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ONUR REGULATOR AND HYDROPOWER PROJECT

COMPLEMENTARY REPORT

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ONUR REGULATOR AND HYDROPOWER PROJECT

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ABBREVIATIONS

CR	Critically endangered
DSI	General Directorate of State Hydraulic Works
EIA	Environmental Impact Assessment
EMMP	Environmental Mitigation and Monitoring Plan
EN	Endangered
GWh	Giga Watt hour
ha	hectare
HPP	Hydro Power Plant
IUCN	International Union for Conservation of Nature
km	kilometer
LR (cd)	Lower risk (conservation dependent)
LR (lc)	Lower risk (least concern)
m	meter
MoEU	Ministry of Environment and Urbanization
MWe	Mega Watt electricity
OP	Operational Policy
TEMA	Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats
TKB	Development Bank of Turkey
VEC	Valued Ecosystem Component
WB	World Bank

FOREWORD

This document provides an update and review of the assessment of environmental and social impacts regarding Onur Hydropower Project located on Kelkit River, within boundaries of Resadiye district of Tokat province in Turkey.

Primary environmental and social impacts were assessed in 2011 within the scope of the official procedures for an environmental impact assessment. The resulting EIA Report provided a detailed evaluation of topics organized in a report outline provided by Ministry of Environment and Urbanization (MoEU). While majority of the headings in the outline were specific for a run-of-river hydropower project, the outline lacked a site-specific and project-oriented context, thereby some sections contained repeated information, while some sections neglected to contain crucial information related with the project.

Along with its several attachments, the National EIA Report included an Ecosystem Report prepared by 4 scientists specialized on different aspects: flora, fauna, aquatic ecosystem and hydrogeology.

The National EIA Report, excluding its annexes but containing crucial parts under sub-sections, was translated into English in order to provide a comprehensive assessment of the Project to the World Bank, at the stage for possible loan application.

The Complementary Report focuses on the major issues both discussed and neglected in the National EIA Report. In this respect, rather than providing a summary or status report, the Complementary Report discusses only site specific issues and major concerns related with the project; i.e. of endemic and critical species of flora and fauna at the Project Site and the zone of influence.

The National EIA Report is an officially approved document and can not be edited or modified. In this Report, where necessary, some parts have been copied from the EIA Report, in order to clarify questions or give up-to-date information on issues raised in the WB review. Information provided in the Report could be used to eliminate some of the Bank's concerns. In this respect, the Consultant put particular concern on avoiding repetitions, hence focused on the essence of the environmental and social issues.

Currently, the Project is still at construction stage, a 70% of construction has been accomplished, including the tunnel excavation. Major remaining works include construction of the regulator. An update of actual situation regarding environmental flow will be possible at operation stage, when monitoring will be conducted. This Report reiterates and explains previous assessments made in the National EIA Report.

1 INTRODUCTION

1.1 Objectives

The Onur Regulator and Hydropower (HPP) Project (The Project) will be operated by Temmuz Electricity Generation Company (the Company).

The Project is subject to the national EIA By-law, thereby an EIA Report was prepared and submitted to MoEU in November 2011, and approved with a positive decision of the Ministry.

2U1K (the Consultant) has been hired as a consultant company to assess the current situation at the Project Site and compare findings against the EIA commitments, and present an analysis report to the Company.

The Company applied Development Bank of Turkey (TKB) in March 2011. TKB has considered funding through the Renewable Energy and Energy Efficiency Credit Line of the World Bank. In this respect, the investment is subject to environmental and social policies of the World Bank. The Project triggers the OP 4.01 Environmental Policy of the World Bank.

The objective of the Complementary Report (the Report) is to present a wrap-up of the EIA Report that was prepared in accordance with national EIA By-law and also to present the findings of the Site Assessment performed on 30 April - 1 May and 9 May 2013 during the construction stage of the Project, and to provide complementary information based on questions and comments of the WB to the National EIA.

1.2 Methodology

The Report builds upon the information presented in the EIA Report of November 2011, which is further assessed based on site observations and meeting with community members for an up-to-date assessment of the situation as compared to the plans and commitments of the EIA Report.

The Report compiles both information in a gap-analysis perspective by comparing the EIA Report against World Bank performance standards and the intermediary comments provided on the EIA Report. Sections 3 and 4 give a brief outline of major environmental and social concerns, complementing the lack of site-specific community information lacking in the EIA Report. Sections 5 and 6 build upon the baseline information for assessing environmental and social impacts, clarifying the open points and comments raised by the World Bank.

Based on the review of the EIA Report and Site Assessment Findings from the site visit of 30 April-1 May 2013, the impact assessment focuses on the Valued Ecosystem Components (VECs) for elaborating possible cumulative impacts in Section 7 of the Report.

The Report is finalized with an Environmental Management Plan and Monitoring Plan in Section 8, which defines actions for filling in the identified gaps based on the current situation, anticipated residual impacts from construction stage and overall assessment of operation stage impacts.

The influence area of the project has been discussed in the EIA Report considering the potential impacts of air, water and soil pollution. Accordingly, there will be a temporary effect on environment during the construction stage consisting of impacts such as emission of dust from earthworks, exhaust gas from motor vehicles and tunnel blasting works. Given the tunnel type blasting inside the hill of 300 m high, noise and vibration has been very limited.

Residual impacts are associated with the construction stage are disturbed landscape and pasture lands remaining within the project Site, and the part of the stream that is diverted through the tunnel.

According to the calculations given in Chapter IV of the EIA Report; the maximum influence area of the project has been determined as 200 m around the regulator and 300 m around the HEPP site. Limited and medium term impacts are also likely to be observed along the river diversion about 4 km, where the river will flow at about a 10% of its original flow.

1.3 Legislative Requirements

An EIA Report was submitted to MoEU in November 2011, and the planned investment was certified with a positive decision of the Ministry. In this respect, the Project is subject to a series of national environmental legislation as depicted in the EIA Report. The Provincial Directorate of Environment and Urbanization will check environmental compliance of the Project, at both construction and operation stages, on a regular basis. Hence all environmental management issues such as waste, wastewater, environmental noise, soil contamination, etc. will be controlled in line with national by-laws under the Environmental Law No: 2872.

In addition to the environmental management issues, all land permits and land-use decisions have been acquired from the pertinent government authorities.

The expropriation of 3.4 ha area belonging to private owners in Toklar and Bereketli villages and Yolüstü municipality was done by Reşadiye Civil Court in 2011 and 115,558 TL has been paid to the land owners, and no ongoing court processes are reported.

2 THE PROPOSED DEVELOPMENT

2.1 Purpose of the Project

Onur HPP (Hydroelectric Power Plant) is planned with an installed capacity of 19,568 MWe and an annual total capacity of 42,848 GWh. The Project is planned on Zinav Stream, which is a branch of Kelkit Stream situated in 15 km northwest of Reşadiye District of Tokat Province, by Temmuz Electricity Generation (the Company).

2.2 Project Location and the Project Site

The Project is situated in the borders of Reşadiye District of Tokat Province, in the Black Sea Region of Turkey. The power plant is under construction on Zinav Stream (see Photograph-1 and Photograph-2), branch of Kelkit Stream in Yeşilırmak River Basin.

Photograph-1. Regulator Construction and Camp Site Locations

Photograph-2. HPP Construction Location

Land access to the Project Site is via the E80 Highway. The settlements close to the project site are Toklar Village, about 1 km away from the regulator (water acquisition system) and Bereketli Town, at an approximate distance of 3 km. Another access route used during construction is from the Yolüstü Town at about 6 km to the Project Site.

Zinav Lake is situated at about 1250 m downstream of the Site.

"Project Site" referred in this report stands for all project-affected area including ancillary infrastructure. Ancillary infrastructure covers transmission line, camp site and spoil disposal

sites. During the construction, excavated material from tunnel construction and material from near by quarries have been used for concrete production. Therefore, no additional quarry is operated in the scope of the project.

2.3 Project Components

The Project is comprised of construction of a regulator, energy tunnel, penstock, powerhouse and operation of the hydropower plant and associated units for energy generation.

The Project is a run-of-the-river type project with limited amount of storage in a pondage. Water taken into the regulator will alter according to the change in daily flow. Given the topographical conditions, water transmission will be attained through a tunnel of about 3.1 km. The penstock with a length of 324 m will be installed within the tunnel. 309 m of the penstock will be built inside the transmission tunnel and 15 m will be built outside the tunnel, which will be inside the powerhouse when built. Water sent to the power plant through the penstock will produce totally 42.848 GWh of annual energy by means of turbines. Tail water to be obtained at the end of the system will be discharged to the stream without any change in the original amount. Hence, Zinav Stream will not be altered after installation of the plant, except for the 3.1 km transmission through the tunnel.

A sedimentation pool will prevent sediments coming from the river basin from entering into the tunnel. Two vertical axis Francis turbines will be used with 19.568 MW with a total installed power of (2 x 9.784 MW).

Electricity produced at the power plant is planned to be connected to Reşadiye Havza TM River Basin Transformer Center's medium voltage busbar through an energy transmission line of 9 km. There is no requirement for an EIA by national legislation for the Energy Transmission Line that extends in a route shown in Figure-1. No sensitive areas are located on this route, and construction of the line is comprised of installation of poles and lines, with minor construction works, and no construction of access roads.
It was initially planned to construct several access roads within the Project, yet in order to avoid expropriation, tree cutting and risks of landslides, the Company improved the existing roads in stead. The only road construction is a 1,100 m stabilized access road to the power house area and a 800 m access road to the regulator. The Company also improved the existing 3 km access road in the land under the jurisdiction of the General Directorate of Forestry.

According to the Project time schedule, concrete works are planned to be completed by December 2013, and the operation to start by March 2014.

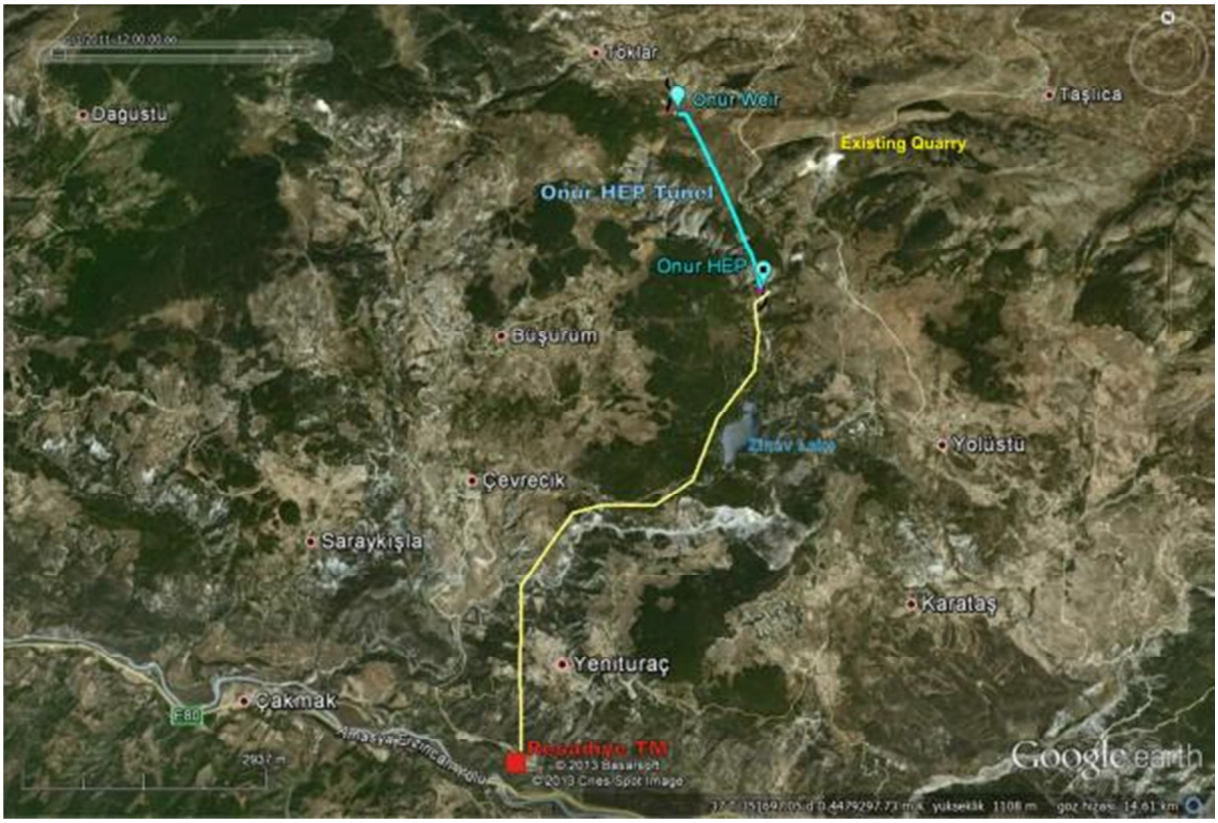


Figure-1. Google Earth Photo: Site Location and Route of the Power Transmission Line

2.4 Assessment of Alternatives

Alternatives to Onur HPP are discussed below.

Option	Description	Comments
1	No Project	This calls for not constructing a HPP at the Project Site. However, this would be against the government energy policies. The option would be inapplicable since stream section covering the project location had already been reserved for energy production. No-project option can only be realized as a result of "EIA Not Positive" decision.
2	Thermal Power Plant in stead of a Hydropower Plant	This option for energy generation would bring about higher costs of environmental mitigation measures for the increased environmental risks from use of non-renewable energy sources and associated technologies. Environmental and social impacts of both construction and operation stages would be harder to control.
3	HPP with open canal system and penstock stead of tunnel system	This option would result in construction impacts with higher magnitude of nuisance, distorted landscape, disturbed habitats, clearance of trees, etc. in contrast to the tunnel construction with embedded penstock that avoids tree cutting, removal of top soil, expropriation or acquisition of extended land, distortion of landscape, etc.

3 ENVIRONMENTAL BASELINE

3.1 Land-use

The site is located on a 42,300 m² area of which the facilities will cover nearly 31,800 m².

The Project area is composed of 10 ha land which is considered as "forest land" and 14.5 ha part is non-forest area comprised of private and state-owned lands used for grazing animals by local people. The forest area is categorized as "degraded forest" comprised mainly of bushes. There are few apple and pear trees and willows on the expropriated lands in Toklar and Bereketli villages, but the land owners do not generate income from the fruit trees. During expropriation stage the prices of the trees were paid and the cut trees were given to the land owners. There is no other tree cutting except for clearing of some bushes. Permits are in place for the forest lands with no tree cover at the power plant area, debris storage area and regulator area.

There are no registered protected areas within and close to the Project Area.

Due to the topographical characteristics of the region, any kind of architectural or archaeological are not likely to be found. During the phase of construction, Tokat Province Directorate of Culture and Tourism will be informed in case of encountering any kind of cultural means. The Company has stated that the workers are trained on how to act if they come up with a chance-find situation.

Zinav Lake is located at a distance of 1,250 m northern of the Power plant site.

The settlements close to the project site are a few houses located on Zinav upland and Toklar Village, about 1,000 m away from the regulator (water acquisition system).

3.2 Earthquake Risks and Geology

The study site lies within the 1st degree earthquake zone. Provisions of "Regulation on Buildings to be Built in Disaster Areas", published by General Directorate of Disaster Affairs, will be complied with during the construction of the buildings.

3.3 Climate

Tokat Province is situated in the interior parts of Central Black Sea Region. Therefore, it is under the influence of both Black Sea Climatic characteristics and continental climate in Central Anatolia. With this characteristic, its climate has a feature of transition between Black Sea climate and Steppe climate in Central Anatolia. The summer is generally hot and dry in low areas and warm, rainy in patches in uplands, as to winter cold and snowy is the general characteristic of the climate dominant in the province.

3.4 Hydrology and Hydrogeology

Given the lack of a gauging station on Zinav Stream at the time of the feasibility Study and EIA Study, flow values used in the above calculations are retrieved from gauging stations located on the Karakuş Creek flowing in the neighboring catchment area with similar climatic and topographical conditions. The flow values used in calculations are currently being checked against the real-time readings from the gauging station installed in Zinav Stream in 2012. The new AGI is located at the existing bridge connecting Toklar and Reşadiye; and DSI will be installing another AGI at the downstream of the Project Site in the short-term.

The main stream in the Project Site is Zinav Stream, and its flow rate is 1-10 m^3/s with seasonal variations. At about 400 m downstream of the regulator axle, a stream with 0.070 - 0.080 m^3/s flow from Toklar Village also flows into Zinav Stream. According to the groundwater level measurements which were carried out in the drilling wells opened at the regulator area, the groundwater levels on the slopes are over the stream elevation and slopes feed the stream.

Zinav limestone which is among the geological units present in the project site, have karstic features. Groundwater hasn't been encountered in the two wells opened in Zinav Limestone on the energy tunnel route. Additionally, groundwater has not been found at the other projec unit locations (weir and HEPP building) and their vicinity.

Zinav stream is used for small-scale agricultural irrigation works and for water needs of animal grazing by local people. Given the thick layer of alluvium and rocky surface, the banks of Zinav Stream is not rich in vegetation. The stream flows through a canyon.

The Zinav Lake located at about 1250 m downstream of the Project site, is a barrier lake (landslide dam) formed by natural damming of Zinav Stream. At the outlet of the lake, water falls into Kelkit Stream down a height of about 3 m, forming a small waterfall. In this respect, the lake breaks up the ecological integrity along the Zinav Stream. Hence, no back-migration of fish or other ecological life in the downstream of the lake is possible. This isolates the Project from the downstream hydropower projects in terms of cumulative ecological and hydrological impacts.

3.5 Species of Conservation Concern

3.5.1 Flora

The vegetation types taking place within influence area of the project are degraded forest vegetation, riparian vegetation, and steppe vegetation. This applies to all project-affected area including ancillary infrastructure. During construction phase, riparian vegetation will be affected the most. Given the route of the stream with environmental flow is through the

canyon with limited vegetation, impacts will be limited and medium term of adaptation to the changes in the ecosystem.

Based on literature review, IUCN danger categories of the plant species that are endemic, rare and under threat of extinction, which may exist around Zinav Stream are listed in the EIA Report. According to the list, 20 species and taxa, 19 of which takes place in LR (lc) and 1 in LR (cd) category can possibly be observed at the Project influence area. Among the listed species, despite its likely presence, Hieracium reductum Freyn & Sint as an endemic and conservation dependent specie was not observed in the Project Site during the monitoring survey in early June 2013. Observations were made in project-affected area. Details of other flora elements and discussions on endemic species in the region are given in National EIA Report.

3.5.2 Fauna

The literature survey for the Project area designates certain species that fall into IUCN conservation categories. Among these, wide spread tortoise Testudo graeca in VU category, European pond turtle Emys orbicularis and Yellow snake Elaphe quatuorlineata, in NT category. According to Central Hunting Commission decisions, all the reptile species are under conservation by Appendix List-I. The Ecosystem Report and the National EIA Report provide details of reptiles. According to the EIA Report, information on reptiles is based on literature survey, thereby mentions only probability of observing the species within the project influence area.

The March version of EIA report is a direct translation of National EIA. In that respect, as the requirement of National EIA, all mammal species in the region has been listed in EIA Report, regardless of considering project influence area. In addition, in National EIA report, it is also stated that these species are not observed during site survey performed in 2 km surrounding area of project units.

Among mammals, 4 bat species have endangered categories; one of which is vulnerable. Given that there are no caves in the region, it is likely that bats would inhabit within the canyon which will not be posed to impacts of construction and operation. Canyon is the most suitable location for any possible bat burrows. There is no construction and there are no project units in the canyon. Based on experts' calculations and considerations, the environmental flow in the canyon is estimated to be sufficient for a possible population of bats. There are no other issues of impacts on the canyon.

Considering the altitudes of 950 m to 1180 m where construction activities will take place and given the vegetation cover in the area, high trees are not observed. Thereby, it is unlikely to observe small vulture and lesser kestrel in the Project impact area.

Imperial eagle that is categorized as "vulnerable" in IUCN list is one of the species indicated for possible existence in the Project area. Despite that nests were not identified during the field studies, special attention shall be paid not to disturb their individuals, their nests and their surroundings especially during breeding periods. Special concern will be given not to make noise, not to destroy their feeding areas and habitats they feed on. The Company commits annual monitoring of imperial eagle within the project influence zone during the construction stage.

3.5.3 Aquatic Ecosystem

During the field survey conducted at the project site on 01.04.2011, 5 species in total including 4 from Cyprinidae family (Alburnoides bipunctatus, Barbus tauricus, Capoeta banarescui and Squalius cephalus) and 1 from Balitoridae (Oxynemacheilus sp.) were detected.

Barbus tauricus (goatfish) which prefers the fast flowing, clean, oxygen-rich; gravelly, stony, sandy bottom habitats of stream systems, can also accommodate in stagnant water systems. According to IUCN (2010), the species, which is regarded within the Europe population "vulnerable" category, have been detected in both of the stations where sampling is done. The population density was evaluated as medium. Breeding season is between April and July when they immigrate upstream. It prefers stony and sandy coastal parts for ovulation, and breed when water temperature reaches to 12–18 °C. In order to conserve the vulnerable Barbus tauricus, a fish ladder will be built for maintaining seasonal migration of the fish between Zinav Lake and upstream of the Project site. Please see the National EIA Report for details on the aquatic ecosystem; this Report focuses only on the critical species. Lake Zinav forms a natural barrier between upstream and downstream fish as the lake water discharges into the river with a considerable head. In other words, the lake naturally blocks fish passage along a longer route of the stream.

4 SOCIAL BASELINE

4.1 Methodology for the Collection of Baseline Information

This Section of the Report provides site-specific information that the EIA Report lacks in general, in terms of social aspects of the Project. Information is compiled as a result of interview with the Project Site Manager and a stakeholder meeting organized with the help of the Muhtar, the headman of Toklar Village. The meeting was held on 1 May 2013 (see Photograph-3). Participation list is available in Annex-1 of the report.

Photograph-3. Meeting with Local People on 1 May 2013

4.2 Demographics

The village has 28 households with a total population of 118. The number of the summer houses has risen in last five years, thereby the population slightly rises in summer. Retired elderly people have started migrating back to the village in the last five years.

Age composition for households in Toklar is: 43 people (19-65 age), 22 people (5-18 age) and 10 people (0-5 age) and 43 people are 65 and over. 18 of the village population are illiterate. 50 people are primary school graduates, 30 people are secondary school graduates and 20 people have high school graduation. There are 10 children below the school age.

The village does not have school, students are transported daily to the nearest school that is 26 km to the village.

In terms of vulnerability; there are 8 people that live with the assistance of others; and 4 people with physical disability and 2 with mental disability.

Main health problems are related with elderliness.

Villagers have a water supply problem; hence the Company is planning to establish a water tank to resolve this problem.

Other environmental problems of the village are the lack of an organized waste disposal system and the lack of a sewerage system.

Main economic problem is associated with marketing of animal products.

4.3 Livelihoods and Employment

Currently, 8 people from Toklar Village are employed by the Company in the construction works of the Project. Livelihoods of 32 people depend on livestock breeding. The village has 47 housewives, 22 students, 8 retired people, and one *imam* responsible or religious affairs.

4.4 Infrastructure

Access

The bridge that connects Bereketli Town to Toklar Village will be submerged when the regulator starts retaining water (Photograph-4). For this reason, the bridge will be removed by disassembling after construction of a new bridge that is 3 m higher and 12 m away further from its current position along the river axis. Demolishment debris and bridge parts will be transported to a disposal site to be designated by Bereketli Municipality in compliance with the By-law on Control of Construction and Demolishment Debris. Demolishment of the bridge has been covered in the EIA Report. The permission for constructing a new bridge has been approved by DSI, as part of the Project Feasibility Study.

Sewerage

The existing sewerage system of the village is currently out of operation. The Company will repair the sewerage line as part of their corporate social responsibility activities.

Heating

Villagers use woods from forest for heat resource. Some of the trees in the Project area were cut down by villagers for timber and fuel.

Photograph-4. The Bridge Connecting Toklar Village to Bereketli Town

Water Supply

Water supply in the village is from spring water within the village area. Capacity of their current storage tank is insufficient in summer time when the population increases; thereby the Company has committed to construct an additional water storage tank for the village.

5 ENVIRONMENTAL IMPACTS

5.1 Land Acquisition

About 10 ha of the Project area is located in forest land, and about 14.5 ha is comprised of pastures used for animal grazing, privately owned and state owned areas with no agriculture or forest quality. Permission for the forest area has been granted from Provincial Forestry Department in accordance with the 17th Article Forest Law (No: 6831). The lands designated as "forest land" on maps of the General Directorate were possibly deforested by local people for developing pasture areas, hence such lands have lost their forest characteristics in time. Yet those lands are still under the jurisdiction of the General Directorate of Forestry. All permits and approvals are in place for the Project as issued by the Forestry Department.

Land acquisition and expropriation of the Project site has been completed. No prevailing disputes or problems are reported. No resettlement issues are of concern as no settlement units will remain under water nor occupied by Project units. The expropriation of 3.4 ha area belonging to private owners in Toklar and Bereketli villages and Yolüstü Town has been done by Resadiye Civil Court in 2011 and a total of 115,558 TL has been paid to the land owners.

For pastures that will remain under water, the Company will compensate by providing seeds to farmers for planting animal feed plants. Area of grazing land lost by farmers is about 5 ha. Farmers have agreed with the suggestion of the Company to provide fodder seeds for compensation of the limited take of grazing area.

5.2 Construction Stage Impacts

Creep of concrete has been avoided by constructing filtered drainage pipes underneath the approach plate. These drainages are drained behind edge walls and connected to the streambed. During the Site Due Diligence Study, no concrete dumping has been observed from these pipes into the river bed.

As of the current stage, no nuisance has been reported by local people from dust emissions, traffic load, noise and vibrations caused by various construction activities which have been controlled as committed in the EIA Report.

Material Supply

Material for improvement of access roads that lead to the regulator and the power plant is supplied from the debris generated from tunnel excavation. Additional material supply is maintained from an existing quarry at a distance of about 3 km to the Site. The quarry holds positive EIA certificate issued by MoEU. Part of excavation debris generated at the tunnel

works is crushed at the same quarry, while it is partly processed at the concrete plant established on the Site. The excess material is temporarily stored at the storage area approved by DSI, until all stored materials are used up for concrete works on the Project site. Some of the stored debris is handed out to local people free of charge for their land reclamation works.

A concrete plant with a 160 m^3/h capacity is installed on the site for concrete works. As the sand to be used at the concrete plant will be supplied from the outside, sand washing process is not carried out on the site. Hence effluent is recycled and reused, thus resulting with no wastewater. Water is supplied from the spring located across the stream at the concrete plant area. Wash waters from washing of mixers used for concrete mixing operations is settled in a sedimentation pond with three sections and is re-circulated for reuse. Provincial directorate of Environment and Urbanizations pays regular audit visits to check compliance of the concrete plant with the By-law on Water Pollution Control (Official Gazette dated 30.03.2010; No: 27537). The concrete plant is formally approved by MoEU, as part of the Project in the scope of the EIA Report.

Top Soil and Excavation Debris

About 325,200 tons of excavation material will be produced during the project. Approximately 5% of this amount is expected to be vegetative soil, which contributes to about 16,250 tons of vegetative soil. The top soil will be stored separately and will be used at the site restoration stage following completion of construction works.

Aggregate materials excavated during construction are recycled and used in the construction as much as possible. The material that can not be reused are stored temporarily on an formally approved storage area, until all excavation debris are removed for land reclamation works. Apart from being reused at the construction site, debris is taken by local people for land leveling, etc. The storage area is poor in soil, and is stony and rocky. Storage at riverbanks or within the river bed is avoided.

A detailed and approved guideline document is provided by the Company, for showing how to store the excavation material and specifies the necessary measures for prevention of the stored material from drag into the riverbed will be prepared by the owner of the activity. This will be included in the contract for loan agreement.

The penstock of about 324 m length is embedded in the tunnel, which implies no requirement for topsoil restoration. Neither the tunnel, nor the penstock will result in disruption of surface vegetation.

5.3 Operation Stage Impacts

5.3.1 Water Rights

There exist four mills located at the downstream of the Project site. The mills are ruined and out of operation. According to the water usage rights report appended to the EIA Report, 80 lt/s of water requirement is foreseen for these four mills. The Company commits to release this amount of water to the stream in addition to the environmental flow. There are no social issues about the mills.

Downstream of the Zinav Lake are two other hydropower projects (one is operational and the other is abandoned unfinished due to financial constraints) and also a hydropower license that is not at project stage yet. Yet these hydropower projects are not within the impact area of the Project, given the Zinav Lake regulating the flow from the Project.

Photograph-5. Remains of Three Water-powered Grain Mills

There are no other water rights downstream, given the rocky surface with no agricultural use and no fish farms, etc. that could need river water.

5.3.2 Ecology and Biodiversity

The Ecology Report lists endemic species. The list is derived from the literature survey for a very broad zone covering the whole province and beyond. Despite that it is cited in literature for its possible prevailance in the region of the Project Site, Hieracium reductum Freyn & Sint among the enlisted species, was not encountered on and around the Project Site during the

site survey performed for EIA studies, as well as during the monitoring survey conducted in early June 2013.

The tunnel structure of the water transmission system minimizes the impacts on the ecosystems. In terms of flora, major impact zones can be defined as the river diversion zone that will receive about 10% of the natural flow for about 3 km, and the limited pasture area where the reservoir will be built.

The Company will continue its monitoring of flora. In case of encountering on the Project Site, as a mitigation measure based on expert opinion, the Company will collect seeds of Hieracium reductum Freyn & Sint species in spring time before construction of the reservoir area and will create ex-situ habitats of similar ecological properties. Some of the seeds will be delivered to the Seed Gene Banks.

According to the Ecosystem Report, about environmental flow calculated as 10 % of annual flow average through the year except for the 13% during dry months of June to August, will be sufficient to sustain continuity of riparian vegetation. Averages have been calculated in the EIA Report by the team of ecosystem assessment using flow data of a time period between 1966 and 2009.

Particular care will be given not to disturb vegetation during construction activities. Site restoration works will put significant concern on protecting floristic diversity and endemic species. Separate storage and reuse of the top vegetative soil layer in site restoration will also contribute to conservation of endemic flora species.

5.3.3 Fauna

Ecosystem Report lists fauna species encountered on the Project impact area, along with their conservation status. The Company will put significant concern during construction stage activities for not disturbing fauna by means of noise, dust, light, odor and use of chemicals.

Zinav Lake and its close environs is a feeding and breeding area for many migratory water-birds. The Project will have no impact on the lake, thereby no impact on migratory birds. As for the bat population, no construction activities will take place in the canyon section of Zinav Stream where the bats may be observed.

5.3.4 Aquatic Ecology

Environmental Flow Requirements

To sustain continuous flow on Zinav Stream and to protect the ecological balance, an environmental flow will be discharged through the riverbed. The Ecosystem Report calculates environmental flow requirement in accordance with the available site-specific data using the Montana-Tenant Hydraulic Method and Wet Environment Hydraulic Ratio Method. Montana-Tennant disregards the changes in dry and wet months and the associated

impact on water requirement of aquatic habitats. Hence the method is backed up by using the Wet Environment Hydraulic Ratio Method that considers assessment of flow separately for October-March and April-September periods.

Using the flow data between 2000-2009, environmental flow that corresponds to about 10% of the average annual flow rate of 10 last ten years was calculated as 0.277 m^3/s. For a safer calculation, 10% of the average annual flow rate for the period 1966-2009 results in an environmental flow value of 0.322 m^3/s. Hence, it has been approved as an approximated value of 0.350 m^3/s. Based on hydro-biological assessment of Zinav Stream at the project location and its environs, it has been decided to increase the environmental flow to 0.450 m^3/s during the dry period of June, July and August.

In this frame, the Company commits maintaining an environmental flow of 0.350 m^3/s between January to June and 0.450 m^3/s during June-July-August months that encounter lowest precipitation.

The results of the hydrogeological calculations using Montana (Tennant) and Wet Environment Methods are approved by the four scientists (hydrobiologist, hydrogeologist, flora expert and fauna expert) that the calculated environmental flows of 0.350 m^3/s in wet season and 0.450 m^3/s in dry season are sufficient to compensate the required conditions for aquatic sustainability.

Fish Passage Requirements

This section is based on the ecosystem assessment report prepared by the hydrobiologist, in the scope of the EIA Report.

Despite that the species that belong to Cyprinidae (Carps) family identified at the project site have high ecological tolerance and are well adapted to stagnant water system, they do spawning migration to upper parts of the river and/or to tributaries in the reproduction period.

Based on the document "Fish Passes: Design, Sizing, and Monitoring" published by SHW in 2009, "fish ladder" will be constructed at the project area as a type of fish passage. River restoration principles will be applied by making use of natural materials like rocks and stones. Velocity of water will be managed by avoiding steep slopes.

The fish passage has been designed and approved by DSI within the context of the Project Feasibility Study.

5.3.5 Flood Prevention and Drainage

Given the lack of a gauging station on Zinav Stream until early 2012, flow calculations at the stages of feasibility study and environmental impact assessment have been based on flow records retrieved from gauging stations in the neighboring basins with similar altitudes and flow regime.

For flood calculations of the project, instant maximum flood data of the surrounding gauging stations were taken into consideration, which are now cross-checked on continuous basis with the readings from a newly installed gauging station (see Photograph-6). Recent measurements with new gauging station shows that measured flow rates are correlated with estimated values.

Photograph-6. New Gauging Station

For Onur Regulator, safe and freeboard flood flow that is for 100-year recurrence is calculated as 146.40 m^3/s and for 500-year recurrence is calculated as 193.50 m^3/s, which could pass through full spillway without freeboard.

Controlled discharge of water from the regulator will be effective in avoiding possible floods. During excavations, intercepting ditches will be constructed for drainage of surface run-off. The regulator will partially serve to delay flood. Zinav Stream has a wild nature and flows along deep valleys, hence the stream does not pose flood risks to the surrounding environment.

The spillway, which is planned to avoid flood and to discharge water in the regulator in-take structure in case of emergency, is designed in consideration with flood flow of 100-year recurrence. The regulator design is based on the principles of regulator sizing that is still in use in Turkey for run-of-the-river type hydropower projects. It has been designed to carry 100-year flood flow with freeboard, and 500-year flood flow without freeboard. The final project designs have been approved by DSI. The monitoring and implementation of the project will also be done by DSI at both construction and operation stages.

5.3.6 Deforestation and Erosion

The forest land to be clear-cut during construction works will create an area that is susceptible to erosion. Water erosion is an important threat especially at sloping land. Necessary measures to prevent possible erosion and landslides is as follows:

- Soil stabilization will be ensured by leaving the roots of the trees to be cut in place,

- Appropriate vegetation cover will be laid on soil after completion of the works,
- Terracing will be applied at high slopes,
- Areas with high risk of erosion will be continuously monitored.

During reforestation and landscaping, oak species will be planted (Quercus pubescens, Quercus trojana) which are will adapting to the vegetation type of the region.

5.3.7 Wastewater

Source of water supply at the Project site is spring water located to the East of the Project site, across the stream at the concrete plant area.

Domestic wastewater generated during construction and operation phase will be treated at the package treatment plant to be installed and then discharged into a tributary mixing into Zinav at about 30-40 m. The analysis of the discharge water is done at the laboratories having certificate of competency. All project activities are monitored by Doğa EIA Company that is authorized on this issue in accordance with the provisions of the EIA By-law. Discharge quality data are reported to the Provincial Directorate of the Ministry of Environment and Urbanization regularly. Treated wastewater and the receiving medium (upstream and downstream of discharge) will be monitored on quarterly basis.

Photograph-7. The Biological Package Treatment Unit

5.3.8 Solid Wastes

Domestic solid wastes are collected by Bozçalı Municipality on weekly basis. Domestic waste is stored separately from other types of wastes.

At operation stage, recyclable packaging wastes will be collected and stored separately and will be taken by certified recycling companies.

Tires of motor vehicles are replaced in service stations, thereby no end-of-life tires will be disposed on the site.

Replacement of spent accumulators will be maintained at service stations. Spent batteries will be separately collected on the site, and will be delivered to battery collection spots of producers or the municipality.

Hazardous waste such as fluorescent lamps will be temporarily stored in impermeable containers with internationally approved standards, and will be sent to licensed hazardous waste disposal facility by licensed vehicles.

5.3.9 Soil Contamination Risks

A temporary area has been established for on-site fuelling of vehicles. The fuelling area is concrete paved, and the fuel tank is placed within a secondary containment for controlling possible spillages. A 10 m^3 horizontal fuel tank is kept half filled at all times.

5.3.10 Topography and Visual Aspects

The Company will cooperate with the Reşadiye Forestry Department for afforestation of erosion prone areas such as the tunnel surroundings and the power plant area.

Landscaping works will comprise of land reclamation such as slope stabilization, leveling of terrain, plantations and afforestation works. Apart from these, surface flow will be controlled by opening drainage ditches and drainage canals in order to hinder the accumulation of the surface flow that may originate during the reclamation works.

No excavation debris will be left at the Project site subsequent to construction works.

The Company will cooperate with the district forestry department in afforestation works.

5.4 Occupational Health & Safety

The labour force (at the time of the study visit for site assessment in May 2013) is comprised of 23 workers. All workers are male. Workers have three working shifts, each with 8 hours.

The company is currently working with eight subcontractors for road, excavation, drilling, iron mould, and catering, resulting in a total of 57 people on the Site.

The Company will take all necessary measures against noise for the operation staff that will work in the power house in compliance with the national health and safety legislation.

6 SOCIAL IMPACTS

6.1 Displacement

No settlement units are located within the impact zone of the Project in terms of land-taking or flooding; thereby no physical displacement will occur as a result of the Project.

6.2 Loss of Land and Natural Resources

A 15 ha land within the Project area is pasture land used by local people for grazing their livestock. Expropriation of the land has been completed. The Company has agreed with local people to compensate this loss of land by means of supplying fodder plant seeds. Given that sufficient pasture areas are available to farmers, the amount of pasture taken within the project area is not likely to pose economic impacts.

6.3 Health Risks

The Project has no health risks imposed on local people.

6.4 Economic Impacts

Livestock breeding is the only income source of Toklar Village, which is the nearest settlement to the Project site. Although it is not likely to pose negative economic impacts, the Company will compensate the land-take from pasture area by means of supplying fodder plant seeds, as stated above.

6.5 Public Nuisance

The noise, which will happen during the operation of the activity results only from the generator in the HEPP building and the turbines. Against the noise to be generated during the operation, power plant building will be built as sound-insulating.

At this stage when about 60% of the construction is complete, tunnel blasting has been over as of February 2013. When asked about their major problems in the stakeholder meeting, local people did not mention nuisance from construction works, except for dust emissions. The Company increased its mitigation measures for minimizing dust emissions. A watering tanker was observed during the Site Assessment on 9 May 2013, on the stabilized access road where majority of nuisance from dust comes from.

6.6 Public Consultation and Disclosure

A public consultation meeting was held in March 2011 at the EIA Stage. The meeting was held in Toklar Village and participation was ensured from the neighboring settlements, TEMA Organization (Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats), and Local newspapers.

During the Public Consultation Meeting, there was no rejection of the public to the project. They merely had some desires from the Company such as employment of workers from the village, providing pasture land that will compensate the limited amount of pasture land taken, helping the villagers by giving them grains like crib, and meeting the food needs of the workers from the village.

6.7 Grievance Mechanism

The Company actively engaged with the community particularly in the pre-construction period. The Company does not have a public relations department, hence administrative personnel of the plant is responsible for public communication in a general scope.

The company has a formal grievance mechanism for community by keeping records of complaints in a "grievance notebook". Problems related with the Project are conveyed to the Company via the *Muhtar*, as the representative of the village. The grievance notebook is regularly checked every 2-3 weeks by the Project Site Manager. Grievance holders are responded in a timely manner, based on the urgency of the complaints.

Apart from the responses to the community grievances, the Company implements some Corporate Social Responsibility activities, yet rather in an unplanned way and does not report these. Some of the responsibility activities include repair and restoration the primary school in the nearest village, the teachers lodges, the house of a villager that was burned down in a fire, etc. The Company is now planning to build a water tank for water storage and supply to the village.

Concerns and expectations of the local people are diverse. Their concerns, in general, are as follows:

- Sufficient job opportunities at the Project Site,
- Sufficient water release from the Project Site for irrigation and needs of their livestock,
- Dust emissions
- Security to be attained at the Project Site (by fencing of the Site borders)

They have no concern over workers from other towns for the construction stage.

Expectations of local people from the Project are related with improvement of the infrastructure in general, and can be listed in detail as:

- Improvement of roads
- Improvement of the sewerage system
- Construction of a water tank
- Job opportunities
- Playground for children
- Community health care centre
- Security guard for Project site
- "Construction of a "Cem evi" used for religious ceremonies of local people"

7 CUMULATIVE IMPACT ASSESSMENT

7.1 Geographic Scope of Possible Cumulative Impacts

The geographic scope for cumulative impact analysis is the part of the basin of Zinav Stream between upstream of the Project starting with the pondage (small reservoir) upto the Zinav Lake at the downstream where the tail water is discharged, in its general scope.

7.2 Time Dimension

The time aspect of the cumulative impacts can be defined by construction stage and the operation time of the project. The license for the Project covers a period of 49 years as of start of operation. Operation will be handed to the State at the end of the license period.

The residual impacts of construction works and Power Transmission Line will be limited with visual aspects and steep slopes which will be controlled by appropriate landscaping, slope stability and erosion control.

The Project Site is isolated from its downstream by Lake Zinav and there are no licenses or plans for new HPPs upstream, which could impose future cumulative impacts.

7.3 Other Activities in the Impact Zone of the Project

Other activities in the basin of the Zinav Stream are:

- Çamlıca HPP under construction (see Photograph-8 and Photograph-9)
- Zinav HPP at license stage
- Kutay HPP (left unfinished at the beginning of construction) (see Photo-10 and Photo-11)
- Power Transmission Line for the Project

Photograph-8. Outlet of Zinav Lake and Çamlıca HPP

Photograph-9. Çamlıca HPP, Penstock and Powerhouse Construction

Photograph-10. Kutay HPP Tunnel Entrance

Photograph-11. Kutay HEPP Power House Construction

Yet the other HPPs remain outside the impact zone of the Project as the tail water connecting with the environmental flow finally discharge into the Zinav Lake. Çamlıca HPP at the downstream uses the natural flow of the stream after it is regulated at Zinav Lake. Thereby the Project site is isolated from impacts of other hydropower projects at the downstream due to the Zinav Lake that acts as a barrier of interaction with the downstream.

At the point Zinav lake discharges into Kelkit Stream, a waterfall of about 3-4 m has been formed that prevents any back migration of fish living in the downstream.

In this respect, the only cumulative impact concerns are related with the construction stage earthworks at the Project site, Çamlıca hydropower plant area and the route of the power transmission line, with a broad regional perspective.

Impacts of construction of the power transmission line will be minimal as the line will be built as a medium voltage line along existing roads, including village roads and forest roads.

The google map below (see Figure-2) shows the Project and other HPPs in the catchment of Zinav Stream, as well as the power transmission lines. As the map shows, there is no interaction between the project and the downstream projects in environmental flow terms. Zinav Lake acts as a natural barrier of interaction.

Figure-2. The Project and Other HPPs in the Catchment of Zinav Stream,

7.4 Monitoring during Operation

Based on the EIA Report and surveys conducted at the project site and its surroundings, the valued ecosystem components are listed by the Consultant as follows:

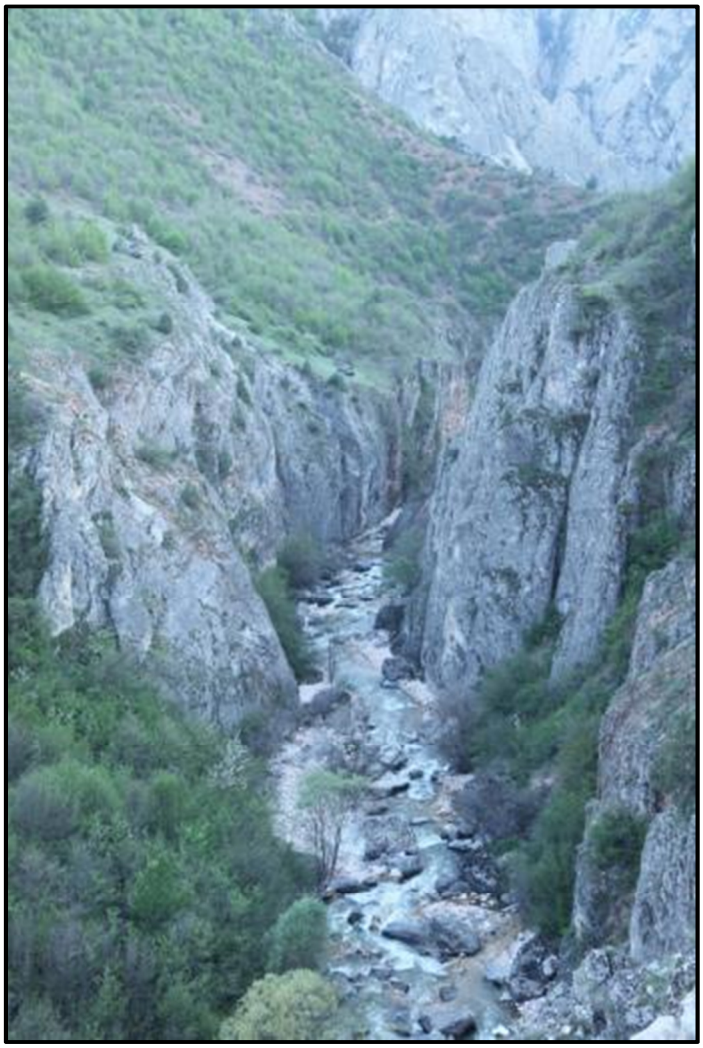
- Flora
  - Hieracium reductum
- Fauna and wildlife
  - Testudo graeca (Spur-thighed tortoise)
  - Aquila heliaca (Imperial eagle)
  - Falco naumanni (Lesser Kestrel)
  - Rhinolophus mehelyi (Mehely's Horseshoe Bat)
- Aquatic
  - Barbus tauricus (Crimean barbel)
- Landscape
- Forest lands
- Pastures
- Environmental flow

As indicated below, the Company will take mitigation measures for each of the VECs.

Hieracium reductum that belongs to Asteraceae family is an herbaceous species that is widely observed at North Anatolian and Central Anatolia limestone rocky places and shrubs.

Despite the tunnel transmission of water that minimizes impacts on flora and fauna, land take from the pastures and forest areas could still pose threats on the specie. Thereby, the Company has committed collecting the plant seeds for replanting elsewhere in the Project area and its environs. Part of the seeds will be delivered to Turkish seed gene bank.

Among the birds, 4 bat species are categorized endangered; one of which is vulnerable. Given that there are no caves in the region and bats can be encountered within the canyon, it is not likely to threaten the bat species as the canyon lies outside the Project impact zone. While they have not been verified during on-site observations, imperial eagle and lesser kertels would nest and habitat at areas with tall trees beyond the impact zone of the Project.



Photograph-12. Zinav Stream Canyon

The Company will monitor flora and fauna twice on seasonal basis every 2-years.

In order to conserve the vulnerable Barbus tauricus, a fish passage will be built for maintaining seasonal migration of the fish between Zinav Lake and upstream of the Project site.

Landscape on and around the Project site has been distorted to a certain level, along with construction of access roads (1,100 m to the power plant; 800 m to the regulator) and construction of project units. The Site will be re-vegetated with the top soil separately stored for reuse.

As stated under Section 5.1, the lands designated as "forest areas" have no tree cover, possibly cut down in the past by local people. The Project has no deforestation impacts.

Pasture areas acquired by the Project make up a very limited part of the land used by local people for grazing their livestock. Expropriation of private lands used as pasture have been finalized, while part of the pastures are state-owned lands. The Company has agreed with local people to compensate their loss by supplying fodder seeds.

Environmental flow will be discharged along a route of about 4 km at a rate of about 10% of natural flow rate of the stream, except for the 13% dry period of June to end of August. Despite that a limited degradation will occur in the riparian ecosystem, it is anticipated that the flow will be sufficient for sustenance of species and adaptation of the riparian vegetation to the flow regime in time.

8 ENVIRONMENTAL MITIGATION & MONITORING

At the stage of construction works that a series of earthworks and constructions are finished, such as tunnel blasting, construction of stabilized access roads, etc., the Company will continue with the mitigation measures as indicated in the table below. Thereby the construction stage mitigation plan is limited to cover environmental and social issues from impacts of remaining site works. All of the mitigation measures in the table will be taken by the Company throughout the construction process and post-construction site restoration. Details of the mitigation measures are provided in the EIA Report.

Table-1. Mitigation Plan for the Remaining Construction Stage

Issue	Management Activities
Dust from trucks on the access roads	Watering of the roads on daily basis and upon complaints by local people.
Waste Management	Temporary storage of domestic waste, recyclables and hazardous waste at appropriate conditions in compliance with pertinent by-laws.
Wastewater (camp site)	Installation and operation of a package treatment unit.
Soil and groundwater protection	The fuel tank for refuelling of vehicles will be placed on a concrete paved surface with secondary containment.
Land	Development and implementation of a reinstatement plan that restores vegetative cover and maintains slope stability at sides of the access roads and temporary debris storage areas, as well as protects the Site from stormwater by constructing ditches as appropriate. Site will be cleared off from all scrap materials and construction debris.
Community	Providing fodder seeds to the farmers as committed, to compensate for the limited amount of pasture land taken for the project.
Erosion	Slope stabilization measures will be implemented by ripraps and terracing works as appropriate.
Workers health and safety	Workers will use personal protective equipment. The Site will be equipped with fire extinguishers at risk areas such as fuelling area and storage place for oils. Safety labels will be placed at areas with risks of falling from height, etc. Drivers will be trained regularly on driving safety issues. Safety and emergency trainings will be provided on regular basis.

As for the operation stage, the mitigation measures to be taken by the Company are indicated in the table below.

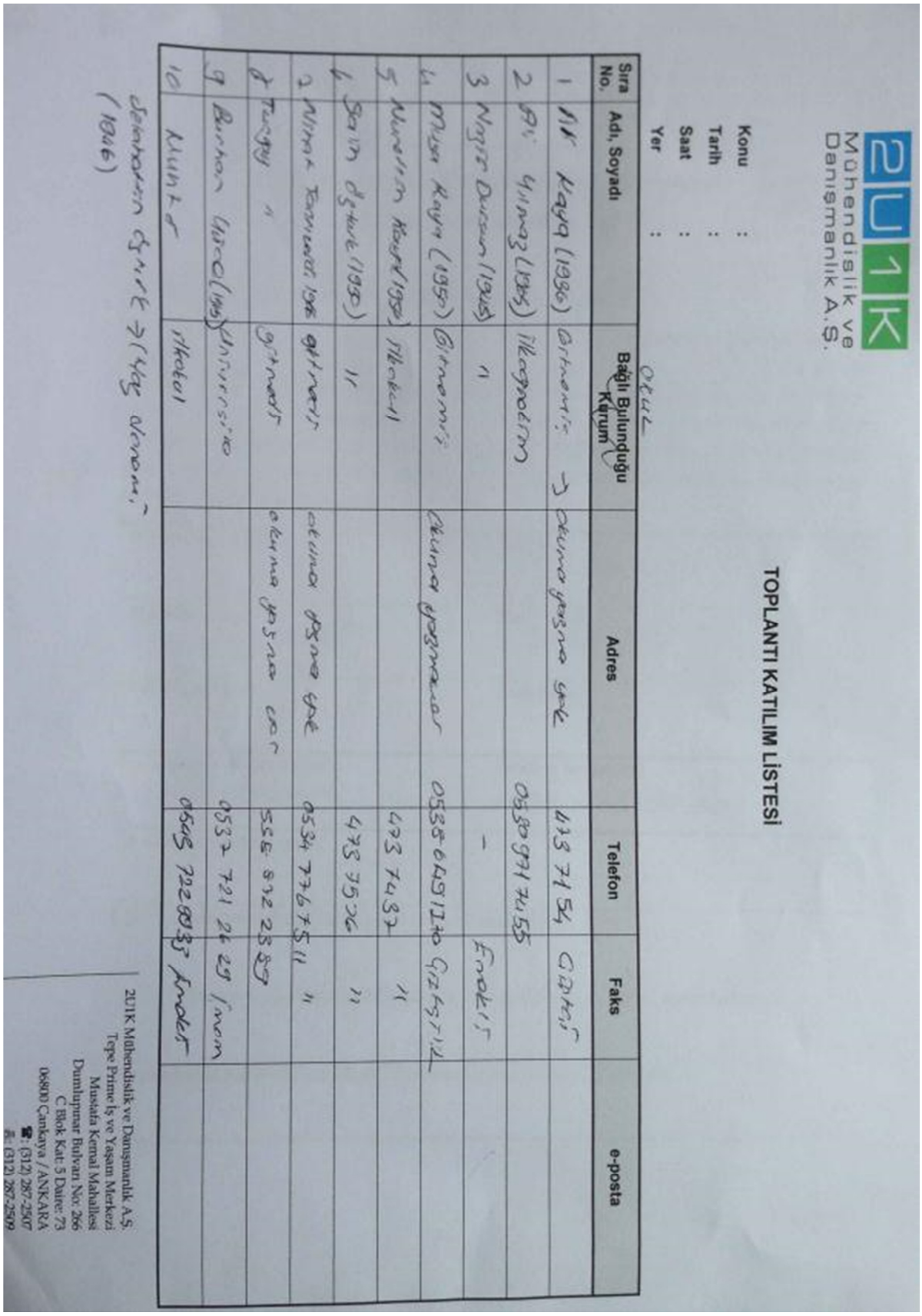
Table-2. Mitigation Plan for the Operation Stage

Issue	Management Activities
Noise from the power house	The powerhouse will be built with sound insulation to prevent environmental noise. Workers will use adequate protective equipment and measures as stipulated in national legislation on occupational health and safety.
Waste Management	Temporary storage of domestic waste, recyclables and hazardous waste at appropriate conditions in compliance with pertinent by-laws.
Wastewater	Operation of the package treatment unit.
Community	Providing fodder seeds to the farmers as committed, to compensate for the pasture lands
Erosion	Slope stabilization measures will be implemented by rip-raps and terracing works as appropriate.
Workers health and safety	Workers will use personal protective equipment. The Site will be equipped with fire extinguishers at risk areas such as fuelling area and storage place for oils. Safety labels will be placed at areas with risks of falling from height, etc. Drivers will be trained regularly on driving safety issues. Safety and emergency trainings will be provided on regular basis.

Table-3. Monitoring Plan

What? Parameter to be monitored	**Where?** Where to monitor the parameter	**How?** Means and Tools of Monitoring	**When?** Frequency of Monitoring	**Who** responsible parties for Monitoring
Environmental management	Power house	Site audits by a consultant for waste, wastewater, soil contamination concerns	Quarterly	Temmuz
Pressure on aquatic ecosystem	Along the stream section with environmental flow discharge	On-site monitoring of fish populations	Twice annually: April and November	Temmuz
Community complaints	Toklar village	Grievance mechanism	Continuous	Temmuz
Landscape	In the context of reinstatement plan: Access roads opened and where excavation debris are piled	Visual observations	Continuous	Temmuz
Flow rate and environmental flow	At the upstream and downstream AGIs	Flow readings	Continuous (daily basis)	Temmuz & DSI
Flood risks	Access roads	Visual observations	Continuous	Temmuz
Erosion	At the steep slopes that may be identified as prone to risks of erosion throughout operation	Visual observations	Continuous	Temmuz
Terrestrial Flora	Critical locations where the endemic specie is observed	Visual observations by flora specialist	Spring and autumn every 2 years	Temmuz
Fauna	Critical locations where vulnerable species can be observed	Visual observations by fauna specialist	Spring and autumn every 2 years	Temmuz

ANNEX-1 Participant List for the Meeting with Local People on 1 May 2013



2U1K Mühendislik ve Danışmanlık A.Ş.

TOPLANTI KATILIM LİSTESİ

Konu :
Tarih :
Saat :
Yer :

Sıra No.	Adı, Soyadı	Bağlı Bulunduğu Kurum	Adres	Telefon	Faks	e-posta
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
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