Environmental Monitoring Report

Semi-annual Report
July 2015

PRC: Anhui Intermodal Sustainable Transport Project

Prepared by Beijing Zhongzi Huayu Environmental Protection Technology Co. Ltd. for the People's Republic of China and the Asian Development Bank.

ADB Loan No. 3112-PRC: Anhui Intermodal Sustainable Transport Development Project

SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT
(No. 2)

Prepared by: Beijing Zhongzi Huayu Environmental Protection Technology Co. Ltd.

July, 2015

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1 INTRODUCTION

1.1 Description of the Project

This project consists of four road subprojects (I-IV) and two waterway subprojects (V and VI) as shown in Table 1. Figure 1 shows the locations of the road subprojects and Figure 2 shows the locations of the waterway subprojects. $200 million of the project cost is funded by ADB, with $150 million applied to the road subprojects and the remaining $50 million applied to the waterways subprojects.

Table 1: Composition of subprojects

Subproject No.	Subproject Title	Jurisdiction	Subproject Description
I	S367 Ma'anshan North Passage Road	Hanshan County, He County	46.874 km to class II
II	S319 Erba-Wuwei Section	Wuwei County	36.52 km to class I
III	Yimu Higway Kedian to Mujiating Section	Nanling County	22.36 km to class I
IV	G206 Dongliu to Yaodu Section	Dongzhi County	16.58 km to class I
V	Shuiyang River Waterway Improvement	Xuancheng City	Length 50 km, bottom width 40 m, water depth 2.5 m
VI	Xuanzhou Multipurpose Port	Xuancheng City	Four 1000 dwt berths totaling 295 m in length and 20 m in width, with a throughput of 1.5 million t/a

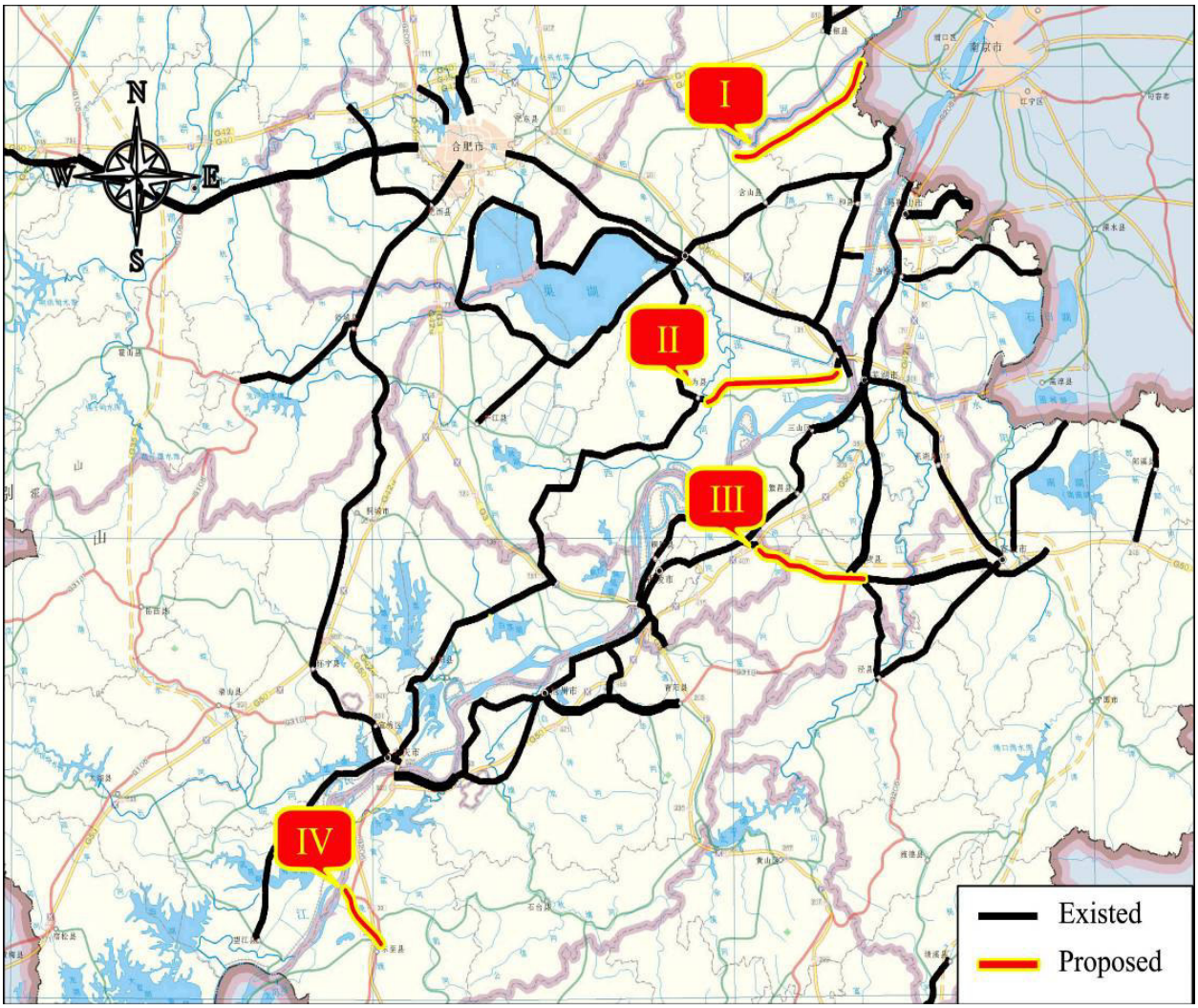


Figure 1: Location map of road subprojects

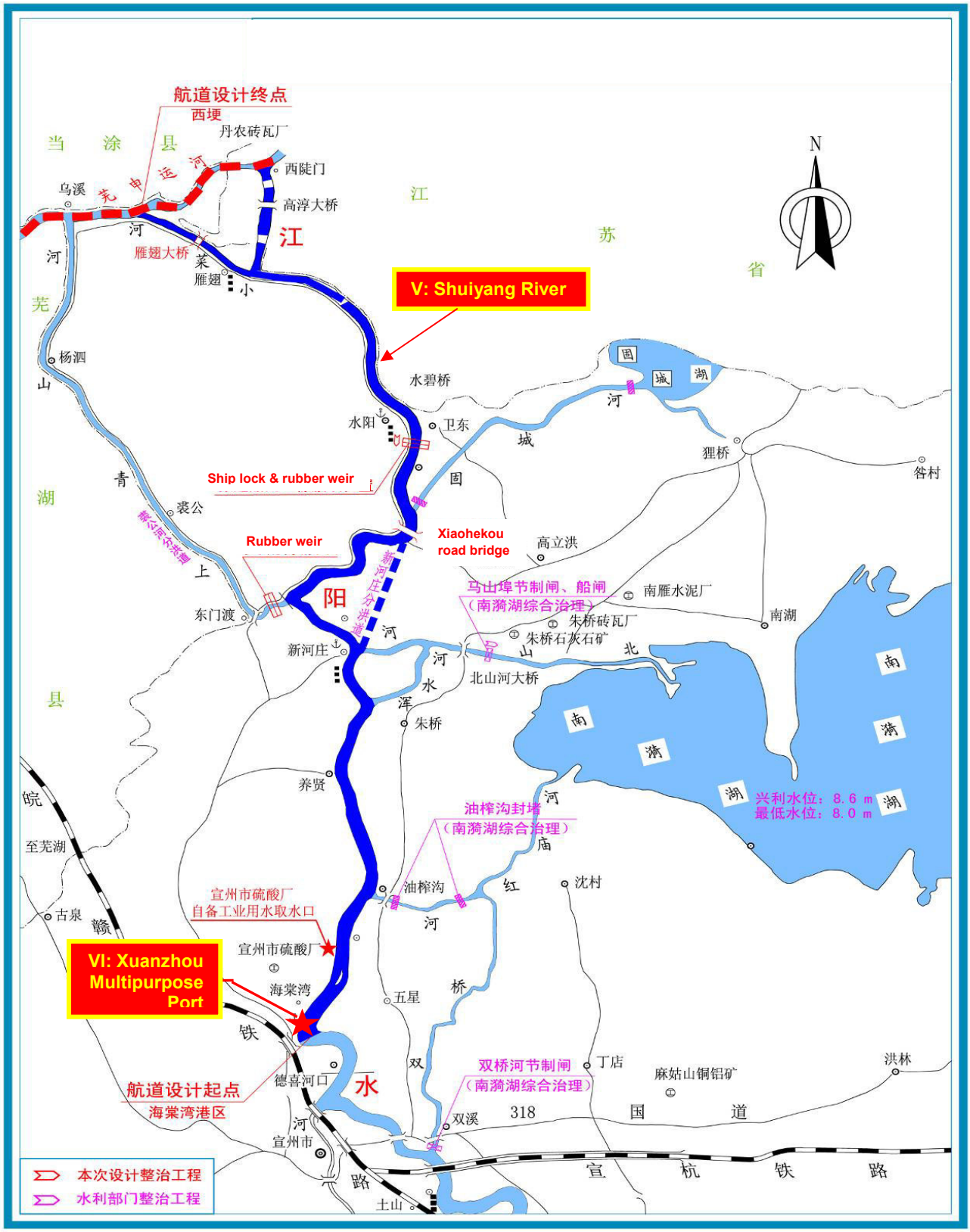


Figure 2: Location map of waterway subprojects

1.2 Purpose of Report

This is the second Environmental Monitoring Report for the project, as required by ADB and its loan covenants to be submitted semi-annually. It covers the period from 1 January to 30 June 2015. The purpose of the report is to document the environmental protection and environmental supervision activities carried out during the reporting period for determining whether the Environmental Management Plan (EMP) and environmental protection measures recommended in the approved domestic Environmental Impact Reports were implemented effectively to avoid, minimize or mitigate adverse environmental impacts.

This report was prepared by the Beijing Zhongzi Huayu Environmental Protection Technology Co. Ltd (BZHEPT), who is the external environmental supervision engineer (ESE) for the project. The report has been approved by the Foreign-funded Project Management Office (FFPMO) of the Anhui Province Department of Transport (Table 2).

Table 2: Preparation, review and approval of the Environmental Monitoring Report

Report title	ADB Loan No. 3112-PRC: Anhui Intermodal Sustainable Transport Development Project – Semi-annual Environmental Monitoring Report No. 2		
Prepared by	MA Qiqi, Beijing Zhongzi Huayu Environmental Protection Technology Co. Ltd	Submission date	15 August 2015
Reviewed by	Foreign-funded Project Management Office, Anhui Province Department of Transport	Review frequency	Every 6 months
Approved by	Foreign-funded Project Management Office, Anhui Province Department of Transport	Version	Draft

1.3 Project Progress

As of 30 June 2015, only subproject IV G206 Dongliu to Yaodu Section had commenced construction (Table 3). Other subprojects were in the tender preparation or tendering stages. Subproject IV has two contractors: (i) Anhui Highway and Bridge Engineering Co. Ltd. under contract NO2-1 covering chainage K0+000 to K9+900, and (ii) Anhui Road and Port Engineering Co. Ltd. under contract NO2-2 covering chainage K9+900 to K15+714. Anhui Zhongxing Engineering Supervision Co. Ltd. had been appointed to undertake construction supervision. Table 4 shows subproject IV progress in the reporting period. Key activities consisted of construction of bridges taking advantage of the dry season, including the Xiaohuangni Lake Bridge and the Quanshui Lake #1 Bridge under contract NO2-1 and the Quanshui Lake #2 Bridge under contract NO2-2.

Table 3: Construction commencement dates of the subprojects

Subproject		Construction Commencement Date
I	S367 Ma'anshan North Passage Road	Not yet started
II	S319 Erba-Wuwei Section	Not yet started
III	Yimu Higway Kedian to Mujiating Section	Not yet started
IV	G206 Dongliu to Yaodu Section	24 September 2014
V	Shuiyang River Waterway Improvement	Not yet started
VI	Xuanzhou Multipurpose Port	Not yet started

Table 4: Progress of subproject IV (up till 30 June 2015)

Subproject		Works Content	Implementation Status at the end of Reporting Period	Work Plan for Next 6 Months
IV	G206 Dongliu to Yaodu Section	(i) Access/haul road construction (ii) Clearing of existing road surface (iii) Subgrade construction (earth cut and fill) (iv) Desilting of rivers and ponds (v) Construction of cement piles	(i) Contract NO2-1: Completed 47.34% of contract value as of 30 June 2015 consisting of: a) 229.38% completion on desilting of rivers and ponds (>100% due to actual quantity > computational quantity) b) 100% completion on clearing of existing road surface,	Key activities will include subgrade earth works, construction of bridges and culverts, and pre-casting of box girders (T-beam).

Subproject		Works Content	Implementation Status at the end of Reporting Period	Work Plan for Next 6 Months
		(vi) Pipe and box culvert engineering (vii) Bore piling (viii) Subgrade side slope construction (ix) Construction of bridges and culverts	haul road construction, gravel laying, cement piles and bored piles c) 88.04% completion on foundation piers d) 83% completion on collar beams e) 64.13% completion on capping beams f) 54.55% completion on box culverts g) 52.32% completion on backfilling h) 51.84% completion on earth excavation i) 41.67% completion on pipe culverts j) 28.57% completion on pedestrian passageways k) 20.86% completion on geogrids l) 8.87% completion on T-beam pre-casting m) 6.65% completion on slab stone retaining walls n) 1.08% completion on T-beam installation (ii) Contract NO2-2: Completed 51.47% of contract value as of 30 June 2015 consisting of: a) 285.13% completion on desilting of rivers and ponds (>100% due to actual quantity > computational quantity) and 133.33% completion on pipe culverts b) 100% completion on clearing of existing road surface, haul road construction, gravel laying and pipe culverts c) 97.56% completion on geogrids d) 86.42% completion on bored piles e) 82.19% completion on collar beams f) 80% completion on box culverts g) 76.62% completion on foundation piers h) 70.33% completion on cement piles i) 63.51% completion on capping beams j) 58.96% completion on backfilling k) 48.67% completion on earth excavation l) 0.30% completion on T-beam pre-casting (iii) Recruitment of contractors for road pavement was in the stage of drafting of tender documents. The plan was to commission road pavement contractors and construction supervision entity through open tendering in the second half of 2015.	

2 IMPLEMENTATION OF THE EMP

2.1 Roles and Responsibilities for EMP and Monitoring Implementation

Environmental management during the construction of these subprojects followed the environmental management hierarchy shown in Figure 3. Table 5 shows the organization of implementing agencies, contractors and supervision organizations for subproject IV.

Executing Agency. The Anhui Province Department of Transport (APDOT) has assigned its Foreign-funded Project Management Office (FFPMO) to be the executing agency for the project. FFPMO is responsible for the overall project implementation and compliance with loan covenants and environmental management plan (including the environmental monitoring program). Specific duties include overall coordination and supervision, management of purchasing and financial matters, and institutional strengthening.

FFPMO has established an Environmental Protection Leading Group, with the FFPMO director as the group leader and other department heads as deputy group leaders and members. The duties of the Environmental Protection Leading Group include:

(a) Implement national and Anhui provincial environmental laws, regulations, policies and guidelines
(b) Organize and implement environmental protection training for the staff
(c) Confirm the environmental quality monitoring organization
(d) Regularly inspect the status of environmental protection during construction, and supervise the implementation of environmental protection measures by contractors

(e) Coordinate with local environmental protection and water resource bureaus to undertake supervision and management activities
(f) Coordinate with ADB and submit quarterly progress reports and semi-annual environmental monitoring reports to ADB

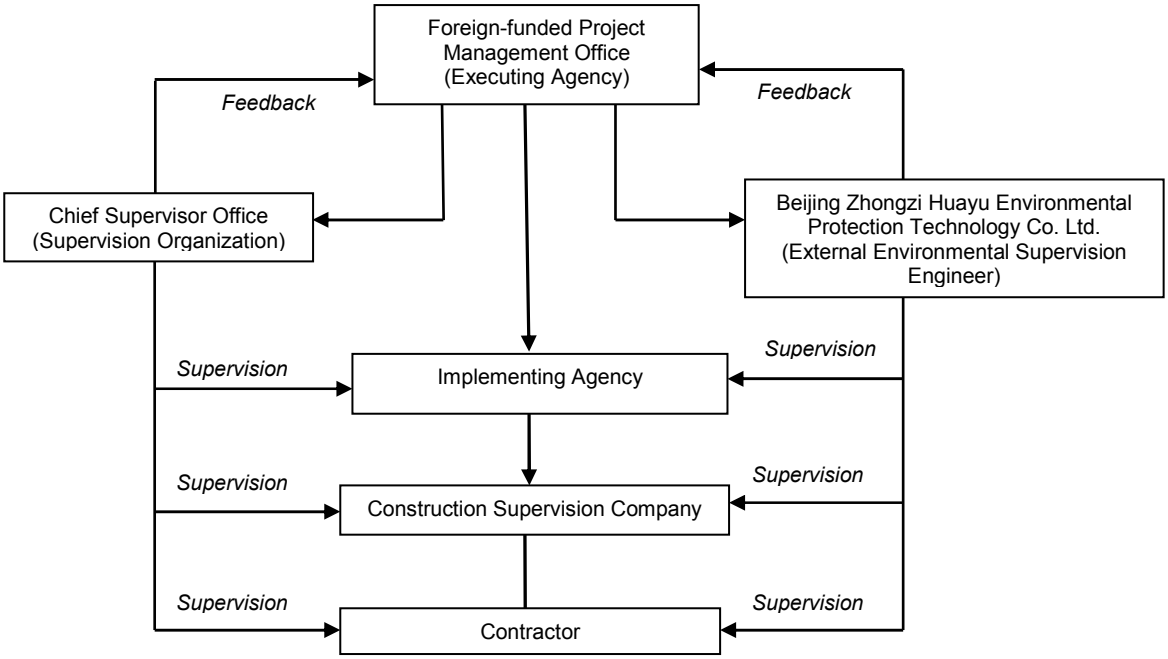


Figure 3: Environmental and construction management hierarchy

Table 5: Implementing agencies, contractors and supervision organizations for subproject IV

Subproject		Jurisdiction	Implementing Agency	Contractor		Supervision Organization	
				Contract #	Company	Construction	Environmental
IV	G206 Dongliu to Yaodu Section	Dongzhi County	Chizhou City Highway Administration Bureau	NO2-1	Anhui Highway and Bridge Engineering Co. Ltd.	Anhui Zhongxing Engineering Supervision Co. Ltd.	Beijing Zhongzi Huayu Environmental Protection Technology Co. Ltd.
				NO2-2	Anhui Road and Port Engineering Co. Ltd.		

Implementing Agency. The Chizhou City Highway Administration Bureau is the implementing agency for subproject IV as shown in Table 5 above. It has appointed one environmental staff to undertake the following activities:
(a) Supervise contractors during construction to ensure compliance with the environmental management plan
(b) Direct regular site inspections
(c) Coordinate environmental quality monitoring so that it is consistent with the approved monitoring program
(d) Act as the local entry point for the grievance redress mechanism
(e) Submit contractors' quarterly inspection reports to the FFPMO and provincial and local environmental authorities for review and confirmation

Construction Supervision Engineer. The Anhui Zhongxing Engineering Supervision Co. Ltd. Is the construction supervision engineer for subproject IV as shown in Table 5 above, responsible for supervising the quality, progress, investment and safety of construction works. It had established a site office consisting of the following: project manager, chief engineer, engineering department, quality testing department, laboratory, materials department, and finance department etc.

External Environmental Supervision Engineer. The external environmental supervision engineer (ESE) is Beijing Zhongzi Huayu Environmental Protection Technology Co. Ltd. (BZHEPT), commissioned by FFPMO through open tendering. The ESE is responsible for environmental supervision of all the subprojects. The ESE had established an Environmental Supervision Project Department for this project, composed of a chief environmental consultant, environmental supervision engineers and supervisors with relevant professional and vocational qualifications and experiences. The chief environmental consultant is a Ministry of Environmental Protection (MEP) certified environmental impact assessment engineer and has overall responsibility for the environmental supervision of the whole project, with independent decisions on environmental supervision activities. Other site supervision staffs have education and experience in environmental protection or related fields, and have obtained vocational certification for undertaking environmental supervision on construction sites. They are responsible for conducting site inspections to ensure that the contractors carry out environmental protection measures in accordance with the EMP and recommendations in the approved domestic environmental impact reports.

The ESE reports directly to FFPMO and the environmental specialists in Anhui Environmental Protection Department. The ESE has the following duties:

(a) Implement national and Anhui provincial environmental laws, regulations, policies and guidelines.
(b) Support project preparation, including EMP revisions.
(c) Support environmental capacity building and training.
(d) Organize and supervise the implementation of environmental protection measures and related requirements in the EMP, the domestic environmental impact reports and the soil and water conservation reports.
(e) Organize the daily management of environmental protection works, conduct regular (at least once per month for each subproject) and ad hoc (when environmental problems are found on site) site inspections on contractors' environmental protection performance and provide instructions when required, and supervise the implementation of various environmental protection measures.
(f) Identify environmental related problems during subproject implementation and formulate necessary corrective actions and action plan.
(g) Provide input to the quarterly progress report and the semi-annual environmental monitoring report.
(h) Prepare documents and reports related to environmental supervision.

Contractor. The contractors for subproject IV are listed in Table 5 above. The contractors had established site offices consisting of various departments on engineering technology, planning and contracts, quality assurance, finance, materials and equipment, general office, and safety and environmental protection, etc. The contractors' environmental protection departments have the following duties:

(a) Implement national and Anhui provincial environmental laws, regulations, policies and guidelines.
(b) Assign dedicated environmental staff and environmental responsibilities in various sections within the construction sites, strengthen the management of environmental protection.
(c) Establish a management system and filing system for environmental protection, and implement various environmental protection measures and related requirements in the EMP, the domestic environmental impact reports and the soil and water conservation reports throughout the construction stage.
(d) Cooperate with ESE supervision for implementing environmental protection measures during construction.
(e) Report to ESE regularly on the implementation status of environmental protection measures.
(f) Coordinate and cooperate with the Environmental Monitoring Stations during their environmental quality monitoring on the construction sites, and take responsibility for the environmental quality conditions within the impact areas of the construction sites.
(g) Strictly comply with the construction management system, ensure that construction activities are confined within the red line areas.

Environmental Quality Monitoring. Table 6 shows the status of environmental quality monitoring arrangements for the subprojects. The Dongzhi County Environmental Monitoring Station (EMS) had been commissioned for conducting environmental quality monitoring subproject IV. The other subprojects had not commenced construction and the process of selecting relevant EMSs was ongoing.

Table 6: Arrangements for environmental quality monitoring of the subprojects

Subproject		Environmental Quality Monitoring Organization / Status
I	S367 Ma'anshan North Passage Road	Not yet appointed
II	S319 Erba-Wuwei Section	Not yet appointed
III	Yimu Higway Kedian to Mujiating Section	Not yet appointed
IV	G206 Dongliu to Yaodu Section	Dongzhi County Environmental Monitoring Station
V	Shuiyang River Waterway Improvement	Not yet appointed
VI	Xuanzhou Multipurpose Port	

Table 7 provides the names and contact information of individuals who are responsible for environment, health and safety of subproject IV. All parties involved in subproject IV were conscientious of workers' health and safety, and provision of regular health checkup for workers would be an important management objective. No accident had been recorded on construction sites to date.

Table 7: Project and subproject IV staffs responsible for environment, health and safety

Subproject	Name of Organization	Name of EHS Staff		Telephone (T) / Email (E)
Foreign-funded Project Management Office		WU Fei	Director	T: 138 5695 1610
		HONG Congsheng		T: 159 0569 0995 T: (551) 6375 6191
External environmental supervision engineer		WANG Qiaochu	Chief Engineer	T: 152 1095 4356 E: 175960016@qq.com
		TAO Jiaxun	Environmental Engineer	E: 270703449@qq.com
		MA Qiqi	Environmental Engineer	T: 177 1065 2761 E: 1206213026@qq.com
IV. G206 Dongliu to Yaodu Section	Implementing Agency: Chizhou City Highway Administration Bureau	WEN Fadong		T: 180 5667 3190 T: 139 5689 8908
	Construction supervision engineer site office: Anhui Zhongxing Engineering Supervision Co. Ltd.	LIU Zhiqiang		T: 186 5665 6676 E: 952648552@qq.com
	NO2-1 contractor: Anhui Highway and Bridge Engineering Co. Ltd.	ZHOU Jianfeng		T: 189 0569 5098
	NO2-2 contractor: Anhui Road and Port Engineering Co. Ltd.	SUN Pengzhi		T: 156 5668 7090

2.2 Environmental Mitigation Measures

Compliance with the EMP on implementation of mitigation measures is presented in Appendix I. Key mitigation measures for subproject IV are highlighted below. Representative photographs of construction sites and activities, and environmental mitigation measure are shown in Appendix II.

Air Quality. Haul roads and access roads were compacted to reduce fugitive dust emission. Each contractor deployed two water trucks for spraying water to suppress dust in unpaved areas and haul roads at least two times per day and more frequent during dry weather and windy days. Trucks transporting dusty materials were covered with tarpaulin and the materials were not allowed to be loaded higher than the side boards of the trucks. Sheltered compartments were installed on construction sites for material storage. Each contract had established one asphalt/concrete mixing station. The asphalt/concrete mixing station for Contract NO2-1 uses the existing Lishan Daoban facility next to G206. The asphalt/concrete mixing station for Contract NO2-2 is a new facility constructed for the subproject, which is located next to the Dongzhi County Wastewater Treatment Plant (WWTP) near G206 and far from local towns and villages. Both mixing stations were paved. The site offices and pre-casting yards were constructed next to these asphalt/concrete mixing stations.

Water Quality. Since construction activities for road sections near water bodies had not commenced fully during the reporting period, mitigation measures for protection of water quality mainly focused on construction sites for subgrade and bridge works, and construction camps, asphalt/concrete mixing stations, and pre-casting yards. Drainage ditches were constructed within the asphalt/concrete mixing stations to collected surface runoff. The asphalt/concrete mixing station for Contract NO2-1 has a 4-chamber sedimentation tank while that for Contract NO2-2 has a 3-chamber sedimentation tank.

Supernatant water from the sedimentation tanks was re-used on site for pavement cleaning and dust suppression. Site offices are equipped with toilet facilities and septic tanks for wastewater treatment. The effluent from the septic tank in Contract NO2-2 was conveyed to the neighboring Dongzhi County WWTP for further treatment. The sedimentation tanks and septic tanks were maintained regularly.

Ditches were constructed around borrow areas and spoil disposal sites to facilitate site drainage. Berms were also constructed around the perimeters to prevent the outflow of muddy slurry. Exposed surfaces not yet ready for borrowing were covered with geotextiles to minimize soil erosion. Steel coffer dams and slurry holding/sedimentation ponds were installed on bridge construction sites to contain and settle muddy water.

Site inspections during the reporting period did not discover maintenance and cleaning of equipment near water bodies, and disposal of spoil and refuse near water bodies.

Noise. Transport of borrow and spoil materials were conducted during day time. Low noise powered mechanical equipment were deployed subject to availability. The use of multiple noisy powered mechanical equipment simultaneously was prohibited. Night time (22:00 to 06:00 hr.) construction works was prohibited.

Solid Waste. Sufficient garbage bins were provided on construction sites and asphalt and cement mixing stations for collection of refuse, which were removed from the site regularly. Construction and demolition (C&D) waste and excavated spoil were stored at spoil disposal sites.

Ecology. Top soils from borrow areas and disposal sites were stripped, removed off site and stored for later use in site rehabilitation. Signs on protection of vegetation and wildlife, and prohibition of hunting were erected on construction sites and construction camps. Signs on protection of vegetation outside construction site boundaries were posted alongside the construction sites. No old and valuable tree was found near the construction sites. Signs on prevention of forest fire were also erected on construction sites that were near wooded areas. No forest fire was recorded during the reporting period.

Geotextiles and landscaping were deployed on road side slopes to prevent soil erosion and to facilitate ecological restoration. Loose soil on spoil disposal sites was compacted regularly with planting of vegetation on spent disposal cells on site.

Existing land uses adjacent to the construction sites were mainly unoccupied barren land. Intrusion of construction activities onto farmland was not observed.

2.3 Environmental Monitoring Data and Record

Table 8 summarizes the environmental quality monitoring programs for subproject IV. Environmental quality monitoring for other subprojects had not started during the reporting period.

Table 8: Environmental quality monitoring programs for the subprojects

Monitoring Specifics		Subprojects					
		I. S367 Ma'anshan North Passage Road	II. S319 Erba-Wuwei Section	III. Yimu Higway Kedian to Mujiating Section	IV. G206 Dongliu to Yaodu Section	V. Shuiyang River Waterway Improvement	VI. Xuanzhou Multipurpose Port
Air quality	Parameter	Daily average TSP					
	Location	Not yet started	Not yet started	Not yet started	4 monitoring points: 1- near asphalt /cement mixing station 2 - on unpaved haul road near construction site 3 - Zhazui 4 -Yangjia	Not yet started	Not yet started
	Frequency	Preconstruction stage: at least 3 consecutive days Construction stage: at least 3 consecutive days every 3 months					

Monitoring Specifics		Subprojects					
		I. S367 Ma'anshan North Passage Road	II. S319 Erba-Wuwei Section	III. Yimu Higway Kedian to Mujiating Section	IV. G206 Dongliu to Yaodu Section	V. Shuiyang River Waterway Improvement	VI. Xuanzhou Multipurpose Port
Noise	Parameter	L_{Aeq}					
	Location	Not yet started	Not yet started	Not yet started	4 monitoring points: 1 & 2- outside the boundary walls of asphalt/ cement mixing station 3 - Zhazui 4 -Yangjia	Not yet started	Not yet started
	Frequency	Preconstruction stage: continual monitoring for 2 consecutive days. Construction stage: at least 2 consecutive days every 3 months				1 day time and 1 night time monitoring every 3 months	
Water quality	Parameter	pH, SS, l_{Mn}, total petroleum hydrocarbon, NH_4-N, COD					
	Location	Not yet started	Not yet started	Not yet started	6 monitoring points: 1 & 2 – 50 m upstream and 50 m downstream of Xiaohuangni Lake bridge 3 & 4 – 50 m upstream & 50 m downstream of Quanshui Lake #1 bridge 5 & 6 – 50 m upstream & 50 m downstream of Quanshui Lake #2 bridge	Not yet started	Not yet started
	Frequency	Preconstruction stage: at least 2 consecutive days Construction stage: at least 2 consecutive days every 3 months				At least 2 consecutive days every 3 months during dredging	At least 2 consecutive days every 3 months during construction
Ecology	Parameter	Not applicable			Bird species and abundance	Not applicable	
	Location	Not applicable			Along the lake between chainage K6+000 to K15+000	Not applicable	
	Frequency	Not applicable			2 consecutive days per month for 2 months per season in summer, winter and transitional (either spring or autumn) seasons respectively	Not applicable	
Monitoring entity		Not decided.	Not decided.	Not decided.	Dongzhi County Environmental Monitoring Station & ornithologist	Not decided.	
Supervision entity	Implementing agency	Ma'anshan City Highway Administration Bureau	Wuwei County Transport Bureau	Nanling County Transport Bureau	Chizhou City Highway Administration Bureau	Anhui Province Ports and Shipping Construction Investment Group Co. Ltd	
	ESE	Beijing Zhongzi Huayu Environmental Protection Technology Co. Ltd.					

2.3.1 Surface Water Quality

For monitoring potential water quality impacts during bridge construction, ADB adopted a "real time baseline" approach with an upstream "control station" and one or more downstream "impact stations", with the standard that the suspended solids (SS) levels at the impact stations should be ≤130% of the SS level at the control station. When the SS levels at the impact stations are >130% of the SS level at the control station, it is indicative of excessive SS dispersing downstream from the bridge construction site and construction methods shall be reviewed and mitigation measures shall be adopted to reduce SS levels at the impact stations to ≤130% of the SS level at the control station.

Table 9 presents the surface water quality monitoring data collected in the reporting period for subproject IV. Water quality data show compliance with Category III surface water quality standards at the monitoring locations on the days of monitoring. However, potential downstream water quality impact as evidenced by the exceedance of ADB's SS level requirement was recorded at the Xiaohuangni Lake bridge site on 11 June 2015 and at the Quanshui Lake #2 bridge site on 10 and 11 June 2015, indicative of the bridge construction site being the source of pollution. Controlling and preventing muddy water runoff into these water bodies needed to be improved at these sites.

Table 9: Surface water quality monitoring data for the reporting period

Subproject	Monitoring Date	Monitoring Location	Parameters Monitored					Remark
			pH	SS	TPH	NH_4-N	COD	
				mg/L	mg/L	mg/L	mg/L	
IV. G206 Dongliu to Yaodu Section	2015.03.23	Xiaohuangni Lake bridge 50 m upstream	7.70	42	0.04	0.330	4.3	Complied with cat. III std.
		Xiaohuangni Lake bridge 50 m downstream	7.81	37	0.05	0.512	5.1	Complied with cat. III std. SS complied with ADB std.
		Quanshui Lake #1 bridge 50 m upstream	7.69	38	0.03	0.401	4.5	Complied with cat. III std.
		Quangshui Lake #1 bridge 50 m downstream	7.81	44	0.03	0.392	5.0	Complied with cat. III std. SS complied with ADB std.
		Quanshui Lake #2 bridge 50 m upstream	8.02	53	0.02	0.412	4.2	Complied with cat. III std.
		QuanshuiLake #2 bridge 50 m downstream	8.04	44	0.03	0.484	4.5	Complied with cat. III std. SS complied with ADB std.
	2015.03.24	Xiaohuangni Lake bridge 50 m upstream	7.75	49	0.05	0.472	3.6	Complied with cat. III std.
		Xiaohuangni Lake bridge 50 m downstream	7.83	52	0.04	0.488	4.0	Complied with cat. III std. SS complied with ADB std.
		Quanshui Lake #1 bridge 50 m upstream	7.75	42	0.04	0.423	5.3	Complied with cat. III std.
		Quangshui Lake #1 bridge 50 m downstream	7.77	49	0.03	0.409	5.7	Complied with cat. III std. SS complied with ADB std.
		Quanshui Lake #2 bridge 50 m upstream	7.98	51	0.03	0.369	5.3	Complied with cat. III std.
		QuanshuiLake #2 bridge 50 m downstream	8.12	51	0.02	0.462	5.4	Complied with cat. III std. SS complied with ADB std.
	2015.06.10	Xiaohuangni Lake bridge 50 m upstream	7.42	55	0.02	0.213	3.5	Complied with cat. III std.
		Xiaohuangni Lake bridge 50 m downstream	7.37	42	0.01	0.349	4.2	Complied with cat. III std. SS complied with ADB std.
		Quanshui Lake #1 bridge 50 m upstream	8.79	60	0.02	0.552	5.4	Complied with cat. III std.
		Quangshui Lake #1 bridge 50 m downstream	8.73	52	0.02	0.213	4.7	Complied with cat. III std. SS complied with ADB std.
		Quanshui Lake #2 bridge 50 m upstream	8.40	38	0.01	0.322	2.8	Complied with cat. III std.
		QuanshuiLake #2 bridge 50 m downstream	8.43	52	0.03	0.405	4.6	Complied with cat. III std. SS >130% of upstream level
	2015.06.11	Xiaohuangni Lake bridge 50 m upstream	7.51	38	0.01	0.307	3.7	Complied with cat. III std.
		Xiaohuangni Lake bridge 50 m downstream	7.55	60	0.01	0.705	3.9	Complied with cat. III std. SS >130% of upstream level
		Quanshui Lake #1 bridge 50 m upstream	8.60	57	0.02	0.510	4.9	Complied with cat. III std.
		Quangshui Lake #1 bridge 50 m downstream	8.52	47	0.04	0.382	4.3	Complied with cat. III std. SS complied with ADB std.
		Quanshui Lake #2 bridge 50 m upstream	8.36	45	0.02	0.428	3.2	Complied with cat. III std.
		QuanshuiLake #2 bridge 50 m downstream	8.24	62	0.01	0.362	4.3	Complied with cat. III std. SS >130% of upstream level
GB 3828-2002 Environmental quality standards for surface water		**Category II**	**6-9**	**---**	**0.05**	**0.5**	**15**	
		Category III	**6-9**	**---**	**0.05**	**1.0**	**20**	
		Category IV	**6-9**	**---**	**0.5**	**1.5**	**30**	
ADB project specific standard				**Downstream ≤130% upstream**				

2.3.2 Air Quality

Table 10 presents the ambient air quality monitoring data collected in the reporting period for subproject IV. Air quality monitoring of total suspended particulates (TSP) at the monitoring locations on the days of monitoring complied with GB 3095-1996 class II ambient air quality standard for TSP at the sensitive receptors, and with GB 16297-1996 fugitive dust emission standard for TSP at the asphalt mixing stations. However, TSP levels exceeded class II ambient air quality standard at Contract NO2-1 asphalt mixing station on two occasions (25 March 2015 and 12 June 2015), and at Contract NO2-2 asphalt mixing station on four occasions (23 and 25 March 2015; 10 and 11 June 2015) . Attempts would be needed to suppress fugitive dust emissions at these sites to lower TSP levels to within GB 3095-1996 class II ambient air quality standard.

Table 10: Air quality monitoring data for the reporting period

Subproject	Monitoring Date	Monitoring Location	Daily Average TSP (mg/m³)	Remark
IV. G206 Dongliu to Yaodu Section	2015.03.23	Zhazui	0.162	Complied with GB 3095-1996 class II std.
		Yangjia	0.203	Complied with GB 3095-1996 class II std.
		Unpaved haul road at Guanshancunzhuang Upper Group	0.160	Complied with GB 3095-1996 class II std.
		Contract NO2-1 asphalt mixing station	0.363	Complied with GB 16297-1996 std. but > GB 3095-1996 class II std.
		Contract NO2-2 asphalt mixing station	0.426	Complied with GB 16297-1996 std. but > GB 3095-1996 class II std.
	2015.03.24	Zhazui	0.175	Complied with GB 3095-1996 class II std.
		Yangjia	0.155	Complied with GB 3095-1996 class II std.
		Unpaved haul road at Guanshancunzhuang Upper Group	0.112	Complied with GB 3095-1996 class II std.
		Contract NO2-1 asphalt mixing station	0.247	Complied with GB 16297-1996 and GB 3095-1996 class II std.
		Contract NO2-2 asphalt mixing station	0.268	Complied with GB 16297-1996 and GB 3095-1996 class II std.
	2015.03.25	Zhazui	0.221	Complied with GB 3095-1996 class II std.
		Yangjia	0.174	Complied with GB 3095-1996 class II std.
		Unpaved haul road at Guanshancunzhuang Upper Group	0.107	Complied with GB 3095-1996 class II std.
		Contract NO2-1 asphalt mixing station	0.418	Complied with GB 16297-1996 std. but > GB 3095-1996 class II std.
		Contract NO2-2 asphalt mixing station	0.411	Complied with GB 16297-1996 std. but > GB 3095-1996 class II std.
	2015.06.10	Zhazui	0.153	Complied with GB 3095-1996 class II std.
		Yangjia	0.160	Complied with GB 3095-1996 class II std.
		Unpaved haul road at Guanshancunzhuang Upper Group	0.108	Complied with GB 3095-1996 class II std.
		Contract NO2-1 asphalt mixing station	0.286	Complied with GB 16297-1996 and GB 3095-1996 class II std.
		Contract NO2-2 asphalt mixing station	0.320	Complied with GB 16297-1996 std. but > GB 3095-1996 class II std.
	2015.06.11	Zhazui	0.196	Complied with GB 3095-1996 class II std.
		Yangjia	0.144	Complied with GB 3095-1996 class II std.
		Unpaved haul road at Guanshancunzhuang Upper Group	0.141	Complied with GB 3095-1996 class II std.
		Contract NO2-1 asphalt mixing station	0.265	Complied with GB 16297-1996 and GB 3095-1996 class II std.
		Contract NO2-2 asphalt mixing station	0.366	Complied with GB 16297-1996 std. but > GB 3095-1996 class II std.
	2015.06.12	Zhazui	0.182	Complied with GB 3095-1996 class II std.
		Yangjia	0.169	Complied with GB 3095-1996 class II std.
		Unpaved haul road at Guanshancunzhuang Upper Group	0.117	Complied with GB 3095-1996 class II std.
		Contract NO2-1 asphalt mixing station	0.383	Complied with GB 16297-1996 std. but > GB 3095-1996 class II std.
		Contract NO2-2 asphalt mixing station	0.294	Complied with GB 16297-1996 and GB 3095-1996 class II std.
GB 3095-1996 Ambient air quality standards		**Class II**	**0.3**	
GB 16297-1996 Air pollutant integrated emission standards (for fugitive dust emissions at asphalt mixing station)			**1.0**	

2.3.3 Noise

Table 11 presents the noise monitoring data collected in the reporting period for subproject IV. Noise levels at all the monitoring locations on the days of monitoring complied with the applicable standards.

Table 11: Noise monitoring data for the reporting period

Subproject	Monitoring Date	Monitoring Location	Noise Level [Leq(dB)A]		Remark
			Day Time	Night Time	

Subproject	Monitoring Date	Monitoring Location		Noise Level [Leq(dB)A]		Remark
				Day Time	Night Time	
IV. G206 Dongliu to Yaodu Section	2015.03.23	Zhazui		58.4	41.5	Complied with GB 3096-2008 cat. 4a std.
		Yangjia		59.2	40.5	Complied with GB 3096-2008 cat. 2 std.
		Contract NO2-1 asphalt mixing station N boundary		67.2	53.7	Complied with GB 12523-2011 std.
		Contract NO2-1 asphalt mixing station S boundary		58.9	54.1	Complied with GB 12523-2011 std.
		Contract NO2-2 asphalt mixing station E boundary		59.3	47.2	Complied with GB 12523-2011 std.
		Contract NO2-2 asphalt mixing station S boundary		58.4	49.6	Complied with GB 12523-2011 std.
	2015.03.24	Zhazui		52.3	44.7	Complied with GB 3096-2008 cat. 4a std.
		Yangjia		55.8	43.6	Complied with GB 3096-2008 cat. 2 std.
		Contract NO2-1 asphalt mixing station N boundary		66.5	54.5	Complied with GB 12523-2011 std.
		Contract NO2-1 asphalt mixing station S boundary		65.3	53.9	Complied with GB 12523-2011 std.
		Contract NO2-2 asphalt mixing station E boundary		60.0	47.7	Complied with GB 12523-2011 std.
		Contract NO2-2 asphalt mixing station S boundary		57.9	48.3	Complied with GB 12523-2011 std.
	2015.06.10	Zhazui		55.7	42.2	Complied with GB 3096-2008 cat. 4a std.
		Yangjia		48.9	44.0	Complied with GB 3096-2008 cat. 2 std.
		Contract NO2-1 asphalt mixing station N boundary		63.5	54.6	Complied with GB 12523-2011 std.
		Contract NO2-1 asphalt mixing station S boundary		59.4	52.8	Complied with GB 12523-2011 std.
		Contract NO2-2 asphalt mixing station E boundary		57.4	49.0	Complied with GB 12523-2011 std.
		Contract NO2-2 asphalt mixing station S boundary		52.8	48.3	Complied with GB 12523-2011 std.
	2015.06.11	Zhazui		54.3	42.5	Complied with GB 3096-2008 cat. 4a std.
		Yangjia		56.1	43.1	Complied with GB 3096-2008 cat. 2 std.
		Contract NO2-1 asphalt mixing station N boundary		65.0	53.6	Complied with GB 12523-2011 std.
		Contract NO2-1 asphalt mixing station S boundary		63.7	54.4	Complied with GB 12523-2011 std.
		Contract NO2-2 asphalt mixing station E boundary		54.9	48.5	Complied with GB 12523-2011 std.
		Contract NO2-2 asphalt mixing station S boundary		56.8	48.0	Complied with GB 12523-2011 std.
GB 3096-2008 Environmental quality standard for noise			**Category 4a**	**70**	**55**	For within 35 m from road
			Category 2	**60**	**50**	For beyond 35 m from road
GB 12523-2011 Emission standard of environmental noise for boundary of construction site				**70**	**55**	

2.3.4 Ecology

No bird survey data was acquired in the reporting period.

2.4 Environmental Institutional Capacity Building and Training

Table 12 presents capacity building and training plan and its implementation status for subproject IV. Table 13 presents the seminars and workshops conducted in the reporting period for subproject IV. Photographs for selected seminars and workshops are presented in Appendix II.

Table 12: Environmental institutional capacity building and training plan and implementation status for subproject IV

Stage	Training Content	Attendee	Combined Duration	Time	Implementation Status
Construction	Environmental management and related policies	1 to 2 persons from each subproject implementing agency and design institute	30 days	2013-2015	Training conducted on 2014.09.23. See Table 13 for details
	1. Environmental Protection Law, regulations and related policies 2. Protection of cultural relics 3. Highway environmental impact assessment & environmental management plan 4. Environmental monitoring methods 5. Environmental supervision	2 persons from each contractor and construction supervision company; 4 persons from design institute	4 days	2013	Training conducted on 2014.09.25 and 2014.09.27. See Table 13 for details
	Environmental management emergency response plan and measures	2 persons from FFPMO, each subproject implementing agency, each contractor and each construction supervision company	3 days	2014-2015	Training conducted from 2014.11.04 to 2014.11.07.

Table 13: Environmental training seminars and workshops for subproject IV in the reporting period

Topic	Trainer	Attendee		Date
		Organization	No.	
Subproject organizational structure; division of duties and responsibilities; requirements for construction supervision; and training by ESE on supervision procedures, quality and safety.	LIU Zhiqiang, supervision engineer, Anhui Zhongxing Engineering Supervision Co. Ltd	Subproject management staff, contractors and supervision staff	20	2014.09.23
Training and discussion on environmental supervision scope, procedures and system	1.LIU Lingfeng, senior engineer, Shanghai Shipping Transport Science Research Institute 2.ZHANG Xiang, environmental supervision engineer, AHEPESTCL 3.TAO Jiaxun, environmental supervision engineer, AHEPESTCL	FFPMO, IA, contractors and supervision staffs	20	2014.09.25
Environmental management training, performing environmental supervision tasks, issues and problems of concern, compliance with related laws and regulations, and assignment of responsibilities for the organizations.	LIU Lingfeng, senior engineer, Shanghai Shipping Transport Science Research Institute	FFPMO, IA, contractors and supervision staffs	20	2014.09.27
ADB environmental safeguard policy requirements, environmental management plan, environmental responsibilities during construction, construction site environmental auditing, environmental monitoring, grievance redress mechanism, and compliance with the above requirements.	Alan Y. KWOK, ADB environmental specialist	FFPMO, IA, contractors and supervision staffs	25	2014.11.04
Site inspection on implementation of environmental protection measures, recommendations on corrective actions.	Alan Y. KWOK, ADB environmental specialist	FFPMO, IA, contractors and supervision staffs	25	2014.11.07

Notes:
ADB = Asian Development Bank; **AHEPESTCL** = Anhui Huafan Environmental Protection Engineering Science and Technology Co. Ltd.; **FFPMO** = Foreign-funded Project Management Office; **IA** = implementing agency

3 PUBLIC CONSULTATION, DISCLOSURE AND GRIEVANCE REDRESS MECHANISM

3.1 Public Consultation and Information Disclosure

Table 14 presents the public consultation plan and implementation status as of 30 June 2015. Project information and environmental impact assessment findings were disclosed on local city and/or county government web sites. Bill boards were also erected on construction sites and construction camps disclosing project information, environmental and safety measures, and complaint hotline numbers to the communities.

Table 14: Public consultation plan and implementation status

Organizer	Format	No. of Times	Subject	Attendees	Implementation Status
Construction stage					
FFPMO, IAs	Public consultation & site visit	4 times: 1 time before construction commences and 1 time each year during construction	Adjusting of mitigation measures, if necessary; construction impact; comments and suggestions	Residents adjacent to project sites, representatives of social sectors	Conducted once before subproject IV G206 Dongliu to Yaodu Section construction commencement
FFPMO, IAs	Expert workshop or press conference	As needed based on public consultation	Comments and suggestions on mitigation measures, public opinions	Experts of various sectors, media	Not yet started
Operational stage					
FFPMO, O&M units	Public consultation and site visits	Once in the first year	Effectiveness of mitigation measures, impacts of operation, comments and suggestions	Residents adjacent to project sites, representatives of residents and representatives of social sectors	Not yet started
FFPMO, O&M units	Expert workshop or press conference	As needed based on public consultation	Comments and suggestions on operational impacts, public opinions	Experts of various sectors, media	Not yet started

Notes:
FFPMO = Foreign-funded project management office; **IA** = implementing agency; **O&M** = operation and maintenance

3.2 Project Grievance Records and Resolution

No complaint had been received to date including the reporting period. The grievance redress mechanism (GRM) consists of a 3-step procedure as described below and shown in Figure 4. Table 15 shows the complaint hotline numbers and personnel responsible for handling complaints.

Step 1: For environmental issues during the construction stage, the affected persons can register their complaints directly with the contractors. Contractors are required to set up a complaint hotline and designate a person in charge of handling complaints, and advertise the hotline number at the main entrance to each construction site. The contractors are required to maintain and update a Complaints Register to document all complaints. The contractors are also required to respond to the complainant in writing within seven calendar days on their proposed solution and how it will be implemented. If the problem is resolved and the complainant is satisfied with the solution, the grievance is considered addressed. The contractors are required to report complaints received, handled, resolved and unresolved to Anhui Province Department of Transport (APDOT) FFPMO monthly.

Step 2: For environmental issues that cannot be resolved by the contractors, the affected person can take the grievance to the implementing agency (IA) local project management offices (LPMOs) and local environmental protection bureaus (EPBs). On receiving complaints by the IA LPMOs or local EPBs, the party receiving the complaints must notify the other party and document the complaint in writing in a Complaints Register. The IA LPMOs and local EPBs must reply to each complainant in writing within 14 calendar days with the proposed solution and method of implementation. If the issue is resolved and the complainant is satisfied with the solution, the IA LPMOs and local EPBs should document the complaint and resolution process in its Complaint Register, with monthly reporting to APDOT FFPMO.

Step 3: If the complainant is not satisfied with the proposed solutions in Step 2, he/she can, upon receiving the reply, take the grievance to the APDOT FFPMO complaints center. Upon receiving the complaint, the center must deal with it within 14 calendar days. Once a complaint is documented and put on file, the APDOT FFPMO complaints center will immediately notify ADB. After discussing the complaint and potential solutions amongst ADB, APDOT FFPMO and the ESE, the complainant and the contractor, APDOT FFPMO must propose a resolution strategy within 14 calendar days from when the complaint is registered.

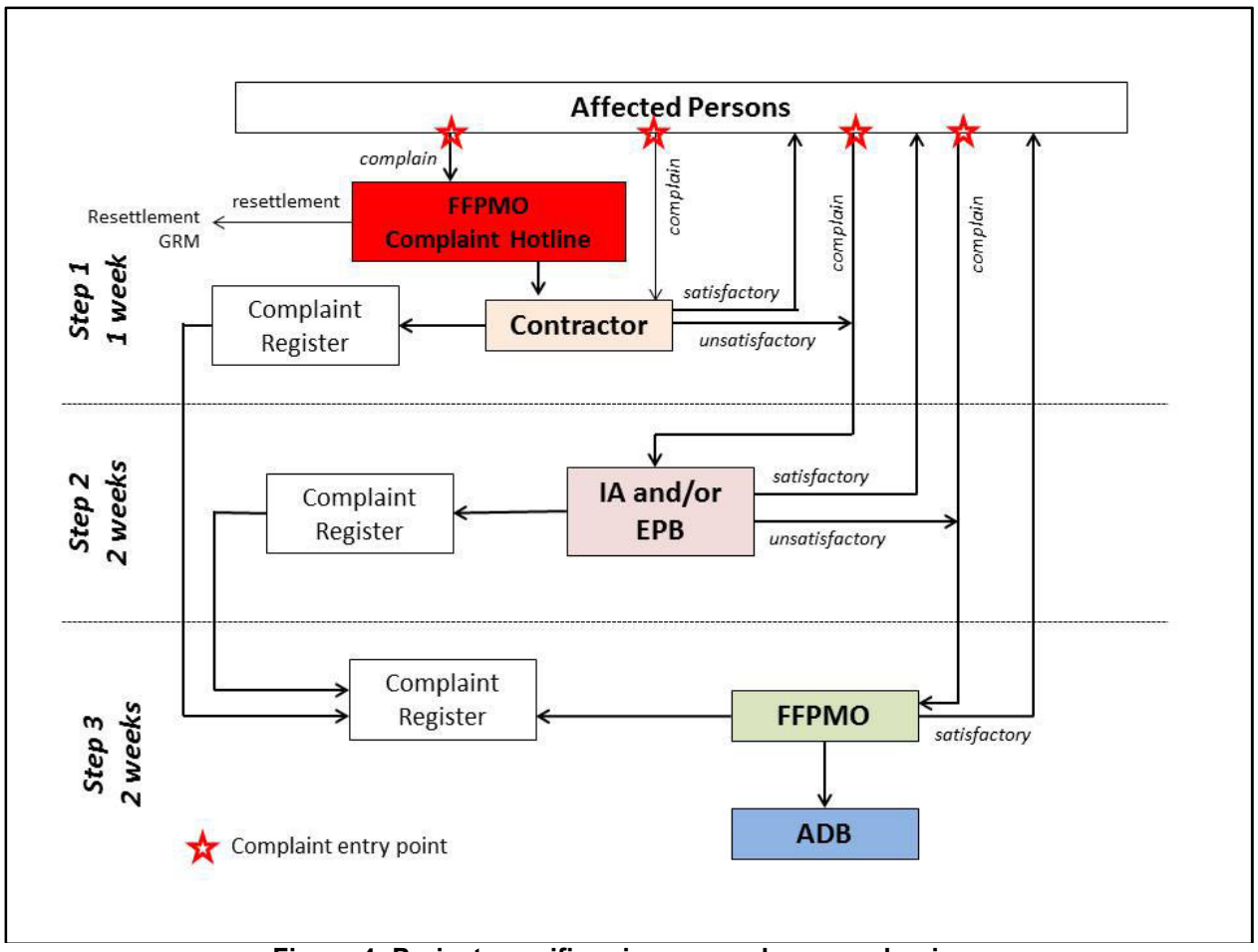


Figure 4: Project specific grievance redress mechanism

Table 15: Complaint hotline numbers and personnel for the grievance redress mechanism

Subproject	Hotline Number	Staff & Organization	Telephone Number
Foreign-funded project management office	0551-63756194	XU Benqing, FFPMO	152 5515 0716
IV: G206 Dongliu to Yaodu Section	0566-7026620	WEN Fadong, Chizhou City Highway Administration Bureau	180 5667 3190 or 139 5689 8908
		Dongzhi County Environmental Protection Bureau	0566-7019187

4 COMPLIANCE WITH EMP REQUIREMENTS

Site inspections during the reporting period revealed that most of the EMP requirements were implemented (see Appendix 1). Isolated incidents related to unsatisfactory construction site practices were observed, mainly at the asphalt/concrete mixing stations on site drainage, maintenance of sedimentation tanks and scattering of refuse and construction and demolition wastes. Corrective actions were identified as described below, which will be followed up in the next reporting period. Corrective actions identified in the previous reporting period were observed to be carried out in the reporting period.

4.1 Required Corrective Actions

Environmental issues observed in the previous reporting period and the respective corrective actions taken during this reporting period are shown in Table 16.

Table 16: Follow up actions on environmental issues observed in the last reporting period for subproject IV

Environmental Issue observed in the Last Reporting Period and Corrective Action Required	Follow Up Inspection in the Reporting Period	
	Implemented	Description

Environmental Issue observed in the Last Reporting Period and Corrective Action Required	Follow Up Inspection in the Reporting Period	
	Implemented	Description
1.Inadequate watering of construction sites resulting in fugitive dust emissions. Suggested increase in watering effort.	Yes	Dedicated watering trucks were deployed with at least twice per day watering frequency.
2.Overflow of process wastewater from the sedimentation tanks in the asphalt/concrete mixing stations. Suggested regular maintenance and desilting of sedimentation tanks.	Yes	Maintenance and desilting of sedimentation tanks were improved.
3.Material stockpiling in the asphalt mixing stations should not be higher than the height of the side boards.	Inadequate rectification	The heights of material stockpiling lowered to below side board heights. Nets were installed on top of side boards to prevent fugitive dust emission. However, material stockpiling in open areas was still observed during site inspection which would need to be rectified.
4.Process wastewater was observed to runoff over paved areas into the sedimentation tanks in the Contract NO2-2 asphalt/concrete mixing station. Suggested improvements in site drainage.	Yes	Installed ancillary facilities around the sedimentation tanks to intercept and direct process wastewater into the tanks.
5.Inadequate environmental awareness of construction site staff. Suggested immediately reporting of environmental problems to the ESE by site management staff.	Yes	Improved communication between site environmental staff and ESE, and pertinent discussions on environmental problems and solutions during site inspections.

The following environmental issues described in Table 17 were observed during the reporting period. Corrective actions were proposed and will be followed up in the next reporting period.

Table 17: Environmental issues observed in the reporting period and corrective actions proposed for subproject IV

Environmental Issue Observed		Corrective Action Proposed
	Contract NO2-1 asphalt/concrete mixing station: water level in the sedimentation tanks too high.	1.Regular maintenance and desilting of the sedimentation tanks to prevent overflow
	Contract NO2-1 asphalt/concrete mixing station: domestic wastewater discharged directly into the sedimentation tanks.	2.Improve site drainage and domestic wastewater collection and treatment to prevent discharge directly into the sedimentation tanks.
	Contract NO2-2 asphalt/concrete mixing station: sizes of the sedimentation tanks too small.	3.Increase holding capacity of the sedimentation tanks and surrounding drainage ditches for collecting and diverting rainwater from entering the sedimentation tanks.
	Contract NO2-2 asphalt/concrete mixing station: unregulated disposal of solid waste and refuse on site.	4.Strictly control the collection, storage and removal of solid wastes, refuse and construction and demolition wastes. Improve the environmental awareness of construction workers.

Environmental Issue Observed		Corrective Action Proposed
	Contract NO2-2 asphalt/concrete mixing station: material stockpiling outside the storage area.	5.Restrict the material stockpiling to within the storage areas
	Contract NO2-2 asphalt/concrete mixing station: material stockpiling higher than the side walls of the storage shed.	6.Restrict the height of material stockpiling to not higher than the walls of the storage shed.

5 APPENDICES

5.1 APPENDIX I: STATUS OF EMP COMPLIANCE

Table A.3: Generic Impacts and Mitigation Measures

	Impact Factor	Potential Impact and/or Issues	Mitigation Measures	Compliance	Corrective Action
Detailed Design Stage					
See Project Specific EMPs		Ensure that the mitigation measures are adopted in detailed design	● APDOT PPMO to appoint ESE	Complied. Beijing Zhongzi Huayu Environmental Protection Technology Co. Ltd. was commissioned as the ESE through open tendering	None
Pre-construction Phase					
Institutional strengthening	-	Lack of environment management capacity within APDOT PPMO	● Appoint one qualified environment specialists to APDOT PPMO. ● Appoint one Environmental Monitoring Station to conduct environment quality monitoring during construction stage. ● ESE to conduct first phase of environment management training for APDOT PPMO staff and environmental specialists. ● ESE to conduct environmental management training for contractors	Complied. Dongzhi Countyh EMS commissioned Complied. Complied	None
	-	Lack of environment management and monitoring capacity within IA LPMOs	● Each IA establishes LPMO and appoints one qualified environmental specialist to staff ● ESE to conduct initial environment management training for the IA LPMOs. ● ESE to provide follow on training.	Complied Complied Complied	None
EMP update	-	-	● Review mitigation measures defined in the EMP. ● Update as required to reflect detailed design. ● Submit to ADB/PPMO for approval and disclose updated EMP on project website. ● Prepare an environmental compliance monitoring plan to meet the environmental requirements in the EIA and EMP.	Complied No need to update during the reporting period Complied	None
Grievance redress mechanism	Social & environmental	Handling and resolving complaints by	● Establish a GRM, appoint a GRM coordinator within APDOT PPMO, each IA LPMO and each contractor.	Complied	None

	Impact Factor	Potential Impact and/or Issues	Mitigation Measures	Compliance	Corrective Action
		contractors	● Brief and provide training to GRM access points. ● Disclose GRM to affected people before construction begins at the main entrance to each construction site.	Complied Complied	
Tender documents		Environmental and social impacts	Ensure that the construction-related environmental and social mitigation measures are incorporated into the tender documents. This should include a clause to employ a proportion of locally sourced workforce.	Complied	None
Construction traffic	Traffic	Construction vehicles causing traffic congestion	● Plan transport routes for construction vehicles. ● Specify approved routes in the tender documents and forbid vehicles from using other roads especially during peak traffic hours. ● Inform drivers of haulage routes ● Separate construction traffic from pedestrians. Do not allow local villages to walk through construction sites.	Complied Complied Complied Complied	None
Construction Stage					
Construction site good practice	Soil resources	Soil stripping	● Strip topsoil and subsoil and store the soil horizons separately, protecting the top soil for reuse in restoration. ● Stockpiles are not to exceed 2m with side slopes at the natural angle of repose. ● Topsoil to be stored for a long time may be seeded with grass.	Complied Complied Complied	None
	Soil resources	Soil erosion	● Ensure contractors are aware of all soil erosion requirements as set out in the approved Water and Soil Conservation Plans and have developed appropriate method statements and management proposals. ● Where possible, avoid construction during periods of high rainfall. If necessary, construct berms to direct rainwater runoff away from exposed surface. ● Install drainage ditches and sedimentation pits in temporary construction areas to prevent soil erosion and to manage site run-off. ● Stabilise all cut slopes, embankments and other erosion-prone working areas while works are ongoing. Implement permanent stabilisation measures as soon as possible, at least within 30 days. ● Pay close attention to drainage provision and establishment of vegetation cover on backfilled areas to prevent soil erosion.	Complied Basically complied Complied Basically complied Complied	None

	Impact Factor	Potential Impact and/or Issues	Mitigation Measures	Compliance	Corrective Action
	Soil resources	Soil contamination	● Properly store petroleum products, hazardous materials and wastes on an impervious surface and preferably with a tray or bund to contain any leaks.	Complied	
			● Develop spill response plan. Keep a stock of absorbent materials (e.g. sand, earth or commercial products) on site to deal with spillages and train staff in their use.	Not complied	
			● If there is a spill, take immediate action to prevent pollution entering drains, watercourses, unmade ground or porous surfaces. Do not hose the spillage down or use any detergents. Use oil absorbents and dispose of used absorbents at a licensed waste management facility.	Did not occur during the reporting period	Each contractor to develop a spill response plan, keep stock of absorbent materials on site and train staff in their use
			● Record any spill events and actions taken in environmental monitoring logs and report to ESE; and	Did not occur during the reporting period	
			● Remove all construction waste from the site to licensed waste disposal sites.	Complied	
Construction site good practice	Air quality	Dust (TSP) during construction	● Erect hoarding / screens around dusty activities such as demolition;	Basically complied	
			● Frequent watering of unpaved areas, backfill areas and haul roads to suppress dust; (at least twice per day and during windy weather, once every two hours)	Complied	
			● Pay particular attention to dust suppression near sensitive receptors such as schools, hospitals, residential areas and natural areas;	Complied	
			● Manage stockpile areas to avoid mobilisation of fine material, cover with tarpaulin and/or spray with water;	Complied	None
			● Minimise storage time of construction materials and wastes on site by regularly removing them off site;	Complied	
			● Equip trucks transporting fine grained materials with covers or tarpaulin to cover loads during transport;	Complied	
			● Plan the transport routes and timing to avoid busy traffic and heavily populated areas;	Complied	
			● Harden the main construction roads and sites;	Complied	
			● Mud dumping, transport and other construction activities likely to give rise to dust are not permitted during windy weather (level 4 wind); and	Complied	

	Impact Factor	Potential Impact and/or Issues	Mitigation Measures	Compliance	Corrective Action
		Fumes and PM from asphalt mixing plant, concrete batching plant and other equipment and machinery	● Locate asphalt plants and mixers at least 300m downwind from residential areas and other sensitive receptors. ● Enclose these plants and equip them with bag house filter or similar air pollution control equipment. ● Regularly inspect and certify vehicle and equipment emissions and maintain to a high standard.	No such facility in the reporting period No such facility in the reporting period Complied	None
	Air Quality	Emissions from vehicles and equipment	● Procurement of new vehicles and plant should take account of low emission alternatives; ● All vehicles and plant to be kept in good order and maintained in compliance with the manufacturer's instructions; ● Minimise movement of construction traffic around the site; ● Set up speed limit signs on construction sites; ● On road vehicles are to comply with vehicle emissions standards; ● Prohibit the burning of waste on site; and ● Vehicles and plant shall be switched off when not in use.	Complied Complied Complied Complied Complied Complied Complied	None
	Noise	Noise from powered mechanical equipment and vehicles	● Sensibly schedule construction activities, avoid noisy equipment working concurrently. ● Specify equipment and machinery that conforms to PRC noise standard GB12523-90 and ensure regular maintenance. ● Select advanced quiet equipment and construction method, and tightly control the use of self-provided generators. ● Comply with local requirements in areas with sensitive receptors very close by, avoiding construction works, particularly noisy activities such as piling and compaction from 2200 to 0600. ● If night time construction needed, inform nearby residents beforehand, obtain permission of local government, keep local communities informed through bulletins, avoid using noisy equipment and set up temporary noise barriers. ● Control the speed of bulldozer, excavator, crusher and other heavy plant travelling on site. ● Locate sites for rock crushing, concrete mixing and other noisy activities at least 300m away from sensitive noise receptors.	Complied Complied Complied Complied Complied Complied Complied	None

	Impact Factor	Potential Impact and/or Issues	Mitigation Measures	Compliance	Corrective Action
			● Minimize the use of whistles and horns, and prohibit the use of horns on construction sites at night.	Complied	
	Natural drainage lines	Control of drainage and flooding on site	● Provide temporary drainage at construction sites ● Provide pollution control such as oil and silt traps at discharge points where hydrocarbons and aggregate may contaminate runoff ● Take measures to reduce the risk of soil erosion on exposed surfaces prior to the start of the heavy summer rains.	Complied Complied Complied	None
	Water Quality	Management of works in and adjacent to watercourses	● Programme in channel works during the dry season. ● Use coffer dams for construction of bridge foundations for ease of construction in the dry and minimize turbidity in the river. ● Construction water is treated via settlement pit prior to re-use or discharge to surface waters ● Erect berms or sandbags during bridge foundation works if necessary to contain runoff polluting the rivers. ● All camps, fuel storage, refuelling and maintenance areas to be located at least 200m from watercourses. ● Construction materials such as aggregate and cement must be protected from rainfall and runoff to prevent erosion	Basically complied Slurry from piling diverted to settling ponds Complied Not yet necessary in the reporting period Complied Complied	None
		Construction site wastewater discharge	● Provide temporary toilets sufficient for the size of the workforce at canteens, construction camps and major construction sites. ● Septic tanks must be emptied periodically and the contents transported to the Municipal wastewater treatment plant for treatment or be spread on agricultural land. ● All construction wastewater to be treated to appropriate PRC standard prior to discharge to surface waters. ● Stockpiles should have temporary drainage provisions to minimise run-off. ● Install sedimentation tanks on site to treat process water and muddy runoff.	Complied Complied Complied Complied Complied	None
	Solid waste	Spoil	● Balance cut and fill on construction sites to minimize the amount of spoil to be disposed; ● Spoil disposal sites must be approved in advance; ● Revegetate spoil disposal sites at the earliest	Complied Complied Not yet occurred in the	None

	Impact Factor	Potential Impact and/or Issues	Mitigation Measures	Compliance	Corrective Action
			opportunity.	reporting period	
		Construction site refuse	● Set up centralized domestic and construction waste collection point(s). ● Sort material on site, for reuse, recycling and disposal. ● Identify final disposal routes and approved sites. ● Use covered dump truck to remove construction and demolition waste. ● Appoint a named individual to manage the waste disposal. ● Prohibit the burning of waste on construction sites.	Complied Complied Complied Complied Complied Complied	None
	Ecology	Protection of vegetation and restoration of disturbed areas	● Demarcate the construction working area to prevent encroachment and damage to adjacent areas. ● Ensure any valuable trees that are being retained are protected with fencing and/or put conspicuous markings and warning signs on these trees to prevent workers from inadvertently damaging or destroying them.	Comply Comply	None
		Protected species	● Prohibit any injury to key protected animals, such as the Asiatic toad and turtle. ● If any injured animals are found, report to local wildlife protection department.	None found on site in the reporting period None found on site in the reporting period	None
			● Qualified ecologist will be on site prior to start of construction to check construction sites for protected species and translocate any discovered on site	Complied	None
		Greening	● Implement the revegetation plans, which may include seeding with grass and planting trees and shrubs.	Not yet occurred in the reporting period	None
	Physical cultural resources	Destruction of cultural relics	● Contractor to comply with PRC's Cultural Relics Protection Law and Cultural Relics Protection Law Implementation Regulations ● If relics are discovered, stop work immediately and protect the site; notify the supervising entities and the local Cultural Relics Bureau; and only start construction after approval by the Cultural Relics Bureau; ● Educate workforce on these procedures.	Complied None found on site in the reporting period Complied	None

	Impact Factor	Potential Impact and/or Issues	Mitigation Measures	Compliance	Corrective Action
Health and Safety	Occupational health and safety	Construction site sanitation	● Effectively clean and disinfect the site, including disinfection of toilets and waste disposal sites, and ensure timely removal of solid waste; ● Exterminate rodents on site at least once every 3 months, and exterminate mosquitoes and flies at least twice each year; ● Provide public toilets in accordance with the requirements of labor management and sanitation departments in the living areas on construction site, ● Appoint designated staff responsible for cleaning and disinfection.	Complied Complied Complied Complied	None
		Occupational safety	● Appoint Environment, Health and Safety Officer to develop and implement environmental, health and safety management plan, maintain records concerning health, safety and welfare and regularly report on accidents, incidents and near misses. ● Train all construction workers in general health and safety matters and on emergency preparedness and response procedures. ● Provide personal protective equipment (hard hats, shoes, eye goggles, respiratory masks, and high visibility vests) to all construction workers and enforce their use. ● Provide goggles and respiratory masks to workers doing asphalt road paving. ● Provide ear plugs to workers working near noisy powered mechanical equipment (PME), especially during piling of bridge foundations. ● Provide a clean and sufficient supply of fresh, potable water for all camps and work sites. ● 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. ● Provide adequate waste receptacles and ensure regular collection and disposal. ● Ensure that Contractors have adequate worker and third party insurance cover. ● No children (less than 14 years of age) to work on any contract.	Complied Complied Complied Not yet occurred in reporting period Complied Complied Complied Complied Complied Complied	None
		Food safety	● Provide a secure source for drinking water at the construction camps ● Inspect and supervise food hygiene in canteens on	Complied Complied	None

	Impact Factor	Potential Impact and/or Issues	Mitigation Measures	Compliance	Corrective Action
			site regularly. ● Canteen workers must have valid health permits. ● Once food poisoning is discovered, implement effective control measures immediately to prevent it from spreading	 Complied None occurred in reporting period	
		Disease prevention and safety awareness	● Construction workers must have physical examination before start working on site. ● Provide annual health checks. ● If infectious disease is found, the patient must be isolated for treatment to prevent the disease from spreading. ● Establish health clinic at location where workers are concentrated, which should be equipped with common medical supplies and medication for simple treatment and emergency treatment for accidents. ● Specify the person responsible for health and epidemic prevention responsible for the education and propaganda on food hygiene and disease prevention to raise the awareness of workers. ● Regularly inspect works to ensure there are no areas of stagnant water that could provide breeding grounds for malaria, encephalitis and dengue fever mosquitoes. ● Regularly inspect works to ensure that there are no breeding grounds for the host snail for schistosomiasis ● Provide training to the workforce on disease prevention and safety awareness ● Undertake checks every six months for workforce working in areas / tasks with a moderate to high risk of contact with schistosomiasis and medicate if the disease is found. ● Inform the local Schistosomiasis Prevention and Treatment Office and report the incidence to the local Health Administrative Department	Complied Not yet necessary in reporting period Complied Complied Complied Not on Chinese List Complied Complied Checks were carried out and no disease was found in reporting period Complied	None
	Community health and safety	Temporary traffic management	A traffic control and operation plan will be prepared together with the local traffic management authority prior to any construction. The plan shall include provisions for identifying preferred haul routes, diverting or scheduling construction traffic to avoid morning and afternoon peak traffic hours, regulating traffic at road crossings with an emphasis on ensuring public safety through clear signs, speed controls and planning in advance.	Complied	None

	Impact Factor	Potential Impact and/or Issues	Mitigation Measures	Compliance	Corrective Action
		Information disclosure	Residents and businesses will be informed in advance through publicity about the construction activities and provided with the dates and duration of expected disruption.	Complied	None
		Access to construction sites	● Clear signs will be placed at construction sites in view of the public, warning people of potential dangers such as moving vehicles, hazardous materials, excavations and raising awareness on safety issues. ● All sites will be made secure, discouraging access by members of the public through fencing or security personnel, as appropriate.	Complied Complied	None
		Utility services interruptions	● Assess construction locations in advance for potential disruption to services and identify risks before starting construction. ● Communicate the dates and duration in advance to all affected people.	Complied Complied	None
Demobilisation	Site cleanup	Site remediation and restoration	● Contractor to keep a schedule of all temporary land prior land use, and land occupiers ● At the end of construction, all buildings, stockpiles, and litter on temporary land is to be removed. ● Temporary land is to be restored to its original land use, unless agreed otherwise with the land occupier. ● Borrow pits and spoil disposal sites are to be restored according to the approved plans and will be subject to approval by APEPD / local EPB during the environmental acceptance review on completion. ● Latrines must be removed and the site disinfected and infilled. Sewage sludges may be spread on agricultural land.	Complied Complied Complied Complied Complied	None
Grievance redress mechanism	Social & environmental	Handling and resolving complaints by contractor, IA LPMOs and APDOT PPMO	● Disclose GRM to affected people before construction begins at the main entrance to each construction site. ● Maintain and update a Complaints Register to document all complaints. ● Ensure satisfactory resolution of complaints within specified timescales.	Complied Complied Complied	None
Operational Stage					
Environmental management	Operation activities	EMP	● Prepare an EMP to address potential impacts, mitigation and monitoring needs, and institutional	Not yet necessary in the reporting period	None

	Impact Factor	Potential Impact and/or Issues	Mitigation Measures	Compliance	Corrective Action
			requirements for the operations phase		
		Emergency planning	● Prepare an emergency response plan	Not yet necessary in the reporting period	None

Table A.8a: Specific Mitigation Measures for the Improvement Works of G206 Dongliu to Yaodu

Item	Impact Factor	Potential Impact and/or Issues	Mitigation Measures	Compliance	Corrective Actions
Detailed Design Stage					
Conservation of soil and land resources	Soil resources	Loss of land and topsoil and increased risk of erosion	● Minimise permanent and temporary landtake for development. ● Retain/incorporate landscape features of interest in design. ● Optimise balance between cut and fill and avoid deep cuts and high embankments to minimise earthworks. ● Maximise reuse of spoil within the construction or adjacent construction works. ● Agree spoil disposal sites, management and rehabilitation plan with APEPD/local EPB. ● Remove and store topsoil (10-30cm) for restoration works prior to main earthworks. ● Design appropriate drainage systems for slopes to reduce soil erosion.	Complied Complied Complied Complied Complied Complied Complied	None
Design of road alignment, road surface, drainage and lighting	Extreme weather events due to climate change	Road surface cracking due to extreme hot or cold weather, landslide and flooding due to torrential rainfall	● Consider potential impacts from extreme weather events due to climate change in designing road subgrade, pavement, road-side slopes, drainage system, bridges and culverts. ● Adopt appropriate protective measures such as vegetation cover, geotextiles, settling basins, permeable paving, infiltration ditches, stepped slopes, riprap, crib walls, retaining walls and intercepting ditches to reduce the speed of surface run-off.	Complied Complied	None
	Health and safety	Promotion of non-motorized transport, protection of vulnerable road users	● Design must ensure public health and safety. ● Promote non-motorized traffic. ● Ensure barrier-free design for disabled people.	Complied Complied Complied	None
	GHG emissions	Energy efficiency	● Consider energy efficient street lighting, such as LEDs or solar-powered lights	Complied	None
G206 Dongliu to Yaodu section	H&S	NMT and pedestrians	● Review the need for pedestrian walkways along this alignment and provision of pedestrian crossings for this dual three lane highway	Complied	None
Construction Stage					
Implementation of mitigation measures	Traffic Noise	Protection of noise sensitive receptors	● Provide noise insulation for windows at 94 households in the sensitive receptor clusters in Weizhuang, Zhanggang, Liuchun Village and the farm dormitory.	Not yet started in reporting period	None
	Slope Stability	Protection of new cuttings	● Take care during excavations of deep cuttings to avoid creating slope collapse and mass movements. ● Use appropriate techniques to stabilize the slopes, including geo-technical, slope reinforcement and planting options. ● Install drainage to the top of the slope.	Complied Complied Complied	None

Item	Impact Factor	Potential Impact and/or Issues	Mitigation Measures	Compliance	Corrective Actions
	Ecology	Protection of natural habitats	● Minimize the construction programme for the sections between K0+000 to K2+300 and K15+000 to K16+580 to reduce impact on ecological features.	Complied	
			● Avoid noisy activities such as blasting between the main bird nesting season May and June.	Complied	
			● Prohibit blasting in the morning and at night.	Complied	
			● Walkover survey prior to construction by trained wildlife and forestry experts to confirm works can go ahead.		
			● Identify trees to be preserved and clearly mark them, translocate other trees to new locations, and ensure adequate aftercare	Complied	None
			● If any protected species are observed along the alignment, take advice from ecologist on appropriate measures for translocation.	Complied	
			● Provide environmental training on the importance of protecting habitats and wildlife to construction workforce	Complied	
			● Prohibit the collection of timber, non-timber forestry products, hunting, and fishing in the Forestry Reserve by the construction workforce.	Complied	
			● Prohibit the setting of fires in the woodland sections of the alignment.	Complied	
Operational Stage					
Road maintenance and safety	Traffic	Road condition	Regularly inspect and maintain the road surface and clean up the drains.	Not yet started in reporting period	None
		Road safety and traffic accidents	Strictly enforce traffic laws to improve road safety and reduce traffic accidents.	Not yet started in reporting period	None

5.2 APPENDIX II: ADDITIONAL INFORMATION

5.2.1 Representative Photographs for Subproject IV: G206 Dongliu to Yaodu Section

Contract NO2-1 project office

Contract NO2-2 project office

Contract NO2-1 construction camp

Warning sign on no hunting

Warning sign on forest fire prevention

Box culvert at K0+127

Cement sprayed on culvert sides to minimize soil erosion

Terraced soil excavation to minimize soil erosion

Temporary drainage ditch during subgrade works to minimize soil erosion

Access road at K13+800 paved with gravel to minimize fugitive dust emission

#1 borrow area at K1+500

#2 borrow area at K6+800

Borrow area across from the site office

Borrow area at K14+100

#1 spoil disposal site at K3+500

#2 spoil disposal site at K6+300

3 spoil disposal site at K11+120

Toilet on construction site

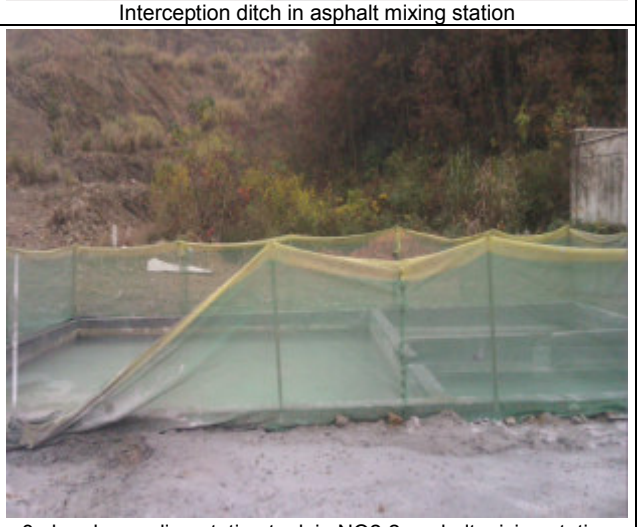
Interception ditch needed to direct process wastewater to sedimentation tank in asphalt mixing station

Wheel washing bay in asphalt mixing station

Drainage ditch in asphalt mixing station

Interception ditch in asphalt mixing station

4-chamber sedimentation tank in NO2-1 asphalt mixing station



3-chamber sedimentation tank in NO2-2 asphalt mixing station

Water sampling

Stakeholder interview

Local PMO suggestion/complaint box

Contract NO2-1 suggestion/complaint box

Contract NO2-2 suggestion/complaint box

5.2.2 Representative Photographs of Meetings, Seminars and Workshops

Environmental awareness training

ADB environmental workshop

Site inspection and meeting

Environmental management training

First site seminar

Training for PMO and IA