Yunnan Kunming Changshui Green Airport Development Project

Environmental and Social Management Plan (ESMP)

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1 Objectives

This *Environmental and Social Management Plan* (hereafter referred to as the "ESMP") is prepared for the Yunnan Kunming Changshui Green Airport Development Project in the People's Republic of China (hereafter referred to as the "Project"). The ESMP is based on the ESIA Report of the Project (prepared by the Consortium of Guangzhou Greenworld Engineering Technology Consultant Co., Ltd. and Hohai University, 2023), the *Feasibility Study Report of Yunnan Kunming Changshui Green Airport Development Project* (prepared by Civil Aviation Airport Planning and Design Research Institute Co., Ltd., 2022) and the *EIA Report of Yunnan Kunming Changshui Green Airport Development Project* (prepared by Beijing Zhongzi Huayu Environmental Protection Technology Co. Ltd., 2022).

The ESMP defines mitigation measures for potential environmental and social impacts and specifies organizational responsibilities and management mechanisms for monitoring and complying with the environmental and social laws, regulations, and standards of the PRC and the environmental and social policy framework of the Asian Infrastructure Investment Bank (hereinafter referred to as "AIIB").

The ESMP contains the following contents:

1) Objectives;
2) Institutional arrangement and responsibilities;
3) Mitigation measures;
4) Environmental and social monitoring requirements;
5) Reporting;
6) Capacity building and training; and
7) Estimated costs for the implementation of the ESMP.

The ESMP will be included as a separate attachment in all tender and contract documents for civil works. It is the responsibility of the Contractor to fulfill the requirements of the ESMP and to list the estimated costs in the Tender Documents. The results of environmental and social impact monitoring will be used to assess the effectiveness of mitigation measures and to determine whether additional improvement measures are required.

2 Responsibilities of ESMP Implementing Agency

Yunnan Provincial Government is the project implementing entity (PIE) of the Project. Yunnan Airport Group Co., Ltd. is the project implementation agency (PIA). A project implementing office (PIO) is set up under the PIA. Kunming Changshui International Airport Co., Ltd. is the project implementation unit (PIU) (see **Figure 1**).

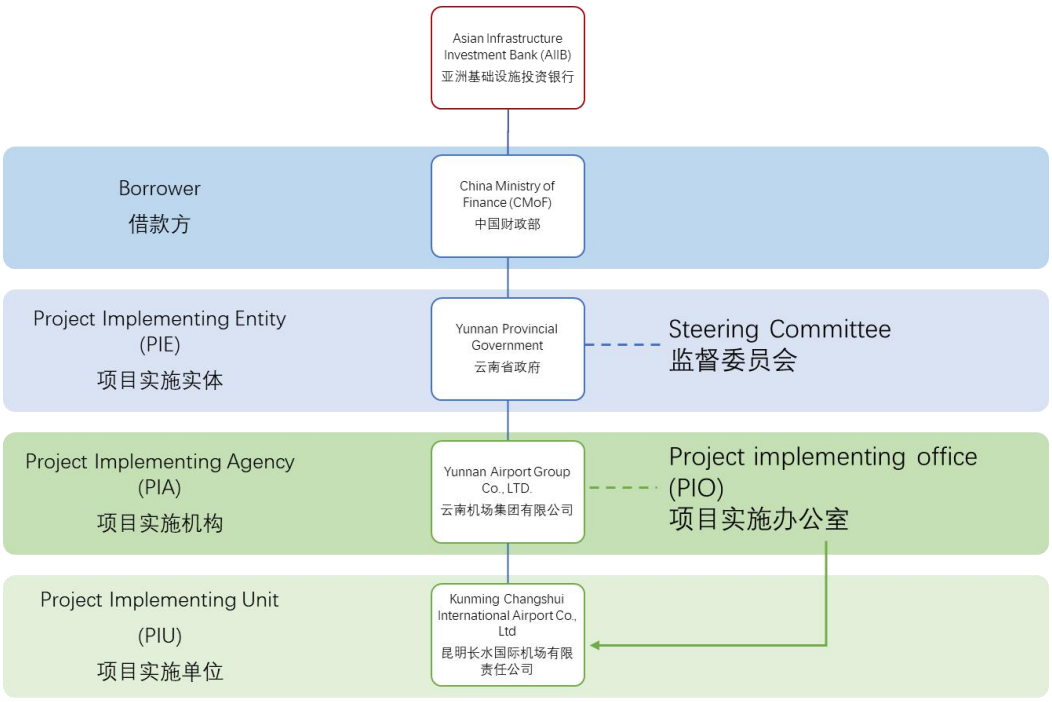


Figure 1 Organizational chart for project implementation

Due to the great difference in environmental and social management aspects between the construction period and the operation period, the YAG has established the Kunming International Aviation Hub Project Construction Headquarters (hereinafter referred to as the "Hub Headquarters") to be responsible for the construction of the Project and overall coordination. The Hub Headquarters has departments such as Finance Department, Procurement Department, Engineering Management Department, Safety and Quality Management Department and Land Operation Coordination Department, which are responsible for the coordination and management during the construction period. The Hub Headquarters will be fully responsible for supervising the implementation of the ESMP during the construction period, coordinating the operation of the grievance mechanism, and reporting to AIIB through the PIO. The environmental and social management process during the construction period of the Project is shown in **Figure 2**. Kunming Changshui International Airport Co., Ltd. are responsible for the environmental and social management during the operation period respectively.

The Hub Headquarters will appoint an environmental and social officer within the Land Operation Coordination Department to be responsible for: 1) coordinating with the Procurement Department to ensure that environmental and social mitigation measures are included in the tendering documents and construction contracts; 2) reviewing the Contractor's ESMP for the site, including but not limited to dust removal and noise reduction plan, HSE-compliant construction plan, site sewage management plan, etc.; 3) coordinating the operation of the grievance mechanism; 4) in case of any unforeseen environmental and social negative impacts in the ESIA and ESMP, organizing supplementary assessment and implementing corresponding mitigation measures and report to AIIB in a timely manner; 5) submitting environmental and social impact monitoring reports to AIIB regularly through the PIO.

The Engineering Management Department of the Hub Headquarters shall designate 1-2 environmental and social officers for each construction section, to be responsible for the implementation of environmental protection measures and work safety measures in their respective construction sections, the inspection and acceptance of

environmental protection works, coordination in the operation of the grievance mechanism, and the collection and filing of environmental and social monitoring data on the construction site.

The Contractor: 1) Ensure that sufficient funds and manpower are available to implement the mitigation measures and monitoring scheme in the ESMP throughout the construction stage; 2) Be responsible for the operation of the grievance mechanism during the construction stage.

The Construction Supervisor: 1) Ensure the provision of sufficient funds and human resources to supervise and guide the Contractor, and require the Contractor to implement mitigation measures and monitoring promptly according to the requirements in the ESMP; 2) The Engineer is responsible for supervising and recording the implementation of environmental protection and work safety measures during the construction period every day, submitting monthly supervision reports to the Engineering Management Department, and organizing meetings to discuss the supervision results.

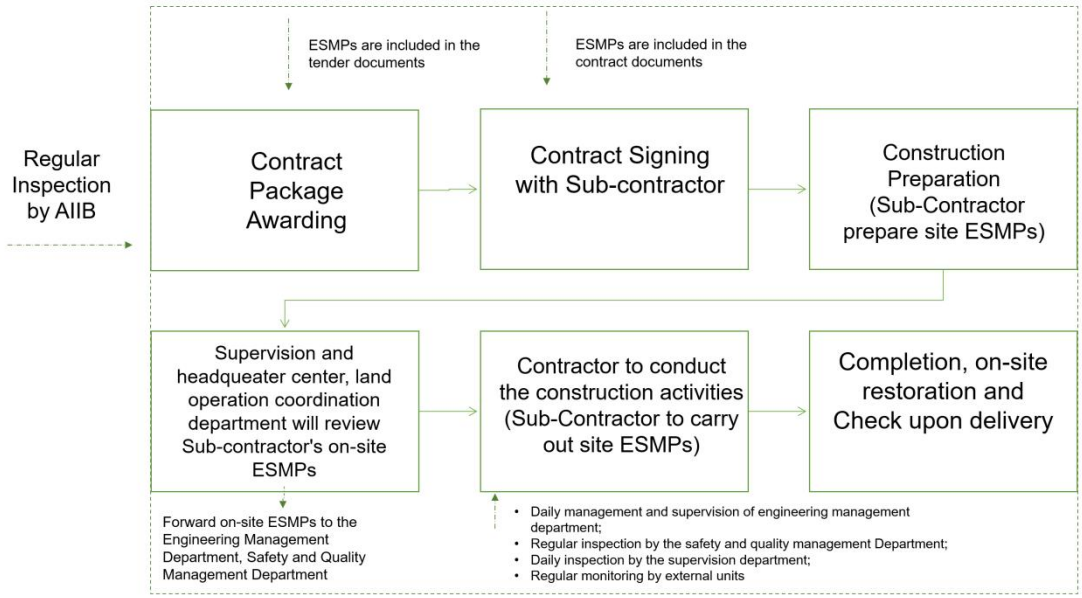


Figure 2 Environment, social and health safety management procedures during construction

3 Environmental and Social Impact Summary and Mitigation Measures

Based on the environmental and social impacts identified, mitigation measures were developed (Tables 1, 2 and 3). The design unit and contractor shall incorporate mitigation measures into the design, tender documents, construction contracts and operational management, under the supervision of the project implementation unit and the supervising company. The effectiveness of these measures will be assessed on the basis of monitoring results by supervisors and external monitoring units to determine whether adjustments and improvements to these measures are needed.

3.1 Environmental Impact and Mitigation Measures

Table1 Environmental Mitigation Measures

Category	Impact	Mitigation/Governance measures	Performance standard	Implemented by	Supervised by
Design stage					
Climate change	Greenhouse gas (GHG) emission	Take into account energy efficiency, energy conservation and low GHG emissions in all structures and systems designs and equipment selection.	Relevant energy saving standards	Design institute	Hub HQ
	Higher temperature	Long life pavement design.	/	Design institute	Hub HQ
	Extreme weather due to climate change	Consider potential impacts from extreme weather events due to climate change in designing road surface and drainage system.	/	Design institute	Hub HQ
Construction preparation					
Construction site planning	Construction site environmental and social management plan (CS-ESMP)	Develop CS-ESMP in accordance with the provisions of this ESMP, including the following sub plans at least: • Site drainage and soil erosion control plan; • Waste management plan; • Temporary traffic management plan; • Occupational health and safety plan; • Emergency response plan. Appoint environmental, health and safety personals.	Approved CS-ESMP	Contractor	Hub HQ CS
Information disclosure	Information disclosure	Disclose the project information, major environmental mitigation measures, the project grievance redress mechanism (GRM) at the entrance of the construction sites, including the project affected peoples mechanism (PPM): https://www.aiib.org/en/about-aiib/who-we-are/project-affected-peoples-mechanism/how-we-assist-you/index.html	/	Contractor	Hub HQ CS
Construction stage					
Exhaust gas	Construction dust	• Before the commencement of construction, a fence of not less than 2.5 m shall be set up at the construction site boundary; • An on-line dust monitoring system shall be installed, and water sprinkling shall be carried out on the construction site to reduce dust during construction;	Integrated Emission Standard of Air Pollutants (GB16297-1996)	Contractor	Hub HQ CS

		• Temporary access roads and main roads on the construction site shall be hardened and watered regularly, and other exposed sites shall be covered or provided with temporary greening; • Materials stacked that are easy to generate dust shall be sealed. If the condition does not permit, measures such as enclosures, wind-break and dust control nets shall be taken; • In the transport of materials prone to dust emission by truck, the materials shall be covered by tarpaulins and the speed shall be controlled to prevent materials from dropping and generating dust; during unloading, the drop shall be reduced as much as possible to reduce dust; • A vehicle washing facility shall be provided at the gate of the construction site. Wheels of vehicles shall be washed or swept to avoid dirt brought by vehicles onto urban roads. • The construction site shall be cleaned and leveled in time, and dumping or throwing materials and construction waste from high places is not allowed; • Construction in the windy season and rainstorms in summer shall be avoided, and the construction duration shall be shortened as much as possible. Large earthwork operations such as excavation and backfilling shall be avoided in windy weather; • Information such			
	Fuel exhaust	• Maintain the construction machines in good conditions; • high-quality fuels shall be selected, and the overload operation of construction machinery fueled by diesel shall be prohibited to reduce exhaust emissions.	Emission Limits and Measuring Methods for Exhaust Pollutants from Diesel Engines for Non-Road Mobile Machinery	Contractor	Hub HQ CS

			(Stage III and IV of China) (GB 20891-2014)		
Noise and Vibration	Nose	• Avoid construction at night, except when construction must be carried out at night due to non-stop aviation construction. It is strictly forbidden to carry out construction work at night in the vicinity of the noise protection targets. If night construction is necessary due to special requirements, the local population must be informed in advance and the necessary noise reduction and impact mitigation measures must be taken. • Construction transport lines should avoid the acoustic environmental protection targets; • Reasonably arrange the use of construction machinery to avoid the simultaneous operation of noisy equipment; • elect construction machinery and equipment with low noise; • Strengthen the maintenance of various construction machinery, and strictly limit the use of high-noise machinery at night; • Limit the speed of vehicles on construction sites (below 8 km/h). • Set construction site boundaries;	Environmental Noise Emission Standard for Construction Site Boundary (GB 12523-2011)	Contractor	Hub HQ CS
	Vibration	• Limit the speed and load of night transport vehicles to reduce the impact of night noise on villages, etc. • Use low-vibration tools and equipment: The use of low-vibration tools and equipment can significantly reduce vibration levels in the workplace, thereby reducing injuries to workers. For example, choose low-vibration tools and equipment such as hammers, drills and rollers. • Optimize the way you work: Reduce the effects of vibration on workers by changing the way you work. For example, when using vibrating tools, the transmission of vibration should be minimized, e.g. by buffering materials.	/	Contractor	Hub HQ CS

		• Use protective equipment: Use protective equipment to reduce the effects of vibration on workers, such as anti-vibration gloves, goggles, earplugs, etc. • Increase maintenance: Carry out regular maintenance on equipment to ensure normal operation and reduce vibration. • Increase rest periods for workers: Provide workers with adequate rest periods to reduce fatigue and the health risks associated with prolonged exposure to vibration.			
Wastewater	Domestic sewage	• The domestic sewage of construction workers shall be collected and treated by environment-friendly mobile toilets or anti-seepage septic tanks and transported out regularly.	Wastewater shall not be discharged out of the site	Contractor	Hub HQ CS
	construction wastewater	• During the construction period, sedimentation tanks shall be set up at the cleaning place for transport vehicles and beside the mixer. Construction wastewater shall be discharged into the sedimentation tanks. The supernatant obtained after sedimentation and clarification in the multi-stage sedimentation tanks shall be reused for sand and gravel sprinkling or watering on the construction site to reduce dust. Production wastewater shall not be discharged out of the site, and the precipitated slurry shall be transported to the spoil yard after drying; • Catch drains shall be set around the construction site to collect construction wastewater such as concrete curing water and leakage water discharged from the construction site, and the collected wastewater shall be discharged into the sedimentation tanks and used for watering for dust suppression after sedimentation; • Fixed storage sites for construction materials and construction waste shall be set up. It is strictly prohibited to stack and discard those materials and waste at will. If necessary, fences or covers shall be set up to prevent pollutants from being carried into surface water bodies by rainwater;	Wastewater shall not be discharged out of the site	Contractor	Hub HQ CS

		• In the rainy season, the surface runoff shall be reused after being treated by sedimentation. The remainder after reuse shall be discharged after obtaining the permission of the relevant department. It is forbidden to discharge wastewater containing a large amount of sediment or untreated wastewater into the municipal pipe network and water bodies. Water retaining, interception, and drainage works shall be set up on the construction site. • Necessary anti-leakage and anti-seepage measures shall be taken for all temporary wastewater collection and treatment facilities on the construction site; • An emergency plan shall be formulated to stop construction immediately, and effectively collect and remove pollutants in case of a sudden rainstorm during construction, or that building materials, waste, oil, etc. accidentally enter the ditches; • During the construction period, all kinds of sewage and wastewater shall be effectively collected and classified for treatment in strict accordance with the requirements of the Construction Supervisor. Discharge of sewage and wastewater at will shall be strictly prohibited to avoid the formation of surface runoff; • During the construction period, the environmental supe rvision department shall supervise the construction to ensure that the airport construction sewage and waste are not discharged out of the site.			
Solid waste	Construction waste	• Develop waste management plan. • Establish enclosed waste collection points on site, with separation of domestic waste and construction waste and hazardous wastes. • Special personnel shall be designated to be responsible for sorting construction waste and recycling any useful steel bars, timbers, cables, and other materials. Any construction waste or debris from demolished structures that cannot be reused shall be piled up at designated sites	The disposal of hazardous waste shall be subject to the Standard for Pollution Control on Hazardous Waste Storage	Contractor	Hub HQ CS

		and regularly transported to the designated disposal location in the Airport New Town.	(GB18597-2001, with its amendment in 2013); The disposal of general industrial solid waste shall be subject to the Standard for Pollution Control on the Non-hazardous Industrial Solid Waste Storage and Landfill (GB18599-2020).		
	Domestic waste	• Temporary waste containers shall be installed at the construction site, and domestic waste shall be sorted for management, and regularly cleaned and transported in accordance with the regulations of the local sanitation department. • It is strictly prohibited to burn garbage at the construction site.		Contractor	Hub HQ CS
	Hazardous waste	• Store the hazardous waste separately; • Entrust a qualified third party to transport and properly dispose of hazardous waste.		Contractor	Hub HQ CS
Soil	Water Loss and Soil Erosion	• Potential soil erosion risks shall be minimized at all times during the construction of earthworks through effective engineering and construction management practices. • The topsoil shall be stripped and stockpiled for future use in land rehabilitation. • Spoil shall be reused on site to its fullest extent as fill. Excess spoil which cannot be used on site shall be transported to an approved disposal area for spoil. • Properly store petroleum products, hazardous materials and wastes on impermeable surfaces in secured and covered areas, and use the best management practice to avoid soil contamination.	/	Contractor	Hub HQ CS

Occupational health and safety	Occupational health and safety of construction personnel	The Contractor shall designate an EHS officer to be responsible for developing and implementing an occupational health and safety plan and emergency plan, keeping health, safety, and welfare records and reporting related accidents, incidents, and near misses regularly. The occupational health and safety plan shall provide sufficient measures to safeguard the well-being and safety of employees, including but not limited to: • Conduct occupational health and safety training for all construction personnel at least once a month, including basic safety and health protective measures at the construction site; • Wear appropriate personal protective equipment (e.g., protective goggles, masks, safety helmets, safety shoes, etc.); • Train workers to use correct methods to handle and dispose of materials during construction and demolition, and specify a maximum weight limit for single-person handling (if the limit is exceeded, mechanical assistance or teamwork is required); • Reasonably arrange the working hours and avoid operation at fatigue; • Implement a good site clearance system, such as sorting scattered construction materials and demolished items; • Train workers to use anti-fall devices and ensure that they use them in daily work; • Paste warning signs in areas with safety risks; • Use temporary fall protection measures, such as handrails and toeboards, along the edges of scaffolds and other elevated work surfaces to prevent material from slipping and falling; • Plan and zone vehicle traffic, mechanical operations and pedestrian areas, control vehicle traffic by one-way traffic rules, set speed limits, and have trained traffic control persons wearing conspicuous vests or jackets directing traffic at the site; • Ensure personnel wear conspicuous vests when working	No work safety accidents	Contractor	Hub HQ CS

		or walking in the heavy machinery operating area to increase visibility; • Ensure mobile equipment is fitted with a reversing alarm. • Establish a safety logbook, which shall be completed daily by the personnel responsible for safety; • Establish workers' health records and conduct regular physical examinations of workers; • Health education for construction workers, such as encouraging individuals to take protective measures to avoid transmitting diseases to others through the use of condoms; and encouraging the use of repellents, clothing, mosquito nets, and other deterrents to prevent mosquito bites from spreading diseases; • Comply with national and local regulations and guidelines for the prevention and control of infectious diseases and successful international health safety practice.			
Physical cultural resources	Incidental discovery of cultural relics during excavation in construction	• The Contractor shall establish the following procedures for discovering physical cultural resources incidentally: In the event that any cultural relics are found during construction, the construction personnel shall take the following steps: (1) Immediately stop construction in accordance with Article 32 of the *Law of the People's Republic of China on the Protection of Cultural Relics*; (2) Secure and protect the site, and promptly notify the cultural relics management department of Kunming; (3) Revise the construction plan according to the opinions of the cultural relics management department of Kunming; and (4) Resume construction only after obtaining approval from the cultural relics management department.	/	Contractor	Hub HQ CS
Operation period					
Exhaust gas	Aircraft exhaust	• To control aircraft exhaust pollution, it is recommended that the airport avoids congested takeoff and landing schedules when designing flight density. This will help prevent the accumulation of high concentrations of atmospheric pollutants, such as CO and NO2, in the	/	Airlines Kunming Changshui International Airport	Local ecology and environment bureau

		airport vicinity over a certain period of time. • It is encouraged that airlines adopt aircraft models with lower pollution emissions. • Under weather conditions that are not conducive to the diffusion of atmospheric pollutants, such as calm or light winds, flight schedules shall be adjusted accordingly to minimize emissions and prevent pollution of the local atmosphere.		Co., Ltd.	
	Vehicle exhaust	• Yellow label vehicles and other high-emission old motor vehicles shall be prohibited from entering the airport area. All motor vehicles entering the airport area shall comply with the national emission standards for motor vehicle pollutants in CHINA 5. • New energy equipment and vehicles shall be used at the airport so long as they meet the required technical standards and relevant management regulations for civil aviation airports. Moreover, charging facilities must be installed on site to facilitate the use of these vehicles.	/	Kunming Changshui International Airport Co., Ltd.	Local ecology and environment bureau
Sewage	Domestic wastewater	• Sewage shall be collected and transported to the new sewage treatment station in the north working area via the sewage pipeline in the airfield area. During the dry season, sewage shall be treated and reused for road sprinkling, irrigating greening areas, and flushing toilets, without being discharged. During the rainy season or in the event of a sewage treatment plant malfunction, some airport sewage shall be discharged into the south sewage treatment plant in the airport area for treatment.	Reuse of Urban Recycling Water - Water Quality Standard for Urban Miscellaneous Water Consumption (GB/T 18920-2020)	Kunming Changshui International Airport Co., Ltd.	Local ecology and environment bureau
Solid waste	Aviation waste	• After being sealed and disinfected, aviation waste from areas other than the quarantine area shall be transported and disposed of together with domestic waste by KSEC Environmental Protection Technology Co., Ltd.	/	Kunming Changshui International Airport Co., Ltd.	Local ecology and environment bureau

Wildlife management	Bird repelling	• Enhance pest control measures for vegetation and trees in the airport's terminal and residential areas to prevent the creation of the food chain of birds. • Properly install bird net traps and rat and animal traps in the airfield area to prevent birds of prey from interfering with aircraft operations. • Set protective barriers for surface channels to prevent animals from entering the airfield area.	/	Kunming Changshui International Airport Co., Ltd.	Local ecology and environment bureau
Community health and safety	Noise	• **Subject to Appendix 1: Noise Management Framework**			
Occupational health and safety	Noise	• Ensure that staff who are exposed to noise disturbance wear personal hearing protection devices; • Implement a shift system to minimize the cumulative noise disturbance that workers experience.	No work safety accidents	Ground Service Provider	Kunming Changshui International Airport Co., Ltd.
	Mobile equipment	• Provide safety and access signs at locations such as passenger stairs, taxiways, and other areas where ground vehicles and aircraft have the potential to collide; • Train the staff who are involved in aircraft support equipment operations to familiarize themselves with the safety procedures for passenger stairs and taxiways.	No work safety accidents	Ground Service Provider	Kunming Changshui International Airport Co., Ltd.

CS=construction supervisor; HQ=headquarter.

3.2 Social Impact and Mitigation Measures

Based on the impact assessment results of the Environmental and Social Impact Assessment of the project, the social management plan and gender action plan of the project were developed after full consultation with the airport group, affected residents of the project area and other stakeholders, as shown in the table below.

Table 2 Social Management Plan

Item	Impact factor	Specific measures or actions	Implemented by	Supervised by	Source of fund	Monitoring indicators
Resettlement	Risks from land acquisition and demolition	• Following the approved resettlement plan	Administrative Committee of Yunnan Dianzhong New Area	Hub HQ	Included in the project investment	Indicators defined in the resettlement plan
Community health and safety	Traffic safety	• Develop temporary traffic management plan before construction; • The temporary traffic management plan should include the timing and route arrangement of construction vehicles to avoid morning and evening peak hours and reduce the use of roads by pedestrians and construction vehicles at the same time; • Carry out traffic safety publicity, add traffic signs and detour plans in village sections; • Work with local communities on traffic education and pedestrian safety education; • Road signs and warning signs at key intersections; • Limit the driving time of	Contractor	Hub HQ	Included in the civil work contract of contractors	Number of traffic accidents and loss caused

		construction vehicle drivers to avoid fatigue driving; • Organize safe driving training for drivers.				
	Infectious diseases and vector-borne diseases	• Strengthen education on health and prevention of HIV/AIDS and COVID-19, including prevention of HIV/AIDS, COVID-19 and other infectious diseases, which should be included in contract documents; • Medical examinations for project construction workers (e.g., temporary medical clinics, full use of local medical resources, etc.); • Develop diverse awareness campaigns on HIV/AIDS and COVID-19 prevention, such as brochures, posters and photo albums; • Encourage the use of repellent, mosquito nets and other methods to avoid mosquito bites.	Contractor	Hub HQ	Project budget Government budget	• The terms of the construction contract and implementation; • Public safety HIV/AIDS and COVID-19 prevention training courses and number of participants; • Number of publicity on HIV/AIDS and COVID-19 prevention and control during the construction phase, including brochures, posters and photo albums.
Labor	Labor management	• Provide equal opportunities and fair treatment, and do not discriminate against personal characteristics unrelated to inherent job requirements, such as age and gender restrictions; • Improve the complaint handling mechanism of employees (including direct workers and contract workers)	Contractor	Hub HQ	Included in the civil work contract of contractors	• The proportion of workers employed by special groups such as women and persons with disabilities and by age group; • complaint handling mechanism;

		• Improve employee training programs; • Provide appropriate protection and assistance measures for specific groups of workers, such as women, low-income groups, migrant workers and children of legal working age; • Ensure that necessary personal safety protective equipment, such as safety helmet, is worn at the construction site; and COVID-19 protective equipment, such as masks and thermometers; • Detailed occupational and health measures are listed in Table 1.				• Employee training program; • Protection measures and regulations for women, low-income groups and migrant workers; • Promotional photos and materials for safety protection in the construction safety record manual.
	Labor influx	• Improve community health management by increasing the number of garbage stations, the frequency of sanitation trucks and the number of cleaners; • Invite respected elders or knowledgeable community cadres in the project area to carry out promotional activities on local social and cultural customs, such as brochures, posters, photo albums, etc.	Project street communities, contractors	Hub HQ	Project funds, government funds	• The number of garbage stations in the community, the cleaning frequency of sanitation trucks and the number of cleaners; • Publicity and education on local social and cultural practices, including the number of brochures, posters and photo albums.
Vulnerable groups	Risk of inadequate participation of vulnerable groups	• Increase forms of ethnic minority participation in the project, such as Wechat, TikTok and other new media forms; • The needs of ethnic minorities	Project street communities, contractors	Hub headquarters, Civil Affaris Bureau	Project funds, government funds	• Number and proportion of ethnic minorities participating in

		should be taken into account in airport information publicity, with information guidance and training specifically for ethnic minorities; • Provide employment opportunities for ethnic minorities, such as low-skilled positions.				project information publicity and discussion; • Number of ethnic column pictures in airport information campaigns; and • Number and proportion of ethnic minorities among construction staff.
Other social risks	Social risks from environmental pollution	• Implementation of the mitigation measures defined in the Table 1.	Contractor	Hub HQ	Included in the civil work contracts	Relevant pollutant emission standards and environmental quality standards
Operation stage						
Resettlement	Cumulative impact of noise	• Following the noise management framework; • Resettlement will be carried out in accordance with the noise management framework and the project resettlement planning framework.	Administrative Committee of Yunnan Dianzhong New Area, PIU	YAG	Project budget, government finance budget	• Monitoring the implementation of noise management plans; • Monitoring the implementation of the resettlement Plan framework.

Community health and safety	Traffic safety risks	• Reasonable planning of road access Settings to reduce the risk of traffic jams and collisions; • Strengthen traffic safety publicity, more traffic persuaders and traffic command stations.	Street community PIU	Traffic management authority	Airport operation budget, government department financial budget	Number of traffic accidents and the losses caused
	Aircraft failure and other emergencies	• Develop emergency response plan and make the community aware of the plan; • Runways shall be maintained and regularly inspected to prevent any item that might affect aircraft landing and take-off.	PIU	YAG	Airport operation budget	No accident occurred
Labor	Labor management	• Provide equal opportunity to all project staff; Do not discriminate against personal characteristics unrelated to inherent job requirements, such as limitations on the age and gender of the applicant; • Provide appropriate protection and assistance measures for specific groups of workers, such as women, the disabled, migrant workers and children of legal working age; • gender-based violence see Gender Action Plan.	PIU	YAG	Project labor Management plan implementation budget	• The proportion of workers employed by women, persons with disabilities and other special groups of the population and the proportion by age group; • Protection measures and regulations for women, the disabled and migrant workers; and the implementation of

						the gender action plan.
	Risk of labor influx	• Improvement of community health management, increase the number of garbage stations, the working frequency of sanitation trucks and the number of cleaners; • Invite prestige elders or knowledgeable community cadres in the project area to carry out publicity activities on local social and cultural customs, such as brochures, posters, photo albums, etc.	YAG, project street community	Hub HQ	Project budget, government financial budget	• Number of community garbage stations, the cleaning frequency of sanitation trucks and the number of cleaners; and • Number of publicity and education on local social and cultural practices, including the number of brochures, posters and photo albums.

HQ=headquarter; PIU=project implementing unit; YAG= Yunnan Airport Group Co., Ltd.

Table 3 Gender Action Plan Gender Action Plan

Item	Specific measures or actions	Implemented by	Supervised by	Source of fund	Monitoring indicators
Reduce the risk of gender-based violence	• Set up a special commissioner responsible for safeguarding women's rights and interests, and formulate a system and implementation plan to prevent and stop sexual harassment of female employees in the workplace;	Contractor, PIU, Hub HQ	YAG, women's Federation	Project budget, government finance	• Formulate specific system and implementation plan for the prevention and suppression of sexual harassment of female

	• Provide female workers with regular mental health counseling and training on protection of female workers' rights and interests; • Strengthen supervision of construction sites to prevent harmful practices such as gender-based violence, sexual exploitation and sexual abuse and harassment; • Establish a clear complaint channel, set up a complaint group, including at least two female members, and ensure the safety of the complaint group members to avoid bias and fear of retaliation.				employees in the workplace; • 100% of female workers received training in labor rights protection; • Ensuring that 100% of female and male workers receive equal pay for equal work and that there are zero incidents of gender-based violence; • Complaints about the establishment of channels and the number of women members.
Increase employment opportunities for women	• During the construction and operation of the project, women in the villages involved in the project areas will be given priority to technical and non-technical positions. • For jobs that do not require much physical effort, the age range should be broadened to give priority to women aged 40 to 50 who have difficulty in finding non-agricultural employment opportunities, such as cleaning, cooking and custodial care.	Administrative Committee of Yunnan Dianzhong New Area, Township and street community, PIU, and Hub HQ	Airport Group, Women's Federation, Human Resources and Social Security Bureau	Project budget, government finance	• Prioritize project employment opportunities for women (baseline value of about 8% of construction workers, target value of 15%).
Develop capacity of women	• Hold seminars on employment knowledge, training courses on skills and knowledge, and seminars on employment and entrepreneurship to improve women's skills, knowledge and opportunities for employment and entrepreneurship. • In the training of green airport and sustainable information disclosure capacity building, appropriate skills training content and appropriate training time are provided based on	Administrative Committee of Yunnan Dianzhong New Area, Township and street community, PIU, and Hub HQ	YAG, Women's Federation	Project budget, government finance	• Percentage of female participation in various types of training, including noise prevention, women's rights advocacy and education, employment skills training, etc. (baseline 20%, target 30%). • Training to improve YAG women's participation in

	women's physical and psychological quality, education level and personal needs, so as to further ensure that women have the same opportunities to improve their skills as men.				project information disclosure and management (baseline 25%, target 50%).
Expand women's participation in decision-making	• Increase the participation of women in decision-making on matters related to the community; • Increase the proportion of women or "husband and wife co-signed" in land expropriation or demolition compensation agreements.	Administrative Committee of Yunnan Dianzhong New Area, Township and street community, PIU and Hub HQ	YAG, Women's Federation	Project budget, government finance	• Percentage of women involved in project mobilization, information disclosure, policy advocacy and consultation targeting women (20% baseline, 30% target). • Percentage of women who signed compensation agreements for land acquisition or demolition (0% in baseline versus 100% in target).

HQ=headquarter; PIU=project implementing unit; YAG= Yunnan Airport Group Co., Ltd.

4 Environmental and Social Monitoring

4.1 Environmental Inspection and Monitoring

The purpose of environmental monitoring is to monitor (i) the degree and severity of the actual environmental impact compared with the expected environmental impact, (ii) the implementation of environmental protection measures and their compliance with relevant regulations, (iii) the comprehensive effect of the environmental management plan of the Project; and (iv) the necessity of adjusting the Environmental Management Plan of the Project. The Project Monitoring Plan shall focus on the environmental conditions in the area affected by the Project.

There are two types of environmental monitoring: (i) monitoring the implementation of environmental mitigation measures; (See Figure 2 Environmental Management Process). Results will be reported through the construction supervisors' monthly reports to the Hub HQ and PIO; and (ii) environmental quality monitoring, to be implemented by a third-party environmental monitoring institution, including collection and analysis of air quality and noise data at designated monitoring locations to assess the compliance with applicable environmental quality and emission standards.

Construction period

The whole construction process will be monitored in order to timely address or mitigate the environmental and social risks associated with the construction activities. The monitoring includes: 1) daily inspections conducted by the contractor and construction supervisor, focusing on regular checks of construction sites' environmental, social and health and safety management practices; 2)regular monitoring of physical indicators (such as dust and noise) conducted by the construction supervisor; 3) inspections conducted by the hub HQ.

Table 4 Environmental Monitoring Plan during Construction Period

Monitoring item	Monitoring content	Monitoring time and frequency	Monitoring location	Indicator	Implemented by	Executive standard
Atmospheric environment	Construction dust	1 period/quarter, 2 days/period, 2 times/day	One monitoring point shall be set at the upwind site boundary and the downwind site boundary of the nearest village respectively.	TSP	Construction supervisor	Class II standard in *Ambient Air Quality Standard* (GB3095-2012)
	Whether air pollution mitigation measures are effectively implemented	Daily visual inspection	All construction sites	/	Contractor, construction supervisor, Hub HQ	

Noise	Construction noise	1 period/month, 2 days/period, 2 times/day, once in the day and once in the night	One monitoring point shall be set in the east, south, west and north of the construction sites.	Leq	Construction supervisor	Class II standard in *Environmental Quality Standard for Noise* (GB3096-2008)
	Whether noise control measures are effectively implemented	Daily visual inspection	All construction sites	/	Contractor, construction supervisor, Hub HQ	
Wastewater	Construction and domestic wastewater are collected and treated	Daily visual inspection at construction sites	All construction sites	/	Contractor, construction supervisor, Hub HQ	No direct discharge of wastewater
Hazardous waste	Proper storage and disposal of waste oil, oily rags, paint cans and other hazardous materials	Daily visual inspection of storage areas and waste transfer records	Construction sites and storage yards	/	Contractor, construction supervisor, Hub HQ	No improper disposal
Soil erosion	Soil erosion intensity	Daily visual inspection at spoil sites and all construction sites	All construction sites	/	Contractor, construction supervisor, Hub HQ	Soil erosion control measures are implemented
Solid waste management	Adequacy of solid management and storage system, including hazardous waste	Daily visual inspection at construction sites	All construction sites	/	Contractor, construction supervisor, Hub HQ	No uncollected waste at end of works each day
Occupational health and safety	Camp hygiene, safety, availability of clean water, provision of personal protective equipment,	Daily visual inspection at construction sites	All construction sites	/	Contractor, construction supervisor, Hub HQ	Camps clean, emergency response plan in place; all workers are aware of the emergency response

	emergency response plans, hazardous activities management.					plan
Community health and safety	Adequacy of construction site signage, fencing, and noise mitigation measures; types and extend of any accidents; emergency and response; traffic related management; public complaints	Visual inspection; informal interviews with nearby residents, weekly during peak construction period, and monthly after	Communities and villages surrounding the construction sites	/	Contractor, construction supervisor, Hub HQ	All public complaints received are documented and resolved; no accidents occurred.

Operation period

The Environmental Monitoring Plan during the operation period is to track and monitor the implementation effect of environmental protection measures of the Project, and monitor the pollutant emission intensity to prevent pollution accidents and provide a scientific basis for airport environmental, health and safety management.

Table 5 Monitoring Plan during Operation Period

Category	Location of monitoring point	Monitoring factor	Recommended monitoring frequency	Implemented by	Standard
Noise	12 automatic aircraft noise monitoring points;	WECPNL	Continuous	Real-time monitoring	Standards for Class I and Class II areas in *Standard of Aircraft Noise for Environment Around Airport* (GB9660-88)
	Erjia Village, Sanjia Village, Sijia Village, Ayi Village, and Yunrui Community		Follow-up monitoring, once a year	Contracted third-party monitoring agency	

Wastewater	Inlet of sewage treatment station (new and existing stations)	Flow, COD, NH_3-N, total nitrogen, and total phosphorus	Installing on-line monitoring equipment for automatic monitoring.	Real-time monitoring	/
	Outlet of sewage treatment station (new and existing stations)	Flow, pH, water temperature, COD, NH_3-N	Installing on-line monitoring equipment for automatic monitoring.	Contracted third-party monitoring agency	Standards for toilet flushing use and car wash use in the *Reuse of Urban Recycling Water - Water Quality Standard for Urban Miscellaneous Use* (GB/T 18920-2020). For the sewage entering the south sewage treatment plant in the airport area in the rainy season or in case of accident, Class A standard in the *Wastewater Quality Standards for Discharge to Municipal Sewers* (GB/T31962-2015) shall be implemented.
		Suspended solids, chroma, turbidity, smell, DO, BOD_5, iron, manganese, total chlorine, total dissolved solids, anionic surfactant, and Escherichia coli	Quarterly	Contracted third-party monitoring agency	
Ambient air	Plant boundary	SO_2, NO_2, PM_{10}, $PM_{2.5}$ and non-methane hydrocarbon	Once/year	Contracted third-party monitoring agency	Class II standard in Ambient Air Quality Standard (GB3095-2012) and its amendments;
Municipal and aviation solid waste	solid waste temporary storage facility	Visual inspection	Daily	PIU	No uncollected waste at end of works each day
Hazardous waste	Temporary storage room	Visual inspection, records of hazardous waste transport and disposal	Quarterly	PIU	The temporary storage room should be "windproof, rainproof, seepage-proof, and sun-proof", with

					environmental protection signs, ledgers, hazardous waste transfer sheets, and whether the entrusting unit has corresponding qualifications.
Occupational health and safety	Runway and apron operational areas	Workplace noise levels from aircraft operations; use of PPE (hearing protection,high-visibility clothing); Compliance with airside driving and safety protocols; Ergonomic manaual handling practices.	Quarterly	PIU	Occupational Exposure Limits for Hazardous Agents in the Workplace (GBZ2.1-2019); ICAO apron safety guidelines

Note: PIU=project implementing unit.

Ecological monitoring

The key monitoring areas for terrestrial ecology shall be the areas within and around the airport according to the ecological environment characteristics of the assessment area and project area of Kunming Airport Project, as well as the airport operation characteristics, and the monitoring content is the change of bird population. Besides, it is required to strengthen bird survey and information management; arrange field service personnel to receive the training on the theoretical knowledge of ornithology and ecology, and master the bird strike prevention knowledge and the basic knowledge of bird strike prediction; and on this basis, standardize the bird monitoring at the airport and make the bird monitoring records. With the gradual accumulation of bird observation data, the bird strike warning system can be developed to predict the bird strike for the airport in the future.

1) Monitoring objects

The monitoring objects are mainly the quantity, distribution and activity of bird populations in and around the airport, based on which, the investigation and observation shall be carried out, e.g., the research on the habitat environment, distribution characteristics, tweeting characteristics and daily activity intensity of birds. Meanwhile, it is required to monitor the activity rules of other animals in the airport area, intensively investigate the grass, insect, bird and animal situations, and master the change trend of each environmental factor in detail, so as to formulate the bird strike prevention plan more effectively.

2) Monitoring method

Main basis for monitoring: *Technical Guidelines for Biodiversity Monitoring - Birds* (HJ 710.4-2014).

The long-term follow-up monitoring shall be adopted, i.e. follow-up monitoring during the construction period and 10 years after the formal operation of the Project.

- Monitoring in the airport: There is less human intervention in the airport, and birds are mainly interfered by aircrafts and some machines. Ten fixed bird monitoring points can be set in fixed areas that have no impact on the normal operation of the airport. The sample points shall cover the clearance area and airfield area of the

airport.

- Monitoring around the airport: Different types of habitats around the airport, e.g. woodland, shrubland, grassland, garden plot, plowland, waters and wetland, shall be selected, and 3 monitoring line transects with a length of about 1~2 km shall be set for each type of habitat, to regularly monitor and record the species, quantities and flight height of birds and the impact on them.

3) Monitoring period and frequency

Monitoring period: from the beginning of the construction period to the end of 10 years after the Project is officially put into operation; monitoring frequency: 4 times a year;

- First time: March ~ May
- Second time: June ~ August
- Third time: September ~ November
- Fourth time: December to February of the following year

Monitor birds in different seasons and record their species, quantities, flight height and daily activity intensity, to systematically grasp the annual and interannual changes of bird species, populations and residence in and around the airport, so as to formulate the bird strike prevention plan in a more accurate manner.

4.2 Social monitoring

Monitoring and evaluation is an important link to ensure the Project is implemented according to its objectives, the project information is disclosed as required, the public can participate in the Project, and the social management action plan proposed in the design of social impact assessment report can receive attention and be implemented, and is also an important error correction mechanism and participation mechanism for the proposed Project. To this end, a supervision and evaluation mechanism is established for the proposed Project, including internal supervision and external monitoring and evaluation.

Internal monitoring: Yunnan Airport Group Co., Ltd. monitors and evaluates the implementation of the proposed Project, the implementation of the social management action plan, the progress of information disclosure and public participation plan, the application of project funds, and the implementation of rules and regulations.

External independent monitoring and evaluation: An independent monitoring institution employed by YAG and approved by AIIB, with ten years or longer experience in social and resettlement monitoring and evaluation of projects financed by AIIB, the World Bank, ADB and other international financial organizations shall carry out the external monitoring of the implementation of the social management action plan. The independent monitoring and evaluation agency shall regularly track, monitor and evaluate the implementation activities of the social management action plan, put forward advisory opinions, and submit the monitoring and evaluation report to AIIB.

5 Report

YAG's PIO shall regularly report the implementation of the Environmental and Social Management Plan, i.e., submitting one report in each quarter in the first year of the implementation of the Project, and thereafter submitting one report every six months. These reports shall be independent documents and a part of the project implementation report and will include: (i) progress made in ESMP implementation; (ii) overall effectiveness of the ESMP implementation; (iii) environmental and social monitoring compliance; (iv) institutional strengthening and training; (v) stakeholder

engagement (including GRM); and (vi) problems encountered during construction and operation, and the relevant corrective actions undertaken

According to AIIB's assessment on the implementation of environmental and social measures, the environmental and social monitoring report shall be submitted every six months.

6 Institutional Strengthening and Training

During the implementation of the Project, Yunnan Airport Group Co., Ltd. will organize external experts to provide preliminary training on the implementation of the Environmental and Social Management Plan for the environmental and social officers of the project implementation organizations, the Contractor, the Supervisor and Kunming Airport. The training contents include AIIB's Environmental and Social Policies, good management practice for construction, monitoring and reporting, grievance mechanism, green airport construction, etc. The indicative training plan is given in Table 7 and will be tailored according to the demands of PIO, contractors and facilities operator.

Table 6 Indicative training plan

Training Topic	Summary of Training Purpose and Content	Recipients/ Participants	Frequency or Target Date
Induction to AIIB ESP requirement, project ESMP	Overview of ESMP, including pollution risks and controls, and preparation of site-ESMPs and training on implementation to staff of contractor(s); labor management; GBV prevention etc.	PIO, contractor, construction supervision company	At beginning of project
Review of ESMP, and refreshers' training on SEMP	ESMP monitoring, supervision, reporting, procedures, and review of ESMP, including new changes and updates, effectiveness of the mitigation measures and any corrective actions required.	PIO, contractor, construction supervision company	1 year after project start or more frequently if required
GRM	GRM roles and responsibilities, and procedures; information disclosure requirements.	PIO, contractor, construction supervision company	Once prior, and once the first year of project operation
Environmental, health and safety	i)Good practices to manage operation noise; ii) green airport	Operation staff of Kunming Changshui Airport	Once at first year of operation

	development ; iii) wastewater and solid waste management ; iv) occupational and community health and safety etc.		
Emergency preparedness and response drill	Organize drill on emergency conditions such as fire, natural disaster, epidemic, explosion, etc.	Operation staff of Kunming Changshui Airport	Included in the regular training program of Kunming Changshui Airport

7 Cost Estimate

The cost of implementing and managing environmental and social mitigation measures is 86.76 million yuan, including: 1) The cost of measures during the construction period, including safe and civilized construction, such as construction enclosure, water sprinkling, construction material covering, drainage ditch, sound barrier, traffic signs, labor occupational health and safety measures, a total of 83.96 million yuan, to be borne by the contractor (as part of the construction contract); 2) 2 million Chinese Yuan (CNY) for environmental and social monitoring; 3)CNY 500,000 for capacity building and training. In the operation phase, the daily maintenance cost of the facility shall be borne by Kunming Changshui International Airport Co., LTD. 4) CNY 300,000 will be spent on training sessions for recruiting women and subsistence workers, organizing and implementing public participation, and complaining. Noise monitoring equipment and climate change investment are part of the project construction content, not included in the environmental and social management plan implementation costs.

Table 7 ESMP implementation cost

Implementation measure	Cost estimation/ CNY 10,000
Measure cost during construction period	8396
Environmental and social monitoring fees	200
Capacity-building and training costs	50
Training meeting, public participation implementation and complaint fees	30
Total cost	**8676**

Appendix 1 Noise Management Framework

1. Basis for Preparation of Noise Management Framework

1.1 Legal and Regulatory Framework

Law of the People's Republic of China on Noise Pollution Prevention and Control (2022) stipulates that:

Article 52 The people's government of the place where a civil airport is located shall, according to the scope and extent of the impact of civil aircraft noise on the living environment around the airport determined based on the environmental impact assessment and monitoring results, designate the areas where the construction of noise-sensitive buildings are prohibited and restricted, and shall implement the control measures.

It is prohibited to construct any noise-sensitive buildings irrelevant to aviation in the construction prohibited area.

If it is really necessary to construct noise-sensitive buildings in construction restricted areas, the Employer shall provide building sound insulation design for noise-sensitive buildings according to the requirements of relevant standards for sound insulation design of civil buildings.

Article 53 Civil aircrafts shall meet the noise requirements in the airworthiness standards stipulated by the competent civil aviation authority under the State Council.

Article 54 The civil airport administration shall manage the noise of the aircrafts taking off and landing on the airport, and together with the air transport enterprise, general aviation enterprise, air traffic management department and other relevant units, take such measures as adopting low-noise flight procedures, optimizing take-off and landing runways, controlling aircraft operations and time periods, restricting the operation of high-noise aircrafts or taking sound insulation and noise reduction measures for surrounding noise-sensitive buildings, to prevent and reduce noise pollution of civil aircrafts.

The civil airport administration shall, according to national regulations, monitor the noise of civil aircrafts around the airport, keep the original monitoring records, be responsible for the authenticity and accuracy of the monitoring data, and regularly submit the monitoring results to the competent civil aviation and ecological environment departments.

Civil Aviation Law of the People's Republic of China **(1996)** stipulates that:

Article 55 Civil airport construction plans should fit in with city construction plans.

Regulation on the Administration of Civil Airports (Order No.553 of the State Council of the People's Republic of China, April 13, 2009) stipulates that:

Article 59 Civil aircrafts taking off and landing on civil airports shall comply with relevant national airworthiness standards for aircraft noise and turbine engine out-emission.

Article 60 The airport administration shall, together with the air transport enterprise, air traffic management department and other relevant units, take technical means and management measures to control the impact of civil aircraft noise on the surrounding areas of the airport.

Article 61 The local people's government of the place where the civil airport is located shall formulate the overall planning and urban-rural planning for use of the land in the surrounding areas of the civil airport, fully consider the impact of civil aircraft noise on the surrounding areas of the civil airport, and comply with the national environmental quality standards for noise.

The airport administration shall report the impact of civil aircraft noise on the surrounding areas of the transport airport to the land and resources, planning and

construction, environmental protection, and other competent departments of the local people's government.

Article 62 The local people's government in the place where the civil airport is located shall designate the areas where the construction of noise-sensitive buildings are restricted in the surrounding areas of the civil airport, and shall implement the control measures. If it is really necessary to construct noise-sensitive buildings in such areas, the Employer shall take measures to reduce or avoid the noise impact generated by civil aircrafts during operation. The local people's government in the place where the civil airport is located shall, together with the regional civil aviation administration, solve the problems caused by the noise impact of civil aircrafts taking off and landing on the civil airport.

1.2 Environmental Quality Standard for Noise

(1) *Standard of Aircraft Noise for Environment Around Airport* (GB9660-88)

Applicable area	Standard value **(Lwecpn)**
Class I area	≤70 dB
Class II area	≤75 dB

Class I area means special residential areas, residential areas, and cultural and educational areas. Class II area means the living areas other than Class I area. Generally, the standard limit for Class I area shall be implemented for facilities or buildings with special requirements for acoustic environment, such as schools, hospitals, kindergartens and nursing homes. The standard limit for Class II area shall be implemented for general residential areas in cities and towns.

(2) *Environmental Quality Standards for Aircraft Noise in the Surrounding Area of the Airport* (Second Draft for Comments) (for reference)

Applicable area	Standard value of aircraft noise around the airport	
	Current standard (Lwecpn)	Standard to be adopted (YLdn)
Class I land: urban and rural land sensitive to aircraft noise, including the land for residential buildings, education and scientific research, health and medical institutions and other similar land.	≤70	≤57
Class II area: urban and rural land relatively sensitive to aircraft noise, including the land for administrative office, culture and art, financial business and other similar land.	≤75	≤62
Class III area: urban and rural land relatively insensitive to aircraft noise, including the land for industrial production, logistics and warehousing, sports and entertainment, parks, squares and other similar land.	/	≤67
Class IV area: urban and rural land not sensitive to aircraft noise, including the land for agricultural production, mining production, transport facilities, public facilities and other similar land.	/	/

Note: 1) YLdn: annual average diurnal equivalent sound level; 2) The difference between L_{WECPN} and Ldn depends on the division of time periods and the number of flights in each time period, generally ranging from 13 dB to 14 dB. The conversion method of L_{WECPN}= Ldn+13 is adopted in the Environmental Quality Standards for Aircraft Noise in the Surrounding Area of the Airport (Second Draft for Comments).

(3) Reference standards for noise control measures

Refer to *Code for Design of Sound Insulation of Civil Buildings (GB*

50118-2010) for sound insulation of existing buildings;

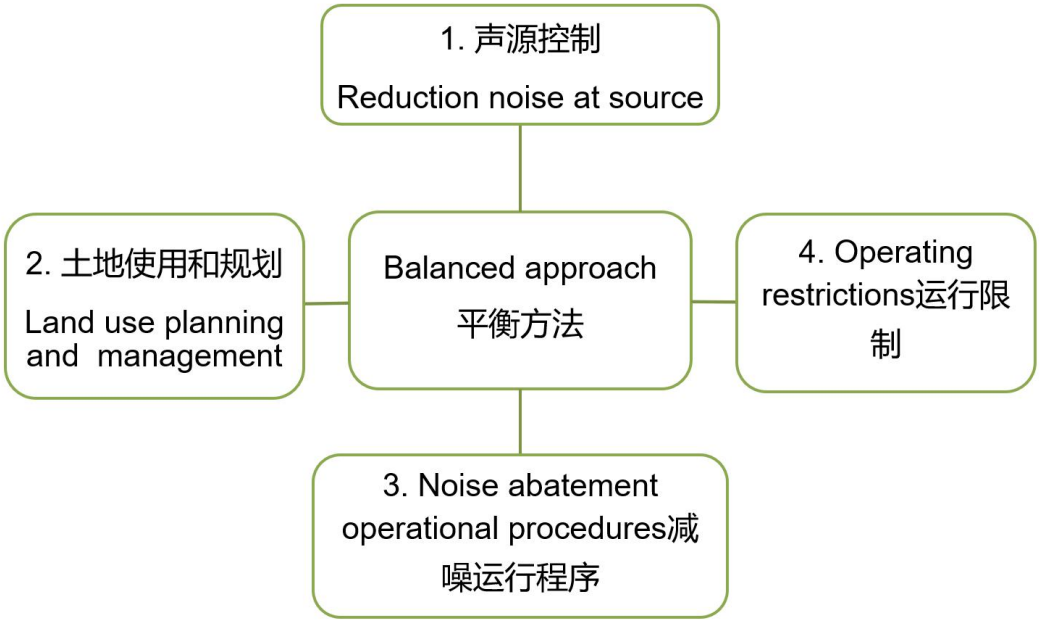
Refer to the *General Code for Building Environment* (GB 55016-2021) for sound insulation of new buildings;

After the implementation of sound insulation measures: the indoor noise of residential, office and cultural, and educational buildings within the assessment scope of the airport in this phase meets the limit requirements of Ld (07:00–22:00) 55 dBA in the daytime and Ln 45 dBA at night in the EHS guidelines of the World Bank;

After implementation of sound insulation measures: The indoor noise of residential, office and cultural, and educational buildings within the assessment scope of the airport in this phase can also meet the limits of Lden≤45 dB and Lnight≤40 dBA in the Guidelines for the Prevention of Environmental Noise for the European Region (2018) issued by WHO.

1.3 ICAO Balanced Approach to Aviation Noise Management

The ICAO's main overall policy on aircraft noise is the Balanced Approach to Aviation Noise Management, which was adopted by the 33rd session of the ICAO General Assembly (2001) and reaffirmed at all subsequent General Sessions (Reference: Appendix C of ICAO Resolution A39-1).



Appendix Figure -1 Four Basic Components of the Balanced Approach to Aviation Noise Management

With reference to the "balance approach" proposed by ICAO: 1) sound source control (using quieter aircraft); 2) reasonable planning and management of land around the airport; 3) use of aircraft noise reduction operation procedures; 4) restriction of aircraft operation at the airport, the aircraft noise control measures of the Project are formulated according to the following principles:

(1) Formulate the land use planning around the airport according to the aircraft noise prediction results, and implement the construction and development around the airport in strict accordance with the planning;
(2) Control the aircraft noise emission from the source, including selecting more optimized take-off and landing procedures, controlling the take-off and landing operations of high-noise aircraft, adjusting the take-off and landing ratios of different runways on the premise of ensuring the stable operation of the airport, and reducing

the utilization rate of runways close to sensitive points;
(3) Measures for Exceeding Standard
a. If the sensitive targets of residential buildings exceed LWECPN by more than 85 dB, relocation measures shall be taken, and sound insulation measures shall be taken for 75 dB–85 dB;
b. If the LWECPN of sensitive cultural, education, and health targets exceeds 80 dB, relocation measures shall be taken, and sound insulation measures shall be taken for 70 dB–80 dB.
Refer to Code for Design of Sound Insulation of Civil Buildings (GB 50118-2010) for sound insulation of existing buildings. Refer to the General Code for Building Environment (GB 55016-2021) for sound insulation of new buildings.

(4) Follow-up monitoring
For sensitive receivers that have not exceeded the standard at this stage but are relatively greatly affected by aircraft noise at the airport, regular aircraft noise monitoring or overall assessment shall be carried out to understand the impact of aircraft noise at the actual airport.

(5) Noise assessment
If the airport flight procedures and flight volume are greatly adjusted, or the follow-up monitoring results generally exceed the standard, the noise assessment shall be carried out again to determine the actual impact scope and degree of airport aircraft noise, and necessary prevention and control measures shall be taken in time.

2. Noise Control Measures during Operation Period

There are 164 sensitive points within the noise assessment scope, including 114 villages and residential communities (97 villages and 17 residential communities), 44 schools (20 kindergartens and 24 schools), 4 hospitals, and 2 drug rehabilitation centers. Among them, 6 residential communities and 18 schools and hospitals are within the control scope of the previous EIA planning and were constructed after the approval of the previous EIA.

According to Article 52 of the Law of the People's Republic of China on Prevention and Control of Noise Pollution: If it is really necessary to build noise-sensitive buildings in restricted construction areas, the Employer shall carry out building sound insulation design for noise-sensitive buildings to meet the requirements of relevant standards for sound insulation design of civil buildings. The Employer shall bear the cost of sound insulation for the above 6 villages and settlements (Class II sensitive receptors) and 18 schools and hospitals (Class I sensitive receptors).

Excluding the new sensitive buildings approved in the previous EIA, after the implementation of the expansion project in this phase, the aircraft noise L_{WECPN} of 26 villages and settlements (Class II sensitive receivers) and 27 schools and hospitals (Class I sensitive receivers) in this phase exceeds the corresponding standard limits.
There are three implementation subjects of noise control measures involved in the expansion project in this phase:

a) **New construction unit:** including 6 villages and settlements (Class II sensitive receptors) and 19 schools and hospitals (Class I sensitive receptors) construction units. According to Article 52 of the Law of the People's Republic of China on Prevention and Control of Noise Pollution: If it is really necessary to build noise-sensitive buildings in the restricted construction area, the construction unit shall carry out building sound

insulation design for noise-sensitive buildings to meet the requirements of relevant standards for sound insulation design of civil buildings. The required funds are "self-raised" by the owners of the new building and are not included in the scope of the airport and other relevant responsible subjects.

b) **The responsible subject of the previous expansion project (Kunming Changshui International Airport):** For the 5 villages (Heibo Village, Adi Village, Hongshapo Village, Shagou Village, and Ganluochong Village) and 13 schools and hospitals (Yunnan Vocational College of Agriculture, Kunming Guanghua School, Baihanchang Central School, Changshui Central School, Yunnan Vocational College of Judicial Police, Yunnan Horticultural School, Lizhi Primary School, Xiaochaoyang Kindergarten, Banqiao Middle School, Xingjie Primary School, Shagou Central School, Xiaoshao Township Hospital, and Xiaoshao Middle School) where sound insulation measures are required to be installed in the previous phase of the Project, relevant measures shall be implemented by the responsible unit of the previous period in this reconstruction and expansion, and repeated accounting of environmental protection investment is not considered this time. Kunming Changshui International Airport, as the actual operation department, is also the main responsible person for excessive noise.

c) **Responsibility subject of the expansion project in this phase (Kunming Changshui Airport):** If the aircraft noise at the existing acoustic environment sensitive points (receptors) caused by the expansion project in this phase exceeds the standard, the responsibility subject of the expansion project in this phase, i.e. Kunming Changshui Airport, shall implement it;

This assessment focuses on the noise control measures to be implemented by the responsible subject in b) and c).

2.1 Land Use Planning and Control around the Airport

Land use planning around the airport is the primary prevention and control means to avoid conflicts caused by airport development. As the responsible subject, the implementation unit of the expansion project in this phase shall cooperate with the planning preparation department in the following aspects to carry out relevant work.

(1) Establish a communication mechanism

The airport shall establish a regular communication mechanism with the municipal planning department to ensure that the planning department keeps abreast of the impact of aircraft noise on the airport and the area affected by aircraft noise in the airport development target year.

(2) The airport shall actively participate in the planning preparation and relevant feedback work.

In the stage of soliciting opinions on the planning preparation of the airport and its surrounding areas, the airport shall actively participate in the feedback and put forward adjustment suggestions for possible problems in the planning.

(3) Conservation of data

The airport may set up a specialist to be responsible for the communication between the airport and the planning department, and be responsible for keeping relevant communication records, regularly sorting out and summarizing them, and forming a development planning document for the surrounding areas of the airport.

(4) Controlled Range of Areas around the Airport

Different organizations have different requirements for land use planning around

airports. For example, the Federal Aviation Administration of the United States of America (FAA) has proposed the compatibility standards in Part 150 Airport Noise Compatibility Plan in accordance with the United States Aviation Safety Noise Reduction Act (49 United States Code, Part 2101 and subsequent sections), but China has not carried out systematic legislative work on land use planning around airports. At present, the planning of land use around the airport is mainly based on the Environmental Standard for Aircraft Noise around Airport (GB9660-88) and the Reply on the Interpretation of Relevant Items of Environmental Standard for Noise in the Surrounding Area of Airports (State Environmental Protection Bureau HH (2004) No. 163), with Lwecpn 70 dB and 75 dB as the main control values.

In this assessment, it is suggested to use Ldn as the main index for the planning of land around the airport for the following reasons:

First, Ldn and the current Environmental Quality Standard for Noise (GB3096-2008) are of the same noise system. It can more intuitively reflect the impact degree of aircraft noise in the surrounding area of the airport;

Secondly, Ldn has good compatibility with the EHS Guidelines of the World Bank, WHO Environmental Noise Guidelines for the European Region (2018), and other airport noise assessment standards of major economies of the world;

Thirdly, the planning and control of the surrounding land of the airport for Ldn can be used for reference.

Fourthly, Ldn is the recommended index in the Environmental Quality Standard for Aircraft Noise in the Surrounding Area of the Airport (Draft for Comments), which also sets out planning control standards for land use around airports applicable to Ldn in China. Compared to the current planning control indicators, this approach is more comprehensive, and is considered scientifically sound and reliable to a certain extent. The only limitation is that the Environmental Quality Standard for Aircraft Noise in the Surrounding Area of the Airport (Draft for Comments) is still in the stage of public consultation and has not yet been officially issued.

After comprehensive consideration, since there is no existing reference basis for the current planning and control of land use around the airport in China, for the development of the airport and from the perspective of better protecting the people around the airport from the impact of aircraft noise, the aircraft noise control standards proposed in the Environmental Quality Standards for Aircraft Noise in the Surrounding Area of the Airport (Draft for Soliciting Comments) are selected in this phase to propose the guidance scope for the planning of land use around the airport.

According to the Environmental Quality Standards for Aircraft Noise in the Surrounding Area of the Airport (Draft for Comments), the planning and control of land around the airport in 2030 of Kunming Changshui International Airport is divided into the following contents:

1) Area with Ldn ≤ 57 dBA

The scope of Ldn 57 dBA area of Kunming Changshui International Airport in 2030 is shown in the following figure:

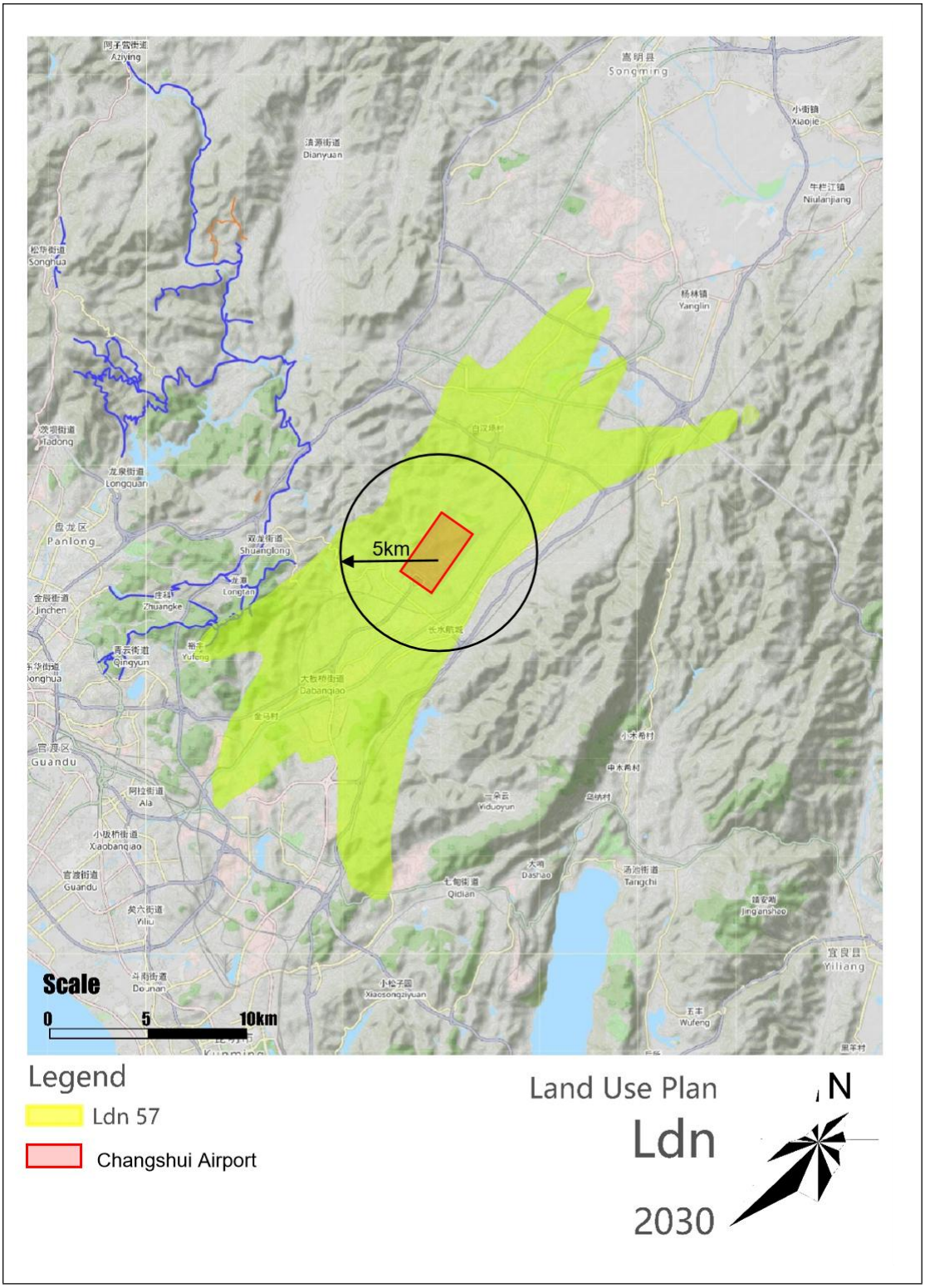


Figure-2 Distribution of Aircraft Noise Ldn 57 dBA Impact Area of Kunming Changshui Airport in 2030

Area with Ldn ≤ 57dBA, i.e. Class I area, and the area beyond the impact scope of Ldn 57 dBA is also planned. Buildings and land types that are relatively sensitive to noise, such as residences, hospitals, and schools, can be planned.

2) Area with 57 dBA < Ldn ≤ 62 dBA

It is a Class II area, which can be planned as sensitive buildings and land for administrative office, culture, commerce, etc. The regional distribution of area with Ldn 57–62 dBA of Kunming Changshui Airport in 2030 is shown in the following figure.

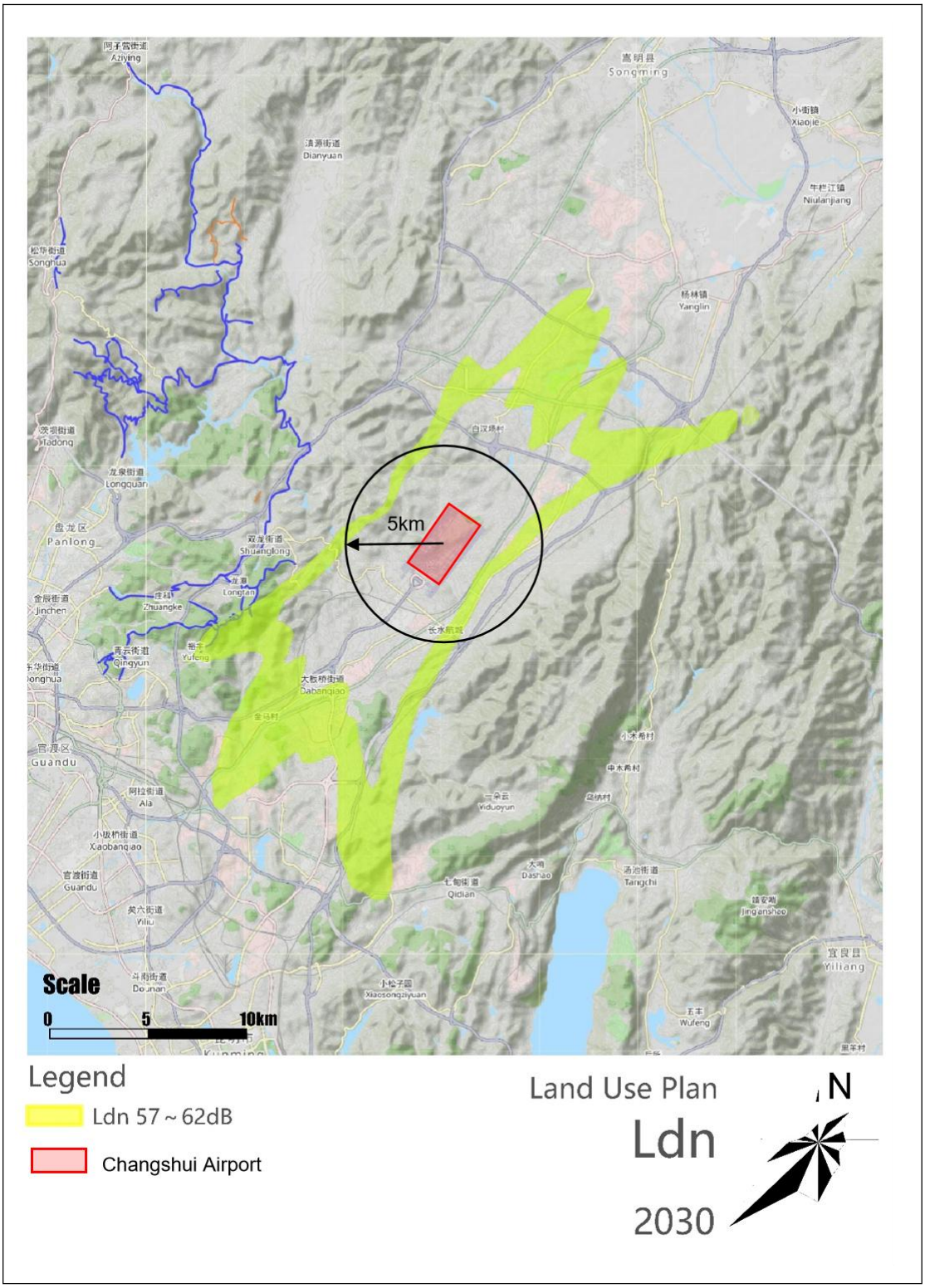


Figure-3 Distribution of Aircraft Noise Ldn 57–62 dBA Impact Area of Kunming Changshui Airport in 2030

3) Area with 62 dBA < Ldn ≤ 67 dBA

It is a Class III area that can be planned as buildings or lands that are less sensitive to noise such as industry, storage, and entertainment. The regional distribution of area with Ldn 62–67 dBA of Kunming Changshui International Airport in 2030 is shown in the following figure;

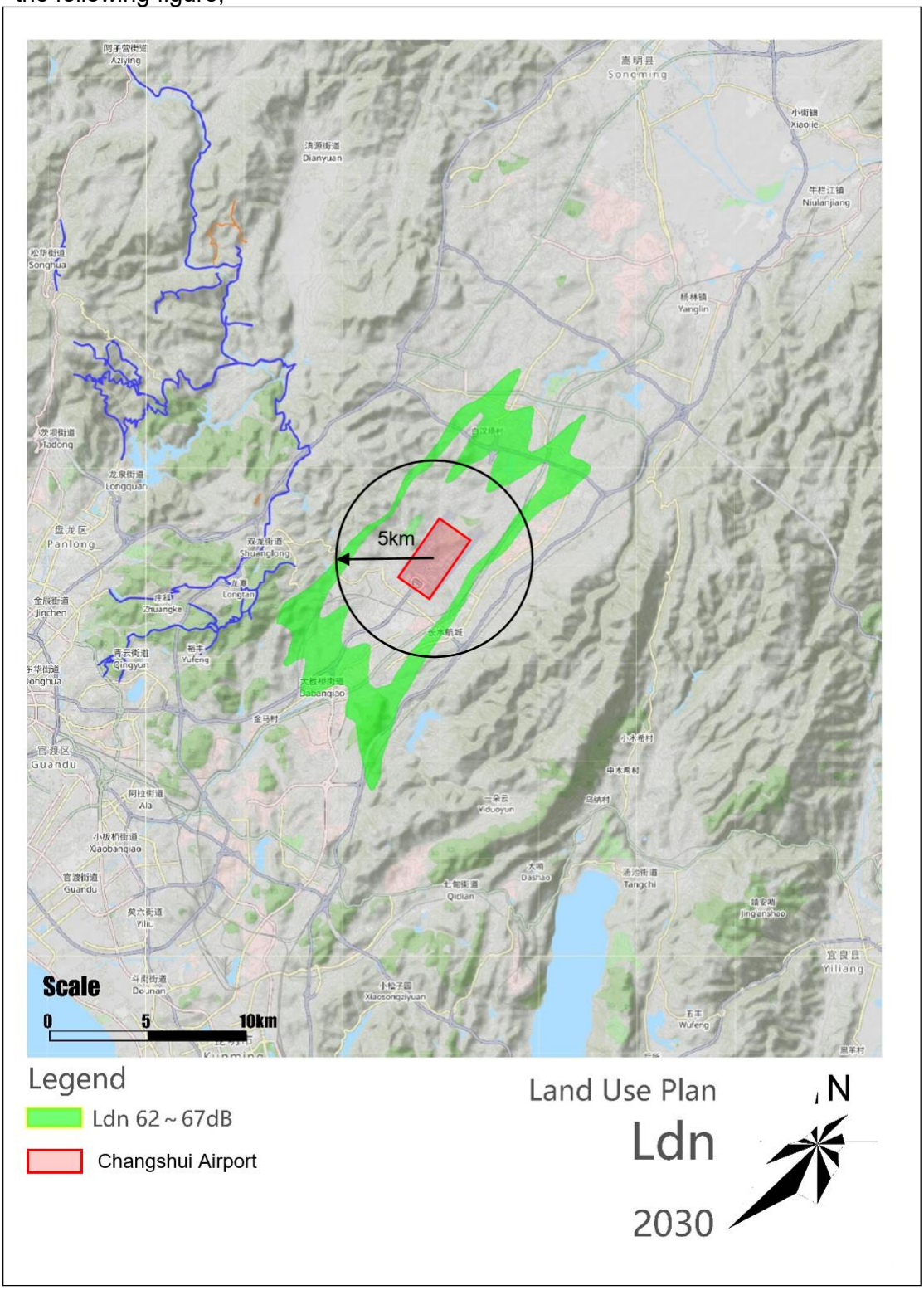


Figure-4 Distribution of Aircraft Noise Ldn 62–67 dBA Impact Area of Kunming Changshui Airport in 2030

4) Area with Ldn > 67 dBA

It is a Class IV area that can be planned as land types that are not sensitive to noise, such as agriculture, mining, and transportation, in addition to the airport land. The regional distribution of area with Ldn > 67 dBA in Kunming Changshui International Airport in 2030 is shown in the following figure:

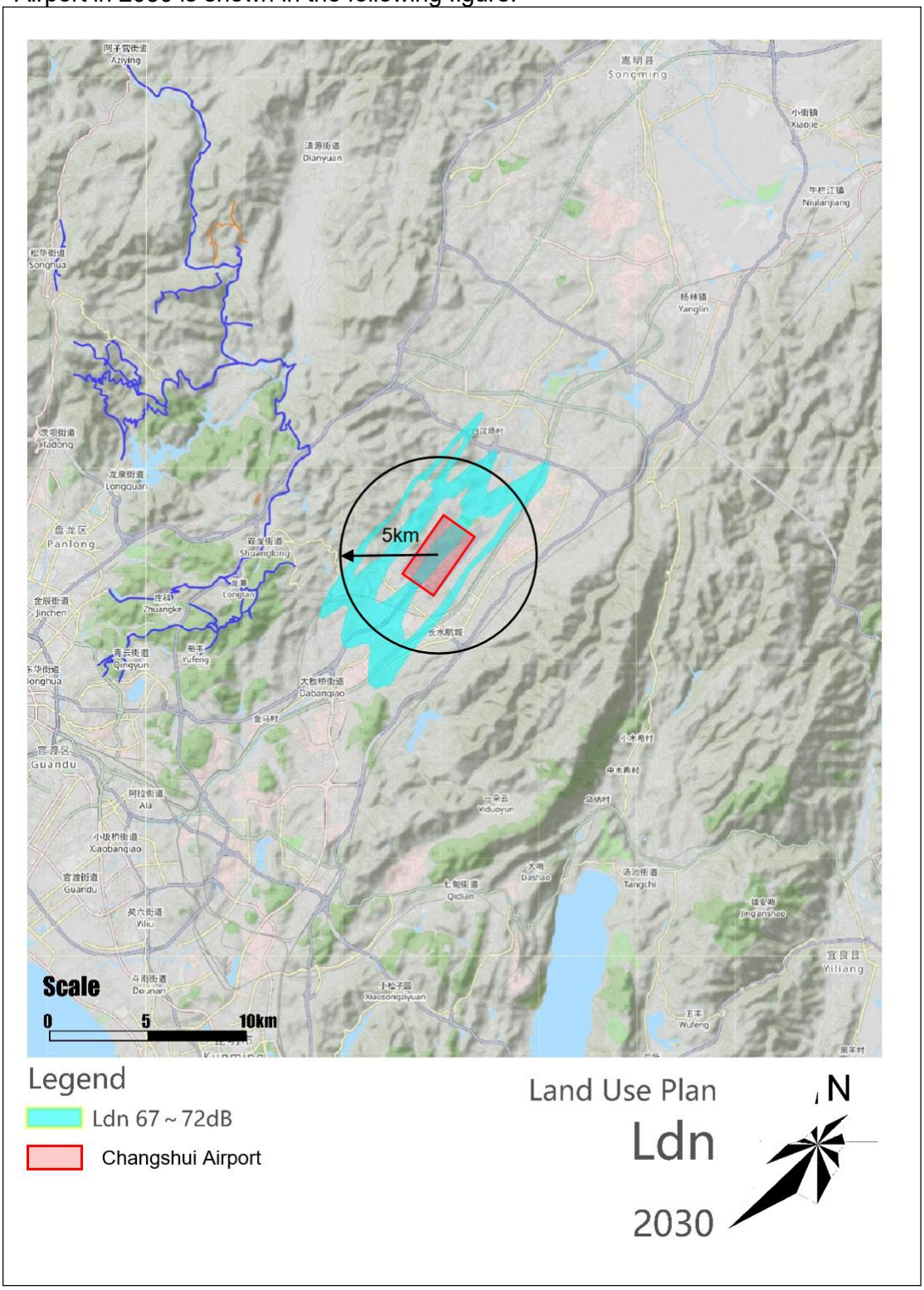


Figure-5 Distribution of Aircraft Noise Ldn>67 dBA Impact Area of Kunming Changshui Airport in 2030

In addition, if the planning department needs to plan noise-sensitive buildings within the noise impact range according to economic development and other factors, sound

insulation treatment shall be carried out according to the General Code for Building Environment (GB 55016-2021) to ensure that the indoor noise of new buildings can meet the noise standard limits corresponding to their functional areas and the daytime Ld (07:00-22:00) 55 dBA in the World Bank EHS Guidelines. The nighttime Ln 45 dBA limit is required by the Environmental Noise Guidelines for the European Region (2018) Lden ≤ 45 dB and Lnight ≤ 40 dBA limits issued by WHO.

a) Sound insulation measures

(1) Targets of sound insulation measures

Among the acoustic environmental protection targets, a total of 23 villages enter the aircraft noise contour line WECPNL 75-85 dB, of which 5 villages (Heibo Village, Adi Village, Hongshapo Village, Shagou Village, and Ganluochong Village) are sensitive points required by the previous EIA to set sound insulation windows, and the remaining 18 villages need to install soundproof windows for this reconstruction and expansion.

Among acoustic environmental protection targets, 26 schools and hospitals enter the aircraft noise contour line (WECPNL) within 70-80 dB, including 12 schools and hospitals (Yunnan Vocational College of Agriculture, Kunming Guanghua School, Baihanchang Central School, Changshui Central School, Yunnan Vocational College of Judicial Police, Lizhi Primary School, Xiaochaoyang Kindergarten, Banqiao Middle School, Xingjie Primary School, Shagou Central School, Dabanqiao Xiaoshao Community Health Service Station in Guandu District, and Guandu Xiaoshao Middle School) that are required to set sound insulation windows for the previous EIA. Soundproof windows have been installed in Kunming No.17 Middle School, No.1 Kindergarten of Airport Economic Zone, No.2 Kindergarten of Airport Economic Zone, and Kunming Airport No.1 Primary School in Yunnan Province; the remaining 10 schools and hospitals need to be equipped with soundproof windows for this reconstruction and expansion.

(2) Cost standard for sound insulation measures

The area of doors and windows for residents is calculated as 25 m^2 per household, and that for schools is calculated as 50 m^2, with CNY 1,200 per square meter.

(3) Cost estimate of sound insulation measures

The cost estimate of noise prevention and control for the expansion project of Kunming Changshui Airport in this phase is listed in the following table. The total cost of sound insulation is CNY 134.40 million, including CNY 29.79 million left over from the previous period and CNY 104.61 million increased this time.

Table-1 List of Investment Estimation for Sound Insulation Measures

S/N	Type	Noise range	Description	Predicted Noise Value (dB)	Number of Households (No.)	Soundproof Window Area (m^2)	Unit Price of Soundproof Window (CNY)	Proposed Measures	Investment estimate (CNY ten thousand)	
									Newly added this time	Legacy of the previous period
1	Village	80-85	Dacunzi	81.1	343	8575	1200	Class III Soundproof window 40 > RW ⩾ 35	1029	
2			Xiaokanglangxiao Village	84.9	118	2950	1200		354	
3			Xiaokanglangda Village	83.8	167	4175	1200		501	
4			Fuxing Village	81.2	165	4125	1200		495	
5			Xinqiao Village	84.3	54	1350	1200		162	
6			Xichong Village	83.4	79	1975	1200		237	
7			Getenggou	80.1	32	800	1200		96	
8			Yangguanzhuang	83.7	100	2500	1200		300	
9			Ganluochong	80.8	39	975	1200			117
10		75-80	Xialiqi	75.2	92	2300	1200	Class IV soundproof window 35 > RW ⩾ 30	276	
11			Yijia	75.5	499	12475	1200		1497	
12			Wujia	76	470	11750	1200		1410	
13			Dadongchong	75.9	98	2450	1200		294	
14			Gaoshitou	77.9	80	2000	1200		240	
15			Caojiachong	75.8	28	700	1200		84	
16			Yangtianchong	76.8	54	1350	1200		162	
17			Yunqiao Village	75.7	274	6850	1200		822	
18			Baihanchang	78.1	500	12500	1200		1500	
19			Baizhongqing	79.9	66	1650	1200		198	
20			Heibo Village	79.6	176	4400	1200			528
21			Adi Village	79.8	169	4225	1200			507
22			Hongshapo	77.9	108	2700	1200			324
23			Shagou Village	77	134	3350	1200			402

S/N	Type	Noise range	Description	Predicted Noise Value (dB)	Soundproof Window Area (m^2)	Unit Price of Soundproof Window (CNY)	Proposed Measures	Investment estimate (CNY ten thousand)	
								Newly added this time	Legacy of the previous period
1	Schools and hospitals	70-75	Xichong No.2 Kindergarten	72.2	250	1200	Class IV soundproof window 35 > RW ≥ 30	30	
2			Aibeier Kindergarten	71.1	400	1200		48	
3			Morningstar Kindergarten	74.1	250	1200		30	
4			Xichong Kindergarten	72.5	300	1200		36	
5			Xichong Primary School	72.8	1000	1200		120	
6			Qinglong School	71.7	450	1200		54	
7			Mingzhu School	74.7	600	1200		72	
8			No.4 Primary School of Kunming Economic and Technological Development Zone	70.7	1200	1200		144	
9			Airport Experimental School of Kunming No.3 Middle School	71.2	2000	1200		240	
10			Changshui Chenxing Kindergarten	74.6	250	1200		30	
11			Kunming Airport Economic Zone No.1 Kindergarten	72.1	Hollow double-layer sliding soundpro				

					of window installed				
12			Yunnan Kunming No. 17 Middle School	71.8	Hollow double-layer casement soundproof window installed				
13			Airport Economic Zone No.2 Kindergarten	71	Hollow double-layer casement soundproof window installed				
14			Kunming Airport No.1 Primary School	70.8	Hollow double-layer casement soundproof window installed				
15			Lizhi Primary School	75	148	1200			18
16			Xingjie Primary School	74.6	419	1200			50
17			Banqiao Middle School	74.8	444	1200			53

18			Changshui Central School	74.7	242	1200			29
19			Xiaoshao Middle School, Guandu District	74.8	296	1200			36
20	Schools and hospitals	75-80	Xiaozhaoyang Kindergarten	75.1	944	1200	Class III Soundproof window 40 > RW ≥ 35		113
21			Shagou Central School	79.8	312	1200			37
22			Yunnan Vocational College of Judicial Police	79.9	4165	1200			500
23			Dabanqiao Xiaoshao Community Health Service Station, Guandu District	77.7	60	1200			7
24			Baihanchang Central School	75.7	426	1200			51
25			Kunming Guanghua School	76.5	752	1200			90
26			Yunnan Vocational College of Agriculture	77.1	977	1200			117
Subtotal								10461	2979
Total								**13440**	

According to different materials, the sound insulation capacity of ventilation and soundproof windows can reach 25–32 dB(A), which can meet the requirements of 30 dB(A) for sound insulation and noise reduction in this phase on the premise of ensuring that the materials meet the standards.

After some sound insulation and noise reduction measures are taken, the indoor noise of residential, office and cultural, and educational buildings within the assessment scope of the airport in this phase meets the limit requirements of Ld (07:00-22:00) 55 dBA in the daytime and Ln 45 dBA at night in the EHS guidelines of the World Bank.
After the implementation of sound insulation measures in this phase, the out-of-standard indoor noise of residential, office and cultural, and educational buildings within the assessment scope of the airport in this phase can also meet the limit requirements of Lden ≤ 45 dB and Lnight ≤ 40 dBA in the Environmental Noise Guidelines for the European Region (2018) issued by WHO.

2.2 Environmental Relocation involving Excessive Noise

(1) Implementation target
In addition to the land occupation and demolition area of the Project, 3 villages (Ganhaizi, Huaqing, and Changpo villages) in the acoustic environmental protection target are within 85 dB of the aircraft noise contour line, of which Ganhaizi is the environmental protection relocation point in the previous environmental impact assessment. Among the schools and hospitals, only Fuxing Primary School is located within 80 dB of the aircraft noise contour line. According to the principle of environmental protection relocation measures, it is proposed to take relocation measures for residents exceeding 85 dB in this phase.
(2) Demolition standard
The compensation standard for noise relocation shall be implemented according to the relevant regulations issued by the local government. The following accounting only includes the cost of homestead relocation, and other expenses involved shall be determined through negotiation between the local government and the Employer. The compensation for village relocation is calculated at CNY 3,500/m^2 per 450 m^2/household, and the compensation for school relocation is calculated at CNY 4,000/m^2.
(3) Investment cost for environmental protection relocation
The estimation of environmental protection and demolition costs is listed in the following table.

Table-2 Investment Estimation for Environmental Protection Relocation Measures

S/N	Type	Description	Predicted value **(dB)**	Number of Households (No.)	Area **(m^2)**	Unit Price (CNY)	Investment Estimate (CNY 10,000)	
							Current period	Previous period
1	Village	Ganhaizi	85.6	125		3500		19688
2		Huaqing Village	90.8	162		3500	25515	
3		Changpo Village	89.8	303		3500	47723	
4	School	Fuxing Primary	81.5	/	300	4000	120	

		School						
Subtotal							73358	19688
Total current period							**93046**	

The total cost of environmental protection and demolition is CNY 930.46 million, including CNY 196.88 million left over from the previous period and CNY 733.58 million increased this time. A 10% contingency has been included in the estimate.

(4) Source of funds
Due to various reasons, the relocation of the village (Ganhaizi) to be relocated in the previous project has not been implemented yet, and the relevant measures will be implemented by the responsible unit for demolition in the previous phase in this reconstruction and expansion. Repeated accounting of environmental protection investment will not be considered this time.

Two new villages (Huaqing Village and Changpo Village) and one school (Fuxing Primary School) will be relocated for environmental protection in this reconstruction and expansion. The local government will be responsible for the relocation and resettlement, with a cost budget of CNY 733.58 million.

Summary of Noise Exceedance and Prevention Measures Related to East Runway 2
As a whole, it is difficult to quantify the noise impact of a runway on a single sensitive point in the actual operation stage of the airport, but it can be roughly distinguished according to the runway layout and the relative position between the sensitive point and the runway;

(1) Sensitive points related to East Runway 2 with excessive noise
According to the characteristics of aircraft noise and the operation mode of Kunming Changshui International Airport in Yunnan Province, the noise impact scope of the take-off and landing aircraft on the east runway 2 is mainly concentrated in the areas 1.5 km on both sides and 10 km within both ends of the runway. At the sensitive points close to the runway, the correlation with the runway noise impact is relatively large, and with the increase of distance, the correlation decreases accordingly.;

According to the location relationship between sensitive points and East Runway 2, the impact degree is divided into the following three categories:

A. Main impact: The noise impact mainly comes from the East Runway 2;
B. Partial impact: The noise impact mainly comes from other runways, but is also affected by the superposition of East Runway 2;
C. No significant correlation: The noise impact mainly comes from other runways and is basically not affected by East Runway 2;
The correlation between the noise exceeding points in this phase and the noise impact of East Runway 2 is listed in the following table.

Table-4 List of Correlation Analysis between Noise Exceeding Standard Points and Noise Impact of East Runway 2 in Current Period

S/N	Description	WECPNL values in 2030 **(dB)**	Relative to East Runway 2	Impact correlation
1	Dacunzi	81.1	SW	C
2	Xiaokanglangxiao Village	84.9	SW	C
3	Xiaokanglangda Village	83.8	SW	C
4	Fuxing Village	81.2	SW	C
5	Xinqiao Village	84.3	SW	C
6	Xichong Village	83.4	NW	C
7	Getenggou	80.1	NW	C
8	Yangguanzhuang	83.7	N	A
9	Ganluochong	80.8	SW	C
10	Xialiqi	75.2	SW	C
11	Yijia	75.5	SW	C
12	Wujia	76.0	SW	B
13	Dadongchong	75.9	SE	A
14	Gaoshitou	77.9	SE	A
15	Caojiachong	75.8	SE	A
16	Yangtianchong	76.8	SW	C
17	Yunqiao Village	75.7	NE	A
18	Baihanchang	78.1	NW	C
19	Baizhongqing	79.9	NW	C
20	Heibo Village	79.6	SW	C
21	Adi Village	79.8	S	A
22	Hongshapo	77.9	S	B
23	Shagou Village	77.0	S	B
24	Xichong No.2 Kindergarten	72.2	SW	B
25	Aibeier Kindergarten	71.1	SW	C
26	Morningstar Kindergarten	74.1	SW	C
27	Xichong Kindergarten	72.5	SW	C
28	Xichong Primary School	72.8	SW	C
29	Qinglong School	71.7	SW	B
30	Mingzhu School	74.7	SW	C
31	No.4 Primary School of Kunming Economic and Technological Development Zone	70.7	SW	B
32	Airport Experimental School of Kunming No.3 Middle School	71.2	SW	B
33	Changshui Chenxing Kindergarten	74.6	NE	A

34	Lizhi Primary School	75.0	SW	C
35	Xingjie Primary School	74.6	SW	C
36	Banqiao Middle School	74.8	SW	C
37	Changshui Central School	74.7	NE	A
38	Xiaoshao Middle School, Guandu District	74.8	NW	C
39	Xiaozhaoyang Kindergarten	75.1	SW	C
40	Shagou Central School	79.8	S	A
41	Yunnan Vocational College of Judicial Police	79.9	SW	B
42	Dabanqiao Xiaoshao Community Health Service Station, Guandu District	77.7	NW	C
43	Baihanchang Central School	75.7	NW	C
44	Kunming Guanghua School	76.5	N	A
45	Yunnan Vocational College of Agriculture	77.1	NW	B
46	Ganhaizi	85.6	S	A
47	Huaqing Village	90.8	W	C
48	Changpo Village	89.8	N	A
49	Fuxing Primary School	81.5	SW	C

It can be seen from the above table that there are 21 points where the noise exceeds the standard due to the operation noise of East Runway 2, of which 9 points are partially affected, that is, 12 points where the noise exceeds the standard are mainly affected from East Runway 2;

(2) Summary of Noise Control Measures Related to East Runway 2
According to the implementation principles of noise control measures, the noise control measures related to East Runway 2 are summarized in the following table.

Table-5 List of Correlation between Noise Control Measures and Noise Impact of East Runway 2 in Current Period

S/N	Description	WECPNL values **(dB)**	Control measures	Investment Estimate (CNY 10,000)		Impact correlation
				Add	Previous period	
1	Yangguanzhuang	83.7	Soundproof window	300	/	A
2	Wujia	76.0		1410	/	B
3	Dadongchong	75.9		294	/	A
4	Gaoshitou	77.9		240	/	A
5	Caojiachong	75.8		84	/	A
6	Yunqiao Village	75.7		822	/	A
7	Adi Village	79.8		/	507	A
8	Hongshapo	77.9		/	324	B

9	Shagou Village	77.0		/	402	B
10	Xichong No.2 Kindergarten	72.2		30	/	B
11	Qinglong School	71.7		54	/	B
12	No.4 Primary School of Kunming Economic and Technological Development Zone	70.7		144	/	B
13	Airport Experimental School of Kunming No.3 Middle School	71.2		240	/	B
14	Changshui Chenxing Kindergarten	74.6		30	/	A
15	Changshui Central School	74.7		/	29	A
16	Shagou Central School	79.8		/	37	A
17	Yunnan Vocational College of Judicial Police	79.9		/	500	B
18	Kunming Guanghua School	76.5		/	90	A
19	Yunnan Vocational College of Agriculture	77.1		/	117	B
20	Ganhaizi	85.6	Overall relocation	/	19688	A
21	Changpo Village	89.8		47723	/	A
22	Total			51371	21694	/

Due to the close distance between East Runway 1 and East Runway 2, it is difficult to divide the separate impacts of the two runways in detail.; After the completion of the East Runway 2, it will be used as the main take-off and landing runway to replace some of the original functions of the East Runway 1. The sensitive points originally affected by the East Runway 1, such as Ganhaizi, Changshui Central School, Yunnan Vocational College of Judicial Police, Kunming Guanghua School, Yunnan Vocational College of Agriculture, Adi Village, Hongshapo Village, Shagou Village, etc., will also be included in the Excessive Noise Contribution Value of the East Runway 2.

2.3 Aircraft Noise Monitoring System

(1) Monitoring content

1) Monitor and analyze the LAmax, LEPN and Td of the noise of a single aircraft of different models of different airlines operating in Kunming Airport, and determine the models that need to be eliminated and adjusted by airlines during their operation period.

2) Provide the contribution of different airlines to the aircraft noise of Kunming Airport and their responsibilities.

3) Monitor and analyze the monthly and annual variation trends of boundary noise within the control range of aircraft noise at different levels in the airport.

4)Monitor and analyze the compliance of aircraft noise at main petition points.
5)Check the fixed-point monitoring results in combination with the actual flight trajectory and aircraft noise.
6)Monitor and analyze the control effect of different measures in combination with the implementation of aircraft noise control measures at Kunming Airport.

(2) Setting and Investment of Monitoring Points

According to the airport noise contour map, combined with the aircraft flight path and the distribution of surrounding sensitive points, a noise monitoring system is set up, including a total of 12 aircraft noise monitoring points, as listed in the following table:

Table-6 List of Setting of Points of Aircraft Noise Monitoring System

S/N	Monitoring Point	Longitude (E°)	Latitude (N°)	Objective Setting
1	Xiaokanglangxiao Village	102.89065361	25.09643270	Sensitive point
2	Xinqiao Village	102.8866939	25.09240424	Sensitive point
3	Lingyuan Village	102.95306861	25.17952467	Sensitive point
4	Banqiao Middle School	102.8708345	25.04905296	Sensitive point
5	The Seventh Compulsory Isolation Drug Rehabilitation Center in Yunnan Province	102.91027665	25.06908401	Sensitive point
6	Getenggou	102.96260655	25.14400746	Sensitive point
7	Kunming Guanghua School	102.99752355	25.15798252	Sensitive point
8	Adi Village	102.9009741	25.04993263	Sensitive point
9	Shagou Village	102.89480001	25.04287064	Sensitive point
10	Yunnan Vocational College of Agriculture	102.9754635	25.16928395	Sensitive point
11	Baihanchang	102.9549619	25.17072683	Sensitive point
12	Heibo Village	102.8772531	25.08106521	Sensitive point

The estimated total investment is CNY 24 million, of which CNY 14 million is included in the project investment.

2.4 Management Measures

The current aircraft noise management measures to be taken in accordance with the above regulations are as follows:
1) The Kunming Municipal People's Government, with reference to the 2030 aircraft noise contour map, jointly formulates the prohibited and restricted construction areas

for noise-sensitive buildings around Kunming Airport with planning, land and environmental protection authorities, and implements control.
2) Under the guidance of the noise control zone, the relevant district and municipal planning departments shall formulate the land use plan in the aircraft noise control zone of the airport and actively promote the implementation of the plan.
3) When constructing a project within the noise control area, an aircraft noise impact assessment must be conducted, and the opinions of the airport should be solicited simultaneously. If the project is incompatible with the aircraft noise in the location where it is to be built, and the project owner still wishes to proceed with the construction, the project owner shall assume all legal liabilities arising therefrom..
4)During building sound insulation measures, the Employer shall negotiate with the owner and the school to jointly take sound insulation measures to solve the interference of aircraft noise to life and study.
5) The airport shall disclose the monitoring results of conventional aircraft noise in a timely manner, and set up a noise-related complaint acceptance agency.

3 Summary of Noise Control Measures and Costs

(1) Summary of Noise Control Measures

According to the current management regulations of environmental protection in China, Kunming Changshui International Airport is the main responsible party for WECPNL exceeding the standard of aircraft noise at sensitive points around the airport. The target year of noise control measures in this phase is 2030.

Kunming Changshui International Airport, as the responsible subject, shall regularly file the monitoring results with the local environmental protection department according to the daily monitoring mechanism. According to the operation conditions of the airport, including changes in data such as air traffic volume, the compliance of aircraft noise at the above sensitive points of the Management Committee of Central Yunnan New Area and the opinions on whether to implement sound insulation and relocation shall be submitted.

According to the Minutes of the Fourth Site Meeting of the People's Government of Yunnan Province in 2009 on Accelerating the Construction of Kunming New Airport (General Office of the People's Government of Yunnan Province, Issue 71, June 10, 2009), the Management Committee of Central Yunnan New Area, as the main body implementing noise control measures, shall timely implement relevant measures according to the feedback from the airport. Ensure that all measures are in place by 2030.

According to the types of noise control measures and different implementation subjects, implementation objects and responsible objects, the summary of noise control measures in the current period is as follows.

Table-7 Summary of Noise Control Measures in the Current Period

Type of measures	Noise control measures	Objects	Quantity	Responsible subject	Implementer	Notes	Cost Estimate (CNY 10,000)	Source of fund
Management Measures	Restriction on take-off and landing of high-noise models	Airlines	/	Kunming Changshui International Airport	Kunming Changshui International Airport	/	/	/
	Continuous approach instead of conventional approach	Airlines	/	Kunming Changshui International Airport	Kunming Changshui International Airport	/	/	/
	Optimization of runway utilization	Airport	/	Kunming Changshui International Airport	Kunming Changshui International Airport	/	/	/
	Restriction on percentage of take-off and landing at night	Airport	/	Kunming Changshui International Airport	Kunming Changshui International Airport	/	/	/
Planning control	Ldn≤57	Land around the airport	/	Natural Resources and Planning Bureau of Central Yunnan New Area	Natural Resources and Planning Bureau of Central Yunnan New Area	/	/	/
	57dB<Ldn≤62dB	Land around the airport	/	Natural Resources and Planning Bureau of Central Yunnan New Area	Natural Resources and Planning Bureau of Central Yunnan New Area	/	/	/
	62dB<Ldn≤67dB	Land around the airport	/	Natural Resources and Planning Bureau	Natural Resources and Planning Bureau	/	/	/

				of Central Yunnan New Area	of Central Yunnan New Area			
	Ldn≥67dB	Land around the airport	/	Natural Resources and Planning Bureau of Central Yunnan New Area	Natural Resources and Planning Bureau of Central Yunnan New Area	/	/	/
Sound insulation measures		Settlement	5	Kunming Changshui International Airport	Management Committee of Central Yunnan New Area	Legacy of the previous period	1878	/
			6	Kunming Changshui International Airport	New building construction subject	Newly added after the previous EIA	/	Self-raised
			18	Kunming Changshui International Airport	Management Committee of Central Yunnan New Area	Add	9657	Pooled funds
		School	12	Kunming Changshui International Airport	Management Committee of Central Yunnan New Area	Legacy of the previous period	1101	Pooled funds
			4	Kunming Changshui International Airport	Management Committee of Central Yunnan New Area	Available	/	Pooled funds
			18	Kunming Changshui International Airport	New building construction subject	Newly added after the previous EIA	/	Self-raised

		10	Kunming Changshui International Airport	Management Committee of Central Yunnan New Area	Add	10461	Pooled funds
Relocation	Settlement	1	Kunming Changshui International Airport	Management Committee of Central Yunnan New Area	Legacy of the previous period	19688	Pooled funds
		2	Kunming Changshui International Airport	Management Committee of Central Yunnan New Area	Add	73238	Pooled funds
	School	1	Kunming Changshui International Airport	Management Committee of Central Yunnan New Area	Add	120	Pooled funds

Notes: 1. Considering the different sources of funds for noise control measures and the differences in budget and price levels at different stages, in order to ensure that noise prevention and control measures can be implemented in place, it is suggested that the investment in new noise control measures and the investment in remaining measures in the previous period should be managed as a whole (hereinafter referred to as **pooled funds** for noise control) according to the fund management specifications of Yunnan Provincial Department of Finance on the expansion project of Kunming Changshui Airport in this phase. Special personnel shall be assigned for supervision.

2. The new construction subject refers to the buildings or facilities built by enterprises or individuals within the scope of airport noise impact assessment after the approval of the previous EIA. According to Article 52 of the Law of the People's Republic of China on the Prevention and Control of Noise Pollution: If it is really necessary to build noise-sensitive buildings in the restricted construction area, the construction unit shall carry out building sound insulation design for noise-sensitive buildings, which shall meet the requirements of relevant standards for sound insulation design of civil buildings. The required funds shall be "self-raised" by the main body of the new building and shall not be included in the scope of the airport and other relevant responsible subjects;

(2) Summary of Investment in Noise Control Measures

The noise control of Kunming Changshui Airport in this phase includes the installation of soundproof windows, relocation and installation of aircraft noise monitoring systems. According to the source of funds, it can be divided into two categories: new expenses in this phase and remaining expenses in the previous phase. Considering the different sources of funds for noise prevention and control measures and the differences in budget and price levels at different stages, in order to ensure that noise control measures can be implemented in place, it is suggested that the investment in new noise control measures and the investment in remaining measures in the previous period should be managed as a whole (hereinafter referred to as pooled funds for noise control) according to the fund management specifications of Yunnan Provincial Department of Finance on the expansion project of Kunming Changshui Airport in this phase. Special personnel shall be assigned for supervision.

The costs are summarized as follows:

Table-8 Summary of Investment in Noise Control Measures

S/N	Item	New cost (CNY 10,000)	Legacy cost (CNY 10,000)
1	Installation of soundproof window	10461	2979
2	Relocation	73358	19688
3	Noise monitoring system	2400	/
Total		86219	22667