Project Administration Manual

Project Number: 46048
November 2014

People's Republic of China: Jilin Urban Development Project

Contents

Project Administration Manual Purpose and Process

The project administration manual (PAM) describes the essential administrative and management requirements to implement the project on time, within budget, and in accordance with Government and Asian Development Bank (ADB) policies and procedures. The PAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the PAM.

The Jilin Provincial Government (JPG), the executing agency; Baicheng Municipal Government (BCMG) and Baishan Municipal Government (BSMG), the implementing agencies; Baicheng Economic Development Zone Development and Investment Corporation (BEDZDI), Baishan Xibeicha Qiyuan Hydropower Corporation (BXQH), and Baishan Solid Waste Disposal (BSWD), the project implementing units, are wholly responsible for the implementation of the ADB financed project, as agreed jointly between the borrower and ADB, and in accordance with Government and ADB's policies and procedures. ADB staff is responsible to support implementation including compliance by JPG, BCMG, BSMG, BEDZDI, BXQH, and BSWD of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At Loan Negotiations the borrower and ADB shall agree to the PAM and ensure consistency with the Loan Agreement. Such agreement shall be reflected in the minutes of the Loan Negotiations. In the event of any discrepancy or contradiction between the PAM and the Loan Agreement, the provisions of the Loan Agreement shall prevail.

After ADB Board approval of the project's report and recommendations of the President (RRP) changes in implementation arrangements are subject to agreement and approval pursuant to relevant Government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval they will be subsequently incorporated in the PAM.

Abbreviations

ADB	–	Asian Development Bank
ACWF	–	All China Women's Federation
BCMG	–	Baicheng Municipal Government
BSMG	–	Baishan Municipal Government
BEDZ	–	Baicheng Economic Development Zone
BEDZDI	–	BEDZ Development and Investment Corporation
BXQH	–	Baishan Xibeicha Qiyuan Hydropower Corporation
BSWD	–	Baishan Solid Waste Disposal
EIA	–	environmental impact assessment
EMP	–	environmental management plan
GAP	–	gender action plan
GRM	–	grievance redress mechanism
IEE	–	initial environmental examination
ICB	–	international competitive bidding
JPG	–	Jilin Provincial Government
LAR	–	land acquisition and resettlement
MOF	–	Ministry of Finance
MSW	–	municipal solid waste
mu	–	Chinese land measuring unit (1 hectare = 15 mu)
NCB	–	national competitive bidding
NDRC	–	National Development and Reform Commission
O&M	–	operation and maintenance
PAM	–	Project Administration Manual
PIU	–	project implementing unit
PMO	–	project management office
PPMS	–	project performance management system
PPTA	–	project preparatory technical assistance
PRC	–	People's Republic of China
PSA	–	poverty and social assessment
QCBS	–	quality- and cost-based selection
SAP	–	social action plan
SOE	–	statement of expenditures
TOR	–	terms of reference

I. PROJECT DESCRIPTION

1. The proposed project will support the development of Baishan and Baicheng cities in Jilin Province, the People's Republic of China (PRC) as livable and resource efficient medium-sized cities. It will address urgent infrastructure needs and make provision for (i) streamlining integrated solid waste management (ISWM) based on 3R principle;[1] (ii) improving water supply services in Baishan; and (iii) constructing urban roads and municipal services in Baicheng.

A. Rationale

2. The PRC's National Urbanization Strategy, 2014–2020 aims to increase the urbanization rate from the current 54% to 60% by 2020 (representing about 100 million new urban residents), and to 70% by 2030 (equal to about 300 million new urban residents).[2] Urbanization is perceived as a means to sustain economic growth through domestic consumption,[3] and to achieve more balanced development by directing the future urban population away from large cities.[4] The strategy focuses on the development of medium-sized cities (in which more than one-third of the urban population lives) as an important means of absorbing future urban residents in a sustainable, inclusive, and efficient manner.[5] These cities have the potential to generate sufficient economies of scale to cluster local economic activities, while their proximity to the rural population supports rural and urban integration,[6] and balances the development of industry and job markets nationally and in each province. Although they benefit from some advantages,[7] they suffer from a deficit of infrastructure and municipal services, resulting in environmental pollution and constrained economic development. The capacity of medium-sized cities to pilot, implement, and replicate efficient urban infrastructure and municipal service delivery best practices will play an essential role in the quality and livability of the country's urban development.

3. Development in Jilin Province is centered in the cities of Changchun and Jilin, and improvements barely reach the remote, less-developed prefectures in the southeast and northwest, where Baishan (480,000 residents) and Baicheng (330,000 residents) cities, respectively, are located. The Jilin provincial government (JPG) has formulated a strategy that prioritizes development of the two cities, seeking to increase economic activity, decrease the poverty rates in their respective areas,[8] and balance development within the province. Basic infrastructure is urgently needed in both cities to support these goals and promote resource-efficient, environmentally friendly urban development.

4. **Urban mobility enhancements.** Residential areas in western Baicheng—the Baicheng Economic Development Zone (BEDZ)—have grown without proper access to central municipal

[1] Reduce, reuse, and recycle.

[2] Staff Council of the PRC. 2014. *National New Urbanization Plan, 2014–2020*. Beijing.

[3] Domestic consumption accounted for 36% of the PRC's gross domestic product in 2011; by comparison, it accounted for 72% in the United States, 65% in the United Kingdom, and 59% in India. The PRC's domestic markets are perceived to have the potential to sustain economic growth even if the global economy stagnates.

[4] Most large or mega cities in the PRC face significant challenges relating to the environment and congestion (e.g., escalating housing prices, traffic gridlock, extensive air and water pollution, water scarcity, and overcrowding).

[5] A medium-sized city has a population of 0.2–1.0 million.

[6] On 15 November 2013, the decisions by the Central Committee of the Communist Party of China indicated that urbanization and reform of the *hukou* (household registration) system should focus on small- and medium-sized cities, while migration to the large and mega cities should be strictly controlled.

[7] Such as lower living costs, healthier environments, household registration system reforms, proximity to large rural populations, and lower land costs.

[8] The two cities and their surrounding rural areas have some of the highest poverty rates in the province.

services.[9] A rational road network is absent within the BEDZ to adequately support the city extension and properly connect the area to the rest of Baicheng. The city's current road design allows little room for promoting public and nonmotorized transport. The project will support the city master plan in upgrading and constructing strategic roads and municipal infrastructure in the BEDZ to provide adequate urban services to the existing population, and facilitate the development of mixed-function areas to accommodate future residents and economic activities. The project will promote low-carbon transport modes, including public and nonmotorized transport, through provision of lanes dedicated to buses and nonmotorized traffic. Combined with a capacity development program, this will initiate a change in the transport planning system, and promote the extension of low-carbon transport and more systematic and efficient use of public buses. A traffic management and control system, traffic safety measures, and a public-awareness campaign will be implemented, and will help to improve traffic safety and reduce traffic congestion.[10] The project will also pilot curbside stormwater collection and local infiltration, which has the potential to significantly reduce water logging and pollution.[11]

5. **Solid waste management and composting.** The current daily generation of municipal solid waste (MSW) is 420 wet tons per day (t/d) in Baicheng and 330 wet t/d in Baishan. In Baicheng, a new sanitary landfill is under construction. In Baishan, the existing landfill is being rehabilitated and will reach its maximum capacity in 3 years. In the two cities, solid waste management relies on "truck and dump" operations, with little consideration for 3R principles, and limited disposal options. This results in pollution and inefficient use of waste resources. To address the challenges these cities face in moving to long-term, environmentally compliant solutions, their solid waste management systems will be developed into ISWM systems,[12] based on the international waste hierarchy approach,[13] through a plan that defines step-by-step solutions for each type of waste and considers local conditions.[14] The project will pioneer an MSW composting program in a medium-sized city.[15] In selected communities that represent 20% of the population of the two cities, at-source segregation (a household-level, two-bin system for wet and dry waste) will be established. Wet waste will be directed to a composting facility to produce organic fertilizer for landscaping use. Recycling activities will be maximized by the provision of collection points for materials such as glass, metal, and clothes. Construction waste recycling machines will be procured to reuse construction waste. Finally, education and public awareness campaigns and community-based solid waste management will be implemented to ensure the sustained operation and impact of the infrastructure improvements.

6. **Resource-efficient and safe water supply system.** Baishan's water supply has reached its full capacity and cannot ensure 24-hour water services. Currently, 30% of the

[9] An estimated 25,000 residents are not yet connected to the central wastewater treatment plant, and discharge wastewater into the surrounding environment or into unimproved septic tanks.

[10] This will address urban traffic safety through engineering, education, and enforcement, and will include a traffic monitoring system, red light and speeding violation monitoring system, and real-time traffic condition displays.

[11] Water logging refers to temporary urban flooding; this results from urban drainage system overflows caused by increased surface sealing in cities.

[12] ISWM integrates (i) stakeholders; (ii) technical elements of waste reduction, reuse and recycling, collection, and disposal; and (iii) sociocultural, environmental, institutional, political, and legal issues.

[13] This involves reducing the amount and toxicity of material entering the waste flow (minimization), reusing as much material as practicable, recycling waste that cannot be reused, and disposing of residue in an environmentally sound way.

[14] The road map is in Appendix 4 of the Project Administration Manual (accessible from the list of linked documents in Appendix 2).

[15] Currently, composting represents less than 5% of SWM treatment undertaken in the PRC, and is virtually unknown in medium-sized cities.

population (144,000 people) lacks full-time access to water. The recent decline in the quality and quantity of the main water source (Dayangcha River) in Jiangyuan district combined with the growing population of Hunjiang district are putting Baishan's water supply safety at significant risk. Previously inadequate technical standards, aging pipes, and poor water supply dispatching efficiency have resulted in nonrevenue water (NRW) in Baishan reaching 65%; this in turn has caused inefficient water use, loss of income, and excessive energy consumption. The financing of a new 50,000 t/d water treatment plant will meet the needs of the current and future population.[16] It will be accompanied by measures, a road map (footnote 15), and investments that will ensure the water delivery system complies with international best practices and supports (i) reduction of NRW from 65% to 35%, by addressing water leakage, unbilled uses, and commercial losses; (ii) improvements in operations and energy efficiency by addressing engineering, automation and monitoring, and operation and maintenance (O&M); (iii) water supply safety, through the implementation of a water safety plan based on water quality monitoring and assurance systems;[17] (iv) financial sustainability through tariff reform to achieve full cost recovery; and (v) an education campaign to raise water conservation awareness.

7. **Strategic fit.** The project supports the Asian Development Bank (ADB) Strategy 2020 goal of livable and sustainable cities through creation of a cleaner and healthier environment.[18] It is aligned with the ADB country partnership strategy strategic pillars of supporting inclusive and environmentally sustainable development by promoting growth-oriented, resource-efficient urbanization.[19] It is also in line with ADB's urban strategic focus in the PRC, the National Urbanization Strategy (2014–2020), and the government's Twelfth Five-Year Plan as it supports (i) balanced urbanization with development of cities that are livable, conserve resources, and are inclusive; and (ii) the sector objective of improving and piloting best practices with respect to water, solid waste, and municipal services.[20] It directly supports the main thrust of ADB's urban and water operational plans, 2011–2020 by promoting well-conceived urban development, green cities, efficient water use, and asset management.[21] Finally, the project continues the long-term strategic partnership that ADB has built through multiple investments to decrease urban pollution and support more balanced urban development in Jilin Province, the Songhua river basin, and the Yalu river basin.[22]

[16] The water source will be Xibeicha reservoir (currently under construction).

[17] Water conservation and implementation of a water safety plan is based on World Health Organization methodology, and aims to avoid the limitations associated with relying on end-product testing as a means of water safety control.

[18] ADB. 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank, 2008–2020.* Manila.

[19] ADB. 2012. *Country Partnership Strategy: People's Republic of China, 2011–2015.* Manila.

[20] For example, the Twelfth Five-Year Plan direction for solid waste management indicates that classified collection, transport, and treatment of organic waste in the cities at or above prefecture level should be promoted. Model cities for domestic solid waste classification should focus on wet and/or dry classification of household garbage. If applicable, organic waste will be collected separately and recycled. The construction and upgrading of domestic solid waste transfer stations should be strengthened.

[21] ADB. 2013. *Urban Operational Plan, 2012–2020.* Manila; and ADB. 2011. *Water Operational Plan, 2011–2020.* Manila.

[22] ADB. 2008. *Report and Recommendation of the President to the Board of Directors. Proposed Loan to the People's Republic of China for the Songhua River Basin Water Pollution Control and Management Project.* Manila.; and ADB. 2011. *Report and Recommendation of the President to the Board of Directors. Proposed Loan to the People's Republic of China for the Jilin Water Supply and Sewerage Development Project.* Manila.

B. Impact and Outcome

8. The impact will be improved economic growth, resource efficiency, and quality of life in Baicheng and Baishan cities. The outcome will be improved delivery and efficiency of municipal services in Baicheng and Baishan cities.

C. Outputs

9. The project has four components: (i) Baicheng municipal services; (ii) the Baishan ISWM system; (iii) Baishan water supply management; and (iv) capacity development and institutional strengthening, divided into five outputs: (a) Output 1: improved urban infrastructure in Baicheng, which consists of (1) construction of nine urban roads with a total length of 32.4 kilometers (km), including dedicated bus (7 km) and nonmotorized transport (26 km) lanes; (2) construction of two bridges (20-meter span) and one railroad underpass; (3) installation of a 36.9 km water supply piping network; 63.2 km sanitary sewer piping network, including a pump station; 59.9 km stormwater piping network with two pump stations; and a 28.2 km heating network; (4) installation of associated communication, energy, lighting facilities, and landscaping; and (5) installation of traffic control and management system; (b) Output 2: ISWM system in Baicheng, which consists of (1) construction of a 30 t/d kitchen waste sorting and composting facility; (2) procurement of one construction material recycling machine; (3) construction of nine new MSW transfer stations and 20 recyclate collection points; and (4) upgrading of MSW handling, city cleaning and maintenance vehicles, and equipment; (c) Output 3: ISWM system in Baishan, which consists of (1) construction of a new MSW sanitary landfill with a daily capacity of 330 t/d; (2) construction of a 30 t/d kitchen waste sorting and composting facility; (3) provision for two construction waste recycling machines; (4) upgrading of 15 MSW transfer stations and 21 recyclate collection points; and (5) upgrading of MSW handling equipment, city cleaning and maintenance vehicles, and equipment; (d) Output 4: improved water supply management in Baishan, which consists of (1) construction of a 6.8 km water transmission line to Jiangyuan, supplying water to an existing water treatment plant; (2) construction of a 21.1 km water transmission line to Hunjiang new water treatment plant; (3) construction of a new 50,000 t/d water treatment plant with supervisory control and data acquisition system; (4) upgrading of the 11.1 km existing water supply piping network and construction of a 44.2 km new water supply piping network; and (5) construction of four pump stations, and provision of leak detection equipment, manholes, valves, flow meters, and other associated facilities; and (e) Output 5: improved capacity and institutional arrangements, comprising (1) support for project implementation and management, institutional strengthening, capacity development, and training; (2) institutional capacity development support for water management, community-led waste sorting and recycling, people-oriented urban transport, traffic management and safety, and public-awareness campaigns; and (3) external resettlement monitoring.

10. **Improved capacity and institutional arrangement.** This output consists of (a) support for project implementation and management, institutional strengthening, capacity development and training; (b) institutional capacity development support for water management, public awareness campaign and community-led waste sorting and recycling, people oriented urban transport, traffic management and safety, and public awareness campaigns; and (c) external resettlement monitoring.

11. The details of each output are summarized in the following table.

No		Description	Type/ Classification	Unit	Length/ Capacity	Remark
1	**Improved Urban Infrastructure in Baicheng**					
	A	**Urban Roads and Bridges**				
	1	Third ring road	Urban Major	M	11,304	
		20 m RC void slab bridge (W = 24 m twin bridge)				
		Railroad underpass	(two twin cell culverts: 8.5+11.5 m)			
	2	Xiangyang street (w/bus priority lanes)	Urban Major	m	4,505	
	3	Xinhua xi road (w/bus priority lanes)	Urban Major	m	2,724	
	4	Shengli road	Urban Major	m	2,068	
	5	Xingfu bei street	Urban Major	m	1,330	
	6	Nanyi street	Secondary	m	1,024	
	7	Taoerhe road	Secondary	m	2,657	
		20 m RC Void Slab Bridge (W = 30 m)				
	8	Chunyang road	Branch	m	3,881	
	9	Xinggong road	Branch	m	2,927	
		subtotal =			32,420	
	B	**Municipal Service Facilities**				
		Water supply		m	36,932	
		Sanitary sewer		m	63,229	
		No. 1 sewer pump station ((Xingfu Bei street/third ring road, capacity = 184.4 L/S) stormwater		m	59,890	
		No. 1 stormwater pump station (Xinggong road/G302, capacity = 10479 L/S)				
		No. 2 stormwater pump station (at existing pump station site, capacity = 11000 L/S)				
		Power supply	10 KV	km	33	
		Communication		km	33	
		Street lighting and landscaping		each	1,582	
		District heating primary piping network		m	28,194	
		Traffic control and traffic management		set	1	
2	**Integrated Solid Waste Management in Baicheng**					
		a. Municipal solid waste sorting and composting center		t/d	30	20 t cmpst
		b. Municipal solid waste transfer station	28 t/d	each	9	New
		c. Urban cleaning equipment, MSW container and trash bin		set	1	
		d. Urban Infrastructure maintenance equipment		set	1	
3	**Integrated Solid Waste Management in Baishan**					
		a. Municipal solid waste sanitary landfill		t/d	330	
		b. Municipal solid waste sorting center		t/d	30	20 t cmpst
		c. Municipal solid waste collection station		each	15	Upgrading
		d. Urban cleaning equipment, MSW container and trash bin				
		e. Construction waste recycling machines		each	3	

No	Description	Type/ Classification	Unit	Length/ Capacity	Remark
4	**Improved Water Supply Management in Baishan**				
	a. Water transmission lines to Hunjiang and Jiangyuan				
	Jiangyuan water transmission line	30,000 t/d	m	6,800	
	Hunjiang water transmission line	50,000 t/d	m	21,140	
	b. Water treatment plant for Hunjiang	50,000 t/d			New
	c. Water distribution network in Hunjiang				
	Upgrading existing water piping network		m	11,138	
	New water piping network		m	44,240	
5	**Improved Capacity & Institutional Arrangement**				
	A Project implementation support				
	B Institutional capacity development				
	C External resettlement monitoring				

cmpst = composting, km = kilometer, m = meter, MSW = municipal solid waste, t/d = ton per day.

II. IMPLEMENTATION PLAN

A. Project Readiness Activities

Indicative Activities	2014 Jul	Aug	Sep	Oct	Nov	Dec	2015 Jan	Feb	Mar	Apr	Responsible Agency
Establish project implementation arrangements											JPG, BCMG, BSMG, JHUCD, JPPMO
FSRs approval											JDRC
Prepare CUAR and PEOR											JPG, BCMG, BSMG, JHUCD, JPPMO
Advance contracting actions											BCMG, BSMG, JHUCD, JPPMO
Retroactive financing actions											BCMG, BSMG, JHUCD, JPPMO
Review and approval of CUAR and PEOR											MOF, NDRC
State Council approval for loan negotiation											State Council
Loan Negotiations											ADB, MOF, JMG, JFD, BCMG, BSMG
ADB Board approval											ADB
Loan signing											ADB, MOF
Government legal opinion provided											MOF, NDRC, JPG
Loan effectiveness											ADB, MOF

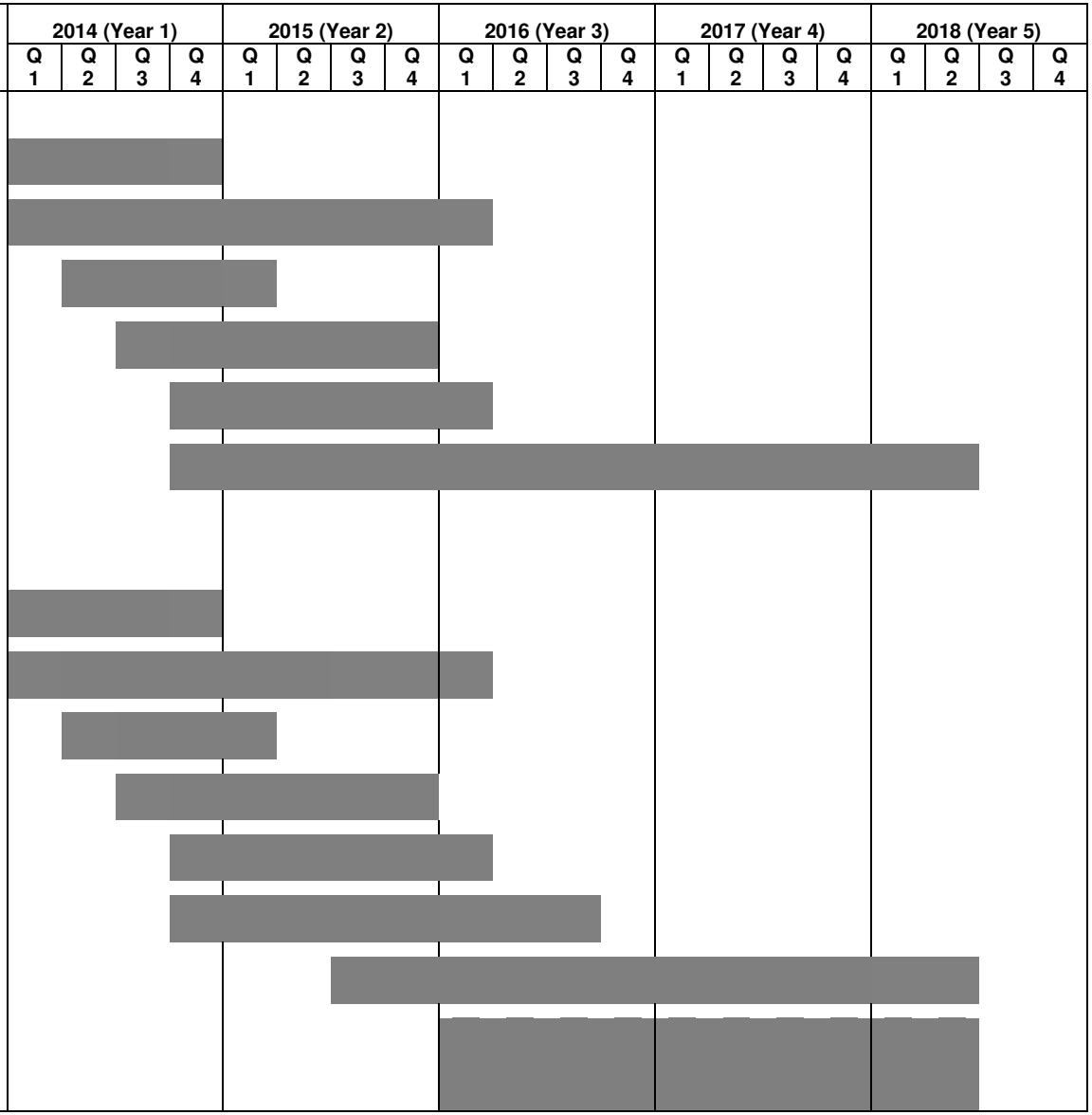
ADB = Asian Development Bank, BCMG = Baicheng Municipal Government, BSMG = Baishan Municipal Government, CUAR = Capital Utilization Application Report, FSR = feasibility study report, JDRC = Jilin Provincial Development and Reform Commission, JFD = Jilin Provincial Financial Department, JPG = Jilin Provincial Government, MOF = Ministry of Finance, NDRC = National Development and Reform Commission, PEOR = project evaluation opinion report, JPPMO = Jilin provincial project management office.

Notes:

1. Provision for advance contracting (RRP Page 6, Table 3).
2. Provision for retroactive financing is limited to 20% of the loan amount and may occur not more than 12 months before the loan effectiveness.
3. Board approval, loan signing, legal opinion, loan effectiveness—dates to be confirmed later.
4. The project readiness covers activities from establishing PMO and/or implementing agencies' during project preparation stage to loan effectiveness.

B. Overall Project Implementation Plan

Activities	Start	Finish
1 Improved Urban Infrastructure in Baicheng		
1.1 Preliminary design	Q1 2014	Q4 2014
1.2 Bidding document preparation	Q1 2014	Q1 2016
1.3 Detailed design	Q2 2014	Q1 2015
1.4 Land acquisition and resettlement	Q3 2014	Q4 2015
1.5 Bidding and contract award	Q4 2014	Q1 2016
1.6 Road, bridge, utility construction	Q4 2014	Q2 2018
2 Integrated Solid Waste Management System in Baicheng		
2.1 Preliminary design	Q1 2014	Q4 2014
2.2 Bidding document preparation	Q2 2014	Q1 2016
2.3 Detailed design	Q2 2014	Q1 2015
2.4 Land acquisition and resettlement	Q3 2014	Q4 2015
2.5 Bidding and contract award	Q4 2014	Q1 2016
2.6 Sorting and composting facility	Q4 2014	Q3 2016
2.7 MSW transfer stations construction	Q3 2015	Q2 2018
2.8 Equipment procurement	Q1 2016	Q2 2018



Activities	Start	Finish	2014 (Year 1)				2015 (Year 2)				2016 (Year 3)				2017 (Year 4)				2018 (Year 5)			
			Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
3 Integrated Solid Waste Management System in Baishan																						
3.1 Preliminary design	Q1 2014	Q3 2014																				
3.2 Bidding document preparation	Q2 2014	Q1 2016																				
3.3 Detailed design	Q2 2014	Q2 2016																				
3.4 Land acquisition and resettlement	Q3 2014	Q4 2015																				
3.5 Bidding and contract award	Q4 2014	Q1 2016																				
3.6 Sanitary landfill construction	Q1 2015	Q4 2016																				
3.7 Sorting and composting facility	Q2 2015	Q4 2016																				
3.8 MSW transfer stations construction	Q3 2015	Q2 2018																				
3.9 Equipment procurement	Q1 2017	Q2 2018																				
4 Improved Water Supply Management in Baishan																						
4.1 Preliminary design	Q1 2014	Q4 2014																				
4.2 Bidding document preparation	Q4 2014	Q1 2016																				
4.3 Detailed design	Q2 2014	Q2 2016																				
4.4 Land acquisition and resettlement	Q3 2014	Q4 2015																				
4.5 Bidding and contract award	Q4 2014	Q1 2016																				

Activities	Start	Finish	2014 (Year 1)				2015 (Year 2)				2016 (Year 3)				2017 (Year 4)				2018 (Year 5)			
			Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
4.6 Water transmission line construction	Q4 2014	Q4 2016																				
4.7 Water treatment plant construction	Q2 2015	Q4 2016																				
4.8 Water distribution network construction	Q3 2015	Q2 2018																				
5 Improved Capacity and Institutional Arrangement																						
5.1 Recruit and mobilize consultants	Q4 2014	Q2 2015																				
5.2 Establish project management system	Q1 2015	Q3 2015																				
5.3 Establish PPMS system	Q4 2014	Q3 2015																				
5.4 Project implementation support	Q1 2015	Q4 2018																				
5.5 Capacity development implementation	Q2 2015	Q2 2018																				
5.6 Environmental monitoring	Q4 2014	Q2 2018																				
5.7 Resettlement monitoring	Q4 2014	Q3 2017																				
5.8 PPMS monitoring	Q4 2014	Q2 2018																				

ISWM = integrated solid waste management, MSW = municipal solid waste, PPMS = project performance management system.
Source: PPTA consultant's report.

III. PROJECT MANAGEMENT ARRANGEMENT

A. Project Implementation Organization—Roles and Responsibilities

Project Implementation Organizations	Management Roles and Responsibilities
Executing agency	
Jilin Provincial Government	• Responsible for project coordination with two project city governments and liaison with ADB financial management and administration • Provide overall project guidance and coordination • Manage the project imprest account • Submit withdrawal applications to Asian Development Bank
Jilin Provincial Project Leading Group	• Headed by the Vice-Secretary General, and will include senior officials from JDRC, JFB, JHUCD, BCMG, and BSMG (members). • Provide policy guidance and project supervision • Facilitate interagency coordination and cooperation
Jilin Provincial Project Management Office (supported by Procurement Agent and Project Implementation Consulting Firm)	Responsible for entire project implementation • In charge of all day-to-day management work during project preparation and implementation period • Coordinate with all involved parties and government agencies for the project implementation • Communicate and coordinate with ADB for project management and implementation • Report project implementation progress and compliance monitoring to ADB • Engage project management consulting service • Engage external resettlement and social monitors • On behalf of the implementation agencies and three PIUs, review and submit bidding documents, bid evaluation reports, and other necessary documentations to ADB for necessary approval • Submit withdrawal applications to Jilin Provincial Finance Department • Submit required annual audit reports and financial statements of project account of the BCMG, BSMG, and PIUs to ADB • Engage a procurement agency which supports the implementation agencies and three PIUs
Implementing agency for Baicheng Roads, Bridges, Municipal Services and ISWM	
Baicheng Municipal Government	Responsible for project implementation of Baicheng subproject, including finance and administration, technical and procurement matters, monitoring and evaluation, safeguard compliance, provide policy guidance during implementation, and facilitate interagency coordination and coordination

Project implementation organizations	Management Roles and Responsibilities
Baicheng City Project Management Office (supported by Procurement Agent and Project Implementation Consulting Firm)	Responsible for Baicheng subproject • Headed by the director of BEDZ • In charge of all day-to-day management work during the project preparation and implementation period • Coordinate with all involved parties and government agencies for the project implementation • Communicate and coordinate with Jilin PMO office for project management and implementation • Engage a resettlement and social monitor
Implementing agency for Baishan Water Supply and ISWM	
Baishan Municipal Government	Responsible for project implementation of Baishan subproject, including finance and administration, technical and procurement matters, monitoring and evaluation, safeguard compliance, provide policy guidance during implementation, and facilitate interagency coordination and coordination.
Baishan City Project Management	Responsible for Baishan subproject

Project implementation organizations	Management Roles and Responsibilities
Office (supported by Procurement Agent and Project Implementation Consulting Firm	• Headed by the director of HCB • In charge of all day-to-day management work during the project preparation and implementation period • Coordinate with all involved parties and government agencies for the project implementation • Communicate and coordinate with Jilin provincial project management office for project management and implementation • Engage a resettlement and social monitor
Project implementing units	
BEDZ Development and Investment Corporation (supported by Procurement Agent and Project Implementation Consulting Firm	Implement Baicheng road, bridges, municipal services, and ISWM subproject on behalf of BCMG. • Engage contractors and procure equipment with assistance of the international tendering agency • Engage a design institute to complete preliminary and detailed engineering designs • Administer and monitor contractors and suppliers • Supervise construction and quality control • Contract construction supervision company • Contract Baicheng Environmental Monitoring Station to conduct environmental monitoring • Report to Baicheng municipal government
Baishan Xibeicha Qiyuan Hydropower Corporation (supported by Procurement Agent and Project Implementation Consulting Firm	Implement Baishan water supply component on behalf of BSMG • Engage contractors and procure equipment with assistance of the international tendering agency • Administer and monitor contractors and suppliers • Supervise construction and quality control • Contract construction supervision company • Contract Baishan Environmental Monitoring Station to conduct environmental monitoring • Report to BSMG
Baishan Solid Waste Disposal Company (supported by Procurement Agent and Project Implementation Consulting Firm	Implement Baishan MSW management component on behalf of BSMG • Engage contractors and procure equipment with assistance of the international tendering agency • Administer and monitor contractors and suppliers • Supervise construction and quality control • Contract construction supervision company • Contract Baishan Environmental Monitoring Station to conduct environmental monitoring • Report to BSMG
Asian Development Bank	Responsible for administering ADB-funded components of the project

ADB = Asian Development Bank, BCMG = Baicheng Municipal Government, BEDZ = Baicheng Economic Development Zone, BSMG = Baishan Municipal Government, DRC = Development and Reform Commission, EPB = Environmental Protection Bureau, HCB = Housing and Construction Bureau, HUCD = Housing and Urban Construction Development Department, ISWM = integrated solid waste management, LRB = Land Resources Bureau, MSW = municipal solid waste, PIU = project implementing units, PMO = project management office, WRB = water resources bureau.

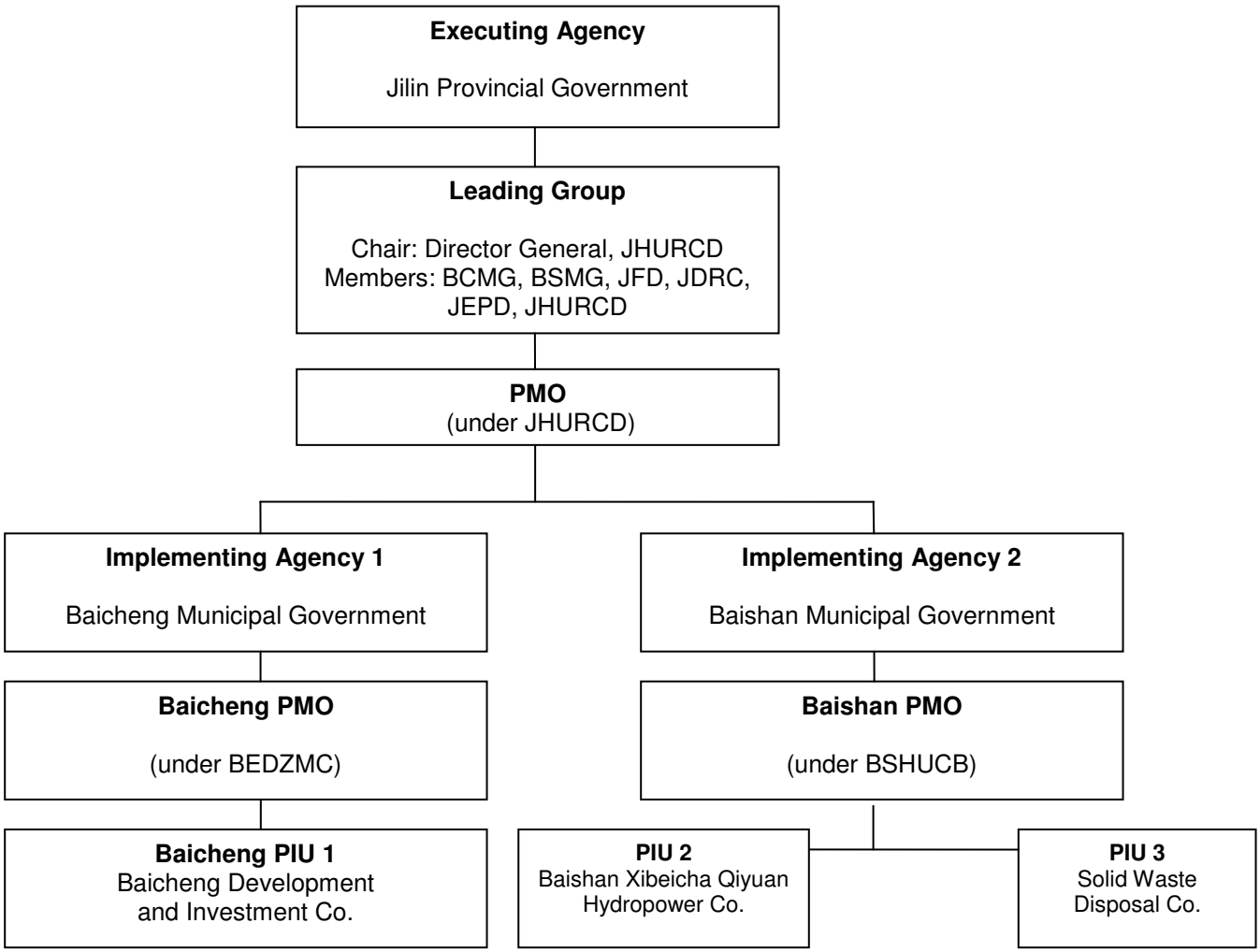
B. Key Persons Involved in Implementation

Provincial Government		
Jilin Provincial Finance Department	Officer's Name:	Cui Zhiqiang
	Position:	Deputy Director, Debt and Financing Division
	Telephone(Fax):	+86 0431 8855 0775
	Fax:	+86 0431 8855 3915
	Email Address:	cuizhiqiang62@163.com
	Office Address:	No. 3646 Renmin Avenue, Changchun City, Jilin Province, PRC
Jilin Provincial DRC	Officer's Name:	Li Xin
	Position:	Director, Utilization of Foreign Capital and Foreign Investment Division
	Telephone:	+86 0431 8891 5300
	Fax:	+86 0431 8891 5300
	Email Address:	+86 0431 8891 5300
	Office Address:	No. 329 Xinfa Road, Changchun City, Jilin Province, PRC
Executing Agency		
Jilin Provincial Government	Officer's Name:	Xing Wenzhong
	Position:	Deputy Director General, HUCD and Director, PMO
	Telephone(Fax):	+86 0431 82752305
	Email Address:	
	Office Address:	No.287 Guiyang Street, Changchun City, Jilin Province, PRC
	Officer's Name:	Zhang Jiuhui
	Position:	Director, Sector Development Division, HUCD and Deputy Director, PMO
	Telephone:	+86 0431 82798099
	Email Address:	jilinpmo@126.com
	Office Address:	No. 287 Guiyang Street, Changchun City, Jilin Province, PRC
Implementing Agencies		
Baicheng Municipal Government	Officer's Name:	Pei Zhong
	Position:	Vice Mayor
	Telephone:	+86 043 6321 1717
	Office Address:	No.1 Culture Eastern Road, Baicheng City, Jilin Province PRC
	Officer's Name:	Wang Ku
	Position:	Vice Mayor
Baishan Municipal Government	Telephone:	+86 0439 322-5659
	Office Address:	No.1717 Tienan Street, Baishan City, Jilin Province, PRC
Project Implementing Units		
BEDZ Development and Investment	Officer's Name:	Guan Tingzhi
	Position:	General Manager
	Telephone:	+86 15504362001
	Email Address	kfqtrz@163.com
	Office Address:	19/f Kaifa Building, No.88 Xingfu Southern Avenue, Baicheng City, Jilin Province, PRC
Baishan Xibeicha Qiyuan Hydropower Corporation	Officer's Name:	Feng Limin
	Position:	General Manager
	Telephone:	+86 186 0439 8516
	Office Address:	6/f Fangda Real Estate, No.114 Hunjiang Avenue, Hunjiang District, Baicheng City, Jilin Province, PRC
Baishan Solid Waste Disposal Company	Officer's Name:	Xia Jinsong
	Position:	General Manager
	Telephone:	+86 138 4396 1008

	Email Address	13604490601@163.com
	Office Address:	Xifeng Road, Hunjiang District, Baishan City, Jilin Province, PRC
Asian Development Bank		
East Asia Regional Department Urban and Social Sectors Division	Staff Name: Position: Telephone No.: Email Address:	Sangay Penjor Officer-in-Charge +63 2 632 6148 spenjor@adb.org
	Staff Name: Position: Telephone No.: Email Address:	Arnaud Heckmann Urban Development Specialist +63 2 632 5029 aheckmann@adb.org

DRC = development and reform commission, HUCD = Housing and Urban Construction Development Department, PMO = project management office.

C. Project Organization Structure



BCMG = Baicheng Municipal Government, BSMG = Baishan Municipal Government, BEDZ = Baicheng Economic Development Zone, BEDZMC = Baicheng Economic Development Zone Management Committee, BSHCB = Baishan Housing and Construction Bureau, JDRC = Jilin Development and Reform Commission, JEPD = Jilin Environmental Protection Department, JFB = Jilin Financial Bureau, JHUCD = Jilin Housing, Urban and Rural Construction Department, PMO = Project Management Office, PIU = Project Implementation Unit.

IV. COST AND FINANCING

1. The project is estimated to cost $386.84 million (Table 1). The government has requested a loan of $150 million from ADB's ordinary capital resources to help finance the project. The loan will have a 25-year term, including a grace period of 5 years, annuity method with 10% discount factor, an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.15% per year, and such other terms and conditions to be set forth in the draft loan and project agreements. Based on this, the average loan maturity is 18.31 years and the maturity premium payable to ADB is 0.20%.

2. The ADB loan will finance taxes and duties for eligible ADB-financed expenditures, and transportation and insurance costs included in the base cost for ensuring smooth project implementation. The loan will finance 38.78% of the project cost, including civil works, equipment and materials, and institutional strengthening. Interest and commitment charges will be capitalized. The government will finance the remaining $236.84 million, accounting for 61.22% of the project cost, through counterpart funds from municipal governments of Baicheng and Baishan, including civil works, resettlement and contingencies. The financing plan is in Table 2.

Table 1: Project Investment Plan
($ million)

Item		Amount[a]	Share Total (%)
A.	**Base Cost**[b]		
	1. Baicheng municipal services	234.05	60.5
	1.1 Baicheng urban infrastructure	202.48	52.3
	1. 2 Baicheng integrated solid waste management	31.57	8.2
	2. Baishan integrated solid waste management	30.85	8.0
	3. Baishan water supply management	63.55	16.4
	4. Capacity and institutional arrangement	3.00	0.8
	Subtotal (A)	**331.44**	**85.7**
B.	**Contingencies**[c]	**47.80**	**12.4**
C.	**Financial Charges During Implementation**[d]	**7.60**	**2**
	Total (A+B+C)	**386.84**	**100**

Note: Numbers may not add up precisely due to rounding.
[a] Includes taxes and duties of $16.57 million to be financed from government resources and ADB loan resources. The amount of taxes and duties to be financed by the project is based on the principles that (i) the amount of taxes and duties financed by the ADB loan does not represent an excessive share of the project, (ii) the taxes and duties apply only to ADB-financed expenditures, and (iii) the financing of the taxes and duties is relevant to the project success.
[b] In mid-2013 prices.
[c] Physical contingencies computed at 5% for civil works; and 5% for field research and development, training, surveys, and studies. Price contingences computed at 6.03% on foreign exchange costs and 9.37% on local currency cost.
[d] Includes interest and commitment charges. Interest during construction for ADB loan(s) has been computed at 5-year USD fixed swap rate plus a spread of 0.5% and additional 0.2% maturity premium. Commitment charges for an ADB loan are 0.15% per year on the undisbursed loan amount.
Source: Asian Development Bank estimates.

3. The PRC is the borrower of the loan and will make the loan available, through JPG to Baicheng and Baishan city governments on the same terms and conditions as those of the ADB loan. The project city governments will assume the foreign exchange and interest variation risks of the ADB loan. The governments assured ADB that counterpart funding will be provided in a timely manner, including any additional counterpart funding required for any shortfall of funds or

cost overruns. The indicative flow of funds and the relending and onlending arrangements are in the project administration manual (PAM).

Table 2: Financing Plan

Source	**Amount** ($ million)	**Share Total** (%)
Asian Development Bank	150.00	38.78
Baicheng Municipal Government	175.50	45.37
Baishan Municipal Government	61.34	15.85
Total	**386.84**	100.00

Note: Numbers may not add up due to rounding.
Source: Asian Development Bank estimates.

A. Detailed Cost Estimate by Expenditure Category

Item			(CNY million) Foreign Exchange	Local Currency	Total Cost	($ US Dollar million)[a] Foreign Exchange	Local Currency	Total Cost	% of Total Base Cost
A.	**Investment Costs**[b]								
	1	Civil works	102.87	925.80	1,028.66	17.14	154.30	171.44	51.7
		Baicheng municipal services	141.11	741.37	882.48	23.52	123.56	147.08	44.4
		a. Urban infrastructure	71.26	641.36	712.63	11.88	106.89	118.77	35.8
		b. Municipal solid waste	11.11	100.00	111.12	1.85	16.67	18.52	5.6
		Baishan water supply	16.80	151.24	168.04	2.80	25.21	28.01	8.5
		Baishan municipal solid waste	3.69	33.19	36.88	0.61	5.53	6.15	1.9
	2	Mechanical and equipment	38.25	344.23	382.48	6.37	57.37	63.75	19.2
		Baicheng municipal Services	16.60	149.40	166.00	2.77	24.90	27.67	8.3
		a. Urban infrastructure	14.36	129.25	143.61	2.39	21.54	23.93	7.2
		b. Municipal solid waste	2.24	20.15	22.39	0.37	3.36	3.73	1.1
		Baishan water supply	15.07	135.61	150.68	2.51	22.60	25.11	7.6
		Baishan municipal solid waste	6.58	59.22	65.80	1.10	9.87	10.97	3.3
	3	Environment and social mitigation	1.97	17.76	19.73	0.33	2.96	3.29	1.0
		Baicheng municipal services	0.45	4.05	4.50	0.08	0.68	0.75	0.2
		a. Urban infrastructure	0.39	3.51	3.90	0.06	0.58	0.65	0.2
		b. Municipal solid waste	0.06	0.55	0.61	0.01	0.09	0.10	0.0
		Baishan water supply	0.92	8.31	9.23	0.15	1.38	1.54	0.5
		Baishan municipal solid waste	0.60	5.40	6.00	0.10	0.90	1.00	0.3
	4	Land acquisition and resettlement	0.00	366.46	366.46	0.00	61.08	61.08	18.4
		Baicheng municipal services	0.00	298.46	298.46	0.00	49.74	49.74	15.0
		a. Urban infrastructure	0.00	258.20	258.20	0.00	43.03	43.03	13.0
		b. Municipal solid waste	0.00	40.26	40.26	0.00	6.71	6.71	2.0
		Baishan water supply	0.00	14.92	14.92	0.00	2.49	2.49	0.8
		Baishan municipal solid waste	0.00	53.07	53.07	0.00	8.85	8.85	2.7
	5	Consultants	18.00	0.00	18.00	3.00	0.00	3.00	0.9
	6	Design, survey, and management	16.51	148.60	165.11	2.75	24.77	27.52	8.3
	7	Operation expenditure	4.86	3.32	8.18	0.81	0.55	1.36	0.4
		Subtotal (A)	**182.46**	**1,806.17**	**1,988.63**	**30.41**	**301.03**	**331.44**	**100.0**
B.	**Recurrent Costs**								
	1	Salaries	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	2	Accommodation	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	3	Equipment operation and maintenance	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Item			(CNY million) Foreign Exchange	Local Currency	Total Cost	($ US Dollar million) Foreign Exchange	Local Currency	Total Cost	% of Total Base Cost
		Subtotal (B)	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		Total Base Cost	**182.46**	**1,806.17**	**1,988.63**	**30.41**	**301.03**	**331.44**	**100.0**
C.	**Contingencies**[c]								
	1	Physical	0.00	97.03	97.03	1.80	16.17	17.97	5.4
	2	Price	17.90	161.08	178.98	2.98	26.85	29.83	9.0
		Subtotal (C)	**28.68**	**258.11**	**286.79**	**4.78**	**43.02**	**47.80**	**14.4**
D.	**Financial Charges During Implementation**[d]								
	1	Interest during implementation	28.23	14.11	42.34	4.70	2.35	7.06	2.1
	2	Commitment charges	3.27	0.00	3.27	0.54	0.00	0.54	0.2
		Subtotal (D)	**31.50**	**14.11**	**45.61**	**5.25**	**2.35**	**7.60**	2.3
Total Project Cost (A+B+C+D)			**242.63**	**2,078.39**	**2,321.03**	**40.44**	**346.40**	**386.84**	**116.7**

[a] Includes taxes and duties of $16.57 million to be financed from government resources and ADB loan resources. The amount of taxes and duties to be financed by the project is based on the principles that (i) the amount of taxes and duties financed by the ADB loan does not represent an excessive share of the project, (ii) the taxes and duties apply only to ADB-financed expenditures, and (iii) the financing of the taxes and duties is relevant to the success of the project.

[b] In mid-2013 prices.

[c] Physical contingencies computed at 5% for civil works; and 5% for field research and development, training, surveys, and studies. Price contingences computed at 6.03% on foreign exchange costs and 9.37% on local currency cost.

[d] Includes interest and commitment charges. Interest during construction for ADB loan(s) has been computed at 5-year USD fixed swap rate plus a spread of 0.5% and additional 0.2% maturity premium. Commitment charges for an ADB loan are 0.15% per year on the undisbursed loan amount.

Source: Asian Development Bank estimates.

(See Table "Cost by Components" for notes)

B. Allocation and Withdrawal of Loan Proceeds

Number	Item	Total Amount Allocated for ADB Financing ($)		Basis for Withdrawal from the Loan Account
		Category	Subcategory	
1	Works	75,660,000		
1A	Baicheng municipal services		65,260,000	47% of total expenditure claimed
1B	Baishan water supply		7,420,000	25% of total expenditure claimed
1C	Baishan municipal solid waste		2,980,000	42% of total expenditure claimed
2	Goods	63,750,000		
2A	Baicheng municipal services		27,670,000	100% of total expenditure claimed
2B	Baishan water supply		25,110,000	100% of total expenditure claimed
2C	Baishan municipal solid waste		10,970,000	100% of total expenditure claimed
3	Consulting Services	3,000,000		100% of total expenditure claimed
4	Interest and Commitment Charges	7,590,000		100 % of amounts due
	Total	**150,000,000**		

C. Detailed Cost Estimates by Financier (in $ million)[a]

Item			ADB Amount	ADB % of Cost Category	Baicheng Municipal Government Amount	Baicheng Municipal Government % of Cost Category	Baishan Municipal Government Amount	Baishan Municipal Government % of Cost Category	Total Cost
A.	**Investment Costs**[b]								
	1	Civil works	74.49	43.50	72.38	42.2	24.57	14.3	171.44
		Baicheng municipal services	64.91	47.30	72.38	52.7			137.29
		a. Urban infrastructure	56.15	47.30	62.62	52.7			118.77
		b. Municipal solid waste	8.76	47.30	9.76	52.7			18.52
		Baishan water supply	7.03	25.10			20.98	74.9	28.01
		Baishan municipal solid waste	2.56	41.60			3.59	58.4	6.15
	2	Mechanical and equipment	63.75	100.00	0.00	0.0	0.00	0.0	63.75
		Baicheng municipal services	27.67	100.00	0.00	0.0			27.67
		a. Urban infrastructure	23.93	100.00	0.00	0.0			23.93
		b. Municipal solid waste	3.73	100.00	0.00	0.0			3.73
		Baishan water supply	25.11	100.00			0.00	0.0	25.11
		Baishan municipal solid waste	10.97	100.00			0.00	0.0	10.97
	3	Environment and social mitigation	1.16	35.20	0.40	12.0	1.74	52.8	3.29
		Baicheng municipal services	0.35	47.30	0.40	52.7			0.75
		a. Urban infrastructure	0.31	47.30	0.34	52.7			0.65
		b. Municipal solid waste	0.05	47.30	0.05	52.7			0.10
		Baishan water supply	0.39	25.10			1.15	74.9	1.54
		Baishan municipal solid waste	0.42	41.60			0.58	58.4	1.00
	4	Land acquisition and resettlement	0.00	0.00	49.74	81.4	11.33	18.6	61.08
		Baicheng municipal services	0.00	0.00	49.74	100.0			49.74
		a. Urban Infrastructure	0.00	0.00	43.03	100.0			43.03
		b. Municipal solid waste	0.00	0.00	6.71	100.0			6.71
		Baishan water supply	0.00	0.00			2.49	100.0	2.49
		Baishan municipal solid waste	0.00	0.00			8.85	100.0	8.85
	5	Consultants	3.00	100.00					3.00
	6	Survey, design, and management	0.00	0.00	17.98	65.3	9.54	34.7	27.52
	7	Operation expenditure	0.00	0.00	0.61	45.1	0.75	54.9	1.36
		Subtotal (A)	**142.40**	**43.00**	**141.11**	**42.6**	**47.93**	**14.5**	**331.44**
		Total Base Cost	**142.40**	**43.00**	**141.11**	**42.6**	**47.93**	**14.5**	**331.44**
B.	**Contingencies**[c]		**0.00**	**0.00**	**34.39**	71.9	**13.41**	**28.1**	**47.80**
	1	Physical	0.00	0.00	13.11	73.0	4.86	27.0	17.97
	2	Price	0.00	0.00	21.28	71.3	8.55	28.7	29.83

Item		ADB Amount	ADB % of Cost Category	Baicheng Municipal Government Amount	Baicheng Municipal Government % of Cost Category	Baishan Municipal Government Amount	Baishan Municipal Government % of Cost Category	Total Cost
C.	**Financial Charges During Implementation**[d]	**7.60**	**100.00**	**0.00**	**0.0**	**0.00**	**0.0**	**7.60**
	1 Interest during implementation	7.06	100.00	0.00	0.0	0.00	0.0	1.65
	2 Commitment charges	0.54	100.00	0.00	0.00	0.00	0.0	0.13
	Total Project Cost (A+B+C+D)	**150.00**		**175.50**		**61.34**		**386.84**
	% Total Project Cost	**38.8**		**45.4**		**15.9**		**61**

[a] Includes taxes and duties of $16.57 million to be financed from government resources and ADB loan resources. The amount of taxes and duties to be financed by the project is based on the principles that (i) the amount of taxes and duties financed by the ADB loan does not represent an excessive share of the project, (ii) the taxes and duties apply only to ADB-financed expenditures, and (iii) the financing of the taxes and duties is relevant to the success of the project.

[b] In mid-2013 prices.

[c] Physical contingencies computed at 5% for civil works; and 5% for field research and development, training, surveys, and studies. Price contingences computed at 6.03% on foreign exchange costs and 9.37% on local currency cost.

[d] Includes interest and commitment charges. Interest during construction for ADB loan(s) has been computed at 5-year USD fixed swap rate plus a spread of 0.5% and additional 0.2% maturity premium. Commitment charges for an ADB loan are 0.15% per year on the undisbursed loan amount.

Source: Asian Development Bank estimates.

D. Detailed Cost Estimate by Outputs ($ million)[a]

Item			Total Cost	Baicheng Infrastructure Amount	Baicheng Infrastructure % of Cost Category	Baicheng MSW Amount	Baicheng MSW % of Cost Category	Baishan Water Supply Amount	Baishan Water Supply % of Cost Category	Baishan Municipal Solid Waste Amount	Baishan Municipal Solid Waste % of Cost Category
A.	**Investment Costs**[b]										
	1	Civil Works	171.44	118.77	69.3%	18.52	10.8%	28.01	16.3%	6.15	3.6%
	2	Mechanical and equipment	63.75	23.93	37.5%	3.73	5.9%	25.11	39.4%	10.97	17.2%
	3	Environment and social mitigation	3.29	0.65	19.7%	0.10	3.1%	1.54	46.8%	1.00	30.4%
	4	Land acquisition and resettlement	61.08	43.03	70.5%	6.71	11.0%	2.49	4.1%	8.85	14.5%
	5	Consultants	3.00	1.73	57.7%	0.27	9.0%	0.70	23.3%	0.30	10.0%
	6	Survey, design, and management	27.52	15.56	56.5%	2.43	8.8%	5.94	21.6%	3.60	13.1%
	7	Operation expenditure	1.36	0.53	39.0%	0.08	6.1%	0.46	34.0%	0.29	21.0%
		Subtotal (A)	**331.44**	**204.21**	**61.6%**	**31.84**	**9.6%**	**64.25**	**19.4%**	**31.15**	**9.4%**
B.	**Recurrent Costs**										
	1	Salaries	0.00	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%
	2	Accommodation	0.00	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%
	3	Equipment operation and maintenance	0.00	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%
		Subtotal (B)	**0.00**	**0.00**	**0.0%**	**0.00**	0.0%	**0.00**	**0.0%**	**0.00**	**0.0%**
		Total Base Cost	**331.44**	**204.21**	**61.6%**	**31.84**	**9.6%**	**64.25**	**19.4%**	**31.15**	**9.4%**
C.	**Contingencies**[c]										
	1	Physical	17.97	11.34	63.1%	1.77	9.8%	3.02	16.8%	1.84	10.3%
	2	Price	29.83	18.41	61.7%	2.87	9.6%	5.74	19.3%	2.81	9.4%
		Subtotal (C)	**47.80**	**29.75**	**62.2%**	**4.64**	**9.7%**	**8.76**	**18.3%**	**4.65**	**9.7%**
D.	**Financial Charges During Implementation**[d]										
	1	Interest during implementation	7.06	4.07	57.7%	0.63	9.0%	1.65	23.3%	0.71	10.0%
	2	Commitment charges	0.54	0.31	57.7%	0.05	9.0%	0.13	23.3%	0.05	10.0%
		Subtotal (D)	7.60	**4.38**	**57.7%**	0.68	9.0%	**1.77**	**23.3%**	**0.76**	**10.0%**
Total Project Cost (A+B+C+D)			**386.84**	**238.34**	**61.6%**	**37.16**	**9.6%**	**74.78**	**19.3%**	**36.56**	**9.4%**

[a] Includes taxes and duties of $16.57 million to be financed from government resources and ADB loan resources. The amount of taxes and duties to be financed by the project is based on the principles that (i) the amount of taxes and duties financed by the ADB loan does not represent an excessive share of the project, (ii) the taxes and duties apply only to ADB-financed expenditures, and (iii) the financing of the taxes and duties is relevant to the success of the project.

[b] In mid-2013 prices.

[c] Physical contingencies computed at 5% for civil works; and 5% for field research and development, training, surveys, and studies. Price contingences computed at 6.03% on foreign exchange costs and 9.37% on local currency cost.

[d] Includes interest and commitment charges. Interest during construction for ADB loan(s) has been computed at 5-year USD fixed swap rate plus a spread of 0.5% and additional 0.2% maturity premium. Commitment charges for an ADB loan are 0.15% per year on the undisbursed loan amount.

Source: Asian Development Bank estimates.

E. Detailed Cost Estimate by Year ($ million)[a]

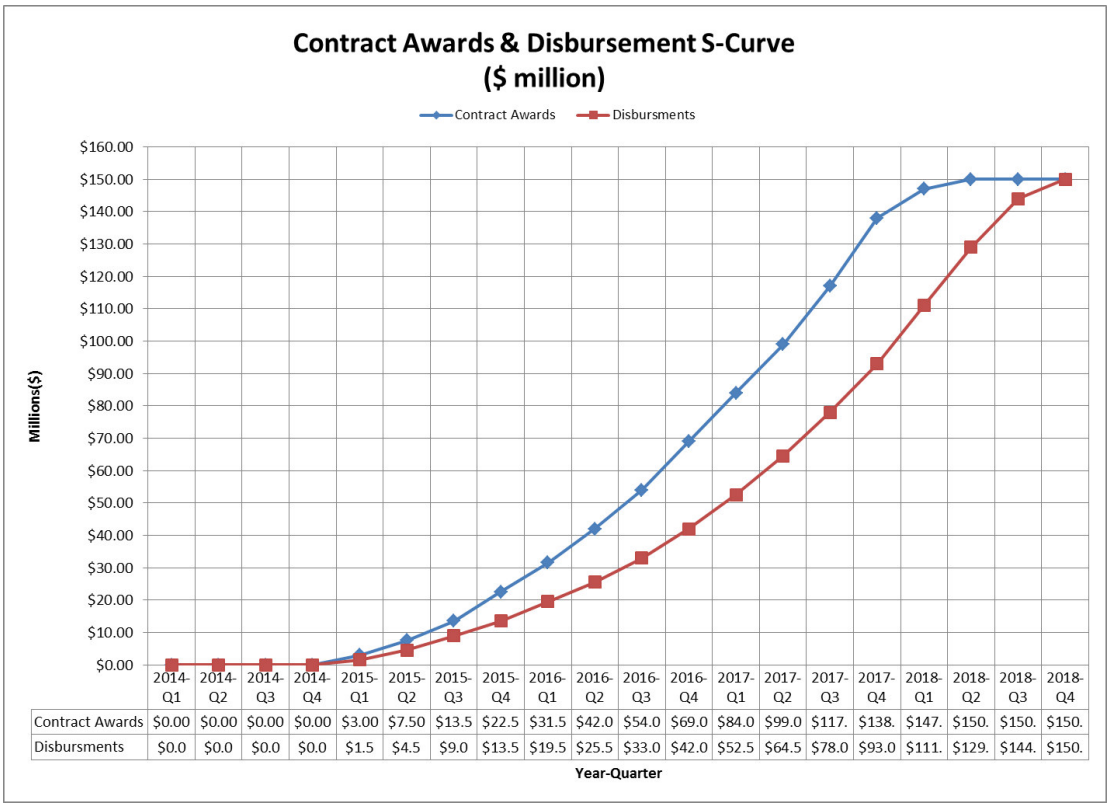
Item		Total	2014 (Year 1)	2015 (Year 2)	2016 (Year 3)	2017 (Year 4)	2018 (Year 5)
A.	**Investment Costs**[b]						
1	Civil works	171.44	6.17	46.31	92.62	138.93	24.70
	Baicheng municipal services	137.29	2.75	20.59	41.19	61.78	10.98
	a. Urban infrastructure	118.77	2.38	17.82	35.63	53.45	9.50
	b. Municipal solid waste	18.52	0.37	2.78	5.56	8.33	1.48
	Baishan water supply	28.01	0.56	4.20	8.40	12.60	2.24
	Baishan municipal solid waste	6.15	0.12	0.92	1.84	2.77	0.49
2	Mechanical and equipment	63.75	1.83	13.71	27.42	41.14	7.31
	Baicheng municipal Services	27.67	0.55	4.15	8.30	12.45	2.21
	a. Urban infrastructure	23.93	0.48	3.59	7.18	10.77	1.91
	b. Municipal solid waste	3.73	0.07	0.56	1.12	1.68	0.30
	Baishan water supply	25.11	0.50	3.77	7.53	11.30	2.01
	Baishan municipal solid waste	10.97	0.22	1.65	3.29	4.94	0.88
3	Environment and social mitigation	3.29	0.08	0.61	1.21	1.82	0.32
	Baicheng municipal services	0.75	0.02	0.11	0.23	0.34	0.06
	a. Urban infrastructure	0.65	0.01	0.10	0.19	0.29	0.05
	b. Municipal solid waste	0.10	0.00	0.02	0.03	0.05	0.01
	Baishan water supply	1.54	0.03	0.23	0.46	0.69	0.12
	Baishan municipal solid waste	1.00	0.02	0.15	0.30	0.45	0.08
4	Land acquisition and resettlement	61.08	2.22	16.62	33.25	49.87	8.87
	Baicheng municipal services	49.74	0.99	7.46	14.92	22.38	3.98
	a. Urban infrastructure	43.03	0.86	6.46	12.91	19.37	3.44
	b. Municipal solid waste	6.71	0.13	1.01	2.01	3.02	0.54
	Baishan water supply	2.49	0.05	0.37	0.75	1.12	0.20
	Baishan municipal solid waste	8.85	0.18	1.33	2.65	3.98	0.71
5	Consultants	3.00	0.06	0.45	0.90	1.35	0.24
6	Survey, design, and management	27.52	0.55	4.13	8.26	12.38	2.20
7	Operation expenditure	1.36	0.03	0.20	0.41	0.61	0.11
	Subtotal (A)	**331.44**	**10.94**	**82.03**	**164.07**	**246.10**	**43.75**
B.	**Recurrent Costs**						
1	Salaries	0.00	0.00	0.00	0.00	0.00	0.00
2	Accommodation	0.00	0.00	0.00	0.00	0.00	0.00
3	Equipment operation and maintenance	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal (B)	**0.00**	**0.00**	0.00	**0.00**	0.00	**0.00**
	Total Base Cost	**331.44**	**10.94**	**82.03**	**164.07**	**246.10**	**43.75**

Item			Total	2014 (Year 1)	2015 (Year 2)	2016 (Year 3)	2017 (Year 4)	2018 (Year 5)
C.	**Contingencies**[c]		**47.80**	**0.96**	**7.17**	**14.34**	**21.51**	**3.82**
	1	Physical	18.0	0.36	2.70	5.39	8.09	1.44
	2	Price	29.8	0.60	4.47	8.95	13.42	2.39
D.	**Financial Charges During Implementation**[d]		**7.60**	**0.15**	**1.14**	**2.28**	**3.42**	**0.61**
	1	Interest during construction	7.1	0.14	1.06	2.12	3.18	0.56
	2	Commitment charges	0.5	0.01	0.08	0.16	0.25	0.04
	Total Project Cost (A+B+C+D)		**386.84**	**12.05**	**90.34**	**180.69**	**271.03**	**48.18**
	% Total Project Cost		**100.00**	**3.00**	**23.00**	**47.00**	**70.00**	**12%**

[a] Includes taxes and duties of $16.57 million to be financed from the government and ADB loan resources.
[b] In mid-2013 prices.
[c] Physical contingencies computed at 5% for civil works; and 5% for field research and development, training, surveys, and studies. Price contingences computed at 6.03% on foreign exchange costs and 9.37% on local currency cost.
[d] Includes interest and commitment charges. Interest during construction for ADB loan has been computed at the 5-year forward London interbank offered rate plus a contractual spread of 0.5% and additional 0.2% maturity premium and commitment charges for an ADB loan are 0.15% per year on the undisbursed loan amount.

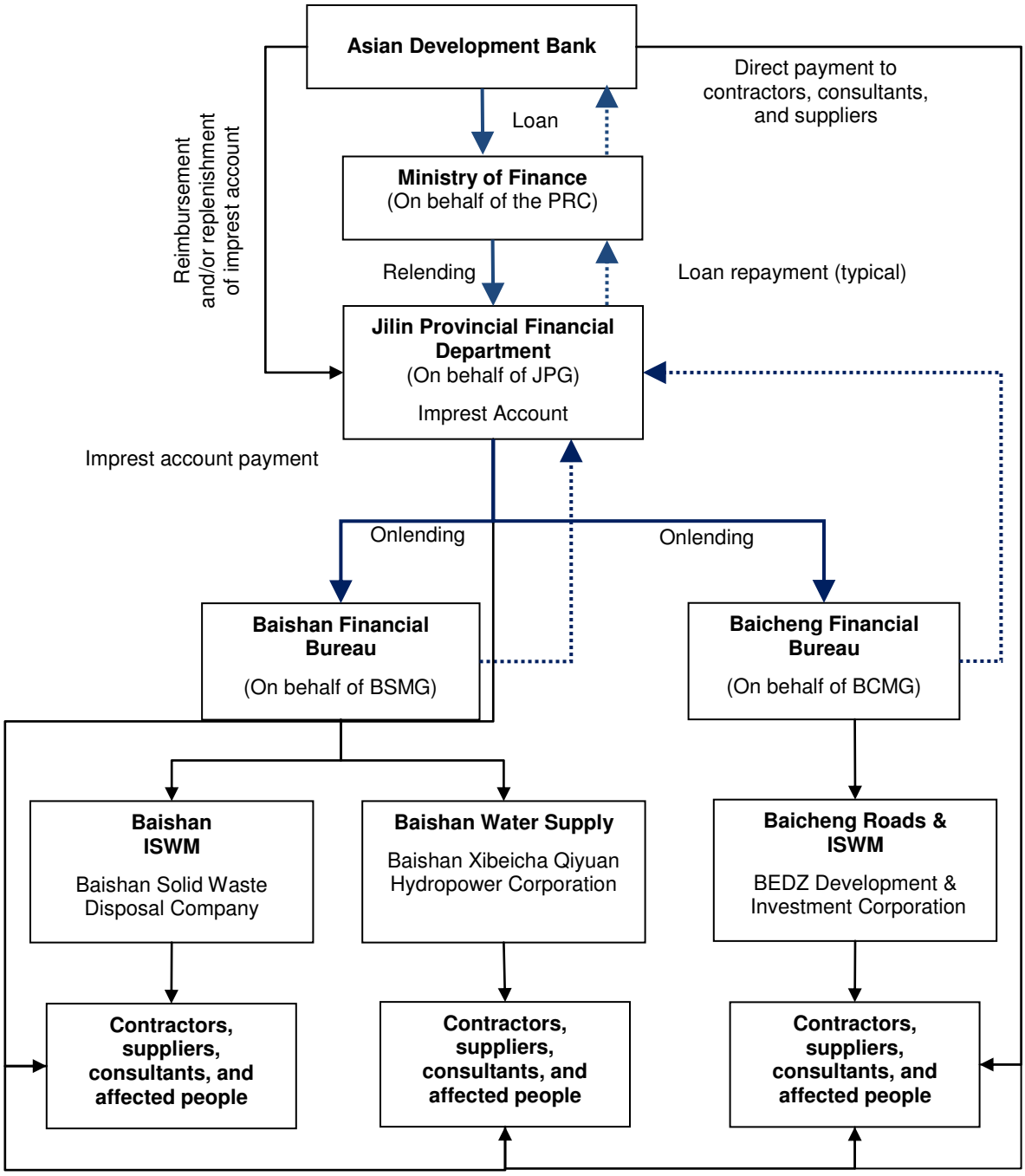
Source: Asian Development Bank estimates.
(See Table "Cost by Components" for notes)

F. **Contract and Disbursement S-Curve** ($ million)



	2014-Q1	2014-Q2	2014-Q3	2014-Q4	2015-Q1	2015-Q2	2015-Q3	2015-Q4	2016-Q1	2016-Q2	2016-Q3	2016-Q4	2017-Q1	2017-Q2	2017-Q3	2017-Q4	2018-Q1	2018-Q2	2018-Q3	2018-Q4
Contract Awards	$0.00	$0.00	$0.00	$0.00	$3.00	$7.50	$13.5	$22.5	$31.5	$42.0	$54.0	$69.0	$84.0	$99.0	$117.	$138.	$147.	$150.	$150.	$150.
Disbursments	$0.0	$0.0	$0.0	$0.0	$1.5	$4.5	$9.0	$13.5	$19.5	$25.5	$33.0	$42.0	$52.5	$64.5	$78.0	$93.0	$111.	$129.	$144.	$150.

G. Fund Flow Mechanism



BCMG = Baicheng Municipal Government, BSMG = Baishan Municipal Government, BEDZ = Baicheng Economic Development Zone, ISWM = Integrate Municipal Solid Waste Management, JPG = Jilin Provincial Government, PRC = People's Republic of China.

V. FINANCIAL MANAGEMENT

A. Financial Management Assessment

1. The financial management assessment was carried out in accordance with ADB's Guidelines for the *Financial Management and Analysis of Projects*[1] and *Financial Due Diligence: a Methodology Note*,[2] to assess the financial management capacity of the two implementing agencies: Baicheng Municipal Government (BCMG) and Baishan Municipal Government (BSMG); and the three project implementing units: Baicheng Economic Development Zone Development and Investment Corporation (BEDZDI), Baishan Xibeicha Qiyuan Hydropower Corporation (BXQH), and Baishan Solid Waste Disposal Company, including funds-flow arrangements, staffing, accounting policies and procedures, internal and external auditing arrangements, reporting and monitoring, and financial information systems. The assessment concluded that BEDZDI, BXQH, and Baishan Solid Waste Disposal (BSWD) are inexperienced in managing ADB projects; hence the project capacity development component will provide comprehensive assistance on ADB policies and procedures, including procurement and disbursement. The overall financial management risk-rating of the project is "medium". The identified risks in financial management will be closely monitored during project implementation. The assessment indicated that (i) there are established accounting and financial management policies and procedures in the People's Republic of China (PRC), which are strictly followed by BEDZDI, BXQH, and BSWD; and (ii) they have sound accounting and financial management capability and are experienced in managing large domestic projects. However, the implementing agencies, BEDZDI, BXQH, and BSWD never implemented foreign-funded projects, and the managers and financial personnel have limited knowledge and experience of ADB policies and procedures.

2. It was agreed that the implementing agencies, BEDZDI, BXQH, and BSWD will strengthen their financial management capability to manage the project, including (i) setting up clear institutional arrangements and strengthen coordination mechanism; (ii) completing staff recruitment to fill identified positions; (iii) developing policies and procedures for managing foreign exchange and interest rate risks; (iv) undertaking more training, particularly on ADB policy and procedures and internal auditing system; and (v) seeking external financial management assistance as needed.

B. Disbursement

3. The loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2012, as amended from time to time) and detailed arrangements agreed upon between the government and ADB.[3]

4. Pursuant to ADB's Safeguard Policy Statement (SPS, 2009),[4] ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the SPS. All financial institutions will ensure that their investments are in compliance with applicable national laws and regulations and will apply the prohibited investment activities list to subprojects financed by ADB.

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[1] ADB. 2005. *Financial Management and Analysis of Projects*. Manila.
[2] ADB. 2009. *Financial Due Diligence: A Methodology Note.* Manila.
[3] Loan Disbursement Handbook available at http://www.adb.org/documents/loan-disbursement-handbook. Link Chinese version http://www.adb.org/documents/loan-disbursement-handbook-zh.
[4] Safeguard Policy Statement available at http://www.adb.org/sites/default/files/pub/2009/Safeguard-Policy-Statement-June2009.pdf.

5. The implementing agencies, BEDZDI, BXQH, and BSWD, will be responsible for all disbursement arrangements for each of the subprojects in Baicheng and Baishan, including (i) preparing disbursement projections, (ii) requesting budgetary allocations for counterpart funds, (iii) collecting supporting documents, and (iv) preparing and sending withdrawal applications to ADB.

6. Direct payment procedure will generally be used for large civil works, equipment contracts, and consulting service contracts. Reimbursement procedures will also be used as appropriate when the government initially funds ADB eligible expenditures from its own resources.

7. To facilitate project implementation and funds flow, Jilin Finance Department (JFD) on behalf of Jilin Provincial Government (JPG) will, upon loan effectiveness, establish the imprest account at a commercial bank acceptable to ADB. Expenditures not using the imprest account may use other disbursement procedures, such as direct payment (to the supplier or contractor), commitment, and reimbursement.

8. The maximum ceiling of the imprest account will not at any time exceed 10% of the loan amount. The currency of the imprest accounts will be the US dollar ($). The imprest account is to be used exclusively for ADB's share of eligible expenditures. The JPG, through JFD, who established the imprest account in its name, is accountable and responsible for proper use of advances to the imprest account.[5] The government may request for initial and additional advances to the imprest account based on 6 months estimated expenditures to be financed through the imprest account. The imprest account will be established, managed, and liquidated in accordance with ADB's *Loan Disbursement Handbook* and detailed arrangements agreed by the government and ADB. The handbook describes (i) which supporting documents should be submitted to ADB, and (ii) which should be retained by the government for liquidation and replenishment of an imprest account.

9. To expedite funds flow and simplify documentation process, the statement of expenditures (SOE) procedure will be used for liquidation and replenishment of imprest account and reimbursement of eligible expenditures not exceeding $200,000 per individual payment. Payments in excess of the ceiling of the SOE procedure will be reimbursed, liquidated, or replenished based on full supporting documentation process. SOE records should be maintained and made readily available for review by ADB's disbursement and review mission or upon ADB's request for submission of supporting documents on a sampling basis, and for independent audit.[6]

10. Before the submission of the first withdrawal application, JPG should submit to ADB sufficient evidence of the authority of the person(s) who will sign the withdrawal applications on behalf of the borrower, together with the authenticated specimen signatures of each authorized person. The minimum value per withdrawal application is $100,000 equivalent, under reimbursement and imprest fund procedures, unless otherwise approved by ADB. Individual payments below this amount should generally be paid from the imprest account, or by the executing agency (or the implementing agency) and subsequently claimed to ADB through reimbursement. ADB reserves the right not to accept withdrawal applications below the

[5] The bank charges in the operation of the imprest account may be financed from the loan proceeds.
[6] SOE procedures and formats are available at Appendix 9B of the *Loan Disbursement Handbook.*

minimum amount. Withdrawal applications and supporting documents will demonstrate, among other things that the goods, and/or services were produced in or from ADB members, and are eligible for ADB financing.

11. For the domestic funds, the implementing agencies will allocate the designated funding for the project as specified in the project agreement. Counterpart funds from the government will be disbursed and liquidated by project implementing units (PIUs) to contractors and service providers. The disbursement will follow this process: (i) project implementing agreements will be mutually signed between each PIU and respective city government; (ii) project implementing agreements will become effective; (iii) according to the progress of the contract, PIUs will submit disbursement request to the project management office of the respective city governments; and (iv) once approved, counterpart funds will be disbursed from finance bureau of the respective city governments.

C. Accounting

12. The implementing agencies will maintain, or cause to be maintained, separate books and records by funding source for all expenditures incurred on the project. Consolidated project financial statements will be prepared annually in accordance with the government's accounting laws and regulations, which are consistent with international accounting principles and practices.[7]

D. Auditing and Public Disclosure

13. The JPG will cause the detailed consolidated project financial statements to be audited in accordance with International Standards on Auditing and the Government Auditing Standards of the PRC (where these are consistent with International Standards on Auditing), by an auditor acceptable to ADB. The audited project financial statement will be submitted in the English language to ADB within 6 months of the end of the financial year by the executing agency.

14. The annual audit report for the project will include an audit management letter[8] and auditor's opinions which cover (i) whether the project financial statements present a true and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting framework; (ii) whether loan and grant proceeds were used only for the purposes of the project or not; (iii) the level of compliance for each financial covenant contained in the legal agreements for the project; (iv) use of the imprest fund procedure; and (v) use of the SOE procedure certifying to the eligibility of those expenditures claimed under SOE procedures, and proper use of the SOE and imprest procedures in accordance with ADB's *Loan Disbursement Handbook* and the project documents.

15. Compliance with financial reporting and auditing requirements will be monitored by review missions and during normal program supervision, and followed up regularly with all concerned, including the external auditor.

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[7] Applicable laws, regulations, and guidelines include:
(i) The Accounting Law of the PRC (2000).
(ii) State-owned Construction Enterprise Accounting Control Regulations.
(iii) Capital Construction Financial Control Regulations.
(iv) Accounting Methods for Projects Financed by the World Bank.

[8] A management letter means formal communications from the auditor to the client management in accordance with the International Standard on Auditing 265 (communicating deficiencies in internal control to those charged with governance and management), which is not required to be provided separately as it is equivalent to the Audit Findings and Recommendations prepared by the project auditor and submitted to ADB.

16. The government has been made aware of ADB's policy on delayed submission, and the requirements for satisfactory and acceptable quality of the audited project financial statements. ADB reserves the right to require a change in the auditor (in a manner consistent with the constitution of the borrower), or for additional support to be provided to the auditor, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures.

17. Public disclosure of the project financial statements, including the audit report on the project financial statements, will be guided by ADB's Public Communications Policy (2011).[9] After review, ADB will disclose the financial statements for the project and the opinion of the auditors on the financial statements within 30 days of the date of their receipt by posting them on ADB's website. The Audit Management Letter will not be disclosed.

[9] Public Communications Policy available at http://www.adb.org/documents/pcp-2011. Chinese version available at http://www.adb.org/documents/pcp-2011-zh.

VI. PROCUREMENT AND CONSULTING SERVICES

A. Advance Contracting and Retroactive Financing

1. All advance contracting and retroactive financing will be undertaken in conformity with ADB's Procurement Guidelines (2013, as amended from time to time) [1] and ADB's Guidelines on the Use of Consultants (2013, as amended from time to time).[2] The issuance of invitations to bid under advance contracting and retroactive financing will be subject to ADB approval. It was explained to the borrower: the executing agency, implementing agencies, and project implementing units (PIUs) that (i) advance contracting includes the advertisement, bidding documents, (not prequalification), evaluation of bids and up to the recommendation of contracts award, and that all steps will require ADB's no objection; (ii) approval of advance contracting and retroactive financing does not commit ADB to finance the project; and (iii) where advance contracting is approved, ADB's approval must be sought for the draft prequalification and bidding documents before they are issued.

2. To expedite project implementation, the government requested ADB to approve advance contracting, which includes the recruitment of consultants and procurement of civil works; and retroactive financing of eligible expenditures for consulting services, civil works, and equipment procurement.

3. **Advance contracting.** Advance contracting will include (i) prequalification of contractors, tendering, and bid evaluation for civil works contract packages; (ii) awarding of contracts; and (iii) recruitment of consultants. The advance contracting includes civil work contract packages and consulting service contracts. The issuance of invitations to bid, the draft prequalification, and bidding documents under advance procurement action will be subject to ADB approval.

4. **Retroactive financing**. The government was informed that as a general rule, retroactive financing is permitted only if (i) it is specifically agreed by ADB and the Borrower; (ii) the goods, works, services, and consultants for which it is requested are procured in accordance with ADB's Procurement Guidelines (2013, as amended from time to time) and ADB's Guidelines on the Use of Consultants (2013, as amended from time to time); (iii) the amount to be retroactively financed does not exceed 20% of the loan amount; and (iv) the expenditures must have been incurred before effectiveness of the relevant loan but, generally, no earlier than 12 months before signing of the Loan Agreement. In either instance, detailed assessments (due diligence) on each retroactive financing proposal must demonstrate that (i) the expenditures incurred are genuine, reasonable, and material to getting the project off the ground; and (ii) they were incurred for proper reasons, in a transparent manner over a reasonable period of time. The government has been advised that approval of advance contracting and retroactive financing does not commit ADB to finance the project.

B. Procurement of Goods, Works, and Consulting Services

5. All procurement of goods and works will be undertaken in accordance with ADB's Procurement Guidelines (2013, as amended from time to time). International competitive bidding (ICB) will be used for civil works contracts estimated to cost $10 million and above. National competitive bidding (NCB) will be used for civil works contracts estimated to cost over

[1] Available at: http://www.adb.org/Documents/Guidelines/Procurement/Guidelines-Procurement.pdf
[2] Available at: http://www.adb.org/Documents/Guidelines/Consulting/Guidelines-Consultants.pdf

$100,000 equivalent up to $10 million. For goods and equipment, ICB will be used for values exceeding $1 million, while NCB will be used for goods and equipment from over $100,000 to below $1 million equivalent. For NCB, the first draft English language of the procurement documents (prequalification, bidding documents, and draft contract) should be submitted for ADB approval regardless of the estimated contract amount. Subsequent procurements are subject to post review. All ICB contracts are subject to prior review. Prior review and approval of ADB of the procurement documents (prequalification, bidding, contract) is required.

6. An 18-month procurement plan indicating threshold and review procedures, goods, works, and consulting service contract packages and national competitive bidding guidelines is in **Section C**.

7. All consultants financed by ADB will be recruited according to ADB's Guidelines on the Use of Consultants (2013, as amended from time to time).[3] The terms of reference for project implementation consulting service and start-up consulting service are detailed in **Section D**. An estimated 183 person-months (26.5 international, 148 national) of consulting services are required to (i) facilitate project management and implementation, (ii) provide capacity building and institutional strengthening, and (iii) required external monitoring.

C. Procurement Plan

Table 1: Basic Data

Project Name: Jilin Urban Improvement Project	
Project Number: 46048-002	**Approval Number:** XXXX
Country: People's Republic of China	**Executing Agency**: Jilin Provincial Government
Loan Amount: $150.0 million	
ADB Financing:	
Non-ADB Financing:	
Date of First Procurement Plan: (loan approval date)	**Date of this Procurement Plan**: 27 October 2014

1. Process Thresholds, Review, and 18-Month Procurement Plan

a. Procurement and Consulting Methods and Thresholds

8. Except as the Asian Development Bank (ADB) may otherwise agree, the following process thresholds shall apply to procurement of goods and works.

Table 2: Procurement of Goods and Works

Method	Threshold
International competitive bidding for works	$10 million or more
International competitive bidding for goods	$1 million or more
National competitive bidding for works	Beneath that stated for international competitive bidding works
National competitive bidding for goods	Beneath that stated for international competitive bidding goods
Shopping for works	Below $100,000
Shopping for goods	Below $100,000

[3] Checklists for actions required to contract consultants by method available in e-Handbook on Project Implementation at: http://www.adb.org/documents/handbooks/project-implementation/

Table 3: Consulting Services

Method	Comments
Quality- and cost- based selection	Quality- and cost ratio = 90:10
Consultants' Qualification Selection (CQS)	

b. Goods and Works Contracts Estimated to Cost $1 Million or More

9. The following table lists goods and works contracts for which the procurement activity is either ongoing or expected to commence within the next 18 months.

Table 4: Goods and Works Contracts Estimated to Cost More Than $1 Million

Package Number	General Description	Estimated Value	Procurement Method	Review (Prior/ Post)	Bidding Procedure	Advertise-ment (Quarter/Year)
Baicheng Infrastructure						
Civil Works						
CBC1	Third Ring Road I (Xingfu Bei Street - Mianfang Road)	$18,300,712	ICB	Prior	1S1E	Q1 2016
CBC2	Third Ring Road II (Mianfang Road - RR underpass)	$17,114,104	ICB	Prior	1S1E	Q1 2015
CBC3	Third Ring Road III (RR underpass - Taobai Highway)	$8,724,377	NCB	Post	1S1E	Q1 2015
CBC4	Xiangyang Street I (Third Ring Road - Mianfang Road)	$9,021,975	NCB (advance contracting & retroactive financing)	Post	1S1E	Q4 2014
CBC5	Xiangyang Street II (Mianfang Rd - Xinyi Rd) + Xinhua Xi Road	$19,988,976	ICB	Prior	1S1E	Q3 2015
CBC6	Shengli Road	$6,954,216	NCB (advance contracting & retroactive financing)	Prior	1S1E	Q4 2014
CBC7	Xingfu Bei Street	$4,891,600	NCB	Post	1S1E	Q1 2016
CBC8	Nanyi Rd & Taoerhe Rd (including the bridge)	$9,598,468	NCB	Post	1S1E	Q2 2015
CBC9	Chunyang Road	$8,982,864	NCB (advance contracting & retroactive financing)	Prior	1S1E	Q4 2014
CBC10	Xinggong Road	$5,781,910	NCB	Post	1S1E	Q3 2016
CBC11	Third Ring Road RR underpass	$6,492,353	NCB	Post	1S1E	Q2 2015
CBC12	MSW sorting and composting center	$1,551,947	NCB	Post	1S1E	Q2 2015
Equipment Supply and Installation						
EBC1	ITS and traffic control	$3,021,667	ICB	Prior	1S1E	Q4 2016

Package Number	General Description	Estimated Value	Procurement Method	Review (Prior/ Post)	Bidding Procedure	Advertise-ment (Quarter/Year)
EBC2	Stormwater and sewer pump station	$1,224,180	ICB	Prior	1S1E	Q4 2015
EBC3	Heating pipe network	$11,808,148	ICB	Prior	1S1E	Q2 2015
EBC4	Street lighting	$2,684,917	ICB	Prior	1S1E	Q2 2015
EBC5	MSW handling equipment	$7,738,000	ICB	Prior	1S1E	Q3 2015
EBC6	Trash and recycle bins	$2,540,000	ICB	Prior	1S1E	Q4 2015
EBC7	Snow clean vehicles	$2,833,333	ICB	Prior	1S1E	Q4 2015
EBC8	MSW transfer stations and equipment	$6,112,783	ICB	Prior	1S1E	Q2 2015
EBC9	MSW sorting and composting center equipment	$1,858,417	ICB	Prior	1S1E	Q2 2015
Baishan Water Supply						
Civil Works						
CBSW1	Water transmission line I (reservior to Jiangyuan)	$2,172,117	NCB (advance contracting & retroactive financing)	Prior	1S1E	Q4 2014
CBSW2	Water transmission line I (Jiangyuan to Hunjiang)	$4,476,633	NCB (advance contracting & retroactive financing)	Prior	1S1E	Q4 2014
CBSW3	Water treatment plant I (site & civil)	$4,807,083	NCB (advance contracting & retroactive financing)	Prior	1S1E	Q4 2014
CBSW4	Water treatment plant II (processing)	$8,194,083	NCB	Post	1S1E	Q2 2015
CBSW5	Water distribution network I (main line)	$1,011,883	NCB	Post	1S1E	Q4 2015
CBSW6	Water distribution network I (branch line)	$6,562,133	NCB	Post	1S1E	Q4 2015
Equipment Supply and Installation						
EBSW1	Water distribution pump stations	$1,070,900	ICB	Prior	1S1E	Q4 2015
EBSW2	Water transmission pipe	$13,079,833	ICB (advance contracting)	Prior	1S1E	Q4 2014
EBSW3	Water treatment plant equipment I	$2,831,258	ICB	Prior	1S1E	Q4 2015
EBSW4	Water distribution pipe I	$7,325,183	ICB	Prior	1S1E	Q4 2015
EBSW5	Water distribution pipe II	$1,051,233	ICB	Prior	1S1E	Q4 2015
Baishan MSW Management						
Civil Works						

Package Number	General Description	Estimated Value	Procurement Method	Review (Prior/ Post)	Bidding Procedure	Advertise-ment (Quarter/Year)
CBSSW2	MSW sorting and composting center civil	$2,038,379	NCB	Prior	1S1E	Q2 2015
CBSSW3	Sanitary landfill	$3,389,163	NCB	Post	1S1E	Q2 2015
Equipment Supply and Installation						
EBSSW1	MSW handling equipment and trash bins	$5,622,000	ICB	Prior	1S1E	Q4 2015
EBSSW2	MSW transfer station equipment	$4,139,167	ICB	Prior	1S1E	Q2 2015
EBSSW3	MSW sorting and composting center equipment	$1,446,921	ICB	Prior	1S1E	Q2 2015

ICB = international competitive bidding, ITS = intelligent transport system, MSW = municipal solid waste, NCB = national competitive bidding.
Source: Asian Development Bank.

c. Consulting Services Contracts Estimated to Cost $100,000 or More

10. The following table lists consulting services contracts for which the recruitment activity is either ongoing or expected to commence within the next 18 months.

Table 5: Consulting Services Contracts Estimated to Cost More Than $100,000

Package Number	General Description	Estimated Value	Procurement Method	Review (Prior/ Post)	Advertisement Date (Quarter/Year)	Type of Proposal
CS1	Consulting services and capacity development	$2,850,000	QCBS (advance contracting)	Prior	Q4 2014	Full
CS2	External resettlement monitoring	$150,000	CQS (advance contracting)	Prior	Q4 2014	BTP

BTP = Biodata Technical Proposal, CQS = consultants' qualification selection, QCBS = quality- and cost- based selection.
Source: Asian Development Bank.

d. Goods and Works Contracts Estimated to Cost Less than $1 Million and Consulting Services Contracts Less than $100,000 (Smaller-Value Contracts)

11. The following table groups smaller-value goods, works and consulting services contracts for which the activity is either ongoing or expected to commence within the next 18 months.

Table 6: Smaller Value Goods, Works, and Consulting Services Contracts

Package Number	General Description	Estimated Value	Number of Contracts	Procurement Method	Review (Prior /Post)	Advertisement Date (Quarter/Year)	Type of Proposal
CBSSW1	MSW transfer station civil works	$263,109	1	NCB	Post	Q2 2015	
EBSW6	Water treatment plant equipment II	$460,082	1	NCB	Post	Q4 2015	

MSW = municipal solid waste, NCB = national competitive bidding.
Source: Asian Development Bank.

2. Indicative List of Packages Required Under the Project

12. The following table provides an indicative list of goods, works, and consulting services contracts over the life of the project, other than those mentioned in previous sections (i.e., those expected beyond the current period).

Table 7: Summary of Indicative List of All Contracts—Goods and Works

Description	Estimated Value (cumulative)	Estimated Number of Contracts	Procurement Method	Review (prior/post)	Bidding Procedure
Works	$55,403,792	3	ICB	Prior	1S1E
Works	$29,431,292	6	NCB	Prior	1S1E
Works	$65,483,001	12	NCB	Post	1S1E
Goods	$76,387,941	17	ICB	Prior	1S1E
Goods	$460,082	1	NCB	Post	1S1E

ICB = international competitive bidding, NCB = national competitive bidding.
Source: Asian Development Bank.

Table 8: Summary of Indicative List of All Contracts—Consulting Services

Package Number	General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Procurement Method	Review (Prior/Post)	Type of Proposal
CS1	Consulting services	$2,850,000	1	QCBS	Prior	Full
CS2	External resettlement monitoring	$150,000	1	CQS	Prior	BTP

BTP = Biodata Technical Proposal, CQS= consultants' qualification selection, ICB = international competitive bidding, QCBS = quality- and cost- based selection.
Source: Asian Development Bank.

3. List of Awarded, Ongoing, and Completed Contracts

13. The following tables list the awarded, ongoing, and completed contracts: awarded and ongoing contracts, none; completed contracts, none.

4. Non-ADB Financing

14. The following table lists goods, works, and consulting services contracts over the life of the project, financed by non-ADB sources.

Table 9: Non-ADB Financing

	Goods and Works			
General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Procurement Method	Comments
Power supply cable	$7,189,079	1	single-source selection	

D. Consultant's Inputs and Terms of Reference[4]

1. Introduction

15. The project management consulting service and capacity development service will be recruited in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time). Jilin provincial project management office (PMO) on behalf of JPG will be responsible for engaging consultants through QCBS (quality- and cost-based selection) for the project management and capacity development consulting service.[5] Under the project, the consulting services will be provided in two areas:

(i) **Project management and capacity development.** Project management and capacity development will provide project management assistance to the executing agency and implementing agencies, and PIUs to comply with ADB procedural requirements including: (a) project management and contract management; (b) project performance management system (PPMS); (c) procurement of contracts; (d) disbursement and contract management; (e) construction planning, supervision, and monitoring; (f) reporting requirements; (g) safeguard management and monitoring; and (h) corporate planning and financial management. The consultants will also provide capacity development support to the executing agency and/or implementing agencies and PIUs with (a) ADB's procedural requirements of procurement, disbursement, safeguards, and financial management; (b) operation and maintenance (O&M) of project components; (c) capacity development policy studies; and (d) training, organization of study visits, and workshops.

(ii) **External resettlement monitoring.** An external resettlement monitor will be engaged intermittently for the whole duration of project implementation. The consultant firm and/or institute will be engaged by consultants' qualifications selection method. The external resettlement monitor will (a) make recommendations to resolve any issues or problems on implementation of resettlement plans, and providing advice to the local PMOs and PIUs; (b) pay special attention to vulnerable groups, including women, and the poor to assess whether they have participated and fully regained their standard of living; and (c) submit English and Chinese external monitoring report to JPG and ADB with quality acceptable to ADB every 6 months during resettlement implementation of the project, and annually for two years to evaluate whether affected persons have been adequately rehabilitation.

2. Consulting Services for Project Management and Capacity Development

16. Project management and capacity development consulting service will be engaged by QCBS method with a standard quality: cost ratio of 90:10 with full technical proposal procedure. The outline terms of reference are in the following paragraphs. The consulting firm will assist the executing agency, implementing agencies, and PIUs in the following tasks:

[4] The terms of reference (TOR) was prepared by ADB and the executing agency. The PPTA consultants were not involved in the preparation of the TOR.

[5] TOR guidelines available at: http://www.adb.org/Documents/Manuals/Consulting-Services-Operations-Manual/CSOM.pdf?bcsi_scan_D4A612CF62FE9576=AORY9a8Nho2ezS9Xss/ligEAAAANNiAA&bcsi_scan_filename=CSOM.pdf.

a. Project Management and Technical Audit

(i) Set up institutional framework, operational procedure, document filing system, and work plan to guide and facilitate the project implementation.

(ii) Set up PPMS in accordance with ADB's policy requirements, including establishing baseline and operation mechanism for data collection, analysis, and reporting.

(iii) Upgrade and improve the project management information system to (a) ensure efficient and effective information sharing and coordination about the project management (e.g., procurement, disbursement, construction, safeguard and compliance); and (b) monitoring the project's design and monitoring framework, through the use of the PPMS.

(iv) Conduct design, technical, environmental and social as well as gender/social action plans' review and audit, and provide expert comments on engineering detailed design in accordance with the required design codes and standards. Assist PIUs/PMO with implementation of resettlement and gender/social action plans and internal monitoring/reporting.

(v) Assist the executing agency and/or implementing agencies and PIU to establish quality assurance and quality control system, and help the PIUs to implement and monitor the quality assurance and/or quality control program to ensure all works are completed in accordance with contract document requirements.

(vi) Assist the executing agency and/or implementing agencies and PIUs to establish construction safety program, and help PIUs to implement and monitor the safety program and to ensure the safety for all construction actives.

(vii) Conduct routine site visits and provide technical inputs to construction planning, supervision, and monitoring for quality control of the subproject construction.

(viii) Provide expert inputs, review, and justification for contract variations and prepare necessary documentations (e.g., a due diligence report) in accordance with the government and ADB requirements.

(ix) Review procurement documentations including technical specifications, bill of quantity, bidding documents, bid evaluation procedures, and contract negotiations.

(x) Conduct contract management during the project implementation to include monitoring construction progress, preparing quarterly and annual progress report, reviewing and certifying the contractors' claims for payments, coordinating project implementation among contractors and various stakeholders, and coordinating daily operational tasks.

b. Financial Management

(i) Establish an efficient and effective financial management system for the project implementation (e.g., fund disbursement management, withdrawal application review, use of loan proceeds, and counterpart funds) in accordance with ADB policy and procedural requirements.

(ii) Assist the PMO and PIUs in preparing financial statements and consolidated financial statements according to relevant project financial covenants, and make necessary arrangement with auditing units to supervise the financial management of PIUs.

c. Support for Compliance with Asian Development Bank Safeguard Requirements and other Social Aspects

(i) Review and update the environmental management plan (EMP), resettlement plans, SAP, and GAP.

(ii) Support the PIUs in contracting and managing local environmental monitoring stations (EMS) for the conduct of periodic environment impact monitoring in compliance with the approved monitoring plan defined in the updated EMP.

(iii) Help Jilin provincial project management office (JPPMO), local PMOs, and PIUs establish management supervision mechanisms for implementation, monitoring, and reporting of the project safeguards issues based on the relevant ADB documentation (i.e., EMP, resettlement plans) as well as the GAP, and SAP, and provide support for their implementation.

(iv) Help JPPMO, local PMOs, and PIUs ensure implementation of the GAP and SAP requirements by conducting necessary workshops and focus groups meetings.

(v) Conduct compliance monitoring of safeguards issues, assist the local PMOs and PIUs to formulate corrective actions where necessary, and help the JPPMO to prepare safeguards and social development section in the semi-annual progress report and relevant safeguards monitoring reports (i.e., annual environment monitoring report, and semi-annual resettlement monitoring report).

(vi) Assist in establishing and managing grievance redress mechanism (GRM), including assistance to the local PMOs to establish city-level project public complaint units, and to provide training for project public complaint members and GRM access points.

(vii) Assist JPPMO, local PMOs, local PIUs, and other relevant agencies to develop reporting formats and establish mechanisms to prepare and submit the environment safeguards-related reports specified in the loan and project agreements.

d. Institutional Strengthening and Reporting

(i) Collect all necessary information, edit, draft, and submit the reports on time required under loan and project covenants with quality acceptable to the executing agency and ADB.

(ii) Organize and provide training on the skills necessary for construction supervision, project management, implementation of GAP, SAP, and safeguards plans (EMP, resettlement plans) for ADB requirements.

(iii) Discuss with the executing agency and implementing agencies to finalize a training plan, organize appropriate training according to the plan; and design an evaluation questionnaire to gauge the usefulness of the training/capacity building design and performance of the trainers.

(iv) Coordinate and prepare study tours on (a) water supply O&M and water safety planning and risk management, and non-revenue water management; (b) advanced municipal solid waste management systems and practices; (c) good practices in road safety; (d) urban transport planning and management; and (e) other relevant aspects related to the project.

(v) Provide training on prevention and control of transmissible diseases and HIV/AIDS, and community disturbance to contractors.

(vi) Organize and provide capacity building for JPPMO, BPMOs, and PIU staff with respect to gender and development.

e. Capacity Building Support

(i) **Urban transport and road safety.** Assist the executing agency and/or implementing agencies and PIUs to introduce and implement the concept of people-centered urban transportation system, with emphasis on promoting pedestrian and bicycle traffic, public transportation including bus priority lane implementation, urban parking management, low carbon urban transport, to improve the urban road safety by conducting road safety audit, development urban road safety program consisting of 3E components (engineering, education, and enforcement).

(ii) **Municipal solid waste management.** Assist the executing agency and/or implementing agencies and PIUs to introduce reduce, reuse, recycle (3R)-based municipal solid waste management system to (a) reduce, reuse, and recycle municipal solid waste, (b) help the PIUs to implement the proposed ISWM components, (c) provide technical support for the component implementation, develop and implement training, study tours, workshops, and seminars on advanced municipal solid waste treatment and management method.

(iii) **Stormwater management.** Assist the executing agency and/or implementing agencies and PIUs to introduce the concept of stormwater management to reduce the impact to downstream areas caused by increased runoff discharge (impact of rapid urbanization), implement the proposed stormwater management features for runoff infiltration, develop and implement training, study tours, workshops and seminars for the advanced technologies in stormwater management, low impact development, and O&M of stormwater management system.

(iv) **Energy efficiency improvement.** Assist the executing agency and/or implementing agencies and PIUs to build/install the proposed system (SCADA and other optimization of the water supply system and its facilities. Capacity development and training for water supply operator to use the system effectively (such as peak and nonpeak operation) and maintain it in good working condition.

(v) **Water safety plan.** Assist the executing agency and/or implementing agencies and PIUs to (a) introduce the concept of water safety plan (WSP), develop, and update the WSP for the local water supply system; (b) develop and assist the implementation of the WSP.

(vi) **Non-revenue water reduction.** Assist executing agency and/or implementing agencies and PIUs to develop non-revenue water (NRW) reduction plan, provide assistance in implementing the NRW program including technical support in using advanced water leaking equipment, implementation monitoring system on the new and existing water supply network, develop and implement the institutional strengthening program, training, study tours, workshops, and seminars on water supply operation and management.

17. To ensure the NRW program and the water supply safety plan are sustained and sustainable, the following actions have been proposed and incorporated into the project:

(i) **Management focus.** A set of proposed indicators and a monitoring system will be developed, implemented, and maintained during the project and this will carry over beyond project closure. It is expected that the Ministry and/or regulator will also come to rely upon and require regular performance measures to be monitored and reported. Further in tariff reviews, a benchmark NRW rate will be

allowed so management will be motivated to achieve lower than that figure in order to ensure financial viability.

(ii) **People skills.** The capacity building plan allows for building a skill base to tackle NRW and carry out in house programs.

(iii) **Asset management.** Improved asset management systems are planned to be developed and progressively be installed as part of the planned project.

18. Inputs to be procured under the NRW component have been estimated to account for about 10% of the total equipment to be supplied with the new water treatment plant and about 20% of the capacity building and/or consultancy budget. This capacity, to be developed between Q2 2017 and Q4 2018, includes both systems and personnel skills and overarching governance improvement.

19. The cost to implement, update, and maintain the WSP (e.g. WSP consultant(s) and/or facilitators, training for utility staff and/or government officials) amount to roughly 34% of the capacity building budget of the project.

f. Asian Development Bank Project Administration Support

(i) Prepare basic project information, including updated project scope, implementing schedule, contract management, procurement plan, social and safeguards compliance, and PPMS monitoring for ADB's loan administration missions.

(ii) Support the executing agency and/or implementing agencies in processing minor and major changes in project scope, including conducting detailed technical and safeguards audits and prepare necessary documentations (e.g., due diligence reports).

(iii) Conduct a detailed project review by updating project financial status, project cost tables, financing plan, and financial and economic analysis, and prepare for safeguard reviews for ADB's loan midterm review.

(iv) Collect and consolidate all necessary project information, and prepare for project completion report and ADB's project completion mission.

3. Consulting Service for External Resettlement Monitor

20. An external resettlement monitor will be an entity engaged for the whole duration of project implementation. The external resettlement monitor will examine and verify the project's social and resettlement safeguards performance by:

(i) conducting baseline survey (sex-disaggregated) of affected persons , monitoring and training for the PIUs to ensure implementation of resettlement plans for the project components in compliance with ADB's Safeguard Policy Statement (2009);

(ii) making recommendations to resolve any issues or problems on implementation of the plans (as specified above), and providing advice to the project city PMOs and PIUs;

(iii) checking whether PIUs are paying special attention to vulnerable groups, including women and the poor, to assess whether they have participated and fully regained their standard of living;

(iv) submitting English and Chinese external resettlement monitoring reports to executing agency and ADB with quality acceptable to ADB every 6 months during until the completion of resettlement activities, and annually for two years to evaluate whether affected persons have been adequately rehabilitation; and

(v) conducting monitoring of SAP and GAP, and including the findings in the relevant section of the external monitoring report to be submitted to the executing agency and ADB semiannually.

4. Scope of Services for Specialists

21. **Urban development specialist/team leader** (international, 11.5 person-months). The team leader shall be a registered professional engineer with a post graduate degree and a minimum of 10 years of experience in urban development and urban infrastructure improvement projects financed by ADB or the World Bank. The specialist shall take overall leadership to ensure the successful management and implementation of the project. Specific tasks are explained below:

(i) Develop detailed work plan, including the specialist input schedule for the project implementation and update the work plan periodically based on the project implementation progress.
(ii) Develop and establish the project management system to manage and monitor the project implementation progress. Prepare and submit project management manual for approval.
(iii) Develop and establish contract management system to manage and monitor the procurement process and the implementation of the contracts. Prepare and submit project contract management manual.
(iv) Coordinate with the financial specialists to develop and establish a financial management and disbursement management system. Prepare and submit project financial management manual.
(v) Coordinate with team specialists to organize specialist inputs base on the project implementation progress and project development needs. Provide coordination among team specialists, ADB, executing agency, implementing agencies, and other stakeholders to facilitate the implementation of the project.
(vi) Take overall responsibility to coordinate preparing and submitting all deliverables, including progress report, monitoring reports, semiannual and annual reports, project completion report, etc.
(vii) Develop capacity development and training plan and, coordinate and carry-out capacity development and training.
(viii) Will identify potential water operation partnership and will support its establishment
(ix) Monitor overall project progress, contract management, safeguards-related issues and plans, social and gender issues related targets and activities, and the project's development impacts through the PPMS.
(x) Assist the executing agency to engage qualified external monitors timely in accordance with ADB policies and procedures.

22. **Urban infrastructure specialist/deputy team leader** (national, 40 person-months). The specialist shall be an urban infrastructure engineer with a post graduate degree and with a minimum of 10 years of experience in urban development and unban infrastructure projects. The specialist shall take a leading role to work with the team leader to provide overall project management and coordination for the project implementation. The specific tasks may include the following:

(i) Work with the team leader to provide day-to-day project management and coordination for the project implementation including communication among the executing agency, implementing agencies, and PIUs contractors and other project entities.

(ii) Provide overall guidance to project-wide construction supervision, contract management, financial and disbursement management, conduct regular site inspections and discussions with contractors to assist the implementing agencies and PIUs for construction supervision.
(iii) Assist the team leader to coordinate among the team specialists to supervise tendering and contracting process.
(iv) Assist the executing agency, implementing agencies, and PIUs for contract management by keeping good records of awarded contracts as well as proposed procurement packages, analyzing needs of contract variations, and issues arising from civil works construction and goods installment, and controlling overall disbursement and residual loan progress.
(v) Assist the team leader to coordinate with team specialists for their inputs base on the project implementation progress and project development needs. Provide coordination among team specialists, ADB, executing agency, implementing agencies, and other stakeholders to facilitate the implementation of the project.
(vi) Work with the team leader and responsible to coordinate preparing and submitting all deliverables including progress report, monitoring reports, semiannual and annual reports, project completion report, etc.
(vii) Monitor overall project progress, contract management, safeguards-related issues and plans, social and gender issues related targets and activities, and the project's development impacts through the PPMS.
(viii) Prepare the plans for training and seminars and give the deliverables in both Chinese and English.

23. **Urban transport specialist** (national, 6 person-months). The national specialists with a post graduate degree shall have a minimum of 8 year experience in the field of urban transport, urban planning and public transport for ADB and World Bank projects. The urban transport team will be responsible to provide technical and management supports for the implementation of urban road component for Baicheng Municipal Government (BCMG). The specific tasks may include:

(i) Responsible to provide all technical, procurement, and construction supports for the implementation of the urban road component.
(ii) Conduct technical review of the urban road component and provide expert comments on engineering detailed design in accordance with the contract documents and applicable national design codes and standards as well as the best international practices.
(iii) Provide support and review on the bidding documents, bill of quantities, technical specifications, and other contract documents. Provide assistance to the procurement and bidding process including bid review and bid evaluation.
(iv) Review the current urban planning of the project city and provide recommendations on urban planning improvement in consideration of economic development, urbanization, green development, environmental and ecological preservation development, etc.
(v) Conduct site inspections to review construction progress, provide technical support to construction planning and construction method, and verify the completion and compliance with the contract documents including the design drawing.
(vi) Review and inspect the quality of the construction items and safety measures in the construction site, carry out the quality assurance and/or quality control and construction safety plans.

(vii) Prepare and submit the specialist report urban road component, provide technical input to other project required reports.
(viii) Coordinate with the team leader and other team specialist to develop capacity development and training program for people centered urban transport system, and provide training for urban transport improvement.

24. **Municipal solid waste specialists** (international, 2 person-months; national, 6 person-months). The international and national MSW specialists shall have a post graduate degree and a minimum of 10 and 8 years of experience in municipal solid waste management. The MSW team will be responsible to provide technical and management supports for the implementation of the municipal solid waste components in the project cities. The specific tasks may include:

(i) Responsible to provide all technical, procurement, and construction supports for the implementation of the solid waste management component.
(ii) Conduct technical review of the solid waste component and provide expert comments on engineering detailed design in accordance with the contract documents and applicable national design codes and standards as well as the best international practices.
(iii) Provide support and review on the bidding documents, bill of quantities, technical specifications and other contract documents. Provide assistance to the procurement and bidding process including bid review and bid evaluation.
(iv) Conduct site inspections to review construction progress, provide technical support to construction planning and construction method, and verify the completion and compliance with the contract documents including the design drawings.
(v) Review and inspect the quality of the construction items and safety measures in the construction site, carry out the quality assurance and/or quality control and construction safety plans.
(vi) Provide technical support for the commissioning and equipment testing, and provide support for the facility O&M.
(vii) Prepare and submit the specialist report on solid waste management component, and provide technical input to other project required reports.
(viii) Provide input for the training and capacity development, and coordinate with the team leader and other team specialists to carry out training program.

25. **Water supply engineer** (national, 6 person-months). The national water supply specialists shall have a post graduate degree and a minimum of 8 years of experience in water supply projects. The water supply team will be responsible to provide technical and management supports for the implementation of the water supply component. The specific tasks may include:

(i) Responsible to provide all technical, procurement, and construction supports for the implementation of the water supply component.
(ii) Conduct technical review of the water supply component and provide expert comments on engineering detailed design in accordance with the contract documents and applicable national design codes and standards as well as the best international practices.
(iii) Provide support and review on the bidding documents, bills of quantities, technical specifications and other contract documents. Provide assistance to the procurement and bidding process, including bid review and bid evaluation,
(iv) Conduct site inspections to review construction progress, provide technical support to construction planning and construction method, and verify the

completion and compliance with the contract documents including the design drawings.

(v) Review and inspect the quality of the construction items and safety measures in the construction site, and carry out the quality assurance and/or quality control and construction safety plans.

(vi) Provide technical support for the commissioning and equipment testing, and provide support for the facility O&M.

(vii) Prepare and submit the specialist report on water supply component, and provide technical input to other project required reports.

(viii) Provide input for the training and capacity development, and coordinate with the team leader and other team specialists to carry out training program.

(ix) Assist the team leader to coordinate among the team specialists to compile necessary information for technical review, technical inputs, procurement documents review and contract variation requests review, procurement plan management and update, due diligence report, review of the contractor's claims, and other project management support.

26. **Procurement and contract management** (international, 2 person-months; national 12 person-months). The international and national procurement and contract management specialists shall have a post graduate degree and a minimum of 10 and 8 years of experience in procurement and contract management in urban infrastructure development and municipal service projects. The procurement specialist team will be responsible to provide technical and management supports for bidding document review, procurement assistance, contract bid review and evaluation, and other procurement related tasks. The specific tasks may include:

(i) Assist the executing agency and/or implementing agency to carry out procurement on civil work, equipment purchase and installation, consulting services, and other contracts in accordance with the PRC and ADB policies and procedure requirements.

(ii) Provide technical support in design review, BOQ, and bidding document review, technical specification review, and other procurement documents review. Provide bidding and procurement process assistance, coordinate with bidding company and other involved agencies, provide assistance in bids review and bid evaluation, bid evaluation report preparation, and other bidding related tasks.

(iii) Develop contract management system and provide contract management assistance including procurement plan updating, contract award and disbursement monitoring and management, procurement planning and projection, and other contract management tasks.

(iv) Provide inputs for contract management and procurement to progress reports, project midterm and completion reports, and other project required reports.

(v) Assist the team leader to coordinate among the team specialists to provide project implementation support on technical review, procurement documents review, and contract variation requests review, due diligence report, contractor's claims, and other project management support.

(vi) Provide input for the training and capacity development, coordinate with the team leader, and other team specialists to carry out training program and provide support to the capacity development activities.

(vii) Review the bidding documents, bidding evaluation reports and contracts, and other related documents to bidding procedures.

27. **Environment specialist** (national, 9 person-months). The national environmental specialist shall have a post graduate degree and a minimum of 10 years of experience in

environmental services for urban infrastructure development and municipal service projects. The environmental specialist will be responsible to provide technical and management support for environmental compliance for the project implementation including initial environmental examination and environmental management plan (EMP) implementation, monitoring, and other environmental protection related tasks. Specific tasks include:

(i) Assist to establish the environmental management system, consisting of relevant staffing, inspection, monitoring, grievance redress mechanism, reporting, and initiating corrective actions or measures;
(ii) Update the EMP based on the detailed engineering design and submit for executing agency and ADB's approval;
(iii) Conduct site inspections and discussions with contractors to assist the IAs and PIUs for implementation of EMP;
(iv) Provide expert advice to properly implement the EMP and ensure actual practices are in accordance with the EIA, EMP, soil erosion protection plan, and other environmental protection guidelines;
(v) Assist in selection of environment monitoring agency and coordinate with the agency on all monitoring activities as required by domestic and ADB policies and procedures;
(vi) Prepare environment monitoring reports during both construction and operation periods and submit to the authority for approval, and to ADB for appraisal and disclosure;
(vii) Provide input of environmental protection to progress report, midterm report, project completion report, and other project required documents;
(viii) Assist the TL to coordinate among the team specialists to provide project implementation support on technical review, procurement documents review and contract variation requests review, due diligence report, contractor's claims and other project management support; and
(ix) Provide input for the training and capacity development; coordinate with the TL and other team specialists to carry out training program, and provide support to the capacity development activities.

28. **Social and/or gender and resettlement specialists** (national social and gender, 10 person-months; national resettlement, 10 person-months)**.** The national social and gender specialist and the national resettlement specialist shall have a post graduate degree and a minimum of 8 years of experience in urban infrastructure development and municipal service projects. The social and resettlement specialist team will be responsible to provide social and resettlement supports for the project implementation in compliance of ADB safeguard policies and procedures including the implementation of SAP, GAP, resettlement plans and other safeguard action plans, and coordinate the internal and external monitoring and other safeguard related tasks. The specific tasks may include:

(i) develop a framework for implementing and monitoring the poverty and social dimensions of the project based on key socioeconomic indicators, the PPMS monitoring system, and the resettlement plans; Update the social safeguard documents including SAP, GAP, the resettlement plans based on the detailed engineering design and submit for the executing agency and ADB's approval to ensure actual practices are in accordance with the plans; Provide practical advice for PMO/PIUs on the implementation of relevant plans within both ADB and domestic policy frameworks;
(ii) assist the executing agency and/or implementing agencies to develop work plans for the implementation of SAP and GAP;

(iii) assist the executing agency and/or implementing agencies to develop plan for the establishment and implementation of PPMS, conduct baseline value survey, and conduct annual PPMS survey according to the developed implementation plan, and complete annual PPMS monitoring report in accordance ADB policies and requirements;

(iv) assist the executing agency and/or implementing agencies to develop plan to carry out the resettlement plans, provide assistance in implementing the resettlement plans, conduct monitoring and coordinate with the external monitoring agency to ensure the implementation is carried out in accordance with the government and ADB policies and procedures;

(v) assist the executing agency and/or implementing agencies to design and conduct public education campaigns identified under SAP and GAP;

(vi) provide assistance in selection of resettlement external monitoring agency and coordinate with the external agency on all monitoring activities as ADB requires; Review external environment monitoring reports during both construction and operation periods and submit to the authority for approval;

(vii) Provide input of social safeguard and resettlement to progress report, midterm report, project completion report, and other project required documents;

(viii) Assist the team leader to coordinate among the team specialists to provide project implementation support on technical review, procurement documents review and contract variation requests review, due diligence report, contractor's claims and other project management support; and

(ix) Provide support for carrying out capacity building training, and provide management support to the capacity development activities. Provide training on (a) proper implementation of RP, and other ADB requirements and (b) proper implementation of SAP, GAP, and other ADB requirements.

29. **Project performance management system specialist** (national, 5 person-months). The national PPMS specialist shall have a post graduate degree and a minimum of 8 years of experience in PPMS monitoring for ADB urban development and municipal service projects. The specialist will be responsible to PPMS monitoring services meeting ADB PPMS policy and procedure requirements and provide assistance to the executing agency and/or implementing agencies to complete project performance monitoring requirements per PRC government requirements. The specific tasks may include:

(i) Based on the PPMS system developed during the project preparation and in consultation with the executing agency and/or implementing agencies, the specialist shall develop a detailed PPMS framework and implementation plan, including the overall monitoring system, refinement of indicators, targets and goals, sources for monitoring data, reporting system, etc.

(ii) Update indicators and design a PPMS sheet according to the project design and monitoring framework. The selected indicators should provide a practical and meaningful measure of key Project impacts, outcomes, outputs and achievements. Specified targets and goals should be measurable and achievable.

(iii) In coordinating with the executing agency and/or implementing agencies to conduct baseline value survey at the beginning of the project implementation, and prepare initial PPMS report.

(iv) Based on the designed PPMS, conduct periodic PPMS monitoring and data collection, prepare and submit PPMS reports in accordance with ADB requirements semiannually. The monitoring reports should include: (i) summary of monitoring data for major indicators; (ii) major existing and potential problems;

(iii) recommended mitigation or prevention measures which shall be incorporated in the updated PPMS implementation plan; (iv) assessment of previous follow-up actions; and (v) conclusions and recommendations.

(v) Provide inputs for contract management and procurement to progress reports, project midterm and completion reports, and other project required reports.

(vi) Provide input for the training and capacity development; coordinate with the TL and other team specialists to carry out training program for PPMS development and implementation, and provide support to the capacity development activities.

(vii) Provide assistance and supports to the executing agency and/or implementing agencies to complete the project performance monitoring tasks in compliance of PRC auditing and monitoring policies and requirements.

30. **Financial and economic specialists** (national, 15 person-months). The national financial and economic specialist shall have a post graduate degree and a minimum of 8 years of experience in urban infrastructure development and municipal service projects. The financial and economic specialist team will be responsible to provide financial and economic supports for the project implementation in compliance of ADB and domestic requirements on financial management, finical and economic analysis, disbursement and other financial and economic tasks. The specific tasks may include:

(i) Assist the executing agency and/or implementing agencies to develop financial management system, financial management plan, disbursement plan and projection; work with TL to prepare and submit project financial management manual.

(ii) Assist the executing agency and/or implementing agencies to establish project accounting and disbursement system to comply ADB disbursement requirements and domestic financial management and finical annual auditing requirements; provide assistance in accounting management and disbursement processing, annual auditing and other financial related tasks.

(iii) Provide assistance to review the executing agency and/or implementing agencies financial statements and provide comments to meet ADB requirements.

(iv) Provide the update economic assessment and analysis for the midterm review and project completion report and to provide the updated economic analysis results for ADB.

(v) Provide input of financial and economic aspect to progress report, midterm report, project completion report, and other project required documents.

(vi) Assist the team leader to coordinate among the team specialists to provide project implementation support on technical review, procurement documents review and contract variation requests review, due diligence report, contractor's claims and other project management support.

(vii) Provide support for carrying out capacity building training, and provide management support to the capacity development activities. Develop training program and conduct training on: (a) ADB's disbursement procedure and financial management (including financial audit) and project financial management, (b) organizational financial management and financial audit system and (c) public financial management.

(viii) Review the withdrawal applications and conduct water tariff and complete the water tariff analysis report.

31. **Capacity development: urban transport and traffic safety specialists** (international, 2.5 person-months; national, 3 person-months). The international and national specialists shall have a post graduate degree and a minimum of 15 and 8 year experience in the field of urban

transport, urban planning and public transport for ADB and World Bank projects. The urban transport team will be responsible to provide technical and management supports for the implementation of the road map of urban transport for Baicheng Municipal Government. The specific tasks may include:

(i) Review and update urban transport road map based on the latest urban development and urban transport development, especially in pedestrian and bicycle traffic, nonmotorized traffic, and public transport;

(ii) Develop detailed work plan for implementing the urban transport road map including institutional arrangement, investment, engineering and technical aspects, public consultation, education and public awareness, and implementing schedule;

(iii) Assess the existing urban transport system, especially the current pedestrian and bicycle traffic planning and facilities, public transportation system, ITS applications, urban parking and parking management system, and other urban transport system; Identify the problems on the current urban transport system causing traffic congestion, air pollution and unsafe urban transport; Develop urban transport improvement plan for promoting people centered urban transportation system by improving the pedestrian and bicycle system, nonmotorized traffic, and public transport system;

(iv) Introduce the concept of public transportation oriented urban development, , and present national and international case and best practices; introduce public transportation and pedestrian and NMT oriented commercial and residential development and the land use planning along the main new roads of the BEDZ. Organize at the early stage of the project implementation both international and national study tours on best example of public transportation.

(v) Assist BCMG relevant agencies including Baicheng Planning Bureau, Baicheng Construction Bureau, etc. to develop implantation plan for urban transport improvement, and provide technical and management support for the plan implementation;

(vi) Assess the existing public transportation system including public bus, taxi, high speed railroad, etc. Identify problems in the public transport system for coverage, effectiveness, schedule, convenience, safety and other relevant issues; Develop public transport improvement plan to promote public transport in the urban area including public transport planning, bus priority lanes, intermodal transport among bus, bicycle, pedestrian, railroad traffic, motor vehicle traffic, etc.

(vii) Assist BCMG and the relevant agencies and companies including Baicheng Transport Bureau, Baicheng Public Bus Company, etc. to develop public transport improvement plan, and provide technical and management support for the plan implementation;

(viii) Review and update the urban traffic safety part in the urban transport road map based on the latest urban development and urban transport situation, especially in pedestrian and bicycle traffic, nonmotorized traffic, and public transport;

(ix) Develop detailed work plan for implementing the urban transport road map in the aspect of urban traffic safety. The urban traffic safety shall address the 3E urban traffic safety program for Engineering, Education and Enforcement, and the plan shall cover institutional arrangement, investment, engineering and technical aspects, public consultation, education and public awareness, and implementing schedule;

(x) Conduct urban traffic safety auditing to assess the existing urban traffic safety situation, especially the current pedestrian and bicycle traffic, public

transportation system, motor vehicle traffic, and all other urban traffic safety problems;

(xi) Prepare and submit urban traffic safety auditing report;

(xii) Assist BCMG relevant agencies including Baicheng Planning Bureau, Baicheng Construction Bureau, etc. to develop implantation plan for urban traffic improvement, and provide technical and management support for the plan implementation;

(xiii) Assist BCMG relevant agencies including Baicheng Planning Bureau, Baicheng Traffic Bureau, Education Bureau, etc. to develop public education and public awareness campaign program to promote people centered urban transport system promoting pedestrian and bicycle traffic, nonmotorized traffic, public traffic, low carbon urban transport; Provide technical and management support for the plan implementation;

(xiv) Coordinate with the team leader and other team specialist to develop capacity development and training program for people centered urban transport system, and provide training for urban transport improvement.

(xv) Prepare and submit urban transport improvement report outlining improvements on urban transport, public transportation, public education, and awareness campaign program.

32. **Capacity development: municipal solid waste management specialists and community municipal solid waste specialists** (international, 2.5 person-months; national, 5 person-months; national community MSW specialist, 10 person-months)**.** The international and national MSW and community MSW specialists shall have a post graduate degree and a minimum of 15 and 8 year experience in the field of municipal solid waste management. The municipal solid waste team will be responsible to provide technical and management supports for the implementation of MSW road map for Baicheng and Baishan Municipal Government. The specific tasks may include:

(i) Review and update MSW road map based on the latest urban development and municipal solid waste management

(ii) Develop detailed work plan for implementing the SWM road map including institutional arrangement, investment, engineering and technical aspects, public consultation, education and public awareness, and implementing schedule.

(iii) Assist Baicheng Municipal Government (BCMG) and Baishan Municipal Government (BSMG) relevant agencies, including the construction bureaus and their environmental and sanitary divisions to develop implantation plan for MSW road map, and provide technical and management support for the plan implementation.

(iv) The community MSW specialist shall coordinate with other team members to carry out community MSW program including: holding meeting with PMOs and PIUs to formulate targeted communities for solid waste sorting at source demonstration, conducting focus group discussions with community leaders, residents' association and community property companies (if have), and raising awareness of project, the demonstration scheme and its benefits with support of the social (gender and public awareness) consultant, designing and implementing a demonstration scheme for solid waste sorting and recycling in targeted communities, and ensuring meaningful local participation through community planning and awareness creation to support constructive public relations, designing and preparing a handbook for solid waste sorting at source and its content includes (a) solid waste category and definition of each kind of waste, (b) how to collect different kinds of waste, (c) why need to sort household

waste, (d) different bins and containers for different kinds of waste in community, (e) knowledge of solid waste treatment and management, 3R, and (f) contact information, etc., distributing the handbook for waste segregation to all households of targeted communities for waste sorting awareness, organizing targeted communities to build capacities of local women and vulnerable groups to take a leading role in local social and environmental initiatives, particularly in the areas of hygiene, sanitation, 3R, and waste sorting at source with support of the social (gender and public awareness) consultant, mobilizing targeted communities to form community-based waste sorting at source groups which promote source segregation and recycling, monitor waste sorting and collection in communities with support of the social (gender and public awareness) consultant.

(v) Coordinate with the team specialist to develop a training program for integrated municipal solid waste management, which will also cover the training for households, community committees, community property companies, and sanitary workers on (a) how to separate waste, (b) the benefits of source segregation, and (c) motivation of households to separate kitchen waste and non-kitchen waste; Designing and implementing behavior change programs in relation to health seeking behaviors, hygiene and sanitation, and in promoting 3R strategy, source segregation and recycling of waste, through a sustained campaign of information, education, and communication at the local community level; Providing skill training in waste sorting and recyclable collection, targeting poor and women, for household waste recycling and reusing.

(vi) Establish a monitoring and evaluation system for the community-based solid waste sorting and recycling, guiding community-based solid waste sorting group and PIUs to monitor and evaluate the segregation.

(vii) Assist BCMG and BSMG relevant agencies including construction bureaus and their environmental and sanitary divisions to develop public education and public awareness campaign program to promote MSW reduce, reuse and recycle; Provide technical and management support for the training and education program implementation.

(viii) Prepare and submit MSW road map implementation report outlining road map implementation on technical and engineering, community MSW program and public education and awareness campaign program.

(ix) Summarize the good practices from the developed countries and provide the constructive suggestions on the MSW for Baicheng and Baishan cities.

33. **Capacity development: water safety plan and non-revenue water specialists** (international water safety plan [WSP], 1.5 person-months; international non-revenue water [NRW], 2.5 person-months; national WSP, 5 person-months; national NRW, 5 person-months). The international and national NRW specialists shall have a post graduate degree and a minimum of 15 and 8 year experience in WSP management. The international and national NRW specialists shall have a post graduate degree and a minimum of 15 and 8 years of experience in NRW reduction and management field. The team of WSP and NRW specialists will be responsible to provide technical and management supports for the implementation of the road map of water supply for BSMG. The specific tasks may include:

(i) review and update the water supply road map based on the latest urban development and water supply situation, especially in NRW loss, water supply safety, water supply efficiency, water supply operation and maintenance (O&M);

(ii) develop detailed work plan for implementing the water supply road map including institutional arrangement, investment, engineering and technical aspects, public consultation, education and public awareness, and implementing schedule;

(iii) assess and update the latest NRW situation to evaluate the NRW losses due to physical loss, commercial loss, unbilled water use, update the NRW loss reduction plan in the aspects of effectively utilization of the advanced water leaking detection equipment, develop and carry out NRW leaking monitoring and detection by utilizing the flow meters and DMAs constructed by the project, develop and implement institutional strengthening to reduce commercial and unbilled NRW losses;

(iv) assess O&M of the existing water supply system, identify problems associated with system operation efficiency and system maintenance, develop O&M improvement plan for both the existing and new build water treatment plants. The plan shall make full use of the design SCADA system in the new water treatment plant and to adjust the water supply based on the actual use, especially for the peak and non-peak periods;

(v) organize water supply stakeholders meeting to refine and update the water supply safety plan, develop an action plan to implement the water safety plan, provide technical and management support to implement the water safety plan; Develop water safety monitoring and verification program, provide support to conduct water safety plan monitoring and verification program, update the water safety plan and to start a new cycle of the water safety plan implementation, monitoring, and updating;

(vi) assist BSMG relevant agencies including Baishan Water Authority, Water Supply Company, Education Bureau, etc. to develop public education and public awareness campaign program for water conservation, water source protection, energy conservation; Provide technical and management support for the plan implementation;

(vii) coordinate with the team leader and other team specialist to develop capacity development and training program for NRW reduction, water safety plan development and implementation; Provide training on improving water supply management system; and

(viii) prepare and submit water supply management improvement report outlining improvements on NRW reduction, water supply safety plan, water supply O&M.

34. **Capacity development: stormwater management specialist** (international, 2 person-months; national, 1 person-months) The international and national stormwater management specialists shall have a minimum of 15 and 8 year experience in stormwater management and drainage design in urban development projects. The stormwater management team will be responsible to provide technical and management supports for the design and construction of the demonstration urban runoff infiltration system in the proposed component. The specific tasks may include:

(i) review and refine the proposed stormwater infiltration system, provide technical and management supports for the design, detail, construction, and stormwater management system O&M;

(ii) coordinate with the team leader and other team specialist to (a) develop capacity development and training program for stormwater management, urban flooding prevention, and low impact urban development based on the best international practices; and (b) provide training on stormwater management, environmental and ecological conservation by stormwater management, best management

system on stormwater management drainage design, and the stormwater management systems successfully used in the developed countries; and

(iii) prepare and submit stormwater management report outlining improvements on stormwater management, engineering details on the infiltration system design, technical support on the design and construction, and O&M of the stormwater management system.

5. Inputs and Cost of Consulting Services

35. The consulting service inputs for project management and capacity development are summarized below in Table 9.

Table 9: Project Implementation Supporter and Capacity Development

No	Title	International (m)	National (m)
1	Urban development specialist/team leader	11.5	
2	Urban infrastructure specialist/deputy team leader		40
3	Urban transport specialist		6
4	MSW specialist	2	6
5	Water supply specialist		6
6	Procurement and contract management specialist	2	12
7	Environmental specialist		9
8	Social and gender specialist		10
9	PPMS specialist		5
10	Resettlement specialist		10
11	Financial and economic specialist		15
	Subtotal =	15.5	119
	Cost =	$341,000	$833,000
	Out-of-pocket expenses =		$341,871
		International pm = 15.5	
		National pm = 119	
		Cost = $1,515,871	

MSW = municipal solid waste, PPMS = project performance management system.

Table 10: Capacity Development

No	Title	International (m)	National (m)
Urban Transport Improvement			
1	Urban transport and traffic safety specialist	2.5	3
2	MSW specialist	2.5	5
	Community MSW specialist		10
Stormwater Management			
3	Stormwater management specialist	2	1
4	WSP specialist	1.5	5
	NRW specialist	2.5	5
	Cost =	$165,000	$203,000

Out-of-pocket expenses =	$111,108

International pm =	**11**
National pm =	**29**
Cost =	**$556,108**

MSW = municipal solid waste, NRW = non-revenue water, WSP = water safety plan.

E. Resettlement Monitoring

No	Title	Unit	Cost
1	External resettlement monitoring	LS	$150,000
		Subtotal =	**$150,000**

F. Training, Study Tours, and Operations

International Study Tours

No	Topic	Person	Day	Rate	Cost
1	MSW management	5	10	$800	$40,000
2	Stormwater management	5	10	$800	$40,000
3	Urban transport and new zone development	5	10	$800	$40,000
4	Water supply operation and maintenance	5	10	$800	$40,000
				Subtotal =	$160,000

Domestic Training and Education

Study tours (six tours: one MSW management, two new urban zone development, two water, 1 stormwater)	$48,000
Solid waste management handbook	$35,000
Water conservation education materials	$30,000
Urban transport and traffic safety education	$35,000
Public education of MSW and water conservation	$35,000
Seminars and workshops (eight)	$40,000
Office rent and utilities	$125,000
Transportation	$100,000
Translation	$50,000
Subtotal =	$598,021
Subtotal =	**$758,021**

MSW = municipal solid waste. O&M = operation and maintenance

G. Consulting Service and Training Grand Total

International consultant (person-month)	26.5
National consultant (person-month)	148.0
Project management total	$1,535,871
Capacity development total	$1,334,109
Resettlement monitoring	$150,000
Total =	**$3,000,000**

H. Procurement Guidelines and Resources

http://www.adb.org/Documents/Guidelines/Procurement/default.asp
Procurement Guidelines (in Chinese)
http://www.adb.org/Documents/Translations/Chinese/Guidelines-Procurement-CN.pdf

Guidelines on Use of Consultants by ADB and Its Borrowers
http://www.adb.org/Documents/Guidelines/Consulting/default.asp
Consulting Services Recruitment Notice:
http://csrn.adb.org
http://csrn.adb.org:8080/csrn/login.jsp

Templates for engagement of consultants: (including submission templates)
http://www.adb.org/Consulting/loan-rfp.asp

Harmonized RFP (Loans)
http://www.adb.org/Consulting/all-methods-loan.asp

Sample Individual consultant contract
http://www.adb.org/Consulting/ICS-Contract-Loan.pdf

Consulting Services Operations Manual
http://www.adb.org/Documents/Manuals/Consulting-Services-Operations-Manual/CSOM.pdf

Toolkits and Templates for Consultants:
http://www.adb.org/Consulting/toolkit-template.asp

Procurement Documents:
http://www.adb.org/Procurement/prequalification-bid-documents.asp

User's Guide (Procurement of Goods)
http://www.adb.org/Documents/Manuals/Bidding_Documents/Goods/SBD-Goods-Users-Guide.pdf

User's Guide (Small Civil Works - below 10 MN USD)
http://www.adb.org/Documents/Manuals/bidding_documents/prequalification/SBDWorks-sml-UserGuide.pdf

Guide on Bid Evaluation
http://www.adb.org/site/business-opportunities/operational-procurement/goods-services/documents/guide-bid-evaluation

Procurement Plans
http://www.adb.org/Projects/reports.asp?key=reps&val=PP

Electronic Procurement
http://www.mdbegp.org/www/eGPInteractiveus/tabid/69/language/en-US/Default.aspx

E-GP (Electronic Government Procurement) Toolkit
http://www.mdbegp.org/www/eGPToolkitus/tabid/67/language/en-US/Default.aspx

Project Administration Instructions
http://www.adb.org/Documents/Manuals/PAI/default.asp

E-Handbook on Project Implementation
http://www.adb.org/Documents/handbooks/project-implementation/default.asp?p=proj

Anticorruption and Integrity
http://www.adb.org/Integrity/default.asp

How to report fraud and corruption
http://www.adb.org/Integrity/howto.asp

VII. SAFEGUARDS

A. Environment

1. **Environment due diligence.** The project is classified as environment category B. A project initial environmental examination (IEE) was prepared. The IEE complies with ADB's policies and requirements including ADB's Safeguard Policy Statement (2009).[6] The IEE concludes that the construction and operational impacts can be mitigated through the implementation of the environmental management plan (EMP), which is annexed and forms part of the PAM (Attachment 1). The EMP defines mitigation measures, monitoring requirements, and institutional responsibilities to ensure proper environmental management throughout the project construction and operation.

2. **Impacts.** Anticipated impacts during construction include earthwork (640,000 cubic meter (m^3) of cumulative cut and fill in Baishan, 930,000 m^3 in Baicheng), soil erosion, noise, dust, temporary interruption of municipal services and traffic disturbance, and potential health and safety risks. These impacts are of a temporary nature and are covered by stringent site management and procedural provisions in the EMP. During operation, predicted noise and odor levels at site boundary of solid waste transfer stations, composting and disposal facilities are within legislated limits. The assessment concludes that the water supply system, including Xibeicha reservoir will not significantly affect local water resources and downstream water users. Water source protection measures and minimum water release requirements are specified in the reservoir operation specifications and draft water safety plan developed for the project.

3. **Benefits.** The project will have significant environment, health, and safety benefits. In Baishan, the project will help reduce non-revenue water (NRW) in Baishan from 65% to 35% and implement water supply monitoring and control system (SCADA) to improve energy efficiency, resulting in annual water savings of 6.4 million m^3 and energy savings of 7.3 million kilowatt per hour. In Baicheng, the wastewater collection rate will be increased by 9,000 m^3 per day, significantly reducing annual pollution load to the environment. In Baicheng, the project will promote low-carbon transport modes by dedicating separate bus priority and nonmotorized lanes. Curbside stormwater collection and infiltration will be piloted along three project roads to mitigate the risk of waterlogging induced by increased urban soil sealing. The solid waste management components will significantly improve waste management practices by promoting source-segregation and recycling of domestic waste (kitchen waste, recyclates such as glass, metal, and clothes) and composting of kitchen waste. As a result, approximately 14,000 tons of kitchen waste will be converted to valuable compost. In Baishan, the proposed sanitary landfill will include methane capture. The assessment conducted during the IEE identified specific needs for increasing climate resilience. According to the IEE this was addressed though providing two supply sources for the Jiangyuan District, including the Xibeicha Reservoir (main water source) and the Dayangcha River (current water source), which will be kept as secondary water source to cover emergency situations, such as in case of interruptions of the main transmission line, or during extreme dry years. This dual water sourcing will increase redundancy and thus resilience of the water supply system for Jiangyuan District, recognized as a key climate change adaptation measure. Baishan's resilience will be strengthened by reducing non-revenue water (from 65% to 35%); by increasing the number of supply options and thus redundancy; through demand management (i.e., public awareness on water conservation); and through water supply safety planning. In Baicheng, the project will promote low-carbon transport modes by providing separate bus priority and nonmotorized lanes. Curbside stormwater

[6] ADB. 2009. *Safeguard Policy Statement*. Manila.

collection and infiltration will be piloted along three project roads to mitigate the risk of waterlogging induced by increased urban soil sealing.

4. **Environmental monitoring plan update on bidding documents**. In the design stage the Jilin provincial project management office (JPPMO) will pass the EMP to the design institutes for incorporating mitigation measures into the detailed designs. The EMP will be updated at the end of the detailed design, as needed. To ensure that bidders will respond to the EMP's provisions, the JPPMO, the local PMOs, and project implementing units (PIU) will prepare and provide the following specification clauses for incorporation into the bidding documents: (i) a list of environmental management requirements to be budgeted by the bidders in their proposals, (ii) environmental clauses for contractual terms and conditions, and (iii) component EIAs, and project IEE including updated EMP for compliance.

5. EMP implementation responsibilities:

(i) **Environment staff within local offices.** The local PMOs will have main EMP coordination responsibility. Therefore, each local PMO will establish an environmental management unit (EMU) and designate a leader and an appropriate number of staff. The EMUs will take charge of (a) coordinating the implementation of the EMP and developing implementation details; (b) supervising the implementation of mitigation measures during project construction and operation; (c) ensuring that environmental management, monitoring, and mitigation measures are incorporated into bidding documents, construction contracts and operation management plans; (d) submitting annual EMP monitoring and progress reports to the JPPMO; (e) coordinating the local grievance redress mechanism (GRM); and (f) responding to any unforeseen adverse impact beyond those mentioned in the domestic EIAs, the project IEE, and the EMP. EMUs will be technically supported by the loan implementation environment consultant (LIEC). The JPPMO and the PIUs will nominate one staff to act as environmental coordinator to check the overall implementation of environmental management provisions of the EMP, and to work in close coordination with the EMUs of the local PMOs.

(ii) **Loan implementation environment consultant.** A LIEC will be hired under the loan implementation consultant services (LIC). The LIEC will advise the JPPMO, local PMOs, PIUs, contractors, and construction supervision companies (CSC) on all aspects of environmental management and monitoring for the project. The LIEC will (a) assist in updating the EMP and environmental monitoring program, as needed; (b) supervise the implementation of the mitigation measures specified in the EMP; (c) on behalf of the local PMOs and JPPMO, prepare the annual EMP monitoring and progress reports in English and submit it to ADB; (d) provide training to the JPPMO, local PMOs, PIUs, CSCs, on the PRC's environmental laws, regulations and policies, ADB SPS 2009, EMP implementation, and GRM in accordance with the training plan defined in **Table EMP-9**; (e) identify any environment-related implementation issues, and propose necessary corrective actions; and (f) undertake site visits as required.

(iii) **Construction contractors and construction supervision companies.** Construction contractors will be responsible for implementing relevant mitigation measures during construction under the supervision of the CSCs and PIUs. Contractors will develop site-specific EMPs on the basis of the project EMP. CSCs will be selected through the PRC bidding procedure by the PIUs. The CSCs will be responsible for supervising construction progress and quality, and EMP implementation on construction sites. Each CSC shall have at least one

environmental engineer on each construction site to (a) supervise the contractor's EMP implementation performance; and (b) prepare the contractor's environmental management performance section in monthly project progress reports submitted to the PIUs and local PMOs.

(iv) **Environmental monitoring stations.** The PIUs will appoint the EMS of each project city to conduct periodic environmental impact monitoring during construction and operation in accordance with the monitoring plan (Table EMP-7 and Table EMP-8).

6. EMP implementation and supervision responsibilities are defined in the EMP (Attachment, Table EMP-1).

7. **Capacity building.** Capacity building in environmental management will be provided to the JPPMO, local PMOs, PIUs, contractors, and construction supervision companies in accordance with the training plan (Table EMP-9) to ensure adequate institutional capacity in managing the environmental impacts.

8. **Grievance redress mechanism**. Environmental grievances may occur during construction and operation of the project. The local PMOs will establish an environmental GRM, which follows the procedure and timeframe defined in the EMP. Each local PMO will establish a public complaints unit to coordinate the GRM. The loan implementation environment consultant will provide training to the members of the BPMOs and the access points of the GRM to ensure that responsibilities and procedures are clear. Plans for future public consultation and participation were developed and defined in the EMP (Table EMP-10). The implementing agencies (through the BPMOs) and the PIUs will have main responsibility for meaningful consultation and participation during project implementation.

B. Involuntary Resettlement

9. The project is classified as Category A for involuntary resettlement due to significant land acquisition and resettlement (LAR) impacts. The implementing agencies, with the support of a local institute, prepared resettlement plans for (i) Baicheng urban infrastructure and integrated municipal solid waste management, (ii) Baishan water supply, and (iii) Baishan municipal solid waste management. The resettlement planning and implementation is designed to ensure that the affected persons will be better off or at least not worse off as a result of the project.

10. The project affects 10 villages and three towns. Detailed impacts are presented in Table 1. The total permanent land acquisition is 2,425 *mu*, including 796 *mu* of state-owned land and 1,629 *mu* of collective land.[7] The collective land includes farmland, house plot, and other lands accounting for 48.2%, 34.4%, and 17.4%, respectively. Total house and building demolition area is 59,715 square meters (m^2), including residential houses of 54,446 m^2, rural sheds of 2,261 m^2 and small shops and institution buildings of 1,117 m^2. It is estimated that a total of 1,914 persons from 701 households will be affected, including 364 households to be affected only by land acquisition, 293 households by house demolition, and 44 households by both.

11. The LAR compensation standards will follow the *Land Administration Law of the People's Republic of China* (2004), *Law of the People's Republic of China on Administration of*

[7] A *mu* is a Chinese unit of measurement (1 *mu* = 666.667 square meters).

the Urban Real Estate (2007 Revised), *Regulations of Administration of Urban Housing Demolition* (2011), and other applicable guidelines. They will also be based on local policies regarding LAR in Jilin Province, Baicheng Municipal Government (BCMG), Baishan Municipal Government (BSMG), and ADB's Safeguard Policy Statement (SPS, 2009). The executing agency and/or implementing agencies, and PIUs will provide necessary assistance for house construction, relocation and livelihood development/income restoration during resettlement implementation.

12. **Institutional arrangements.** The provincial PMO will assume the overall responsibility for the implementation of LAR, including the planning, implementation, financing, and reporting of LAR. The implementing agencies and urban construction investment and management offices of Baicheng and Baishan will take the primary responsibility for the resettlement planning, implementation, and timely delivery of entitlements. To ensure smooth implementation, the staff in charge of LAR will undertake training on resettlement implementation organized by the PMO. The resettlement implementation schedule has been prepared based on the preparation and construction timetable. The resettlement plans will be updated based on the final design and detailed measurement survey, disclosed to affected persons in local language, and submitted to ADB for review and approval prior start of LAR activities and the awarding of civil works contracts.

13. The total estimated budget is CNY403.2 million, including (i) costs for permanent land acquisition of CNY148.8 million (accounting for 39.6% in the total budget), (ii) compensation for temporary land occupation of CNY10.3 million (2.6%), (iii) compensation for houses demolition of CNY77.2 million (19.1%), (iv) compensation for ground affiliated facilities of CNY48.0 million (11.9%), (v) taxes of CNY75.2 million (18.6%), and (vi) contingency and other costs of CNY 44.0 million (10.9%).

14. **Grievance redress mechanism**. The project implementing agencies (through local PMOs) will establish the four stages of grievance mechanism at the village-level, city/town government, state land acquisition office, and JPPMO as elaborated below:

(i) Stage 1: If any displaced person is dissatisfied with the resettlement plans, s/he can report this to village/community committee orally or in writing. In case of an oral appeal, the village/community committee shall make a disposition and keep written records. Such appeal should be solved within 2 weeks.

(ii) Stage 2: If the displaced person is dissatisfied with the disposition of Stage 1, s/he may file an appeal to the city/town government after receiving such disposition, which shall make a disposition within 2 weeks.

(iii) Stage 3: If the displaced person is dissatisfied with the disposition of Stage 2, s/he may file an appeal to the State Land and Resources Bureau/House Demolition Management Office after receiving such disposition, which shall make a disposition within 30 days.

(iv) Stage 4: If the displaced person is still dissatisfied with the disposition of Stage 3, s/he may apply for administrative reconsideration with the Baicheng and Baishan PMO. Also at any point, s/he may file an administrative action in the district people's court in accordance with the Civil Procedure Law of the PRC after receiving such disposition.

15. Displaced persons may file an appeal on any aspect of resettlement, including compensation rates, etc. The above means of appeal, and the names, locations, persons responsible and telephone numbers of the appeal accepting agencies will be communicated to the displaced persons at a meeting, through an announcement or the resettlement information

booklet, so that the displaced persons know their right of appeal. Mass media will be used to strengthen publicity and reporting, and comments and suggestions on resettlement from all parties concerned will be shared by the resettlement organization at all levels. All agencies will accept grievances and appeals from the affected people for free, and costs so reasonably incurred will be disbursed from the contingency costs. During the whole design and construction periods of the project, these appeal procedures will remain effective to ensure that the affected people can use them to address relevant issues. Affected persons can also submit complaints to the project complaint unit of the local PMOs or ADB which will be handled by the project team. If an affected person is still not satisfied and believes he and/or she has been harmed due to non-compliance with ADB policy, he and/or she may submit a complaint to ADB's Accountability Mechanism.[8]

16. **Monitoring.** A detailed plan for both the internal and external monitoring and evaluation is included in the resettlement plans. JPPMO will submit an internal monitoring report through quarterly project monitoring report to ADB. Furthermore, JPPMO will employ an external resettlement monitoring institute or firm to conduct independent external monitoring and submit unbiased external monitoring report. A baseline study of affected persons will be completed for each of the three resettlement plans before the LAR begins and the first monitoring report will be submitted. After that and until project completion, semiannual monitoring reports will be prepared and submitted for ADB's review during resettlement implementation and annually for two years after completion of resettlement. The implementation milestones of the resettlement plans are summarized in Table 2.

Table 1: Summary of Land Acquisition and Resettlement Impacts

Item		Unit	Baishan Solid Waste Management	Baishan Water Supply Services	Baicheng Urban Roads with Associated Facilities	Total
Affected town/urban subdistrict		No.	1	1	1	3
Affected village/community		No.	1	2	8	11
Affected village groups		No.	1	0	0	1
Permanent land acquisition	Collective land	mu	82.25	72.0	1,479.41	1,633.66
	Farmland	*mu*	30.67	2.5	754.59	787.76
	House plot	*mu*	11.83	0	550.53	562.36
	Construction land	*mu*	0	0	0	0
	Enterprise land	*mu*	0	0	0	0
	Other land	*mu*	39.75	69.5	174.30	283.55
	State land	mu	0	0	791.58	791.58
Acquisition of residential houses and structures	Rural house	m^2	5,269	0	37,446	42,716
	Rural shanty	m^2	236	0	2,025	2,261
	Urban house	m^2	0	0	11,729.19	11,729.19
	Urban shanty	m^2	0	0	0	0
	Urban enterprise/shop	m^2	0	0	1,116	1,116
Affected rural households	Acquisition of farmland	HH	3	4	357	364
		person	9	17	1,011	1,037

[8] For further information, see: http://www.adb.org/Accountability-Mechanism/default.asp.

and persons	Acquisition of residential houses	HH	27	0	266	293
		person	100	0	639	739
	Both land and house acquisition	HH	6	0	38	44
		person	20	0	118	138
Affected urban households and persons	Acquisition of residential houses	HH	0	0	77	77
		person	0	0	197	197
Total of affected households and persons		HH	36	4	661	701
		person	129	17	1,768	1,914
Total of enterprises/shops		No.	9	0	9	18
		person	41	0	309	350

HH = household, m^2 = square meter, *mu* = a Chinese unit of measurement (1 *mu* = 666.667 m^2).
Source: Asian Development Bank estimates.

Table 2: Milestones for Resettlement Activities*

No.	Resettlement Tasks	Target	Responsible Agency	Deadline
1.	**Consultation and Disclosure**			
1.1	Draft resettlement plan circulation and endorsement	Cities and project districts	Implementing agency and district governments	15 Dec 2013
1.2	RIB distribution	All affected villages and people	City and district ROs	31 Jan 2014
1.3	Consultations for updating resettlement plan	Seriously affected villages and people	Implementing agency, city and district ROs, and consultant	15 Sep–15 Dec 2013
1.4	Resettlement plan distribution	All affected villages	City and district ROs	28 Feb 2014
2.	**Resettlement Plan and Budget**			
2.1.	DMS		Design institute, city and district ROs, affected villages and affected persons	1–5 Feb 2014
2.2	Updating resettlement plan based on DMS		Implementing agencies, consultant	6–10 Feb 2014
2.3	Approval of final resettlement plan & budget		Baishan and Baicheng city governments	10–20 Feb 2014
2.4	Establish PMOs with grievance redress mechanism capacity		Baishan and Baicheng PMOS	June 2014
3.	**Capacity Building**			
3.1	Establishment of a resettlement offices at various levels		Implementing agencies, local governments	31 Dec 2013
3.2	ROs capacity building	30 staff	Implementing agencies, consultant	31 Jan 2014
3.3	Designate village authorities	All affected villages	City and district ROs	1–15 Mar 2014
4.	**Commencement and Completion of Resettlement**			
4.1	Agreements with villages and affected persons	All villages and affected persons	District ROs	Mar 2014
4.2	Commencement		All ROs	Mar 2014
4.3	Disbursement of compensation to affected persons		District RO	Mar 2014 onwards
4.6	Completion		All ROs	30 Aug 2015
5.	**Monitoring and Evaluation**			
5.1	Internal monitoring reports	Semi-annual reports	Implementing agencies	Jun and Dec each year
5.2	Contracting external monitor		Implementing agencies	15 Mar 2014

No.	Resettlement Tasks	Target	Responsible Agency	Deadline
5.3	Baseline survey	10-20% of seriously affected households 50% affected villages	External monitor	30 Mar 2014 (during and shortly after DMS)
5.4	External monitoring report	Semi-annual reports	External monitor	Jun and Dec each year
5.5	Resettlement completion report	Report	External monitor	31 Dec 2017

* The table was prepared in January 2014. The date reflected in this table will be updated during loan inception mission together with the three resettlement Plans.
DMS = detailed measurement survey, RIB = resettlement information booklet, RO = resettlement office
Source: Asian Development Bank estimates.

B. Indigenous Peoples

17. The project is categorized as C for the indigenous peoples safeguards. Both project cities are in multi-ethnic areas with high poverty rates in the surrounding rural areas. Statistics from local government indicate that Baicheng city has numbers of Mongol and Manchu ethnic minority residents (12,000) and Baishan city has numbers of Korean and Manchu ethnic minority residents (18,000). The poverty and social assessment confirmed that the ethnic minorities are socially and economically integrated with the majority Han Chinese and will equally benefit from the project. The project components are all focused on urban areas of Jilin province. No specific communities of ethnic minorities or groups are living separately and no adverse impacts are expected. Some ethnic minority people (2.5% of all affected people) will be affected by LAR. They will be fully compensated for loss of assets and rehabilitated through the resettlement plan provisions.

VIII. GENDER AND SOCIAL DIMENSIONS

A. Summary Poverty Reduction and Social Strategy

1. This section describes the required actions for gender and social dimensions, other than social safeguards. A social, poverty and gender analysis was undertaken in accordance with ADB guidelines.[1] The analysis collected information to assist in the design of the project by identifying the poor, examining causes of poverty and recommending poverty reduction measures including non-income poverty within the scope of the project.

2. **Design features.** The project will implement the following.

(i) **Gender action plan**. The gender action plan (GAP) will promote gender inclusion in the project activities and monitoring system. It will address gender mainstreaming in all project components and under training and capacity building. Implementation and monitoring of the GAP is included in the loan assurances.

(ii) **Social action plan**. The social action plan (SAP) includes targets for employment for poor and women on project works and subsequent operation and maintenance (O&M), protection of labor that will be employed on project works, mitigation of HIV/AIDS and construction disturbances, and consultation with and participation of community members throughout project implementation. In addition, it ensures that: (i) traffic safety awareness training programs, and (ii) solid waste reuse, reduce, and recycling programs are conducted in the project beneficiary areas of the roads, solid waste management, and flood management subprojects and that local residents are involved in the planning of these awareness programs. Implementation and monitoring of the SAP is included in the loan assurances.

B. Gender Development and Gender Action Plan

3. The poverty, social and gender analysis indicates that women strongly support all of the subprojects. They perceive that the project will improve their living environment, improve access and mobility, and create employment opportunities. A GAP (Table 1) has been prepared for the project and gender specific parameters have been included in the project's design and monitoring framework to ensure that targets are met, women fully participate in the project and enjoy project benefits, and adverse effects upon women are avoided or mitigated. The project city and county governments will work with the All China Women's Federations (ACWF), city and county government agencies, contractors and communities to facilitate the participation of women in paid work opportunities for physical works; and ensure that all labor laws of the People's Republic of China (PRC) and core labor standards are respected. Analysis of the survey and focus group discussion data reveal that: (i) women are more supportive to have more urban open space and recreation area for better urban environment and ecological condition, (ii) women are disproportionately affected by poor mobility since higher percentage of women are taking public transportation, (iii) women have more concerned regarding access to tap water and other municipal services due to family and household responsibilities; and (iv) more women are being employed in low-paying jobs. The project will ensure that: (i) priority will be given to women for employment, including a 30% target for project employment opportunities during the project construction and operation phases; (ii) women will not be discriminated on the basis of age or sex with respect to any job that they are capable of carrying out; (iii) sex disaggregated baseline and survey data will be collected; and (iv) the GAP is implemented. The

[1] ADB. 2001. *Handbook on Poverty and Social Analysis*. Manila.

local PMOs with the assistance of the project management consulting firm are responsible for the implementation of the GAP, and reporting on progress and achievements of the project. The three city and county governments agreed to provide necessary costs for implementation of the GAP (Table 1) and SAP (Table 2). All activities in GAP are part of the capacity building component (e.g., training, consultation, awareness raising activities) and implementation of SAP; therefore no additional cost is required specifically for the GAP.

C. Social Development and Social Action Plan

4. The SAP was prepared for the project. It sets out activities (i) for the mitigation of adverse impacts and risks identified in the course of the poverty and social analysis of the project, and (ii) to help maximize the benefits to be derived from the project.

5. To address the risk of the spread of HIV/AIDS, the project requires contractors to provide all their workers with training in the transmission and prevention of both HIIV/AIDS and other sexually transmitted infections (STIs). The Center for Disease Control in each city and county has agreed to conduct initial trainings at commencement of contract work and at any time when a large number of new employees are mobilized simultaneously. Recommendations specific to this particular aspect of the SAP implementation include:

(i) Separate sessions to be held for men and women.
(ii) If employees are employed one or a few at a time, they should be briefed by a member of the contractor's staff of the same sex as the employee, as part of the induction process for all new employees.
(iii) The Center for Disease Control may be asked to ensure that such briefings are carried out in an accurate and effective manner.
(iv) Contractors should be advised to try and ensure that a means of purchasing condoms is readily accessible if construction workers are housed where such access might otherwise be limited.
(v) Project construction workers will be engaged locally. As ensured in the assurances, construction workers from the local communities will be trained on the (i) prevention and control of transmissible diseases, and (ii) community disturbance and sensitization. In addition, capacity building will be undertaken with respect to advocating behavioral change.

6. The creation of new job opportunities is seen as a very important outcome of the project in most of the project areas. During the project construction, a total of about 3,370 job positions will be created directly, including about 337 technical and management positions, 846 positions of skilled labors, and 2,187 positions of unskilled labors. During operation, a total of about 321 job positions will be created directly, including 19 technical and management positions, 107 positions of skilled labors, and 195 positions of unskilled labors. It will be important that project employment opportunities for unskilled workers are advertised well in advance through media and notices in the public places most frequented by village and community residents. The project specific recommendations include:

(i) In conjunction with the Department of Labor and Social Security, Poverty Alleviation and Development Office and/or ACWF, local PMOs ensure local advertising process is in place to assist, for contractors to recruit appropriate local labor.
(ii) In some areas, local people employed by contractors may have had very little experience in the labor market of anything other than very short-term casual work. Measures to protect those local labors may be necessary, which requires

all employees to have a written contract, and information about whom they can approach to help resolve labor disputes or misunderstandings.

(iii) Timelines of the consultation meeting and public notice about the project may be carefully considered to give sufficient warning of start dates for physical works to enable local people to make appropriate decisions.

D. Other Social Aspects

7. **Labor issues**. Core labor standards will be implemented. Civil works contracts will stipulate priorities to (i) employ local people for works, (ii) ensure equal opportunities for women and men, (iii) pay equal wages for work of equal value, (iv) pay women's wages directly to them, (v) not employ children or forced labor, and (vi) ensure that all contracted labor have written contracts. Specific targets for employment have been included in the GAP, and SAP. CSG and the three project city and county governments are responsible for the implementation of the GAP, and SAP; and the local PMOs will report on the progress and achievements to PMO. The detailed SAP is provided in Table 2.

8. Under the project management consulting service, a social and gender specialist will be engaged to support the three project city and county PMOs to implement, monitor, and report on progress of the GAP, SAP, and other social aspects. GAP and SAP will be monitored semiannually and reported via quarterly progress reports.

9. **Consultation and participation.** Public education and awareness program will be conducted to promote municipal waste sorting at source, including solid waste separation in selected communities (21 communities in Baishan and 20 communities in Baicheng) and public sanitation management campaign including 3R in schools; road safety awareness campaign in Baishan schools, and water conservation and safe drinking water campaign in urban area of Baishan and also in schools. The project will strengthen also public participation in tariff reform of water and solid waste.

Table 1: Gender Action Plan

Activity	Target/ Indicators	Responsible Party	Budget	Time (year)
A. Solid Waste Management, Water Supply Service, and Road Construction—All Outputs				
1. Ensure women employment opportunity in the project construction and operations. 2. Ensure work environment and conditions (any separate latrines, washing arrangements, women -only dormitories, safety measures during the night, child -care facilities, etc.) on construction sites are conducive to the participation of women. 3. Provide separate HIV/AIDS/STIs and sexual harassment awareness for construction workers and communities.	(i) 30% job positions for female laborers in project construction and operations (baseline for women's construction workers is 0% in 2013) (ii) 100% work sites with facilities (i.e., latrines) designed particularly for female workers (iii) 100% of women and men involved in construction work and communities get HIS/AIDS/STIs and sexual harassment awareness	PIUs, contractors, project operators Monitored by labor bureau and PMOs Supported by ACWF, community committees Contractors, CDC	Salary included in project civil works cost and paid by contractors Cost for awareness included in SAP	2014–2018 (whole construction period) 2016 –ongoing (from operation of any subprojects)
B. Road and Related Infrastructure Facilities Outputs of Baicheng Component				
4. Ensure women in community consultation and decision making processes related to road design features (traffic signal, marks, pedestrian crossings, etc.). 5. Ensure women involved in consultation on public transport services in new route design and service quality.	(i) At least 50% of female participants in road safety program and consultation on public transport services	PMOs Supported by PIU, community committees, education bureau, and consultants	Road safety awareness and campaign cost included in SAP	2014–2018 (whole construction period)
C. Integrated Solid Waste Management Outputs of Baicheng and Baishan Components				
6. Ensure public awareness on environmental protection and sanitation management, solid waste sorting at source, garbage collection, transportation and sanitary disposal, and 3R[1] campaign handbook preparation in communities and schools.	(i) Establishment of 20 community based solid waste management groups in Baicheng with 50% of female participation (ii) Establishment of 21 community based solid waste management groups in Baishan with 50% of female participation	PMOs Supported by PIUs, community committees, education bureau, and consultants	Handbook cost included in SAP	2014–2018 (whole construction period)

[1] Reduce, reuse, and recycle.

7. Ensure women are involved in preparation and implementation of waste sorting at source.	(i) Establishment of community-based waste sorting groups in selected communities (ii) At least 50% of female in group members	PMOs Supported by PIUs, community committees, and consultants	No cost required	2014–2018 (whole construction period)
D.Water Supply Services Outputs of Baishan Component				
8. Ensure public awareness on water conservation, drinking water safety in communities and schools. 9. Ensure women participating in project design and preparation.	(i) Women participate in project design discussion and public awareness (ii) At least 50% of female participants	PMOs Support by PIUs, community committees, education bureau, and consultants	Public awareness and training cost included in SAP	2014–2018 (whole construction period)
D. Project Management				
10. Ensure a social (gender and public awareness) consultant, including in TA consultant team during project implementation to guide GAP and/or SAP implementation and provide training. 11. Ensure at least one staff member is allocated responsibility for social and/or gender issues in each PMO and PIU (hereafter referred to as "safeguard staff"). 12. Nominate at least one woman in community offices to act as link between residents and the PMO, and to attend all project-related public meetings, consultations, etc. to facilitate effective participation of all attendees. 13. Sex-disaggregated data will be collected in the management information system to ensure the monitoring, evaluation, and reporting of GAP and SAP.	(i) 100% activities designed in GAP are implemented with instruction of the specialist and support of the staff (ii) At least one person appointed to this role in each PMO and/or PIU and community office (iii) Completion of the monitoring report on GAP and SAP (iv) Indicators involving social development and gender in PPMS	JPMO, PMOs	Consultant cost included in SAP	2014–2018 (whole project implementation period)
E. Capacity Development Outputs				
14. Gender awareness training for PMOs and PIUs staff to include discussion on (i) ADB gender policies, (ii) the GAP, and (iii) the benefits to be derived from gender mainstreaming in infrastructure projects.	(i) 100% staff of PMO and implementing agencies receive the training (ii) At least 30% female representatives in all trainings	JPMO Supported by PMOs, PIUs, local government	Consultant cost included in SAP	2014–2018

ACWF = All China Women's Federation, ADB = Asian Development Bank, CDC = center of disease control, GAP = gender action plan, JPMO = Jilin project management office, PIU = project implementing unit, PMO = project management office, PPMS = project performance management system, SAP = social action plan, STI = sexually transmitted infection, TA = technical assistance,

Table 2: Social Action Plan

Activity	Target and Indicators	Responsible Party	Budget and Cost	Timing
A. Generating Job Opportunities to Increase Residents' Income				
(i) Employment during project Ensure employment priority to local people in construction contracts with contractors (ii) Ensure training on labor law, job skills, safety, sanitation, etc. to be provided by contractors	**Targets:** (i) A total 3,370 job positions will be created (about 337 technical and management positions, 846 positions of skilled labors, and 2,187 positions of unskilled labors) (i) At least 30% women for labor in landscaping and civil work (ii) At least 15% poor for unskilled labor in landscaping and civil work (iii) 100% contracted laborers get training **Indicators:** (i) Number of local people employed (disaggregated by sex, skilled/ unskilled, ethnicity and poverty status) (ii) Wages (disaggregated by sex) paid to local people (iii) Number of laborers trained (disaggregated by sex)	PMOs, PIUs, contractors, local street offices, and township governments	Included in project civil works cost and paid by contractors	2014–2018
2. Employment during project operation (i) Ensure employment priority to local people (ii) Ensure training workers on labor law, job skills, safety, sanitation, etc. to be provided by PIUs	**Targets:** (i) A total 321 job positions will be created (19 technical and management positions, 107 positions of skilled labors, and 195 positions of unskilled labors) (i) At least 30% women for labor in new solid waste management, water supply services landscaping and road maintenance (ii) At least15% poor for unskilled labor in landscaping, and road and river maintenance **Indicators:** (i) Number of local people employed (disaggregated by sex, skilled/ unskilled, nationality and poverty status) (ii) Wages (disaggregated by sex) paid to local people (iii) Number of workers trained (disaggregated by sex)	PMOs, PIUs, POCs, local street offices, township governments, labor bureau, and urban construction bureau	Included in project operation cost and paid by POCs	2016–2018 and onwards
B. Measures to Reduce Potential Risks				
1. Control and Prevention of HIV/AIDS/STI (i) Ensure local CDPC provides training to worksite health promoters (ii) Ensure to provide manuals, posters, and drawings	**Targets:** (i) 100% contractors establish connection with local CDPC (ii) 100% construction staff and workers get HIV/AIDS and STI counseling	PIUs, contractors, local CDPCs, and local governments	Awareness training costs for workers are included in contract costs.	2014–2018

Activity	Target and Indicators	Responsible Party	Budget and Cost	Timing
	Indicators: (i) Number of total contractors and contractors connected with local CDPC (ii) Number of manuals, posters or drawing distributed at worker living area		Local CDPCs costs included in local health bureau budget at about CNY10,000	
C. Enhancement Measures (Responsibility of Participating Local Governments)				
1. Strengthen Solid Waste Sorting at Source (i) Establish a management institution led by PMOs and responsibilities (ii) Provide trash bins and containers in selected communities (iii) Design and prepare household garbage 3R Instruction handbook (iv) Hold public participation and consultation for waste sorting in selected communities (v) Public sanitation management campaign including 3R in schools (lecture or picture exhibition, handbooks, etc.)	**Targets:** (i) 21 residence communities in Hunjiang District of Baishan and 20 communities in Taobei District of Baicheng (ii) 100% primary and middle schools in DPA (70 primary and 30 middle schools) (iii) At least 50% female participants **Indicators:** (i) Number of handbook copies (ii) Number of bins and containers (iii) Number of schools and communities (iv) Number of participants (disaggregated by sex, students, residents) in two districts	PMOs, BESB, CCs, environmental bureau, and PIUs	Bins and containers are included in project construction cost Handbook and consulting service cost is included capacity building of the project at about CNY810,000	2014–2016
2. Strengthen Water Conservation and Safe Drinking Water Public Awareness (i) Prepare and deliver water-saving campaign materials (ii) Public water conservation campaign in schools (lecture or picture exhibition, etc.) (iii) Public water conservation and safe drinking water campaign in urban area of DPA (poster, picture exhibition, etc.)	**Targets:** (i) 30% urban households in the project district to receive water conservation awareness (ii) 100% primary and middle schools in DPA (28 primary and 13 middle schools) (iii) At least 35% local residents (150,000 urban residents in DPA of two districts) (iv) At least 50% female participants **Indicators:** (i) Reduction of water consumption of average urban households (ii) Number of households with water-saving taps or toilet (iii) Number of campaign materials distributed (iv) Number of schools and communities (v) Number of participants (disaggregated by sex, students, residents) in two districts	BWAB, PIUs, and environmental bureau	New water supply plant and control system cost is included in project construction cost Campaign material cost is included capacity building of the project at about CNY200,000	2014-2016

Activity	Target and Indicators	Responsible Party	Budget and Cost	Timing
3. Strengthen Traffic Road Safety and Public Awareness (i) Traffic signal and marks on street (ii) Special traffic marks on roads near schools (iii) Road safety campaign in schools (picture exhibition, etc.) (iv) Road safety campaign in DPA (picture exhibition, etc.)	**Target:** (i) 100% signal and marks on newly constructed roads and roads near school (ii) 100% primary and middle schools in DPA (1 primary and 1 middle schools) (iii) At least 70% local residents (18,000 residents in Xijiao Street Office of Baicheng) (iv) At least 50% female participants (rural and urban residents) **Indicators:** (i) Number of schools and communities (ii) Number of participants (disaggregated by sex, students, residents)	EB, TPB, and PIUs	New signal and mark cost is included in project construction cost Picture exhibition cost is included capacity building of the project at about CNY120,000	2015–2018
4. Strengthen public participation in tariff reform of water and solid waste (i) Participation of women and low-income people in tariff hearings (ii) Provide subsidy for low-income inhabitants when water and solid waste treatment prices are increased	**Target:** (i) At least 30% female participants (ii) At least 15% low-income participants (iii) 100% urban low-income inhabitants in two project cities to be provided subsidy for tariff increment **Indicators:** (i) Number of participants (disaggregated by sex, low-income, residents) (ii) Number of low-income people to receive subsidy	PMO, finance bureau, price bureau	No budget need	2015–onward

PMO = project management office, PIU = project implementation unit, TPB = traffic police branch.

IX. PERFORMANCE MONITORING, EVALUATION, REPORTING, AND COMMUNICATION

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Improved economic growth, resource efficiency, and quality of life in Baicheng and Baishan cities	**By 2023 (2012 baseline)** Average annual per capita disposable income of urban residents is increased by 7% in both Baishan City (from CNY21,282 in 2012) and Baicheng City (from CNY20,154 in 2012) Lifespan of Baicheng and Baishan landfills increased by 8% 30% of solid waste in the two cities is recycled or reused (baseline: less than 5% in 2012) Cost to end users of 1 cubic meter of water reduced by 50% (2012 baseline CNY2.64)	Baicheng and Baishan statistical yearbooks Baicheng statistical yearbooks Baicheng and Baishan statistical yearbooks Baishan water supply company financial report	**Assumptions** City master plans and provincial development plan are implemented Infrastructure is properly maintained Sector road maps are implemented **Risks** Insufficient funds to support implementation of city master plans and provincial development plan
Outcome Improved delivery and efficiency of municipal services in Baicheng and Baishan cities	**By 2019 (2013 baseline)** Bus priority lane and nonmotorized transport lane length in Baicheng will be increased from 0 km in 2013 to 7.2 km Baicheng wastewater collection rate increased from 60% to 75% 20% of MSW (or 60 t/d) in Baishan and Baicheng is sorted for waste reduction, recycling, and reuse Nonrevenue water in Baishan is reduced from 65% to 35% 3,370 jobs will be created during construction and 321 jobs will be created during operation, of which 30% are filled by women and 15% by the poor	Record from BEDZ development progress report Record from BEDZ development progress report Record from Baicheng and Baishan MSW management Water supply data by implementing agency Quarterly reports by PMO and implementing agencies	**Assumption** Government commitment and support for environmentally sustainable urban development **Risk** Actual economic growth and population increases outpace projections
Outputs 1. Improved urban infrastructure in Baicheng	**By 2018 (2013 baseline)** Construction of 32.4 km of roads, two 20-meter span bridges, and one railroad underpass Rehabilitate and construct the following: water supply pipe (36.9 km), sewer pipe (63.2 km) with one pump station, stormwater pipe (59.9 km) and two pump stations, power line (33 km), communication conduit (33 km), street lights, primary heating pipe (28.2 km), and one traffic control and management system	Project CQPRs Project CQPRs	**Assumptions** Project counterpart fund is appropriated timely The project is properly managed and monitored to ensure final implementation is completed in compliance of contract documents. **Risks** Land acquisition approvals and

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
2. Integrated solid waste management system in Baicheng	Establish a 30 t/d composting plant and establish 20 recyclate collection points Build 9 MSW transfer stations with 12 armed self-loading trucks and 30 compaction containers and other equipment Purchase MSW handling equipment, upgrade MSW and street-cleaning equipment, and garbage containers and recycling bins Establish 20 community-based solid waste management groups with women accounting for 50% of participants	Project CQPRs Project CQPRs Project CQPRs Project CQPRs	implementation are delayed Consulting firm is not hired in a timely manner
3. Integrated solid waste management system in Baishan	**By 2018 (2013 baseline)** Construct a 330 t/d MSW sanitary landfill, establish a 30 t/d composting plant and establish 21 recyclate collection points Rehabilitate 15 MSW transfer stations with 15 armed self-loading trucks and 30 compaction containers and other equipment Purchase MSW handling equipment, upgrade MSW and street-cleaning equipment, and garbage containers and recycling bins Establish 21 community-based solid waste management groups with women accounting for 50% of participants	Project CQPRs Project CQPRs Project CQPRs Project CQPRs	
4. Improved water supply management in Baishan	**By 2018 (2013 baseline)** Construct water transmission lines to Jiangyuan district (, 6.8 km) and Hunjiang district (21.1 km) Construct a new waste treatment plant in Hunjiang district with a capacity of 50,000 t/d Rehabilitate 11.1 km of existing water distribution line, and construct 44.2 km of new water distribution line Install (i) 12 flow and 10 pressure meters to better detect leaks, (ii) advanced leak detection equipment, (iii) a pilot district metered area, and (iv) a supervisory control and data acquisition system	Project CQPRs Project CQPRs Project CQPRs Project CQPRs	
5. Improved capacity and institutional arrangements	**By 2018 (2013 baseline)** Provide training to PMOs and implementing agencies to ensure efficient and effective project implementation and operation, with a target that 30% of participants be women	Project CQPRs	**Assumption** Staff of relevant bureaus, project operation and maintenance entities, and public and related stakeholders participate

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
	Sex-disaggregated program performance and monitoring system operational (2013 baseline: 0)	Project CQPRs	in capacity development training
	Community environment-awareness promotion program for solid waste management implemented with at least 50% of participants women	Project CQPRs	**Risk** Recruitment of the loan implementation consultant is delayed
	Technical support and training for sector road map implementation	Project CQPRs	

Activities with Milestones	**Inputs** ($ million)	
1. Improved urban infrastructure in Baicheng	ADB ordinary capital resources loan	150.00
1.1 Preliminary design by Q4 2014	Base cost	142.40
1.2 Detailed design by Q1 2015	FCDI	7.60
1.3 Land acquisition and resettlement by Q4 2015		
1.4 Bidding document preparation by Q1 2016		
1.5 Road, bridge, and associated facilities construction by Q3 2018		
1.6 Landscaping and traffic control by Q2 2018		
2. Integrated solid waste management system in Baicheng	Baicheng municipal government	175.50
2.1 Preliminary design by Q4 2014	Base cost	141.11
2.2 Detailed design by Q1 2015	Contingencies	34.39
2.3 Land acquisition and resettlement by Q4 2015		
2.4 Bidding document preparation by Q1 2016		
2.5 MSW composting plant construction by Q3 2016		
2.6 MSW transfer station by Q2 2018		
3. Integrated solid waste management system in Baishan	Baishan municipal government	61.34
3.1 Preliminary design by Q4 2014	Base cost	47.93
3.2 Detailed design by Q1 2015	Contingencies	13.41
3.3 Land acquisition and resettlement by Q4 2015	**Total**	**386.84**
3.4 Bidding document preparation by Q1 2016		
3.5 MSW composting plant construction by Q3 2016		
3.6 MSW sanitary landfill by Q3 2017		
3.7 MSW transfer station by Q3 2018		
4. Improved water supply management in Baishan		
4.1 Preliminary design by Q4 2014		
4.2 Detailed design by Q1 2015		
4.3 Land acquisition and resettlement by Q4 2015		
4.4 Bidding document preparation by Q1 2016		
4.5 Jiangyuan water transmission line by Q3 2017		
4.6 Hunjiang water transmission line by Q4 2017		
4.7 Water treatment plant by Q2 2018		
4.8 Water distribution network by Q3 2019		
5. Improved capacity and institutional arrangement		
5.1 Establish project management system for executing agency, implementing agencies, and project management units by Q4 2014		
5.2 Establish environmental impact assessment and resettlement plans monitoring system by Q1 2015		
5.3 Recruit and mobilize consultants by Q2 2015		
5.4 Establish project performance management system for executing agency and implementing agencies by Q3 2015		
5.5 Implement capacity development by Q4 2018		
5.6 Implement EMP, resettlement plans, GAP, and SAP until Q4 2018		
5.7 Monitor implementation of EMP, resettlement plans, SAP, and GAP until Q4 2018		

BEDZ = Baicheng Economic Development Zone, EIA = environment impact assessment, EMP = environmental management plan, FCDI = financial charges during implementation. GAP = gender action plan, km = kilometer, m =

meter, MSW = municipal solid waste, NMT = nonmotorized transport, NRW = non-revenue water, O&M = operation and maintenance, PIU = project implementation unit, PPMS = project performance management system, SAP = social action plan, SWM = solid waste management, t/d = ton per day, WTP = waste treatment plant.
Source: Asian Development Bank.

A. Monitoring

1. Project Performance Monitoring

1. The project performance management system (PPMS) indicators, their relevance, and monitoring practicalities will be discussed with the executing agency, implementing agencies and project beneficiaries during project implementation. Disaggregated baseline data for output and outcome indicators gathered during project processing will be updated and reported semiannually through the semiannual progress reports of the Jilin provincial project management office (PMO) and after each ADB review mission. These semiannual reports will provide information necessary to update ADB's project performance reporting system.[1] At the start of project implementation, the PMO and implementing agencies, with the project implementation consulting services, will develop integrated PPMS procedures to generate data systematically on the inputs and outputs of the components, as well as the indicators to be used to measure the project's impact and outcome taking into account the components' scope. The PMO will be responsible for monitoring and reporting on project performance. The basis for performance monitoring will be the design and monitoring framework (DMF), which identifies performance targets for the impact, outcomes, and outputs of the project. By collecting data from the sources identified in the DMF, the PMO will be able to report on an annual basis the performance of the project. Specific reporting requirements will be set out in the agreement between ADB and the Government. The PMO will collect the data, calculate the indicators, analyze the results, and prepare a brief report describing the extent to which the project is generating the intended outputs and outcomes, as well as the overall impact on the project municipalities. The relevance and practicability of data collection for indicators was confirmed with the PMO and the implementing agencies. Meanwhile, the agreed socioeconomic and environmental indicators to be used will be further enhanced to measure project impacts. The PMO and the implementing agencies agreed and confirmed that they will (i) refine and integrate the PPMS framework at the start of project implementation; (ii) confirm that targets are achievable; (iii) develop recording, monitoring, and reporting arrangements; and (iv) establish systems and procedures no later than 6 months after project inception. It is recommended that a procurement revue for effective implementation (PREI) is conducted at mid-term review mission or at a time when still important number of packages are to be procured. So lessons from the first implementation phase can benefit the rest of the implementation of the project.

2. Compliance Monitoring

2. The executing agency, with assistance of two city governments, project implementing units (PIUs) and the project management consulting service, will conduct compliance monitoring, submit reports and information to ADB concerning the use of the loan proceeds, project implementation, PIUs' project implementation performance, and compliance of loan and project covenants. These reports will include (i) semiannual progress reports on project implementation; and (ii) a project completion report, which should be submitted not later than 3 months after the completion of the project facilities. The compliance status of loan and project

[1] ADB's project performance reporting system is available at http://www.adb.org/Documents/Slideshows/ PPMS/default .asp?p=evaltool

covenants will be reported and assessed through the semiannual progress report. ADB review missions will verify these statuses.

3. Safeguards Monitoring

a. Environment

3. **Internal monitoring and reporting by construction supervision companies**. During construction, construction supervision companies (CSC) will be responsible for conducting internal EMP monitoring and supervision in accordance with the monitoring plan defined in the EMP (Attachment, Table EMP-7 and Table EMP-8). The results will be reported through the CSCs' reports to the PIUs.

4. **Environmental impact monitoring by environmental monitoring stations.** The PIUs will contract the local environmental monitoring stations (EMS) to conduct environmental impact monitoring in accordance with the monitoring plan (**Table EMP-7, Table EMP-8**). A detailed cost breakdown will be provided by the two local EMSs when the environmental monitoring program is updated at the start of each component implementation. Monitoring will be conducted during construction and operation period, until a project completion report (PCR) is issued. Quarterly monitoring reports will be prepared by the EMSs and submitted to JPPMO, local PMOs and the PIUs.

5. **Environmental management plan implementation monitoring and progress reporting.** The LIEC will review project progress and compliance with the EMP based on field visits, and the review of the environmental impact monitoring conducted by the EMSs. The findings of the LIEC will be reported to ADB through the annual EMP monitoring and progress reports. The reports will include (i) progress made in EMP implementation, (ii) overall effectiveness of the EMP implementation (including public and occupational health and safety), (iii) environmental monitoring and compliance, (iv) institutional strengthening and training, (v) public consultation (including GRM), and (vi) any problems encountered during construction and operation, and the relevant corrective actions undertaken. The LIEC will help JPPMO prepare the reports and submit the English report to ADB for appraisal and disclosure.

6. **Project completion environmental audits.** Within 3 months after each subproject completion, or no later than one year with permission of the city EPBs, environmental acceptance monitoring and audit reports of each subproject completion shall be (i) prepared by a licensed environmental monitoring institute in accordance with the PRC Guideline on Project Completion Environmental Audit (2001), (ii) reviewed for approval of the official commencement of individual subproject operation by environmental authorities, and (iii) finally reported to ADB through the annual EMP monitoring and progress reporting process.

b. Resettlement

7. Internal and external monitoring of resettlement plan implementation will be conducted. Monitoring methodologies are specified in the three resettlement plans. Each implementing agency will carry out internal supervision and monitoring to ensure compliance with the provisions of the resettlement plan. The PMO and implementing agencies have agreed to a set of supervision milestones with ADB, to ensure timely and effective implementation of resettlement activities. An independent agency under contract to each of two implementing agencies will implement external monitoring and evaluation. Semiannual external monitoring reports and annual evaluation reports will be forwarded directly to both the PMO and ADB.

c. Gender and Social Action Plans

8. Monitoring of the gender action plan (GAP) and social action plan (SAP) will be incorporated into the PPMS. Clear targets and indicators have been established and some indicators, such as those on employment, are also captured in the DMF. Assistance will be provided for the executing agency and implementing agencies by the resettlement and social development consultant who will help to set up effective monitoring systems and work with the focal points in the executing agency and implementing agencies to ensure implementation, monitoring and reporting of the GAP, and SAP. The GAP and SAP will be monitored semiannually and reported via the quarterly project progress reports and during ADB review missions.

d. Evaluation

9. ADB, executing agency and implementing agencies will undertake a semiannual review mission to evaluate the progress of project implementation. ADB, executing agency and implementing agencies will undertake a comprehensive midterm review two years after the start of project implementation to have a detailed evaluation of the scope, implementation arrangements, resettlement, achievement of scheduled targets, and progress on the agenda for policy reform and capacity building measures. Feedback from the PPMS activities will be analyzed. Within 3 months of physical completion of the project, the PMO will submit a project completion report to ADB.[2]

e. Reporting

10. The PMO will provide ADB with (i) semiannual progress reports in a format consistent with ADB's project performance reporting system; (ii) consolidated annual reports, including (a) progress achieved by output as measured through the indicator's performance targets, (b) key implementation issues and solutions, (c) updated procurement plan, and (d) updated implementation plan for the next 12 months; and (iii) a project completion report within 6 months of physical completion of the project.

11. The executing agency and implementing agencies have agreed on the following reporting commitments: (i) submission of semiannual progress reports during project implementation; (ii) submission of periodic reports on the progress of safeguards monitoring, i.e., resettlement activities (semiannual), environmental monitoring (annual), GAP and SAP implementation (semiannual); (iii) submission of project completion report 6 months after completion of the project; and (iv) submission of audited project accounts and financial statements 6 months after the end of fiscal year. PPMS data will be incorporated in the semiannual progress reports.

12. The following table summarizes the key reporting requirements during project implementation.

Table 1: Key Reporting Requirements

[2] Project completion report format available at: http://www.adb.org/Consulting/consultants-toolkits/PCR-Public-Sector-Landscape.rar

Report	Reference	Timing of Reporting
Project performance management system:	Project Agreement, Schedule, paragraphs	No later than 6 months after loan effectiveness
Develop comprehensive project performance management system procedures		
Reporting of baseline and progress data including environmental management plan		Semiannual, included in the quarterly project progress reports
Semiannual project progress r reports	Project Agreement, Schedule, Article	Semiannual, within 1 month after the end of each quarterly
Audited project accounts and financial statements auditor's report (including auditor's opinion on the use of the imprest account and statement of expenditures)	Project Agreement, Schedule, Article	Not later than 6 months after the closure of fiscal year (end of June)
Resettlement monitoring:	Project Agreement, Schedule, paragraphs	
Internal monitoring reports for the executing and implementing agencies		Included in the semiannual project progress reports
Land acquisition and resettlement phase–external monitoring report		Semiannual until activities are completed
Post-land acquisition and resettlement phase–external evaluation report		Annual reports for 2 years after the resettlement activities
Resettlement completion report		Within 3 months after project completion
Other social monitoring:	Project Agreement, schedule, paragraphs	
Reporting on gender action plan implementation		Semiannual, included in the quarterly project progress reports
Reporting on social action plan implementation		Semiannual, included the quarterly project progress reports
Environmental report:	Project Agreement, schedule, paragraphs	
Construction phase – Reporting on EMP implementation progress		Semiannual, included in the semiannual project progress reports
Construction phase – Environmental monitoring report		Quarterly (EMS to PIUs and local PMOs), annual (to ADB)
Operations Phase–Environmental monitoring report		Annual, until a project completion report is issued
Project completion report	Project Agreement, schedule, Article	Not later than 6 months after the physical completion of the project

ADB = Asian Development Bank, EMP =Environmental Management Plan, EMS = environmental management system, PIU = project implementation unit, PMO = project management office.

4. Stakeholder Communication Strategy

13. Project information will be communicated through public consultation, information disclosure mechanism in ADB's and government's website, meetings, interviews, focus group discussions, and community consultation meetings, in accordance with ADB's requirements of information disclosure policy.

14. **Environment.** Meaningful consultation for each subproject has been conducted during feasibility study and domestic environmental impact assessments in accordance with the PRC Interim Guideline on Public Consultation in EIA (2006) and ADB's Safeguard Policy Statement (2009). A public consultation and communication plan has been defined in the environmental management plan (EMP, Table EMP-10). Affected people will be consulted and informed through formal questionnaire surveys, site visits and informal interviews by the local PMOs (through their environmental management unit) and the relevant PIU, with support of the loan implementation consultant.. Public meetings will be organized by the local PMOs and PIUs in both cities prior to mid-term mission to present and discuss EMP implementation progress, solicit community opinions and concerns, and agree on required corrective actions. The loan

implementation consultant will, prior to project completion report, organize surveys in both cities to assess community satisfaction with project implementation, project outputs, and EMP implementation performance. The results will be documented in the project completion report (PCR). The project's environmental information will be disclosed by the local EPBs and ADB as follows: (i) the project IEE is disclosed at www.adb.org; (ii) the Chinese EIAs were disclosed on the website of the Jilin Province Environmental Protection Department (JPEPD); and (iii) the annual environment monitoring and progress reports will be disclosed at www.adb.org.

15. **Involuntary resettlement**. All of the affected households and towns/townships, leaders and town and township and district governments will continue to be involved in the project impact and social-economic survey. Through meetings, interviews, focus group discussions, public consultation workshops, and community consultation meetings, local representatives have participated in the planning and concerns have been integrated into the three resettlement plans. Before implementation, the PMO and the implementing agencies will further discuss and consult with the affected persons' representatives the impacts on every town/township and the detailed compensation plan to ensure affected persons' interests are protected and to provide employment opportunities for the affected persons' livelihoods as a result of project implementation. The PMO and PIU in each implementing agency will disclose the resettlement plan in the offices as well as the community offices and to affected people in the local language. The resettlement plans have been posted on the ADB website. Resettlement information booklets were distributed to affected households during project preparation. This guideline contains information such as the affected project area, proposed land acquisition and relocation implementation progress and procedure, compensation standards for land acquisition, relocation assistance, and livelihood restoration strategy. The respective component implementing units will establish project resettlement units for supervision of implementation, continued public consultation, monitoring of progress, and response to grievances. The grievance redress procedures will be established and explanations have been included in the resettlement information booklets.

16. Affected households including men and women have been consulted during the resettlement planning exercise. The resettlement survey also identified the women headed households who would suffer land acquisition and/or house demolition impacts. Provisions are made in the resettlement plan to ensure that affected households including women receive equal entitlements based on the type of losses and equal access to training and job opportunities of their choice for restoring their livelihood. Vulnerable households were identified which also includes the women headed households would receive a special assistance of RMB 2000 to improve their living conditions. Affected households including men and women will have access to the grievance mechanism and their complaints will be handled free of cost.

17. **Gender and social action plan**. Consultations with communities have taken place and will continue at different points in the preparation and implementation of the GAP and SAP within the project, and will be designed not only to inform people about the component or specific activities related to its preparation and implementation, but also to enable people in the community to ask questions, make suggestions, state preferences, and express concerns. Special attention will be paid to the participation of women and any other vulnerable groups, such as the poor. GAP and SAP will be monitored and reported semiannually and verified by external resettlement and social monitoring consultants. Disclosure of social and environmental monitoring reports will be undertaken during project implementation.

X. ANTICORRUPTION POLICY

1. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the project.[3] All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all project contractors, suppliers, consultants and other service providers. Individuals/entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contracts under the project.[4]

2. To support these efforts, relevant provisions are included in the loan agreement, and the bidding documents for the project. ADB's Anticorruption Policy (1998, as amended to date) will be explained to and discussed with the executing agency and/or implementing agencies and their project management offices (PMOs), and project implementing units (PIUs). Consistent with its commitment to good governance, accountability and transparency, ADB reserves the right to investigate any alleged corrupt, fraudulent, collusive, or coercive practices relating to the project. To address the risks on governance and corruption related to procurement of civil works, relevant provisions of ADB's Anticorruption Policy will be included in the loan agreement and the bidding documents for the project. In particular, all contracts financed by ADB in connection with the project will include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and/or implementing agencies, PIUs and all contractors, suppliers, consultants, and other service providers as they relate to the project. The executing agency has indicated its commitment to promote good governance and establish a corruption-free environment under the project. Further to this, a number of good governance and anticorruption provisions have been included in the loan and project agreements.

3. The executing agency and/or implementing agencies will, and with their PMOs and PIUs to, comply with ADB's Anticorruption Policy (1998, amended from time to time). The executing agency agrees (i) that ADB reserves the right to investigate any alleged corrupt, fraudulent, collusive, or coercive practices relating to the project; and (ii) to cooperate fully with, and to require contractors and suppliers to cooperate fully with, any such investigation and to extend all necessary assistance, including providing access to all relevant books and records, as may be necessary for the satisfactory completion of any such investigation.

4. The executing agency will (i) conduct periodic inspections on the contractors' activities related to fund withdrawals and settlements; and (ii) ensure that all contracts financed by ADB in connection with the project include relevant provisions of ADB's Anticorruption Policy (1998, as amended to date) in all bidding documents for the project specifying the right of ADB to audit and examine the records and accounts of JPG and all the contractors, suppliers, consultants and other service providers as they relate to the project.

5. The executing agency and/or implementing agencies will also (i) involve the agencies responsible for oversight of each PIU in bidding and construction to enhance construction quality control and supervise effective work; (ii) introduce a dual-signing system in which each works contract winner also signs an anticorruption agreement with the employer; (iii) periodically inspect the contractors' activities related to fund withdrawals and settlements; (iv) require the project management consulting service to support PMOs and the PIUs to ensure good

[3] Available at: http://www.adb.org/sites/default/files/pub/1998/anticorruption.pdf.
[4] ADB's Integrity Office web site is available at: http://www.adb.org/integrity/unit.asp.

governance, accountability, and transparency in project operations; and (v) in consultation with relevant ministries at the central level, update rules and regulations on corporate governance and anticorruption to enhance the transparency of the operations of executing agency and/or implementing agencies, and the PIUs.

XI. ACCOUNTABILITY MECHANISM

1. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make a good faith effort to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, they should approach the Accountability Mechanism.[5]

[5] For further information see: http://www.adb.org/Accountability-Mechanism/default.asp.

XII. RECORD OF PAM CHANGES

1. The PAM is a living document and is subject to change after ADB Board approval of the project's report and recommendation of the President. It is concise yet informative, providing checklists of all activities related to project implementation along with the necessary procedures for the project management office's to effectively implement and monitor the project.

No.	Changes/Updates	Date	Remarks
1	PAM initial draft agreed	10 Jan 2014	Agreed during the loan fact-finding mission
2	Updated PAM agreed	XXX	Agreed during the loan negotiation

PAM = project administration manual.

APPENDIX 1: ENVIRONMENT MANAGEMENT PLAN

A. Objectives

1. This environmental management plan (EMP) was prepared for the proposed Jilin Urban Development Project, in conjunction with the domestic environmental impact assessment (EIA) Institutes,[6] the design institute,[7] and Jilin Provincial project management office (JPPMO) based on the domestic EIA reports, the plan EIA of the Baicheng Economic Development Zone (BEDZ), the feasibility study reports (FSRs), as well as the master plans of Baicheng and Baishan cities, and other project documents. The EMP covers all project implementation phases, including design and pre-construction, construction, and operation.

2. The EMP defines appropriate mitigation measures for the anticipated environmental impacts, and defines the institutional responsibilities and mechanisms to monitor and ensure the compliance with the People's Republic of China's (PRC) environmental laws, standards, and regulations, and ADB's Safeguard Policy Statement (SPS, 2009). The EMP specifies (i) objectives; (ii) implementing organization and responsibilities; (iii) mitigation measures; (iv) inspection, monitoring, and reporting arrangements; (v) training and institutional strengthening; (v) future public consultation; and (vi) a feedback and adjustment mechanism.

3. In the design stage, JPPMO will pass the EMP to the design institutes for incorporating mitigation measures into the detailed designs. The EMP will be updated at the end of the detailed design, as needed. To ensure that bidders will respond to the EMP's provisions, the JPPMO, the local PMOs and project implementing units (PIUs) will prepare and provide the following specification clauses for incorporation into the bidding documents: (i) a list of environmental management requirements to be budgeted by the bidders in their proposals, (ii) environmental clauses for contractual terms and conditions, and (iii) component EIAs, and project IEE including updated EMP for compliance.

B. Organizations and their Responsibilities for Environmental Monitoring Plan Implementation

4. The Jilin Provincial Government (JPG) is the executive agency of the project. At the provincial-level, JPG has established the Jilin Provincial Project Leading Group (JPPLG) to provide policy guidance and coordination, and JPPMO to supervise and coordinate overall project implementation. The two participating city governments will be the implementing agencies, and they have already established local project management offices (LPMOs) to supervise and coordinate overall implementation of subprojects in their respective cities. The project implementing units (PIUs) will physically implement the subprojects on behalf of respective implementing agencies. The EMP implementation arrangements and responsibilities of governmental organizations are summarized in **Table EMP-1.**

[6] China Northeast Municipal Engineering Design and Research Institute for Baishan solid waste component, Jilin Province Environment Engineering Assessment Center for Baishan water supply component, Jilin Xinghuan Environment Protection Company and Ecological Environment Research Center of Chinese Academy of Sciences for Baicheng municipal infrastructure component.

[7] China Northeast Municipal Engineering Design and Research Institute, Shandong Branch, for Baishan solid waste component, China Northeast Municipal Engineering Design and Research Institute for Baishan water supply component, China Northeast Municipal Engineering Design and Research Institute and Jilin Northeast Architecture Municipal Engineering Design Institute Co., Ltd for Baicheng municipal infrastructure component.

Table EMP-1: Institutional Responsibilities for Environmental Management Plan Implementation

Agency	Environmental Management Roles and Responsibilities
Executing agency: Jilin Provincial Government	Overall policy and direction control. Responsible for project coordination with two project city governments, liaison with ADB, financial management, and administration.
Jilin Provincial Project Leading Group	Responsible for implementation of the entire project Headed by the Vice Governor and consisting of JDRC, JEPD, JHUCD, JFD, and municipal governments of Baicheng and Baishan: (i) coordinate and overlook project preparation and implementation; (ii) provide policy guidance during the project implementation; and (iii) facilitate interagency coordination.
Jilin Provincial Project Management Office	Supervision and overall management to ensure smooth implementation of the project: (i) responsible for all day-to-day management work during the project preparation and implementation periods; (ii) assign one environment specialist as EMP officer/coordinator; (iii) communicate and coordinate with ADB for project management and implementation; report the project implementation progress and compliance monitoring to ADB; (iv) submit bidding documents, bid evaluation reports, and other necessary documentations to ADB for necessary approval; (v) procurement of PIC services, including LIEC to assist in supervision, tracking, and reporting on EMP implementation of all subprojects; and (vi) consolidate environmental monitoring reports prepared by LPMOs and local EMS and submit them to ADB for disclosure.
Implementing agencies: Municipal Governments of Baishan and Baicheng cities	Primarily responsible for project implementation for project components in their jurisdiction, including finance and administration, technical and procurement matters, monitoring and evaluation, and safeguard compliance. Day-to-day activities delegated to LPMOs (see below).
Local project management offices (LPMOs), established under implementing agencies[8]	Responsible for all day-to-day management work during the project preparation and implementation periods: (i) communicate and coordinate with JPPMO for project management and implementation; (ii) establish EMU; (iii) in conjunction with PIUs, incorporation of EMP into bidding documents; (iv) establishment of a GRM with a dedicated project complaints coordinating unit (PCCU); (v) supervision and monitoring of the EMP implementation and annual reporting to the JPPMO (with support of LIEC); (vi) participation in capacity building and training programs; (vii) on behalf of the implementation agencies and three PIUs, submit bidding documents, bid evaluation reports and other necessary documentations to JPPMO and ADB for necessary approval; (viii) submit withdrawal applications to JPFD; (ix) submit required annual audit reports and financial statements of project account of Baicheng and Baishan PIUs to ADB; (x) engage a design institute to complete preliminary and detailed engineering designs; and (xi) engage a procurement agency which supports the implementation agencies and three PIUs.

[8] Baishan LPMO was setup under the municipal Housing and Construction Bureau; Baicheng LPMO was established under the Management commission of Baicheng Economic Development Zone.

Agency	Environmental Management Roles and Responsibilities
Project Implementing Units[9]	Ensuring successful implementation of the relevant project components: (i) Appoint one environment specialist as EMP coordinator; (ii) Tendering contractors and equipment with assistance of the international tendering agency; (iii) Administer and monitor contractors and suppliers; (iv) Construction supervision and quality control (v) Contracting of local (EMS) to conduct environmental monitoring; (vi) Procurement and management of construction supervision companies (CSC) required for subproject implementation in accordance with the PRC and ADB procedures and regulations; (vii) Participation in capacity building and training programs; and (viii) Commissioning of the constructed facilities.
Facility Operators: (i) Baishan Xibeicha Qiyuan Hydropower Corporation; (ii) Baishan Solid Waste Disposal Company; (iii) Baicheng BEDC Investment and Development Co.	Ensuring successful ongoing operation and maintenance of the relevant project components: • In conjunction with PIUs, commissioning of the constructed facilities; and • O&M of completed facilities, including environmental management, monitoring and reporting responsibilities.

EMP = environmental management plan, EMS = environmental monitoring station, EMU = environment management unit, GRM = grievance redress mechanism, JPFD = Jilin Provincial Finance Department, LIEC = loan implementation environmental consultant, PIC = project implementation consulting.
Source: Project Administration Manual, February 2014.

5. **Environment staff within local PMOs, JPPMO, and PIUs.** The local PMOs will have main EMP coordination responsibility. Therefore, each local PMO will establish an environmental management unit (EMU) and designate a leader and an appropriate number of staff. The EMUs will take charge of (i) coordinating the implementation of the EMP and developing implementation details; (ii) supervising the implementation of mitigation measures during project construction and operation; (iii) ensuring that environmental management, monitoring, and mitigation measures are incorporated into bidding documents, construction contracts and operation management plans; (iv) submitting annual EMP monitoring and progress reports to the JPPMO; (v) coordinating the local grievance redress mechanism (GRM); and (vi) responding to any unforeseen adverse impact beyond those mentioned in the domestic EIAs, the project IEE and the EMP. The EMUs will be technically supported by the loan implementation environment consultant (LIEC). The JPPMO and the PIUs will nominate one staff to act as environmental coordinator to check the overall implementation of environmental management provisions of the EMP, and to work in close coordination with the EMUs of the local PMOs.

6. **Loan Implementation Environment Consultant.** A LIEC will be hired under the Loan implementation consultant services (LIC). The LIEC will advise the JPPMO, local PMOs, PIUs, contractors and CSCs on all aspects of environmental management and monitoring for the project. The LIEC will (i) assist in updating the EMP and environmental monitoring program, as needed; (ii) supervise the implementation of the mitigation measures specified in the EMP; (iii) on behalf of the local PMOs and JPPMO, prepare the annual EMP monitoring and progress reports in English and submit it to ADB; (iv) provide training to the JPPMO, local PMOs, PIUs, CSCs, on the PRC's environmental laws, regulations and policies, ADB SPS 2009, EMP implementation, and GRM in accordance with the training plan defined in **Table EMP-9**; (v) identify any environment-related implementation issues, and propose necessary corrective actions; (vi) undertake site visits as required.

[9] There are two PIUs in Baishan, the PIU for the water supply component is Baishan Xibeicha Qiyuan Hydropower Corporation, while the PIU for the MSW Component is Baishan Solid Wastes Disposal Company. The PIU for the two Baicheng components is BEDZ Development and Investment.

7. **Construction Contractors, Construction Supervision Companies (CSCs).** Construction contractors will be responsible for implementing relevant mitigation measures during construction under the supervision of the CSCs and PIUs. Contractors will develop site-specific EMPs on the basis of the project EMP. CSCs will be selected through the PRC bidding procedure by the PIUs. The CSCs will be responsible for supervising construction progress and quality, and EMP implementation on construction sites. Each CSC shall have at least one environmental engineer on each construction site to: (i) supervise the contractor's EMP implementation performance; and (ii) prepare the contractor's environmental management performance section in monthly project progress reports submitted to the PIUs and local PMOs.

8. **Environmental monitoring station.** The PIUs will appoint the EMS of each project city to conduct periodic environmental impact monitoring during construction and operation in accordance with the monitoring plan (**Table EMP-7** and **Table EMP-8**).

C. Potential Impacts and Mitigation Measures

9. **Table EMP-2 to EMP-5** list the anticipated impacts of the project components in Baishan and Baicheng during project preparation, implementation and operation as identified by the domestic EIAs and the this IEE, as well as corresponding mitigation measures defined to minimize those impacts. The mitigation measures will be incorporated into detailed design, bidding documents, construction contracts and operational management manuals, which will mainly be implemented by the design institutes (during detailed design) and contractors (during construction), under the supervision of CSCs, LPMOs and PIUs, with technical support from the LIECs. The effectiveness of these measures will be evaluated based on environmental inspections and monitoring to determine whether they should be continued, improved or adjusted.

Table EMP-2: Potential Impacts and Mitigation Measures during Preconstruction and Construction Phases

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget of Component (10,000 CNY)				Source of Funds
			Who Implement	Who Supervise	Baicheng		Baishan		
					Infra.	MSW	WSP	MSW	
A. Design & Preconstruction Phases									
Detail design stage	Include low carbon and climate change considerations	1. Design low carbon Baishan Water Supply System including variable speed pumps, SCADA,[a] accurate water metering, water quality monitoring instruments (for monitoring at least 42 parameters), leakage detection and repairing equipment for NRW reduction (ensure reduce the NRW from 65% to 30%); 2. Include high-capacity stormwater-drainage pipelines and rainwater detention and reuse facilities in Baicheng infrastructure component.	DIs[b]	JPPMO, LEPBs,[c] LPMOs,[d] PIUs[e]	-	-	-	-	Included in the design contracts
	Institutional strengthening for EMP Implementation & supervision	3. Establish an EMU in each LPMO, including at least one environment specialist. 4. Appoint environmental coordinators for EMP coordination within JPPMO and PIUs. 5. Engage loan implementation environmental consultant (LIEC) under the project implementation consulting TA. 6. Provide training to all environmental staff for EMP implementation and supervision.	LPMOs, JPPMO, PIUs	EA, ADB	-	-	-	-	Counterpart funds (executing agency, imlpementing agencies, PIUs)

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget of Component (10,000 CNY)				Source of Funds
			Who Implement	Who Supervise	Baicheng		Baishan		
					Infra.	MSW	WSP	MSW	
	Updating EMP	7. Update mitigation measures defined in this EMP based on final detailed design, as needed, submit to ADB for review. 8. In case of major change of project location (or additional physical component) that may cause substantial environmental impacts or involve additional aps,[g] implementing agencies, and LPMOs should form an EIA team to conduct additional EIA and also public consultation. The revised EIA should be submitted to the JEPD and ADB for approval and disclosure. To determine whether the change is minor or major under assistance of LIEC, JPPMOs and LPMOs should consult with ADB.	JPPMO, LPMOs, LIEC	JEPD,[f] LEPBs, ADB	-	-	-	-	Included in JPPMO's operation budget
Construction Preparation	Env. monitoring plan	9. Prior to construction, engage Municipal EMS.[h] 10. Prepare a detailed environmental monitoring plan in accordance with environmental monitoring plan defined in this EMP.	PIUs, EMSs	LPMOs, JPPMO, ADB	11.7	5.3	23	11.2	Counterpart funds (IAs)
	Bidding and contract documents	11. Ensure the mitigation measures in the EMP are incorporated in all bidding documents, which will be sent to ADB for review; and 12. Prepare environmental contract clauses for contractors, namely the special conditions (e.g., reference to EMP and monitoring requirements).	DIs, JPPMO, LPMOs, PIUs	LIEC, JEPD, LEPBs, ADB	-	-	-	-	Included in detail design contract
	EMP training	13. LIEC, or invited environment specialists and/or officials from the JEPD or LEPBs provide training on construction environmental management and implementation and supervision	LIEC, JPPMO	JEPD, ADB	2.0	1.0	2.0	1.5	Included in the PIC[i] budget

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget of Component (10,000 CNY)				Source of Funds
			Who Implement	Who Supervise	Baicheng		Baishan		
					Infra.	MSW	WSP	MSW	
		of environmental mitigation measures to contractors and CSCs, in accordance with the training plan in this EMP.							
	Establish operational GRM	14. Establish a Project Public Complaints Unit (PPCU) in each LPMO; provide training for PPCU members and GRM access points. 15. Disclose the PPCU's phone number, fax, address, and email to the public on City EPB's website and on information boards at each construction site.	LPMOs	JPPMO, LIEC, ADB	-	-	-	-	Included in LPMO's operation budget
	Land acquisition and resettlement	16. Update LARP[j] after detail design 17. Establish a resettlement office comprising local government officials to manage the land acquisition and resettlement process. 18. Conduct information dissemination and community consultation programs in accordance with the PRC Land Administration Law (1999) and ADB SPS. 19. Ensure that all resettlement activities are reasonably completed before construction starts on any component.	PIUs, LAROs,[k]	BCA,[l] BLM,[m] LBs,[n] BCAs	-	-	-	-	Included in the cities' LAR cost
Subtotal					**13.7**	**6.3**	**25.0**	**12.7**	
Total					**57.7 (94,590USD)**				
B. Construction Phase									
Topography and Soils	Earthwork, soil erosion, soil contamination	20. Define spoil disposal sites and borrow pit locations in the construction tender documents. 21. Construct intercepting ditches and drains to prevent runoff entering construction sites, and divert runoff from sites to existing	Contractor CSCs	PIUs, EPBs, WRBs, LIEC	100.0	29.25	100.0	80	Included in construction contract

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget of Component (10,000 CNY)				Source of Funds
			Who Implement	Who Supervise	Baicheng		Baishan		
					Infra.	MSW	WSP	MSW	
		drainage. 22. Limit construction and material handling during periods of rains and high winds. 23. Stabilize all cut slopes, embankments, and other erosion-prone working areas while works are going on. 24. Properly store petroleum products, hazardous materials and wastes on impermeable surfaces in secured and covered areas. 25. Remove construction wastes from the site to the approved disposal sites. 26. Establish emergency preparedness and response plan (Spill Management Plan) including spill cleanup equipment at each construction site and training in emergency spill response procedures. 27. Stabilize all earthwork disturbance areas within 30 days after earthworks have ceased at the sites.							
Ambient Air	Dust generated by construction activities, gaseous air pollution (SO2, CO, NOx) from construction machinery and asphalt pavement	28. Equip material stockpiles and concrete mixing equipment with dust shrouds, maintain shrouds regularly. 29. Spray water on construction sites and earth/material handling routes where fugitive dust is being generated. 30. Cover materials during truck transport, in particular, the fine material, to avoid spillage or dust generation. 31. Purchase pre-mixed asphalt for road surface paving (Baicheng);	Contractor CSCs	LPMOs, PIUs, LIEC	15.0	2.0	10.0	10.0	Included in construction contract

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget of Component (10,000 CNY)				Source of Funds
			Who Implement	Who Supervise	Baicheng		Baishan		
					Infra.	MSW	WSP	MSW	
		if asphalt is heated and mixed onsite, asphalt mixers must be located at least 200m away from residential areas and other sensitive receptors. 32. Store petroleum or other harmful materials in appropriate places and covering to minimize fugitive dust and emission. 33. Ensure emissions from vehicle and construction machineries are in compliance with the PRC standards of GB18352-2005, GB17691-2005, GB11340-2005, GB2847-2005, and GB18285-2005. 34. Provide high-horsepower equipment with tail gas purifiers. 35. Carry out atmospheric monitoring during the construction period.							
Noise	Noise generated from construction activities	36. Ensure that noise levels from construction equipment and machinery conform to the PRC standard of GB12523-90, and properly maintain vehicles and machineries to minimize noise. 37. Apply noise reduction devices or methods where piling equipment is operating, such as construction of bridges and WSP & MSW structures, within 300 m of sensitive sites; 38. Locate sites for rock crushing, concrete-mixing, and similar activities at least 1000 m away from sensitive areas. 39. To reduce noise at night, restrict the operation of machinery generating high levels of noise, such as piling, and movement of heavy vehicles along urban and	Contractor CSCs	LPMOs, PIUs, LIEC	15.0	5.0	10.0	10.0	Included in construction contract

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget of Component (10,000 CNY)				Source of Funds
			Who Implement	Who Supervise	Baicheng		Baishan		
					Infra.	MSW	WSP	MSW	
		village roads between 20:00 and 06:00 the next day in accordance with the PRC regulations. 40. Place temporary hoardings or noise barriers around noise sources during construction, if necessary. 41. Monitor noise at sensitive areas and consult potentially affected people at regular intervals (refer to the monitoring plan in the EMP). If noise standards are exceeded, equipment and construction conditions shall be checked, and mitigation measures shall be implemented to rectify the situation.							
Water Resources	Impact of bridge construction on river hydrology (Baicheng)	42. Conduct bridge pier construction during the dry season. 43. Protect banks by matting and sediment traps and on the completion of construction by the planting of grass and stabilizing vegetation to prevent soil and water loss. 44. Pump slurry from pile drilling in the channel bed to shore and properly dispose to reduce the disturbance of sediments and the impact on water quality. 45. Plan pier construction so as to ensure adequate opening for water flow.	Contractor CSCs, EMS	PIUs, LIEC, EPBs, WRB	8.0	-			Included in construction contract and EMS contract (monitoring)
	Surface and GW contam.	46. Develop contingency plans for control of oil and other dangerous substances (Spill Management Plan) as part of the CS-EMP. 47. Collect wastewater from construction activities in				1.0	15.0	11.0	

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget of Component (10,000 CNY)				Source of Funds
			Who Implement	Who Supervise	Baicheng		Baishan		
					Infra.	MSW	WSP	MSW	
		sedimentation tanks, retention ponds, and filter tanks to remove silts and oil. 48. Equip all areas where construction equipment is being washed with water collection basins and sediment traps. 49. Place storage facilities for fuels, oil, and other hazardous materials within secured areas on impermeable surfaces, and provide bunds and cleanup installations. 50. Contractors' fuel suppliers must be properly licensed and follow proper protocol for transferring fuel and the PRC standard of JT3145-88 (Transportation, Loading and Unloading of Dangerous or Harmful Goods). 51. Ensure that water quality (for pollutants such as SS, CODcr, and oil) in surface water is monitored in accordance with the EMP monitoring program.							
Solid Waste	Solid waste generated by construction activities and from workers' camps	52. Provide appropriate waste collection and storage containers at locations away from surface water or sensitive receivers. 53. Reach agreement with municipal waste collection services for regular collection of waste prior to construction. 54. Properly remove and dispose of any significant residual materials, wastes and contaminated soils that remain on the ground timely during and after construction to the spoil sites. Any planned paving or vegetating of the area shall be	Contractor CSCs	PIUs, LIEC	8.0	2.0	8.0	5.0	Included in construction contract

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget of Component (10,000 CNY)				Source of Funds
			Who Implement	Who Supervise	Baicheng		Baishan		
					Infra.	MSW	WSP	MSW	
		done as soon as the materials are removed to stabilize the soil. 55. Burning of waste is strictly prohibited. 56. Provide sufficient garbage bins at strategic locations and ensure that they are protected from birds and vermin, and emptied regularly (using the municipal solid waste collection systems).							
Biological resources	Protection of flora and fauna around construction sites	57. Protect existing trees and grassland during road and pipeline construction. Where trees are to be removed or an area of grassland disturbed, replant trees and re-vegetate the area immediately after construction. 58. Remove trees or shrubs only as a last resort if they impinge directly on permanent works or approved necessary temporary works. 59. In compliance with the PRC Forestry Law, undertake compensatory planting of an equivalent or larger area of affected trees and vegetation. 60. Only native plant species of local provenance shall be used for re-vegetation. 61. Identify, demarcate and protect sites where small animals, reptiles, and birds of common species live, such as vegetated roadside areas, trees, inner areas of bridges and river beaches, etc.	Contractor, CSCs	PIUs, LIEC	100.0	10.0	80.0	30.0	Included in construction contract
Socioeconomic resources	Impact on physical cultural resources	62. Establish chance-find procedures for physical cultural resources. 63. If a new site is unearthed, work	Contractor, CSCs	LPMO, LIEC, City	30.0	10.0	30.0	20.0	Included in construction contract

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget of Component (10,000 CNY)				Source of Funds
			Who Implement	Who Supervise	Baicheng		Baishan		
					Infra.	MSW	WSP	MSW	
		shall be stopped immediately and local BCR and the LPMO promptly notified.		BCR[o]					
	Community health and safety	64. Prepare a traffic control plan, to be approved by LTMB[p] before construction. The plan shall include provisions for diverting or scheduling construction traffic to avoid morning and afternoon peak traffic hours, regulating traffic at road crossings, selecting transport routes to reduce disturbance to regular traffic, reinstating roads, and opening them to traffic as soon as the construction is completed. 65. Plan construction activities so as to minimize disturbances to utility services. Three-dimensional detection of underground facilities shall be conducted before construction (Baicheng infrastructure component). 66. Inform residents and businesses in advance through media of the construction activities, given the dates and duration of expected disruption. 67. Place clear signs at construction sites in view of the public, warning people against potential dangers such as moving vehicles, hazardous materials, excavations etc., and raising awareness on safety issues. Heavy machinery shall not be used at night (noise and vibration control). 68. Secure all sites, disabling access by the public through appropriate fencing whenever appropriate.							

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget of Component (10,000 CNY)				Source of Funds
			Who Implement	Who Supervise	Baicheng		Baishan		
					Infra.	MSW	WSP	MSW	
	Occupational health and safety	69. Prepare environmental, health and safety management plan for the construction works. The plan will include the following provisions. 70. Provide clean water for all construction sites and workers' camps. 71. Provide an adequate number of latrines and other sanitary arrangements at construction sites and work camps, and ensure that they are cleaned and maintained in a hygienic state. 72. Garbage bins at construction sites and camps will be set up, which will be periodically cleared to prevent outbreak of diseases. 73. Provide personal protection equipment, such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection. 74. Prepare an emergency response plan to take actions on accidents and emergencies, including environmental and public health emergencies associated with hazardous material spills and similar events. 75. Establish emergency phone link with hospitals in Baishan and Baichen. 76. Organize a fully equipped first-aid base in each construction camp. 77. Ensure that occupational health and safety matters are given a high degree of publicity to all persons regularly or occasionally on each construction site.	Contractors	CSCs, LPMOs, LBs, EPBs, LIEC	20.0	10.0	20.0	20.0	Included in construction contract

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget of Component (10,000 CNY)				Source of Funds
			Who Implement	Who Supervise	Baicheng		Baishan		
					Infra.	MSW	WSP	MSW	
		Display posters prominently in relevant areas of the site. 78. Train all construction workers in basic sanitation, general health and safety matters, and on the specific hazards of their work. Implement site HIV/AIDS and other communicable diseases awareness and prevention program to target the local community and construction workers. 79. Civil works contracts shall stipulate priorities to (i) employ local people for works, (ii) ensure equal opportunities for women and men, majorities and minorities, (iii) pay equal wages for work of equal value, and pay women's wages directly to them; and (iv) not employ child or forced labor. Specific targets for employment have been included in the gender action plan (GAP).							
Cumulative Impacts	Cumulative Impacts during construction	80. Contractors shall coordinate with other project contracts and other projects in the area of influence in terms of construction schedule, possible access roads and disposal sites sharing. 81. Contractors shall develop material transport plans in consultation with local traffic management authorities, other contractors, and local community.	Contractors	CSCs, LPMOs, LBs, EPBs, LIEC	-	-	-	-	Included elsewhere in construction contract
Subtotal					**296.0**	**69.25**	**273.0**	**186**	
Total					**824.25 (1.35123 million USD)**				

a. Supervisory control and data acquisition system.
b. Design institutes.
c. Baishan and Baicheng municipal environment.

d. Protection bureaus.
e. Baicheng and Baishan project management offices.
f. Project implementation units.
g. Affected people.
h. The municipal environmental Monitoring Station of Baishan and Baicheng (the licensed environmental monitoring units).
i. Project implementation consultant.
j. Land acquisition and resettlement plan.
k. Land acquisition and resettlement office in Baishan and Baicheng.
l. Baishan and Baicheng municipal bureaus for civil affairs.
m. Baishan and Baicheng municipal bureaus of land management.
n. Labor bureaus of Baishan and Baicheng.
o. Bureau of Cultural Relics.
p. Local Traffic Management Bureau
Source: Domestic EIAs

Table EMP-3: Potential Impacts and Mitigation Measures during Operation - Baicheng Urban Infrastructure Component

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget (10,000 CNY)	Source of Funds
			Who Implement	Who Supervise		
Ambient Air	Excessive vehicle emissions, affecting ambient air quality	1 Conduct periodic examination of emission of vehicle exhaust pollutants for each vehicle in accordance with PRC regulation (such as GB18352.3-2005); 2 Refuse registration to vehicles with excessive emissions; 3 Implement policies and measures for vehicle emission control formulated by the state and provincial authorities.	OPF[1], TMB[2],	LEPB, JPPMO, LPMO	-	OPF's operation budget
		4 Conduct periodic air quality monitoring (through the EMS) in accordance with the monitoring program in this EMP;	EMS[3]	LEPB	10.0/a	LEPB's operation budget
Acoustic Environment	Traffic noise along project roads	5 Plant trees and shrubs along the proposed roadsides after construction; and 6 Install 70 double-glazed windows along the Third Ring Road in Erlong village (CBC1) and Hujia village (CBC3) in accordance with the domestic EIA.	Contractors	PIU, LIEC		Included in civil works contracts (CBC1, CBC3)
		7 Conduct ambient noise monitoring and inspection, determine whether mitigation measures will be required for sites where noise levels are expected to exceed by more than 3 dB(A);	EMS	LEPB	4.0/a	LEPB's operation budget
Water Resources	Pollution from storm water runoff and solid waste	8 Install special stormwater collection, storage and infiltration system under the roadside landscaping strip along two project roads (included in detailed design); 9 Routinely collect and properly dispose litter and debris from sidewalks, driveways, and parking lots, especially near channels; 10 Clean the roadside catch basins before rainy season to avoid surface water pollution by storm water runoff flushing debris and silt; 11 Place garbage bins and containers along the road networks; and	OPF, MDC[4], EMS	LEPB, WRB[5]	45.0/a	OPF's operation budget

[1] Operator of project facilities (Baicheng BEDZ Investment and Development Company).
[2] Traffic management bureau.
[3] Biacheng environmental monitoring station.
[4] Municipal drainage company.
[5] Baicheng water resource bureau.

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget (10,000 CNY)	Source of Funds
			Who Implement	Who Supervise		
		12 Prohibit the construction of car washing near drainage networks and channels.				
	Sewers, wastewater collection and treatment	13 Regularly inspect and maintain project sewer network; 14 Review performance of linked WWTP [6] (treatment performance, compliance with effluent standards)	OPF, WWTP EMS, MDC	LEPB	3.0/a	OPF's operation budget
Socioeconomic Resources	Road safety	15 Conduct traffic audit and separate traffic safety awareness campaigns both in schools and residential communities; 16 All roads shall be designed with pedestrian sidewalks. All major roads shall have separate lanes for nonmotorized traffic. Pedestrian-priority traffic lights, safety islands, crosswalks (zebra lines), and boarding bays/islands shall be established at all intersections;	JPPMO, PIC, OPF, Traffic Police, ITS contractor	LEPB, TMB, PSB[7]	1.5/a	Capacity building budget of the PIC[8]
		17 Road maintenance vehicles shall be equipped with warning lights, and staff will wear safety hats and reflective garments and undergo safety training; 18 Proper operation of ITS, include traffic monitoring system, red light and speeding violation monitoring system, real time traffic condition displays			10.0/a	OPF's operation budget
	Spills of dangerous goods	19 Ensure that all trucks carrying hazardous materials are marked according to PRC norms; 20 Enforce traffic controls, and set speed limits for trucks carrying hazardous material; and	OPF, Local Traffic Police	LPMO, LEPB, PSB		OPF's operation budget
Biological resources	Vegetation	21 Routinely inspect and properly maintain all roadside trees, slope stabilization sites, and landscaping vegetation.	OPF	EPB, LFB	12.0/a	OPF's operation budget
TOTAL OPERATION COST					**75.5/a**	

[6] Wastewater treatment plant.
[7] Public security bureau.
[8] Project implementation consultancy.

Table EMP-4: Potential Impacts and Mitigation Measures during Operation for Water Supply Component in Baishan

Item	Potential Impacts/ Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget (10,000 CNY)	Source of Funds
			Who Implement	Who Supervise		
Water Source	Water source protection, contamination	1 Properly delineate and maintain water source protection zones around the water source (Xibeicha Reservoir) in accordance with Drinking Water Source Protection Plan for the Xibeicha Reservoir (approval document No. Jiling Gov-2010-112); 2 Install and properly operate automatic water source monitoring and emergency warning system in Xibeicha Reservoir (at the water intake point); 3 In case of pollution, shut down water transmission from Xibeicha Reservoir, and temporary switch to existing Nanshan WTP through the pipeline network; and take effective measures to identify and remove pollution source.	PIU (OPF)[9], LEPB	JEPB, WRB, LPHB[10]	30.0/a	Included in PIU's operation budget
Water supply safety (Quality)	Drinking water quality monitoring	4 Equip WTP with laboratory able to examine 42 parameters of the National Standard for Drinking Water (GB5749-2006); 5 Twice a year, send water samples taken from the clean water tank of the WTP to Changchun WSC for examination of 106 parameters according to the PRC regulation; 6 Ensure that WSPs' staff/workers are well trained on all steps of the treatment process, including emergency warning and response actions.	PIU, LIEC	LEPB, IA, WRB	1.5/a	Included in the training budget
Handling and disposal of chlorine dioxide at the WTP	Risk caused by hydrogen chloride and chlorine dioxide leakage	7 Chemicals will be transported and managed in compliance with PRC regulations on hazardous chemical substance management (The PRC State Council Order No. 2002-244); 8 Transport vehicles and personnel will be trained and qualified with hazardous chemical substance handling and transportation; 9 Storage of hazardous chemicals will be arranged with certificates procured from the police department and fire authorities; 10 Chlorination rooms and chemical storage rooms in the WSP will be equipped with automatic censors and alarms, which will be triggered by ClO2 leakage; 11 The WSP will be equipped with gas masks, oxygen breathing apparatus and other rescue materials, to protect staff in the event of leakage of hydrogen chloride and ClO_2; and 12 An emergency response plan will be prepared and implemented in the WSP. The plan will inform staff about the characteristics of ClO_2 and	PIU	EPB, WRB	15.0/a	Included in PIU's operation budget

[9] The PIU and OPF are the same.
[10] Baicheng Municipal Public Health Bureau.

Item	Potential Impacts/ Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget (10,000 CNY)	Source of Funds
			Who Implement	Who Supervise		
		hydrochloric acid, potential hazards, and define accident prevention measures and evacuation plan.				
Noise	Operational noise in the WTP	13 All noise-emitting machinery and equipment including pumps, fans, and sludge dewatering machines (spin-driers) shall be installed in sound-proof housing within rooms in the WTP, and be kept in good operation condition. 14 Conduct periodic noise monitoring to confirm compliance with GB12348-2008	PIU	LEPB	---	Included in PIU's operation budget
Sludge in WTP	Sludge in sedimentation tanks	15 Develop and implement a sludge handling plan, including collection and storage of sludge, transport, environmentally sound reuse and/or disposal. Sludge shall be reused for manufacturing bricks and other construction materials, if possible.	PIU	LEPB	20.0/a	Included in PIU's operation budget
Solid wastes and wastewater	WTP staff will generate wastewater and solid waste	16 Ensure environmentally sound collection, transportation, and disposal of domestic solid waste (13.7 t/a) to the existing Baishan Sanitation Landfill; and 17 Treat 1,300 m^3/a of domestic wastewater generated at WTP onsite (septic tank).	PIU	LEPB, LHB	6.0/a	Included in PIU's operation budget
Ecological impact to downstream	Water extraction from Xibeicha Reservoir, reduction of downstream flow, water quality of return waters from use of supplied water reentering the river basin	18 Ensure minimum ecological flow release of 0.14m^3/s to downstream of the Xibeicha River and Hunjiang River in accordance with approved EIA for the Xibeicha Reservoir; verify and manage downstream riparian releases; 19 Automatically measure the water flow at the downstream of Xibeicha River, and feedback the measurement result to influence the water extraction operation; 20 Extend capacity of existing Baishan WWTP from 50,000m^3/d to 100,000m^3/d by 2016 (before WTP completion) to cope with increased wastewater amounts induced by increased water supply capacities; ensure that effluent from the WWTP will meet the PRC Standard of GB18918-2002.	PIU, WRB	LEPB	5.0/a	Included in PIU's operation budget
Total				**77.5/a (127,000USD/a)**		

Source: Domestic EIA Report

Table EMP-5: Potential Impacts and Mitigation Measures during Operation – Integrated MSW Components in Baishan and Baicheng

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget (10,000 CNY)		Source of Funds
			Who Implement	Who Supervise	Baishan MSW	Baicheng MSW	
Municipal Landfill (Baishan)	Leachate treatment, groundwater pollution	1. Construct and maintain interception drains to divert runoff water from entering the landfill site; 2. Install impermeable lining for the landfill base and sides; 3. Operated and maintain leachate collection cell that were constructed for Phase 1 and Phase 2 of the landfill to contain and treat leachate; 4. Conduct periodic monitoring of the leachate treatment facility and groundwater quality to confirm adequacy of protection measures.	PIU, OPF[11]	LEPB, JPPMO	15.0/a	-	OPF operation budget
	Dust, windborne waste	5. Install and maintain an adequate buffer zone around the landfill facility; 6. Ensure that waste transport vehicles are covered; 7. Install and maintain fences around the landfill site to control wind-borne waste; 8. Enforce strict site management prescriptions such as covering the opening of a single active tip face at any one time, daily soil covering to catch wind-borne litter, and watering of dust-prone areas.	PIU, OPF	LEPB, JPPMO	15.0/a	-	OPF operation budget
	Odorous (NH3, H2S) and GHGs emissions	9. Collect and flare methane produced in the landfill; 10. Regularly (monthly) monitor methane, H2S and NH3 levels in and around the landfill; 11. Conduct regular inspections of the methane gas outlet pipes to check for blockages or damage, and fire control and lightning protection facilities; 12. Regularly consult nearby residents, and define corrective actions as needed; 13. Prohibit construction of new residential houses or community buildings within 600 m.	OPF	LEPB, JPPMO	10.0/a	-	OPF operation budget
	Pest and disease	14. Timely soil cover to minimize breeding areas for flies and mosquitoes; arrange staff timely soil cover the hollow area	OPF	LEPB, JPPMO	10.0/a	-	OPF operation

[11] Operator of project facility

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget (10,000 CNY)		Source of Funds
			Who Implement	Who Supervise	Baishan MSW	Baicheng MSW	
	vector control	within the landfill site 15. Monitor mosquito, fly and rat activities during landfill operation; and 16. Periodic spraying with approved pesticide as needed.					budget
Waste Transfer Stations	Leachate, wastewater from MSW transfer stations	17. Install and regularly clean septic tanks in each transfer station; transport accumulated sediments by covered vehicles to local landfills for disposal; 18. Design and construct the floor of the MSW stations and the septic tanks to prevent any potential seepage and pollution of groundwater; 19. Conduct periodic monitoring of the pollutant concentrations in the pre-treated wastewater to confirm compliance with Class III of the Integrated Wastewater Discharge Standard of GB8978-1996;	PIU, OPF	LEPB, JPPMO	20.0/a	15.0/a	OPF operation budget
	Odors, noise emissions, pest control	20. Install a 5 m wide buffer zone and a greening belt no less than 2 m around the MSW transfer stations, as specified in Technical Specifications for Domestic Solid Waste Transfer Stations (CJJ47-2006); 21. Design MSW transfer stations as closed structure and with a maximum capacity of 10t/d; 22. Pack and store MSW in enclosed MSW containers; the collected MSW shall be removed daily; 23. Conduct pest control (sprinkle with disinfectant) at least once a day in summer; 24. Monitor ambient noise and odor (H2S, NH3) to determine whether further mitigation measure is required or not; 25. Consult nearby residents regularly on odor nuisance, and define and implement corrective actions as necessary;	PIU, OPF	LEPB, JPPMO	15.0/a	10.0/a	OPF operation budget
Composting facilities	Leachate	26. Control leachate generation by monitoring and correcting the moisture levels in the composting pile; 27. Collect leachate in collection basin, back-spray on compost piles; 28. Place windrows or piles under a roof to prevent excessive moisture levels due to precipitation.	OPF	LEPB, JPPMO	5.0/a	5.0/a	OPF operation budget

Item	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Budget (10,000 CNY)		Source of Funds
			Who Implement	Who Supervise	Baishan MSW	Baicheng MSW	
Occupational health and safety (all MSW facilities)	Bio-aerosols, endotoxins	29. Implement dust control measures described above (to effectively control bio-aerosols and endotoxins dissemination); 30. Keep compost and feedstock moist; moisten compost during the final pile teardown and before being loaded onto vehicles, taking care not to over-wet the material, which can produce leachate or runoff; and 31. Isolate workers from spore-dispersing components of the composting process such as mechanical turning (for example, using tractors or front-end loaders with enclosed air-conditioned or heated cabs).	OPF	LEPB, JPPMO	10.0/a	5.0/a	OPF operation budget
	Personal protective equipment, training	32. Provide training to MSW workers, covering rights and responsibilities of workers under the PRC's labor law; identification of chemical, physical, and biological risks at the site; safe practices and operating procedures; the role of engineering controls and personal protective equipment in preventing injuries and illnesses; procedures for reporting injuries and illnesses; and procedures for responding to emergencies. 33. Provide personal protective equipment (PPE) to employees, as well as shower facilities, and first medical aid kits.	OPF	LEPB, JPPMO	15.0/a	8.0/a	OPF operation budget
TOTAL					**115.0/a**	**43.0/a**	

Source: Domestic EIA reports

D. Environmental Monitoring, Inspection, and Reporting

10. The project monitoring program focuses on the environment within the project's areas of influence in Baishan and Baicheng. A detailed environmental monitoring program is shown in **Table EMP-8**, which covers the scope of monitoring, monitoring parameters, time and frequency, implementing and supervising agencies, and estimated costs. The monitoring shall comply with the methodology provided in the relevant national environmental monitoring standards. Other associated standards to be followed are the national environmental quality standards of air, water and noise, and the pollutant discharge standards.

11. **Internal monitoring/supervision and reporting by CSCs.** During construction, CSCs will be responsible for conducting internal environmental monitoring in accordance with the monitoring plan (**Table EMP-7**, **Table EMP-8**). Supervision results will be reported through the CSCs' reports to the PIUs.

12. **Environmental compliance monitoring by EMSs.** The PIUs will contract the local EMSs to conduct environmental monitoring in accordance with the monitoring program (**Table EMP-7, Table EMP-8**). A detailed cost breakdown will be provided by the two municipal EMSs when the environmental monitoring program is updated at the start of each component implementation. Monitoring will be conducted during construction and operation period, until a project completion report (PCR) is issued. Semiannual monitoring reports will be prepared by the EMSs and submitted to JPPMO, LPMOs and the PIUs.

13. **EMP implementation monitoring and progress reporting.** The LIECs will review project progress and compliance with the EMP based on field visits, and the review of the environmental monitoring conducted by the EMSs. The findings of the LIECs will be reported to ADB through the annual EMP monitoring and progress reports. The reports will include (i) progress made in EMP implementation, (ii) overall effectiveness of the EMP implementation (including public and occupational health and safety), (iii) environmental monitoring and compliance, (iv) institutional strengthening and training, (v) public consultation (including GRM), and (vi) any problems encountered during construction and operation, and the relevant corrective actions undertaken. The LIECs will help JPPMO prepare the reports and submit the English report to ADB for appraisal and disclosure.

14. **Project progress reports.** A summary of the project's environment performance and compliance with the EMP will be included in the semi-annual project progress reports submitted by the JPPMO to ADB, to be consolidated in annual progress reports. The annual reports will also cover (a) progress achieved by output as measured through the indicator's performance targets, (b) key implementation issues and solutions, (c) updated procurement plan, and (d) updated implementation plan for the next 12 months.

15. **Project completion environmental audits.** Within 3 months after each subproject completion, or no later than one year with permission of the municipal EPBs, environmental acceptance monitoring and audit reports of each subproject completion shall be (i) prepared by a licensed environmental monitoring institute in accordance with the PRC Guideline on Project Completion Environmental Audit (2001), (ii) reviewed for approval of the official commencement of individual subproject operation by environmental authorities, and (iii) finally reported to ADB through the annual EMP monitoring and progress reporting process.

16. **Quality assurance /quality control for compliance monitoring.** To ensure accuracy of the monitoring, the quality assurance and/or quality control procedures will be conducted in

accordance with the following regulations:

(i) Regulations of QA/AC Management for Environmental Monitoring issued by the State Environmental Protection Administration in July 2006;
(ii) QA/QC Manual for Environmental Water Monitoring (Second edition), published by the State Environmental Monitoring Centre in 2001; and
(iii) QA/QC Manual for Environmental Air Monitoring published by the State Environmental Monitoring Centre in 2001.

Table EMP-7: Environmental Reporting Plan

Report	From	To	Frequency of Reporting
A. Construction Phase			
Internal progress reports	CSCs	PIUs	Monthly
Environmental monitoring reports	Local EMSs	LPMOs, PIUs	Semi-annually
EMP monitoring progress reports	JPPMO, LPMOs	ADB	Semi-annually (through semi-annual project progress reports)
	JPPMO	ADB	Annually (stand-alone EMP progress report)
Environmental acceptance monitoring and audit reports	Licensed institute	Municipal EPBs, JPPMO, implementing agencies, PIUs, ADB	Within 3 months after component completion
B. Operation Phase			
EMP monitoring and progress reports	JPPMO	ADB	Annually

ADB = Asian Development Bank.
Source: Domestic EIAs and consultant's proposal.

Table EMP-8: Environmental Monitoring Program

Subject	Parameter	Location	Frequency	Who Imple-ment	Who Super-vise	Estimated Cost (RMB 10,000)			
						Baicheng		Baishan	
						Infra	MSW	WSP	MSW
1. Construction									
1.1 Quality of sewer from work-camp	pH, SS, NH_3-N, $COD_{Cr,}$ oil	Domestic wastewater discharge at selected work-camps (50% of total camps in each city)	Compliance monitoring: four times per year during construction activities	LEMS	LEPB, LPMO	3.0	1.0	5.0	3.0
1.2 Construction wastewater	SS, oil, pH	At the bridge (50m upstream and 100m downstream of the drainage channel in Baicheng); At wastewater discharge points of all construction sites in each city	Compliance monitoring: four times per year during construction activities	LEMS	LPMO LEPB	1.2	1.0	1.0	1.0
1.3 Water quality downstream of the reservoir	pH, SS, DO, NH_3-N, BOD_5, COD_{Cr}, Total coliform, oil	Downstream of Xibeicha River (at the section 2000 m downstream of the reservoir)	Compliance monitoring: twice per year during construction activities	LEMS	LPMO, LEPB	-	-	1.0	-
1.4 Ambient air	Dust mitigation measures (water spraying, cover vehicles, etc.); and maintenance of vehicles & equipment	Visual inspection at all construction sites	Internal monitoring: once a week	CSC	PIU, LIEC	Included in the CSCs' contract			
	TSP, PM10, NOx	At all construction sites (at least one point upwind, one points downwind) and sensitive receivers nearby (see Chapter IV - sensitive receptors within project area of influence)	Compliance monitoring: four times per year during construction activities	LEMS	LPMO EPB	2.0	1.0	2.0	2.0
1.5 Noise	LAeq	At boundaries of all construction	Compliance monitoring:	LEMS	LPMO EPB	2.0	1.0	1.5	1.2

Subject	Parameter	Location	Frequency	Who Imple-ment	Who Super-vise	Estimated Cost (RMB 10,000)			
						Baicheng		Baishan	
						Infra	MSW	WSP	MSW
		sites and sensitive receivers nearby (see Chapter IV-sensitive receivers within project area of influence)	twice per year (twice a day, once in day time and once at night time, for 2 consecutive days)						
1.6 Solid Waste	Garbage from work-camps and construction waste at construction sites	Visual inspection at all construction sites and work-camps	Internal monitoring: once a week	CSCs	PIU, LPHB	Included in the CSC contract			
			Compliance monitoring: once a year	LIEC	ADB	Included in PIC contract			
1.7 Soil erosion and re-vegetation	Soil erosion intensity	Visual inspection at spoil sites and all construction sites, in particular the water transmission pipeline route and the Baishan landfill site	Internal monitoring: Random check after rain (rainfall＞50 mm)	CSC	PIU, LIEC	Included in the CSCs' contract			
			Compliance Monitoring: At least once a year, and once after completion of construction	LIEC	EPB, executing agency, ADB	Included in PIC contract			
	Re-vegetation of spoil disposal sites and construction sites	Visual inspection at all disposal sites, and temporary occupied lands	Internal Monitoring: At least four times per year	CSC	PIU	Included in the CSCs' contract			
			Compliance Monitoring: At least once a year, and once after completion of construction	LIEC	JPPMO, ADB	Included in PIC contract			
1.8 Occupational health and safety	Work camp hygiene and safety, availability of clean water and emergency response plans	Inspection at all construction sites and work-camps	Internal Monitoring: once a month	CSC	PIUs	Included in the CSCs' contract			
			Compliance Monitoring: At least once a year, and once after completion of construction	LIEC	LPHB, LLB	Included in PIC contract			
Subtotal						**8.2**	**4.0**	**10.5**	**7.2**
Total						**29.9 (49,000USD)**			
2. Operation Phase									
2.1 Water quality of	pH, SS, DO, NH_3-N, oil, COD_{cr},	Two points: (i) center of the Xibeicha	Four times a year (in addition to	LEMS	PIU, LEPB	-	-	2.0/a	-

Subject	Parameter	Location	Frequency	Who Imple-ment	Who Super-vise	Estimated Cost (RMB 10,000)			
						Baicheng		Baishan	
						Infra	MSW	WSP	MSW
Xibeicha reservoir	Cr_6+, BOD_5, TN, TP, chloride, NO_3-N, total coliforms, dipterex, dimethoate, dichlorphos	Reservoir; and (ii) the water intake point of the water transmission pipeline.	online monitoring system of WTP operator)						
2.2 Water quality of treated water at WTP	42 regular parameters [1] in the standard of GB5749-2006.	Internal monitoring: Clear water tank in the WSP	Once a week	Lab in the PIU	LEPB, LPHB	-	-	20/a	-
	106 parameters of GB5749-2006	Compliance monitoring: Clear water tank in the WSP	Twice a year	Chang chun Water Supply Co.	LEPB, LPHB	-	-	4.0/a	-
2.3 Water quality and quantity downstrea m of Xibeicha River	m^3/s, pH, SS, NH_3-N, Oil, COD_{cr}, Cr_6+, BOD_5, TN, TP, DO, total coliforms,	One sampling at confluence section of the downstream Xibeicha River and the Hunjiang River	Once a month	LEMS	LEPB	-	-	12/a	-
2.4 Landfill leachate	SS, CODcr, NH_3-N, Total bacteria, heavy metals	Landfill leachate	Four times per year	LEMS	LEPB	-	-	-	2.4/a
2.5 Groundwat er quality	pH, NH_3-N, COD_{Mn}, Cr(+6), As, Pb, Cd, Hg, volatile phenol, cyanide, fecal coliform, total hardness, chloride	Baishan Landfill site: One sampling at the background well, two at a 50m distance of both sides of landfill site; one at a distance of 50m downstream of the direction of ground water under the landfill site, separately.	Twice per year	LEMS	LEPB, JPEPD	-	-	-	4.0/a
2.6 Noise	LAeq	(i) At the boundary of the	Twice per year (twice a	LEMS	LEPB	-	1.0/a	0.5/a	1.0/a

[1] The 42 regular water quality in the standard of GB5749-2006 includes: Total coliform, Thermotolerant coliform, Escherichia coliform, Total plate count, As, Cd, Cr^{+6}, Pb, Hg, Se, Cyanide, NO3-N, Chloroform, Tetrachloromethane (CCl4), Fluoride, Bromate, Formaldehyde, NH3-N, Chlorite, Chlorate, Chromaticity, Turbidity, odor & taste, Lookable (appearance), pH, Al, Fe, Mn, Cu, Zn, Chloride, Sulfate, TDS, Total hardness, CODmn, Volatile phenol, LAS, Total α-radioactivity, Total β-radioactivity, ClO_2, Residual Cl_2.

Subject	Parameter	Location	Frequency	Who Imple-ment	Who Super-vise	Estimated Cost (RMB 10,000)			
						Baicheng		Baishan	
						Infra	MSW	WSP	MSW
		WTP; (ii) The boundary of the MSW transfer stations; (iii) landfill site boundaries.	day, once in day time and once at night time for 2 consecutive days)						
		All sensitive receivers along the roads and nearby bridges;				1.5/a	-	-	-
2.7 Ambient Air	TSP, SO_2, NOx, PM_{10}	All sensitive receivers along the roads and nearby bridges	Twice a day for 3 consecutive days, twice per year	LEMS	LEPB	1.5/a	-	-	-
	CH_4, TSP, NH_3, H_2S	(i) Upwind and downwind of the MSW sorting/ composting plants and the landfill boundaries; (ii) 20% of MSW transfer stations (random selected)	Twice a year	LEMS	LEPB	-	5.0/a	-	3.0/a
2.8 Soil and Vegetation	Vegetation survival and coverage rate	All re-vegetated sites.	Spot check, twice a year	PIU	LEPB, LFB[2]	-	-	-	-
2.9 Traffic flow and safety	Traffic flow and road use (against predictions), and accident incidents	Project roads	Once a year, in particular in the representative years of 2019, 2025 and 2033	PIU	LTMB[3] JPPMO	0.5/a	-	-	-
2.10 Pest and disease vectors	Rats, mosquitos, fly density (No./m^2)	Four boundaries of MSW facilities and the landfill.	Twice a year (once in summer)	PIU	LPHB	-	0.3/a	-	0.4/a
Subtotal						**3.5/a**	**6.3/a**	**38.5/a**	**10.8/a**
Total						**59.1/a (96,853 USD/a)**			

BOD5 = 5-day biochemical oxygen demand; CODcr = chemical oxygen demand; CSC = construction supervision company; EMS = environmental monitoring station; EPB = environmental protection bureau; IA = implementation agency; LAeq = equivalent continuous A-weighted sound pressure level; LSMI = licensed soil erosion institute; NH_3-N = ammonia nitrogen; NOx = nitrogen oxides; OPF = operators of project facilities; PM10 = particles measuring 10ÂµÂµm or less; PMO = project management office; SO_2 = sulfur dioxide; SS = suspended solids; TSP = total suspended particle.

[2] Local forestry bureau.
[3] Local traffic management bureau.

E. Training, Capacity Building, and Awareness-raising

17. To ensure effective implementation of the EMP, the capacity of the JPPMO, LPMOs, PIUs, OPFs, CSCs and contractors must be strengthened, and all parties involved in implementing mitigation measures and monitoring of environmental performance must have an understanding of the goals, methods, and the best practices of project environmental management. The Jilin Provincial EPB, Baishan and Baicheng municipal EPBs, and the LIECs will offer training specific to their roles for all the project components. The main training emphasis will be to ensure that the contractors, CSCs, PIUs, and OPFs are well versed in environmentally sound practices and are able to undertake all construction and operation with the appropriate environmental safeguards.

18. The training and awareness raising program addresses immediate training needs, i.e. training needed for project personnel in order to ensure that involved institutes are well versed in environmentally sound practices and are able to undertake all construction with the appropriate environmental safeguards.

19. The training program also addresses long-term capacity building and awareness raising needs, i.e. for the operational phase of the project components. Training and awareness raising campaigns will be provided by qualified experts on MSW management with 3R principal, drinking water safety, drinking water source protection, NRW reduction, operation and maintenance of WSP, strategic urban and regional planning, low carbon and sustainable urban transport management planning, and urban traffic safety.

20. The following training program will be delivered or organized by the project management consulting service during the course of project implementation. Training Needs Assessments will be conducted by the Project Implementation Consultant (PIC) to tailor the training for maximum impact. The trainer will include in their program a before/after assessment to evaluate the success of the training. The LIEC and other PIC members will design an evaluation questionnaire to gauge the usefulness of the training/capacity building design and performance of the trainer. The evaluation will be taken into account in the trainer's performance evaluation.

Table EMP-9: Indicative List of Short-term Training Program Related to Environment

Training program	Scope of Training	Trainer	Trainee	Time	Days	Persons	Budget (CNY)
Procurement and contract management	1. ADB's procurement Guideline and process 2. Bidding document preparation, including EMP clauses 3. Risk of improper procurement and mitigation measures 4. Handling variation orders and contract management	PIC	JPPMO, PIUs, implementing agencies, LPMOs, LFBs[4]	1	1	30	12,000
Implementation of EMP and other health and safety requirements including GRM	5. EMP implementation, including implementation responsibilities, environmental monitoring, inspection and reporting, public consultation and	PIC, LIEC	JPPMO, implementing agency, PIUs, LPMOs,	2	2	30	24,000

[4] Municipal Finance Bureau

Training program	Scope of Training	Trainer	Trainee	Time	Days	Persons	Budget (CNY)
	participation, mechanism of EMP review, feedback and adjustment; 6. The GRM, including GRM structure, responsibilities and timeframe, types of grievances, eligibility assessment; 7. EHS considerations during project construction and operation, including community and occupational health and safety; 8. Monitoring and inspection methods, data collection and processing, interpretation of data, reporting system; 9. Communication with the public by different means (Innovative community-based advocacy campaigns) 10. Prevention and control of transmissible diseases and HIV/AIDS		LEPBs, LCAB[5], GRM access points, other related local units				
Drinking water source protection and WTP operation including NRW reduction	11. The PRC and Jilin provincial regulations for drinking water source protection and protection zoning; 12. Point and non-point pollution control, and principles of surface water management 13. Energy saving and GHG emission reduction in water supply sector including NRW reduction strategy and methods 14. Sustainable water management and water saving practices	Experts invited from ADB or IWA[6] (Beijing Office)	PIU, OPF of the WTP, LWRB	1	1	20	10,000
Municipal solid waste management	15. International and national good practices for MSW management (3R concept and practice) 16. MSW disposal and management technologies and options including sorting and composting;	Experts from JPEPD, and LIEC	LPMOs, PIUs, LPHB, LEPBs	1	1	30	12,000
Sustainable transport planning, traffic safety	17. International and national good practice for urban traffic safety 18. Road safety audit tools and approaches	PIC	Baicheng implementing agency, PIU, and	1	1	20	10,000

[5] Local Civil Affair Bureau
[6] International Water Association.

Training program	Scope of Training	Trainer	Trainee	Time	Days	Persons	Budget (CNY)
	19. Public awareness program and education for traffic safety 20. Use of performance indicators and short-, medium- and long-term planning 21. GHGs emission reduction and climate change adaptation in transport sector		other related units (e.g. traffic managem ent bureau)				
Emergency preparedness and response planning	22. Environmental accidents, mitigation measures for the sectors of water supply, urban infrastructure and MSW; 23. Emergency response team, procedure and actions; 24. Urban drainage and flood emergency response	PIC	Implement ing agencies, PIUs, OPFS, other related local bureaus	1	1	30	12,000
Total				**7**	**7**	**150**	**8,000**

ADB = Asian Development Bank, EHS = environment, health, and safety, EMP = environment management plan, EPB = environment protection bureau, GRM = grievance redress mechanism, IWA = international water association, JPPMO = Jilin provincial project management office, LEPB = local environment protection bureau, LFB = local finance bureau, LIEC = loan implementation environmental consultant, LPMO = local project management office, LWRB = local water resources bureau, MSW = municipal solid waste; OPF = operator of project facilities, PIC = project Implementation consulting service, PIU = project implementing unit, WTP = willingness-to-pay.

21. In addition, a series of **awareness raising activities** have been defined in the social action plan (SAP) and gender action plan (GAP) of the project:

(i) **Awareness raising on municipal waste sorting at source.** This activity defined in the SAP will include, amongst others (i) the preparation of a household garbage 3R instruction handbook; (ii) public consultations on waste sorting in selected communities (21 communities in Baishan and 20 communities in Baicheng); and (iii) public sanitation management campaign including 3R in schools (lecture or picture exhibition, handbooks, etc., targeting 70 primary and 30 middle schools). A budget of CNY810,000 has been earmarked in the consulting service package to cover handbook production and consultation and awareness raising activities.

(ii) **Awareness raising on water conservation and safe drinking water.** This activity defined in the SAP will target Baishan and include, amongst others: (i) the preparation and delivery of water-saving campaign materials; (ii) a public water conservation campaign in schools (lecture or picture exhibition, etc.), and (iii) a public water conservation and safe drinking water campaign in the urban area of Baishan. Campaign material costs of CNY200,000 have been earmarked in the capacity building component of the project.

(iii) **Awareness raising on traffic road safety.** This activity defined in the SAP will target Baicheng and mainly consist of a road safety campaign in schools. Campaign preparation costs of CNY120,000 have been earmarked in the capacity building budget of the project.

F. Public Consultation

22. Meaningful consultation was conducted during the PPTA. Direct public participation was conducted as an ongoing element in the development of the components, which and its outcome are described in Chapter VII of this IEE. These activities were carried out by the EIA institutes in their preparation of the EIAs, and by the PPTA consultants following the PRC National EIA Technical Guidelines and ADB SPS (2009) and PCP (2011).

23. Future plans for public involvement during the design, construction, and operation phases were developed during PPTA (**Table EMP-10**). These plans include public participation in (i) monitoring impacts and mitigation measures during construction and operation, (ii) evaluating environmental benefits and social impacts, and (iii) interviewing the public after the project is completed. The LPMOs and PIUs are responsible for public participation during project implementation. They will be supported by the LIEC. Costs for public participation activities during construction are included in the project funding.

Table EMP-10: Consultation and Participation Plan

Organizer	Approach	Times/Frequency	Subjects	Participants
Project Preparation				
EIA institutes	Questionnaires and interviews	During field work for EIA	Project priority, effects, attitudes to the project/ components, and suggestions	Residents within project component areas and construction area
PPTA consultants, ADB	Site visits, and public consultations, and interviews	Two rounds of consultation in each of the two city	Comments and recommendations of affected persons and stakeholders	Representatives of affected people and stakeholder agencies
Construction				
PIUs, LPMOs, LIEC	Public consultation through questionnaire survey, site visits, informal interviews	Once a year during peak construction period	Adjusting mitigation measures if necessary, construction impacts, comments and suggestions	Work staff within construction area; and residents within construction area
	Public workshops	At least once during peak construction period	EMP implementation progress, adjusting mitigation measures if necessary, construction impacts, comments and suggestions	Representatives of residents, affected people and social sectors
Operation				
PIUs, OPFs	Public consultation and site visits	At least once	Effects of mitigation measures, impacts of operation, comments and suggestions	Residents, affected people, adjacent to project facilities
	Public workshop	As needed based on public consultation	Effects of mitigation measures, impacts of operation, comments and suggestions	Representatives of residents, affected people, and social sectors
	Public satisfaction survey	At least once after one year of operation	Comments and suggestions	Project beneficiaries

EIA = environmental impact assessment, OPF = operator of project facilities, PIU = project implementing unit, LPMO = local project management office, LIEC = loan implementation environmental consultant, PPTA = project preparation technical assistance.

G. Mechanisms for Feedback and Adjustment

24. Based on environmental inspection and monitoring reports, the JPPMO, LPMOs, PIUs shall decide, in consultation with the LIEC, whether (i) further mitigation measures are required as corrective actions, or (ii) some improvements are required for environmental management practices.

25. The effectiveness of mitigation measures and monitoring plans will be evaluated by a feedback reporting system. Adjustment to the EMP will be made, if necessary. The LPMOs and their EMUs will play a critical role in the feedback and adjustment mechanism.

26. If during inspection, substantial deviation from the EMP is observed or any changes are made to the project that may cause substantial adverse environmental impacts or increase the number of affected people, then the JPPMO and the LPMOs will immediately consult with ADB and form an environmental assessment team to conduct additional environmental assessment and, if necessary, further public consultation. The revised EIA report including the EMP will be submitted to the ADB for review and appraisal, and disclosure. The revised EMP will be passed to the contractors, CSCs and OPFs for implementation. The mechanism for feedback and adjustment of the EMP is shown in **Figure EMP-1.**

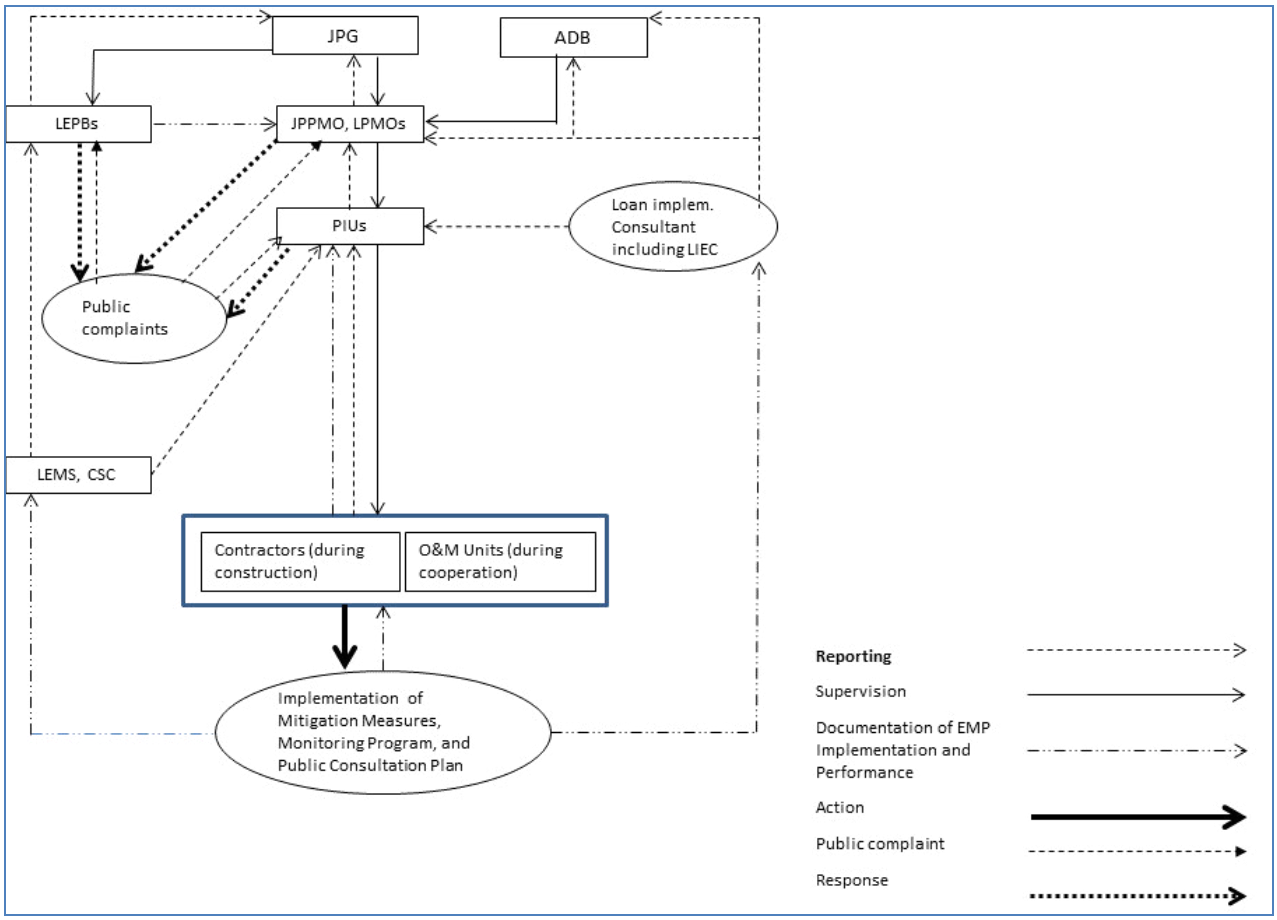


Figure EMP-1: Mechanism for Feedback and Adjustment of the EMP

APPENDIX 2: WATER SAFETY PLAN FOR BAISHAN WATER SUPPLY

A. Background

1. Challenges with Drinking-water Safety in China

1. Safe drinking water and adequate sanitation are central to the lives of people in China, especially in medium-small sized cities and rural areas. The impacts of poor water supply sanitation (WSS) services are causing serious health problems. A large percentage of health issues have been attributed to unsafe water, sanitation, and hygiene. The burden of illness weighs most heavily on the poorest members of society. Improved water supply and sanitation are closely linked to progress in health, education, gender equality, and environmental sustainability.

2. Inadequate water supply facilities in many areas of China contribute to low water supply coverage, poor drinking water quality, and NRW losses. With regard to the applicable requirements on salinity standards for drinking water, there is a need to upgrade water purifying facilities of WSP and treatment technologies to ensure a safe water supply. In 2010, the average water supply coverage rate was about 90% in China, 79% in counties, and 62% in townships.

3. Baishan City faces challenges similar to other places in China, including: (i) limited water supply and insufficient water treatment capacity, (ii) water pollution due to the recent exploitation of mineral resources; (iii) poor purification treatment processes and monitoring capacity,(iv) outdated networks of water transmission and distribution; and (v) an inefficient emergency response mechanism .

B. Water Supply Safety Assessment

4. In 2009, the World Health Organization (WHO) and The International Water Association (IWA) issued the Water Safety Plan (WSP) Manual for water supply safety assessment and the development of WSP. A water supply system usually includes 4 parts: (i) water intake section, (ii) a water treatment, (iii) distribution pipeline network, and (iv) the consumers. Drinking-water suppliers are usually required to verify that the quality of water supplied to consumers meets specific standards. The WSP is a useful tool to identify the potential risks for water safety in all sections of the water supply system. Studies of the WSP for urban water supply in the PRC have started late, and the challenges to water supply safety are becoming more serious.

5. Risks assessment of urban water supply systems can help reduce the occurrence of disastrous accidents, eliminate risk factors in a timely manner, and improve the reliability, integrity, and security of the water supply system. It can also lead to targeted preventive measures.

C. Guidelines of Water Safety Plans

6. WSPs are used to evaluate all of the potential risks posed by water sources to end-users, and to carry out risk management activities. It includes (i) water sources, (ii) water treatment, (iii) water delivery and water distribution, and (iv) water users. Progress in expanding access and improving the quality of these basic services requires a supportive, enabling environment and cross-sectored interventions in areas such as water resource management, land management, fiscal decentralization, and public health, among others.

7. A typical WSP development process as recognized by World Health Organization is shown in **Figure 1**. The process starts with the mapping of the water supply system, follows with identifying the hazards and risks, implementing the improvement, reviewing the adequacy of preventative measures, reviewing the WSP, and returning to step 1 to start the circle again.

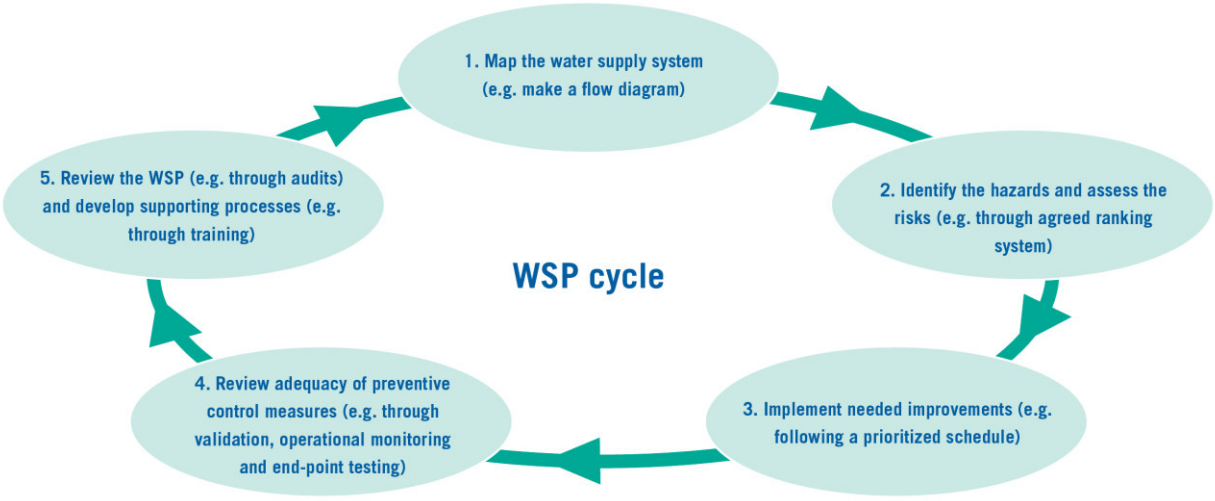


Figure 1: WHO Water Safety Plan (WSP) cycle

D. Risk Management

8. Risk management of the urban water supply system refers to the activities of water supply enterprises and government departments, including risk identification, risk analysis, risk evaluation, strategy planning and decision-making, implementation and evaluation, and ensuring safety in the most economic and feasible method way. Among them, risk identification is the first and most important step in the process of managing the urban water supply system.

E. Risk identification

9. A WSP workshop was held at the Baishan Water Supply Company to evaluate the potential risks for all sections in the water supply system. The participants included all stakeholders in the water supply management system such as the operation and management company at the water source and water transmission line, the management staff of the water treatment plant, the operation and maintenance crews for water distribution, the water quality monitoring and inspection crews, consultants, design institute, environmental institute, and other relevant agencies. The WHO guideline for developing WSP and the detailed procedures as illustrated in Figure 2 was adopted in the workshop, and the key risks in Baishan water supply system were discussed and identified.

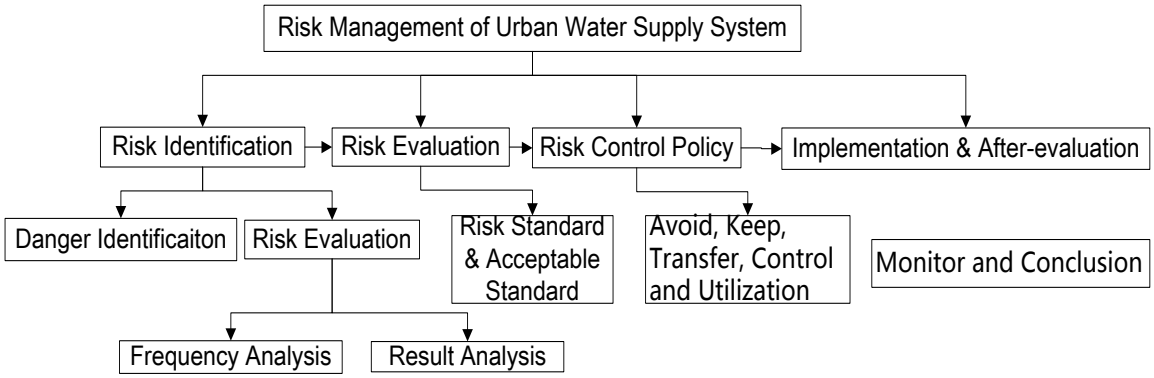


Figure 2 Logic structure of risk management process of urban water supply

F. Risk Assessment and Risk Control

10. The potential risks of the water supply system in Baishan were assessed in the following segment: i) water sources (water quantity and water quality); ii) water treatment; iii) water distribution supply pipe network; and iv) unexpected events.

G. Potential Risks of Raw Water

1. Potential Risks of Insufficient Water Quantity

11. There is a potential risk of inadequate water supply of the water source at Xibeicha Reservoir, especially during the drought years.

12. **Risk control.** The water supply source, Xibeicha Reservoir, will supply water to both Hunjiang and Jiangyuan districts. The water source has been configured to guarantee the water supply to Hunjiang district in the event of water shortage, and use the current existing water supply to supplement the supply in Jiangyuan district.

2. Potential Risks of Raw Water Pollution

13. There are potential risks of water pollution at the water source such as: i) pollution from the domestic and industrial wastewater; ii) pollution from agricultural production; iii) pollution from mining, which was the case of pollution of 2 of the 4 water sources in Baishan; and iv) terrorist sabotage.

14. **Risk control.** The risk of pollution at the water source of Xibeicha Reservoir is low due to its isolated location in the deep forest. A water source protection plan has been developed and approved by the government authority. It is critical to implement and enforce the water source protection plan after the construction of the reservoir completed and in operation.

3. Potential Risk of Water Production

15. The potential risks in the water production process may include water quality deterioration in water treatment plant and pipe network, excessive residual chloride, residual turbidity, etc.

4. Potential Risks of the Water Purification Process

16. The risk may come from equipment. When flocculation and sedimentation tanks do not clean and wash on time, it may cause the water quality at the end-outlet to become worse. The temperature in Baishan City in winter could be extremely cold and frozen sludge is one of potential risks to cause water quality deterioration.

17. **Risk control.** To develop and implement adequate training to the plant operation staff to closely monitoring the water quality in the plant, and conduct flushing procedure to clean the system in according to the operation manual and based on the actual needs.

5. Potential Risks of Residual Chloride

18. Chloride is used in the water treatment plant to remove the bacteria from the water. However, the excessive residual chloride will have harmful impact to human body. There is potential risk of having excessive chloride in the water if the amount of the chloride is not adjusted correctly based on the water quality received in the plant.

19. **Risk control.** To develop and implement training program for the plant operation staff to monitor and control the water treatment process according to operation manual and procedures strictly.

6. Potential Risks of Residual Turbidity

20. The chemical and physical process is used in the water treatment plant to remove the turbidity in the water. There is a potential risk that there is excessive turbidity in the water supply system if the water treatment process is not conducted properly.

21. **Risk control.** To develop and implement training program for the plant operation staff to monitor and control the water treatment process according to operation manual and procedures strictly.

H. Potential Risk of Water Transmission and Water Delivery

1. Potential Risks of Water Quality Deterioration in the Pipe Network

22. The water quality in the water supply network is often deteriorates rapidly. The reasons may be due to the extremely low water temperature in the winter season affecting the flocculation and sedimentation of the water or the high temperature causing over-growth of the water bloom in the summer.

23. **Risk control.** Develop and implement water quality monitoring program to check the water quality in the pipe network, especially in the ends of the network. Perform pipe network flushing or disinfection to clean the system as needed.

2. Potential Risks of Turbidity in the Pipe Network

24. The water in the pipe network may stay at different water qualities or flow at different velocities, which will cause pipe corrosions. When the direction and speed of the flow of water change, the sediments and bio-membranes on the pipe walls could be washed off, and causing excessive turbidity.

25. **Risk control.** Develop and implement water turbidity monitoring program to check the water quality in the pipe network. Perform pipe network flushing or disinfection to clean the system as needed.

3. Potential Risk of Pipe Burst

26. Water pipe burst may happen due to excessive pressure, aged-pipe lines and out-of-date pipelines, damaged due to excavation actives, etc.

27. **Risk control.** Develop emergency response plan and provide training to the emergency response crew to take quick action in the event of pipe bursting.

4. Unexpected Events

28. The unexpected events may include natural disasters, accidents, terrorist sabotages, and other uncontrollable extreme events.

29. **Risk control.** Develop emergency response plan for these unexpected events and provide training to all involved people including plant operator and management, maintenance crew, publics, etc. to react to the extreme events accordingly.

5. Water Safety Plan

30. The risk assessment identified a number of hazards and risks to water safety system, but concluded that the control measures proposed is the WSP will reduce most of those the risks to acceptable levels (low risk rating). Key hazards and risks for different water supply process steps as well as the proposed control measures are described in the following table.

Risks Analysis and Risks Control for Baishan Water Supply Project (Technical Issues)

Process Step	Location	Risk	Risk Rating without Control	Proposed Control Measure	Risk Rating with Control	Notes
Water source	Water intake site	Insufficient of water quantity	High	1. To joint-dispatch of drinking water sources, to achieve the urban water supply by multiple water sources. 2. To strength water conservation by reducing NRW through capacity building on providing leakage detection equipment, to setup the rapid emergency rescue mechanism of safety water supply, to install water meters and flow meters with good accuracy . 3. To study and formulate a rational water tariff policy to simulate the public awareness on water conservancy by policy. 4. To improve water quality in spare water sources gradually by through implement Water Protection Law and other relative laws within the water conversation zones.	Low	• After the project completion, it will be achieved the joint-dispatch of water supply between Qujiaying Reservoir and the Xibeicha Reservoir. • The water production capacity and water supply capacity will be increased and meet the requirement of water demand.
	Water intake site	Water pollution	Medium-low	5. Develop and update the water source protection plan 6. Implement and enforce the water source protection plan for forestation, controlling access, prohibiting illegal farming, etc.	Low	IA to coordinate the implementation and enforcement of the protection plan will all involved agencies.
Water Production	WTP	Water pollution	Medium	7. Develop training program to improve the capacity of the water treatment plant operation staffs to ensure the proper operation of the plant 8. To establish the on-line water quality monitoring system to check the real time variation of water quality timely. 9. To strength the capacity of the chemical laboratory of the water quality for water quality testing. 10. To strength and provide necessary equipment on the supervisory control to drinking water sources, water treatment plant. 11. To strengthen and implement the management mechanism of regular inspection, maintenance and operation, reporting to ensure the safe operation of water supply pipe network. 12. To strength the supervision of waste water discharging.	Low	To develop the proper operation procedures and have the routine training to the operation staffs are critical to ensures the proper operation of the plant.

Process Step	Location	Risk	Risk Rating without Control	Proposed Control Measure	Risk Rating with Control	Notes
	Pre-sediment tank	Algal bloom and algal toxins in the tank	Low	13. Monitoring and clean the tank according to the operation procedure 14. Water flows in the tank will be supervised by qualified staff	Low	
	Coagulation and flocculation tank	15. Mechanical fault chemical dosing system, resulting in high turbidity and pathogens 16. The mixing contaminated causes water pollution	Medium	17. To install real time monitoring system and warning system 18. To flush the dosing system; 19. To establish an automatic dosing pump alarm system 20. The coagulant agent must be purchased from the qualified supplier sourcing, and to provide supporting documents to meet the national standard GB1892-2009. 21. To connect with the network of monitoring and warning system to monitor the filtered turbidity;	Low	
	Filtration	22. The failure of filtration system leads to a high turbidity and the potential pathogens exceed to the standard	Medium	23. To install real time monitoring and warning system 24. To install parallel multiple filtration units; 25. Conduct routine filter maintenance program.		
	Chlorine treatment	26. Due to machine's breakdown cause by chlorine deficiency or excess, thereby leading to the breeding of bacteria or chlorine's overweight	High	27. To establish an on-line monitoring and warning system to monitor the Chlorine content 28. To install automatic dosing system to ensure that the accuracy of chlorine content	Low	
	Pumping Station	29. Pumping station's failure causing not enough pressure	High	30. Install dual pump system at key pump stations 31. Install spare power supply system	Medium	

Process Step	Location	Risk	Risk Rating without Control	Proposed Control Measure	Risk Rating with Control	Notes
Water transmission & distribution networks	Pipe network	32. Pipe burst cause the secondary pollution and cause to stop water supply interruption	High	33. Install real time monitoring system to detect pipe bursting timely and to take immediate remedy actions 34. Develop emergency response plan for pipe bursting 35. Select and use the proper pipe material for the design working pressure. 36. Conduct routine leaking detection to locate and fix water leaking early 37. Conduct routine inspection and implement preventive maintenance to keep pipe network in good working condition	Medium	
		Pipe burst at connection pipe to water users	High	38. Use proper connection pipe to improve the interface quality	Low	
		Water is polluted by using unqualified pipe material, out-of date material(Galvanized iron and lead)	High	39. To upgrade aged pipe system with new pipe meeting current design standards 40. The purchased pipe lines must be met the national standards of safety drinking water and the design requirement. 41. To regular monitor water quality ----To improve public safety awareness and reporting timely.	Low	
Overall			**Medium**		**Low**	

APPENDIX 3: NON-REVENUE WATER

A. Introduction

1. Most developed countries have a solid infrastructure and established operational practices for managing and controlling non-revenue water (NRW). This is not always the case in developing countries; many are struggling to ensure that customers receive a reasonable supply of safe drinking water, often via a pipe network that is inadequate, with poor record systems and a low level of technical skills and technology. Tariff system and revenue collection policies often do not reflect the true value of water supplied, which limits the utility's cost recovery and encourage customers to undervalue the service.

2. NRW is a globe problem requiring a management strategy that can be globally applied. Developing such a strategy requires a diagnostic approach to identify the problem, and then to use the available tools to reduce or remove it. Following a step-wise process--asking some basic questions about the utility policies and practices, and then undertaking the appropriate tasks to answer them-- is the basis of successful strategy development. The philosophies, concepts, and recommendations, especially those recommended by the IWA and the World Bank Institute, reflect international best practice.

3. Developing country like China faces similar challenges in reducing NRW, including aging infrastructure, financial constraints, poor project design and installation. Many utilities in China, however, can draw on motivated and industrious staff to implement solutions once the challenges of reducing NRW have been identified.

4. ADB has worked with the PRC on NRW reduction in several projects, but there are still limited practical examples and experiences in addressing the issues in cold region, like north-east China in Jilin province. The project provides a better chance to addressing and assessment this issue based on previous knowledge and skills. This could serve as demonstration which will also help other similar places in the PRC improve non-revenue water management performance.

5. Based on the 2012 water supply statistics data of Baishan city in Jilin, current situation and status for Baishan as follows:

(i) There are three water plants in Baishan City, including two ground water plants and one surface water plant. The average output water volume is 43 MLD in 2012. The popularity rate is 70%. The daily per capita water consumption is 75 liter/day/capita.

(ii) Total lengths of pipe which diameter above 75 mm are 225 km. The NRW rate is 65%. Total water consumers are up to 102,085, including 93,744 domestic consumers.

(iii) The average pressure 0.22 MPa and the water supply covering 30 km^2 areas.

(iv) Water power consumption per unit is 115 kilowatt per hour / 1000 m^3.

(v) Annual sales income for Baishan water utility is CNY15, 440,000 and annual net profit is – CNY7, 020,000. The number of total staffs is 597.

(vi) With 2004 water policy, water tariff system is shown as follows: domestic water consumer 2.3 CNY/m^3, administrative water consumer 4.0 CNY/m^3, industrial water consumer 4.0 CNY/m^3, business water consumer 4.8 CNY/m^3 and special high-water-consumption sector 8.0 CNY/m^3 respectively.

B. Proposed Project Targets

6. The following are the proposed project targets:

(i) Implement a diagnostic of the NRW situation, possible targets, and timeframes for NRW reduction;

(ii) Identify investments needed, expected results and other changes including organizational, legislation, and contractual that would be needed to enable NRW reduction to occur;

(iii) Formulate a capacity development to enable the achievement and sustain targeted NRW levels;

C. Establishment and Check of Water Balance

1. Water Balance Analysis Theory

7. Water balance is a method of quantifying and analyzing the System Input Volume and System Output Volume. The fundament of water balance analysis theory is that for a water supply system, the overall water volume calculation should be balanced through measurement or definition of the volume of produced, input, output, and lost water. Theoretically, each of the water balance components can be quantified in a fixed period, and water balance analysis of the water supply system can be complemented by investigating the input and output and collecting relative data. Therefore, introduction of water balance can help quantify the components and the lost water more precisely.

8. To most water utilities, the level of NRW is a key performance indicator of efficiency. However, most utilities tend to underestimate NRW because of institutional and political pressures, as well as a lack of knowledge to properly determine the NRW level. Reports of low levels of NRW are eagerly accepted by senior managers. However, reported low levels of NRW, whether due to deliberate misinformation or, more likely, a lack of accurate information, will not help the water utility to reduce its costs or increase revenue. Instead, it will mask the real problems affecting the water utility's operating efficiency. Only by quantifying NRW and its components, calculating appropriate performance indicators, and turning volumes of lost water into monetary values, can the NRW situation be properly understood and the required actions taken.

9. Water balance helps utility managers to understand the magnitude, sources, and cost of NRW. The International Water Association (IWA) has developed a standard international water balance structure and terminology (**Table 3.1**).

Table3.1: Water Balance Showing NRW Components

<table>
<tr><td rowspan="3">System Input Volume</td><td rowspan="3">Authorized Consumption</td><td rowspan="2">Billed Authorized Consumption</td><td>Billed Metered Consumption</td><td rowspan="2">Revenue Water</td></tr>
<tr><td>Billed Unmetered Consumption</td></tr>
<tr><td>Unbilled Authorized</td><td>Unbilled Metered Consumption</td><td>Non-Revenue</td></tr>
</table>

		Consumption	Unbilled Unmetered Consumption	Water
	Water Losses	Commercial Losses	Unauthorized Consumption	
			Customer Meter Inaccuracies and Data Handling Errors	
		Physical Losses	Leakage on Transmission and Distribution Mains	
			Leakage and Overflows from the Utilities Storage Tanks	
			Leakage on Service Connections up to the Customer Meter	

10. Non-revenue water (NRW) is equal to the total amount of water flowing into the water supply network from a water treatment plant (the 'System Input Volume') minus the total amount of water that industrial and domestic consumers are authorized to use (the 'Authorized Consumption').

NRW = System Input Volume - Billed Authorized Consumption

11. This equation assumes that:
    (i) System input volume has been corrected for any known errors
    (ii) The billed metered consumption period for customer billing records are consistent with the System Input Volume period.

12. Utility managers should use the water balance to calculate each component and determine where water losses are occurring, as described in the next sections. They will then prioritize and implement the required policy changes and operational practices.

2. Steps for Establishing Water Balance

13. Water balance is conducted by calculating or estimating the input, output, consumption, and losses of the water supply system. The significance lies in being capable of clearly describing and quantifying every system component and hence making the water losses more easily understood. Initially the volume of each water balance component need be calculated; the key part of which is to decompose NRW into Unbilled authorized consumption, apparent losses and Physical losses. Generally, steps to calculate water balance components are as follows:
    (i) Determine system input volume
    (ii) Determine billed metered consumption and billed unmetered consumption which sum up to revenue water
    (iii) Determine NRW by subtracting revenue water from system input volume.
    (iv) Determine unbilled metered consumption and unbilled unmetered consumption which sum up to unbilled authorized consumption.
    (v) Determine authorized consumption by adding revenue water to unbilled authorized consumption.

(vi) Determine water losses by subtracting authorized consumption from system input volume.

(vii) Estimate unauthorized consumption and customer metering inaccuracies properly which sum up to apparent losses.

(viii) Determine physical losses by subtracting apparent losses from water losses.

(ix) Estimate real loss components in feasible methods which include night flow analysis, burst frequency / leakage flow rate / leakage duration, modeling and etc. Add components of physical losses and cross-check with the physical losses as derived from Step 8.

a. Water Balance Analysis of Baishan's Water Supply System

i. Setting a Research Period

14. Given water balance's essential relation to time, water utility should choose a period for analyzing and evaluating the total system consumption. According to Baishan water utility's statistics, utility can define the whole year of 2012 as the water balance research period and use relative volume data from Jan 1, 2012 to Nov 31, 2012, so as to reduce the influence of the time lag between water consumption and meter reading. Besides, this period also involves the seasonal element.

Table 3.2: Water balance of Baishan water supply system in 2012 after check and verification

Unit: m^3

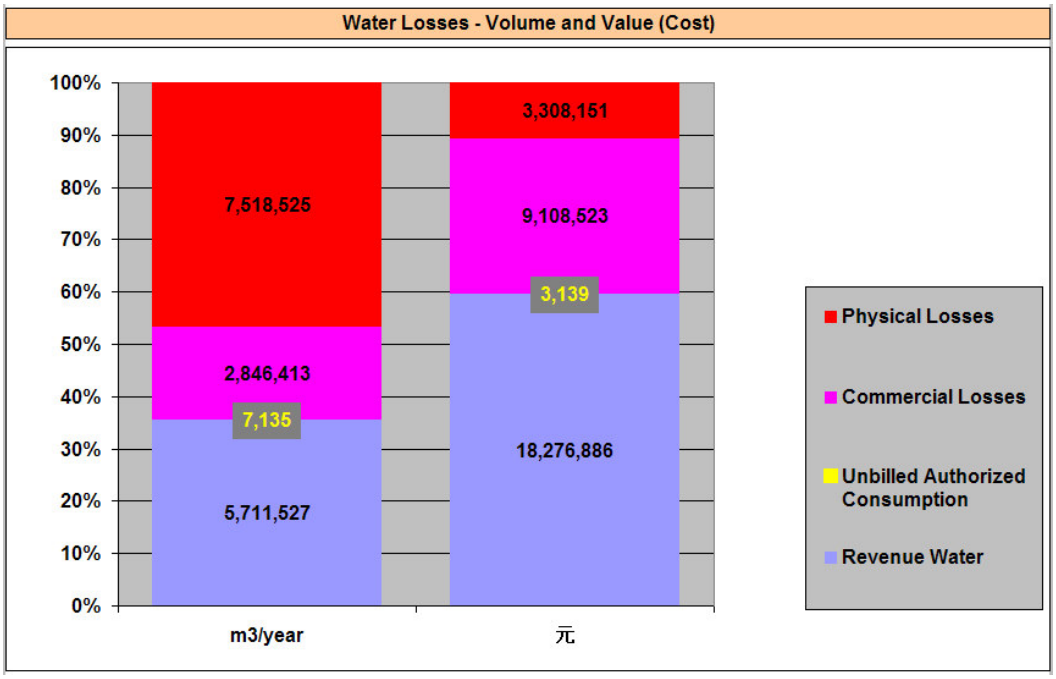
<table>
<tr><td rowspan="8">System Input Volume
16,083,600</td><td rowspan="3">Authorized Consumption
5,719,135</td><td rowspan="2">Billed Authorized Consumption
5,712,000</td><td>Billed Metered Consumption
5,538,840</td><td rowspan="2">Revenue Water
5,712,000</td></tr>
<tr><td>Billed Unmetered Consumption
173,160</td></tr>
<tr><td rowspan="2">Unbilled Authorized Consumption
7,135</td><td>Unbilled Metered Consumption
0</td><td rowspan="7">Non-Revenue Water
10,371,600</td></tr>
<tr><td>Unbilled Unmetered Consumption
7,135</td></tr>
<tr><td rowspan="5">Water Losses
10,364,465</td><td rowspan="2">Commercial Losses
2,846,413</td><td>Unauthorized Consumption
453,703</td></tr>
<tr><td>Customer Meter Inaccuracies and Data Handling Errors
2,392,710</td></tr>
<tr><td rowspan="3">Physical Losses
7,518,052</td><td>Reported Bursts
2,442,002</td></tr>
<tr><td>Unreported Bursts
4,892,713</td></tr>
<tr><td>Background Leakage
183,337</td></tr>
</table>

D. Assessment of Current Infrastructure Leakage Situation and Analysis of Leakage Reduction Strategy

1. Calculation Results of 2012 Water Balance

Table 4.1: Percents of 2012 water balance components in SIV

<table>
<tr><td rowspan="8">System Input Volume</td><td rowspan="4">Authorized Consumption
35.559%</td><td rowspan="2">Billed Authorized Consumption
35.515%</td><td>Billed Metered Consumption
34.438%</td><td rowspan="2">Revenue Water
35.515%</td></tr>
<tr><td>Billed Unmetered Consumption
1.077%</td></tr>
<tr><td rowspan="2">Unbilled Authorized Consumption
0.044%</td><td>Unbilled Metered Consumption
0%</td><td rowspan="6">Non-Revenue Water
64.485%</td></tr>
<tr><td>Unbilled Unmetered Consumption
0.044%</td></tr>
<tr><td rowspan="4">Water Losses
64.441%</td><td rowspan="2">Commercial Losses
17.697%</td><td>Unauthorized Consumption
2.821%</td></tr>
<tr><td>Customer Meter Inaccuracies and Data Handling Errors
14.876%</td></tr>
<tr><td rowspan="3">Physical Losses
46.744%</td><td>Reported Bursts
15.183%</td></tr>
<tr><td>Unreported Bursts
30.421%</td></tr>
<tr><td>Background Leakage
1.140%</td></tr>
</table>

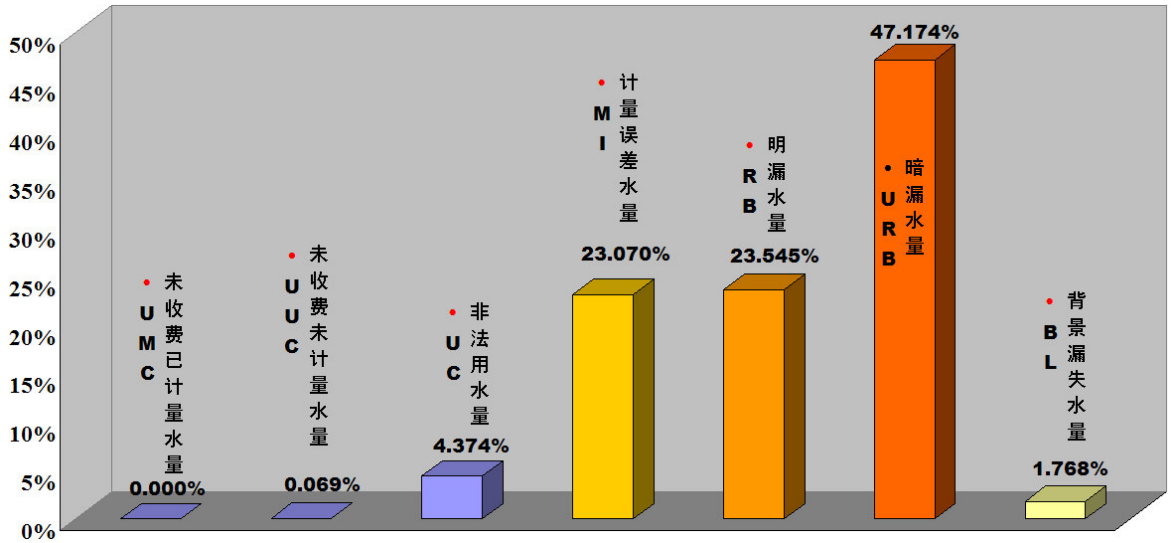


Picture 4.1: Column diagram of Baishan's water balance components in 2012

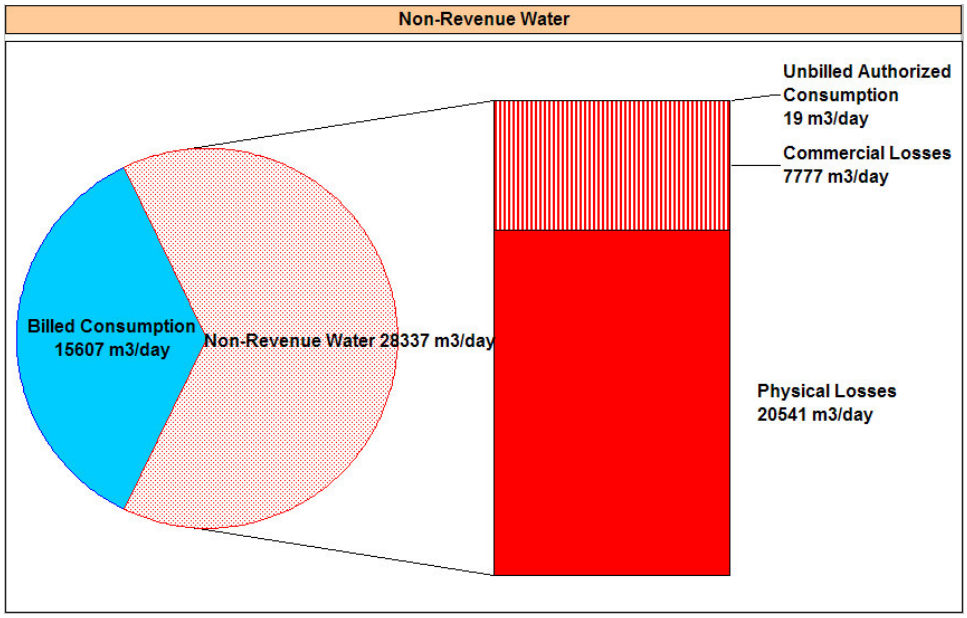
a. Non-Revenue Water

15. In 2012, NRW of Baishan water supply system is 10,371,600 m³, 64.485% of the System Input Volume and costs 12,539,085 yuan. It is composed of five components as follows:

(i) Unbilled Metered Consumption(UMC):0 m^3
(ii) Unbilled Unmetered Consumption(UUC): 7135m^3
(iii) Unauthorized Consumption(UC): 453703m^3
(iv) Customer Meter Inaccuracies and Data Handling Errors(MI): 2392710m^3
(v) Reported Bursts(RB): 242,002 m^3
(vi) Unreported Bursts(UB): 4,892,713 m^3
(vii) Background Leakage(BL): 183,337 m^3



Picture 4.2: Column diagram of NRW component proportion



Picture 4.3: Pie Diagram of NRW Component Proportion

b. Infrastructure Leakage Index (ILI) and its categories

16. In Baishan, the ILI is 29. And at the current operating pressure of 22m, the physical loss value per service connection per day is 689 L/c/d. By comparison with the physical loss target matrix in Table 3.5, it's concluded that Baishan has qualified at Category D in developing countries with high network leakage level. Leakage management is imperative to reduce NRW. This situation indicates that horrendously inefficient use of resources, leakage reduction programs imperative and high priority.

Physical Loss Performance Indicators	Best Estimate	Error Margin [+/- %]	Lower Bound	Upper Bound
Infrastructure Leakage Index (ILI)	29	12%	26	32
Liters per Connection per Day (w.s.p.) w.s.p.: when the system is pressurized - this means the value is already corrected in the case of intermittent supply	689	12%	610	769
Liters per Connection per Day per meter Pressure (w.s.p.)	31	15%	27	36
m3/km mains per hour (w.s.p.)	3.80	6%	3.57	4.03

Picture 4.4: ILI Value Calculated

Table 4.2: Comparison matrix between ILI and physical losses (l/c/d)

Technical performance category		ILI	Physical Losses [liters/connection/day] (when the system is pressured) at an average pressure of:				
			10m	20m	30m	40m	50m
Developed Countries	A	1-2		<50	<75	<100	<125
	B	2-4		50-100	75-150	100-200	125-250
	C	4-8		100-200	150-300	200-400	250-500
	D	>8		>200	>300	>400	>500
Developing Countries	**A**	1-4	<50	<100	<150	<200	<250
	B	4-8	50-100	100-200	150-300	200-400	250-500
	C	8-16	100-200	200-400	300-600	400-800	500-1000
	D	>16	>200	>400	>600	>800	>1000

a. Category A: Good. Unless with extremely scarce water resources, further loss reduction may be uneconomic and careful analysis needed to identify cost-effective improvements.
b. Category B—Potential for marked improvements. Consider pressure management, better active leakage control, and better maintenance.
c. Category C—Poor. Tolerable only if water is plentiful and cheap, and even then intensifies NRW reduction efforts.
d. Category D—Bad. The utility is using resources inefficiently and NRW reduction programs are imperative.

E. Conclusion and Suggestion

1. Conclusion

17. It can be concluded from field test data analysis, water balance establishment and leakage condition assessment in Baishan City:

(i) Its NRW in 2012 is 10,371,600 m³, 64.485% of system input volume, and worth 12,539,085yuan. After assessment of Baishan's water supply system leakage condition, it can be discovered that physical losses and poor meter management are the key factors of NRW.

(ii) Its apparent losses in 2012 are 2,846,413 m³, 17.697% of system input volume. And ALI is calculated at 0.9966.

(iii) Its physical losses in 2012 are7,518,052 m³, 46.744% of system input volume. Moreover, it can be known from estimation of physical losses components that reported bursts take up15.183%, unreported losses 30.421% and background losses 1.14%.

(iv) Baishan's ILI is 29, the average pressure is 0.22 MPa, and the physical losses are 689 L/c·d. Compared with Target Matrix provided by World Bank Institute, Baishan's water supply network is Category D among developing countries, which means serious leakage level. Its horrendously inefficient use of resources, leakage reduction programs imperative and high priority.

(v) Based on current condition investigation and data analysis, leakage reduction consultant selected 29 performance indicators suitable for Baishan's current conditions from IWA Performance Indicator Handbook, and developed a series of leakage reduction strategies and measures involving PIs as tools.

18. Although the apparent loss of Baishan is lower than the real loss based on the statistics data, the condition of meter management is not optimal for the reasons that Baishan has not established meter check and meter validation mechanism. May be the apparent loss is higher than the result of water balance calculation from the objective view.

19. It is not necessary that Baishan water utility take more measures to reduce pressure of systems. Firstly, Nanshan WTP as a main surface water plants, is located at higher level, so the pressure of Nanshan is not higher than any other plain position WTP. Secondly, the average pressure in Baishan reaches at 0.22 MPa, supplying with 4 floors building only. So the water network has not more redundancy pressure to be lowered.

20. The water loss strategy team of Baishan water utility will serve as an effective focal point for the implementation of its water loss reduction. It plays a key role of in galvanizing the expertise of the other department who are involved in water network management., such as operation and maintenance, national water control center, SCADA, water planning, network development and GIS, field services, customer services and corporate planning, to reduce water loss and enhance network management efficiency.

2. Suggestions

a. **Capacity Building** (inclusive of training and institution enhancement)

21. Establish leakage reduction strategy team which comprises core staff from Departments of Operation Control, Network Maintenance, Billing, Customer Service, Auditing, Measurement,
22. Finance and so on. First, undertake comprehensive and systematic leakage control training, based on IWA's water leakage control principles, processes and methods. Second, according to results of water balance and performance assessment, identify key loss components and targets of leakage control, make corresponding enforcement schemes, and draft annual plan and budget for leakage control. Finally, every department devotes great efforts to fulfill performance assessment criteria of leakage control, and enforce corresponding strategies. **(With capacity building expense CNY 50,000)**

23. Enhancement specialized leak detection group skills. Leak detection is an active leakage control measure. At present, Baishan has one leak detection group equipped with a set of relevant detection equipment. However, lack of sufficient staffs and professional leak detection expertise, the detection frequency remains one year when scanning the whole networks in Baishan. It is advisable to expand leak detection group and equip more necessary leak detection devices. In the first place, conduct strict leak detection trainings that focus on field practice. External leak detection force can also be resorted to for training and drill when necessary. Mentoring program helps group members master leak detection technology. And these devices enable local leak detection, leakage reduction and performance boost. **(with capacity building expense of CNY 50,000 and equipment purchase expense of 331,000)**

24. Baishan's poor meter management is reflected in difficulty of estimating apparent losses. From perspectives of management, reducing apparent losses requires no extra input and can obtain obvious effectiveness. Specifically, Baishan water utility should first establish a meter

management department staffed with specialized members. Second, carefully check current meters' category, diameter distribution and whether they match flow or not, change the present condition of using domestic meters continuously without any calibration procedure once they installed, quantify and analyze apparent losses, so as to increase metering accuracy. Most importantly, meter fraud and water thief activities should be punished severely with the combined action from local government and water utility.

b. Project Construction

25. Installation 6 water meters in outlet of WTP for output volume measurement accuracy (Cost of CNY 602,000)

(i) There are 3 water treatment plants (WTP) in Baishan city. One is surface water plant named Nanshan WTP with capacity of 80,000 m^3 per day, others are Zhenzhumen and Kuchangou groundwater WTP, with output volume 9,000 and 5,000 m^3 per day respectively.

(ii) Lack of measurement facilities in all of outlet of WTPs, it is difficult to assess the output volume of the whole systems. Current result of water balance is based on some estimated data with limited confidence. The unbelievable data should be eliminated immediately so as to gain reliable information with support of ADB water supply project in Baishan.

(iii) Electromagnetic meters, be selected in Nanshan water treatment plant for its electricity and remote devices installation availability. 2 Bore-hole electromagnetic meters is suitable for Zhenzhumen and Kucanggou groundwater plants for no electricity charge condition in site.

26. Flow meter installation and night flow monitoring in 3 DMAs demonstration (Cost of CNY 110,000)

(i) Select 3 DMAs in Baishan water supply network to conduct leakage monitoring and analysis which can be taken as the basis of leakage monitoring and reduction of the whole network. Install measuring equipment on DMAs' boundaries to record pressure, flow and other data in different area networks. Thus water utility is able to monitor the whole network for long term, acquire the micrographic distribution of leakages and balance the network service pressure to reduce leakage. Establishing DMAs as a strategy of leakage management enables the water utility to evaluate the area leakage condition, to compare leakage of different areas, and to find out areas with high leakage for active leak detection.

(ii) Analyses of long-term monitoring data of DMAs help water utility to understand the flow variation against time. For example, when burst happens in a DMA, flow changes sharply and even the area pressure drops considerably. Based on the monitoring data, the utility managers can find out areas with abrupt variation of pressure and flow, and analyze the flow rates to locate leakages in short time. Especially in case of bursts, the monitoring data can facilitate utility managers to identify the location quickly for timely repair which would diminish volume of lost water and other losses. In conclusion, monitoring DMA is vital for network management because through the monitoring system, pressure and flow of the whole network can be explicitly reflected, bursts can be quickly located and it can provide data for network modeling.

(iii) It is to be noted that ADB cannot fund all DMA monitoring. However, ADB will provide technological support or demonstration areas in terms of IWA philosophy of water loss reduction, and conduct comprehensive analysis to make sure network operates better and functions properly. In this way, objectives of the demonstration project can be fulfilled.

(iv) Choose residential quarters, as required, with commercial and industrial customers as few as possible, aged network, frequent leakages, individual inflow mains, and bulk meters installed at inlets.

(v) DMA named Xingtai garden(including 1017 household), Baihe (including 1248 household)and Yangguang community(including 1098 household) are chose as demonstration areas for monitoring customer demand against pressure. Meanwhile, data from the DMA meters are transmitted to central operation department by remote devices.

c. Anticipated Accomplishments of the Leakage Reduction Project

(i) Make rational use of urban water resources with moderate or none consumption increase, and realize sustained development.

(ii) In contrast to current ALR period, Leak detection period of the urban water supply network, and time taken to attend bursts or leaks after the first notification be shorted significantly in the future.

(iii) During implementing ADB project, water utility should perform water balance calculation and leakage reduction PI assessment annually. The NRW at the end of the project will be decreased by 30%, standing at 35% compared with current high level 65%.

(iv) Be capable of analyzing and comparing night flow data in DMAs to prioritize leak detection strategy.

(v) The popularity rate for water supply is 70% in 2012. The figure is expected to reach 90% by the end of ADB project period.

(vi) Undertake and realize an annual optimistic estimation of investments saved by implementation ADB water loss control project.

Table 5.1: Proposed Plan for Baishan Loss Control

Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Increased access of the urban residents to safe water supply in Baishan. Intermittent supply is not happened.	By 2016: Non-revenue water management Improved near domestic average level. Non-revenue water reduced to 35%	local statistical reports and Baishan Water Supply Company's annual reports	**Assumption** The Baishan government will improve its water resources management and supervised strongly with NRW.
Outcome Reduced non-revenue water in Baishan water supply system	By 2014: Non-revenue water management improved Non-revenue water reduced to 55% from current 65%	Reports by the Baishan Water Supply Company's records	**Risk** Measure meters in WTP are not installation completely.

Outputs 1. A survey report and water balance chart on nonrevenue water produced 2. Non-revenue water Reduction measures proposed 3. Awareness on Non-revenue water Management increased	By 2013: final report submitted to ADB Non-revenue water recommendation incorporated in the ensuing loan project	Site inspection and collection, Government's various FSR and other documents	**Assumption** Participation and strong support of the PMO and local water Supply Company

Table 5.2: Expenses of Capacity Building, Project Construction and Equipment Purchase

No	Item	Equipment	Qty	Equipment expense (CNY)	Construct. expense (CNY)	Others (CNY)	Sub-total (CNY)	Note
1	Capacity building					50,000		3 days workshop of NRW reduction
2						50,000		3asys workshop of leak detection
	100,000							
3	Equipment purchase	Electronic leak detector	1	78,000				
4		Pipe locator	1	67,000				
5		Soundness correlator	1	180,000				
6		Listening pod	2	3,000*2=6,000				
	331,000							
7	Project construction 1 (meter installation)	DN800 Electromagnetic meter	1	74,000	38,000	10,000	122,000	Using for Nanshan WTP measurement, including electricity and remote devices
8		DN400 Electromagnetic meter	1	44,000	38,000	10,000	92,000	Using for Nanshan WTP measurement, including electricity and remote devices
9		DN300 Electromagnetic meter	2	2*36,000=72,000	2*38,000=76,000	2*10,000=20,000	168,000	Using for Nanshan WTP measurement, including electricity and remote devices
10		DN400 bore-hole Electromagnetic meter	1	74,000	38,000	0	112,000	Using for Zhenzhumen WTP measurement, including pressure recording and remote devices
11		DN300 bore-hole Electromagnetic meter	1	7,000	38,000	0	108,000	Using for Kucanggou WTP measurement, including pressure recording and remote devices

12	Project construction 2 （DMA management）	DN200 remote meter	2	2*40,000=80,000	0	0	80,000	Installation at Xingtai garden (1017 households)and Baihe community （1248 households）
13		DN150 remote meter	1	30,000	0	0	30,000	Installation at Yangguang community （1098 households）
Total	**1,143,000**							

APPENDIX 4: ROAD MAPS

A. Roadmap for Urban Transport in Baicheng

1. Overall component strategic objective: improve urban transport in Baicheng urban area to promote people centered urban transport system emphasizing pedestrian and bicycle traffic and public transportation.

2. Strategic objectives are to (i) promote pedestrian and bicycle traffic in urban transport by providing associated pedestrian and bicycle traffic facilities; (ii) promote public transportation by improving bus services and providing bus priority system; (iii) Improve urban traffic safety by traffic safety auditing and implementation of 3E (engineering, education, and enforcement) program; (iv) improve urban transport by developing the integrated urban transport system promoting pedestrian and/or bicycle traffic and public transportation; and (v) education and public campaign to raise awareness of promoting pedestrian and bicycle traffic, public transport and urban traffic safety.

3. Approaches to achieve objectives are (i) engineering and technical aspect, (ii) institutional strengthening and capacity development, (iii) stakeholder corporation and consultation, and (iv) education and public awareness campaign.

Strategic Objectives; Target/Indicators	Actions/Investments	Institutional reforms/Capacity building	Time Frame/ Milestones	Responsible Agency/ Institution
Short-term (2013–2023)				
Promote pedestrian and bicycle traffic/ Population walking and using bicycles	1. Design urban roads with sufficient pedestrian and bicycle facilities 2. Education and public awareness promoting pedestrian and bicycle 3. Implement improvement plan for existing pedestrian and bicycle facilities	1. Capacity building to develop education and public awareness program promoting pedestrian and bicycle traffic 2. Existing pedestrian and bicycle facility auditing and develop improvement plan	Q3 2015, existing pedestrian and bicycle facility auditing and improvement plan Q1 2017, education and public awareness program Q4 2017, completion of construction of pedestrian and bicycle facilities	BCMG, BCPMO, BCTB
Promote public transport/ Population using public transportation	1. Design bus priority lanes on the project roads 2. Improve urban transport by implementing public transportation planning 3. Education and public awareness to promote using public transportation	1. Project implementation support to implement the design bus priority lanes 2. Capacity building to develop education and public awareness program 3. Capacity building to develop public transportation improvement planning	Q3 2015, education and public awareness program Q1 2016, public transportation improvement planning	BCMG, BCPMO, Baicheng Bus Company, BCPB

Urban traffic safety/ Cost per 10k people due to traffic accidents	1. Traffic safety auditing and safety design improvement 2. Public education and awareness for traffic safety 3. Improvement of traffic safety enforcement program	1. Capacity development for traffic safety auditing and design improvement 2. Capacity building to develop public education and awareness program for traffic safety 3. Capacity building to develop traffic safety enforcement program	Q1 2015, traffic safety auditing and design improvement Q4 2016, public education and awareness program Q3 2017, traffic safety enforcement improvement program	BCMG, PMO, BCTB, BCPSB
Urban transport planning/ Percentage of urban residents walking, biking and public transport	1. Implementing urban transportation improvement planning	1. Capacity building to develop urban transport improvement plan	Q1 2016 , urban transport improvement plan Q2 2017, starts to implement improvement	BCMG, PMO, BCPB
Public awareness for people centered urban transport / Public satisfactory rate for urban transport	1. Education and public awareness campaign for people centered urban transport system emphasizing on pedestrian and bicycle traffic and public transportation	Capacity building to develop education and public awareness campaign for water conservation	Q4 2016, urban transport education and public awareness campaign program. Q2 2017, starts urban transport education and public campaign.	BCMG, BCPB, Baicheng TV stations and news papers
Cost/Source of Funds				
1. Equipment and construction - included in the project investment plan. 2. Institutional strengthening and training - budget for capacity building in the project investment plan. 3. Education and public awareness program - program development financed by ADB project capacity building program, education and public campaign financed by BCMG.				
Long-term (2023–2033)				
Promote pedestrian and bicycle traffic/ Population walking and using bicycles	1. Improve pedestrian and bicycle facilities 2. Continue education and public awareness promoting pedestrian and bicycle	Strengthening pedestrian and bicycle facility planning improvements	2023–continue pedestrian and bicycle facility improvement	BCMG
Promote public transport/ Population using public transportation	1. Improve public transportation system 2. Education and public awareness to promote using public transportation	Improve public transportation planning	2033–continue public transport improvement	BCMG, Baicheng Bus Company
Strategic Objectives; Target/Indicators	1. **Actions/Investments**	**Institutional reforms/Capacity building**	**Time Frame/ Milestones**	**Responsible Agency/ Institution**

Urban traffic safety/ Cost per 10k people due to traffic accidents	2. Public education and awareness for traffic safety 3. Improvement of traffic safety facilities	Improve urban traffic safety facilities	2033–continue urban traffic safety improvement	BCMG, BCTB, BCPSB
Public awareness for people centered urban transport / Public satisfactory rate for urban transport	Education and public awareness campaign for people centered urban transport system emphasizing on pedestrian and bicycle traffic and public transportation	Improve urban transport planning	2023–continue urban transport	BCMG, BCPB, Baicheng TV stations and news papers
Cost/Source of funds				
Baicheng municipal government budget				

BCMG = Baicheng Municipal Government, BCPMO = Baicheng Project Management Office, BCTB = Baicheng Traffic Bureau, BCPB = Baicheng Planning Bureau, BCPSB = Baicheng Public Security Bureau

B. Roadmap for the Water Supply Component in Baishan (Hunjiang District)

4. Overall component strategic objective improve operation and maintenance of Baishan water supply in Hunjiang District to target NRW reduction, operation efficiency, including energy efficiency and water supply safety.

5. Strategic objectives are the following:
   (i) NRW reduction to address the NRW losses due to leakage, unbilled uses, and commercial losses.
   (ii) Operation efficiency including energy efficiency to address the aspects of engineering, automation and monitoring, and operation and maintenance.
   (iii) Water supply safety through developing, updating and implementing the water safety plan.
   (iv) Tariff reform to achieve full cost recovery.
   (v) Education and public campaign to raise awareness of water conservation.

6. Approaches to achieve objectives: (i) engineering and technical aspect, (ii) institutional strengthening and capacity development, (iii) stakeholder consultation, and (iv) education and public awareness campaign.

Strategic Objectives; Target/Indicators	Actions/Investments	Institutional reforms/Capacity building	Time Frame/ Milestones	Responsible Agency/ Institution
Short-term (2013–2018)				
Reduce NRW losses (both physical and commercial) Target NRW Physical Loss Rate of 35%	4. Install physical equipment: (i) 12 flow and 10 pressure meters to better detect leaking locations (CNY 1.088.300= USD 181.333) (ii) Advanced leaking detection equipment (CNY 1.320.000= USD 220.000) (iii) Pilot DMA (District Metered Area) management in 3 zones	3. Project implementation support to build / install the proposed system 4. Capacity building and training to the water supply operator for DMA management, monitoring and operation of the installed system, including participation in utility twinning programs 5. Set up of a NRW committee represented by a focal person in the PMO to provide semiannual reports on the progress of the NRW component.	Q4 2017: system installation completion Q2 2017–Q4 2018: capacity building through on-site training, domestic study tours and workshops Q2 2018–Q4 2018: capacity building through on-site training, domestic study tours and workshops	PIU (Qiyuan Hydropower Company) Baishan Water Supply Company BSMG, BS Water Affairs Bureau, Baishan Water Supply Company
Operation and energy efficiency/ Energy Consumption per ton water supplied	1. Engineering design optimization including site selection, equipment selection, installation of SCADA system. (CNY 1.200.000 = USD 200.000)	4. Project implementation support to build / install the proposed system 5. Capacity development and training for water supply operator to use the system effectively (such as peak and nonpeak operation) and maintain it in good working conditions	Q1 2017 - system installation completion Q4 2017 – Q4 2018 develop operation and maintenance manual	Baishan Water Supply Company

Governance	Institutional strengthening and training	1. Develop performance contracts between the service provider and the government (not only to hold the service provider accountable for improving performance, but also to ensure that governments do their part) 2. Defining clear and measurable targets that must be achieved by the service provider and measures in case of non-compliance with the performance targets and rewards for achieving performance targets. 3. Setting reporting requirements that the service provider must adhere to.	Q3 2017–Q4 2018: Establish NRW Committee in BSMG Q2–Q4 2017: develop accountability mechanisms	BMG, Baishan Water Affairs Bureau, Baishan Water Supply Company
Water supply safety plan/ Rate of drinking water meeting national standards	Implementation of domestic water source protection plan (developed and implemented by domestic funding) Implementation of the water safety plan (safe operation of the physical infrastructure)	2. Set up water safety plan team to be represented by a focal person in PMO and to provide regular reports on the status of the implementation of the plans. 3. Update and maintain WSP and implement actions defined in the WSP, including water quality monitoring and remedy actions. 4. Capacity building and training on water supply operator to operate the water supply system correctly to avoid human errors	Q1–Q2 2017: set up of WSP team and update the WSP Q4 2017–training on safe WTP running and O&M	BMG, Baishan Water Authority, Baishan Water Supply Company
Cost recovery/ Financial statements by the water utility	Tariff reform plan aiming at partial cost recovery based on Increasing Block Tariff Structure (in line with Dec. 2013 guidance of NDRC+MOHURD)	1. Capacity building to develop action plan to improve water use fee collection 2. Install water meters for all customers 3. Promote the installation of water-saving plumbing fixtures	Q1–Q3 2017: develop action plan for water use fee collection	BSMG, Baishan Water Supply Company

Public awareness for water conservation Public support rate for water conservation	7. Education and Public awareness campaign for water conservation	Capacity building to develop education and public awareness campaign for water conservation	Q4 2016–water conservation education and public awareness campaign plans Q4 2017–water conservation education and public campaign	BSMG, Baishan Water Affairs Bureau, Baishan Water supply Company
Governance		1. Develop performance contracts between the service provider and the government (not only to hold the service provider accountable for improving performance, but also to ensure that governments do their part) 2. Defining clear and measurable targets that must be achieved by the service provider and measures in case of non-compliance with the performance targets and rewards for achieving performance targets. 3. Setting reporting requirements that the service provider must adhere to.	Q2–Q4 2017: develop accountability mechanisms	BMG Baishan Water Affairs Bureau, Baishan Water Supply Company
Long-term (2018–2025)				
Reduce NRW loss	1. Expand and refine the DMA management and monitoring system for NRW 2. Assets management to sustain the NRW targets	Confirm or adjust existing institutional and management framework. Share experience with other operators in the city.	2019–critical review of existing framework	BSMG, Baishan Water Affairs Bureau, Baishan Water Supply Company
Operation and energy efficiency	1. Expand and refine the monitoring system to achieve operation and energy efficiency 2. Assets management to sustain or increase the operation and energy efficiency	Capacity development and training for water supply operator to use the built system effectively	2028–system upgrade	Baishan Water Supply Company
Water supply safety	WSP update and implementation	Identify the most appropriate government regulator that is committed and can ensure the long-term WSP adoption.	Regular update (5 years) of the WSP	BMG, Baishan Water Affairs Bureau, Baishan Water Supply Company

Cost recovery	Systematically update prices for utility service that recover costs to provide service, encourage conservation of resources	Progressive tariff adjustment	2028–Updating tariff plans	BSMG, Baishan Water Affairs Bureau, Baishan Water Supply Company
Governance	Transition towards an IUWM[1] approach, which integrates urban water service with water supply, wastewater and stormwater as components of an integrated physical and institutional system	1. Supply optimization 2. Demand management, including conservation pricing 3. Policy, regulatory and institutional frameworks 4. Public participation		JPG, JPDRC, BMG, Baishan Water Affairs Bureau,

BCMG = Baicheng municipal government, BSMG = Baishan municipal government, DMA = district meter areas, JPG = Jilin provincial government, JPDRC = Jilin provincial development and reform commission, IUWM = integrated urban water management, NRW = non-revenue water, MOHURD = Ministry of Housing and Urban-Rural Development, NDRC = national development and reform commission, PMO = project management office, O&M = operations and maintenance, PIU = project implementation unit, and WSP = water safety plan.

[1] IUWM is described by UNEP (2003) as the practice of managing freshwater, wastewater, and stormwater as links within the resource management structure, using an urban area as the unit of management. IUWM includes all the different water sources that are present within an urban catchment and plans the processes for treatment, distribution, and disposal as part of one continuous cycle instead of discrete activities.

A. Roadmap for Baishan and Baicheng Municipal Solid Waste Management

1. Overall component strategic objective: demonstration for promoting waste minimization, beneficiary reuse, and safe disposal in small and medium city in PRC.

2. Integrated solid waste management parameters to implement and manage the system: (i) integration of all stakeholders, (ii) technical waste system elements such as prevention, reuse and recycling, collection and disposal, and (iii) socio-cultural behavioral patterns, environmental, institutional, and political and legal issues.

3. International waste hierarchy strategic objectives: (i) **minimization**, reducing the amount and toxicity of material entering the waste flow, (ii) **reuse:** as much material as practicable, (ii) **recycle:** the waste that cannot be used and recovery of resources, and (iii) **safe disposal:** residue/rejects disposed of in an environmentally sound way.

Strategic Objectives; Target/Indicators	Actions/Investments	Institutional reforms/Capacity building	Time Frame/ Milestones	Responsible Agency/ Institution
SHORT-TERM (2014 to 2020)				
STRATEGIC OBJECTIVE 1: WASTE MINIMISATION				
1.1 Public awareness to minimize waste production **Targets:** (i) 21 communities in Hunjiang District of Baishan and 20 communities in Taobei of Baicheng (ii) Total 45,000 copies of handbook to be delivered to households **Indicators:** (i) Number of communities (ii) Number of copies of handbook delivered to households and communities	(i) Hold municipal government meeting with all related institutes to mobilize the solid waste management project (ii) Select communities for demonstration of the waste sorting at source and design container location (iii) Design and print 3R-based Waste Sorting at Source Handbook and work plan with assistance of consultants (iv) Hold community-based meeting to introduce handbook and work plan (v) Deliver handbook to household	(i) A group in PMO shall be established to guide and manage the preparation and implementation (ii) A community-based group shall be established to monitor and support the implementation (iii) Consultants shall provide training to group members and staff of PMO, PIU, and CCs	2014–2016 (preparation)	PMO/PIU, DI, CCs, CPC
1.2 Procurement of facilities for sorting of recyclable waste, such as paper, glass, and clothes	(i) Procure containers (ii) Design location for container installation (iii) Install containers in selected communities	Training staff of PMO and PIU on ADB' procurement	2014–2016 (preparation)	PMO/PIU, DI
Target: Total 41 containers to be installed in communities **Indicator:** Number of containers installed in Baishan and Baicheng				

1.3 Segregation/sorting at source **Target:** Sorting recyclable waste such as paper, glass and clothes **Indicator:** Amount of paper, glass, and clothes per day	(i) Monitor the segregation by the community based group (ii) Record amount of recyclable waste by the community based group (iii) Make statistic of total amount of recyclable waste all communities per day, per month by PIU	Training the community-based group on community solid waste management	2016–2020 (implementation)	PIU/CCs, CPCs, PMO
Cost/Source of funds				
STRATEGIC OBJECTIVE 2: WASTE REUSE				
2.1 Public awareness to waste reuse **Targets:** (i) 21 communities in Hunjiang District of Baishan and 20 communities in Taobei of Baicheng (ii) Total 45,000 copies of handbook to be delivered to households **Indicators:** (i) Number of communities (ii) Number of copies of handbook delivered to households and communities	(i) Same as to SO1 (ii) Same as to SO1 (iii) Same as to SO1 (iv) Same as to SO1 (v) Same as to SO1	(i) Same as to SO1 (ii) Same as to SO1 (iii) Same as to SO1	2014–2016 (preparation)	PMO/PIU, DI, CCs, CPC
2.2 Procurement of facilities for sorting kitchen waste and treating construction waste	(i) Procure bins (ii) Procure vehicles for kitchen waste transport (iii) Design location for bin installation	Same as to SO1	2014–2016 (preparation)	PMO/PIU, design institute

Targets: (i) Total 3000 bins to be installed in communities (ii) Total eight vehicles for kitchen waste transport **Indicators:** (i) Number of bins installed in Baishan and Baicheng (ii) Number of vehicles procured by Baishan and Baicheng	(iv) Install bins in selected communities (v) Procure sorting facilities for composting (vi) Install a composting plant with pre-sorting facilities (30ton/day) (vii) Purchase two sets mobile crushing equipment for construction waste treatment with capacity of 90-190 ton/hr each (viii) Install crushing equipment (select a workplace) (ix) Procure facilities for restaurant waste treatment and reuse in Baishan (x) install a treatment center for restaurant waste treatment and reuse in Baishan			
2.3 Sorting waste at source/ composting kitchen waste **Targets:** (i) Sorting kitchen waste at source (ii) Treat 30ton/day of kitchen waste at composting plant	(i) Monitor the sorting at source by the community based group (ii) Record amount of sorted kitchen waste by the community based group at community	Same as to SO1	2016–2020 (implementation)	PIU/CCs, CPCs, PMO
Indicators: (i) Amount of sorted kitchen waste per day (ii) Amount of treat kitchen waste per month	(iii) Make statistic of total amount of kitchen waste all communities per day, per month by PIU (iv) Make statistic of total amount of treated kitchen waste per month by PIU			
2.4 Material recovery of kitchen waste as compost	(i) Make statistic of total amount of compost production per month by PIU (ii) Make statistic of total MSW sorted out from kitchen waste and disposed into landfill			

Targets: (i) Production of 10 ton/day MSW to landfill (ii) Production of 20 ton/day compost product	(iii) Analyze composition of compost products and evaluate its unitization according to relevant national standards		2016–2020 (implementation)	PIU/PMO
Indicators: (i) Amount of waste disposed to landfill per day (ii) Amount of compost produced per month				
2.5 Material and/or energy recovery of restaurant waste in Baishan **Targets:** (i) Reduction of 7300 ton/year to landfill (ii) Reuse of 700 ton/year of restaurant waste	(i) Make statistic of total restaurant waste collected (ii) Make statistic of total restaurant waste treated and reused	Training restaurant on restaurant waste sorting and management	2016–2020 (implementation)	PIU/PMO
Indicators: (i) Amount of restaurant waste collected per day (ii) Amount of restaurant waste treated and reused per month	(iii) Construction waste management based on restaurants	Training restaurant on restaurant waste sorting and management	2016–2020 (implementation)	PIU/PMO
Cost/Source of funds				
STRATEGIC OBJECTIVE 3: WASTE DISPOSAL				
3.1 Public awareness to waste disposal **Targets:** (i) 21 communities in Hunjiang District of Baishan and 20 communities in Taobei of Baicheng (ii) Total 45,000 copies of handbook to be delivered to households	(i) Same as to SO1 (ii) Same as to SO1 (iii) Same as to SO1 (iv) Same as to SO1 (v) Same as to SO1	(i) Same as to SO1 (ii) Same as to SO1 (iii) Same as to SO1	2014–2016 (preparation)	PMO/PIU, design institute, CCs, CPC, HB
Indicators: (i) Number of communities (ii) Number of copies of handbook delivered to households and communities				

3.2 Procurement of bins for MSW other than recyclable and kitchen waste and facilities for waste transfer, transport and disposal	(i) Procure bins (ii) Procure vehicles for kitchen waste transport (iii) Design location for bin installation (iv) Install bins in selected communities	Same as to SO1	2014-2016 (preparation)	PMO/PIU, design institute
Targets: ➢ Total 3000 bins to be installed in communities ➢ Total 15 waste transfer stations in Baishan and 12 stations on Baicheng	(v) Procure facilities/equipment for waste transfer (vi) Install/upgrade waste transfer stations (vii) Design and procure facilities for expanding landfill in Baishan			
Indicators: ● Number of bins installed in Baishan and Baicheng ● Number of waste transfer stations upgraded in Baishan and constructed in Baicheng				
3.3 Source separation of MSW from kitchen waste and recyclable waste	(i) Monitor the sorting at source by the community based group	Same as to SO1	2016–2020 (implementation)	PIU/CCs, CPCs, PMO
Target: Sorting MSW waste at source **Indicators:** (i) Amount of MSW per day (ii) Amount of MSW per month	(ii) Record amount of MSW by the community based group at community (iii) Make statistic of total amount of MSW of all communities per day, per month by PIU (iv) Make statistic of total amount of MSW per month by PIU			
3.4 Improvement of MSW transport vehicles and collection	(i) Input vehicles (ii) Maintain vehicles	Training staff on transport rout and safety, and waste protection during transport	2016–2020 (implementation)	PIU/PMO
Targets: (i) Upgraded vehicles (ii) Transport MSW from source to landfill **Indicator:** Number of vehicles	(iii) Make statistic of total amount of MSW transport per day, per month by PIU			

3.5 Upgrading existing MSW collection and transfer stations in Baishan, and construction of stations in Baicheng **Targets:** (i) 15 stations in Baishan and 12 stations in Baicheng (ii) Collection and transfer of MSW **Indicators:** (i) Number of transfer stations in Baishan and Baicheng (ii) Amount of collected and transferred MSW	(i) Upgrade or construct MSW transfer stations (ii) Make statistic of total amount of MSW transferred per day, per month by PIU (iii) Operate and maintain transfer stations	Training staff on O&M of MSW transfer stations	2016–2020 (implementation)	PIU/PMO
3.6 Improvement of hazardous waste management **Target:** Establishment of special collection and treatment of hazardous waste management system **Indicators:** (i) Number of transfer stations in Baishan and Baicheng (ii) Amount of collected and treated hazardous waste	(i) Establish hazardous waste management system (ii) Establish hazardous waste collection station(s) for specific treatment and disposal (Municipality Task!) (iii) Make statistic of total amount of hazardous waste collected and treated per day, per month by PIU	Training staff on hazardous waste, collection, transfer, treatment, and management system	2016–2020 (implementation)	PIU/PMO, HB
Cost/Source of Funds				
STRATEGIC OBJECTIVE 4: Institutional Capacity Building				
4.1 Leading group in PMO to guide and manage ISWM	(i) Establish a leading group in PMO to coordinate relevant institution in the preparation and implementation	(i) The group shall be led by director of PMO, at least one special staff, and one	2014–2016 (preparation)	PMO/PIU
Targets: (i) Establish the group (ii) At least one female member **Indicators:** (i) Time to establish the group (ii) Number of staff (disaggregated by sex)	(ii) Recruit consultants of community solid waste management and public awareness/US$60,000	female member (ii) Consultants shall provide training to group members and staff of PMO, PIU, and CCs		

4.2 Community-based 3R waste sorting at source group in each targeted community to monitor and support waste sorting at source **Targets:** (i) Establish the group (ii) At least one female member **Indicators:** (i) Time to establish the group (ii) Number of staff (disaggregated by sex)	(i) Establish a group based on community to support the project (ii) Monitor waste sorting in community (iii) Support PIUs to deliver handbook of	(i) Groups members should consist of staff of CCs, CPCs (if have), representatives of inhabitants, and sanitary workers (ii) Consultants shall provide training to group members	2014–2016 (preparation)	PMO/PIU, CCs, CPCs
4.3 Consultants' support **Target:** Two consultants with 10 person-month **Indicators:** (i) Number of consultants (ii) Number of training and participants (disaggregated by sex)	(i) Assist PMOs and PIU to implement SAP and GAP (ii) Provide training on solid waste sorting, 3R, management system to staff of PMOs, PIUs, CCs, representatives of targeted communities		2014–2016 (preparation)	PMO/PIU, CCs
4.4 Technical and management visiting **Target:** Learn technical and management of solid waste management from other cities	Visit other cities on solid waste sorting, composting, hazardous waste management		2014–2016 (preparation)	PIU/PMO
Indicator: Number of participants (disaggregated by sex)				
STRATEGIC OBJECTIVE 5: Public Participation and Consultation				
5.1 PPC plan **Targets:** (i) Prepare the plan (ii) At least one female participant to prepare the plan **Indicators:** (i) Time to complete the plan (ii) Number of participants (disaggregated by sex)	Design and prepare PPC	Consultants shall train and guide staff of PMO to prepare PPC plan	2014–2015 (preparation)	PMO, consultants

5.2 PPC of targeted communities for handbook design and preparation, and implementation scheme **Targets:** (i) Opinions of representatives of targeted communities, CCs, CPCs (if have), PIU on content of handbook (ii) At least 40% female participants **Indicator:** Number of participants (disaggregated by sex)	(i) Draft content of handbook and implementation scheme by consultants (ii) Discuss draft content of handbook and requirement (iii) Develop final content of handbook and implementation scheme		2014–2015 (preparation)	PMO/PIU, consultants
5.3 PPC of targeted communities for solid waste sorting at source	(i) Improve implementation scheme		2016–2020 (implementation)	PMO/PIU, CCs, consultants
Targets: (i) Opinions of representatives of targeted communities, CCs, CPCs (if have), PIU on content of handbook (ii) At least 40% female participants	(ii) Discuss any questions in waste sorting			
Indicator: Number of participants (disaggregated by sex)				
LONG-TERM (2021–2030)				
STRATEGIC OBJECTIVE 1: WASTE MINIMISATION				
1.1 Extension of source recycling of recyclable waste such as paper, glass and clothes in other communities in Baishan and Baicheng **Target:** 100% urban communities in Hunjiang district and Taobei district **Indicator:** Number of communities conducted waste sorting at source	(i) Conduct PPC before implementing waste sorting at source in new communities (ii) Prepare detail implementation scheme (iii) Establish community-based group in community (iv) Follow the best practice concluded from experience in the targeted communities		2021–2030	PIU/CCs, DI
Cost/Source of funds				
STRATEGIC OBJECTIVE 2: WASTE REUSE				

2.1 Extension of material recovery of kitchen waste as compost to other communities	(i) Conduct PPC before implementing waste sorting at source in new communities (ii) Prepare detail implementation scheme (iii) Establish community-based group in community		2021–2030	PIU/CCs, DI
Target: 60 t/d kitchen waste treated with composting in Hunjiang district and 60 ton/day in Taobei district **Indicator:** Amount of kitchen waste treated with composting in Hunjiang district and in Taobei district, respectively	(iv) Follow the best practice concluded from experience in the targeted communities			
2.2 Energy recovery of other MSW through incineration **Target:** 60% MSW treated with incineration in Hunjiang district and 60% in Taobei district **Indicator:** MSW treated with incineration in Hunjiang district and in Taobei district	(i) Conduct PPC during preparation and design of incineration (ii) Prepare detail implementation scheme (iii) Construct incineration		2021–2030	PIU/CCs, DI
Cost/Source of funds				
STRATEGIC OBJECTIVE 3: WASTE DISPOSAL				
3.1 Source separation of MSW from kitchen waste and recyclable waste **Target:** 24% MSW disposed to landfill directly in Hunjiang District and 24% in Taobei District **Indicator:** MSW disposed to landfill directly in Hunjiang District and in Taobei District	(i) Conduct PPC before implementing waste sorting at source in new communities (ii) Prepare detail implementation scheme (iii) Establish community-based group in community (iv) Follow the best practice concluded from experience in the targeted communities		2021–2030	PIU/CCs, DI

3.2 Reduction of MSW capacity of the existing landfill site **Target:** Less than 60 t/d of MSW disposed to landfill directly in Hunjiang District and 60 t/d in Taobei District **Indicator:** MSW disposed to landfill directly in Hunjiang district and in Taobei district	Operate source recycling and separation, composting of kitchen waste and incineration of other MSW		2021–2030	PIU/CCs

ACWF = All China Women's Federation, CC = community committees, CDPC = centers for disease prevention and control, CPC = Community property company, GAP = gender action plan, MSW = municipal solid waste, PMOs = project management office, PIUs = project implementing units, PPC = public participation and consultation.