DETAILED ENVIRONMENTAL STUDY
part 1

Executive Summary

DECEMBER 1996

DHV Consultants BV
The Netherlands
in association with
Consulting Engineering Services (India) Pvt., Ltd.
Development Design Consultants Ltd., Bangladesh
Desh Upodesh Ltd., Bangladesh,
The Government of the People's Republic of Bangladesh

NALKA - HATKAMRUL - BONPARA NEW ROAD

Loan Agreement 2638 BD

DETAILED ENVIRONMENTAL STUDY

Part 1 EXECUTIVE SUMMARY
Part 2 Socio-Economic Survey
Part 2a Appendices Socio-Economic Survey
Part 3 Base Line Survey
Part 4 resettlement Issues
Part 5 Environmental Management and Monitoring Plan
Part 5a Air Pollution Assessment
Part 5b Noise Pollution Assessment

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Acronyms and Abbreviations

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<tr>
<td>BOQ</td>
<td>Bill of Quantities.</td>
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<td>BWDB</td>
<td>Bangladesh Water Development Board</td>
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<td>EP</td>
<td>Entitled Person</td>
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<td>FAP</td>
<td>Flood Action Plan</td>
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<td>GoB</td>
<td>Government of Bangladesh</td>
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<td>HDV</td>
<td>Heavy Duty Vehicle</td>
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<td>IGP</td>
<td>Income Generating Program</td>
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<td>MIS</td>
<td>Management Information System</td>
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<td>NGO</td>
<td>Non Governmental Organisation</td>
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<td>NHBNR</td>
<td>Nalka - Hatikamrul - Bonpara New Road</td>
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<td>PAP</td>
<td>Project Affected Person</td>
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<td>RAP</td>
<td>Resettlement Action Plan</td>
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<td>RHD</td>
<td>Roads and Highways Department</td>
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<td>RoW</td>
<td>Right of Way</td>
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<td>SSI</td>
<td>Social Science Institute</td>
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<td>SWMC</td>
<td>Surface Water Modelling Centre</td>
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1 INTRODUCTION

The Government of Bangladesh (GoB) has awarded the Detailed Engineering, Preparation of Bid Documents, Environmental Impact Assessment and the Resettlement Plan for the Nalka - Hatikamrul - Bonpara New Road to DHV Consultants BV, the Netherlands in association with CES (India) DDC and Desh Upodesh Ltd.

The Nalka - Hatikamrul - Bonpara New Road is an important link between the Jamuna bridge (and as such the eastern part of Bangladesh) and the Rashjahi Division. This road has major economic importance and also ensures a direct link between the Eastern and the Northwest part of Bangladesh. In the Pre-feasibility Study two route options, Route no. 1 and Route no. 3A were defined as being economic feasible. Out of these Route option 1 was chosen as most viable. Under this contract this route choice was optimised to reduce the number of affected homesteads and to avoid environmental hazards.

The main distinction of the land in the project area is agricultural. Some small scale agro-related industries are established in villages adjacent to the alignment. Seasonal fisheries are also an important occupation in this region.

As every new road, also this road will have an impact, either positive or negative, on the existing environment. To assess these impacts, several studies were conducted. As indicated in the title of the project, the Detailed Environmental Study is an integral part of the design. This integrated approach has been maintained throughout the project and played a role in every independent item of the design. This Study is made up out of the following parts:

Part 1 Executive Summary
Part 2 Socio-Economic Sample Survey
Part 2a Appendices Socio-Economic Survey
Part 3 Environmental Base Line Survey
Part 4 Resettlement Assessment comprising:
  ToR for NGO(s)
  Shortlist of NGO(s)
  Time Schedule for NGO(s)
Part 5 Environmental Management and Monitoring Plan with
  Environmental Impact Assessment
Part 5a Air Pollution Assessment
Part 5b Noise Pollution Assessment

The above mentioned reports besides this executive summary were already earlier submitted for comments and further necessary action. The Environmental Impact Assessment is made in accordance with the World Bank’s Operational Directives 4.01 and 4.30 for Category A roads.

This executive summary is a brief listing of the positive and negative impacts and the measures to be taken to mitigate the negative impacts of the construction of the Nalka - Hatikamrul - Bonpara New Road. The details are elaborated in the above mentioned reports.

1.1 Terms of Reference

The Environmental Survey is executed under the indications of the Terms of Reference of this Contract. The Detailed Environmental Study is divided into two parts being the environmental issues and the resettlement issues.
The assignment for the environmental issues is defined as follows:

(i) Carry a survey to identify the distribution and remaining value of Chalan Beel wet lands within the impact zone of the proposed road;

(ii) Assess impacts of embankments on surface drainage patterns and natural fish production to assist the engineering team in designing appropriate road cross-drainage;

(iii) Carry out a base line survey to identify sensitive areas which should be protected from borrow activities;

(iv) Develop criteria and procedures for rehabilitating the sites after the earthwork is completed;

(v) Assess air pollution and noise problems principally during operation phase, based mainly on a survey for those of existing roads;

(vi) Develop a comprehensive environmental management plan and an environmental monitoring plan, based on the results of (i) to (v) above.

For the resettlement issues:

(i) Review the RAP of the Jamuna bridge and the RRMP-II project financed by the IDA to obtain knowledge about resettlement issues in Bangladesh;

(ii) Assist the engineering team in the selection of the optimum route choice to minimise homestead loss for the PAPs;

(iii) Prepare time schedule in conjunction with the construction program schedule for the preparation of the RAP with target dates for appointments of NGO, conducting of a socio-economic survey, land acquisition, etc.:

(iv) Prepare TOR for the preparation of the RAP, make a shortlist of interested NGO/SSI for the study, formulate selection criteria for their appointment.
2 SOCIO-ECONOMIC SURVEY

For the construction of the Nalka - Hatikamrul - Bonpara New road a total surface of 275 ha is required. This surface represents the RoW along the total distance of the road. The first 4 km is already property of the GoB. For the remaining 51 km another 2 km (existing rivers, roads, etc.) is also property of the GoB. Total 245 ha is to be acquired for the construction of the road. These 245 ha represents approximately 3,000 affected plots and their affectation varies from 1 to 100%. Each plot has an average of 3 owners. This results in 15,000 EPs. According to the Socio-Economic Survey the average family size in the project area is 5 persons. With this figure the total number of PAPs comes to 75,000 excluding squatters and utholis. During the fixation of the final alignment the number of affected homesteads was reduced from 294 as indicated in the feasibility Study to 28. The 28 homesteads represent 128 households as several families live in one homestead.

The Socio-Economic Sample Survey was carried out in June/July 1996 for the affected homesteads and in July/August 1996 the affected land users. For the household survey 28 households were interviewed and for the affected plot survey 120 households.

2.1 Methodology

A questionnaire was designed for the survey of the households and the landusers. This questionnaire was divided in 18 subsections dealing with the different aspects of the resettlement. A crew of supervisors was selected and trained to execute the interviews. Once mobilised in the field, each interviewer got a local assistant assigned to use their specific knowledge of the area and its inhabitants. The sampling of the landusers was done according to a sample frame comprising fully and partly affected plots.

All interviews were processed in the computer on a spread sheet to allow for a flexible approach. This spread sheet covered the whole questionnaire. For the purpose of cross-checking different other sources of data were used.

2.2 Survey Analyses and Results

The survey analyses is composed of the following items:

- Demographic data like household composition, education levels, religion, etc.:
- Availability and access to public utilities
- Land tenure and its arrangements
- Agricultural activities
- Other assets
- Yearly income
- Loans and credit
- Response to resettlement

2.3 PAP Categorisation

To obtain an overview of the people to be resettled the PAPs were categorised into 3 groups and 9 categories varying from loss of homestead including structures and equipment, land and other sources of income to the loss of (semi)-fixed employment and habitual rights. It appeared that already 42% of the landowners with an affected plot had already less than 33 decimals per household member. This 33 decimal is considered as the minimal land surface for a sustainable income.
2.4 Compensation Cost Estimate

Based on previous projects with resettlement a cost estimate was made to calculate the compensation to be paid. This cost estimate includes the homesteads, structures, land and crops, and employment. The total cost was estimated at more than BDT 170 million. Not taken up in this estimate is the price increase of land which is going on at the moment. It was learnt that in Bonpara the price of land adjacent to the alignment has already doubled in price.
3 ENVIRONMENTAL BASELINE SURVEY

A detailed environmental baseline survey of the project area concerning environmental issues was undertaken in accordance with the World Bank's Operational Directive 4.01. As the environmental study also covers partly the resettlement issues, OD 4.30 was also used as guideline for this part of the study. The baseline survey is designed to meet the requirements of the Environmental Impact Assessment and the elaboration of the Environmental Management Plan.

3.1 Natural Physical Environment

An inventory was made of the existing physical environment concerning topography, soil conditions, climatic conditions and the hydrology.

The project area is situated in the NW region of Bangladesh and is located in three major river basins, being the Kaludaha river basin, the Atrai river basin and the Mora Boral river basin. The alignment is perpendicularly situated on the existing drainage pattern of the project area. If no adequate drainage measures are taken, blockage of the existing drainage may occur. To assess the impact of the embankment construction on the existing drainage, the SWMC carried out a Hydraulic Modelling Study. To allow an almost undisturbed flow in the existing drainage pattern, 12 bridges and 80 culverts are proposed.

In the project area two locations need special attention concerning hydrology.

a) Kaludaha River Basin

This river basin suffers from severe inundation when the Jamuna River embankment fails and water spills into the Karatoa (Bengali) River. Out of the three regulators along the Karatoa River at the inlet of the Kaludaha river, two of them are in deplorable conditions and require rehabilitation. A breakthrough of the Jamuna River embankment does not only damage the embankment, but also causes severe damage to homesteads and livestock in this part of the project area. For this purpose the BWDB was contacted and in the mean time a meeting was held between the Consultants and the representative of the BWDB to discuss the measures to be taken.

b) Green River Basin

The name “Green River” is given to the area between the Nimaicharai Khal and the Atrai River in the different FAP studies. This is the main discharge zone of the Atrai floodplains and around 2,000 m³/sec are to be disposed of during peak discharges. To obtain an appropriate cross-drainage and to avoid erosion, three bridges with a span of 150 m each were designed in this region.

Besides the above two river basins, a third main river basin is crossed by the alignment. This is the Mora Boral River basin. The Mora Boral river is no longer connected to its original source and currently only drains off the regional surface water. To retain the water in this river, several sluices and regulators are built in the course of the river. However, during the dry season the river does not accommodate any water.

The soil along the alignment mainly consists of clayey/silty soils with a low organic matter content. A few old river beds are encountered within the vicinity of the alignment, but these are covered by a clay layer. As a large part of the area is flooded every year, the soil is very fertile.
3.2 Natural Biological Environment

The biota is built up of an uneven distribution of highly structured terrestrial habitats and uniform mono-culture croplands. Two different types of habitats could be determined, being terrestrial and (semi) aquatic habitats. Despite the fact that the biological environment is totally man-made, a fair degree of variety of plants are encountered in the highlands and along the road side. Tree plantations of sisoo and mahogany are getting more and more popular. The wildlife has a limited extent, the use of insecticides and the mono-culture has reduced the number of species of birds and mammals. The key habitats along the route corridor were defined as follows:

- homestead gardens
- homesteads in floodplain
- refuge forests
- solitary trees
- embankments
- beels
- rivers and khals
- fishponds

3.3 Ecological Sensitive Areas

The main ecological sensitive part is the Chalan Beel. The alignment just touches the southern part of the remains of the Chalan Beel. Despite the reduced ecological function of the beel, it still offers a vast variety of terrestrial, aquatic and marshy habitats. Almost the entire beel is now under cultivation. As this cultivation is expanding to the last unused corners, it is foreseen that very soon the Chalan Beel will no longer be a sensitive area. Other sensitive areas were encountered in homestead gardens and graveyards.

3.4 Socio-Economic Conditions

Besides the analyses of the demographic features like religion and education, utilities and landuse, an inventory of the income of the people in this region was made. The income is mainly based on agriculture and agro-related activities. Fisheries, either open water or fish cultivation, are important. Small scale rural industries mainly consist of rice mills, potteries, molasses and local transport facilities.
4 RESettlement Issues

4.1 Alignment Choice

The corridor of the road was defined in the feasibility study and the final alignment was to be defined in the Detailed Design Study. For this reason a comprehensive field survey was carried out to define all environmental impacts of the construction of the road. The initial alignment was set out by the surveyors and, if so required, adjusted in the field. This was done in close co-operation between the technical and the environmental team to obtain an optimum solution and to minimise homestead loss. Bisecting of villages and the affection of homesteads was avoided to the extent as far as possible. In this way the number of affected homesteads could be reduced from 294 numbers (as indicated in the Feasibility Study) to 28 numbers as recorded during the topographic survey. This number will however increase as construction along the alignment is in progress. During the establishment of the final alignment, realignment was made in places where graveyards and mosques were affected. Permanent school buildings were avoided.

4.2 Resettlement and Compensation Policy

The resettlement and rehabilitation policy is to be executed as per OD 4.30 guidelines of the World Bank. The OD 4.30 indicates that the displaced and PAPs are fully resettled and rehabilitated according to the following guidelines:

- The full compensation of their loss is paid before the move;
- The move is to be assisted and guided during the transition period
- Assist the PAPs to improve their former living standard, income and production level
- Pay special attention to the poorest and vulnerable groups
- Encourage community participation
- Support the use of existing social and cultural institutions for resettlement
- Integrate the resettler socially and economically into the host community
- Provide compensation against all properties and direct and indirect loss of income
- Ensure compensation to squatters and utholis

The 1982/1989 Acquisition and Requisition of Immovable Property Ordinance of Bangladesh is to be implemented for the compensation of direct losses.

4.3 Time Schedule and Organisation

A time schedule for the landacquisition and the resettlement in line with the anticipated construction program is made up taking into account the notification periods under section 3 and section 6 of the above mentioned Ordinance. This time schedule includes the selection and preliminary works of the NGO(s) and the preparation and execution of the RAP. This time schedule is related to the tender procedure and covers all required actions.

4.4 Terms of Reference and Selection Criteria for NGO

The Socio-Economic sample survey was carried out to define a profile of the PAPs and as such to enable the NGO(s) conducting the PAPs inventory for the RAP. In view of the total number of PAPs and the geographical lay out of the project, the Consultants proposed to divide the project into two parts. One part located entirely in the Sirajgonj District and one part entirely located in the Natore District. The border between these districts is more or less the Atrai river.
The ToR for the NGO conducting the PAP inventory and preparing the RAP was defined and submitted. The tasks were defined as follows:

(i) Define the extent of losses and the residual land  
(ii) Carry out a full survey of PAPs  
(iii) Develop a RAP with compensation packages  
(iv) Develop IGPs and training programs  
(v) Develop a Management Information System for resettlement activities.

As mentioned above, an estimated 75,000 people will be directly affected by the project. To what extent they are affected is to be determined by the surveys of the NGOs. These surveys also have to determine the number of PAPs to be resettled.

4.5 Shortlisting of NGOs

The consultants invited several NGOs to be shortlisted for the preparation of the RAP. Only four NGOs responded positive. These four are NGOs, CCDB, RDM, World Concern and SHARB who were shortlisted for submission of their proposal for final selection.

4.6 Co-ordination and Logistics

Taken into consideration the tight time schedule, the elongated shape and the poor accessibility of the project the consultants proposed to introduce a Project Co-ordinating Consultant. As two NGOs are to be employed to carry out the preparation and execution of the RAP, a co-ordination between the two NGOs to obtain a socio-economic survey and a RAP fixed on the same basic levels is required. In the consultants opinion it is vital that the resettlement is integrated in the total package of the construction of the road. This approach can reduce the time and cost of the total project.
5 ENVIRONMENTAL IMPACT ASSESSMENT

A comprehensive inventory of the existing environmental impacts in the project area was made. The existing impacts were differentiated as follows:

- Natural impacts like flooding, storms, etc.;
- Man made impacts;
- Impacts due to developments in the region.

The expected impacts due to the construction of the road were separated from impacts during construction and impacts after construction. The different areas of impact were defined into the following categories:

- Physical impacts like disruption of drainage systems and interruption of local transport systems;
- Ecological impacts on habitats, wildlife, groundwater and the influence of waste disposal;
- Economic impacts.

All the potential positive and negative impacts were listed and elaborated. The fields of potential impacts directly resulting from the road construction were determined as follows:

- Surface water resources
- Groundwater resources
- Soil conditions
- Agriculture
- Wildlife and fisheries
- Public health

Other regional impacts due to the construction of the road following the regional development are anticipated as well:

- Undesired development beyond control (illegal encroachment and use of embankment);
- Explosive population growth and subsequent pressure on local resources;
- Deforestation due to increased firewood demand;
- Change in use of land patterns
- Socio-cultural conflicts
- Depletion of biological resources, etc.

5.1 Impact on Natural Fish Production

As indicated in the ToR, special attention is to be paid to the loss in natural fish production. This issue is extensively elaborated in the Environmental Impact Assessment.

The loss of natural fish production due to the construction of the road embankment is estimated in relation to the area yearly inundated in the monsoon. The loss is calculated at a total of 12.5 ton per year. This loss is compensated through the creation of permanent waterbodies from the sand borrowpits. However, other factors play a significant role here. Due to the construction of the embankment with its limited drainage surface of culverts and bridges, migration routes are now channelled and the culverts and bridges provide an unique opportunity to catch all the migrating fish. The capture of fishes will undoubtedly influence the long term sustainability of the fish stocks.
5.2 Noise Pollution

The noise pollution level in the project area will certainly increase. An assessment of the noise pollution was made based on the available data using several standards. From this assessment it appears that the level of noise pollution will remain within an acceptable level outside the RoW of the road. Details of the noise pollution can be found in the report of the same name.

5.3 Air Pollution

The air pollution level will also increase due to the construction of the Nalka - Hatikamrul - Bonpara New Road. It is difficult to estimate the level of air pollution in the future. It is expected that the output of air polluting agents from vehicles will be reduced in the future when different measures to reduce air pollution will be enforced. With the current standard of emissions of mainly HDVs, the air pollution remains within acceptable levels according to British standards. It is however assumed that the pollution levels will gradually lower in the future despite the traffic growth. Details of the air pollution can be found in the report of the same name.

5.4 Road Safety

One of the reasons to design a secondary lane for slow traffic was to increase road safety. A separation of slow and fast moving traffic will considerably reduce accidents.

It is anticipated that especially the first months after the opening of the road accidents will occur. People in the project area are not familiar with high speed traffic. To reduce speed in build up areas, curves were designed at the entrance of villages and as such to reduce accidents. Junctions are designed in such a way that only perpendicular crossing of the mainroad is possible. In two locations, Hatikamrul junction and Bonpara junction, roundabouts are designed for a smooth flow of traffic.

5.5 Environmental Benefits

Not only negative impacts result from the construction of the Nalka - Hatikamrul - Bonpara New Road. Besides, the positive economical effects resulting from the construction of the Jamuna bridge and consequently the NHBNR, numerous other non-economical positive impacts can be foreseen.

**Environmental benefits:**

It is anticipated that the locally generated surplus of water will be significantly reduced, by creating ponds and lakes from borrow pits, wintering habitats are considerably increased. As embankment plantation is foreseen, afforestation will increase.

**Agricultural benefits:**

Due to the construction of the embankment local drainage and flood protection will improve, together with the irrigation schemes.

**Life quality and public health benefits:**

The rescue facilities in the project area will considerably improve, evacuation during severe flooding will be facilitated. It is also anticipated that in general the water quality will improve due to newly installed tubewells.
Social benefits:

During construction, temporary employment facilities will be created. With an improved infrastructure also the transport requirements will grow and as such employment. As the general employment rate will grow, also the spin-off like small scale industries will grow.
6 ENVIRONMENTAL MANAGEMENT

6.1 Design Measures

From the start of the project design, environmental considerations related to the design were duly incorporated. This approach started with the choice of the final alignment and is maintained throughout the project preparation.

6.2 Embankment Construction

After studying the embankment height and dimensions it appeared that approximately 5 million m³ of fill material will be required. This quantity represents an average fill of 100 m³ per m of road. If the conventional way of side borrow was maintained an additional 500 ha was required for borrow material only. To reduce the quantity of required land, the Consultants searched for another solution for borrow material. Initially it was considered to dredge material from the different rivers adjacent to and crossing the alignment and creating fill borrowpits of considerable depth to reduce the surface area of affected land. During the soil investigations it appeared that this was only partly feasible. The river banks are elevated due to sedimentation during flooding and these highlands are densely populated. The overburden on the embankments is considerable. Deepening of the river beds by dredging is only partly possible as the material encountered in the riverbeds is very fine sand and the natural slope is very flat. If dredging of the river beds is executed, the risks of embankment slides during the first rains is not unimaginable. Therefore, optional sand borrowpits were located on different locations along the centreline. These locations are mainly old river beds. These defined borrowpits are all situated in non-sensitive areas. The depth of these borrowpits varies from 3 to 7 m. After rehabilitation, these lakes create a good opportunity to improve the water availability during the dry season as a large part of the project area is affected by water shortage during the dry season.

To protect the sand core of the embankment cladding material is to be laid on the sand core. The minimum thickness of this cladding material is 0.5 m. In places where the embankment will be regularly inundated, a 0.75 m cladding layer is foreseen. For the cladding material different sources are available. The first source is the material obtained from the clearing of the topsoil. The second source is the overburden from the different sand borrowpits. As a third source different clay borrowpits are identified along the alignment at an interval of approx. 3 km. These clay borrowpits can be transferred through rehabilitation into fishing ponds and can serve as alternative income source for PAPs.

6.3 Road Safety Design

Various measures to reduce the accident risks during operation are worked in the different parts of the design and elaborated in the EMAP. Also, measures to be taken during construction are worked out.

6.4 Social Tensions

With the importation of a few hundred man labour force, it is anticipated that tension will arise during the construction period between the employees of the contractors and the local population. Regular meetings between contractors, NGOs, consultants and representatives of the villagers should ease these tensions.
6.5 Management of Water Resources

The construction of the embankment will create a change in the existing drainage and irrigation pattern. This will require during construction a review of the existing irrigation schemes and additional tubewells may be required. A provisional sum for deep and shallow tube wells to re-establish the disrupted irrigation schemes is taken up in the BoQ. Additional sedimentation may occur as a result of reduced water velocity and however a large number of drainage structures are foreseen, locally waterlogged areas may be created.

In the hydraulic design adequate bridge and culvert openings are taken up to reduce water velocity to an acceptable level and to minimise erosion. Three locations remain with a water velocity of more than 1.0 m/sec. The elevated water velocity only occurs during peak discharges calculated at once in the 25 years under the most unfavourable circumstances. These unfavourable circumstances happen during heavy rains at the start or at the end of the monsoon. The locations are situated at the following places:

1) Harinchara bridge 1.48 m/sec. Ch. 16+000
2) Khalkula bridge 1.14 m/sec Ch. 18+650
3) Nimaicharai bridge 1.27 m/sec Ch. 17+170

The Harinchara bridge is situated in a lowland area and the water velocity is not likely to damage surrounding agricultural areas. The water velocity at the Khalkula and Nimaicharai bridge are still within an acceptable level. For the protection of the embankment against erosion and scour adequate slope protection is taken up in the design. In places with high water velocity, the slope protection consist of concrete block work. In places where the water velocity is within acceptable limits a geomat with selected deep-rooting grasses is applied. In other places where water velocity is not an issue, grassing and tree plantation is recommended.

During construction special care is to be taken in respect to dumping of waste material and the existing ground water level. Oil and other waste products can easily pollute surface and ground water. As the inhabitants of the project area rely completely on ground water for domestic purposes, pollution of ground water is to be avoided.

6.6 Fisheries Mitigation Plan Measures

The alteration of fish migration routes and the change in ecology due to the construction of the NHBNR, adequate measures for fish stock conservation are to be taken. As it is envisaged that the natural fish production will at least not improve, culture based fishery schemes and aquaculture development are to be encouraged to create additional income generating facilities.

6.7 Forestry Schemes

The noise and air pollution levels will rise considerably. These impacts can be reduced partly by a plantation scheme for the slopes of the embankment. It is also to be avoided that houses and settlements are erected within the RoW of the road. It is therefore advised to lease out the planted embankments to PAPs. The advantages are multiple. By leasing out the embankments, the land loss of PAPs can partly be compensated. If there is someone responsible for the roadside plantation, illegal cutting of trees will be considerably reduced. If, as part of the lease, the maintenance of the slopes is included, it will save the GoB the funds for this maintenance. Also illegal settlement on the slopes will be reduced.

Species were selected and a plantation and harvesting scheme was worked out for the afforestation scheme.
7 ENVIRONMENTAL MONITORING

For the implementation of the environmental management plan an organisational framework was set up with the description of the different tasks of the people and bodies involved in the construction of the project. The elements to be monitored and the activities were listed to enable adequate monitoring.

8 SUMMARY AND RECOMMENDATIONS

The design of the road has been made in accordance with the findings of the Hydraulic Modelling and the Detailed Environmental Study. All physical negative impacts arising out of the road construction have been studied and where possible converted to additional values of the road construction. However, these additional values require additional investment. For example, a road embankment plantation scheme to mitigate the negative impact of traffic requires additional funds.

On different locations in Bangladesh the remains of brickyards, borrowpits and sites are left in an unusable condition. The ToR clearly indicates that these conditions are to be avoided. The rehabilitation of borrowpits and sites will be prescribed in the Technical Specifications, but if the borrowpits are not acquired by the GoB, the influence on rehabilitation is only minimal. The conversion of clay borrow pits into fishponds can only be undertaken adequately if the designated areas are Government property. In the opinion of the Consultants it is financially cheaper to acquire the land for the borrowpits and make the soil material available for the Contractor(s). The social acceptance to expropriate valuable land for borrowpits, transferring it into a good income generating fishponds and leasing it out to someone else is another issue. However, if the negative impact on the environment of construction sites is to be avoided, additional land acquisition for borrowpits and sites is the only solution.
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