

## CHAPTER 6

### PROPOSED MITIGATORY MEASURES

#### **Mitigations for Soil Erosion and Siltation**

Soil disturbances are unavoidable as the project activities involve clearing and excavation of the land. Every measure will be taken such as turfing of open banks to control soil erosion. The dry period, in which minimal siltation will occur, is the time selected for the planned construction activities of the weir and tail race.

Recommendations and guidelines from the NBRO will be strictly followed during the construction period. According to NBRO recommendations, the service of a well qualified geotechnical expert will be obtained.

#### **Mitigations for River bank erosion**

A well adapted vegetation cover provides stability to the river banks on either side of the ponding area and upper reach of the stream. A considerable of degradation was identified on the right bank, which is quite vulnerable. This area will be replanted with riverine vegetation as a mitigatory measure. Any possible occurrence of river bank erosion at the tailrace canal will be negligible as water released through the power house via the tail race canal will occur at a non erosive velocity. Anchorage will be provided to unstable rock boulders at the tail race point and ponding area to avoid damage by dislocation. The banks opposite the tailrace outlet point, will be paved by use of rock boulders as an erosion control. The velocity of the water released from the spill ways and the outlet of the de-silting tank will be reduced by designing them in a step-wise manner. The NBRO guidelines will be closely followed during all application of mitigatory and other related activities.

**Mitigations during rehabilitation of access to the weir and powerhouse**

The construction of the access road to the powerhouse will be done according to the guidelines of NBRO. The soil erosion of the constructed road will be controlled immediately by turfing of the banks. The excavated earth banks which have high slopes will be protected by applying necessary bank conservation methods under the guidance of geotechnical experts. Furthermore the construction will commence during the dry period to prevent possible minor slope failures.

**Mitigations for Hydrology and water quality impacts**

Any chemical or biological changes of the water quality of Padiyan dola during the operational phase of the proposed project will be avoided. A comprehensive waste disposal program along with the Ratnapura Pradeshiya Sabha will ensure that disposable material such as cement bags etc. will be disposed of in an environmentally friendly manner.

**Mitigations for Waste generation and pollution from temporary workers camp**

Suitable sites will be selected for the construction of general sanitation facilities prior to the commencement of construction. The removal of organic and non-degradable waste from the site will be organized along with the Ratnapura Pradeshiya Sabhawa, to ensure prevention of water pollution.

**Mitigations for Ecological impacts****Mitigations for Terrestrial fauna and flora by the project**

Based on the sociological needs and ecological requirements such as existing animal routes, the project proponent has agreed to cover the all arts of intake headrace canal and forbay tank. The open areas in tailrace canal will be cover by a wire mesh. (Specially area with a steep slope which is a likely place for animals to fall accidentally to the proposed canal )

The thrash rack in the forebay tank will be constructed with a  $45^{\circ}$  slope for animals which cannot escape from the stepwise canal bank. The thrash rack will be regularly monitored by operators.

Degraded lands around the project area will be restored by the project proponent as a compensatory measure for trees which have been felled for project constructions (see fig 10). Additionally the project proponent is willing to participate in some restoration or environmental conservation activities in the along the stream bank for prevention soil erosion which is a main catchment area for the Padiyan dola, on an annual basis. The above work will be conducted under the guidance of the Forest department and Department of Wildlife Conservation. This will use native plant species growing in the area. Also this will be facilitate to provide sustainable water yield to the present project .

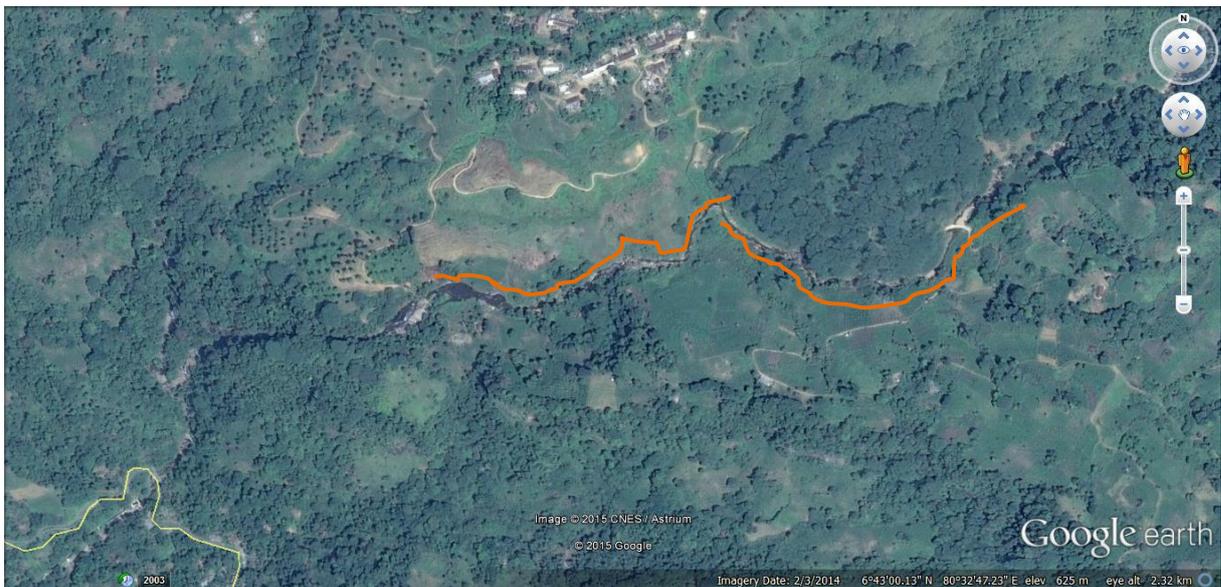


Fig 12. Propose bank restoration area for control soil erosion and serve as an ecological corridor for less mobile animals

### **Impacts on aquatic fauna and flora due to low flows down stream and inundation upstream during the operational stage**

The proposed weir although a small scale one (1.25m), and considerably low aquatic species recorded in the area. It should be ensure the free moment of the aquatic species. Therefore it need to the compensatory migration of native fish and the river continuing concept. .

Since only recorded fish species in weir location is *Garra ceylonensis* and is a an effective climber by suckers A simple fish ramp will sufficient for the location (DVWK, 2002). The fish pass design to successfully operate during the rainy season which has high water flow. The fish pass construction will be undertake with the supervision and guidance of well experience ecologist.

The populations of *Dalzellia zeylanica* which can effect by significantly low flow during the construction and operational phases, The plants firmly attach nature to the rocky substrate the translocate is not possible. The only method to reduce the reduction of plant population is channel the flow of mandatory ecological discharge from the weir. The Padi dola which situated in southern slopes of Peak wilderness forest which have considerable water flow with regular rains as many months of the year. The project will release an uninterrupted ecological flow as **0.03 m<sup>3</sup>/s.** from the wear throughout the year according to the CEA regulations. For release the above water quantity, 9.8 cm diameter hole will be establish at 1.16 m below from the dam top level at dam centre.

Also Kadurugaldola a large stream flow between the weir and the tail race (just 700m below the proposed weir location) which also reduce the stream bed drying effect of latter parts of the project area. The flow of this stream will not be modified by the proposed project. Therefore a significant level of water will remain in the river throughout the year.



Fig. 13 The Rock face ca. 20m below of the proposed weir location growing one of main *Dalzellia zeylanica* Population recorded in the stream. Which need to protect by channellings the environmental flow through location.

#### **Mitigations for Impact on bed rock stability**

The following mitigatory measures will be applied for ensure the ground stability. The weir structure will be anchored to the fresh bedrock. Rock blasting will be carried out at specific locations to remove boulders and rock blocks by using none explosive methods (chemical

blasting) As suggested in the geological report and NBRO recommendations, general blasting procedures will be carried out directly supervised by a qualified geo-technical person. During excavation, safety measures such as sheet pile walls will be utilized to stabilize the embankments of the area.

**Mitigations for Loss of soil stability and increase of slope failures.**

A certain level of ground disturbance is expected during the construction phase of the project. The expected changes particularly in the Penstock sites will be minimized by strictly following the NBRO recommendations and guidelines. Based on the NBRO recommendations the expertise of a well qualified geotechnical expert will be referred to and construction engineers will be advised to follow all guidelines strictly to ensure negligible soil erosion at the project site.

To ensure stability of bedrock, concrete columns driven to the fresh bedrock will be utilized in the foundation of the power house.

**Drainage Management Plan**

NBRO guidelines provided for drainage management will be followed strictly throughout the project. Also the present natural drainage network and their catchments will not be disturbed by any construction activities See fig V.j.2 for derange management along the penstock path.

**Mitigations for Sociological impacts**

**Noise and Vibration control**

In the project area, construction activities will mainly be conducted manually at all possible times. Whenever use of machinery is required occasionally all measures will be taken to maintain the noise levels within a range permitted by the Central Environmental Authority below 75 dB during daytime and 50 dB at night time respectively.

### **Mitigation on small scale hydropower generation**

Project proponent has agreed to Supply electricity form the national grid for all house holds using above micro hydropower facility. Also project proponents agreed to pay their monthly electricity bill for the project period.