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Report No: PAD697

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US\$150.00 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR A

QINGHAI XINING WATER ENVIRONMENT MANAGEMENT PROJECT

August 26, 2014

Water Global Practice
East Asia and Pacific Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective February 2014)

Currency Unit	=	Renminbi Yuan (RMB)
RMB 1.00	=	US\$0.163934
US\$1.00	=	RMB 6.10

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
CEA	Cost-effectiveness Approach
CPS	Country Partnership Strategy
DA	Designed Account
DRC	Development Research Center of the State Council
EA	Environmental Assessment
ECOPs	Environmental Code of Practices
EIRR	Economic Internal Rate of Return
EMDP	Ethnic Minority Development Plan
EMDF	Ethnic Minority Development Framework
EMP	Environmental Management Plan
ESMP	Environmental and Social Management Plan
FIRR	Financial Internal Rate of Return
FSR	Feasibility Study Report
FYP	Five Year Plan
GDP	Gross Domestic Product
IBRD	International Bank for Reconstruction and Development
ICR	Implementation Completion Review
LA	Loan Agreement
IHRBMC	Integrated Huangshui River Basin (Xining Section) Management Committee
LIBOR	London Interbank Offered Rate
LID	Low Impact Development
MIS	Management Information Systems
M&E	Monitoring and Evaluation
MOC	Ministry of Construction
MTR	Mid-term Review
NWRMP	National Water Resource Master Plan
NPV	Net Present Value
O&M	Operation and Maintenance
ORAF	Operational Risk Assessment Framework
PDO	Project Development Objective
PEP	Project Expert Panel

PIP	Project Implementation Plan
PIU	Project Implementation Unit
PLG	Xining Municipality Project Leading Group
PIU	Project Implementation Unit
PMO	Project Management Office
QPFB	Qinghai Provincial Finance Bureau
RAP	Resettlement Action Plan
RAF	Resettlement Action Plan Framework
SA	Social Assessment
SIL	Specific Investment Loan
TA	Technical Assistance
TSS	Total Suspended solids
VSL	Variable Spread Loan
WACC	Weighted Average Cost of Capital
WWTP	Wastewater Treatment Plant
XEPB	Xining Environmental Protection Bureau
XFWMP	Xining Flood and Watershed Management Project
XMDDCC	Xining Municipal Drainage Development and Construction Co., Ltd
XMFB	Xining Municipal Finance Bureau
XMG	Xining Municipal Government
XMHIMC	Xining Municipal Huangshui Investment Management Co., Ltd
XWAB	Xining Water Affairs Bureau

Regional Vice President:	Axel van Trotsenburg, EAPVP
Country Director:	Klaus Rohland, EACCF
Sector Director:	John A. Roome (through June 30, 2014)
Global Practice Senior Director:	Junaid Ahmad (from July 1, 2014)
Global Practice Director:	Jennifer Sara (from July 1, 2014)
Sector Manager:	Charles M. Feinstein (through June 30, 2014)
Practice Manager:	Ousmane Dione (from July 1, 2014)
Task Team Leader:	Ximing Zhang, GWADR

CHINA
Qinghai Xining Water Environment Management Project

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PAD DATA SHEET

China

China-Qinghai Xining Water Environment Management Project (P133116)

PROJECT APPRAISAL DOCUMENT

EAST ASIA AND PACIFIC

0000009057

Report No.: PAD697

Basic Information					
Project ID P133116	EA Category A - Full Assessment	Team Leader Ximing Zhang			
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints []				
	Financial Intermediaries []				
	Series of Projects []				
Project Implementation Start Date 25-Sep-2014	Project Implementation End Date 31-Dec-2019				
Expected Effectiveness Date 23-Feb-2015	Expected Closing Date 31-Dec-2019				
Joint IFC No					
Practice Manager/Manager	Senior Global Practice Director	Country Director	Regional Vice President		
Ousmane Dione	Junaid Kamal Ahmad	Klaus Rohland	Axel van Trotsenburg		
Borrower: PEOPLE'S REPUBLIC OF CHINA					
Responsible Agency: Xining Municipal Government					
Contact:	Mr. Xu Guocheng	Title:	Vice Mayor		
Telephone No.:	0971-6280366	Email:	xnhjzlsxmb@163.com		
Project Financing Data(in USD Million)					
[X]	Loan	[]	IDA Grant	[]	Guarantee
[]	Credit	[]	Grant	[]	Other
Total Project Cost:	246.6		Total Bank Financing:	150.00	
Financing Gap:					

Financing Source							Amount			
Borrower							96.60			
International Bank for Reconstruction and Development							150.00			
Total							246.60			
Expected Disbursements (in USD Million)										
Fiscal Year	2015	2016	2017	2018	2019	2020	0000	0000	0000	0000
Annual	5.00	20.00	35.00	45.00	40.00	5.00	0.00	0.00	0.00	0.00
Cumulative	5.00	25.00	60.00	105.00	145.00	150.00	0.00	0.00	0.00	0.00
Proposed Development Objective(s)										
The Project Development Objective is to reduce water pollution and pilot potential sustainable reuse of wastewater in Xining Municipality.										
Components										
Component Name							Cost (USD Millions)			
Construction of Stormwater and Wastewater Collection Systems							139.80			
Comprehensive Stormwater Management and River-Bank Environmental Restoration							35.90			
Integrated Gully and Canal Improvement							28.70			
Wastewater Reuse							1.80			
Project Management and Capacity Building							31.30			
Institutional Data										
Practice Area / Cross Cutting Solution Area										
Water										
Cross Cutting Areas										
<input type="checkbox"/> Climate Change										
<input type="checkbox"/> Fragile, Conflict & Violence										
<input type="checkbox"/> Gender										
<input type="checkbox"/> Jobs										
<input type="checkbox"/> Public Private Partnership										
Sectors / Climate Change										
Sector (Maximum 5 and total % must equal 100)										
Major Sector				Sector		%	Adaptation Co-benefits %		Mitigation Co-benefits %	

Water, sanitation and flood protection	Wastewater Collection and Transportation	60		
Water, sanitation and flood protection	General water, sanitation and flood protection sector	30		
Agriculture, fishing, and forestry	Agricultural extension and research	5		
Water, sanitation and flood protection	Water supply	5		
Total		100		

I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes

Theme (Maximum 5 and total % must equal 100)

Major theme	Theme	%
Environment and natural resources management	Water resource management	60
Urban development	City-wide Infrastructure and Service Delivery	40
Total		100

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes []	No [X]
Does the project require any waivers of Bank policies?	Yes []	No [X]
Have these been approved by Bank management?	Yes []	No []
Is approval for any policy waiver sought from the Board?	Yes []	No []
Does the project meet the Regional criteria for readiness for implementation?	Yes [X]	No []

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	X	
Natural Habitats OP/BP 4.04		X
Forests OP/BP 4.36		X
Pest Management OP 4.09	X	
Physical Cultural Resources OP/BP 4.11		X
Indigenous Peoples OP/BP 4.10	X	
Involuntary Resettlement OP/BP 4.12	X	

Safety of Dams OP/BP 4.37		X
Projects on International Waterways OP/BP 7.50		X
Projects in Disputed Areas OP/BP 7.60		X

Legal Covenants

Name	Recurrent	Due Date	Frequency
Project Expert Panel	X		Yearly

Description of Covenant

The Project Implementing Entity shall maintain the Project Expert Panel with composition and staffing acceptable to the Bank, throughout the period of Project implementation, in order to provide technical assistance to the PMO, XMDC and XMHIMC on Project preparation, implementation and review.

Conditions

Source Of Fund	Name	Type
IBRD	Signing of the Subsidiary Agreements	Disbursement

Description of Condition

No withdrawals shall be made:

- for payments under Part A.1.(a) and D.1 of the Project until Xining Municipality and XMDC have entered into a Subsidiary Agreement, under terms and conditions satisfactory to the Bank.
- for payments under Parts A.1(b), B and C of the Project until Xining Municipality and XMHIMC have entered into a Subsidiary Agreement, under terms and conditions satisfactory to the Bank.

Team Composition

Bank Staff

Name	Title	Specialization	Unit
Yi Geng	Sr Financial Management Specialist	Sr Financial Management Specialist	GGODR
Jingrong He	Procurement Specialist	Procurement Specialist	GGODR
Feng Ji	Senior Environmental Specialist	Senior Environmental Specialist	GENDR
Xiaokai Li	Sr Water Resources Mgmt. Spec.	Sr Water Resources Mgmt. Spec.	GWADR
Gang Qin	Water & Sanitation Specialist	Water & Sanitation Specialist	GWADR
Dan Xie	Team Assistant	Team Assistant	EACCF
Songling Yao	Senior Social Development Specialist	Senior Social Development Specialist	GURDR
Ximing Zhang	Sr Water Resources Spec.	Team Lead	GWADR

Non Bank Staff					
Name		Title	City		
Charng Ning Chen		Flood Management Expert	Singapore		
Joseph Gadek		Senior Sanitary Engineer			
Wanshan Li		Wastewater Treatment Consultant	Shanghai		
Yan Sun		Social and Reresettlement Expert	Nanjing		
Yongli Wang		Environment/Safeguard Consultant	Shengyang		
Ning Wu		Finance Analyst	Beijing		
Locations					
Country	First Administrative Division	Location	Planned	Actual	Comments
China	Qinghai Sheng	Xining	X		

I. STRATEGIC CONTEXT

A. Country Context

1. With 20 percent of the world's population but only 7 percent of its freshwater, water scarcity is a major problem for sustainable urban development in China. Although China has the fifth largest endowment of fresh water resources, its per capita resources of 2,100 m³ are about one third of the global average of 6,000 m³ per capita annually. There is a strong disparity in its spatial distribution as 81 percent of China's water resources are concentrated in the region south of the Yangtze River, where 60 percent of the population lives; and only 19 percent is available to the 40 percent of the population in the north, where most of the major grain production is located, and in the west. Per capita water availability in the north is only about 900 m³ per year.¹ About two thirds of China's cities – 420 cities – are water short, of which 110 face severe shortages, with the annual deficit of 10.5 billion m³.

2. The main driver of water demand is the increase in consumption by a growing population, by agriculture, and by expanding water-intensive industries in the water-short north and west. Falling precipitation, possibly due to climate change, could also contribute to water shortages in some regions. Under current policies, demand increases are likely to continue and China's total water demand by 2030 is projected to rise by 61 percent above the 2005 level (2030 Water Resources Group 2009). Urban municipal and domestic use is expected to rise from about 12 percent of total demand in 2005 to 16 percent by 2030. However, the total amount of water use in China will be limited to 670 and 700 billion m³ by 2020 and 2030, respectively, according to the National Water Resource Master Plan (NWRMP) approved by State Council in December 2010.

3. In addition to water scarcity, problems are exacerbated by the growing pollution of rivers. While water quality in some of China's major river basins have shown small but steady improvement since 2001- due to investments in end-of-pipe controls for industry, the water quality in the northern basins is worsening. Forty percent of Chinese rivers were seriously polluted and unfit for drinking water in 2010, and the ground water quality in more than half of 200 cities surveyed were classified as "bad" (40.3 percent) or "extremely bad" (14.7 percent).²

B. Sectoral and Institutional Context

4. Xining Municipality is the provincial capital of Qinghai Province. The municipality lies in the eastern part of the province and has a population of 2.23 million people and total area of 7,649 km². Among the 2.23 million people, about 1.46 million (65%) live in urban areas. The municipal GDP has increased by 15% over 2010, and reached RMB 77.1 billion in 2011. The urban per capita income has reached RMB 15,842 in 2011, an increase of 12.5% compared to 2010. The rural per capita income is only RMB 6,634, but a 20.2% increase from 2010. The Xining GDP per capita in 2012 was RMB 38,534, which is about the average of the GDP per capita in urban areas in China, but one of the lowest among provincial capitals.

¹ China Water Resource Partnership Strategy. World Bank, 2013.

² "China's underground water in poor condition", Gov.CN (Chinese Government's Official Web Portal), May 10, 2012, http://english.gov.cn/2012-05/10/content_2134183.htm

5. Located in the Huangshui River Basin, and at the confluence of the Nanchuan and Beichuan Rivers, Xining is a city with a serious water resource shortage set of issues. The mean annual rainfall in this area is about 360 mm and the average ground elevation of the municipality is 2,260 m. The available water resources per capita is less than 600 m³ per year; which places Xining in the category of areas with severe water shortages based on international standards (500-1000 m³ per year). The estimated safe limit for water use in Xining Municipality is 479 million m³ per year, which would not cause any depletion or pollution of groundwater. However, the annual water consumption of Xining municipality is estimated to be 675 million m³ in 2012, an over withdrawal of 196 million m³. Based on data provided by the Provincial Hydrology Bureau and a water balance analysis, the water shortage in Xining is getting worse, and is projected to be 550 million m³ by 2020, and 615 million m³ by 2030.

6. The water environment conditions are declining, mostly due to increasing pollution from municipal water discharges, but also from increased industrial, and rural discharges. There are four major rivers in and around Xining Municipality, these are the: Huangshui, Nanchuan, Beichuan, and Shatangchuan Rivers. These are polluted to different extents by direct wastewater discharge, low carrying capacity of the river water, gully inflow with sediments rich in nutrients, and solid waste disposal into the rivers from local industrial and domestic sources. The water quality in the Beichuan and Huangshui Rivers in and around the Xining urban area are Classes IV and V, respectively, indicating that the rivers are highly polluted (refer to Annex 2 for the listings of classifications). In Huangshui River, the content of NH₃-N is over 1.5mg/l in the sections of Xiaoxian Bridge and Chaoyang Bridge, which is the legal limit for a Class IV river.

7. The provincial officials have recognized the problems and the multitude of costs (financial, environmental, etc.) associated with the rapidly deteriorating water quality in and around Xining Municipality. If left unchecked, the water quality and the quality of life in and around the river system would deteriorate leading to heightened dissatisfaction among the local populace and escalating costs of the inaction. Xining generates significant revenues and local employment as a result of its attraction to tourists, particularly in the summer months. Again, the provincial leadership has recognized this, and is responding to the situation by investing heavily in water pollution control measures.

8. In order to address the dual challenges of water shortage and increasing water pollution, the Xining municipal government plans to adopt an integrated water resources management strategy. The strategy includes interventions which promote water-savings and pollution reduction at the source, increase wastewater collection and effluent water quality from the wastewater treatment plants, and increasingly utilize the treated water as an alternative water source for non-portable uses. The proposed project will contribute to the implementation of this strategy and the municipal 12th Five-Year Plan (FYP) by focusing on water pollution reduction from municipal sources and increased reuse of wastewater in the Huangshui River basin.

9. The main government agencies involved in water resource and environmental management in Xining Municipality are: Xining Water Affairs Bureau (XWRB), Integrated Huangshui River Basin (Xining Section) Management Committee (IHRBMC), and Xining Environmental Protection Bureau (XEPB). These government agencies contribute to integrated

water resource and environmental management in the areas of coordination, information sharing policy making, planning, regulation, management , and operations based on their respective responsibilities assigned by the Municipal Government.

10. Based on the Provincial and Municipal 12th FYP, the Xining Municipality Urban Development Master Plan (2030), and the Integrated Management Plan of Huangshui River Basin (2011–2015), the Xining Municipal Government is strengthening its efforts to protect water resources, improve water use efficiency, enhance environmental adaptive capacity of the rivers, and limit pollutants discharged into rivers. To improve the overall water environment, the local government has been working on improved industrial water pollution management through the adoption and enforcement of more stringent pre-treatment standards, completing and upgrading domestic sewerage & storm water management, and limiting the potential silt and suspended solids washed down by storms from its large number of gullies, as well as the urban land surfaces, streets, and highways. The goal of the municipal government under the Urban Development Plan is to raise the quality of the rivers by 2030 in and around Xining from Classes IV and V to Classes III and IV.

11. This Project will complement large investments by Xining Municipality in building Wastewater Treatment Plants (WWTP). Currently there are 6 WWTPs in operation within the municipality with an aggregate design capacity of 260,000 m³/day. Another two WWTPs are under construction with a combined capacity of 60,000 m³/day and another 2 WWTPs are planned with a total capacity of 105,000 m³/day. All 9 WWTPs (with WWTP No. 2 to be taken out of service when WWTP No. 6 comes on line) will provide 382,500 m³/day of treatment and will achieve Class 1A or 1B treatment standard levels, in line with the Urban Development Plan to raise the water quality levels of the rivers to Classes III and IV. The total investments in these 9 WWTPs will be in the range of US\$500 million, showing the commitment of provincial and municipal authorities approach to improving water quality and addressing water scarcity issues in the municipality. To put this in perspective, approximately 61% of the urban wastewater is collected and treated currently, and this will move up to close to 100% in the next 5 years.

12. The Project will also complement the ongoing Bank financed Xining Flood and Watershed Management Project (XFWMP), which aims at improving the protection of property and safety of people from flood events and bring about sustainable utilization of land and water resources in Xining Municipality. The project is designed: (a) to increase flood protection and enhanced flood management; (b) improve wastewater collection rates; (c) improve soil and water conservation in catchment areas; and (d) strengthen institutions and build capacity of Xining Municipality to manage and protect water resources through pollution control. The XFWMP is making very good progress in helping the municipality to reach a protection standard for 1 in 100 years recurrence flood, and the municipal government seeks further support from the World Bank to better conserve its scarce water resources and protect the urban environment. The XFWMP became effective in November 2009 and is scheduled to be completed in December 2014.

C. Higher Level Objectives to which the Project Contributes

13. The new World Bank-China Country Partnership Strategy (CPS) 2013-2016 (Report No. 67566-CN) issued on November 6, 2012 is aligned with the challenges and priorities outlined in China's 12th Five-Year Plan. The CPS is also hinged on the recent joint study – “China 2030: Building a Modern, Harmonious, and Creative Society (China 2030)” – prepared by the World Bank and the Development Research Center of the State Council (DRC). Consistent with China's priorities, the CPS focuses on three main themes: (i) green growth; (ii) inclusive development; and (iii) mutually beneficial relations with the world. The project design is in line with the water resources development plan and water pollution control plan stated in the Xining Urban Development Master Plan (2030) and the Integrated Rehabilitation Plan of Huangshui River Basin (2011-2015).

14. The project will support to end extreme poverty goal and boost shared prosperity in Xining Municipality by providing WBG's value added in green growth, promoting more inclusive development, and innovative designs.

- Green growth: The project will focus on not only engineering aspects but also improving operation and maintenance (O&M) and monitoring and evaluation (M&E) to help Xining Municipal Government to enhance urban environmental services, including reclaimed wastewater treatment plants, wastewater collection and treatment systems, urban storm water management & riverbank environment restoration, and integrated gully erosion abatement.
- Promoting more inclusive development: Participatory approach was introduced for the project throughout the identification, preparation, design, implementation and operation and maintenance to enhance services and opportunities in Xining Municipality. The project is designed to integrate water quality (pollution reduction) and water saving/conservation strategies, and to coordinate water environment and urban development planning.
- Innovative designs: Technical standards for infrastructure investments have been reviewed carefully to confirm that appropriate design parameters and conservative population growth forecasts have been used. Low Impact Development (LID) practice has been applied in urban storm water and drainage management design. The integrated water and environmental management and LID application to urban storm water management will benefit the Bank's global knowledge and these experiences will be shared with other interested urban governments, in and outside of China.

II. PROJECT DEVELOPMENT OBJECTIVE(S)

A. PDO

15. The development objective (PDO) of the project is to reduce water pollution and pilot potential sustainable reuse of wastewater in Xining Municipality.

16. The PDO will be achieved by: (a) construction of an expanded stormwater and wastewater collection systems; (b) comprehensive stormwater management and river-bank

environment restoration; (c) integrated gully and canal improvements; (d) the demonstration of treated wastewater reuse; and (e) technical assistance and capacity building in integrated water resources and environmental management.

Project Beneficiaries

17. The direct beneficiaries of the project are the 319,000 residents in the suburban areas of Chengbei, Chengxi and Chengdong districts, of whom about 50% are women. Integrated gully and canal improvement, LID for storm water management, and riverbank environment restoration and management will benefit the general population of Xining municipality. The restoration of degraded areas will lead to an appreciation in property values and increase in commercial activities, which will provide increased employment opportunities for the local population. Indirectly, through reduction of pollution, the entire municipal population of 1.46 million Xining urbanites will benefit from the macro improvements in the urban environment.

PDO Level Results Indicators

18. Achievement of the PDO will be monitored through a set of PDO-level Results Indicators and Intermediate Results Indicators for each project component. The PDO-level Results Indicators include the: (a) direct project beneficiaries; (b) volume (mass) of Biochemical Oxygen Demand (BOD) pollution load removed by treatment plant under the project; (c) volume (mass) of Chemical Oxygen Demand (COD) pollution load removed by treatment plant under the project; (d) reduction of Total Suspended Solids (TSS) load flowing into the river systems; and (e) volume of treated wastewater reused (see Annex 1 on results framework and monitoring).

III. PROJECT DESCRIPTION

A. Project Components

19. The project will be implemented over a period of five years and will finance priority investments in Xining Municipality. The project will consist of the following five components with a total estimated project base cost of US\$237.5 million and total financial required USD\$246.6 million, including an International Bank for Reconstruction and Development (IBRD) loan of US\$150 million: (a) construction of stormwater and wastewater collection systems; (b) comprehensive stormwater management and river-bank environment restoration; (c) integrated gully and canal improvement; (d) demonstration of treated wastewater reuse; and (e) project management and capacity building. Annex 2 shows the detailed project description. Annex 7 shows the map of the project activities.

20. **Component A: Construction of stormwater and wastewater collection systems (estimated cost US\$139.8 million).** This component will reduce water pollution by construction of 128 km of wastewater and rain water collection pipes along rivers and urban wastewater distribution networks, including (i) construction of 34 km of stormwater and wastewater collection pipes (DN800-DN1000) from Datong Wastewater Treatment Plant to Ningda Road toll gate along Beichuan River for No. 5 Wastewater Treatment Plant; and construction of 16 km of stormwater and wastewater collection pipes from Yangjiawan Village to Duoba along

Xichuan River for No. 4 Wastewater Treatment Plant; and (ii) construction of 34 km of wastewater collection pipes for No. 3 Wastewater Treatment Plant, and the affiliated access road and other urban facilities , and construction of 44 km of stormwater collection pipes in Beichuan Area.

21. Component B: Comprehensive stormwater management and river-bank environment restoration (estimated cost US\$35.9 million). This component will apply “Low-Impact Development” strategies, greening and landscaping, to increase natural infiltration and reduce peak run-off and non-point source of pollution to Beichuan River. The targeted area is a core urban area but with no sound wastewater collection system and no environmental protection facilities. Many of the river banks have been turned into waste disposal sites with building rubble, waste soils, and garbage being dumped causing serious pollution inflows to the Beichuan River during the rainy season, particularly during the first sets of heavy rains. A systematic approach is being adopted to treat this area through a set of project activities including (a) LID storm water management in Beichuan Area; and (b) River-bank environment restoration along the banks of Beichuan River. Typical LID features, such as increased vegetation covers, vegetative swales, bio-retention basins, permeable pavements, and water re-use, will be incorporated into the storm-water management and rainwater harvesting system. These investments are in line with the recent directives issued by the Ministry of Construction (MOC) that requires the introduction of “low impact development” (LID) strategies to manage stormwater when possible. Typical stream-bank restoration work includes residue soil cleaning, and planting of diversified native vegetation along stream-banks; construction of porous walk path, access roads and green byways; installation of lighting systems, environment sanitation facilities, greening of the water supply catchment areas; and other environmental amenities. This will further enhance the water quality in the receiving water body of Beichuan River.

22. Component C: Integrated gully and canal improvement (estimated cost US\$28.7 million). This component will stabilize gully/canal bank slopes and reduce BOD, COD, and TSS discharge into surface water by improving the environment along canals and gullies. The main project activities include (i) integrated improvement of 10.4 km Chaoyangdian Canal with wastewater collection pipes, access road, affiliated structures and environment sanitation facilities; (ii) integrated improvement of 0.9 km Liujia Gully with channel normalization, slope protection, and box culvert construction; and (iii) integrated improvement of 0.9 km Shengou Gully with canal normalization, slope protection, wastewater collection pipe construction, and environment sanitation facilities.

23. Component D: Wastewater reuse (estimated cost US\$1.8 million). This component will pilot the reuse of treated wastewater by construction of a transfer station and pipes, as well as Technical Assistance (TA) in the areas of reclaimed wastewater policies and technologies. The project activities will include: (i) construction of treated wastewater pumping station and affiliated monitoring facilities with a capacity of 5,000 m³/day at No.5 Wastewater Treatment Plant (under construction, to be commissioned in 2014) and approximately 5 km of water transmission pipes; and (ii) technical assistance for study on economy and policy schemes for stimulating reclaimed wastewater reuse, and study on impact of reclaimed wastewater reuse on domestic soil and vegetation. This component is important to the province and municipality in taking the lead in the determination of the most cost effective methods of reclaiming water in

such a water scarce region. With the ever widening gap between water resources and water demands in this region, it is extremely important to assist the municipality in developing its roadmap towards water reclamation and reuse, in line with the 2030 objectives set out in the Urban Development Strategy.

24. **Component E: Project management and capacity building (estimated cost US\$31.3 million).** This component is intended to improve Xining’s capacity in integrated water environment management. This component includes (i) project management activities: construction supervision, and Management Information System (MIS); (ii) consulting services: study on Monitoring and Evaluation (M&E); technical support on integrated water and environmental management, reclaimed wastewater policies, regulations and technical issues; and technical and management workshops ; and (iii) domestic and overseas training and study tours.

B. Project Financing

Lending Instrument

25. The proposed lending instrument for this project is an Investment Project Financing (IPF). The Borrower has selected a US Dollar denominated, commitment-linked variable spread loan based on six-month LIBOR plus an additional variable spread. It has also selected all available conversion options, annuity repayment of principal, and a repayment period of 30 years, including a 5-year grace period.

Project Cost and Financing

26. Project costs are estimated at US\$246.6 million, inclusive of price and physical contingencies, interest during construction and front-end fee. The project will be financed by the proposed IBRD loan of US\$150 million (about 61% of total project cost) and local counterpart funding of US\$96.6 million from financial budget of Xining Municipal Government (XMG). Table 1 shows the project cost allocation among different project components.

Table 1: Project cost and financing plan by components (in US\$million)

Components	Total		IBRD		IBRD/ Total
	US\$ m	RMB m	US\$ m	RMB m	%
1. Construction of stormwater and wastewater collection systems	139.8	852.6	100.6	613.7	72
2. Comprehensive Stormwater management and river-bank environmental restoration	35.9	219	25.8	157.6	72
3. Integrated gully and canal improvement	28.7	175.2	20.6	125	71
4. Demonstration of treated wastewater reuse	1.8	10.8	1.5	9	83
5. Project Management and Capacity Building	31.3	191.4	1.2	7.4	4

Total project base cost	237.5	1449	149.6	912.7	63
Interest During Implementation	8.7	52.9	0	0	0.0
Front-end fees	0.4	2.3	0.4	2.3	100.0
Total financial required	246.6	1504.2	150	915	61

C. Lessons Learned and Reflected in the Project Design

27. The project design has benefited from experiences and best practices on water environment development in China and from similar projects in Latin America and Caribbean, Africa, and Europe and Central Asia Regions. Three key lessons were applied based on actual social, economic and technical conditions of Xining Municipality.

28. The first is application of participatory approach in integrated gully and canal management. Water environmental management in rural areas is usually difficult especially in western China. In the Bank financed Xining Flood and Watershed Management Project in China and Odra River Basin Flood Protection Project in Poland, the participatory approach has been successfully applied and practiced. The approach was introduced for the project throughout the identification, preparation, design, implementation and operation and maintenance (O&M).

29. The second is forcing on not only engineering aspects but also O&M and monitoring and evaluation (M&E). The experiences from the Bank financed Brazil Espirito Santo Water & Coastal Pollution Project in these areas have been applied in working closely with the PMO and design institute (DI) to provide assistance to bring about such aspects into the design of the project components and preparation of the feasibility study report (FSR). Consulting services have also been incorporated into the project to ensure the PMO has specialized professional assistance during implementation. PMO also has designated staff responsible for project monitoring and evaluation.

30. The third is using appropriate design standards for infrastructure components. Overly optimistic forecasts for economic and population growth often result in overdesign of infrastructure facilities and eventual over capacity. Lessons from the Bank financed Cameroon Sanitation APL Project have been applied in providing and defining technical standards for infrastructure investments to confirm that appropriate design parameters and conservative population growth forecasts have been used.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

31. Xining Municipality Project Leading Group (PLG), chaired by the Mayor of Xining Municipal Government and composed of senior officials from relevant government agencies, has been established to provide strategic leadership and policy guidance for the project. A project

management office (PMO) set up under the Integrated Huangshui River Basin (Xining Section) Management Committee is operational to undertake project management and coordination. Also two Project Implementation Units (PIUs) based in two publicly owned companies: Xining Municipal Drainage Development and Construction Company and Xining Municipal Huangshui Investment Management Co., Ltd. have also been established under the leadership of the PMO. Many key officials of the PLG and PMO are coming from the ongoing Xining Flood and Watershed Management Project.

32. In addition, an official agreement between the PIUs and Xining Municipal Government would be signed to stipulate the duties and responsibilities of the PIUs.

33. ***Project Expert Panel (PEP)***. An Expert Panel has been set up to support the PMO in quality control and project management. The PEP would be composed of technical experts, environmental expert, financial management expert, forestry management expert, procurement expert, etc. Main functions of the PEP include: design review, bidding documents review, preparation of project work programs and reports, oversight of construction supervision engineers' performance, and other pertinent technical and management assistances to the PMO and PIUs.

B. Results Monitoring and Evaluation

34. A result-based monitoring and evaluation system (M&E) will be developed and established under the project, and implemented by Xining Municipal Project Management Office. The M&E system includes a Management Information System (MIS), and a reporting system. The project MIS will be developed by the PMO, and installed in the PMO and all PIUs for physical and financial progress reporting.

35. The MIS will be consolidated at the provincial level and provided to the Bank in semi-annual periodic reports. The system will include a database for overall project outcome or PDO indicators and intermediate outcome indicators for each component. The PMO will provide progress reports to the Bank (using the MIS) twice a year (by February 15 and August 15). The M&E report will include the agreed key outcome and output indicators, in coordination with financial and physical progress reporting. Project implementation reports include the semi-annual project progress report, the annual overall project M&E report, the Mid-term Review (MTR) report and the Implementation Completion Review (ICR) report. Special technical M&E reports include the environmental monitoring and evaluation report, the social evaluation report, and the resettlement monitoring and evaluation report. Annex 3 shows the detailed project implementation arrangement.

C. Sustainability

36. To enhance sustainability of the project investments and beyond, the following measures will be undertaken as part of the project design:

- a. *Technical & economic aspects:* The design of each component and major sub-projects will be optimized to ensure technical robustness and cost effectiveness (life-cycle cost) .

Similarly, interventions with financial revenue such as the treated water reclamation operation should be designed in such way to be able to meet the water quality and supply reliability requirements of different users at a least total cost ;

- b. *Institutional arrangements:* One of the two major implementation and Operation and Maintenance (O&M) entity, Huangshui Investment Company is not a technical organization while the project facilities span cross different sectors. Therefore, this company plans to set up a technically competent team to manage the project facilities, and a cross-sectoral collaboration mechanism be set up to ensure proper functions of those facilities such as Liujia Gully and Chaoyang Canal. Further, participatory management arrangements will be made for dealing with solid and construction waste disposal in project areas;
- c. *Financial sustainability:* the water reclamation operations under the project are expected to be managed by the respective WWTPs. To ensure the water reclamation operation is financially viable, Xining municipal government should ensure that the reclaimed wastewater tariff is able to cover the O&M costs and the required asset depreciation, etc., and that the required water supply agreements are signed between WWTPs and user entities, and the revenue collected goes to the respective WWTPs.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

Risk Category	Rating
Stakeholder Risk	Moderate
Implementing Agency Risk	
- Capacity	Moderate
- Governance	Moderate
Project Risk	
- Design	Substantial
- Social and Environmental	Substantial
- Program and Donor	Low
- Delivery Monitoring and Sustainability	Moderate
- Other (Optional)	
- Other (Optional)	
Overall Implementation Risk	Substantial

B. Overall Risk Rating Explanation

37. The overall project implementation risk is rated Substantial. The main risks identified by the task team are (i) the potential improper implementation of safeguards polices, particularly the social/resettlement plans that will result in negative impacts on affected people; (ii) the slow counterpart funds allocation; (iii) potential poor project preliminary design and detail design; and (iv) rapidly changing government development plans which might affect the outcomes of the project. Appropriate mitigation measures have been included in the project design to manage implementation risks. During project implementation, these risks will be carefully monitored and mitigated.

VI. APPRAISAL SUMMARY

A. Economic and Financial (if applicable) Analysis

Economic Analysis

38. For components of wastewater collection, integrated gully improvement and stormwater management and river-bank environmental restoration, a least-cost analysis or Cost-effectiveness Approach (CEA) was adopted to compare alternatives and select the best design options to strive for the achievement objective. For the promotion of treated wastewater re-use component, quantitative cost-benefit approach was applied (see Annex 6 for details).

39. ***Cost-Benefit Analysis for Demonstration of Water Reuse for Reclaim Water component.*** Economic analysis was performed not only to determine the efficiency of use of investments but also to see the economic viability of the projects. The costs were based on the costs for investments and operation and maintenance of the demonstration of water reuse for reclaim water. Investment costs are based on market prices of existing contracts in the region excluding taxes and duties and transfer payments. Benefits are derived from the tariff multiplied by the quantity of reclaim water supplied for the afforesting and for the municipal miscellaneous water wastewater treated. The startup period is for 3 years when water flows have to be built up to 100%. The cost-benefit analysis indicates that Economic Internal Rate of Return (EIRR) of the Demonstration of Water Reuse for Reclaim Water component will be 19.1%, providing a Net Present Value (NPV) of RMB 3.22 million Yuan. The component will be economically viable. Sensitivity analysis shows that EIRR would be 12% under assumption of 10% decrease in economic benefits and 10% increase in total costs; hence the investment is economically robust.

Financial analysis

40. The Financial Analysis was carried out to assess the financial sustainability of the project. Except for the treated wastewater reuse component, this project is a non-revenue generating project. Therefore, the financial analysis of the project focuses on fiscal impact of the project on the finance of Xining Municipal Government (XMG).

41. Based on the past years performance, XMG's future fiscal revenues were projected and compared with its contribution to the project. The results of the comparison show that the highest contribution of the project to the total revenues of the city will be in the second year, when it will reach 3% of that year's revenues. Table 2 presents the results of those comparisons between XMG's contribution and its fiscal revenues. It shows that the contribution by XMG to the project has no significant impact on its fiscal revenues. However, the Task Team identified the risk that the counterpart funds may not be provided in a timely manner.

	RMB million						
	2014	2015	2016	2017	2018	2019	2020
Total Fiscal Revenues	3,513	4,051	4,625	5,228	5,854	6,495	7,115
XMG's Contribution to the Project	60	120	120	120	120	49	–
% of Contribution to Total Revenues	1.7	3.0	2.6	2.3	2.0	0.8	0

Table 2: Fiscal Revenue Projection for Xining Municipal Government, 2014-2020

42. The sewers and rain storm pipelines created under the project will be transferred to Xining Municipal Drainage Development and Construction Company (XMDDCC) for O&M.

43. XMDDCC's main business is to operate and maintain the sewers and rain storm pipelines which have a total length of more than 850 km by the end of 2013. These O&M of sewers and rain storm pipelines are financed by XMG's fiscal budget. The annual fiscal budget allocation to XMDDCC for O&M of sewers and rain storm pipelines are summarized in Table 3.

Table 3: Summary of XMG's Fiscal Allocation to XMDDCC for O&M of Sewers and Rain Storm Pipelines

	RMB				
	2008	2009	2010	2011	2012
Fiscal Budget Allocation	3,000,000	5,500,000	6,200,000	5,640,000	7,900,000

44. XMG will be responsible for the debt service and additional O&M expenses of the project, except for the reclaimed water sub-project. The annual O&M expenses were assumed 1% of physical value of assets created under the project, which is about RMB800.87 million. Table 4 presents the impact of debt service and O&M expenses on XMG's fiscal revenues. In general, the annual requirements for XMG's fiscal revenues for debt service and incremental O&M expenses are less than 1% of total annual fiscal revenues. There is no any negative impact on XMG's finances.

Financial Analysis of Reclaimed Water Subproject

45. The financial analysis and sensitivity analysis were conducted for reclaimed water subproject. The Financial Internal Rate of Return (FIRR) of the reclaimed water subproject is 8.9%, which is greater than Weighted Average Cost of Capital (WACC). The results of the sensitivity analysis by reducing total revenues by 10% and increasing capital and operating costs by 10%, still show a FIRR of 6.2%.

B. Technical

46. ***Construction of stormwater and wastewater collection system.*** Wastewater interception systems along the Xichuan and Beichuan Rivers: the wastewater interception systems (Xichuan upstream interception system and Beichuan upstream interception system) are being designed to collect wastewater generated from villages and small towns in and around Xining Municipality. There is currently no wastewater collection systems in these villages and small towns. The wastewater generated is being discharged into neighborhood open drainage channels or nearby irrigation canals. These are subsequently discharging to these two main rivers at points identified in the Feasibility Study Report (FSR). These are the points at which the wastewater from the neighborhoods will be collected into the interceptors and conveyed to the respective wastewater treatment plants.

47. The design of these wastewater interceptors has been made on the bases of the following based upon criteria: (a) it has to be able to collect the wastewater generated from these villages and towns for treatment in dry season; (b) it has to be able to collected storm water, which is heavily polluted, in the wet season from these villages and towns for treatment in order to limit the potential impact of storm water to local river quality; and (c) it has to be able to meet the future wastewater management demand of these areas, which are suburban areas of Xining central urban area, and could be urbanized in the near future; At this stage, overflow structures will be installed at the interception points of each existing natural drainage ditches in order to limit overflow of pollutants to local river in the wet season; and pipes with large diameters will be installed for the purpose of: a, conveying large portion of combined wastewater to wastewater treatment plants downstream in order to limit the potential pollution to local river; b, meeting with the large wastewater flow generated in these areas in the near future.

48. ***Comprehensive stormwater management and river-bank environment restoration.*** An innovative approach has been proposed for collecting and discharging the stormwater into Beichuan River nearby with treatment by low impact development (LID) practice. The LID approach has begun to be widely practiced in many parts of the world over the past few decades as a cost effective way of improving storm-water management. Typical LID features, such as increased vegetation covers, vegetative swales (esp. for highway and road side drainage), bio-retention and solids settling basins, permeable paving blocks (for parking, driveways and walk paths), and water re-use, are all incorporated into the overall storm-water management and rainwater harvesting system. Utilizing the flow retention, infiltration, filtering and evapo-transpiration capacities of the soil and vegetation, the LID practice is able to reduce the storm runoff and pollutants from the source areas- mimicking the natural hydrologic process of the watershed. The experience gained from this pilot township development project on LID practice could be applied to future storm-water drainage designs in other parts of the City and beyond utilizing other sources of municipal financing.

49. In addition to the application of LID to stormwater management in the core urban area of Beichuan Area, the stream-bank areas adjacent to both banks of the Beichuan River will also be restored. Typical stream-bank restoration work includes residue soil cleaning, and planting of diversified native vegetation along stream-banks; construction of porous walk path, access roads and green byways; installation of lighting systems, environment sanitation facilities and other

environmental amenities. This will further enhance the water quality in the receiving water body of Beichuan River.

50. ***Integrated gully and canal management.*** The proposed integrated gully improvement component is aimed to address problems associated with (i) the environment, (ii) pollution from solid waste and wastewater, (iii) sediment /debris from erosion, scour, and slope failures of the gully channel and banks, and (iv) flash flood. Silt or sediment loadings to the river systems from the upstream of the gully is not considered here as it is treated under other activities or project. The works proposed are located in the downstream section of the gullies, within the urban areas. It consists of upgrading the existing streams into environmentally sound channels . In Chaoyangdian canal, the canal cross-sections will be re-designed for reduced canal flow. There are additional construction of wastewater collection pipe, access roads, slope protection and affiliated facilities. In Liujiagou Gully, the channel design consists of 0.9 km of box culvert section connecting to the box culvert designs at both upstream and downstream ends of the project limit. In Shengou gully, only open channel is proposed. Both gully sections involve additional construction works on slope protection and wastewater collection pipes. For the sustainability of the environmental protection work, a community participatory approach for environmental management has been introduced to the client, including “hardware” and “software”. The client has accepted this somewhat new approach to environmental management based on reviews of regional and international best practices.

C. Financial Management

51. The Bank loan proceeds, including overseeing the Designated Account, will be managed by Qinghai Provincial Finance Bureau. The PMO will be responsible for overall coordination and project management, detail implementation including contract payments will be managed by two state owned companies, Xining Municipal Drainage Development and Construction Company (XMDDCC) and Xining Municipal Huangshui Investment Management Co., Ltd (XMHIM). A financial management capacity assessment has been conducted by the Bank and actions to strengthen the project’s financial management capacity have been agreed with the relevant implementing units. The FM assessment has concluded that with the implementation of these propose actions, the financial management arrangements will satisfy the Bank’s requirements under OP/BP 10.00. FM risk is rated moderate. Annex 3 of the PAD provides additional information on financial management.

52. Retroactive financing of up to US\$15 million would be available for eligible expenditures incurred on and after March 1, 2014. Retroactive financing will be processed according to the requirements specified in the loan agreement and project agreement.

D. Procurement

53. A two-layer procurement management system was set up under the project. The PMO setup in Huangshui River Integrated Management Committee will be in charge of overall procurement management of the project. The two PIUs, one at the XMDDCC and the other at the XMHIMC will take charge of implementing respective components under the project. Competent procurement staff have been appointed at both PMO and PIU level.

54. Although this is the first Bank-financed project to be implemented by the PMO established at Huangshui River Integrated Management Committee, it is the third Bank-financed project to be implemented by XMG. The first one is Xining Flood and Watershed Management Project (P101829), which has been under implementation since 2009. In general, the procurement work carried out by the PMOs set up at the Xining Water Affairs Bureau (XWAB) and water affairs departments of the three project counties have been implemented smoothly and in accordance with the Bank's procurement policies and requirements. It is notable that the local bid evaluation committees have been pragmatic and have respected the Bank's procurement requirements and have understood the differences between the Bank's procurement policies and procedures and the domestic regulations and practices. In sum, from the procurement perspective, the working style of the XMG is conducive to an effective and efficient implementation of Bank-financed projects. The second one is the newly approved Qinghai Xining Urban Transport Project (P127867), which is to be managed and implemented by Xining Construction Commission.

55. The primary procurement risk identified is the lack of Bank procurement experience. Procurement risk is rated moderate. This will be mitigated through the following measures: (i) preparation of a procurement management section in Project Implementation Plan (PIP) stating roles and responsibilities of PMO and PIUs, procurement cycle management and contract management measures, etc.; (ii) selection of a qualified and experienced procurement agent; (iii) provide training to PMO and PIU staff on Bank procurement policies and requirements. Based on the design prepared and project activities proposed in the feasibility study, a Procurement Plan covering procurement activities of the first 18 months of project implementation was prepared by the PMO. The Bank team reviewed it and found it acceptable.

E. Social (including Safeguards)

56. The project will generate environment benefit for the citizens and promote social and physical capital of the citizens. However, the project probably results in some adverse impacts such as land acquisition and resettlement will be entailed by construction of the above activities, and further social disturbance during construction period, etc. In some project areas, there are ethnic minority villages which might be impacted by the project. Although most project activities are located in urban Xining city, a few ones will and would go to Datong and Huangzhong counties, where there are ethnic minority villages. Both the Involuntary Resettlement (OP 4.12) and Indigenous People Policies (OP 4.10) were triggered, and an Ethnic Minority Development Framework (EMDF), a Resettlement Plan (RP) were prepared. Further, potential resettlement impacts from some sewers and stormwater pipes cannot be determined at this stage and so a Resettlement Policy Framework (RPF) was developed. The SA was prepared in order to understand the social environment in the project area, identify potential social risks and the corresponding mitigation measures.

57. All the documents were reviewed by the Bank TT several times and the final draft versions are found compliant with the Bank requirements and relevant policies. The RAP, RPF and EMDF were disclosed in Xining on December 18, 2013 and the Bank's Infoshop on December 24, 2013.

58. ***Involuntary Resettlement OP4.12.*** The four project components involve physical activities, which need land acquisition and/or resettlement. The activities consist of construction of reclaimed water plant, roads, installation of sewers and reclaimed water pipe, rehabilitation of river bank, as well as treatment of some gullies. Furthermore, five activities, linking to the project, entail land related issues. Measures to avoid or minimize resettlement impacts were adopted in the project preparation stage, including pipe-jacking technology to avoid house demolition, staged sewer/pipe installation to minimize the scope and duration of construction disturbance, utilization of unused land to avoid farmland use, etc. The four project components involving physical activities which need land for construction. Components 1 and 3 will require land acquisition; while Components 2 and 4 will use land acquired in linked activities. The project will require the permanent acquisition of 2.4 mu of land and temporary use of 403 mu of land, but will not involve the demolition of any house or other structure. However, there are five linked activities consisting of No.3, 4 and 5 WWTPs, Yinjiagou Landfill and Beichuan Plot Development Project, which have resulted in permanent land acquisition of 3,615 mu of land, impacting 6,761 persons, and the relocation of 1,348 households with 6,495 persons. As for the resettlement related issues under the five linkage activities, due diligence review was conducted and documented in the Annex 2-4 of the RP, which concluded that four of the five activities have generally completed the resettlement in a satisfactory way, and only one, Beichuan Plot Development Project, is implementing the resettlement. For Beichuan, implementing resettlement, a standalone external resettlement monitoring report was prepared particularly, which in details stated the implementation progress, compensation rates, participation process and clearly concluded that the implemented resettlement is satisfactory so far.

59. ***Monitoring and grievance redress arrangement.*** A monitoring mechanism, consisting of internal and external monitoring, was designed and agreed in the RP, including contents such as institutional arrangement, monitoring indicators/frequency, monitoring report format etc. On the ongoing resettlement under one linkage activity, the external monitoring work has already started and will be continue in the next stage. Furthermore, a complete grievance redress system for the resettlement process was designed in the RP, with elements such as responsible agencies, contact information, etc.

60. ***Ethnic Minority.*** There are ethnic minority villages in the project areas, especially in the suburb of Xining City. Specific locations of such activities as some sewers in the area are not clear or subject to change in the next stages. The particular impacts on any ethnic minority villages could not be identified at this stage. Therefore, an EMDF was prepared to guide any possible EMDP in the project implementation.

61. ***Gender Issues.*** The stand-alone SA shows that there is a significant division of labor in domestic wastewater and solid waste disposal. 87% of those pouring domestic wastewater are women (57% elderly and 30% young), and 73% of those dumping solid waste are women (45% elderly and 28% young). This shows that women play an important role in domestic wastewater and solid waste disposal. Therefore, more attention should be paid to attitudes, needs and suggestions of women, especially elderly women, in project activities. The SA identified demand of and impacts/risks on women in the project construction and operation, and prepared an action plan on women issue by consulting with the Xining PMO, PIUs, women's federation and

agencies concerned. The action plan considered promoting women's participation and development, and includes provision of employment opportunities for women, right protection for women in resettlement process and provision of lighting and other facilities in the project for women.

62. **Other social issues.** The SA focused on evaluation on affordability of wastewater fee, among others. The evaluation indicated water related fee takes up about 1.56 percent of average household income, which is affordable, but for poor households the percentage is about 2.44. Therefore the SA recommended that subsidies for poor households should be maintained after the project by Xining Municipality, and the PMO should ensure to follow up this issue in the project implementation stage

F. Environment (including Safeguards)

Environmental

63. The project is classified a Category A project, and triggers Environmental Assessment (EA) (OP4.01) and Pest Management (OP4.09). EA and Environment Management Plan (EMP) have been prepared in accordance with Chinese EA regulations and the Bank Safeguards Policies.

64. **Environmental Assessment(OP4.01):** There is no ecological sensitive or culturally sensitive site in the project area of influence. The EA include analysis on construction related impacts, operational impacts, potential risks, cumulative and indirect impacts. The project will bring about overall environmental and social benefits, such as (i) leading to the reduction of sediments and pollution loads discharging into Huangshui River; (ii) conserving water resources by the use of reclaimed water; (iii) reducing non-point sources pollution by the application of LID practices; and (iv) contributing to the improvement of public health and visual quality. With respect to the cumulative impacts, the project itself is a set of mitigation measures to address the existing environmental problems in Xining. Key Valued Ecosystem Components(VECs) under consideration include water quality and water resources. The EA determines that the project will not adversely affect these VECs, but alleviate the pollution discharged to the rivers.

65. The construction related impacts will be short-term, temporary and site-specific, and can be readily managed with good construction management practices. Adverse impacts during operation mainly include traffic noise nuisance, vehicle emission, and road safety associated with the newly built roads. The improvement of environment and infrastructure may increase land value, and accelerate urbanization process in the project areas, especially the Beichuan Area. Risk assessment covers leakage of sewer pipelines, and road safety, but these risks are minor. The pilot use of reclaimed water may have some concerns on public health, soil salinization, toxicity of heavy metals, and nutrients overload into groundwater. But these impacts are not considered significant and can be effectively reduced to acceptable levels through good design and specific mitigation measures proposed in the Environmental and Social Management Plan (ESMP), including that (i) the reclaimed water will be used for watering the areas along the newly built roads; (ii) potential negative impacts will be mitigated to an acceptable level by adopting the well-proven wastewater treatment technology for the WWTPs and by equipping

with disinfect units; (iii) the WWTP effluent will meet strict water quality standards (e.g. TP, TN, TDS) after disinfection; (iv) a specific TA activity –impacts of reclaimed water on soil and vegetation is included in the project; and (v) monitoring on the effect of the reclaimed water on the soil and vegetation is included in the ESMP. The above arrangement is considered adequate to address potential adverse impacts. As part of the EA process, due diligence for the existing WWTPs and WWTPs under construction have been conducted confirming that these WWTPs and their sludge disposal at the existing Yinjiagou Sanitary Landfill are in compliance with the Chinese regulations.

66. Alternative analysis has been conducted in the EA and the feasibility study, including storm water treatment options, the scale of reclaimed water facility, and the “without-project” situation.

67. A stand-alone Environmental and Social Management Plan (ESMP) has been developed, including that (i) Environmental Code of Practices (ECOPs) for civil work contractors will be included into the bidding documents and civil work contracts; (ii) LID practices for storm water management and road safety design have been included in the design; (iii) the induced impacts such as waste and wastewater generated in the Beichuan Area have been taken into account, and installation of sewers, storm water pipelines, garbage bins and public toilets etc. are included in the project design. The land use plan for Beichuan area has been updated and approved by local government.

68. *Pest Management (OP4.09)*. The re-vegetation of Beichuan River Bank and the gullies likely result in the use of pesticides, although none will be procured as part of the project. A Pest Management Plan, as part of the ESMP, has been developed. The project will (i) be vegetating the areas using non-invasive species; (ii) promote the use of biological or environmental control methods; and (iii) improve local capacity to apply knowledge to minimize the usage and to properly apply pesticides.

69. ESMP implementation will be managed by Xining PMO. An environmental and social management unit will be established in the PMO with dedicated safeguards staff. Civil work contractors and supervision companies will be required to assign qualified environmental staff to their team to ensure effective implementation of the ESMP. PMO, under assistance of on-site environmental supervisors, local Environment Protection Bureau (EPB) and external monitoring institution, will supervise the implementation of ESMP. To improve local capacity, the ESMP proposes capacity training activities for civil work contractors, PMO, environmental supervisors, and monitoring institutions etc.. The ESMP also specifies monitoring plan, environmental supervision and the budget for the ESMP implementation.

70. During the EA preparation, two rounds of public consultation were undertaken: the first round at the beginning of EA preparation (EIA TOR) in May 2013, and the second round in September 2013 after the first draft EA and ESMP were prepared. Consultations were carried out through questionnaires, interviews and meetings with project affected people, experts, and governmental agencies. Main feedback and concerns from the public have been addressed in the project design and the ESMP’s mitigation measures. In accordance with the Bank’s information disclosure policy, prior to project appraisal, the latest safeguards documents, including EA and

ESMP, were made available in the project areas (e.g. village committees) and are accessible at PMO. The documents were disclosed on the website of the Xining municipal government on December 5, 2013, and at the Bank's InfoShop on December 27, 2013.

Annex 1: Results Framework and Monitoring

China: Qinghai Xining Water Environment Management Project (P133116)

Project Development Objective (PDO): The Project Development Objective is to reduce water pollution and pilot potential sustainable reuse of wastewater in Xining Municipality.													
PDO Level Results Indicators	Core	Unit of Measure	Baseline	Cumulative Target Values						Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (indicator definition etc.)
				2014	2015	2016	2017	2018	2019				
1. Direct project beneficiaries	<input checked="" type="checkbox"/>	1,000 Person	0	78	231	286	302	319	319	Once a year	Design and actual Data	IHRMC	By independent consultant
2. Volume(mass) of BOD pollution load removed by treatment plant under the project	<input checked="" type="checkbox"/>	Ton/yr	0.00	79	375	544	691	727	727	Once a year	Design and actual Data	IHRMC	By independent consultant
3. Volume(mass) of COD pollution load removed by treatment plant under the project	<input checked="" type="checkbox"/>	Ton/yr	0.00	253	1011	1167	1689	1767	1767	Once a year	Design and actual Data	IHRMC	By independent consultant
4. Reduction of TSS load flowing into the river systems	<input type="checkbox"/>	Ton/yr	0.00	279	521	529	882	985	985	Once a year	Design and actual Data	IHRMC	By independent consultant
5. Volume of treated wastewater reused	<input type="checkbox"/>	1,000 Ton/yr	0.00	0	0	174	694	868	868	Once a year	Data collected on site	IHRMC	By supervision engineer
INTERMEDIATE RESULTS													
<i>Intermediate Result Indicators : Construction of Wastewater Collection Systems</i>													
6. Rainwater and wastewater collected by the completed collection system per day	<input type="checkbox"/>	Million m ³ /day	0.00	6.37	22.17	27.58	28.95	29.73	29.73	Once a year	Data collected on site	IHRMC	By supervision engineer
7. Reduction of NH3-N load flowing into the river systems	<input type="checkbox"/>	Ton/yr	0.00	28	97	84	146	151	151	Once a year	Design and actual Data	IHRMC	By independent consultant
<i>Intermediate Result Indicators: Comprehensive stormwater management and river-bank environmental restoration</i>													
8. Decrease of soil erosion flowing into river per year.	<input type="checkbox"/>	Ton/yr	0.00	337	1826	2880	2880	2880	2880	Once a year	Data collected on	IHRMC	By staff

											site		
9. Decrease of storm run-off per year	<input type="checkbox"/>	1,000 m ³ /yr	0.0	40	130	210	310	390	390	Once a year	Data collected on site	IHRMC	By staff
Intermediate Result Indicators: Integrated Gully and Canal Improvement													
10. Percentage of gully and canal improvement	<input type="checkbox"/>	%	0.00	6	15	49	100	100	100	Once a year	Data collected on site	IHRMC	By supervision engineer
11. Percentage of environmental and sanitation facilities installation along gully and canal	<input type="checkbox"/>	%	0.00	6	15	49	100	100	100	Once a year	Data collected on site	IHRMC	By supervision engineer
Intermediate Result Indicators: Promotion of treated wastewater reuse													
12. Percentage of TA progress	<input type="checkbox"/>	%	0.00	0	37	76	98	100	100	Once a year	Data collected on site	IHRMC	By supervision engineer
Intermediate Result: Project Management and Institutional Capacity Building													
13. Number of PMO staff trained	<input type="checkbox"/>	Person	0	14	78	108	158	158	158	Once a year	Data surveyed in the PMOs	IHRMC	By Bank SPN Mission

Annex 2: Detailed Project Description

China: China-Qinghai Xining Water Environment Management Project (P133116)

1. The Project development objective (PDO) is to reduce water pollution and pilot potential sustainable reuse of wastewater in Xining Municipality. The PDO would be achieved through: (a) construction of an expanded set of stormwater and wastewater collection systems; (b) comprehensive stormwater management and river-bank environment restoration; (c) integrated gully and canal improvements; (d) the demonstration of treated wastewater reuse; and (e) technical assistance and capacity building in integrated water resources and environmental management.
2. The project rationale is to achieve a reduction in river water pollution and increase in water availability, through the integration of prudent and sustainable environmental management (such as wastewater collection and conveyance, wastewater treatment and reclamation, and other water resources management practices, such as (but not limited to): reducing soil erosion, use of alternative/reclaimed wastewater resources, river, stream and gully ecological management practices, etc. in a basin context).
3. The project will consist of the following five components with a total estimated cost of US\$246.6 million, including an IBRD loan of US\$150 million:

Component A: Construction of Stormwater and Wastewater Collection Systems (estimated cost US\$139.8 million).

4. The main objective of this component is to improve coverage of urban wastewater service and therefore reduce pollution to the rivers. This component will finance investments in construction of wastewater and storm water collection pipes (including affiliated access roads and other urban facilities in Beichuan Area) along selected rivers and urban wastewater distribution networks, including: (i) construction of stormwater and wastewater collection network along the Beichuan River and construction of stormwater and wastewater collection network along the Xichuan River which would be implemented by Xining Municipal Drainage Development and Construction Company (XMDDCC); and (ii) construction of wastewater collection and storm drainage network in Beichuan Area which would be implemented by Xining Municipal Huangshui Investment Management Co. Ltd (XMHIMC).
5. *Construction of Stormwater and Wastewater Collection Network along the Beichuan River.* The investment of 34 km of wastewater collection pipelines will be financed by the project. It will collect wastewater generated from both sides of the Beichuan River during dry weather and a combination of wastewater and stormwater during storm events and convey it to No. 5 WWTP, which will be ready to operate in 2015.
6. *Construction of Stormwater and Wastewater Collection Network along the Xichuan River.* The investment of 16 km of combined wastewater and stormwater collection pipelines will be financed by the project. It will collect wastewater generated during dry weather and a

combination of wastewater and stormwater during storm events. along the northern side of the Xichuan River and convey it to the No.4 WWTP

7. *Construction of Wastewater Collection and Storm Drainage Network in Beichuan Area.* The investment on 34km wastewater (only) collection pipelines, 27km roads and 44km storm draining pipelines will be financed by the project. It will collect wastewater generated from a portion of the Beichuan Catchment (the LID area – Component B) and improve the storm drainage in this targeted area.

8. According to the design, after completion of this component, 24,000 m³/day of wastewater in the dry season and 77,000m³/day of combined wastewater in the wet season will be collected and conveyed to the WWTPs, 318,500 people will benefit from the improved wastewater collection and drainage services.

9. These investments should be put into the perspective of the partnership this project is engaging in with the Municipality of Xining: to better control pollution loading into the head waters of the Yellow River system and, therefore, to conserve water resources in this water scarce region of the country. The following table highlights the seriousness of the municipality’s investment program and commitment over the past 15 years to elevating the river water qualities in and around Xining from Classes IV and V, to Classes III and IV.

Wastewater Treatment Plant	Year Commissioned	Capacity (m ³ /day)	Treatment Level (1A, 1B, 2, or 3)	Treatment Process	Remarks
WWTP No. 1	2002	85,000	1A	Activated sludge	
WWTP No. 2	2007	42,500	2	Oxidation ditch	Will be abandoned after No. 6 completed.
WWTP No. 3	2010	100,000	1B	A ² O	
WWTP No. 4	2014	30,000	1A	A ² O	Under construction by Xining Municipality.
WWTP No. 5	2014	30,000	1A	A ² O	Under construction by Xining Municipality.
WWTP No. 6	Planned	100,000	1A	A ² O	Plan to replace No. 2
Chengnan New District WWTP	2009	22,500	1A	A ² O	
Ganhe Eastern WWTP	2012	5,000	1B	Oxidation ditch	
Ganhe Western WWTP	Planned	5,000	1A	A ² O	Planned
Huangyuan County WWTP	2011	5,000	1B	Oxidation ditch	

10. In summary, there are currently 6 WWTPs in operation within the municipality with an aggregate design capacity of 260,000 m³/day. Another two WWTPs are under construction with a combined design capacity of 60,000 m³/day and another 2 WWTP planned with a total treatment capacity of 105,000 m³/day – total capacity is 402,500 m³/day (WWRP No. 6 of 100,000 m³/day will replace WWTP No. 2). All 10 WWTPs attain (or will attain) treatment levels of 1A or 1B, which is in line with the Urban Development Plan to raise the water quality levels of the rivers to Classes III and IV. A rough estimate of these investments in these 10 WWTPs is US\$0.5 billion. With these large scale investments, there can be little doubt as to the seriousness with which the provincial and municipal authorities approach pollution control and water resources management, from both a water scarcity and water quality perspective. This project helps collect and convey wastewater from communities which are currently discharging directly to the local rivers to the wastewater treatment plants that have been built and/or are under construction.

11. All 9 WWTPs (WWTP No. 2 will be taken out of service when WWTP No. 6 comes on line) WWTPs will provide 382,500 m³/day of treatment and will achieve Class 1A or 1B treatment standard levels, in line with the Urban Development Plan to raise the water quality levels of the rivers to Classes III and IV. To put this into perspective, currently approximately 61% of the urban wastewater is collected and treated, in the next 5 years, this will move up to close to 100%.

12. The following table provides the key parameters of the national river quality classification system for a better understanding of the water quality impacts of the improvements planned for by the municipality.

	River Classes Parameters	Class I	Class II	Class III	Class IV	Class V
1	°C- temperature	The temperature variation caused by human activities shall be limited within: Weekly maxi temperature rise ≤1 Weekly minimum temperature decrease: ≤2				
2	pH value	6–9				
3	DO (mg/l)	90% saturation (or 6.7.5)	6	5	3	2
4	COD Mn (mg/l)	2	4	6	10	15
5	COD ≤ COD Cr. (mg/l)	15	15	20	30	40
6	BOD5 (mg/l)	3	3	4	6	10
7	NH ₃ -N (mg/l)	0.15	0.5	1.0	1.5	2.0

Component B: Comprehensive Stormwater Management and River-Bank Environmental Restoration (estimated cost US\$35.9 million)

13. The main objective of this component is to reduce the production and transport of pollutants from the core urban area of Beichuan Area and the river-bank zones into the receiving water bodies. The scope of work of this component can be divided into two parts/stages: (1) to reduce pollutants caused by waste dumping into the river and soil erosion of the river banks under the current condition of the Beichuan Area and river-bank area, and (2) to reduce pollution and storm runoff derived from the buildings, streets, highways, and other facilities from the urbanized area of the Beichuan Area.

Part 1: Reduction of pollution under current condition:

14. Due to the lack of infrastructure investment and socio-economic development in Beichuan core urban area, there is no sound wastewater collection system and no environmental protection facilities. The natural flood plain area and stream banks on both sides of the river have been damaged by debris and solid waste dumping in the past. During the flood season, runoff through the flood plains flushes the residue soil into Beichuan river and thus increases pollutant loads into the river. Erosion from the unprotected river banks also contribute to the increase of sedimentation in the Beichuan River.

15. Some of the site clearing and preparatory works are :
- *Residue debris/soil and garbage cleaning:* in the area of 60 ha along 5 km of right bank of Beichuan River, about 200,000 cubic meters of residue debris soil and garbage are identified. These materials will be cleaned and removed. Most part of the residue soil will be moved to the nearby construction sites as fill to low land area or foundation of road. The garbage will be carefully treated and moved to safe area
 - *Sandy gravel pavement and layout of humus soil:* after cleaning of the residue soil and garbage. Sandy gravel and humus will be carefully selected based on Chinese design standards and local condition.
 - *Selection of vegetation:* based on local climate and soil conditions, a wide variety of native species of plants and trees will be selected (including those of fast-growing species and slow-growing species, arbor and shrub, evergreen and hardwood) for subsequent restoration development.

Part 2: Reduction of pollution and storm runoff under urbanized condition through Low Impact Development (LID) practice

16. Urban development in the Beichuan area invariably increases the percent of catchment areas rendered impervious and served by storm sewers/drains. This in turn reduces the base-flows and increases peak flows, runoff pollution, and channel erosion. LID is an innovative storm water management practice that helps to minimize these adverse impacts of urbanization. Typical LID features include:

- *porous pavement (for parking & driveways)*
- *vegetative covers, vegetative swales*
- *bio-retention swales, cells & basins; rain gardens*

- *rainwater harnessing & re-use*
- *wetland preservation & enhancements*
- *naturalized stream channel & banks*

17. Utilizing the flow retention, infiltration, filtering and evapo-transpiration capacities of the soil and vegetation, the LID practice is able to reduce the storm runoff and pollutants from the source areas- mimicking the natural hydrologic process of the watershed.

18. To provide a holistic solution to the potential increase of pollution and runoff in the urbanized Beichuan Area, river-bank zones, and the receiving water bodies, a comprehensive stormwater management program- incorporating the LID practice into the storm drainage system, has been developed. This program encompasses the entire catchment of the Beichuan Area, including the residential, commercial, and industrial zones; streets, highways, and infrastructures; and the river-bank restoration areas on both banks of the Beichuan River.

19. Typical LID features, such as increased vegetation covers, vegetative swales (esp. for highway and road side drainage), bio-retention ponds, permeable pavers (for parking, driveways and walk paths), and water re-use, will be incorporated into the storm-water management and rainwater harvesting systems. These practices offer the beneficial effects of water quality improvement, water conservation, and environmental improvement to the watershed, in addition to reduction of runoff peak and volume.

20. Restoration of 60 ha river-bank area along 5-km stretch of Beichuan River, with diversified native vegetation, porous walk path and access roads, lighting system, and other environmental amenities will further enhance the environment of the river bank area and water quality in the receiving water body of Beichuan River.

21. Proper Inspection and Maintenance program will be instituted for the LID facilities to safeguard the effectiveness of their various functions. This is to ensure that the storage volume has not been reduced by sediment, outlets are not clogged by debris, and structural features maintain their integrity. The maintenance of most of the LID features can easily be performed as part of regular landscaping. Specialized maintenance may occasionally be required to ensure that the filter media are not clogged and toxic materials such as heavy metals do not accumulate to a detrimental level.

22. In comparison with the conventional storm water drainage design, the design features incorporating LID elements have the beneficial effects of water quality improvement, water conservation, and environmental improvement to the watershed, in addition to reduction of runoff peak and volume. The experience gained from this pilot township development project on LID practice could be applied to future storm-water drainage designs in other parts of the City and beyond.

Component C: Integrated Gully and Canal Improvement (estimated cost US\$28.7 million).

23. The development objective of this component is to improve the water environment and reduce wastes and pollutants from being conveyed into the gully and canal systems. Local

residents habitually dump solid waste, residue soil, construction rubble/waste, and wastewater in to the gullies and canal from both banks of Chaoyangdian Canal, Liujiagou Gully, and Shengou Gully-, all situated in the Beichuan Core Urban Area. In flood season, the dumped material and pollutants are washed down through the gully/canal system and cause pollution to the surrounding environment and the receiving water bodies.

24. This component includes (i) integrated improvement of Chaoyangdian Canal; (ii) integrated improvement of Liujiagou Gully; and (iii) integrated improvement of Shengou Gully. A participatory approach will be adopted during the design and implementation stages.

25. *Integrated improvement of Chaoyangdian Canal:* the 10.4km of Chaoyangdian Canal will be improved by integrated approach: including re-design of canal cross-sections for reduced canal flow, construction of wastewater collection pipe, a stormwater drainage system, an affordable and sustainable solid waste system adopted, construction of access roads, slope protection and other auxiliary facilities.

26. *Integrated improvement of Liujiagou Gully:* the 900 meter of Liujiagou Gully will be renovated using this integrated approach: including construction of box culvert section linking the box culvert design work on both upstream and downstream side of the project limits; an open channel section with proper bed and slope protections, and construction of a drainage network, and wastewater collection pipes feeding into existing interceptors.

27. *Integrated improvement of Shengou Gully:* the 900 meter of Shengou Gully will be renovated in a similar manner as the Liujiagou Gully - by construction of an open canal, slope protection, construction of a drainage network, and wastewater collection pipes.

28. *Application of participatory approach:* a participatory approach has been successfully implemented in Xining Flood and Watershed Management Project. This approach will be adopted to ensure the successful design and sustainable implementation of this component.

Component D: Wastewater Reuse (estimated cost US\$1.8 million).

29. This component will introduce and investigate the viability of the reuse of treated wastewater by construction of treated wastewater transfer stations and piping, as well as technical assistance in areas of reclaimed wastewater strategies, policies, and technologies. The project activities will include: (a) construction of water reclamation pumping station plant and affiliated monitoring facilities with a capacity of 5,000 m³/day at No.5 Wastewater Treatment Plant (under construction, to be commissioned in 2014), and approximately 10 km of water transmission pipes; ; and (b) technical assistance for study on economy and policy schemes for stimulating reclaimed wastewater reuse, and study on impact of reclaimed wastewater on domestic soil and vegetation. The component is important to the province / municipality in taking the lead in the determination of the most efficient and cost effective methods of reclaiming water in such a water scarce region.

30. With the ever widening gap between water resources and water demands in this region of the country, it is extremely important to assist the municipality in developing its roadmap to

water reclamation and reuse, in line with the 2030 objectives set out in the Urban Development Strategy. At the heart of the challenge is to identifying ways to make the commercialization of reuse of wastewater a reality such that private entities take the risks, taking the investments out of the government sector. The project will also assess the technical and financial viability of the water reuse and reclaimed water scheme piloted by the project and draw lessons for other cities facing issues of water scarcity.

Component E: Project management and capacity building (estimated cost US\$31.3 million).

31. The development of this component is to improve integrated water environment management capacity. This component includes (i) project management activities: project supervision, and management information systems (MIS); (ii) technical assistance and consulting services for: monitoring and evaluation (M&E); technical support on integrated water and environmental management, reclaimed wastewater policies, regulations and technical issues; and technical and management workshops, and (iii) domestic and overseas training and study tours.

32. For the technical assistance, the study would support the city to ensure long term sustainable operation and maintenance of existing and new assets, and ensure proper budget is allocated over time for this purpose. The study would also apply the integrated water management approach considering the different type of water resources (surface water, groundwater, and reclaimed water and wastewater) and environmental protection requirements.

Annex 3: Implementation Arrangements

China: Qinghai Xining Water Environment Management Project (P133116)

Project Institutional and Implementation Arrangements

1. The project management institutions have been established, including Xining Municipality Project Leading Group (PLG), Xining Project Management Office (PMO), Project Expert Panel (PEP), and Project Implementation Units (PIUs). (see Figure 1 for the management framework).

2. Xining Municipality Project Leading Group (PLG) has been established, and is chaired by Major of Xining Municipal Government and composed of senior officials from Xining Development Reform Committee (XDRC), Financial Bureau (XFB), Urban Construction Bureau(XUCB), Environmental Protection Bureau (XEPB), Water Resources Bureau (XWRB), Huangshui River Integrated Management Committee (XHMC), Xining Municipality National Land Resources Bureau, and Bureau of Ethnic and Religious Affairs and other relevant government line agencies. The PLG will provide coordination, policy-level support, and policy guidance. Its main responsibilities would be as follows:

- a. To be in charge of coordination and guidance on the whole project cycle. To be responsible for cross sector coordination, studies, making decisions on key issues raised during project cycle and monitoring & evaluation of the project.
- b. To coordinate and strengthen cooperation between different project parties, and promote establishment of robust project management system at all levels.
- c. To develop project strategy, targets, and planning schedules and tasks.
- d. To coordinate counterpart fund raising, and ensure timely World Bank loan repayments.
- e. To study and make decisions on key issues of project management, bidding and procurement, resettlement implementation, environmental action, financial management and auditing, in compliance with World Bank procedures and guidelines
- f. To coordinate among different government agencies and strengthen the relationship between the World Bank and the local government, to facilitate smooth project implementation.

3. The Project Management Office (PMO) is located in the Integrated Management Committee for Xining Huangshui River, chaired by Director of the Committee, and will include officials and experts from Xining Municipal Development and Reform Committee (DRC), Financial Bureau, Water Resources Bureau (WRB), Environmental Protection Bureau (EPB), Huangshui River Integrated Management Committee (XHMC). The PPMO will be responsible for day-to-day management of overall project implementation, including: coordination of various technical departments and agencies involved in implementation; financial management and procurement according to Bank guidelines; annual mobilization and allocation of funds; specialized technical assistance support to county level Project Management Offices (PMOs); overall project monitoring and evaluation and reporting on project implementation and

supervision; and making implementation recommendations and providing guidance to improve the project and its impact. Detailed responsibilities are as follows:

- a. In charge of Project preparation and implementation under the guidance of the World Bank and PLG.
- b. In charge of technical works concerning project preparation, TOR preparation, implementation plans, pilot projects; to study and solve the problems raised from planning and design, a consolidated project schedule, construction supervision, and project quality control, and to ensure unified requirement of project implementation.
- c. To conduct comprehensive management and technical guidance; to establish well designed and rolled out institutional management systems, and policies and regulations on concerning project management, financial management, and MIS.
- d. To set up a project Expert Panel which provides technical assistance to the PMO on project preparation, implementation and review;
- e. To prepare and compile all required documents during the project implementation, to ensure these documents are in line with the World Bank requirements; to assist the World Bank teams with visits of the Bank Missions, and take proper actions according to recommendations of the Mission Aide Memoirs.
- f. To organize trainings and study tours on project management and technical issues related to the project.
- g. To be in charge of project implementation, including required resettlement actions and environmental implementation; to monitor project progress and identify problems with the implementation of the project with options for the solutions of the problems and issues developed for discussions.
- h. To prepare project implementation plans and manage the plans; to review and evaluate project progress, quality and outputs of the project during the implementation.
- i. To set up financial management systems in accordance with World Bank requirements, as spelled out in the loan agreement; to conduct critical financial and accounting management based on laws, regulations, and systems agreed to with the World Bank; to manage bidding and procurement of equipment and materials, payment and reimbursement, and auditing, based on the relevant regulations of the World Bank and requirement of the Project; to organize project Bid Evaluation Committees and the bidding process; to establish management systems on accounting, bidding and procurement, and put them into an approved MIS.
- j. To report to PLG regularly, or promptly in case of emergency situations.

4. Project Expert Panel (PEP). An Expert Panel is proposed to be setup to support the PMO for improving project management. The PEP should be set up before project implementation begins to better help and support the PMO. The Bank task team had recommended the client to set up the PEP prior to pre-appraisal mission. The PEP could be composed of an Environmental Expert, Financial Management Expert, Forestry Management Expert, Procurement Expert etc. The main function of the PEP would include: design review; bidding documents review; preparation of Project Reports; supervision of construction supervisors; and provision of technical and management support for PMO staff and relevant project beneficiaries. Detailed responsibilities of the PEP are as follows:

- a. To provide consultation on management and technical issues during project preparation

- and implementation, and assist PMO on technical review and project monitoring.
- b. To provide the PMO staff and project designers with technical guidance, training, and consultation.
- c. To review documents, materials, and other technical reports to be provided to higher level organizations and the World Bank.
- d. To work jointly with international consultants on technical consultation services and technical training.
- e. To prepare an independent technical report on review of project management and implementation progress during project implementation, specifically upon each World Bank Mission. This report should include review and evaluation on project management, project coordination, and efficiency of the management and coordination.
- f. To monitor and evaluate implementation of physical works, resettlement, and environmental impacts and required actions.
- g. To assist PMO with project Implementation Completion Review.

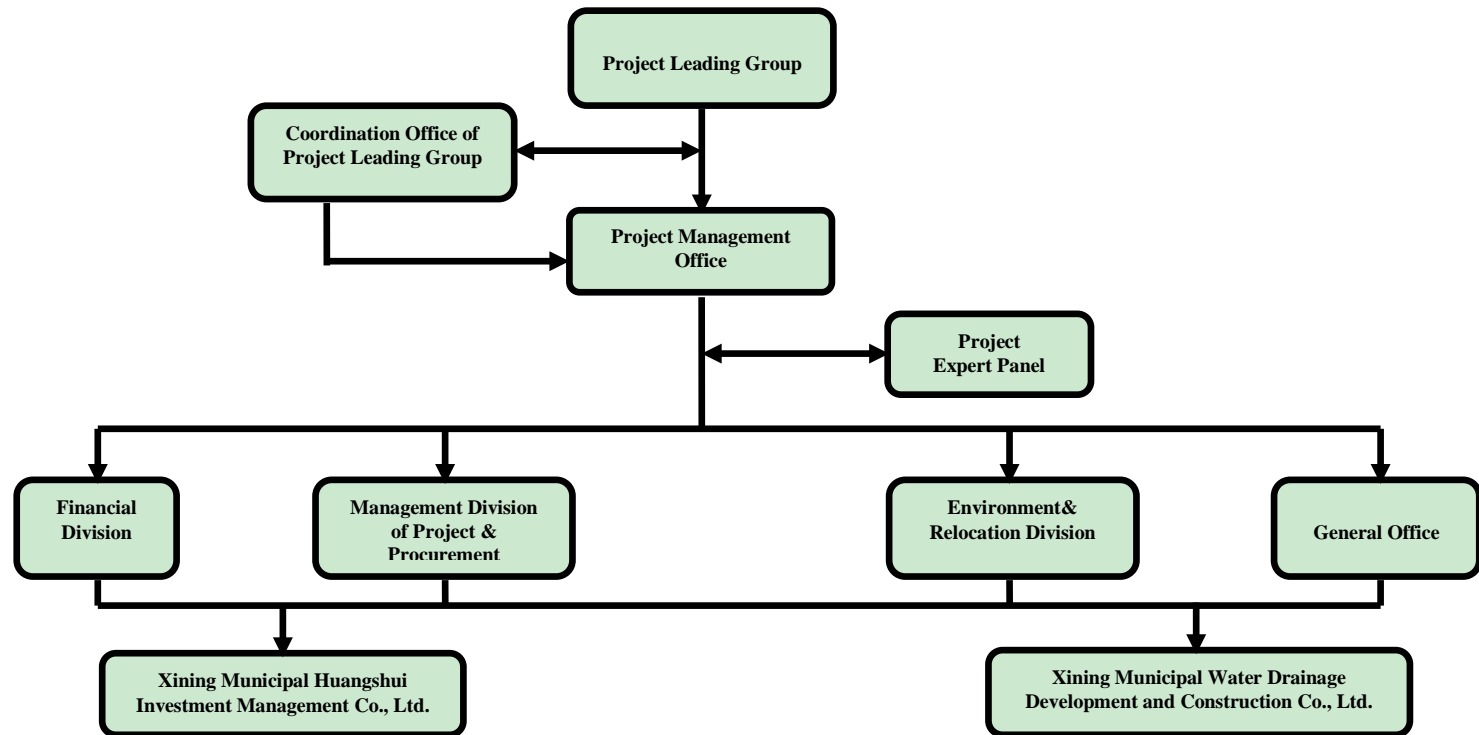
5. To adequately prepare for project implementation, the Xining Government has arranged two Project Implementation Units based in Xining Municipal Drainage Development and Construction Company and Xining Municipal Huangshui Investment Management Co., Ltd. under the leadership of PMO. An official subsidiary agreement between the PIUs and Xining Municipal Government, or representative of Xining Municipal Government should be signed to stipulate the above duties and responsibilities of the PIUs. The government representative could be Xining Financial Bureau or Xining Municipal Huangshui Investment Management Co. Ltd.. Duties and responsibilities of the two PIUs are as follows:

- a. To assist PMO in completing the procurement of bidding agencies, consulting & design entities and projects funded by World Bank loans, and hold the responsibility for technical matters.
- b. To perform contracts that are required to be signed with bidding agencies, related consulting & design entities, and project contractors, assuring qualified personnel and other resources required for the performance of project contracts are allocated.
- c. To assist PMO in making project fund plans (including World Bank loans and domestic supporting funds), and prepare basic documents with regard to withdrawal and accounting of World Bank loans.
- d. To take charge of cost control and expenditures for the project, provide PMO with financial reports, and establish the accounting archives.
- e. To accept the supervision, examination and auditing by financial departments, auditing departments, taxation departments and competent authorities on matters associated with revenues and expenditures of the project.
- f. To standardize basic accounting procedures, and carry out financial management and financial accounting, in accordance with financial management and financial

accounting systems related to the World Bank loans and domestic utilization of foreign funds, as well as guidelines on implementation of project accounting management.

- g. To timely review and handle the application for withdrawal and accounting for this project. To offer contractors the needed funds in a timely manner as to ensure the favorable implementation of the project.
- h. To prepare and submit all related financial records, accounts, statements and other documents pertaining to auditing agencies, based on the rational requirements proposed by relevant departments. Submit the unaudited Interim Financial Report of Project within the stipulated time limit, and work with auditing department to present Annual Audit Report of Project.
- i. To provide all necessary documents and data in a timely manner (6 weeks in advance before the submission deadline of semi-annual progress reports), and work with PMO to prepare semi-annual and annual progress reports, as well as annual work plans.
- j. To submit to PMO preliminary training programs required by the project.
- k. To offer PMO assistance in fully implementing the Environmental Management Program, Migrant Relocation Program, and Development Framework of Minority Groups, according to security assurance policies approved by World Bank.
- l. To help PMO with continuous monitoring and evaluation for the project implementation and to ensure the fulfillment of project targets.
- m. To make sure that its obligations under the Entrusted Management Contract is performed in such a manner as to safeguard interests of World Bank and PMO, and to ensure the fulfillment of project targets. The Entrusted Management Contract shall not be transferred, amended, terminated or waived by any implementation organization, without the prior consents of World Bank and PMO.

Figure 1: Project Management Framework of Qinghai Xining Water Environment Management Project



Financial Management, Disbursements and Procurement

Financial Management

6. The FM capacity assessment identified the following principal risk: (a) Both XMDDCC and XMHIM lack prior experience in managing World Bank financed projects and some project financial staff are just graduates without significant experience. Mitigation measures to address the above risk are as follows: (a) a FM manual (FMM) has been prepared, so that project FM procedures for coordination and reporting are standardized; (b) in addition to FM training to be provided by the Bank, more extensive workshops (including technical training and experience sharing) will be arranged by Provincial Finance Bureau and the PMO; and c) an external expert will be hired to assist the PMO and implementing agencies to improve their project financial management work. Overall, the residual financial management risk after taking into account mitigation measures is rated as Moderate.

7. Funding sources for the project include the Bank loan and counterpart funds. The World Bank loan agreement will be signed between the World Bank and MOF, the subsidiary loan agreement will be entered by MOF and Qinghai Provincial Government. Qinghai Provincial Finance Bureau (QPFB) representing Provincial Government will further on lend the World Bank loan to Xining Municipal Government who will be the final debtor and responsible for repayment. The Bank loan proceeds will flow from the Bank into the project DA to be set up at and managed by QPFB and then be disbursed to Xining Municipal Finance Bureau (XMFB), then to XMHIM and XMDDCC through the PMO based on their funding requests (also referred to as withdrawal applications) submitted. The funding requests will be supported by contractor and supplier invoices and other necessary documents.

8. **Audit Arrangement:** Qinghai Provincial Audit Office (QPAO) has been identified as the auditor for the project. The annual audit report will be issued by QPAO. The annual audit report on the project financial statements will be submitted to the Bank within 6 months after the end of each calendar year. This requirement will be stipulated in the loan agreement. According to the agreement reached with MOF and China National Audit Office, the audit report and audited financial statements will be made publicly available in both World Bank and QPAO's official websites in accordance with the World Bank Policy on Access to Information. The responsible agency and timing is summarized as follows.

Audit Report	Submitted by	Due date
Consolidated Project financial statements	Xining PMO	June 30 of each calendar year

9. **Budgeting.** The project will apply subsidies from national and provincial government, and municipal government will also mobilize funds, if necessary. The PMO will be responsible for the overall financing plan and making funds available to the two project companies based on actual construction progress.

10. **Funds flow.** Following the on lending arrangement and general practice, a project Designed Account (DA) in USD will be opened and managed by Qinghai Provincial Finance Bureau (QPFB). Generally World Bank loan proceeds will flow from QPFB to Xining

Municipal Finance Bureau (XMFB), then to XMHIM and XMDDCC through the PMO. With capacity enhanced during project implementation, the funds flow layer of XMFB and the PMO may be reduced to speed up disbursement. And when appropriate, the funds may be disbursed to contractors/suppliers directly upon implementing agencies' request. The proposed flow of funds and funding requests are shown in Figure 1.

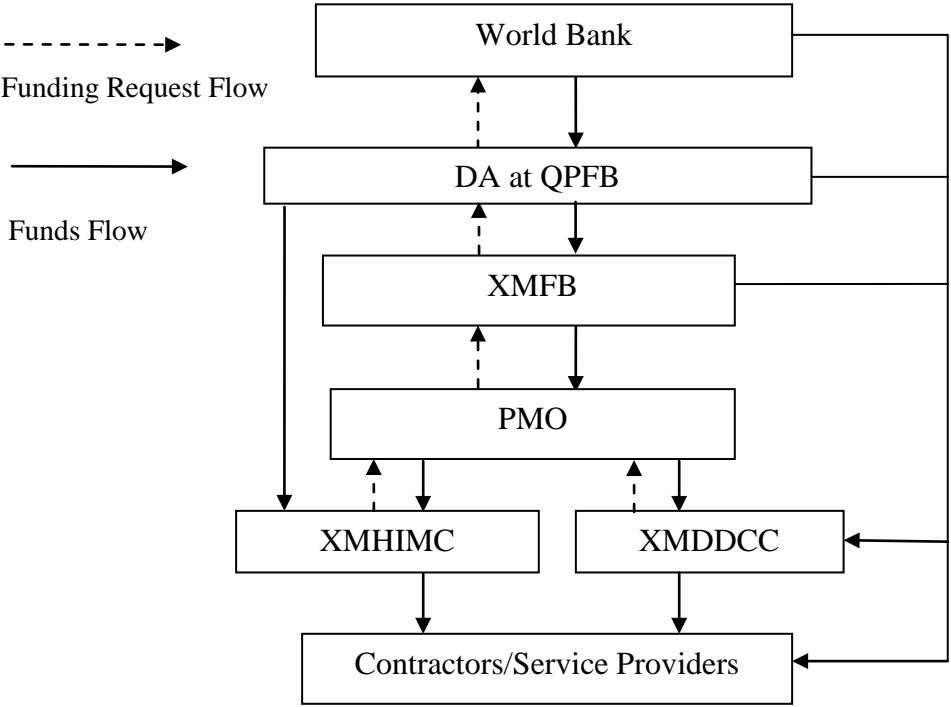


Figure 1: Funds and Funding Requests Flow

11. **Accounting and Financial Reporting.** The administration, accounting and reporting of the project will be set up in accordance with Circular #13: “Accounting Regulations for World Bank-financed Projects” issued in January 2000 by MOF. XMHIM and XMDDCC will use their current accounting systems “Yong You (User Friend)” and “Xin Zhong Da”, both are commonly used computerized accounting software approved by MOF.

12. All the implementing agencies will manage, monitor and maintain project accounting records for their responsible project activities. Xining PMO will work with the finance bureaus to prepare the consolidated project financial statements. The unaudited semi-annual project financial statements will be prepared and furnished to the Bank by Xining PMO as part of the Progress Report no later than 60 days following each semester (the due dates will be August 31 and February 28).

13. **Internal Control.** The related accounting policy, procedures and regulations were issued by MOF and the FMM aligns the financial management and disbursement requirements among various implementing agencies.

Disbursement Arrangements

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

15. The Bank loan would disburse against eligible expenditures (taxes inclusive) as in the following table:

Category	Amount of the Loan Allocated (expressed in USD)	Percentage of Expenditures to be financed (inclusive of Taxes)
(1) Civil works under: (a) Components A (i) and D (i) of the Project; (b) Components A (ii), B and C of the Project.	23,850,000 119,422,000	88%
(2) Goods, consultant's services, non-consulting services, Training and Workshops under Components A (ii), B and C of the Project.	4,120,000	100%
(3) Goods, consultant's services, non-consulting services, Training and Workshops under Components D (ii) and E of the Project.	2,233,000	100%
(4) Front-end Fee	375,000	Amount payable pursuant to Section 2.03 of this Agreement in accordance with Section 2.07 (b) of the General Conditions
(5) Interest Rate Cap or Interest Rate Collar premium	0	Amount due pursuant to Section 2.07(c) of this Agreement
TOTAL AMOUNT	150,000,000	

Procurement

16. Capacity Assessment. The procurement capacity assessment identified the lack of experience with World Bank-financed project of the PMO and PIUs as the primary risk. Though some PMO staff are experienced with Bank's first project in Xining, i.e. Xining Flood and Watershed Management Project, it is the first time of the PMO and PIUs to carry out Bank

financed project. Mitigation measures include: (a) procurement training has been provided during project preparation and will be continued periodically during implementation; and (b) a procurement agent experienced in World Bank procurement procedures to be recruited to assist in procurement planning and implementation; (c) preparation of project Procurement Manual to guide project procurement management. The other risk will be large value variation due to design change and unexpected geological conditions. Mitigation measures include: (a) preparation of Bidding Document(BD) based on detailed design; (b) provision of updated project site information to Design Institute(DI) and request the DI to visit site before bidding; (c) allow sufficient time for BD preparation; (d) smooth and frequent communication with senior management of the city to ensure design under the project is in compliance with city government requirements. The overall procurement risk is rated moderate.

17. Applicable Guidelines. Procurement will be carried out in accordance with the “Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers” dated January 2011; and “Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers” dated January 2011; and the provisions stipulated in the Loan Agreement. NCB shall be carried out in accordance with the Law on Tendering and Bidding of the People’s Republic of China promulgated by Order of the President of the People’s Republic of China on August 30, 1999 subject to the modifications stipulated in the Legal Agreement in order to ensure consistency with Bank Procurement Guidelines.

18. Procurement of Works. Works procured under this project will include: construction of stormwater and wastewater collection system, LID and stream bank restoration related works, integrated gully and canal improvement works and construction of treated wastewater transfer station, etc. Procurement will be conducted using the Bank’s Standard Bidding Documents for all International Competitive Bidding (ICB) and National Model Bidding Documents agreed with or satisfactory to the Bank for all National Competitive Bidding (NCB).

19. Procurement of Goods. Goods procurement is not expected during project appraisal, but may be needed with the implementation of the project. Procurement will be done using the Bank’s Standard Bidding Documents for all ICB and National Model Bidding Documents agreed with or satisfactory to the Bank for all NCB.

20. Selection of Consultants. Consulting services will include: study on renew of urban rainwater collection, introduction of the concept of integrated water and environment management and project management services, etc. Universities and research institutes may be included in shortlists as a source of consultants, provided they possess the relevant qualifications and are not in a conflict of interest situation. In such cases, QBS or CQS (for small assignments) would be used, if the shortlist also includes consulting firms. The shortlist may comprise entirely national consultants (firms registered or incorporated in the country), if the assignment is below US\$500, 000.

21. Training and Workshops. Plans for training and workshops will be developed by the PMO, and included in project annual work plan for review by the Bank. Actual expenditures incurred in accordance with the approved plans for training and workshops will be the basis for

reimbursement. Where selection of service provider is required, the appropriate procurement method and contract type should be reflected in procurement plan and to be reviewed and cleared by the Bank in advance.

22. Procurement Plan. A Procurement Plan for the first 18 months of project implementation has been prepared by the PMO. It has been made available on the Bank’s external website. The procurement plan sets forth those contracts subject to prior review, and the remaining contracts will be subject to procurement post review on a sample basis. The Procurement Plan will be updated annually or as required to reflect implementation needs and improvements in institutional capacity.

23. Frequency of Procurement Supervision. In addition to prior review, the Bank mission will also carry out procurement post review on an annual basis with a sampling rate of one in fifteen contracts.

24. Thresholds for Procurement Methods and Prior Review: the indicative thresholds are shown in the table below.

Thresholds for Procurement Methods and Prior Review

Expenditure Category	Contract Value Threshold (US\$thousands)	Procurement Method	Prior Review Threshold (US\$thousands) ^{1/}
1. Goods and Non-Consulting Services	≥3,000	ICB	All
	<3,000	NCB	First 2 NCB contracts and all contracts valued ≥1,500
	<100	Shopping	1 st contract of the project. ALL the 1st contract of the project.t.
2. Works and Supply and Installation of Plant and Equipment	≥25,000	ICB	ALL
	<25,000	NCB	First 2 NCB contracts and all contracts valued ≥15,000
3. Consultants Services	<200	Shopping	1 st contract of the project.
	≥300	QCBS/QBS	All
	<300	CQS	1 st contract of the project.
	--	Individual Consultant	Only in exceptional cases.
	--	Single-Source	All

	--	Selection (firm) Single-Source Selection (individual)	≥20
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- All contracts to be financed through retroactive financing will be subject to prior review. A contract whose cost estimate was below the Bank prior review threshold is subject to prior review if the price of the lowest evaluated responsive bid (or, in the case of consulting services, the financial offer of the selected firm) exceeds such threshold at the bid/proposal evaluation stage.
- **Advance Contracting and Retroactive Financing**
Retroactive financing of up to US\$15 million would be available for eligible expenditures incurred on and after March 1, 2014. Retroactive financing will be processed according to the requirements specified in the loan agreement and project agreement.

Environmental and Social (including safeguards)

Environmental

25. The project is classified a Category A project, and triggers *Environmental Assessment (OP4.01)* and *Pest Management (OP4.09)*. EA and EMP have been prepared in accordance with Chinese EA regulations and the Bank safeguards policies.

26. *Environmental Assessment(OP4.01)*: Xining PMO has engaged an EA consulting institute (i.e. Lanzhou University which is accredited the First Class in EA) to conduct the environmental assessment. There is no ecological sensitive (e.g. nature habitat, nature reserves etc.) or culturally sensitive site in the project area of influence. The EA includes analysis on construction related impacts, operational impacts, potential risks, cumulative and indirect impacts. The EA shows that the project will bring about overall environmental and social benefits, such as (i) leading to the reduction of sediments and pollution loads discharging into Huangshui River; (ii) conserving water resources by the use of reclaimed water; (iii) reducing non-point sources pollution by the application of LID practices; and (iv) contributing to the improvement of public health and visual quality. With respect to the cumulative impacts, the project itself is a set of mitigation measures to address the existing environmental problems (i.e. water pollution, and lack of water resources). Key Valued Ecosystem Components under consideration include water quality and water resources. The EA determines that the project will not adversely affect these VECs, but alleviate the pollution discharged to the rivers.

27. Adverse impacts during construction are related to construction activities such as disposal of spoil, soil erosion, nuisance of dust and noise, and disturbance to traffic and local communities etc. The construction related impacts will be short-term, temporary and site-specific, and can be readily managed with good construction management. Adverse impacts during operation mainly include traffic noise nuisance, vehicle emission, and road safety associated with the newly built roads. The improvement of environment and infrastructure may increase land value, and accelerate urbanization process (e.g. attract people and future investments for

recreation, residential and commercial buildings) in the project areas, especially the Beichuan Area. Risk assessment covers leakage of sewer pipelines, and road safety, but these risks are minor. The pilot use of reclaimed water may have some concerns on public health, soil salinization, toxicity of heavy metals, and nutrients overload into groundwater. But these impacts are not considered significant and can be effectively reduced to acceptable levels through good design and specific mitigation measures proposed in the ESMP, including that (i) the reclaimed water will be used for watering the areas along the newly built roads; (ii) potential negative impacts will be mitigated to an acceptable level by adopting the well-proven wastewater treatment technology for the WWTPs and by equipping with disinfect units; (iii) the WWTP effluent will meet strict water quality standards (e.g. TP, TN, TDS) after disinfection; (iv) a specific TA activity –impacts of reclaimed water on soil and vegetation is included in the project; and (v) monitoring on the effect of the reclaimed water on the soil and vegetation is included in the ESMP. The above arrangement is considered adequate to address potential adverse impacts.

28. Three WWTPs (one in operation, two under construction) will receive sewage collected via sewers to be financed under the project. As part of the EA process, due diligence for the WWTPs and their sludge disposal at the existing Yinjiagou Sanitary Landfill have been conducted confirming that the WWTPs are in compliance with Chinese regulations.

29. Alternative analysis has been conducted in the EA and the feasibility study, including storm water treatment options, the scale of reclaimed water facility, and the “without-project” situation.

30. Based on the EA, a stand-alone Environmental and Social Management Plan (ESMP) has been developed to avoid, minimize, mitigate and compensate the potential adverse impacts. The ESMP specify mitigation and enhance measures for the project activities, including that (i) Environmental Code of Practices (ECOPs) for civil work contractors will be included into the bidding documents and civil work contracts; (ii) LID practices for storm water management and road safety design have been incorporated into the project design; (iii) the induced impacts such as waste and wastewater generated in the Beichuan Area have been taken into account, and installation of sewers, storm water pipelines, garbage bins and public toilets etc. are included in the project design. The land use plan for Beichuan area has been updated and approved by local government; and (iv) with respect to the concerns on the pilot use of the reclaimed water, the water will be used for watering the areas along the newly built roads. The potential negative impacts will be mitigated to an acceptable level by adopting the well-proven wastewater treatment technology for the WWTPs and by equipping with disinfect units. The WWTP effluent will meet strict water quality standards(e.g. TP, TN, TDS) after disinfection. A specific TA activity –impacts of reclaimed water on soil and vegetation is included in the project. Monitoring on the effect of the reclaimed water on the soil and vegetation is included in the ESMP. This arrangement is considered adequate.

31. *Pest Management (OP4.09)*. The re-vegetation of Beichuan River Bank and the gullies likely result in the use of pesticides, although none will be procured as part of the project. This raises issues of improper use of pesticides. A Pest Management Plan, as part of the ESMP, has been developed. The project will (i) be vegetating the areas using non-invasive species; (ii)

promote the use of biological or environmental control methods; and (iii) improve local capacity to apply knowledge to minimize use and to safely and properly apply pesticides.

32. ESMP implementation will be managed by Xining PMO. An environmental and social management unit will be established in the PMO with dedicated safeguards staff. Civil work contractors and supervision companies will be required to assign qualified environmental staff to their team to ensure effective implementation of the ESMP. PMO, under assistance of on-site environmental supervisors, local EPB and external monitoring institution, will supervise the implementation of ESMP. To improve local capacity, the ESMP proposes capacity training activities for civil work contractors, PMO, environmental supervisors, and monitoring institutions etc. The ESMP also specifies monitoring plan, environmental supervision, and the budget for the ESMP implementation.

33. During the EA preparation, two rounds of public consultation were undertaken: the first round at the beginning of EA preparation (EIA TOR) in May 2013, and the second round in September 2013 after the first draft EA and ESMP were prepared. Consultations were carried out through questionnaires, interviews and meetings with project affected people, experts, and government agencies. Local people generally supported this project and provided specific comments, for example, on construction impacts on local communities; and reclaimed water quality. Main feedback and concerns from the public have been addressed in the project design and the ESMP's mitigation measures. In accordance with the Bank's information disclosure policy, prior to project appraisal, the latest safeguards documents, including EA and ESMP, were made available in the project areas (e.g. village committees) and are accessible at PMO. The documents were disclosed on the website of the Xining municipal government on December 5, 2013, and at the Bank's InfoShop on December 27, 2013.

Social

Social Impacts and Policy Triggered

34. The project will generate environment benefit for the citizens and directly promote social capital and physical capital of the citizens, via providing sanitary services, using reclaimed water, channeling rain water, improving roads, promoting riverside landscape, etc. On the other hand, the project probably results in some adverse impacts such as land acquisition and resettlement will be entailed by construction of the above activities, and further social disturbance during construction period, etc. Further, there are ethnic minority villages in some project areas which might be impacted by the project. So the Involuntary resettlement and indigenous people policies were triggered. To some extent, the project may generate social disturbance in project construction period, impacts on gender and other vulnerable groups, which a stand-alone SA was prepared.

35. With Hohai University's assistance, the PMO has prepared a RP/RPF, an EMDF, and a social assessment report to handle potential social issues. For the resettlement related issues under the five linkage activities, due diligence review was conducted and documented in the RP. Further for the ongoing resettlement implementation in a linkage activity, Beichuan Plot Development Project, an external resettlement monitoring report was also prepared. All the

documents were reviewed by the Bank TT several times and the final draft versions are found compliant with the Bank requirements, such as OP 4.12, and OP 4.10.

Involuntary Resettlement OP4.12

36. The four project components involve physical activities, which need land acquisition and/or resettlement. The activities consist of construction of reclaimed water plant, roads, installation of sewers and reclaimed water pipe, rehabilitation of river bank, as well as treatment of some gullies. Furthermore, five activities, linking to the project, entail land related issues. Measures to avoid or minimize resettlement impacts were adopted in the project preparation stage, including pipe-jacking technology to avoid house demolition, staged sewer/pipe installation to minimize the scope and duration of construction disturbance, utilization of unused land to avoid farmland use, etc. The four project components involving physical activities need land for construction. Component 1, Construction of storm water and wastewater collection systems, and Component 3, Integrated gully and canal improvement, will need land acquisition, while Component 2, Comprehensive Stormwater management and river-bank environmental restoration, and Component 4, Promotion of treated wastewater reuse, will use land acquired in linkage activities. The project directly acquired 2.4 mu of land permanently and 403 mu temporarily and will not require any house or structure demolition. However, there are five linkage activities consisting of NO. 3, 4, and 5 WWTPs, Yinjiagou Landfill and Beichuan Plot Development Project, which have resulted in permanent land acquisition by 3615 mu with impacts on 6761 persons, including relocation of 1348 households with 6495 persons.

37. Resettlement to be done under the Component 1 and 3. Only some land will be used for the project construction, among which 2.4 mu collective land will be permanently acquired with impacts on 35 households, and 329 mu collective land and 75 mu state-owned land will be temporarily acquired, with impacts on 91 households by the collective land use. For the permanent land acquisition, resettlement measure rests with cash compensation based on the latest land price determined by Qinghai Provincial Government. As for the temporary land use, compensation for collective land covers annual land output compensation plus land restoration fee and compensation for state-owned land is for restoration of the land after use. There is no need to provide social security program for the affected due to minor land loss.

38. Component 2 and 4 will use land acquired by two linkage activities, resulting in permanent land acquisition by 3420 mu with relocation of 1382 households, among which one activity, the Fifth WWTP, almost completed its resettlement. A due diligence review in the RP was conducted and concluded that 64 mu collective farmland was acquired in early 2013 and affected 34 households with 135 persons in Shuansupu Village, and that resettlement packages, covering cash compensation, on job training and social security program, was completed, and that the interviewed villagers were satisfied with the resettlement implementation. The review identified the social security program was not fully completed, and suggested to continue monitoring in the RP and in the project external monitoring arrangement. On the ongoing resettlement in the Beichuan Plot Development Project, a due diligence review in the RP was conducted. It was found that the total resettlement under the activity consists of 3357 mu collective land acquisition with impacts on 6495 persons in 1348 households; and on 38 small businesses, who will lose all their farmland, house and business, that 1343 houses, 724 mu land

and 38 small businesses were acquired or demolished. The report also indicated that all the affected households will obtain replacement residential house by 50 m² per person plus commercial building areas by 20 m² per person within the residential areas helping livelihood restoration. The remaining resettlement work covers relocation of 5 households, land acquisition for 2633 mu, social security program for all the affected and replacement house construction. To ensure full restoration of the affected, an external resettlement monitor was required to start external resettlement monitoring on this activity. The first external resettlement monitoring report was prepared as a document of social preparation package. The monitoring report done by Hohai University concluded that all the affected was fully investigated and consulted, that the compensation was compliant with relevant laws and was fully disbursed to the affected villages in a transparent manner. The land taken and house demolished were carried out only after the full payment were made and that relevant job training program for those who lost land were freely provided. The monitoring also indicated that social security program for those who lost their land should be started as early as possible, and the land compensation should be paid to the affected households as soon as possible from the village committees. Further, the PMO should ensure timely completion and transparent reallocation of the replacement houses, and provide restoration choice for the affected businesses, such as moving to development zone or re-building in other places. These recommendations have been adopted and committed by Xining Government in its commitment letter. The monitor will follow up these issues in the next stage.

39. As for the other three linkage activities, due diligence reviews were also conducted and documented in the RP, which found that: i) 133 mu collective land for No.3 WWTP was acquired prior to 2000 and the relevant resettlement was fully done and there is no pending issues found; ii) Yinjiagou Landfill utilized unused stated-owned land and there is no resettlement issue; iii) No. 4 WWTP acquired 62 mu land covering 52 mu collective land with impacts on 32 households with 131 persons and 6 agencies. The review concluded the resettlement was satisfactory, except for the social security program. It was suggested that the external resettlement monitoring should cover the implementation of the social security program in the next stage.

40. *Ethnic Minority.* There are ethnic minority villages in project areas, especially in the suburb of Xining City. Specific locations of such activities as some sewers are not clear or subject to change in the next stages, and the particular impacts on any ethnic minority villages could not be identified at this stage. Therefore, an ethnic Minority Development Framework (EMDF) was prepared to guide any possible ethnic minority development plan (EMDP) in the project implementation.

41. *Disclosure and Consultation:* All stakeholders related to the project were engaged in consultation process in the EMDF development, resettlement planning and social assessment, via media, information sheet, meetings, group discussion, questionnaires, etc. All the documents, especially resettlement plan, were explored based on the consultation process, disclosed among the affected, and modified in line with feedbacks. The documents, RP/RPF, SA and EMDF, were locally disclosed with an announcement on local newspaper on December 18, 2013, and sent to Infoshop on December 24, 2013.

42. *Commitment on implementing the RP/RPF/EMDF:* The Xining Municipal Government has provided the Bank with a commitment letter on December 20, 2013 to implement the documents prepared by the PMO and agreed by the Bank.

43. *Institutional Arrangement:* Xining has an ongoing Bank financed project. For this proposed project, a Project Leading Group (PLG), which is chaired by the Mayor of Xining and comprises senior officials from relevant municipal agencies, has been established to oversee the preparation and implementation of the Project. A Project Management Office (PMO) has been established in Huangshui River Integrated Management Committee in Xining. The PMO will be responsible for project management, detailed designs, social and environment safeguard preparation, monitoring and evaluation etc. in accordance with Bank guidelines. The PMO will include adequate dedicated staff for overall social and environment management. The PMO and its consultants received safeguard trainings in the project preparation, and will continue to receive more training and technical guidance during project implementation.

44. The social work under the project involves several components managed by various government authorities, so the coordination among the various stakeholders is quite important. Therefore, a division chief was required to be assigned to effectively coordinate the social work. Further a resettlement information system covering all the components will be established to assist resettlement supervision and monitoring. Training programs on project preparation were conducted in the project preparation, and relevant training on resettlement issues were covered in the RP and will be conducted in next stage, extended to relevant staff from involved authorities such as bureaus of Land, House, Labor enabling them to understand the WB policy and adequate resettlement implementation. Further, Hohai University was engaged to work on the social aspects, which provided valuable assistance and guidance to the PMO in the social document preparation and capacity building. Still another, in project implementation stage, an experienced external resettlement monitor will be entrusted to provide more technical assistance to help the PMO strengthen its capacity of resettlement implementation and monitoring..

Resettlement monitoring and grievance redress arrangement

45. A monitoring mechanism including internal and external monitoring was designed and agreed in the RP, with elements of institutional arrangement, monitoring indicators/frequency, and monitoring report format, etc. On the ongoing resettlement under the linkage activities, the external monitoring has started by a team from Hohai University and will be continued in next stage. A complete grievance redress system was designed in the RP, including contents such as responsible agencies, contact information, etc..

Monitoring & Evaluation

46. A result-based monitoring and evaluation system (M&E) will be developed and established under the project, and implemented by Xining Municipal Project Management Office. The M&E system includes:

- (i) *Management Information System (MIS)*. The project MIS will be developed by the PMO and installed in the PMO and all PIUs for physical and financial progress reporting. The MIS will be consolidated at the provincial level and provided to the Bank in semi-annual reports. The system will include a database for overall project outcome or PDO indicators and intermediate outcome indicators for each component.

- (ii) *Reporting*. The PMO will provide progress reports to the Bank (using the MIS) twice a year (by February 28 and August 31). The M&E report will include the agreed key outcome and output indicators, in coordination with financial and physical progress reporting. Project implementation reports include the semi-annual project progress report, the annual overall project M&E report, the MTR report and the ICR report. Special technical M&E reports include the environmental monitoring and evaluation report, the social evaluation report, and the resettlement monitoring and evaluation report.

- (iii) *Institutional Responsibilities*. The M&E system and database will be maintained by the PMO. The PMO will designate a specific unit and/or staff to be responsible for these functions. The PMO will be responsible for the collection and consolidation of data from PMO and all PIUs and for producing the required M&E reports. MIS and MES responsibilities of the PMO will include: (a) formulation of uniform monitoring and evaluation standards and the key indicator system, and supervision of the implementation and operation of the project MIS; (b) carrying out field inspections, consolidation of data, studies on important issues and report writing; and (c) submitting MIS reports to the Bank.

Annex 4: Operational Risk Assessment Framework (ORAF)
China: China-Qinghai Xining Water Environment Management Project (P133116)

Risks						
Project Stakeholder Risks						
Stakeholder Risk	Rating	Moderate				
<p>Risk Description:</p> <p>The project is fully in line with the development strategy of Xining Municipal Government on improving the urban environment services. Hence the project has received strong commitment and support from the Xining Government at all levels.</p> <p>The project will require some land acquisition and resettlement. If this is not carried out carefully, it may cause some social unrest.</p>	<p>Risk Management:</p> <p>The PMO will continue consultations with stakeholders and disseminate project information throughout the project implementation. The Bank task team will monitor feedback from stakeholders during missions and trough review of reports.</p> <p>The EA, EMP, RAP and EDMP Framework have been prepared; the project monitoring and evaluation (M&E) system and MIS will be used to assist the PMO to ensure that Bank social policies and plans are well implemented, supervised and monitored to ensure fair and equity compensation for those negatively affected by the project.</p>					
	Resp: Client	Status: In Progress	Stage: Implementation	Recurrent:	Due Date:	Frequency :
Implementing Agency (IA) Risks (including Fiduciary Risks)						
Capacity	Rating	Moderate				
<p>Risk Description:</p> <p>Although some key staff of the PMO have experience working on another World Bank financed project, Xining Flood and Watershed Management Project (P101829), most of the PMO staff are new to World</p>	<p>Risk Management:</p> <p>PLG and PMO have been established to guide the project implementation with representatives from all key relevant government agencies.</p> <p>Intensive training will be continuously provided by the task team to the PMO staff and relevant government agencies. The PMO will also learn experiences from other Bank financed project, such as Xining Flood and Watershed Management Project. Capacity building for PMO will be conducted</p>					

<p>Bank policies and procedures. There is the risk of non-compliance of Bank fiduciary and safeguard requirements. Although there is a high level of commitment to project from county governments, the timely provision of counterpart is always a risk to project implementation schedules. The proportion of counterpart funds accounts for the project is more than 40% of total project costs. Delay in provision of sufficient counterpart funds will cause implementation delays.</p>	<p>during project implementation stage. Refresher training on Bank procurement and Financial Management will also be provided on an on-going basis during project implementation and adherence to Bank FM and procurement policies/guidelines will be carefully monitored during implementation support missions and reviews of reports, including annual audit reports. Close monitoring of counterpart funds allocation and frequent talks with high rank of Municipal government officials will be conducted to secure the timely and sufficient counterpart funds allocation during project implementation stage.</p>					
<p>Governance</p>	<p>Rating</p>	<p>Moderate</p>				
<p>Risk Description: The project is set in the context of the Qinghai Provincial 12th Five-Year Plan (FYP), Xining Urban Development Master Plan, and Huangshui River Integrated Environmental and Water Resources Development Plan. This is a multi sector project involving Environment and Water sectors. Successful project implementation will depend on effective coordination between Environmental and Water sectors.</p>	<p>Risk Management: The Bank task team will maintain an on-going dialog with government agencies, in particular the PMO, on project objectives, design, and implementation arrangements and provide guidance in revolving any emerging issues.</p>					
	<p>Resp: Client</p>	<p>Status: In Progress</p>	<p>Stage: Implementation</p>	<p>Recurrent:</p>	<p>Due Date:</p>	<p>Frequency :</p>
<p>Project Risks</p>						
<p>Design</p>	<p>Rating</p>	<p>Substantial</p>				
<p>Risk Description: The Design Institute hired by the client is a Class 1 institute; however, it has fewer experiences on the design of low impact development activities. The low impact development concept is first introduced to</p>	<p>Risk Management: Government agencies at provincial and municipal levels and the Bank task team will monitor implementation of the project according to the approved design, and make adjustments to the design if necessary. The Bank task team will also review the detailed project preliminary design and detailed design for some selected subproject and provide comments and recommendations to improve the project design.</p>					

Xining Municipality, there is no fruitful experiences to follow in this particular area.	Resp: Client	Status: In Progress	Stage: Implementation	Recurrent:	Due Date:	Frequency :
Social and Environmental	Rating	Substantial				
<p>Risk Description: The project will involve environmental impacts and some land acquisition. Limited capacity and experience of the PMO to prepare, manage and implement the safeguards policy instruments (EIA/EMP/PMP/RAP), etc, may result in non-compliance of safeguard policies during implementation.</p>	<p>Risk Management: Safeguards documents (e.g. EA, EMP, RAP, and EMDP Framework) have been developed. The Bank task team will continue providing training to the PMO on a regular basis. Experienced external monitoring consultants on environment, social and resettlement have been engaged to monitor the implementation of environmental, social and resettlement safeguards policies. The Bank task team will review the monitoring reports and conduct site visits and discuss safeguard issues with the external monitoring consultants and the PMO, and municipal leaders to ensure the Bank safeguards policies are well implemented.</p>					
	Resp: Client	Status: In Progress	Stage: Implementation	Recurrent:	Due Date:	Frequency :
Program and Donor	Rating	Low				
<p>Risk Description: N/A</p>	<p>Risk Management:</p>					
	Resp:	Status:	Stage:	Recurrent:	Due Date:	Frequency :
Delivery Monitoring and Sustainability	Rating	Moderate				
<p>Risk Description: Monitoring: Data may not be collected early enough to have the baseline in hand for further impact monitoring and analysis.</p> <p>Sustainability: There is a risk of inadequate and long term management funding resources and emergency preparedness plans to allow what is achieved under the project to have a sustainable impact.</p>	<p>Risk Management: M&E. Attention to the need to build capacity and strengthen the M&E process including based line survey has been discussed with the PMO and suitable training and computer based MIS systems has built.</p> <p>Sustainability. The Operations and Maintenance requirements for each sector have been addressed in the FSR. The task team will monitor the subprojects transferring and ensure the budgets for O&M are sufficient.</p>					
	Resp: Client	Status:	Stage: Implementation	Recurrent:	Due	Frequency

		In Progress			Date:	:
Implementation Risk						
	Rating	Substantial				
<p>Comments:</p> <p>The overall project implementation risk is rated Substantial. The main risks identified by the task team are (i) the potential improper implementation of safeguards polices, particularly the social/resettlement plans that will result in negative impacts on affected people; (ii) the slow counterpart funds allocation; (iii) potential poor project preliminary design and detail design; and (iv) rapidly changing government development plans which might affect the outcomes of the project.</p> <p>Considerable guidance has been provided to the PMO by Bank task team in different professional areas, and the following actions have been successfully taken: (a) EA, EMP, RAP and EMDP Framework, and due diligence review have been prepared; (b) computer management information system was introduced; (c) water quality monitoring arrangement; and (d) procurement guidelines have been provided and financial management manual has been finalized. Appropriate mitigation measures have been included in the project design to manage implementation risks. During project implementation, these risks will be carefully monitored and mitigated.</p>						

Annex 5: Implementation Support Plan

China: Qinghai Xining Water Environment Management Project (P133116)

Strategy and Approach for Implementation Support

1. The overall implementation risk for the project is rated in the ORAF (Annex 4) as substantial. The implementation support plan has been developed based on the Project risk profile as elaborated in the ORAF, and focuses on: (a) implementation agencies' technical capacity; (b) implementation of the EMP and the RAP; and (c) fiduciary aspects, i.e., procurement and financial management.
2. **Technical Guidance and Results Monitoring.** Bank technical specialists (wastewater treatment and reuse/water resources management/M&E) will review and provide advice on technical designs, implementation and results monitoring & evaluation issues, and on the institutional development and related TA studies. The Bank will also facilitate the organization of important exchange visits for project teams to learn from pertinent small town development projects and practices, as well as disseminate the lessons and achievements of the project.
3. **Procurement and Contract Management.** Procurement implementation support will include: (a) facilitation of targeted refresher training to procurement staff in the PMO; (b) reviewing procurement documents and providing timely feedback on the results of prior reviews and regular post reviews; (c) providing guidance on Bank Procurement Guidelines as and when required; and (d) monitoring procurement progress against the agreed Procurement Plan. Contract management implementation support will include: (a) familiarization for the client with the standard World Bank FIDIC contract documents, (b) guidance on the preparation of an overall implementation plan for the scheduling of the execution of all contracts, civil work, goods, and consultancy services, (c) review with the client common contract management issues and problems such as: (i) different forms of variations to the contract, (ii) contract price escalation, (iii) compensation events and associated claims, (iv) termination of a contract for non-performance, and (v) other related contractual issues which impact the more effective management of the contracts and overall project.
4. **Financial Management.** The FM specialist team will provide support during missions and on an as needed basis on the implementation of the agreed FM arrangements for the project, and to resolve any issues. They will also review FM reports, including IFRs, annual financial statements, and audit reports; and will follow-up on issues identified requiring actions. They will pay special attention to the timely provision of counterpart funds by each of the project agencies and highlight any shortfalls to the appropriate levels in Government and to the TTL.
5. **Environmental Safeguards.** Implementation support for environmental safeguards will ensure that mitigation measures relating to the environmental assessment environmental policies triggered by the project are properly implemented. This support will focus on the EMP being properly implemented by the contractors and that it is being monitored on an on-going basis by the PMO. They will review internal and external monitoring reports on compliance with the EMP to identify and resolve issues in a timely manner.

6. **Social Safeguards.** Implementation support for social aspects of the project will ensure that the project RAPs are implemented as approved by the project agencies, under the close supervision of the PMO. The Bank social specialist team will visit project sites and the resettlement locations during regular missions, and at other times as required, to confirm that project affected persons have been compensated according to the RAP, that livelihood restoration is satisfactory, and that grievance redress mechanisms are functioning effectively. The Bank will pay special attention to the due diligence review (and remedial measures needed and their implementation) for the linked project and to the relocation of the graves affected by the project. In addition, the Bank will review the internal and external monitoring reports to confirm proper implementation of the RAP and initiate any corrective action as needed. They will also monitor whether women are properly consulted at various stages of implementation, their concerns addressed, and that they benefit from the project equally.

7. **Use of Country Based Staff.** Most of the Bank task team is based in the China country office in Beijing to ensure rapid and effective response to the Borrower's needs for implementation support.

8. **Resources and skills required.** Formal supervision and site visits covering all aspects of project implementation will be carried out semi-annually, and will be supplemented by need-based visits by small groups. Estimated inputs from different specialists in different stages of project implementation are outlined below. These obviously might change as implementation progresses based on issues and problems identified at that time, hard to predict with accuracy at this time.

Time	Focus	Skills Needed	Resource Estimate
First twelve months	Procurement and contract management review, supervision and training	Procurement specialist(s) Contract management specialist	4 SWs 2 SW
	FM and disbursement training and FM supervision	FM specialist	4 SWs
	Social and Resettlement Management	Social development specialist	4 SWs
	Environmental training and supervision	Environmental specialist	4 SWs
	Wastewater Management	Wastewater Management Specialist	4 SWs
	Water Resources Management	Water Resources Management Specialist	4 SWs
	Lawyer	Senior Council	1 SW
	Monitoring and Evaluation	M&E Specialist	2 SW
	Team Leadership	TTL	8 SWs
12-48 months	Procurement and contract	Procurement specialist(s)	12 SWs

Other	management review, supervision and training	Contract management specialist	
	FM and disbursement training and FM supervision	FM specialist	9 SWs 3 SW
	Social and Resettlement Management	Social development specialist	9 SWs
	Environmental Management	Environmental specialist	9 SWs
	Wastewater Management	Wastewater Management Specialist	12SWs
	Water Resources Management	Water Resources Management Specialist	9SWs
	Legal Management	Senior Counsel	3SW
	Monitoring and Evaluation	M&E Specialist	6SW
	Team Leadership	TTL	24SWs

SW: Staff Weeks

9. The skills mix required is summarized below.

Skills Needed	Number of Staff Weeks (SWs) Each Year	Number of Trips	Comments
TTL/Water Resources Management	10 SWs	3	Bank staff Country Office based
Wastewater treatment technical specialist	10 SW	5	Country Office Based and Local and international Consultants. Important to have a lot of input early, first 1-2 years
WSS technical specialist	1 SW	1	Country Office Based Very low level of activity
Water resources management technical specialist	8 SW	0.5 X 2= 1	Bank International staff or International consultant. Combine travel with other mission commitments
Procurement Specialist	3 SW	2	Country Office Based
Contract Management Specialist	2 SW	2	Country Office Based Or local consultant
Social Development Specialist	3 SW	2	Country Office Based
Environmental Specialist	3 SW	2	Country Office Based

Annex 6: Economic Analysis

China: China-Qinghai Xining Water Environment Management Project (P133116)

1. 319,000 populations will benefit from the project. The project includes the five components: Construction of stormwater and wastewater Collection Systems, Comprehensive Stormwater management and river-bank environmental restoration, Integrated Gully Improvement, Demonstration of treated wastewater reuse and the Capacity Building. For the components of Construction of stormwater and wastewater Collection Systems, Comprehensive Stormwater management and river-bank environmental restoration and Integrated Gully Improvement, it is difficult to quantify economic benefits, at-least-cost analysis(cost-effectiveness approach (CEA) will be adopt to compare alternative and select the best design options to achieve the achievement objective; for the Demonstration of treated wastewater reuse component, the cost-benefit approach will be adopt, EIRR will be calculated.

Least cost Analysis.

2. The cost of the components of Construction of stormwater and wastewater Collection Systems, Comprehensive Stormwater management and river-bank environmental restoration and Integrated Gully Improvement were analyzed to see whether the options selected were the least cost options for the project. There are very few alternatives for them. The below are these alternatives for each component:

3. ***Construction of stormwater and wastewater Collection Systems.*** 6,472ha urban area will be serviced by the systems. Annual 2,639,500 ton wastewater and 12,944,000 ton stormwater will be collected by the systems. There are two alternatives: rain and sewage diversion system / rain and sewage system. For the each option, the investment and its operation cost are calculated and discounted by 12% as average discount rate. The whole cost present value of the rain and sewage diversion system and the rain and sewage system are RMB 97,540,000 Yuan and RMB 144,220,000 Yuan, in respectively. The rain and sewage diversion system will be proposed. The detailed results see the below table 1.

Table 1: Least Cost Analysis for Construction of Stormwater and Wastewater Collection Systems

Unit RMB 000 Yuan		
Item	Rain and Sewage Diversion System	Rain and Sewage System
Investment		
Laying rainwater pipes	38,377,100	-
Laying sewage pipes	25,829,500	64,256,200
Sewage treatment plant	22,326,945	55,500,000
others	7,962,900	13,788,200
Contigencies	7,217,000	13,354,400
Subtotal	101,713,445	146,898,800
Operations & Maintenance costs		
including: labor costs	518,400	334,800
others	1,688,600	3,489,400
Subtotal	2,207,000	3,824,200
Present Value(12%)	97,540,109	144,215,761

4. Comprehensive Stormwater management and river-bank environmental restoration. The subcomponent of the low impact development (LID) covers 267 ha rain attachment area. LID will reduce annually 421 ton total suspended solids (TSS) into the river and treat annually 2,338,920 m³ pre-treated water. There are two alternatives: LID scattered layout scheme and centralized layout scheme. For the each option, the investment and its operation cost are calculated and discounted by 12% as average discount rate. The whole cost present value of LID scattered layout scheme and centralized layout scheme are RMB 25,910,000 Yuan and RMB 29,350,000 Yuan, in respectively. The LID scattered layout scheme will be proposed. The detailed results see the below table 2.

Table 2 Least Cost Analysis for Low Impact Development

Unit RMB 000 Yuan		
Item	LID scattered layout	centralized layout
Investment		
Riparian stormwater treatment system	11,035,400	28,282,000
Bioretention tree pool	2,114,700	-
Point ecological treatment	170,000	-
others	2,295,400	3,911,500
Contigencies	1,561,500	3,219,400
Subtotal	17,177,000	35,412,900
Operations & Maintenance costs	389,800	655,200
Present Value(12%)	25,910,000	29,350,000

5. The subcomponent of the riparian landscape improvement covers 60,000 m². There are two alternatives: local plant program and flowering shrubs program. For the each option, the investment and its operation cost are calculated and discounted by 12% as average discount rate. The whole cost present value of the : local plant program and flowering shrubs program are

RMB 7,010,000 Yuan and RMB 7,210,000 Yuan, in respectively. The local plant program will be proposed. The detailed results see the below table 3.

Table 3 Least Cost Analysis for River-bank Environmental Restoration
Unit RMB 000 Yuan

Item	Local plant	Flowering shrubs
Investment		
Planting fee	536,800	540,300
others	294,000	306,200
Contigencies	83,100	84,700
Subtotal	913,800	931,200
Operations & Maintenance costs	1,196,300	1,232,000
Present Value(12%)	7,010,000	7,210,000

6. **Integrated Gully Improvement**. The component of the integrated gully improvement covers 56,700 m² revetment areas. The integrated gully improvement will collect annually 892,000 ton wastewater. There are two alternatives: open channel program and culvert program. For the each option, the investment and its operation cost are calculated and discounted by 12% as average discount rate. The whole cost present value of the open channel program and culvert program are RMB 17,480,000 Yuan and RMB 20,630,000 Yuan, in respectively. The open channel program will be proposed. The detailed results see the below table 4.

Table 4 Least Cost Analysis for Integrated Gully Improvement
Unit RMB 000 Yuan

Item	open channel program	culvert program
Investment		
Engineering fee	16,694,300	19,903,500
others	2,639,100	2,988,200
Contigencies	1,933,300	2,289,200
Subtotal	21,266,700	25,180,900
Operations & Maintenance costs	386,300	450,900
Present Value(12%)	17,480,000	20,630,000

Cost-Benefit Analysis for Demonstration of treated wastewater reuse component

7. Economic analysis was performed not only to determine the efficiency of use of investments but also to see the economic viability of the projects. The costs were based on the consultant's costs for investments and operation and maintenance of the demonstration of water reuse for reclaim water. Investment costs are based on market prices of existing contracts in the region excluding taxes and duties and transfer payments.

8. Based on these assumptions an economic analysis was done for the reclamation water supply systems. Table below summarizes the EIRR for the assumed tariffs. These tariffs can be assumed as the economic tariffs to obtain a viable scheme. Economic tariffs represent the full cost recovery of O & M and capital costs. Existing tariffs are about RMB 2.5 Yuan per cum.

9. The present tariffs only cover the costs of treatment plant (not the collections systems) and that only the operating costs of the treatment plant.

10. Benefits are derived from the tariff multiplied by the quantity of reclaim water supplied for the afforesting and for the municipal miscellaneous water wastewater treated. The startup period is for 3 years when water flows have to be built up to 30%, 60% and 100%, in respectively.

11. The cost-benefit analysis indicates that EIRR of the Demonstration of Water Reuse for Reclaim Water component will be 14.4%, providing a NPV of RMB 2.93 million Yuan. The component will be economically viable. (See table 5)

Table 5 EIRR for Demonstration of Water Reuse for Reclaim Water component

Economic Evaluation					CNY 10thousand				
Year	Costs				Benefits		Net Benefits	Present Value	
	Capital	Operation	Main-tenance	Total	Reclaim Trarff	Total			
2014	102	0.0	0.0	101.5	0.0	0.0	(101.5)	(101.5)	
2015	286	0.0	0.0	285.5	0.0	0.0	(285.5)	(254.9)	
2016	224	0.0	0.0	224.2	0.0	0.0	(224.2)	(178.7)	
2017	102	29.3	0.00	130.8	81.4	81.4	(49.4)	(41.0)	
2018	102	58.6	24.4	184.5	162.8	162.8	(21.8)	(24.2)	
2019	0.0	97.7	24.4	122.1	271.3	271.3	149.2	69.3	
2020	0.0	97.7	24.4	122.1	271.3	271.3	149.2	61.8	
2021	0.0	97.7	24.4	122.1	271.3	271.3	149.2	55.2	
2022	0.0	97.7	24.4	122.1	271.3	271.3	149.2	49.3	
2023	0.0	97.7	24.4	122.1	271.3	271.3	149.2	44.0	
2024	0.0	97.7	24.4	122.1	271.3	271.3	149.2	39.3	
2025	0.0	97.7	24.4	122.1	271.3	271.3	149.2	35.1	
2026	0.0	97.7	24.4	122.1	271.3	271.3	149.2	31.3	
2027	81.4	97.7	24.4	203.5	271.3	271.3	67.7	9.3	
2028	0.0	97.7	24.4	122.1	271.3	271.3	149.2	25.0	
2029	0.0	97.7	24.4	122.1	271.3	271.3	149.2	22.3	
2030	0.0	97.7	24.4	122.1	271.3	271.3	149.2	19.9	
2031	0.0	97.7	24.4	122.1	271.3	271.3	149.2	17.8	
2032	0.0	97.7	24.4	122.1	271.3	271.3	149.2	15.9	
2033	0.0	97.7	24.4	122.1	271.3	271.3	149.2	14.2	
2034	0.0	97.7	24.4	122.1	271.3	271.3	149.2	12.7	
2035	0.0	97.7	24.4	122.1	271.3	271.3	149.2	11.3	
2036	81.4	97.7	24.4	203.5	271.3	271.3	67.7	3.4	
2037	0.0	97.7	24.4	122.1	271.3	271.3	149.2	9.0	
2038	0.0	97.7	24.4	122.1	271.3	271.3	149.2	8.0	
2039	0.0	97.7	24.4	122.1	271.3	271.3	149.2	7.2	
2040	0.0	97.7	24.4	122.1	271.3	271.3	149.2	6.4	
2041	0.0	97.7	24.4	122.1	271.3	271.3	149.2	5.7	
2042	0.0	97.7	24.4	122.1	271.3	271.3	149.2	5.1	
2043	(40.7)	97.7	24.4	81.4	271.3	271.3	189.9	6.1	

Economic Internal Rate of Return: **14.4%**
Discount Rate: 12%
Economic Net Present Value (2014) 2,925

12. If the startup period is for 3 years when water flows have to be built up to 100%, EIRR of the Demonstration of Water Reuse for Reclaim Water component will be 19.1%, providing a NPV of RMB 3.22 million Yuan.

13. Sensitivity analysis shows that EIRR would be less than 12% under assumption of 10% decrease in economic benefits and 10% increase in total costs; hence the investment is reasonable. (See table 6)

Table 6 Sensitivity Analysis Result

Scenario	Item			EIRR	ENPV@12% (CNY million)
	Capital Costs	Operation and Maintenance	Benefits		
Base Case				14.4%	1.35
Sensitivity tests:					
1. Capital costs	+10%			13.2%	0.76
	+20%			12.3%	0.16
2. Operation and maintenance costs					
		+10%		13.4%	0.81
		+20%		12.5%	0.27
3. Benefits					
			(10%)	11.7%	-0.16
4. Combinations					
	+10%	+10%	(10%)	9.7%	-1.30

Annex 7: Project Map

China: China-Qinghai Xining Water Environment Management Project (P133116)

