ADB. The total project cost was \$843 million.

B. Scope of Resettlement Impacts

3. In 1998, resettlement plans (RPs) were prepared for the Project and its eight components, involving land acquisition and housing relocation, in accordance with related Chinese laws and regulations, and ADB policies. The RPs provided the basis of resettlement implementation, monitoring, and evaluation.

4. The total permanent land acquisition of the Project was 2,372 mu,¹ which increased by 39.01% compared with 1,706 mu in the RPs. Total temporary land occupation of the Project was 4,303 mu, an increase of 130.35% compared with 1,868 mu in the RPs. According to differences in ownership, the affected houses can be divided into two categories: (i) dwellings, and (ii) houses owned by factories or public institutions. Total demolished dwellings covered 584,244 square meters (m²). A total of 6,581 households were relocated and 514 households were only partially affected and were not relocated—an increase of 168.04% compared with all the 2,647 affected households in the RPs. Total demolished houses owned by factories and public institutions covered 976,921 m². A total of 33 factories or public institutions were relocated and 845 were only partially affected and were not relocated—an increase of 88.82% compared with all the 465 affected factories or public institutions in the RPs (Table A10.2).

¹ 1 mu= 600 m²

Table A10.2: Scope of Resettlement Impacts

Component	Land Acquisition			Land Borrowing			Affected Households			Affected Factories		
	RP	Actual	Change	RP	Actual	Change	RP	Actual	Change	RP	Actual	Change
	mu	mu	%	mu	mu	%	No.	mu	%	No.	mu	%
1	91.60	71.50	(21.94)		119.00		2	30	1400	2	4	100.00
2	225.64	77.43	(65.68)	1,367.99	1,727.89	26.31	624	809	29.65	314	429	36.62
3	261.27	384.30	47.09		2,446.90		168	435	158.93	72	93	29.17
4	951.79	1,117.50	17.41				226	408	80.53	12	8	(33.33)
5	56.55	119.98	112.19		4.58		1,181	2,598	119.98	47	87	85.11
6	66.00	92.28	39.82	500		(100.00)	139	320	130.22	3	17	466.67
7	53.10	364.65	586.73		4.50		269	1,504	459.11	15	219	1,360
8		144.42						991			21	
9	0.45		-100				38		(100.00)			
Total	1,706.40	2,372.07	39.01	1,867.99	4,302.87	130.35	2,647	7,095	168.04	465	878	88.82

RP= resettlement plan.

Notes:

1. In the RP for the whole Project, land acquisition was as follows: Component 2 (1,279.15), Component 3 (262.77) and Component 6 (566); and land borrowing for Component 2 was 1,093.99. Table A10.2 figures have been revised according to the breakdown and context of the RPs for the related components.

2. The RPs did not provide all the data for the demolished areas of the dwellings and factories or public institutions, so they cannot be compared with the corresponding ones actually affected.

Source: Suzhou Creek Rehabilitation and Construction Company.

5. All changes in scope of resettlement were mainly due to technical design changes and larger than anticipated land occupation and house relocation.

6. The actual resettlement impacted areas included 11 districts of Shanghai Municipality. Tables A10.2 provides detailed data about land acquisition and house relocation by components. The components were seriously affected as follows: component 4 (permanent land acquisition), component 3 (temporary land occupation), component 5 (dwelling demolition), and component 2 (factory or public institution). The seriously affected districts were Baoshan District (permanent land acquisition and dwelling demolition), Jiading District (temporary land occupation), and Minhang District (factory or public institution demolition).

Applied Laws and Regulations, and Compensation Standards

7. The Project's land acquisition and resettlement was implemented according to the following laws and regulations, which were slightly different from those mentioned in the RPs:

- (i) The Law of Land Administration of the People's Republic of China;
- (ii) Implementation Regulations of Shanghai on the Management of Housing Resettlement;
- (iii) Compensation Standards of Using Land for State Construction in Shanghai;
- (iv) Methodology of Using Land for State Construction in Shanghai;
- (v) Measurement of Shanghai Concerning Resettlement and Compensation for Dismantling Business Site of Self-Employed Entrepreneur;
- (vi) Interim Method of Housing Appraisal in Shanghai.

8. According to the investigation by the Project Completion Review Mission, the actual compensation standards for land and houses were mainly based on those stipulated in the RPs.

C. Resettlement Organizations

9. The executing agency for the Project is the Shanghai Suzhou Creek Rehabilitation and Construction Company (SSRCC). SSRCC set up the Project Preparation Department, which was responsible for overall resettlement management, coordination, and internal monitoring. District- and township-level implementation agencies were responsible for resettlement activities within their jurisdictions.

10. Those resettlement agencies are all equipped with qualified employees and the necessary facilities for office work, communication, and transportation. In rural and suburban areas, district resettlement agencies contacted the affected townships, which contacted villager groups and households through the administrative villages. In urban areas, district resettlement agencies contacted the affected factories or institutions and households through house relocation companies.

D. Resettlement Budget and Payment

11. The total actual cost of the compensation for land acquisition, house relocation, and affected electric and telecom facilities was \$334 million, 48.52% higher than \$225 million in the RPs, because of increases in the amount of land acquisition and housing relocation (Table A10.3).

Table A10.3: Resettlement Cost
(CNY million)

Component	RP Total	Actual				Total	Percent Change
		Land	Dwellings	Factories or Public Institutions	Infrastructure		
1	41.49	12.61	1.05	6.05	8.27	27.98	(32.56)
2	829.39	9.17	168.42	232.35	88.44	498.38	(39.91)
3	203.20	71.81	44.10	84.36	99.64	299.90	47.59
4	241.98	116.53	55.02	44.01	10.93	226.50	(6.40)
5	327.00	12.21	543.90	4.31	1.19	561.60	71.74
6	105.53	22.14	62.16	7.91	38.07	130.27	23.44
7	104.04	20.33	301.14	97.02	35.20	453.69	336.08
8		8.05	208.11	273.81	80.95	570.92	
9	11.87						(100.00)
Total	1,864.50	272.84	1,383.90	749.82	362.69	2,769.24	48.52

Source: Shanghai Suzhou Creek Rehabilitation and Construction Company.

12. The SSRCC allocated the resettlement funds to the district resettlement agencies. Districts distribute funds in different ways to affected collectives and households. Some funds are paid directly to the affected households and units, and some are paid via townships and administrative villages.

E. Resettlement Implementation

13. Land acquisition and house relocation were mainly carried out 1999–2002 according to the components' civil construction schedules. Compensation contracts were usually signed after detailed measuring survey had been completed.

14. For land acquisition—in addition to land compensation—certain villagers were awarded urban citizenship in proportion to the acquired land area, than the affected laborers were provided with new jobs, and affected seniors (males over 55 and females over 45) were given pensions. If the affected laborers opted for self-resettlement, they could receive CNY10,000–15,000 plus two social security benefits (i.e. pension and medical fund would be paid until they reached eligibility age). Current pensions are about CNY400 per person per month. Some 1,062 people were provided with new jobs or special subsidies for self-resettlement (1.53% higher than the estimate of 1,046 in the RPs); and 618 people were provided with pensions (60.52% higher than the RPs' estimate of 385).

15. Only five households affected by dwelling demolition in rural areas opted for dwelling rebuilding nearby. They were provided with household compensation and a new housing plot, and built the new houses themselves. Other households affected by dwelling demolition chose either replacement houses or cash compensation. Replacement houses were usually six-floor apartments in suburban areas, located in six districts of Shanghai. Cash compensation was lump-sum based on the household population and dismantled areas of dwellings, which were usually equal to market prices of similar resettlement houses. Since cash compensation provided more freedom to choose new dwellings, about 80% of affected households chose this option.

16. A compensation fee for demolished houses owned by factories or public institutions was paid directly, through consultation, to the affected factories or public institutions. The fee included compensation for affected structures and attachments, moving cost, replacement land cost, and other losses. Most affected factories or public institutions (96.24%) were only partially affected and were not relocated, so they could continue production, and workers and staff members could keep their jobs. Other affected factories or public institutions (3.76%) were mainly small township and village enterprises, which preferred to receive cash compensation because they could start more suitable business according to their real situations.

F. Quality Assessment of Resettlement Implementation and Rehabilitation

17. After land acquisition, farmers were given urban citizenship, new employment, and basic social security. Thus, people who need full economic rehabilitation have been well resettled.

18. Site visit and further investigation have indicated that the affected households were relocated in the new resettlement areas with adequate public facilities either provided by the Project or purchased by the affected households. House size and structure of households have been improved after relocation. While the house compensation appeared to be adequate for purchasing new houses with at least the same structure and quality, the affected people chose to invest more in better houses. Most relocated households are satisfied with arrangements for house relocation.

19. For affected factories and public institutions, additional subsidies (such as the government funds well above market land use prices) have been provided, as well as basic compensation. This should allow them to continue or even expand their business. The affected infrastructure has been rehabilitated or reconstructed according to construction progress.

20. According to the investigation by the Project Completion Review Mission, the affected laborers in rural areas usually work in foreign-invested, state-owned, collective, or private enterprises—after land acquisition—with an average salary of CNY1,000 per person per month. Seniors (males over 55 and females over 45) can receive monthly pensions of about CNY400

per person. The affected persons' per capita income increased substantially in recent years compared with about CNY5,000 before land acquisition, according to the related statistical yearbooks. Therefore, the land acquisition of the Project will not have significant adverse impacts on them.

G. Consultation, Monitoring and Evaluation

21. Before the resettlement implementation for each component, frequent resettlement information meetings were held in affected collectives and households. During the resettlement implementation, job creation programs were established through consultation with affected villagers. The affected residents could choose new homes in their areas of preference. Compensation amounts and resettlement methods of affected factories and public institutions were decided on a consultative basis.

22. SSRCC checked and inspected resettlement agencies' resettlement work periodically, supported by all the resettlement agencies. They finished the quarterly resettlement summary reports and included them in project progress reports, which were submitted to ADB every quarter. SSRCC improved gradually its internal monitoring activities, such as data collection, database maintenance, and field visits. During the project completion review, detailed basic data concerning resettlement have been provided by SSRCC.

23. The Project chose the Economic, Legal & Social Consultancy Center, Shanghai Academy of Social Sciences (SASS), as an independent monitoring organization to carry out external resettlement monitoring. A total of 15 issues of the external monitoring and evaluation reports (one issue for one component) were submitted to ADB, so each component had one or two issues of the monitoring reports. Based on the survey of 214 affected households and 21 affected factories, a resettlement completion report for the whole Project was finished and submitted by SASS in November 2003.

H. Conclusion and Lessons Learned

24. The resettlement was implemented mainly according to the RPs, through efforts by all levels of the resettlement agencies and local governments. RP objectives have been achieved.

25. The resettlement activities were carried out by a well-established resettlement organization system at municipal, district, township, and village level. Such a system could both relate resettlement to the project construction schedule tightly and activate local government enthusiasm. Therefore, institutions involved in resettlement were well coordinated and well operated.

26. Prior to and during resettlement implementation, consultation and participation were conducted so that affected people were informed about compensation policies, and their resettlement options were taken into consideration.

27. Compensation was delivered to the affected collectives and households according to the RPs. The income of the people affected by land acquisition has been improved and their income-earning capacity has risen. All households affected by relocation that requested new houses have received them either via replacement houses or cash compensation. Affected facilities and infrastructure have been rehabilitated or reconstructed.

28. For ADB, the Project's main lessons are as follows:

- (i) When preparing the project budget during the design stage, a resettlement specialist should participate so that the engineering design budget can include real resettlement costs as far as possible.
- (ii) For multi-component projects involving resettlement, external resettlement monitoring reports should be prepared throughout the resettlement process of all related components. Ideally, a biannual monitoring report should be prepared from the beginning to the end of the physical resettlement activities. Then, annual reports should be prepared until the resettlement objectives are achieved.

Table A10.4: Detailed Data on Land Acquisition and House Relocation by Components

No.	Item	Component Unit	1	2	3	4	5	6	7	8	Total
1	Paddy Field Acquisition	mu	20.53	1.64	46.14	556.01			2.9		627.22
2	Dry Land Acquisition	mu							26.54		26.54
3	Vegetable Land Acquisition	mu	16.29	9.13	131.53						156.95
4	Cultivated Land Acquisition Subtotal	mu	36.83	10.77	177.67	556.01			29.43		810.71
5	Forest Land Acquisition	mu	1.72		54.14				1.15		57
6	Road and Water Acquisition	mu	8.66	0.72	50.93	35.26			34.91		130.48
7	Other Non-Cultivated Land Acquisition	mu	24.3	65.95	101.56	526.23	119.98	92.28	299.16	144.42	1,373.88
8	Non-Cultivated Land Acquisition Subtotal	mu	34.68	66.66	206.62	561.49	119.98	92.28	335.22	144.42	1,561.36
9	Permanent Land Acquisition Total	mu	71.5	77.43	384.3	1,117.5	119.98	92.28	364.65	144.42	2,372.07
10	Percent	%	3.01	3.26	16.20	47.11	5.06	3.89	15.37	6.09	100.00
11	Temporary Non-Cultivated Land Occupation Total	mu	119	1,727.89	2,446.9		4.58		4.5		4,302.87
12	Percent	%	2.77	40.16	56.87		0.11		0.10		100.00
13	Brick Concrete Structure Dwelling Demolition	m ²	800	111405	20,761	49,780	176,100	22,530	101,780	84,070	567,226
14	Total Area of Dwelling Demolition	m ²	1,000	11,639	1,259	2,620			500		17,018
15	Brick Concrete Structure Dwelling Demolition	m ²	1,800	123,044	22,020	52,400	176,100	22,530	102,280	84,070	584,244
16	Percent	%	0.31	21.06	3.77	8.97	30.14	3.86	17.51	14.39	100.00
17	Total Relocated Households	household	5	793	210	262	2,590	296	1,434	991	6,581
18	Total Relocated Residents	person	15	2939	650	786	7,770	888	5,019	2993	21,060
19	Partially Affected Households	household	25	16	225	146	8	24	70		514
20	Partially Affected Residents	person	103	78	602	664	24	77	209		1,757
21	Unit-Owned Concrete Frame Structure House Demolition	m ²	3,580	54,720	6,320	6,000			2,030		72,650
22	Unit-Owned Brick Concrete Structure House Demolition	m ²	2,587	285,833	91,785	24,890	7,694	13,050	57,770	82,073	565,682

No.	Item	Component Unit	1	2	3	4	5	6	7	8	Total
23	Unit-Owned Simple Structure House Demolition	m ²		177,615	100,099	24,400	1,080		5,345	30,050	338,589
24	Total Area of Unit-Owned House Demolition	m ²	6,167	518,168	198,204	55,290	8,774	13,050	65,145	112,123	976,921
25	Percent	%	0.63	53.04	20.29	5.66	0.90	1.34	6.67	11.48	100.00
26	Total Relocated Units	no.		1		8	2	1		21	33
27	Total Affected Workers or Staff Members in Relocated Units	person		34		320	201	120		1,050	1,725
28	Total Partially Affected Units	no.	4	428	93		85	16	219		845
29	Total Affected Workers or Staff Members in Partially Affected Units	person	120	14,001	3,720		4,149	545	4,380		26,915

Note: Unit means factory or public institution.

Source: Shanghai Suzhou Creek Rehabilitation and Construction Company

Table A10.5: Detailed Data About Land Acquisition and House Relocation by Districts

No.	Item	Component Unit	Putuo	Jiading	Minhang	Changning	Baoshan	Zhaibei	Qingpu	Yangpu	Hongkou	Jingan	Huangpu	Total
1	Paddy Field Acquisition	mu	7.15	13.38	1.64	14.22	556.01	34.82						627.22
2	Dry Land Acquisition	mu						26.54						26.54
3	Vegetable Land Acquisition	mu	10.30	87.90	32.48			3.63	22.64					156.95
4	Cultivated Land Acquisition Subtotal	mu	17.45	101.28	34.12	14.22	556.01	64.99	22.64					810.71
5	Forest Land Acquisition	mu	29.43	3.76	2.97			20.84						57
6	Road and Water Acquisition	mu	15.83	8.86	21.79		53.67	22.62	3.80		3.92			130.48
7	Other Non-Cultivated Land Acquisition	mu	189.00	31.67	29.98	13.40	745.62	88.46		62.30	192.36	7.80	13.31	1,373.88
8	Non-Cultivated Land Acquisition Subtotal	mu	234.25	44.29	54.74	13.40	799.29	131.92	3.80	62.30	196.28	7.80	13.31	1,561.36
9	Permanent Land Acquisition Total	mu	251.70	145.57	88.86	27.61	1355.30	196.91	26.44	62.30	196.28	7.80	13.31	2,372.07
10	Percent	%	10.61	6.14	3.75	1.16	57.14	8.30	1.11	2.63	8.27	0.33	0.56	100.00
11	Temporary Non-Cultivated Land Occupation Total	mu	246.52	2543.45	797.66	195.38	314.49	194.95	4.77	1.96	3.68			4,302.87
12	Percent	%	5.73	59.11	18.54	4.54	7.31	4.53	0.11	0.05	0.09			100.00
13	Brick Concrete Structure Dwelling Demolition	m ²	81,090	10,300	59,928	2,445	12,1130	43,773	3,610	103,500	122,190	4,000	15,260	567,226
14	Total Area of Dwelling Demolition	m ²	719	1310	3347	900	6760	3792	190					17,018
15	Brick Concrete Structure Dwelling Demolition	m ²	81,809	11,610	63,275	3,345	127,890	47,565	3,800	103,500	122,190	4,000	15,260	584,244
16	Percent	%	14.00	1.99	10.83	0.57	21.89	8.14	0.65	17.72	20.91	0.68	2.61	100.00
17	Total Relocated Households	household	879	77	324	127	980	548	19	1380	1979	50	218	6,581
18	Total Relocated Residents	person	2,825	276	988	561	3,687	1,680	54	4,140	6,045	150	654	21,060
19	Partially Affected Households	household	58	100	43	3	171	63	10	2	64			514
20	Partially Affected Residents	person	198	328	93	9	738	158	30	6	197			1,757
21	Unit-Owned Concrete Frame Structure House Demolition	m ²	18,730	1,840	12,980		24,820	14,280						72,650
22	Unit-Owned Brick Concrete Structure House Demolition	m ²	84,920	82,960	97,295	61,745	96,948	89,175		4,561	36,278	1,450	10,350	565,682
23	Unit-Owned Simple Structure House Demolition	m ²	67,260	46,200	130,450	18,539	45,295	29,615		1,080	150			338,589

No.	Item	Component Unit	Putuo	Jiading	Minhang	Changning	Baoshan	Zhaibei	Qingpu	Yangpu	Hongkou	Jingan	Huangpu	Total
24	Total Area of Unit-Owned House Demolition	m ²	170,910	131,000	240,725	80,284	167,063	133,070		5,641	36,428	1,450	10,350	976,921
25	Percent	%	17.49	13.41	24.64	8.22	17.10	13.62		0.58	3.73	0.15	1.06	100.00
26	Total Relocated Units	no.	18	1			9	1		1	1		2	33
27	Total Affected Workers or Staff Members in Relocated Units	person	890	34			440	35		171	30		125	1,725
28	Total Partially Affected Units	no.	81	31	170	83	198	80		52	148	2		845
29	Total Affected Workers or Staff Members in Partially Affected Units	person	2,730	1,315	4,981	2,691	5,910	2,704		2,655	3,899	30		26,915

Note: Unit means factory or public institution.

Source: Shanghai Suzhou Creek Rehabilitation and Construction Company

PROJECT PERFORMANCE RATING ASSESSMENT

Table A11.1: Project Rating Analysis

Criterion	Assessment
A. Relevance	
(i) Relevance of project preparation to project output at the time of appraisal	Highly relevant
(ii) Relevance of project output to achieving project goals and objectives at the time of appraisal	Yes
(iii) Priority of the Project in the context of the country's development strategy at the time of appraisal	Yes
(iv) Priority of the Project in the context of one or more of ADB's strategic objectives at the time of appraisal	Yes
Evaluation rating	3
B. Efficacy	
(i) Achievement of most project physical outcomes	Yes
(ii) Achievement of most project tangible outcomes (e.g., technical assistance)	Yes
(iii) The likelihood that project outcomes will lead to project goals	Yes
Evaluation rating	3
C. Efficiency	
1. Efficiency of Investments	
(i) EIRR > 12% (where recalculated at evaluation)	Yes
(ii) FIRR > weighted average cost of capital (where recalculated at evaluation)	Yes
(iii) Cost-effectiveness of project generating project outputs	Yes
2. Efficacy of Process	
(i) Manner of ADB's internal processing of the Project	Yes
(ii) Organization and management of executing and implementing agencies	Yes
(iii) Effectiveness of project management	Yes
(iv) Efficiency in recruiting consultants and other procurement	Yes
(v) Timely and adequate availability of counterpart funding	Yes
Evaluation rating	3
D. Sustainability	
(i) Availability of adequate and effective demand for services or products	Yes
(ii) Probable operating and financial performance of the operational entity and its ability to recover costs	Yes
(iii) Probability of funds available (cash flow) for continued operation, maintenance, and growth	Yes
(iv) Probable availability of skills to continue support	Yes
(v) Probable availability of appropriate technology and equipment to operate the Project	Yes

Criterion	Assessment
(vi) Probable availability of the enabling environment (subsidies, tariffs, price competitiveness, and political developments) in which the Project operated at the time of evaluation	Yes
(vii) Government ownership and commitment to the Project	
(viii) The extent to which the operation affects the environment and renewable or nonrenewable resources	Yes Yes
(ix) The extent to which community participation and beneficiary incentives are adequate to maintain project benefits	Yes
Evaluation rating	
E. Institutional Development and Other Impacts	3
1. Institutional development impacts	
(i) Country's formal laws, regulations, and procedures	Partly
(ii) The people's informal norms and practices	Yes
(iii) Institutional and organizational strengthening	Yes
(iv) Participatory attitudes of the society	Yes
(v) Macroeconomic or sector policy framework	Yes
2. Other development impacts	
(i) Impacts on poverty	Partly
(ii) Impacts on the environment	Yes
(iii) Impacts on social organization	Yes
Evaluation rating	
	2

Source: staff assessment.

Table A11.2: Assessment of Overall Project Performance

Criterion	Weights (%) (a)	Assessment	Rating Value (b)	Weighted Rating (a) x (b)
Relevance	20	Highly relevant	3	0.6
Efficacy	20	Highly efficacious	3	0.6
Efficiency	20	Highly efficient	3	0.6
Sustainability	20	Highly likely	3	0.6
Environmental, Sociocultural, and Other Impacts	20	Successful	2	0.4
Overall Rating		Highly successful		2.8

Highly successful = overall weighted average (OWA) > 2.5 and no criteria less than 2; successful = OWA 1.6–2.5 and no criteria less than 1; less than successful = OWA 0.6–1.5 and no criteria less than 1; unsuccessful = OWA < 0.6.

Source: staff assessment.