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MATARA KATARAGAMA RAILWAY EXTENTION PROJECT

ENVIRONMENTAL ASSESSMENT

**Natural Resources and Environmental Policy Project/
International Resources Group Ltd**

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Environmental Assessment

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SUMMARY

Purpose of the Project

The Matara-Kataragama Railway Extension Project is a component of the Sri Lankan government's development plan for the South. The project seeks to improve access to the South and in doing so generate economic activity and development. It specifically seeks to:

1. Serve pilgrim traffic to shrines in Kataragama.
2. Serve local and foreign tourist traffic to Yala National Park and Bundala Bird Sanctuary.
3. Enhance tourist traffic to major tourist destinations such as Hambantota and Tangalle.
4. Improve transport facilities for goods and produce in and out of the Southern Province.
5. Serve as a mode of transport from the southern parts to the Koggala Free Trade Zone.

GSL has allocated funds for, and work has begun on, the first phase of the project, 17 kilometers between Matara and Dikwella. The following actions have been taken:

- * All persons in the Matara to Dikwella stretch, who would be displaced, have been informed of their need to relocate but have not been advised on the details of the compensation afforded to them;
- * Rs 48 million has been released to the Government Agent Matara for resettlement activities;
- * The route from Matara to Dikwella has been surveyed;
- * An access road, to the Nilwala Ganga bridge site, has been built.

The second phase, between Dikwella and Kataragama, is being planned.

Purpose of Environmental Assessment

The Environmental Assessment (EA) of the Matara Kataragama Railway Extension Project provides the Ministry of Highways and Transport (M/TH) in its capacity as the Project Approving Agency (PAA), project participants, and other decision makers with a study of environmental impacts that are likely to result from the implementation of the entire project. This report will be useful to GSL if it seeks international funding for completion of the project. The findings and recommendations contained in this

report along with other related studies will contribute to Sri Lanka Government Railway's (SLGR) design and implementation of the project. This document will be used by M/TH to develop a system to monitor the environmental effects of the project. This is the first time an EA study has been undertaken by the SLGR. It is also the first time a railway project has been subjected to an EA study.

Project Details and Affected Environment

The proposed railway line runs generally parallel to and inland from the A2 highway, except for the stretch between Matara and Dikwella.

- * The first three kilometers from Matara to Nilwala Ganga the tracks will deviate from the A2 and bisect a densely populated area causing relocation of about 86 families and a few business establishments. The Nilwala Ganga bridge will be located in a mangrove.
- * The rest of the stretch to Dikwella, will traverse mostly through paddy fields, coconut plantations, and residential gardens. At Nakutiya nearly 26 families of goldsmiths will have to be relocated to accommodate the tracks that will bisect the village.
- * Dikwella station will be located 200 meters north of Wewrukannala in Walasgala village. The tracks then converge and run parallel to the A2.
- * The next stop will be 10 kilometers away in Seenimodara, where the station will be located in a sensitive bird habitat.
- * The following five stations along the route -- Tangalle, Medagama, Ranna, Nonagama, and Ambalantota -- will be located in paddy fields. At Tangalle and Ambalantota the rail line will cross Kirama Oya and Walawe Ganga respectively. At Ambalantota, the tracks will go through the town center causing relocation of some business establishments.
- * The next station, Hambantota, will be located in a hilly, undeveloped area about 3.5 kilometers north of the town center.
- * For 16 kilometers beyond Hambantota, the tracks will go north of lewayas, pass through sensitive bird habitats, and cross the A2 before reaching Weerawila. Weerawila station will be located in a paddy field by the side of the A2 highway.
- * The tracks then cross the proposed elephant corridor, between Bundala and Udawalawa parks, and reach Tissamaharama. The Tissamaharama station will be located

about 500 meters from the famous Tissamaharama dagaba.

- * From Tissamaharama up to Bogahapellasa, the tracks will pass through chena land and residential gardens.
- * At Bogahapellasa, the rail line will cross the highway again and the balance stretch of the track will be through a very sensitive wild life habitat and forest up to Kataragama. Current plans call for Kataragama station to be located in a valuable teak plantation.

The distance of the railway from the town center is important for commuter acceptability of the stations. Kataragama, Hambantota, Tangalle and Seenimodara stations, however, will be more than one kilometer away from town centers. Barring Seenimodara, Weerawila, Bogahapellasa and Kataragama, all the other stations will be located in paddy fields.

Project Alternatives

Altogether the GSL/SLGR considered 14 project alternatives before SLGR decided to adopt a modified version of the proposal recommended by Korean Consultants International (KCI). These alternatives were studied by two groups; three by a Korean team and 11 by the University of Moratuwa team. For the Koreans the decision criteria was train speed and travel time. The University of Moratuwa study put more emphasis on development of the South. The EA team assessed three alternatives: the Korean proposal adopted by SLGR, 'no action,' and the Korean proposal with mitigatory measures.

After several site visits, interviews, research and analysis, the EA team concluded that the Korean proposal with mitigatory measures would be the most appropriate course of action. This report provides detailed analysis of the project plan and recommendations to counter adverse socio-economic and environmental effects. M/TH should also evaluate the proposed railway line's implications, in terms of reduced traffic and economic viability, for the proposed Southern Highway Development project.

Significant Environmental Impacts and Recommendations

The most significant environmental impact of this project will be the resettlement of persons, who will be displaced by the project. Numerous socio-economic issues will arise with the relocation of approximately 250 families, and business establishments. Some of these issues are site specific but general issues include: the nature and size of compensation packages; suitable land for alternative housing; loss of livelihood; and adverse changes in lifestyles of those displaced. In addition to site specific recommendations the EA team has made several recommendations for a more cohesive approach to social issues and compensation packages by the authorities.

The most important institutional recommendation made was to involve NHDA in the relocation and rehabilitation of displaced persons. NHDA involvement would greatly enhance SLGR's effectiveness in implementing the project.

Ecological implications of the project include disturbances to bird habitats in Seenimodara and Hambantota and to elephant herds between Bogahapelessa and Kataragama. The project will also cause some deforestation. This assessment includes recommendations and measures to minimize or eliminate such adverse effects of the project. Recommendations include rerouting track between Bogahapelessa and Kataragama, relocating Kataragama station, downsizing Seenimodara station, and track strengthening to reduce noise in sensitive bird habitats.

Other issues assessed by the team included; commuter convenience, protection for sacred sites, and secondary development. Stations at Tangalle, Hambantota, Seenimodara and Kataragama are more than one kilometer away from town centers causing inconvenience to commuters. Although engineering concerns must ultimately play a major role in the selection of station sites, the EA team has suggested alternative sites for Kataragama and Hambantota stations in order to increase commuter convenience and minimize adverse environmental effects. Track strengthening to minimize damage to important archeological and cultural sites is another recommendation of the EA team.

Monitoring

This EA recommends that construction activities of the project be monitored to ensure compliance with environmental regulations and standards. CEA oversight of this monitoring will strengthen SLGR's efforts to gain expertise in environmental impact assessment. The monitoring team should be the environmental cell of M/TH, and a SLGR engineer, or a private consulting firm under contract.

SLGR should make use of this opportunity to strengthen its planning capabilities by incorporating environmental aspects. The SLGR engineer should study social and environmental implications of the project as well as monitor implementation of the recommendations.

Environmental Assessment Team

The EA team included: a civil and environmental engineer, a traffic and transport engineer, a land use planner, a sociologist, and an ecologist.

The team worked in collaboration with the project proponent, Sri Lanka Government Railways. Site visits and discussions were used to provide feedback that was instrumental in effecting changes to the project during the early stages of planning.

CHAPTER 1

OVERVIEW

1.0 PURPOSE AND CONTENT OF ENVIRONMENTAL ASSESSMENT

In 1990, the Government of Sri Lanka (GSL) approved plans for construction of a railroad from Matara to Kataragama. Funding approval was granted for the first 17 kilometers from Matara to Walasgala of the 110 kilometer railway line from Matara to Kataragama. The Environmental Assessment (EA) of the Matara Kataragama Railway Extension Project provides the Ministry of Transport and Highways (M/TH) in its capacity as the Project Approving Agency (PAA), project participants, and other decision makers with a study of environmental impacts that are likely to result from the implementation of the entire project. This report will be useful to GSL if it seeks international funding for completion of the project. The findings and recommendations contained in this report along with other related studies will contribute to Sri Lanka Government Railway's (SLGR) design and implementation of the project. This document will be used by M/TH to develop a system to monitor the environmental effects of the project.

1.1 BACKGROUND TO THE EA

The National Environmental Act (NEA) of 1980, amended in 1988, requires that an EIA study be done for a project of this nature. Responsibility for calling an EIA, setting the terms of reference for the study, reviewing and evaluating the EIA document and final approval or rejection of the project (based on the environmental impacts) rests with M/TH. M/TH will be assisted in this task by the Environmental Cell of the Ministry headed by the State Secretary of Transport. The Central Environmental Authority (CEA) assisted M/TH in the preparation of the terms of reference. Consequently M/TH directed SLGR, the project proponent, to submit an EIA report on the proposed project for approval.

This is the first time an EA study has been undertaken by the SLGR. It is also the first time a railway project has been subjected to an EA study. M/TH requested the Natural Resources and Environmental Policy Project (NAREPP) of the Ministry of Environment and Parliamentary Affairs (MEPA) supported by the United States Agency for International Development (USAID), to provide technical assistance. The EA team comprised of a Civil/Environmental Engineer and four other experts in the areas of sociology, land use planning, ecology and transportation/civil engineering. The team was assisted by Dr. Charles Russell a US consultant on Environmental Impact Assessments.

1.2 LEGAL AND INSTITUTIONAL OVERVIEW

The proposed track will pass through the Southern Provincial Council districts of Matara and Hambantota as well as the Uva Provincial Council district of Monaragala. Districts, however, no longer operate as administrative units. Urban Councils and Pradeshiya Sabhas at local authority level, Provincial Councils at provincial level and Divisional Secretaries on issues pertaining to central government administration, have increased relevance to the project approval process. TABLE 1 provides an overview of the various local and provincial authorities, Divisional Secretaries and other agencies like the Urban Development Authority (UDA), whose jurisdiction applies to the route of the proposed track.

The 13th amendment to the constitution in the scheme of devolution, lists the subject of environment in the concurrent category. This status allows the respective provincial councils to enact their own provincial environment laws and EIA regulations subject to the concurrence of the central government. The Southern and Uva Provincial Councils, however, have not enacted their own environmental legislation. The NEA's EIA regulations are thus applicable in these two provinces. Accordingly, the project will not be burdened with the task of meeting two different sets of EIA requirements for the two provinces. In addition to EIA requirements the project should meet the planning regulations and requirements of the local government ordinances and UDA where applicable.

1.3 LAND ALIENATION OF THE PROJECT

Land to be acquired for the project can be divided into two groups based on ownership: privately owned land and state land.

The initial assessment of the EA team identified three categories of state owned land which will be required for the project: undeveloped state land coming under the jurisdiction of the Ministry of Lands; developed land belonging to other government institutions; and land allocated to a government or local authority for other purposes and projects. Proper legal procedure should be observed in the acquisition of public land for the project. There are no plans to acquire quarry and burrow sites because public/state land acquired under the project is expected to be used for these purposes.

1.4 GSL COMMITMENT

The GSL has given high priority for this project, which will form part of the Southern Area Development plan of the government. The government decision to fund and complete the first stage of the project stretching from Matara to Dikwella (17 kilometers) clearly indicates the priority given for the project.

M/TH plans to use the EA to help identify critical environmental issues and needs. The Ministry has indicated a firm commitment to pay adequate attention to environmental issues. Approval for the project will be conditional on it being environmentally acceptable.

1.5 EIA PROCESS IN SRI LANKA

The 1988 amendments to the NEA provide the regulatory basis for EIA preparation. The EIA process includes scoping sessions, public notice and participation, and appropriate agency review and approval. The CEA is responsible for implementing EIA regulations, and has delegated this authority to PAAs.

In general, the EIA process in Sri Lanka adheres to the following steps:

- A project proponent submits preliminary information to the PAA, which then determines the environmental review requirements.
- The PAA reviews the preliminary information and then undertakes an environmental scoping process to determine whether an Initial Environmental Examination (IEE) or an EIA is required. The scoping process may (but not necessarily have to) include representatives of the public (affected communities, non-government organizations [NGO], etc.), as well as agencies involved in project decisions. The scoping process is to result in the establishment of the scope of work for the required environmental document.
- If an EIA is required, it is to be prepared by the project proponent, in consultation with the CEA, PAA, and whatever donor agency may be involved.
- When the EIA is submitted, the PAA is to publish a notice in the Gazette and one national newspaper in each of the Sinhala, Tamil, and English languages, offering the public 30 days to review the document and submit written comments.
- An optional public hearing may be held on the proposed project on completion of the public review period.
- Following review of the EIA and the public comments the PAA decides whether or not to approve a proposed project. The decision may be appealed for administrative review.

Regulation to implement the 1988 NEA amendments have not yet been gazetted.

1.6 OTHER PROJECT ACTIVITIES

Projects in this region cannot be considered to be mutually exclusive in their effect. Other regional development projects and various other externalities need to be taken into account. The EA team considers it necessary to bring this issue to the attention of the project evaluators. **APPENDIX I** lists other major regional projects that are either planned or in the pipeline. Two projects which will have significant interaction in their impact with the proposed project have been are:

1. Southern Highway, which may have impacts on traffic and goods volume and thereby on economic returns;
2. Proposed Jungle corridor between Bundala and Lunugamwehera Park intersecting the proposed railway line, which is a proposal, being studied by Japanese consultants, to drive the isolated elephant herd at Udawalawe, to existing wild life parks and sanctuaries. The Walawe Left Bank area has been proposed for development under Japanese Aid.

1.7 PROJECT GOALS AND OBJECTIVES

The purpose of the project is to extend rail transportation facilities in the Southern Province beyond Matara up to Kataragama to:

1. Serve the pilgrim traffic to shrines in Kataragama.
2. Serve local and foreign tourist traffic to Yala National Park and Bundala Bird Sanctuary.
3. Enhance tourist traffic to major tourist destinations such as Hambantota and Tangalle.
4. Improve transport facilities for goods and produce in and out of the Southern Province.
5. Serve as a mode of transport from the southern parts to the Koggala Free Trade Zone.

1.8 DECISIONS REQUIRED TO INITIATE THE PROJECT

The following actions should precede project implementation:

- * approval of the EA;
- * release of public land required for the project;
- * approvals by UDA and local authorities;
- * necessary approvals from the Irrigation Department to

change irrigation channels and structures;

- * acquisition of private land and property;
- * Highway Department approval for level crossings.

1.9 MAIN FEATURES OF THE ASSESSMENT

The assessment process included team visits to the sites, interviews and discussions with officials from public agencies, NGOs and representatives of the communities, and reviews of relevant documents and maps.

1.9.1 Project Visits

The following visits were made by the project team to the project site area.

1. Two day project visit, on 16 & 17 January 1993, by Mr. Vasantha Siriwardhena (team leader), Dr. Charles Russell (US EA consultant to the team) and Mr. Jinadasa (SLGR project engineer). The team visited all major sections of the proposed track including all proposed station sites, bridge sites and previously identified burrow pits and quarry sites.
2. Two day site visit on 20 & 21 February 1993 by EA team members. This visit covered the area and sites mentioned above. The team also met members of the public in Matara, Dickwella (Wewrukannala) and Kataragama.
3. One week visit, from 10 to 17 March 1993, by the team sociologist who carried out rapid social appraisal. Those interviewed include public officials, community leaders, NGOs, religious dignitaries and members of the public in the affected area.
4. One day area visit, on 25 March 1993, by the team leader and the sociologist to study the feasibility of the alternate track for Matara (British proposal made in the 1940s).
5. One day site visit, on 20 April 1993, by the team leader and the SLGR project engineer to study changes to the route and stations.

1.9.2 Meetings

1. The project team has met five times as a group to review and discuss the process, findings and observations.
2. The team leader and other team members have met key persons

in the following public institutions: UDA, Irrigation Department, Sri Lanka Government Railways, Forest Department, Wild Life Department and Divisional Secretaries in the Project area.

3. The project team also met the Deputy Chief Engineer of the SLGR, on an interim basis, to inform him of the findings.

1.9.3 Documents Reviewed

Southern Railway Line Extension feasibility report of Korea Consultants International (KCI), alternate route study report carried out by University of Moratuwa, Japan International Cooperation Agency (JICA) EA study for Uda Walawa Left Bank Development Project, land use and other relevant maps of the area.

1.9.4 Inputs to Project Planning

EA team had mutually beneficial discussions with SLGR officials while on joint project visits and on several other occasions. Some of the recommendations and observations made by the EA team during the course of these discussions were incorporated into changes in the project plan made by SLGR engineers. The feasibility study that is currently in circulation does not reflect these recent changes. Project plan changes, listed below, have been further detailed in **Appendix II**.

1. Modifications to the proposed route.
2. Precise locations of railway stations, access roads and details on proximity to town centers.
3. Locations and details of identified burrow and quarry sites
4. Details of the number of persons displaced by the project.
5. Any other details which will differ from the original plan.

1.10 ISSUES AND PROBLEMS

After identifying project impacts the team selected the following major issues to be dealt with in the EA report:

- * relocation and resettlement of people;
- * impact of damming on plains which may get flooded - particularly in the Nilwala Ganga flood protection scheme;
- * impact on paddy land, water supply, drainage and consequent loss of livelihood;

- * impact on forests, wildlife and ecosystems in the district of Hambantota and Kataragama area;
- * quarry and burrow site selection;
- * impact of vibration on masonry and other structures;
- * secondary development issues with respect to land use.

CHAPTER 2

PROJECT ALTERNATIVES

2.0 BACKGROUND TO SELECTION OF ALTERNATIVES

The KCI feasibility study considered three routes and recommended a route, running almost parallel to the A2 highway, hereinafter referred to as Korean Trace (Figure 1). Subsequently, on the request of M/TH, the University of Moratuwa studied several alternatives to Korean Trace, taking the track through the hinterland of the Southern Province with the objective of developing the under-developed areas of the Southern and Sabaragamuwa provinces.

Altogether 14 alternatives were considered by the two consultant groups: 3 by the Koreans and 11 by the University of Moratuwa team. The KCI feasibility report provided a comparative analysis of the three routes but stopped short of providing clear justification or selection criteria. Nor did KCI support their selection of the route vis-a-vie the project objectives of Southern Region Development. This has resulted in considerable socio-political pressure on the authorities to consider more alternatives to the proposed projects and to explore the feasibility of taking the route to the interior of the Southern Province. For these reasons SLGR requested the University of Moratuwa study the viability of taking a route through the hinterland of the Southern Region with a view to serving the lesser developed interior. SLGR has also proposed two alternatives (deviations from proposed Korean Trace). However for a more comprehensive analysis the University team considered 11 alternatives including the two deviations proposed by SLGR.

KCI's route selection appears to have been based on engineering and traffic considerations. They estimate that as many as 10,000 travellers per day visit Kataragama in the month of May alone. Approximately 90 per cent of the visitors use cars, chartered buses, lorries and other forms of private transport. They expect this figure to increase by about five per cent each year. The accuracy, however, of traffic estimations used and assumptions made is arguable. Their choice of Route 2 was subject to an environmental examination and a recommendation to incorporate suitable mitigatory measures to control adverse environmental impacts. The University of Moratuwa study has more focus on traffic and regional development considerations and proposes a route deviating from the Korean Trace (Route 2) at Walasgala, passing through Beliatta and re-joining it at Tangalle. The rest of the proposed route is similar to Korean Trace. The Moratuwa team assessed that any of the proposed routes could be adopted with suitable mitigatory measures without

adverse environmental consequences. The Moratuwa University study also suggested that bringing railway stations closer to nodal points (town centers) might make the railway more attractive to commuters. The study recommends that 700 meters be the maximum distance from the station to the node.

Considering these suggestions and options proposed by the two teams SLGR has now decided to implement the route proposed by KCI with slight modifications to bring the stations closer to town centers.

The approach taken by both studies was to select the preferred option based on engineering and/or traffic criteria and then evaluate the preferred option on environmental grounds. The EA team views this as a logical approach and are in full agreement with the methodology. The EA team has not attempted to verify the assumptions and methods followed in traffic forecasting, engineering data and economic evaluation.

2.1 DESCRIPTION OF ALTERNATIVES

Conceptually the EA should consider alternatives on the basis of achieving project objectives equally or better than the proposed project at lesser environmental costs. The project feasibility study is unfortunately not very clear on how and to what extent the proposed action will achieve the project objectives better than any other alternative. The EA team assumed that the project proponent had adequately considered these aspects in proposing the Korean Route 2 (modified) as the preferred option. The EA team, therefore, did not research the validity of the selection in terms of engineering, technical, economic or traffic points of views.

On this basis the EA team decided to limit its research to three main alternatives. They are: the project as currently proposed, the 'no action' alternative and the proposed project with mitigatory measures.

2.1.1 Alternative I

The proposed project with a two kilometer wide UDA zone with the track as the center.

2.1.2 Alternative II

The EA team considered it important to discuss the 'no action' option in order to understand the environmental implications if the project were to be canceled.

2.1.3 Alternative III

The proposed project with changes and mitigatory plans deemed suitable by the EA team. The reason for inclusion of this alternative is twofold.

1. Despite the mitigatory measures, the project is expected to result in some changes to the environment. The EA team considered it important that decision makers be aware of such changes even if they are considered to be the least harmful.

2. The public should be fully aware of the final outcome in terms of their immediate environment.

2.2 EVALUATION OF ALTERNATIVES

Selection of an alternative is made on engineering, traffic and economic considerations and the EA team decided to apply the following criteria to the evaluation of alternatives:

- * the project should maximize public and commuter convenience;
- * the project should minimize need for relocation;
- * the project should minimize exposure to sensitive ecosystems;
- * the project should minimize public inconvenience and damage to property as a result of noise pollution, accidents and vibration;
- * the project should minimize unplanned secondary development.

2.2.1 Alternative I

The main avoidable shortcomings, based on the above criteria, of Alternative I have been identified below.

1. Seenimodara railway station: This site is about 800 meters away from the Matara-Tangalle Road. The station will be located by the bank of Seenimodara Ela and in the vicinity of a bird nesting ground. Although this location is in an ecosensitive area, SLGR engineers claim the topography of the area before Seenimodara dictates this specific location. (refer Chapter 3)
2. Location of Kataragama Railway Station: This site is 1.5 kilometers from the town center on the Sella-Kataragama road. This distance to the pilgrim rest and town center is too far to walk with luggage in hand and too short to

warrant provision of any other mode of transport. Passengers and pilgrims who opt for bus transport (as opposed to rail) would have the advantage of being able to disembark at the pilgrim rest thereby avoiding a long and tiresome trek at the end of a tiring journey. Land is available to facilitate a more suitable location of the railway station.

3. Other adverse impacts of proposed location of Kataragama Railway Station:

The track in Alternative I will pass through a sensitive wildlife and forested area between Bogahapelessa and Kataragama. This can be avoided if the station is relocated.

Construction of the railway station at the present location will result in greater urbanization of Kataragama. Given the religious and cultural significance of Kataragama, it would be preferable to contain development activity to the town center.

4. The railway line should adopt technology to minimize the impact of noise and vibration in the following areas: Matara town area up to Nilwala Bridge, at Walasgala, at Ambalantota and at Tissamaharama.
5. Similar steps should be taken in ecosensitive areas of Hambantota district. (refer Chapter 3)
6. Limit to ten feet on each side of the track, the area designated as "railway reservation." This would reduce loss of property and prevent development of shanties in urban areas.
7. The proposed location for Hambantota is technically inconvenient and is liable to be economically costly.

2.2.2 Alternative II

At present it takes about two hours to reach Kataragama from Matara and traffic increases are likely. If both the proposed project and the Southern Highway project are delayed or not implemented, traffic congestion and travel time will increase as will the frequency of accidents. KCI estimate that as many as 10,000 travellers per day visit Kataragama in the month of May. Approximately 90 per cent of the visitors use cars, chartered buses, lorries and other forms of private transport. They expect this figure to increase by about five per cent each year if current conditions prevail.

The availability of rail transport to Kataragama will benefit visitors from other parts of the country. The railway link to Kataragama will most benefit government servants who will be able to use railway warrants, thus reducing travel costs.

Alternative II will deny them this benefit.

This alternative will not cause any changes in land use patterns in any of the urban areas. 'No action,' however, will prevent development of unauthorized human settlements along the railway line in urban areas. Poor soil quality and lack of water are expected to counter development pressures on lands in eco-sensitive areas identified by the EA team. The EA team does not expect these ecosystems to be threatened by other users if the project were not to be implemented.

2.2.3 Alternative III

Alternative III is the proposed project with the following changes:

- * relocating Seenimodara station within one kilometer of the A2 road and limiting it to a railway halt as opposed to a full sized station;
- * relocating Kataragama station closer to Kataragama town and behind the present pilgrim rest area;
- * structural improvements to the track in the Matara town area, Walasgala, Tissamaharama and other ecosensitive areas to reduce noise and vibrations;
- * relocating Hambantota station at the Hambantota-Gonoruwa level crossing.

2.3 THE PREFERRED ALTERNATIVE

The EA teams recommends Alternative III with the incorporation of specific mitigatory measures incorporated in Chapter 5.0.

These measures make marginal changes to the original track without increasing engineering costs in an appreciable way. There will be cost savings in proposed station changes at Seenimodara, Hambantota and Kataragama. There will also be cost savings in the proposed track changes between Bogahapelessa and Kataragama. The proponents can still base their planning on a previously allocated budget. Further the recommendations will enhance commuter acceptability and positively contribute to higher revenues.

The proposed changes will reduce or completely avoid structural damages to buildings and structures like the archaeologically important Tissamaharama Dagaba. These changes that accommodate religious and cultural sensitivities will improve public acceptability of the project and reduce externalities.

CHAPTER 3

AFFECTED ENVIRONMENT

3.0 LOCATION

The proposed Korean Trace of the Matara-Kataragama railway line runs through the districts of Matara, Hambantota and Monaragala. Most of the 110 kilometer long track will be confined to the Matara and Hambantota districts with only a few kilometers of track (final leg) extending in to the Moneragala district.

3.1 CLIMATE

The track passes through two main climatic zones. The first 25 kilometers of track are in the Wet Zone which has hot and moist climatic conditions suitable for vegetation. The average annual rainfall in the wet zone is 125 inches with heaviest rain fall during the months of May, June and July. The rest of the track would be laid in the Southeast Dry Zone of the country with average annual rain fall of about 40 inches. This area receives its highest rainfall during the months of December, January and February. The mean annual temperature for the entire stretch of the track varies between 25 and 28 degrees celsius. The vegetation in the Dry Zone is basically bush jungle type.

3.2 ECONOMY - OUTWARD TRANSPORT

Agriculture dominates the economy of the Southern Province. Most of the tea, rubber and coconut plantations in the province are located in the Galle and Matara districts. There are a few coconut plantations situated in the area covered by the proposed track. The proposed rail link, however, would not be of any benefit to these plantations. There is no evidence to suggest that there could be a significant supply of coconuts from this region to other regions served by the project.

The new rail link, however, could have a significant impact on the supply and distribution of rice. The Hambantota district produces a considerable amount of the nation's rice supply. If the distribution is properly managed the new rail link could reduce the transportation costs. These savings could be passed on to the consumers.

The fisheries industry is also well established in the area. The main fishery harbors in the region are Tangalle and Kirinda. Once again the net output is not sufficient to warrant any commercial transport to other regions of the country. There is also the fact that the lorry has been, and continues to be, the preferred means of transport of the nation's fisheries industry. SLGR is not perceived to be sufficiently organized to provide efficient transport for an item as easily perishable as fish.

Another major industry is the saltern at Hambantota which is now producing Sri Lanka's entire requirement. The rail line will possibly improve the transportation of salt to other parts of the country and in doing so reduce the costs. This will benefit both the salt industry and the consumer.

There is no evidence of the rail link being of benefit to any other product or sector established in the region. Nor does it appear to have the potential to contribute in a significant manner to any new industrial development in the region.

3.3 ECONOMY - INWARD TRANSPORT

It is difficult to precisely estimate the benefits; the area will clearly gain by the reduction of transport costs of goods coming in to the region. The main items are petroleum products, livestock, sugar, wheat and other essentials.

The project will also definitely benefit tourism in the area. With the availability of a convenient mode of transport it is reasonable to expect a rise in the number of tourists who will visit Yala National Park and other regional attractions. This increase in the flow of tourists would, in turn, benefit other related economic activities in the area.

The project will also benefit local visitors and pilgrims to Kataragama. The KCI feasibility report estimates the number of visitors and pilgrims at 350,000 annually, and rising. However, if there is a large shift of commuters from road to rail, then it is possible that it would have an impact on the road-side economy between Kataragama and Hambantota. At present there are a large number of way side boutiques between Kataragama and Hambantota providing various products and services to travellers. These products and services range from refreshments to exotic fruits and vegetables to other regional products. It is conceivable that some of the affected businesses would relocate to Kataragama, thereby contributing to the urbanization of Kataragama town.

UDA plans for Kataragama town should consider these potential developments. The EA team is of the opinion that the urbanization of the town be carefully controlled so as not to spoil the scenic beauty and natural tranquility of this sacred place.

3.4 HYDROLOGY

Nearly 70 per cent of the proposed rail line will be in the Dry Zone. The balance 30 per cent will be in the Wet Zone. In its entire length it passes four major flood plains and its furthest end is close to another flood plain. Those are: Nilwala Ganga in Matara, Kirama Oya, Walawe Ganga and Kirindi Oya and Manik Ganga. As we move eastward into the Dry Zone from the Wet Zone the total annual water flow in the rivers we cross is in descending order.

Although there was a lack of detailed data on floods, river flow and rainfall, the EA team studied the available information on past floods. The Nilwala Ganga Flood Protection Scheme has reduced the flooding of Matara town area and no flood has been recorded in the town area over the last 5 years. There have, however, been floods in the Kirama Oya basin in recent years. In 1969 the Kirama Oya water level rose three meters above the road level. Drainage channels have since been improved and the extent of flooding has been effectively curbed. Recent floods were generally below road level, and the latest recorded flood was one meter below the road level. No major flooding problem has been recorded in any of the other basins since the floods of 1969.

The proposed track, however, will traverse large areas of paddy fields, and it is conceivable that it could pose some flooding and drainage problems.

Some of the related issues will be:

1. Railway embankments built in the paddy fields and other low lying areas could hinder the natural drainage of surface water. This could aggravate and extend the period of flooding and cause problems associated with water logging. There may also be an overflow of water over the embankments if they are not designed correctly.
2. In irrigated areas, the railway line may interfere with the irrigation and drainage network.
3. The absence of clear records of past flood levels would make it difficult to determine bridge heights.

3.5 BIO-DIVERSITY / ECOSYSTEMS

The railway line will pass through several different ecosystems between Matara and Kataragama.

Ecosystems affected by this project can be categorised as aquatic, semi-aquatic and terrestrial systems. Aquatic ecosystems include flowing water systems and still water bodies. Semi-aquatic ecosystems include marshlands and paddy fields. Terrestrial ecosystems are dry mixed forests and scrub jungle.

3.5.1 Aquatic Ecosystems

1. Rivers, streams and irrigation canals

This railway line will cross four major waterways namely Nilwala Ganga, Kirama Oya, Walawe Ganga and Kirindi Oya besides several minor ones such as small streams and irrigation canals. Impacts on flowing water systems will occur mainly during bridge or culvert construction and will be of a transient nature. Affected flora and fauna of these river bodies are what commonly found in Sri Lankan rivers and streams.

Several species of mangrove plants flourish on the left bank of the Nilwala Ganga. Acanthus ilicifolius (katu ikiri), Sonneratia alba (kirilla), ceriops tagal (pankanda), Dolichondrone spthacea (diya danga), Cerbera manghas (gon kaduru), Nypa fruticans (gin pol) and Acrostichum aureum (karang) are but a few of them. Mangrove plants and animals show many adaptations to their environment and the diversity of species is high. Mangroves are provide an excellent opportunity to study adaptation, diversity and other similar biological phenomena.

2. Irrigation tanks and lewayas

In the district of Hambantota, the railway line will run close to some small irrigation tanks such as Oluwilawewa, Mandegalawewa and Batatawewa. It will also pass through Karagan lewaya and Mahasittara lewaya. These irrigation tanks and lewayas abound with waterfowl, resident and migratory birds such as flamingoes, ducks, pelicans, herons cormorants and shore birds. Sri Lanka being the terminus of the Indo-Asia flyway for migratory birds, many species from as far away as Siberia are known to spend their winter months in the Hambantota district. In fact over 150 species are known to be annual winter visitors to the region arriving in Sri Lanka by mid August and leaving the island in the following year in March, April and May. Most of the resident species breed from December to March making their nests on trees growing in the vicinity of tanks and lewayas or on the ground among the reeds. This stretch of the track is about 10 miles starting from the Hambantota station.

3.5.2 Semi-Aquatic Ecosystems

1. Paddy fields and Marshlands

Paddy fields constitute nearly 20 per cent (271 Hectares) of the total land area taken up by the track and stations: marshlands account for only three per cent (44.7 Hectares). Certain sections of the marsh will have to be

filled up to accommodate the station.

Paddy fields and marshes have their own distinctive fauna among which are several species of herons, egrets, kingfishers, insectivorous and seed-eating birds, rodents, snakes, amphibians, fish mollusc, insects and other invertebrate animals. Inhabitants of paddy fields are subject to various disturbances in the course of normal agricultural activities and adapt to human presence and disturbance fairly quickly.

3.5.3 TERRESTRIAL ECOSYSTEMS

1. Forests and scrub jungle

Degraded secondary dry/mixed forest, scrub jungle & chenas account for 29 per cent (414 Hectares) of the total land taken up by the railway track and stations. The major part of the forested terrain is presently scrub jungle where shift cultivation (chena cultivation) has taken its toll of natural forest vegetation. A small area of degraded secondary mixed forest (degradation resulting from chena cultivation and cutting of trees for timber and firewood) remains between Weerawila and Kataragama. There is also a teak forest to the north-east of the land earmarked for the Kataragama station and yard.

Plant species growing in the scrub jungle show xeromorphic characteristics and attain a height of two to five meters. The common species are Zizyphus napeca(eraminiya), Gymnosporia emarginata(katupila), Dichrostachys cinera(andara), Acacia leucopholoea(katuandare), Carissa spinarum(karamba), and Diospyros ovalifolia(habara). Scattered among these shrubs are tree species such as Drypetes sepiaria (wira), Bauhinia racemosa(maila), feronia limonia(divul), Chloroxylon swietenia (burutha), Strychnos potatorum(ingini), Cassia fistula(ehela) and Cassia auriculata (ranawara). Common succulent species are Aloe vera (komarika), Euphorbia antiquorum (daluk) and Cissus quadrangularis (heerassa). In the forested stretch between Weerawila and Kataragama trees such as Diospyros ebenum (kaluwara), Adina cordifolia (kolon), Azadirachta indica (kohomba), Vitex pinnats (milla), Borrha cordifolia (halmilla) and Manilkara hexandra (palu) are also present tracing a height of 20 to 25 meters.

The number of animals inhabiting these forests have been progressively depleted over the past two decades as a result of shrinking and degradation of faunal habitats. This has been caused by the encroachment of human settlements and activities such as shift cultivation, poaching and felling of trees. Among the large mammals found in these forests an Elephas maximus (elephant), Bubalus bubalis(wild buffalo), Sus scrofa cristatus(wild

boar), Carvus unicolor (sambhur), Axis ceylonensis (spotted deer), Panthera pardus fusca (leopard), Melursus ursinus inornatus (bear), Canis aureus lanka (fox), Semnopithecus priam thersites (Ceylon grey langur) and Macaca sinica (toque monkey). Amongst the small mammals that could be found are squirrels, civet cats, black napped hare, porcupines, pangolins, wild cats, mongooses, rodents, shrews and bats.

There are at least 40 species of resident birds of which four are endemic; they are Gallus lafayetti (Sri Lankan jungle fowl), Galloperdix bicalcarata (Sri Lankan spur fowl), Acridotheres tristis melanosternus (Ceylon common mynah) and Pyononotus melanicterus (black capped bulbul).

Among other vertebrates recorded as being present in the region are six species of amphibians, four species of lizards, two species of tortoises and fourteen species of snakes of which five are endemic; they are Python molurus pimbura (rock python), Ceraspis carinatus (Sri Lankan wolf snake), Chrysopelea taprobanica (golden tree snake), Oligodon sublineatus (Dumeril's kukrisnake) and Bungurus ceylonicus (Sri lankan krait).

2. Seenimodera Station

The proposed site for Seenimodera station is about 800 meters from the main road in a sparsely populated, wooded area traversed by a stream. This area is rich in bird species both resident and migrant.

3.5.4 Proposed Elephant Corridor

Under the Walawae Left Bank Extension Scheme (WLBES), 15,700 Hectares of land southeast of the Udawalawe Dam will be developed for agricultural purposes and settlements. A study carried out in 1988/89 by the Elephant Conservation Unit of the Department of Wildlife Conservation has revealed that 50 to 75 elephants inhabit the project area. It is imperative that these animals be moved out to prevent serious conflicts between man and elephant. WLBES proposes to drive the elephants off the project area into the National parks at Udawalawe and Lunugamvehera through jungle corridors two to three kilometers wide linking the Bundala sanctuary and the Badagiriya tank to these National parks. Once the elephants are evacuated from the WLBES area, an electric fence could be erected extending southwards from Suriyawewa a distance of 43.4 kilometers to Sippikulama to prevent the displaced elephants backtracking into the project area.

If these proposals are implemented the proposed railway line will intersect the jungle corridor at Weligatta and the electric fence at Bandiakanda. During wet weather these elephants are

known to move in small family groups but in the dry season, herds numbering from 30 to 50 animals have been observed in the vicinity of the Ridiyagama tank. Once the corridors are set up, elephants will not only move northwards but also southward towards the Bundala sanctuary. Before entering the Bundala sanctuary they have to cross the railway track. At this point, they could, instead of travelling southward, turn to the left or to the right and proceed along the railway track. High speed trains plying on this track will pose a grave threat to elephant herds taking this route.

3.5.5 Health and Pest Issues

Kataragama is reported to have a high incidence of the mosquito that spreads Malaria. Hambantota has, in the past, been subject to attacks by paddy pests. The proposed railway link poses a greater risk of transborder infestations of these pests.

3.6 LAND USE PATTERN

The following key observations were made of existing land use in the project area. For purposes of clarity the description is divided into four sections on the following basis:

- 1) Land use along the track including the reservation;
- 2) Land use at proposed railway station sites;
- 3) Land use in the two kilometer UDA corridor;
- 4) Land use at burrow and quarry sites.

- 1) Land use along the track including the reservation.

The track passes through some heavily populated residential and urban areas within the Matara Urban Council limits. This land use pattern prevails up to the marsh and the bridge site over the Nilwala Ganga. Beyond Matara the proposed track intersects a few heavily built up areas. These stretches are sections of the track in the vicinity of Kekunadara, Babaranda, Walasgala, Ambalantota and Kataragama railway stations. At Kekunadara and Babaranda, houses and other buildings are far apart and only a few permanent structures will have to be demolished for the purpose. At Walasgala a number of relatively new buildings and houses situated East of the proposed railway station site will have to be razed. The first one kilometer from the Walasgala Station will stretch through a heavily residential area. Much of the remaining track will pass through paddy fields, residential gardens, coconut estates and the like. **Table 2** provides a detailed understanding of the various areas covered by the project.

Significantly different land use can be observed in some of the other areas traversed by the track, such as the salterns in Hambantota, scrub jungle and chena between Weerawila and Tissamaharama. The track is proposed to be laid slightly to the north of the salterns. At Weerawila up to Tissamaharama the track passes through existing and abandoned chenas, scrub jungle and small patches of secondary forest. The Tissamaharama Station is to be located in a paddy field southeast of Tissamaharama Temple. The track beyond Tissamaharama, up to Bogahapellasa, winds its way through paddy fields, scrub jungle, abandoned and existing chenas. At Bogahapellasa the track crosses the existing Tissa-Kataragama Highway and runs close to it as it passes through a residential area. From that point onwards the track runs along a hill range passing through secondary forest area up to Kataragama. Near Kataragama, the proposed station is located in a teak Forest belonging to the Department of Forests in the village of Galpotuwa. A few families in this village will be forced out of their homes to give way to the station and yard. Most of these houses are mud huts with cadjan roof cover. The village has both encroachers and legal occupants.

2. Land use at proposed railway stations.

The railway stations planned for Kekunadura, Babaranda, Medagama, Tangalle, Ranna, Nonagama, Ambalantota and Tissamaharama would be located in paddy fields. Except for Medagama and Tangalle all other stations are adequately close (less than half a kilometer) to the respective town centers. Kekunadura, Babaranda, Tangalle, Ranna and Nonagama stations are planned by the side of the service roads. Tissamaharama and Ambalangoda stations, although close to the service road, need access roads. Walasgala station is about 200 meters from the famous Vevrukannala Temple and situated in a built up area by the side of the Dikwella-Beliatta road. Seenimodara station is about 1.2 kilometers away from Seenimodara town which is situated along the Matara-Kataragama highway. Population density in this area is negligible. Seenimodara station will be located by the side of Seenimodara Oya in a virtually abandoned coconut estate that is reverting to jungle. Land in this area is both privately and publicly owned. The area is very sparsely populated and no houses could be seen in the vicinity. The proposed station will be served by the Seenimodara-Beliatta road, which is at present in dilapidated condition.

The Hambantota Station will be located about 3.5 kilometers from the town center (see FIGURE 2). This location would require an improvement in the condition of access roads. The selected station site would not displace any persons since it is not a residential area. The only significant type of vegetation in the area is Cactus. The Weerawila Station would be located in a scrub jungle about

300 meters from the main road. Bogahapelassa Station will also be located near the main road.

The proposed Kataragama Station will be located 1.5 km away from the town center, in a Teak plantation adjoining the Galhitiya village. An estimated 100 acres of potentially valuable timber and productive plantation land will have to be razed to make way for the station and the yard.

3. Land use in the two kilometer UDA corridor.

No extensive study has been done to ascertain the exact land use pattern of this section. This is mainly because this section will not be directly affected by the construction of the railroad. The intention of the planners is to manage the secondary development in a systematic manner particularly around the stations. Therefore, the following discussion will be limited to the study of land use patterns within a radius of one kilometer from the railway stations and other significantly important sections of the track.

- a. Track up to Nilwala river - heavily populated residential area with houses and other forms of infrastructure.
- b. Kekunadura and Babaranda - Both stations would be located near paddy fields. The stations would be built between paddy fields and residential areas.
- c. Walasgala Station - Located about 200 meters north of Weurukanala temple and two kilometers from Dikwella town. The area within a one kilometer of the location can be described as built up.
- d. Seenimodara station - Located in a thinly populated less developed area.
- e. Tangalle station - Situated in a paddy field about 1 kilometer from the town. The area is residential with moderate population density.
- f. Medagama, Ranna, Nonagama - All three stations are located in paddy fields surrounded by residential areas with low population density.
- g. Stretch from Ambalantota bridge to station - Heavily built up business, commercial and residential area.
- h. Ambalantota station - Located in a paddy field. Ambalantota town is within 600 meter radius. The main highway is about 200 meters from the station site.

- i. Hambantota station - Located 3.5 kilometers away from town center on an unproductive stretch of land.
- j. Weerawila Station - The main highway is within 300 meters but the area is basically bush jungle and chena area with very low population density.
- k. Tissamaharama Station - Located in a paddy field along Tissa-Kirinda road and surrounded by built up areas and paddy fields.
- h. Babaranda Station - Situated in chena land. Low population density.
- l. Stretch between Babaranda and Kataragama - Forest and wild life area.
- m. Kataragama Station - Located in a forest area about 1.5 kilometers from the main town center. A built up area is more than one kilometer away from the station site.

4. Quarry and Burrow Sites

Other major land use changes can be expected at quarry and burrow sites. There could be some adverse environmental implications if sufficient care is not taken in site selection and operations. Of the several burrow and quarry sites that would be necessary for construction of the tracks and stations, only three have been identified. All three sites are currently being used for other projects. The three identified sites are: the Nilwala Ganga Project burrow site at Matara; the quarry site at Matara adjoining Nilwala Ganga; and the quarry site at Bogahapellasa. Refer to Chapter 5.0 for recommendations in this regard.

3.7 TOPOGRAPHY AND GENERAL GEOLOGY

In general, the terrain in the area under investigation is relatively flat in all divisions except for a modestly hilly area in the vicinity of Kataragama. Elevations of more than 30m are not uncommon. Nearly half of the length of the proposed route runs over cultivated paddy land, as seen from the survey maps available. The route crosses four major streams, i.e., Nilwala Ganga, Kirama Oya, Walawe Ganga, and Kirindi Oya. There are also other minor rivers, streams and canals in the region. The main geological areas found suitable to obtain construction material

APPENDIX III.

Although land slides are rare in these regions, there is the possibility of such occurrence through infiltration of water through discontinuities once the rock is exposed, particularly

during the rainy season. Sufficient measures must be taken at all sites to ensure that the stability of slopes on the periphery are not affected during or after excavations.

3.7.1 Construction Material

Nearly half of the total length of the proposed route runs over low lying areas, such as paddy fields and marshes, which are regarded as regions with unsuitable or poor ground conditions.

An embankment having a seven meter wide top surface with 1:1.5 slopes is expected to be built on these regions with poor ground conditions. The height of the embankment may vary with respect to the level of the alignment of the track. It is estimated that at least 50,000 cubic meters of earth will be required to build these embankments.

The quantity of rock material required for the entire length of the rail link between Matara and Kataragama is estimated to be in the range of 280,000 cubic meters.

In order to meet these material requirements a total of sixteen potential quarry sites/burrow areas have been located in close proximity to the route. A description of material and the quantity of material available based on visual examination in each site is detailed in Table 4. SLGR, however, has not made clear whether any of the potential sites would be used.

The sand requirements for construction work would be available from the major river beds along the trace, viz, Nilwala Ganga, Walawe Ganga, Kirama Oya and Menik Ganga. Sand is being manually mined from river beds at present as per demand. Sea sand, of suitable granular distribution, could be substituted for river sand provided the sand is washed free of sodium chloride prior to use.

3.8 SOCIAL IMPACT ASSESSMENT

The purpose of this study is to identify the major social issues concerning the affected populations. Due to time constraints a decision was made to use a rapid rural appraisal technique to identify the socio-economic conditions and major social issues of the community concerned.

Fieldwork primarily involved semi-structured interviews. Interviews (individual and group) were conducted with:

- (1) a group of people from the same community with various socioeconomic backgrounds and concerns
- (2) Village leaders, Grama Niladaris, Buddhist Monks and members of various village groups.

- (3) Divisional Secretaries, Department of Railways, Valuation Officers, Matara's Superintendent of Surveys, NGO personnel, and members of the business and banking communities.

3.9 COMMUNITY OVERVIEW

Rapid social appraisal was conducted to assess the affected socio-economic environment and impacts.

The majority of people who will be affected by the said project will be Sinhala-Buddhists and the balance comprise of Sinhala-Christians and Muslims. The percentage of Sinhala-Buddhists affected by the project is in keeping with the population ratios for the districts of Matara and Hambantota. The affected population in the Monaragala district (at Kataragama) is primarily Sinhala-Buddhist. It does not appear that the project would have an unfair bearing on any particular ethnic group.

There were some people, however, who felt that they would be adversely affected by the project. Most of the people with reservations about the project are those whose homes and businesses would be demolished to make way for the tracks and railway stations. Their gravest concern is that they will be given land far away without adequate facilities. People are also concerned about their income levels being affected negatively by having to take on jobs that pay less. In addition, they are concerned over the capital loss on their properties, and the high cost of rebuilding.

3.9.1 Route Change - "Society of Residents who will be Displaced"

One of the major social issues confronted by this project is within the Matara Town Council area. The area concerned stretches from the Matara Railway Station up to the proposed Nilwala Ganga bridge. This is an urban residential area. There is a satisfactory level of infrastructure for the residents. The land prices vary from Rs 40,000.00 to Rs 25,000.00 a perch. This area is densely populated with an average six members to a household. The majority of people are public servants, professionals and businessmen. Other residents include low income groups of factory workers, labourers and craftsmen. Most of the houses affected by the project are well built valuable properties representing middle class life styles.

A group of people from Matara town have formed a People's Organization and filed action in Court to litigate for a fair compensation package. They were successful in getting an injunction against the project implementation, and the case is now pending a Supreme Court decision in Colombo.

Three major demands of the affected people are:

1. To allow them to stay in their present houses for a period of one year or more until they build new houses.
2. To pay compensation based on current market value rather than on rates determined by the government.
3. To provide alternate land within the Matara Town Council area.

There are 86 complaints, and construction will resume only after the case is settled. The Department of Railways has stated that it will abide by the court's decision and will pay compensation due accordingly. Although they do not expect the project to be of any appreciable value to their community, the concerned residents of Matara understand the value of the project to the government and to the residents of other regions covered by the project. Accordingly, they do not seek to cancel the project. Rather, their primary concern is fair compensation.

Much of the dissatisfaction among the affected people is also based on the decision by the SLGR to choose a new route instead of the old route decided by the British-run CGR (Ceylon Government Railways) in the early forties. This decision led to some friction among the members of the community. The prevalent opinion is that the decision to change the track was arbitrary and unfair. There is an allegation that a powerful person, whose house would have otherwise been demolished by the old route, was able to influence the change in the route to save his house. SLGR has not been very forthcoming in either refuting these allegations or in offering valid reasons for the route change. This issue has divided the community. People whose houses are no longer in any danger of being razed are non-committal. Those who will be affected by the change of route are very upset and resentful about it. They also allege that people who bought land, at lower prices, in the vicinity of the old route, will benefit from the route change since their property is no longer targeted for demolition - thus giving them an unfair advantage over those who bought land at higher prices.

People in the area also expect the modified project to cost more. According to information compiled by the "Society of Residents who will be Displaced," the number of houses that will be demolished from Matara to Nilwala Ganga following the new route has increased from 64 to 86. Construction costs are also alleged to be higher at the new Nilwala Ganga bridge site. The rock bed at the new site is supposed to be 60 feet deep, compared to 20 feet at the earlier site. The cost of the bridge will increase if the depth of the rock bed is increased from 20 to 60 feet.

Unlike the old route, the proposed new route will bisect St. Thomas' Girls' School, Matara. SLGR has informed the Principal that compensation money has been paid to the Divisional Secretary's office. The Principal was informed that the school

will receive approximately Rs 110,000.00. She is concerned that the hostel might be forced to close down affecting about 100 children from the surrounding villages. The proposed line will also bisect a public cemetery. The people in the area do not seem to be as concerned about this issue based on the understanding that alternate land would be provided.

In response to public protests, SLGR officials claim:

- * their calculations indicate that Korean trace will demolish only 80 houses - as opposed to 95 houses marked for demolition under the old route plan;
- * their cost estimates are lower for the new route;
- * the same number of level crossings for both routes.

3.9.2 Other Affected People

Beyond Matara town the track would run a minimum of 500m away from the town centers. Most of these towns are fairly small, and there have not been any significant concerns expressed except from Walasgala (Dikwella), and Nakutiya village.

The Dikwella Station would be located at Walasgala, which is about two kilometers from town but 200 meters from the famous Vevrukannala Temple. The Divisional Secretary (DS) of Dikwella was concerned that he had not been informed of the total number of houses that were to be demolished in his division, despite the fact that SLGR had completed marking the track up to Bambaranda village. It is clear, though, that a few permanent buildings and some houses in the vicinity of the proposed railway station would have to be demolished. The track's exact route beyond Dikwella is not yet clear. According to the DS this project will improve transport facilities for people, as for goods like fertilizer, animals and agricultural produce. There are, however, some individual inconveniences and social problems that have arisen as a result of the proposed project. Some of these issues include the loss of ancestral property and families being forced to live apart due to the demolition of their homes and lack of suitable alternative accommodation.

Nakutiya is another village in Matara which will be affected by the project. This village is well known for jewelry manufacturing in Sri Lanka. This is more or less a micro enterprise in the village. All residents basically belong to the same caste and work as goldsmiths. They get orders from jewelry shops in towns, and manufacturing is done at the household level. Nearly 26 houses are slated to be demolished by the project. The residents who would be displaced insist they be provided with houses in the area and in close proximity to each other, similar to the current situation. They prefer to live as a close knit community. Their team identified no other basis for opposition to the project.

In Kataragama at Galhitiya there are no data available on the exact number of houses that would be demolished. The EA team estimates that no more than five to ten, of the 126 houses (both legal occupants and encroachers) in the village, will be demolished. Each family (legal occupants) was given one acre of land by the government about ten years ago. The people now have title to their land. Some people who would be affected had obtained bank loans to build their houses and have not completed repayment. They feel their living standards might worsen if they are asked to relocate to a remote area without any facilities.

In the Kataragama area people interviewed were generally in agreement that this project would bring economic prosperity to their district. The Divisional Secretary, however, has not received any official notification regarding the proposed railway. The DS and GN of Sella-Kataragama under whose jurisdiction Galhitiya village falls suggested an alternate site for the station and yard. They suggested the station be located at the Mahasen Wataxuma (on the Gamudawa road). There are no houses that need to be demolished at this location. That would reduce financial costs and inconvenience to the local community.

The rest of the track goes through paddy, coconut, forest and shrub land. The houses that would be demolished are few and far apart. Outside the town areas, those that would be affected are mainly agricultural and working class communities. In Dickwella, the affected people are primarily labourers (agriculture and non-agriculture), carpenters, masons, goldsmiths, factory workers, government employees and farmers.

3.9.3 NGOs and Peoples Organizations

At present there is no NGO involvement in this project except for the "Society of Residents who will get Displaced" that was formed in Matara to litigate for just compensation. NGOs interviewed are of the opinion that the Southern Railway Extension is not an immediate development priority for the two districts.

3.9.4 Construction Labour

SLGR has indicated that it will bring in various private contractors for all construction jobs except track laying. This job will be undertaken by SLGR since there are no private local contractors with similar experience. SLGR has indicated that these arrangements apply only to the first phase of the project and that construction arrangements for the second phase would depend largely on the source and scope of the funding.

The EA team's assessments indicate high population concentrations and unemployment levels along the route in all areas except for the stretch between Hambantota and Weerawila. As such unskilled local labour will certainly be available in construction areas. Skilled labour, however, will have to be

brought in from outside the area. It is common practice for contractors to bring in, from elsewhere, skilled and unskilled labour. This practice, however, will not ease unemployment in areas served by the project. It is also reasonable to assume that there will be an influx of labourers, from elsewhere, to the project area. Such a situation could cause some concern to the local community. Concerns expressed to the team include:

- * strain on the social balance of the community - strangers in the community could cause tension;
- * strain on the economic balance of the community - more money in circulation;
- * strain on the infrastructure - demand for public utilities, medical facilities, recreation facilities, and other public services.

3.9.5 Land Acquisition and Compensation

Private land to be acquired by the project would be assessed by the Department of Valuation at current market value. The last sale in the area is used to assess the value. All the land required for the project up to Dikwella has been valued.

Based on the Superintendent of Surveys' plan the DS will publish a gazette notification inviting claims to ownership. If there is more than one owner claiming ownership it will be determined through the legal system. Under Section Nine of the Acquisition of Lands Act, legal recourse can be taken for forcible removal of people from private and public lands.

DS Matara is holding Rs 48.5 million in compensation money for the affected residents of Matara. Compensation money has not been paid pending court judgement. Members of communities concerned do not believe they have received accurate information from SLGR on the type of compensation package being offered by the government. The following examples will clearly explain the current situation as synthesized from the team's interviews.

In Naakutiyagama village (Matara district), the GN has informed the people that compensation money will be paid in installments. The MP of their area has informed them that they will receive compensation money and land to build their houses. People are concerned about the kind of compensation package they will be offered by the government. Older people complain that they are unable to build houses or secure alternate accommodation. They would prefer to move into newly built houses when they relocate.

In Dikwella the Divisional Secretary has informed the people that compensation would be determined according to a government rating system and not the current market value. Village people interviewed knew nothing about the compensation package they will receive from the government. When they were questioned about

what kind of compensation they would like to receive all of them felt that government rates were insufficient and that they should be given the current market value for their houses and land.

The authorities in Kataragama have not informed those due to be displaced of their need to relocate their homes. Nor has there been any mention of a compensation package. The GN indicated that the displaced people of Koggola received a good compensation package and a similar package would be recommended for those displaced in Kataragama. The people claim they are willing to relocate if they are given land suitable for cultivation and sufficient money to build their houses. Villagers are particularly interested in getting cultivatable land. However, only cash compensation is planned for the loss of paddy, coconut and similar crops. There are no plans to relocate people on land suitable for cultivation.

3.10 POLLUTION

Except for few short stretches in Matara, Walasgala, and Ambalantota, the rest of the track is over an area which will not be adversely affected by noise pollution.

Except for Matara town council area, the track and station sites are unpolluted at present. There is no significant evidence to suggest that any of the areas traversed by the track are currently subject to soil, solid waste or water pollution. Nor is there sufficient data available to assess the project's pollution generating potential.

3.11 OTHER MAJOR ISSUES

EA team identified one other major environmental issue related to the proposed project. This is the impact of vibration on structures. Three important categories have been identified by the EA team for special attention.

1. Buddhist temples at Wewrukanala and Tissamaharama. The Wewrukanala Temple is the tallest brick masonry Buddhist structure in the country. The railway line would pass just about 200 meters from the temple. The exact distance of the track from the Tissamaharama Temple is not known as the track has not yet been accurately surveyed. However, based on the identified site for the station the EA team is of the opinion that the track will be about 500 meters east of the temple. The temple is nearly 2000 years old and it is a brick masonry and soil structure.
2. Irrigation structures (dams, bunds, etc,.) along the track. Existing irrigation structures were not designed to withstand effects of vibrations generated by rolling stock.
3. Buildings situated close to the track.

CHAPTER 4

ENVIRONMENTAL IMPACTS

4.0 KEY FIELD OBSERVATIONS

This project is expected to have both negative and positive environmental effects. These effects can be categorised in terms of socio-economic consequences, changes in land use, and ecological consequences. Other concerns include pollution and engineering.

4.1 NEGATIVE SOCIO-ECONOMIC CONSEQUENCES

1. In Matara town, the project will force the relocation of about 86 families. These families have lived in the area for several generations, are used to an urban lifestyle, and prefer not to settle outside town. The authorities have experienced difficulty procuring suitable land to resettle these families.
2. The decision, in Matara, to abandon the original route, proposed by the British, has not been clearly explained. This has created a degree of social tension, between those affected by the new route and those who would have been affected by the old route.
3. The 26 families who will be displaced in the village of Nakutiya want to be resettled as a community. The villagers share the same livelihood and caste and would prefer to remain a closely knit community.
4. The government's current compensation plans for acquired property, based on current market value, will be insufficient to cover all costs involved with rebuilding in another location or purchasing property.
5. Traders and service providers currently located in the area will be adversely affected and would find it difficult to rebuild their clientele or regain their current levels of operation.
6. The time allocated for relocation is insufficient. Affected people in Matara have had difficulty coping with the schedules set by the project proponents.
7. The exact nature of the compensation package has not been clearly explained. This has led to a nervous and unsettled atmosphere.

8. Government officers who have direct contact with people have not been informed or briefed on the project's development. Their ignorance of the project along with problems caused by route changes, has further eroded confidence in a fair deal from the government.
9. It is expected that some people will lose their livelihood due to relocation and loss of paddy land.
10. A reduction in road traffic will affect the income and livelihood of way-side vendors who sell exotic vegetables, curd and other regional products to travellers. The urbanization of Kataragama will increase if the vendors relocate there in order to re-establish their businesses.

4.2 POSITIVE SOCIO-ECONOMIC CONSEQUENCES

1. The railway will considerably improve the transportation needs of school children and office workers between Matara and Dikwella.
2. The railway line will improve transport facilities for passengers to Kataragama.
3. With the exception of a section of the residents of Matara, most other communities along the proposed route will gain net socio-economic benefit from the project.
4. The construction phase will generate temporary employment opportunities that would otherwise be unavailable.
5. There will be enhanced potential for development of tourism, industries and agriculture.
6. Facilities for transportation of goods, agricultural produce, salt, etc from Tissamaharama, Tangalle and Kataragama will be improved.
7. In Kataragama, there will be a sufficient influx of clientele to support new businesses that may be established in the vicinity of the station.

4.3 NEGATIVE LAND USE

1. If the area earmarked as "railway reservation" on either side of the track is excessive and otherwise unmanaged it may encourage urban slum development (shanties).
2. The proposed project may increase urbanization of Kataragama town and will urbanize presently undeveloped but valuable forested areas.

3. Burrow and quarry sites may be neglected and wasted on completion of the project. The legal ramifications of such actions are not clear.
4. The track's embankment will reduce water drainage and increase flood retention time causing serious damage to paddy fields that might then have to be abandoned.
5. The track will reduce plot sizes of some of the cultivated land, particularly paddy fields, making it uneconomical to cultivate those plots.
6. Solid waste will collect at station sites requiring disposal. Such waste will also be generated by secondary development in the vicinity of stations and would be most detrimental where stations are located in ecosensitive or culturally significant areas like Hambantota and Kataragama.
7. The track takes considerable portions of valuable urban property in Matara, Dikwella and Ambalantota.
8. Property values, in the vicinity of the tracks, may drop as a result of vibration and noise pollution.

4.4 POSITIVE LAND USE

1. The project will reduce the need for road widening and will eliminate the need for demolition of a large number of buildings on the road side. This situation will particularly benefit the town centers where most business establishments are located on either side of the road.

4.5 ECOLOGICAL ISSUES

Effects of construction on water systems, damage to mangroves, loss of forest cover, bird habitats, elephant migration, mosquito infestation and paddy pest infestation are the major ecological issues that concern the EA team.

4.5.1 Water Systems

Impacts on flowing water systems will occur mainly during bridge or culvert construction, but they will be of a transient nature and not have long term effects on aquatic fauna and flora.

4.5.2 Mangroves

There are several species of mangrove plants on the left bank of the Nilwala Ganga, to the north of the bridge site. Mangrove vegetation is confined to the coastal belt of Sri Lanka. The current levels of mangrove cover do not exceed 0.1 per cent of the nation's total land area.

4.5.3 Forest Cover

Threat to forest cover is small but the track will slash valuable teak plantations at Kataragama in addition to clearing another 300 acres of forest.

4.5.4 Birds

There is a strong possibility that tracks running close to irrigation tanks and lewayas, will disturb resident and migratory bird habitats at the Seenimodara station location and in the Hambantota District. Most of the resident species breed from December to March making their nests on trees growing in the vicinity of tanks and lewayas or on the ground among the reeds. Noise generated initially by construction activities and then by rolling stock may cause migratory birds to avoid settling in areas close to the railway track. A greater threat is posed to resident birds whose favourite nesting sites may lie close to the track. The disturbance might force these birds to leave their nests unprotected and vulnerable to predators.

4.5.5 Elephants

If the plan for the elephant corridor is implemented the railway line will intersect the jungle corridor at Weligatta and the electric fence at Bandiakanda. Once the corridors are set up, elephants will not only move northwards but also southward towards the Bundala Sanctuary. Before entering the Bundala Sanctuary they would be forced to cross the railway track. At this point, they could, instead of travelling southward, turn to the left or to the right and proceed along the railway track. High speed trains plying on this track will pose a serious threat to the elephant herds and vice versa.

4.5.6 Malaria

Extraction of material from burrow sites for the construction of access roads and embankments will leave holes and pits at the burrow sites which, with the onset of rains, could become breeding grounds for mosquitos.

It is known that trains and aircraft could carry disease vectors and crop pests from one country or region to another. Malaria is almost chronic in and around Kataragama because the mosquito (*Anopheles Culicifacies*) breeds freely in this area. It is conceivable that trains plying in and out of the region

might unwittingly carry mosquitos and other pests to other regions. While it is clear that road traffic could do the same, the introduction of rail traffic could possible increase the threat of cross-border infections.

4.5.7 Paddy Pests

A similar threat exists in Hambantota. Hambantota is an important paddy producing region. On this line, from Matara to Kataragama, the proposed route runs about half of its course through paddy fields. Pest outbreaks often begin in random patches and go undetected until the damage becomes quite severe. These outbreaks are often contained by intensive spraying of insecticides which in turn should be avoided for health and safety reasons. In a recent outbreak of the Brown Hopper pest in the Ratnapura District many acres of paddy were totally destroyed. The pest was not detected in the initial stages of infestation. If outbreaks such as this were to occur in the vicinity of this railway line, trains could carry and scatter pests throughout the paddy growing region with catastrophic results. Agricultural officers and farmers would be well advised to maintain a close watch on all pest outbreaks in the vicinity of the tracks.

4.6 ENGINEERING ISSUES

There are several culturally and archaeologically important sites along the route taken by the track. There are also other buildings and structures in the vicinity of the track. The effect of vibration on these structures, from construction and rolling stock, is cause for concern.

4.6.1 Vibration impact on Archeological and Religious sites

Vibration caused by construction and rolling stock could affect both Tissamaharama Dagaba and the Vewrukannala Buddha statue as those are located close to the track. It is not possible to determine the degree of vibration based on current information. The dagaba is more than 2000 years old and has a previous history of structural problems. This resulted in the construction of an alternative road few years back. The Vewrukannala Buddha statue is the tallest statue in the country. This 20 year old masonry statue will most certainly feel the effects of vibration.

4.6.2 Vibration impact on buildings and other structures.

Vibration will also affect other buildings and structures closer to the track. Improvements to the track along the entire length is expensive and may not be economical. Improvements to the track in heavily built up areas like Matara, Walasgala and

Ambalantota, will prevent damage to these structures.

4.7 NOISE POLLUTION

The occupants of houses and other establishments in the vicinity of the track and stations will be subject to high noise levels. Noise pollution would also be an adverse factor for nesting resident and migratory birds. The EA team is not aware of any cost-effective, viable solution to this problem. Measures, however, could be taken to reduce noise pollution in critical areas.

4.8 OTHER OBSERVATIONS

Secondary development and economic activity in the vicinity of stations located in paddy fields and other rural areas is likely to cause an increase in land prices. Given the limited potential for new income generating schemes, and the unlikelihood of a significant influx of capital or clientele, it is very likely that economic gains in the vicinity of stations would result in a corresponding drop in economic activity in other parts of the village. The net change, therefore, in land use, in economic terms, is not clear.

SLGR is now directly involved in resettlement activities. This organization has no experience and little expertise in carrying out an efficient resettlement plan. On the other hand there are several other well experienced organizations that are quite capable of doing the job efficiently. Efforts must be made to make use of the resources of these organizations.

There is inadequate coordination between the various government offices. This situation hinders efficient project implementation.

CHAPTER 5

RECOMMENDATIONS

The environmental effects of the project, as assessed by the EA team, were described in the previous chapter. This chapter offers remedial and mitigatory measures to meet the adverse effects of the project. The EA team's recommendations have been grouped into three categories -- A, B and C. Given the limited availability of funds, the three categories groups are listed in descending order of importance. Recommendations considered critically important in terms of potentially adverse environmental and socio-economic effects are listed in Category A. Recommendations in Category B though important are not as crucial in nature as those in Group A. Recommendations in Category C, though not insignificant, should receive lowest priority. Most of the issues at hand are linked and so are the recommendations. The EA team has also made some other recommendations that could facilitate efficient environmental impact assessments of future SLGR expansion projects.

CATEGORY A

A.1 RELOCATION OF KATARAGAMA RAILWAY STATION AND CHANGES TO TRACK BETWEEN BOGAHAPELLASA AND KATARAGAMA

The team recommends that the proposed Kataragama railway station be relocated. The primary argument in favour of the proposed location is that it facilitates a future extension of the line to Badulla. After reviewing all the possible options the EA team proposes the following changes to the proposed Kataragama railway station and the stretch of track between Bogahapellasa and Kataragama. (Refer FIGURE 3).

Kataragama railway station could be relocated behind the present Kataragama bus terminal. There is adequate flat land (paddy fields) available behind the bus terminal and the track could be laid alongside the Tissa-Kataragama road. If SLGR decided to extend the line to Badulla in the future they would be able to do so with an arrangement similar to that at Galle for the Galle-Matara line. If the station's orientation is carefully planned, a simpler arrangement than at Galle might be possible to facilitate future extension of the track. The economic and environmental advantages of relocating the proposed station at Kataragama are listed below.

1. The proposed change would allow the railway line to avoid a forested area. This would reduce the threat to wild life especially elephants. The reduced threat to wildlife would also mean that trains would not have to operate at slower speeds. The proposed change to the route will avoid sensitive eco-system and will instead traverse through chena and paddy cultivations.
2. The proposed change would also avoid the need for a level crossing at the Tissa-Kataragama road. There will not be a station between the proposed level crossing (closer to Bogahapelessa) and Kataragama. There would thus be no need for the track to intersect the road.
3. The proposed change would also eliminate the need to clear about 100 acres of valuable teak forest. The venture would cost less if the proposed station were to be located in a paddy field.
4. The proposed change would also attract more passengers by reducing the inconveniences of the original proposal. The original location for the station is about 1.5 kilometers from the Kataragama town center where all the business and pilgrim rests are available. That would force weary travellers to switch to alternate road transportation or walk the entire 1.5 kilometers to reach the pilgrims' rests. This inconvenience may discourage people from using the train to travel to Kataragama and would thus reduce the economic viability of the project.
5. The proposed change would also reduce the extent of unplanned secondary development in the area. The currently proposed distance between the station and town center would result in a greater degree of unplanned development. It is inevitable that shops, new pilgrim rests, hotels and boutiques would be established on either side of the road between the station and the town center. The environmental and cultural consequences of such haphazard development would be significant. **The EA team strongly recommends that all attempts be made to retain the tranquility and natural beauty of this sacred site. Development should be carefully planned and confined to one area.**
6. The proposed change would also reduce the number of homes to be demolished and families relocated. The original proposal requires that a few families be relocated to make way for the station, track and yard. The new route and location would not eliminate the need for relocation of persons but it would reduce it.
7. The proposed change would also save money. The EA team's proposed route change would reduce the length

of track needed and would thus reduce materials and labour costs. The proposed change would also reduce costs by eliminating the costs of clearing jungle and constructing level crossings.

A.2 TRACK IMPROVEMENTS AT URBAN AND SACRED SITE AREAS

Noise pollution and vibration are inevitable. In urban densely populated areas, especially, noise and vibration caused by construction and rolling stock will be most unwelcome. Vibration could also cause serious damage to structures not designed to withstand the impact of such vibration. While it is not possible to eliminate vibration and noise, it is possible to take measures to reduce the amount of noise and vibration that is generated.

SLGR has the capacity and the engineering skill to implement these mitigatory measures, and the EA team strongly recommends that such measures be implemented wherever deemed necessary, especially in the following stretches of track. (Although not as critically in need as those listed below, other sections that could benefit from noise and vibration reduction are listed in Category C).

1. The stretch of track up to Nilwala bridge.
2. A minimum one kilometer stretch of track into and out of Walasgala station. This will reduce the ill effects of vibration on the famous Wewrukannala Buddha statue, which is located about 200 meters from the proposed track.
3. The section of track between Ambalantota Bridge and the proposed railway station.
4. The section of track at Tissamaharama. The Tissamaharama Dagaba is more than 2000 years old and would not be able to withstand the ill effects of vibration.

A.3 RELOCATION AND COMPENSATION OF DISPLACED PERSONS

The number of people displaced by the project varies from area to area. The displaced people have to be relocated and compensated. It is important that this issue be handled with a great degree of sensitivity and efficiency. SLGR must use all available resources, including external organizations, to come up with a reasonable resettlement plan for each community.

A.3.1 Resettlement Programs

SLGR does not now have the experience or the capacity to handle this issue effectively. The National Housing Development Authority (NHDA) should be given the task of resettlement once the persons to be displaced have been identified. NHDA has the expertise and the resources to develop specific resettlement programs for each community.

A.3.2 Community Relations

The EA team observed a degree of confusion and hostility in the communities concerned. The primary reason for this situation is their perception of insensitivity and confusion in the approach of public officials involved in the resettlement program.

The most important issue to most people is the exact nature of the compensation package and resettlement plan. SLGR should notify in writing, to each of the affected persons, the exact nature of the project's requirements and details of the compensation package. The letter should clearly address the following issues:

1. The project's timing with relevance to their community;
2. Details of the resettlement plan;
3. The amount of compensation to be paid and the basis of computation.

Respective DSs should appoint complaints officers who would receive and investigate complaints with regard to the compensation package in each AGA division. The letter sent to persons who will be displaced must also include the telephone number, address and other information on how to contact the complaints officer.

SLGR should also detail and justify selection of the new route, as opposed to the old route, within Matara town. This information has thus far been concealed from the public and has led to much suspicion and resentment.

A.3.3 Compensation and Relocation

The EA team makes the following recommendations with regard to the resettlement plan.

1. SLGR, UDA and the Matara Local Authority could study the possibility of expanding the Matara town limits by including more undeveloped land. This land can be carefully developed and provided to those who lose property in the Matara town area.

2. Compensation must be paid a minimum of six months before clearing begins. This will provide adequate time to buy new property and/or construct a new house.
3. Compensation should be paid at market rates.
4. Compensation should be paid in a lump sum.
5. NHDA should be entrusted with the task of resettlement for Nakutiya village. As per the wish of that community, the village should not be divided.

A.3.4 Relocation of Business Establishments

Small traders and service providers who have to be relocated will be affected by their loss of clientele. SLGR has indicated that it will attempt to provide these traders new business premises in the same vicinity. Land designated as railway reservation might be used for these purposes if necessary.

A.4 QUARRY AND BURROW SITES

All the quarry and burrow sites have not been identified or assessed for environmental impact. SLGR should thus include CEA regulations and a reclamation performance bond as part of the conditions of contract to all contractors involved in quarrying, metal crushing, excavating and transporting of rock, metal and earth. This would minimize any adverse environmental effects that might arise from such activity.

A.5 HEALTH HAZARDS

Proper management of construction sites is necessary to contain the spread of mosquitos and diseases like Malaria. The contractors' conditions of contract should specify measures that will minimize the potential for health hazards. SLGR should also monitor construction activities to ensure that these measures are implemented.

CATEGORY B

B.1 RAILWAY RESERVATION

The EA team recommends the railway reservation on either side of the track be limited to ten feet as opposed to 20. This would prevent development of unauthorized settlers (shanties) on either side of the railway line particularly in urban areas. In addition, UDA regulations could be imposed to restrict construction activities within 20 feet of the track.

B.2 SEENIMODARA RAILWAY STATION

The Seenimodara railway station and track complex would be located in or near a migratory bird habitat area. Engineering considerations limit the options in terms of the location. A full size station, however, is not necessary at Seenimodara. Given Seenimodara's location and size of population, it is unlikely that it will be an important node. It would be quite sufficient in terms of railroad traffic control and safety if the station were to be downsized to a railway halt. This will reduce the land area requirement for additional tracks and structures that might affect bird habitats. This would also minimize secondary development.

B.3 HAMBANTOTA RAILWAY STATION

The EA team does not view the original location of the Hambantota station as being suitable. It is likely that the undulated topography of the selected site and the need to develop an access road would lead to large, heretofore unexamined, development costs. (see FIGURE 2)

Hambantota station could be relocated at the intersection of the proposed railway line and the Hambantota-Gonoruwa road. This location has a developed road to service it and has a large extent of flat undeveloped land available for the station and yard. The distance to the new location from the Hambantota town is also slightly less. The proposed change would also service those who live in the interior parts of Hambantota, thereby increasing use of the railroad. This change could result in significant economic gains.

B.4 CONSTRUCTION OF NILWALA BRIDGE

Extreme care must be taken at the Nilwala bridge site to avoid any unnecessary damage to sensitive ecosystems. The EA team recommends that land requirements for construction be kept to a bare minimum. This should be specified in the contractor's contract, be reflected in his quote, and be subject to careful monitoring during the construction process by SLGR.

CATEGORY C

C.1 TRACK STRENGTHENING AND BIRD HABITATS

There are several valuable bird habitats in the district of Hambantota. Strengthening the track to reduce noise will help protect these habitats. The total length of this stretch is about ten miles.

C.2 TRACK EMBANKMENTS

When paddy fields are bisected by the track, farmers, their tractors and buffalos could have problems in scaling the rail embankments to get to the other side. Such crossings could also damage the embankments. The EA team recommends that access ducts or other suitable measures be taken wherever necessary to reduce the risk of, and need for, arbitrary crossings.

C.3 STRENGTHENING OF IRRIGATION STRUCTURES

SLGR and the Irrigation Department must identify the irrigation structures that might be adversely affected by the project. Necessary funds should be allocated to carry out required strengthening and adjustments that would allow these structures to function as intended.

OTHER RECOMMENDATIONS

Given the nature of the project and the potential for expansion the EA team recommend that SLGR appoint a coordinating committee and an environmental officer for this and future projects to facilitate efficient environmental impact assessment.

1. COORDINATING COMMITTEE

The project's implementation process and its efficiency will be greatly enhanced if there is a coordinating committee for each geographic area. The committees can be set up on the basis of each Divisional Secretariat and comprise representatives from SLGR, the DS's office, other local authorities, other decision making bodies, and community groups. The committee would screen and discuss resettlement, changes to irrigation structures, relocation of stations and track and other similar issues. Most of these issues would be resolved at this level, thus enhancing the implementation of the project. Those that can not be resolved can be forwarded to SLGR.

2. ENVIRONMENTAL OFFICER

This project will provide valuable experience to SLGR in terms of environmental planning of future railway development projects. SLGR should appoint an engineer as an environmental monitoring officer for the duration of the project. That officer would monitor implementation of the EIA recommendations to ensure compliance and prevent costly mistakes. He or she would monitor construction processes at critical areas along the route and at burrow sites and would report regularly to SLGR's design and planning unit. This would facilitate an increased awareness of environmental issues within SLGR. SLGR will thus be able to integrate environmental awareness at the project development stage and reduce costs and difficulties associated with revisions and changes to plans.

3. ADHERENCE TO LEGAL PROCEDURE

SLGR should carefully follow established legal procedures in the acquisition of private land and in the transfer of public land. All relevant authorities, including UDA, should be consulted whenever required by law.

4. PROPOSED ELEPHANT CORRIDOR

This proposal made by JICA, as part of the Udawalawe development plan, has yet to be implemented. If it is implemented, SLGR should limit train speeds in the area to five to ten mph and also erect luminescent sign boards at critical points.

CHAPTER 6

MONITORING PROGRAM

The EA team acknowledges that institutional responsibility for the project lies with the environmental cell of M/TH, in its capacity as the PAA of the project. M/Th, however, may not be adequately equipped for the task. M/TH's environmental cell does not have full time working members, nor does it have support staff and facilities of its own. With this in mind, it is recommended that a private consultant be engaged to do the monitoring and that CEA oversee the monitoring, in compliance with M/TH. The following steps are proposed to facilitate this process:

1. Based on a review and evaluation of the EA document, and on public comments, the project proponents and the regulatory authorities (i.e. CEA and M/TH) must agree on the exact nature of the project and the environmental recommendations that will be implemented. This must form the basis of the monitoring program.
2. Based on actions agreed upon, the proponent must prepare an implementation schedule and furnish the same to regulatory authorities.
3. In addition the proponent shall prepare and submit to regulatory authorities, monthly status reports on implementation of EA recommendations. This document must be made available to regulatory authorities within seven working days from the end of each calendar month.
4. EA cell meetings of M/TH could also be used as review meetings for the monitoring program.
5. If SLGR were to appoint an engineer to monitor environmental aspects of the project, the engineer should participate in all EA cell meetings for the duration of the project.

List of Projects Under Southern Development Plan

Source: Department of Policy Planning and Implementation

PROJECT	PROJECT PROPOSER
Koggala FTZ	Board Of Investment
Galle Port	Ports Authority
Matara Kataragama Railway	Sri Lanka Railways
ADB Southern Province Development Programme	Regional Development Division, MPP & I
Spinal Road	RDA
Eraminiyaya International Airport	Civil Aviation Department
Nilwala Ganga Kiralakele 600 acres	Urban Development Authority
Kirama Oya & Urubokka Oya Basin Rehabilitation	Irrigation Department
South East Dry Zone Project	Lands Ministry
Udawalawe Crop Diversification	Agriculture Ministry
Kirindi Oya Project	Irrigation Department
Upper Uma Oya Project	Ministry of Power & Energy / Lands Ministry
Fisheries	Fisheries Ministry
Tourism	Ministry of Tourism

APPENDIX I

APPENDIX - II

Notes on Changes to the Project Proposal

SLGR accepted the route 2 proposed by the Koreans as the best alternative for the extended rail line. The SLGR however made certain changes to the proposal to make it more acceptable to the commuters based on the recommendations made by the University of Moratuwa team who studied the project alternatives in additions to the Koreans. The major change was the shifting of the railway stations closer to the town centers. The Koreans were more bent on maintaining the speed and thus were keen to reduce the number of curves and bends. The SLGR considered the University of Moratuwa proposal to have the railway stations within 700m from the town centers as important and adhered to this as far as possible. Only exceptions are Seenimodara, Tanqalle, Hambantota and Kataragama. This has not made major changes to the track path but introduces more bents and curves. The SLGR planners also made certain minor alterations to the track whenever possible to reduce the impact of relocation. Thus number of houses to be demolished was brought down to the extent possible by engineering designs. This was also a recommendation by the EA team. Further changes and improvement to the project had already been agreed by the SLGR on the recommendation of the EA team. These are relocation of Hambantota station, strengthening of the track in the town centers etc. SLGR has also made changes to the Kataragama station site from the site selected by the Koreans but this change has not met the recommendations of the EA team.

ifb

APPENDIX - III

Main Geological Features in the Project Area

Location	Rock/Soil	Material Description	Quantity	Remarks
1. Kekandura (North of 1/2km along the proposed route)	Mostly rock (very little soil)	Charnokites (hypersthene gneisses)	10 ⁴ m ³ 120	Fisheries Harbour Quarry
2. Kirineliya (2km North of Bambarenda Central on pro- posed route)	Rock/soil (both)	Charnokites (basic)	Spread over a large area	Owner H.E. Anyadasa
4. Deniyagoda on proposed route	Rock/soil (both)		Spread over a large area	Very close to the pro- posed route
5. Seenimodera (working quarry)	Rock/soil (both)	Charnokites	3000	Massive ex- tends about 1 km inland from 119 mile post on Tangalle- Matara Road
6. Galgodapilla (Ground pit)	Mostly soil (rock under- neath)	Gravelling soil	1250	Partly state property
7. Vigamuwa (Pit Quarry) (along the Ranna-Tha- hluwa Rd)	Mostly rock (thin over-burden)	Biotite gneisses	Covers an area of 1 sq km and depth is unknown	Private land

4/7

Location	Rock / Soil	Material Description	Quantity	Remarks
8. Vigamuwa (near Giriate Rajamaha Vihare) (working quarry)	Rock	- do -	Small outcrop	Owner: K. V. A. Don Henry
9. Kattaka-duwa (along Ranna - Kattakaduwa Rd)	Borrow Material			Mostly bare land at moderately high elevation
10. Bata-ata (just after 132 mile post 200 m to the west)	Thin overburden covers a large area, rock underneath	Biotite gneisses	Over 7500 (rock only)	* Privately owned working quarries
11. Udamalala (133 mile post on Hambantota-Tissa Road) 3 to 4 km from the junction	Mostly rock	Hornblende gneisses	Vast area (poor access road)	* Privately owned metal crusher at the junction
13. Yodakan-diya (off Yoda Wewa)	Mostly rock	Hornblende granite (sound, durable rock)	10	State owned contact L. S. Ranjith, S/J Culvert, Yodakandiya Tissa
14. Yodakan-diya (just north of Yodakan-diya quarry on Situlpauva Rd) Gravel Pit	Borrow material (Thin overburden)	Gravel	1000 ^m	Kirinda Fisheries Harbour Gravel Quarry
15. Bogahaplessa (between 8 and 9 mile posts on the Tissa - Kataragama Road)	Soil / Rock both	Hornblende gneisses (mostly)	7500 ^m	Rock mostly outcropped, plenty of borrow material
16. Dalukaga (Milagama) Kataragama (at the terminus of proposed route)	Rock	Mostly hornblende biotite gneisses	15*	Thick forest with wild animals, Irrigation Dept. Quarry

TERMS OF REFERENCE FOR THE
SOUTHERN RAILWAY LINE EXTENSION
BETWEEN MATARA AND KATARAGAMA

PROJECT PROPONENT : Sri Lanka Railways
PROJECT APPROVING AGENCY : The Ministry of Transport & Highways
in concurrence with the Central
Environmental Authority

Introduction

The Government of Sri Lanka (GOSL) considers the extension of the Southern railway a national project with highest priority, as it expects the railway to promote development in the fields of agriculture, industry and tourism and the generation of employment, thus uplifting the social standards of the people in the Southern region.

This project intends to extend the Southern Railway from Matara to Kataragama in two phases. The first phase, 17 km from Matara to Dickwella, is to be financed by the Government of Sri Lanka (GOSL). The financing for the second phase, 93 km from Dickwella to Kataragama, is to be undertaken with external funds, either through outright grant aid or credit.

A one kilometer land area on either side from the centerline of the railway line is to be declared as 'UDA area' in order to control the developments in the area and to facilitate future improvements.

A Feasibility Study on the "Southern Railway Line Extension Between Matara and Kataragama" was submitted to the Ministry of Finance and Planning on 31 May 1991 by Korean Consultants International (KCI). The pertinent background information to commence the Environmental Impact Assessment (EIA) is in this study.

Environmental Impact Assessment Requirements

The Central Environmental Authority (CEA) supports the premise that sustainable development is achieved most efficiently when negative environmental impacts are identified and addressed at the earliest possible planning stage. For the present exercise the term 'environment' is broadly defined as the human, natural and physical environment encompassing the social conditions surrounding mankind, including future generations.

The following is a general guide prepared by the Central Environmental Authority (CEA) for the preparation of an EIA in Sri Lanka. It relies heavily on the World Bank's Operational Directive on Environmental Assessment's (OD 4.00 of October 1989) and on the US Code of Federal Regulations (CFR 22, Ch II, part 216 of 1980 and the 1986 amendments to the Foreign Assistance Act (FAA) sections 117, 118 and 119 pertaining to the protection of the environment and natural resources, tropical forests and biological diversity respectively) pertaining to environmental assessments (EAs) for USAID.

THE ENVIRONMENTAL IMPACT ASSESSMENT

Introduction

An Environmental Impact Assessment (EIA) is a detailed study of the reasonably foreseeable environmental impacts, both positive and negative, of a proposed action and its reasonable alternatives. The purposes of an EIA are to ensure that development options under consideration are environmentally sound and sustainable and that the environmental consequences are recognized and understood by concerned citizens and their representative groups, funding agencies, local and national government, and project decision-makers.

Although the EIA should be prepared as a 'stand alone' document, it should ideally form part of the project feasibility study, so that the EIA's findings can be integrated directly into project design. However, the EIA is normally prepared separately by independent specialists.

The EIA is a specific document having a definite format and content. It should be concise and limited to significant environmental issues. It should define those issues and describe how they have been resolved or are being addressed by the project. The target audience should be project designers and decision-makers, project donors, implementing agencies, and concerned citizens and their representative groups (e.g., NGO, religious groups, opposition groups, etc.).

It includes a full discussion of significant environmental effects of a proposed action and alternatives which would avoid or minimize adverse effects or enhance the quality of the environment so that the expected benefits can be weighed against any adverse impacts.

Content and Form of Environmental Impact Assessments

(a) Executive Summary

Is a concise discussion of significant findings, major issues and recommended actions.

(b) Policy, legal and administrative framework

This section presents a brief discussion of the administrative, legal and political environment as well as the purpose and need of the project. It should also discuss the project activities and their interaction with other related or tangential projects.

(c) Proposed action and its reasonable alternatives

This section presents a brief description of the proposed project and its alternatives. The environmental impacts of the project and its alternatives should be presented in comparative form thereby sharpening the issues. This comparison serves to focus on the information which provides the basis for making choices among the alternatives. This section should explore and evaluate reasonable alternatives and briefly discuss the reasons for eliminating those alternatives, if any, not included in the detailed study. It should devote sufficient treatment to each alternative considered in detail so that the reviewers may evaluate their comparative merits. The alternatives include the project as proposed by its proponents, the no action alternative, and alternatives incorporating mitigation measures recommended by the EIA team. Mitigation measures are incorporated into the project and presented as reasonable alternative(s). From this discussion the EIA team picks the preferred alternative.

(d) Affected Environment

This section briefly describes the environment (physical, natural and socio-cultural conditions) of the area(s) to be affected by the alternatives considered in detail above. Description of the environment are no longer than necessary to understand the effects of the alternatives. Technical information may be referred to as appendices but data and analyses should be summarized and the information presented in lay terms so that reviewers can evaluate the alternatives considered.

(e) Environmental Consequences

This section contains the analytical basis for the comparisons presented above. It discusses the alternatives, each of the mitigation measures, their significance, and their costs. It defines or describes the ecological and social systems and the importance of each. It discusses the mitigation measures and their environmental consequences. The criteria used to compare and contrast the alternatives is defined. Appropriate theory and definitions may be included in this section.

(f) Monitoring programme

This section contains a plan for the implementation of the mitigatory measures and the impacts of the project during construction and operation. It should also recommend the institutional arrangements required for implementation and management of the monitoring plans.

(g) Appendixes.

(i) List of Preparers--

This section shall list the names and qualifications of each person primarily responsible for preparing the EIA

(ii) References--

This section shall list all significant written material used in the EIA document preparation.

(iii)

Basic documents, data, and calculations may be included as needed to support the conclusions and descriptions presented in the EIA text.

Additional Tasks:

Following a preliminary site review (partial scoping exercise) by CEA technical staff it was felt that special attention should be given to the following tasks.

Task 1. A study of borrow pits and quarry sites to be used to supply fill and gravel for the railway bed.

Task 2. A study of the impacts expected on the roads and transportation system to be used to transport fill material and gravel for the railway bed.

- Task 3. A study of the secondary impacts of the railway extension which include the potential for increased development in agriculture, industry and tourism in the region served by this railway extension.
- Task 4. A study of the impacts created by the change of landscape and drainage systems due to new embankment being formed to carry the Railway.
- Task 5. A study of effects of noise and vibrations resulting from this project to the surrounding environment including religious places, houses etc.
- Task 6. Crossings of minor and major roads by way of level crossings, overpasses and underpasses. Deviation of roads due to railway line being laid on or along side (near) to existing roads.
- Task 7. A study of directly and indirectly affected populations. A resettlement plan should also be included.

These additional studies must be referred to in the EIA report. The EIA report and the studies themselves may be included as appendices to the report if deemed necessary by the team conducting the EIA.

Other Information.

The consulting team conducting the EIA is advised to review the Draft National Environmental (Procedure for approval of projects) Regulation No 1 of 1993 in accordance with the National Environmental Act and US Code of Federal Regulations [CFR 22, Ch II, part 216], the amendments to the US Foreign Assistance Act [FAA sections 117, 118 and 119], and the World Bank's Operational Directive (OD) 4.00 and its annexes.

It is expected that this EIA will not exceed 60 pages, exclusive of appendices.

APPENDIX - IV

Glossary

- CEA - Central Environmental Authority
- DS - District Secretary
- EA - Environmental Assessment
- GOSL - Government of Sri Lanka
- JICA - Japanese International Corporation Agency
- KCI - Korean Consultants International
- M/TH - Ministry of Transport and Highways
- NGO - Non Governmental Organization
- FAA - Project Approving Agency
- RDA - Roads Development Authority
- SLGR - Sri Lanka Government Railways
- UDA - Urban Development Authority
- USAID - United States Agency for International Development

APPENDIX - VI

EA Team

1. Team Leader - Mr. Vasantha Siriwardhena
Deputy Chief of Party (NAREPP/IRG)
2. Other Team Members
 - a. Professor L.L. Ratnayake
Head of the Department of Civil Engineering
University of Moratuwa
 - b. Professor Ivor Fernando
Head of the Department of Zoology
University of Kelaniya
 - c. Mrs. J. Edirisinghe
Lecturer, Department of Estate Evaluation and
Urban Planning
University of Sri Jayawardhenapura
 - d. Mrs. S. Perera
Consultant, Sociologist

TABLE - 1

List of Central Government, Provincial and Local Authorities

SOUTHERN PROVINCE			
DISTRICT	AGA DIVISION	LOCAL AUTHORITY	SPECIAL ZONES
Matara	Matara	Matara U.C	UDA (Matara)
		Pradesiya Sabah Kekunadura Babaranda	
	Dikwella	Pradesiya Sabah Dikwella	
Hambantota	Tangalle	Tangalle UC	
	Ambalantota	Pradesiya Sabah Ambalantota	
	Hambantota	Hambantota UC	
	Tissamaharama	Pradesiya Sabah Dikwella	UDA (Tissa)

UWA PROVINCE			
DISTRICT	AGA DIVISION	LOCAL AUTHORITY	SPECIAL ZONES
Monaragala	Tanamalwila	Pradesiya Sabah Kataragama	UDA (K'gama)

TABLE - 2

Land Use Data Along the Track

Major Section	Description of Features
Matara to Dikwella	<ul style="list-style-type: none"> - Straight and short - Going through 100 m contour - In the vicinity of important buildings Residential area = 42.27 % Coconut = 24.55 % Paddy = 17.05 % Marshy land = 12.27 % Built up area = 3.86 %
Dikwella to Ranna	<ul style="list-style-type: none"> - Straight and short - Proximity to main road - Traverses a working tank and marshy land Paddy = 37.25 % Coconut = 30.88 % Residential area = 29.90 % Marshy land = 1.96 % Built up area = 3.86 %
Ranna - Ambalantota	<ul style="list-style-type: none"> - Straight - Traverses Oluwila Wewa Residential area = 51.83 % Paddy = 43.90 % Chena cultivation = 4.27 %
Ambalantota - Weeravila	<ul style="list-style-type: none"> - Elevations under 100 m mostly - Proximity to main road - Proximity to historical site - Traverses cotton plantation area Chena cultivation = 44.50 % Forest = 24.15 % Other plantation = 13.56 % Paddy = 12.29 % Residential area = 4.25 % Marshy = 0.85 % Lewaya = 0.42 %
Weeravila - Kataragama Kodigahakade weva	<ul style="list-style-type: none"> - Straight - Traverses both Yoda weva and Kodigahakade weva Forest = 46.23 % Residential area = 23.58 % Paddy = 19.34 % Chena cultivation = 8.96 %

TABLE - 3

Details of Ground Conditions

Area	Total Length (km)	Length of Soild Ground (km.)	Length of Poor Ground (km)
Matara	27	14	13
Tangalla	12	7	5
Hambantota	32	10	22
Tissa	26	18	8
Kataragama	13	13	-

Figure 1

Some Route Alternatives

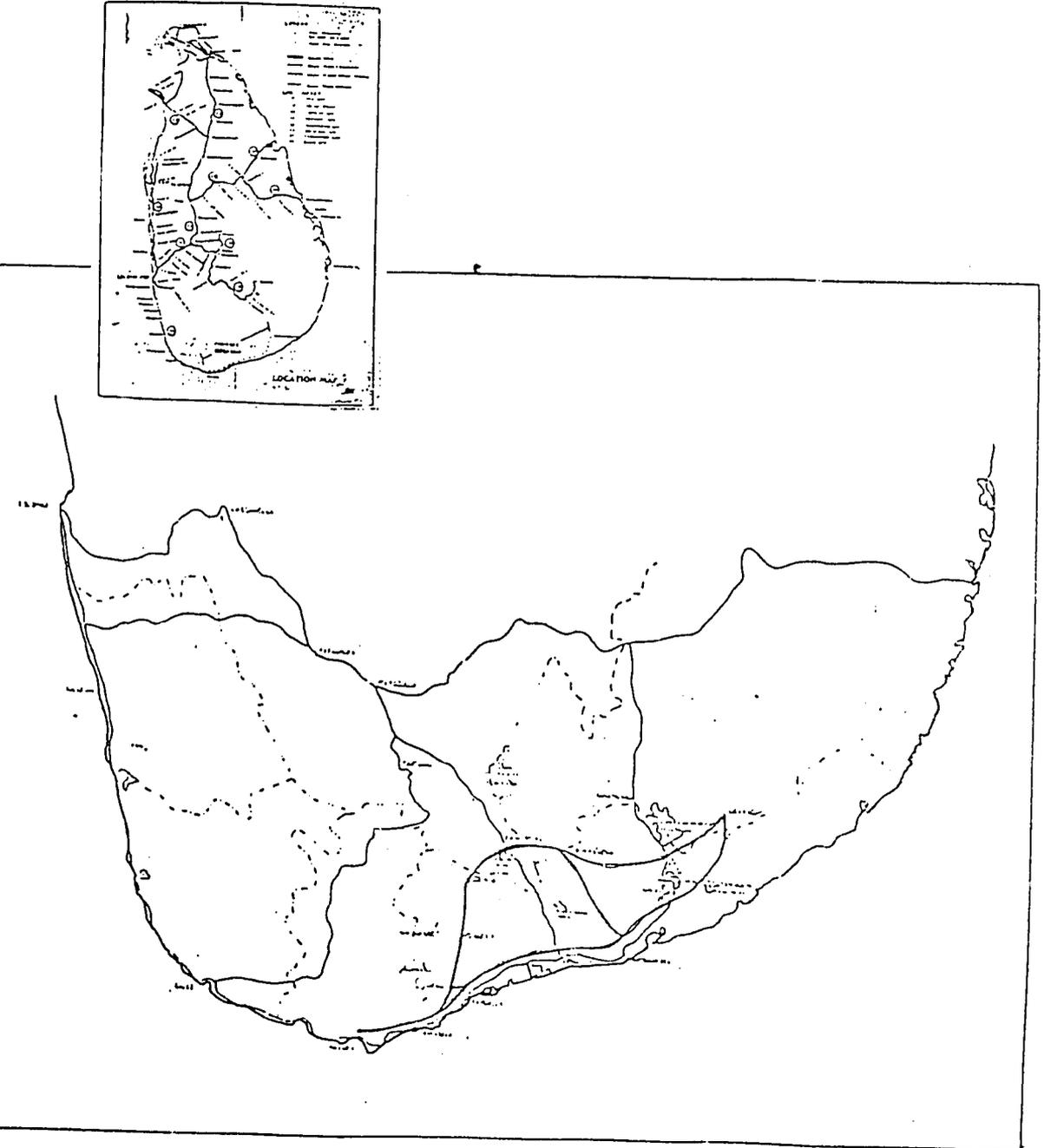


FIGURE 2.0

Sketch Map of Hambantota Station Site

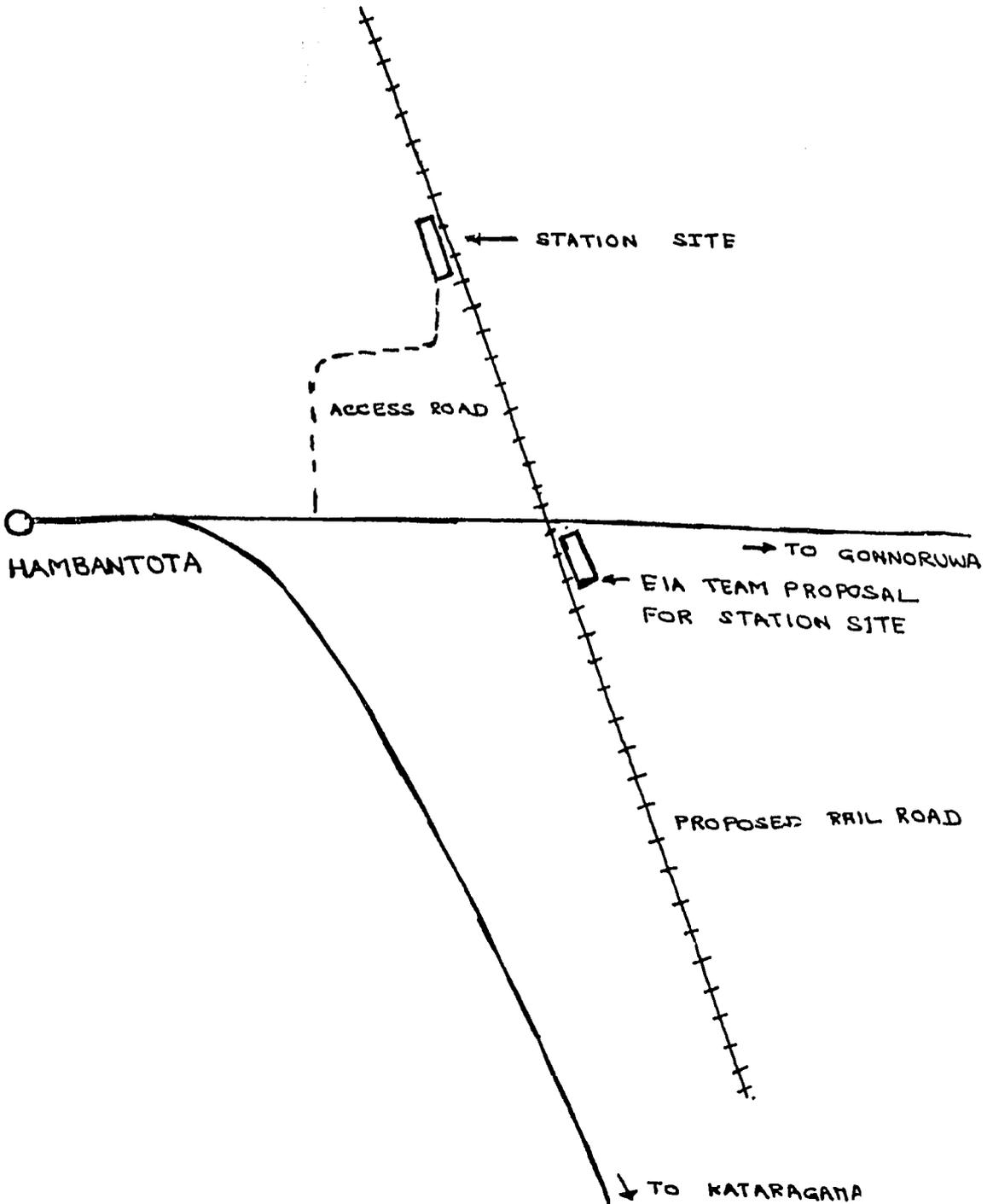
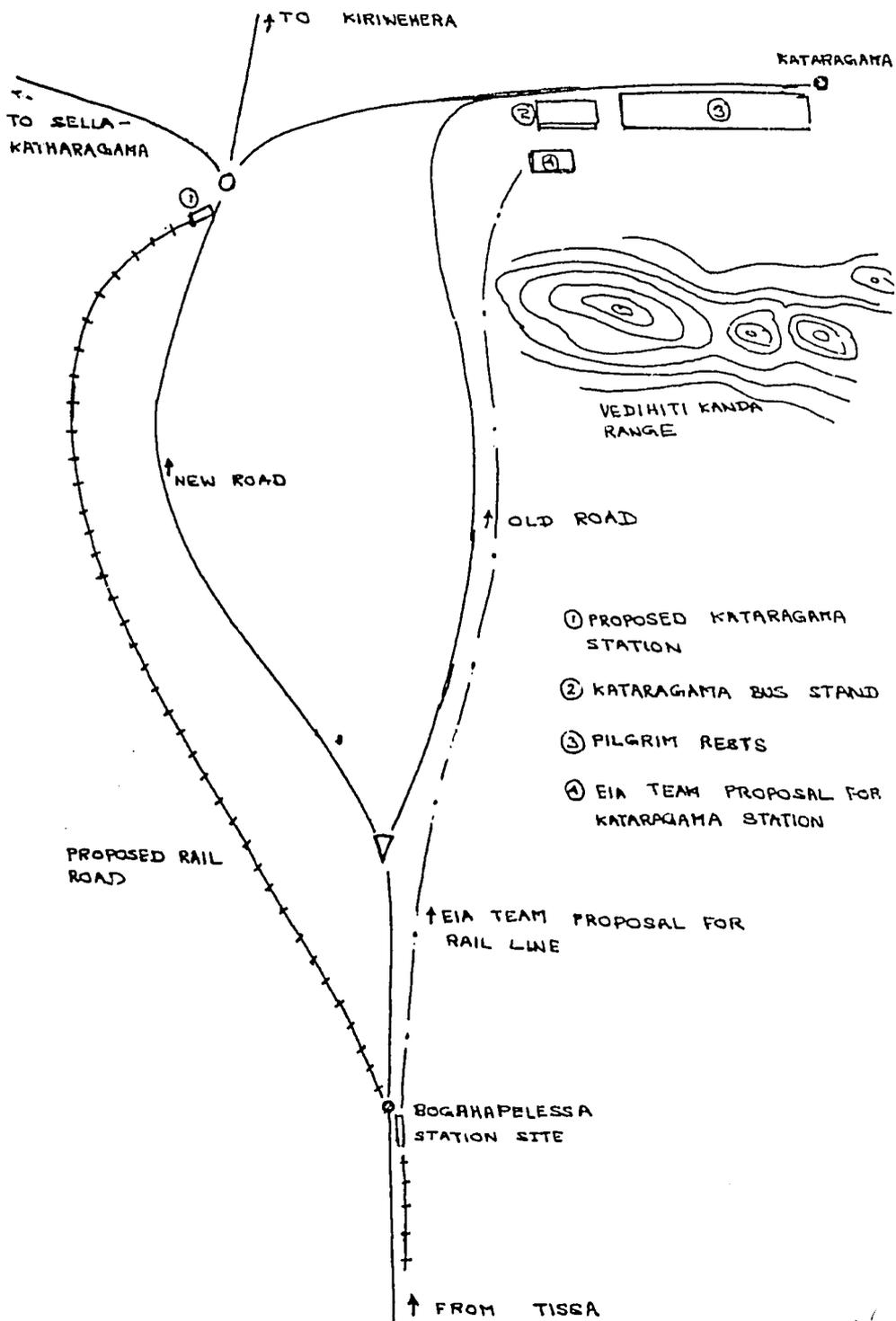


FIGURE 3.0

Sketch map of Kataragama Station Site



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