

TERMS OF REFERENCE

(This ToR is valid only for one and half years from the date of issue)

This ToR has been issued by the Central Environmental Authority (CEA) only as a means of providing guidance for preparation of the Environmental Impact Assessment (EIA) report for the proposed project. Required information on impacts mitigation measures etc. which will be useful in decision making should be incorporated in the EIA report based on the findings of the EIA study.

Issuance of the ToR does not in any way reflect an agreement on the part of the CEA regarding the granting of approval for the project. It is the responsibility of the project proponent to clear any issues regarding land ownership and to obtain approvals required from agencies other than the CEA. In the case where the project is to be sited on state land we recommend obtaining “in principle” approval of the land owner, prior to embarking on the EIA report preparation. The CEA will not be responsible for any costs incurred by the project proponent in EIA report preparation in case the project is rejected.

Project Name	:	Ruwanpura Expressway Project Phase 2 from Ingiriya (26+300 Km) to Ratnapura (52+500 Km) and Phase 3 from Ratnapura (52+500 Km) to Palmadulla (76+450 Km)
Project Proponent	:	Road Development Authority
Project Approving Agency	:	Central Environmental Authority
Report requirement	:	Environmental Impact Assessment (EIA) report
Date of issue of the ToR	:	04.10.2021
Report format	:	

Executive Summary

1. Introduction
2. Reasonable alternatives and description of the proposed project
3. Description of the existing environment
4. Anticipated environmental impacts of proposed project
5. Proposed mitigation measures
6. Cost - Benefit Analysis
7. Environmental Management Plan
8. Conclusion and Recommendation

Annexure

- I Terms of Reference
- II References
- III Sources of data & information
- IV List of preparers including their work allocation (Report should be authenticated by the preparers)
- V Comments made by the public, NGOs and other agencies during formal and informal scoping meetings held by the EIA study Team
- VI Relevant approvals and consent letters obtained
- VII Complete set of relevant maps, tables, charts, layout plans and other details

Executive Summary

The summary should be a brief, non-technical summary of the justification of the proposed project, description of the salient features of the project, the existing environment of the project sites and its environs, key environmental impacts, the measures proposed to mitigate the environmental impacts, extended cost benefit analysis, monitoring programme and conclusions.

A one page summary table indicating the significant impacts and proposed mitigation measures should be presented.

1. INTRODUCTION

- 1.1 Background of the project (Brief history of the project, its current status etc.)
- 1.2 Objective of the proposed project and justification of the project (Summarize the need of the project. Please note that concerns of the planning agencies such as National Physical Planning Department need to be considered).
- 1.3 Objective of the EIA report (Specify the objectives of the assessment and the relationship of the results to project design and implementation).
- 1.4 Methodologies and technologies adopted in EIA report preparation
- 1.5 Conformity with existing or proposed developments and/ or conservation plans in the area/ relevant government policies.
- 1.6 Preliminary approvals needed for the project and any conditions laid down by state agencies in granting preliminary clearance for the project
Ex: National Physical Planning Department, National Planning Department, Urban Development Authority, Irrigation Department, Archeological Department

2. REASONABLE ALTERNATIVES AND DESCRIPTION OF THE PROPOSED PROJECT

2.1 Evaluation of Alternatives

- Describe reasonable alternatives considered in the course of developing the project and the basic environmental engineering and economic parameters used in their investigation and evaluation. The following alternatives shall be described;
 - No action alternative
 - Alternative routes
 - Siting
 - Design
 - Technology selection
 - Construction methods
- Compare alternatives considered both during pre-feasibility and feasibility stages of the project in terms of potential environmental impacts, mitigation of environmental impacts, capital and operating costs, reliability etc.
- Comparison of the alternatives considered and recommendations should be given with respect to selected option (Give clear reasons for why such alternatives were rejected in preference to the one recommended).

2.2 Description of the proposed project

2.2.1. Project Location land ownership of the proposed project

Following details should be given in order to get a clear picture of the project

- Location, indicating the Divisional Secretariat Division/s and the Local Authority area/s within which the project site falls. GPS coordinates of the Centerline of the final trace.
- Location map(s) of appropriate scale indicating the project site (road trace and surrounding land use). Clear coloured and readable maps together with diagrams and photographs to be provided for reviewer to get a clear understanding of the project area.
- Ownership of the project site (public / private / other- specify)
(If state owned especially either by the Forest Department or Department of Wildlife Conservation, in principle approval/ consent of the state agencies are required for release of the land for the project).

2.2.2. Project Details

- Design details of all project components including the following
 - Length of the trace, width of the Right of Way (RoW), length, width and height of the cut /fill (embankment) sections, length, width, height and vertical clearances of the elevated structures, number of lanes, interchanges, ramps, toll plazas, dimensions and number of grade separated crossings (overpasses, underpasses etc) and tunnels (if any), drainage provisions, service areas to be kept etc
- Methodology of construction
 - Steps in construction process such as methodologies applied for preliminary works, earth works, construction of structures (including installation of foundations, piles, piers, decks within the marshes and water bodies), ground development and removal of unwanted materials, temporary facilities, Greenery works and temporary activities should be described. Construction technology to be applied for plain terrain/hilly area/water bodies should also be described.
 - All relevant details including methodology of construction of any actions/additional structures both permanent and temporary (such as pilot/service roads) to be installed to support the project activities, area earmarked and the removal procedure of such works also need to be described. Any engineering or technical adaptation to be followed to avoid ground subsidence/ any collapses. Management procedures/ technologies to be adopted to be indicated when road traverses through already established public utility services.
 - Construction materials
 - Quantities of raw material required and sources (all sources for material extraction should be proposed upon identification of the availability of such sources with the relevant agencies such as GSMB. Approvals/consent obtained from such agencies needs to be annexed)
 - Locations of material storage, temporary facilities to be established
 - Details of supportive plants such as operation of asphalt batching, metal crushing along with location
 - Temporary stockpiling & disposal of earth/soil/debris with locations, anticipated quantities and suitability of selected sites for such work and any

improvements/developments required at such sites (Attach recommendations received from such relevant agencies).

- Solid waste & wastewater management
 - Anticipated quantity of solid waste such as plastics, cement debris, construction debris etc. / scheduled waste/ with quantities / materials use se for piling/ and its management and final disposal
 - Wastewater generated due to project activities (including labour camps, dewatering process of which water accumulated during the construction/ piling) and its management.
- Project Layout plan
 - The layout plan(s) of the project at appropriate scale. This should indicate all the project components mentioned above and reservations to be maintained. The layout plan should also indicate the project area depicting RoW of the road trace and foot print of elevated structures, embankment/cut sections of the road trace and interchanges.

2.2.3 Implementation plan

- Construction programme (timing and duration of all project activities from preconstruction to full operation)
- Requirement and availability of workforce
- Phased development activities If such activities are envisaged
- Methodology of operation of the project components, any maintenance requirements during operational phase and methodologies to be used
- Environmental monitoring works along with locations for all environmental aspects especially noise, air quality and ground vibration, low lying area filling both construction and operation stages
- Ownership of the project after completion of the project

2.2.4 Project cost, investment and funding sources.

- Project cost including construction, operation, maintenance cost along with break downs
- Investment and funding sources.

3. DESCRIPTION OF THE EXISTING ENVIRONMENT

3.1 Study Area

The study area for the assessment shall include but not be limited to, the following;

- i) Project site (area within proposed Right of Way (RoW) and areas where project related constructions such as drainage structures, interchanges etc. are planned)
- ii) The area beyond the Right of Way (Row) and 100 m buffer that has a likelihood of being significantly impacted (“influenced area”), which must also include areas in the vicinity of the ancillary constructions. (The limits of “influenced area” should be identified by the study team with clear justification.
- iii) Offsite locations which will be affected due to activities of the project.

Assemble, evaluate and present baseline data on the relevant environmental characteristics of the areas identified under (i), (ii) and (iii) above.

This chapter should provide representative information on physical, biological socio-economic, archaeological and cultural aspects of the environment likely to be affected by any activity of the project during and after the project construction period. Information should be presented in a comprehensive format using photographs, tables, maps and diagrams where appropriate. The maps provided must be clear, readable and in coloured form and appropriate scale. An updated satellite images may also be used. The methods used to collect data should be clearly stated under each category.

The existing environment should be described under following;

3.2 Physical aspects

- Description of the existing land use (directly and indirectly affected land use categories/ areas to be indicated)
- Geology and soil types
 - Identify of terrain conditions with the aid of existing contour maps, slope maps, geological and landslide hazard zonation maps. Drone survey/photo geological survey could be provided as required.
 - Describe general geology of the area and detailed description of geology along the road trace of the project. Provide a regional geology map (1:100,000) to describe geology of the region and site specific geology map to describe the detailed geology of the impact area at suitable scale (preferably at 1:10,000 scale on 500m distance either side of the center line, without enlarging existing 1:100,000 regional geology maps)
 - Bore-hole data or augur-hole data to determine the soil type and the thickness of the soil layer and depth to hard bedrock at every major structure locations along the road trace. Provide few geological sections along the road and across the road (Few bore-holes or auger-holes should be drilled at suitable locations up to the bed rock)
 - Include a detailed landslide study report along the road trace to identify landslide risk of the proposed road and to identify previous landslide locations which may affect the road trace (Records of landslide occurrence to be provided).
 - Geophysical survey to identify abandoned gem mining pits and other cavities of voids especially along the river trace.
 - Include detailed groundwater study report of the entire project area.
- Existing ground levels with respect to MSL along the trace (LS) and the immediate vicinity
- Rainfall data both historic and projected for climate change scenarios (monthly rainfall data for the last 10 years for the rainfall stations in the vicinity of the proposed expressway trace, critical rain fall events induced flooding , updated IDF curves)
- Hydrology and drainage
 - List and maps showing rivers, streams, drainage pathways, flood plains etc. encountered (with basic information such as width, peak flows etc.)
 - Flood retention/ detention areas, marshy lands or any other wetland encountered (with basic information such as extents etc.). Relevant maps in this regard needs to be provided additionally.
 - Present flood detention capacity of the lowlands on either sides of the trace
 - List and layout of existing flood protection schemes or irrigation schemes (irrigation structures/ anicuts/ maintenance roads etc.) encountered
 - Drainage pattern in and around the proposed trace including drainage capacity of existing waterways and flood ways to which collected water from the road trace is to be discharged (This should be supported by a map of the stream network of the area, clearly labeled with the names of all the significant streams in the network. The map shall extend up to the catchment boundaries).
- Surface water quality along the affected areas (*including BOD₅, COD, Total Suspended Solids, Oil and grease, e-coli and electrical conductivity*) and water uses including water supply intakes and existing sources of water pollution if any etc

- Ground water quality (*Water Level, pH, Turbidity, BOD₅, COD, Temperature, Electrical conductivity, Total Dissolved Solid, and Total coli form and e-coli*) and present uses of ground water.
- Air quality, ground vibration & noise
(Baseline information on air quality, ground vibration levels, noise levels, noise & ground vibration sensitive receptors etc. and locations identified for baseline establishment related to identification of ground water quality, Surface water quality, noise and vibration to be provided including all relevant details together with the maps)
- Information regarding natural disaster (occurrence, frequency and duration of incident prevailed to be indicated)
 - Floods- including flood peak value, inundation levels in the last 50/100 years, inundation periods and inundation areas)

3.2 Ecological aspects (both terrestrial and aquatic)

- A description of protected areas (extent, category etc., ecological services and importance) and other sensitive/reservation habitats (rock outcrops, wetlands, rivers/riverine vegetation, streams etc.) lying within the project area (described under (i, ii, iii above). A map should be provided with the demarcation of the PAs together with the project entities (ROW, other constructions and a 1 km buffer from either side from the centerline).
- A description of the different natural, semi-natural and anthropogenic habitat types (species composition, distribution) in the study area. Ecological significance of the natural/semi-natural habitats should be described.
- Description of fauna and flora including their distribution status (native, endemic, exotic, migrant) and conservation status (threatened status – Critically Endangered, Endangered, Vulnerable, Near Threatened or Least Concern) (if any) within these habitats as divulged through a field survey conducted as part of the EIA and those that have been recorded previously (as evident from published and unpublished documents, informal interviews). Baseline studies and data collection may need to consider seasonal factors.
- Animal movement pathways (including nocturnal species, avifauna, primates (monkeys etc.) aquatic species etc.)
- Nesting and roosting sites (the latter would also include those of bats) within the study area
- Presence of any commercially important species

3.3 Socio-economic and cultural aspects

- Settlements (number of houses, government institutes, commercial buildings/ workplaces, religious places etc.) within the area directly affected by project and within the influenced area separately
- Existing sensitive receptors on either side of the RoW (such as schools, religious places, court houses, archeological monuments/ heritage sites/ locations envisaged with cultural activities)
- Socio economic status of the affected population
- Principal economic activities carried out within the directly affected area
- Agricultural areas (types of crops, extent, number of farmers affected directly and indirectly)
- Planned development activities
- Presence of infrastructure, public/ common utilities/ facilities within directly affected area (roads, railways, water supply lines, sewerage lines, power transmission lines, telecommunication network etc.)
- Service area covered by existing water supply/ irrigation/ flood control structures
- Any land mark or evidence of historic, religious, archeological or cultural/ heritage importance known to be in the study area
- Existing environmental considerations, problems or issues prevailing in the area.

4. ANTICIPATED ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

This chapter should show the overall impacts of the project on the individual environmental components. Impacts should include the direct and indirect, long and short-term, positive and negative effects. When describing the impacts indicate which are irreversible or unavoidable and which can be mitigated to the extent possible. Wherever possible describe impacts quantitatively.

Significance of impacts should be assessed using appropriate techniques. Impacts should be discussed in the order of significance.

Impacts caused by the project activities during the construction phase may differ from the long-term impacts during the operational phase. Significant short-term impacts have to be considered whenever necessary. Following impacts, among others, have to be analyzed and evaluated.

Special attention should be paid but not limited to;

- **Hydrological and drainage impacts**

- Impacts on the natural drainage system to be studied using a mathematical model and the model need to be calibrated and verified for selected past flood events with observed data. Impacts in both Construction (including temporary filling for pilot road, yards, working platforms etc) and operational phases of the proposed project on the hydrology should be analyzed. Climate change impacts (increase in rainfall frequency/intensity) should be incorporated as appropriate in the design. Future developments in land use should also be incorporated. A suitable critical Design rainfall event should be adopted depending on the catchment characteristics.
- Evaluation of impacts from floods (10 year, 25 year, 50 year, 100 year etc.) including impacts on flood detention/retention capacity, discharge levels, storage capacity of affected water bodies, for both construction and operational phases. Worst case scenario, which is likely to be the construction stage should be analyzed in depth.
 - Pilot road drainage openings shall be provided for 5 year return period floods.
 - Subsequently, the main trace shall be designed for 100 year return period floods. 10, 25, 50 year return period flood impacts should also be checked in terms of inundation extent, flood depths, period of inundation etc against the baseline conditions (without the expressway).
- Impacts on river/stream flows (including water levels/flows in the downstream part of the catchment), blockage of drainage pathways, inundation areas and inundation time periods including permanent or temporary stream/channel diversions (if any) should also be discussed using proper hydrological studies. Inundation maps, hydrographs, etc shall be presented in the discussion.
- Any anticipated impacts on flood protection schemes (flood bunds/ gates etc.) and/or other irrigation schemes.
- All the long-term hydrological impacts must allow for predicted climate change.

- **Impacts on surface water quality and ground water quality due to;**

- Spillage, leakages and accidental discharge of fossil oil, waste oil generated from maintenance, washing, serving etc.
- Disposal of liquid (wastewater)/solid wastes (including hazardous) from workers camps, offices, toll plaza buildings, serving at motor pools (if any) etc.

- **Impacts on land stability and soil erosion**
 - Erosion of excavated materials, construction materials etc. and spoil and other waste generated from construction activities and resultant siltation
 - Impacts on the stability of the area due to the project activities and possibility of slope failures (Landslide risk assessment using evaluation criterion to be indicated).
 - Stability assessment of gentle- steep slopes which identified as critical for future failures.
 - Possible impacts due to subsidence/collapsing due to adits (ongoing/abandoned) especially for gem mining
 - Impacts due to natural disaster such as earthquake, landslides

- **Biological /ecological impacts**

Ecological impacts of the project should be assessed and presented clearly and must include the following.

- A description of the impacts on natural habitats and ecosystems. A map should be provided indicating the extents of the impacted areas.
- Habitat fragmentation and loss of connectivity associated with Protected Areas (PA) and Environment Protection Areas (EPA), reservations or other natural habitats should be specifically addressed. Wetlands, forests and the Kaluganga riverine forests should be given specific emphasis.
- A description of the impacts on species i.e. flora and fauna, particularly on endemic and threatened species, and impacts on migratory or movement paths, foraging, nesting and roosting sites, within PAs and other sensitive habitats. The PAs and EPAs and reservations should be addressed separately.
- Description of impacts on species/habitats outside the PA, EPA and reservations – e.g. tributaries that might be impacted.
- Impacts must include the loss of habitats and the death, displacement and disturbance of fauna.
- A count (species & distribution and conservation status) of trees that would have to be removed due to project activities
- Loss and alteration of natural functions/balance of habitats / ecosystems
- Impacts on aquatic habitats and on paddy/coconut/tea/rubber cultivations due to sedimentation, increased turbidity and contamination due to run off containing increased particulate matter, oil, fuel and other hazardous material or due to other pollutants
- Impacts on ecosystem due to leakages, improper handling of construction materials
(Note: Impacts in each case must be categorized as impacts during site preparation/ construction/ operation phases; low/ moderate/ high; temporary/ permanent)

- **Socio economic impacts**

- Impacts due to losses of properties, agricultural lands, public amenities and significance of such impacts
- Destruction of existing/ongoing economic and livelihood related activities due to construction activities
Any negative impact on social wellbeing (risk on lives , livelihoods such as gem mining, agriculture based on paddy lands, livestock etc of the people in the vicinity (especially due to flooding, in the vicinity as well as downstream part of catchment as a result of the project. Consultation of farmer organizations/public in the vicinity of highway with respect to flood aspects should be done at a satisfactory level in order to avoid public conflicts during construction stage which may lead to delays and increase of project costs and it should be documented and presented).
- Loss of social cohesions and impacts of relocation
- Impacts due to disruption of existing infrastructure facilities

- Impacts due to disruption/ damages to the public/common utilities
 - Impacts on public safety including impacts on people and their properties due to sudden collapses and possible failures caused by project activities.
 - Social unrest due to accidents and heavy vehicle movements due to project activities
 - Possible impacts due to groundwater depletion due to deep cuts /steep slopes
 - Impacts due to migration and settlement of workers (social issues, solid waste disposal, waste water disposal etc.)
 - Impacts on culturally, historically and archaeologically important objects/places
- **Impacts on land stability and soil erosion**
 - Erosion of excavated materials, construction materials etc. and spoil and other waste generated from construction activities and resultant siltation
 - Impacts on the stability of the area due to the project activities and possibility of slope failures (Landslide risk assessment using evaluation criterion to be indicated).
 - Stability assessment of gentle- steep slopes which identified as critical for future failures.
 - Possible impacts due to subsidence/collapsing due to adits (ongoing/abandoned) especially for gem mining
 - Impacts due to natural disaster such as earthquake, landslides
- **Noise and vibration impacts during construction and operation.**
 - Noise / vibration impacts during construction (predicted cumulative impacts during pilling, compaction etc. need to be considered)
 - Distribution of noise levels at expected different fleet compositions should be predicted using a validated mathematical model and results should be presented to identify the impact area and affected population etc,
- **Extraction, process and transportation of construction materials (sand, soil and metal etc.)**
 - Impacts due to extraction of borrow material at such locations
 - Impacts caused by metal crushing plants, asphalt plants, concrete batching plants, precast yards etc.
 - Damages to roads due to movement of heavy vehicles
- **Waste Disposal (Solid & Liquid)**
 - Disposal of dredged material and other solid waste and its impacts on surface/ground water and/or air
 - Waste types (hazardous, domestic, recyclable waste etc.), quantities of and possible impacts (e.g. accumulation & wash off etc)
 - Types and quantities of wastewater generated due to project activities. (including dewatering process of water accumulated during the construction/piling)
 - Wastewater disposal method (type of wastewater with quantities / treatment process (if any) and final discharge) and its impacts on surface /ground water

5. PROPOSED MITIGATION MEASURES

This chapter should set out the proposed measures to minimize the impacts identified in Chapter 4 to maximum possible level including conformity to regulations and national standards. Alternative methods of mitigation should be discussed and effectiveness of the proposed measures that are to be provided should be stated. Mitigation methods should be defined in specific practical terms. A rationale should also be presented for selection of chosen mitigation measures.

A contingency plan for unexpected events for constructional and operational stage should be provided. This plan should indicate anticipated occurrences of accidents such as fire, pollution, natural hazards etc.

Special emphasis should be paid on the following

- Mitigation plan for drainage impacts
 - The drainage management plan should be prepared in order to minimize the flood impacts to the maximum possible level. Drainage management plan for 100 year return period should be considered as the worst case scenario which shall be the construction stage with temporary filling (pilot road, yards, working platforms etc). The drainage management plan should comprise of layout plan of drainage structures such as viaducts/ bridges/culverts/toe drains/cut off drains etc with dimensions for main trace and drainage structures for pilot road. Mitigation measures (such as retention ponds in the upstream, resettlement of people during construction stage etc) for the people affected due to flood impacts due to temporary filling (based on 10, 25, 50 , 100 return period flood analysis) should be provided.
 - Emergency management plan (with breaching sections, criteria for breaching etc) addressing impact due to temporary fillings such as pilot road, working platforms, yards, etc. should also be provided
- Mitigation plan for any ecological and/or biological impacts especially susceptible fauna and flora (reptiles, amphibians and birds etc.)
- Mitigation plan for the affected agricultural lands and wetland functions during operational and construction periods
- Resettlement plans along with schedules, compensation packages
- Measures to salvage/ relocate archeological/ cultural monuments
- Restoration of lands, water bodies, disturbed areas and infrastructure
- Landslide and slope failure mitigation strategies/ plan covering possible geotechnical hazards due to implementation of the project
- Soil conservation plan with siltation and erosion control measures
- Noise & Vibration control measures
- Pollution control measures air quality and water quality aspects
- Emergency preparedness plan in consultation with relevant agencies including identification of breaching sections in pilot/access roads for discharging floods during construction phase, landslides

6. EXTENDED COST BENEFIT ANALYSIS

Extended cost benefit analysis for the project. (The cost of the proposed remedial/ mitigation measures including the cost incurred by the loss of ecosystem services due to the proposed land use changes should be considered additionally).

7. ENVIRONMENTAL MANAGEMENT PLAN

A suitable Environmental Management Plan (EMP) should be submitted to mitigate potential adverse impacts and monitor the changes of environment and implementation of mitigation measures. This plan should include the following;

- (i) Mitigation

- Identifies and summarizes anticipated significant adverse environmental impacts and risks
- Describes each mitigation measure with technical details, including the type of impact to which it relates and conditions under which it is required, together with designs, equipment descriptions, and operating procedures as appropriate
- Contingency plans for maintain services in the event of accident/floods that disrupt project operation.

(ii) Monitoring

A suitable monitoring programme should be submitted to monitor the changes of environment and implementation of mitigation measures. This plan should include the following;

- Parameters to be monitored
- Frequency of monitoring, detection limits and definition of thresholds that will signal the need for corrective action
- Location / timing of sampling
- Institutional framework for mitigation of impacts
- Responsible agency / agencies of monitoring

(iii) Implementation arrangements

- Specifies the implementation schedule showing phasing and coordination with overall project implementation
- Describes the institutional framework, namely who is responsible for carrying out the mitigation and monitoring, which may include, additional topics to strengthen environmental management capability, technical assistance programs, training programs, organizational changes etc,
- Identify the capital and recurrent costs to implement mitigation and monitoring measures described above. Identify the availability and source of funds to implement the measures.

8. CONCLUSION AND RECOMMENDATION

The environmental acceptability of the proposed project and key findings and recommendations of the assessment should be clearly stated.

Any programme to improve general environmental conditions can also be stated here.