GOVERNMENT OF PAKISTAN

Water and Power Development Authority (WAPDA)

Kreditanstalt für Wiederaufbau (KfW)

DETAILED ENGINEERING DESIGN AND PREPARATION OF TENDER DOCUMENTS FOR THE KEYAL KHWAR HYDROPOWER PROJECT

VOLUME V

ENVIRONMENTAL MANAGEMENT PLAN

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ABBREVIATIONS / ACRONYMS

GTZ/SHYDO	–	Gesellschaft fuer Technische Zusammenarbeit/Sarhad Hydel Development Organization
WAPDA	–	Water and Power Development Authority
HEPO	–	Hydro Electric Planning Organization
HPO	–	Hydro Planning Organization
KHPC	–	Keyal Hydropower Consultants
KKH	–	Karakorum Highway
RFST	-	Revision of the Feasibility Study of Keyal Khwar Hydropower Project
SoP	–	Survey of Pakistan
EIA	–	Environmental Impact Assessment
EMP	–	Environmental Management Plan
RAP	–	Resettlement Action Plan
EPA	–	Environmental Protection Agency
IEE	–	Initial Environmental Examination
IFC	–	International Finance Corporation, A member of the World Bank Group
IUCN	–	The World Conservation Union
LI	–	Lahmeyer International (Bad Vilbel, Germany)
NDC	–	National Development Consultants Pvt.Ltd. (Lahore, Pakistan)
NA	–	Northern Areas
NGO	–	Non-Governmental Organization
KPK	–	Khyber Pakhtun Khwah
PCDP	–	Palas Conservation and Development Project
SWHP	–	Surface Water Hydrology Project
SHYDO	–	Sarhad Hydel Development Organisation
UNDP	–	United Nations Development Programme
WWF	–	World Wide Fund for Nature

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UNITS OF MEASUREMENT

m	Meter	Unit measurement of length
km	Kilometer	Unit measurement of length
m^2	square meter	Unit measurement of area
km^2	square kilometer	Unit measurement of area
m^3	cubic meter	Unit measurement of volume
Mm^3	million cubic meters	Unit measurement of volume
masl	meters above sea level	Unit measurement of elevation
m/s	meter/second	Unit measurement of velocity
m/s^2	meter/second/second	Unit measurement of acceleration
m^3/s	cubic meters per second	Unit measurement of discharge
kg	Kilogram	Unit measurement of mass
t	metric tone	Unit measurement of mass
kW	Kilowatt	Unit measurement of power
MW	Megawatt	Unit measurement of power
kWh	kilowatt – hour	Unit measurement of energy
GWh	Giga watt – hour	Unit measurement of energy
kV	Kilo Volt	Unit measurement of electrical voltage
1K	1 Kanal(5440 Sq ft)	Unit measurement of Land

UNITS OF CURRENCY

EUR	Euro (European Union)
EUR¢	Euro cent
PKR	Pakistan Rupee
US$	United States dollar
US¢	United States cent

1. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

1.1 General

The EIA of Keyal Khwar Hydro power project was written in 2007. Now while updating the EMP the baseline data were cross checked.

No physical or biological change has been witnessed in the project area but some minor modifications have taken place as regards the project design and social features of the project area. Changes in the overall EIA were, therefore, not considered necessary. However in order to absorb the impacts of minor modifications in design and local social conditions, the EMP of the EIA has been updated.

This Environmental Management Plan shall be made a mandatory annex to tender as well as contract documents.

This EMP contains the following components:

I. Mitigation Plan

- Pre-construction Stage
- Construction Stage
- Allied Matters

II. Monitoring Plan(EMMP)

- Monitoring Schedule for Impacts
- Effects Monitoring Plan
- Site Specific Check List
- Grievance Redressal

III. Institutional Setup

- Institutional Organogram
- Institutional Strengthening
- Reporting and Supervision, Reporting Formats

IV. Consolidated Summary of EMP

- Legal Clauses
- Reporting Formats
- EMP Cost

V. Social Framework Agreement(SFA)

- Proposed sample attached

VI. EMP Implementation Support Plan

- Safety Health and Environment (SHE) Plan
- Plan for labour camp Facilities (Latrines, Bathrooms, Drinking Water, Kitchen and Labour Movements)
- Traffic Plan
- Training Plan

Most of the mitigation activities proposed in this EMP will be assured under provisions in the construction contract, engineering supervision contract and necessary agreement with the communities.

1.2 Mitigation Plan

Pre-construction Stage

Following Mitigation measures are taken at pre construction stage:

I. Production of EIA (Including EMP and EMMP)

II. Technical clearance of EPA by Concerned Environment Management Agency(in this case the EPA Khyber Pakhtun Khwah

III. Necessary re-adjustments in Detailed Design stage to create conformity between EMP and design - this means mitigation through avoidance. Built-in inherent negatively impacts can be invited through an unsound design and most negative factors can be avoided (eliminated) through the use of improved and environmentally sound technical design. Usually the engineer, find a compromise somewhere in between to adjust with the available finances. As the detailed design of the project is now available, necessary re-adjustments in the EMP have been made in the light of detailed design features and the processing of salient features of EIA/EMP have been brought to the notice of design engineers. They have the option to avoid as many adverse factors as possible through design adjustments some of such possibilities are given below:

- Maximum headrace tunnel excavation from the downstream side so as to minimize transport of excavation material through Keyal valley;
- Minimize cutting of trees while expanding the road.
- Dumping maximum quantity of excess excavation material on the dumping site near Pattan

IV. Inclusion of EMP in tender as well as agreement documents;

V. Holding of pre- bid conference to uniform all parties regarding EMP implementation.

VI. Providing necessary training to all parties regarding the monitoring process, procedures and formats.

Construction stage

The mitigation plan includes measures to mitigate potential negative project effects and enhance its positive impacts during initial physical works and normal works of reservoir and power house.

Most important negative impacts and their mitigation measures are as follows:

I. Mitigation against flash floods:

The project components have been designed to safely evacuate the once in 10,000 years flood and some 35% additional discharge capacity has been provided as a safety margin. The project is therefore virtually safe for its physical life time.

II. Mitigation Against Sedimentation

The construction of the dam will create a reservoir upstream of the dam where the velocity of river flow water will reduce and sediments may largely deposit. According to the hydrological studies there will be two types of sediments; bed load (coarse sediments) which deposit in the reservoir and suspended (fine) sediments that may continue transport in the reservoir to a certain extent. For both types of sediments (and their modes of movement) the necessary mitigation measures have been duly adjusted in the project design. For reservoir flushing of coarse and fine sediments three sluices have been provided in the dam design. For removal of suspended sediments from the flow entering the Power Conduit system Desander works have been provided close to the power intake at the beginning of the headrace tunnel. These mitigation measures shall adequately mitigate potential adverse impacts of sedimentation on reservoir and power plant operation. For more details reference is given to Section 5 and 14 of Volume I of this Report.

III. Minimum Ecological Flow of water below the Dam

After construction of dam and commissioning of the power plant, large parts of the flow of Keyal Khwar will be diverted through the underground power conduit system. In order to ensure acceptable conditions for flora, fauna and the communities living along the banks of the stream, beside other measures a minimum ecological release has been defined for the dam site, which is on average 250 liters of water per second.

This flow will pass a small hydropower unit and generate electricity for station own use at dam site and the need of the population of Keyal valley. The ecological flow shall be released at the dam on perennial basis in addition to the inflow from the various tributaries of Keyal Khwar. Diverting the major part of river flow is expected to cause some changes in flora, fauna including fisheries. These potential modifications need to be monitored regularly during the operational phase. But as per anticipated water demand downstream of the dam, the project design has assured a perennial release of 250 liters per second.

Table 1.1: Mitigation Plan

LAND RESOURCES

For construction and post construction (operational) stages important impacts and their mitigation measures are as follows:

Sr. No	Impact due to	Mitigation Measures	Quantity/Cost (where to be provided)
01	Dumping of excess excavation material	Major part of the excess excavation material shall be used as part of the aggregate required for construction of main dam. Some of such material shall be used for road construction and creation of leveled area for community development center. Any surplus material shall be dumped and leveled on the selected dumping site near Patan.	Calculation reflected in BoQ and bidding Documents
02	Adjustment to insta-bilities occurring during construction such as landslide, rock fall during tunnel excavation	Contractor's obligation to readjust with the new situation under the supervision and following the instructions of RE. RE will facilitate the Contractor to readjust with the new situation and provide adjustments of the design as required.	To be provided in BoQ as contingency item.
03	Location of labor camps, material depot, equipment yards, access roads and transmission lines.	Area for main labor camp, material depot and material yard of contractor has been proposed near Pattan town. For site installations for dam, desander and headrace tunnel construction, an areas is proposed at km 4+500 of Keyal Valley road. The area at the labor camp and for site installations shall be leveled and broadly terraced.	Calculations reflected in BOQ in Bid Document.
04	Limitations of construction site other than given at 2 & 3 above.	Contractors contractual obligation to resolve the matter in consultation with RE; will be specified in the tender document and the clause in the contract document.	To be provided as contingency item in BOQ in Bid Document.
05	Contamination from diesel and other spills from construction machinery	Contractor shall strictly abide by the rules and procedures for controlling diesel and other spills from construction machinery. In case of spills standard procedures shall be followed for disposal.	Calculations reflected in BOQ in Bid Document.

06	Damage to cross-drainage structures along roads by moving machinery.	Contractor's contractual obligation to carry out immediate repairs. To be provided as a provisions in tender document and the clause in the contract document	Calculations reflected in BOQ in Bid Document.
07	Discharge to unstable slope or leakage on construction	In case of any such eventuality, the contractor shall immediately seek guidance from RE and follow his instructions appropriately	To be provided as contingency item in BOQ in Bid Document.
08	Any damage discharge or diversion of water to any graveyard or any burial	Contractor to avoid such damage through awareness and signology amongst his workers and operators. If such a damage takes place, It will be contractors responsibility to carry out immediate repair to the best satisfaction of RE.	Calculations reflected in BOQ in Bid Document.
09	Any discharge, spill or dumping of material from houses/camps in or along the river	Contractor's contractual obligation to be provided as tender condition and contract clause.	Calculations reflected in BOQ in Bid Document.
10	Impact due to construction of cofferdam (upstream of main dam)	Contractor to design and construct coffer dam and adapt such precautionary measures which are necessary for the safety of cofferdam. In case of breach or failure the contractor shall carry out repairs as per satisfaction of RE.	Calculations reflected in BOQ in Bid Document.
11	Materials and construction waste left behind when the cofferdam is not required.	Contractor's contractual obligation to remove all left over material and waste is specified in tender documents.	Calculations reflected in BOQ in Bid Document.
12	Impact of taking borrow material from borrow sites	Contractor's contractual obligation to leave borrow areas in good shape with stable slopes – as specified in tender document and contract document	Calculations reflected in BOQ in Bid Document.
13	Impacts on roads used for transport of construction material.	Contractor to carry out regular maintenance of roads used by contractor's vehicle or machinery.	Calculations reflected in BOQ in Bid Document.

HYDROLOGY AND WATER

Sr. No	Impact due to	Mitigation Measures	Quantity/Cost
01	Source of construction water	For construction activities at dam site water will be taken from Keyal Khwar; suitability of water for concrete production has been confirmed by laboratory tests; construction water obtained by Contractor from Keyal Khwar and Indus River shall be free of cost; however, if due to any reason such as reduced stream flow during winter, water is obtained from community spring or any other private source, the Contractor shall pay an agreed cost to the owners.	Cost of collection of water if to be obtained from Keyal Khwar or river Indus and cost of water as well as its collection of collected from community spring, to be included in BOQ.
02	Source of drinking water	During construction phase the contractor shall provide clean drinking water to all his labour workers and staff as well as the staff of the client. Use of any spring for obtaining water shall be permissible only upto a limit that local population is not affected.	Cost to be reflected in BOQ.
03	Diesel and other fluids spilling over to river water from machinery	Contractor to strictly comply with rules and procedures laid down for spill of oils and fluids. Liquids that may cause contamination/ pollution of soil and water resources, subject to approval and supervision by the Engineer.	To be reflected in BOQ (contractors provisions for site installations)
04	Protection of construction from floods	The project design is based on a sound flood protection concept with adequate safety margins and low risks; during dam construction the contractors is obliged to design construct flood protection works according to the specified design flood subject to approval and supervision of the engineer. The permanent and temporary works at powerhouse outfall and switchyard are arranged safely above highest recorded and design flood water levels in Indus River.	To be reflected in BOQ

05	Obstruction in flow of water downstream of the dam	Contractor's contractual obligation to plan construction in such a way that flow of water is not fully obstructed in Keyal Khwar during the construction stage. During the operational phase as a minimum the specified ecological flow is released. Respective provisions are made in the tender and contract documents and shall be supervised by the Engineer. On average a mandatory ecological release of 250 Lit/sec shall be released at dam site through a micro hydro power station into the original river bed downstream of the dam. This release has appropriately been calculated in collaboration with local communities.	To be reflected in BOQ

AIR QUALITY AND NOISE POLLUTION

Sr. No	Impact due to	Mitigation Measures	Quantity /Cost
01	Dust, smoke and other polluting impacts from construction machinery.	Contractor's contractual obligation to keep the dust and smoke emission low by using well maintained machinery; all access roads especially un-metalled shall be regularly and daily sprinkled with water to keep the dust down.	Cost to be reflected in BOQ
02	Dust or other pollutants from stored material/ spoil keeps.	Contractor's obligation to make his stores at a safe distance from any human habilitation or camp. Also while handling the material in the store, contractor's workers shall work safely and not cause any dust or pollutant to rise and come out of store.	Cost to be reflected in BOQ
03	Smoke from burning of waste material or burning of firewood	Contractor's shall not allow his labour or staff to burn fuel wood or smoke producing oil. Instead, the labour and staff shall be provided Fon-gas in cylinders.	Cost to be reflected in BOQ

04	Noise from operation of machinery (e.g. Trucks, excavators, drilling equipment)	Contractor's contractual obligation to use new and well maintained machinery. Provisions to be made in tender and contract documents	Cost(If any) to be reflected in BOQ
05	Noise due to any blasting	Contractor's contractual obligation to carry out the necessary blasting according to the specifications, maintaining all necessary safety standards and minimize the impact on residents to an acceptable level under the supervision of explosive experts. Provisions to be made in the Tender and contract documents.	Cost to be reflected in BOQ
06	Soil compaction for labor camps, site installations and machinery yard.	Contractor's contractual obligation to return temporarily used sites in the same condition as before start of construction if not otherwise specified by contract documents or indicated by RE. Provisions to be made in the Tender and Contract documents. Such leveled and stabilized piece of land can be used by the community for building community school for girls; a hospital or veterinary centre.	Cost to be reflected in BOQ
07	Impact due to disposal of sewage water from latrines, washrooms labor camps and WAPDA colony.	No sewage water shall be allowed to flow into the streams/Indus river without treatment in a septic tank. No sewage water shall be allowed to be discharged on surface of land. Only treated clean water would be allowed to be released in the stream.	Cost to be reflected in BOQ for construction phase. Cost for permanent post construction phase to be included in the overall cost of the project.

BIOLOGICAL RESOURCES

Sr.No	Impact due to	Mitigation Measures	Quantity/Cost
01	Damage to Biota (Flora and Fauna), Forests and Wildlife.	Contractor's contractual obligation not to cause damage to flora or fauna within the project area or in its adjacent area. Contractor shall run awareness campaign for his staff and labour to motivate them not to kill any animal or cut any tree (for any offense the laws of the land pertaining to forest and wildlife shall prevail). For those trees which may have to be cut in exigency of project work a compensatory plantation shall be carried out at a ratio of 1:5 saplings. As a proactive social development action, the client shall organize to plant 5000 saplings of local species in project area or nearly private land.	Direct Cost to WAPDA
02	Damage to Fisheries	Contractor's contractual obligation to refrain from illegal fishing and pollution of river water.	Direct Cost to WAPDA
03	Impacts on Endangered Specie	Contractor's contractual obligation to ensure that none of his labor or workers does any harm to endangered species or cause any threat to the wildlife in general. Provisions be made in Tender and Contract Documents.	Direct Cost to WAPDA
04	Habitat loss (Fauna & flora	Contractor's should facilitate the wild life team to inspect the sites regularly for any habitat loss, (if happened) compensatory habitats should be made available for endangered animals/plants and shifted to a suitable place with its own specified environment. Provisions be made in Tender and Contract Documents	Direct Cost to WAPDA

SOCIO ECONOMIC AND CULTURAL

Sr. No.	Impact due to	Mitigation Measures	Quantity/ Cost
01	Project Construction on existing services for education, health electricity supply, water supply, communication	Contractor's contractual obligation to arrange repairs/replacement of any of the services which is disrupted or damaged due to any of the activities caused by the contractor. Respective provisions are made in the Tender and Contract documents.	Cost(If any) to be reflected in BOQ
02	Impact on land ownership / land tenure system	Contractor's contractual obligation to avoid damage to residential places of locals (If accidentally happening adequate compensation shall be made in terms of repair or replacement houses at new locations or monetary compensation); the corresponding provisions are made in the Tender and Contract documents (in case of scheduled resettlement RAP should be followed).	Cost (If any) to be reflected in BOQ
03	Impact on local ethnicity, Tribal Tension community rivalries issues on river/ spring water	Contractor's camp (accommodation) is arranged at Pattan and not in Keyal valley to limit impact on residents to the possible minimum; Contractor will arrange his own drinking water supply without competition of limited local drinking water resources (springs) with local population. Respective provisions are made in Tender and Contract Documents	Cost to be reflected in BOQ
04	Adverse effect on cultural and archaeological heritage	Contractor's contractual obligation to inform Engineer and Employer and the archeological Department in case of discovering components of cultural and archaeological heritage as specified in the Tender and Contract Document to be supported in SFA.	Cost (If any) to be reflected in BOQ
06	Employment	Contractors obligation employ local laborer and workers except for those slots for which skills are not available	No cost to project over and above normal cost in BOQ

		locally. For that the community must be taken into confidence by the contractor.	
07	Privacy Matters	Contractor's contractual obligation to bound its construction site as well as the residential sites by fencing and try to give every civic facility to labor and employees inside its camps so that local residents privacy wouldn't be disturbed.	Cost(If any) to be reflected in BOQ
08	Public Safety at construction site	Contractor will design its schedule for moving heavy machinery in such a way that the disturbance of the local community is limited to the possible extent. The locals should be prevented from interfering in the project activities (e.g. local traffic interference). Local residents should not be allowed to enter the construction area except for those whom are employed there.	Cost(If any) to be reflected in BOQ
09	HIV/AIDS in the transmitted by labor and water borne diseases such as e.g. cholera, dysentery, diarrhea	Contractor's contractual obligation to ensure an awareness program in labor camps and surrounding area as specified in the tender and contract documents;	To be reflected in BOQ
10	Health and safety Measures	Contractor's contractual obligation to implement HSE (Health & Safety) Manager at site who would be responsible for HSE related issues. In addition a dispensary with an ambulance and doctors will be established by the Employer in Keyal valley Development Centre. The local residents will be allowed to use this dispensary. Provisions are to be made in Tender and Contract Documents.	To be reflected in BOQ
12	Women Status; Exposure to employment and education	Local communities be taken into confidence through an SFA that no discrimination shall be exercised against employment of women on	No cost to project over and above normal the labor cost provided in BOQ.

	opportunities.	suitable posts on the project, during all phases of construction and operation and that woman shall not be discriminated against for education as preparation of jobs.	
13	Market opportunities	To be recognized as a clause on SFA	No cost to the project.

1.2.1 Associated Aspects

- **Road Closure**

For transporting construction material or conveying heavy machinery to the site, main KKH road may have to be closed for some time temporarily. It is also suggested that this transport of heavy equipment should be conducted at night time in order to minimize the impact to other road users and the population around.

- **Cultural and Historical Resources**

Communities shall be requested to identify in the field all known sites of cultural and historical value that may be affected by the project by the contractors.

- **Archaeological Field Support**

The Government of Khyber Pakhtun Khwah (KPK) will make available (on demand) a qualified archaeologist to conduct field investigation when important search work and new material site areas will be opened. No such site is yet known but in case that such situation arises, the services of an archeologist will be required.

- **Graveyard and Burial**

If unrecorded graveyards and or burials are found during the courses of construction activities, the supervisory agency will be contacted and in coordination with local religious authorities within the immediate project area measures will e coordinated to allow the possible identifications of the remains and when appropriate, properly undertake relocation and burial.

- **Local Employment**

The contractor is advised that both semi-skilled and unskilled masons/mistries/stone workers are available at local communities as when required. As far as technically and economically reasonable the Contractor shall employ unskilled local labor. If adequate semi-skilled and

capable skilled man power is not available locally, they can be brought from outside by the contractor

- **Land Acquisition and Other Compensation**

According to the Rehabilitation Action Plan (RAP) 476 Kanals of land belonging to various families or community as a whole shall have to be acquired for construction of Keyal Valley road, the dam site area, the area of WAPDA's colony, powerhouse and associated structures.

During the community consultation in the project area it was made clear by the communities that they would expect adequate compensation, for their land, buildings and trees, which would be acquired for implementation of the project. The land acquisition will be done by the Revenue Department but the compensation money will be provided by WAPDA to the local government authority and the Land Revenue Department (Asst. Commissioner, Patwari etc.) will distribute the compensation money.

- **Resource Use Agreement - Construction Material**

There is no quarry area specified for the construction material because part of the excavation (dam site and Keyal Valley road) and mucking material extracted from the various tunnels would be used for construction purposes. If necessary, a small borrow area will be opened in the future reservoir area or along Keyal Valley road. Fine concrete aggregates can be extracted from river deposits or from crushed excavation material. Riprap and large boulders are available at Keyal Khwar in abundance and there is no need of quarrying stones from elsewhere.

- **Resource Use Agreement – Water**

Although ample quantity of water is available in Keyal Khwar and in Indus River in particular for concrete production and other construction related activities, the Contractor will be required to detail water demands and indicate the source of water prior to the start of construction.

- **Grievance Redressal Mechanism**

A Grievance Redressal Mechanism (GRM) for the project shall be set up by the Project Director for that a Grievance Redressal Cell (GRC) will be established. The GRC shall be headed by the Project Director and shall have as members Deputy Director Environment (WEC), Deputy Director Social (WEC), Deputy Director Technical and Deputy Director Finance, representative of the Local Community, representative of Construction Supervision Consultants and the local Executive Engineer (XEN) of WAPDA. The XEN shall be the key redressal focal person. The project shall establish a project site office and Grievance register will be placed there for lodging complaints and grievances. The register shall be open to public who writes their complaints and grievances in that register. All complaints received otherwise (written or verbal) by the XEN (Focal Person) shall be recorded by him in the register. The GRC will give response to all grievances, recorded directly or indirectly in the grievance register, within two weeks and the complainant shall be informed about the response/resolution of the grievance. If the complainant does not receive response from GRC

within two weeks of registering the complaint, he/she can submit an appeal to Director General WAPDA Environmental Cell (WEC) for redressal.

1.2.2 Pre Tender Conference

To ensure full understanding of EMP by prospective contractors, all pre-qualified contractors are requested to participate at a pre-tender conference, where they will be briefed on their responsibilities with regard to environmental, social, health, and safety issues. These briefings will review specific provisions to the construction tender documents and contracts. The EIA/EMP will be introduced to all participants and it will be made clear that EMP will be a part of tender and contract document.

1.2.3 Pre - Construction Coordination Meeting

Once the contract is awarded the contractor will be obliged to regularly attend project coordination meetings with participation of project authorities and local communities. At these meetings, the Project Manager (PM) and the Resident Engineer (RE) of the supervising Engineer will further explain the Terms and Conditions of the Contract especially those narrated above. Emphasis will be given to sensitive areas listed in the contract document. EMP is part of the Tender as well as the contract document and shall be followed up accordingly.

1.2.4 Operational Phase Management of Operational Impact

After completion of the construction phase the project will be handed over to WAPDA along with an Operational Manual and training to staff to implement the Operational Manual.

1.2.5 Management of Social Impacts

During construction period, Social Development Action Programme (SDAP) and Social Framework Agreement (SFA) shall be implemented to mitigate any negative social impacts.

1.3 Monitoring Plan Implementation

1.3.1 Environmental Impact

Main instrument of recognition of environmental impacts is the Environmental Management Plan (EMP) of which the Monitoring Plan is an essential component. Implementation of the EMP shall be the contractual obligation of the contractor. For this purpose the contractor shall engage a full time technical staff capable of carrying out the instructions given in the EMP as contractual obligations under the contract document. The supervising engineering consultants shall have on their team a professional level environmental expert to provide an overall professional guidance to the environmental monitoring process and the procedures and initiate required reports and point out any gaps in the implementation of the mitigation measures or enforcement of the definitions of the EMP. Of special significance shall be the non-compliances of the Contractor to be assessed by the Engineer and classified into minor moderate and major categories. In WAPDA there is a WAPDA Environmental Cell (WEC), which will monitor and evaluate application of environmental measures at detailed design, bidding and construction stages. The result of monitoring and evaluating activities will be included as routine element of reports prepared by the Project Manager and WAPDA.

The monitoring program will include site inspections designed to determine the contractors' compliance with EMP and applicable regulations and statutes.

It is, however, to be noted that:

- Any project impact will be identified by site inspections and in discussion with the supervising Engineer and local communications
- The project is a localized activity and changes in the environment are likely to be minimum.

The proposed site inspections by the consultant's environmentalist and WEC Deputy Director (Environment) will be carried out on regular basis as per their the time schedules as defined at the start of the project. As the minimum level of monitoring and evaluating activities by each monitoring agency, the program outlined in table 1.2 below should be observed.

Table 1.2: Minimum Required Monitoring Plan

Sr No.	Project Phase	Proposed Minimum Inspection
01	Pre-Construction	• One visit to main project site's along site Project Base Map • One visit each to proposed Borrow site, Camp Site, Material Depot Site, Proposed Machinery Yard and other proposed sites. • One visit to each affected community and other stake holders linked with the project • One visit to each of the water sources and sources of construction material.

02	Construction	• Visits to main project site at 20%, 50%, 75% and 100% completion stage in collaboration with RE • One visit to other project areas every three months. • Two visits within 3 months in response to complaints • Daily visit to actual construction site and main action area
03	Post Construction	• One visit to each construction (part) site after construction. Especially with reference to after effects and their mitigation regarding water resources, water quality, noise, waste management, flora fauna, fisheries, health and safety and economy. • As a guidance an operational manual shall be prepared by the Monitoring and Evaluating Cell for perpetual mitigation of any possible after effects. • Two visits to each site of the main structural project components 12-18 months after commissioning of the project to verify the assumption made during the initial post construction visit. • Two visits each 3 months in response to any complaints. • To ensure that the project Operation and Maintenance Manual is being implemented by the trained staff.

It is anticipated that additional inspections will be required in response to any complaint by local communities. Another two visits per three months period may be budgeted for Monitoring and Evaluation units. All officers concerned with Monitoring and Evaluation shall prepare their own corresponding implementation plans for information of all concerned. All Monitoring and Evaluation nits shall be given optimal mobility and flexibility to implement their implementation plans. Necessary performa's:

A: Daily monitoring

B: Weekly Monitoring and

C: Monthly as appended to this EMP.

- **Visits / Inspection Authorization**

For the inspection process to function, access to the project and other related sites must be guaranteed. Accordingly, the tender and contract documents and operating manuals shall incorporate a phrase with similar intent to that outlined below:

Any officer authorized in writing by Project Director / WAPDA or Environmental Protection Council (EPC), may at any time enter any premises whether prescribed or otherwise, and may:

- Examine and inspect equipment, control equipment or plant, take samples of any pollutants that are emitted, discharged or deposited or are likely to be or are of a class or kind that are usually emitted, discharged or deposited from such premises.

- Examine any books, records or documents related to the performance or use of such equipment, control equipment, monitoring equipment or plant or related to the emissions, discharge or deposit from such premises.

- Photograph such premises as he/she considers necessary or make copies of any book, records or documents seen in the course of such examination".

1.3.2 Socio-Economic Impact

A program is proposed to monitor key social developments and socio economic indicators as means of defining the overall project performance:

These indicators include:

- General development and employment in the project area as per project policy.
- Prices of essential commodities (cost of living) before and after the project.
- Any improvements in marketing horticulture products such as fruits or any agriculture related products.
- Units of clean drinking water produced in water treatment plant and supplied to users
- Cost per unit of electricity available to communities.

1.4 Institutional Arrangements and Financial Cover

1.4.1 Management Responsibility

Responsibility for environmental management during the construction phase of the Project will rest with various agencies under the umbrella of WAPDA, as delineated below:

Table: 1.3 Management Responsibilities

The Implementation Agency:	The contractor through his qualified and technical staff trained in implementation of EMP and employed on full time basis.
Supervising Agency	Construction Supervision Consultants (CSC) through professional level environmental experts giving a professional cover to entire exercises, employed on full time basis.
Monitoring Agency	WAPDA Environmental Cell (WEC)
General assistance to all above agencies in their respective tasks	Resident Engineer of the Project will facilitate communications, logistics and data collection as when required.
Grievance Redressal	Grievance Redressal Committee (GRC) and Appeal to the DG, WAPDA Environmental Cell (WEC), See Figure 6.1 for Organogram, Institutional arrangement for Monitoring and Evaluation responsibility.

1.4.2 Institutional Strengthening

For Monitoring and Evaluation function the existing staff in WEC, the Project Director's Office the construction supervision consultant and the contractor shall be adequate. This shall however, require training to work together as a team.

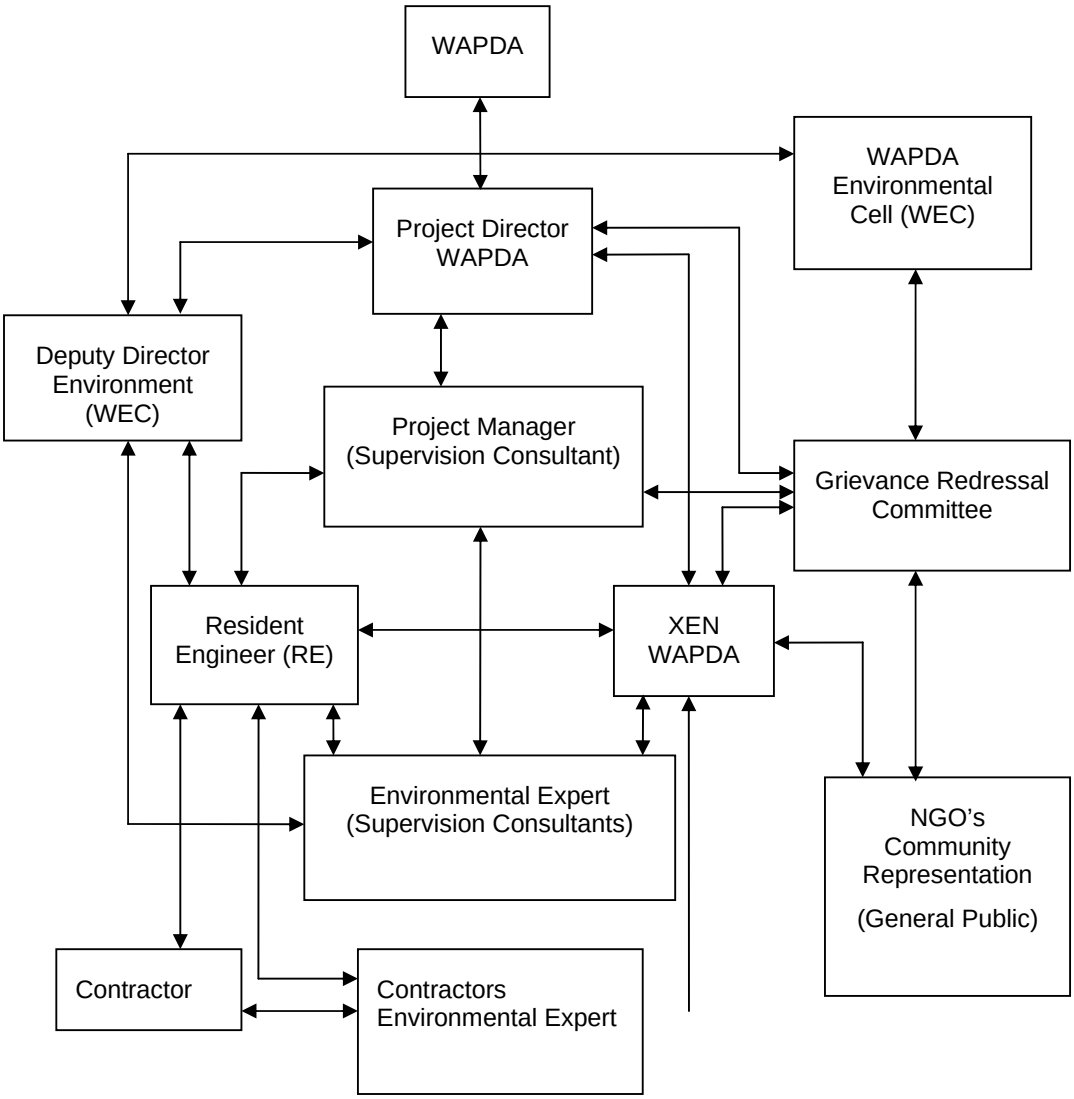

Figure 1.1: INSTITUTIONAL ARRANGEMENT FOR EMP/EMMP IMPLEMENTATION

i. <u>Implementing Agency:</u>

Implementation agency for the monitoring plan will assume overall responsibility to ensure:

- That while executing the contract and undertaking the construction all environmental norms, regulations and requirements promulgated by Environmental Protection Council (EPC), Pakistan Environmental Protection Agency (PEPA) and Environmental Protection Agency Khyber Pakhtun Khwah (EPA, KPK) with respect to the project site and adjacent areas are fully respected and implemented.

- That all the mitigating measures for adverse impacts are duly and timely implemented in letter and spirits.

All mitigation and precautionary measures prescribed in EMP shall be implemented meticulously and well in time and duly reflected in the progress reports.

For this task, the contractor shall deploy a well qualified Environmentalist on full time basis.

ii. Supervisory Agency

The Project Manager as the Head of Consultants for engineering supervision will be the supervising agency and will be responsible for the timely and sound execution of activities given in an acceptable sequence under the project. The consultant's environmental team shall consists of a Head Environment, Senior Environmentalist and an Environmental Field Inspector.

iii. Monitoring Agency

WAPDA's Environmental Cell (WEC) already exists, which has adequate manpower and expertise to carry out the monitoring and evaluation function for the project. The WEC will ensure that are:

- Regular monitoring activity is in progress by the construction supervision consultants (CSC)
- Receive monthly progress reports regarding the Monitoring and Evaluation activities in the project.
- Take notice of any non compliance and ensure that these are suitably linked with performance of the contractor with respect to implementation of EMP.
- To submit Monitoring and Evaluation progress reports to any donors or external agency.
- To act as appellate authority for appeals against grievance redressal committee and incorporate the redressal in their report.

iv. Logistic Support

RE shall provide or arrange the logistics including communication, transport and accommodation to all visiting persons / teams experts from any of the above monitoring units and shall coordinate with contractors to facilitate the visits/ inspections. For all monitoring and evaluation activities in the field the RE shall act as focal point.

v. Summary of Finances For Various Agencies

Following is the summary of finances for various tires of EMP implementation, monitoring and evaluation process:

1.4.3 Checklist for Environmental Monitoring

For the purpose of preparation of the schedules for environmental monitoring, it will be helpful if Monitoring and Evaluation agencies at various levels develop their checklists before going to the field visits. It is suggested that in their check lists the following cardinal points for various sites must be included.

I. Checklist for Labor Camp Site/ Material Depots/ Equipment Yard

- Location of labor camps, material dumping sites, equipment yards, approach roads to be selected properly.
- Pollution from diesel and other oil spills from machinery to be controlled adequately.
- Prevention of smoke from burning of waste material or burning firewood.
- Soil compaction due to labor camps and machinery yards.
- HIV/AIDS possibly transmitted by labor employees and nearby public, control of water borne diseases such as cholera, malaria, dengue, jaundice, dysentery, diarrhea etc.

II. Checklist for Borrow Area and Quarry (for each site)

- Impact of taking borrow material from borrow sites (Tunnels serve as quarry sites)
- Access to other construction materials.

III. Checklist for Disposal of Excess Excavation Material

- Site for disposal of excess excavated material selected appropriately.
- Check stability embankments and adequate drainage of dumping sites.

IV. Checklist for Construction Site

- Check any unstable locations during construction.
- Limitations of construction sites resolved appropriately.
- Adequate scour protection both temporarily and permanent at embankments.
- Control of leakages and discharge to prevent destabilization of slopes.
- Any discharge spill or dumping on any building or house on the river bank to be checked and mitigated.
- Protection of construction works from floods by adequate construction of upstream cofferdam subject of approval by the Engineer.
- During construction, at no time, the stream flow shall be completely stopped by the contractor
- Effects in surface flow of water (water quality).
- Dust or smoke or other polluting impacts from construction machinery.
- Dust or other pollutants from stored material/spoil heaps.
- Noise from use of machinery.
- Noise due to any blasting (if required)
- Public safety at construction site.

- Health and safety of labor and employees at construction site.
- Adjustment with any unprecedented event like flash floods or land slide.

V. Checklist for Water Extraction Point

- Impact on sources of construction water
- Impacts on sources of surface water
- Impacts on sources of drinking water

VI. Checklist for Roads

- Prevent blockage of road cross-drainage structures by moving machinery and damage suitably repaired.
- Impacts on roads used for transport of construction material.
- Impact of cutting into slopes and potential destabilization of valley slope.

VII. Checklist for Operational Phase

- Strict application of prescribed monitoring and engineering plan.
- Understanding and training of operational manual.
- Environmental Annual Audit
- Regular maintenance
- Staff Welfare
- Continued Public Consultation
- Refresher courses for operational staff.
- Staff and labor colony restriction.

VIII. Checklist for Biological Impact Monitoring

- Damage to Flora.
- Damage to Fauna.
- Damage to Fisheries.
- Impacts on migratory birds, using the river / nullah as their habitat
- Impact on endangered species.

IX. Checklist for Sociological Impact Monitoring

- Impact on existing services, education, health, electricity, water supply and communication.
- Impact on local ethnicity, tribal tension, community rivalries and disputes.
- Impact on land ownership / land tanure system.
- Adverse effects on cultural and archaeological heritage.
- Chance find during construction
- Graveyards or burials.
- Employment.
- Women status, exposure to employment and education opportunities.
- Cultural Reunion.
- Market opportunities.
- Recreation opportunities and tourism.
- Grievance Redressal

X. Checklist for Effect Monitoring

All these checklists for effect monitoring have been consolidated into a monitoring plan as in the following Table:

Table: 1.4: Checklist for Effect Monitoring during Construction Stage

Sr. No	Description	Monitoring Location	Monitoring Parameters	Frequency of Measurement
1	Construction Phase Ambient Air Quality	Batching plant site, Labor Camp site and Borrow Areas.	NOx, SOx, CO and Particulate Matter(PM_{10})	Quarterly
2	Quantity and Quality of ground water used for domestic purposes	Camp site and 1 Km away from the camp site.	Discharge physical – Chemical parameters, biological contamination, heavy metals and toxic organic compounds	Quarterly
3	Quality of surface water used for construction activities	At source of surface water used.	pH, EC, SAR, RSC	Quarterly
4	Emission of dust smoke and potential air pollutants from the construction machinery	Construction sites, camp sites, access roads, borrow areas.	Dust, Smoke, Gases	Throughout Construction Phase on weekly basis (Weekly Checklist)
5	Visual check for exhaust emissions from the vehicles	Construction sites, camp sites, access roads, borrow areas.	Visible Emission	During Routine Monitoring(Daily Checklist)
6	Visual check for vegetation loss	Construction sites, camp sites, access roads, borrow areas	Type and number of tree species uprooted	At the beginning of construction activities(Weekly Checklist)
7	Noise	Construction sites, camp sites and communities within 500 m of construction site.	Noise measurement	Once a week throughout the construction phase. (Weekly Checklist)

8	Soil erosion	Construction sites, camp sites, access roads, borrow areas	Visual observation for street or rill/ gully erosion.	During routine monitoring of entire project activities especially after rains (Weekly Checklist)
9	Solid Waste generation	On camp site and Construction Site	Any sign of soil or water contamination; any indisposed waste	Daily during whole construction phase (as per solid waste disposal plan)
10	Waste Water Generation	Campsites, Offices, colony and construction site	Waste water generation rate, Integrity and Maintenance of the septic tanks an soaking pits, any sign of soil or water contamination	To be determined through water management techniques. (as per sewage disposal plan)
11	Oil Wastes/spills	Oil storage area vehicle washing lines any other spill area	Facilities to control the accidental oil spills as per oil spill contingency plan; any sign of soil or water contamination	Daily during construction phase(as per daily checklist)
12	Social Issues	On any of the construction sites.	Social issues can be largely avoided by preferring the employment of local labor by the contractor. For all skills for which local labor is available, outside labor should not be brought in.	Contractual obligation of Contractor
13	Public Grievance	On project site	A complaint register shall be maintained by the contractor on project sites. A grievance redressal cell shall be set up under the chairmanship of Project Director, KKHPP	RE will keep a constant check on complaint register and forward all public grievances to Grievance Redressal Committee (GRC)

Checklist for effect monitoring during Operation Phase				
1	Surface Water Quantity and Quality	Water in the reservoir and downstream of the dam requires testing.	Discharge, pH, conductivity, TSS, TDS, BOD, and COD.	Regular annual tests at selected spots.
2	Ground Water Quality	This may not be required ordinarily except where septic tanks make seepage.	Physical- Chemical Parameters, heavy metals and toxic organic compounds.	Once a year on regular basis at selected spots.
3	Soil Erosion	At project sites and along the aligned borrow areas, road and area below power house; at locations prone to soil erosion.	Visual observations	Once a year in entire project area.
4	Habitat Disturbance	Within the project boundaries	Visual observations	Monitoring by an independent and qualified agency. The state of habitat is compared with baseline data in EIA, during construction and after the commissioning of the project.
5	Compensatory Tree Plantation	According to the tree plantation plan. It is planned that the project would contribute 5,000 saplings irrespective of the number of trees to be cut for the project.	The success and establishment of plantation shall be monitored regularly	Once / Twice in a year for three years as per tree plantation plan

1.4.4 Reporting

For reporting three sets of Guidance are available in the EMP:

- Monitoring Schedule
- Monitoring Checklists (see Ref. Table 1.5)
- Monitoring Performa's for daily weekly and monthly reports (see Appendices A, B & C)

Most important deliverables for various levels of Monitoring and Evaluation shall be as follows:

A. Contractors Environmentalist:

i. Daily Checklist in collaboration with Construction Supervision Consultant's (CSC) Environmental Expert/ Inspector.
ii. Weekly checklist in collaboration with the CSC environmental expert/Inspector.
iii. Monthly Progress reports on prescribed performa's.

B. CSC Environmental Expert / Inspector:

i. Daily Checklist
ii. Weekly Checklist
iii. Monthly progress report also containing non compliance statement.

All reports by CSC Environment Expert/Inspector shall be in quadruplicate, copies will go to:

- Contractor
- Project Director
- RE
- Retained as counter foil

C. RE/PD/WEC

i. Consolidated Reports for submission to EPA
ii. Take action for non compliance.
iii. Carry out Grievance Redressal complaints disposal.
iv. Training.
v. Environmental Audit

1.4.5 Supervision

Daily checklist shall be filled up by Environmental Field Inspector. Monthly Progress Reports shall be prepared by Senior Environmentalist and Head Environment will provide guidance for monitoring non – compliances and violations.

Table 1.5: Comprehensive Summary of EMP

Impact	Mitigation		Responsibility		
	Mitigation Measure	**Contract and Social Framework Agreement (SFA) clauses**	**Implementation**	**Supervision**	**Monitoring**
(A) Construction Phase					
1. Land Resources					
1.1. Impact due to disposal of excess excavation material	Controlled disposal of excess excavation material on specified site in agreed method with RE is also applicable to the material of cofferdam when dam is constructed. Excavation material will be used as concrete aggregates; surplus material will be used for landfill, e.g. at Valley Development site and at Switchyard area near Pattan along Indus River	Contractors obligation a defined in the Tender and Contract Documents	Contractor in collaboration with RE*	Supervision consultants through CSC* Environmental Expert (SCE**	WEC of WAPDA and ext. Monitoring by Donor's Mission
1.2. Impact due to unprecedented events occurring during construction such as landslides, roc falls etc.	The Contractor shall report the occurrence of any emergency situation to RE; RE in consultation with Contractor will instruct immediately suitable required adjustment of the design of the affected project component or direct measures for mitigation	Contractors obligation as defined in the Tender and Contract Documents	Contractor and RE*	Supervision Consultants through SCE***.	WEC OF WAPDA and Ext. Monitoring by Donor's Mission.
1.3. Impact due to location of camps, Materials Equipments and special approach routes and roads and electrical transmission lines.	There are control measures involved in the contractor's obligations. Contractor to collaborate with RE*	Contractors obligation to locate these sites in agreement with RE* as per Contract and his obligation to community as per SFA	Contractor and RE*	Supervision Consultants through SCE***	WEC OF WAPDA and Ext. Monitoring by Donor's Mission

1.4. Impact due to limitation of construction site other than given above	To be re adjusted by the contractor in the consultation with RE*.	Contractors obligation as defined in the Tender and Contract Documents and SFA with community.	Contractor and RE*	Supervision Consultants through SCE***	WEC**** of WAPDA and Ext. Monitoring by Donor's Mission
1.5. Impact due to rehabilitation of project extraction sites and storage materials	These sites will be rehabilitated, by the contractor, so it will be contractor's obligation	Contractors obligation defined in the Tender and Contract Document.	Contractor and RE*	Supervision Consultants through SCE***	WEC**** of WAPDA and Ext. Monitoring by Donor's Mission
1.6. Impact due to stabilization of slopes on earth fill works	Appropriate design for protection and minimizing d/s effects as given at pre-construction (Design) stage. Construction sha be carried out exactly as per design.	Preferably whole of the problem is mitigated through design. For any further eventuality, is contractor's obligation to minimize the d/s impact in co-ordination with RE*.	Contractor and RE*	Supervision Consultants through SCE***	WEC OF WAPDA and Ext. Monitoring by Donor's Mission.
1.7. Impact due to agriculture land destruction (not anticipated at this stage)	Cuts fills and borrow operations to be controlled. Disposal of waste material at pre-designated sites and leaving the site in rehabilitated form to be controlled.	Contractors obligation to refrain from entering into unauthorized agriculture/forest land/ protective areas to be defined in the contract document clearly. (a clause of SFA)	Contractor and RE*	Supervision Consultants through SCE***	WEC**** of WAPDA and Ext. Monitoring by (Donor's Mission.
1.8. Impact due to contamination from diesel & other spills from construction machinery.	These are control measures involved in contractor's obligation, under contract.	Contractors obligation defined in the Tender and Contract Document	Contractor and RE*	Supervision Consultants through SCE***	WEC**** of WAPDA and Extern Monitoring by Donor's Mission.
1.9. Impact due to drainages paths, roads any other linear fixtures crossed damage by machinery moving to and from constructio site.	Temporary protection to be provided to help drainage to cross, by providing culverts or piping and protecting other fixtures.	Contract Document and drawings to clearly spot such points and oblige the Contactors to make temporary arrangements to prevent damage from existing infrastructure.	Contractor and RE*	Supervision Consultants through SCE***	WEC OF WAPDA and Ext. Monitoring by Donor's Mission.

1.10. Impact due to discharge to unstable slopes or leakages into dam construction pit.	Must be protected by water diversion techniques or as the case may be.	Provision in the Tender and Contract Document.	Contractor and RE*	Supervision Consultants through SCE***	WEC**** of WAPDA and Ext. Monitoring by Donor's Mission

2. Hydrology and Water					
2.1. Impact due to source of construction water	River water and the spring water available nearby is suitable, river water must be used for construction purpose.	Contract documents and contract obligations	Contractor and RE*	Supervision Consultants through SCE***	WEC*** of WAPDA and Ext. Monitoring by Donor's Mission.
2.2. Impact due to diesel and other fluids spilling over to river water from construction machinery	Contractors obligation to avoid; It but if happened then impact shall be compensated adequately.	Contractor's obligation be clearly defined in contract document.	Contractor and RE*	Supervision Consultants through SCE***	WEC**** of WAPDA and Ext. Monitoring by Donor's Mission.
2.3. Impact due to protection of construction work from flood.	Cofferdam designed for adequate design flood (once in 20 years) unlikely to be exceeded during construction period, provisions to be made to protect staff and equipment in the event of higher floods includir flood warning system.	Contractors obligation to keep contractor alert and equipped against any such eventuality.	Contractor and RE*	Supervision Consultants through SCE***	WEC**** of WAPDA and Ext. Monitoring by Donor's Mission.
3. Air Quality And Noise Pollution					
3.1. Impact due to dust, smoke and other potential pollutants from construction machinery	Using strict standards for maintenance of construction machinery. Sprinkling of water to prevent/reduce dust emission, use cover for dump trucks. Provision of Safety Goggles, Facemasks, and ear plugs, Safety Harness etc. to all work forces.	Contractor's obligation to be defined in the tender and Contract Documents.	Contractor and RE*	Supervision Consultants through SCE*	WEC**** o WAPDA and Ext. Monitoring by Donor's Mission.

3.2. Impact due to dust or other pollutants from dumping sites and material storage.	Preferably these sites should be located away from communities or water should be sprinkled regularly on the materials(Sand, soil etc)	Contractors obligation to be defined in the Tender and Contract Document	Contractor and RE*	Supervision Consultants through SCE*	WEC**** o WAPDA ar Ext. Monitoring by Donor's Mission.
3.3. Impact due to smoke from burning of waste materials or burning of firewood in the labor camps	Prohibition of burning of waste material. It should be buried at pre-selected and agreed safe places. Supply of cylinder gas to labor camp. Prohibition of burning fuel wood in the Camp.	Contractors obligation defined in Contract and Tender Documents refrain from burning waste and fuel wood and to provide substitute fuel to the employee	Contractor and RE*	Supervision Consultants through SCE*	WEC**** of WAPDA ar Ext. Monitoring by Donor's Mission.
3.4. Impact due to noise control from use of outdated machinery	There are control measures involved in contractors obligation to use appropriate measures and to avoid making noise at night time.	Contractor's obligation defined in Contract Document and Tender Documents.	Contractor and RE*	Supervision Consultants through SCE*	WEC**** of WAPDA and Ext. Monitoring by Donor's Mission.
4. Biological Resources					
4.1. Impact due to damage to the biological resources, i.e. flora, fauna and fish during construction	Un-necessary and out of bound activities should be prohibited for all, generally there is very limited flora fauna or fish in the immediate construction area. But all the same no construction activity in any component shall be allowed to cause any damage to flora, fauna or fish in the extended project area.	Contractor's obligatio defined in Tender and Contract Documents; relevant wildlife Forest and Fisheries Laws shall be observed. A particular clause incorporated in the Contract Documents to respect and conserve biodiversity and conserve its terrestrial as well as aquatic habitat; Necessary sign and sign boards should be displayed to make visitors and all concerned aware of their obligations towards biota.	Contractor and RE* in collaboration with local wild life and forest and fisheries departments.	Supervision Consultants through SCE****	WEC**** of WAPDA and Ext. Monitoring by Donor's Mission.

5. Socio-Economic and Cultural Issues					
5.1. Impact of project on socio economic and cultural issues, e.g. existing service facilities like education health electricity, drinking water supply, public gathering religious congregation.	Social consultation was done and all impacts influencing the communities were defined, and all those factors were and incorporated in the Resettlement Action Plan (RAP) and made part of SFA***** between the contractor and the communities	Contractors obligation defined in Contract Document and community obligation in Social Framework Agreement (SFA)	Contractor and RE and RAP Implementation Team	Supervision Consultants through SCE**	WEC**** of WAPDA and Ext. Monitoring by Donor's Mission.
5.2. Impact of project on tribal tensions and local rivalries on river/spring water issues.	All such issues to be defined and incorpo-rated in Contract Document and SFA***** ; No interference to be caused by any project component or contractor.	Contractors obligation defined in contract document and SFA*****.	Contractor and RE*	Supervision Consultants through SCE**	WEC**** of WAPDA and Ext. Monitoring by Donor's Mission.
5.3. Impact of project on Land Ownership	There are control measures involved in the contractor's obligations and in SFA*****. Not to encroach upon any land other than allocated to him/her.	Contractors obligation defined in Contract Document and community obligation in Social Framework Agreement (SFA)	RAP Team and RE*	Supervision Consultants through SCE**	WEC OF WAPDA and Ext. Monitoring by Donor's Mission.
5.4. Impact due to access to other construction material	It must be done under an agreement with local community and no digression should be allowed.	Contractors obligation as provided in Contract Document and community obligation in SFA*****.	Contractor and RE*	Supervision Consultants through SCE**	WEC**** of WAPDA and Ext. Monitoring by DM.
5.5. Adverse impacts on known Archaeological Sites.	Should any archaeological site or articles are found during construction, the laws existing to deal with such situation shall be followed by	Contract Document and SFA*****.	Contractor and RE*	Supervision Consultants through SCE**	WEC**** of WAPDA and Ext. Monitoring by Donor Mission.

	Contractor in collaboration with RE and local communities. The archaeological find is handed over to the Archaeological Department.				
5.6. Impacts on Chance Finds (Extraction of Valuable Goods)	Contractor's obligation to convey the chance find to the concerned authorities in collabo-ration with the communities. Laws pertaining to chance finds must be applied strictly.	Contract Document and SFA*****.	Contractor and RE*	Supervision Consultants through SCE	WEC**** of WAPDA and Ext. Monitoring by Donor Mission.
5.7. Impacts on graveyards and burials	Contractor to facilitate the security of graveyards and ease of burials.	Contract Document and SFA*****.	Contractor and RE*	Supervision Consultants through SCE	WEC**** of WAPDA and Ext. Monitoring by Donor Mission.
5.8. Impacts on public safety at construction sites.	Proper temporary signs and markings and manual regulations of traffic and public movement.	Defined in the Tender and Contract Document and SFA***** with communities access to Dispensary should be made available local residents too.	Contractor and RE*	Supervision Consultants through SCE	WEC OF WAPDA and Ext. Monitoring by donor mission.
5.9. Impacts on health and safety on the construction sites.	Use of proper equipment, proper operation of equipment minimizing risks to all parties e.g. Safety Helmet, Safety Shoes, Masks, Ear Muffs/Ear Plugs (if required) First Aid Kits, Ambulance, Dispensary etc.	Contractors obligation defined in the Tender and Contract Document and community obligations in SFA*****.	Contractor and RE*	Supervision Consultants through SCE**	WEC**** of WAPDA and Ext. Monitoring by Donor Mission.
5.10. Impacts on employment issues	During construction by employing local labor social conflicts can be avoided (as far as possible). A policy for employment of unskille	SFA***** should be followed in terms of employment of labor especially unskilled.	Contractor and RE	Supervision Consultants through SCE	WEC**** of WAPDA and Ext. Monitoring by Donor Mission.

	semiskilled and skilled labor already laid out and it shall be followed.				
5.11. Mitigation against HIV/AIDS infectious diseases, jaundice and water borne diseases.	Regular medical checkups by camp doctor availability of medicine in camps dispensary and an ambulance.	Regular awareness campaign supported by medical treatment. all preventive and curative measures	Contractor and RE*	Supervision consultant through SCE***	M& E offices of WEC**** of WAPDA

*RE: Resident Engineer,

**CSC: Construction Supervision Consultants,

***SCE: Supervision Consultant Environmentalist,

**** WEC: Wapda Environmental Cell,

*****SFA: Social Framework Agreement

(B)Operational Phase:				
Impact	**Mitigation Methodology**	**Mitigation**	**Responsibility of Mitigation**	**Responsibility of Monitoring**
1. Impact due to sedimentation in dam reservoir during operational phase	i Regular monitoring of reservoir sedimentation ii Three low level sluices arranged for reservoir flushing alternative reservoir dredging possible. iii Desanders works arranged to avoid excessive abrasion of mechanical equipment	Low level sluices are capable of flushing most of sediments from the reservoir in the high flow season; suspended sediments will be removed by desander from flow in power conduit system to be made a part of operational manual	Engineer in charge of operation and maintenance of the dam and power house	Officer nominated by WAPDA
2. Impact due to diversion of river flow on flora fauna and fish during operational phase.	Ensure minimum ecologic release of 250 liters per second through a small hydropower unit inside the dam.	Ensured release of 250 liter per second of water to downstream river reach in addition to water released through 3 sluices. To be made part of operational manual.	Engineer in charge of operation and maintenance of the dam and powerhouse	Officer nominated by WAPDA

3. Impacts of not following the operational manual and not carrying out a strict application of prescribed monitoring and engineering plan	Competent and well trained staff to be appointed	Operational Manual to be implemented by WAPDA staff on the commissioning of the project.	Engineer in charge of Keyal Khwar HPP with the help maintenance contractor	Officer authorization by WAPDA,
4. Impact of not carrying out a continuous evaluation of HP performance as per design	According to operational manual continuous monitoring shall be done.	Work done through maintenance contractor according to strict compliance of operationa manual and in consultation with local communities	Engineer in charge of Keyal Khwar HPP with the help maintenance contractor.	Officer authorization by WAPDA,
5. Understanding and training of operational manual	Operational manual to be handed over by supervision consultant and maintenance staff to be trained in understanding and implementing the operational manual.	Training to be provided by the consultants to the WAPDA staff on implementation of the Operational Manual	Engineer Incharge of Keyal Khwar HPP with the help of contractor.	Officer authorized by WAPDA,
6. Impacts due to avoiding Environmental Annual Audit	Annual Environmental Audit to be specified in operational manual	Works done through Environmental auditors as part of implementation of operational manual	Engineer in charge of Keyal Khwar HPP.	M&E Officer authorization by WEC WAPDA,
7. Impact due to lack of Regular Maintenance	Maintenance according to operational manual	Works done through maintenance contractor according to strict specification of operational manual.	Engineer in charge of Keyal Khwar HPP with the help maintenance contractor.	M&E Officer authorization by WEC, WAPDA,
8. Impacts due to missing staff Welfare	Staff welfare must be provided as a part of operational manual.	Works done as per operational manual.	Engineer in charge of Keyal Khwar HPP with the help maintenance contractor.	M&E Officer authorization by WEC WAPD ,

9. Impact due to avoiding continued public consultation	All public grievances/ complaints must be addressed on day to day basis and a public office open to all shall be maintained wherein a Grievance Register shall be maintained with due follow up.	i Continuous contact with community. ii Maintenance of complaint register with a follow up. iii Grievance Redressal to be made part of operational manual.	Engineer in charge of Keyal Khwar HPP	M&E Officer authorization by WEC WAPDA,
10. Impact due to avoiding continued Gender Issues and women Consultants	In general, public should b contacted. Due contact sha be maintained with women through village elders.	Works done through Village elders	Executing. Engineer and other WAPDA staff running the project at operational stage.	M&E Officer authorization by WEC WAPDA,
11. Impact due to lack of refresher courses for the operational staff	Even after initial training to implement the Operational & Maintenance Manual, the WAPDA staff shall be kept abreast with project management through a series of refresher courses.	According to training plan given in the operation manual regular refresher courses shall be carried out for staff and all stakeholders	Engineer in charge of Keyal Khwar HPP	M&E Officer authorization by WEC WAPDA,
12. Impact due to any lack to maintain buildings and facilities of staff colony for WAPDA	Regular maintenance of all buildings and infrastructure in WAPDA colonies.	Works done through contractor to according to strict specification and in commutation with the communities.	Engineer in charge of Keyal Khwar HPP with the help maintenance contractor.	M&E Officer authorization by WEC WAPDA,
13. Impact on tree plantation and maintenance	5000 saplings shall be monitored for 3 years (maintained by Forest Department).	Monthly monitoring visits to plantation sites.	Engineer in charge of Keyal Khwar HPP	M&E authorized by WEC of WAPDA.
14. Impact on water resources	Water samples to be collected at reservoir and a point downstream of the dam	Samples to be collected and tested in laboratory from selected points.	XEN/Engr Incharge of dam and power house	M&E authorized by WEC of WAPDA.
15. Impact on water quality	Quality of drinking water to be tested regularly.	Samples of water to be tested at points from where drinking water is collected.	Engineer in charge of Keyal Khwar HPP	M&E authorized by WEC of WAPDA.

16. Impact on air quality and noise.	Air samples and noise levels to be recorded at different selected spots.	Air and noise to be checked at dam and power house sites.	Engineer in charge of Keyal Khwar HPP	M&E authorized by WEC of WAPDA.
17. Impact of project on waste management	Permanent waste management system for solid waste, sewage syste and septic tanks.	Waste management shall be done according to detailed waste management plan	Engineer in charge of Keyal Khwar HPP	M&E authorized by WEC of WAPDA.
18. SHE plan for operational phase of the project.	A meticulous safety health and environment plan sha be made part of operationa manual	All prescription of SHE in operational manual to be implemented.	Engineer in charge of Keyal Khwar HPP	M&E authorized by WEC of WAPDA.
19. HIV/AIDS ,Infectious diseases/ Jaundice and water borne diseases.	Regular medical checkups and awareness in labor camps	Selected Experts in HIV/AIDS	Engineer in charge of Keyal Khwar HPP	M&E authorized by WEC of WAPDA.

¤ Explanatory Note to Operational Phase

At the end of the construction phase and before handing over the completed project to the Client the Construction Supervision Consultants shall produce an elaborate operational manual for the operational staff of dam and power house. Inter alia the operational manual should contain clear prescriptions regarding but not limited to the following operations:

i. Flood Management
ii. Control of Sediments
iii. Minimum Ecological flow of water in Keyal Khwar downstream of the dam.
iv. Dam and powerhouse maintenance Standing Operations and Procedures (SOPs).
v. Continuous mechanism for monitoring the performance of the project as per design.
vi. Training of operational staff
vii. Annual Environmental Audit
viii. Regular check for maintenance.
ix. Prescription for staff welfare
x. Mechanism of continuous public consultation.
xi. Women consultation and neutrality towards genders
xii. Refresher courses for operational staff.
xiii. Regular maintenance of WAPDA colonies and buildings and infrastructure therein.
xiv. Tree plantation maintenance.
xv. Regular monitoring on selected spots for water resources.
xvi. Regular monitoring of water quality.
xvii. Regular monitoring of air quality and noise levels.
xviii. Waste management for WAPDA colonies nearby villages, at dam site and powerhouse
xix. Flora, fauna and fisheries
xx. SHE plan

The above outline for operational phase is only illustrative. Site specific plan shall be developed by Engineer in charge.

1.5 Social Framework Agreement (SFA)

1.5.1 General

A Social Framework Agreement (SFA) will be signed through mutual open consent between local village leaders and the Contractor and witnessed and countersigned by Executive Engineer (XEN) of WAPDA as well as RE.

At least two confirmed Leaders/ Elders will be chosen from each of the villages situated adjacent to the area where construction activity will be going to be witnessed. These leaders/elders will constitute a villager committee and they will choose a Chairman from among themselves. The SFA shall be drafted on the lines of legal agreements signed between two parties and should preferably be written on a judicial stamped paper. Obligations of the contractor and the villagers shall be clearly described in SFA.

Following a Draft SFA is suggested.

SOCIAL FRAME WORK AGREEMENT

This social Framework agreement (SFA) is signed between the chairman of Villagers Committee (Party-I) and the Construction Contractor (Party-II) of Keyal Khwar Hydropower Project to ensure a cordial relationship between the parties during the construction period of the project.

The Chariman of the villagers represents the following villagers:

Sr. No	Village	Name(two of Each)	Fathers Name
01		1.	
		2.	
02		1.	
		2.	
03		1.	
		2.	
04		1.	
		2.	
05		1.	
		2.	
06		1.	
		2.	
07		1.	

We the committee of village Leaders/elders of Keya Khwar Hydro Power Project area have agreed unanimously to nominate_____ s/o _____ as our chairman and authorize him to enter into an SFA with Contractor for Keyal Khwar HPP on our behalf. We understand and pledge that this SFA will be binding on the community, wholly and several, and the Contractor and his representatives throughout the period of the construction work as well as the operational phase.

Signatures of the Chairman and the Members of the Villagers Committee;

Sr. No	Name	Signatures
01		
02		
03		
04		
05		
06		
07		
08		
09		
10		
11		
12		
13		
14		
15		
16		
17		
18		

By mutual consent it is agreed that WAPDA

I. Shall not cause any disturbance to wildlife, any public archeological heritage or place of worship.
II. Shall not cause interfere in the social political or tribal balance of the area.
III. Shall/wherever possible facilitate better services and supplies to the area, e.g. schooling, health awareness on epidemic diseases, HIV/AIDS, electricity supply and road communication.
IV. (More commitments can be added if required)

Also, by mutual consent it is agreed that all the villagers residing in the project area

I. Shall not interfere in the location of labor camps, material depots, equipment yards and all the approach roads to be used during project construction phase and the electricity transmission lines to be laid out in various/parts of the project.
II. Shall not receive any discharge of slurry or oil spills to any graveyard or archaeological land.
III. Shall not cause any damage to fisheries, wildlife forest resources of the area. No villager will be involved in poaching or hunting of animals.
IV. Shall not allow reduction or official interference in our existing facilities like health education, electricity, drinking water supply, religious and social congregations
V. Shall not allow any interference in our tribal, commercial or social norms.
VI. Agree to respect and observe the cautions on the sign boards displayed by project authorities and shall not remove or cause damage to any signboards or installations put up by the Contractor.

(Add more conditions if required as per the prevailing circumstances)

This SFA has been signed this _____ day of _____at _____.

Signature

Contractor

(Full name and Address)

Date:

Signature

Chairman Villagers Committee

(Name and Address)

Date:

Countersigned

Signature

Executive Engineer/Project Director KKHPP

(Full Name and Address)

Date:

Signature

Resident Engineer

(Full Name and Address)

Date:

1.6 EMP Implementation Plans

For EMP implementation on site, the prescriptions of EMP shall be transformed into discipline wise execution plans. Herein some illustrative plans are given which shall need to be changed to site specific EMP implementation plans by the contractor in collaboration with RE. Soon after signing of the Contract Agreement, the Contractor shall submit a site specific plan for EMP implementation for approval by CSC. While writing such plans guidance can be taken from the following set of some illustrative plans.

1.7 Occupational Safety and Health Standards Plans

1.7.1 General Introduction

The Contractor for his own risk management strategy and protection of workforce and local residents should have his own Occupational Health and Safety Management System. Thus, the Contractors may consistently identify and control its health and safety risks, reduce the potential for accidents, and improve overall performance.

The Occupational Health and Safety Management System should be compatible with

ISO 9001 and ISO 14001. The following key areas are addressed

- Planning for hazard identification, risk assessment and risk control
- Occupational Health and Safety Management System programme
- Structure and responsibility
- Training, awareness and competence
- Consultation and communication
- Operational control
- Emergency preparedness and response
- Performance measuring, monitoring and improvement

This procedure aims to reduce the risks associated with health and safety in the working environment for employees and local residents.

1.7.2 Construction

- **Safety of workers**

In compliance with the related working standards for construction works following general preparations, have to be made:

- Assignment of skilled workers
- Regular, frequent training of safety conditions and risks
- Protective cloths for all workers including shoes and helmet
- Safety trainings for every construction worker prior to assignment, regular repetitions
- Frequent security checks
- Safety containers for blasting works for workers
- Special security management at steep slopes (grab ropes and safety belts).

The Contractor's safety supervision requires assigning security officers who are experienced to work under mountainous conditions.

- **Safety of local residents especially children**

The new Keyal Valley road will pass through near various villages, where construction machines including excavators, bulldozers, and trucks will operate and may become potential threat for the safety of the villagers, especially children and women. The Contractor shall develop a "Traffic Plan" ensuring suitable signs, barricades, timings and first aid facilities. The Traffic Plan shall be got approved by CSC.

- **HSE for Emergency system**

The Contractor should prepare and establish an emergency system, which would be implemented in urgent cases of accidents of local residents and workers.

This would include following subjects:

- First aid facilities must be kept by the contractor on work sites as well as in labor camp to meet any emergency.
- Regular information on various places in the camps and workshops
- Availability of emergency equipment (motor ambulance)
- Establishment of medical facilities in Pattan.

- **HSE for Operational phase**

All facilities of the hydro power plant after completion have to be assured against improper handling or damage. All objects have to be fenced and protected by security guards.

1.8 Sewage Disposal Plan

1.8.1 General

This is an illustrative plan for disposal of sewage produced by the contractor's labor camps and some temporary offices of the client and construction supervision consultants. The sewage will come from the toilets of labor camps and nearby office facilities. In this entire plan shall serve above 300 inmates of construction area.

1.8.2 Physical Layout

The sewage shall be water borne from about 40 latrines, 20 bathrooms and 5 kitchens. Pumped water from Keyal Khwar or Indus River shall be available in a temporary overhead tanks to flush away the sewage material from its source. It requires to be stored in a lined septic tank for some time to get decomposed and converted into gases and water and allow the water to be returned to the rivers.

1.8.3 Operation

All latrines will be connected by G.I pipes into a main sewage pipe which in turn will open into a covered sewage tank with an outlet at the other end. The sewage will flow into the tank under gravity and will be stored there till it gets decomposed.

The gases shall be passed out through the vent (placed inside the cover of tank. The water will flow again under gravity to the river. Solids if settled down shall have to be dredged out from time to time or a leachate collection system may be introduced in the septic tank.

1.8.4 Precautions

- Dependable water pumping system should be installed so as to keep the whole system working and functional.
- The sewage system should be saved from choking with polythene bags and other non biodegradable solid materials.
- The sewage tank should be dredged for removal of settled material at suitable intervals.

1.9 Plan for Latrines and Bathrooms

1.9.1 General

Contractor's labor and staff, CSC field staff and related WAPDA staff who will encamp near construction site and in the labor camp. They will require adequate latrine and bathroom facilities.

1.9.2 Physical Layout

Forty latrines with flush system installed and Indian commodes shall be built at a suitable distance from the residential area. Adjacent to the latrines 20 Bathrooms with a proper showering system should be built with well drained sewage system. The waste water from the latrines and bathrooms shall be taken to the sewage disposal system (Septic Tank) through the GI pipeline. After decomposition process in septic tank clear water shall flow into Keyal Khwar stream.

1.9.3 Operation

As an illustrative figure it is estimated that one latrine shall be available to maximum of 7-8 persons and one bathroom shall serve 30 persons 24 hrs basis. Weekly checklist will include the checking of these facilities.

1.9.4 Precautions

- Hygienic conditions and cleanliness shall have to be ensured in latrines as well as bathrooms through regular maintenance
- Use of latrines and bathrooms shall have to be regulated so that there is an even utilization of the facilities.

1.10 Solid Waste Management Plan

1.10.1 General

Solid wastes will be produced in labor camps, offices and residences. It will consist of normally paper, polythene bags, empty bottles, empty cartons, kitchen refuse and other items generated through various activities and items. The trash may be cumulated as all discarded materials.

1.10.2 Physical Layout

A set of thirty large dust bins will be provided at all important points in labor camps, Client's offices, supervision consultants' offices and all other residential and potential areas. The workers shall be educated to use the dust bins and some coercive steps shall be provided against those who throw trash outside the dust bins. The dust bins shall be emptied into a trash truck on daily basis. After the pit is filled it should be covered with earth and a new pit should be dug and repeat the process again.

1.10.3 Operation

The dustbins, yellow in color with black writing on those will be placed within an easy approach of the inmates of the camp. The lids of dustbins shall be kept in position all the time. While emptying the dust bins in the trash truck no part of the trash shall be left out. The truck should be sealed off after the space is full, so that no part of the trash is spilled out.

1.10.4 Precautions

- Dustbins shall be available within easy access of everybody.
- No trash would be allowed to thrown here and there.
- Dumping of trash in to the earth fill areas shall be carefully done. No part of the trash especially polythene bags should not be allowed to fly away of the earth fill pit.

1.11 Traffic Management Plan

1.11.1 General

The Contractor will deploy a number of vehicles of different types for various construction activities and transport of materials and staff. A good traffic management plan shall be required to have accident free movement of vehicles and machinery.

1.11.2 Physical Layout

Machinery and vehicle yard(s) shall be established at suitable places. Area and reaches to various work site shall be marked and vehicle to road compatibility shall be identified. It will be ensured that the vehicles are new and are in good working condition. No jittery or smoky vehicle shall be allowed. In consultation with RE a rout map for traffic shall be allowed to operate on routes not prescribed for it. A maximum speed limit shall be prescribed by RE keeping in view of the terrain, vehicle itself, its load and road type and quality. An elaborate signology shall be provided at all important points on the roads.

1.11.3 Operation

The vehicles shall be operated by properly and well trained qualified and licensed staff/driver. The vehicles will be operating in the prescribed working hours. The Staff shall follow the sign boards and observe the speed limits. The contractor shall ensure that no unfit vehicle or driver shall come on road. The road shall be kept well watered and dust free (in case of katcha road).

1.11.4 Precautions

- Speed limit shall be followed strictly
- Signology shall be displayed properly and followed strictly.
- Traffic personnel shall be provided (If needed) with flags for special areas.
- When vehicle is being used for transporting people (either of the contractor side or consultant side) all responsibility of safety of passengers will be with the driver.
- In case of accident the company in which the driver is employed would be bound to take care of the matter and provide facilities of medication to the victims of accidents(either passengers inside or local resident outside the vehicle)
- Vehicles and roads must be maintained properly.

1.12 Plantation Plan

1.12.1 General

Some trees shall have to be felled to facilitate construction of dam, roads and other structural components of the Keyal Khwar HPP. In general for each tree cut the owners are paid compensation and a compensatory tree plantation is carried out. Irrespective of the number of trees to be cut, it is proposed that the project contribute 5,000 saplings of trees for betterment of environment and improving fuel resources in the area.

1.12.2 Physical Layout

The local forest department shall be given necessary funds to purchase and bring to the site 5,000 saplings of suitable species for carrying out plantation in the project area, along the road side, inside WAPDA's colony area and other suitable sites identified by CSC and Forest Department. If enough space is not available within the project area, the forest department shall get planted the saplings on private lands through social forestry.

The payment to the Forest Department includes maintenance cost for 3 years, an age up to which the saplings would get established. If some saplings die out then beating up replacement may be carried out.

1.12.3 Operation

The operation would involve:

- Contacts with Forest Department and payment of funds to them.
- The Forest Department would make the choices about the specie and there plantation location is on the project area or private land.
- Transport of required number of saplings.
- Planting of sapling on project land colonies roadside or on private lands.
- Maintenance of plants for 3 consecutive yrs till they get established.

1.12.4 Precautions

- Choices of species must be made in consultation with people. Most useful fruit and fuel wood trees should be selected.
- Plants should be carefully selected, transported and planted to ensure success.
- Protection of plant is as important as its planting. Suitable arrangements must be made to protect the planted saplings.

1.13 Training Plan

1.13.1 General

Implementation of EMP shall require intensive monitoring and evaluation of the implementation at different stages. Even if expertise is available for Monitoring and Evaluation at the level of the client the construction supervision consultant and the contractor there shall be a need for a project specific training for all who are involved in the Monitoring and Evaluation process at their respective levels. This training may be internal or external.

1.13.2 Physical Layout

- Training in understanding EMP for Client, CSC and contractor.
- Training in understanding process for Client, CSC and contractor.
- Training for daily, weekly monitoring and preparation of monthly progress reports for

CSC Environmental Consultant, and contractor's environmentalist.
- Training in non-compliance reporting for field staff of consultant as well as contractor.
- Training in public grievance redressal for Grievance Redressal Committee and Client.
- Training in Evaluation of EMP implementation.

1.13.3 Operation

The Environmentalist of CSC shall be the focal person and in charge of the entire training program. He/she will chalk out need specific training program for various group / individuals to be trained. The CSE may impart training session by him/her or can hire a resource person. The training shall constitute one day workshops for which full preparation including training material shall be prepared in advance. The course contents shall be kept as project specific as possible. At the end of the training all components should be on even keel regarding the understanding and implementation of the EMP and EMMP.

1.13.4 Precautions

- Every training must be held well in time, i.e. before the start of phase for which training is to be given.
- Every training must be structured; it should be timed should have suitable participants and most suitable resource persons.

1.14 Oil Spill / Leakages Management Plan (from Construction Machinery)

1.14.1 General

At some places some leakages of oil may be inevitable and may exceed the maximum permissible limit. In case it occurs on consistent basis the dumping site may be damaged permanently. This impact is mitigable through effective application of the maximum spills regulation of the rules and procedures for treating various types of oil spills. General criteria for oil set forth by "Oil Spill Consultancy Plan" of PKP Exploration Ltd and "Guidelines for oil spill waste minimization and management and issued by international petroleum Industry Environmental Conservation association" is to be followed as given below.

1.14.2 Physical Layout

- **Minor spill**

Soil contamination by minor spills/leakages (defined as leakage from vehicles, machinery, equipment or storage containers such that the area and depth of the contaminated soil is less than one sq. foot and three inches respectfully is to be scraped and burnt in a well protected burn pit.

- **Moderate Spill**

Moderate spills may be defined as" Spills of volume less than or equal to 200 liters. These are to be contained and controlled using shovels, sand and native soil. These equipments and materials are to be made available at camp site during operation. The contaminated soil is burnt in a burn area with an impermeable base, depending upon on the volume of contaminated soil. The contaminated soil is disposed either by burning in a burn pit or subjected to bio remediation.

- **Major spill**

Major spills are defined as spills of volume larger than 200 liters. This would require invoking of "Emergency Response Procedures and oil spill contingency plan" to be prepared by the contractor in consultation with CSC. These spills are to be handled and controlled according to the plan and require special treatment such as bio remediation.

1.14.3 Precaution

It must be made contractors obligation to impose strict rules on the workers, drivers and operators to ensure that no spills or leakages are caused and if these must be followed by the treatment presented above as per degree of spill.

1.15 Cost of EMP Implementation

Cost of the Implementation of EMP shall be covered in the following way:

1. **Direct Cost:**

   These are the costs incurred by the Client or through Construction Supervision Consultant.

2. **BOQ Cost:**

   These are the costs which are calculated by contractor for his part of EMP implementation and are incorporated in BOQ. These are then transferred to contract document and get included in the total cost of project as indirect costs.

3. **SFA Cost:**

Table 1.6: Direct costs of EMP Implementation (Illustrative):

Sr No.	Item	Cost
1	Soil Tests at sample spots	400,000
2	Water tests on site parameters at different intervals	1,000,000
3	Air & Noise tests at sample spots at intervals	200,000
4	Plantation Cost to be paid to the forest Department for 5000 saplings @ Rs: 300/-	1,500,000
5	Training Cost for Environmental trainings to be held at different stages	2,000,000
6	Cost of equipment/ Instrument required to monitor the EMP implementation	2,000,000
7.	Annual audit cost (3 times @ Rs:500,000/-)	1,500,000
8.	Monitoring and Reporting cost(Salaries included elsewhere)	**1,500,000**
	Sub Total	**10,100,000**
9.	Contingencies/ Miscellaneous @ 10%	**1,010,000**
Total		**11,110,000**
Amount In Million Rupees		**11.11 Million**

The above costs are purely illustrative. Actual costs can be worked out at the time of actual implementation

Illustrative Proforma **Appendix – A**

Daily Checklist for Each Work Site

In Quadruplicate; copies to 1) RE, 2) PM, 3) PD, 4) Counterfoil to be held jointly by Environmentalists of CSC and Contractor

1. Date
2. Work Site
3. Contractor
4. EMP Implementation Status

More aspects can be added or some can be taken out as for site specific Plan.

Sr. No.	Aspect	Yes (+10)	No (-100	Score (100)
1	Has construction waste and excess excavation material disposed correctly?			
2	Has any oil spills on land or water not noticed.			
3	Was any smoky vehicles not noticed.			
4	Was water for drinking available on site			
5	HSE procedures being observed by workers			
6	Is no erosion or damage to slopes and embankments noticed?			
7	Are vehicles maintaining speed limits?			
8	Is the noise emission of the Contractors machinery within acceptable limits ?.			
9	No accidents			
10	No social clash			

EMP Implementation Status

(Excellent 81 – 100 %, Very Good 71 – 80 %, Fair 61 – 70 %, Poor below 60 %)

5. Non Compliance:- _____
_____
_____
_____

Full Name and Signature of
Environment Field Inspector

Full Name and Signature of
Contractors Environmental. Expert

Illustrative Proforma **Appendix – B**

Weekly Checklist for Each Work Site

In Quadruplicate; copies to 1) RE, 2) PM, 3) PD, 4) Counterfoil to be held Jointly by Environmentalists of CSC and Contractor

1. Date
2. Work Site
3. Contractor
4. EMP Implementation Status

Aspects can be added or taken away from this list as per site specific Plan.

Sr. No.	Aspect	Yes (+10)	No (-100	Score (100)
1	Borrow pits in proper order			
2	Stone quarry in proper order			
3	No damage to Flora			
4	No damage to Fauna			
5	Labour Camp being maintained properly			
6	Kitchen, Latrines, Bathrooms Clean			
7	Batching Plant not producing dust			
8	All roads undamaged and maintained			
9	All pollution to soil water or under control			
10	Community labour given due share			

EMP Implementation Status

(Excellent 81 – 100 %, Very Good 71 – 80 %, Fair 61 – 70 %, Poor below 60 %)

Full Name and Signature of
Environment Field Inspector

Full Name and Signature of
Environmentalist Contractors

Appendix – C

(Performa)

KHYAL KHWAR HYDRO POWER PROJECT

Monthly Environmental Monitoring Report

(Month & Year)

Employer	Project KKHP WAPDA
Engineer	
Contractor	

Appendix – C

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Appendix – C

EXECUTIVE SUMMARY

Appendix – C

Environment Health and safety of Keyal Khwar Hydropower Project, 2011

<table>
<tr><td colspan="2">Title: Monthly EHS Summary</td><td>Report No:</td></tr>
<tr><td colspan="2">Period: ----------</td><td>Reference:</td></tr>
<tr><td>Prepaid By:</td><td rowspan="3">Reviewed By:</td><td>Date:</td></tr>
<tr><td rowspan="2"></td><td>Distribution:</td></tr>
<tr><td>Page:</td></tr>
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Appendix – C

1. Introduction

- Short introduction to project
- Short introduction to Contract
- Short introduction to the activities addressed in this report
- Short outline of what to except in this report

Appendix – C

2. Project Implementation Status

(State the activities and sub activities/achievements at Pre-construction stage)

Activates/Sub-activity	Achievement (in %)		
	Previous Repot	Current Period	Overall

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3. Fuel Consumption

Fuel	Previous Report	Current	Total Date
Diesel			
LPG			
Petrol			
Kerosene Oil			
Fuel-wood			
Others(e.g. Cow Dung, Agri Refuse)			

Remarks

Appendix – C

4. Man-hours

Date	Previous Report	Current	Total Date

Remarks:-

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5. Employment

Category		Total	Local*		Non-Local*	
			Number	Percentage	Number	Percentage
1.	Skilled					
2.	Semiskilled					
3.	Unskilled					

***** From which village

** From which localities

Mention as footnotes the names of villages and localities form which labour is drawn.

	6. Monthly HSE Progress report (As submitted by Contractor)	Doc No: Rev: Date: Page:

Project:_____ Project No:_____ Report:_____

Date: _____ Month"_____

Sr. No.	**Description**		**This Month**	**Project To date**	**Remarks**
1	No. of Tool Box Talks Conducts				
2	No. of people given Orientation Training				
3	Accident Details				
	a	First Aid (FA)			
	b	Medical Treatment (MT)			
	c	Restricted Work Injury (RWI)			
	d	Lost time Incident (LTI)			
	Total Number of Accident				
4	Project man-hours				
5	No. of HSE Audits Conducted				
	a	No. of Non Compliance Observation Raised			
	b	Non-compliance Closed			
	c	Non-compliance outstanding			
6	Key Activities				

Incharge HSE Site Site Manger

Project Manager

Remarks:-

Appendix – C

7. Monitoring of Mitigation Measures proposed Under EMP

Action	Issue	Proposed Mitigation	Implementation Status	Recommendation

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8. Non Compliance / Violations

Regd. Sr. No.	Location	Non-Compliance/violation	Category of Non Compliance/Violation. (Minor Moderate, Major Hazardous)

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9. Summary of Non-Compliance

No.	Date	Raised by	Location	* Description	Category	Corrective Area

(This table shall have to be expanded as per quantity of material to be expended as per quantity of material to be accommodated in the table)

* Minor, Moderate, Major Hazardous

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10. Statistics of Non-Compliance Instance

10.1 Breakdown by Areas of Concern

Area	Previous	Current period	To Date
Social & Cultural			
Soil & Water			
Vehicles & Tracks			
Waste Management			
Wildlife & Vegetation			
Others			
Total			

Add more categories as per nature of project, if required.

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10.2 Breakdown by Sites Needs Correction as per Scope of Work

Area	Previous	Current period	To Date
Cofferdam			
Main Dam			
Tunnels			
Road			
Power House			
Transmission Line			
Other			
Total			

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10.3 Status of Contract with respect to Non-Compliance/Violations

Sr. No.	Nature of Non-Compliance/Violation	Number of Non-Compliance/Violation	*Status of Contract	Action Suggested for PMU	Deadline
1	No Non-Compliance No Violation				
2	Minor				
3	Moderate				
4	Major				
5	Hazardous				

*****

- Non Violation **:** Satisfactory
- Minor Violations **:** Normal
- Moderate Violation **:** High Alert
- Major Violations **:** Red Alert, Needs Action
- Hazardous **:** Serious Condition Emergency Action Required

Appendix – C

11. Outstanding Issues

No.	Date	Raised By	Location	Description	Category*	Corrective Action	Responsibility	Original Target Date	Status

This table can be expanded as required.

Category of Non-Compliance

*****

- Minor: Beyond one month but less than 2 months. (draw attention through copy of daily check list)
- Moderate: Beyond 2 months but less than 3 months (Issue warning recorded on check list as well as separate letter)
- Major: Beyond 3 months: Do no verify the Contractors invoice
- Hazardous: Beyond 6 months stop payments of total contract

Appendix – C

12. Environment Evaluate of New Developments

New Development	Change Management Category	Remarks

(Expand the Table as required)

Remarks:-

Appendix – C

13. Training

Sr. No.	Type of Training	Participants	Result Achieved

Appendix – C

14. Proposed Action for Next Month

Appendix – C

15. Photographs

(Photographs must be linked with Contents of the Preceding Monitoring Report)