



International Finance Corporation

Environmental, Health and Safety Guidelines for

Roads and Highways

These guidelines are for the design and construction of roads and highways. The guidelines incorporate the provisions of the World Bank policies for cultural properties, indigenous peoples, involuntary resettlement, biodiversity, water resources management and wildlands. Environmental issues that are identified by the project sponsor or other interested parties, but not addressed by World Bank policies or guidelines, must be brought to the immediate attention of IFC for consideration and guidance.

Siting And Right-Of-Way Alignment

The principal elements of World Bank policy regarding rights-of-way alignment, land acquisition, and infrastructure development are summarized below. The rights-of-way for projects should be chosen through a systematic, documented process that includes consideration of alternatives and their environmental impacts. The sponsors must provide information regarding alignment of these rights-of-way, addressing the following guidelines:

- a) Rights-of-way must be aligned and ancillary facilities located taking environmental factors into consideration in a manner which will minimize, to the extent possible, visual impacts and the need for physical alteration of the landscape, as well as impacts to natural resources, sensitive ecosystems, cultural resources, agricultural lands and populated areas.
- b) Land acquisition must be carried out in accordance with World Bank resettlement policy which requires quantification of any impacts on land-based livelihood, and fair compensation to

landowners and people relying on the land for their residence and/or livelihood.

- c) Indirect environmental and sociocultural impacts that may result from unplanned development induced by the road or highway should be considered and measures adopted to minimize the impacts in sensitive areas.
- d) Selection of the right-of-way alignment should be made after consultation with government agencies, affected communities and affected local nongovernmental organizations.

Project sponsors must provide IFC with a complete record of the process by which the right-of-way alignments were selected, including the analysis of alternative alignments, and the consultation with government agencies, affected communities and local nongovernmental organizations.

Erosion And Sediment

Project sponsors should develop an erosion and sediment control plan to minimize erosion in construction areas, reduce the risk of sediment discharge to nearby streams, and provide for long-term maintenance and operation practices that will control erosion and sedimentation. The control plan should include, but should not be limited to, the following measures.

- a) An alignment should be selected to avoid, where possible, areas susceptible to erosion.
- b) The area cleared of vegetation to accommodate construction and roadway development should be minimized and slopes should be stabilized to prevent erosion.

- c) Cleared areas should be promptly revegetated with native grasses, shrubs and trees.
- d) Overland drainage should be controlled to prevent channeling and sediment transport by diverting flows from areas where soils are exposed, and/or by providing filter barriers or settling basins to remove sediment before the runoff is discharged to surface waters.
- e) Culverts should be provided as necessary to prevent the road from disrupting or radically changing the existing drainage regime.
- f) Revegetated areas and areas subject to erosion must be monitored and maintained during project operation.

Construction Materials

- a) In siting raw material borrow pits, quarries, and asphalt and concrete plants, project sponsors should consider adjacent land uses, and the environmental and cultural resources potentially affected by their operation.
- b) Borrow pits, quarries, and asphalt and concrete plants should be developed and operated in accordance with the General Health and Safety Guidelines and the General Environmental Guidelines, so that potential impacts on air quality, water resources, ambient noise levels and sensitive natural environments are minimized.
- c) Project sponsors must ensure that borrow pits and quarry sites used to support the project are subject to a closure and reclamation plan that incorporates the following provisions.
 - i) The land should be restored, to the extent feasible and practicable, to conditions capable of supporting prior land use, or uses that are equivalent to the prior land use.
 - ii) Significant adverse effects on adjacent water resources must be prevented or, if unavoidable, mitigated.
 - iii) Native vegetation should be planted to prevent erosion and encourage self-sustaining development of a productive ecosystem.

- iv) The final grading for the closure should ensure that stormwater runoff does not accumulate and become stagnant, potentially contaminating surface waters or serving as a breeding ground for disease vectors.

- d) Closure plans for asphalt and concrete plants should be in compliance with government requirements and include provisions for: disposal and/or recycling of excess materials; disposal of hazardous wastes; control of erosion; and reclamation of the site.

General Environmental Requirements

- a) Project sponsors must devise a program to train construction personnel in the identification of cultural resources, and mitigate adverse impacts to cultural resources that may occur during project construction.
- b) Ecologically sensitive areas that will be impacted must be addressed in the final roadway design, with provisions for animal bridges and/or tunnels at migratory route crossings, fencing and/or vegetation to prevent animal and vehicle collisions, and additional habitats and migration routes for local animals that may be displaced by the project.
- c) Provisions should be made for residential and business areas affected by project development by reducing right-of-way land requirements, minimizing severance of local access routes, improving crossings and/or alternative access routes, maintaining temporary traffic diversions during the construction phase, and establishing and enforcing safe speed limits.
- d) A plan must be developed to mitigate visual impacts resulting from the project and should include the selection of construction materials that adopt local colors and textures, regrading roadside slopes to match the natural topography, and landscaping and revegetating disturbed areas to enhance natural views.
- e) Ambient noise impacts should be mitigated through appropriate pavement design and maintenance, and aesthetically acceptable noise barriers, such as the placement of earth mounds

or vegetation between the road and sensitive receptors.

- f) Contamination of water resources as a result of stormwater runoff should be minimized in sensitive areas by directing the runoff to settling basins prior to discharge to surface waters.
- g) Storage and liquid impoundment areas for fuels, solvents, deicing materials and waste products should be designed with secondary containment, such as dikes, to prevent the contamination of soils, groundwater and surface waters due to accidental spills or releases.
- h) Disposal facilities must be provided to minimize the amount of roadside litter, and assurances should be made by the project sponsor that these wastes will be collected and properly disposed of in accordance with government regulations.
- i) Pesticides, fertilizers and other maintenance chemicals must be applied strictly according to the directives of the manufacturer, and used in compliance with government regulations.

Road and Highway Safety

Project sponsors should coordinate with government agencies responsible for highway safety, including emergency response. Additional guidelines for highway safety are provided below.

- a) Develop a safety management plan to stay current with information on highway safety.
- b) Ensure unauthorized personnel are prevented from entering hazardous or restricted areas.
- c) Use signs and lights to warn motorists of hazardous driving conditions created by construction interference with existing roads.
- d) Provide adequate maintenance of crossing signals, slow traffic lanes, and paved shoulders for pedestrians and non-motored transportation.
- e) Monitor highway use and safety to identify the need for improvements to paved surfaces, drainage systems, signs, guardrails, footpaths, embankments and other right-of-way features.

- f) Establish procedures for the transport and handling of hazardous materials.
- g) Implement an operations and public emergency response program for spills, fires and major accidents, including emergency equipment and trained personnel, and test critical components of the program on a regular basis.

Hazards Protection

- a) Road and highway facilities should be located, to the extent possible, to minimize potential risks from earthquakes, tidal waves, floods and fires from surrounding areas.
- b) Buildings, bridges and other structures must be designed to criteria appropriate to the local seismic risk, wind and snow loading, and any other dynamically imposed loads associated with climatic and geological factors inherent at the location; certification of the design criteria used must be provided by the structural engineers or architect.

Training

- a) Personnel involved in the construction and operation of the project must be trained on the hazards, safety procedures and emergency response plan associated with their tasks.
- b) Maintenance crews must be trained on the proper use and disposal of pesticides and other chemicals.
- c) Project sponsors must provide training for monitoring and mitigating the effects of the project on environmental and sociocultural resources.

Record Keeping and Reporting

- a) The sponsor must maintain records of significant environmental matters, including monitoring data, spills, occupational accidents and illnesses, and fires and other emergencies.
- b) Records of public complaints and accidents involving the general public must be maintained.
- c) The above information must be reviewed and evaluated to improve the effectiveness of the

environmental, health and safety program, and
an annual summary provided to IFC.

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