

**WB Loan Project**

**Environment Management Plan**  
**for**  
**Highway Maintenance Innovation**  
**Demonstration Project in Anhui Province**

**Constructed by: Foreign Fund Project Management Office under Anhui  
Province Department of Transport**

**Compiled by: Zhonghai Environmental Technology (Shanghai) Co., Ltd.**

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# Chapter I Project Profile

## 1.1 Project Background

By the end of 2014, there are 77 common national and provincial trunk highways with 10024.87 Km totally in the whole province, including 2549.495 Km national highway and 7475.377 Km provincial highway. It is calculated according to 10024.87 Km common national and provincial trunk highways that the total assets is about RMB100 billion. Based on calculation that, the annual maintenance fund in our province is about RMB4 billion, however, it is affected by such factors as national macro-control policy, our provincial economic development level and local governmental concept, during 2010~2014, RMB1.06 billion, RMB 1.464 billion, RMB 580 million, RMB 1.764 billion and RMB 2.042 billion are planned to be arranged for the maintenance project of common national and provincial trunk highways in the whole province, with greater maintenance financing gap.

In order to improve the highway assets management level in Anhui Province, change the highway maintenance management concept, improve the maintenance fund utilization rate and sufficiently utilize the international financial organization loan to serve for our province's traffic industry, Foreign Fund Project Management Office (FFPMO) under Anhui Province Department of Transport (APDT) compiles *Planning on Listing the Application for Highway Maintenance Innovation Demonstration Project in Anhui Province into Alternative Project of WB Loan and Declaration on Highway Maintenance Innovation Demonstration Project in Anhui Province* jointly with Anhui Province Highway Administration Bureau (APHAB). In Feb. 2014, through reporting and requesting towards National Development and Reform Commission and Ministry of Finance by Anhui Province Development and Reform Commission and Department of Finance in Anhui Province that, Highway Maintenance Innovation Demonstration Project in Anhui Province (HMIDPAP) was applied and listed into Three-Year rolling Planning for WB Loan. The project construction contents cover such four parts as the update of highway assets management system, highway maintenance marketization and innovation for maintenance technology, establishment of highway emergency system under new situation as well as institution capability construction. It is proposed to select five trial cities having the conditions to organize the implementation, with about RMB 2.82 billion for total investment and USD 200 million from WB Loan. In Oct. 2014, National Development and Reform Commission and Ministry of Finance jointly issued the *Notification on Request for Alternative Project Planning During 2015-2017 Fiscal Year by Utilizing WB Loan* and defined the listing of HMIDPAP into alternative project list, with USD 150 million for loan amount.

Based on the suggestions from WB, the subproject B of this project is divided into such two parts as road maintenance marketization and technology innovation. One part focuses on marketization (including the overhauling), the other part pays emphasis on innovative preventive maintenance technology. Therefore, the proposed project covers five subprojects, respectively referring to: Subproject A: updating of highway assets management system; Subproject B: road maintenance marketization; Subproject C: innovative preventive maintenance technology; Subproject D: establishment of road emergency response system; Subproject E: institution capability construction. In May 2015, entrusted by the FFPMO under APDT Anhui Province Traffic Planning Design and Research Institute (APTPDRI) developed the compilation work of feasibility study report on Highway Maintenance Innovation Demonstration Project in Anhui Province.

In Sep. 2015, the FFPMO under APDT entrusted Zhonghai Environmental Technology (Shanghai) Co., Ltd. ( hereinafter referred to as “ Our Company”) to develop the environment evaluation work for HMIDPAP. After accepting the entrusting, our company immediately developed the site exploration, data collection and report compilation work. In Jan. 2016, our company completed the compilation for *Environment Impact Report of HMIDPAP* and achieved the review and approval by the Anhui Province Department of Environment Protection (APDEP).

## **1.2 Project Overview**

The HMIDPAP mainly covers Subproject B, Subproject C and Subproject D, involves Hefei City, Anqing City,, Xuancheng City, Chuzhou City, Suzhou City and Guangde County ( five cities and 1 county), with wide and disperse distribution as well as 5-year longer period.

The Subproject B (highway maintenance marketization pilot project), Subproject C (innovative maintenance technology application) involve the 947.693 km national and provincial trunkline and county road, including about 669.413 km for Subproject B (highway maintenance marketization pilot project) and about 278.28 km for Subproject C (innovative maintenance technology application). The project construction content mainly refers to large and medium repair and preventive maintenance for pavement within the redline scope of original highway, not involving the newly- increased land occupation.

## **1.3 Laws, Regulations and Technical standards**

*Environmental impact assessment of the project involves the laws and regulations include:*

(1) *Law of the People's Republic of China on Environmental Protection*, December January 1, 2015;

(2) *Law of the People's Republic of China on Environmental Impact Assessment*, October 2002;

(3) *Law of the People's Republic of China on Prevention and Control of Pollution from Environmental Noise*, October 29, 1996;

(4) *Law of the People's Republic of China on Prevention and Control of Air Pollution*, September 1, 2006;

(5) *Law of the People's Republic of China on Water Pollution Prevention*, June 1, 2008;

(6) *Law of the People's Republic of China on Prevention and Control of Pollution from Solid Waste*, April 1, 2005;

(7) *Highway Law of the People's Republic of China*, July 3, 1997;

(8) *Forest Law of People's Republic of China*, April 29, 1998;

(9) *The National Emergency Preplans for Abrupt Environmental Accidents*, January 24, 2006;

(10) *Wildlife Protection Law of the People's Republic of China*, August 28, 2004;

(11) *Regulations of the People's Republic of China on Protection of Wild Plants*, January 1, 1997;

(12) *Scenic Spots Regulations* September 1, 2006;

(13) *National Forest Park management approach*, May 1, 2011;

(14) *The Environmental Protection Regulations on the Administration of the Construction Projects*, November 29, 1998;

(15) *Measures for Administration of National Wetland Park (Trial)*, February 28, 2010;

(16) *Ordinance on Environmental Protection in Anhui Province*, November 1, 2010;

(17) *Notification on Strengthening the Administration of Environmental Impact Assessment for Construction Projects Funded by the Loan from International Financial Organizations*, HuanJian [1993] Document No. 324 issued jointly by the State Environmental Protection Administration, State Planning Commission, Ministry of Finance, the People's Bank of China ;

Due to the project will apply for world bank loans, the applicable WB's safeguard policies include:

■ Environmental Assesment (OP/BP4.01,1999.1)

■ Natural Habitats (OP4.04, 2001.6)

■ Information Notification (BP17.50,1993.9)

***The project mainly involves the evaluation standards :***

**Ambient Air Quality Standards**

Air environment is implement the Grade II standards in *Ambient Air Quality Standards* (GB3095-2012), forest parks, nature reserves, scenic spots and other ecological sensitive area road sections are implement the Grade I standard (see Table 1-1).

Forest parks, nature reserves, scenic spots and other ecologically sensitive areas are all the Class I zone of ambient air, where prohibit that construct new-built or expanding pollution source; the atmospheric pollutant emission of other areas is implement the Grade II standards in *Integrated Emission Standard of Air Pollutant* "(GB16297-1996); fume emission from emergency conservation center, canteen and catering are all implement the *Catering Business Lampblack emission standards* (GB18483-2001).

**Table 1-1 Ambient Air Quality Standards (GB3095-2012) Unit: mg/Nm<sup>3</sup>**

Name of pollutants	Selecting time	Standard concentration limits (mg/m <sup>3</sup> )	
		Grade II	Grade I
SO <sub>2</sub>	Daily average	0.15	0.05
	Annual average	0.06	0.02
NO <sub>2</sub>	Daily average	0.08	0.08
	Annual average	0.04	0.04
Respirable particles (PM <sub>10</sub> )	Daily average	0.15	0.05
	Annual average	0.07	0.04

**Table1-2 Integrated Emission Standard of Air Pollutants (GB16297-1996)**

Maximum allowable emission concentration mg/m <sup>3</sup>	Maximum allowable emission rate kg/h		Provision
	Emission pipe height m	Grade II	
75 ( Building stirring )	15	0.18	Production equipment can not have obvious unorganized emissions
	20	0.30	
	30	1.3	
	40	2.3	

**Acoustic environmental standards**

Acoustic environmental quality status quo is execute the Class 4a standard in *Environmental Quality Standards for Noise* (GB3096-2008) within 35 meters outside the red line both sides existing highway according to the relevant provisions about characteristics of the project and the *Environmental Impact Assessment Technical Guideline -- Acoustic environment*, besides executed Class II standard; the daytime and nighttime noise limits at different stages of construction work in *Emission Standards of Environment Noise for Boundary of Construction Site* (GB12523-2011) should be implemented noise during the construction period. (see Table

1-4)

**Table 1-3 Environmental Quality Standard for Noise (GB3096-2008) (excerpt) Unit: dB (A)**

Class	Daytime $L_{Aeq}$ : dB(A)	Nighttime $L_{Aeq}$ : dB(A)
Class 2	60	50

**Table 1-4 Limits of environment noise for boundary of construction site Unit: dB**

Daytime	Nighttime
70	55

### Surface Water Environmental Standards

In accordance with the "Anhui Water Environmental Function Zoning" (Wanzhenmin [2004] No. 7) is implement the corresponding standard in *Surface Water Environmental Quality Standards* (GB3838-2002), proposes to implement the Class III water quality standard for the water bodies not listed in *Anhui Water Environmental Function Zoning*,

Project sewage efflux is implement the Class I standard in *Integrated Wastewater Discharge Standards* (GB8978-1996). (see Table 1-6)

**Table 1-5 Environmental Quality Standards for Surface Water (GB3838-2002) (excerpt)**

Water quality items	Class II standard	Class III standard	Class IV standard
pH (dimensionless)	6~9		
Permanganate index (mg/L)	4	6	10
BOD <sub>5</sub> (mg/L)	3	4	6
NH <sub>3</sub> -N (mg/L)	0.5	1.0	1.5
TP (mg/L)	0.1	0.2	0.3

**Table 1-6 Integrated Wastewater Discharge Standards (GB8978-1996) (excerpt) Unit: mg/L**

Pollutant	COD <sub>cr</sub>	Petroleum	Animal and vegetable oils	Ammonia nitrogen	SS
Class I standard	100	5	10	15	70

## **Chapter II Mitigation Measures and Implementation Plan**

Based on environmental affect evaluation, a series of mitigation measures are formulated in this “Environment Management Scheme”, referring to Table 2-1, 2-2 and 2-3



**Table 2-1 Plan for the implementation of environmental protection measures at design stage**

<b>Activities</b>	<b>Potential Affect /Problems</b>	<b>Mitigation Measures</b>	<b>Implementtation Schedule</b>	<b>Budget ( RMB10000)</b>	<b>Implementtation Responsibilities</b>	<b>Supervision Responsibilities</b>	<b>Monitoring Indexes</b>	<b>Monitoring Frequency</b>
Design for eemergency maintenance center	Wastewater discharge and disposal for solid wastes	<ul style="list-style-type: none"> <li>• Sewage treatment device in the maintenance center ( RMB50000/set)</li> </ul>	Preparation phase of design and environmental assessment	30	Design Organiation; Environmental Protection Design Organization	APDT, WB	Included into the detailed design	Regular meeting between Design Organiation and Environmental Protection Design Organization
Change of subproject section	Possibly involve the environment sensitive area	<ul style="list-style-type: none"> <li>• For change of subproject section, the communication with environment evaluation organization, environment supervision organization should be conducted timely to verify the positional relationship with such environment sensitive area as forest park, wetland park and scenic spot after change of subproject section.</li> <li>• If the change of subproject section involves such environment sensitive area as forest park, wetland park and scenic spot, the domestic and WB's environmental affect evaluation contents should be supplemented and the relevant procedure should be fulfilled.</li> </ul>	Design and project implementation stage.	—	Design Organiation; Environmental Protection Design Organization	APDT, WB	Included into the detailed design	between Design Organiation and Environmental Protection Design Organization

**Table 2-2a Plan for the implementation of environment protection measures during construction ( large, medium repair and maintenance project)**

Environment Issues	Mitigation Measures	Implementation Organization	Responsible Organization	Supervision Organization
Ecological environment (Land)	<p>(1) Prior to construction commencement, the construction organization should firstly determine the location of construction site, construction camp and construction access road, so as to reduce the damage for soil and vegetations around the operation area as much as possible.</p> <p>(2) Since the morning, dusk and night are the peak period when the wildlife act, breed and find the food, while constructing near forestland, the construction time should be selected optimally to avoid the peak period when the wildlife act. During construction period, if the wildlife suffers from accidental injury, should immediately contact local wildlife protection authority for treatment by the professional.</p> <p>(3) The project will not involve cutting existing trees. In case of occasional find of ancient trees near the project, the contractors will report to project owner and local environmental authority. Under the guidance of relevant authority, project owner will engage specialized institute to confirm and mark these trees with protection nameplate to remind the constructors to pay attention to the protection, meanwhile, the fencing should be set around trees for emphatic protection, the distance between fencing and tree trunk should not be less than 3 m so as to ensure that the plant is protected.</p> <p>(4) During construction, the culvert adit and natural vegetations under bridge should be noticed to be protected, and the human activity trace should be reduced so as to prompt the weeds and shrubs to recover as soon as possible and form the natural landscape consistent with original landscape so as to facilitate that the wildlife may be adaptable as soon as possible.</p> <p>(5) Reasonably manage the solid wastes giving priority to dismantled substances on the pavement and timely implement the clearing and transportation so as to avoid indirectly causing the water and soil loss due to pressing and occupying the vegetations.</p>	Contractor	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Ecological environment (wetland)	<p>(1) Reasonably arrange the operation time. Since the morning, dusk and night are the peak period when the wildlife act, breed and find the food, while constructing near wetland, the construction period should be selected optimally to avoid the peak period when the wildlife act as soon as possible.</p> <p>(2) Wildlife protection in the wetland. During construction, properly implement the publicity work for construction environment protection, if such provincial emphatic protection animals as Chinese toad and tortoise are encountered, it is strictly forbidden to be harmed; if the wildlife suffers from accidental injury, should immediately contact local wildlife protection authority for treatment by the professional.</p> <p>(3) It is strictly forbidden to build the construction cap and construction materials storage yard at the wetland.</p> <p>(4) The construction sewage should be treated properly so as to prevent polluting the water body in the wetland.</p>	Contractor	5	APDEP, each relevant Municipal and County's Environmental Protection Bureau
	(1) Should reasonably select the location of construction camp, suggest the renting local residences as much as possible, provide the domestic garbage collection and storage facilities, regularly implement the	Contractor		

Environment Issues	Mitigation Measures	Implementation Organization	Responsible Organization	Supervision Organization
Surface water pollution	<p>clearing and transportation, intensively collect the domestic sewage and fecal sewage and provide the septic-tank for treatment.</p> <p>(2) Should Irregularly inspect the constructional machinery strictly to prevent the oil leaking. It is strictly forbidden to randomly throw the waste oil into the water body.</p> <p>(3) The building materials storage yard is strictly forbidden to be built within the highest water level line of river, common building materials should be stockpiled away from the water body, the shedding cover must be provided, if necessary, the fencing should be provided; the construction wastewater (sprinkling and washing wastewater by mechanical equipment) produced by such construction site as materials storage yard is required to be treated preliminarily via grit chamber and can't be directly drained into the surface water body or fishpond.</p>		Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Atmospheric pollution	<p>(1) Strengthen the construction management, advocate the civilized construction, concentrated construction and rapid construction.</p> <p>(2) The management should be strengthened for storage yard, the windbreak wall (net) should be provided around the material storage yard, the stacking location should be arranged reasonably, and such sheltering measures as tarpaulin covering shall be taken.</p> <p>(3) The construction access road and the road in and out of storage yard should be watered frequently, twice per day generally, once in the morning and in the afternoon respectively, so as to reduce the air-borne dust .</p> <p>(4) In the whole process of loading and unloading, utilization, transportation, transferring and temporary storage for such easily scattering bulky materials as cement, sand and lime, the windproofing and covering measures should be taken so as to reduce the air-borne dust.</p> <p>(5) Properly implement the constructors' labor protection and wear the dust mark.</p>	Contractor	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Construction noise	<p>(1) Adopt the low-noise machinery as much as possible and frequently implement the maintenance and curing.</p> <p>(2) The constructional machinery with high noise is strictly forbidden to implement the construction in the vicinity of sound sensitive spot along the line at nighttime (22:00—6:00) .</p> <p>(3) While constructing on the road section where the school locates, the construction organization should consult with the school to arrange the construction with high noise at the weekend or after school as soon as possible, meanwhile, the speed should be accelerated, the construction period should be shortened so as to reduce the influence time.</p> <p>(4) While selecting the construction site and construction camps, it should ensure that there isn't distributed sensitive point within 200 m around.</p> <p>(5) While implementing the high-noise operation for long time, the mobile sound barrier at the noise sensitive point so as to lower the influence by construction noise.</p> <p>(6) The closed machine shed should be erected for strong-noise equipment on the construction site and</p>	Contractor	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau

Environment Issues	Mitigation Measures	Implementation Organization	Responsible Organization	Supervision Organization
	<p>should be erected on one side far away from the residential area as possible.</p> <p>(7) Reasonably select the construction vehicle's transportation route and implement the transportation in the daytime as much as possible.</p>			
Solid wastes	<p>(1) Various building construction wastes must be hoisted and cleared by adopting the closed special garbage passageway or sealed container, it is strictly forbidden to throw in the air.</p> <p>(2) The sandstone, building materials, steel and packing materials abandoned during construction should be recycled and managed by the dedicated person, and the working surface should be cleared timely.</p> <p>(3) The sealed garbage station should be set on the construction site to store and stockpile the construction garbage and domestic garbage in categories.</p> <p>(4) The domestic garbage generated by the construction should be concentrated and gathered in categories as well as cleared and transported for absorption by local environmental sanitation department.</p>	Contractor	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Social environment	<p>(1) Relevant road construction should be noticed to notify that the vehicles should bypass based on the conditions; during construction, the corresponding mark, nameplate and temporary signal lamp shall be set additionally at relevant road intersections; the traffic dispatching and management should be strengthened for engineering transportation vehicles, the reasonable transit route should be selected and the traffic peak period should be avoided so as to reduce the jamming caused by construction vehicles.</p> <p>(2) Strictly strengthen the construction management. The area along the construction site should be managed strictly, the construction site boundary should be divided strictly, the muck, sand, rock and materials should be stockpiled reasonably, the vehicles and machineries should be parked reasonably so as to reduce the traffic barrier. Meanwhile, the temporary access road and warning mark shall be set, and the dedicated person is assigned to dredge the traffic;</p> <p>(3) The education on relevant personnel should be conducted, own action should be noticed not to obstruct the traffic in the periphery; the education on drivers should be strengthened, the overloading is strictly forbidden, the scattering materials should be cleared timely.;</p> <p>(4) This project doesn't involve the existing surface cultural relic protection site that has been found, however, the unknown underground cultural relics may exist along the project possibly. During construction, if the underground cultural relics are found, based on national relevant laws and regulations, the construction organization should take a series of protection measures: stop construction – reporting to cultural relics authority – first-aid excavation – re-started, timely notify the cultural relics authority of Anhui Province and along the line for processing so as to ensure the safety of cultural relics and smooth operation of highway construction.</p>	Contractor	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Employment of maintenance workers	<p>Social Assessment has been conducted and arrangement has been made:</p> <p>(1) For formal staff, arrangement includes transfer jobs to emergency centers or other maintenance stations</p>	Transport Bureau at each project city/county	Project Office and Municipal and County Project Office for	APDEP, each relevant Municipal and

Environment Issues	Mitigation Measures	Implementation Organization	Responsible Organization	Supervision Organization
	<p>that are not subject to marketization;</p> <p>(2) For temporary staff that are contracted on yearly basis, preferential treatment will be given to them when the contractors hire workers to conduct maintenance works.</p> <p>(More details are included in the Social Assessment)</p>		HMIDPAP in Anhui Province by WB Loan	County's Environmental Protection Bureau
Safety and health of workers and community	<p>(1) Prior to construction team entering into the site, as for the constructors' intensive activity sites and original toilet, cesspit and garbage storage spot shall be cleared and disinfected.</p> <p>(2) Prior to constructors entering into the site, implement the sanitation quarantine and implement the spot check twice according to 10% of constructors during construction.</p> <p>(3) Strengthen the supervision and management for dietetic sanitation, the workers being engaged in catering industry must hold the health work license.</p> <p>(4) Implement the safety education for residents nearby, including the prevention and control for infectious diseases (such as: HIV/AIDS) in advance.</p> <p>(5) Guarantee the perfectness of all buildings inside construction site; the temporary buildings should be safe and reliable on structure so as to properly resist the strike by severe weather in the local area, and the appropriate sunshine should be provided to isolate partial air-borne dust and noises;</p> <p>(6) The construction organization should ensure that the first aid conforming to the requirements can be provided; on the construction site, the appropriate first-aid apparatus should be provided, the written treatment procedure for emergency conditions should be provided in the faraway site so that the patients may be transferred into appropriate medical institution.;</p> <p>(7) All new constructors should accept the occupational health and safety training, and the basic working principle, personal protection rules in the construction site as well as how to prevent injuries to other employees;</p> <p>(8) If workers' arm and hands are shaken due to use of handheld tools and electric tools, or worker's body vibrates due to standing or sitting on the vibrating surface, the control should be conducted via equipment selection, installation of vibration reduction pads or vibration reduction device and limitation for exposure time;</p> <p>(9) While designing the machine, eliminate the clamping danger to ensure that the protruding portion on the machinery will not cause harm to the human body under normal operation condition;</p> <p>(10) The warning board should be placed on all powered electric devices and electric wires; all electric wires, electric cables and handheld electric tools should be inspected whether there are damaged or exposed electric wires, and the maximal allowable working pressure on the handheld tools shall be determined in accordance with manufacturer's suggestions; the dual insulation/grounding processing should be conducted for all electric equipment used in the damp (or possibly damp) environment;</p>	Contractor	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau

Environment Issues	Mitigation Measures	Implementation Organization	Responsible Organization	Supervision Organization
	<p>(11) Provide the appropriate eye protection appliances for operator participating in or assisting the welding operation ( such as, welding goggles or mask);</p> <p>(12) Install the protective handrail on the edge of fragile and dangerous area ( a rail in the middle and baffle in the periphery should be provided), meanwhile, the constructors should adopt the falling prevention device ( including the safety belt and distance restraint lanyard);</p> <p>(13) The construction organization determines and provides the appropriate personal protection appliances for constructors so as to sufficiently protect the worker himself, other workers and accidental visitors, and unnecessary inconvenience should not be brought for users;</p> <p>(14) The construction organization should establish the procedure and system on reporting and recording for occupational accidents and danger condition accidents.</p>			

**Table 2-2b Plan for the implementation of environment protection measures during construction (preventive maintenance project)**

Environment Issues	Mitigation Measures	Implementation Organization	Responsible Organization	Supervision Organization
Ecological environment (Land)	<p>(1) Prior to construction commencement, the construction organization should firstly determine the location of construction site, construction camp and construction access road, so as to reduce the damage for soil and vegetations around the operation area as much as possible.</p> <p>(2) Since the morning, dusk and night are the peak period when the wildlife act, breed and find the food, while constructing near forestland, the construction time should be selected optimally to avoid the peak period when the wildlife act. During construction period, if the wildlife suffers from accidental injury, should immediately contact local wildlife protection authority for treatment by the professional.</p> <p>(3) The project will not involve cutting existing trees. In case of occasional find of ancient trees near the project, the contractors will report to project owner and local environmental authority. Under the guidance of relevant authority, project owner will engage specialized institute to confirm and mark these trees with protection nameplate to remind the constructors to pay attention to the protection, meanwhile, the fencing should be set around trees for emphatic protection, the distance between fencing and tree trunk should not be less than 3 m so as to ensure that the plant is protected.</p>	Contractor	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Ecological environment (wetland)	<p>(1) Reasonably arrange the operation time. Since the morning, dusk and night are the peak period when the wildlife act, breed and find the food, while constructing near wetland, the construction period should be selected optimally to avoid the peak period when the wildlife act as soon as possible.</p> <p>(2) Wildlife protection in the wetland. During construction, properly implement the publicity work for construction environment protection, if such provincial emphatic protection animals as Chinese toad and tortoise are encountered, it is strictly forbidden to be harmed; if the wildlife suffers from accidental injury, should immediately contact local</p>	Contractor	Project Office and Municipal and County Project Office	APDEP, each relevant Municipal and County's Environmental

Environment Issues	Mitigation Measures	Implementation Organization	Responsible Organization	Supervision Organization
	wildlife protection authority for treatment by the professional. (3) It is strictly forbidden to build the construction camp and construction materials storage yard at the wetland.		for HMIDPAP in Anhui Province by WB Loan	Protection Bureau
Surface water pollution	(1) Should reasonably select the location of construction camp, suggest the renting local residences as much as possible, provide the domestic garbage collection and storage facilities, regularly implement the clearing and transportation, intensively collect the domestic sewage and fecal sewage and provide the septic-tank for treatment. (2) Should Irregularly inspect the constructional machinery strictly to prevent the oil leaking. It is strictly forbidden to randomly throw the waste oil into the water body. (3) The building materials storage yard is strictly forbidden to be built within the highest water level line of river, common building materials should be stockpiled away from the water body, the shedding cover must be provided, if necessary, the fencing should be provided; the construction wastewater (sprinkling and washing wastewater by mechanical equipment) produced by such construction site as materials storage yard is required to be treated preliminarily via grit chamber and can't be directly drained into the surface water body or fishpond.	Contractor	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Atmospheric pollution	(1) Strengthen the construction management, advocate the civilized construction, concentrated construction and rapid construction. (2) The management should be strengthened for storage yard, the windbreak wall (net) should be provided around the material storage yard, the stacking location should be arranged reasonably, and such sheltering measures as tarpaulin covering shall be taken. (3) The construction access road and the road in and out of storage yard should be watered frequently, twice per day generally, once in the morning and in the afternoon respectively, so as to reduce the air-borne dust . (4) In the whole process of loading and unloading, utilization, transportation, transferring and temporary storage for such easily scattering bulky materials as cement, sand and lime, the windproofing and covering measures should be taken so as to reduce the air-borne dust. (5) Properly implement the constructors' labor protection and wear the dust mark.	Contractor	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Construction noise	(1) Adopt the low-noise machinery as much as possible and frequently implement the maintenance and curing. (2) The constructional machinery with high noise is strictly forbidden to implement the construction in the vicinity of sound sensitive spot along the line at nighttime (22:00—6:00) . (3) While constructing on the road section where the school locates, the construction organization should consult with the school to arrange the construction with high noise at the weekend or after school as soon as possible, meanwhile, the speed should be accelerated, the construction period should be shortened so as to reduce the influence time. (4) While implementing the high-noise operation for long time, the mobile sound barrier at the noise sensitive point so as to lower the influence by construction noise.	Contractor	Project Office and Municipal and County Project Office for HMIDPAP in	APDEP, each relevant Municipal and County's Environmental Protection Bureau

Environment Issues	Mitigation Measures	Implementation Organization	Responsible Organization	Supervision Organization
	<p>(5) The closed machine shed should be erected for strong-noise equipment on the construction site and should be erected on one side far away from the residential area as possible.</p> <p>(6) Reasonably select the construction vehicle's transportation route and implement the transportation in the daytime as much as possible.</p>		Anhui Province by WB Loan	
Solid wastes	<p>(1) Various building construction wastes must be hoisted and cleared by adopting the closed special garbage passageway or sealed container, it is strictly forbidden to throw in the air.</p> <p>(2) The sandstone, building materials, steel and packing materials abandoned during construction should be recycled and managed by the dedicated person, and the working surface should be cleared timely.</p> <p>(3) The sealed garbage station should be set on the construction site to store and stockpile the construction garbage and domestic garbage in categories.</p> <p>(4) The domestic garbage generated by the construction should be concentrated and gathered in categories as well as cleared and transported for absorption by local environmental sanitation department.</p>	Contractor	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Social environment	<p>(1) Relevant road construction should be noticed to notify that the vehicles should bypass based on the conditions; during construction, the corresponding mark, nameplate and temporary signal lamp shall be set additionally at relevant road intersections; the traffic dispatching and management should be strengthened for engineering transportation vehicles, the reasonable transit route should be selected and the traffic peak period should be avoided so as to reduce the jamming caused by construction vehicles.</p> <p>(2) Strictly strengthen the construction management. The area along the construction site should be managed strictly, the construction site boundary should be divided strictly, the muck, sand, rock and materials should be stockpiled reasonably, the vehicles and machineries should be parked reasonably so as to reduce the traffic barrier. Meanwhile, the temporary access road and warning mark shall be set, and the dedicated person is assigned to dredge the traffic;</p> <p>(3) The education on relevant personnel should be conducted, own action should be noticed not to obstruct the traffic in the periphery; the education on drivers should be strengthened, the overloading is strictly forbidden, the scattering materials should be cleared timely.;</p> <p>(4) This project doesn't involve the existing surface cultural relic protection site that has been found, however, the unknown underground cultural relics may exist along the project possibly. During construction, if the underground cultural relics are found, based on national relevant laws and regulations, the construction organization should take a series of protection measures: stop construction – reporting to cultural relics authority – first-aid excavation – re-started, timely notify the cultural relics authority of Anhui Province and along the line for processing so as to ensure the safety of cultural relics and smooth operation of highway construction.</p>	Contractor	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Safety and health of workers and	<p>(1) Prior to construction team entering into the site, as for the constructors' intensive activity sites and original toilet, cesspit and garbage storage spot shall be cleared and disinfected.</p>	Contractor	Project Office	APDEP, each



Environment Issues	Mitigation Measures	Implementation Organization	Responsible Organization	Supervision Organization
community	<p>(2) Prior to constructors entering into the site, implement the sanitation quarantine and implement the spot check twice according to 10% of constructors during construction.</p> <p>(3) Strengthen the supervision and management for dietetic sanitation, the workers being engaged in catering industry must hold the health work license.</p> <p>(4) Implement the safety education for residents nearby, including the prevention and control for infectious diseases (such as: HIV/AIDS) in advance.</p> <p>(5) Guarantee the perfectness of all buildings inside construction site; the temporary buildings should be safe and reliable on structure so as to properly resist the strike by severe weather in the local area, and the appropriate sunshine should be provided to isolate partial air-borne dust and noises;</p> <p>(6) The construction organization should ensure that the first aid conforming to the requirements can be provided; on the construction site, the appropriate first-aid apparatus should be provided, the written treatment procedure for emergency conditions should be provided in the faraway site so that the patients may be transferred into appropriate medical institution.;</p> <p>(7) All new constructors should accept the occupational health and safety training, and the basic working principle, personal protection rules in the construction site as well as how to prevent injuries to other employees;</p> <p>(8) If workers' arm and hands are shaken due to use of handheld tools and electric tools, or worker's body vibrates due to standing or sitting on the vibrating surface, the control should be conducted via equipment selection, installation of vibration reduction pads or vibration reduction device and limitation for exposure time;</p> <p>(9) While designing the machine, eliminate the clamping danger to ensure that the protruding portion on the machinery will not cause harm to the human body under normal operation condition;</p> <p>(10) The warning board should be placed on all powered electric devices and electric wires; all electric wires, electric cables and handheld electric tools should be inspected whether there are damaged or exposed electric wires, and the maximal allowable working pressure on the handheld tools shall be determined in accordance with manufacturer's suggestions; the dual insulation/grounding processing should be conducted for all electric equipment used in the damp (or possibly damp) environment;</p> <p>(11) Provide the appropriate eye protection appliances for operator participating in or assisting the welding operation (such as, welding goggles or mask);</p> <p>(12) Install the protective handrail on the edge of fragile and dangerous area (a rail in the middle and baffle in the periphery should be provided), meanwhile, the constructors should adopt the falling prevention device (including the safety belt and distance restraint lanyard);</p> <p>(13) The construction organization determines and provides the appropriate personal protection appliances for constructors so as to sufficiently protect the worker himself, other workers and accidental visitors, and unnecessary inconvenience should not be brought for users;</p> <p>(14) The construction organization should establish the procedure and system on reporting and recording for occupational accidents and danger condition accidents.</p>		and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	relevant Municipal and County's Environmental Protection Bureau

**Table 2-3 Plan for the implementation of environment protection measures during operation**

Surface water pollution	<p>(1) Strengthen the operation management and ensure that the sewage treatment facilities and efficiency in the maintenance emergency center reach the design standard and requirements as well as guarantee that the tailwater is discharged upon standard reaching after long-term, stable and normal operation and treatment.</p> <p>(2) Sewage treatment facilities management should set up an alternate equipment and the emergency accident plans should be formulated to prevent causing the improper consequences while problem occurring.</p>	Each municipal and county highway bureau	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Atmospheric pollution	<p>(1) The atmospheric pollution during the operation of this project mainly comes from the tail gas exhausted by the automobile and a small amount of lampblack generated from maintenance center, not producing the severe influence on air quality in the periphery.</p>	Each municipal and county highway bureau	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Construction noise	<p>(1) The low-noise standard products are all adopted while selecting the equipment of sewage treatment facilities. While installing, such noise reduction measures as shock pad or flexible joint are taken.</p> <p>(2) Implement the sound insulation treatment for inside equipment room, partition wall, doors and windows between duty operation room and equipment room, so as to lower the influence of noise on human body.</p>	Each municipal and county highway bureau	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Solid wastes	<p>The domestic garbage from each emergency maintenance center in this project should be entrusted to local environmental sanitation department for regular gathering, clearing and transportation as well as intensive disposal.</p>	Each municipal and county highway bureau	Project Office and Municipal	APDEP, each relevant Municipal and

			and County Project Office for HMIDPAP in Anhui Province by WB Loan	County's Environmental Protection Bureau
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**Table 2-3 Plan for the implementation of environment protection measures in environment sensitive area**

Yangtze Alligator Natural Reserve Area	<p>(1) Prior to construction commencement, the construction organization must contact the Management Authority of Natural Reserve Area firstly and coordinate the relevant construction arrangement, etc. issues. During construction, strictly control the construction scope and reduce the damage for soil and vegetations around the operation area as much as possible.</p> <p>(2) The construction camps and construction materials storage yard are strictly forbidden to be set within the scope of Natural Reserve Area, all construction materials and construction camps shall be set outside Natural Reserve Area.</p> <p>(3) If the important protection animals are found, timely implement the avoidance and protection as well as report to Management Authority of Natural Reserve Area.</p> <p>(4) Strengthen the management and monitoring during the construction, list this project into the construction supervisor's supervision emphasis, meanwhile, supervise the construction activities by the personnel from Natural Reserve Area's management station.</p>	Each municipal and county highway bureau	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Anhui Binhu National Forest Park / Anhui Jingtingshan National Forest Park/ Anhui Guangde Hengshan National Forest Park	<p>(1) Prior to construction commencement, the construction organization firstly invites the staffs from Hefei Forestry Bureau, Xuancheng Forestry Bureau and Guangde County Forestry Bureau to determine Forest Park 's boundary to ensure that all construction behaviors don't enter into the scope of Forest Park outside the original road. During construction; strictly control the construction scope to avoid damage to the soil and vegetation around the work area..</p> <p>(2) The construction camps and construction materials storage yard are strictly forbidden to be set within the scope of three forest parks, all construction materials and construction campsites shall be set outside Natural Reserve Area.</p> <p>(3) In the process of project construction, should strengthen the inspection and quarantine work for construction materials so as to prevent and impede the influence on vegetations in the forest park by invasion of foreign species.</p> <p>(4) Strengthen the management and monitoring during the construction, list three forest park project into construction supervisor's supervision emphasis, meanwhile, supervise and manage the construction activities by the technicians from the forest bureau in each area.</p>	Each municipal and county highway bureau	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau
Binhu National Wetland Park/ Sanhe National	<p>(1) Prior to construction commencement, the construction organization must contact the Management Authority of Wetland Park firstly and coordinate the relevant construction arrangement, etc. issues. During construction, strictly control the construction scope to avoid damage to the soil and vegetation around the work area; the temporary baffles</p>	Each municipal and county highway bureau	Project Office and Municipal	APDEP, each relevant Municipal and

Wetland Park	<p>should be set locally in the location nearer to wetland's water body to guarantee that the muck don't enter into the water body.</p> <p>(2) Villagers' houses should be rented for construction camps as possible, all construction materials and construction camps should be over 200 m away from the water body of wetland.</p> <p>(3) Strengthen the management and monitoring during the construction, list the road section project of wetland park into construction supervisor's supervision emphasis, meanwhile, supervise and manage the construction activities by the personnel from two wetland parks.</p>		and County Project Office for HMIDPAP in Anhui Province by WB Loan	County's Environmental Protection Bureau
Chaohu National Scenic Spot/ Jingtingshan Provincial Scenic Spot/Langyashan National Scenic Spot	<p>(1) Prior to construction commencement, the construction organization must contact the Management Authority of Scenic Spot firstly and coordinate the relevant construction arrangement, etc. issues. During construction, strictly control the construction land occupation scope and avoid the damage to the soil and vegetation around the work area</p> <p>(2) Strengthen the management and monitoring during the construction, list three road section project of Scenic Spot into construction supervisor's supervision emphasis, meanwhile, supervise and manage the construction activities by the personnel from Scenic Spot Management Committee.</p> <p>(3) Implement the construction by selecting the tourist off-season for scenic spot as much as possible, to reduce the losses caused due to construction.</p> <p>(4) Considering the influence on scenery in the scenic spot, should be noted that the materials in the construction area to be orderly and neatly stacked and site keeps clean during construction.</p>	Each municipal and county highway bureau	Project Office and Municipal and County Project Office for HMIDPAP in Anhui Province by WB Loan	APDEP, each relevant Municipal and County's Environmental Protection Bureau

## Chapter III Environment Management Responsibilities

### 3.1 Environment Management Organization and Responsibilities

The environment management during construction period shall be charged by each party of following personnel: APDT, each municipal and county highway management bureau, contractor and Environment Supervision Engineer (ESE) and External Environment Consultants (EEC) referring to (see Figure 3-1). During operation period, the environment management responsibilities are undertaken by Anhui Province Highway Administration Bureau (APHAB), Anqing Highway Administration Bureau, Hefei Highway Administration Bureau, Xuancheng Highway Administration Bureau, Guangde County Highway Administration Bureau.

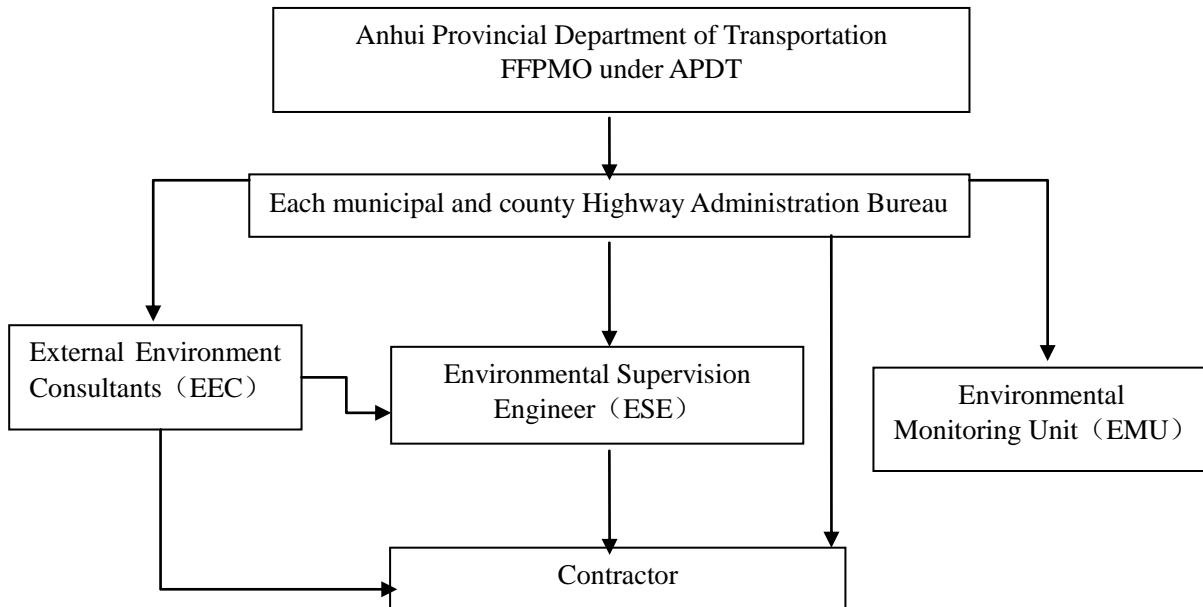


Figure 3-1 Environmental Management System during construction

The main administration responsibilities of these undertakers cover:

#### (1) APDT (FFPMO)

The APDT is responsible for the implementation and management of environmental protection work in this project. FFPMO under APDT is responsible for supervising the implementation and management of environmental protection work in this project as well as realizes the uniform coordination with WB

#### (2) Each municipal and county highway management bureau

Each municipal and county highway management bureau is responsible for the integral

environment management during the construction stage. An environmental protection department is established and is charged by the environment specialist. Environmental protection department established under the project office has 1-2 environmental specialist. Their responsibilities are as follows:

- Under management of project office as well as supervision and guidance by provincial, local (municipal) environmental protection bureau, forestry bureau and water conservancy bureau, be responsible for the integral environment management work, during construction period, submit the environment management report to FFPMO under APDT and compile the environment monitoring report semiannually, or provide and compile the data required by environment management report and environment monitoring report semiannually for FFPMO under APDT.

- Entrust the environment monitoring organization to implement the environment monitoring and provide the support for environment monitoring work during construction period.

- Ensure that there is *EMP* in the bidding document and construction contract. Supervise the pollution prevention measures taken by the construction organization. If the construction team violates the environmental protection regulations or doesn't take the pollution prevention measures, should immediately inform the construction team to violate the regulation and report the conditions to the project office. If the pollution accident occurs, assist to treat the environment pollution condition.

- Ensure that there is *EMP* in the bidding document and construction contract. Supervise and participate in project's environment supervision.

- Employ the EEC to provide the technology support on environment protection during construction period, implement the site monitoring and guidance as well as to review the implementation condition of environmental protection measures; provide the environmental protection guidance for contractor and provide the in-job training on environmental protection for project managers, supervisors and contractor; assist the development organization to compile the semiannual report.

### **(3) Contractor**

The contractor is responsible for the specific environment mitigation measures specified in the *EMP* and contract, formulating the environmental protection work plan for contract, report the new environment issues or the condition on accidentally found ancient cultural relics in the process of construction to supervision engineer as well as implement the continuous communication mechanism with local interested parties. Require each contractor assigning 1-2

full-time environment personnel to be responsible for environment management based on the contract as well as implement the regular training for constructors and management staff.

#### **(4) Environmental Supervision Engineer (ESE)**

Require the supervision engineering company assigning an ESE according to the contract. ESE's responsibilities are as follows:

- Review whether the engineering design conforms to the requirements of *Environmental Impact Evaluation* and *Environmental Management Plan* on behalf of the project office, especially for the requirements relevant with the required site environment management and impact on mitigation measures.
- Supervise contractor's site environment management system, including the performance, experiences and treatment for site environment issues, and implement the correction guidance;
- Review the execution condition of contractor's *EMP*, inspect and confirm the environment supervision procedure, parameters, monitoring site, equipment and results.
- Report the execution condition of *EMP* to the project office.

#### **(5) External Environment Consultant (EEC)**

The project office shall employ the EEC to implement the supervision for *EMP*. The EEC directly signs the contract with project's owner and is independent of contractor and supervision engineer. The ESE's responsibilities are as follows:

- The EEC shall assist the project's owner to implement the training and consultation services;
- Implement the review for contractor and supervision engineer's environment measures;
- Assist to compile the semiannual report and submit to FFPMO and WB.

#### **(6) Environment Monitoring Organization**

The project office shall entrust the environment monitoring organization to execute the environment monitoring plan formulated in *EMP*.

#### **(7) Anhui Province Environmental Protection Bureau (APEPB) as well as Municipal/County Environmental Protection Bureau**

The APEPB is responsible for implementing the monitoring management on environmental protection work for construction project, organize and coordinate relevant organizations to provide services for project's environmental protection work; review the environmental impact report; supervise the implementation of environment action plan of the project; be responsible for completion and acceptance of environmental protection facilities in the project; confirm the environmental regulations and standards that the project should be implemented; designate the municipal and county environmental protection bureau to

implement the environment supervision management during construction period and operation period.

Anqing Environmental Protection Bureau, Suzhou Environmental Protection Bureau, Hefei Environmental Protection Bureau and Xuancheng Environmental Protection Bureau accept the job instruction from the APEPB, supervise the development organization to implement the environment action plan, execute relevant environment management regulations and standards; coordinate each department to properly implement the environmental protection work; be responsible for the inspection and supervision management on construction, completion and operation condition for project’s environmental protection facilities within the administrative jurisdiction area.

### 3.2 Environment Supervision Plan

Each environmental protection task required to be implemented on each stage during project preparation period, construction period and operation period shall all be supervised, and organization specifically executing the supervision tasks, supervision contents and supervision target are as shown in the Table 3-1 below.

Table 3-1 Environment Supervision Plan

Stage	Supervision Organization	Supervision Contents	Supervision Purpose
Design Stage	Environmental Protection Bureau, Development and Reform Committee	1. Review and approve the EMP; 2. Review and approve the initial environmental protection design	1. Guarantee that the environment impact evaluation contents are complete, with appropriate subject setting and highlighting emphasis; 2. Guarantee that the major environment issue possibly produced in this project may be reflected; 3. Guarantee that the mitigation measures on environment impact are provided with specific feasible implementation plan.
Construction Stage	Environmental Protection Bureau	1. Inspect the recovery of construction temporary land occupation, vegetation restoration and environment recovery; 2. Inspect the control measures on dust and noise pollution, decide the construction time; 3. Inspect the disposal and drainage of domestic sewage and oily wastewater on the construction site;	1. Strictly execute “Three Simultaneous”; 2. Reduce the influence of construction on surrounding environment, execute the relevant environmental protection regulations and standards; 3. Ensure that the river water quality isn’t polluted; 4. Ensure that the landscape and land resources are not damaged severely so as to avoid causing water and soil loss.



Operation Stage	Environmental Protection Bureau	1. Inspect the implementation of environmental protection action plan during operation period; 2. Inspect the implementation of monitoring plan during operation period; 3. Inspect whether the environment quality on the environment sensitive point meets the corresponding requirements on environment standard.	1. Implement the environmental protection action plan; 2. Implement the monitoring plan; 3. Strengthen the environmental management and earnestly protection crowds' health.
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### 3.3 Environment Supervision

This project is required to be implemented according to the requirement of *Notice on Carrying Out the Environmental Supervision Work in Traffic Engineering* issued by Ministry of Communications to actively develop the environment supervision work so as to facilitate to carry out the clean production; namely the minimal damage and maximal ecological recovery should be realized during construction to enable that the project construction conforms to the requirements of environmental protection, and the noise, waste gas and sewage drainage reach the relevant standard. The environmental protection project investment should be guaranteed to enable that such environmental protection facilities as ecological protection and restoration and water environment protection are constructed and operated simultaneously with the main project. The environment supervision is important guarantee to implement various environmental protection measures and is the main supplement of whole engineering supervision giving priority to project quality, it also lay the foundation for environmental protection completion and acceptance work of proposed project.

The ESE is an important role in the whole management and supervision level system. In this project should be reasonably sure that the ESE is fully integrated into the system of engineering supervision engineer, namely, the environment supervision responsibilities shall be explicitly distributed and brought into the whole engineering supervision engineer contract.

Meanwhile, bring the EEC into the supervision mechanism. The EEC shall sign the contact directly with project's owner and is independent of contractor and supervision engineer. The EEC shall assist the project's owner to implement the training and consulting services, review the contractor and supervision engineer's environment measures as well as assist to compile the semiannual environment monitoring report of project required by WB during execution period.

### 3.4 Management on Contractor

The environment protection is contractor's responsibility at the stage of project construction,. It is stipulated in Article 19 of Civil Engineering Evaluation Contract for International Federation of Consulting Engineers (FIDIC) that," in the entire process of project

construction, completion and remedy for other defects, the contractor should take all reasonable steps to protect the site and the adjacent environment so as to avoid the pollution, noise or injury or hamper to human body or properties due to project construction”.

In the process of this project construction, the contractor shall play the crucial function on environment management, pollution control and prevention measure implementation, etc. therefore, following requirements are required to be conducted for contractor:

- Select the substantial contractor so as to ensure that the EMP can be executed effectively.

- Require that the contractor and the construction supervisor must accept the training on environment protection and management prior to construction.

- The environment impact mitigation measures during construction period must be included into contractor’ bidding document and should also be included into the construction contract finally to serve as the contract requirement for project contractor.

- Require that the contractor to monitor their environmental activities and provide the environment performance log once every day or every week. The project office and construction supervision team shall implement the supervision and review for these records.

- The contractor is required to assign one full-time environmental staff for each subproject. These environmental staffs should accept the training in the training plan to be competent for their work.

- In the process of construction, the contractor should communicate and negotiate with the crowds in the area where the project locates, erect the bulletin board on each construction unit and notify the specific construction activity and construction time towards the public as well as provide the linkman and contact phone number so that the public implements the complaints and provide the suggestions for construction activities.

## **Chapter IV Environmental Monitoring Plan**

### ***Objective***

The environment monitoring is an important component of the EMP during construction period and operation period. Environment monitoring objective is as follows:

- Completely and timely grasp the pollution dynamic condition of proposed project;
- Understand the environment quality change degree in the area of project construction;
- Understand the influence scope and environment quality dynamic status during operation period, timely reflect the information towards competent authority so as to provide the basis for project's environment management.

### ***Responsibility organization***

Since the environment monitoring during construction period and operation period involves such multiple aspects as noise, water and ecology, the allocation for monitoring personnel and instruments is complex fairly, the development organization is suggested to may entrust the organization with monitoring qualification for completion.

### ***Monitoring plan***

This monitoring task covers the monitoring on environmental noise, water quality and ecological environment during construction period and operation period, the specific plan covers the time, frequency, site and parameters listed in Table 4-1, Table 4-2 and Table 4-3.

Except that the professionals from professional monitoring organization implement the normal monitoring during construction period according to relevant stipulations, the contractor and the construction supervision organization shall also implement the daily environment monitoring, the specific methods are as follows:

- Implement the noise monitoring in the periphery of constructional machinery and sensitive point by utilizing the portable noise meter;
- Implement the inspection for air-borne dust condition caused by temporary construction access road, powdery materials storage yard, disturbed ground surface and the truck transporting the materials through visual observation;
- The water quality in rivers, irrigation, lake and fishpond, where sewage in the periphery of construction site shall be inspected by the observation method.

From the experiences obtained in environment management work of other project that WB loan, can let the contractor to undertakes the environmental supervision task. Each monitoring personnel from contracting bid section and construction supervision organization must accept the training prior to implementation of environment monitoring work. The contractor and the

construction supervision organization should submit the environment monitoring report to FFPMO under APDT monthly. In addition, while unexpected environment pollution accident occurring, require that they can immediately report the specific conditions to the FFPMO so that the FFPMO and the contractor may take the appropriate pollution control measures, including the monitoring by employing the professional monitoring organization, etc. The requirements on all monitoring and reporting work shall be brought into the contractor and construction supervision organization's tendering document and finally written into the contracting contract.

**Table 4-1 Environment Monitoring Plan (Surface Water Quality)**

Stage	Monitoring Site	Monitoring Items	Monitoring Frequency	Monitoring Duration	Sampling Time	Execution Organization	Responsibility Organization
Construction Period	Chengxi Reservoir, Fushan Reservoir, underground water source site in Tianchang City	SS, Petroleum, Permanganate index or COD <sub>Cr</sub>	Determine based on construction frequency needs	1 day	Twice every day	Monitoring organization with qualification entrusted by the owner	Each municipal and county highway bureau
Operation Period	Outlet of sewage treatment facilities in maintenance emergency center	COD <sub>Cr</sub> , BOD <sub>5</sub> , NH <sub>3</sub> -N, TP	Once/year	1day	Twice a day		

**Table 4-2 Environment Monitoring Plan (Environment Air)**

Stage	Monitoring Site	Monitoring Items	Monitoring Frequency	Monitoring Duration	Sampling Time	Execution Organization	Responsibility Organization
Construction Period	Select a village with larger scale adjacent to project from each city and county	TSP	Construction period: Twice /year, it may be added based on actual needs	3 days	Continuous 12-h sampling for TSP	Monitoring organization with qualification entrusted by the owner	Project Department

**Table 4-3 Environment Monitoring Plan (Environment noise)**

Stage	Monitoring Site	Monitoring Items	Monitoring Frequency	Monitoring Duration	Sampling Time	Execution Organization	Responsibility Organization
Construction Period	Select a village with larger scale adjacent to project from each city and county	L <sub>Aeq</sub>	Construction period: 4 times /year, it may be added based on actual needs.	1 day	Construction time 2 times each day and night	Monitoring organization with qualification entrusted by the owner	Project Department
Operation Period	Select a village with larger scale adjacent to project from each city and county	L <sub>Aeq</sub>	1 times / year	1 day	Construction time 2 times each day and night	Monitoring organization with qualification entrusted by the owner	Project Department

**Monitoring Report**Construction period:

During project construction period, the qualified monitoring organization should be entrusted to implement the environment monitoring and the report should be submitted to local environmental protection department. The report contents on this stage should cover the project progress, main construction contents and methods, comment on caused environment impact as well as implementation condition on environment impact mitigation measures.

During project construction period, the monthly report should be issued every month and reported to Engineering Management Office and Municipal Environmental Protection Bureau.

### Operation period:

The monitoring results shall be submitted to FFPMO under APDT twice per year in the form of formal written materials. By the Foreign Office to do sorting, storage of these reports are the basis that WB and APEPB evaluate the environmental protection achievements in this project as well as the environmental protection measures are required to be added when environmental impact exceeds the expected impact.

The contents in the monitoring report mainly cover:

- Monitoring time, frequency, point location, monitoring items, method and quality control scheme;
- Monitoring date and statistical analysis;
- Overview on operation condition for facilities during monitoring period;
- Project under abnormal condition

### ***Estimate on monitoring expenses***

Estimate on environment monitoring expenses during construction period: RMB 40,000/year×5 years=RMB200,000(RMB), monitoring expenses during operation period: RMB 30,000/year. The monitoring results for previous three years during operation period will be used for verifying the environment impact predication results, expenses: RMB 90,000. Three years later, the EMP will be modified in accordance with the monitoring results for previous three years.

The expenses for daily monitoring work by the contractor and supervision personnel are all included into the contract price.

## Chapter V Personnel Training

The successful implementation on EMP for proposed project depends on environmental management personnel's knowledge and work experiences. Meanwhile, the scientific technologies are always under continuous development and advancement. Therefore, it is very necessary to continuously strengthen and improve the personnel training and organization. The personnel training may be held at home and abroad, those countries having the mature highway construction and operation management system shall be selected to be served as the training site abroad. For domestic training, the experts from some universities, environment research institutions and professional consulting organizations will be employed for teaching.

The project contractor and construction supervision organization must strengthen the self-inspection on environmental protection. Even if thus self-inspection isn't the final purpose, however, it may help to establish the environmental protection awareness and simultaneously may also be beneficial for better supervision by the environment management and supervision organization. In order to enable the contractor and the personnel from supervision organization implement the more favorable self-inspection, the training for contractor and the personnel from supervision organization as well as their superior must be conducted.

The specific contents for personnel training plan are as shown in Table 5-1.

Teaching contents cover:

- (1) The regulations, documents and relevant requirements on environmental protection and water and soil conservation in construction project management by state and Anhui Province;
- (2) The environmental protection requirements on environmental protection measures and construction period proposed in this project design;
- (3) The environmental protection guideline for this project construction period

The training for full-time and part-time environmental protection personnel newly added during operation period shall be organized and implemented by the development organization, the relevant environmental protection experts from universities, scientific research institutions and operation management organization may be employed for teaching, or the short-term training class is participated,. The training plan on environmental protection personnel refers to Table 5-1.

**Table 5-1 List of staff training plans**

<b>Training form</b>	<b>Stage</b>	<b>Training content</b>	<b>Staff</b>	<b>Total</b>	<b>Time</b>	<b>Expense (RMB yuan)</b>
Training abroad	During the Construction	Environmental management and related policies	World Bank office 4 person	One month	2016~2017	240,000
Domestic training	During the Construction	1. National, Anhui province environmental protection laws regulations and policies; 2. The environmental protection and heritage conservation knowledge connected with the project 3. The environmental management plan for the construction period of the project 4. The environmental protection measures proposed in the design 5. Routine environmental monitoring methods	2 persons from each contractor and construction supervision organization, about 200 persons	3 days	After the contractor is determined; Before the construction	400,000
		Emergency plan and measures for environmental management	2-3 persons from PMO of WB loan for Anhui Highway Maintenance Innovation Demonstration and PMO of all cities and counties, about 20 persons	3 days	2016	40,000
	During operation period	Management personnel of Emergency Conservation Center	About 12 persons	3 days	After construction is completed; Before the project operation	30,000
Total			236 person-time	816 person-days		710,000



## **Chapter VI Estimate on Environmental Protection Investment**

This project implementation will play the positive function on improvement of each subproject's traffic capability, reduction for vehicle's idling and exhaust gas emission, relief for influence by bumping and noise, driving for economic development and environment beautifying, however, during construction period and operation period, some influence on peripheral environment may be produced. The environmental protection control investment used for wastewater treatment and environmental monitoring, etc. of the project itself and the environmental protection project investment refer to Table 6-1.

Various environmental protection investment expenses in this project are about RMB 5.65 million, the total investment for project construction is RMB1835.14 million, the environmental protection investment of proposed project accounting for 30% of planned total investment of project.

**Table 6-1 Table of Estimate on Environmental Protection Investment Unit: RMB10000**

No.	Name of Project or Item Expenses	Project Expenses	Other Expenses	Total	Remarks
	Part I: Project Expenses				
1	Prevention on environmental air pollution during construction period	15		15	
	200 m fencing	5			
	Watering for dust suppression	4			
	Temporary factory shed	6			
2	Prevention on noise pollution during construction period	50		50	
	Mobile sound barrier	35			
	Sealed machine shed	15			
3	Prevention on water pollution during construction period and operation period	30		30	
	Sewage treatment device in the emergency center	30			Calculation according to RMB50000/set
4	Prevention on solid wastes pollution during construction period and operation period	120		120	
	Temporary storage yard for building refuses	100			
	Dust bin	20			
5	Environments monitoring	29		29	
	Construction period monitoring	20			
	Operation period monitoring	9			
6	Expenses for personnel training		71	71	
	Part II: Previous Work and Survey and Design Expenses				
1	Environmental protection design		120	120	
	Environmental protection evaluation		90		
	Environment regulation engineering design		30		
1	Environment supervision		130	130	
	Total	244	321	565	

## Chapter VII Others

### ***Information communication***

The environment management requires that the necessary information communication should be conducted among different departments and posts in the organization; meanwhile, the organization should also be conducted to inform relevant information towards exterior (relevant parties and social public, etc.).

The internal information communication may be conducted by such multiple modes as meeting and internal briefing, however, one-time formal meeting must be held monthly, all information communication should all be recorded and filed.

The external information communication is conducted once semiannually or yearly, and the information communication with cooperative organizations should be formed as the summary and filed.

### ***Record***

In order to guarantee the effective operation of environment management system, the organization must establish a perfect record system and reserve the following records:

- Requirements in laws and regulations;
- Different permission documents;
- Environment factors and relevant environmental impact;
- Training activities;
- Inspection and assessment activities;
- Monitoring data;
- Environment non-compliant items;
- The enforcement of correction and prevention measures;
- Information on related parties;
- Check;
- Review

Additionally, above-said various records must also be controlled necessarily, including such links as record identification, collection, catalogue, filing, storage, management, maintenance, query, storage period and disposal.

### ***Reporting***

The contractor, monitoring organization and project office should record the project progress condition, EMP execution condition and environmental quality monitoring results as well as timely report to relevant departments in the process of project implementation, mainly

including three parts of contents below:

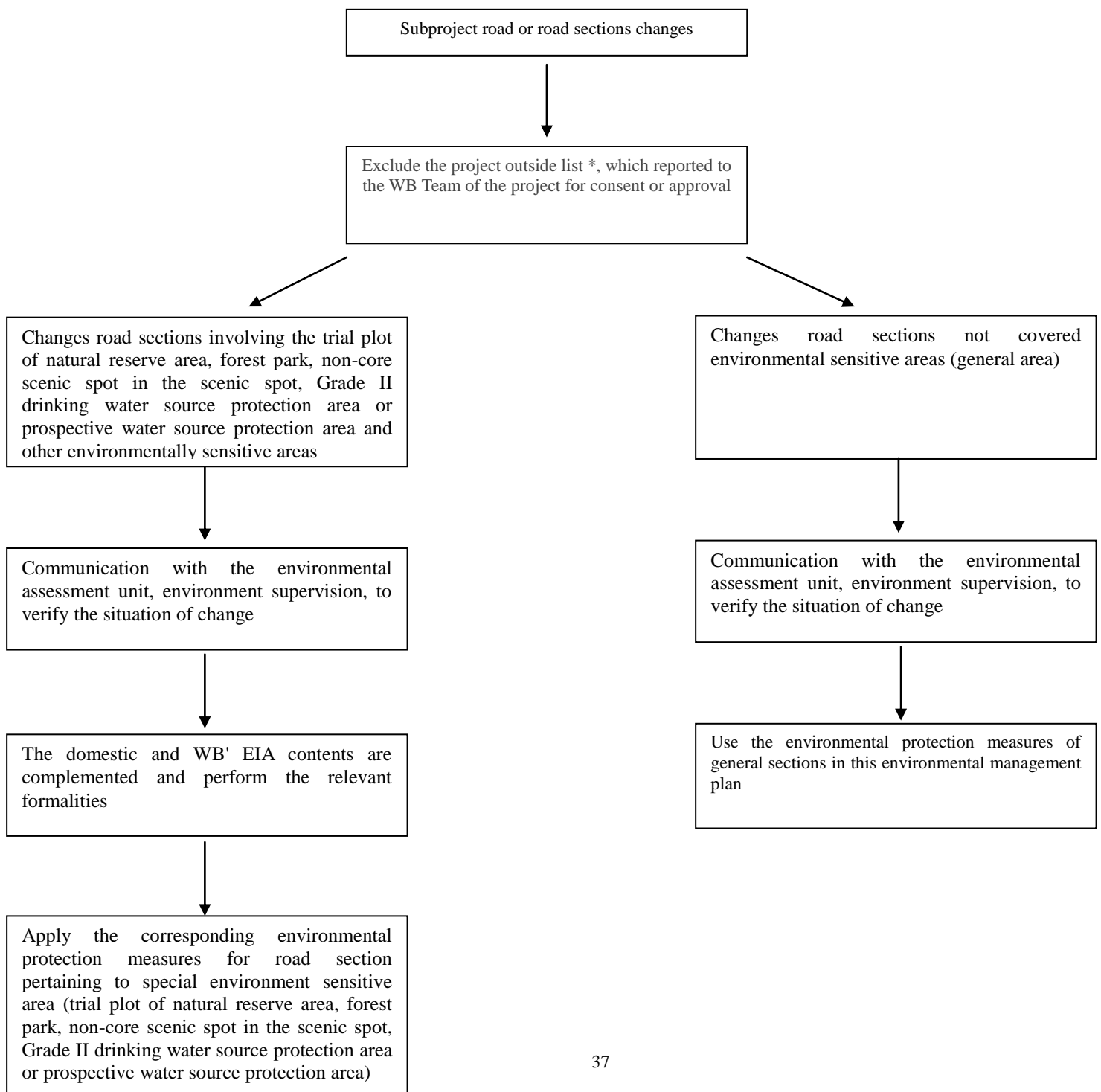
- The contractor and monitoring organization record the detailed EMP execution condition and timely report to project office;
- The project progress reports prepared by the PMO (such as monthly, quarterly and annual reports, etc.) must be included in the contents of EMP progress, such as, EMP's execution progress and execution effect, etc.;
- The EMP execution report of project must be submitted to WB once semiannually.

The EMP execution report may cover following main contents

- Implementation condition of training plan;
- Project progress conditions;
- Whether there is public compliant. If the compliant occurs, should record the main compliant contents, solution and public satisfaction;
- EMP execution plan for the next year

## Chapter VIII Environmental Management Framework Requirement on Regulation Condition for Possibly-Occurred Road Section

Since there are many subprojects of this project, especially in Project C, the change condition on the road or road section involved by the subprojects may occur possibly. Aiming at this kind of situation, put forward the environmental management framework requirements on road section regulation condition, details as follows:



Note \*: Exclude the project outside list - newly selected road sections can not be located in such particularly sensitive areas as primary protection zone of drinking water source, \_nature reserve core areas, scenic spots and core scence spots of forest parks, or other huge impact areas.