



Environmental Monitoring Report

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Prepared by
Yunnan Baolong Expressway Co., Ltd.
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For Yunnan Provincial Communications Department

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Asian Development Bank

WESTERN YUNNAN ROADS DEVELOPMENT PROJECT

BAOSHAN TO LONGLING EXPRESSWAY (No. 1)

Loan No. 2014—PRC

**Implementation of
Environment Protection Measures**

**Annual Report
(2005.1-2005.12)**

Yunnan Baolong Expressway Co., Ltd.

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1. Project General Description & Progress

(1) Project General Description

Western Yunnan Roads Development Project, Baoshan (Daguanshi) to Longling (Longshangka) Expressway, which is 76.24km long, is one segment of the National Trunk Highway GZ65 from Shanghai to Ruili in Yunnan Province. The construction of this project would contribute to the optimization of National Trunk Highway Network, the development of western provinces' economy, the uniform of all ethnic minorities, and the increment of local villagers' income as well as the promotion of new countryside policy.

The bridge works involve 231 bridges (one-way) with 48,865.26 meters for overall one-way length; there are 14 tunnels with 18,160.24 meters for one-way length including 4 separated tunnels and 10 multi-arch tunnels; there are 3 interchanges located respectively in Daganyan (C2), Hejiawan (C7), and Xiaotianba (C13). While there are 3 sections of connecting roads situated in Pupiao (C2), Hejiawan (C7), and Zhen'an (C14). The geological conditions along the whole alignment are poor and fractured; there are 47 investigated landslide areas. 50 spoilage areas are opened for the construction along the whole alignment.

The alignment mainly goes through Daguanshi, Daganyan, Yansanzhai, Majiazhai, Xiaosongpo, Lanzhahe, Denggao, Xincheng, Huchonghe, Nankan, Zhenbao, Xiaotianba, and Longshanka.

Totally, there are 47 environmental sensitive spots. The major sensitive factors are Water erosion, Water quality pollution, Noise pollution, Dust pollution and Plantation spoilage.

(2) Project Schedule & Progress

Baolong expressway was commenced on Dec. 27, 2004 with 24 months for civil works construction (except for C6 with 30 months), while 12 months for pavement and other works. The overall project period is 36 months.

One year has past since the commencement, every work has been constructing smoothly according to the schedule. The accumulated overall progress being achieved by all 14 contracts for the subgrade earthworks, culverts, drainage and protection works is more than 70%. The substructure of bridge works is finished by more than 62% while all 14 tunnels are under excavation with 38% excavation progress being achieved. At present, the project construction, which is under the golden period, focuses on the bridge T-beam pre-casting, installation and tunnel excavation and support works.

2. Management & Training of Environment Protection

Based on *Environment Impact Assessment (EIA)*, *Water Conservation Proposal (WCP)* and the requirements agreed upon with by ADB, YBEC has prepared the *Environment Protection & Water Conservative Management Method (EPWMM)* in November 2004. The EPWMM has been issued to all Contractors and the Senior Resident Engineer Offices (SEROs).

The Environment protection retention system and environment protection award funds are established according to the EPWMM. The measures are to award any contractors who can meet the requirements during the environment inspection, conversely the contractors will be punished and their retention would also be deducted.

In June 2005, YBEC issued the *Engineering Environment Supervision Implementation Programme* to all 14 Contractors and 8 SEROs as well as to monitoring agencies and relevant local environment protection and water reservation units. The *Implementation Programme* is regarded as the upgrading and complementary document for *EIA* and *WCP*. Moreover, the specific mitigation measures and monitoring methods are prepared for dealing with the actual situation in the environment sensitive spots since the work commencement. The *Implementation Programme* specifies the respective responsibilities and the implementation approaches of mitigation measures for all the contractors, and SEROs, it has rather high maneuverability. YBEC has also organized a training course carried out by Chongqing Traffic Science & Research Design Institute to the on-site engineers and main technical staffs, about 90 persons from the above-mentioned units. The training covered the environment protection and management, relevant laws and regulations related to the expressway construction, even the *Engineering Environment Supervision Implementation Programme* issued by YBEC was also incorporated in the training.

In July 2005, YBEC organized 14 representatives from 8 SEROs and relevant technical staffs from YBEC to attend the training on *Water Conservation Supervisor* sponsored by the Water Conservation Center affiliated to the Ministry of Water. All the trainees achieved the qualification certificates.

During the year of 2005, all 14 Contractors submitted the *Implementation Report on Environment Mitigation Measures* on monthly basis, while all 8 SEROs also provided the *Supervision Report on Environment Mitigation Measures* every month.

3. Environment Monitoring

In compliance with the specific requirements of the *Environment Management Action Plan* prepared by YBEC, YBEC has signed the Contracts respectively with Baoshan Environment Monitoring Station and Beijing Huaxiashanchuan Ecology Environment Science and Technology Company. The former is responsible for the environment quality monitoring, on-site sampling and submission of quarterly reports during the construction period while the latter would take the responsibility of monitoring and analysis on the water erosion, namely (1) monitoring and analysis of major water erosion factors, (2) monitoring the water erosion status, (3) monitoring the water erosion hazards, (4) monitoring the effect of water erosion mitigation measures and submitting the *Quarterly Monitoring Report*. The monitoring works has started smoothly. Up to now, Baoshan Environment Monitoring Station has finished the 4 *Quarterly Environment Protection Monitoring Reports* of 2005 (See the Appendix), and Beijing Huaxiashanchuan Ecology Environment Science and Technology Company has also completed the 4 *Quarterly Performance Reports on Water Conservation Monitoring* of 2005 (See the Appendix). From the above-mentioned Quarterly Reports, it is shown as follows:

(1) First Quarter

The result of ground water monitoring corresponded to the standards; however the construction of expressway produced a little impact on water quality. TSP concentration conformed to the executed standards with little impact on the air quality from the construction. There are totally 17 noise-monitoring spots, 3 of which during the daytime and 7 of which at night were beyond the controlled value. Through the careful investigation, it was shown that the exceeded-standard value in Majiazhai during the daytime was incurred by the vehicle's running on the ascent, and the exceeded-standard value in Huangmaozhai and Xiaomidi were both affected by the operation of construction equipments. As for the exceeded values monitored at night, only Denggao village was affected by Nujiang River Bridge construction at night, the remaining spots were affected by material transportation on NH320. With regard to the water erosion monitoring, it was showed that the status of water erosion was standing between the light and slight level due to fewer rainfalls.

(2) Second Quarter

The result of ground water monitoring corresponded to the standards, however the construction of expressway produced a little impact on water quality. TSP concentration conformed to the executed standards with little impact on the air quality from the

construction. There are totally 17 noise-monitoring spots, 12 of which during the daytime and 10 of which at night were beyond the controlled value. Through the careful investigation, it was shown that the exceeded-standard values in Lengshuiqing, Majiazhai, Dongsong Village, Waizhaishe, Shatianzhai, Huihan Village and Bangmai Village during the daytime were incurred by the vehicle transportation, and the exceeded-standard values in Huangmaozhai, Dundong Village, Chaotianshe, Pupiao Connecting Road and Xiaomidi were all affected by the operation of construction equipments. As for the exceeded-standard values monitored at night, Lengshuiqing was affected by traffic noise from NH320, Heshang Village was affected by the frog noise during the summer, and the remaining spots were affected by nighttime construction e.g. Huangmaozhai, Denggao Village, Chaotianshe, and Pupiao Connecting Road or affected by material transportation on NH320. With regard to the water erosion monitoring, it was showed the intensity of water erosion was increased due to more rainfalls at the monitoring spots, but it didn't incur the obvious water erosion hazards, so the status of water erosion was still remaining at the slight level.

(3) Third Quarter

The result of ground water monitoring showed that the values of SS and CODcr were partially out of standards, the construction of expressway produced a little impact on water quality. TSP concentration conformed to the executed standards with little impact on the air quality from the construction. There are totally 17 noise-monitoring spots, 8 of which during the daytime and 4 of which at night were beyond the controlled value. Through the careful investigation, it was shown that the exceeded-standard values in Lengshuiqing, Dongsong Village, Waizhaishe, Lizhai, Huihan Village, Bangmai Village and Pupiao Connecting Road during the daytime were incurred by the vehicle transportation, and the exceeded-standard value in Chaotianshe was affected by the operation of construction equipments. As for the exceeded-standard values monitored at night, Lengshuiqing, Majiazhai, Waizhaishe and Bangmai Village were affected by traffic noise from NH320 or by material transportation. With regard to the water erosion monitoring, it was showed the intensity of water erosion was increased due to more rainfall at the monitoring spots, but it didn't incur the obvious water erosion hazards, so the status of water erosion was still standing at the slight level.

(4) Fourth Quarter

The result of groundwater monitoring showed that except COD_{Cr} in Xiaoganyan Reservoir, all the other values were in conformity with the standards, the construction of expressway produced a little impact on water quality. TSP concentration in Denggao Village was beyond the executed standards, so the construction of expressway also produced a little impact on air quality. There are totally 17 noise-monitoring spots, 5 of which during the daytime and 3 of which at night were beyond the controlled value. Through the careful investigation, it was shown that the exceeded-standard values in Lengshuiqing, Dongsong Village, Waizhaishe, and Lizhai during the daytime were incurred by the vehicle transportation, and the exceeded-standard value in Duntong Village was affected by the operation of construction equipments. As to the exceeded-standard values monitored at nighttime in Lengshuiqing, Huangmaozhai, and Chaotianshe were affected by traffic noise from NH320 or by material transportation. With regard to the water erosion monitoring, it was showed the intensity of water erosion was increased due to more rainfall at the monitoring spots, but it didn't incur the obvious water erosion hazards, so the status of water erosion was still at slight level.

According to the analysis on results of environment and water erosion monitoring from the above-mentioned *Quarterly Reports*, the monitoring values of water quality were generally in conformity with the environmental background values, which means that the project made little negative impact on the surrounding environment. TSP value monitored in Denggao Village during the fourth quarter was slightly increased due to the dry climate in winter and increment of wind power, which means that the construction of expressway affected the environment a little. Based on the noise-monitoring results, it was shown that the exceeded-standard noise, which was mainly incurred by the overloading vehicles transportation, would be defined as the main environment pollution factor caused by the construction of expressway. Thanks to the improved management in September 2005, however, this issue was alleviated and improved during the third and fourth quarters. For the next stage, further alleviation of noise pollution would be the major work on environment impact mitigation, and it will be solved by well-organized material transportation plans. There is a point need to be addressed, namely during the last year, YBEC has not received any claims on noise impact from the local villagers.

4. Implementation of Environment Protection Measures at Work Sites

Temporary Facilities

Temporary facilities of the Contractors include pre-casting yard, mixing plant and

resident & office area.

The Contractor 1, 2, 7 and 14 have rented the local existing houses as the resident & office areas while the Contractor 3, 4, 5, 6, 8, 9, 10, 11, 12 and 13 have built their resident & office areas on the temporarily occupied lands. In compliance with the requirement of the *Environment Protection & Water Conservative Management Method*, the specific swage tanks were built for periodical collection of sewage from the work sites. Meanwhile, basins and seepage wells were also set for domestic wastewater. Therefore, no wastewater is directly discharged outside.

The pre-casting yards and mixing plants were all set up on the temporarily occupied lands. Based on the requirements, the collection of construction waste materials must be carried out before disposal. Moreover, the basins were built for swage collection and disposal.

The Rent Agreements have been signed with the local villages for the all-mentioned temporary lands in conformity with the relevant requirements. The Contractors are responsible for the recovery of the temporary lands upon the completion of the construction.

Resettlement of Public Facilities & Displacement of Tombs

According to the design requirements as well as the coordination with local communities, the resettlement of public facilities & displacement of tombs were implemented as much as possible with respect to the relevant laws, regulations and folk-customs. Such kind of issue in Baolong Expressway Project is relatively less, and has been disposed properly.

Recovery and Diversion of Farming Irrigation System

Up to date, there were 3 impact surveys carried out for the recovery and diversion of farming irrigation system incurred by Baolong Expressway Project, namely (1) during the detailed design and survey stage by the Design Institute in February 2004; (2) after access to the work sites in December 2004; and (3) the joint investigation group comprising the staffs from YBEC, local authorities, Contractors and representatives from local villages affected by the project for specific survey and design optimization, even for obligation confirmation of each party.

YBEC has established the effective grievance procedures and setup the Coordination-leading group for the alleviation of spoilage and impact on local farming irrigation systems incurred by the project as much as possible. In addition to these efforts, the Contractors and SEROs also made a lot of efforts on the issue and coordination. In general, understandings are obtained from both local authorities and local villagers.

Noise Control

The Contractors are strictly limited for their subgrade-working hour on the work sites, which are near the local villages or communities. The operations of all construction equipments are prohibited from 10:00 pm to 6:00 am for a good rest to the local people at night. However, some areas produced the exceeded-standard noise due to material transportation, but the understandings were obtained from local villages and there were also no complaints received from them. As to the a few work sites with noise problem, the Contractors have been making efforts on noise pollution control under YBEC's suggestions.

Dust Control

Since the commencement of the construction, the responsibilities and obligations of each Contractor are clearly defined for the maintenance and repair of access roads and local roads in order to obtain the smooth material transportation and not to affect the communication of local villagers. During the construction period, at least twice a day water spraying should be carried out on the access roads and no material vehicles are permitted to run fast for the dust control. In particular, due to Contractor 7 and 8 are both situated in the beautiful Nujiang Basin, the alignment of these two contracts will go through the local villages, orchards, and famous coffee plantation areas, so these two Contractors made great efforts on dust control, which are praised by YBEC, SERO, and local authorities. The understandings are also received from the local villagers and households.

Protection of Spoilage Areas and Water Erosion Conservation

Because of complex landforms, high and steep slopes along the alignment, the overall volume of excavation are larger than filling work, there is no borrow pits. According to the actual situation, there are totally 50 spoilage areas.

The selection of the spoilage area is subject to the Principle of *3 simultaneously*, and the Principle of *retaining the spoilage material before disposal*. The compaction is implemented along the disposal process according to the design. The disposal of spoilage material is expected to be finished in April 2006. On the occasion, the spoilage areas would be restored as farming lands or be landscaped based on the design, and the water conservation measures would also be implemented.

Increasing Income of Local Villager

The local villagers along the alignment are positively involved in the project construction, and all contractors have also been recruiting worker from local labor force. For instance,

Contractor 12 in Zhen'an, Longling County has hired more than 300 farmers and women as workers from Bangmai Village.

Work Safety and Sanitation, Waste Material Disposal on Work Camp

YBEC has prepared the *Regulation on Work Safety of Yunnan Baolong Expressway Project* with respect to the relevant Laws and Regulations. The *Regulation* has been issued to all Contractors and SEROs. YBEC has organized review and evaluation on actual implementation, and some well performed Contractors and SEROs have been awarded. The rubbish from Contractor work camps are collected for concentrated filling disposal and the sewage channel are available on each camp.

Construction and Maintenance of Rural Roads

The Contractors have totally constructed more than 120km rural roads for local communities along the alignment and have been carrying out maintenance of existing rural roads in conformity with the Contract Document in order to ensure the normal communication for the local villagers during the construction period. Local authorities praise these efforts.

Donation for Education

There are two primary schools built respectively in Longyang District and Longling County under the donation from all Contractors, SEROs and YBEC.

5. Inspections and Supervision

Since the commencement of the construction, YBEC has entirely implemented 6 rounds inspections on the project environment protection issue in addition to other routine inspections, including inspection of:

- 1) The status of organization establishment. Whether the effective unit setup and whether the responsibility is clear;
- 2) Documents preparation. Whether each Contractor according to the actual status has prepared the environment mitigation measures. Whether these measures are incorporated into the *Inception Report*. And whether these measures have properly been implemented and recorded.
- 3) Construction site. Inspection on the work site to verify the implementation of environment mitigation. Through the inspections, YBEC required the Contractor to rectify its inconformity to the relevant requirements and praised the good performance they achieved. In general, the project implementation is basically in

compliance with relevant environment protection requirements stipulated in the *EIA* and the *Loan Agreement* signed with ADB.

- 4) ADB Environment Safeguard Review Mission in August. Ms Ma Xiaoying, leader of ADB Mission, arrived at Baolong Expressway Project to review the implementation of environment protection measures;
- 5) Implementation of the Contractor environment mitigation issue in October. Since July 2005, each Contractor had submitted the *Implementation Report* to the supervision engineer on monthly basis according to the requirements. The implementation of Contractor environment mitigation is basically in conformity to the relevant environment protection requirements regulated in the *Contract Document*, the *EIA* and the *Loan Agreement* signed with ADB.

6. Solution on Problems Raised by ADB Environment Review Mission

As to the complaints raised by villagers in Lengshuiqing, Contractor 1 has solved the water resource impact properly under the supervision of YBEC. The local villagers also have agreed with these solutions.

With regard to the tunnel inspection apparatus, Contractor 11 has procured such equipment for the actual implementation under the supervision of YBEC.

As regards poor sanitary condition, the oil filth problem in a few work sheds, the relevant Contractors have made strong efforts to improve it.

7. Conclusion

In connection with the work site inspections, and the environment monitoring results in 2005, the implementation of environment mitigation measures is basically in conformity to the relevant environment protection requirements regulated in the *EIA* and the *Loan Agreement* signed with ADB. All issues related to the environment protection were implemented smoothly.

In 2006, YBEC will carry out the environment protection measures according to the *Project Administration Memorandum* (PAM) prepared by the ADB Inception Review Mission on July 9, 2004.

- 1) Each Contractor should submit the *Implementation Report on Environment Mitigation Measures* according to the requirement stipulated in the *Environment Protection & Water Conservative Management Method* and the *Engineering Environment Supervision Implementation Programme* every month;

- 2) Each SEROs should submit the *Supervision Report on Environment Mitigation Measures* according to the requirement stipulated in the *Environment Protection & Water Conservative Management Method* and the *Engineering Environment Supervision Implementation Programme* every month;
- 3) Make more efforts on supervision of the alleviation of noise pollution caused by the Contractors;
- 4) Before the rainy season in 2006, the effective control and reinforced work management are necessary to carry out at the work sites vulnerable to the water erosion, such as spoilage areas.
- 5) Before the beginning of the spring plowing 2006, the survey on the status of farming irrigation systems affected by the project should be carefully implemented to find out and solve the existing problems in time.
- 6) Implementation report of environment protection measures for the first and second quarters of 2006 will be submitted to ADB and AFD before August 30 of 2006.

Signed by:

Mr. Peng Saiheng
General Manager, Baolong Expressway Co. Ltd

8. Appendices

- Appendix 1 Environment Protection Monitoring Report of 1st quarter of 2005
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Appendix 6 Water Conservation Monitoring Performance Report 2nd quarter of 2005

Appendix 7 Water Conservation Monitoring Performance Report 3rd quarter of 2005

Appendix 8 Water Conservation Monitoring Performance Report 4th quarter of 2005