To: Mr. Claudio PURIFICATO  
Water engineer  
THE WORLD BANK  
Europe and Central Asia  
Infrastructure and Energy Services  
Department (ECSIE)

Dear Mr. Purificato,

Please find attached the Environmental Management Plan Framework (EMPF) for Infoshop publication.
This document is discussed with the Ministry of Environment and we have reflected here their remarks. The document is accepted by them as an application of the National Water Strategy. The Ministry of Environment suggest that is necessary to increase the collaboration between different state structures and ONG, private sector etc.

Sincerely

FATIMIR XHAFAJ
THE MINISTER

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I. Introduction

1. This document presents the Environmental Management Plan Framework (EMPF), which has been prepared to ensure that the proposed Albania Municipal Water and Wastewater Project is implemented in accordance with the World Bank operational guidelines. The EMPF will include procedures and implementation arrangements for ensuring full consideration of environmental safeguards in the annual investment program, in accordance with OP 4.01 and as well as Albanian laws and regulations on environmental expertise and impact assessment and will follow the best environmental practices. The main purpose of this EMPF is to serve as a valuable tool for identifying key environmental and social impacts that will result from the project, proposing mitigation measures to address the most significant impacts, and outlining the monitoring programs.

2. For the purpose of the Operational Policy (OP) 4.01, the project has been rated as an environmental category F1 (Financial Intermediary) given the fact that the exact investment items will not be known at the time of project appraisal. The project is expected to bring significant environmental and health benefits, such as improvements in the sustainability of raw water sources through reductions in losses and wastage, and improvements in public health through better quality of treated water. Although no major environmental issues are anticipated, certain investments items to be funded under the project may require special mitigation measures to protect the environment and enhance health safety.

3. A summary of the project environmental issues and mitigation program is presented in Annex 1 and 2. The budget for implementing the EMPF has been included in the project cost, and includes the salary of the Environmental Officer and the cost of monitoring.

II. Background and Project Description

4. Albania has abundant water resources, however piped water supply services in almost all urban areas is intermittent (2-4 hours/day) because of the dire condition of Albania's municipal water infrastructure. In addition, drinking water quality is often compromised by lack of adequate treatment and disinfection facilities and unreliable supply of chemicals. Lack of maintenance and repair, and lack of metering and operational control have resulted in excessive water losses, estimated to be greater than 50 percent in all cities. No wastewater treatment facilities exist in Albania.

5. Albania’s water supply systems in the rural areas are also in dire condition. At the end of 1989, 75% of the rural population had access to piped water (all types of access combined). Today this access is reduced to less than an estimated 50% of the rural population. The quality of the service in those areas that do have piped water supply, is very poor. Water is usually only
available a few hours a day, with certain areas receiving virtually no water during the entire summer period. The poorest segment of the population is hit the hardest; in average, their accessibility is lower and their cost of access to water is higher (in relative and absolute terms). The dilapidation of the water supply and sanitation facilities has sparked several water born disease epidemics in the last decade and is thought to be one of the major contributing factors to increased infant mortality in Albania.

6. Because of age, inadequacy of the physical infrastructure and lack of proper operation and maintenance for more then a decade, many of the water and sanitation systems still working today are likely to collapse within the next few years and will be largely beyond cost effective repair. The investment needs to improve Albania's water and sanitation sector are estimated to be US$150-170 million annually. This is in sharp contrast to the US$10-30 million invested annually in the sector.

7. Within the above context, the World Bank is preparing a US$19.3 million loan with the objective to help the improvement of water and sanitation services in Albania so that adequate services can also be provided to all customers including the poor, and the sector can contribute to the economic development of the country in an environmental sound way. The project aims to achieve this objective by assisting the Government of Albania (GOA) in testing and developing important aspects of the water sector reform. The reforms the project will support are: (i) introducing the first time a management contract in Albania's water sector, (ii) piloting the Government's newly adopted Rural Water Supply and Sanitation Strategy, and (iii) integrating wastewater management into an overall ecosystem management to protect globally important biodiversity.

8. The proposed project has three main components:

(a) **Management Contract Component.** This component comprises the following sub-components:

(i) **Management Contract:** This sub-component would finance the costs related to the management contract. These costs include a base fee and a performance-based fee to be paid to the private Operator based on achievement of targets defined in the contract. The Operator would be given full responsibility for managing the investment program, operating the water supply and sanitation systems, and developing and implementing the demand management program and the commercial (billing and collection) and financial management departments. However, the billed amount has to be deposited daily into a revenue account which is managed by the CMU. The CMU will use these funds to replenish the expenditure account from which the operator can withdraw by power of attorney to pay for operation and maintenance cost on behalf of the water company. The PMU will manage separate revenue and expenditure accounts for each water utility.

(ii) **Investment Fund:** This sub-component would finance technical and administrative support systems, asset management studies, revenue
metering, network rehabilitation and extension, operating equipment and deferred maintenance and operation expenditures (e.g., sewer and water main cleaning and disinfection etc.), aimed at improving the operations of the water supply and sanitation systems and the services to the population by achieving the performance improvement targets in the management contract. The Operator will propose the investments that are required to optimally re-structure and rehabilitate key components of the systems, implement a demand management program, and set up financial management, accounting and commercial systems.

(iii) **Technical Assistance:** This sub-component would finance independent technical and financial auditors that would monitor the Operator's performance and prepare the financial project and water utility audits, studies related to the project as well as consulting services to support the Executive Committee and PMU in the supervision of the management contract.

(iv) **Incremental Operating Cost:** This component would support the Executive Committee and PMU including salaries, training, and incremental operating costs; and various consulting services of technical, legal and financial nature.

(b) **Rural Pilot Component:** This component will comprise the following sub-components:

(i) **Investment.** Set-up of a small national and regional office of the Rural Water and Sanitation Agency as well as training for its staff. Grant and credit facilities to set-up 5-10 community owned and managed water and sanitation schemes within a region yet to be identified.

(ii) **Technical Assistance.** Technical assistance for policy setting by the GoA, an operational manual, financial management and procurement system for the Rural Water and Sanitation Agency. Technical assistance for training seminars for the private sector and NGOs operating in the rural water and sanitation sector.

(c) **TA for Sector Reform:** This sub-component would finance:

(i) For the Management Contract Component: Independent technical and financial auditors that would monitor the Private Operator's performance and prepare the financial projections and water utility audits, studies related to the project as well as consulting services to support the Executive Committee and PMU in the supervision of the management contract.

(ii) For the Rural Pilot Component: Technical assistance for policy setting by the GoA, an operational manual, financial management and procurement system for the Rural Water and Sanitation Agency. Technical assistance
for training seminars for the private sector and NGOs operating in the rural water and sanitation sector.

(iii) In addition TA will be needed for important elements of overall water sector and institutional reform e.g. benchmarking of water utilities, support of the newly founded water utility association, national staff training center etc.

III. Description of the Policy, Legal and Administrative Framework

Legal Provisions

9. The legal basis for EIA in Albania is the 1993 Law on Environmental Protection, which defines basic provisions and empowers the Ministry of Environment to specify those activities which will be subject to assessment. These provisions have not until now been systematically implemented. No detailed legislation has been enacted, but draft EIA regulations were prepared in 1994, and are currently being revised in an European Union assisted project (PHARE).

10. Under the 1993 Law, EIA is a pollution control instrument as well as a development planning instrument. Assessments have to be carried out periodically for existing activities as well as for development proposals, not less than once every five years.

Administrative framework

11. The EIA system is administered by the EIA Department of the Ministry of Environment (MoE). This Directorate is also responsible for environmental licensing, inspection, and enforcement of environmental laws and standards. The Department has approximately 15 national level staff in Tirana, of whom 5 are inspectors in the EIA Directorate. The MoE also has about 30 local staff in 12 Prefectorates.

12. A small number of full EIA studies have been carried out for overseas funded projects, generally under the procedures of the funding agencies, using foreign consultancies. Apart from these, the EIA Directorate’s efforts have been devoted primarily to its other responsibilities.

13. Although Albanian scientific and technical institutions have been weakened by the upheavals of the past decade, considerable expertise exists in the fundamental disciplines required for thorough EIA studies. This expertise is located primarily in universities and scientific institutes, rather than in consultancy organizations. The Ministry of Environment has itself established a core of expertise appropriate to the administration of the EIA system. This expertise will need to be further developed, in directions which will depend on the detailed design of the system. Few MoE staff have had any environmental management education or training.

14. Full implementation of EIA in Albania has now become highly desirable, in order to ensure sound environmental management of internationally financed projects, and of certain key Albanian funded developments (e.g. coastal tourism). The action plan developed within the
METAP institutional strengthening project is intended to contribute to this, alongside the development of detailed legislation being supported by PHARE.

**Guidelines and procedures**

15. No guidelines or procedures for EIA have yet been developed. This is a priority need, and initial work on developing guidelines was carried out during the METAP project. This EMPF framework fills current gaps with EIA guidelines and procedures.

**IV. Description of Baseline Conditions of the Project Areas**

**Durres**

16. Durres is the main port Albania and the country's second largest city, with a population of about 93,000 inhabitants. As the Durres Water Works serves also the neighbouring villages, totally 170,000 inhabitants are supplied. Additionally, water is delivered to the neighbouring municipality of Kavaja. Water is taken from the Fushe Kuqe well field 31 Km north of the city. Seven wells are supplying raw water to a central storage reservoir. A pumping station with nine pumps, with a total capacity of 735 l/s is pumping water 18 Km through a DN700 pipeline to the Kurata reservoir from where water is conveyed by gravity to five tanks, four in Durres and one in Kavaja, with a total storage capacity of 14,000 cubic meters. Some areas are receiving water from two other sources. The village of Pjezga is supplied from the Erzen River through a sand filtration plant. The town of Shijak and adjacent villages are served by the Fushe Kruja system which supplies about 120 l/sec from three wells through a new nine kilometers pipeline from a well field near the international airport.

17. The conditions of the system in Durres reflect the general supply situation. Water is available in the early morning and in the afternoon for 2 or 3 hours. The network is in a very bad condition, pipes and valves are old and leaking. Plumbing system inside flats and buildings is poorly maintained and causes significant water losses. Only 15% of the houses are equipped with water meters. Since water bills are not based on the actual consumption the wastage of water is remarkable. Besides great inconvenience and economic loss, the situation is a threat to public health. Due to the negative pressure in the pipes, contaminated ground water can enter the system. Durres Water Works is unable to improve the serious situation on its own. A comprehensive water supply urgent rehabilitation project financed by the World Bank is currently on-going.

18. The Durres sewerage is a combined system which collects storm water and sanitary sewage. The system has been built in 1939 and expanded several times, the last being in 1976. The present layout does not respect the planned one due to the interruption caused by the second world war as well as by the lack of available funding and materials.

19. Initially in 1939 it was planned a separate rain water and sanitary system as well as a treatment plan to be located at the edge of the future built up area. In 1967 the Institute of Hydraulic Design has carried out a comprehensive design for combined system to serve the whole of developed areas (Durres, Shkozet and Durres Beach). No treatment plant has been
planned. In both towns the available technical documentation and mapping are not updated and do not reflect the actual configuration.

20. The wastewaters of Durres gravitates toward two outlets located near the harbor and at the edges of the built area of Durres. The overall system includes eight pumping stations located in the lowest points. The wastewaters of Durres beach are lifted by six pumping stations which discharge in an irrigation canal ending in the same drainage canal which receives part of the Durres city system.

21. Sewerage system in the project area is in poor conditions. The pumping stations are in disrepair and the sewer lines need maintenance. The existing lines cannot be properly operated and maintained by Durres Council Sewerage because the total lack of equipment. The sewerage service area is less extended than the area covered by the water supply and an extension of the service would be required.

**Fier**

22. Water supply and sanitation services in Fier are structurally and operationally deficient due to years of neglect and under investment. Piped water from the public water company is the main source of water for most of the households in Fier which supplies 89% of the population. Approximately 20% of those receiving piped water are supplied by outdoor taps rather than indoor supplies. Most of the households in Fier are connected to the municipal water supply system by legal connections and are charged for water usage. There is increasing evidence that new properties are connecting illegally to the supply network in order to avoid paying the connection fee to the Water Enterprise. This practice frequently damages pipes and increases leakages within the system.

23. Water from the Kafaraj well field is pumped through 225 mm and 400 mm steel pipes to two 600 m3 circular raw water tanks. Six wells discharge into each tank. The main pumping station convey raw water from the well field of Kafaraj to the chlorination point at Koshovices. The transmission mains, that are four large diameters pipes running long a common route, are in a poor state of repair.

24. Following chlorination, water is transferred into three service water reservoirs that, through a central valve chamber, feed the city of Fier. The chamber and its pipe work need major renovation or complete replacement. There is only one service reservoir in Fier with a capacity of 600 m3. The distribution system comprises steel, cast iron, and galvanized iron water supply pipes.

25. The sewerage system in Fier is a combined system, conveying both surface water and sewage. Within Fier City, 80% of the population is connected to a municipal sewerage system. All sewers are gravity sewers and there are no pumping stations or pressure mains. Most of the wastewater is collected in two main trunks: the 2000 mm and 1000 mm sewers. The system is not fully integrated and a large number of outfalls discharge untreated wastewater into the Gjanices River.
26. The sewers suffer from a cluster of defects in their structural and service condition. The 1000 mm sewer is in a bad condition throughout. The 2000 mm sewer in some locations is free flowing except in the immediate vicinity of manholes, where there is considerable heavy masonry. The line and level of this pipe is poor, but its very large size and low duty keeps it flowing adequately.

27. The theft of manhole covers, the bricks from beneath the covers, and of reinforcing bars from the manhole slabs and exposed ends of the pipe, are significant problems in Fier. The loss of sewer access protection has enabled sewers to become full of large debris.

28. The large size and flat gradient of the majority of sewers, in combination with the low level of storm water entering the system, leads to very low sewer flow velocities even during the peak rainfall months. This means that debris is rarely mobilized within sewers, but simply settles out on the inverts of pipes. This debris is not systematically removed, but is only cleared when blockages occur and there are public complaints. This septage is removed by truck and dumped into the Gianices River, without any pre-treatment.

**Lezhe**

29. The first water supply system was erected in Lezhe during the 1940s. It consisted of a well and pumping station in Guraj, a reservoir adjacent the two reservoirs which are currently in use and a few kilometers of network, serving as distribution lines which mainly consisted of cast iron pipes. These distribution lines are still in use, whereas the pumping station and the reservoir have been abandoned.

30. During the 1960s, the Barrbulloja Well Field was started to be exploited. This resulted in the drilling of two wells and the erection of two (2) pumping stations for the Lezhe water supply system in 1968, and two more wells and another pumping station in 1972/73 aimed to increase the water production to meet the needs of a paper mill in Lezhe planned to be taken into operation. The construction of the first two wells was parallel by the construction of one of the two reservoirs presently existing (below the Skanderbey Castle) and successively the transmission main DN500 connecting all these components to the wells field. In order to allow the operation of the paper mill which started working in the late 1970s, another reservoir was built in 1974 adjacent to the existing one.

31. As late as 1983, the Balldreini water supply system was connected to the Lezhe reservoir by starting the operation of the Balldreini reservoir and pumping station, while at the same time the Balldreini connection was linked to the Gocaj supply system. It was as early as 1965 that Shengiini was connected to the Lezhe water supply system and due to the town development this scheme has in early 1996 been extended by the construction of a new reservoir and a new transmission line.

32. In 1991 the paper mill operation was discontinued producing the beneficiary effect that almost the entire water production and distribution capacity is now available to the supply of the local population.
33. The water production for the Lezhe Water Supply System is presently based on three wells within the Barbulloja Well Field which is located approx. 4 Km south of Lezhe City. Three pumping stations extract water from the wells conveying it into the transmission main DN500.

34. Lezhe's water supply system presently operates 3 transmission lines: DN100, DN300, DN500. Several illegal house connections are present along the transmission mains. This poses various problems to the water supply administration, as these illegal connections withdraw water to such an extent that the remaining water delivery does not suffice to supply the zones at the end of the transmission lines.

35. Lezhe's supply network is composed of roughly 76 Km of pipes, mainly consisting of steel, galvanized mild steel, cast iron, and PE pipes with diameters ranging from 25 mm up to 500 mm. Severe losses due to visible leaks have been detected and an assessment of losses due to invisible leaks revealed an average loss of 1.5 m³/h x Km. These figures show that a leak detection and repair campaign is urgently required. This is even more important considering that the unfavorable network conditions leads to the infiltration of contaminated water which in turn create serious risk for public health.

36. About 80% of the population is connected to the sewer collection system but the wastewater services are of a very low standard. The system was designed as a separate system (a network for sewage and a separate network of drains for storm water) but the network is now used as a combined system. The system is inadequate for surface water flows so that sewers surcharge frequently results in streets flooding. Sewage is discharged to the river without treatment. The town officials place a high priority on measures to separate and improve the surface water drainage system and a lower priority on sewage system improvements, which is justified in view of the frequent flooding and the resulting increased health risk.

Saranda

37. Saranda is being supplied with water from two sources. The Navarice Spring (30-70 l/s) located at approximately 13 Km from Saranda. The water flows under gravity from the Navarice Spring intake to two distribution reservoirs near the town with a total capacity of 1200 m³. Transport is through a Φ250 mm steel pipe of 12,600 meters, constructed in 1978. Approximately 2,400 meters of this pipe line is badly corroded. The Vrioni well field (75-100 l/s) located at approximately 3.5 Km from Saranda. Water is pumped from Vrioni wells to a main distribution reservoir of 2000 m³ near Saranda comprising a Φ400 mm steel pipe of 3,300 meters, constructed in 1996.

38. Analysis of water samples taken from the water sources and the tap showed that water quality from both sources comply with EU standards for drinking water. No water treatment facilities except for safety disinfection are required.

39. Distribution of the water from the reservoirs to the town is intermittent. The southern, lowest part of the town receives water 24 hours per day but the other higher parts which are supplied by 7 boosters pumps receive water for only a few hours per day. Due to the lack of a division in pressure zones, pressure varies considerably in the various parts of the supply area.
40. Unaccounted-for-water (UFW) is high, at present technical losses are estimated to be 45% of production. In addition to technical losses in the system there are non technical losses (e.g. unregistered connections) and quite some water is wasted by the consumers within their properties since no water meters are installed.

41. The current sewerage system is a waterborne system constructed over a period of 50 years from 1944. A separate system was constructed with foul flows being carried separately from storm flows. The system consists of a traditional dendritic sewerage system with carrier sewers flowing approximately North-South, collecting flows from lateral sewers running East-West. The carrier sewers are joined by an interceptor sewer, known locally as the “Collector” sewer. This Collector sewer flows from West to East away from the harbor. The Collector sewer has been extended to Cuka, to discharge the wastewater into the Bistreca River, which discharges into the sea at Cuka. The conclusion regarding current condition of the sewerage and sanitation system in Saranda are:

(a) Generally the sewer system in the town has been designed on correct principles, but the capacity of the system is inconsistent. In the central and south east side of the existing system has sufficient capacity to take expected foul flows. In the Koder area (to the west of town), and the North area of the town, sewer upgrading is required.

(b) The lifting station is correctly sited, but its capacity will shortly be exceeded. The rising main to the canal is adequate for the short/medium term, but the collector canal to Cuka is inadequate in both design and construction. It appears to be inadequate even for the short term situation. Also the pump station is not working.

(c) There is some entry of rainwater runoff into the foul sewer system, but the extent is unknown. This must be quantified prior the detailed design, but a flow monitoring program will be required to do this.

V. Addressing Environmental Issues

42. The project is expected to finance rehabilitation of the existing water supply and sanitation infrastructure and expenditures to improve management and operations of water supply/wastewater companies, which should contribute to improve the quality of life and the environment. No additional structures of significant size are envisaged under the project. Specific physical investments will be defined only during the course of the project by the private operator. Nonetheless, potential negative environmental impacts are expected to be localized or able to be mitigated. It is not expected that the project will require land acquisition or result in involuntary resettlement, since most of the work will be done in properties owned by water/wastewater companies, municipal land or rights-of-way assigned to municipal infrastructure.

43. The EMPF will provide water/wastewater companies with an overall framework to guide the preparation and implementation of their annual work program. The EMPF will reflect the environmental guidelines and standards of IDA for water supply and sanitation project since such standards are not well developed in Albania. As noted in Section III above, no detailed
legislation for Environmental Impact Assessment has been enacted yet, but draft regulations were prepared in 1994.

44. The EMPF describes procedures for deciding on whether environmental assessment categories A, B or C are appropriate for each sub-project. Only environmental categories B and C sub-projects are expected. Therefore the EMPF will only develop procedures for categories B and C, stating that the procedures for any category A sub-project would be developed on a case by case basis in consultation with IDA. Procedures and requirements to be followed for each category will include requirements for public information and disclosure, and will set implementation arrangements for ensuring full consideration of environmental concerns in accordance with the 1993 Law on Environmental Protection and OP 4.01. During project preparation, partial environmental assessments will be carried out for the Fier Water Production sub-component, including Environmental Management Plan (EMP). This EMP will be an integral part of the EMPF for the overall project.

VI. Generic Potential Environmental Impacts and Mitigation Measures

Environmental Impacts

45. The potential environmental impacts will vary with the subprojects depending on the location, water supply sources, type of service and other project specific features. In general, the environmental issues that may need to be addressed during different stages of subprojects development would relate to:

   (a) *Improvement in Public Health:* The project will increase water availability and improve the physiological and microbiological quality of water supplied to consumers, which should lead to a reduction of the water-borne diseases and a general improvement in public health.

   (b) *Impact on quality of water resources:* The project will eventually reduce the amount of raw water that is taken from the different sources and will increase the efficiency of the wastewater treatments. This should affect improvements in quality of river and sea water downstream. The project will not adversely affect the quality of upstream waters and its vicinities.

   (c) *Effect on groundwater flows:* General groundwater flows will not be adversely affected by the proposed project. Leak correction and control will reduce groundwater contamination as well as groundwater discharges into wastewater system. That will also improve the efficiency of the wastewater treatment process. A possible reduction in the amount of raw water used could potentially improve the sustainability of groundwater resource use.

   (d) *Disposal of water treatment sludge:* Material from sedimentation pond cleaning during both implementation and operation is a potential source of soil and water contamination. Proper disposal procedures and locations will be enforced.
(e) **Safety hazards from chlorination process:** Chlorine, as a poisonous gas, is always a source of hazard to human health. Chlorine used for water disinfection will be subject to standard measures of protection and air control.

(f) **Pollution by construction run-offs:** Negative impacts to groundwater are expected to be temporary and of minor significance. Civil works will be conducted during very short time, and generally dry weather conditions in Albania will contribute to the limitation of such effects. Additional measures and enforcement of local norms for protection of groundwater will be implemented.

(g) **Disturbance during construction:** These impacts will occur during the rehabilitation works on transmission pipelines and distribution network, but will be only short-term and affect different people at different times. Effects include dust from construction activities, noise during trench excavation, possible effect of vibration on old buildings, restriction on access to buildings, closure of roads and section of roads causing increased traffic, and movement of construction traffic. For residents of the streets where these works are being conducted, these impacts will be felt but only for a short period. Impacts will also be moderate for people using or passing through the affected areas. Appropriate mitigation measures and construction methods will be in place.

(h) **Disposal of demolition debris:** Demolition debris will be generated during the rehabilitation works on treatment facilities, transmission pipelines, and distribution network. These effects will be localized, and will be minimized by means of appropriate removal and disposal procedures.

(i) **Damage to existing utilities:** Old water networks, electricity and telephone lines may be inadvertently damaged during the rehabilitation works. Therefore, necessary measures will need to be taken in the construction phase.

(j) **Safety hazards from construction activities:** No major hazards are expected the construction of the proposed project elements, as long as proper construction practices and safety procedures are applied.

(k) **Spillage of fuel from construction:** The use of fuels and oils will be very limited given the small size of the works, and therefore potential impacts are of little significance. However, proper construction practices must be ensured to avoid contamination of soils and water.

(l) **Damage to trees and vegetative cover:** The impacts on vegetative cover will be short-term, localized, and totally associated with construction. They can be mitigated by adopting proper measures and contract provisions.

(m) **Damage to cultural resources:** No archeological or cultural resources are expected to be encountered during project implementation since works consist in rehabilitation of existing systems where excavations have been conducted before and no findings have been reported. However, all necessary permits will be obtained.
Mitigation Measures

46. Standard mitigation measures as those identified in Annex 1, will be applied when deemed necessary.

V. Environmentally Sound Clauses for Civil Work Contracts

47. The following environment-protecting provisions for civil works contract documents have been identified, and shall be adopted and applied to the rehabilitation-type sub-projects when required. In the case of minimal negative environmental impacts, the application of these environmentally sound construction standards and procedures will suffice.

(a) Construction program to avoid undue disruption. There will undoubtedly be some short-term inconvenience and traffic disruption. To avoid undue inconvenience the construction program should include the following contract provisions:

- Specify the work sequence for pipeline rehabilitation, such that local inconvenience is avoided to the maximum extent feasible.
- Specify the coordination procedures for water service interruption, such that cut-off periods are reduced to the minimum possible.
- Specify the method of construction in certain highly congested areas to minimize access disruption, such as trench-to-truck construction and provision of plates to provide access over trenches. Proper access to businesses will be guaranteed to the maximum extent practicable.
- Require the contractor to secure approval of construction staging and lay down areas.
- Require the contractor to use traffic routing to avoid build up areas and bottlenecks to the maximum extent feasible. Traffic control and safety signals and lighting should be in accordance with national and local regulations. Safe detours and walkways for pedestrians will be implemented as necessary.

(b) Measures to minimize noise and vibration. During construction, noise can be minimized through scheduling and specific restrictions for particularly noisy activities. To the extent possible, excavation and related works in residential areas should not be undertaken from sundown to sunrise. Routine control and maintenance for all equipment used for construction and transportation will be required to ensure reasonable noise levels. In built up areas, excessive vibration from heavy machines during construction will be avoided to the extent possible to reduce any damages to the surrounding areas. Manual excavation will be adopted in certain cases. Local construction standards will be followed if they specify more stringent requirements.

(c) Protection of air quality from the construction dust and pollution. The contractor will employ dust suppression measures during the construction process and transportation, such as periodically sprinkling water in certain
areas and removal of excess materials from the sites. All street surfaces, sidewalks, and construction sites will be cleaned upon completion of activities. To reduce vehicle emissions the contractor will use traffic routing in order to avoid build up areas and bottlenecks to the extent feasible. Also it will be required to provide routine control and maintenance for all equipment used for construction and transportation, and to run the equipment only when required.

(d) **Disposal of demolition and excavation debris.** Material will be removed from the site directly and during demolition/excavation, and will be disposed of at an approved location. Salvaged material will be stored at a designated location and protected from erosion.

(e) **Disposal of water treatment sludge.** The existing Albanian construction standard requires special measures for handling collection and burial of the water and wastewater treatment sludge. Only approved locations will be used. Sludge will never be disposed of in permeable soils or in the proximity of surface waters or buildings.

(f) **Avoidance of underground water pollution by the construction run-offs.** Proper measures for protection of groundwater from construction run-offs shall be observed. Construction sites will provide for adequate runoff and drainage control. All vegetation destroyed will have to be replaced, and trench surfaces will have to be restored to a condition at least equal to that existing before work, to prevent increased erosion. Negative impacts to groundwater are expected to be temporary and minor in significance.

(g) **Prevention of chlorine releases and minimization of impacts.** To prevent potentially serious threats to operators' health, chlorine systems shall operate in order to prevent leakage, chlorinators shall be constructed of materials resistant to chlorine corrosive attack, and chlorine leak detectors shall be installed inside the chlorination facilities. Protective and emergency response equipment will be required in chlorination facilities.

(h) **Prevention of accidents during construction.** The contractors shall take all necessary precautions for the types of civil works involved, specially in residential areas and those with high circulation of persons and vehicles. Safety measures will be adopted to protect the personnel involved in the works as well as third parties. Public access to construction sites will be properly restricted. Internationally accepted practices and local regulations will be followed regarding construction health and safety.

(i) **Handling of fuels and oils.** All above-ground storage tanks and drums will be stored on low permeability bases able to contain 110% of the stored volume. Proper measures will be taken to prevent spillage during equipment maintenance activities. Pouring fuels or oils into soils or drains
will be prohibited. Local environmental requirements on the subject will be followed as to the treatment and disposal of residues.

(j) Protection of trees and vegetative cover. As a general principle, all vegetation destroyed will have to be replaced. Ornamental trees that need to be cut will be properly replaced.

(k) Supplementary measures

- All wood used during construction will be procured from authorized sources.
- Solid waste (other than demolition and excavation debris) such as wood, paper, glass, plastic and trash in general, will be properly collected, separated, stored, and disposed.
- All construction sites will be kept clean and in good sanitary conditions.
- Preparation of concrete or mortar will not be carried out on street or sidewalk surfaces.
- In order to avoid extraction of sand or gravel from river beds, contract documents will require prior approval of the Engineer for the extraction of sand and gravel for use in construction. Contractors' requests for approval will identify the location of authorized sand and gravel quarries or borrow areas, and the quantities of materials to be extracted.

Operational Procedures for Environmental Assessments

48. Operating procedures to be followed during project implementation by the implementing agency for the annual investment program to be financed by the project have been identified. The underlying principle is the development of these procedures would be that environmental issues are best addressed when they are made an integral part of the project cycle – in this particular case, it would be the project cycle for the annual investment program to be funded under the project. The process to be put in place would consist of the steps described below.

Environmental Screening

49. The Private Operator will carry out an appropriate Environmental Assessment (EA) for the annual investment program. Before approving a subproject, the Contract Monitoring Unit (CMU) verifies (through its own staff, outside experts, or existing environmental institutions) that the subproject meets the environmental requirements of appropriate national and local authorities and is consistent with the OP 4.01 and other applicable environmental policies of the Bank. The CMU will submit to the Bank for the final approval the results of the EA review.

50. An environmental screening will be undertaken to determine the appropriate extent and type of EA. The proposed subprojects will be classified according on the type, location, sensitivity and scale of the project and the nature and magnitude of its potential environmental impacts. The highest rating given to individual sub-project will determine the category of the EA.
(a) **Category A:** A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate or compensate for adverse impacts and improve environmental performance.

(b) **Category B:** A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas – including wetlands, forests, grasslands, and other natural habitats – are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project’s potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate or compensate for adverse impacts and improve environmental performance.

(c) **Category C:** A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

**Public Consultation and Disclosure**

51. For all Category A and B subprojects, during the EA process, the water utilities/private operator will consult project-affected groups and local nongovernmental organizations (NGOs) about the project’s environmental aspects and takes their views into account. For Category A projects, the Private Operator consults these groups at least twice: (i) shortly after environmental screening; and (ii) once a draft EA report is prepared. In addition, the private operator consults with beneficiaries on a continuous basis during project implementation through public relations campaigns. The water utilities/private operator will provide relevant material in a timely manner prior to consultation with project-affected groups and local NGOs and in form and language that are understandable and accessible to the group being consulted.

52. For a Category A project, the water utilities/private operator provides for the initial consultation a summary of the proposed project's objectives, description and potential impacts. In addition, the private operator ensures that EA reports for Category A subproject are made available in a public place accessible to affected groups and local NGOs. Any separate Category B project report is made available to project-affected groups and local NGOs.

**Environmental Management Plan**

53. Specific Environmental Management Plan (EMP) will be developed for the annual investment program. The EMP will be based on the assessment of the environmental issues
relevant to the annual investment program, and will include appropriate mitigation and monitoring measures, and will identify the agencies responsible for implementing these measures and their requirements in terms of capacity development and training. For all three aspects (mitigation, monitoring and capacity development), the EMP provides: (i) an implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans; and (ii) the capital and recurrent cost estimates and sources of funds for implementing the EMP.

54. Before an annual investment program is approved, the EMP will be agreed with the Ministry of Environment. Such specific plan will be incorporated, as part of the scope of work of the consultant, in the terms of reference for preparation of detailed designs and bidding documents for the individual component. It is expected that the mitigation measures for the subprojects will be basically limited to the normal construction practices. Additionally, having an international operator managing the utility company will ensure compliance with these measures as well as knowledge transfer.

55. As an example of environmental assessment category B including EMP, the environmental assessment for the Fier production site component which takes into account the potential environmental issues described above, is presented in Annex 2.

Implementation and Monitoring

56. Environmental indicators will be monitored annually and obligations for implementation in accordance with the 1993 Law on Environmental Protection and OP 4.01 will be included in the contract with the private operator. Most likely, consultants (or NGOs) will be engaged to monitor project implementation and conduct periodic environmental audit.

57. The EMPF will be implemented by the water utilities, under the management of an international utility operator. The provisions of the EMPF and the applicable local environmental regulations will be incorporated in the management contract to be signed between the Municipalities and the international utility operator. The Ministry of Environment, the Ministry of Territory Adjustment and Tourism of the Government of Albania will be responsible for monitoring the implementation of the EMPF.

58. All contracts for rehabilitation and minor works will include requirements for the works to be performed as per EMPF specific provisions and international specifications. Responsibilities for daily monitoring will be part of construction supervision. Compliance with the EMPF and monitoring of the impact during the construction phase will be undertaken by the Environmental Officer in the Contract Monitoring Unit (CMU) as part of his/her contract supervisory duties, and by the Municipal Department for Environment. Dedicated and trained personnel will be appointed to carry out this monitoring.
## Annex 1: Generic Environmental Management and Monitoring Plan For Rehabilitation-Type Sub-Project

<table>
<thead>
<tr>
<th>Component and Activity</th>
<th>Impact or Concern</th>
<th>Mitigation Opportunities</th>
<th>Responsible Authority for Implementing Mitigation</th>
<th>Monitoring Requirements</th>
<th>Responsible Agency for Monitoring and Enforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Construction</strong></td>
<td>Environmental</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Rehabilitation of water production facilities and distribution network</td>
<td>Soil and water contamination by water treatment sludge</td>
<td>Use only approved, appropriate disposal sites; follow Albania construction standards.</td>
<td>Utility operator; Contractor</td>
<td>Periodic inspection of plant rehabilitation activities</td>
<td>Project Implementation Unit; Regional (Perfect/Municip) Agency of Environment; Ministry of Environment; National Water Council</td>
</tr>
<tr>
<td></td>
<td>Groundwater pollution by construction run-offs</td>
<td>Provide adequate runoff and drainage control; replace all vegetation destroyed and restore all trench surfaces; follow Albania construction code</td>
<td>Utility operator; Contractor</td>
<td>Periodic inspection of construction activities</td>
<td>Project Implementation Unit; Regional (Perfect/Municip) Agency of Environment; Ministry of Environment; National Water Council</td>
</tr>
<tr>
<td></td>
<td>Soil and water contamination by improper disposal of demolition debris and waste</td>
<td>Use only approved, appropriate disposal sites; remove debris directly and promptly; properly store and protect salvaged material; collect, separate and properly dispose waste; follow Albania construction code.</td>
<td>Utility operator; Contractor</td>
<td>Periodic inspection of construction activities</td>
<td>Project Implementation Unit; Regional (Perfect/Municip) Agency of Environment; Ministry of Environment; National Water Council</td>
</tr>
<tr>
<td></td>
<td>Spillage of fuel and oil</td>
<td>Store tanks and drums on 110% capacity bases; forbid pouring into soils or drains; enforce adequate equipment maintenance procedures; follow local regulations.</td>
<td>Utility operator; Contractor</td>
<td>Periodic inspection of construction activities</td>
<td>Project Implementation Unit; Regional (Perfect/Municip) Agency of Environment; Ministry of Environment</td>
</tr>
<tr>
<td></td>
<td>Damage to trees and vegetative cover</td>
<td>Replace all vegetation destroyed; use authorized wood sources only.</td>
<td>Utility operator; Contractor</td>
<td>Periodic inspection of construction activities; monitoring of wood sources</td>
<td>Project Implementation Unit; Regional (Perfect/Municip) Agency of Environment; Ministry of Environment</td>
</tr>
<tr>
<td>Component and Activity</td>
<td>Impact or Concern</td>
<td>Mitigation Opportunities</td>
<td>Responsible Authority for Implementing Mitigation</td>
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<tr>
<td><strong>SOCI-O-ECONOMIC</strong></td>
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<tr>
<td>Rehabilitation of water production facilities and distribution network</td>
<td>Noise and vibration disturbances to residents and businesses</td>
<td>Establish schedule and other specific restrictions; limit work to daylight hours as possible; equipment to have noise suppression devices and proper maintenance; limit excessive vibration in built-up areas; follow local standards.</td>
<td>Utility operator; Contractor</td>
<td>Periodic inspection of construction activities</td>
<td>Project Implementation Unit; Municipal Dept. for the Environment; Municipal Agency for Construction Supervision</td>
</tr>
<tr>
<td>Dust generation</td>
<td></td>
<td>Dust suppression measures: water sprinkling, removal of excess materials, cleaning of sites upon completion of activities.</td>
<td>Utility operator; Contractor</td>
<td>Periodic inspection of construction activities</td>
<td>Project Implementation Unit; Municipal Dept. for the Environment; Municipal Agency for Construction Supervision</td>
</tr>
<tr>
<td>Reduced pedestrian and vehicle access to residences and businesses</td>
<td></td>
<td>Establish work sequence and methods (trench-to-truck, steel plates) to minimize access disruption; provide alternative safe access as possible; implement detours and walkways.</td>
<td>Utility operator; Contractor</td>
<td>Periodic inspection of construction activities</td>
<td>Project Management Unit; DVK; Municipal Agency for Construction Supervision</td>
</tr>
<tr>
<td>Temporary supply interruptions</td>
<td></td>
<td>Establish coordination procedures for cut-offs; minimize time for replacement operations; use nighttime scheduling as necessary.</td>
<td>Utility operator; Contractor</td>
<td>Monitor coordination of cut-offs</td>
<td>Project Implementation Unit; State Sanitary Inspection</td>
</tr>
<tr>
<td>Increased traffic inconvenience (emissions, bottlenecks, longer travel times)</td>
<td></td>
<td>Use traffic routing; ensure coordination with local authorities; routine control and maintenance of equipment.</td>
<td>Utility operator; Contractor</td>
<td>Periodic inspection; monitor coordination of traffic routing</td>
<td>Project Implementation Unit; Municipal Dept. for the Environment; Traffic Police</td>
</tr>
<tr>
<td>Component and Activity</td>
<td>Impact or Concern</td>
<td>Mitigation Opportunities</td>
<td>Responsible Authority for Implementing Mitigation</td>
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<tr>
<td>Safety hazards to workers, pedestrians and vehicles during construction</td>
<td>Ensure that standard safety measures are taken; restrict public access to construction sites; implement traffic safety plan; ensure safety instruction and equipment for workers; follow local regulations.</td>
<td>Utility operator; Contractor</td>
<td>Periodic inspection of construction activities; monitor safety plans</td>
<td>Project Implementation Unit; Municipal Agency for Construction Supervision</td>
<td></td>
</tr>
<tr>
<td>B. Operation</td>
<td>Environmental</td>
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</tr>
<tr>
<td>Operation of rehabilitated water production facilities</td>
<td>Soil and water contamination by water treatment sludge, Contamination by runoffs, demolition debris, waste, fuel and oil spills, and damage to vegetative cover.</td>
<td>Use only approved, appropriate disposal sites; follow Albania standards. Same basic construction measures and norms as during construction phase.</td>
<td>Utility operator</td>
<td>Periodic inspection</td>
<td>Regional (Perfect/Municip) Agency of Environment; National Water Council</td>
</tr>
<tr>
<td>Implementation of leak detection and correction programs</td>
<td>Specify vacuum-operated corrosion-resistant systems; install chlorine leak detectors; require protection and emergency response equipment for operators.</td>
<td>Utility operator; possible construction contractor</td>
<td>Periodic inspection</td>
<td>Regional (Perfect/Municip) Agency of Environment; Ministry of Environment; Traffic Police; State Sanitary Inspection; Municipal Agency for Construction Supervision</td>
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<tr>
<td>Socio-Economic</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Operation of rehabilitated water production facilities</td>
<td>Safety hazards from chlorination process</td>
<td>Safety hazards to workers, pedestrian and vehicles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation of leak detection and correction programs</td>
<td>Noise, vibration, dust, reduced access, traffic inconvenience, water supply interruptions, and safety hazards to workers, pedestrian and vehicles</td>
<td>Same basic construction measures and norms as during construction phase.</td>
<td>Periodic inspection</td>
<td>Regional (Perfect/Municip) Agency of Environment; Traffic Police; State Sanitary Inspection; Municipal Agency for Construction Supervision</td>
<td></td>
</tr>
</tbody>
</table>
Annex 2

Environmental Management Plan
Fier Water Production Site

Environmental Issues

Presently there is a common supply for Fier Water Works and for the Power Cooperation of Albania (KESH). The wells are located along the Vojosses river approx. 13 km southeast of Fier. The wells, main pump station, transmission mains (4 no. ranging from 400 to 500 mm steel pipes) and three reservoirs (2 x 4000 m³ and 1 x 600 m³) are property of KESH. One reservoir 5000 m³, constructed 1995 is property of Water Works. The reservoirs are located at Koshevica, approx. 4 km south of Fier center. The original concept did foresee the rehabilitation of the existing wells do be done under the World Bank Project, the rehabilitation of the main pump station, surge protection, chlorination and a new transmission main DN 800 DCI under a EU-Project. Both Projects required the transfer of the existing assets from KESH to Water Works.

a) Present Situation

The well field is based on 11 wells from which two (No. 4E and 21) are only partly used due to high total chlorine content (above 300). Another well, no. 2 A is collapsed and out of use. The yield of the wells is ranging from 70 l/s to 100 l/s, the southeastern wells slightly higher in production than those in the northwest. All wells have individual pump mains, diameter 250 to 500 mm steel, generally in good condition. The yield of the well field is in the range of 600 to 900 l/s depending on season and break down of existing pumps. From the wells the water is pumped to two suction tanks at the main pump station, 600 m³ each. One new Grundfoss pump and four old pumps of Chinese manufacture (all approx. 290 l/s, h = 125 m) are delivering water to the Koshevice reservoirs. Pumping capacity between 600 and 900 l/s. Consumption and losses at the villages supplied along the transmission line, depending on season 100 to 180 l/s.

b) Future Development

Two issues interrupted the proposed projects. First no agreement could be reached between the two responsible Ministries on transferring the assets and second the EU project was under financed. EU will undertake with the funds available the laying of the 800 mm transmission main and the new inlet arrangement and metering at Koshevice reservoirs. (The 5000 m³ and one compartment of the 4000 m³ reservoir are now allocated to Fier Water Supply). The replacement of high lift pumps, chlorination and surge protection at the main pump station is cancelled. KESH will have their own supply operating the pump station and the existing transmission mains. Under the World Bank project it is foreseen to replace the existing wells 1A, 3R, 4 R, and 19 by new wells and replace wells 4E, 21 and 2A with two new wells 2A1 and 2A2, equipped with submersible pumps delivering direct through the new 800 mm DCI line to Koshevica reservoirs. This would not increase the maximum extraction capacity of the well field. The wells 3R, 4R and 19 will use the existing steel pipes, for the other wells a new pump main DCI DN 350 to 600 is planned. The new manifold and surge protection is foreseen to be built at the existing main pump station area, chlorination at Koshevica. The expected yield of the new
wells is 120 to 140 l/s. New connections shall be made for the villages, the flow controlled by meter chambers. The village reservoirs and distributions are needing rehabilitation.

c) Environmental Assessment

The environmental assessment identified the following potential negative impacts of the project: (i) inappropriate disposal of excavated materials, construction debris, and small quantities of hazardous wastes related to construction activities (although no hazardous wastes have yet been identified and are unlikely to occur); and (ii) environmental damage caused by contractors during construction activities.

Since most of the rehabilitation work will be done in properties and facilities owned by water companies or are located in rights-of-way assigned to municipal infrastructure, the project will not entail any resettlements and will cause no impacts to structures of cultural importance.

During project implementation, procedures will be introduced to ensure that potential negative impacts as a result of the project are mitigated. For example, the bidding and contract documents for construction will describe that the rehabilitation and construction of the structure or other related activities will be minimized though good construction practices to prevent, minimize or mitigate environmental damage. These requirements will be enforced by the supervisors during construction. Also, to avoid extraction of sand or gravel from river beds, contract documents will require prior approval of the Engineer for the extraction of sand and gravel for use in construction. Contractors' requests for approval will identify the location of authorized sand and gravel quarries or borrow areas, and the quantities of materials to be extracted.

Groundwater extraction will also be monitored during project implementation. Water resources control, under legislation dated 1996, is the responsibility of the National Water Council, Technical Secretariat of the Ministry of Public Works. The Technical Secretariat operates in conjunction with the National Hydrogeological Service. The construction of new wells for Durres would require the permission of the National Water Council. Preliminary discussions with these Authorities have taken place and it appears that permission to develop the proposed wells would not present a difficulty, because the existing wells will be closed and the amount of water extracted will be unchanged. In conjunction with the well development, test wells would first be constructed and would be test pumped for an extended period. During this period, chemical and bacteriological analyses of water samples from the wells would be evaluated to ensure that water quality standards are met. Supervision of this task would be the responsibility of the PIU which would forward results to the World Bank.
## Summary of Environmental Impacts and Proposed Mitigation Measures

<table>
<thead>
<tr>
<th>Item</th>
<th>Potential Negative Impact</th>
<th>Mitigation Measures</th>
<th>Implementation Responsibility</th>
<th>Monitoring Responsibility</th>
<th>Timing of Mitigating Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Excavated material and Construction debris.</strong></td>
<td>Disposal of surplus material</td>
<td>Material to be disposed of in accordance with an approved disposal plan. Suitable material may be used for construction fill where needed, such as road construction or site fill.</td>
<td>Contractor</td>
<td>PIU</td>
<td>Provision in the contract &amp; during construction</td>
</tr>
<tr>
<td><strong>Hazardous wastes</strong></td>
<td>It is unlikely that such wastes would be encountered</td>
<td>Any such wastes would be disposed of in accordance with an approved disposal plan to be formatted when the type and quantity of waste is known.</td>
<td>Contractor</td>
<td>PIU</td>
<td>Provision in the contract &amp; during construction</td>
</tr>
<tr>
<td><strong>Environmental Damage</strong></td>
<td>Damage caused by rehabilitation or construction</td>
<td>Contract documents would provide for the use of acceptable engineering practice that prevent or minimize potential damage.</td>
<td>Contractor</td>
<td>PIU</td>
<td>During construction</td>
</tr>
<tr>
<td><strong>Sources of rock, gravel and sand.</strong></td>
<td>Damage to river courses, public land and beaches</td>
<td>Sources of rock, gravel and sand would require contractors to obtain written authorization by the Engineer to the use of identified sources of these materials.</td>
<td>Contractor</td>
<td>PIU</td>
<td>Provision in the contract &amp; during construction</td>
</tr>
<tr>
<td><strong>Water courses</strong></td>
<td>Sedimentation during construction</td>
<td>Contractors would be required to provide sediment barriers where needed to prevent transport sediment to adjacent properties and water courses.</td>
<td>Contractor</td>
<td>PIU</td>
<td>Provision in the contract &amp; during construction</td>
</tr>
<tr>
<td><strong>Water Resources Allocation</strong></td>
<td>Deprivation of a water resource to other users or potential users</td>
<td>Prior to use of a specific water source, written permission by the National Water Council, of the Ministry of Public Works to be obtained.</td>
<td>Task manager</td>
<td>PIU</td>
<td>Provision in the contract &amp; during construction</td>
</tr>
<tr>
<td><strong>Health Aspects of New Sources of Water</strong></td>
<td>Development of a source of water with unacceptable water quality.</td>
<td>Complete extensive water sampling and analyses to examine chemical and bacteriological quality of the water prior to construction of facilities.</td>
<td>Contractor</td>
<td>PIU</td>
<td>Prior to construction of facility</td>
</tr>
<tr>
<td><strong>Archeology</strong></td>
<td>Disturbance of undiscovered sites</td>
<td>Construction work to be halted if a discovery is made. Appropriate authorities to be consulted.</td>
<td>Contractor</td>
<td>PIU</td>
<td>Provision in the contract &amp; during construction</td>
</tr>
<tr>
<td>Item</td>
<td>Potential Negative Impact</td>
<td>Mitigation Measures</td>
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<tr>
<td>Underground Utilities</td>
<td>Damage resulting in interruption of service</td>
<td>Contractor required to contact local utilities prior to excavations.</td>
<td>Contractor</td>
<td>PIU</td>
<td>Prior to excavation</td>
</tr>
<tr>
<td>Socio-economics</td>
<td>Influx of construction work force to area</td>
<td>Employ local population to the extent possible.</td>
<td>Contractor</td>
<td>PIU</td>
<td>Provision in the contract &amp; during construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contractor to provide on-site accommodation if practicable</td>
<td>Contractor</td>
<td>PIU</td>
<td>Provision in the contract &amp; during construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Municipality and utility authorities to ensure availability of necessary services</td>
<td>Municipality and utility authorities</td>
<td>PIU</td>
<td>Provision in the contract &amp; during construction</td>
</tr>
<tr>
<td>Noise</td>
<td>Disturbance during construction</td>
<td>Construction limited to normal day time working hours (0700 to 1800) if within 100 meters of residences</td>
<td>Contractor</td>
<td>PIU</td>
<td>Provision in the contract &amp; during construction</td>
</tr>
<tr>
<td></td>
<td>Disturbance during facility operation</td>
<td>Noise control devices to be installed in buildings if needed</td>
<td>Contractor</td>
<td>PIU</td>
<td>Provision in the contract &amp; during construction</td>
</tr>
<tr>
<td>Air pollution</td>
<td>Odors from plant operation.</td>
<td>Plant to operate efficiently to minimize exhaust emissions.</td>
<td>Contractor</td>
<td>PIU</td>
<td>Provision in the contract &amp; during construction</td>
</tr>
<tr>
<td></td>
<td>Dust caused by construction</td>
<td>Water spray down to minimize airborne dust where necessary</td>
<td>Contractor</td>
<td>PIU</td>
<td>Provision in the contract &amp; during construction</td>
</tr>
</tbody>
</table>