Initial Environmental Examination

August 2014

PRC: Guangxi Baise Vocational Education Development Project

Prepared by the Baise Municipal Government for the Asian Development Bank

CURRENCY EQUIVALENTS

(as of 8 July 2014)

Currency Unit	–	Chinese Yuan (CNY)
CNY1	=	$. 0.1626
$1	=	CNY 6.15

ABBREVIATIONS

ADB	-	Asian Development Bank
APEC	-	Asia-Pacific Economic Cooperation
ASL	-	above sea level
BEPB	-	Baise Municipal environment Protection Bureau
BEMC	-	Baise environmental monitoring center
BMG	-	Baise Municipal Government
BVS	-	Baise Vocational School
CRB	-	Baise Municipal Cultural Relic Bureau
CSC	-	construction supervision companies
EHS	-	environmental, health, and safety
EIA	-	environmental impact assessment
EIS	-	environmental impact statement report
EMP	-	environmental management plan
EMS	-	environment management system
EPB	-	environmental protection bureau
EPRS	-	Integrated emergency preparedness and response system
FSR	-	feasibility study report
GHG	-	greenhouse gas
GMS	-	Greater Mekong Subegion
GRM	-	grievance redress mechanism
GZAR	-	Guangxi Zhuang Autonomous Region
IEE	-	initial environmental examination
LIS-ES	-	Environment Specialist of the Loan Implementation Support
MEP	-	Ministry of Environmental Protection
MLT	-	multilevel TVET
NDRC	-	National Development and Reform Commission
PAP	-	project affected persons
PCC	-	public complaint center
PIU	-	project implementing unit
PMO	-	project management office
PPTA	-	project preparatory technical assistance
PRC	-	People's Republic of China
TOR	-	terms of reference
TVET	-	technical and vocational education and training
VOC	-	volatile organic compounds
WSECP	-	water and soil erosion control plan

WWTP - wastewater treatment plant

WEIGHTS AND MEASURES

km^2 – square kilometer
m^2 – square meter
m^3/day – cubic meter per day
mu – Chinese unit of area (15 mu = 1 hectare)

NOTES

In this report, "$" refers to US dollars.

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I. EXECUTIVE SUMMARY

A. Introduction

1. This project initial environmental examination (IEE) report was prepared for the proposed Guangxi Baise Vocational Education Development Project (the Project) in Guangxi Zhuang Autonomous Region (GZAR), People's Republic of China (PRC). The IEE assessed and addressed environmental impacts and risks related to output 2 of the proposed project, which will construct teaching and living buildings and facilities in the new Chengbi campus in Baise, and will procure and install equipment for the new buildings which will house the new teaching and learning equipment. The IEE is prepared in accordance with the requirements of the Asian Development Bank's (ADB) Safeguard Policy Statement (SPS 2009) on the basis of the domestic Environmental Impact Statement Report (EIS), Feasibility Study Report (FSR), the Water & Soil Erosion Control Plan (WSECP), the Project Preparatory Technical Assistance (PPTA)'s social and economic assessments and technical due diligence, and project policy dialogue discussions.

2. GZAR is one of the 12 less-developed provinces and autonomous regions in the western part of the PRC. Baise municipality, located within GZAR, is one of the 14 national poverty areas of the PRC. Six main ethnic minority groups make up 86% of the population of 4 million in Baise municipality, which is the largest prefecture in GZAR. Over the past seven years, Baise has emerged as a new economic growth base in GZAR focused on four priority industries: aluminum processing, agriculture, tourism, and regional trade and logistics. The strategic development of Baise is part of the broader national economic transition to a middle income country and the expansion of service industries. Located near the border with Vietnam, Baise is an important gateway to countries of the Association of Southeast Asian Nations (ASEAN) and Greater Mekong Subregion (GMS).

3. In spite of its strategic location for regional activities, further economic development of Baise is constrained by the lack of a skilled workforce. Baise Municipal Government (BMG) has projected a shortage of more than 80,000 skilled workers in 2013, particularly in new and rapidly expanding priority industries, many of which are employing new technologies. A major issue for Baise is the large number of people who leave the province to obtain more work in other provinces and cities (estimated exit in 2012 of 600,000 people). Baise has trouble attracting skilled labor because of the salary differential and comparatively undeveloped key industries. Taking this into consideration, Baise is left with little choice other than to develop its own local human resources.

4. To address the skills shortage, Baise's Twelfth Five-Year Plan has outlined a key human resources development strategy, centered on creating a multilevel technical and vocational education and training (TVET) system (MLT). The MLT provides an integrated education and training system that links the human resources skill supply from universities, vocational colleges, secondary vocational school (SVS) and also includes short-term migrant courses. The MLT system aims to provide students with multiple pathways for initial training, entry to and progress within the workforce. Baise University, with its current three level programs (SVS, vocational colleges, and universities) is well-positioned to take a leading role in shifting to MLT TVET provision both locally and eventually at provincial and regional levels. This requires a major investment from all stakeholders in terms of reforms and upgrades to the TVET system.

5. Ensuring that graduates are prepared for the workforce with relevant knowledge and

skills is a major challenge for PRC's structural reform of the economy and therefore the Asian Development Bank (ADB) involvement in the TVET sector is strongly justified. The project is aligned with ADB's Strategy 2020, the recommendations from the midterm review of the strategy that emphasized promoting TVET to address the human resource agenda and, the education sector strategic plan. It aligns with ADB's PRC Country Partnership Strategy, 2011–2015. The project is consistent with the PRC's Twelfth Five-Year Plan 2011–2015 which promotes environmentally friendly and resource efficient urban development, rebalancing of economic growth; and prioritizes developing high quality human resources and accelerating education reform.

6. The proposed project will improve the supply of skilled human resources in Baise Municipality to meet the demands from industry and support the transformation of the local economy in its effort to achieve sustainable and inclusive growth. The proposed project will be the fourth ADB-financed TVET investment project in the People's Republic of China (PRC), and will play a demonstration role for the sector and provinces in multilevel TVET.

B. Project Impact, Outcome, and Outputs

7. The project's expected impact will be improved access, quality, and responsiveness of TVET in Baise Municipality. The **outcome** will be the development of a multilevel TVET system that links the supply of graduates with relevant knowledge and skills to the demands of industry in Baise Municipality. The indicative project outputs are as follows:

(i) **Output 1: Technical and vocational education and training quality improved and capacity developed.** This component will support: (a) an integrated MLT system that provides curriculum integration through a sequence of learning outcomes that link the current SVS, vocational college, and undergraduate levels of TVET; (b) establishment of an employment information system to support students work placements through responsive programs and courses; (c) development of a communication and outreach strategy to promote understanding and support for the MLT system; (d) a competency-based approach (CBA) to curriculum, instruction and assessment that is applied to priority areas; (e) an improved quality assurance (QA) system that is based on industry standards in the delivery of relevant training; (f) upgrading of both pre-service teacher training and in-service professional development; (g) support for the development of leadership through Core Teacher and Management training courses; (h) a comprehensive workshop program for teachers and other stakeholders, focused on key TVET concepts (e.g. MLT system, CBA and QA) and their application to priority areas and instructional delivery; (i) support for domestic/international visits to provide exposure to and participation in TVET best practice examples.

(i) **Output 2: Chengbi campus constructed and environmental sustainability promoted.** This component will construct teaching and living buildings and facilities in the new Chengbi campus, and will procure and install equipment for the new buildings which will house the new teaching and learning equipment. The component includes the construction of 12 buildings with a total of 160,693 square meter (m^2) building area.[1] In addition, the component will install a 3.47

[1] Including Administration Building, Library, Gymnasium and Physical Education Building, Business School Building, Politics and Law Department Building, Chinese and Foreign Language Department Building, Physics Electronic and

megawatt (MW) photovoltaic power system, purchase of teaching and training laboratory equipment for all training laboratories in the new campus, and construct sport facilities, slope protection, and other school facilities.

(ii) **Output 3: Technical and vocational education and training innovation and relevance promoted.** This component will support: (a) staff opportunities for active engagement in industry visits, assignments and training attachments; (b) enhanced industry participation in the governance of TVET and the delivery of curriculum and assessment; (c) cooperative activities between Baise University, EB and HRSSB to enhance and integrate migrant worker programs into TVET training; (d) an emphasis on entrepreneurship through curriculum and policy development and the design and implementation of an entrepreneurship incubation program; (e) support for an Enterprise Education Facility to provide opportunities for teachers and students to develop small scale enterprise projects with industry links; (f) training for a small team to coordinate regional cooperation planning and development activities; (g) research support for enhanced information and resources gathering for regional cooperation partnerships and ventures; and (h) research that investigates and provides workable options for enterprise-TVET partnerships, emerging priority sectors and future course and qualifications needs.

(iii) **Output 4: Project Implementation Management Support.** This output will build capacity for the project management office (PMO) and Baise University in management, monitoring and evaluation. This will also include consultant inputs for the coordination of environmental management plan (EMP) implementation. The component will also provide expert support to Baise University in defining a campus sustainability strategy (by 2015), and the creation of a sustainability center (by 2017). The center will implement green campus management programs (such as energy efficiency, resource conservation, health and safety); facilitate the engagement of faculty, students, and staff and stimulate service and outreach efforts that promote sustainable practices within the university and extended community; and stimulate and facilitate curricular development and research efforts in sustainability-related areas.

C. Environmental Due Diligence

8. **Categorization.** The Project underwent initial appraisal during project preparation by ADB and was classified as Category B for environment on the basis of ADB's Rapid Environmental Assessment (REA) checklists, requiring the conduct of an initial environment examination (IEE). The main anticipated environmental impacts and risks upon which the categorization was based included dust, noise, wastewater and solid waste arising from construction of 12 buildings and their auxiliary facilities in Baise University's new Chengbi campus under project output 2. Risks to occupational and community health and safety from construction activities were also considered potentially significant.

9. **Environmental assessment.** The environmental assessment documents upon which this IEE is based have been prepared under the provisions of PRC Environmental Impact Assessment Law of 2003 and the PRC Management Guideline on environmental impact assessment (EIA) Categories of Construction Projects (2008). Domestically, the project was

Math Building, Chemistry and Biology Department Building, Art and Science Education Building, Dormitories B1, B2 and B3.

classified as category B for environment, requiring an EIS. The original EIS was approved by Baise Municipal Environmental Protection Bureau (BEPB) in May 2010. Due to adjustments of the project scope and construction measures as a result of policy dialog, technical and safeguards due diligence, the original EIS was updated by the Environmental Science Research Institute of GZAR (the EIA Institute) based on the newly issued PRC specifications and standards and ADB's Safeguard Policy Statement (2009). Updates to the original EIS include, amongst others, more recent and thus relevant environmental baseline data, clear reference to codes and standards pertaining to public buildings and campuses, and meaningful consultation (see below).

10. **Consultation, participation, and grievance redress mechanism.** In the framework of the IEE and EIS update, public consultation was conducted with key stakeholders and potentially affected people (PAP). Information was disclosed to PAPs through the websites of the GZAR government and BU and through posters within the old Baise University campus. This IEE is disclosed on ADB's website. The public consultation conducted during PPTA indicated that PAPs had a positive attitude toward the Project. A grievance redress mechanism (GRM) has been defined to deal with public complaints related to safeguards during project implementation and operation.

D. Main Environmental Impacts and Environmental Management Plan

11. **Construction phase.** Major anticipated impacts during construction include noise, fugitive dust, solid wastes, and community and occupational health and safety risks related to the construction of 12 buildings on the new campus (project output 2). Overall, construction-related impacts are localized, short term, and can be effectively mitigated through the application of good construction methods and housekeeping practices and implementation of construction phase community and occupational health and safety plans. Eight potential landslide sites within the campus have been identified in the FSR **(Figure V-2)**. A slope stability assessment was conducted in the FSR, which concludes that risk of landslides at these points was relatively low as long as slope protection works are implemented as defined in the FSR (para. 118).

12. **Operation phase.** During operation, no major environmental impacts are anticipated. The current environment services of the campus were assessed during the PPTA, and it is concluded that incremental water supply, wastewater and solid waste generation resulting from the project and increased students and faculties will not overburden existing municipal services. The project's potential impacts on community and occupational health and safety during operation were analyzed and corresponding mitigation measures have been defined in the IEE and EMP. The IEE confirmed that the project will have no impact on the water source protection zone for Baise City.[2] Chengbi Lake (the reservoir) is the drinking water source of Baise City, which is located 4.1 kilometer (km) north of the Chengbi Campus. The campus is not located within the water source protection zones (Grade I and II zones). All project activities during construction and operation will be merely confined to the campus boundaries, downstream of the water source protection zones. The sewage pipeline and sewage pumping station that will connect the new campus to the city's sewer network and the central wastewater treatment plant (WWTP) will be completed by September 2014, i.e., prior to commencement of project implementation. Also the associated onsite WWTP with the capacity of 2,000 m^3/a (about 40% of campus sewage) will be constructed in the campus; the effluence of WWTP will meet the Class 1-A standard, which will be used for landscaping in the campus. It is thus concluded that the

[2] This potential issue was identified at project screening stage. See also para 105 for more detailed discussion.

proposed project will have no negative impact to the drinking water protection zone.

13. **Promoting sustainability in campus design and operation.** The outstanding environmental feature of the project is the development of a low-carbon, resource-efficient and environmentally sustainable campus. All buildings will be designed in compliance with green and energy-efficient building codes and specifications.[3] Renewable and high-efficiency energy sources including solar energy (photovoltaic) and heat pumps will be applied to satisfy building energy requirements such as heating, air conditioning, and hot water supplies. A 3.47 MW solar photovoltaic power generation system will be installed in the campus, generating some 3.3-3.5 million kilowatt hour (kWh) of electricity per year. High-efficiency heat pumps will be installed for air-conditioning (heating, cooling) of two buildings, and water heating for the student dormitories B1, B2, and B3. The photovoltaic system will be able to substitute some 15% of the energy demand of the campus, reducing 3,540 tons of CO_2 emissions per year.[4] The two heat pump air conditioning systems will be installed in the library and administration building, which will bring 3.33 million kWh/a electricity saving, equivalent to 3,056 tons of CO_2 emissions. The use of volatile organic compounds (VOC) emitting materials (including paints, coatings, adhesives, carpet and furniture's) will be avoided to ensure safe indoor air quality. The project will also support Baise University in defining a campus sustainability strategy (by 2015), and establishing a sustainability center (by 2017), to be coordinated by Baise University's Comprehensive Affair Department. The sustainability center will build on ongoing sustainability programs and initiatives of Baise University, and aim at ensuring sustainable environmental path for Baise University. The center will aim at greening campus practices, curriculum development, and community awareness, with a strong focus on low-carbon, energy-, and resource-efficient campus management.

14. An **EMP** has been developed for the pre-construction, construction, and operation phases of the project (**Appendix 1**). The EMP will be updated after detailed design (as needed), and incorporated into bidding documents and construction contracts for subproject constructions. The EMP defines mitigation measures, monitoring program, and institutional responsibilities and costs for implementing the mitigation measures and the monitoring requirements. The EMP also includes an inspection checklist (**Appendix 2**) to support the Baise University in supervising contractors during civil works, contractual clauses for civil works contractors (**Appendix 3**).

E. Main Environmental Risks and Assurances

15. Environmental risks, and the assurances required to address these risks, have been identified in the IEE. The majority of environmental risks relate to design features and operational plan which will avoid or mitigate impacts, but which rely on the BMG and Baise University's commitment and capacity to implement and consistently follow-up. The major risks are listed below:

(i) Design of project facilities not complying with relevant design standards and codes related to energy-efficient, safe and green public buildings.

(ii) Inadequate capacity of Baise University in environment management, which could result in inefficient project and EMP implementation.

[3] Including, but not limited to: GB/T50378-2006 (Evaluation Standard for Green Buildings); GB 50176-1993 (Thermal Design Code for Public Buildings); GB 50189-2005 (Energy Conservation Design for Public Buildings); GB 50011-2010 (Building Seismic Design Code); GB 50016-2006 (Code of Design on Building Fire Protection and Prevention); Building Energy Saving Design Standards in Guangxi Zhuang Minority Autonomous Region (DB45/221-2007), and other applicable national design codes.

[4] A KWh electricity generated by solar energy is equal to 0.918 kg of CO_2 emission reduction (grid emission factor).

16. Commitments by the BMG and the Baise University will be incorporated into the project agreement as covenants to ensure that the risks are mitigated in a timely and complete fashion, including: (i) a commitment to adhere to relevant design standards and codes for energy-efficient, safe and green public buildings; (ii) a commitment to adhere to the PRC green public procurement policies;[5] and (iii) a commitment to promote environmental sustainability through the definition of a sustainability strategy, and the creation of a sustainability center within Baise University.

17. The overriding assurance required is that BMG and Baise University, as appropriate, will ensure that the full range of effective measures set out in the IEE and EMP are undertaken, and guarantee that the environmental management provisions and the environmental monitoring plan will be implemented effectively during project implementation, and that the reports on the environmental management and monitoring plan in accordance with ADB requirements will be submitted and disclosed in a timely fashion. Part of this monitoring and management commitment will be a commitment to implement and maintain safeguards GRM.

F. Conclusion

18. The IEE concludes that as long as the environmental mitigation and management measures defined in the EMP are properly implemented, all adverse environmental impacts associated with the project will be prevented, eliminated, or minimized to an acceptable level. The project is feasible from an environment safeguards point of view.

[5] As defined in (i) *Public Procurement List of Environmental Labeling Products* (issued and regularly updated by NDRC and MOF) which includes 21 categories of products, such as light vehicle, photocopier, computer, water-based paint, furniture, etc; and (ii) *Public Procurement List of Energy Saving Products* (issued and regularly updated by MEP and MOF), which includes 27 categories of energy saving products, such as air conditioner, refrigerator, lighting product, television set, electric water heater, computer, printer, monitor, etc. and 7 categories of water saving products, such as toilet, faucet, shower etc.

II. POLICY, LEGAL, AND ADMINISTRATION FRAMEWORK

A. People's Republic of China Legislative Framework

19. The domestic EIS upon which this IEE is based has been prepared and updated under the provisions of the PRC's EIA Law of 2003 and the PRC Management Guideline on EIA Categories of Construction Projects (2008). Main laws, regulation, guidelines and standards applicable to this project are described below. The primary PRC laws that govern environmental safeguards of the project are provided in **Table II-1**.

Table II-1: Applicable Environmental Laws of the PRC

No.	Title of the Law	Year Issued
1	Environmental Protection Law	1989
2	Environmental Impact Assessment Law	2003
3	Water Law	2002
4	Water Pollution Prevention and Control Law	2008
5	Air Pollution Prevention and Control Law	2000
6	Noise Pollution Control Law	1999
7	Solid Waste Pollution Prevention and Control Law	2005
8	Water and Soil Conservation Law	1991
9	Forest Law	1998
10	Wild Fauna Protection Law	2004
11	Cleaner Production Promotion Law	2002
12	Urban and Rural Planning Law	2008
13	Land Administration Law	1999

Source: Project preparatory technical assistance consultant.

20. The implementation of environmental laws and regulations is supported by a series of associated management and technical guidelines (**Table II-2**).

Table II-2: Applicable Environmental Guidelines

No.	Guideline	Year/Code
1	Guideline on Jurisdictional Division of Review and Approval of EIAs for Construction Projects	2009
2	Guideline on EIA Categories of Construction Projects	2008
3	Interim Guideline on Public Consultation for EIA	2006
4	Technical Guideline on EIA Regarding Surface Water	HJ/T 2.3-1993
5	Technical Guideline on EIA Regarding Atmospheric Environment	HJ 2.2-2008
6	Technical Guideline on EIA Regarding Acoustic Environment	HJ 2.4-2009
7	Technical Guideline on EIA Regarding Ecological Impact	HJ 19-2011
8	Technical Guideline on Environmental Risk Assessment for Construction Project	HJ/T 169-2004

Source: Project preparatory technical assistance consultant.

21. The environmental quality standard system that supports and evaluates the implementation of the environmental protection laws and regulations in the PRC is classified into two categories by function (i.e., pollutant emission/discharge standards and ambient environmental standards). The relevant main standards applicable to the project are shown in **Table II-3.** During the construction and operation, the local Environmental Noise Pollution Control Ordinance (revised in 2008) is applicable.

Table II-3: Applicable Environmental/Construction Standards

No.	Standard	Code
1	Surface Water Quality Standard	GB 3838-2002
2	Urban Ambient Acoustic Quality Standard	GB 3096-2008
3	Ambient Air Quality Standard	GB 3095-1996[6]
4	Integrated Emission Standard of Air Pollutants	GB 16297-1996
5	Integrated Wastewater Discharge Standard	GB 8978-1996
6	Underground Water Quality Standard	GB/T 14848-93
7	Domestic Drinking Water Quality Standard	GB 5749-2006
8	Emission Standards of Environment Noise for Boundary of Site Noise	GB 12523-2011
9	Noise Limit of Industrial Enterprises	GB 12348-2008
10	Standard for pollution control on hazardous waste storage	GB 18597-2001
11	Standards for pollution control on the storage and disposal site for general industrial solid wastes	GB18599-2001
12	Building Seismic Design Code	GB 50011-2011
13	Energy Conservation Design for Public Buildings	GB 50189-2005
14	Code of Design on Building Fire Protection and Prevention	GB 50016-2006
15	Evaluation Standard for Green Buildings	GB/T50378-2006
16	Building Energy Saving Design Standards in Guangxi Zhuang Minority Autonomous Region	(DB45/221-2007)

Source: Feasibility study report, June 2014.

22. In addition to national laws and regulations that are commonly followed for civil works (and usually not covered in environment impact assessments), a series of design standards and guidelines related to building safety and resource efficiency apply to this project. These are listed in Table II-4.

Table II-4: Key Design Codes and Technical Standards Applicable to the Project (Civil Works)

Design Code, Technical Standard	
Code of Design for the Geotechnical Survey	GB50021-2009
Code of Design for the Building Foundation	GB50007- 2011
Code of Design for the Energy Conservation of Public Buildings	GB 50189-2005
Code of Design for the Engineering Structural Reliability	GB50153-2008
Code of Design for the Structural Load Calculation	GB50009-2012
Code of Design for the Concrete Structures	GB50010-2011
Code of Design for Building Seismic Resistance	GB50011-2011
Code of Design for Masonry Structures	GB50003-2011
Standards for Acceptance Test of Building Construction Quality	GB50300-2001
Technical Standards for Waterproofing of Underground Structures	GB50108-2008
Code of Electrical design of civil buildings	JGJ16-2008
Design code for protection of structures against lightning	GB50057-2010
Code for design electric power supply system	GB50052-2009
Code for design of low voltage electrical installations	GB50054-2011
Design Standard of Building Lighting	GB50034-2004
Code for Fire Protection Design of Civil Building Cables	DG/TJ08-2048-2008
Code for Engineering Design of Generic Cabling System for Building	GB50311-2007
Code for Design of Automatic Fire Alarm System	GB50116-2013

[6] A new standard has been issued in 2012 (GB 3095-2012), which will become effective on 1 Jan 2016.

Design Code, Technical Standard	
Code of Design on Building Fire Protection and Prevention	GB50016-2006
Code of Design for Sprinkler Systems	GB50084-2005
Code for Design of extinguisher Distribution in Buildings	GB50140-2005
Code for Design of Outdoor Water Supply Engineering	GB50013-2006
Code for Design of Outdoor Drainage Engineering	GB50014-2011
Code for Design of Building Water supply and Drainage Engineering	GB50015-2009
Code for Design of Heating Ventilation and Air Conditioning	GB50019-2003
Technical Guideline of Heating Load Calculation	JGJ 173-2009
Code of Design on Building Fire Protection and Prevention	GB50016-2006

Source: Feasibility study report, June 2014.

B. International Agreements

23. The PRC is a signatory of a large number of international agreements relevant to environment protection. Those with direct application to the project, along with the date of signing by the PRC, include:

(i) *Kyoto Protocol to the United Nations Framework Convention on Climate Change,* 23 February 2005. To further reduce greenhouse gas emissions by enhancing the national programs of developed countries aimed at this goal and by establishing percentage reduction targets for the developed countries.

(ii) *Montreal Protocol on Substances That Deplete the Ozone Layer,* 1 January 1989. To protect the ozone layer by controlling emissions of substances that depletes it.

(iii) *United Nations Framework Convention on Climate Change,* 21 March 1994. To achieve stabilization of greenhouse gas concentrations in the atmosphere at a low enough level to prevent dangerous anthropogenic interference with the climate system.

(iv) *UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage,* 1985. To integrate the practice of heritage conservation in PRC with that being done around the world.

C. Relevant Development Plans

24. The basis of the project design includes the national and regional developments plans, and relevant sectors development plans, namely:

(i) PRC's National Medium and Long-term Education Reform and Development Plan (2010–2020).

(ii) PRC's National Long Term Human Resource Development Strategy Outline (2010-2020).

(iii) BMG's Action Plan for Developing TVET Education in Baise (August 2009).

(iv) GZAR's Five-year Plan for Development of TVET Education (February 2012).

D. People's Republic of China and Asian Development Bank's Assessment Categories

25. **People's Republic of China's classification.** The project was classified as Category B under PRC classification. Guangxi Transport Design Institute prepared the original EIS for the project in March 2010, which was approved by Baise Municipal environment Protection Bureau (BEPB) on 12 May 2010.[7] Due to changes to the original project scope as defined in the FSR of 2010, the GZAR Environmental Science Research Institute, an EIA institute with national grade

[7] The approval document number was Baise-En-2010-65.

A certificate, has updated the EIS in June 2014 to reflect updated project scope and current environmental baseline. The updated EIS was sent to BEPB for record and review. An "EIS alteration approval document" for the updated EIS was issued in June 2014.

26. **Asian development bank's classification.** The project underwent initial appraisal during project preparation and was classified as Category B on the basis of ADB's Rapid Environmental Assessment, requiring an Initial Environmental Examination (IEE). In compliance with ADB's Safeguard Policy Statement[8] an IEE was prepared on the basis of (i) the updated FSR for the New Chengbi Campus, (ii) the updated domestic EIS, (iii) the Water and Soil Erosion Control Plan (WSECP), and (iii) other documents including the PPTA interim and draft final reports.

E. Scope of Assessment and Evaluation Standards for Subprojects

27. The domestic EIS has defined the assessment scope for ambient air, surface water, noise and ecological resources as shown in **Table II-5** below. In PRC EIA requirements, ambient levels of air, noise, and water quality in the proposed works area determine the appropriate category for point source or impacting emissions and effluent standards for the construction and operational phases of built infrastructure. The scope of investigation is the project buildings and areas 200–500 meters (m) surrounding the buildings.

Table II-5: Assessment Scope

No.	Item	Assessment scope
1	Surface water	500 m upstream and 5,000 m downstream of Chengbi River from the campus, and the artificial pond and stream within the campus
2	Ambient air	500 m range from boundaries of the campus
3	Noise	200 m range from boundaries of the campus
4	Ecology	300 m range from boundaries of the campus

Source: Domestic EIS.

28. In the PRC's EIA requirements, ambient conditions of air, noise and water quality in the project area determine the appropriate category of emissions and effluent standards for the construction and operational phases of built infrastructure. However, ADB's SPS requires projects to apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety (EHS) Guidelines.[9] The EHS guidelines are based on best practice construction and operational procedures. Both the PRC standards and EHS guidelines are used in the impact assessment for this project.

29. **Ambient air quality standards.** Assessment of ambient air quality was in accordance with "Ambient Air Quality Standard" (GB3095-1996) and GB3039-2012. A new standard has been issued in 2012 (GB 3095-2012), replacing GB 3095-1996, and will become effective on January 2016. The new standard combines Class II and III and introduces $PM_{2.5}$ standards. It also makes more stringent NO_2 standards. The World Bank EHS guidelines (see below) are based on best international practice. Both the PRC standards and EHS guidelines are used in ambient air assessment of this project, of which the specific standard values are shown in **Table II-5 below**.

[8] ADB. 2009. *Safeguard Policy Statement*. Manila.
[9] World Bank Group 2007, *Environmental, Health and Safety Guidelines General EHS Guidelines*, World Bank, Washington.

Table II-6: Ambient Air Quality Grade II Standard (mg/m^3)

Pollutant	Time	GB 3096-1996 (Grade II)	GB3095-2012 (Grade II)	EHS[10]
SO_2	Annual average	0.06	0.06	n/a
	Daily average	0.15	0.15	0.125-0.05 (0.02 guideline)
	Unit hour average	0.50	0.50	n/a
PM_{10}	Annual average	0.10	0.07	0.07-0.03 (0.02 guideline)
	Daily average	0.15	0.15	0.075-0.15 (0.05 guideline)
NO_2	Annual average	0.08	0.04	0.04 guideline
	Daily average	0.12	0.08	0.10 guideline
	Unit hour average	0.24	0.20	0.20 guideline
CO	Daily average	4.0	4.0	n/a
	Unit hour average	10.0	10.0	n/a
$PM_{2.5}$	Annual average	n/a	n/a	0.015-0.035
	Daily average	n/a	0.15	0.0375-0.075
	Hourly average	n/a	0.35	n/a

Source: Domestic EIS, the World Bank's EHS Guideline.

30. **Acoustic environment.** According to the Technical Specifications for Urban Area Ambient Noise Applicable Area Classification (GBT 15190-94), areas serving for cultural and educational institutions are classified as Class 1, and should comply with the corresponding provisions in Acoustic Ambient Quality Standard (GB3096-2008) according to the classification of the area. Residential, commercial and industrial mixed areas must comply with Class 2 standard. Lower standards apply for industrial areas and major roads. Standards are listed in Table II-6. The PRC standard is identical to the EHS guideline values.

Table II-7: Acoustic Ambient Quality Standards (Equivalent Sound Level: LAeq: dB)

PRC Standard Class	Applicable Area	GB3096-2008		EHS	
		Day	Night	Day	Night
0	Areas needing extreme quiet, such as convalescence areas	50	40	55	45
1	Area mainly for residence, cultural and educational institutions	55	45		
2	Residential, commercial and industrial mixed area	60	50		
3	Industrial area	65	55	70	70
4	Area on both sides of urban road traffic trunk line	70	55		

Source: GB3096-2008, World Bank's EHS Guidelines.

31. **Noise limits for construction sites.** Construction activities must be in accordance with "Noise Limits for Construction Site" standard (GB12523-90), see **Table II-7**.

Table II-8: Noise Limits for Construction Sites Standard (dB (A))

Noise limits

[10] World Bank Group 2007.

Daytime	Night
70	55

32. **Surface water quality standards.** Assessment of surface water quality focused mainly on the artificial pond and stream in the campus, which must comply with Grade IV standard values of “Surface Water Environment Quality Standard” (GB3838-2002); for the Chengbi River nearby the campus, Grade II standard is applicable, which is shown in **Table II-8**.

Table II-9: Surface Water Quality Standards (mg/L, pH excluded)

Parameter	pH	COD_{Mn}	BOD_5	COD_{cr}	TP	TN	NH_3-N	Petroleum
Grade II Standard	6~9	≤4	≤3	≤15	≤0.1	≤0.5	≤0.5	≤0.05
Grade IV Standard	6~9	≤10	≤6	≤30	≤0.3	≤1.5	≤1.5	≤0.5

Key: BOD_5= 5 days biochemical oxygen demand, COD_{cr} = chemical oxygen demand, COD_{Mn} = permanganate index, NH_3-N=ammonia nitrogen; TN = total nitrogen; TP = Total Phosphorus

33. Because the proposed campus is not within or nearby any special ecologically sensitive zones, the assessment of ecological environment belongs to Class III according to the Environmental Impact Assessment Technical Guidelines (HJ19-2011). Considering the characteristics of the project, the project will not cause groundwater level changes nor cause groundwater pollution. No assessment for groundwater is therefore required.

III. DESCRIPTION OF THE PROJECT

A. Justification and Rationale for the Project

34. Guangxi Zhuang Autonomous Region (GZAR) is one of the 12 less-developed provinces and autonomous regions in the western part of the People's Republic of China (PRC). Baise municipality, located within GZAR, is one of the 14 national poverty areas of the PRC. Six main ethnic minority groups make up 86% of the population of 4 million in Baise municipality, which is the largest prefecture in GZAR. Over the past seven years, Baise has emerged as a new economic growth base in GZAR focused on four priority industries: aluminum processing, agriculture, tourism, and regional trade and logistics. The strategic development of Baise is part of the broader national economic transition to a middle income country and the expansion of service industries. Located near the border with Vietnam, Baise is an important gateway to countries of the Association of Southeast Asian Nations (ASEAN) and Greater Mekong Subregion (GMS).

35. In spite of its strategic location for regional activities, further economic development of Baise is constrained by the lack of a skilled workforce. Baise Municipal Government (BMG) has projected a shortage of more than 80,000 skilled workers in 2013, particularly in new and rapidly expanding priority industries, many of which are employing new technologies. A major issue for Baise is the large number of people who leave the province to obtain more work in other provinces and cities (estimated exit in 2012 of 600 000 people). Baise has trouble attracting skilled labor because of the salary differential and comparatively undeveloped key industries. Taking this into consideration, Baise is left with little choice other than to develop its own local human resources.

36. To address the skills shortage, Baise's Twelfth Five-Year Plan has outlined a key human resources development strategy, centered on creating a multilevel TVET system (MLT). The MLT provides an integrated education and training system that links the human resources skill supply from universities, vocational colleges, secondary vocational school (SVS) and also includes short-term migrant courses. The MLT system aims to provide students with multiple pathways for initial training, entry to and progress within the workforce. Baise University, with its current three level programs (SVS, vocational college, and universities) is well-positioned to take a leading role in shifting to MLT TVET provision both locally and eventually at provincial and regional levels. This requires a major investment from all stakeholders in terms of reforms and upgrades to the TVET system.

37. Ensuring that graduates are prepared for the workforce with relevant knowledge and skills is a major challenge for PRC's structural reform of the economy and therefore the Asian Development Bank (ADB) involvement in the TVET sector is strongly justified. The project is aligned with ADB's Strategy 2020, the recommendations from the midterm review of the strategy that emphasized promoting TVET to address the human resource agenda and, the education sector strategic plan. It aligns with ADB's PRC Country Partnership Strategy, 2011–2015. The project is consistent with the PRC's Twelfth Five Year Plan 2011-2015 which promotes environmentally friendly and resource efficient urban development, rebalancing of economic growth; and prioritizes developing high quality human resources and accelerating education reform.

B. Innovative Features of the Project

38. The project has the following demonstration features:

(i) **Multilevel TVET and applied TVET university development.** The project will be at the forefront of piloting two important new reforms in the TVET sector in PRC: (a) Baise University is one of nineteen institutions selected in GZAR to the transition from a university to a TVET applicable institution; and (b) introducing multilevel TVET

development which links curriculum, teachers, learning and opportunity pathways and assessment across levels.

(ii) **Regional cooperation.** The project will support development of regional cooperation in TVET in Baise by (a) training a leadership team to support regional cooperation planning and activities; (b) expanding cooperation in areas such the cross-border language programs and priority majors; (c) introducing APEC standards in related areas; and (d) undertaking research on the impacts of regional cooperation and industry expansion on human resources and skills needs in Baise.

(iii) **Promote environment sustainability.** The outstanding environmental feature of the project is the development of a low-carbon, resource-efficient and environmentally sustainable campus. All buildings will be designed in compliance with green and energy-efficient building codes and specifications.[11] Renewable and high-efficiency energy sources including solar energy (photovoltaic) and heat pumps will be applied to satisfy building energy requirements such as heating, air conditioning, and hot water supplies. A 3.47 MW solar photovoltaic power generation system will be installed in the campus, generating some 3.3-3.5 million kWh of electricity per year. High-efficiency heat pumps will be installed for air-conditioning (heating, cooling) of two buildings, and water heating for the student dormitories B1, B2 and B3. The photovoltaic system will be able to substitute some 15% of the electricity demand of the campus, reducing 3,540 tons of CO_2 emissions per year.[12] The two heat pump air conditioning systems will be installed on the library and administration building, which will bring 3.3 million kWh/a electricity saving, equivalent to 3,056 tons of CO_2 emissions. The use of volatile organic compounds (VOC) emitting materials (including paints, coatings, adhesives, carpet and furniture's) will be avoided to ensure safe indoor air quality. The project will also support Baise University in defining a campus sustainability strategy (by 2015), and establishing a sustainability center (by 2017), to be coordinated by BU's Comprehensive Affair Department. The sustainability center will build on ongoing programs and initiatives of Baise University in the field, and aim at ensuring sustainable environmental path for Baise University. The Center will implement current and future campus sustainability programs (such as energy efficiency, resource conservation, 3R, environmental awareness, health and safety, etc.); facilitate the engagement of faculty, students, and staff and stimulate service and outreach efforts that promote sustainable practices within the university and extended community; and stimulate and facilitate curriculum development and research efforts in environment sustainability-related areas.

C. Project Impact, Outcome, and Outputs

39. The project's expected **impact** will be improved access, quality, and responsiveness of TVET in Baise Municipality. The **outcome** will be the development of a multilevel TVET system that links the supply of graduates with relevant knowledge and skills to the demands of industry in Baise Municipality. The scopes of works for each of the four project outputs are defined in Table III-1, and are summarized below.

40. **Output 1: Technical and vocational education and training quality improved and capacity developed.** This component will support: (i) an integrated MLT system that provides curriculum

[11] Including, but not limited to: GB/T50378-2006 (Evaluation Standard for Green Buildings); GB 50176-1993 (Thermal Design Code for Public Buildings); GB 50189-2005 (Energy Conservation Design for Public Buildings); GB 50011-2010 (Building Seismic Design Code); GB 50016-2006 (Code of Design on Building Fire Protection and Prevention); Building Energy Saving Design Standards in Guangxi Zhuang Minority Autonomous Region (DB45/221-2007), and other applicable national design codes.

[12] A KWh electricity generated by solar energy is equal to 0.918 kg of CO_2 emission reduction (grid emission factor).

integration through a sequence of learning outcomes that link the current SVS, universities, and undergraduate levels of TVET; (ii) establishment of an employment information system to support students work placements through responsive programs and courses; (iii) development of a communication and outreach strategy to promote understanding and support for the MLT system; (iv) a competency-based approach (CBA) to curriculum, instruction and assessment that is applied to priority areas; (v) an improved quality assurance (QA) system that is based on industry standards in the delivery of relevant training; (vi) upgrading of both pre-service teacher training and in-service professional development; (vii) support for the development of leadership through Core Teacher and Management training courses; (viii) a comprehensive workshop program for teachers and other stakeholders, focused on key TVET concepts (e.g. MLT system, CBA, and QA) and their application to priority areas and instructional delivery; and (ix) support for domestic/international visits to provide exposure to and participation in TVET best practice examples.

41. **Output 2: Chengbi campus constructed and environmental sustainability promoted.** This component will construct teaching and living buildings and facilities in the new Chengbi campus, and will procure and install equipment for the new buildings which will house the new teaching and learning equipment. The component includes the construction of 12 buildings with a total of 160,693 m^2 building area.[13] In addition, the component will install a 3.47 MW photovoltaic power system, purchase of teaching and training laboratory equipment for all training laboratories in the new campus, and construct sport facilities, slope protection, and other school facilities.

42. **Output 3: Technical and vocational education and training Innovation and Relevance promoted.** This component will support: (i) staff opportunities for active engagement in industry visits, assignments and training attachments; (ii) enhanced industry participation in the governance of TVET and the delivery of curriculum and assessment; (iii) cooperative activities between Baise University, Education Bureau, and HRSSB to enhance and integrate migrant worker programs into TVET training; (iv) an emphasis on entrepreneurship through curriculum and policy development and the design and implementation of an entrepreneurship incubation program; (v) support for an Enterprise Education Facility to provide opportunities for teachers and students to develop small scale enterprise projects with industry links; (vi) training for a small team to coordinate regional cooperation planning and development activities; (vii) research support for enhanced information and resources gathering for regional cooperation partnerships and ventures; and (viii) research that investigates and provides workable options for enterprise-TVET partnerships, emerging priority sectors and future course and qualifications needs.

43. **Output 4: Project implementation management support.** This output will build capacity for the project management office (PMO) and Baise University in management, monitoring and evaluation. This will also include consultant inputs for the coordination of EMP implementation. The component will also provide expert support to Baise University in defining a campus sustainability strategy (by 2015), and the creation of a sustainability center (by 2017). The center will implement green campus management programs (such as energy efficiency, resource conservation, health and safety); facilitate the engagement of faculty, students, and staff and stimulate service and outreach efforts that promote sustainable practices within the university and extended community; and stimulate and facilitate curricular development and research efforts in sustainability-related areas.

[13] Including Administration Building, Library, Gymnasium and Physical Education Building, Business School Building, Politics and Law Department Building, Chinese and Foreign Language Department Building, Physics Electronic and Math Building, Chemistry and Biology Department Building, Art and Science Education Building, Dormitories B1, B2, and B3.

Table III-1: Summary of Proposed Project Outputs and Sub-components

Output/Component	Description
Output 1: TVET quality improved and capacity developed	
1.1 Multilevel TVET Strategic Development	1.1.1 MLT system leading group undertakes research and planning in collaboration with industry and other stakeholders; 1.1.2 MLT architecture established: Level descriptions, institutional linkages, and pathways developed; 1.1.3 Training provided (for all stakeholders) in MLT system to support the development of a TVET applicable university; 1.1.4 Establishment of a management committee to coordinate enhancement of multilevel system data management; 1.1.5 Develop a Communications and outreach plan
1.2 Curriculum Development	1.2.1 Develop competency standards (in 7 priority areas across different institutional and qualifications levels) initially in preschool education: design: aluminum processing: engineering management: and agriculture; and later in tourism and logistics; 1.2.2 Develop competency based approach to curriculum, instruction and assessment (in 7 priority areas and across designated levels, majors and courses); 1.2.3 Pilot SVS, universities, and undergraduate priority sectors, majors and courses (as agreed) with linkages (pathways) established; 1.2.4 Provide general training (workshops, seminars) in competency-based approach (CBA) for all teaching staff (curriculum, assessment and instruction); 1.2.5 Develop curriculum in enterprise education (Entrepreneurship) and Employability skills; 1.2.6 Review and enhance Quality Assurance system in curriculum, assessment and qualifications design; 1.2.7 Develop teaching and learning resources (publication, web-based) to support priority majors and courses
1.3 Teacher Training and Pedagogy Reform	1.3.1 Develop BU policy and guidelines for staff movement between institutional levels; 1.3.2 Develop guidelines and standards to reform pedagogy in line with CBA (i.e. student-centered and activities-based instruction and assessment); 1.3.3 Develop policy, plans and procedures for the establishment of a secondary TVET Teacher Training Centre (Note: to be expanded later as a regional cooperation activity); 1.3.4 Creation of a core teacher training system (using a train the trainer approach) to support training for pilot lessons in selected priority areas; 1.3.5 Assess staff incentive structures for staff engaged in the project (e.g. staff hours for attending training)
1.4 Staff Development	1.4.1 Revise and upgrade staff training plans to include training in the Baise University MLT system; 1.4.2 Develop strategy to upgrade staff to attain dual qualifications at all levels (SVS, universities, undergraduate); 1.4.3 Devise and develop leadership training program for BU senior and intermediate level leaders and other stakeholders (MLT system, management and leadership) (Overseas program); 1.4.4 Develop overseas training for Core Teachers (train-the-trainer); 1.4.5 Develop domestic study tours for observation and investigation based on specific project reforms (MLT, industry partnerships, regional cooperation, curriculum and teaching, etc.); 1.4.6 Organize and facilitate training in PRC TVET institutions where there is good practice related to priority areas
Output 2: Chengbi campus constructed and environmental sustainability promoted	

2.1 Construction of buildings and facilities in Chengbi Campus	2.1.1 Library 2.1.2 Administration building 2.1.3 Gymnasium and physical education building 2.1.4 Business school building 2.1.5 Politics and law department building 2.1.6 Chinese and foreign language department building 2.1.7 Physics, electronics and math building 2.1.8 Chemistry and biology department building 2.1.9 Art and science education building 2.1.10 Student dormitory (B1, B2&B3) 2.1.11 Outdoor sports facilities 2.1.12 Slope protection and retaining walls 2.1.13 3.47 MW Photovoltaic power system 2.1.14 Teaching and training equipment (financed by MOE designated fund)
Output 3: TVET innovation and relevance promoted	
3.1 School-industry partnerships	3.1.1 Organize, for staff, industry visits, job assignments and training attachments which include specific performance requirements and outcomes; 3.1.2 Enterprise Education Facility established to enhance school industry partnerships and innovation in other project areas; 3.1.3 Establish School Industry Leading groups 3.1.4 Design and implement further outreach training programs for migrant workers and communities 3.1.5 Design and implement an entrepreneurship incubation program
3.2 Regional Cooperation	3.2.1 Develop and train Baise University management team to support regional cooperation planning and activities 3.2.2 Attend regional forums and related activities to support policy and partnership development in regional cooperation; 3.2.3 Explore opportunities for consolidation of cross-border language education programs; 3.2.4 Explore expanded cooperation opportunities with University of Thailand; 3.2.5 Introduce APEC standards in related majors to enhance regional cooperation opportunities
3.3 Research	3.3.1 Develop school-industry partnerships regulation and policy development at different levels of provincial, BMG, and Baise University 3.3.2 Undertake research into sector plans in emerging priority sectors (logistics, tourism, etc.) to link market demand with the supply and development of human resources. Apply research findings to MLT system for course and qualifications development
Output 4. Project implementation management	
4.1 Project implementation management support	4.1.1 Loan implementation technical assistance and training 4.1.2 Project monitoring and evaluation

Source: Project Administration Manual, June 2014.

D. Detailed Description of Activities under Output 2

44. The new Chengbi campus has a total area of 99.9 ha and the dimensions are about 1,210 m in north-south direction and 1,470 m in east-west direction. According to the campus master plan, there will be a total of 24 buildings and facilities for teaching, experiment and training, living and supporting structures. The campus plan is shown in **Figure III-1**. The new campus is being built in a mountain valley with all buildings and facilities constructed next to or on the hillsides or excavated areas along both sides of the valley. The central axle of the campus, which is along the original centerline of the valley, will be

developed with a manmade pond system (3 interconnected ponds, financed under Phase 1 of the campus construction). The campus is divided into six (6) functional areas, including Front Campus Area, Teaching Experiment and Administration Area, Dormitory Area, Physical Education and Sports Area, and Ecology and Scenery Area.

45. **Phasing of the campus construction.** The construction of Chengbi campus is divided into three phases **(Figure III-2)**. Phase I, financed domestically, is under construction; Phase II will be financed by the project (Output 2). Phase III is at initial planning stage and its implementation is not confirmed. Phase I includes buildings and facilities in the west side of the campus including campus road network, the center scenery area (including the man-made lake), the engineering experimental and training center, the GSM TVET teaching building, the public teaching center, the public experimental center, a student cafeteria, dormitories and sports facilities. Phase II will include facilities at the east and central parts of the campus, including 12 buildings financed under output 2 of the project (**Table III-2**). In addition, Phase II will also include a photovoltaic power generation system, a high-efficiency heat pump AC and hot water system for selected buildings, sports facilities, landslide protection works (40,000 m^2) and other associated facilities such as a 2,000-m^3/d wastewater treatment and reuse system. The component will also include the procurement and installation of teaching and training equipment for various TVET and undergraduate programs, which will be procured using a special funding from the PRC's Ministry of Education. The list of equipment is provided in **Table III-3**.

Figure 1 Phases I, II & III of Chengbi Campus Construction

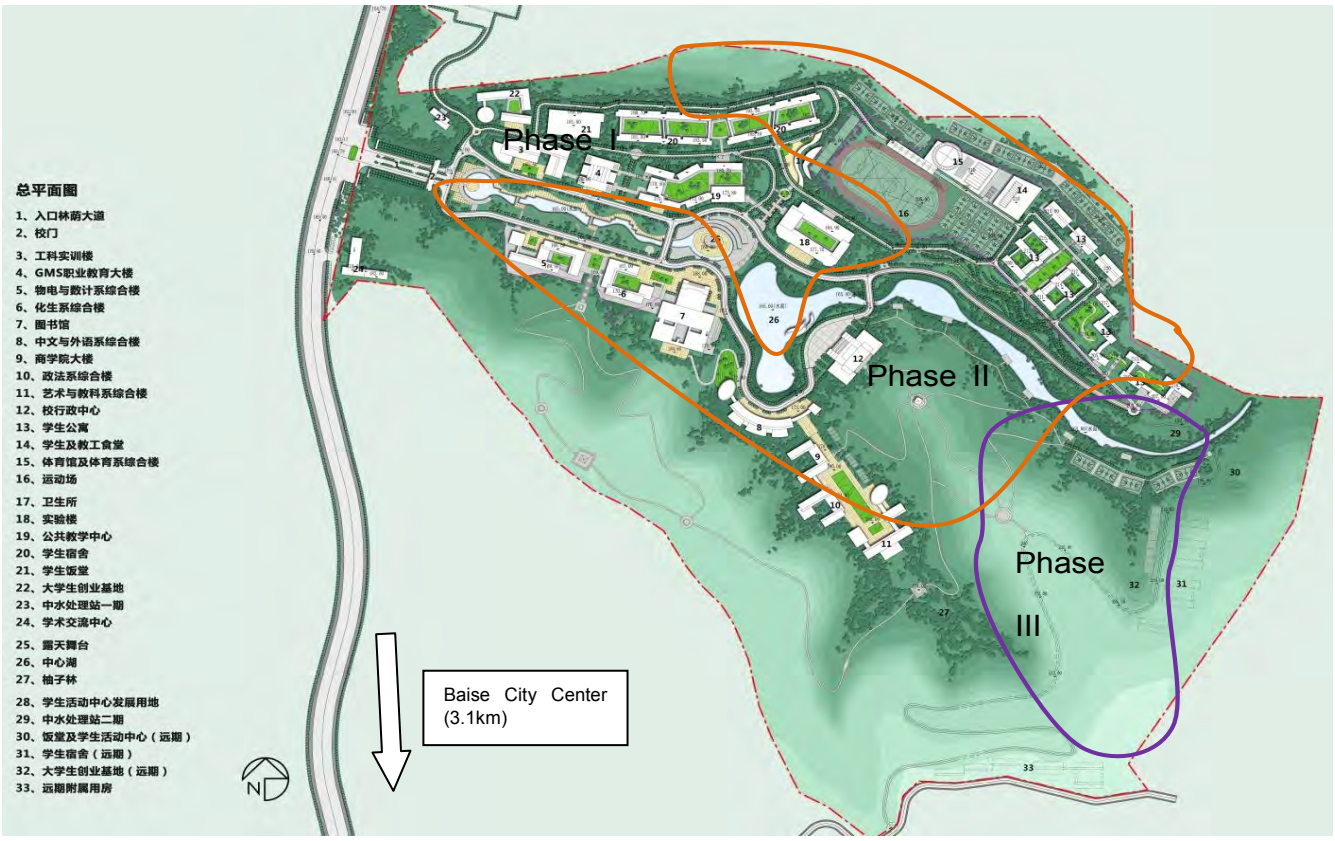


Figure III-1: Phases of Chengbi Campus Construction

Figure III-2: Conceptual drawing of Chengbi Campus

Table III-2: Summary of Proposed Buildings and Facilities

No.	Buildings and Facilities Under the Output 2	Foot Area (m^2)	Building Area (m^2)	Storey
2.1	Library	5,019	27,545	8
2.2	Administration building	3,169	12,338	8
2.3	Gymnasium and physical education building	3,625	8,751	4
2.4	Business school building	2,090	8,788	6
2.5	Politics and law department building	1,491	8,295	6
2.6	Chinese and foreign language department building	3,286	16,448	9
2.7	Physics, electronics and math building	3,412	19,538	6
2.8	Chemistry and biology department building	1,907	10,167	6
2.9	Art and science education building	3,854	17,006	6
2.10	Student dormitory -B1	2,380	13,600	5
2.11	Student dormitory -B2	1,080	9,060	6
2.12	Student dormitory –B3	1,564	9,157	6
	Total	**32,877**	**160,693**	
2.13	Photovoltaic power generation system	Capacity = 3.47 MW Production = 3.3-3.4 Mio kWh/a (80-100 kWh/m2*a)		
2.14	Outdoor sports facilities (basketball, badminton, tennis courts)			
2.15	Slope protection and retaining walls	Total area = 40,606 m^2		

Source: Project Administration Manual (July 2014)

Table III-3: Summary for Teaching and Lab Equipment

No	Description	Unit	Quantity	Unit Price (10k CNY)	Cost (10k CNY)
1	Casting Mold Lab	set	1	261.47	261.47
2	Electronic Simulation Lab	set	1	82.42	82.42
3	Aluminum Lab	set	1	298.30	298.30
4	Physics, Chemistry and Material Lab	set	1	251.50	251.50
5	Chemical Engineering Lab	set	1	135.00	135.00
6	Corrosion Protection Lab	set	1	90.00	90.00
7	Chemical Engineering Simulation Lab	set	1	80.00	80.00
8	Tropical Biology Lab	set	1	284.50	284.50
9	Natural Organic Lab	set	1	290.00	290.00
10	Agricultural Product Lab	set	1	444.26	444.26
11	ERP Lab	set	1	50.00	50.00
12	E-commerce Lab	set	1	60.00	60.00
13	Language Lab	set	1	50.00	50.00
14	Digital Language Lab	set	1	88.40	88.40
15	Multipurpose Language Learning Center	set	1	253.00	253.00
16	Internet and Information Lab	set	1	161.20	161.20
17	Internet Engineering Lab	set	1	358.00	358.00
18	Intelligence Control Engineering Lab	set	1	202.70	202.70
19	Communication Engineering Lab	set	1	597.76	597.76
20	Ethnic Minority Teaching Lab	set	1	157.00	157.00
21	Digital Media Art Lab	set	1	122.22	122.22
22	Fashion Design Lab	set	1	46.45	46.45
23	Art Lab	set	1	50.68	50.68
24	Clay Art Lab	set	1	63.12	63.12
25	Textile Coloring Lab	set	1	112.35	112.35
26	Tourism Planning Lab	set	1	200.08	200.08
27	You River Basin Cultural Research Center	set	1	110.20	110.20
28	Piano Room	set	1	135.00	135.00
29	Acoustic Lab	set	1	48.18	48.18
30	Music Room	set	1	32.19	32.19
31	Minority Performance Hall	set	1	220.78	220.78
32	Library Information System	set	1	547.84	547.84
33	Campus Network System	set	1	512.90	512.90
	Total =				6397.50

Source: Project Administration Manual (July 2014)

E. Campus Buildings Financed by the Project (Output 2)

46. The project will support the construction of 12 buildings. The summary of the functional areas for classroom, laboratory facilities, office, and administrative facilities is shown in **Table III-4**. The buildings are described in the following paragraphs.

Table III-4: Summary of Functional Areas in Each Building

No.	Names	Workshops/Lab		Facility Rooms		Classrooms		Admin Office	
		No. Room	Areas (m^2)	No. Room	Areas (m^2)	No. Room	Areas (m^2)	No. Room	Areas (m^2)
1	Gymnasium and Physical Education Department Building	14	3440	2	140	10	788	14	512
2	Business Department Building	23	2160	0	0	17	1980	19	1074
3	Politics and Laws Department Building	10	900	0	0	25	2641	24	1064
4	Foreign Language, Chinese Department Building	29	2746	0	0	61	5599	54	2440
5	Building of Physics & Communication, Mathematics and Computer Engineering Department	78	7312	5	155	33	3475	17	1555
6	Chemical and Life Sciences Department Building	46	3133	1	37.88	28	2632	10	545
7	Arts and Educational Science Department Building	138	6972	9	148	28	2490	29	1108
	Total:	338	26663	17	480.88	202	19605	167	8298

Source: Project Administration Manual (July 2014).

47. **Library.** The library is a reinforced concrete frame + shear wall structure with eight (8) stories. The total building area and the footing area are 27,545 m^2 and 5,019 m^2, respectively. The total building height is 38.7 m. The library will have computer-controlled 1.5 million book collection and 400 reading seats. The building includes four functional areas of storage, borrowing, reading and management. The design has fully incorporated the use of natural ventilation and sunlight, and adoption of energy saving materials for exterior walls, roof and windows. The lighting design will follow national green public building standards. A high-efficiency heat-pump AC system will be installed for the entire building.

48. **Administration building.** It is an eight-story reinforced concrete frame structure (**Figure III-3**). The total building area and the footing area are 12,338 m^2 and 3,169 m^2, respectively. The total building height is 29.4 m. The building includes three functional areas of offices, conference rooms, and supporting area. The design has fully incorporated the use of natural air flow and adoption of energy saving materials for exterior walls, roof and windows. The lighting design will follow national green public building standards. A high-efficiency heat-pump AC system will be installed for the entire building.

49. **Gymnasium.** The gymnasium is a five-story reinforced concrete frame structure with four stories above the ground and one underground story. The building is a rectangle structure (**Figure III-4**). The total building area and the footing area are 8,751 m^2 and 3,625 m^2, respectively. The total building height is 27.0 m, with the length of 96 m and width of 48 m. The building includes three functional areas of athletic training, sport research, and administration. The design has fully incorporated the use of natural air flow and sunlight, and adoption of energy saving materials for exterior walls, roof and windows. The lighting design will follow national green public building standard.

Figure III-3: Administration Building

Figure III-4: Gymnasium

50. **Business school building.** It is a reinforced concrete frame structure with six stories above the ground. The total building area and the footing area are 8,787.5 m^2 and 2,090 m^2, respectively. This is a "U" type structure with the total building height of 23.7 m. The building includes four functional areas of large classrooms, regular classrooms, teaching and research, and administration. The design has fully incorporated the use of natural air flow and sunlight, and adoption of energy saving materials for exterior walls, roof and windows. The lighting design will follow national green public building standard.

51. **Political and law school building.** The building is a reinforced concrete frame structure with six stories above the ground. The total building area and the footing area are 8,295 m^2 and 1,492 m^2, respectively**.** The total building height is 23.7 m. The main entrance is at the northeast side of the building, and the secondary entrance is at the south side for emergency evacuation. The building includes three functional areas of teaching, education research, and administration. The design has fully incorporated the use of natural ventilation and sunlight, and adoption of energy saving materials for exterior walls, roof and windows. The lighting design will follow national green public building standard.

52. **Physics electronics and math building.** This is a "U" shape reinforced concrete frame structure with six stories above the ground (Figure III-5). The total building area and the footing area are 19,538 m^2 and 3,412 m^2, respectively**.** The total building height is 23.7 m. The building includes three functional areas of teaching and training, education research, and administration. The design has fully incorporated the use of natural ventilation and sunlight, and adoption of energy saving materials for exterior walls, roof and windows. The lighting design will follow national green public building standard.

53. **Chinese and foreign language building.** This is a domed shape reinforced concrete frame structure with six stories above the ground. The total building area and the footing area are 16,448 m^2 and 3,286 m^2, respectively**.** The total building height is 23.7 m. The building includes four functional areas of experimental and training, classroom, teaching and research, and administration. The design has fully incorporated the use of natural air flow and adoption of energy saving materials for exterior walls, roof and windows. The lighting design will follow national green public building standard.

54. **Chemistry and biology building.** This is a "U" shape reinforced concrete frame structure with six stories above the ground (**Figure III-6**). The total building area and the footing area are 10,167 m^2 and 1,907 m^2, respectively**.** The total building height is 23.7 m. The building includes four functional areas of experiment and training, classroom, education research, and administration. The design has fully incorporated the use of natural air flow and adoption of energy saving materials for exterior walls, roof and windows. The lighting design will follow national green public building standard.

Figure III-5: Physics, Electronics and Math Building

Figure III-6: Chinese and Foreign Language Building

55. **Art and science education building.** This is a reinforced concrete frame structure with six stories above the ground. The total building area and the footing area are 17,006 m^2 and 3,854 m^2, respectively**.** The total building height is 23.7 m. The building includes four functional areas of experiment and training, classroom, education research, and administration. The design has fully incorporated the use of natural air flow and adoption of energy saving materials for exterior walls, roof and windows. The lighting design will follow national green public building standard.

56. **Dormitories B1, B2, and B3.** The dormitory group B has three buildings; each of them is a reinforced concrete frame structure with six stories above the ground. The total building height is 19.8 m. The first floor of the building will have study rooms, bike parking, laundry rooms, and other supporting spaces. The second to sixth stories are student dormitory rooms. The design has fully incorporated the use of natural air flow and adoption of energy saving materials for exterior walls, roof, and windows. The lighting design will follow national green public building standard standards.

F. Other Campus Facilities Financed by the Project

57. **Slope stability and slope protection.** The campus is surrounded by various hills and slopes, and the project involves cuts to the existing hills. Slope stability is one of the major safety concerns for the construction, especially during rains which could increase the risk of landslides. At FSR stage, a preliminary slope stability analysis has been conducted and the slope protection methods have been proposed with a reasonable cost estimate. A preliminary geotechnical assessment was conducted to evaluate the potential risk of landslide and slope stability problems. The geotechnical formation at the campus site consists of top backfill soil of 0.8 to 1.1 m, hard clay of 0.3 to 15.3 m, sandy rock of 0.7 to 13.9 m, and lime stone of 2 to 18.8 m. The general condition of the geotechnical condition is categorized as the hard soil to soft rock. It is relatively stable and suitable for general construction. During the PPTA, different methods for slope protection have been evaluated and selected. Three schemes ware defined in the FSR based on the slope conditions and the findings of the geological assessment report (**Figure V-2** and **Figure V-3**). The slope protection works will include: (i) Design I – natural vegetation slope protection (in blue); (ii) Design II – gravity retaining wall + vegetation slope protection (in pink); and (iii) Design III – arched concrete-framed vegetation slope protection, anchored to the bedrock (in red). The area of slope protection is 40,606 m^2 in total, and the designs comply with the PRC's Standard Drawings for Retaining Walls and Slope Protection of 04J008.

58. **Heat pump hot water and air conditioning system.** A high-efficiency heat pump hot water and air conditioning system will be installed in the campus. The hot water system will be installed in the student dormitories, and the heat pump air conditioning system will be installed at Library and

Administration Buildings.

59. **Photovoltaic power generation system.** A photovoltaic power generation system, with the designed capacity of 3.47 MW will be installed on top of the campus buildings (32,900m^2). The annual power generation will be 3.3-3.4 million kWh, which amounts to 3,540 tons of CO_2 emission reduction.[14] The estimated electricity will cover some 15% of the total campus demand. The proposed photovoltaic system consists of photovoltaic panels array (multi-crystalline silicon), photovoltaic confluence boxes, photovoltaic inverters, transformers, electrical conversion and control system and monitoring system. The estimated cost is about CNY 29.58 million.

[14] A KWh electricity generated by solar energy is equal to 0.4 kg standard coal saving and 0.997 kg of CO_2 emission reduction.

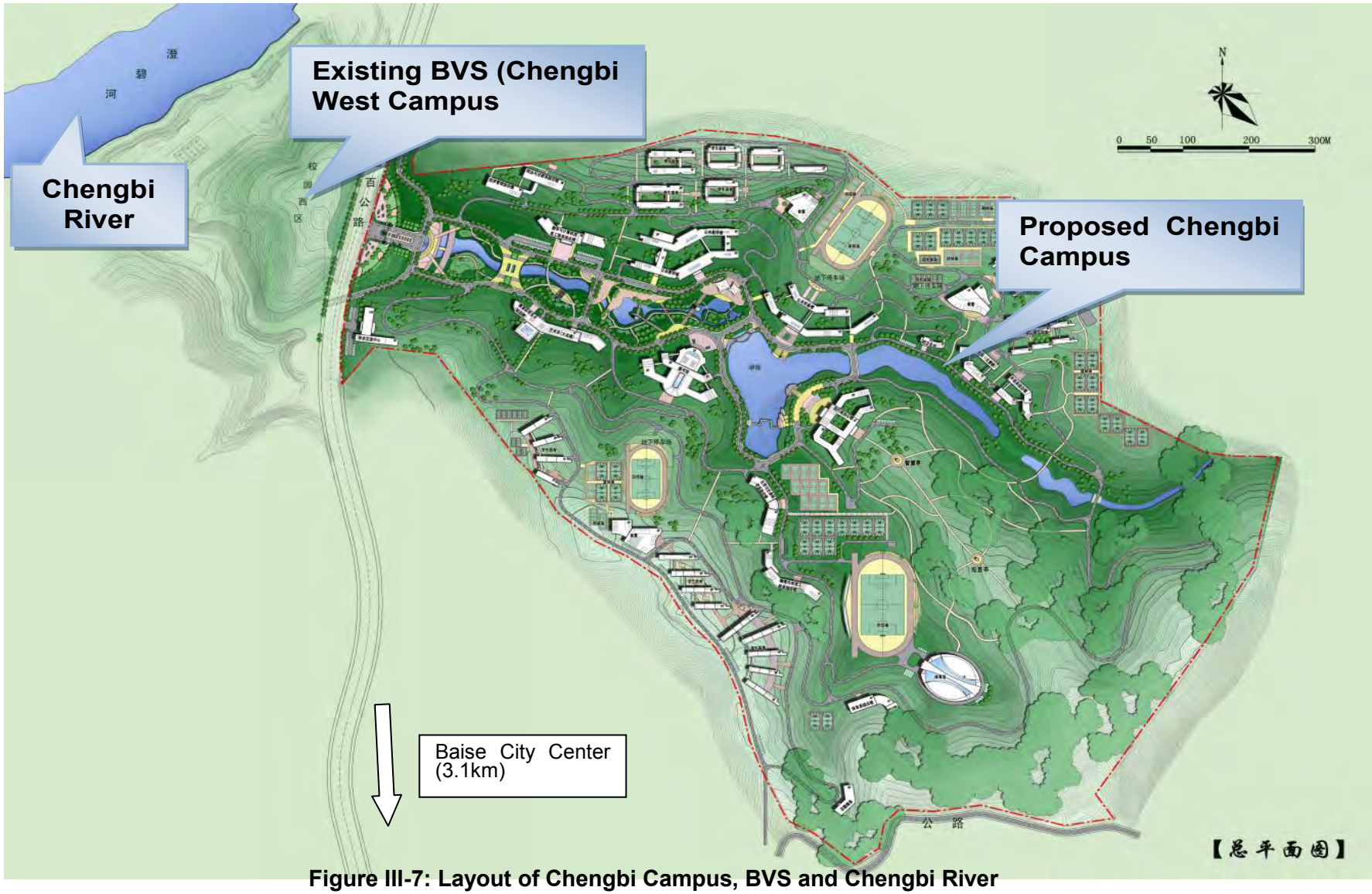


Figure III-7: Layout of Chengbi Campus, BVS and Chengbi River

IV. DESCRIPTION OF THE ENVIRONMENT (BASELINE)

60. The description of the pre-project environment (biophysical and socio-economic) establishes (i) the environmental setting within which the project will be implemented, and therefore needs to be designed to suit, and (ii) the environmental values which will be changed (either negatively or positively) by the project. Both these roles are encompassed by the concept of the "baseline" environment.

A. Physical Environment

61. **Geographical location.** The project area (Chengbi Campus of Baise University) is located within Baise Municipality. Baise Municipality is located in the western part of GZAR at latitudes 104°28' ~ 107°54' east and longitudes 22°51' ~ 25°07' north. It is the largest municipality in GZAR, with a total administrative area of 36,300 km^2 and a total population of 4.09 million (2012). It borders Yunnan Province to the west, Guizhou Province to the north, Nanning City, the capital of GZAR to the east, and Vietnam to the south. Baise City is approximately 266 km from Nanning. The 11 counties under the jurisdiction of Baise Municipality are Pingguo, Tiandong, Tianyang, Tianlin, Debao, Jingxi, Napo, Lingyun, Leye, Longlin, and Xilin, with 10 of these classified as state-level poor counties.

62. **Geology and topography.** Baise is characterized by mountainous karst, located in the transition belt between the Yun-Gui Plateau and the Guangxi hills. Mountainous areas account for 95.4% of the terrain (with 65.4% stone mountains and 30% earth mountains), with hills and plains accounting for the remaining 4.6%. The Youjiang River Valley is made up of low hills, karst hills, mountains and alluvial terrain; soil types include clay and sandy clay, while the bedrock is mainly mudstone, conglomerate, shale, and sandstone. Baise's terrain and topography could be classified into the following three types: (i) earth mountains in the north at elevations of 500-1500 m ASL; (ii) stone mountains of karst landform in the south at elevations of 500-800 m ASL. The area of stone mountains account for 21.31% of the total area of Baise Municipality; and (iii) Youjiang River Basin in the middle at elevations of 100-300 m ASL.

63. The new Chengbi campus is located in the north of Baise's urban center, at an elevation between 120m and 320m ASL (**Figure IV-1**). The geotechnical formation at the campus site consists of top backfill soil of 0.8 to 1.1 m, hard clay of 0.3 to 15.3 m, sandy rock of 0.7 to 13.9 m, and lime stone of 2 to 18.8 m. The general condition of the geotechnical condition is categorized as the hard soil to soft rock. It is relatively stable and suitable for general construction. A topographic survey was conducted for the campus, presented in **Figure IV-2**.

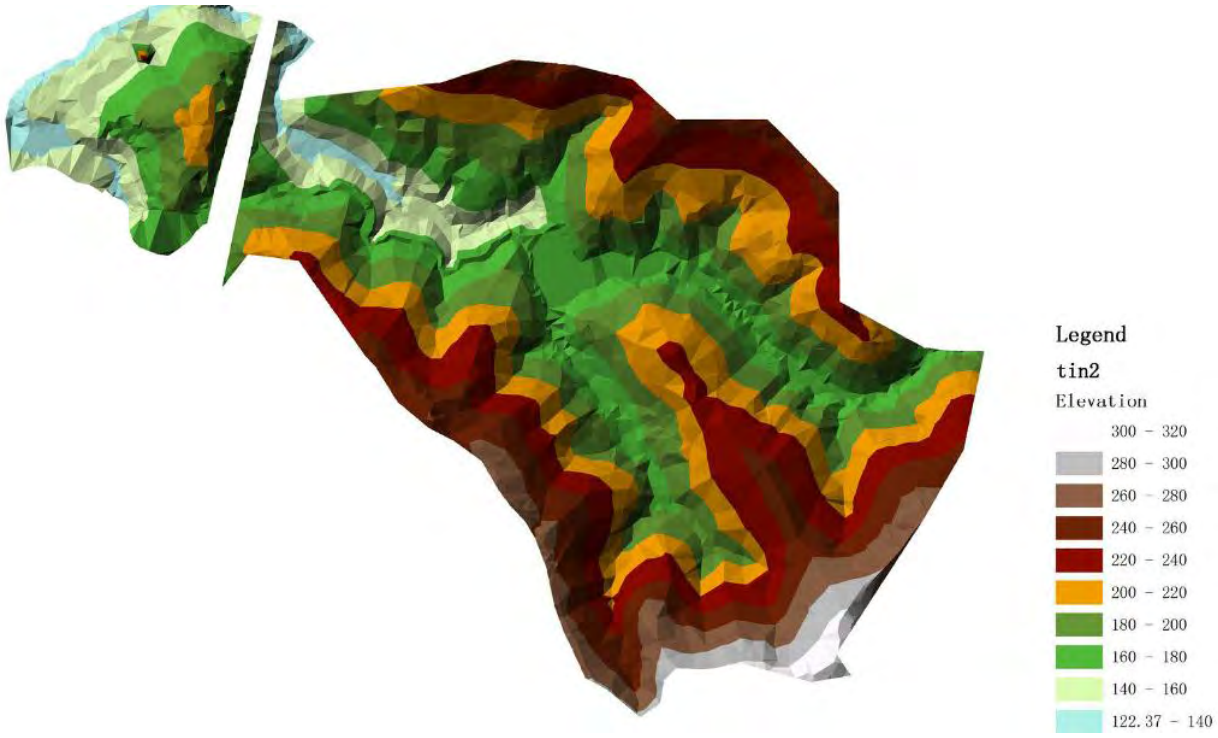


Figure IV-1: Elevations within Chengbi Campus

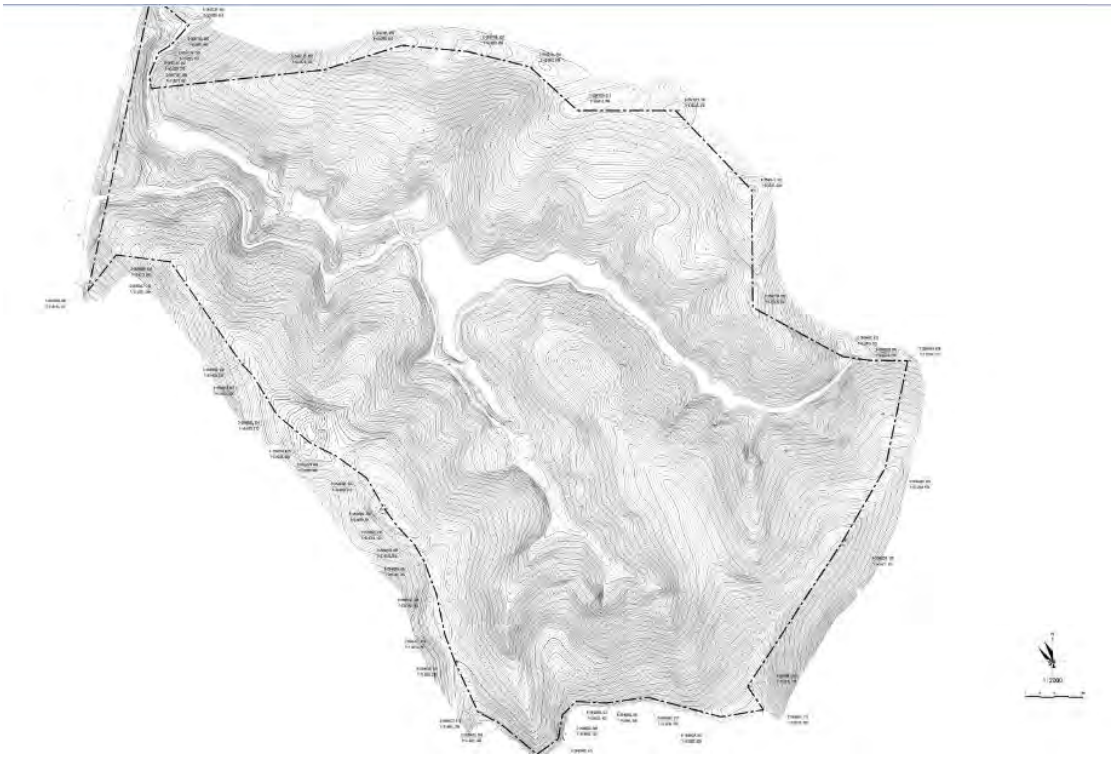


Figure IV-2: Topographic Survey, Chengbi Campus

64. **Seismicity**. Baise is sensitive to seismic activities. Most recently, a magnitude-4.5 earthquake occurred on February 20, 2013 at the boundaries of Pingguo and Tiandong Counties in Baise Municipality. Comparing the basic seismic intensity of Baise Municipality with the Earthquake Parameters Zoning Map of China (GB 18306-2001), Earthquake Protection Classification Standard of Construction Works (GB 50223-2008) and Earthquake Protection Design Specification of Buildings (2010), design for the structures in the municipality adopts seismic precautionary intensity of 7 degrees, a basic earthquake acceleration of 0.1 g, and a vibration response spectrum period of 0.35 s. Heavily populated public buildings such the buildings to be financed by the project, must adopt one degree above the seismic precautionary intensity (i.e. 8 degrees).

65. **Climate**. Baise has subtropical seasonal monsoon climate, with long summer and short winter. Mild climate occurs in the mountainous regions to the north and south, while hot and dry in the Youjiang River Basin. The lowest temperature is in January at average 13.4℃; highest temperature in July at average 28.61C. The extreme highest temperature in past years is 42.5 ℃; the extreme lowest temperature in past years is -2℃. Rainy season occurs from May to October, with frequent storm weather from June to September. Dry season occurs from November to April. Severe weather includes drought, flood, wind storm, cold and hail**.** Of these, droughts and colds are more frequent; especially spring droughts whose frequency reaches 70-90%. **Table IV.1** summarizes Baise's climatic characteristics.

Table IV-1: Main Meteorological Parameters of Baise City

Weather elements	**Value**
Annual average temperature	19.0 – 22.1°C
Extreme high temperature	42.5°C
Extreme low temperature	-2.0°C
Annually average precipitation	1,300 mm/a
Highest 24-hr precipitation	402.1 mm (1973)
Average wind speed	2.5 m/s
Average evaporation amount	1,385 mm/a
Average annual frost free season	357 days

Source: Updated EIS report, June 2014.

66. **River system and hydrology.** There are two main rivers in Baise Municipality, including Youjiang and Chengbi River. Youjiang River is the upstream of Yujiang River, which is a primary tributary of the Pearl River. Youjiang River originates at the Yangmei Mountain in Guannan County of Yunnan Province and flows from the northwest towards the southeast across Baise. It merges with Xiyangjiang River after passing through Xilin and Tianlin Counties, and becomes Boyi River, then merges with Chengbi River at Baise City and becomes Youjiang River. It then merges with Zuojiang River at the Song Village of Nanning Municipality and becomes the Yujiang River. The total length of Youjiang River is 718 km. Its length within Baise Municipality is 465 km, with a catchment of 21,903 km^2. The annual average flow rate in the Baise section is 277 m^3/s and the incoming water volume is 8.74 billion m^3/a. The normal water level in the Baise section is 115.52~115.97 m. The water level for 1-in-50 year flood return is at 119.88~121.22 m. The existing embankment is an elevation of 120~135 m, providing adequate protection from 1-in-50 year floods. (The flood risk within the project area is discussed in para 138).

67. **Chengbi river** originates from the foot of Qinglong Mountain in Lingyun County with the total length of 56.8 km and a total catchment area of 1,326 km^2. It flows into Youjiang River in Baise City. The average flow of Chengbi River is 40.5 m^3/s (1.1581 billion m^3 per year). Chengbi River is the main water source of Baise City, supplied through the Chengbi Lake, an artificial reservoir.[15] The reservoir is located northeast of Baise city, upstream of Chengbi River, 4.1km upstream of the Chengbi Campus. The reservoir area is 39.1 km^2 (when full), with a total storage capacity of 1.25 billion m^3, and an effective capacity of 580 million m^3. The annual average runoff volume is 38.7 m^3/s, and the average water level of the reservoir is 175.69 m. Chengbi Reservoir is the drinking water source of Baise City.

68. **Groundwater.** The site of Chengbi campus contains two layers of groundwater, i.e. phreatic water in loose rock mass recharged mainly by rainwater (2.0-3.0 m deep under the lowest ground in the campus, with annual variation of 1-2m); and bedrock fissure water (6.0-8.0 m deep), which has slight corrosion potential to the concrete structure and reinforcing steel bars.[16] None of these groundwater resources are being utilized.

69. **Flora and fauna.** The ecosystem within the assessment area (i.e., New, Chengbi Campus) can be characterized as a shrub and grassland ecosystem with strong human disturbance, with low diversity of plant species. Vegetation within the area belongs to the sub-tropical monsoon evergreen broad-leaf forest, and consists mainly of evergreen shrubs, gramineae (true grasses), *engelhardia* (tree), *fagaceae (trees and shrubs)*, as well as fruit trees (mango, litchi, banana). None of the rare and protected species present in Chengbi River Nature Reserve (see below) has been recorded in the project site.[17] Animals are dominated by small birds, rodents and snakes, with frogs occurring in wet areas. The project area is significantly human-altered and does not contain animal habitats of importance.

70. **Protected sites.** Literature review and site reconnaissance conducted for the EIS revealed that there is no protected area or nature reserve, and no record of rare, threatened, or endangered species within the project's area of influence. The Chengbi River Nature Reserve (CBRNR) is located at the Chengbi Lake Reservoir 7 km to the northeast of Baise's urban area, and 4.1 km from the project's area of influence. It is a forest-reservoir ecosystem covering an area (including the reservoir) of 39 km^2 with the functions of biodiversity conservation, water source protection, scientific research and eco-tourism. It was added to the list of important nature reserves in the PRC in 2000. Due to the distance separation, CBRNR will not be affected by this project.

71. **Natural resource.** Baise is rich in natural resources. It is a famous base for subtropical fruits and vegetables in GZAR and in the PRC. Forests cover 58.6% of the municipality's total land area. Baise is rich in mineral resources such as bauxite, copper, crystal, lignite, and gold. Prospective reserves of bauxite total 1 billion tons, accounting for almost one third of the PRC's total. Baise is also an important producer of aluminum, both in ore and in product manufacturing. It is the 3rd largest hydropower producer in the province, with 5 million kilowatts produced annually.

[15] Chengbi Lake in Chinese means "the lake with clear and clean water".
[16] Source: FSR.
[17] Species under national protection include shorea chinensis, golden camellia, hopea chinensis, caesalpiniaceae Erythrophleum fordii, Gungxi greengage, fokienia hodginsii, tsoongiodendron odorum, burretiodendron hsienmu, Zenia insignis, toon and keteleeria fortune. Wild animals of relevance include pangolin, macaques, *cervus elaphus* (red deer), civet, wild pig, *gekkonidae* (geckos), snakes such as the *Ophiophagus Hannah* (King cobra), the *zaocys*, coral snake, francolin, and many bird varieties.

B. Socioeconomic Conditions

72. **Economic features.** Baise realized GDP of CNY74.62 billion in 2012, representing a rise of 8.9% year on year. The city's GDP accounted for approximately 5.7% of GZAR's total. The value added output of secondary industry (industry and construction) amounted to CNY41.42 billion, accounting for 55.5% of the city's total. In 2012, the value added industrial output from enterprises rose 10.1% year on year to CNY31.51 billion. Nonferrous metallurgy is one of the pillar industries of the city. In addition, petrochemicals, energy, coal, manganese smelting, building materials, sugar production and paper making have also been developing rapidly. The service sector contributed 26.0% of the city's total GDP in 2012. During 2012, Baise's tourism income totaled RMB 9.51 billion, increasing 28.1% year on year.

73. In 2012, the total value of imports and exports amounted to US$508.66 million (comprising export value of US$ 292.86 million and import value of US$ 215.8 million), up 18.6% year on year. The city's major trading goods are aluminum, electrolytic manganese and pre-baked anode. Exports sell primarily to countries in ASEAN. The major economic indicators are listed in **Table IV-2.**

Table IV-2: Baise Economic Development Indicators in 2012

No.	Economic Indicator	Data
1	Total GDP	74.62 billion RMB
	GDP composition	
2	Primary industry	18.5%
3	Secondary industry (industry and construction)	55.5%
4	Tertiary industry (Service)	26.0%
5	GDP per capita	21,279 RMB
6	Unemployment rate	3.5%
7	Fixed asset investment	100.1 million RMB
8	Tota import and export	508.66 million USD
9	Export	292.86 million USD
10	Import	215.8 million USD
11	Sales of consumer goods	15.67 billion RMB

GDP = gross domestic product.
Source: Baise Social economic Development Report 2012.

74. **Transportation.** Baise has a very convenient transportation system. The Baise Airport, 38 km from the city's downtown area, operates flights to cities such as Guilin, Nanning, Chongqing and Guangzhou. The Nanning-Kunming, Shantou-Kunming, and Baotou-Youyi Pass Expressways, State Highway 323 and State Highway 324 run through the city. In addition, the Nanning-Kunming Railway, the trunk railway in southwest of Guangxi, also runs across Baise and connects the city with Nanning and Kunming, the capitals of Guangxi and Yunnan, respectively.

75. **Physical cultural resources.** Baise is a multi-cultural city with 7 ethnic minority groups, including the Zhuang, the Miao, the Yi, the Mulao and the Yao. They live together harmoniously and retain their cultural legacy and life practices. Baise has a revolutionary history. Youjiang Revolutionary Base, established by Deng Xiaoping in 1929, has become one of the most important red tourism (revolutionary tourism) spots in the PRC. Baise Uprising Memorial is also ranked as one of the country's 100 Patriotism Educational Demonstration Bases by China's Publicity Department. Consultations with the relevant cultural authority and site investigation during the IEE and domestic EIS showed that the project-influenced area does not have any known cultural or historical sites. Should buried artifacts of archaeological significance be uncovered during the construction stage within the project areas, construction will be stopped and immediately reported to the Baise Cultural Heritage Bureau in

accordance with the PRC's Cultural Heritage Protection Law.

C. Environmental Quality Baseline

76. **Ambient air quality.** The PRC ranks air quality into 3 classes according to its Ambient Air Quality Standard (GB 3095-1996), with Class I being the best air quality and Class III the worst air quality. Daily and hourly average ambient air quality was monitored by the local EMS for seven consecutive days from 9 to 15 April 2014. Daily average monitoring was conducted four times a day (2:00, 8:00, 14:00 and 20:00, respectively). One sampling point was selected at the center of the campus. Baseline data is shown in **Table IV-3**. The applicable standard is Grade II of National Ambient Air Quality Standard (GB3095-1996).

Table IV-3. Air Quality in Project Areas (Unit: mg/m^3)

	Para.	Time	Date (April 2014)							GB3095-1996 (Grade II)	GB3095-2012 (Grade II)	EHS Guideline
			9	10	11	12	13	14	15			
Hourly Average	SO_2	02:00	ND	ND	ND	ND	ND	ND	ND	0.50	0.50	n/a
		08:00	ND	ND	ND	ND	ND	ND	ND			
		14:00	ND	ND	ND	ND	ND	ND	ND			
		20:00	ND	ND	ND	ND	ND	ND	ND			
	NO2	02:00	0.008	0.010	0.007	0.007	0.013	0.008	0.006	0.24	0.20	0.20
		08:00	0.011	0.012	0.009	0.009	0.012	0.006	0.009			
		14:00	0.007	ND	0.010	ND	0.006	0.005	0.008			
		20:00	0.007	0.007	0.006	0.005	ND	0.008	0.009			
Daily Average	SO2		ND	ND	ND	ND	ND	ND	ND	0.15	0.15	0.125 -0.05
	NO2		0.008	0.007	0.007	0.007	0.009	0.007	0.007	0.12	0.08	0.10
	TSP		0.096	0.094	0.155	0.137	0.193	0.213	0.124	0.15	0.15	--
	PM10		0.067	0.066	0.072	0.061	0.094	0.106	0.064	0.15	0.15	0.075 -0.15

Key: ND - not detected (lower than detection limit).
Source: Domestic EIS Report, June 2014.

77. According to **Table IV-3** above, the quality of the monitored ambient air in the campus all met the Grade II Standard of GB 3095-1996 and GB3 095-2012, as well as the guideline values recommended in the World Bank Group's EHS Guidelines.

78. **Noise.** Noise monitoring within the project area was conducted during the period of 10–11 April 2014 at the boundaries of the New Chengbi Campus. Eight points were selected, which are shown in **Table IV-4**, and the monitoring results are listed in **Table-5** below.

Table IV-4: Baseline Noise Monitoring Locations

Sampling Code	Monitoring Location	Description
#1	East boundary of the campus	Barren land
#2	South boundary of the campus	40m west of the road (first floor of the school)
#3	West boundary of the campus	15 m to the Banbei Expressway
#4	North boundary of the campus	Nearby the teaching building
#5	East boundary of the ADB construction scope	Nearby the teaching building
#6	South boundary of the ADB construction scope	Nearby the teaching building
#7	West boundary of ADB construction scope	Barren land
#8	North boundary of the ADB construction scope	Nearby the teaching building

ADB = Asian Development Bank.
Source: Domestic EIS Report, June 2014.

Table IV-5: Baseline Noise Monitoring Data (dB(A))

Sampling Code	Date	Time	Monitored Data	Grade I Standard	EHS Guideline	Assessment Result
#1	10 Apr.	Day	42.6	55	55	meet
		Night	38.1	45	45	meet
	11 Apr.	Day	42.7	55	55	meet
		Night	37.5	45	45	meet
#2	10 Apr.	Day	43.5	55	55	meet
		Night	37.9	45	45	meet
	11 Apr.	Day	43.7	55	55	meet
		Night	38.2	45	45	meet
#3	10 Apr.	Day	49.1	55	55	meet
		Night	38.9	45	45	meet
	11 Apr.	Day	48.6	55	55	meet
		Night	38.8	45	45	meet
#4	10 Apr.	Day	45.7	55	55	meet
		Night	38.4	45	45	meet
	11 Apr.	Day	46.2	55	55	meet
		Night	38.3	45	45	meet
#5	10 Apr.	Day	44.3	55	55	meet
		Night	37.5	45	45	meet
	11 Apr.	Day	44.9	55	55	meet
		Night	37.6	45	45	meet
#6	10 Apr.	Day	45.7	55	55	meet
		Night	38.5	45	45	meet
	11 Apr.	Day	45.9	55	55	meet
		Night	38.7	45	45	meet
#7	10 Apr.	Day	43.1	55	55	meet
		Night	37.9	45	45	meet
	11 Apr.	Day	43.5	55	55	meet
		Night	37.6	45	45	meet
#8	10 Apr.	Day	43.5	55	55	meet
		Night	38.0	45	45	meet
	11 Apr.	Day	43.6	55	55	meet
		Night	38.3	45	45	meet

Source: Domestic EIS Report, June 2014.

79. **Table IV-5** above shows that baseline noise monitoring data all complied with both the PRC standard of GB 3096-2008 and the World Bank's EHS Guideline values.

80. **Surface water quality.** The baseline monitoring of surface water quality within the project impact area was performed during 10-12 April 2014. Three points were selected for the monitoring: point #1 and #2 were monitored for baseline water quality of the Chengbi River, and the point #3 was the water quality of small man-made pond within the campus **(Figure IV-1 and 2)**. The monitoring points are shown in **Table IV-6**, and the monitoring results are presented in **Table IV-7**.

Table IV-6: Baseline Surface Water Monitoring Locations

No.	Description of Monitoring Location	Applicable Standard
#1	Chengbi River (300 m upstream of the sewer pumping station, 400 m southwest of the campus)	Grade II of GB3838-2002
#2	Chengbi River (300 m downstream of the sewer pumping station)	Grade II of GB3838-2002
#3	The man-made pond within the campus	Grade IV of GB3838-2002

Source: Domestic EIS Report, June 2014.

Table IV-7: Surface Water Quality (mg/L, except for fecal coliform and pH)

Monitored Parameter	Date	#1 (Grade II)	#2 (Grade II)	#3 (Grade IV)	Class II Standard of GB3838-2002	Class IV Standard of GB18919-2002
pH	10 Apr.	8.39	8.40	7.58	6-9	6-9
	11 Apr.	8.38	8.38	7.60		
	12 Apr.	8.40	8.40	7.60		
SS	10 Apr.	7.0	10.0	8.0	---	---
	11 Apr.	8.0	9.0	9.0		
	12 Apr.	8.0	11.0	8.0		
DO	10 Apr.	6.7	6.7	5.8	≤6.0	≤3.0
	11 Apr.	7.0	7.0	5.7		
	12 Apr.	6.9	6.9	5.8		
COD_{mn}	10 Apr.	1.2	1.1	2.1	≤4.0	≤6.0
	11 Apr.	1.3	1.1	2.6		
	12 Apr.	1.2	1.1	2.3		
CODcr	10 Apr.	9.0	12.0	12.0	≤15	≤30
	11 Apr.	11.0	8.0	10.0		
	12 Apr.	9.0	10.0	10.0		
BOD_5	10 Apr.	0.9	0.8	0.8	≤3	≤6
	11 Apr.	0.8	0.8	1.0		
	12 Apr.	0.7	0.7	0.8		
NH_3-N	10 Apr.	0.338	0.333	0.432	≤0.5	≤1.5
	11 Apr.	0.421	0.410	0.339		
	12 Apr.	0.377	0.369	0.385		
TP	10 Apr.	**0.17**	**0.25**	0.27	≤0.1	≤0.3
	11 Apr.	0.10	**0.31**	0.15		
	12 Apr.	**0.12**	**0.26**	0.16		
TN	10 Apr.	**0.64**	**0.69**	0.45	≤0.5	≤1.5
	11 Apr.	**0.62**	**0.75**	0.46		
	12 Apr.	**0.62**	**0.71**	0.45		
fecal coliforms (CFU/L)	10 Apr.	1900	1000	760	2,000	20,000
	11 Apr.	**3,700**	**3,800**	2100		
	12 Apr.	**4,700**	**2,200**	1000		

Key: BOD_5 = 5 days biochemical oxygen demand, COD_{cr} = chemical oxygen demand, COD_{Mn} = permanganate index, NH_3-N=ammonia nitrogen; SS = suspended Solid; TN = total nitrogen; TP = Total Phosphorus.
Source: Domestic EIS report.

81. According to **Table IV-7**, all ten monitored parameters at #3 point met the Grade IV standard of GB5838-2002, which shows that the water quality in the small man-made pond in the campus can be used for landscaping purposes (currently being constructed under Chengbi Campus Phase 1 implementation). Three parameters including TP, TN and fecal coliform at #1 and #2 points slightly exceeded the Grade II standard. Plausible causes include the discharge of domestic wastewater into Chengbi River and non-point source pollution (agriculture). These causes are not related to, and will not be exacerbated by the project.

Figure IV-3: Chengbi River nearby the Existing BVS (270 m west of Chengbi Campus)

Figure IV-4: The man-made pond within Chengbi Campus

D. Environment Sensitive Receivers within Project Area of Influence

82. Sensitive receptors during both construction and operation of the project have been identified in the domestic EIS Report. (**Table IV-8**). The project area is significantly human-altered and does not contain critical habitats. The project will have no impact on livelihoods through environmental media.

Table IV-8: Sensitive Receivers within Project Impact Area

No.	Sensitive Receptor	Distance and Direction to the Project Site	Characteristics	No. of Affected People
1	Existing BVS campus (to be renamed “Chengbi West Campus” after the project completion)	200m west	Teaching buildings, students' dormitory.	2,300 students
2	New Chengbi Campus	Project site	Teaching and training buildings, students' dormitory.	10,000-15,000 students
3	Chengbi River	270 m west	Surface water for fishery and landscaping according to the environmentally functional zoning	---

BVS = Baise vocational school.
Source: Domestic EIS Report, June 2014.

V. ANTICIPATED IMPACTS AND MITIGATION MEASURES

A. Screening of Potential Impacts

83. The potential impacts were screened during the IEE and PPTA processes in order to (i) identify the relative significance of potential impacts from the activities of the proposed project and construction and operation activities; (ii) establish the scope of the assessment which assists in focusing on major, critical, and specific impacts; and (iii) enable flexibility in regard to consideration of new issues, such as those that reflect the requirements by ADB's SPS.

84. The screening process showed that the civil works including construction of buildings and other facilities in Chengbi Campus will cause potential environmental impacts. The project impact area will be confined to the campus premises. No significant direct impacts outside the campus are anticipated, with exception of construction traffic. The main impacts relating to the construction, operation of buildings and facilities are indicated in **Figure V-1**.

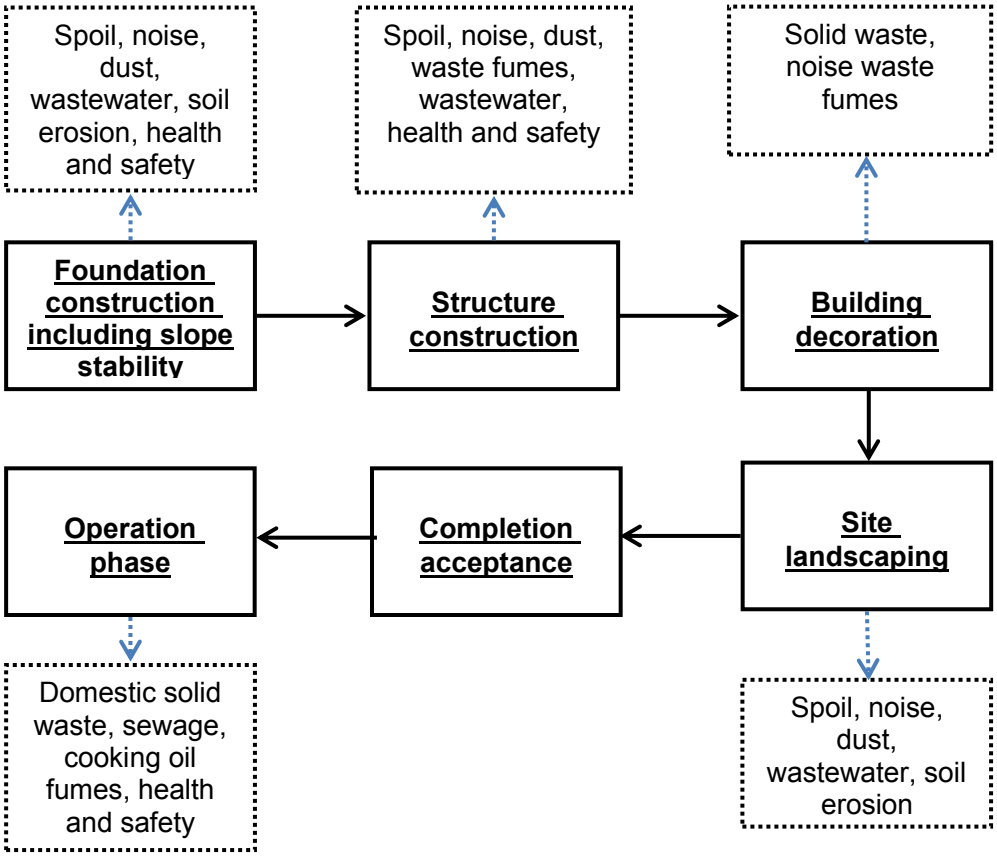


Figure V-1: Major impacts during construction and operation

85. During **construction**, the major negative environmental impacts are associated with increased level of noise and dust due to the usage of heavy vehicles and construction machineries, waste soil and construction debris generated during excavation, backfill, foundation work, concrete structure and building decoration. Risks to occupational and community health and safety from construction activities are also considered potentially significant.

86. During **project operation**, no significant environmental impacts and risks are anticipated. Minor concerns include noise from the air-conditioners and ventilation facilities, practice training wastes, municipal solid waste and domestic sewage. To ensure that project facilities will be safe, energy efficient and green, BU agreed that all buildings shall comply with relevant design standards and codes, including but not limited to: GB/T50378-2006 (Evaluation Standard for Green Buildings); GB 50176-1993 (Thermal Design Code for Public Buildings); GB 50189-2005 (Energy Conservation Design for Public Buildings); GB 50011-2010 (Building Seismic Design Code); GB 50016-2006 (Code of Design on Building Fire Protection and Prevention); Building Energy Saving Design Standards in Guangxi Zhuang Minority Autonomous Region (DB45/221-2007), and other applicable national design codes. Contractors will be required to provide operation and maintenance capacity building and training for the operators of the PV system and heat pumps. This will be included in contract specifications.

87. The results of the impact screening are shown in **Table V-1** below. Impacts during construction and operation phases are considered separately in the following sections.

Table V-1: Screening of Environmental Impacts

Project Phase	Assessment Item	Potential Impacts
Construction	**Landslide**	There are 8 potential landslide sites identified in the FSR.
	Wastewater	Domestic sewage from workers' camps; and wastewater from vehicles and machinery washing.
	Air	Dust generated from construction activities; exhaust gas from construction vehicles and machineries.
	Noise	Noise from bulldozers; excavators and loader; pile driving machines; concrete mixer; vibrator and electric saw; hoist and lifter.
	Solid waste	Construction waste and municipal solid waste from workers' camps.
	Soil	Soil erosion caused by foundation excavation, and surface runoff.
	Health and safety	Construction site safety; occupational health and safety; safety of students and staff during construction activities (including construction traffic).
Operation	**Water source**	Chengbi Lake (Baise's drinking water source, 4.1 km north of the campus) may be impacted by domestic sewer discharge from the campus.
	Wastewater	Waste cooling water containing oil; domestic sewage from buildings;
	Air	Cooking oil fumes from the canteens of the campus;
	Noise	Noise from air-conditioners and ventilation facilities; mechanical training equipment;
	Solid waste	Municipal solid waste and waste from mechanical practice;
	Health and safety	Fire and earthquake safety; indoor air quality and lighting; waste management; water supply; campus traffic management; etc.

Source: Domestic EIS (June 2014) and PPTA consultant observations.

B. Energy Conservation and Greenhouse Gas Emission Reduction

88. The energy conservation and greenhouse gas (GHG) emission reduction benefits of the project are derived primarily from the following major interventions: (i) the solar photovoltaic power generation facility, with the designed capacity of 3.47 MW will be installed on top of all campus buildings with flat roofs (15 buildings). The annual power generation will be 3.3-3.5 million kWh, which amounts to 3,540 tons of CO_2 emission reduction annually in comparison with conventional coal-fired power generation;[18] (ii) the two heat pump air conditioning systems will be installed on the library and administration building, which will bring 2.35 million kWh/a electricity saving, equivalent 2,342 tons of CO_2; (iii) the installation of the on-site wastewater treatment facility in the campus, with the treatment capacity of 2,000 m^3/d and the effluent quality of Class-1A, will produce COD_{cr} removal of 75 tons and allow for 6.0 million m^3 water reuse annually; and (iv) the application of energy conservation materials for the construction of 12 campus buildings, including concrete hollow blocks and sintered porous brick, as well as energy efficient

[18] A KWh electricity generated by solar energy is equal to 0.4 kg standard coal saving and 0.997 kg of CO_2 emission reduction (calculation basis: the PRC's NDRC and MEP.

lighting will further reduce energy consumption as compared to conventional materials. The expected energy saving and GHG emission reduction by the proposed project are shown in **Table V-2.**

Table V-2: Energy Savings and GHG Emission Reduction by the Proposed WTP

No.	Item	Unit	Amount
1	**Solar photovoltaic power generation system**		
	● Designed capacity	MW	3.47
	● Annual power generation	million kWh/a	3.3-3.5
	● Annual CO_2 emission reduction in comparison with conventional coal-fired power generation	tons/a	3,540
2	**The 2 heat pump air conditioning systems**		
	● Annual electricity saving in comparison with conventional electricity system including 2 months for winter heating in winter and 2.5 months for air conditioning in summer (deducted 1 month winter vacation and 1.5 months summer vacation)	million kWh/a	2.349
	● Annual standard coal saving in comparison with conventional electricity system	tons/a	939
	● Annual CO2 emission reduction in comparison with conventional electricity system	tons/a	2,342
3	**On-site domestic wastewater treatment facility**		
	● Designed treatment capacity	m^3/d	2,000
	● Annual COD_{cr} removal	tons/a	75
	● Annual water conservation for landscaping	m3/a	600,000

Source: calculated by the EIA the PPTA consultant based on the FSR.

C. Environmental Considerations and proposed Mitigation Measures during Detailed Design and Pre-construction Phases

89. **Measures implemented during project preparatory technical assistance.** A number of environmental management measures have been implemented during PPTA to ensure that appropriate plans to ensure environmental performance of construction and operation of the project are in place. In the updated FSR (June 2014), all campus buildings and facilities were designed to avoid and/or minimize potential adverse impacts on the environment and surrounding areas (i.e. the existing BVS campus). The project underwent the PRC EIA process under the PRC laws and regulations. The original EIS report was approved by Baise EPB in May 2010, which was updated and strengthened by a qualified EIA institute (GZAR Environmental Science Research Institute) to reflect the revised project scope. The updated EIS was approved by Baise EPB in June 2014. A project-level grievance redress mechanism (GRM) has been defined and will be operational prior to construction to address safeguards related concerns and complaints.

90. **Pre-construction measures.** A number of environmental management measures will be implemented in the pre-construction phase to ensure project's environment management readiness. These include:

(i) **Institutional strengthening,** including (a) appointment of one environment officer within the PMO (PMO-SO); (b) establishment of a project implementing unit (PIU) within Baise University, and appointment of one environment specialist within the PIU (PIU-ES); (c) hiring of an environment specialist within loan implementation support (LIS-ES) by the PMO; and (d) contracting of the Baise environmental monitoring center (BEMC) by the Baise University to conduct environment impact monitoring during construction.

(ii) **Green building design.** The design for all buildings will be made compliant with relevant codes and standards pertaining to health, safety and resource-efficiency, including green

and energy-efficient building codes and specifications, but not limited to: GB/T50378-2006 (Evaluation Standard for Green Buildings); GB 50176-1993 (Thermal Design Code for Public Buildings); GB 50189-2005 (Energy Conservation Design for Public Buildings); GB 50011-2010 (Building Seismic Design Code); GB 50016-2006 (Code of Design on Building Fire Protection and Prevention); Building Energy Saving Design Standards in Guangxi Zhuang Minority Autonomous Region (DB45/221-2007), and other applicable national design codes.

(iii) **Updating environmental management plan.** Mitigation measures and monitoring plan defined in the EMP will be updated and incorporated into the detailed design to minimize adverse environmental impacts. This will be the responsibility of the PMO and Baise University, supported by the LIS-ES.

(iv) **Bidding document and contract documents.** The EMP will be included in the bidding documents and contracts for procurement of civil works, goods and services. All contractors and subcontractors will be required to comply with the EMP. Reference to Public Procurement List of Energy-Saving Products (NDRC & MOF, 2011, or as updated) and Public Procurement List of Environmental Labeling Products (MEP & MOF, 2011, or as updated) will be included in bidding documents to ensure the project's adherence to green procurement principles.

(v) **Training in environmental management.** Baise EPB and the LIS-ES will provide training to the PMO-SO, the Baise University, PIU-ES, contractors and construction supervision company (CSC) on implementation and supervision of EMP, GRM, reporting, in compliance with training plan (**Table EMP-5**).

(vi) **Establishment of a grievance redress mechanism,** including (a) appointment of a GRM coordinator within PIU; (b) provision of training to GRM access points (e.g. PIU-ES, contractors); and (c) disclosure of GRM to affected persons before construction begins.

(vii) **Develop site environmental management plan.** All contractors will be required to develop their site-EMPs, responding to all clauses and requirements of the EMP, and including sub-plans such as Spill Management Plan, Waste Management Plan, Temporary Traffic Management Plan, Occupational Health and Safety Plan, and Soil Erosion Control Plan.

D. Impacts and Mitigation Measures during the Construction Phase

91. The following impacts and mitigation measures refer to construction impacts. Potential construction phase impacts are associated with soil erosion, increased noise and dust levels, liquid and solid wastes, and safety risks to community members (on campus) and workers. Impacts on flora and fauna will be minimal. There are no reports of physical cultural resources in or around any of the sites, though a chance find procedure will be put in place. Overall, environmental impacts associated with the construction phase are expected to be localized and short term, and can be effectively mitigated through the application of sound construction site management practices. Main impacts during construction, as well as mitigation measures, are discussed below.

1. Impacts to Physical and Biological Environment

92. **Impacts on soil and landscape.** Potential impacts and issues related to soil and landscape include: (i) soil erosion; (ii) soil contamination; (iii) inappropriate management of spoil; and (iv) slope protection and landslide risk management.

(i) **Soil erosion**. May be caused by construction, excavation, borrow pits, stockpiles and spoils from earthwork during construction of buildings and site grading. The factors that are expected to contribute to accelerated erosion in the campus are winds and rainfall, especially during the rainy months of April to September. Construction works should be programmed to minimize soil excavation works in rainy seasons. If erosion prevention

measures described below in the construction phase are implemented, no significant induced soil erosion is anticipated.

(ii) **Soil contamination.** Contamination of soil in the construction phase may result from the inappropriate transfer, storage, and disposal of petroleum products, chemicals, liquids and solid waste.

(iii) **Spoil and deconstruction waste disposal.** Significant spoil disposal will be required, and potential impacts will be short-term and localized.

(iv) **Landslide risk.** Eight potential landslide sections have been identified in the FSR, including four caused by nature and four induced by human activity **(Figure V-2)**. A landslide risk assessment was conducted in the framework of the FSR, which concluded that risk of landslides at these eight points was relatively low, but that slope protection works were required.

93. **Earthwork.** According to the updated EIS and the water and soil conservation plan (WSCP), the project will require significant earthwork. Construction in Chengbi Campus Phase 2 will require 2.7 million m^3 of earth excavation including building foundation and slope excavation works, and 1.8 million m^3 of filling earth. The total surplus earth is 806,800 m^3, which will be transported to an approved spoil disposal site.[19] (**Table V-2**).

Table V-3: Earth Balance of Constructions (Unit: 10,000 m^3)

Item		Excavation					Filling			Spoil disposal
		Top soil	Earth	Stone	Spoil	Subtotal	Earth	Stone	Subtotal	
Site leveling	Top soil removal	9.49	-	-	-	9.49	-	-	-	
	Excavation and filling	-	113.22	55.39	-	168.61	62.00	55.39	117.39	51.22
	Sub-total	9.49	113.22	55.39	-	178.10	62.00	55.39	117.39	51.22
Buildings	Foundation works	-	0.88	0.43	-	1.31	0.34	0.28	0.62	0.69
	Basement work	-	5.29	2.59	-	7.88	-	-	-	7.88
	Structure	-	-	-	0.61	0.61	-	-	-	0.61
	Sub-total	9.49	119.39	58.41	0.61	187.90	62.34	55.67	118.01	60.40
Road construction		-	54.67	26.74	-	81.41	34.76	26.74	61.50	19.91
Water supply and drainage works		-	0.48	-	-	0.48	0.29	-	0.29	0.19
Workers camps		-	-	-	0.18	0.18	-	-	-	0.18
Total		**9.49**	**174.54**	**85.15**	**0.79**	**269.97**	**97.39**	**82.41**	**179.80**	**80.68**

Source: Domestic EIS and WSCP.

94. **Mitigation of impacts on soil**.[20] The construction sites in the campus are relatively small and the impacts on soil will be mitigated through a number of remedial measures which are defined in the EMP. The following mitigation measures defined in the EMP shall be included in construction contracts and the site-EMPs, to be developed by contractors:

(i) **Soil erosion**. If soil excavation cannot be avoided during rainy season or at any time of the year when rainstorms are likely, temporarily exposed slope surface should be covered, e.g. by tarpaulin. Arrangements should be in place to ensure that adequate surface protection measures can be carried out well before the arrival of rainstorm. Since disturbed areas are relatively small, the plan can be an overlay to the site plan showing how runoff will be controlled at site perimeter to control soil and water runoff, and how disturbed areas will be reclaimed.

[19] The approved spoil disposal site is located 200m north of the Chengbi campus. The site was confirmed in the WSCP approved by Baise Municipal Water Resource Bureau on 6 May 2010 (Baise Shuibao-2010/13). The total disposal capacity is 1.0 million m^3. Drainage ditches have been constructed and the re-vegetation and ecological restoration plan is available.

[20] These measures are defined more precisely in the WSCP approved by Baise Municipal Water Resource Bureau, May 2010 (Doc. No. Baise Shuibao-2010/13).

(ii) **Soil contamination.** (a) Store small amount of chemicals/hazardous products at short time and waste on impermeable surfaces in secure, covered areas; (b) Remove all construction wastes from the site to approved waste disposal sites; (c) Establish Spill Management Plan; (d) Provide spill cleanup measures and equipment at each construction site; and (e) Conduct training in emergency spill response procedures.

95. **Slope protection, landslide risk mitigation.** During the PPTA, different methods for slope protection have been evaluated and selected. Three schemes ware defined in the FSR based on the slope conditions and the findings of the geological assessment report (**Figure V-2** and **Figure V-3**). The slope protection works will include: (i) Design I – natural vegetation slope protection (in blue); (ii) Design II – gravity retaining wall + vegetation slope protection (in pink); and (iii) Design III – arched concrete-framed vegetation slope protection (in red). The area of slope protection is 40,606 m^2 in total, and the designs comply with the PRC's Standard Drawings for Retaining Walls and Slope Protection of 04J008.

Figure V-2: Potential Landslide Sections in the Campus

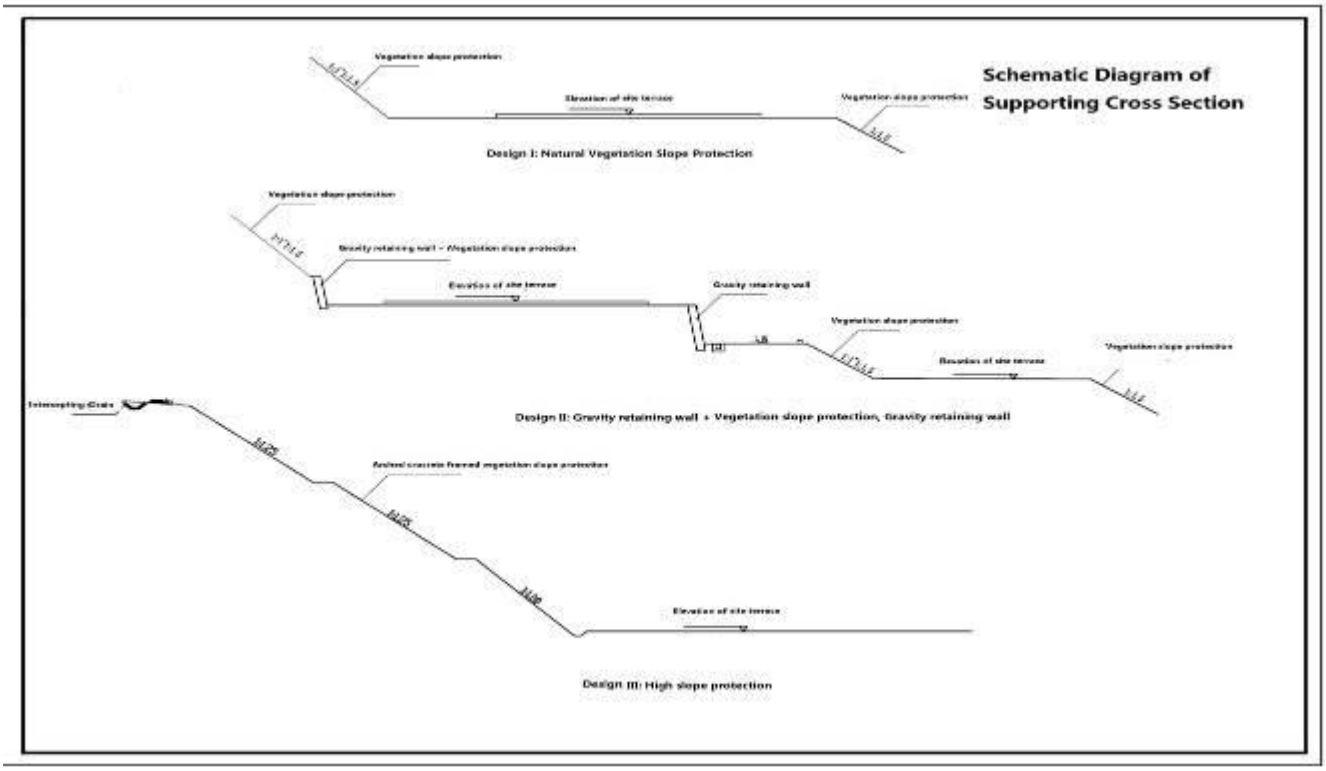


Figure V-3: Proposed Construction Methods for Slope Protection

Figure V-4: Arch Concrete-Framed Vegetation Slope Protection (Design III)

Figure V-5: Natural Vegetation Slope Protection with Intercepting Drain (Design I)

96. **Impacts on surface and groundwater.** Since the buildings to be constructed are located on higher elevation within the campus, the FSR and EIS predict that no permanent site drainage will be needed. However, site drainage will be required for some foundation construction. The pumping will be temporary and localized, with no long-term impact on groundwater aquifer. The major risk to groundwater and surface waters is through spills of dangerous substances, and inappropriate construction waste management. The potential risks to surface and groundwater will be mitigated through a number of measures defined in the EMP, which will be incorporated in construction contracts and clearly defined in site-EMPs to be developed by the contractors:

(i) Construction wastes and materials (e.g. fuel) shall be properly contained during construction. Wastes shall be removed from the construction sites and taken to approve spoil disposal site timely.

(ii) Water collection basins and sediment traps shall be installed in all areas where construction equipment is washed.
(iii) Wastewater generated from the washing down of concrete mixers and drum mixers and similar equipment should wherever practicable be recycled. The discharge of wastewater should be kept to a minimum. Surplus wastewater and wastewater generated from building construction activities, including concreting, plastering, cleaning of works and similar activities should be discharged in to sewer after removal of solids in a silt removal facility.
(iv) Sewage from temporary toilets, kitchens and similar facilities should be stored in an on-site facility (such as septic tank), emptied regularly and transported to a designated wastewater treatment plant for further treatment.

97. In Chengbi campus, there will be a pond system (3 interconnected ponds, 2.2 ha in total) and a small stream (600 m long and 10-15 m wide and 2 m deep) running through the campus. The waterway is designated for purposes of campus landscaping and storm water drainage (the total storage capacity of lakes and stream is 141,000 m^3). The works on the pond system and stream are not included in the project scope (constructed during Phase 1). Water quality monitoring will be conducted periodically to confirm compliance with surface water quality standards.

98. **Impact on drinking water source protection zone (Chengbi Lake).** The proposed project will have no negative impact to the protected drinking water source: Chengbi Lake (Chengbi reservoir) is the drinking water source of Baise City, which is located 4.1 km north of the Chengbi Campus. The campus is located 270 m east of Chengbi River (**Figure V-6**), downstream of the reservoir. The campus is not located within the water source protection zones (Grade I and II zones). All project activities during construction and operation will be merely confined to the campus boundaries, downstream of the water source protection zones. The sewage pipeline and sewage pumping station that will connect the new campus to the city's sewer network and the wastewater treatment plant (WWTP) will be completed by September 2014, i.e., prior to commencement of project implementation.

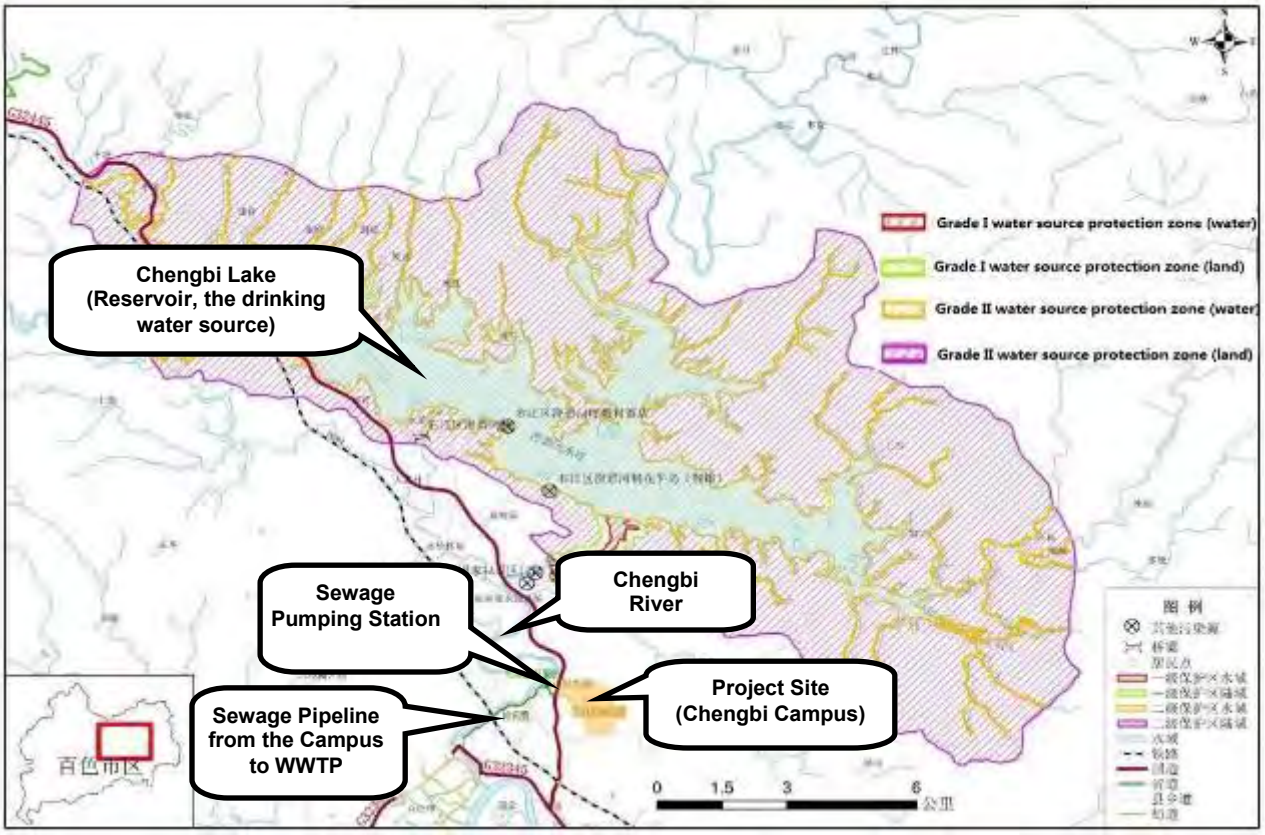


Figure V-6: Location and Distance between the Drinking Water Source and the Campus (source: the EIA Institute)

99. **Impacts on air quality.** Minor temporary air quality impacts during the construction stage of the project are anticipated due to fugitive dust generation in and around the campus. Minor increases in the level of nitrogen oxides (NO_x) and sulfur dioxides (SO_2) from construction vehicles and machineries are expected. These impacts will be localized and temporary, but could affect the construction workers as well as students and faculties in the existing BVS campus, that is 200 m away from Chengbi campus. The potential impacts on air quality will be mitigated through a number of activities defined in the EMP, to be reflected in site-EMPs of contractors. The civil works contracts will specify the following:

(i) Water shall be sprayed on construction sites where fugitive dust is generated.
(ii) Fuel & chemicals shall be covered and stored to minimize emissions.
(iii) Trucks carrying earth, sand or stone shall be covered with tarps or other suitable cover to avoid spilling.
(iv) Construction vehicles and machinery shall be maintained to a high standard to ensure efficient fuel-burning.
(v) Contractors and Baise University (through its PIU) shall regularly consult students and staff of the Chengbi Campus, the BVS campus, as well as nearby residents to identify concerns, and implement additional measures as necessary.
(vi) Perimeter fences shall be erected at each construction site prior to excavation works to limit access to the construction site and control fugitive dust emissions. The fence shall be at least 2 m high. The perimeter fence will have cumulative benefits of dust mitigation, noise diffusion and community health and safety.
(vii) Regular air quality monitoring (PM_{10}, TSP) shall be undertaken by a licensed institute during construction works in around the campus in accordance with the environmental monitoring plan.

100. **Solid waste management.** Inadequate disposal of construction wastes could have adverse impacts on soil, water and health of workers and the students and staff of the Chengbi and BVS campuses. Waste streams will include inert construction wastes (soil, debris, residual concrete etc.), municipal solid wastes (MSW, construction workers' food and packaging wastes from construction consumables) and potentially hazardous wastes (fuel containers, oil filters, oily rags etc.). The updated domestic EIS estimates that, during the construction period, there will be 200 workers on the site in average. The MSW per worker will be 0.6 kg/d, thus the daily MSW increase will be 120 kg/d, which will be disposed to the municipal landfill through the existing MSW collection and disposal system.

101. The potential impacts arising from solid waste production and disposal will be mitigated through a number of activities defined in the EMP. In compliance with "*Construction Waste Management in Baise*"[21], construction waste must be transported by licensed contractors and transport vehicles must be cleaned timely. the following waste management and impact mitigation measures have been defined in the EMP, which shall be defined in construction contracts and the site-EMPs, to be developed by contractors:

(i) Maximize reuse/recycling of construction waste.
(ii) Provide appropriate waste storage containers for workers' municipal garbage.
(iii) Install confined storage points of solid wastes, regularly haul to an approved disposal site.
(iv) Use licensed contractors to remove wastes from the construction sites.
(v) Prohibit burning of waste.

102. **Noise.** The major sources of noise are movement of construction vehicles, haulage of construction materials to the construction sites and the noise generating activities at the construction sites. Foundation works, concrete mixing and material movements are the primary noise generating activities and will be uniformly distributed over the entire construction period. Each construction machine can be treated as one point noise source. The point source noise attenuation formula and noise superimposed formula have been used to predict the major construction machinery noise impacts during construction.

Point source noise attenuation formula*:*

$$L_2 = L_1 - 20\lg\left(\frac{r_2}{r_1}\right) - \Delta L$$

Noise superimposed formula:

$$L_{eqs} = 10\left(\sum_{i=1}^{n} 10^{0.1L_{eqi}}\right)$$

Where,

L1,L2 - the noise value at points of r1.r2 (dB(A));

r1,r2 - the distances of the points to the noise source(m);

⊿L- Houses, trees and other shield contributions to noise attenuation value (dB(A));

Leqs -The equivalent sound level value at the prediction point (dB(A));

Leqi - Equivalent sound level of the i-th point source on the prediction point (dB(A)).

103. Without consideration of the construction fence contribution to machinery noise attenuation (i.e.,

[21] The document No "Baise_Gov_2010-135, 27 August 2010".

the △L=0), machinery attenuation only rely on spatial distance natural attenuation, the intensity and scope of the noise caused by the project have been modeled (**Table V-3)**.

Table V-4: Predictive noise levels of construction machinery with various distances (Unit: dB(A))

Major construction machinery	Predictive noise values						Distance to meet GB12523-2011 standard (m)	
Distance from machine	**10 m**	**20 m**	**40 m**	**80 m**	**160 m**	**200 m**	**day**	**night**
Loader	78.0	71.9	65.9	59.9	57.2	56.1	53	225
Excavator	78 0	71.9	65.9	59.0	56.6	56.0	53	225
Bulldozer	78.0	71.9	65.9	59.9	57.2	56.1	53	225
Pneumatic hammer, pneumatic drills	88.0	81.9	75.9	69.9	59.1	57.8	120	359
Air compressor	88.0	81.	75.9	69.9	59.1	57.8	120	359
Static pressure piling	78.0	71.9	65.9	59.9	57.2	56.1	53	225
Tower crane	73.0	66.9	58.9	54.9	54.2	48.9	30	159
Bar Straightening Machine	78.0	71.9	65.9	59.9	57.2	56.1	53	225
Stone cutting machine	83.0	79	70.9	64.9	57.9	57.1	90	292
Chainsaw	73.0	66.9	60.9	54.9	57.2	56.1	53	159
Hammer	73.0	66.9	60.9	54.9	57.2	56.1	53	159
Multi-function woodworking plane	83.0	76.9	70.9	64.9	57.9	57.1	92	292
All machinery operated at the same time	93.1	87.0	81.0	75.0	72.6	68.2	230	430

Source: Updated domestic EIS Report, June 2014.

104. **Table V-4** shows that for construction machinery noise in the unobstructed case, single noise source, the impact zone at daytime will be 30-159 m distance and at night will be 159-359 m (i.e., distance to meet the requirements of *Construction Site Boundary Environmental Noise Standards*, GB12523-2011). If all of the machinery and equipment operate at the same time, the distance increases to 230 m at daytime and 430 m at night.

105. Contractors will be required to regulate their construction activities and implement the following mitigation measures to ensure compliance with the relevant provisions of the PRC Environmental Noise Pollution Prevention Ordinance, GZAR's Environmental Noise Pollution Control Ordinance (issued in 1993) and *Baise Environmental Noise Pollution Control Ordinance* (revised in 2008):

(i) Nighttime works should only be conducted in exceptional cases, and a permit should be obtained for that purpose. Potentially affected people including students and staff on the New Chengbi Campus and the BVS campus should be informed in advance.

(ii) Maintain equipment and machinery in good working condition; undertake regular equipment maintenance, ensure compliance with PRC standard of GB 12523-2011.

(iii) Locate sites for concrete-mixing and similar activities at least 300 m from school buildings where classes take place on the Chengbi and BVS campus.

(iv) Monitor noise within the campus and at nearby sensitive areas at regular intervals (as defined in the monitoring plan).

(v) Install temporary anti-noise barriers to shield buildings where non-compliance with Category I in Environmental Quality Standards for Noise (GB3096-2008) is monitored.

(vi) Seek suggestions from Baise University and BVS management and potentially affected sensitive receptors to reduce noise annoyance. Disseminate information on procedure of handling complaints through the GRM.

106. **Impact on ecological resources.** As described in para 91 (Environment Baseline), the ecosystem within the New Chengbi Campus can be characterized as a shrub and grassland ecosystem influenced by strong human disturbance, with low diversity of plant species. Vegetation within the area belongs to the sub-tropical monsoon evergreen broad-leaf forest, and consists mainly of evergreen shrubs as well as fruit trees (mango, litchi, banana). Field investigations have established that there are no threatened or endangered flora and fauna species within the project's direct area of influence. Therefore, no adverse impact on such species is likely to occur during the construction activities. All sites will be re-vegetated after construction. According to the campus master plan, about 10,000 trees and bushes, and 10ha of grass and flowers will be planted by using domestic fund after the construction completion. Only native, non-invasive species will be selected within the campus.

2. Socioeconomic Impacts

107. **Land acquisition and resettlement**. The project will not involve land acquisition and resettlement, and is categorized C for resettlement. Output 2 of the project will be implemented on the land of Chengbi Campus that the implementing agency has had right to use since 1970. The implementing agency with support of a local independent agency prepared a due diligence report (DDR) on the land property, use rights and affected ground attachments. ADB approved the DDR on June 17, 2014. Should there be any change in scope or other changes with unanticipated resettlement impacts during project implementation, land acquisition and resettlement activities will be implemented in accordance with ADB's SPS.

108. **Economic displacement**. There will be no economic displacement or impacts on livelihoods through environmental media associated with the project.

109. **Loss of physical cultural resources**. There is no record of cultural heritage or archaeological sites on the campus. Should archaeological objects be discovered during site works, the government requirements for excavating and preserving those items will be strictly followed. The mitigation measures will include immediate suspension of construction activities if any archaeological or other cultural relics are encountered. Baise Municipal Cultural Relic Bureau (CRB), as well as Baise University (as the implementing agency) and PMO, will be promptly notified, and construction will resume only after thorough investigation and with the permission of the CRB. This requirement is included in the EMP.

110. **Risks to community health and safety (including students and staff).** Construction sites will be located 200 m east of the existing BVS campus, representing a minor threat to about 2,300 students' health and safety. Phase I of the New Chengbi Campus will be in operation by the time of project implementation, with some 4,000-5,000 students and staff expected during peak school season. The potential impact on community health and safety will be mitigated through a number of activities defined in the EMP (in addition to the measures defined to control noise and dust). The contractors will implement the following measures:

(i) **Traffic management**. Contractors will prepare temporary traffic control and operation plans in consultation with the management of Baise University and representatives of the New Chengbi Campus and the BVS campus, as well as local traffic police prior to construction. The plans shall include provisions for diverting or scheduling construction traffic to avoid peak traffic hours, avoiding periods of main teaching activities such as exams, regulating traffic at road crossings with an emphasis on ensuring public safety through clear signage. Contractors shall designate staff members to control traffic during on-school and off-school hours.

(ii) **Access to construction sites**. The construction sites will be made secure, discouraging access through appropriate fencing. Heavy machinery will not be used after day light and all such equipment will be returned to its overnight storage area/position.

(iii) **Information and communication**. In conjunction with the Baise University management and the PIU, the contractors shall hold a meeting prior to commencing construction to discuss issues associated with ensuring the safety of students and staff, in the vicinity of the construction site. Clear signs will be placed at construction sites in view of the people at risk (including students, staff and nearby communities), warning people of potential dangers such as moving vehicles, hazardous materials, excavations etc. and raising awareness on safety issues.

111. **Occupational health and safety**. The civil work contractors will implement adequate precautions to protect the health and safety of construction workers. Each contractor will prepare a site-EMP on the basis of the EMP. It will be submitted to the Baise University and PMO, as well as Baise Municipal Labor Bureau for review and appraisal. In terms of health and safety, the site-EMP will include the following provisions:

(i) **Staffing.** Each contractor will appoint at least one staff to implement and supervise the implementation of the Site-EMP and the performance of subcontractors, if any.
(ii) **Clean water.** Provide a clean and sufficient supply of fresh water.
(iii) **Sewage and wastewater.** Provide an adequate number of latrines and other sanitary arrangements at the site and work areas, and ensure that they are cleaned and maintained in a hygienic state.
(iv) **Solid waste.** Garbage receptacles at construction site, which will be periodically cleared to prevent outbreak of diseases will be setup.
(v) **Personal protection.** Provide personal protection equipment (PPE), such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection, in accordance with relevant health and safety regulations, for workers.
(vi) **Emergency preparedness and response.** 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 will be prepared, and submitted to the implementing agency and the PMO for review and appraisal. A fully equipped first-aid base at each construction site will be organized.
(vii) **Records management.** A Records Management System that will store and maintain easily retrievable records protected against loss or damage will be established. It will include documenting and reporting occupational accidents, diseases, and incidents. The records will be reviewed during compliance monitoring and audits.
(viii) **Safety communication.** Ensure that safety, rescue and industrial health matters are given a high degree of publicity to all persons regularly or occasionally on the site. Posters drawing attention to site safety, rescue and industrial health regulations will be made or obtained from the appropriate sources and will be displayed prominently in relevant areas of the site.
(ix) **Training, awareness, and competence.** Train all construction workers in basic sanitation and hygiene issues, general health and safety matters, and on the specific hazards of their work. To minimize the risk of conflicts between workers and staff/students of the schools, contractors shall also implement HIV/AIDS and sexually transmitted infections (STIs) awareness and prevention training for all employees, and together with the local centers of disease control and the school management, disseminate information on the risks, hazards, impacts and prevention know-how on HIV/AIDS and STIs among the staff/students, workers on the construction sites, students and faculties of Baise University, and local community.

112. **Labor standards and rights.** In order to ensure that contractors adhere to core labor standards and workers' rights, Baise University will ensure that all construction contracts will include provisions to require the contractors to (i) provide equal pay for equal work, regardless of gender or ethnicity; (ii)

provide the timely payment of wages; (iii) use local unskilled labor, as applicable, (iv) comply with core labor standards and the applicable labor laws and regulations, including stipulations related to employment, e.g. health, safety, welfare and the workers' rights, and anti-trafficking laws; and (v) not employ child labor. Baise University will further ensure that contractors maintain records of labor employment, including the name, ethnicity, age, gender, domicile, working time, and the payment of wages. These requirements shall be clearly specified in all relevant bidding documents.

113. **Utilities provision interruption.** At the campus construction site, construction may require relocation of local utilities such as water, sewers and communication cables. Temporary suspension of services (planned or accidental) can affect the nearby BVS campus' daily operation. The potential impacts on utilities provision will be mitigated through a number of activities defined in the EMP (and flagged as assurance in the project agreement), to be incorporated in construction contracts and the site-EMPs of the contractors:

(i) Contractors shall assess potential disruption to services and identify risks before starting construction.

(ii) If temporary disruption is unavoidable the contractor will develop a plan to minimize the disruption and communicate the dates and duration in advance to all affected people, in conjunction with the Baise University management.

E. Environmental Impact and Mitigation Measures during Operation

114. No major environmental impacts are anticipated during the operation of project buildings and facilities. The project buildings and facilities will create emissions (summarized in **Table V-5** and discussed below), but these can easily be addressed by integrating new buildings and facilities into the campus' and the municipal services (water supply, MSW disposal, and wastewater collection and discharge). To ensure healthy and safe campus management practices, the project buildings and facilities will comply with relevant design standards and codes for energy-efficient, safe and green public buildings, including but not limited to: GB/T50378-2006 (Evaluation Standard for Green Buildings); GB 50176-1993 (Thermal Design Code for Public Buildings); GB 50189-2005 (Energy Conservation Design for Public Buildings); GB 50011-2010 (Building Seismic Design Code); GB 50016-2006 (Code of Design on Building Fire Protection and Prevention); Building Energy Saving Design Standards in Guangxi Zhuang Minority Autonomous Region (DB45/221-2007), and other applicable national design codes. The project will also adhere to PRC green public procurement policies for equipment and appliances procurement.[22] The project will adopt the technologies included in the "Key Technologies promoted in Guangxi Province", such as: (i) new grade III steel; (ii) thermal insulation concrete hollow bricks; (iii) new waterproof technologies. The two on-site wastewater treatment plants (associated facilities) will be operated and maintained by the Comprehensive Affairs Bureau of Baise University. Effluent quality monitoring will be conducted periodically by the Baise EPB to confirm compliance with the national effluent standard. Treated effluent will be used for landscaping purposes in the campus surface water system.

115. The project will also support Baise University in defining a campus sustainability strategy (by 2015), and establishing a sustainability center (by 2017), to be coordinated by Baise University's Comprehensive Affair Department. The sustainability center will build on ongoing sustainability programs and initiatives of Baise University, and aim at ensuring sustainable environmental path for Baise University. The center will aim at greening campus practices, curriculum development, and community awareness, with a strong focus on low-carbon, energy- and resource-efficient campus management.

[22] A rating weight will be assigned to equipment that meets green procurement standards during bid evaluation.

Table V-5: Main Resource Use and Emissions, Proposed Abatement, and Conservation Measures

Item	Users/Producers	Pollutants	Anticipated amount	Abatement and conservation measures
Water supply	All buildings		4,450 m^3/d during school season, and 470 m^3/d during vacation.	Reuse of treated wastewater (2,000 m^3/d, class 1A, disinfected) for campus landscaping. Water conservation promoted through application of water saving appliances (see below), awareness raising program coordinated by Sustainability Center.
Domestic Wastewater	Dormitories, teaching and training buildings (bathrooms)	SS, COD, TP, NH_3-N, E.coli	3,560 m^3/d during school seasons and 375 m^3/d in vacations	In the school season, 2,000 m^3/d will be treated in the on-site WWTP; the remaining 1,500 m3/d will be discharged into the municipal sewer and treated at the municipal WWTP; during off-season, wastewater will be treated in the on-site WWTP.
Municipal Solid Waste	Municipal SW	Domestic Waste	15 t/d during school season and 2 t/d in off-season (4,175 t/a)	Reduce and reuse as possible (3R program coordinated by Sustainability Center); landfilling by sanitation contractor.
Noise	Fan, air conditioners	dB(A)	---	Low noise equipment and Insulation facilities.
Air emissions	Cooking oil fumes from the canteens in the campus	Benzopyrene, PM, CO.	---	High efficient purification equipment and insulation facilities
Electricity	All buildings	CO_2eq	10-20 million kWh/a electricity consumption; 9,000t-18,000t CO_2eq/a	Energy saving promoted through application of photo-voltaic power generation, heat pumps for air-conditioning (heating, cooling), application of energy-efficient building materials, etc.
Stormwater, surface water	Entire campus	SS, COD, NH_3-N	300,000 m^3/a	The artificial pond system and stream will be detention ponds for storm water.

Source: Domestic EIS Report.

116. **Operational noise.** Noise sources during campus operation include air conditioning and ventilation systems, on-campus motorized traffic, as well as pumps, air compressors, and sludge dewatering machine (spin-driers) in the onsite WWTP. In general, operational noise of equipment at the WWTP, and the air conditioning systems will be about 80-85 dB (A) and 60-75 dB (A), respectively. The mitigation measures include (i) proper Installation, maintenance of noise and vibration control facilities on air conditioning and ventilation systems; (ii) all noise-emitting machinery and equipment in the onsite WWTP will be installed in a sound-proof room; and (iii) installation of ventilated sound insulation windows on the buildings along the boundaries of campus if needed. Motorized transport within the campus will be controlled to avoid disturbing class. Night-time traffic will be strictly controlled.

117. **Indoor air pollution.** Indoor air pollution in the new campus is mainly a result of improper decoration. Decoration materials, such as paints, strippers, sealants, glues, adhesives, and carpets emit volatile organic compounds (VOC). Toxic formaldehyde causes short-term and long-term health issues. The mitigation measures include: (i) in addition to ensure the decoration materials that the new campus used are water-based or formaldehyde-free products, an indoor environmental monitoring after completion of decoration works will be conducted in the framework of project acceptance check; (ii) make sure to air out newly painted areas and carpets after decoration; and (iii) take remedy measures if the monitoring data exceed the national standard of GB50325-2001.

118. **Waste gas emissions from cooking**. Waste gas will be produced in the canteens of the campus. Cooking oil fumes will be emitted through the standpipe chimney leading to the building top. Kitchen cooking oil fume purification devices will be installed for purification of the fumes generated. The emissions will satisfy the requirements of the PRC's national Standard for Cooking Oil Fume Emission Control (GB18483-2001).

119. **Laboratory waste.** The project will support the establishment of chemistry, physics, and biology practice laboratories for the training of students. Although in small quantities and of low toxicity[23], laboratories that use chemicals inevitably involve health and safety risks, and produce chemical waste that must be properly disposed of. Toxicity and the amount of chemicals, and chemical waste that is generated, must be controlled and minimized. For that purpose, a laboratory health and safety management plan will be established by Baise University for each laboratory. The plan will be developed based on national regulations and/or international best practice.[24] The plan will define a list of chemicals allowed for training purposes, chemicals storage and handling protocols, waste management plan, responsibilities of teachers and students, emergency response procedures, etc. All laboratories will be equipped with personal protective equipment and emergency equipment in compliance with PRC health and safety regulations.

120. **Water supply.** The campus will include 17,500 students and 1,500 staff members at full capacity. The maximum daily water demand is estimated to be 4,450 m^3 including water supply for canteens, class rooms, offices, students bathrooms, student dormitories, laboratories, as well as for landscaping, dust control, etc. Water will be supplied through the Baise municipal water supply system. Two DN300 mm pipes connect the campus to the municipal water supply system. The water supply to the proposed Chengbi Campus will be Chengbei WSP, with a capacity of 60,000 m^3/d.[25] The water source of the Chengbei WSP is Chengbi Lake Reservoir, and the water quality of the water supplied meets the PRC's national Drinking Water Quality Standard of GB5749-2006. The existing water supply system has sufficient capacity to supply water to the campus (maximum 4,450 m^3/d for 19,000 students and staff in school season). The increase in water demand as a result of the new buildings can easily be met through the municipal water supply services. The incremental water use will not have an impact on other water users within the water supply service area. Water saving considerations have been incorporated into the FSR, including:

(i) **Installation of low flow and no touch faucets.** The faucets are sensor-operated, turning on when hands are present and off when hands move away. This helps limit water flow and prohibits the spread of germs from touching the faucet handle. Low-flow faucets use an aerator to mix air in the water, reducing the flow necessary to achieve the same wetness by about two-third.

(ii) **Use of dual-flush toilets.** Dual-flush toilets use less water to flush urine (2.5-3 liters per flush) and more for faeces (5-6 liters per flush).

(iii) **Use of water-free urinals.** Water-free urinals do not flush, so they use no water. An internal trap is filled with a liquid chemical with lower density than urine. The urine sinks below it and is directed down the drain by gravity, eliminating odor from entering the restroom. Each water-free urinal can save up to 148 m3 of water each year as compared to a traditional urinal.

[23] In accordance with international best practice, chemicals of hazardous nature greater than their potential usefulness in school programs shall not be used, covering physical hazards (i.e., flammability, explosive propensity, reactivity, corrosivity) and health hazards (i.e., toxicity, carcinogenicity).

[24] U.S. National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, Department of Health and Human Services. 2006. School Chemistry Laboratory Safety Guide. Accessible from: http://www.cpsc.gov//PageFiles/122344/NIOSH2007107.pdf.

[25] There are three water supply plants (WSP) in Baise, including Dongsun WSP, Chengbei WSP and Chengdong WSP, with the total capacity of 130,000 m^3/d.

(iv) **Wastewater reuse.** Effluent from the on-site WWTP will be reused for campus landscaping, reducing fresh water resource requirements by approximately 1,500-2,000 m^3/d.

(v) Other **water conservation programs and initiatives** coordinated by the Sustainability Center, e.g. through awareness raising programs.

121. **Wastewater treatment and reuse system.** The campus will produce 3,560 m^3/d and 375 m^3/d of domestic wastewater, respectively during school season and off-season. Wastewater from campus activities will be pre-treated by underground septic tanks first before discharging into the campus sewer pipeline. On-site wastewater treatment and reuse facilities will be constructed on the campus (Phase 1), with a total treatment capacity of 2,000 m^3/d. The designed treatment process is A2/O (Anaerobic-Anoxic-Oxic), and treated effluent will meet the National Class 1-A Pollutants Discharge Standard for Municipal Wastewater Treatment Plants (GB18918-2002). The effluent will be used for landscaping. Two WWTP with a capacity of 1,000 m3/d each will be installed in the east and west side of the campus (**Figure V-7**). The anticipated COD_{cr} removal and tap water conservation are 75 tons and 6.0 million m^3 annually according to the FSR. The facility will be equipped with odor and noise control facilities/equipment, and the anticipated noise level outside the facility is 50dB(A). The treatment process is shown in **Figure V-8**, and the designed pollutants removal rates are listed in **Table V-6**. The two on-site wastewater treatment plants (associated facilities) will be operated and maintained by the Comprehensive Affairs Bureau of BU, which will also conduct regular internal effluent quality monitoring (for basic parameters only, including SS, BOD5, NH4-N, E.coli). Compliance monitoring will be conducted periodically by the Baise EPB. Treated effluent will be used for landscaping purposes in the campus surface water system.

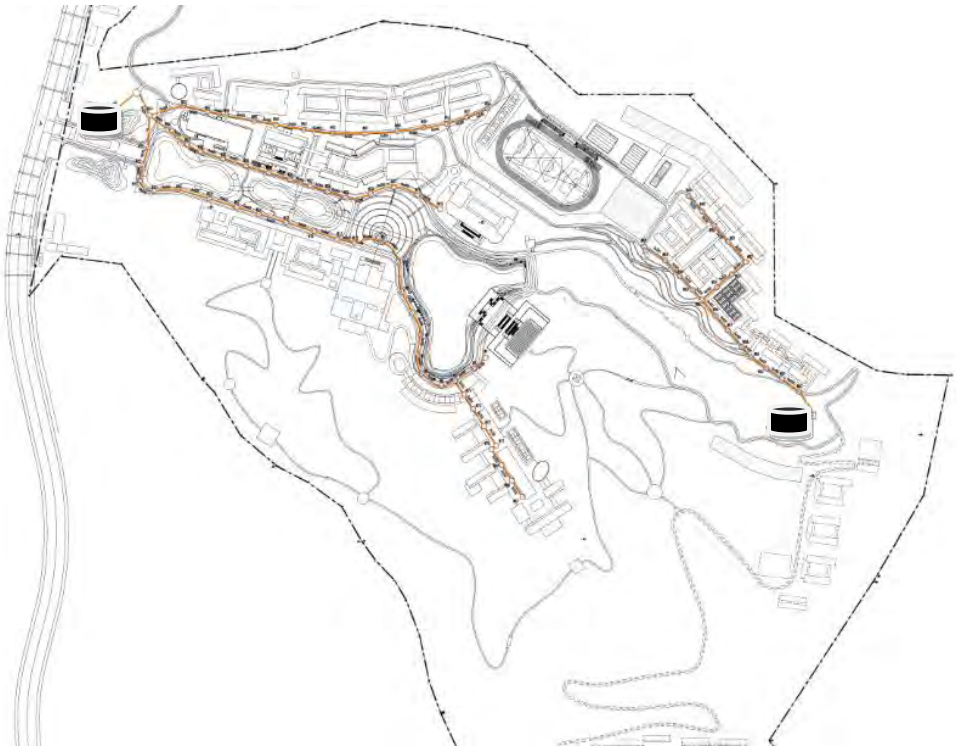


Figure V-7: Campus sewer system and on-site wastewater treatment plants

Table V-6: Removal Rates of Major Pollutants by the onsite WWTP (mg/L)

Pollutant	COD_{cr}	BOD_5	NH_3-N	TP	SS
Influent	300	150	30	4	150
Effluent	≤50	≤10	≤5	≤0.5	≤10
Removal Rate	84%≥	94%≥	84%≥	88%≥	94%≥

Source: Feasibility Study Report, June 2014

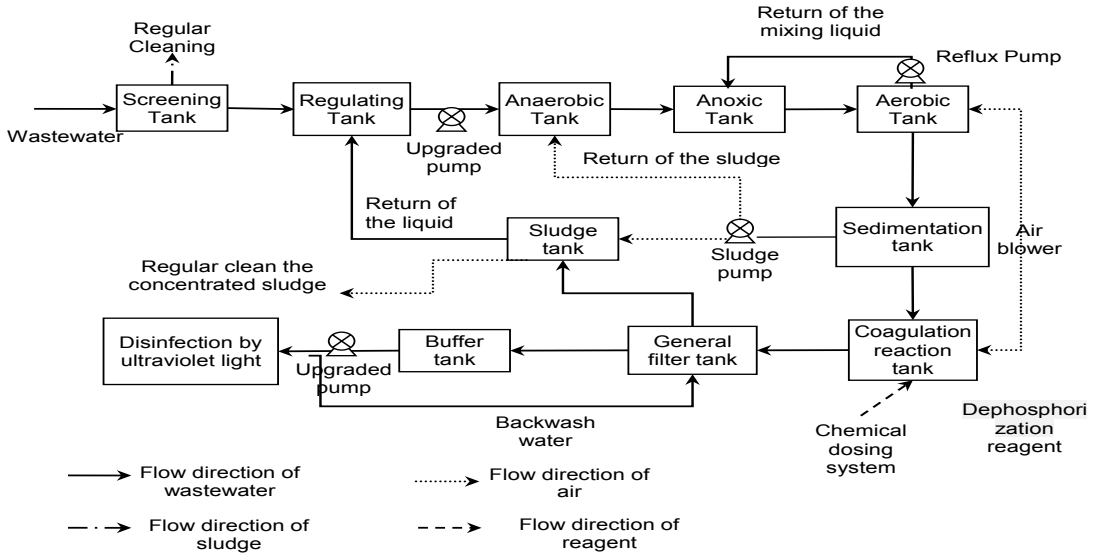


Figure V-8: Treatment Process of the Compact Wastewater Treatment Plants in the Campus

122. **Off-site wastewater treatment.** A backup system is currently being implemented on the campus to convey wastewater to the municipal sewer and the central wastewater treatment plant in case of malfunctioning or overload of the on-site WWTP (**Figure V-9**). A 2.4 km (with diameter of 400 mm) sewage pipeline is currently being constructed from the BU Chengbi Campus to the municipal WWTP. This also includes the construction of a sewage pumping station, with the capacity of 3,000 m^3/d (by 2015) and 5,000 m^3/d (by 2020), respectively. The service population and area of the sewage pipeline and pumping station are 40,000 and 155.09 ha, respectively. The construction is being conducted using domestic funding and will be completed by the end of September 2014. Construction sites were visited and no environment, health and safety issues were identified. The pipeline is being implemented properly.

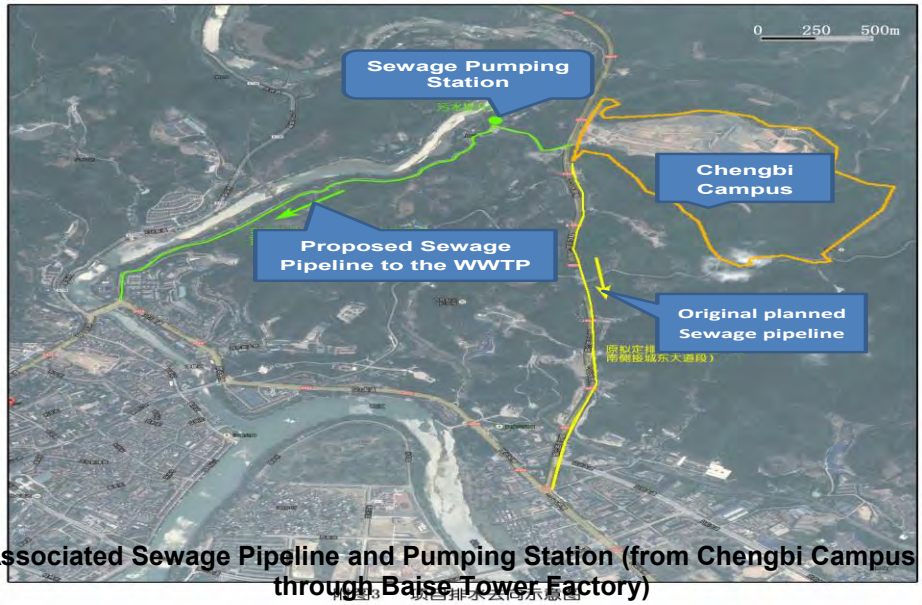


Figure V-9: Associated Sewage Pipeline and Pumping Station (from Chengbi Campus to the WWTP through Baise Tower Factory)

123. There is an existing WWTP in Baise City, located in the Industrial Zone at east of the urban area, with a total designed treatment capacity of 60,000 m^3/d. The WWTP adopts a modified oxidation ditch treatment process. The effluent of WWTP complies with Class 1-B of the PRC Discharge Standard of Pollutants from Municipal WWTPs (GB18918-2002, see **Table V-7**). The WWTP was put into operation in March 2010 by Sino Environment Protection Group (a BOT project). The sewer network includes 22.4 km of sewer mains and four pumping stations. The existing WWTP has sufficient spare capacities to cope with the increased wastewater volume from Chengbi Campus during both construction and operation stages.[26]

Table V-7: Performance of the existing Baise Wastewater Treatment Plant

Parameter	Quality of Current Influent (average concentration)	Quality of Current Effluent (average concentration)	Class 1-B Standard GB18918-2002
COD_{cr}	500 mg/l	≤60 mg/l	60
BOD_5	300 mg/l	≤20 mg/l	20
SS	400 mg/l	≤20 mg/l	20
TN	50 mg/l	≤20 mg/l	20
NH_3-N	35 mg/l	≤8 mg/l	8/15[27]
TP	4 mg/l	≤1 mg/l	1
pH	6-9	---	6-9

Source: Updated EIS Report, June 2014.

124. **Solid waste management.** During operation, the campus will generate MSW such as paper, cardboard, plastics, and general refuse by routine activities. The amount of MSW to be disposed (see Table V-4) can be reduced through the application of 3R (reduce, reuse, and recycle) methods. The Sustainability Center will identify options to 3R waste management in the campus, develop and implement a MSW management and minimization strategy. MSW shall be segregated into biodegradable and non-biodegradable wastes, biodegradable wastes will be used as fertilizers for landscaping and growing vegetables in the campus. Where recycling is feasible, these wastes will be stored in segregated bins and removed as required. Other solid wastes will be removed by sanitary

[26] Wastewater volume predictions are 3,560 m^3/d during school season and 375 m^3/d off-season (vacation).
[27] 8 mg/l for water temperature >12℃; and 15 mg/l for water temperature ≤12℃.

contractors on a regular basis and disposed to designated municipal landfill site.

125. Waste collected on the campus will be collected by an accredited waste collection service provider, and disposed in the Baise landfill site, located at 10 km southwest of the Baise urban area. The existing MSW landfill is located 10 km southwest of Baise, with a capacity of 300 t/d (total capacity of 2.0 million m^3, and a total area of 16.8 ha). The landfill is lined with HDPE geo-membrane for leachate control, and has separate storm water and wastewater drainage systems. The leachate is collected and treated with UASB-MBR-activated carbon process with a treated capacity of 200 t/d and effluent meeting Class II standard in *Municipal Solid Waste Landfill Pollutant Control Standard* (GB 16889-1997). The landfill was put into operation in May 2007, has a designed service life of 15 years and a remaining life of 7.3 years (until 2021). According to the updated FSR, a maximum of 15 t/d MSW during the school season and 2 t/d during off-season will be generated on the campus. The landfill was approved by Baise municipal EPB and the public sanitation bureau in 2005, and the environmental and ecological restoration plan is available. The landfill has sufficient capacity for disposal of the campus MSW.[28]

126. **Operation and maintenance of the photovoltaic system.** The photovoltaic system will be installed and operated by a licensed company. System performance will be checked thoroughly after the installation is mechanically assembled. The contract will make clear that payment of work is conditional upon commissioning test, and adequate training to on-site staff for routine operation and maintenance works. Commissioning tests will be conducted by an independent group of experts, and will include but not be limited to the following: checks of the main components (communications, meteorological station, modules, wiring, inverters, interconnection, batteries, etc.), open circuit voltage, operating current and 30-day operating performance test. The company will be required to provide training to onsite personnel in charge of system inspections, to be conducted at regular intervals. Personnel will use checklists developed for these periodic maintenance activities to ensure that the inspections are thorough, safe and complete. Major repair works will only be conducted by a licensed company. Service personnel will be trained in health and safety matters, and will made aware of PPE required for a specific task (PPE includes fall protection, arc flash protection, fire-rated clothing, hot gloves, boots, and protective eyewear, among other items). A PV system monitoring system including monitoring equipment and centralized management and information center will be established, to cover solar radiation, weather parameters, electricity generation from each power conditioner, battery status, etc.).

127. **Campus traffic management.** The campus traffic plan was critically reviewed during technical due diligence with support of the PPTA consultants, and was reviewed and strengthened in the revised FSR. According to the updated FSR, the main campus roads are laid out along the campus major axis from the entrance at Panbai Expressway on the west of the campus (**Figure V-10)**. The Panbai Expressway is the main traffic corridor between Chengbi campus and the urban area of Baise, and the Baise University's existing campus. There are three types of campus roads that are being constructed in the framework of Phase 1 campus development, including a campus major road, campus branch roads, and campus walkways (Figure III-7). The campus major road (in red) has the cross section of 2+7+2 m, designed for 2 travel lanes and 2 sidewalks. The campus branch roads (in green) have a cross section of 4.5 m travel lanes for mixed transport modes, designed as pedestrian and NMT traffic priority roads, which can be used as emergency fire truck routes. Walkways (green) are for pedestrian only.

[28] The updated FSR estimates that will implementation of the campus "3R" management system, MSW generation will be reduced to about 50%.

Figure V-10: Campus Traffic Plan

128. **Campus fire truck routes, emergency evacuation plan.** BMG has established Integrated Emergency Preparedness and Response System (EPRS) in August 2010. This system streamlines under one roof all the city's police and fire emergencies, paramedic ambulance responses and traffic accident reporting systems, along with other non-emergency public services that were previously managed by a variety of different administrative departments.

129. Baise University's campus safety and emergency preparedness and response system has been reviewed and strengthened during PPTA. The system will be linked to the city's EPRS. The fire evacuation design of buildings follows the "Architectural Design Code for Fire Protection" (GB50016-2006) and "Fire Protection Design for Tall Residential Buildings" (GB50045-95, revised in 2005). The key features of the campus's safety and emergency preparedness and response mechanism including forest fire warning system are presented in **Table V-8** below. The campus EPRS will be linked to the Campus sustainability center.

Table V-8: Campus Safety Management

Item	Measure
Firefighting	Proposed campus road widths are 9.5 -12.5 m and most of the turning radii are bigger than 11.0 m, which is adequate for firefighting requirements; a GIS forest fire warning system will be installed including (i) forest fire sensors and network, which can detect forest fire within 100 m diameter scope in 10 seconds; (iii) firefighting BTS through GPRS wireless communication; and (iii) GIS fire early warning system.
Emergency Evacuation Plan	An emergency evacuation plan has been developed in the FSR. The emergency evacuation sites as well as the emergency exits have been identified in the plan. As part of the Sustainability Center, Baise University shall establish a designated safety and security unit in charge of the campus security and safety, develop an emergency evacuation plan, and conduct emergency evacuation drills and education program.
Campus security	A campus security monitoring system will be installed, including monitoring cameras, a network, and a control center. The security system will be able to monitor and record the campus activities full time.

Source: Domestic FSR, June 2014.

130. Based on the campus planning and design, an emergency evacuation plan has been developed. The emergency evacuation sites as well as the emergency exits have been identified (**Figure V-11**). The campus fire truck routes are defined in the campus master plan, which defines access routes to all buildings within the campus.

Figure V-11: Campus Fire Truck Route and Emergency Evacuation Sites

131. **Campus landscaping, campus flooding.** Some 10,000 trees will be planted in the campus. A waterway including pond system will be built within the campus (Figure V-12, V-13) using domestic fund (Phase 1). The system will be fed through runoff from the campus catchment area, as well as reclaimed water from the onsite WWTP (up to 2,000 m^3/d). A hydrological analysis and flood risk assessment has been conducted during FSR preparation, and the risk of flooding in the campus is considered small: The 1-in-50 years flood flow within the campus is estimated to amount 12.4 m^3/s, while the maximum capacity of the campus discharging system is 23.8 m^3/s, which is adequate to cope with a 1-in-50 years event. Water quality will be conducted regularly to confirm that quality of the man-made pond system complies with the Grade IV standard values of "Surface Water Environment Quality Standard" (GB3838-2002).

Figure V-12: Central Area of Campus

Figure V-13: Artificial Lake of Campus

132. **Campus sustainability strategy, sustainability center.** Under the loan implementation consultancy services of the ADB financed project, national campus sustainability planning specialist will support Baise University and its Comprehensive Affairs Bureau in defining a campus sustainability policy, and developing a sustainability center with clear strategic objectives, sustainability programs, institutional structure, terms of reference. The Sustainability Strategy and the sustainability center will cover the entire campus, including Phase 1 and Phase 2, as well as Phase 3 should this be implemented in future. Specifically, the expert will:

(i) Organize a seminar for Baise University senior management and relevant departments on (a) PRC policies and guidelines pertaining to green campus development, campus sustainability planning, the promotion of energy-efficiency, low-carbon and resource-efficient development; and (b) successful case studies in the PRC *(Output: Seminar report, including documentation of successful case studies*).

(ii) Plan and facilitate (in collaboration with the Comprehensive Affair Bureau and the Teaching Affair Bureau) a participatory assessment of current and planned programs within the campus that aim at promoting campus sustainability, low-carbon development, energy-efficiency, resource-conservation, environmental awareness raising, sustainability in curriculum, and other sustainability initiatives *(Output: Assessment report*).

(iii) Facilitate the definition of a Campus Sustainability Policy based on an nationally recognized methodology, including formulation and agreement on policy vision; policy goals; policy targets and commitments (*Output: Campus Sustainability Policy Statement, endorsed by Baise University senior management*).

(iv) Facilitate the creation of a governance structure ("Sustainability Center") within Baise University's Comprehensive Affair Department, including definition of (a) organization setup and terms of reference; (b) main sustainability pillars (e.g. green campus, green curriculum, green community; and (c) a roadmap with clearly articulated targets and measurable indicators (*Output: sustainability center, roadmap*).

(v) Develop outlines of sustainability policies for Baise University priority areas (e.g., energy policy, waste management policy, green procurement policy, environment awareness policy). (-> *Output: draft sustainability policies for at least 2 priority areas*).

VI. INFORMATION DISCLOSURE AND PUBLIC CONSULTATION

A. Legislative Framework for Public Consultation

133. Public participation and consultation is an important environment safeguards requirement in the evaluation of project planning, feasibility study, design and implementation, it can directly reflect the public's perceptions on environmental quality in the project's area of influence. Relevant provisions in the Environmental Protection Law of PRC and the Regulations on the Administration of Construction Project Environmental Protection (Order of the State Council, No. 253) require that domestic environmental impact assessments shall solicit the opinions of units concerned and inhabitants of project construction sites. ADB's Safeguard Policy Statement (2009) also has detailed and strict requirements on meaningful consultation and information disclosure. The public consultation process for this project therefore followed both the PRC requirements and the ADB requirements.

134. Information disclosure and public consultation for the project have been conducted during preparation of the FSR, the domestic EIS and the project IEE. Information disclosure and consultation included internet disclosure (twice), informal communication with key stakeholders which included students, Baise University management and staff, nearby residents, local authorities; and through two questionnaire surveys conducted in 2010 and 2014, involving 60 and 93 respondents, respectively.

B. First Round of Public Consultation

135. Information about the project was first disclosed on 22 March 2010 on GZAR Government's website. Disclosed information included a description of the project scope, construction methods, main mitigation measures, as well as contact details of the PMO, Baise University, the EIA Institute, and Baise EPB. (**Figure VI-1**).

Figure VI-1: Information Disclosure in March 2010 *(Source: updated domestic EIS, June 2014)*

136. Potentially affected people were first consulted in March 2010 through the conduct of a questionnaire survey. Students and staff members of the existing BVS campus and some residents nearby the proposed New Chengji Campus were consulted. Questionnaires were distributed by the EIA Institute (GZAR Transport Design & Research Institute, who prepared the original EIS report in 2010) to

60 affected persons and beneficiaries from different age groups, gender, educational background, occupation and ethnicity. All questionnaires were completed and returned. Of the total consulted people, 77% supported the project, 23% had no opinion, and nobody was against the project (**Table VI-1**). The result above shows that most consulted people support the project, because they believe the project will significantly increase employment opportunities in Baise Municipality.

Table VI-1: Questionnaire Survey (March 2010)

Question	Response	Persons	Percentage (%)
1、 Do you support the project?	Support	46	77
	Against	0	0
	Abstained	14	23
2、 Do you agree with the project location?	Agree	38	63
	Don't agree	2	4
	Do not know	20	33
3、 Is the layout of the project reasonable?	Reasonable	22	37
	Do not know	34	57
	Unreasonable	4	6
4、 Is the project conducive to the development of local economy?	Yes	20	33
	Do not know	36	61
	No	4	6
5、 What environmental issues do you experience at the project area?	Noise	32	53
	Wastewater	16	27
	Dust	58	97
6、 What are potential environmental impacts caused by the project?	Noise	20	33
	Wastewater	38	63
	Dust	20	33
	Others	4	6

Source: Domestic EIS (2010).

137. A second round of information disclosure was undertaken, after the updating the FSR and EIS, on third June 2014 on Baise University's website (http://www.bsuc.cn/office/ tongz/ 2014060337758.html), to solicit public comments and suggestions on the preliminary findings of the updated EIS, including the potential impacts identified, proposed mitigation measures, as well as the arrangement of environmental management during both project construction and operation. During information disclosure, the EIA Institute (GZAR Environmental Science Research Institute, who updated the EIS based on the updated FSR) also communicated with affected persons and organizations nearby Chengbi campus (mainly the existing BVS's campus) to collect preliminary public opinions for the project (**Figure VI-2**).

Figure VI-2: Second Round of Information Disclosure, June 2014

138. A second round of public consultation was conducted on 8 June 2014 by the EIA institute, in collaboration with, and under the guidance of, the PPTA consultant. Consulted people included faculty members and students of Baise University and BVS, and 5 nearby residents (living within BVS campus). A total of 100 questionnaires were distributed and 93 were returned. The background information of consulted people is shown in **Table VI-2**, and the consultation results are shown in **Table VI-3**.

Table VI-2: Background Information of Participants in Second Round of Public Consultation (in June 2014)

Gender		**Occupation**			
Male	Female	Teacher	Driver	Student	Other
21	72	10	2	79	2
Age					
<30		31-40	41-50	>50	
91		1	0	1	
Education level					
Primary school	Junior middle school	High middle school	College	Technical secondary school	Bachelor	Master
0	1	5	2	48	35	2

Source: Updated Domestic EIS, June 2014.

Table VI-3: Results of Second Round of Questionnaire Survey (in June 2014)

Items	Responses	Persons	Percentage (%)
1. Do you know this project and its components?	No	17	18.3
	Partly	39	41.9
	Yes	37	39.8
2. What are the most urgent environmental issues within the project area (multiple options)	Air pollution	25	26.9
	Water pollution	21	22.6
	Noise pollution	24	25.8
	Ecological disturbance	5	5.3
	Solid waste	22	23.6
3. What are the main environmental impacts during construction phase (multiple-option)?	Dust	37	39.8
	Construction wastewater and domestic wastewater	34	36.5
	Noise	19	20.4
	Solid waste	4	4.3
4. What impacts do you anticipate during project operation phase (multiple-option) ?	Cooking oil fume from canteens, flue dust from hot water boilers	31	33.3
	Domestic wastewater and wastewater from laboratory	33	35.5
	Traffic noise	21	22.6
	Solid waste	9	9.7
5. Do you think the construction activities in the campus will impact the teaching, learning and living environment?	Significant	23	24.7%
	Yes	47	50.5%
	Slight	19	20.4%
	No	4	4.3%
6. Which kind of the campus is your wish after the project?	Beautiful and green	39	41.9%
	Energy conservation	42	45.1%
	Emphasize general knowledge learning, internship and practice	12	12.9%
7. Do you agree with the project location? (if not, please state the reason)	Yes, agree	69	74.2
	No, don't agree	8	8.6
	Do not know	16	17.2
8. Assuming that adequate mitigation measures are applied, do you support the project? (if not, please state the reason)	Support	85	91.4
	Against	8	8.6

Source: Updated Domestic EIS, June 2014.

139. The relatively high percentage (18.3%) of persons who did not know the project after the first round of consultation is a result of high turn-over on the campus. The students consulted in the first round (2010) have already graduated at the time of the second round of consultations. 91% of the consulted persons supported the project; 74.2% of the respondents believed the proposed campus location is appropriate. For the 8.6% (8 persons) of consulted people who didn't support the proposed project and campus location, are sophomores and juniors of Baise University and the students of BVS who will graduate in a year. They thought they will have no time to enjoy the new campus. After the explanation, and awareness of "Feeling for Alma Mater", the 8 students changed their view, expressed their basic understanding of need for the new campus as a result of increased vocational education need in Baise, and the importance for improvement of the vocational education quality.

140. The following suggestions were made by the consulted people: (i) Baise University should design and construct energy efficient and green buildings; (ii) Baise University, after and during the project completion, should provide good learning condition and curriculum design for promoting students' practical skills, innovative ability, and problem solving capacity; (iii) high noise activities should be forbidden between 10:00 pm to 6:00 am in accordance with Baise EPB's regulation; (iv) provide septic tanks during construction to avoid pollution to the surroundings and take appropriate measures to

control soil erosion, in particular during the construction for slope protection; (v) implement dust control measures; and (vi) ensure environmentally friendly MSW and construction waste disposal. A majority of people surveyed indicated that if the measures proposed in the EIS, IEE, and EMP are strictly carried out during construction and operation, they would be satisfied.

141. All concerns and suggestions submitted by the respondents were provided to the design institute and EIA institute. These concerns and suggestions were taken into account and incorporated in the updated FSR, EIS, and reflected in this IEE and project EMP to the extent possible. Some concerns expressed, and actions requested, were also reflected in the project's social action plan (SAP), including (i) at least 30% of jobs generated by the project will be offered to local population; (ii) local materials will be used where possible and local contractors will be prioritized; (iii) contractors will be required to comply with the core labor standards to ensure the health and safety of employees; and (iv) a clause will be included in the tender documents for civil works on the inclusion of HIV/AIDS awareness training for construction workers.

142. **Assessment of Baise University's current environmental management.** In order to assess BU's current environment, health and safety management practices, the staff's and students' understanding of these practices, and to identify gaps between the current situation of Baise University and the PRC and international standards and best practice, a questionnaire survey was conducted by Baise University and the PPTA consultants in June 2014. Totally 13 teachers/faculties and 90 students were consulted. Of the total consulted students and faculties, only 30.8% of consulted faculties and 21.1% consulted students were satisfied with the current situation in MSW disposal and wastewater management and knew some environmental management regulations and methods in Baise University's existing campus. Most of consulted people knew little about the environmental management in Baise University (**Appendix 4** provides two samples of questionnaires returned). But in the survey, 76.9% of surveyed faculties and 93.3% of consulted students expressed that they are interested in strengthening campus-wide environment management (e.g. through establishment of a sustainability center) (**Table VI-4**).

Table VI-4: Summary of Questionnaire Survey for Current Environmental Management in Baise University

Question	Response	Faculty (13 in total)		Student (90 in total)	
		Number	Percentage	Number	Percentage
1. Do you know how much water, energy, solid waste and wastewater Baise University consume or produce every year?	Know	0	0.0%	0	0.0%
	Know some	1	7.7%	0	0.0%
	Don't know	12	92.3%	90	100.0%
2. Are you satisfied with current solid wastes disposal service in Baise University?	Yes	4	**30.8%**	19	**21.1%**
	No	3	23.1%	16	17.8%
	No opinion	6	46.2%	55	61.1%
3. Are you satisfied with current wastewater management in Baise University?	Yes	4	**30.8%**	19	**21.1%**
	No	6	46.2%	29	32.2%
	No opinion	3	23.1%	42	46.7%
4. Does Baise University have an energy conservation policy?	Yes	0	0.0%	1	1.1%
	No	0	0.0%	5	5.6%
	Don't know	13	100.0%	84	93.3%
5. Does Baise University have a solid waste management policy promoting waste reduction, reuse and recycling?	Yes	0	0.0%	3	3.3%
	No	2	15.4%	8	8.9%
	Don't know	11	84.6%	79	87.8%
6. Does Baise University have an environment, health and safety policy?	Yes	0	0.0%	4	4.4%
	No	3	23.1%	5	5.6%
	Don't know	10	76.9%	81	90.0%

Question	Response	Faculty (13 in total)		Student (90 in total)	
		Number	Percentage	Number	Percentage
7. Has Baise University established procedures for communicating environment, health and safety requirements and provisions to students and faculties?	Yes	0	0.0%	9	10.0%
	No	0	0.0%	6	6.7%
	Don't know	13	100.0%	75	83.3%
8. Does Baise University have an environment management system?	Yes	0	0.0%	5	5.6%
	No	3	23.1%	2	2.2%
	Don't know	10	76.9%	83	92.2%
9. Does Baise University have a fire safety plan?	Yes	4	30.8%	27	30.0%
	No	2	15.4%	31	34.4%
	Don't know	7	53.8%	32	35.6%
10. Has Baise University established emergency identification, preparedness and response procedures?	Yes	1	7.7%	9	10.0%
	No	0	0.0%	8	8.9%
	Don't know	12	92.3%	73	81.1%
11. Are all faculties and students whose work involves significant environment and safety aspects competent by training, experience and/or education?	Yes	1	7.7%	16	17.8%
	No	1	7.7%	15	16.7%
	Don't know	11	84.6%	69	76.7%
12. Would you be interested to strengthen the environment, health and safety management system in Baise University?	Yes	10	76.9%	84	93.3%
	No	0	0.0%	0	0.0%
	Don't know	3	23.1%	6	6.7%

Source: Project preparatory technical assistance consultants.

C. Future Public Consultation and Information Disclosure

143. Public involvement and consultation during construction and operation phases of the project will mainly rely on informal interviews with the staff and students from Baise University, BVS, and nearby residents. The PIU will hold a public meeting prior to commencing construction to discuss issues associated with ensuring the safety of students and staff, as well as nearby residents in vicinity of the construction site. The contact persons for different GRM entry points (contractors, PIU, public complaint center [PCC]) will be identified prior to construction, and their contact details (including phone numbers, e-mail addresses, and postal address) will be disclosed on information boards distributed within and around the Chengbi Campus. During construction, the Baise University, the PIU, and civil work contractors will consult potentially affected persons during regular site inspections. The project's environmental information will be disclosed by the PMO and ADB. Annual environment monitoring and EMP implementation reports will be disclosed on ADB's project website.

VII. GRIEVANCE REDRESS MECHANISM

A. Proposed Mechanism

144. A grievance redress mechanism (GRM) was defined in compliance with ADB's SPS requirement to prevent and address community concerns. In consultation with the PMO and Baise University (the implementing agency) it was agreed that a PCC will be established within the PMO. The PCC will instruct contractors, implementing agency and construction supervision companies (CSC) if people complain about the Project. The PCC will coordinate with the local government divisions and Baise EPB, as necessary, and will be supported by the environment specialist of the project implementation support (LIS-ES).

145. The contact persons for different GRM entry points (contractors, PIU, PCC) will be identified prior to construction. The contact details for each entry point (including phone numbers, e-mail addresses, and postal address) will be disclosed on information boards within and around the campus.

146. The PCC will establish a GRM tracking and documentation system. The system will include the following elements: (i) tracking forms and procedures for gathering information from project personnel and complainant(s), (ii) a process for informing stakeholders about the status of a case, and (iii) a procedure to retrieve data for reporting purposes, including the periodic reports to ADB.

B. Types of Grievances Expected and Eligibility Assessment

147. Public grievances addressed by the GRM will most likely be limited to environmental issues during the construction phase. Grievances will most likely relate to dust emissions, construction noise, disposal of waste materials in inappropriate places, and inadequate construction site safety. The GRM will remain operational during project operation. For that purpose, the PCC will be institutionally integrated into the Baise University Sustainability Center.

148. Eligible complaints include those where (i) the complaint pertains to the project; and (ii) the issues arising in the complaint relates to environment or social safeguard issues. Ineligible complaints include those where (i) the complaint is clearly not project-related; and (ii) the nature of the issue is outside the mandate of the GRM (such as issues related to allegations of fraud or corruption). Complaints ineligible to the GRM will be recorded and passed onto relevant authority. Meanwhile, the complainant will be informed of the decision and the reasons for rejection.

C. Grievance Redress Mechanism Procedure and Timeframe

149. Procedures and timeframes for the grievance redress process are as follows:

(i) **Stage 1.** If a concern arises during construction or operation, the affected person (AP) will submit the complaint to one of the GRM access points (contractor, PIU, implementing agency). Whenever possible, the contractor and PIU will resolve the issue of concern directly with the affected person. The contractor or PIU will give a clear reply within one week. If successful, the PIU will inform the PMO and PCC accordingly.

(ii) **Stage 2.** If no appropriate solution can be found during Stage 1, the PIU, contractor or other GRM access point has the obligation to forward the complaint to the PCC. The affected person may also decide to submit a written or oral complaint to the PCC directly. For an oral complaint, proper written records must be made. The PCC will assess the eligibility of the complaint, identify a solution in consultation with the complainant, Baise University and contractor, and provide a clear reply for the complainant within 5 working days. The LIS-ES will assist the PCC in replying to the affected person. The PCC will

inform the ADB project team on the complaint. The contractors during construction, and Baise University during operation, will implement the agreed upon redress solution and report the outcome to the PCC within 2-3 weeks.

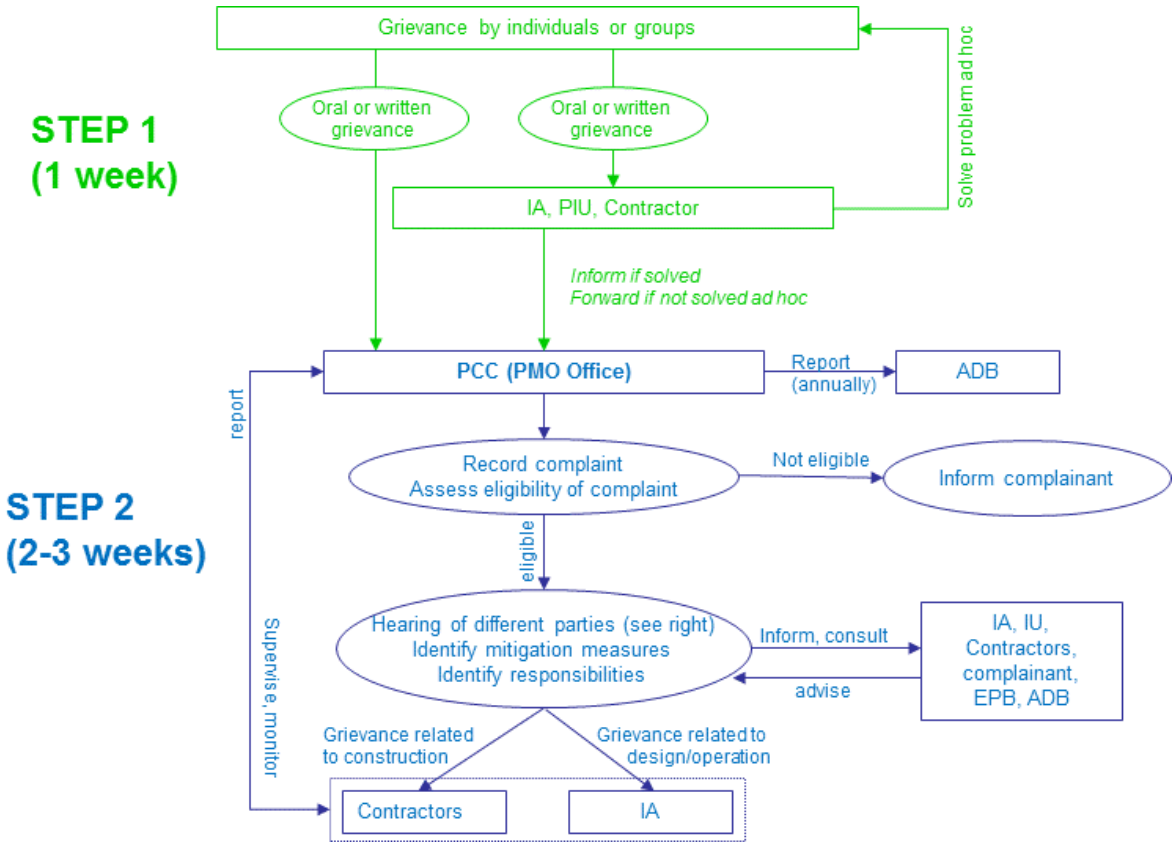


Figure VII.1: Grievance Redress Mechanism

EPB = environmental protection bureau, IA = implementing agency, PIU = project implementing unit (under IA), PMO = project management office, PCC = public complaint center.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

150. An environmental management plan (EMP) has been prepared for the project. It is an essential document to ensure the implementation of mitigation measures. The full EMP will be attached to the Project Administration Manual of the project.

151. The EMP defines all potential impacts of different project outputs and the mitigation and protection measures with the objective of avoiding or reducing these impacts to acceptable levels. The EMP also defines the institutional arrangements and mechanisms, the roles and responsibilities of different institutions, procedures and budgets for implementation of the EMP. The EMP is based on the domestic EIS and FSR, and draws on the findings of the project IEE, PPTA, and ADB review mission discussions and agreements with the relevant government agencies in Baise City and GZAR.

152. The EMP, presented in **Appendix 1**, defines (i) responsibilities and authorities for EMP implementation, (ii) summary of impacts and mitigation measures, (iii) environmental monitoring and inspection plan, (iv) institutional strengthening and training plan, (v) reporting requirements, (vi) public consultation plan, (vii) cost estimates, and (viii) mechanism for feedback and adjustment. The EMP will be reviewed and updated at the end of the detailed design in order to be consistent with the final detailed design. The EMP will also be included as separate annex in all bidding and contract documents. Contractors will be required to develop their site-EMPs that are fully responsive to the EMP. The PIU-ES will be assigned with the responsibility to ensure Contractors' compliance with the site-EMP and EMP.

IX. CONCLUSION

153. The project underwent appraisal during project preparation and was classified as Category B for environment on the basis of site visits and ADB's Rapid Environmental Assessment. In compliance with ADB's Safeguards Policy Statement (2009), an initial environmental examination (IEE), including environment management plan (EMP) was developed, covering the design, construction and operation of the project, drawing on the data and information from FSR, domestic environmental impact statement (EIS), the Water and Soil Erosion Control Plan (WSECP), and discussions with the PMO and Baise University.

154. The project will involve construction of new building and auxiliary facilities as well as equipment purchase for the new Chengbi Campus. Phase I of the campus construction is underway, financed through domestic funding, which includes main earthworks and land leveling, campus roads, installation of main utilities (water supply, drainage, main sewers), and several buildings in the central and northern part of the campus. The tentative scope of the proposed Phase II will include construction of 12 buildings, a photovoltaic power system, slope protection works, and teaching equipment. The total building area is 160,691 m^2.

155. In the framework of the PPTA, the proposed campus design as defined in the FSR was critically reviewed and revised to ensure that the new Chengbi campus will be safe, healthy, resource-efficient and environment-friendly. Key improvements to the FSR, to be further defined in the preliminary and detailed design, include the following:

(i) Promotion of energy-efficiency through adherence to key national and regional energy-efficiency and green building policies and standards.
(ii) Application of technological innovations to enhance resource efficiency and energy-conservation, including a 3.47 MW photovoltaic power generation system on the campus buildings; two heat pump air conditioning and hot water systems on the library and administration building; and an associated onsite wastewater treatment and reuse system with the treatment capacity of 2,000 m^3/d.
(iii) Adherence to PRC green public procurement policies for equipment procurement.[29]
(iv) Improvements to the campus firefighting plan, including fire truck route optimization, as well as the establishment of a campus forest fire warning system; improvements to the campus emergency evacuation plan; setup of a campus security system with strict access control and security monitoring system.
(v) Critical review of landslide risk and definition of slope protection works.

156. During project construction, major anticipated impacts include noise, fugitive dust, solid wastes, and community and occupational health and safety risks. Overall, construction-related impacts are localized, short term, and can be effectively mitigated through the application of good construction and housekeeping practices and implementation of construction phase community and occupational health and safety plans.

157. During operation, no major environmental impacts are anticipated. The current and proposed environment services of Baise University were assessed, and it is concluded that incremental water supply, sewage discharge, and MSW generation resulting from the project will not overburden Baise's existing municipal services. The existing water supply system, sewage pipelines and on-site and off-site

[29] As defined in (i) Public Procurement List of Environmental Labeling Products (issued and regularly updated by NDRC and MOF), which includes 21 categories of products, such as light vehicle, photocopier, computer, water-based paint, furniture, etc; and (ii) Public Procurement List of Energy Saving Products (issued and regularly updated by MEP and MOF), which includes 27 categories of energy saving products, such as air conditioner, refrigerator, lighting product, television set, electric water heater, computer, printer, monitor, etc. and 7 categories of water saving products, such as toilet, faucet, shower etc.

WWTPs, as well as the MSW landfill are adequate to satisfy the water demand, and to receive sewage and MSW from the campus. The project's potential impacts on community and occupational health and safety during operation were analyzed and corresponding mitigation measures have been proposed in the IEE and EMP. Component 4 of the project will also provide expert support to develop a Sustainability Strategy, which will include the creation of a Sustainability Center within Baise University's Comprehensive Affair Department, with the task to promote sustainable campus development.

158. An environment management plan (EMP) has been developed for the pre-construction, construction, and operation phases of the project. The EMP defines mitigation measures, monitoring requirements, and institutional responsibilities and costs for implementing the mitigation measures and the monitoring requirements. The EMP will be included as separate annex in all bidding and contract documents. Contractors will be required to develop site-EMPs that are fully responsive to the EMP.

159. In the framework of the environmental due diligence, meaningful consultation was conducted through questionnaire surveys and meetings with key stakeholders. The final IEE will be disclosed on the ADB website. Further consultation will take place before the startup of construction works. Posters will be placed within and around the campus, and public meetings will be conducted by the PIU and the civil works contractors prior to construction works. A safeguard grievance redress mechanism (GRM) has been defined to deal with public complaints related to project activities during project implementation and operation.

160. Project risks related to environment safeguards have been analyzed, and the assurances required to address these risks, have been defined. The major risks are listed below:

(i) Design of project facilities not complying with relevant design standards and codes related to energy-efficient, safe and green public buildings.
(ii) Inadequate capacity of the BMG and Baise University in environment management, which could result in inefficient project and EMP implementation.
(iii) lack of commitment by Baise University management to promote environmental sustainability issues.

161. Environment safeguards related covenants will be incorporated into the project agreement, including: (i) a commitment of BU to adhere to key energy-efficiency and green building policies and standards promoted by MOHURD and MOED; (ii) a commitment to adhere to PRC green public procurement policies; and (iii) a commitment to promote energy-conservation and low-carbon development on and off campus through the use of renewable energy, and the application of energy-efficient appliances, and the setting up of a Sustainability Center within Baise University.

162. The overriding assurance required is that BMG and Baise University as appropriate will ensure that the full range of effective measures set out in the IEE and EMP are undertaken, and guarantees that the environmental management provisions and the environmental monitoring plan will be implemented effectively during project implementation, and that the implementation reports of the environmental management and monitoring plan in accordance with ADB requirements will be submitted in a timely fashion. Part of this monitoring and management commitment will be a commitment to implement and maintain an appropriate GRM.

A. Conclusion

163. The IEE concludes that as long as the environmental mitigation and management measures defined in the EMP are properly implemented, all adverse environmental impacts associated with the project will be prevented, eliminated, or minimized to an acceptable level. The project is feasible from an environment safeguards point of view.

APPENDIX 1: ENVIRONMENTAL MANAGEMENT PLAN

A. Introduction

1. This environmental management plan (EMP) is developed for the Guangxi Baise Vocational Education Development Project and defines all potential impacts of the project outputs and the mitigation and protection measures with the objective of avoiding or reducing these impacts to acceptable levels. The EMP also defines the institutional arrangements and mechanisms, the roles and responsibilities of different institutions, and procedures and budgets for implementation of the EMP. The EMP seeks to ensure continuously improving environmental protection activities during preconstruction, construction, and operation in order to prevent, reduce, or mitigate adverse impacts and risks. The EMP draws on the findings of the project initial environmental examination (IEE), the domestic environmental impact statement (EIS) report, project preparatory technical assistance, and Asian Development Bank (ADB) review mission discussions and agreements with the relevant government agencies.

2. The EMP will be reviewed and updated at the end of the detailed design in order to be consistent with the final detailed design. The updated EMP will be disclosed on the ADB project website. The updated EMP will also be included as a separate annex in all bidding documents. The contractors will be made aware of their obligations to implement the EMP, to budget EMP implementation costs in their bids, and to develop site-EMPs fully responsive to the EMP.

B. Institutional Responsibilities

3. **Figure EMP-1** defines the organizational structure for the Project implementation.

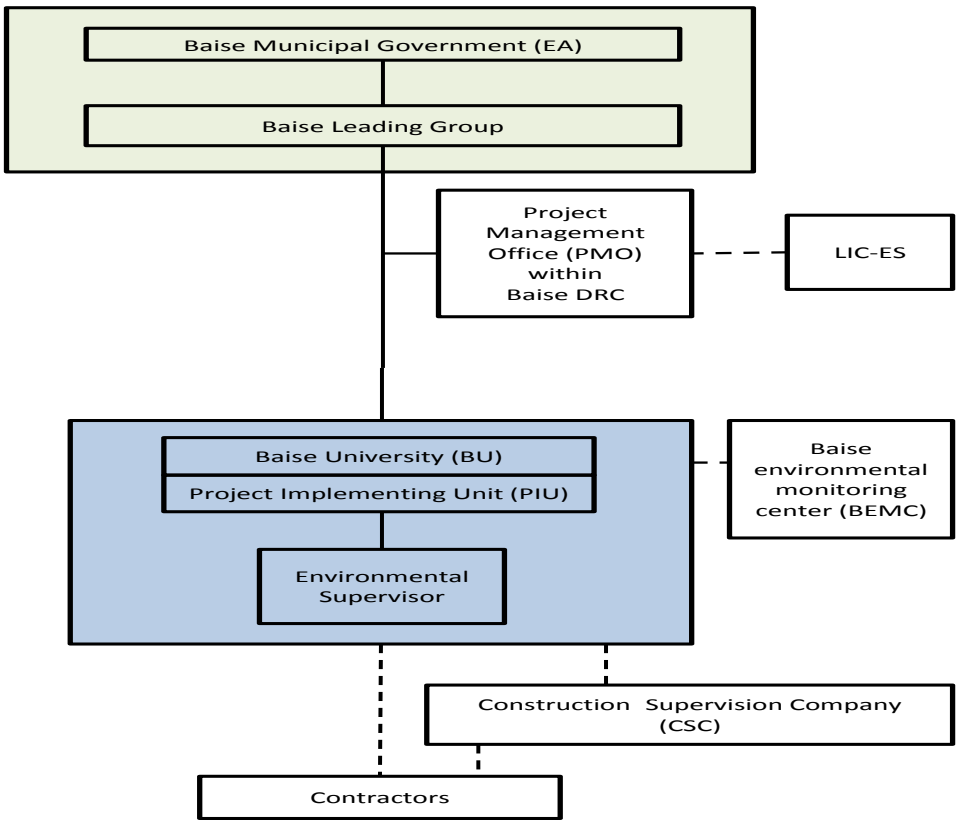


Figure EMP-1: Institutional Arrangement for Environmental Management of the Project

4. As executing agency, the Baise Municipal Government (BMG) will be responsible for the overall implementation of the project, including the EMP and its environmental monitoring plan. BMG has established the Baise project leading group (PLG), led by the vice mayor of Baise Municipality and including high level officials from the Finance Bureau, the Development and Reform Commission (DRC), the Education Bureau, and Housing and Urban-Rural Construction Bureau (HURCB) to (i) provide overall project direction and any required policy guidance, (ii) oversee the preparation and implementation of the project, (iii) support cross-agency policy dialogue, and (iv) review project progress and provide strategic advice to support effective implementation.

5. Baise DRC will exercise day-to-day oversight of the project and will be responsible for (i) approval of domestic feasibility study report and submission of authorization requests for foreign capital utilization, (ii) approval of any major changes needed to project scope, (iii) liaison with DRC of Guangxi Zhuang Autonomous Region and National Development and Reform Commission, (iv) facilitating interdepartmental and intersector cooperation needed for effective project implementation, (v) economic planning and managing the alignment of individual sector plans and reforms with the approved economic plans, and (vi) involvement in policy dialogue.

6. Baise DRC, which includes representatives from Baise University, Baise Finance Bureau, and Housing and Urban-Rural Construction Bureau has established a **project management office (PMO)** to direct project preparation and implementation activities, monitor project progress and project impacts, and facilitate the communication and coordination with ADB. For environment safeguards, the PMO will have the overall responsibility delegated by Baise DRC for supervising the implementation of the EMP, coordinating the project level safeguards grievance redress mechanism (GRM), and reporting to ADB. The PMO will assign one safeguards officer (PMO-SO) in charge to supervise the effective implementation of the EMP.

7. To ensure that the contractors comply with the EMP provisions, the PMO-SO with the help and technical support of environment specialist of the loan implementation support (LIS-ES), will prepare and provide the following specification clauses for incorporation into the bidding procedures: (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) major items in the IEE and EMP. In addition the PMO-SO will prepare annual environment monitoring and EMP implementation reports in English, and submit them to ADB for appraisal and disclosure.

8. **Implementing agency and project implementing unit.** Baise University will be the implementing agency for the project. Baise University has set up the project implementing unit (PIU) to coordinate the preparation and implementation of subproject components. The PIU will be fully staffed with technical experts and administrators in charge of procurement, financial management, disbursement, monitoring, evaluation, and coordination.

9. **Project implementing unit environment supervisor.** The implementing agency will lead the preparation and implementation of all civil works. The implementing agency will appoint one environment supervisor (PIU-ES) to do the following (i) review and approve contractors' site-EMP; (ii) conduct site inspections following the site inspection checklist **(Appendix 2)**; (iii) organize periodic environmental monitoring in compliance with the approved monitoring plan; (iv) act as local entry point for the project GRM; (v) assess the contractors' compliance with the site-EMP and People's Republic of China (PRC) environmental quality standards for ambient air, water, and noise qualities; (vi) submit quarterly inspection and monitoring results to the contractors for information, and to the PMO for verification and confirmation.

10. **Construction contractors** will be responsible for implementing the mitigation measures during construction. In their bids, contractors will be required to respond to the environmental management requirements defined in the EMP. Each contractor will be required to develop site-EMPs and will assign a person responsible for environment, health, and safety. After project completion, environmental management responsibilities will be handed over to Baise University.

11. **Construction supervision company.** One construction supervision company (CSC) will be contracted by the implementing agency. The CSC will be responsible for supervising construction progress and quality, and EMP implementation on construction sites. The CSC will include one staff in charge of (i) supervising the contractor's EMP implementation performance; and (ii) preparing the contractor's environmental management performance section in monthly project progress reports submitted to the implementing agency and PMO.

12. **Environment specialist of the loan implementation support.** Under the loan implementation consultancy services, one national (5 person-months) environmental specialist will be recruited to provide technical and management support to the implementing agency to including IEE and EMP implementation, monitoring, and supervision coordination; and other environmental protection related tasks. The LIS-ES will support the implementation of the EMP, including:

(i) Assess the project outputs' environmental readiness prior to implementation based on the readiness indicators defined in the EMP.
(ii) Update the EMP including mitigation measures, monitoring plan, institutional arrangements, and training plan as necessary, to reflect the final project scope and detailed design, including submission to ADB for review and disclosure.
(iii) If required, update the IEE report for changes in the project during detailed design (for example if there is a scope change) that would result in adverse environmental impacts not within the scope of the approved IEE.
(iv) Support the executing agency, PMO, implementing agency, PIU, and tendering companies in preparing bidding documents; ensure that the bidding documents and civil works contracts contain provisions requiring contractors to comply with the mitigation measures in the EMP and that relevant sections of the updated project EMP are incorporated in the bidding and contract documents.
(v) Support the implementing agency in reviewing and approving contractors' site-EMPs and organizing the conduct of periodic environmental impact monitoring.
(vi) 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.
(vii) Assist the executing and implementing agency to establish a GRM, and provide training for the implementing agency and other GRM access points.
(viii) Conduct regular EMP compliance verification, undertake site visits as required, identify any environment-related implementation issues, and propose necessary corrective actions.
(ix) Prepare, on behalf of the implementing agency, annual EMP monitoring and progress reports to ADB.
(x) Provide training to PMO, implementing agency, PIU, and contractors on environmental laws, regulations and policies, ADB's SPS 2009, EMP implementation, and GRM in accordance with the training plan defined in the EMP.
(xi) Assist the PMO, implementing agency, and PIU in conducting site inspections and public consultation meetings with affected persons and relevant stakeholders, informing them of imminent construction works, updating them on the latest project development activities.
(xii) Conduct assessment of project's performance at project completion stage and approximately one year of operation to confirm compliance with EMP as well as sound

management practices (environment audit), contribute to the project completion report.

(xiii) Provide inputs of environmental protection to semiannual progress reports, midterm report, project completion report, and other project required documents.

13. **Campus sustainability planning expert.** Under the loan implementation consultancy services, one national (4 person-months) campus sustainability planning expert will be recruited to assist Baise University and its General Affairs Department in defining a campus sustainability policy, and developing a sustainability center with clear strategic objectives, sustainability programs, institutional structure, terms of reference. The specific tasks of campus sustainability planning expert (CSPE) include:

(i) Organize a seminar for Baise University senior management and relevant departments on (a) PRC policies and guidelines pertaining to green campus development, campus sustainability planning, the promotion of energy-efficiency, low-carbon, and resource-efficient development; and (b) successful case studies in the PRC (output: seminar report, including documentation of successful case studies).

(ii) Plan and facilitate (in collaboration with the General Affairs Department and the Teaching Affair Department) a participatory assessment of current and planned programs within the campus that aim at promoting campus sustainability, low-carbon development, energy-efficiency, resource-conservation, environmental awareness raising, sustainability in curriculum, and other sustainability initiatives (output: assessment report).

(iii) Facilitate the definition of a Campus Sustainability Policy based on a nationally recognized methodology, including formulation and agreement on policy vision; policy goals; policy targets; and commitments *(*output: Campus Sustainability Policy Statement, endorsed by Baise University senior management).

(iv) Facilitate the creation of a governance structure ("Sustainability Center") within Baise University's General Affair Department, including definition of (a) organization setup and terms of reference; (b) main sustainability pillars (e.g. green campus, green curriculum, green community; and (c) a roadmap with clearly articulated targets and measurable indicators (output: sustainability center and roadmap).

(v) Develop outlines of sustainability policies for Baise University priority areas, e.g., energy policy, waste management policy, green procurement policy, and environment awareness policy (output: draft sustainability policies for at least two priority areas).[1]

14. Overall environmental responsibilities are outlined in **Table EMP-1**.

Table EMP-1: Environmental Responsibilities by Project Phase

Phase	Responsible Agencies	Environmental Responsibilities
Detailed design	Design institute	Incorporation of environmental mitigation measures in detailed designs
	PMO, implementing agency, LIS-ES	Update EMP based on detailed design, if necessary
	ADB	Issue no-objection for updated EMP, disclose on project website
Tendering	Implementing agency, LIS-ES, tendering agent	Ensure that mitigation measures and the EMP clauses are incorporated in bidding documents, civil works contracts, and contractors' site-EMPs
	LIS-ES, ADB	Review bidding documents, confirm project's readiness
Construction	Contractors	Develop site-EMP, appoint one environmental specialist to coordinate site-EMP implementation, and ensure health and safety.
	CSC	Supervise the contractor's EMP implementation performance, and prepare the contractor's environmental management performance section in monthly project

[1] This may include the following: energy conservation, resource-efficiency, 3R in waste management, health and safety, green procurement, campus landscaping, environment awareness).

Phase	Responsible Agencies	Environmental Responsibilities
		progress reports submitted to the implementing agency and PMO
	PMO (PMO-SO)	Coordinate GRM, supervise EMP implementation, and prepare annual environmental progress report (with support of LIS-ES)
	Implementing agency, PIU, PIU-ES	Assign one environmental supervisor (PIU-ES); conduct environmental inspections and regular monitoring; prepare quarterly environmental inspection and monitoring reports; act as local GRM entry point. Contract BEMC for periodic environment monitoring of air, noise, and surface water quality.
	LIS-ES	Advise on the mitigation measures; provide comprehensive technical support to PMO, implementing agency, and PIU for environmental management, conduct training, conduct annual EMP compliance review, and support PMO in preparing annual environmental progress reports.
	ADB	Conduct review missions, and review and approve annual environmental progress reports, including disclosure.
	BEPB, BEMC	Conduct periodic inspections of all constructions relative to compliance with PRC regulations and standards. Conduct environment monitoring of air, noise, and surface water quality in accordance with monitoring plan defined in the EMP.
Operation	Construction completion acceptance committee	Construction completion acceptance for each civil work contract (acceptance committee consisting of Baise University, LDI, Baise Quality Inspection Station, Baise Construction Bureau, Baise EPB)
	PMO (PMO-SO)	Conduct EMP compliance review, instruct Baise University on environmental management requirements, and prepare annual environmental progress report until a project completion report is issued.
	Baise University	Define a campus sustainability policy; develop a sustainability center with clear strategic objectives, sustainability programs, institutional structure, and terms of reference.
	CSPE	Provide training on green campus development, energy efficiency, and low carbon campus operation. Plan and facilitate an assessment of current and planned programs that aim at promoting campus sustainability, low-carbon, and energy-efficiency. Facilitate the definition of a campus sustainability policy and develop outlines of sustainability policies for Baise University priority areas.

ADB = Asia Development Bank, BEMC = Baise environment monitoring center, CSPE = campus sustainable planning expert, EMP = environment management plan, EMS = environment management system, EPB = environment protection bureau, GRM = grievance redress mechanism, LIS-ES = loan implementation support environment specialist, PIU = project implementing unit (under implementing agency), PIU-ES = PIU environmental supervisor, PMO = project management office.

C. Summary of Potential Impacts and Mitigation Measures

15. Potential environmental issues and impacts during the pre-construction, construction, and operation phases, as identified in the IEE, as well as corresponding mitigation measures designed to minimize the impacts are summarized in Table EMP-2. The contractors will reflect these mitigation measures in their site-EMPs, to be reviewed and approved by the PIU-ES, PMO-SO, and the LIS-ES.

16. The effectiveness of these measures will be evaluated based on the results of the environmental inspections by the PIU-ES and the CSC, environment monitoring by the Baise Environmental Monitoring Center (BEMC), and through annual EMP verification conducted by the LIS-ES.

17. Most mitigation measures will be shouldered by construction contractors in the construction phase under supervision of CSC and LIS-ES. Periodic monitoring and regular supervision costs will be shouldered by the implementing agency and PIU. The PMO will ensure that adequate funds for mitigation measures and monitoring activities have been allocated by the contractor and Baise University.

Table EMP-2: Anticipated Impacts, Mitigation Measures

Impact Factor / Project Stage	Potential Impacts and/or Issues	Location	Mitigation measures	Implementation Agency	Supervision Agency	Monitoring Indicators
A. Pre-construction Phase						
1. Detailed design stage	Institutional strengthening	Not applicable	• Implementing agency (Baise University) to establish PIU. • PMO to assign PMO-SO. • PMO to engage LIS-ES and CSPE. • Implementing agency to engage PIU-ES. • Implementing agency to engage BEPB.	Implementing agency, PIU, PMO	Executing agency, ADB	Project readiness assessment by LIS-ES, first EMR.
	Design complying with relevant national health, safety and environmental codes and standards, including green and energy-efficient building codes and specifications.	All new buildings	• Design buildings in compliance with relevant design standards and codes for energy-efficient, safe and green public buildings, including but not limited to: Including, but not limited to: GB/T50378-2006 (Evaluation Standard for Green Buildings); GB 50176-1993 (Thermal Design Code for Public Buildings); GB 50189-2005 (Energy Conservation Design for Public Buildings); GB 50011-2010 (Building Seismic Design Code); GB 50016-2006 (Code of Design on Building Fire Protection and Prevention); Building Energy Saving Design Standards in Guangxi Zhuang Minority Autonomous Region (DB45/221-2007), and other applicable national design codes. • Ensure use of no VOC-emitting materials (including paints, coatings, adhesives, carpet and furniture's) to ensure high indoor air quality.	Design institute	Implementing agency, PMO, LIS-ES	Approved detailed designs, first EMR
	Updating EMP	Not applicable	Review mitigation measures defined in this EMP, update as required to reflect detailed design.	LIS-ES, PMO-SO	ADB	Updated EMP approved by ADB and disclosed.
2. Bidding and contract award stage	Bidding documents and contractors qualifications	Not applicable	• Include updated EMP of the IEE as annex to the bidding documents. • Include an environmental section in the requirements for bidders. • Ensure that construction and supply contracts are responsive to EMP provisions and mitigation and monitoring measures are adequately budgeted; • Implement a Green Public Procurement policy, with references to Public Procurement List of Energy-Saving Products (NDRC and MOF, 2011, or as updated) and Public Procurement List of Environmental Labeling Products (MEP and MOF, 2011, or as updated).	Procurement agent, design institute(s), PIU-ES, LIS-ES	Executing agency, PMO, ADB	Bidding documents, construction and equipment supply contracts
	GRM	Not	• Establish a GRM, appoint a GRM coordinator.	PMO-SO, LIS-ES	Executing	Operational

Impact Factor / Project Stage	Potential Impacts and/or Issues	Location	Mitigation measures	Implementation Agency	Supervision Agency	Monitoring Indicators
		applicable	• Brief and provide training to GRM access points PIU-ES, contractors). • Disclose GRM to affected people before construction begins.		agency, ADB	GRM, first EMR
	EMP training	Not applicable	Provide training to PMO, PIU and contractors on implementation and supervision of EMP, GRM, reporting, in compliance with training plan (Table EMP-5)	LIS-ES	PMO, ADB	Evidence of training provided, satisfaction survey of participants, First EMR
	Site-EMPs	Not applicable	Develop Site-EMPs, responding to all clauses and requirements of this EMP, and including sub-plans such as Spill Management Plan, Waste Management Plan, Temporary Traffic Management Plan, Occupational Health and Safety Plan, Soil Erosion Control Plan, and others.	Contractor	PMO-SO, PIU-ES, LIS-ES	Approved Site-EMPs, First EMR.
B. Construction Phase						
1. Soil	Soil erosion, revegetation	All construction sites, spoil disposal sites	• Develop soil erosion protection plan in compliance with provisions of the WSCP approved by Baise Municipal Water Resource Bureau, May 2010 (Doc. No. Baise Shuibao-2010/13), including: o Minimize active open excavation areas; o Construct intercepting ditches and drains to prevent runoff entering construction sites, and divert runoff from sites to existing drainage; o minimize soil excavation works in rainy seasons (April to September) o Dispose of surplus soil at approved spoil disposal site located 200m north of the Chengbi campus; o Stabilize all earthwork disturbance areas within maximum 14 days after earthworks have ceased; o Properly slope and re-vegetate disturbed surfaces	Contractor	PIU-ES, CSC, LIS-ES	Quarterly inspection reports of PIU-ES, annual EMRs
	Soil contamination	All construction sites	• Store chemicals/hazardous products and waste on impermeable surfaces in secure, covered areas.	Contractor	PIU-ES, LIS-ES, CSC	Quarterly inspection reports of

Impact Factor / Project Stage	Potential Impacts and/or Issues	Location	Mitigation measures	Implementation Agency	Supervision Agency	Monitoring Indicators
			• Remove all construction wastes from the site to approved spoil disposal sites. • Provide spill cleanup measures and equipment at each construction site. • Conduct training in emergency spill response procedures.			PIU-ES, annual EMRs
	Slope stabilization, landslide risk	Landslide prone slopes within campus	• Construct 40,600 m^2 of slope protection works within campus at designated areas in compliance comply with the PRC's Standard Drawings for Retaining Walls and Slope Protection of 04J008, including (i) design I–natural vegetation slope protection; (ii) design II–gravity retaining wall + vegetation slope protection, and (iii) design III–arched concrete-framed vegetation slope protection.	Contractor	PIU-ES, CSC, LIS-ES	Quarterly inspection reports of PIU-ES, annual EMRs
2. Surface and groundwater	Pollution of surface and groundwater resources	All construction sites, surface water within Chengbi campus	• Install water collection basins and sediment traps in all areas where construction equipment is washed. • Wastewater generated from the washing down of mixer trucks and drum mixers and similar equipment should wherever practicable be recycled. • Surplus wastewater and wastewater generated from building construction activities, including concreting, plastering, cleaning of works and similar activities should be discharged in to sewer after removal of solids in a silt removal facility. • Sewage from temporary toilets, kitchens and similar facilities should be stored in an on-site facility (such as septic tank), emptied regularly and transported to a designated wastewater treatment plant for further treatment. • Properly manage solid waste (see below).	Contractor	PIU-ES, LIS-ES, CSC	Quarterly inspection reports of PIU-ES, annual EMRs
3. Solid waste	Construction and domestic wastes generated on construction sites	All construction sites	• Maximize reuse/recycling of construction and deconstruction wastes (e.g. iron, bricks, windows, doors, steel bars, etc.). • Provide appropriate waste storage containers for worker's construction and hazardous wastes. • Install confined storage points of solid wastes away from sensitive receptors, regularly haul to an approved disposal facility. • Use licensed contractors to remove wastes from the construction sites. • Prohibit burning of waste.	Contractor	PIU-ES, LIS-ES, CSC	Quarterly inspection reports of PIU-ES, annual EMRs
4. Noise	Noise from	All	• Maintain equipment and machinery in good	Contractor	PIU-ES, LIS-ES,	Quarterly

Impact Factor / Project Stage	Potential Impacts and/or Issues	Location	Mitigation measures	Implementation Agency	Supervision Agency	Monitoring Indicators
	construction activities	construction sites, nearby residential areas	working order; undertake regular equipment maintenance, ensure compliance with PRC standard of GB 12523-2011. • Reach an agreement with Baise University management and nearby residents regarding the timing of heavy machinery work, to avoid any unnecessary disturbances; nighttime works should only be conducted in exceptional cases, and a permit should be obtained for that purpose; and potentially affected people including students, staff and nearby residents should be informed in advance. • Install temporary anti-noise barriers to shield school buildings where non-compliance with Category II in Environmental Quality Standards for Noise (GB3096-2008) is anticipated and/or monitored. • Locate sites for concrete-mixing and similar activities at least 300 m from sensitive areas if without any mitigations. • Monitor noise within Baise University campus and at nearby sensitive areas at regular intervals (as defined in the monitoring plan). • Seek suggestions from Baise University management and potentially affected sensitive receptors to reduce noise annoyance. Disseminate information on procedure of handling complaints through the GRM.		CSC, BEMC	inspection reports of PIU-ES; annual EMRs;
5. Ambient air	Dust generated during construction	All construction sites, including nearby residential areas	• Install perimeter fences at each site prior to construction. The fence shall be at least 2m high. • Spray water at least twice a day where fugitive dust is generated during deconstruction of old buildings and civil works. • Cover trucks carrying earth, sand or stone with tarps or other suitable cover to avoid spilling and dust generation. • Undertake regular air quality monitoring in around the campus in accordance with the monitoring plan. • Regularly consult students and staff as well as nearby residents to identify concerns, and implement additional dust control measures as necessary.	Contractor	PIU-ES, LIS-ES, CSC, BEMC	Quarterly inspection reports of PIU-ES; annual EMRs
	Air emissions from construction	All construction	• Store petroleum or other harmful materials in appropriate places and covering to minimize	Contractor	PIU-ES, LIS-ES, CSC	Quarterly inspection

Impact Factor / Project Stage	Potential Impacts and/or Issues	Location	Mitigation measures	Implementation Agency	Supervision Agency	Monitoring Indicators
	vehicles and machinery	sites	fugitive dust and emission. • Maintain vehicles and construction machineries to a high standard to ensure efficient running and fuel-burning and compliance with the PRC emission standards (GB18352-2005, GB17691-2005, GB11340-2005, GB2847-2005, and GB18285-2005).			reports of PIU-ES; annual EMRs
6. Physical cultural resources	Damage to known or unknown above- or below-ground cultural relics	All construction sites with excavation works	• Establish chance-find procedures for physical cultural resources. • If a new site is unearthed, construction must be stopped immediately and the implementing agency and local cultural relic bureau promptly notified, and construction will resume only after a thorough investigation and with the permission of the appropriate authority.	Contractor	PIU-ES, LIS-ES, CSC, PMO-SO local cultural relics bureau	Quarterly inspection reports of PIU-ES, annual EMRs
7. Flora and fauna	Protection of vegetation, re-vegetation of disturbed areas, greening of sites	Chengbi campus	• Preserve existing vegetation where no construction activity is planned. • Remove trees or shrubs only as a last resort if they impinge directly on permanent structures. • Properly re-vegetate disturbed areas after completion of civil works.	Contractor	PIU-ES, LIS-ES, CSC	Annual EMRs
8. Health and safety	Occupational health and safety	All construction sites, work camps	• Appoint one staff to implement and supervise the implementation of the site-EMP and the performance of subcontractors. • Provide safe supply of clean water and an adequate number of latrines and other sanitary arrangements at the site and work areas, and ensure that they are cleaned and maintained in a hygienic state. • Provide garbage receptacles at construction site. • Provide PPE for workers in accordance with relevant health and safety regulations. • Develop an emergency response plan to take actions on accidents and emergencies; document and report occupational accidents, diseases, and incidents; organize fully equipped first-aid base at each construction site. • Establish records management system that will store and maintain easily retrievable records on occupational accidents, diseases, and incidents. • Train all construction workers in basic sanitation and hygiene issues, general health and safety matters, and on the specific hazards of their work. • To minimize the risk of conflicts between workers and staff/students of the schools, implement	Contractor, PIU-ES	PMO-SO, Baise Municipal center of disease control, LIS-ES	Inspection report of PIU-ES, report on number of incidents and complaints in annual EMRs

Impact Factor / Project Stage	Potential Impacts and/or Issues	Location	Mitigation measures	Implementation Agency	Supervision Agency	Monitoring Indicators
			HIV/AIDS, and STI awareness and prevention training for all employees, and together with the local centers of disease control and the school management, disseminate information on the risks, hazards, impacts and prevention know-how on HIV/AIDS and STIs among the staff/students, workers on the construction sites, students and staff of Baise University, and local community. • Ensure that safety, rescue, and industrial health matters are given a high degree of publicity to all persons regularly or occasionally on the site. Posters drawing attention to site safety, rescue and industrial health regulations will be made or obtained from the appropriate sources and will be displayed prominently in relevant areas of the site.			
	Community health and safety	All construction sites, Baise University campus, plus nearby residential areas	• Prepare traffic control plan within and around the campus during construction, to be approved by Baise University management, and local traffic management administration. The plan shall include provisions for diverting or scheduling construction traffic to avoid peak traffic hours, main teaching activities such as exams, regulating traffic at road crossings with an emphasis on ensuring public safety through clear signage. • Designate staff members to control traffic during on-school and off-school hours. • Ensure that all sites are secure, discouraging access through appropriate fencing, place clear signs at construction sites in view of the people at risk (including students, staff and nearby communities), warning people of potential dangers such as moving vehicles, hazardous materials, excavations etc., and raising awareness on safety issues. • Return machinery to its overnight storage area/position. • In collaboration with the Baise University management, held a meeting prior to commencing construction to discuss issues associated with ensuring the safety of students and staff, as well as nearby communities in the vicinity of the construction site.	Contractor, PIU-ES	LIS-ES; CSC, PMO-SO, local traffic police	Inspection report of environment specialist, report on number of incidents and complaints in annual EMRs
	Utilities provision interruption	All construction sites, nearby	• Assess potential disruption to services and identify risks before starting construction. • If temporary disruption is unavoidable, develop a	Contractor	PIU-ES, LIS-ES, CSC	Annual EMRs

Impact Factor / Project Stage	Potential Impacts and/or Issues	Location	Mitigation measures	Implementation Agency	Supervision Agency	Monitoring Indicators
		areas	plan to minimize the disruption and communicate the dates and duration in advance to all affected people, in conjunction with the Baise University management.			
9. Labor standards and rights	Social protection of workers	Not applicable	• Contractors shall (i) provide equal pay for equal work, regardless of gender or ethnicity; (ii) provide the timely payment of wages; (iii) use local unskilled labor, as applicable, (iv) comply with core labor standards and the applicable labor laws and regulations, including stipulations related to employment, e.g. health, safety, welfare, and the workers' rights, and anti-trafficking laws; and (v) not employ child labor. • Contractors shall maintain records of labor employment, including the name, ethnicity, age, gender, domicile, working time, and the payment of wages.	Contractor	ADB, LIS, PMO-SO	Project progress reports
10. Campus sustainability program		Baise University	Define a campus sustainability policy; develop a sustainability center with clear strategic objectives, sustainability programs, institutional structure, and terms of reference.	CSPE, Baise University	Executing agency, ADB, LIS	Campus sustainability policy defined, sustainability center operational
C. Operation Phase						
1. Wastewater	Inadequate wastewater disposal	Baise University	• Ensure completion of the associated onsite WWTP (2x1,000m^3/d) by 2017. • Properly operate and maintain the associated onsite WWTP to ensure both treatment load and effluent quality (Class-1A) meet the designed specifications. • Ensure connection of all new buildings to on-site WWTP and to municipal sewer system (backup system).	Baise University	Baise EPB, Baise Public Sanitation Bureau	First operation phase EMR
2. Solid waste	Inappropriate management of non-hazardous solid waste	Baise University's Chengbi campus	• Provide adequate solid waste collection facilities in all buildings and on the campus. • Promote segregation of waste through (i) provision of separate collection bins for paper, biodegradable waste, metallic waste, and other wastes; and (ii) provision of training and awareness raising for TVET staff and students. • Reach agreement with waste collection service provider(s) for different types of waste. • Regularly clean and disinfect waste collection facilities.	Baise University, CSPE	Baise EPB	First operation phase EMR
3. Operational	Inappropriate control	Baise	• Proper Installation and maintenance of noise and	Baise University	Baise EPB	First operation

Impact Factor / Project Stage	Potential Impacts and/or Issues	Location	Mitigation measures	Implementation Agency	Supervision Agency	Monitoring Indicators
noise	of noise	University's Chengbi campus	vibration control facilities on air conditioning and ventilation systems. • All noise-emitting machinery and equipment in the onsite WWTP will be installed in sound-proof housing within rooms. • Installation of ventilated sound insulation windows on the buildings along the boundaries of campus if needed.			phase EMR
4. Indoor air pollution	Caused by improper decoration of campus buildings	Baise University's Chengbi campus	• Ensure the decoration materials are water-based or formaldehyde-free products. • Conduct indoor environmental monitoring after completion of decoration works; and take remedy measures if the monitoring data exceed the national standard of GB50325-2001.	Baise University (through sustainability center)	Baise EPB	First operation phase EMR
5. Laboratories	Risks to environment, health and safety from inadequate laboratory practices	Baise University's chemistry, physics, and biology training laboratories	• Define, implement and maintain a laboratory health and safety management plan for each laboratory in line with on national regulations and/or international best practice.[2] The plan will define (i) inventory of chemicals allowed for training purposes, (ii) chemicals storage and handling protocols, (iii) waste management plan, (iv) responsibilities of teachers and students, and (v) emergency response procedures, etc. • All laboratories must be equipped with personal protective equipment and emergency equipment in compliance with PRC health and safety regulations.	Baise University (through Sustainability Center)	Baise EPB	First operation phase EMR
6. Greening and landscaping	Low vegetation survival rate, poor surface water quality	Baise University's Chengbi campus	• Regular inspection of campus vegetation. • Regular monitoring of surface water quality in the manmade pond system. • Avoid use of pesticides and as far as possible.	Baise University (through sustainability center)	Baise EPB, Baise Forestry Bureau	First operation phase EMR
7. Health and safety	Campus health and safety	TVET classrooms, workshops, outdoor areas	• Ensure compliance with relevant health and safety regulations pertaining to ventilation, indoor air quality, lighting, noise, fire escape, etc. • Enforce campus traffic management plan, ensure protection and promote non-motorized transport modes. • Establish preparedness plan and operation plan under emergency conditions, such as fire, flood, earthquake, wind, storm, water contamination, epidemic, air contamination, infestation, explosion etc.	Baise University (through sustainability center)	Executing agency, occupational health authorities	First operation phase EMR

[2] U.S. National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, Department of Health and Human Services. 2006. School Chemistry Laboratory Safety Guide. Accessible from: http://www.cpsc.gov//PageFiles/122344/NIOSH2007107.pdf.

ADB = Asia Development Bank, BEMC = Baise environment monitoring center, BEPB = Baise Environmental Protection Bureau, CSC = construction supervision company, CSPE = campus sustainable planning expert, EHS = environment, health, and safety, EMP = environmental management plan, EMR = annual environment monitoring and EMP progress report, EMS = environment management system, EPB = environment protection bureau, GRM = grievance redress mechanism, IEE = initial environmental examination, LIS = loan implementation support, LIS-ES = loan implementation environmental consultants, m = meter, m^2 = square meter, m^3 = cubic meter, MEP = Ministry of Environmental Protection, MOF = Ministry of Finance, NDRC = National Development and Reform Commission, PIU = project implementation unit, PIU-ES = PIU environmental supervisor, PMO = project management office, PMO-SO = PMO safeguards officer, PPE = personal protection equipment, PRC = People's Republic of China, STI = sexually transmitted infections, TVET = technical vocational education and training, WWTP = wastewater treatment plant.

D. Environmental Inspection and Monitoring Plan

18. The inspection and monitoring plan in the EMP will serve as the template for assessing the potential adverse impacts caused by the project components, and identifying adequacy of protection measures implemented.

19. The plan defines the items to be inspected and parameters to be monitored, the frequency of inspection and monitoring, and the location of sampling. The PIU-ES will be in charge of conducting regular inspections and organizing periodical environmental monitoring for noise, surface water, and air quality (to be conducted by the Baise EMC).

20. The PIU-ES will compile environmental inspection reports on a quarterly basis during construction. These reports will be shared with the contractors, and submitted to implementing agency (Baise University) and its PIU for information, as well as to the PMO-SO for review and appraisal. The PMO-SO will summarize the quarterly environmental inspection and monitoring results of the PIU-ES into the semi-annually project progress report prepared for ADB. More details on environmental inspection and monitoring will be included in the annual environmental monitoring and EMP progress reports prepared for ADB by the PMO-SO (with support of the LIS-ES). These will be disclosed on the ADB's project website (in English) and Baise University's website (in Chinese).

Table EMP-3: Environmental Monitoring and Inspection Plan

Environmental Media/Issue	Location, Parameters, and Monitoring Frequency	Responsibility and Frequency
Pre-construction Phase		
Project readiness (internal monitoring)	**Method:** Review of PMO, implementing agency, PIU, and contractors' readiness to implement the project and mitigation measures based on assessment of project readiness indicators. **Parameters:** Readiness indicators **(Table EMP-4)**	LIS-ES, once before construction
Construction Phase		
Soil erosion and contamination (internal monitoring)	**Method and location:** Visual inspection of the construction sites. **Parameters:** (i) adequacy of soil erosion prevention measures; (ii) adequacy of soil contamination prevention techniques; (iii) evidence of excessive soil erosion or soil contamination (based on site inspection checklist, **Appendix 2**), and in compliance with monitoring plan defined in WSCP (May 2010, Doc. No. Baise Shuibao-2010/13).	Once every 10 days during peak construction period by PIU-ES, then monthly, and yearly by LIS-ES
Solid waste and wastewater management (internal monitoring)	**Method and location:** Visual inspection of construction sites **Parameters:** (i) adequacy of solid and liquid waste management, storage and containment system, and (ii) presence of solid waste dumps and waste fires (based on site inspection checklist, **Appendix 2**).	PIU-ES – once every 10 days during peak construction period, then monthly, and yearly by LIS-ES
Construction site health and safety (internal monitoring)	**Method and location:** Visual inspection and interviews with construction workers and contractors at construction sites. **Parameters:** Site inspection checklist (**Appendix 2**).	Once every 10 days during peak construction period by PIU-ES, then monthly, and yearly by LIS-ES.
Community health and safety (compliance monitoring)	**Method and location:** Visual inspection of the construction sites, informal interviews with TVET staff and students, and nearby residents. **Parameters:** (i) adequacy of construction site signage and fencing, (ii) adequacy of temporary noise mitigation measures,	Once every 10 days during peak construction period by PIU-ES, then monthly, and yearly by LIS-ES.

	(iii) accidents involving public and workers; (iv) emergencies and responses, and (v) public complaints about noise, air pollution, construction site safety, and localized flooding.	
Air quality (compliance monitoring)	**Method and location:** Air quality monitoring, at least four points in the campus, around construction site, and at boundaries of sensitive receptors. **Parameters:** TSP, PM_{10}	Semiannually by Baise EMC
Noise (compliance monitoring)	**Method and location:** At four points at boundary of construction site, and at least three points around at boundaries of sensitive receptors. **Parameters:** Leq dB(A)	Semiannually by Baise EMC
Surface water (compliance monitoring)	**Method and location:** At two points in the artificial lake and stream in the campus. **Parameters**: NH_3-N, SS, CODcr, coliform.	Semiannually by Baise EMC
Construction Completion Phase		
Construction completion acceptance (acceptance monitoring)	**Method:** For each civil work contract, construction completion acceptance to be conducted by acceptance committee. For the project, EIA completion acceptance to be conducted by Baise EPB. **Parameters:** In accordance with national completion acceptance regulations (compliance with relevant building regulations and codes on building safety, energy-efficiency, and others) and EIA regulation.	Acceptance committee (including Baise University, LDI, Baise Quality Inspection Station, Baise Construction Bureau, Baise EPB) Baise EPB for EIA completion acceptance.
Photovoltaic Commissioning (acceptance monitoring)	**Method:** Commissioning tests by an independent group of experts, prior to final payment of contract, within 2 months of installation completion. **Parameters:** In accordance with national completion acceptance regulations, including but not limited to: checks of the main components (communications, meteorological station, modules, wiring, inverters, interconnection, batteries, etc.), open circuit voltage, and operating current and 30-day operating performance test.	Acceptance committee (including licensed PV experts, Baise University, LDI, Baise Quality Inspection Station, Baise Construction Bureau, Baise EPB)
Operation Phase		
Campus management (general) (internal monitoring)	**Method and location:** New Chengbi campus, environment audit to be arranged by ADB OD in consultation with local EPB and Baise University. **Parameters:** DMF indicators; campus sustainability strategy; sustainability center; energy consumption.	ADB, local EPB-once after one year of operation (during review mission), before PCR is issued. Baise University sustainability center (to include comprehensive campus management system)
Surface water (internal monitoring)	**Method and location:** at two points in the artificial lake and stream in the campus. **Parameters:** NH_3-N, TP, SS, CODcr, coliform.	Baise University sustainability center, with support of Baise EPB
Wastewater treatment plant (internal and compliance monitoring)	**Method and location:** Sampling of WWTP influent and effluent (2 onsite WWTPs), assessment of compliance with Integrated Wastewater Discharge Standard GB 8978-1996; noise and odor monitoring **Parameters:** COD, BOD, NH4-N, TN, TP, SS, E. coli, dB(A), H2S, SO2	Internal monitoring: Baise University sustainability center (with involvement of students), once a week, or as defined in the Waste management policy. Compliance monitoring: Baise EPB, periodically (as regulated)
Solid waste (internal monitoring)	**Method and location:** Visual inspection of waste collection and transfer station within campus. **Parameters:** Waste quantity, presence of disease vectors,	Internal monitoring: Baise University sustainability center (with involvement of students), once a week, or as defined in the

	malodorous gases, littering.	waste management policy.
Indoor air quality (compliance monitoring)	**Method and location:** Air quality monitoring in classrooms, dormitories, laboratories, and training facilities. **Parameters:** As defined in national standard of GB50325-2001	Compliance monitoring: Baise EPB, periodically (as regulated)
Photovoltaic system (Internal monitoring)	**Method and location:** Regular visual inspection of photovoltaic system components (communications, meteorological station, modules, wiring, inverters, interconnection, batteries, etc.); PV system monitoring system (centralized management and information center). **Parameters:** Solar radiation, various weather parameters, electricity generation from each power conditioner, battery status, etc.	Internal monitoring: Baise University sustainability center (with involvement of students), continuously.

ADB = Asia Development Bank, DMF = design and monitoring framework, EIA = environmental impact assessment, EMP = environmental management plan, EPB = environment protection bureau, LIS-ES = loan implementation environmental consultants, PCR = project completion report, PIU = project implementation unit, PIU-ES = PIU environmental supervisor, PMO = project management office, TVET = technical vocational education and training.

21. **Assessment of project readiness**. Before construction, the LIS-ES will assess the project's readiness in terms of environmental management based on a set of indicators (**Table EMP-4**) and report it to ADB, PMO, and implementing agency. This assessment will demonstrate that environmental commitments are being carried out and environmental management systems are in place before construction starts, or suggest corrective actions to ensure that all requirements are met.

Table EMP-4: Project Readiness Assessment Indicators

Indicator	Criteria	Assessment	
EMP update	The EMP was updated after detailed design, and approved by ADB	Yes	No
Compliance with loan covenants	The borrower complies with loan covenants related to project design and environmental management planning	Yes	No
Public involvement effectiveness	Meaningful consultation completed; GRM established with entry points	Yes	No
Environmental supervision in place	LIS-ES is in place, PIU-ES appointed, PMO-SO appointed	Yes	No
Bidding documents and contracts with environmental safeguards	Bidding documents and contracts incorporating the environmental activities and safeguards listed as loan assurances	Yes	No
Contractor readiness	Site-EMPs prepared by contractors, reviewed and approved by PIU-ES, PMO-SO	Yes	No
EMP financial support	The required funds have been set aside to support the EMP implementation according to the financial plan.	Yes	No

ADB = Asia Development Bank, EMP = environmental management plan, GRM = grievance redress mechanism, LIS-ES = loan implementation environmental consultants, PIU-ES = project implementation unit environmental supervisor, PMO = project management office, PMO-SO = PMO safeguards officer.
Source: Environmental management plan of the domestic environmental impact statement.

E. Institutional Strengthening and Training

22. The capacity of the PIU, implementing agency, and the PMO's staff responsible for the EMP implementation and supervision will be strengthened. All parties involved in implementing and supervising the EMP must have an understanding of the goals, methods, and practices of project environmental management. The project will address the lack of capacities and expertise in environmental management through (i) institutional strengthening, and (ii) training.

23. **Institutional strengthening.** The capacities of the PMO, implementing agency, and PIU to

coordinate environmental management will be strengthened through a set of measures:

(i) The appointment of a staff member within the PMO (PMO-SO) in charge of EMP coordination, including GRM.
(ii) The appointment of one national environmental consultant under the loan implementation consultancy to guide PMO and implementing agency in implementing the EMP and ensure compliance with ADB's Safeguard Policy Statement (SPS 2009).
(iii) The appointment of an environment specialist by the PIU-ES to conduct regular site inspections and coordinate periodic air, surface water and noise monitoring.

24. **Training.** The executing agency, PMO, implementing agency, and PIU will receive training in EMP implementation, supervision, and reporting, and on the GRM (**Table EMP-5**). Training will be facilitated by the LIS-ES and Baise EPB with support of other experts under the loan implementation support.

Table EMP-5: Training Program

Training Topic	Targeted Agencies	Timing	Duration and Costs
EMP Implementation: Roles and responsibilities, monitoring, supervision and reporting procedures, and review of experience (after 12 months)	PMO, implementing agency, PIU, contractors	Once prior to, and once after one year of project implementation	2 x 1 day, US$500
GRM: Roles and responsibilities, procedures, review of experience (after 12 months)	PMO, implementing agency, PIU, contractors community representatives, contractors	Once prior to, and once after one year of project implementation	2x 1 day, US$500

EMP = environmental management plan, GRM = grievance redress mechanism, PIU = project implementation unit, PMO = project management office, PMO = project management office.
Source: Project preparatory technical assistance consultants.

F. Environmental Reporting

25. **Project progress reports.** The executing agency will provide ADB with (i) project semiannual progress reports in a format consistent with ADB's project performance reporting system; (ii) annual project progress 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 next 12 months; and (iii) a project completion report within 6 months of physical completion of the project.

26. The semiannual progress reports will also include a summary of EMP implementation status, results of inspections conducted by the PIU-ES, problems encountered during construction and operation, if any, and the relevant corrective actions undertaken.

27. **Annual environmental progress reports.** To ensure proper and timely implementation of the EMP and adherence to the agreed environmental covenants, the PMO shall submit to ADB yearly environmental progress reports, based on the semiannual inspection and monitoring reports of the LIS-ES. The LIS-ES will support the PMO in developing the annual reports. The report should confirm the project's compliance with the EMP and the PRC's environmental standards and regulations, and identify any environment related issues and necessary corrective actions. The performance of the contractors will also be reported on with respect to environmental protection and impact mitigation. The operation and performance of the project GRM, environmental institutional strengthening and training will also be included in the report. Table EMP-6 summarizes the reporting requirements.

Table EMP-6: Reporting Requirements

Report	Frequency	Purpose	From	To
Inspection and monitoring reports	Semiannually	Confirmation of contractors compliance with EMP, presentation of monitoring results	PIU-ES	Contractors, IA, PMO, LIS-ES
Project Progress Reports	Semiannually	General project progress, including summary of EMP implementation	PMO	ADB
Annual Environmental Monitoring Reports	Annually	Adherence to Environmental Covenants and EMP, presentation of monitoring results, EMP work plan.	PMO, LIS-ES, LIS	ADB

ADB = Asia Development Bank, EMP = environmental management plan, LIS = loan implementation support, LIS-ES = loan implementation environmental consultants, PIU = project implementation unit, PIU-ES = PIU environmental supervisor, PMO = project management office.
Source: Project preparatory technical assistance consultants.

G. Mechanisms for Feedback and Adjustment

28. Based on environmental monitoring and reporting systems in place, the PMO, PIU, and PIS-ES shall assess whether further mitigation measures are required as corrective action, or improvement in environmental management practices are required. The effectiveness of mitigation measures and monitoring and inspection plans will be evaluated by a feedback reporting system. If the PMO, PIU, and PIS-ES identify a substantial deviation from the EMP, or if any changes are made to the project scope that may cause significant adverse environmental impacts or increase the number of affected people, then the PMO, PIU, and PIS-ES shall immediately consult ADB to identify EMP adjustment requirements.

H. Cost Estimates for Environmental Management

29. The total project budget for the project is approximately CNY 471.459 million (US$ 76.66 million). The EMP related costs for the construction period are estimated in the domestic EIS at CNY 20.0 million (US$ 3.25 million) of the total project budget including CNY 15.0 million (US$2.44 million) for water and soil conservation cost (proposed in the project WSECP). Cost estimates for mitigation measures, environmental monitoring, public consultations, and capacity building are summarized in **Table EMP-7.** Construction completion and environment acceptance audits are expected to cost some CNY 200,000 (US$32,500). Campus environment, health and safety management costs (indicative) are estimated at CNY 750,000 per year (US$ 122,000).

30. Costs for environmental monitoring and inspection include salaries and consultancy fees for the PMO-SO, the LIS-ES and the PIU-ES, as well as costs for the environmental monitoring performed by the PIU-ES. The salary costs of the PMO-SO and LIS-ES will be covered by the executing agency; the salaries of the PIU-ES will be covered by the implementing agency. Air, water and noise monitoring costs will amount to approximately $4,000 per year over 4 years. These expenses will be covered by the implementing agency.

Table EMP-7: Cost Estimates for Environmental Management Plan Implementation

Phase	Main activities and measures	Budget (CNY10,000)
Construction Phase	**Soil and water conservation**, including slope stabilization, open excavation area protection, re-vegetation and intercepting ditches for water and soil runoff control (as defined in the WSECP, Doc. No. Baise Shuibao-2010/13)	1,500
	Construction and domestic wastewater management (installation of sedimentation tanks and temporary drains, installation of oil separators, construction of three steps septic-tanks in the campus	73

Phase	Main activities and measures	Budget (CNY10,000)
	Construction waste management	10
	Construction site environment, health and safety (ambient air quality and dust control, occupational health and safety, access control, noise mitigation)	50
	Greening and landscaping including the landscaping maintenance in first operation year	200
	Indoor air quality control measures (avoid use of VOC emitting materials)	13
	Kitchen and laboratory design (Installation of kitchen hoods, and ventilation & purification system; laboratory hoods, and lab waste gas treatment system)	65
	Noise mitigation (building design, including installation of noise and vibration control facilities and sound insulation windows)	70
	EMP training (twice in the first 2 year of construction)	1
	Construction phase environment compliance monitoring (air, surface water, noise)	9
	Construction phase environment internal monitoring/inspection (soil erosion and contamination, solid waste and wastewater management, community health and safety, construction site safety)	10
	Total	**2,000**
Acceptance Phase	**Environmental acceptance audit** (check the configuration, installation and operation performance of the environmental protection facilities against the related standards and codes. Construction completion audit, including building safety and energy-efficiency audit.	6
	Indoor environmental monitoring and mitigation after completion of decoration works; and take remedy measures if the monitoring data exceed the national standard of GB50325-2001	8
	Photovoltaic commissioning by an independent group of experts, prior to final payment of contract, within 2 months of installation completion, in accordance with national completion acceptance regulations	6
	Total	**20**
Operation Phase	**General campus management** (landscaping, solid waste collection and removal, wastewater treatment, traffic management, etc.)	50/a
	Environment monitoring/inspection (wastewater effluent quality, surface water quality, air quality, noise, solid waste amount, re-vegetation survival rate, laboratory safety, campus traffic management, emergency preparedness and response, etc.)	4/a
	Photovoltaic system operation and monitoring (regular visual inspection of photovoltaic system components (communications, meteorological station, modules, wiring, inverters, interconnection, batteries, etc.); PV system monitoring system (centralized management and information center)	20/a
	Training for campus sustainability policy and sustainability center	1/a
	Total	**75/a**

EMP = environmental management plan
Source: Domestic environmental impact statement report and project preparatory technical assistance consultants.

31. During project implementation, the budget will be adjusted based on actual requirements. Contractors will bear the costs of all mitigation measures during construction, which will be included in the tender and contract documents. Baise University will bear the costs related to mitigation measures during operation. Costs related to environmental inspection during construction will be borne by construction contracts. Training costs will be borne by the project as a whole.

APPENDIX 2 – ENVIRONMENTAL SITE INSPECTION CHECKLIST
ADB-financed Guangxi Baise Vocational Education Development Project

Note: This form is designed for use by the PIU-ES during site inspections and may not be exhaustive. Modifications and additions may be necessary to suit individual project components and to address specific environmental issues and mitigation measures.

Project Component/construction Name: _____
Site Location: _____
Construction stage: _____
Inspection Date: _____
Inspection Time: _____
Weather: _____
Inspected by: _____

Inspection Item	Yes	No	N.A.	Remarks (i.e. problem observed, possible cause of nonconformity and/or proposed corrective/preventative actions)
Site-EMP, GRM, and Information Disclosure				
1. Has contractor appointed an environment supervisor and is the supervisor on-site?				
2. Is site-EMP established?				
3. Is information pertaining to construction disclosed at construction site (including construction period, contractor information, etc.)?				
4. Is GRM disclosed at construction site?				
Soil Erosion and Contamination				
5. Has contractor established a site-specific water and soil conservation plan that incorporates the measures defined in the WSCP approved by Baise Municipal Water Resource Bureau (Doc. No. Baise Shuibao-2010/13)?				
6. Are intercepting ditches and drains constructed to prevent runoff entering construction sites, and divert runoff from sites to existing drainage?				
7. Are disturbed areas stabilized after earthworks have ceased, and re-vegetated?				
8. Are chemicals/hazardous products and waste stored on impermeable surfaces in secure, covered areas?				
9. Is there evidence of oil spillage?				
10. Are spill kits / sand / saw dust used for absorbing chemical spillage readily accessible?				
11. Are chemicals stored and labeled properly?				
Air Quality Control				
12. Are construction sites regularly watered?				
13. Are stockpiles of dusty materials covered or watered and cement debagging process undertaken in sheltered areas?				
14. Are trucks carrying earth, sand or stone covered with tarps or other suitable cover to avoid spilling and dust?				
15. Is equipment well maintained? (any black smoke observed, please indicate the plant/equipment and location)				
16. Are there enclosures around the main dust-generating activities?				
17. Does contractor regularly consult with the Baise University, students, as well as nearby residents to identify concerns?				
18. Was air quality monitoring conducted since the last				

Inspection Item	Yes	No	N.A.	Remarks (i.e. problem observed, possible cause of nonconformity and/or proposed corrective/preventative actions)
inspection? If yes, present results. If no, indicate date of next monitoring campaign.				
Noise				
19. Is there evidence of excessive noise? If yes, describe location and equipment.				
20. Does the contractor undertake regular equipment maintenance, ensure compliance with relevant PRC standard?				
21. Are sites for concrete-mixing and similar activities located at least 300 m from sensitive areas?				
22. Is the CNP valid for work during restricted hours?				
23. Do air compressors and generators operate with doors closed?				
24. Is idle plant/equipment turned off or throttled down?				
25. Any noise mitigation measures adopted (e.g. use noise barrier / enclosure)?				
26. Was noise monitoring conducted since the last inspection? If yes, present results. If no, indicate date of next monitoring campaign.				
27. Does contractor regularly consult with PIU, Baise University, students as well as nearby residents to identify concerns related to noise?				
Surface Water Pollution				
28. Did the contractor develop a spill management plan?				
29. Are wastewater treatment systems being used and properly maintained on site? (e.g. de-silting tank)				
30. Is construction wastewater and domestic wastewater discharged to sewer systems (if possible), or are on-site treatment facilities provided to ensure compliance with effluent discharge standard?				
31. Are there any wastewater discharged to the storm drains?				
Solid Waste Management				
32. Is the site kept clean and tidy? (e.g. litter free, good housekeeping)				
33. Are separate chutes used for inert and non- inert wastes?				
34. Are separated labeled containers/ areas provided for facilitating recycling and waste segregation?				
35. Are construction wastes / recyclable wastes and general refuse removed off site regularly?				
36. Are chemical wastes, if any, collected and disposed of properly by licensed collectors?				
Health and Safety				
37. Is safe supply of clean water and an adequate number of latrines provided for workers?				
38. Are garbage receptacles provided at construction site?				
39. Is PPE provided for workers in accordance with relevant health and safety regulations?				
40. Does the contractor have emergency response plan to take actions on accidents and emergencies?				
41. Are clear signs placed at construction sites in view of the TVET students and staff as well as the public, warning people of potential dangers such as moving vehicles, hazardous materials, excavations etc., and raising awareness on safety issues?				
42. Are all construction sites made secure, discouraging access through appropriate fencing?				
43. Are traffic control measures (speed control, access				

Inspection Item	Yes	No	N.A.	Remarks (i.e. problem observed, possible cause of nonconformity and/or proposed corrective/preventative actions)
control) applied?				
44. Are fire extinguishers / fighting facilities properly maintained and not expired? Escape not blocked / obstructed?				
Vegetation				
45. Is there any evidence of excessive destruction of existing vegetation where no construction activity is occurring?				
46. Are disturbed areas properly re-vegetate after completion of civil works?				
Physical Cultural Resources				
47. Are they any chance found relics? If yes, ensure appropriate measures taken to preserve them.				
Others				
48. Any other problems identified or observations made?				

_____

Date, Name and Signature of Site Inspector

APPENDIX 3: ENVIRONMENTAL SAFEGUARD CLAUSES FOR CIVIL WORKS CONTRACTS

1. The general environment, health and safety obligations of the Contractor within this Contract, without prejudice to other official provisions in force, include the following:

(i) The Contractor shall ensure that the construction and decommissioning of project facilities comply with (a) all applicable laws and regulations of the People's Republic of China (PRC) relating to environment, health and safety; (b) the Environmental Safeguards stipulated in ADB's Safeguards Policy Statement (2009); and (c) all measures and requirements set forth in the EMP (PAM, Appendix EMP).

(ii) The Contractor shall establish a telephone hotline staffed at all times during working hours. Contact details shall be prominently displayed at the sites. The Contractor shall disseminate in timely manner information on the construction progress, including anticipated activities that might cause safety risk.

(iii) The Contractor shall secure, where necessary, appropriate permits and licenses before undertaking the works.

(iv) The Contractor shall prepare a construction site-EMP based on the measures defined in the EMP prepared for the project (PAM, Appendix EMP), and the measures defined in the water and soil conservation plan (WSCP) approved by Baise Municipal Water Resource Bureau (Doc. No. Baise Shuibao-2010/13).

(v) The Contractor shall assign sufficient qualified staff to manage site-EMP implementation, and ensure adequate financial resources are available to implement the site-EMP throughout the construction period.

(vi) The Contractor shall provide equal pay for equal work, regardless of gender or ethnicity; provide those they employ with a written contract; provide the timely payment of wages; use local unskilled labor, as applicable, comply with core labor standards and the applicable labor laws and regulations, including stipulations related to employment, e.g. health, safety, welfare and the workers' rights, and anti-trafficking laws; and not employ child labor. Contractors shall maintain records of labor employment, including the name, ethnicity, age, gender, domicile, working time, and the payment of wages.

(vii) The Contractor shall take necessary precautions to avoid interruptions to water supply, wastewater collection, heating and other utility services during the civil works.

(viii) The Contractor shall take appropriate sanctions against personnel violating the applicable specifications and provisions on environment, health and safety.

(ix) The Contractor shall document, and systematically report to the implementing agency and its PIU, of each incident or accident, damage or degradation caused to the environment, workers or residents or their assets, in the course of the works.

(x) The Contractor shall provide all relevant information about the EMP, as well as the Site-EMP to subcontractor/s and be responsible for their actions.

(xi) The Contractor shall provide the implementing agency and the PIU with a written notice of any unanticipated environmental, health and safety risks or impacts that arise during implementation of the contract that were not considered in the EMP.

APPENDIX 4 - TWO SAMPLE QUESTIONNAIRES RETURNED FOR BU'S ENVIRONMENTAL MANAGEMENT SURVEY

Questionnaire for the Management of Baise University (targeted by the ADB Project) 亚行项目百色学院管理工作问卷调查表

Information on school campus

1. What is the ***name and location of your school/institutions***?
您学校/机构的名称和位置？
Response 回答: 百色学院，百色市中山二路 21 号

2. How many ***students and school personnel*** are currently staying on this campus?
目前在校的学生和教职员工有多少？
Students: 10491
学生
Faculty staff: 497
教师
Admin. staff: 83
行政人员
O&M staff: 66
运营人员
Others: 302 *(specify)* 临时聘请人员（司机，宿舍管理员，食堂工作人员，保洁人员等）
其他 具体描述

3. Do you know the ***size of the school campus*** and the building area?
您知道学校校园面积和建筑面积吗？
Size of campus: _____ *mu* _√_ *Don't know*
校园面积： *亩* *不知道*
Number of buildings: _____ __√__ *Don't know*
建筑物的数量 *不知道*
Total floor area: _____ *m2* _√_ *Don't know*
总建筑面积 *平方米* *不知道*

Water, Wastewater, Solid Waste, Energy 水，污水，固体废弃物，能源

4. Do you know how much **water, energy, waste and wastewater** you consume/produce every year?您知道每年的水，能源，废物和废水的消耗/生产的数量是多大吗？

Water consumption: _____ *m3 per year* _√_ *Don't know*
用水量 *立方米每年* *不知道*
Energy consumption: _____ *kWh per year* __√__ *Don't know*
能源消耗 *千瓦时每年* *不知道*
Non-hazardous waste: _____ *kg per year* __√__ *Don't know*
无害废料 *公斤每年* *不知道*
Hazardous waste: _____ *kg per year* __√__ *Don't know*
有害垃圾 *公斤每年* *不知道*
Wastewater: _____ *m3 per year* __√__ *Don't know*
废水 *立方米每年* *不知道*

5. Do you know by whom and where ***solid waste*** is being transported and discharged?
你是否知道固体废弃物由谁在哪里进行运送和排放？

Who collects your waste: _____ *(organization)* __√__ *Don't know*
您的废弃物由谁收集： *（组织）* *不知道*
Where is it disposed: _____ *(location)* ___√_ *Don't know*
在哪里进行处理 *（地点）* *不知道*
Satisfied with service: _____ *Yes* __√__ *No*
是否满意其服务 *是* *否*

6. Do you where your ***wastewater*** is being transported, treated and discharged?
您是否知道学校的废水往何处输送、处理和排放？

Discharged to nearby river: _____
排放到附近的河流
Treated in on-site septic tank: ___√_____
在现场化粪池处理
Treated in central treatment plant: _____
中央处理厂处理
Other (specify): _____
其他（详细说明）
Don't know: _____
不知道

7. Do you have an **energy conservation policy**? If yes, what are specific measures to minimize energy consumption?是否有能源节约政策？如有，那么减少能源消耗的具体措施有哪些？

Response 回答：：有，如安装了节能水表，节能电表，节能灯

8. Do you have a **waste management policy** promoting waste reduction, reuse and recycling? If yes, what are specific measures to reduce, reuse and recycle waste?
是否有废物管理的政策以减少废物量，促进废物再利用和回收？如有，那么在减少废物量，促进再利用和回收方面有哪些具体措施？
Response 回答:不清楚

Environment, Health and Safety System

9. Does you campus or school have an ***environment, health and safety policy***? If yes, please shortly describe the main component of the policy.您们学校是否有环境，卫生和安全方面的政策？如有，请简要描述其主要组成部分。

Response 回答: 有

10. Do you have established ***procedures for communicating*** relevant environment, health and safety requirements and provisions to school students and employees?
是否有针对学生及员工在环境、卫生和安全方面对话的要求和规定？
__√____ *Yes 是* ____ *No 否*

11. Do you have an ***environment management system*** for the school or campus? If yes, please shortly describe the system.学校是否有环境管理体系？如有，请简要描述。

Response 回答:不清楚

12. Are ***roles, responsibilities and authorities***, including the appointment of a specific manager in charge of environment management, health and safety, clearly defined?
是否明确任务，责任和部们，包括指定专人负责环境管理，卫生和安全方面的工作？
Response 回答: 有

13. Who is ***responsible for the following activities*** on your campus (indicate number of full time or part time staff):您的校园中谁负责以下的活动（说明全职或兼职人员数量）

a. Indoor air quality control: _____
室内空气质量控制
b. Wastewater collection and sewer maintenance: _____
废水收集和污水管道维护
c. Solid waste collection and maintenance: _____
固体废物收集和维护
d. Hazardous waste management: _____
有害废物管理
e. Laboratory safety: _____
实验室安全
f. Campus maintenance (outdoor): _____
校园维护（室外）
g. School building maintenance (indoor): _____
学校建筑物维护（室内）
h. Fire safety: _____
消防安全
i. First aid: _____
急救
j. Water supply safety and quality: _____
供水安全和质量
k. Emergency response: _____
应急响应
l. Others (please specify): _____
其他（请描述）

14. Have you developed, implemented and documented ***operating procedures*** for activities associated with environment management: 在涉及环境管理的活动方面是否制定，实施并形成书面化的操作规程？

a. Non-hazardous solid waste collection: ___ *Yes 是* __√__ *No 否*
a.无害的固体废弃物收集：
b. Hazardous solid waste collection: __√__ *Yes 是* ___ *No 否*
b.有害的固体废弃物收集
c. Laboratory safety: __√__ *Yes 是* ___ *No 否*
c.实验室安全
d. Water supply quality assurance: __√__ *Yes 是* ___ *No 否*
d 供水质量保证
e. Wastewater collection and treatment: __√__ *Yes 是* ___ *No 否*
e 污水收集与处理
f. Safety plans for laboratories: __√__ *Yes 是* ___ *No 否*
f 实验室安全计划
g. Hazardous waste management: __√__ *Yes 是* ___ *No 否*
g 有害废弃物管理
h. Indoor air quality assurance: __√__ *Yes 是* ___ *No 否*
h 室内空气质量保证
Notes 备注:

15. Do you have a ***fire safety plan*** for your school? 你们学校有消防安全计划吗？
__√____ *Yes 是* ___ *No 否*
Notes 备注:

16. Do you have established ***emergency identification, preparedness and response*** procedures? 你们学校是否建立起了突发事件识别，防范和应对的程序？
__√____ *Yes 是* ___ *No 否*
Notes 备注:

Capacity Building 能力建设

17. Are all employees/faculty/students whose work involves significant environment and safety aspects ***competent by training***, experience and/or education? 通过培训，经验积累和/或教育，涉及学校重大环境及安保方面工作的所有员工、老师、学生是否能够胜任？
_√__ *Yes 是* ___ *No 否*____
Notes 备注:

18. Would you be ***interested*** to strengthen the environment, health and safety management system for your school/institution?您对学校/机构在加强环境，卫生和安保的管理体系是否感兴趣？
Response 回答: 不感兴趣

19. Which aspects of environment, health and safety in your school/institution do you think should be improved?您认为您的学校/机构在环境，卫生和安保的哪些方面需要进一步改善？

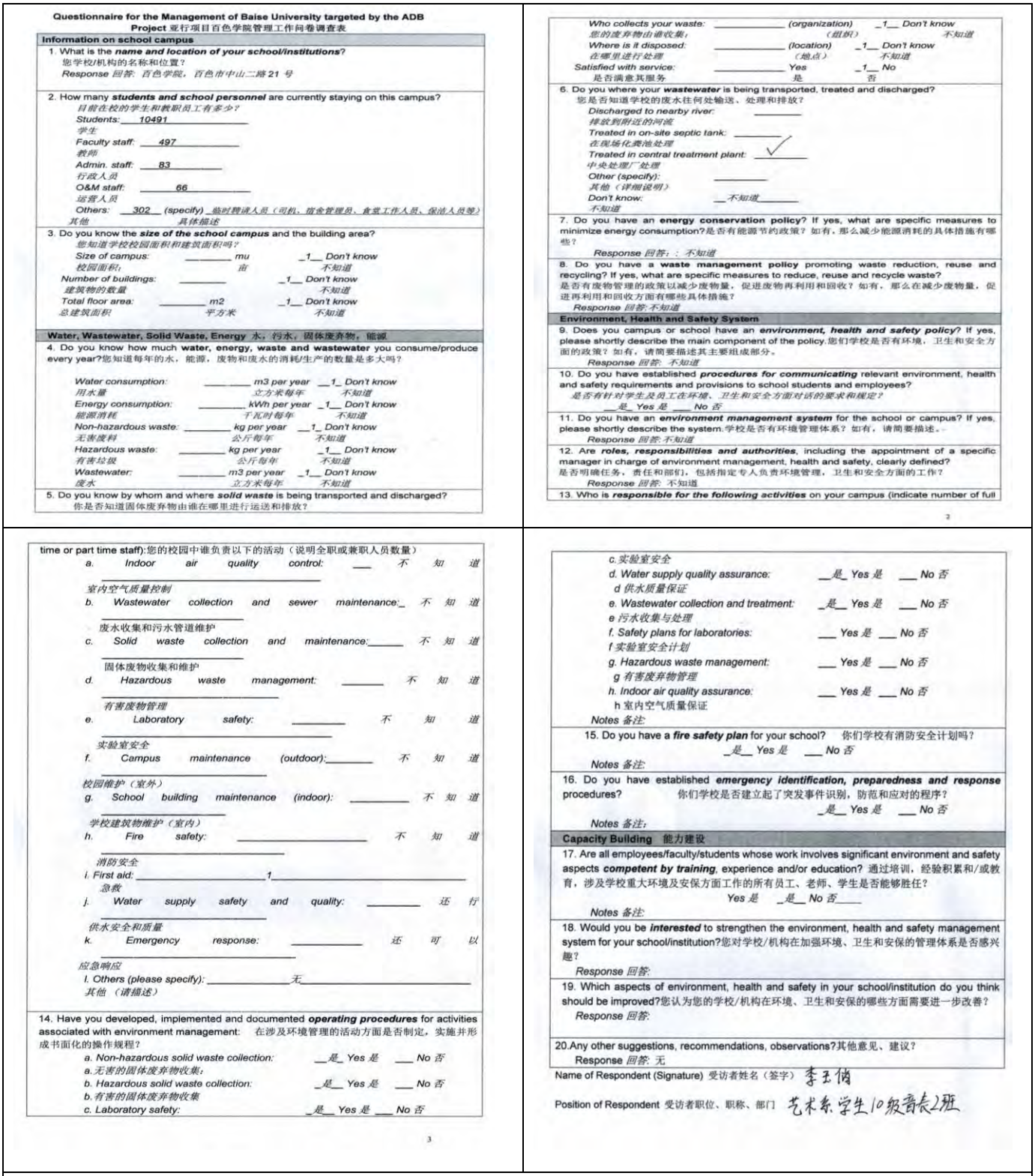
Response 回答:: 将政策落实到实处

20.Any other suggestions, recommendations, observations?其他意见，建议？
Response 回答:: 无

Name of Respondent (Signature) 受访者姓名（签字）黄宝利

Position of Respondent 受访者职位，职称，部门 百色学院行政科科长

A Teacher's Response to the Environmental Management questionary Survey



Questionnaire for the Management of Baise University targeted by the ADB Project 亚行项目百色学院管理工作问卷调查表

Information on school campus

1. What is the ***name and location of your school/institutions***?
您学校/机构的名称和位置？
Response 回答: 百色学院，百色市中山二路 21 号

2. How many ***students and school personnel*** are currently staying on this campus?
目前在校的学生和教职员工有多少？
Students: 10491 *学生*
Faculty staff: 497 *教师*
Admin. staff: 83 *行政人员*
O&M staff: 66 *运营人员*
Others: 302 *(specify)* 临时聘请人员（司机，宿舍管理员、食堂工作人员、保洁人员等） *其他 具体描述*

3. Do you know the ***size of the school campus*** and the building area?
您知道学校校园面积和建筑面积吗？
Size of campus: _____ *mu 亩* _1__ *Don't know 不知道*
校园面积;
Number of buildings: _____ _1__ *Don't know 不知道*
建筑物的数量
Total floor area: _____ *m2 平方米* _1__ *Don't know 不知道*
总建筑面积

Water, Wastewater, Solid Waste, Energy 水，污水，固体废弃物，能源

4. Do you know how much **water, energy, waste and wastewater** you consume/produce every year?您知道每年的水，能源，废物和废水的消耗/生产的数量是多大吗？

Water consumption: _____ *m3 per year 立方米每年* __1_ *Don't know 不知道*
用水量
Energy consumption: _____ *kWh per year 千瓦时每年* _1__ *Don't know 不知道*
能源消耗
Non-hazardous waste: _____ *kg per year 公斤每年* __1_ *Don't know 不知道*
无害废料
Hazardous waste: _____ *kg per year 公斤每年* _1__ *Don't know 不知道*
有害垃圾
Wastewater: _____ *m3 per year 立方米每年* _1__ *Don't know 不知道*
废水

5. Do you know by whom and where ***solid waste*** is being transported and discharged?
你是否知道固体废弃物由谁在哪里进行运送和排放？

Who collects your waste: _____ *(organization) (组织)* _1__ *Don't know 不知道*
您的废弃物由谁收集;
Where is it disposed: _____ *(location) (地点)* _1__ *Don't know 不知道*
在哪里进行处理
Satisfied with service: _____ *Yes 是* _1__ *No 否*
是否满意其服务

6. Do you where your ***wastewater*** is being transported, treated and discharged?
您是否知道学校的废水往何处输送、处理和排放？
Discharged to nearby river: _____
排放到附近的河流
Treated in on-site septic tank: _____
在现场化粪池处理
Treated in central treatment plant: ✓
中央处理厂处理
Other (specify): _____
其他（详细说明）
Don't know: __不知道_____
不知道

7. Do you have an **energy conservation policy**? If yes, what are specific measures to minimize energy consumption?是否有能源节约政策？如有，那么减少能源消耗的具体措施有哪些？
Response 回答:：不知道

8. Do you have a **waste management policy** promoting waste reduction, reuse and recycling? If yes, what are specific measures to reduce, reuse and recycle waste?
是否有废物管理的政策以减少废物量，促进废物再利用和回收？如有，那么在减少废物量，促进再利用和回收方面有哪些具体措施？
Response 回答:不知道

Environment, Health and Safety System

9. Does you campus or school have an ***environment, health and safety policy***? If yes, please shortly describe the main component of the policy.您们学校是否有环境，卫生和安全方面的政策？如有，请简要描述其主要组成部分。
Response 回答: 不知道

10. Do you have established ***procedures for communicating*** relevant environment, health and safety requirements and provisions to school students and employees?
是否有针对学生及员工在环境、卫生和安全方面对话的要求和规定？
__是 Yes 是 ___ No 否

11. Do you have an ***environment management system*** for the school or campus? If yes, please shortly describe the system.学校是否有环境管理体系？如有，请简要描述。
Response 回答:不知道

12. Are ***roles, responsibilities and authorities***, including the appointment of a specific manager in charge of environment management, health and safety, clearly defined?
是否明确任务，责任和部们，包括指定专人负责环境管理，卫生和安全方面的工作？
Response 回答: 不知道

13. Who is ***responsible for the following activities*** on your campus (indicate number of full

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time or part time staff):您的校园中谁负责以下的活动（说明全职或兼职人员数量）

a. *Indoor air quality control:* ___ *不知道*
室内空气质量控制
b. *Wastewater collection and sewer maintenance:* _ *不知道*
废水收集和污水管道维护
c. *Solid waste collection and maintenance:* _____ *不知道*
固体废物收集和维护
d. *Hazardous waste management:* _____ *不知道*
有害废物管理
e. *Laboratory safety:* _____ *不知道*
实验室安全
f. *Campus maintenance (outdoor):* _____ *不知道*
校园维护（室外）
g. *School building maintenance (indoor):* _____ *不知道*
学校建筑物维护（室内）
h. *Fire safety:* _____ *不知道*
消防安全
i. *First aid:* _____1_____
急救
j. *Water supply safety and quality:* _____ *还行*
供水安全和质量
k. *Emergency response:* _____ *还可以*
应急响应
l. *Others (please specify):* _____无_____
其他（请描述）

14. Have you developed, implemented and documented ***operating procedures*** for activities associated with environment management: 在涉及环境管理的活动方面是否制定，实施并形成书面化的操作规程？
a. *Non-hazardous solid waste collection:* *__是 Yes 是 ___ No 否*
a.无害的固体废弃物收集：
b. *Hazardous solid waste collection:* *_是__ Yes 是 ___ No 否*
b.有害的固体废弃物收集
c. *Laboratory safety:* *_是__ Yes 是 ___ No 否*

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c.*实验室安全*
d. *Water supply quality assurance:* *__是_ Yes 是 ___ No 否*
d 供水质量保证
e. *Wastewater collection and treatment:* *_是__ Yes 是 ___ No 否*
e 污水收集与处理
f. *Safety plans for laboratories:* *___ Yes 是 ___ No 否*
f 实验室安全计划
g. *Hazardous waste management:* *___ Yes 是 ___ No 否*
g 有害废弃物管理
h. *Indoor air quality assurance:* *___ Yes 是 ___ No 否*
h 室内空气质量保证
Notes 备注:

15. Do you have a ***fire safety plan*** for your school? 你们学校有消防安全计划吗？
_是__ Yes 是 ___ No 否
Notes 备注:

16. Do you have established ***emergency identification, preparedness and response*** procedures? 你们学校是否建立起了突发事件识别，防范和应对的程序？
_是__ Yes 是 ___ No 否
Notes 备注:

Capacity Building 能力建设

17. Are all employees/faculty/students whose work involves significant environment and safety aspects ***competent by training***, experience and/or education? 通过培训，经验积累和/或教育，涉及学校重大环境及安保方面工作的所有员工、老师、学生是否能够胜任？
Yes 是 _是__ No 否
Notes 备注:

18. Would you be ***interested*** to strengthen the environment, health and safety management system for your school/institution?您对学校/机构在加强环境、卫生和安保的管理体系是否感兴趣？
Response 回答:

19. Which aspects of environment, health and safety in your school/institution do you think should be improved?您认为您的学校/机构在环境、卫生和安保的哪些方面需要进一步改善？
Response 回答:

20.Any other suggestions, recommendations, observations?其他意见、建议？
Response *回答:* 无

Name of Respondent (Signature) 受访者姓名（签字） 李王俏

Position of Respondent 受访者职位、职称、部门 艺术系学生10级音表2班

A Student's Response to the Environmental Management Qestionary Survey