APPLICATION FOR ENVIRONMENTAL CLEARANCE

GUIDELINE FOR HYDROPOWER

National Environment Commission

Royal Government of Bhutan

August 2004

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ROYAL GOVERNMENT OF BHUTAN

NATIONAL ENVIRONMENT COMMISSION SECRETARIAT

FOREWORD

In 1999, the National Environment Commission with technical and financial assistance from the Asian Development Bank (ADB) published six sectoral environmental assessment guidelines for the mining, roads, industries, hydropower, transmission lines and forestry sectors. Several stakeholder consultation workshops and seminars were conducted before the guidelines were published. These guidelines were intended to guide different project proponents through the process of acquiring an environmental clearance for their projects. The Environmental Assessment 2000 (EA Act 2000) was passed by the National Assembly in 2000 and the Regulations under the Act were adopted two years later. Stakeholder feedback and our experiences in implementing the EA Act and the guidelines indicated that there was a need to revise the guidelines in order to make them more practical and relevant to the Bhutanese context and also to streamline them with the provisions of the EA Act 2000. It was also felt that there was a need for two more sectoral guidelines for urban development and tourism as rapid developments in these two sectors was becoming a concern for Bhutan. Therefore, in 2003 the NEC once again revisited these guidelines and revised and updated them to make them more practical and functional documents. Several Environmental Codes of Best Practices (ECOPs) have also been produced to support these environmental assessment guidelines.

The NEC is grateful to the ADB for being so forthcoming with technical and financial assistance to revise and update these guidelines. The revision and updating of these guidelines were accomplished through close consultation with all the various stakeholders. We would also like to express our gratitude and appreciation to all the line ministries and stakeholders for their active participation, support and inputs. We are confident that the revised guidelines will be more useful documents that facilitate and expedite the environmental clearance process as project proponents will now have a better understanding of what information must be provided in order to attain an environmental clearance.

In Bhutan, environmental conservation has been embraced as one of the four pillars of Gross National Happiness - the other three pillars being good governance, socio-economic development and cultural preservation. However, with the expansion of developmental activities in the country, it is becoming very difficult to strike a sustainable balance between environmental conservation and socio-economic development. The number of industries is on the rise every year

while the demand for rural access to market facilities in the form of farm roads and feeder roads is increasing with every Five Year Plan - in the 9th Five Year Plan alone there is a plan to develop 588kms of farm roads. Environmental issues such as waste disposal related to urbanization are also becoming serious concerns for Bhutan. Bhutan is lauded by the international community for its sound environmental policies and the political will to implement these policies. However, environmental problems are becoming more and more visible and instruments like the EA Act 2000 must be implemented effectively to support the government's sound environmental policies and to ensure that Bhutan remains clean and green.

The environmental assessment process endeavors to mitigate and prevent the undesirable impacts of developmental activities. It is in no way intended to hamper socio-economic development in Bhutan but to guide project proponents in making the right investments in land, manpower, technology and mitigation measures to ensure that their projects have the least possible impacts on the environment. With the revision and updating of the old guidelines and the publication of two new guidelines on Urban Development and Tourism and relevant ECOPs, the NEC is hopeful that the private sector, line ministries and competent authorities under the Regulations for Environmental Clearance of Projects find the guidelines more useful, practical, informative and easy to comply with. It is the sincere wish and hope of NEC that all the stakeholders, both public and private will make the best use of these guidelines, which in turn will help in protecting our fragile ecology. Sound implementation of these guidelines will go a long way in minimizing the negative impacts of developmental activities on Bhutan's environment.

18.8.2004

Nado Rinchhen
Deputy Minister for Environment

NECS, PO Box 466, Thimphu, Bhutan
Telephone: (975-2) 323384/325856/324323/326993 Fax: (975-2) 323385
Email addresses:
AFD: admnec@druknet.net.bt
Technical Division: EIA Section: eanec@druknet.net.bt; RMS Section: rnrnec@druknet.net.bt; ICO section: cunec@druknet.net.bt
Policy Coordination Division: Policy Analysis Section: ppdnec@druknet.net.bt; Legal Section: legalnec@druknet.net.bt

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1. GLOSSARY

Affected people: individuals, groups of people or other organisations whose interests may be directly affected by the location, construction and operation of the project

Agency: a ministry, department, municipality established under the Bhutan Municipal Act, 1999 or any autonomous body of the Royal Government of Bhutan

Applicant: a person seeking an Environmental Clearance from a Competent Authority or from the National Environment Commission

Application: is the output of this guideline, which is submitted to either the Competent Authority or the NEC for approval

Competent Authority: any agency of the Royal Government that has the power to issue an Environmental Clearance for a project

Cultural Heritage: tradition or culture that should be preserved for future generations

Development Consent: the approval that is issued or renewed by a Competent Authority in the form of a licence, lease or permit for land use or construction. The Development Consent can only be obtained after the Environmental Clearance has been issued

Distribution line: power lines with voltages below 66 kilovolts

Environmental Assessment: all procedures required under Bhutanese law to identify means to ensure that the activities of a project are managed in an environmentally sound and sustainable way

Environmental Clearance: the decision issued under Chapter III of the Environmental Act, 2000, issued in writing by the National Environment Commission or the Competent Authority, to let a project proceed. The Environmental Clearance includes terms and conditions which the Applicant or Holder of the Environmental Clearance must abide by to ensure that the project is managed in an environmentally sound and sustainable way

Environmental Management Plan: a plan, which addresses the ways of mitigating and monitoring the impacts that have been identified by the environmental assessment. The Environmental Management Plan may comprise part of the conditions of the Environmental Clearance that is issued either by the Competent Authority or by the National Environment Commission

Environmental Parameter: A component of the surrounding environment which may be altered by a project activity. This includes physical interventions or releases to air, water and soil which may in turn affect vegetation, wildlife, human and aquatic communities

Environmental Terms: the requirements and conditions that a project must comply with, as stated in the Environmental Clearance issued either by the NEC or the CA

Environmental Unit: a management unit that is established within a project structure that is responsible for implementing, monitoring and reporting on the environmental terms attached to the Environmental Clearance

Forest: any land or water body, whether or not under vegetative cover, in which no person has acquired a permanent and transferable right of use and occupancy, whether such land is inside or outside the forest boundary pillars, and includes land registered in a person's name as *Tsamdo* (grazing land) or *Sokshing* (woodlot for collection of leaf litter)

Holder: the recipient of an Environmental Clearance under Chapter III of the EA Act, 2000

Land acquisition: the acquisition of any land, constructions or other property in accordance with the procedures established under the Land Act, 1979 (or successor legislation)

Monitoring: a program of systematic measurement or observation of environmental and social parameters. Monitoring requirements includes regular reporting and specifies action to be taken if non-compliance occurs. Monitoring requirements are specified in the Environmental Terms which is attached to the Environmental Clearance. Monitoring consists of *Baseline monitoring* which is carried out prior to a project commencing. Baseline monitoring measures the existing environment and this is compared to later monitoring which establishes the effects caused by the project. *Compliance monitoring* refers to a system of regular measurements, which compares releases from an activity to those that have been specified in the Environmental Terms. The permitted releases are established in environmental standards

Municipal Corporation: a Corporation incorporated under the Bhutan Municipal Act, 1999, to implement the provisions of that Act for the benefit of the residents of a community classified as a Municipality by the Royal Government

Non-listed project: all projects that are not listed in Annex 2 of the Regulation for the Environmental Clearance of Projects, 2002 including its most recent update

Project: an activity, which may have significant effects on the environment

Project area: The area that includes the immediate and the proximate area of a project that the project may have an environmental or social impact on

Protected Area: is an area which has been declared to be a national park, conservation area, wildlife sanctuary, wildlife reserve, nature reserve, strict nature reserve, research forest, critical watershed or other Protected Areas for the preservation of areas of natural beauty of national importance, protection of biological diversity, management of wildlife, conservation of soil and water and related purposes

Screening: the review process carried out by the National Environment Commission or by the Competent Authority of the Application with regard to whether the project may be (i) issued with an EC (ii) rejected or (iii) require further environmental assessment

Sustainability: development that recognises the need to raise the living standards of the present population without compromising the country's resource base, cultural integrity, historical heritage or the quality of life of future generations

Transmission line: power lines with voltages above 66 kilovolt

Wildlife: includes all mammals, avians, reptiles, amphibians, fishes and invertebrates

2 INTRODUCTION

In 1999 the National Environment Commission (NEC) approved six sectoral environmental guidelines on (i) Forestry, (ii) Highways and Roads, (iii) Hydropower, (iv) New and Existing Industries, (v) Mines and Mineral Processing and (vi) Power Transmission Lines. In 2000, the National Assembly passed the Environmental Assessment Act and in 2002, the government approved the Regulation for the Environmental Clearance of Projects (the Regulation). Under the Regulation, both the National Environment Commission (NEC) and the designated Competent Authorities (CA), which are listed in Annex 2 of the Regulation, are authorized to issue Environmental Clearances for projects.

Applicants, CAs and the NEC found the six sectoral guidelines developed in 1999 cumbersome and difficult to comply with. This often led to delays in issuing environmental clearances and therefore the execution of projects. In order to ensure that these guidelines address the requirements of the *Environmental Assessment Act, 2000* and the *Regulation for the Environmental Clearance of Projects, 2002* while at the same time keeping them simple and easy to follow, the NEC, with financial and technical assistance from the Asian Development Bank (ADB), has revised the six guidelines and also developed two new sectoral guidelines: one for tourism and the other for urban development.

The NEC had the overall responsibility for coordinating the program, which was directed by Mr Karma C.Nyedrup of the Environmental Assessment Section. The assistance of numerous officers within the NEC and the following consultants; Karma Jimba, Sonam Tobgay and Charles Adamson is gratefully acknowledged.

This guideline has been developed in close consultation with relevant agencies that are involved in activities/projects related to the development of hydropower projects and also integrates requirements needed by other agencies that are involved in approving hydropower projects.

3 INFORMATION REQUIRED FOR PREPARING AN APPLICATION FOR THE ENVIRONMENTAL CLEARANCE OF A PROJECT

The Application for Environmental Clearance (EC) of a project[1] is hereinafter referred to in this Guideline as the "Application.

1. Issuance of an Environmental Clearance is a prerequisite to the issuance of a Development Consent. (Ch II, article 8, Environmental Act, 2000)

2. The Competent Authority under the Ministry of Trade and Industry will issue the Environmental Clearance for projects that are defined in Annex 2 of the Regulation for the Environment Clearance of Projects, 2002[2]

3. The purpose of the Application is to assist the CA or the NEC review the project to determine the level of environmental assessment required. It is therefore, important to provide concise and accurate information when completing the Application. When quantifying the environmental impacts, avoid using subjective statements such as "*the project will have minimal environmental impact*"

4. One of the main reasons for delays in making a decision to either issue environmental clearance or reject the Application is lack of dequate information in the Application. If the required information is not provided in detail, the CA or the NEC will have to seek further clarification from the Applicant which extends the review process

[1]To establish a project without an Environmental Clearance, or to provide false, misleading or inaccurate information shall be an offence under Article 49 of the EA Act, 2000 and Section 36 and 37 of the Regulation for the Environmental Clearance of Projects, 2002.

[2]Each year the NEC requests the various Competent Authorities to review and add projects to Annex 2. Thus while the Regulation was issued in 2002, Annex 2 has and will continue to be revised. The latest issue of the Regulation needs to be referred to for the most recent update of Annex 2.

5. If the Application is subject to further environmental studies, the Applicant will need to submit Terms of Reference for the subsequent detailed investigations to the NEC for approval. (*Article 15, Env Act, 2002*)

6. If any section is not relevant to your project, explain why this is the case then proceed to the next section

7. The numbering of sections for the Application should start from 1. Persons completing the Application are not obliged to maintain the same numbering sequence as used in the Guideline

3.1 Applicant's Details

Information that should be provided are:

(i) Name of the project
(ii) Name of the Applicant
(iii) Present mailing address including telephone number, fax, and email (if any)
(iv) Name of the environmental focal person[3]
(v) Qualification/designation of the focal person
(vi) Telephone number of environmental focal person
(vii) If a consultant prepares the Application, give the name and contact details for the company that prepared the Application

3.2 Project Objectives

Clearly describe the main objective/s of project. The objective/s can be written in bullet form.

[3]Section 23 of the Regulation for the Environmental Clearance of Projects, 2002, may require the Applicant to delegate a focal person to ensure compliance with the terms of the Environmental Clearance. While Section 24 of the Regulation, requires that depending on the size of the project, the project may need to establish an environmental unit responsible for ensuring compliance with the terms of the Environmental Clearance.

3.2.1 Relevance to Power Sector Master Plan

(i) Has the Project been identified in the Power Sector Master Plan?

(ii) If so state the rank that the project holds in the Power Sector Master Plan?

3.3 Site location

Show the Project site location details in Table 1.

Table 1: Project location details

Facility	***Dzongkhag***	***Geog***	**Name of Map**	**Map Scale**	**Map Reference**
Dam					
Powerhouse					
Headrace/ channel					
Penstock channel					
Others					

Note: Name of Map is the name given to the Survey of Bhutan map Others include: camp and construction site, and etc.

3.4 Project Details

3.4.1 Type of Project:

Indicate type of project, for instance: Reservoir, Run-of- river, mini-hydro,micro-hydro,or other:
……..……...

3.4.2 Size of Project:

Installed capacity …….. MW : or ……..…… kW
Average Energy produced ……GWh/yr: or ……..kWh/yr

3.4.3 Project Costs

1. What is the estimated total cost of the Project? ……..……..
2. How much of this is allocated for environmental management programs? ……..……..
3. Name of Project Financier

Note: The environmental management cost is derived from section 4.11.

3.4.4 Dam Details

Indicate type of dam, e.g. concrete arch, gravity, earth-filled etc. .....

Height of crest above riverbed ..... (m) Crest elevation ..... m. asl Crest length ..... (m)

Gates (i) Top opening ..... (No) Dimensions ..... (L m x H m)

(ii) Bottom opening ..... (No) Dimensions .... (L m x H m)

(iii) Height of intake: ..... m. asl

3.4.5 Weir Details (for mini or micro hydro)

Type of construction, e.g. concrete, wood etc. .....

Type of weir.....

Height of weir from stream bed: ..... m

Crest elevation: ..... m. asl. Crest length: .....m

3.4.6 Reservoir/Headpond Details

i. Full supply level (FSL):
   (a) Height .....m. asl. (b) Area .....(km^2)
   (c) Volume .....m^3
ii. Minimum Draw Down Level (MDDL):
   (a) Height .....m. asl. (b) Area ..... (km^2)
   (c) Volume ..... m^3 (= Dead Storage)
iii. Capacity Inflow Ratio (CIR) ……..…

CIR is the ratio of gross volume of the reservoir at full supply level to the average annual runoff. CIR helps to understand the size of the reservoir and provide an idea of sedimentation in the reservoir.

iv. Highest Flood Level (HFL)

(a) Height……..…m. asl (b) Area……..……(km^2)

(c) Volume……..…m^3

HFL will determine the level of submergence.

3.4.8 Powerhouse Details

i. Is the powerhouse (i) underground or (ii) above ground?.....

ii. Water conductor system:
Length of tunnel: ..... km
Open channel length…… km

iii. Tail water level ..... …m. asl.

iv. Gross head: .....……m.

v. Turbines: ..... (no) x..…….. MW/kW= ……..MW/kW (Installed capacity)

vi. Design discharge: ..... …m^3/s

vii. Type of penstock
(a) Length of exposed penstock……..…..m
(b) Length of buried penstock…… m
(c) Length of underground pressure shaft…..……...m

4.4.8 Excavation Quantities

Provide details in Table 2 on the quantities of spoil that will be excavated.

Table 2: Excavated quantities

Item	Excavation Volume (m^3)
Tunnel and adits	
Pressure shaft and surge shaft	
Underground powerhouse and access tunnel	
Tailrace tunnel	
Desilting chamber	
Other	
Total	

Can the spoil be used beneficially for land reclamation purposes in other sites?
Explain:…….....…..

3.4.9 Access

1. Indicate the total length of permanent access roads that the project will have to construct. This does not include road widening or road upgrading.
   i. Length of External access required:. … km
   ii. Name/location of takeoff point:…….. km
   iii. Length of Internal access required:.. ..…km

Note: External access is the length of road required to link the project site to an existing road head.

Internal access is the length of road required to link the various project components

2. Indicate length of Temporary Access roads that will be constructed (km)

The applicant will be required to submit a separate application for access and internal road construction in line with the *EA Guideline for Roads, 2004*.

3.4.10 Transmission Line for Export of Power

Provide a summary of the Export Transmission Line below.
Transmission line voltage: ……. kV
Standard width of RoW: …….. m
Transmission line length from switchyard to load or distribution centre: …… km
Name of the location of the load or distribution centre:..……..
Minimum ground clearance required for conductor:... ...…m
Minimum horizontal clearance required for houses: ……....m

The project may need to connect to the closest existing energy distribution point. Show the length of power transmission line that will be required from the distribution point to the project site and the transmission line voltage:
..... km kv Where transmission lines will need to be constructed to export power, the Applicant will need to submit a separate Application for environmental clearance in line with the "*Guidelines for Transmission and Distribution, NEC, 2004."*

3.4.11 Implementation Schedule

1. How long will the project take to construct? ..... months/years
2. Attach a Project Implementation Schedule Chart to this document

3.5 Alternative/s

Alternatives include: (i) Project alternatives, which examine other possibilities of energy production and (ii) Project site alternatives, which look at other possible sites to locate the project.

State if there are:
i) Project alternatives; and/or
ii) Project site alternatives.

Clearly justify why this project is chosen over other alternative/s
…….....…

3.6 Public Consultation

Provide details of public consultation[4] held with affected people.

[4]As per the Article 16 of the EA Act 2000 and Section 31 of the Regulation for the Environmental Clearance of Projects 2002, Public Consultation is mandatory. Establish the Public Consultation by meeting the requirements shown in Section 31.

The Applicant must explain to the affected people the expected impacts of the development, where they will occur and how they will be mitigated. Provide a record of the meeting/s and attach a list of the names of the people together with the date of consultation/s, details of their Geog and village, issues raised by them and the agreement/s arrived at between the Applicant and the people to resolve these issues. Provide signatures or other proof of consultation/s with the affected people. Describe issues that remain unresolved.

3.7 Project Physical Environmental Details

3.7.1 Topography

Provide the area for each of the facilities, and then estimate the ground slope as a percentage[5] for each of the project sites. Enter this in Table 3.

Table 3: Project topography

Facility	Area (km^2 or m^2)	0-10 % Low slope	10- 50% Moderate	50 -100 % Steep	> 100 % Very steep	Total
Headpond Reservoir						100%
Dam site						100%
Power house						100%
Access Roads						100%
Project Infrastructure						100%
						100%
Total		xx	xx	xx	xx	xx

Note: i.Area is the amount of land that will be required to accommodate the facility. This is not an estimate

[5]degrees = 100%

ii. If the powerhouse is underground then the estimate is only required for the external switchyard area and support facilities

iii. Project Infrastructure: Bhutanese terrain is often such that it is difficult to site support facilities alongside the project component (dam site/intake and powerhouse). This requires that the support facilities such as offices and workshops be constructed in other areas often at some distance from the project component. In Table 3 show the area that will be required to locate the permanent support facilities including community housing, BHUs, schools etc.

3.7.2 Hydrology

Project is located on (name of river/water course) :.....
If the hydrological data for that particular river is not available, the data of a proximate river ***may be*** used for hydrological analysis. Therefore, provide the name of the river/watercourse that was used to determine the project data: .....Source of this hydrological data: (i) Hydrology Division or (ii) other.....
Years of record of hydrology data (time series): from .....(year) to ..... (year)
Catchment area to dam site: ..... (km^2)
Using the times series data complete the table below.

Table 4: Discharge shown in m^3/s

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Max													
Min													
Mean													

Notes:

1. For major hydropower projects, the time series of hydrological data may be 30 years or more. The 90% dependable flows have to be computed from these time series of data by statistical analysis. In the above table, the monthly max, min, and average flow corresponding to 90% dependable year shall be filled in
2. For mini hydropower projects, flow data are normally limited and may range from 5–10 years. For micro hydro project, 2 – 3 years of lean season flows are required
3. In the above table:
   Max = maximum discharge in m^3/s observed during that month of the year
   Min = minimum discharge in m^3/s observed during that month of the year
   Mean = average discharge in m^3/s observed during that month of the year

   For major hydropower projects, provide the following:

   a) 90 % dependable flow, $Q_{90\%}$……m^3/s
   b) Mean annual run-off, Q_{mean} ……m^3/s
   c) Mean annual yield, Q_{mean} ……million m^3

For mini and micro hydropower projects, provide the average lean flow recorded, Q_{lean}:……m^3/s

3.7.3 Powerhouse Requirement

The powerhouse discharge is ..... m^3/s and this will operate **as shown in Table 5.**

Table 5: Powerhouse discharge (m^3/s)

Discharge	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Year*
$Q_{average}$													
To Powehouse													
Remaining													
% of Original													

Notes:

i. $Q_{average}$ = average flow in that month.
ii. To powerhouse = flow directed to powerhouse
iii. Remaining = (i – ii)
iv. % of original = flow remaining as % of original flow (i)

3.7.4 Hydrology of Dewatered Area

The dewatered area is the length of channel between the intake (dam site) and the powerhouse release point (the tailrace). During operation this section of channel has flows removed from it, which harms aquatic life affects other users. The effect can be mitigated by a downstream release from the dam site while inflows from catchments entering the dewatered section (the supplementary catchments) can assist in reducing the impact. Provide information on the following:

i. Length of dewatered channel: ……..…….. km
ii. Supplementary catchment area available to the dewatered section: ……..…….. km^2
iii. Inflow from supplementary catchment: ……. m^3/s (for small watercourses l/s)
iv. Recommended environmental release from dam site to address this concern: ……..…… m^3/s

3.7.5 GLOF

Is the river subject to a possible Glacial Lake Outburst Flood? Yes or No. If ”Yes” identify the source of the GLOF: .....

4.7.6 Sediment Yield

Erosion rates and sediment yields (suspended and bed load) are very high in Bhutan due to geological erosion. Clearing forests and other changes in land use, which accelerates the geological erosion rate,

causes human induced erosion. Landslides are common to both types of erosion but may be more prevalent in human induced erosion.

What is the expected sediment yield at the dam site? ..... t/yr =.....m^3/yr.

What is the source of this information? .....

Relate this to the reservoir/headpond storage. How long will this take to fill the reservoir/headpond to FSL? ..... yrs.

Proportion your estimate of this erosion into:

(a) Geological erosion .....% and

(b) Human induced erosion .....%.

What is the expected silt that may be accumulated in the desilting chamber?…..……t/yr

3.7.7 Mining and Mineral Resources

Are there any known mines or mineral resources that will be flooded by the reservoir/headpond? "Yes" or "No". If "Yes" define the mineral resource and its current status: .....

3.8 Project Biological Environment

3.8.1 Land Use/Vegetation

i. <u>Project Facilities</u>

Complete Table 6 showing the areas of land use/vegetation that will be occupied by the various project facilities (km^2).

Table 6

Facility	Chu-sshing	Kam-sshing	Tseri	Tsmando	Sos-sshing	Broad-leaf	Conifer	Scrub-Land	Wet-land	Total (km^2)
Damsite										
Reservoir/ headpond										
Powerhouse										
Infrastructure										
Access roads										
Total (km^2)										

Provide the source of this information: …...……..

Note:

a. *Should Mixed Forest (Broadleaf + Coniferous) occur allocate this to the Broadleaf category unless it is dominated by Coniferous Forest in which case allocate it to Coniferous Forest*

b. *Scrubland also includes disturbed areas of Broadleaf and Coniferous forest that have been recently logged and are now regenerating*

3.8.2 Protected Areas

Protected Areas include, Wildlife Sanctuaries, National Parks, Nature Reserves, Conservation Areas and Biological Corridors.[6] Information about the location of Protected Areas can be obtained from the Nature Conservation Division, Ministry of Agriculture.

Provide information on the following.

i. Project Facilities: Are any of the project facilities located in a (i) Protected Area or (ii) Wildlife Corridor?

Name of the Protected Area/Wildlife Corridor:…....…
Classification of Management Zone in Protected Area:…….....……..

[6] Protected Areas are regulated by the Bhutan Forest and Nature Conservation Act, 1995.

ii. Access Road: Is the access road required to pass through a Protected Area or Wildlife Corridor? Yes or No.

If Yes, What is the length of road in the Protected Area or Wildlife Corridor? ……..... km
Name of the Protected Area/Wildlife Corridor ……
Classification of Management Zone in Protected Area:……..……..

iii. Transmission Line: Does the transmission line cross a Protected Area or a Wildlife Corridor? Yes or No
If Yes, What is the length of transmission line inside the Protected Area or Wildlife Corridor? ……km
Name of the Protected Area/Wildlife Corridor: ……..……..
Classification of Management Zone in Protected Area:……..……..

Note: Protected Area includes various management zones classified as; core zone, buffer zone, administrative zone, seasonal grazing zone, enclave zone and multiple use zone. The Nature Conservation Division will be able to provide details of the zone classification.

3.8.3 Wildlife

Using one or more methods provided below, the proponent will need to collect information on the occurrence of wildlife in the project area.

i. From the nearest Forest Office obtain a list of wildlife found in the project area and attach the list to this document

ii. If the information is not available with the forest office, conduct village interviews on the occurrence of wildlife in the project area and document the findings

iii. During site visits wildlife may be noted in the area. Provide a list of wildlife recorded at the Project sites during these visits

Note: the "Project Area" is the area and the immediate surroundings that will be occupied by the project facilities

3.8.4 Fish Species

Similar to wildlife the Applicant will need to collect information on the occurrence of fish species within the Project area.

i. From the nearest Forest Office obtain a list of fish species that are found in the river/water course and attach the list to this document

ii If the information is not available from the Forest Office, conduct village interviews on the occurrence of fish species in the project area and document the findings

iii. During site visits fish species may be noted in the area. Also provide a list of fish recorded at the Project sites

iv. The Golden Mahseer *(Tor tor)* is listed as a Totally Protected Species by the Forest and Nature Conservation Act, 1995. The Mahseer is also the only known long-range migratory fish in Bhutan. Has Mahseer been recently sited in the river at the project site? "Yes" or "No".

If "Yes" indicate the months when the Mahseer is found in the river: .....

3.8.5 Wetlands

i. Wetlands are wide flat areas that may be seasonally inundated. They have significant biodiversity and support a wide range of flora and fauna by creating habitats for terrestrial species, including water birds and aquatic life.

Will the Project inundate or remove wetland habitats? ”Yes” or ”No”: Explain your answer: .....
.....

ii. Sometimes reservoirs and headponds will create new water bird habitats. This is especially relevant if islands are created in the new reservoir/headpond which provide secure roosting and breeding refuges for the water birds. Otherwise if the reservoir/headpond is created in steep sided areas which will not support aquatic vegetation then the new habitat apart from creating a resting habitat on the water surface will not be as significant.

Will the project reservoir/ headpond create a better habitat for water birds? ”Yes” or ”No”: Explain your answer: .....
.....

3.9 Project Social Environment

3.9.1 Land Tenure

For those areas shown in Tables 6 - the Land Use/ Vegetation Tables, now show in Table 7 land ownership as being either (a) ”private” or (b) ”public”. For private land show the number of affected families. This data will be used to work out resettlement requirements and compensation payable.

Table 7: Land use details

Facility	Chuzing		Kamzhing		Tseri		Tsamdo		Sokshing		Broad Leaf	Conife-rous	Scrub Land	Wet Land	Total
	Owner	h. h.	Own	h. h.	Own	h. h.	Own	h. h.	Own	h. h.					
Damsite															
Reservoir/ headpond															
Power house															
Infrastructure															
Access roads															
Transmission Line															
Total families (no)															

Provide the source of this information: ……..

Note:

"affected families" are those who own or occupy the area and are dependent on it for their livelihood. They may or may not be the actual landowner

Where the transmission line RoW crosses private agricultural areas, only show the tenure and the number of affected families if transmission towers are to be erected on these areas. There is no need to show this for the RoW as this land will not be compensated as the landholders will continue to enjoy uninterrupted access to these areas

3.9.2 Houses and Infrastructure

In Table 8 enter the number of houses, huts and other infrastructure that will be lost as a result of the project. This data will be used to assess compensation requirements.

Table 8: Loss of houses and other infrastructure

Facility	Houses (no)	Infrastructure losses Describe
Dam site		
Reservoir/headpond		
Powerhouse		
Infrastructure Site		
Access roads		
Transmission line		
Total (no)		xx

Provide the source of this information: ……..……..

Note:

i. Houses could include shops and other places of residence.

ii. Other infrastructure losses could include; BHUs, schools, roads, mule tracks, bridges, power and

telephone lines. For these losses provide details of the structure and its location, e.g. suspension bridge,2m wide x 75 m long, inundated by headpond; mule track 3.2 km long, inundated by headpond; 1 BHU lost at powerhouse site.

4.9.3 Cultural and Heritage Sites

In Table 9 list any cultural or heritage sites that will be directly affected by the Project and its support facilities. Provide source of this information: ……

Table 9: Cultural and Heritage sites that will be affected by the project

Facility	Name of Cultural/ Heritage Site	Remarks (Listed with Department of Culture etc)
Damsite		
Reservoir/head pond		
Powerhouse		
Infrastructure		
Access roads		
Transmission line		

Note:

a. *Locate the site on the appropriate scale map*
b. *"directly affected" means that any of the project components including the transmission line may need to be (a) located on the site or (b) the proximity of the project component and its operation will affect the normal use of the site*

3.9.4 Water Use Conflicts

Are there water users' within the dewatered section? "Yes" or "No"..... If "Yes" decribe the number of affected households and how they will be affected, e.g. loss of water for irrigation.

3.9.5 Aesthetics

Will the project have an adverse visual impact when compared to the surrounding natural landscape. ”Yes” or ”No”. Explain your answer:

….....….…..…….....……..…….....

3.10 Project Impacts and Mitigation Measures

Using the information provided in the earlier sections, list the positive impacts and quantify these where possible. If impacts can’t be quantified, the explanation should be provided as to how the project will benefit the local communities and others.

From the information provided in the preceding sections, identify the impacts that will occur from these activities and list these as shown in the table below. Impacts can be identified as those due to (i) the Location of the project, (ii) Design of the project; (iii) Construction related activities and (iv) Operation of the project. For each negative impact provide mitigation measures and the approximate cost required to implement the mitigation measure.

The Applicant will be responsible for ensuring that the Environmental Terms that are attached to the Environmental Clearance are carried out. Where a Contractor is employed the Holder will be held responsible for ensuring the Contractor abides by the Environmental Terms. The Environmental Terms are to be attached to the Contract Document so that the Contractor has a clear understanding of the environmental requirements that are to be adhered to during construction. At the time of tendering, the Contractor will be required to prepare a Contractor’s Site Environmental Management Plan (CSEMP) that shows how the Contractor will implement the Environmental Terms that are included as part of the Tender Specifications. The CSEMP is to be included as part of the Contract Documents and is to be evaluated as part of the overall tender. The NEC can assist in this area.

The Applicant will also have to provide the following plans if these are relevant. These are to be attached to the Application.

v. The Land Compensation and Resettlement Plan
vi. Worker Health and Safety Plan

3.11 Monitoring Program

Monitoring responsibilities including other provisions that the Applicant/Holder and Contractor will need to address at the time of submitting a tender for the work will be included as part of the Environmental Terms which will be attached to the Environmental Clearance.

Regular monitoring will be the responsibility of the Holder of the Environmental Clearance and will also be detailed in the Environmental Clearance**.**

Either the CA or the NEC may conduct unannounced monitoring and checks.

3.12 Checklist for No Objection Certificate

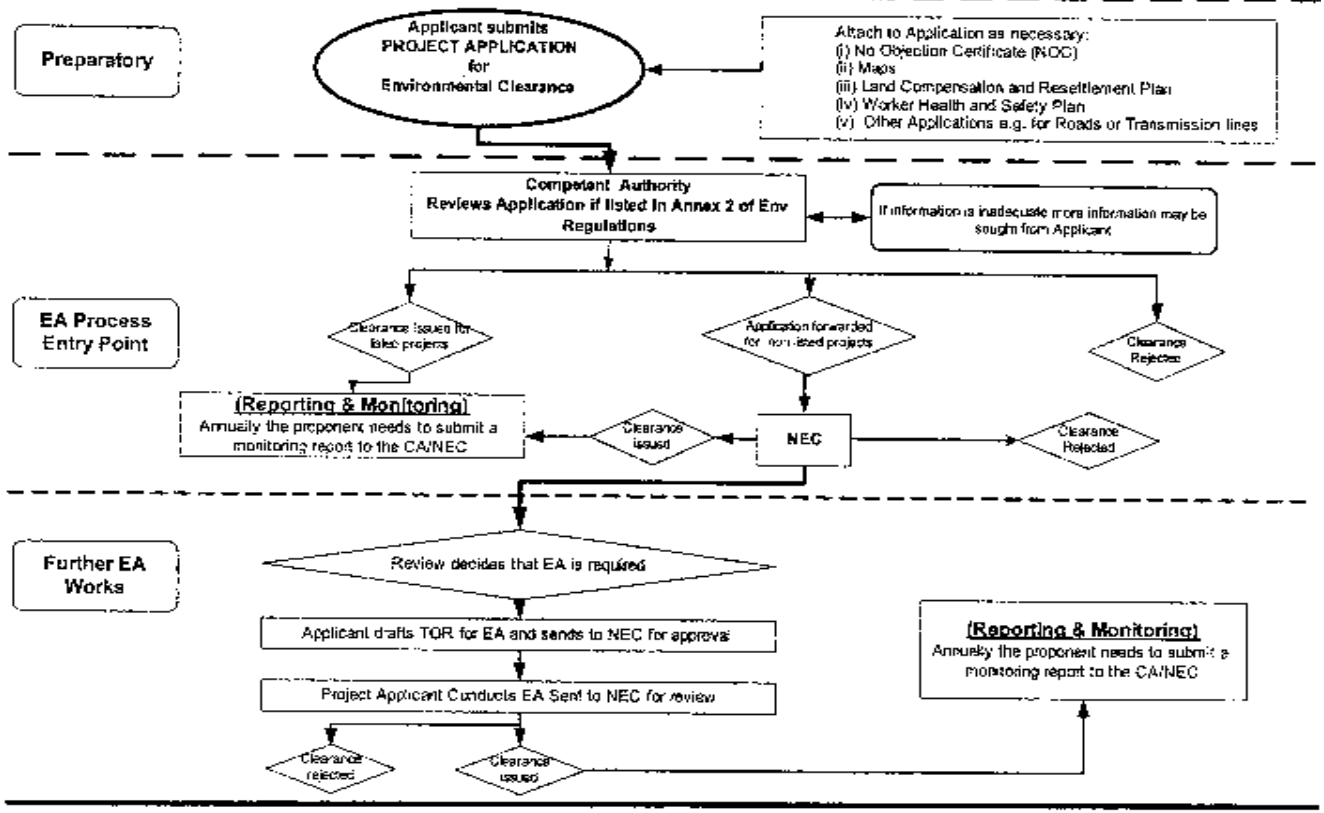
In order to obtain an Environmental Clearance for the project, an NOC must be obtained from all relevant parties. Attach these documents to the Application. Below is a checklist of agencies from whom NOCs may be required.

Agency/concerned people to issue NOC	Why/when
Dzongkhag/City Corporation	Administrative approval from Dzongkhag
DoF	Should the project damage or acquire *Tsamdo*
DoF	Should the project damage or acquire *Sokshing*
Department of Culture	Should the project be located within 50 m of a cultural or religious site
Nature Conservation Division	Within boundary of a Protected Area
Municipal Authority	within 50m of a public park
Private owner	within 50m of a human dwelling
Private property owners	Should the project need to acquire private property
Department of Health	within 50m of hospital
Department of Education	within 50m of school
Department of Energy	Should the project require the relocation of power transmission line
Bhutan Telecom Authority	Should the project require relocation of telephone lines
Department of Roads	Should the project require access from highways and feeder roads

3.13 Environmental Assessment Procedure

A flowchart is attached showing how the Application for Environmental Clearance will be processed.

ENVIRONMENTAL ASSESSMENT PROCEDURE FOR HYDROPOWER PROJECTS



Note: For environmental assessment timeline refer Annex 1 of the EA Regulation 2002