AZERBAIJAN REPUBLIC
Azersu Joint Stock Company

National Water Supply and Sanitation Project

ENVIRONMENTAL IMPACT ASSESSMENT

FINAL REPORT

March 22, 2007

ACRONYMS

Azersu JSC	Azersu Joint Stock Company
BOD	Biological Oxygen Demand (liquid effluent)
COD	Chemical Oxygen Demand (liquid effluent)
DoSEE	Department of State Ecological Expertise
EA	Environmental Assessment
EAL	Estimated allowable level
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EGR	Economic-Geographical Regions
ELV	Emission limiting value
EMP	Environmental Management Plan
FAO	Food and Agriculture Organization
GOA	Government of Azerbaijan
IBRD	International Bank for Reconstruction and Development
IEC	Important Environmental Components
MENR	Ministry of Ecology and Natural Resources
MA	Ministry of Agriculture
MAC	maximal allowable concentration
MH	Ministry of Health
NGO	Non-Governmental Organization
OP	Operational Policy
pH	Acidy/Alkalinity : pH 7.0 is neutral
PMU	Project Management Unit.
RWSSS	Regional Water Supply and Sanitation Services
NWSSP	National Water Supply and Sanitation Project
SEE	State Ecological Expertise
WB	World Bank
WHO	World Health Organization
WSS	Water Supply and Sanitation
WSS C	Water Supply and Sanitation Company (Operator)
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

TABLE OF CONTENTS

1. EXECUTİVE SUMMARY

1. INTRODUCTION.

Azerbaijan has 3 big cities, 23 towns with population of 20 000-100 000 persons and 25 rayons with population of 5 000 -20 000 persons. This project refers to water supply and sanitation sector of towns. Water supply and sanitation sector in Azerbaijan is characterized by institutional weakness, unsatisfactory work, obsolete and half destroyed physical infrastructure and big financial constraints. As a result, water treatment plants do not operate normally in majority of regions, due to physically obsolete condition of water supply networks, water losses reach 25-50%, not all subscribers are provided with network, and those subscribers, who are provided, are supplied by water during 5-12 hours per day. Sanitation system is not available in majority of regions, waste water is discharged without treatment to environment-water sources, relief, topsoils (from sewers –to sanitation wells)

The National Water Supply and Sanitation Project (RWSSS Project) in the Azerbaijan Republic, financed by the World Bank and planned for 2007, is in its preparation stage.

The objective of the Environmental Impact Assessment (EIA) for the RWSSS Project is to assist to ensure the project proposed for World Bank financing to be environmentally sound and sustainable and to make the project interventions respond to requirements of the legislation of the Republic of Azerbaijan and the World Bank Safeguard Policy.

Being a part of the project development, conceptual assessment of influence on environment was conducted, preliminary activities and mitigation methods directed for preventing, removing and minimizing of possible negative impact on the project (including corresponding monitoring), were determined.

Public discussions (initial and final consultations) on main points of the project and proposed EIA were conducted, outcomes of discussions were taken into consideration in final statement.

Introduced EIA report is of framework character. Detailed environmental assessment will be conducted in future at each Rayon within RWSSS Project for the works to be done in that Rayon.. In the same way, the Environmental Management Plan (EMP) in this report provides the framework (mitigation of impacts, monitoring plan, management) to be followed in EMPs to be prepared for each Rayon in the future.

2.PROJECT.

The National Water Supply and Sanitation Project (RWSSS Project), to be financed by the World Bank, envisages possibility of provision of safe, reliable and sustainable water supply and improvement of sanitation systems (WSS) in 20 Rayon centers of Azerbaijan, including - 10 Rayons (1st phase) up to 2008, and 10 Rayons (2nd phase) up to 2009.

Objectives of the project:

- To improve water supply by rehabilitation and improvement of existing networks, to treat water supplied to network according to existing standards, to provide subscribers with water meters for regulation of water use;
- To protect urban areas covered by the project from potential negative impact on surface and underground water sources, to install and rehabilitate selected sewage systems required for health and environmental needs;

- institutional strengthening for efficient management of potable water provision and waste water.

Realization of the project will positively effect on environmental safety, economic, social development and health of population; will put the basis for correspondence to legislative requirements in the area of environmental safety and to state standards in the area of water usage.

Main project activities will include: (i) rehabilitation and extension of water supply and sewerage systems in twenty rayons; (ii) construction of wastewater and septic sludge treatment facilities; (iii) preparation of an urban Master Plan for the Baku area and updating the Water Supply and Wastewater Master Plan; and (iv) development and implementation of an Institutional Development Plan (IDP) for Azersu and its subsidiary companies, to improve the efficiency and sustainability of WSS services (including implementing a meter-reading/billing/collection system and a financial restructuring and recovery plan; implementing a demand-management program, improved technical and financial monitoring performance, etc.

3. EIA REQUIREMENTS

Introduced EIA was composed according to Laws of Azerbaijan Republic "About protection of environment (1999), "About ecological safety" (1999), Regulations on EIA process in Azerbaijan (1996), requirements of WB on Ecological Assessment (OP 4.01). Besides, during composition of EIA report, existing legislation in the area of water separation and water use, standards of AR on quality of drinkable and waste water, sludge and requirements of UST were taken into consideration.
During environment impact assessment of project at development of National Water Supply and Sanitation Project, Azerbaijan - World Bank (September, 2006} WISF-02 Study information obtained from Azersu JSC, Investment Planning and Priority Study report, was used.
Main conceptions of EIA with comunity were discussed 24 November 2006, and initial report of EIA was discussed at a public meeting 14 February 2007.

4. PROJECT REGİONS (RAYONS).

The 1st phase of the project will be realized in 10 towns, included into four economic-geographical rayons (EGR) of Azerbaijan Republic, benefitting a total population of 700 thousand persons. These rayons are located in different economic-geographical zones of Azerbaijan and one may say, reflect all characteristic features of Azerbaijan area concerning water use: thus, they include resort and tourist zones (Guba, Gabala, Oguz, Zagatala) with clean water resources, located both in mountainous and foothills areas; with water resources of low quantity and quality (channel, proceeding from Araz river), from areas with warm climate (Bilasuvar, Saatly); water supply sources with relatively temperate climate and different nature (springs, rivers, underground water) (Agstafa, Goranboy, Khanlar, Tovuz) .

5. RESULTS OF ANALYSIS OF PROJECT ALTERNATIVES

Project alternatives were studied in EIA. As a result of researches, priority was given to alternative "Rehabilitation/upgrading of selected sanitation system infrastructure and drinkable water. Institutional strengthening".

Rehabilitation of water systems, especially repair and upgrading of distribution networks will provide high water supply, will decrease water losses and will increase volume

of consumed water and period of water supply, will lead to decrease of frequent repairs of physically obsolete systems and to decrease of expenses, made for big water losses (operation of engines and equipment, additional energy expenses).

Alternative of a project limited to water supply was rejected. Collection and treatment of waste water according to standards on water supply, will have strong, positive and long period impact, as a whole, on environment and health level of population.

Discharge of non-treated (non-processed) waste water from project rayons directly to relief and/or water basins will be prevented.

Analysis of alternatives for technologies and design of water systems, sites for infrastructure, etc. will be a subject of the specific EIAs to be carried out in each Rayon.

Institutional strnegthening in WSS system will put basis for sustainable use of the system.

6. PROJECT IMPACTS

The objective of the project refers to the group of RWSSS projects of ecological character, aimed at improvement of water supply and sanitation system (institutional and infrastructure), decrease of potential impacts on environment and human health, and it is correspondingly expected that final impacts will be of positive character.

Possible environmental issues addressed include: (i) selection of sites and technologies for wastewater treatment facilities (possible impacts on local ecology and settlements); (ii) the potential for increased offtake of water from some water sources (although at the rayon level no net increase in water abstraction is expected); (iii) ecological disturbance associated with the construction phase of rehabilitation and extension of the water supply and sewer networks and wastewater treatment plants; and (iv) the potential for bacteriological contamination if water or sludge from the wastewater treatment plants are used for agricultural purposes. The framework EIA indicates how these issues should be covered in the rayon level EIAs.

Some environmental and social issues will be addressed at the design phase, through careful selection of sites for any new construction (water supply or wastewater treatment) to avoid ecologically sensitive sites and sites occupied by existing homes or social infrastructure.

Adverse impacts of the project will mainly occur at construction/installation phases (Construction Phase), majority of these impacts will be of temporary character. Application of good construction practice (described in the EMP) would mitigate most of temporary impacts up to acceptable level (7).

The Framework EIA indicates where there are ecologically sensitive sites which will need to receive special attention in the rayon-level EIAs.

6.1. Impact During Construction Phase

The key environmental risks during construction/operation period of project are, as follows:

- Dust, raised from the roads at construction sites and from material, carrying trucks
- Waste water from construction/renovation sites
- Generation, disposal and destruction of solid wastes

- Noise generated by machinery and equipment
- Use of construction materials that may damage health
- Discharge of toxic substances into atmosphere during welding, painting and other works
- Impact on earth structure and soils
- Pollution of soil layer from fule and lubricants and/and or water pollution
- Earthworks, removal of extra soils and other materials
- Destruction or displacement of flora and fauna in ecologically sensitive areas
- Hazard to health and safety to workers, conducting construction works and population

6.2. Impact during Operation Phase

Generally, during operation of WSS system final impact is expected to be positive.

However, certain impacts on environment may be expected during operation phase of WSS system too: smell (in case wastewater treatment is not carried out according to regulations); local ecological effects of offtake of water from new sources (in cases where this occurs); impact of potable water, waste (disposed) water and sludge on environment and on human health (particularly if treated water or sludge are used for agriculture), possible impacts of operational failures during accidents and extraordnary situations.

7. MITIGATION MEASURES OF IMPACTS

Mitigation measures of impacts are to be realized by construction contractors as one part of their contract responsibility (during construction) and by auxiliary enterprises (enterprises, responsible for water supply and sanitation services), (during WSS system operation).

7.1. Mitigation impacts during rehabilitation/upgrading works (Construction Phase) of WSS infrastructure:

During rehabilitation/upgrading works of WSS infrastructure the main operational rules, directed for protection of human health, environment, natural and cultural heritage, include the following:

The main operational measures, which should be taken into consideration during the construction/renovation works and handling construction and waste materials with the aim to protect human health, environment, natural and cultural heritage, include:

- The general disruption during construction will be mitigated by coordinated planning of construction activities. Other adverse impacts due to construction activities will be mitigated through the adoption of good environmental practice procedures.
- Selection of environmentally friendly construction materials and equipment for redesign and revitalisation of existing buildings and their premises
- Not to use any hazardous chemicals and their disposal to the public sanitation system or to the site land;
- excavated soil should not be disposed near streambeds or dumped into lakes. disposals in wetlands or coastal marshes are unacceptable;

- erosion effects should be avoided to the possible extent. Proper erosion control should be incorporated into construction planning.
- pipelines should not be routed along stream channels;
- conveyors should be cross-streamed in the shortest distance possible. Construction should be scheduled for during dry flows, if any;
- at those places, where conveyors are to cross-streams or rivers, the trench should be armored with appropriately sized boulders to prevent erosion. Alternatively, it may be possible to use thrust boring, heading or tunneling to cross-streams without disturbing the stream flow;
- the number of access roads to streamed and/or crossing other ecologically sensitive areas, such as wetlands should be minimized;

The construction contract document will incorporate all requirements to minimize disturbance from construction activities, which will be monitored by the Supervision Engineer and the PIU staff (Environment Specialist) to ensure compliance and implementation of the required provisions by the contractors.

7.2. Mitigation measures during operation of WSS system

- Water quality For examination of correspondence of water quality to general standards according to requirements of usage rules of potable water and for revealing of any negative tendency in change of water quality it is necessary to conduct regular monitoring.
- Water availability: Wherever new water sources are to be used, the feasibility study and EIA will ensure that the source is sufficient to supply the anticipated water demand without causing negative environmental or economic impact , and the EMP will
- *Effluent Quality*: The proposed treatment level would ensure a treated effluent of acceptable quality for discharge into water bodies (rivers, streams, etc.) and if feasible in some rayons, for use in agriculture.
- Regular monitoring is to be conducted with aim provide meeting of treated waste water with standards and norms given in EIA.
- *Sludge Quality*:. If use of sludge is considered in agriculture, then for use of sludge processed in sludge treatment plants, corresponding processing of sludge is to be done to acceptable standards, as described in the EIA.

  If use of sludge is not considered in agriculture, then according to Azerbaijan legislation, sludge will be considered according to regulation on sludge treatment equipment, afterwards it will be kept it sludge area and will be buried.

Mitigation plan is given in detail in EIA during construction/installation and operation period.

Table I shows the potential impact, risks and the proposed mitigating action.

8.MONITORING AND IMPLEMENTATION

The PMU within the Azersu JSC will be responsible for overall Project implementation.

Monitoring of all activities within the project will be the responsibility of the PMU

Compliance with the EMP guidelines will be monitored by the PMU Manager and supervised by the World Bank

PMU manager will keep working relations with official clerks of department of State ecology expertize of the Ministry of Ecology and Natural Resources and local (regional) environmental inspectors.

Construction inspection team (engineer) is to conduct daily inspection on the project progress.

During monitoring for inspertion of quality of air, noise, water, waste water, sludge, monitoring standards and norms are given on base of Azerbaijan and international standards.

Monitoring report on EMP of the project will be developed and completed according to agreed procedures after certain periods in corresponding format, and after approval with MENR and MH will be sent to the World Bank.

8.1.Monitoring during construction/installation works

Most visual monitoring works will be conducted during inspection of envisaging of EMIP requirements. In the first turn, checking of meeting of requirements issued by EMIP and construction safety standards during construction/installation period is to be provided.

Along with this some measurement works are to be executed. This means measurement of air quality and noise.

Ambient air quality measurements will be undertaken near construction sites. This will be mostly near locations where sewer network is being laid and treatment plant sites. When selecting sites due consideration will be given to sensitive receptors like schools, hospitals, houses etc. Total suspended particles (TSP) will be measured regularly through site visits (once a month, sensitive receptor zone, fortnight, for 8 hours period,) over the construction period.

Noise will measured at the same locations as TSP.

8.2. Monitoring during operation of WSS system

According to own functions on potable and waste water, monitoring is to be conducted by the WSS enterprise, the Ministry of Health and the Ministry of Ecology and Natural resources. During use of treated water in agriculture at irrigation and application of sludge for soil fertility and or as fertilizer, corresponding monitoring works of lands or plants are to be conducted by the Ministry of Health and Ministry of Agriculture.

Table 1. Mitigation Actions

Potential impacts and Risks	Mitigation Actions
	a. Design Phase
Ecological and Social impact	• Site selection for any new construction to avoid impacts on endangered or threatened flora and fauna, sensitive ecological areas, human habitations or economic assets • For any new or increased water offtake from a given source, investigation to ensure water resources are sufficient to meet projected demand without negative environmental impacts
	a. Construction Phase
Air Quality	• Careful construction planning and work phasing, specifications and construction methods to reduce the length of time that the soil is exposed to the enviroment; • Dust control by water or otherwise; • Cover the material transporting trucks; • Construction activities causing dust will not be carried out on excessively windy days; • Avoidance of use or reduce to the minimum the use of open fire, specifically use of fuel, hot insulation coating (asphalt), and use the energy with low efficiency and high pollution; • Prohibit use of non-standard paints and other materials; • Cosntruction works are to be organized at such day time, when it is possible to avoid rush hour of traffic, and also reasons, causing jam and noise.
Water and Soil	• Careful and rational planning of construction and postconstruction phases of the project; • Proper erosion control should be incorporated into construction planning; • Provide temporary drainage and storage facilities for excavtion soils, for fuel and oils needed for equipment; • Strip topsoil as necessary and stored, replace/reuse post construction; • Design slopes & retaining structures to minimize risk, provide appropriate drainage and vegetation cover; • Store hazardous materials and wastes carefully, provide suitable wastewater drainage and safe waste disposal, with treatment as necessary; • Not to use any hazardous chemicals and their disposal to the public sewage system or to the site land;
Noise Noise disturbance from construction works, traffic – speed, quantity and type of traffic during and post construction	• Use appropriate construction methods & equipment; • Time work to minimize disturbance, Confining noisy work to normal working hours in the day; • Using of noisy equipment (ex. Breakers, compressors, etc.) should be minimized and better avoided during late and non-working hours; • Restricting construction traffic movements during the night time.
Fauna and Flora	• Careful siting and/or design to minimize impacts, especially for sensitive/rare species Select appropriate construction methods; • Protect sensitive areas within /or close to site; • Work seasonally, as appropriate; • Careful de-commissioning of construction areas and disposal of wastes

Potential impacts and Risks	Mitigation Actions
Human Health	• Incorporate safety and environmental requirements in contract documents. • Construction employees shall be trained in safety procedures for all relevant aspects of construction; • Use of materials should be in accordance with sanitary norms of Azerbaijan Republic and be specified in bidding documents; • fence hazardous areas; • careful disposal of wastes
Historical/Cultural Sites	• Immediately halt work in vicinity of discoveries, pending instructions from relevant authorities and agreed actions; • Take a special care for protection of existing cultural heritage of the work-in building or near it while at work site, and those of archaeological historical, ethnological, scientific, cultural and spiritual local.
	b.Operation Phase
Environmental hazards due to accidents and man-made or natural disasters.	• Carefully designed post-construction maintenance, contingency and monitonng programs; • Well designed plan for detection of accident or natural events including precautionary and remedial measures to be taken/observed; • Capacity building, training and awareness; • Ensure proper operation and maintenance of the water (wastevater) treatment plant; • Adequate plans for environmental rehabilitation, clean-up, restoration and disposition of temporary structures and facilities installed during the construction phase; • Train the concerned officials of the WSS about health and safety procedures; • Emergency procedures will be developed in the event of the release of chlorine gas.
Water quality	• In order to safeguard public health, it is imperative that *regular monitoring* of raw and treated water at the treatment plants, groundwater wells, storage reservoirs and in the distribution network be implemented to ensure that drinking water limits are not exceeded.
Treated Effluent Quality:	• As soon as the wastewater treatment plants start operating, monitoring of wastewater quality in the influent and effluent will be conducted to ensure adherence to the required standards.
Sludge quality	• corresponding processing of sludge is to be conducted; • Monitoring on sludge composition is to be made according to standards fixed by EIA;
Health and environ mental risks.	• Regular monitoring of effluent quality discharging from the WTP; • Dispose of wastewater into rivers after proper treatment; • Capacity building, training and awareness.
Odors (organic and sulfit compounds mainly from the WWTPs, trucks unloading septage).	• Careful planning and implementation of operation and maintenance; • Maintenance of greenbelt zones and vegetation; • Provision of landscaped open spaces which will improve the aesthetic of the area by planting the green strips with appropriate plant or tree species
Noise	Establishment of buffer zones and noise zones

1. INTRODUCTION

1.1. OBJECTIVE OF THE ENVIRONMENTAL ASSESSMENT

The Government of Azerbaijan has identified the improvement of water supply and sewage systems in regions of Azerbaijan, as a key national priority.

The sector of water supply and sanitation systems in Azerbaijan regions is characterized by institutional weaknesses, non-satisfactory works, obsolete and half-squandered physical infrastructure, great financial constraints. As a result, level and quality of water supply and sanitation systems to consumers is low.

The National Water Supply and Sanitation Project (RWSSS Project) in the Azerbaijan Republic, financed by the World Bank and planned for 2007, is in its preparation stage.

For development of the stable conditions on water supply and sanitation systems at the project tasks, recommendations on technical and organizational issues and on investments have been developed.

The objective of the Environmental Impact Assessment (EIA) for the Regional Water Supply and Sanitation Service Project (NWSSP) is to assist to ensure the project proposed for World Bank financing to be environmentally sound and sustainable and to make the project interventions respond to requirements of the legislation of the Republic of Azerbaijan and the World Bank Safeguard Policy.

From view point of activities impacting potentially on environment in RWSSS project realization of upgrading of infrastructure of existing water supply and sanitation system and construction of new waste water treatment plants in some rayons, and realization of institutional reforms aimed at increase of effectiveness of WSS services are considered. As the project, in essence, is of ecological character, in case of meeting with requirements at new construction/rehabilitation works, significant ecological impacts on environment is not expected. As it is supposed, main negative impacts will occur during construction of new treatment plants/construction/rehabilitation work.

As it is indicated in EIA, it is possible to manage negative impacts on environment in the process of realization of the project and operation of WSS system.

WSSSP has been assigned as the World Bank's environmental category A. In case of "A" category projects the Bank requirements and the Azerbaijan legislation require that all renovation/construction/operation related to project activities should be verified to be in compliance with the Azerbaijan environmental laws and regulations and are consistent with the World Bank policy (OP 4.01) and procedures on Environmental Impact Assessment (EIA) and public discussions on the project are to be held.

The Project has not been finalized at the stage of environmental assessment although significant changes to the concept and the current description of components are not anticipated.

Being a part of the project development, conceptual assessment of influence on environment was conducted, preliminary activities and mitigation methods directed for preventing, removing and minimizing of possible negative impact on the project (including corresponding monitoring), were determined.

Public consultations of basic provisions of the project and proposed EIA were held with participation of representatives of NGO on 24 November 2006 at Azersu JSC's office

(ANNEX 8), outcomes of consultations were reflected in draft report. Eventually, broad public discussions of EIA report will be held, claims and proposals will be considered in the final document.

Rehabilitation of WSS system execution of improvement works at initial stage in RWSSS project is expected at 10 rayons. Meantime, necessary feasibility study, engineering solutions were not developed in each project rayon. Introduced EIA is of framework character at environment assessment for works to be executed in future within RWSSS project at each project rayon.

Environmental Management Plan provided by the EIA team within the RWSSS Project (mitigation of impacts, monitoring plan, management) will provide the management structure of financed activities with data and conclusions on environmental management.

The Environmental Management Plan provides institutional responsibilities and financial mechanisms for mitigation of environmental impacts.

The EIA also includes the Monitoring Plan to provide necessary attention to environmental and social safeguard issues and observe their management progress and problems.

1.2. DESCRIPTION OF PROJECT AND ALTERNATIVES CONSIDERED

1.2.1. PROJECT

The National Water Supply and Sanitation Project (RWSSS Project), to be financed by the World Bank, envisages possibility of provision of safe, reliable and sustainable water supply and improvement of sanitation systems (WSS) in 20 Rayon centers of Azerbaijan, including -10 Rayons (1st phase) up to 2008, and 10 Rayons (2nd phase) up to 2009.

Objectives of the project:

- To improve water supply by rehabilitation and improvement of existing networks, purification of water supplied to network according to existing standards, provision of subscribers with water meters for regulation of water use. Thus, water loss will be prevented, number of water users will grow due to augmentation of number of subscribers from villages adjacent to city and city subscribers; Increase of quantity of water use, will compel establishing of new sanitation systems and/or improving of existing systems.
- Safeguard from potetntial negative impacts of areas, ground and underground water resources in cities covered by project, installation/improvement of sanitation systems for the sake of health and needs of environment
- To protect urban areas covered by the project from potential negative impact on surface and underground water sources, to install and rehabilitate selected sewage systems required for health and environmental needs.
- To develop proposals on institutional strengthening of efficient management of drinking water provision and waste water;
- Realization of the project will positively affect on environmental safety, economic, social development and health of population; will put the basis for responding to legislative requirements on environmental safety and to state standards of water usage.

Within the regional investment component, as constituent part of development, collection and analysis of initial data in 10 Rayons during 2006 has been accomplished.

Research team for each Water Industry Investment Support-02 (WIIS 02), which conducts preparation for the RWSSS project, has proposed the project with short, medium and long period actions.

- Capacity building and institutional development relating to water supply and sewage systems;
- Change of infrastructure by putting efforts primarily towards the drinking water supply with subsequent sewage system;
- change and improvement of water supply with aim to achieve 24-hour water supply in the administrative centers of 10 Rayons and surrounding villages;
- establishment/improvement of selected sewage systems for health and environmental needs by achieving of repayment of operational and technical services costs of water supply systems.

Increase of number of water users, period of supply by water, and water quantity will oblige to establish in these rayons new sanitation systems and or to improve existing systems. Failing to do so would aggravate ecological situation in these rayons.

Presently, drastic lack of water supply is perceived in some rayons too (ANNEX 6). This leads to decrease of productivity of live-stock and income of population. Prospects of development of agriculture in Azerbaijan and increase of water use aggravates situation significantly. Due to this reason, possibilities of use of treated water and sludge in some project rayons (for ex. Goranboy, Bilasuvar, Saatli, Khanlar, Agstafa, Tovuz) is to be clarified. It is necessary to consider possibilities of use in agriculture of water and sludge, which was subjected to corresponding treatment and neutralization. The issue of use of specific rayon is to be determined during the development of the project for that rayon. Taking into account specifics of negative impacts, formed in thris case, treatment plants, neutralization procedures, requirements on decrease of potential impacts and monitoring procedures are to be strictly envisaged

Realization of this project will bring to economic growth and poverty reduction in the local communities.

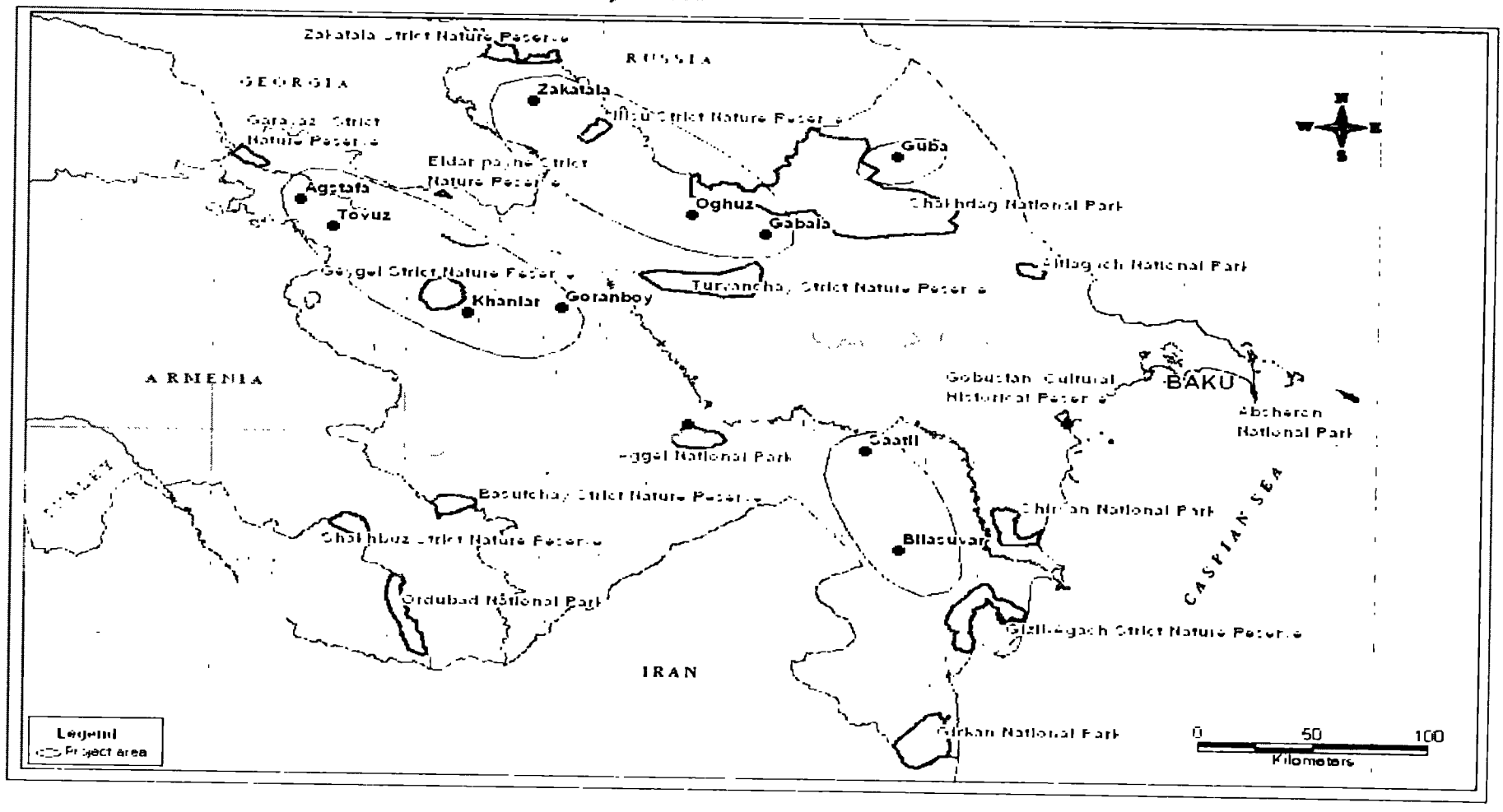
The project is to be managed by Azersu JSC. There will be a special Project Management Unit be established within the Azersu JSV to ensure good management of the project activities and to ensure that goods and services are procured according to Bank rules, contract supervision, and disbursement.

During running of environmental assessment of the project it was in its preparation stage and it is unlikely that the project components will suffer significant changes in the next stages. Change of some details of components is possible during the subsequent period.

1.2.1.THE PROJECT AREA

The 1st phase of the project will be realized in 10 cities, covering 4 Economic-Geographical Regions (EGR) of Azerbaijan Republic with population of 700,000: Guba-Khachmaz EGR (Guba), Sheki-Zagatala EGR (Gabala, Oguz, Zagatala), Ganja-Gazakh (Agstafa, Goranboy, Khanlar, Tovuz), Lowland EGR ((Bilasuvar, Saatly) (pic.1)

Picture 1. RWSSS Project Area



1.3. ANALYSIS OF PROJECT ALTERNATIVES

1.3.1.ALTERNATIVE 1. REHABILITATION/IMPROVEMENT ONLY OF INFRASTRUCTURE OF DRINKING WATER SYSTEMS

Rehabilitation of water systems, especially repair and improvement of distribution network will decrease fear from polluted drinking water and will enable supplying high quality drinking water. Repair of water supply system will result in decrease of water losses and in increase of volume of consumed water and increase volume of consumable water.

Provision of subscribers with water meters will ensure registration and regulation of water consumption, for sustainable operation of system, level of collection of finances for water will be increased,

Water saving will result in decrease of extra water use and will lead to rational use of water resources.
It will ensure decrease of regular repair of obsolete systems and reduction of expenses for considerable water losses (additional energy consumption, operation of machinery and equipment).

Currently in regional centers only 50-90% of the population are supplied with fresh water, after the implementation of the project the regional centers and surrounding villages on the whole will be supplied with water during 24 hours a day. High quality of the supplied water will positively influence the population's health and considerably reduce expenses for treatment.

Increase of number of water users, period of supply with water, quantity of water use, will cause increase of waste water in these rayons. Presently, in majority of project rayons neither treatment plants, nor sanitation is available (ANNEX 2) and existing ones are not in working condition and do not meet with acting requirements. As it is indicated in Alternative 1, if only rehabiltation/improvement of infrastructure of drinking water supply is conducted within frame of projects, this contradicts to Azerbaijan legislation, will cause discharge of waste water to water basin and/or to areas and aggravation of ecological.
During improvement of water supply of projected rayons, if increase of water use in these rayons is taken into account in future, increased taking of water quantity from existing water sources and new water sources in some places is expected. In such case certain impacts on environment is expected. (5.1)

1.3.2.ALTERNATIVE 2. REHABILITATION/IMPROVEMENT OF INFRASTRUCTURE OF DRINKING WATER AND SELECTED SANITATION SYSTEMS. INSTITUTIONAL STRENGTHENING

This project alternative has more advantages in comparison with the 1st project alternative. This alternative, along with proposed rehabilitation/improvement of infrastructure of drinking water supply and selected sanitation systems in the 1st alternative, will also influence positively both on collection and cleaning of waste water, as a whole will reflect on health conditions of population strongly and in long-term.

The project will prevent discharge of not cleaned waste (not processed) water from Rayons directly to relief and or water basins will be prevented. As a result, it will prevent pollution of soil, surface and underground water, discharge of not cleaned waste water to Kura and Araz rivers and the Caspian sea. This will lead to decrease of existing negative

influence on quality of water, used by consumers from these rivers, will reduce creation/spreading of salinity and erosion of soil, which are the main environmental problems of these Rayons.

Use of treated water and processed sludge in agriculture in areas with water deficit would result in economic use of limited water reserves and to economic benefit. However, this practice carries environmental and health risks which need to be addressed.

(While developing of specific projects for Rayons, possibilities of use of treated waste water and sludge at agriculture in some Rayons will be studied.)

These factors will attract tourists to well-known resort areas such as Guba, Gabala, Oguz, Zagatala possessing rich nature and will influence positively on incomes of population.

1.3.3.ALTERNATIVE 3. NONE PROJECT WILL BE REALIZED, EXISTING STATE WILL BE PRESERVED.

These alternatives will cause further aggravation of existing systems, lead to additional expenses on repair and maintenance works. These, as it is shown in chapter 3 will lead to worsening of water supply in those rayons, and, as a result of environmental impact, will adversely influence on natural resources (soil, water, flora, fauna) and people's health. And this in turn will lead to additional economic losses; high service expenses for additional water supply, losses in a result of degradation of land surface and water environment, increase of expenses be spent on human health, etc. Currently, it is practically impossible to meet environmental standards.

Consequently, environmental, economic and social benefit of the proposed project is comparatively higher than keeping status-quo and non-realizing of the project.

2. POLICY CONTEXT

2.1. THE WORLD BANK SAFEGUARDS POLICY

The World Bank requires an environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus improve decision making (OP 4.01, January 1999).

EA is the process, the volume, depth and type of which depends on potential ecological impact, features and volume of a proposed project.

EA evaluates the potential ecological risks of a project and its impact to the territories covered by the project; analyses alternatives of the project; determines ways for development of choice, location, planning, design and execution of the project, by taking measures on mitigation, compensation and bringing to minimum of harmful ecological impacts and strengthening its positive impacts to the environment. The Banks prefer preventive measures, if any, to mitigation or compensation ones.

The EA takes into account the environment (air, water and land); humans health and safety; social aspects (obligatory resettlement, residents and cultural heritage property); and trans – boundary and global environmental aspects. At the same time it takes into account all changes taken place in the project and country; results of ecological studies held over the country, plans of local ecological measures; common political framework of the country, local legislation and institutional possibilities on ecological and social aspects; obligations of the country on international Agreements and Treaties concerning the projects activities.

The Bank doesn't fund the project activities which are contrary to such country's obligations as it would be determined during the EA.

- Key considerations to be taken into account during the EA process include:
- Generic initial screening to determine appropriate environmental assessment;
- Compliance with existing environmental regulations in Azerbaijan;
- Linkages with social assessment;
- Analysis of alternatives;
- Public participation and consultation with affected people and organizations; and
- Disclosure of information.

2.2. ENVIRONMENTAL CATEGORIES

The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EIA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity and scale of the project and the nature and magnitude of its potential environmental impacts. The four Categories are A, B, C, and FI, and these categories are detailed in ANNEX 1.

Under Azerbaijan Law an EA is grouped in four environmental categories (1,2,3, or 4) the first three of which are approximately equivalent to Bank environmental categories A, B and C. Azerbaijan Category 4 relates to project activities that have no environmental impact but may need some form of permit.

The World Bank's Integrated Safeguard Data Sheet for the RWSSS Project classified it as a Category "A" project, triggering the Bank's safeguard policies for environmental assessment.

2.2.1. THE WORLD BANK SAFEGUARDS POLICY AND ITS APPLICATION BY PRESENT EIA

The possibilities of application of the World Bank safeguard policy during EA were studied. The outcomes of application of these policies about EA in EIA are, as follows:

- **Environmental Assessment (OP[1] 4.01, BP[2] 4.01, GP[3] 4.01)**

  The anticipated environmental and social impacts of the infrastructure improvements in the proposed project trigger this safeguard policy (OP 4.01, BP 4.01). Because the anticipated adverse impacts will not be significant or irreversible, however, and because they can be prevented or reduced through appropriate preventive actions or mitigation measures, the project is classified a Category "A" project, which requires only partial environmental assessment under this policy. This EA, with its EMMP ensuring that recommended preventive actions and mitigation measures will be taken, satisfies this Bank safeguard policy.

- **Projects on International Waterways (OP 7.50, BP 7.50, GP 7.50)**

  In connection with realization of the project Kura and Araz rivers, passing through the territories of several states and flowing into Caspian Sea, may be subjected to potential impacts. During ecological assessment of the project this factor was taken into consideration and possible impacts of the project on these waterways were studied.

  Capital works, connected with consumption of significant amount of water from international waterways, will be not be conducted and construction of new channel is not accomplished. However, some existing water offtake infrastructure will be rehabilitated and some new ones may be constructed at new water sources. It is expected that any increase in overall water consumption that may result from the increase in the number of water users and improved reliability of service will be offset by the reduction in water losses from leakages and by improved efficiency of water use because of metering. However, the amount of water taken out of some particular sources may increase, and this will

[1] Operational Policies (OPs) are short, focused statements that follow from the World Bank's Articles of Agreement, the general conditions, and policies approved by the Board. OPs establish the parameters for the conduct of operations; they also describe the circumstances under which exceptions to policy are admissible and spell out who authorizes exceptions.

[2] Bank Procedures (BPs) explain how Bank staff carries out the policies set out in the OPs. They spell out the procedures and documentation required to ensure Bank-wide consistency and quality.

[3] Good Practices (GPs) contain advice and guidance on policy implementation, for example, the history of the issue, the sectoral context, analytical framework, best practice examples.

need to be considered particularly in rayons with overall water shortage or in ecologically sensitive areas.

Upgrading of sanitation system in comparison with present situation will cause higher quality water will flow into water sources. Additionally, Kura and Araz, which are considered as international water ways, after passing through territory of other states/borders, will enter into Azerbaijan territory.
Therefore, given the expected negligible impacts of the project on international waterways, the EA recommends that the Bank seek a waiver pursuant to paragraph 7(a) of OP 7.50 for this safeguard policy
Mitigation and or removal of possible impacts will be taken into consideration in composed in EMP acccording to ecological category of the project.

- **Involuntary Resettlement (OP 4.12, BP 4.12).**
  The EA also determined that the project, as currently designed, does not trigger the involuntary resettlement policy.
  The project will not involve any physical relocation of local populations, nor will it result in any loss of assets or access to assets, or loss of income sources or means of livelihood. On the contrary, the project is specifically designed to improve the value of farm assets and thus increase farm incomes. Any interference will be temporary, short-term and insignificant in nature.
  Along with this, in case of laying of some new systems within project frame in certain Rayon, physical resettlement of local population during construction of new treatment equipment and losses of land and or residential sources, then this point will be taken into consideration in EIA document, specifically developed for those Rayons and project OP 4.12, BP 4.12 requirements will be taken into consideration.

- **Cultural Property (OPN 11.03).**
  The project will be aimed at reconstruction of already existing system which operates for long period. According to conclusions of executors of the project, which conducted assessment of the project area, there are no cultural heritage specimens, archeological monuments in areas, directly envisaged for conducting of rehabilitation works. Due to this reason during EA, principles of policy on protection of cultural heritage (OPN 11.03) will not be considered. If according to principles of Ecological Assessment (OP 4.01), cases, related to cultural-historical specimen, are revealed within project area and or cases of possibility of its revealing, are detected, then corresponding measures will be undertaken according to EMP (Chapter 4, ANNEX 3).

- **Remaining Safeguard Policies.**
  At the same time EA revealed, that due to following reasons, it will not be needed to implement other safeguard policies of the WB in the project. Mitigation and or removal of impacts, expected in those safegurds policies will be taken into consideration in composed EMP, according to ecological category of the project.

  - **Safety of Dams (OP 4.37, BP 4.37).** Due to non consideration of construction dams in this project, therefore application in EIA of this safeguards policy, covering improvement of safegurd and regulation measures of dams is not required.
  - **Pest Management (OP 4.09).** The EA determined that the project does not

trigger the pest management safeguard policy. The project will not procure any pesticides nor will the project alone induce an increase in the use of pesticides.

- **Forests (OP 4.36, BP 4.36)** /The project will involve no forested or woodland areas, which would trigger this policy
- **Natural Habitats (OP 4.04, BP 4.04** The project will involve no conversion of natural areas or critical natural habitats, which would trigger this policy.
- **Indigenous Peoples (OD 4.2).** The project will involve no indigenous peoples, ethnic minorities or tribal groups, which would trigger this policy.
- **Projects in Disputed Areas (OP 7.60, BP 7.60).** The project will not be implemented in a disputed area, which would trigger this policy.

2.3. AZERBAIJAN ENVIRONMENTAL LEGISLATION AND PROCEDURES

Environmental protection in Azerbaijan is governed by the Law on Environment Protection (1999). The Law establishes the main environmental protection principles, and the rights and obligations of the State, public associations and citizens regarding environmental protection. It establishes the requirements for the preparation of environmental impact assessments, environmental quality standards, and requirements for permitting the activities that affect the environment, prevention and reduction of environmental pollution, environmental monitoring and control, the role of the public and sanctions imposed on law violators.
Other laws governing specific issues such as sanitary-epidemiological welfare, land reform, energy, health, water, forests, cadastre and land use, industrial and domestic wastes, ecological safety, water supply and wastewater, atmospheric protection and specially protected areas have been adopted since 1992.

The questions related with protection of environment and regulation of use of nature is regulated with following Laws of relevant legislation of Azerbaijan Republic: *Water Code (1997), Land Code (1999), Forest Code (1997), On Entrails (1998), On Protection of Flora (1996), On Fauna (1999), On Obligatory Insurance (2002), On radioactive Wastes (1994), On Industrial and Household wastes (1998), On Radioactive safety of population (1997), On Sanitary – Epidemiological Safety (1992), On Melioration and Irrigation (1996), On Water Supply and Waste Water(1999), On Safety of Hydrotechnical Plants (2002), On State land cadastre, monitoring of lands and structure of earth (1998), On Pesticides and agrochemical substances (1997), On protection of the Soil fertility (1999), On specially protected nature areas and objects (2000).*

In addition, a large number (some 75+) of Decisions of the Cabinet of Ministers have been issued to help interpret the body of environmental legislation and related Presidential Degrees and Orders.

Republican criminal legislation and legislation on administrative faults includes some measures directed to protection of environment and efficient use of nature.
The relevant legislation in force includes some laws regulating activity of natural persons and legal entities in the various spheres of use of natural resources (underground resources, water and land resources, forests, fishes, etc.)

The International Agreements and Conventions signed by Azerbaijan are inseparable part of legislation system of the country.

Republic of Azerbaijan pursuing the policy of integration to the World Community during last years signed and ratified scores of International and bilateral conventions, treaties and agreements, including 15 Conventions related with environment.
Each law of Republic of Azerbaijan includes a special chapter or article stating that if International Agreements provide rules which differ from existing relevant rules of Azerbaijan Legislation, the rules of international documents should prevail.

2.3.1.WATER SUPPLY AND WATER USE

These papers determine principles of rational water use, its state registration, settlement of water disputes and responsibility for violation of water legislation:Water Code of Azerbaijan Republic (1997)

1. -The Law of Azerbaijan Republic on Environmental Protection (1999).
2. Law of Azerbaijan Republic "On Melioration and Irrigation" (1996);
3. Law of Azerbaijan Republic on Water supply and waste water (1999).
4. Law of Azerbaijan Republic About Municipality Water Facilities (2001) .
5. Law of Azerbaijan Republic on Safety of Hydro-engineering Installations (2002).
6. Decree of the President of Azerbaijan Republic (2003) on additional measures in link with Application of Law of Azerbaijan Republic on Water Supply and Sanitation System
7. Law on Sanitary Epidemiological Services, 10 November 1992, No: 2238.
8. "Rules for surface water protection from pollution with wastewaters", State Committee for Ecology and Control over Use of Nature, Baku, 1994.
9. "Sanitary rules and regulations for protection of coastal sea waters from pollution in the areas of municipal water use" (USSR Ministry of Health, 1988).
10. Rules for use of water objects for cultural and community purposes, recreation, and sport purposes. Resolution of Cabinet of Ministers of Azerbaijan Republic No: 216 (1998).
11. Permitted limits for detrimental effects to fishery water objects. Resolution of Cabinet of Ministers of Azerbaijan Republic (1999).
12. Instruction on regulation of discharge of polluting substances into atmosphere and water enterprises of Goskompriroda USSR, 11.09.1989 No.09-2-8/1573
13. Rules for State Control in the sphere of protection and use water objects. Resolution of Cabinet of Ministers of Azerbaijan Republic No: 198 (1998).
14. Resolution of Cabinet of Ministers of Azerbaijan Republic on Application of Rules for paid use of water in Azerbaijan Republic No: 150 (1996).
15. Regulations on Standardization in the area of Utilization and Protection of Water Objects – Article 4, Resolution of Cabinet of Ministers No. 206 (1998).
16. Regulations on Preparation and Application of Limit Values of Water Utilization – Article 8 (15.10.1998. Council of Ministries' Decision No: 206).
17. Resolution of Cabinet of Ministers of Azerbaijan Republic on Application of fees for Natural Resources, for discharge of polluting substances to environment and on use of finances formed from these fees (No: 122, dated with 03.03. 1992).
18. Regulations on Processing, Preparation, Submission, State Expertise, Approval and Application of Systems of Complex Utilization and Protection of Water Reserves – Article 8 (15.10.1998, Council of Ministries' Decision No: 206).
19. Radiation Safety Norms QN 2.6.1.054-90 (NRB-90)";
20. GOST 2874-82 . Drinking Water. Hygienic Requirements and Water Quality Control;

21. SNIP (Construction Norms and Regulations):

- For water treatment plants: SNIP 2.04.02-84; state construction committee in 1985
- For wastewater treatment plants: SNIP 2.04.03-85; state construction committee in 1985

2.3.2. INSTITUTIONAL ASPECTS OF MANAGEMENT AND PROTECTION OF WATER RESOURCES IN AZERBAIJAN

In Azerbaijan the following organizations are engaged in questions of water resources management:

- **The Ministry of Ecology and Natural Resources;**
- **The State Agency on Melioration and Water Use of the Ministry of Agriculture.**

➢ **The Ministry of Ecology and Natural Resources** is responsible for safety and protection from pollution of water resources. Carries out the state account of water resources and supervises their quality by carrying out of stationary hydrometric, hydro-geological and hydro-chemical supervision, make water balances and forecasts of elements of a water regime, estimates reserves of ground waters, prosecutes with the questions of rational use and reproduction of water resources. Establishes and approves norms of maximum permissible limits of run-off waters and carry out their control by means of regional offices.

Expertise Department of the Ministry conducts State ecological examination of new projects on water distribution, water use, new structures, other works executed in this area and gives its opinion on realization or non realization of projects and works.(see 2.3)

Department of Environmental Policy and Environmental Protection defines the basic directions of a policy on maintenance of safety and protection of water resources from pollution.

Department of Environmental Protection coordinates activity on monitoring and implementing of nature protection statutory acts, on conditions of water resources checks a level of conformity of influence of planned activity to working statutory acts and applies sanctions.

National departments of the Ministry of Ecology and Natural Resources on Hydrometeorology and Monitoring of the Environment are engaged in monitoring of quality and quantity of a surface discharge of the rivers. And monitoring of ground waters is carried out by National Prospecting Service. The information on characteristics of water resources and scientific - methodical materials is kept in Informational and archival fund on preservation of the environment and use of natural resources. The center of environmental contamination of National Department, on monitoring of environment carries out analysis of water quality.

➢ **The State Agency on Melioration and Water Use of the Ministry of Agriculture** Agency is responsible for complex use of water resources, studies requirements for water resources, develops plans and norms of water use, maintains irrigating systems, together

with associations of water-users coordinates water use and plans of distribution of water between various branches of economy, establishes a payment for water use and together with other departments and the organizations are busy with the questions on management of water resources of trans-boundary rivers.

Besides the Ministry of Ecology and Natural Resources and Agency on Melioration and Water Use which are carrying out managements and protection of water resources in Azerbaijan, at their coordination below listed other organizations are also accept participations in realization of a water policy of the country.

- **Ministry of Health with the Center on Epidemiology and Hygiene** is responsible for drawing up of standards and realization of monitoring of drinking water quality. In the areas there are corresponding divisions of the ministry for realization of monitoring, quality assurance of waters, etc.

- **Azersu Joint Stock Company**
  Till July 11, 2004 with questions of water supply of the cities Baku and Sumgait was engaged Absheron Joint-stock Water Society. In July, 2004 service on water supply and run-off waters of other regions of the country was also transferred to it (earlier the State Committee on Architecture and Construction was engaged in it) and Joint-stock company Azersu was established. Basic function of Azersu is operation and rehabilitation of systems of water supply and sanitation.
  Joint-stock company Azersu has established different tariffs for use of water by populationss, by budgetary organizations and in the industry. In connection with economic problems, for the population lower tariffs are established. The collecting of means makes 80 %. Water-measuring devices are few. The collected means do not pay expenses.

- **The Ministry of Fuel and Industry**
  In the questions of water use for the power purposes, the Ministry of Fuel and Industry is engaged. At exploitation of large water basins it is necessary the coordinated actions with the State Agency on Melioration and Water Use which is interested in a water-intake by Yukhari-Karabakh and Yukhari Shirvan channels with a view of irrigation.

- **The Ministry of Justice** participates in acceptance and realization of the statutory acts, being legal base in the sphere of water resources.

- **Local enforcement authorities** carry out a policy on a water-intake and water supply, responsible for supply of the population by qualitative drinking water, for their clearing, coordinate development of norms of water use.

  At the organization of works on water supply and sanitation all above-said problems are also for institutional structures of local bodies of power.

- **The scientific-research organizations and higher educational institutions**
  The scientific-research organizations and corresponding higher educational institutions Baku State University, Azerbaijan Architecture building University and Azerbaijan Oil Academy are let out experts in the sphere of water resources, prepare masters and post-graduate students. It is carried out scientific researches.

The Non Governmental organizations (**NGOs**) in Azerbaijan carry out projects on informing the public on existing problems in water sector, explain legislatively - legal aspects of questions on protection of water resources by edition of bulletins, booklets, speak at press and carrying out of training. From the lack of own means for realization of works in water sector of NGO, it is carry out activity within the framework of projects on grants. Frequently these projects are directed on increasing of knowledge of the population

2.3.4. CONSTRUCTION STANDARDS AND REGULATIONS

In Azerbaijan, engineering survey, design and construction standards and regulations are governed by the State Construction Committee. Rules of conducting supervision and control procedures by the State Construction Committee (in several areas regarding to safety of construction by the recently established Ministry of Emergencies) had been approved by the Cabinet of Ministers in 2003. Subject to the State Construction Committee regulations all construction operations are to be carried out with due regard to the environmental requirements. Following the existing construction rules, construction or renovation works are to be carried out on the basis of the approved project (design) documents only. The State Construction Committee issues special licenses to conduct engineering survey and design operations (no license is required for construction operations).

The project design documents include descriptions of proposed construction and related activities together with applications for permits from relevant authorities for geological studies of soil characteristics, fire safety, public health, utilities (gas, water, electricity, telecommunication) and environmental assessment. The relevant authorities conduct inspections during construction to monitor compliance with the permits, and may issue significant fines if violations are found.

2.4. EIA PROCEDURES

In 1996 Government of Azerbaijan adopted the procedure of EIA process which comply with systems used in most countries. The new rules are described in Regulations on carrying of Environment Impact Assessment in Azerbaijan Republic (UNDP / State Ecology Committee, 1996). This Regulations states, that "Activities on assessment of impacts of wastes to environment should begin in the stage of planning of the project".

The process of Environmental Impacts Assessment is one of means regulating protection of environment, efficient use if nature and effectiveness of economic development.

This existing normative, legal basis of the Azerbaijan Republic broadly uses the notion of EIA. The need for EIA activities is described in following documents:

- Law on protection of environment (1999);
- Law on ecological safety (1999);
- Regulations of EIA process in Azerbaijan Republic (UNDP / State Ecology Committee, 1996);
- *(Draft Laws "EIA Process" and "Ecological Expertise" are in the preparation stage).*

In the EIA process the main objects are projects of state importance which cover the various spheres of industry and agriculture.

The main aim of the EIA process is: Recovery of natural systems violated due to previous economic activity; prevention of degradation of environment; ecological – economical balancing of future economic development; creation of favorable living conditions for peoples; decrease of level of ecological hazard of envisaged activity.

This document was made up before decisions on fulfillment of any of projects. EIA is a document which determines character of all potential forms and level of danger of impacts to environment caused by economic activity to be carried out. This document evaluates results of fulfillment of the project from ecological, social and economical view of point.

State Expertise Board of Ministry of Ecology and Natural Resources is authorized state organ for EIA process.

For concrete project the EIA process begins from planning and feasibility study and its realization. The Applicant (the project proponent, nature user) is responsible for content and final version of EIA document submitted to Ministry of Ecology. The Applicant bear the responsibility for fulfillment of conditions shown in the given permission and also for carrying out of monitoring of the project.

During the EIA the Ministry of Ecology stating its position on this process should pay special attention to following:

- Use of new technologies;
- Volume and complexity of proposed processes and technologies;
- Anticipated results for environment;
- Impact to social – economic sphere of the district hosting the planned work;
- Public opinion about the project, etc.

In the Ist stage: The originator (applicant) of the activity submits application to Ministry of Ecology and informs about major project decisions and possible results of negative Impacts to Environment.

Ministry of Ecology after consideration of the Application informs the Applicant about necessity of carrying out of EIA and scale of this activity. In rare cases, after consideration of application, the permission for carrying out of work may be given immediately (Article 2.5).

In the IInd stage: The documents (on EIA) prepared by the Applicant are considered by the Group of Experts and Summary is made. The summary also includes proposals and critics of community.

On the basis of the summary, the Ministry of Ecology may give permission for work or refuse to permit to activity, explaining reasons for rejection. The Ministry of Ecology determines 3 months maximal period for consideration of EIA documents.

The Regulations includes requirements for components – content of the Summary. Together with the permit given to Applicant, the obligatory conditions are also put forward. The main purpose of these conditions is concretization of impacts to environment and strengthening of the control (i.e. carrying out of monitoring over management is considered as necessary). These conditions also explain parameters of environment which should be monitored.

The Ministry of Ecology possesses the right to control correctness and authenticity of results of monitoring.

Main purposes and duties of State Ecology Expertise and Public Ecology Expertise are determined in the Law on Protection of Environment (Article 42) (Draft of the new Law on State Ecology Expertise is in the stage of preparation). Observation of opinion of the State

Ecology Expertise (SEE) is obligatory. The public opinion is necessary for adoption of optimal or alternative decisions. But Public Ecology Expertise differ from the SEE and featured by informative and recommendation character.

2.5. CRITERIA FOR IMPACT ASSESSMENT

Criteria used for determining the significance of an impact includes severity, extent, duration, frequency, possibility of occurrence, and possibility of reversibility of the impact. The extent of each of the criteria was based on judgement and no numerical ranking or consideration was given. (Table 2.1.)

The remaining inputs will have varying levels of potential impact and for each of these a matrix has been established that describes the potential direct and indirect impacts that can be expected, and the consequences of these impacts. The mitigation solutions to these impacts are also provided. Each input is given a level of impact significance prior to mitigation and a level of significance (for the residual impact) assuming that mitigation is carried out.

Table 2.1: Level of Significance of Potential Impact

Level of Significance	Description
Very High Significance	Potential impact of the Project could cause damage to an IEC* over a large area affected (e.g. loss of important habitat, loss of biodiversity, loss of large areas of productive land). Mitigation is not possible and the impact is irreversible.
High Significance	Potential impact of the Project could cause irreparable damage to a small area (e.g. on site) of an IEC; or, potential impact could cause damage to an IEC over a large area, but the ecosystem can still function (e.g. surface water contamination causing limited aquatic ecosystem damage). The impact is reversible over a long period of time.
Moderate Significance	Potential impact damages an ecosystem over a small area but it is still functional and the damage is reversible over a long period of time. Damage to an ecosystem over a large area, still functional, and the damage is reversible over a relatively short period of time.
Low Significance	Potential impact of the Project could cause damage to an IEC over a small area but system still very functional and damage is reversible over a short period.
No Impact	Non measurable impact.

*- IEC- Important Environmental Components (IECs) are those components of the environment which society generally feels are worthy of protection in light of the general activities of the project. Important environmental components.

Important environmental components in implementation of the projects that have construction-assembling works superiority include Physical Components (Soil quality, Soil erosion ability, Land, Surface water quality, Hydrological regime, Groundwater quality Air quality) Biological Components (Trees, vegetation, Flora, Fauna, Aquatic ecosystems) and Socioeconomic Components (Poverty, Health, Migration, Income, Employment, Historical/Cultural Sites, Domestic water).

3. BASELINE INFORMATION

3 .1. BACKGROUND

This chapter presents brief information about situation with water distribution and water use in Azerbaijan, characterizes (investigates) state of WSS in Rayons by Economic–Geographic Regions and ecological aspects.

Surface waters. Azerbaijan is poor in terms of available water resources. A large part of the country, notably the Kura – Araz lowlands and the Absheron peninsula has significant water deficit due to low precipitation and high evaporation. This part, inhabited by more than 70% of the population, is completely dependent on irrigation for its agricultural production.

The Kura is the main river in the region, Its source is in Turkey, and the river and its tributaries flow through Georgia, Armenia, the Islamic Republic of Iran and Azerbaijan before discharging into the Caspian Sea.
The Araz river, a major tributary to the Kura, also rises in Turkey. It flows along the border between Armenia and Iran before joining the Kura. The Kura basin occupies 68,900 km^2 of Azerbaijan or 80 % of its territory.

The general absence of waste – water treatment in the river basin with a population of 11 million and economic activities results in very low water quality in the region and especially in Azerbaijan. This is a major problem, with Azerbaijan being dependent on the Kura river for more than 70 % of its drinking water supply.

The remaining 10 % of the surface water resources is made up of a number of rivers originating from the Greater Caucasus, the Lesser Caucasus and the Talysh, and flowing directly towards the Caspian Sea. Many of these rivers are however not perennial or disappear underground before reaching the sea.

Reservoirs. In Azerbaijan there are 23 main reservoirs, of which only 3 have a volume over 1 km^3. The Mingechevir reservoir on the Kura river is the biggest, with a capacity of 15,7 km^3. The water is used for power generation and for irrigation. The Jeyranbatan reservoir (0,2 km^3), north of Baku, is fed by the Samur river on the border with the Russian through a 180 – km – long channel. The reservoir is important for the water supply to Baku and for irrigation.

3.1.1 WATER USE

Despite limited water resources of Azerbaijan, they are used inefficiently. The water supplied by water pipelines, provides 50% of population and there is lack of drinking water resources in some districts.
The physical condition and performance of the water supply and wastewater treatment, transmission and distribution systems is generally poor. Most part of water and wastewater infrastructure is old and needs repair and replacement. The condition of water treatment and distribution facilities has deteriorated as a result of deferred maintenance. Many water transmission and distribution pipes, which are made of unprotected steel, are now over 40 years old. The rate of pipe breakages in cities is high (5-10 times higher than in Western Europe).

Water losses from 26 % in 1993 to 31 % in 2003. Domestic uses, however, had increased, from 2,5% (1993) to 5 % (2003). Surface water constitutes 95 % of the water resources used. Per capita abstraction was 2,149 m^3 in 1993. In 2003 this had decreased to 1,332 m^3 per capita, or a reduction of 39 %. One of main reasons of insufficient water distribution per capita is connected with status of existing water supply system. (ANNEX 2)
Water use data are given in table 3.1.

Table 3.1: Water abstraction and use (million of cubic meters per year)

(million m^3 / year)

	1993	1994	1995	1996	1997	1998	2002	2003	2004	2005
Total abstraction	**16344**	**14631**	**13971**	**13462**	**12512**	**10235**	**10075**	**10772**	**11440**	**11500**
Domestic use	390	368	327	277	222	264	503	512		
Per capita abstraction, m^3	2,149	1,923	1,837	1,753	1,613	1,307	1,256	1,322	1.320	
Discharge of non treated waste water to surface sources			134		171 (2000)	170 (2001)	167	167	160	162
Water losses	4195	3855	3747	3530	3477	2941	3321	3404	3421	3450

Source: The State Agency of Amelioration and Water Management. January 2003.
State Statistical Committee. Statistical Yearbook 2006

Waste water

The condition of waste – water facilities in Azerbaijan is generally very poor. Lack of maintenance for more than a decade, the excessive flows due to leakage and infiltration, and the low standard of construction and materials are the main reasons for this.

The waste – water network in Baku serves about 72 % of the city, but only about 50 % of the waste water is treated; 90 %- biologically and only 10 %- mechanically. In other urban areas in the country, the coverage drops up to 32 %. There are waste – water treatment plants in 16 cities and towns; most are partly or completely out of operation. In rural areas, on–site sanitation is used, primarily latrines.

Due to absence of sanitation network in majority of Azerbaijan rayons and in all rural areas, waste waters are discharged to environment, relief, ground layer (by means of sewers, sanitation).

3.1.2. EXISTING CONDITIONS OF PROJECT AREA AND WSS

For projects of WB with A category, according to requirements on environental assessment, description of existing structure is presented in project rayons.
Based on researches and discussions, conducted on site with water supply and sanitation enterprises in 10 Rayons, which are under authority of "Birleshmish Sukanal", initial outcomes of assessment ***of Water supply and sanitation system*** are as follows (Table 3.2 and Table 3.3 and ANNEX 2, ANNEX 3):

- Dilapidated Infrastructure: Customers typically do not receive safe (treatment facilities typically out-of-service), sufficient (dilapidated pipe networks squander otherwise sufficient water resources) nor reliable (typically only 4-12 hours per day) drinking water; sanitation is limited and only two Rayons have wastewater treatment plants.

- Limited Customer Inputs: According to poor service levels, customer payment of water bills is low (from 44 to 97% collection rates).
- Not conducting of water accounting at appropriate level. Not provision of subscribers, mostly, with water meters. This results in water waste and shortage of water for all those subscribers during water delivery hours, cases of unfair approach on water use, claims.

- Limited Utility Capacity: Without sufficient revenues, the management and staff of the utilities have limited resources for materials, equipment and outfitting to conduct standard tasks for a community water service. The market for water professionals appears depressed, with low salaries and poor working conditions unable to attract sufficiently educated managers, administrators and technicians to these small towns.

Table 3.2 : Effective nesses Drinking Water Supply Infrastructure in the Urban Centers

As per data reported onsite by Utilities - without opportunity for confirmation of base data

Economic- Geographic Region: EGR	**Khachmaz Guba**	**Sheki Zagatala**			**Ganja Gazakh**				**Aran**	
Factor	**Guba**	**Gabala**	**Zagatala**	**Oguz**	**Goranboy**	**Khanlar**	**Agstafa**	**Tovuz**	**Bilesuvar**	**Saatli**
PUBLIC HEALTH & SAFETY										
Safe Drinking Water Supply										
- Resource Type	Mixed	Surface	surface	spring	mixed	surface	ground	Springs	surface	surface
- Compliance with National Standards	Turbidity	Turbidity!	Turbidity!	Turbidity	Mg, H	Turbidity	H	NA	Turbidity!	Turbidity!
- Original treatment system functional	**Yes**	No	No	No	No	No	No	No	No	No
-Current treatment mechanism (% time applied)	Cl-50%	None	Cl-50%	Cl-50%	Cl-25%	Cl-25%	Cl-25%	None	None	None
- Consistent operation of disinfection	**Yes**	No	**Yes**	**Yes**	No	No	No	No	No	No
Supply of urban Population										
- Coverage by service area	75%	70%	64%	90%	73%	75%	70%	50%	90%	59%
- Litres per capita per day (delivered)	180	150	150	115	100	180	150	150	100	115
Water Gap (estimated per calculations)										
- Resources sufficient for "customer" demand (2006)	**Yes**	No data	**Yes**	No data	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
- Resources sufficient for "system" demand (2006)	No	No	No	No	No	No	No	No	No	No
- Resources sufficient for future demand (2020)	**Yes**	No data	**Yes**	No data	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
- Resources sufficient to connect full urban centre										
- Resources sufficient to connect villages										
CUSTOMER SERVICE										
Reliable Service										
- Hours per day	5-24	24/ 9 mnth	24/ 9 mnth	24/ 9 mnth	8-24	4	6	9	10-12	6
- Rationing (by network zone)	1x/dav	Summer	summer	sumrrer	1x/day	2x/day	1x/2 days	1x/2-3 days	1x/day	2x/day
- Customers with private water tanks	60%	50%	50%	50%	50%	90%	100%	**0%**	100%	50%
- Customers with private wells	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
SYSTEM SECURITY										
Water Resources Protection										
- Watershed /well head protection	No	No	No	No	No	No	No	No	No	No
- Secure capture facilities (fencing, housing)	No	No	No	No	No	No	No	No	No	No
Duplicate Water Source	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	No	No	No	No
Duplicate Transmission mechanism	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	No	No	**Yes**	No
Type	Mixed	Gravity	Gravity	Gravity	Mixed	Gravity	Pressure	Pressure	Pressure	Pressure
Power Limiting Factor (Cost. Reliability)	**No**	NA	NA	NA	C	C	R	C. R	C R	C R
Back Up Power Supply	No	NA	NA	NA	No	No	No	NA	No	No
Sufficient storage capacity (operational)	**Yes**	No	**Yes**	No	**Yes**	**Yes**	**Yes**	**Yes**	No	**Yes**
Secure network layout (ring: grid)	**Yes**	No	No	**Yes**	No	Part	No	Partly	**Yes**	No

Table 3.2 : Effective nesses Drinking Water Supply Infrastructure in the Urban Centers										
As per data reported onsite by Utilities - without opportunity for confirmation of base data										
Firefighting Capacity	No	No	No	No	No	No	No	No	No	No
SYSTEM EFFICIENCY										
Supply										
- Leakages - reported	10%	10%	10%	30%	5%	10%	5%	10%	5%	10%
- Leakages - estimated	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
- Customer complaints (No./day)										
- Utility response time (days)										
- Bulk water meters (production)	No	No	No	No	No	No	No	No	No	No
- Bulk water meters (distribution)	No	No	No	No	No	No	No	No	No	No
Demand										
- Customer usage (watering. wastage)	High	High	High	High	High	High	High	High	High	High
- Customer meters	No	No	No	No	No	No	No	No	No	No
LEGEND	**Bold**	Satisfactory Condition (conduct to sustainability)								

Source: WISF-02 Study: Investment Planning and Priority Study In preparation of the National Water Supply and Sanitation Project, Azerbaijan - World Bank (September, 2006}

Table3.3. : Effectiveness of Wastewater and Storm water Infrastructure in the Urban Centers

Economic- Geographic Region: EGR	Khachmaz Guba	Sheki Zagatala			Ganja Gazakh				Low land	
Factor	**Guba**	**Gabala**	**Zagatala**	**Oguz**	**Goranboy**	**Khanlar**	**Agstafa**	**Tovuz**	**Bilesuvar**	**Saatli**
PUBLIC HEALTH & SAFETY										
Connection of Urban Population										
-Coverage by service area	65%	0%	30%	0%	25%	35%	25%	10%	0%	0%
-Coverage by private pits/latrines	35%	100%	70%	100%	75%	65%	75%	90%	100%	100%
-Reports of flooding	No	No	No	No	No	No	No	No	Yes	No
-Reports of disease	No	No	No	No	No	No	No	No	No	No
-Reports of stench & nuisance	No	No	No	No	No	No	Yes	No	No	No
Evacuation-Collection Mechanism										
-Mixed or Separate system type (design)	separate	No	separate	No	separate	separate	separate	separate	No	No
-Open channels for storm water	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
-Open channels for sanitation (design)	No	No	No	No	No	No	No	No	NA	No
Treatment										
-Presence of sewage treatment plant	Yes	No	No	No	No	Yes	No	incomplete	No	No
-Compliance with national standards for effluents	Yes	No	No	No	No	No	No	No	No	No
-Ponding of sewage	No	No	No	No	No	No	Yes	No	No	No
-Complaints of nearby residents	No	No	No	No	No	No	Yes	No	No	No
-Treatment of Sludge removed from pits/latrines	Yes	No	No	No	No	No	No	No	No	No
Environmental Protection										
-Protected receiving waters	No	No	No	No	No	No	No	No	No	No
-Sensitive downstream ecological & biodiversity areas	No	No	No	Yes	No	No	No	No	No	No
LEGEND	**Bold**	Satisfactory Condition			Under Construction					

Source: WISF-02 Study: Investment Planning and Priority Study In preparation of the National Water Supply and Sanitation Project, Azerbaijan - World Bank (September, 2006}

*

The above table indicates that sensitive downstream and biodiversity areas are found on in Guba. However, such sensitive areas are found also in Oguz Gabala and Zaqatala. Oguz cities are directly located in vicinity of Shahdag National Park, as is Gabala Rayon, and Zagatala is directly located in vicinity of Zagatala preserve, which are tourists zone of Azerbaijan and possess rich natural and Biodiversity (see ANNEX 2, 4)

4. ENVIRONMENTAL ASSESSMENT

4.1 OBJECTIVE

The objective of environmental assessment (EA) is to assess important ecological and social impacts (positive and negative) of proposed project and to define corresponding measures (including corresponding monitoring) for preliminary activities and mitigation of impacts, directed for preventing, removal and minimizing of potential negative impacts.

While preparation of present EIA document, due to absence of specific technical solutions (projects) for rehabilitation/improvement of infrastructure of (WSS), this EIA will have character of framework document.

For specific Rayons, while conducting of projecting/preparational works, specific assessment of environment will be conducted for executing of works on rehabilitation/improvement of infrastructure, and this will be included into EIA Report for this Rayons . Consultations with MENR will be held during asessment. Asessement will be developed at the same time with project/construction documents with aim to consider to utmost extent environmental protection issues during project works. Along with conducting of other data compiled into standard EIA structure on report of einvironmental impact assessment for specific Rayons, the following works are to be included (depending on specific situation, other additional works may also be included):

- *Site Description and Existing Environment.* A complete site description to include: (i) site location; (ii) identification of significant ecological features; (iii) archaeological and cultural sites; (iv) location of surface water ; (v) on-site and adjacent land use; and (vi) local climatic conditions including rainfall patterns. Water sources used in water supply (taking into account possible alternative), water quality and quantity (taking into account prospects) are to be given in this point. A description of existing environmental issues such as contaminated soils or poor drainage will also be included.
  Some project rayons are located at vicinity of ecologiclally sensitive areas.. (Annex 2, 4). During description of environment in EIA document, developed for these rayons more comprehensive information about endangered species of flora and fauna is to be included, and corresponding measures are to be taken in the area of its safguard.

- *Project Description.* A detailed description of the proposed physical works including: (i) works to be conducted and schedule of works, (ii) description of technological process, technological equipment, technical indicators (including treatment level), facility layout; (iii) energy and water requirements; (iv) site access and traffic pattern;
- *Potential Environmental Issues.* Environmental issues associated with the project will be identified, based on the general issues identified in this EMP (e.g. asbestos, waste disposal). Issue related to nuisance, traffic patterns, and restricted neighbourhood access will be included
- *Mitigation.* Site-specific mitigation measures will be described for each of the environmental issues described above and integrated in design of EIA. It is quite possible, that after justification from economic and environment view point, use of treated water and sludge in agriculture will be considered in some Rayons with water shortages. In this case, it is necessary to ensure conducting of justification from economic and environment view point (ANNEX 6, 7), corresponding standards for processing of waste water and sludge, measures on mitigation of impacts and monitoring plan are to be added to EIA report (ANNEX 8)

- *Monitoring Plan.* A monitoring plan will be developed for any proposed facility. The purpose of the plan will be to monitor compliance with the mitigation measures identified above and to identify actions to be taken should there be non-compliance with the EMP. Progress on implementation would be reviewed regularly by the PMU and during World Bank supervision missions.

This EIA process ensures taking into consideration of proper envisaging of all required environmental issues and special points about environment, health and safety in tender documents.

4.2. PROJECT ENVIRONMENTAL CATEGORY

The project has been assessed as a Category A project under the environmental safeguards criteria of the World Bank. It is anticipated, that project activities will not trigger the process of full-scale analysis of impacts to ecology. Category A project has potential adverse environmental impacts on human populations or environmentally important areas - including wetlands, forests, grasslands, and other natural habitats. These impacts may affect an area broader than the sites or facilities subject to physical works, can cause serious and irrevocable impact upon the environment or human health.

As activites, potentially influencing on environment at RWSSS Project, consider only works on realization of upgrading of infrastructure and reforms of institutional character at system of water supply and sanitation services, raising of important ecological issues is not envisaged.

Project activities (Table 3.1) under RWSSS Project would be Bank Category A.B or C (Azerbaijan Category 1, 2, 3 and 4 respectively) (ANNEX 1).

4.3. IMPACTS OF THE PROJECT

The objective of the project refers to the group of RWSSS projects of ecological character, aimed at improvement of water supply and sanitation system (institutional and infrastructure), decrease of potential impacts on environment and human health and it is correspondingly expected, that final impacts will be of positive character.

Positive impacts of the project :

- The environmental assessment indicates that the implementation of the project will have long-term positive environmental impacts in terms of reducing pollution of natural resources, generation of significant economical, social and public health benefits, and will enable the government to enforce existing environmental regulations and standards.
- Repair and improvement of WSS systems, especially, distribution system, while decreasing fear of pollution, will provide high quality drinking water.
- Repair of water supply systems will decrease water losses and will increase volume of consumable water.
- Provision of subscribers with water meters will ensure registration and regulation of water consumption, for sustainable operation of system, level of collection of finances for water will be increased.

- Water saving will result in decrease of extra water use and will lead to rational use of water resources.
- The provision of wastewater collection and treatment facilities will have a strong long term positive effect on the overall environment and on public health conditions. There will be improvement in the water quality in the streams and rivers that flow throughout the project area. A major benefit of the project is the protection of groundwater resources from contamination by untreated sewage, and the elimination of direct sewage discharge to the Caspian Sea from Kura and Araks.

  And this will cause decreasing of negative impacts on water quality, consumed by other users from those rivers. Besides, pollution of ground, surface water and underground water caused by flowing of non-cleaned (non processed) polluted water directly onto the relief in project areas will be prevented, grounds for formation/raising of salination and erosion problems, which are main ecological problems of some rayons will not be created.
- As a result of the project, economic benefits will occur in terms of increased water volume of good quality, increased tourism activities (Quba, Khachmaz, Qabala) , and lower medical costs associated with treating water-borne diseases.

Potential negative impacts of the project

Adverse impacts of the project will mainly occur at construction/installation phases (4.3.1.), majority of these impacts will be of temporary character. Application of good construction practice would mitigate most of temporary impacts up to acceptable level (see 5.1 a).
During period of operation of WSS system, impact on environment may occur if the necessary treatments are not properly implemented and regulated, for example during emergency situations or disasters. This could lead to impacts of inadequately treated drinking water on human health, impact of waste water on environment and human health. In cases where new water sources are used, or where there is the possibility that amount of water taken from existing sources will increase, this could have impacts on ecosystems or water table. The also risks of using waste water and sludge in agriculture are also considered,. Negative impacts on environment during operation of the project and measures, directed on its decrease, are cited in chapter 5.1 and ANNEX 9.

4.3.1. ENVIRONMENTAL IMPACTS, WHICH OCCUR DURING CONSTRUCTION/ REHABILITATION AND OPERATION PHASE

The population of Rayons along the main pipelines will be affected during construction. In this regard, dust and noise nuisance from activities such as excavation, piling, demolition, storing construction materials, transportation and localized movement of heavy machinery may have an impact on residents. Dust generation may cause more significant impacts on windy days or when construction activities are in very close proximity to commercial, institutional or residential areas or to certain agricultural and horticultural crops during sensitive growing periods.

Business activity might suffer during construction from loss of pedestrian and vehicular access. Interference with water and electrical power supplies might occur in some urban areas, inconveniencing the public. There might be a loss of visual amenities as construction materials are stockpiled and moving of some trees and natural vegetation.

Another temporary impact on the population will occur from increased traffic resulting from transportation of materials. Some of the impacts associated with increased traffic concern public safety, congestion of roads and disruption of regular traffic.
The Project is not expected to produce major environmental impact.

Potential negative impacts of the project will mostly be the case during (period of execution of works) realization of components of works on rehabilitation and improvement of infrastructure of the project and this will be of temporary character. Other negative impacts on execution of the project, will be mitigated by means of measures presented in Environmental Management Plan, adopted for the project. Social, cultural and historical values and ecological factors will be considered in planning of rehabilitation and improverment of infrastructure.

Activities carried out under the project will conform to current laws in Azerbaijan and sound environmental principles. In general, construction and building renovation activities will not contribute to the permanent degradation of the physical and human environment. The short-term negative environmental impacts, which inevitably occur during construction or rehabilitation works, will be minimized by proper planning and application of preventive measures, and will be mitigated by restorative actions after the civil works are completed.
Use of construction materials, which are hazardous to human health (e.g., asbestos), will not be permitted, consistent with Azerbaijani regulations.
The key environmental issues of the construction/renovation process and operation/maintenance activities are:

- Dust raised from the roads in the construction sites and from material carrying trucks
- Waste water from construction/renovation sites
- Disposal of solid wastes
- Use of materials that may damage health (i.e. heavy-metal (lead) containing paints, asbestos-cement tiles, pipes, copper pipes, inflammable and toxic materials etc.)
- Construction site protection activities
- Protection of natural and cultural heritage within the project and neighbouring sites
- Restoration of lands damaged by excavation
- Noise generated by the construction machinery
- Traffic Disruption
- Contamination/pollution of resource by construction, human wastes, including fuel & oil, hazardous wastes, wastewater, etc Soils and Water Resources

5.ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The EMP identifies feasible cost effective measures to mitigate any adverse environmental impacts that might occur during the construction and operation of the project. The EMP covers mitigation measures, monitoring and institutional strengthening.

5.1. MITIGATION MEASURES

Mitigation measures have been identified to ensure that the defined objectives of the project are achieved whilst preventing and reducing any adverse environmental impacts. The mitigation measures are to be executed by the construction contractor (construction phase) and the treatment plant operators (operation phase) with supervision by the WSS utilities.
ANNEX 3 summarize the major impacts and the mitigation measures for the construction and operation phases.

a. Mitigation measures during rehabilitation/improvement of WSS infrastructure:
To avoid the use of dangerous and hazardous construction materials, chemicals and environmentally non-friendly construction technologies, designer and contractor assigned for rehabilitation of WSS utilities or new construction under the project should apply all assumptions and measures for the protection of the environment described in the adopted related legislative Acts of the Republic of Azerbaijan
Increase of taking of water in project areas from existing water sources and taking of water from new water sources in some places is expected. In such case not only economical factors, but issues of environment including interests of neighbouring areas are to be thoroughly substantiated. For decrease of formed impacts in EIA documents to be developed, corresponding mitigation measures are to be presented.

Some project rayons are located at vicinity of ecologiclally sensitive areas.. (Annex 2, 4). During description of environment in EIA document, developed for these rayons more comprehensive information about endangered species of flora and fauna is to be included, and corresponding measures are to be taken in the area of its safguard.

The main operational measures, which should be taken into consideration during the construction / renovation works and handling construction and waste materials with the aim to protect human health, environment, natural and cultural heritage, include:

The general disruption during construction will be mitigated by coordinated planning of construction activities. This will include coordination with all concerned authorities prior to the start of the construction activities. Other adverse impacts due to construction activities will be mitigated through the adoption of good environmental practice procedures. For instance, noisy (*According to Azerbaijan standards, exceeding of level of noise higher of 65 dB during day time and higher than 45 dB is not permitted*) construction activities can be limited to normal working hours and providing muffler to minimize noise nuisance. Dust emissions *(0.15-0.5 mq/m3)* can be avoided by using dust suppression measures such as periodically sprinkling water in certain areas, providing appropriate covers, and removal of excess material from the site. Dangerous activities in public areas will be controlled to reduce risk to the public, traffic and warning signs will be placed at construction sites, trenches will be provided with fences, or railings. (ANNEX 9).

- Selection of environmentally friendly construction materials and equipment for redesign and revitalisation of existing buildings and their premises; for that purpose, It is prohibited to use asbestos and it is not recommended to use materials with significant content of heavy metals, anti-fire equipment with content of Halons, acclimatization and refrigeration equipment with content of Freon (CFC substances), high radiation, fire smoke indicators and paints based on synthetic diluters;
- Avoidance of use or reduce to the minimum the use of open fire, specifically use of fuel, hot insulation coating (asphalt), and use the energy with low efficiency and high pollution;
- Use the construction / destruction technology and working tools which will not produce high noise and emission of high dust during demolition of old parts of buildings and reconstruction works; provide the protective cartons for outside walls and covered trucks – pipes for and loading of demolished materials and waste disposal;
- Not to use any hazardous chemicals and their disposal to the public sewage system or to the site land;
- Select the solid waste materials and dispose it to the regular land registered and managed waste disposal yards;
- To draw special attention at during work with materials, containing asbestos. Asbestos waste materials must be wetted, before and during demolition and packaged in leak-proof containers or proceed into a non – friable form and dispose it to the special storage fenced sites with warning signs and special care of its disposal;
- Take a special care for protection of existing cultural heritage of the work-in building or near it while at work site, and those of high archaeological historical, ethnological, scientific, cultural and spiritual local.

Overall, mitigation of any environmental effects will be the responsibility of the PMU. However, it will also be the responsibility of contractors to ensure, that mitigation is carried out successfully during construction/renovation works, as it is required. The specific mitigation measures will be implemented by the contractor under the supervision of engineers or design companies involved in preparation of design documents. The provisions described in this EMP will be incorporated in the contract with construction companies selected to perform the works. The cost of mitigation measures will be included in the cost of the contracts and will be borne by contractors, who will make the necessary provisions for implementation of mitigation measures as part of their contractual obligations.

The contractors shall take also all necessary precautions for the types of civil works involved, especially in residential areas and those with high circulation of persons and vehicles. All construction and rehabilitation works should be carried out with keeping the safety equipment rules, and health and safety regulations. Safety measures will be adopted to protect the personnel involved in the works. Public access to construction sites will be properly restricted. Internationally accepted practices and active regulations should be assisted regarding restoration of construction, health and safety

The construction contract document will incorporate all requirements to minimize disturbance from construction activities, which will be monitored by the Supervision Engineer and the PIU staff (Environment Specialist) to ensure compliance and implementation of the required provisions by the contractors.

The contractors will provide suitable and reliable equipment for construction, with a formal maintenance program to ensure efficient operations. The WSS utilities will develop and establish appropriate safety procedures for the operation and maintenance of the water and wastewater treatment plants. All employees of the contractors and the WSS utilities will get suitable training in occupational health, safety, and emergency preparedness procedures for earthquakes. Safety equipment will also be provided.

b.Mitigated measures during operation of WSS system

- Water quality: Presently, analysis of drinking and waste water in project areas is not conducted at appropriate level. (Assesment of existing state- chater 3.). Water quality is reflected in tables of Addition 2 on completion of analysis conducted during project assesssment in Bilasuvar and Gabala. According to some information, water quality in Bilasuvar is not better than in 9 other rayons: water is taken here from channel, coming from Araz river and in other rayons water is taken from small mountainous rivers, which are less subjected to antorpogenic impacts. Results of analyses, taken in Gabala and Bilasuvar, indicate, that excluding amount of mechanical mixtures in water composition of existing hardness (muddiness) and amount of bacteriological indicators, other indicators correspond to national standards. Due to this point and for examination of correspondence of water quality to general standards according to requirements of usage rules of drinking water and for revealing of any negative change tendency in water quality it is necessary to conduct regular monitoring.

- The *provision of a wastewater network* for collecting and transmitting the generated wastewater to a treatment plant will certainly minimize potential bacteriological contamination of ground water. During project implementation, a continuous monitoring program would be implemented to ensure that treated water will always meet the required standards. The monitoring program will cover biological and physical parameters as well as heavy metals and pesticides residues.

- *Effluent Quality*: The proposed treatment level, would ensure a treated effluent of acceptable quality for discharge in receiving surface water bodies. These proposed treatment will result in the removal of organic materials and nutrients down to the required levels. (ANNEX 8) As soon as the wastewater treatment plants start operating, monitoring of wastewater quality in the influent and effluent will be conducted to ensure adherence to the required standards.
- In view of the treated effluent quality of SWTPs, which will be in compliance with the prevailing standards for discharge to surface water resources, the impacts on rivers is insignificant and will be localized to the discharge point. In fact, the environmental situation of the river is expected to be improved in comparison with present condition due to elimination of direct wastewater discharge to the river once the SWTPs will be put into operation.
- The effluent of SWTPs will be mixing with the river water to discharge in the Caspian Sea. The project is expected to improve the Caspian Sea general environmental state by preventing the untreated wastewater to the Caspian Sea. Regular monitoring will be required to ensure treated effluent adherence with the Azerbaijan discharge standards. (5.2.1., ANNEX 8)
- In some rayons during summer season discharged waste water will be used in agriculture. To accomplish this, it is necessary to ensure correspondence of microbiological indicators of treated water to standards in these rayons. (ANNEX 7, 8). That is why, monitoring is to be conducted with aim to provide correspondence of microbiological indicators in treated waste water to standards. During winter period, water discharged from treatment plants, while mixing with river water, will flow into

Caspian sea. As a result of realization of the project, by preventing of flowing of non-treated waste water into Kura and Araz rivers into Caspian sea, it is expected, that this will contribute to improvement of general ecological situation. Regular monitoring is required with aim to provide correspondence of treated waste water to Azerbaijan stadnards (5.2.1, ANNEX 10).

Sludge Quality:

- **a. If use of** sludge **is considered in agriculture of certain Rayons**: The sludge treatment processes of treatment plants will include sludge blending, thickening, aerobic or anaerobic digestion, sludge dewatering, and composting. (Other neutralization technologies may be used in projects to be developed).These processes will ensure the elimination of toxics and pollutants in the sludge. For the use of composted sludge in agriculture as soil conditioner or fertilizer, the project will ensure compliance with applicable guidelines FAO through sufficient compost curing. (ANNEX 7, 8)
  b.If use of sludge is not considered in agriculture, then according to Azerbaijan legislation, sludge will be processed according to regulation on sludge treatment equipment, afterwards it will be kept it sludge area and will be buried.

5.1.1. Environmental Mitigation Plan

According to rules of Ecological Assessment of Projects of WB (OP 4.01, BP 4.01, GP 4.01) plan of mitigation of impact ANNEX 6 was presented. Mitigated measures are described in the section 4.1 of this plan and below indicated good practice (GP) is taken into account.

- Prevention of accidents during construction
  The contractors shall take all necessary precautions for the types of civil works involved, especially in residential areas and those with high circulation of persons and vehicles. All construction and rehabilitation works should be carried out with keeping the safety equipment rules, and health and safety regulations. Safety measures will be adopted to protect the personnel involved in the works. Public access to construction sites will be properly restricted. Internationally accepted practices and active regulations should be assisted regarding restoration of construction, health and safety.

- As a general principle, all vegetation destroyed will have to be replaced; first transplant must be used, if this is impossible, then it is to be replaced with similar species and size.
- scheduling of dust generating construction activities should attempt to avoid seasons with high winds;
- if excavated spoil requires storing in sensitive areas, the storage heaps should be covered or protected to minimize dust emissions;
- if dust generating construction activities, e.g., excavation or transport, are in close vicinity to agricultural lands with crops sensitive to dust during a certain time of the year, avoidance through scheduling and route selection is the preferred mitigation;
- excavated spoil should not be disposed of on agricultural land;
- excavated spoil should not be disposed near streambeds or dumped into lakes. disposals in wetlands or coastal marshes are unacceptable;
- disposals of spoil should be as close as possible to construction sites in order to minimize unnecessary traffic;

- oil and chemicals (for example, chlorine, using for disinfection of new pipelines) should be carefully stored with ensuring the observance of safety rules and regulations.
- erosion effects should be avoided to the extent possible. Proper erosion control should be incorporated into construction planning. Soils in construction areas should be stabilized by reseeding areas with grass;
- pipelines should not be routed along stream channels;
- conveyors should cross-stream in the shortest distance possible. Construction should be scheduled for during dry flows, if any;
- at those places, where conveyors are to cross-streams or rivers, the trench should be armored with appropriately sized boulders to prevent erosion. Alternatively, it may be possible to use thrust boring, heading or tunneling to cross-streams without disturbing the stream flow;
- the number of access roads to streamed and/or crossing other ecologically sensitive areas, such as wetlands should be minimized;
- Using of noisy equipment (ex. Breakers, compressors, etc.) should be minimized and better avoided during late and non-working hours

-5.2. MONITORING

The extent of project monitoring will be dependent on the nature, scale and potential impact of the project activities. Monitoring may require the services of environmental specialists or a company with laboratory and analytical facilities (for complex environmental problems) or inspection by the local government environmental officer.

Monitoring of all activities within the project will be the responsibility of the PMU. Compliance with the EMP guidelines will be monitored by the PMU Manager and supervised by the World Bank. Monitoring of environmental effects is important. The PMU Manager will follow an effective monitoring procedure. He will need to select sampling individual activities within categories of activities for regular monitoring purposes. A number of activities will be environmentally benign and as such will not require monitoring on a regular basis. Nevertheless, they should be examined on occasion to ensure that this EA did not overlook any potential impacts. Project activities should be monitored regularly on a random sample basis. Environmental Monitoring Plan is given in ANNEX 4.

Presently, only initial assessment of projects is conducted. After presentation of engineering solutions for each rayon, taking into account the nature of the project (technological solution to be applied, surrounding area etc), monitoring plan for each rayon is to be composed.

Construction inspection team (engineer) is to conduct daily inspection on the project progress.

5.2.1 MONITORING PLAN

1. Monitoring of construction activities will have to ensure that mitigation measures of construction impacts are being implemented properly, while monitoring of operation activities is to ensure that no unforeseen negative impacts are arising.

2. During construction, the monitoring program will include dust and noise. Monitoring of the water supply will include biological, physical and chemical parameters as well as heavy metals and pesticides residues. During the operation of the wastewater system, monitoring will include data on BOD, COD, suspended solids, phosphates, nitrates, salinity, heavy metals, fecal coliform and nematodes eggs. Quality monitoring in Water Resources will include data on BOD, COD, suspended solids, pH, phosphates, nitrates, salinity, and heavy metals. Soil and agricultural products will be monitored for significant pollutant levels.

   - *Drinking Water Quantity and Quality*: treated water quantity and quality should meet water demand as well as allowable drinking water standards set by the Azerbaijan. In order to safeguard public health, it is imperative that *regular monitoring* of raw and treated water at the treatment plants, groundwater wells, storage reservoirs and in the distribution network be implemented to ensure that drinking water limits are not exceeded.
   - *Treated Effluent Quality*: the treated effluent should be of acceptable quality so that it can be safely discharged into water bodies. Furthermore, since treated effluent may be directly re-used in agriculture as in the case of discharge to the rivers, it must also be safe for this application. This means that the effluent quality should meet the standards for discharge into water bodies and the WHO guidelines for agriculture re-use. Regular monitoring of these variables will be required to ensure strict adherence to the prevailing standards.[1]
   - *Sludge Quality*: In the case of dried sludge re-use by farmers as soil conditioner or fertilizer, the sludge quality will have to comply with the FAO guidelines for the use of sludge in agriculture. The adopted treatment processes, sludge composting process, including proper curing period followed by storage, and the control of industrial discharges to the sewage system would have to ensure that the acceptable standards for bacteriological and toxic substances would not be exceeded for the use of sludge in agriculture.(ANNEX 7, 8)

3. According to own functions on drinking and waste water, monitoring is to be conducted by the WSS enterprise, the Ministry of Health and the Ministry of Ecology and Natural resources. During use of treated water in agriculture at irrigation and application of sludge

[1] According to these rules, discharge of wastewaters into water bodies is allowed only after obtaining a permit for "special water-use". The degree to which discharged wastewaters have to be treated (purified) is determined by the Maximum Allowable Discharge (MAD) norms for polluting substances. These norms are normally imposed in order to gradually improve surface water quality and meet the sanitary-hygienic requirements in proximity to water-intake structures Norms (MACs or EALs) for the water chemical composition and its properties in water bodies are set depending on the category of water-use. According to Azerbaijan legislation, MAD norms are to be compiled for discharging of waste water from treatment installations to water sources, and these norms are to be agreed by MENR. (ANNEX 8)

for soil fertility and or as fertilizer, corresponding monitoring works on lands\plants are to be conducted by the Ministry of Health and Ministry of Agriculture.

4. Monitoring report on EMIP of the project will be developed and completed according to agreed procedures after certain periods in corresponding format and after approval with MENR and MH will be sent to the World Bank.

Monitoring of main social parameters
Monitoring on social assessment is presented in document of social assessment of the project.

Monitoring plan ANNEX 7 was presented.

5.3. MANAGEMENT

The objective of this EMP is to ensure the integration of environmental issues and proposed mitigation into the detailed design and implementation. To achieve satisfactory implementation of construction/ renovation works and operation of WSS facilities, this EMP will ensure that: (a) implementation is monitored; (b) adverse environmental impacts are mitigated; (c) implementation will meet the requirements of the environmental law of the Republic of Azerbaijan and the World Bank safeguard policies.

The PMU within the Azersu JSC will be responsible for overall Project implementation. The Unit will be supervised by the Project Director and the World Bank task team. The PMU Manager will ensure implementation of the project in compliance with the EMP. Within the PMU project, to implement the environmental requirements, to monitor and solve ecological problems, will hire highly specialized professionals using short-term agreements.He must be able to recognize activities which may fall into Category A of the World Bank and ensure that the EMP guidelines are followed.

The PMU Manager will maintain a working relationship with the relevant officers in the MENR and the relevant environmental inspectorates.

6. CONSULTATIONS

As one of the main requirements of the WB in the area of financing of project proposals there should be held public discussions depending on the project's specifies during its implementation phase and after its completion.

Due to A category of the project to discussions with the public during the EIA development process are to be held and outcomes of discussions are to be considered in final document.

Participation rights of the public at discussion of environmental issues and adoption of decisions on environment, are determined according to requirements of International Conventions, ratified in the main legislative document of AR.

It should be noted that simultaneously with desighning EIA for this project Social Assessment is being worked out. This document is presently at its completion phase. In accordance with WB requirements all the RSSSPI projects should be publicly discussed during development phase and their completion.

According to Regulations on EIA process, project document should be developed, the public should be informed about adopted project decision by means of mass media. Copies of reports should be distributed and additional data should be supplied. Data on response to EIA comments, made by the public should be reflected in this information.

On November 24, 2006, was hold the first EIA public discussion for definition of Envoronment managment plann maintenance.

Public discussions of the report of Environment Impact Assessment, developed by ACEP company on Project of Regional Water Supply and Sanitation services, were held in the conference hall of AzerSu Joint Stock Company, 14 February 2007.

Community was informed about public discussions in advance. Thus:

- EIA report was placed in Azərsu JSC site (www.azersu.az) on 01.02.2007.
- By means of electronic distribution information about conducting of discussion on EIA developed for RWSSS in Ecoforum of NGO was sent to Baku NGOs on 02.02.2007.
- Announcement about conducting of public discussion was conducted in newspaper "Respublika" on 13.02.07.

On these discussions, sufficiently information about projects which will be implemented by each rayon in future, local companies and specialists are to be involved into the process of development of projects for rayons was proposed. (Annex 11b)

For each rayon in future, during project design and implementation, a consultation plan will be developed to include local communities and NGOs in the development of the project. Consultations will be essential in any circumstances where the project activities will affect local communities or individuals.

The physical and social environment must not be changed to the detriment of local residents, and any changes must be with their agreement

Consultation will involve public participation of affected community members and NGOs. In the event of public consultation, minutes are to be recorded of the discussions and records maintained of any public objections to the project activities, together with the mitigating measures proposed by the project proponent.

ANNEX 1.ENVIRONMENTAL CATEGORIES

Bank Category A (Azerbaijan Law Category 1): A Category A project 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, can cause serious and irrevocable impact upon the environment or human health. The EIA 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" scenario), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance for a Category A project, the borrower is responsible for preparing a report, normally an Environmental Impact Assessment (or a suitably comprehensive regional or sectoral EIA).

Bank Category B (Azerbaijan Law Category 2 or 3): A Category B project has potential adverse environmental impacts on human populations or environmentally important areas - including wetlands, forests, grasslands, and other natural habitats - which are less adverse than that 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 EIA (EA) for a Category B project may vary from project to project, but it is narrower than that of Category A assessment. Like Category A, a Category B environmental assessment examines the projects potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.

Bank Category C (Azerbaijan Law Category 3-4): A Category C project is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EIA action is required. Category-C includes activities, the scope, location and content of which will not bring about serious impact on the environment.

Bank Category FI: A Category FI project involves investment of Bank funds through a financial intermediary (FI), in subprojects that may result in adverse environmental impact. (also known as Category F). Sub-projects may be defined as Category A, B or C within the FI Category[1]. Where FI operations are expected to have Category A sub-projects, the PFI will provide to the Bank a written assessment of the institutional mechanisms for sub-project EIA. This is done prior to the Bank's appraisal of the PFI and may include identification of measures to strengthen the EIA capacity of the PFI.

If the Bank is not satisfied that adequate EA capacity exists within the PFI, all Category B sub-projects EIA reports and, where appropriate, Category B sub-project EIA reports, are subject to prior review by the Bank.

It is important that the project management unit and the lending institution be able to identify activities for which funding is being requested and which may fall into either of the World Bank's Category A or Category B.

For the most recent information on environmental categories see Website www.worldbank.org/environment

ANNEX 2.EXISTING CONDITIONS OF PROJECT AREA AND WSSS

A2.1. ARAN ECONOMIC GEOGRAPHICAL REGION

A2.1.1. BILESUVAR

General information Bilesuvar Rayon is located in the southern coastal plain of Azerbaijan with a boundary to Iran. Area is 1358km^2. Climate hot, dry summers and cold, wet winters. Annual Rainfall – 29,7mm. Population 63000 in Rayon (of which 18500 in Urban Centre). The main economic activities are based in agriculture and commerce.

Climatic observations indicate mainly hot, arid summer and cold winter with insufficient rainfall. Annual Annual precipitation level is 230-280mm. Main economic areas of the Rayon are: cotton-growing, grain-growing and cattle breeding. Several small-size industrial enterprises are operating in the Rayon. Bulkharchay and Misharchay rivers flow through the Rayon area. Bulharchay river and Azizbayov channel are of exclusive importance for irrigation of Mugan plain. Bulkharchay river and Azizbayov channel flow together at vicinity of Ovchubara village.

Marshland (with area of 13,000 ha), named Mahmudchala, is available within Rayon. Bulharchay river and Azizbayov channel are main sources of this marshland.

Saline lands, predominantly observed in the Rayon, are characterized by occurence of saline ground water near the surface. This is mainly accounts for extensive development of agriculture for many years, absence of necessary irrigation system and violation of irrigation rules (including absence of drainage).

The Rayon is characterized by meagre vegetation.

Drinking Water Systems

Overall, the drinking water service in the urban center of Bilesuvar is characterized as unsound and unable to satisfactorily fulfill the basic utility mandate of community service. Surface water is inconsistently disinfected via an improvised mechanism; Existing water resources are squandered, but would meet existing demand with proper design, maintenance and management of the pipe network (to reduce leakages, maintain pressure levels and control customer usage). The service area of the "urban center" water supply system, the focus of this evaluation, encompasses about 90 percent of the Town of Bilesuvar. Several "new" neighborhoods have been developed, which are not connected to the system, for about 10 percent of the population. These roughly 2,000 inhabitants rely on informal/vendor systems or public taps.

*Water Resources.*The system resources, the Azizbeyov Canal, appears sufficient to meet current water demand, even during periods of low flow, but poor network management over the past decades results in squandering of resources (via leakages, no demand metering, etc.). This conclusion is based on "reported" water flows and capacities (see table below); no meters are present at key water collection or distribution points. The raw water is collected via four pump stations, located along the canal over a length of about 3.5 kilometres.

Water Quality and Treatment The original treatment facility is a conventional plant (sedimentation, filtration, disinfections) and was designed for a capacity of about 150 l/s. It was built in 1979, but was abandoned during the 1990s, less than 20 years after being placed in operation. A second filter unit was built in 1985, along with Pump Station No.2, but is also in a state of disrepair and out of order. At present, no water treatment facility in the Bilesuvar system is functional and raw water from the Azizbeyov Canal is pumped directly into the distribution network. The lack of a treatment facility presents significant public health risks to the general population.

During the project evaluation the samples of analysis were taken from water sources, city water network, waste water, and analyses were examined at scientific-research and design institute "Sukanal". Results of conducted analyses indicate water quality conforms to national standards, excluding elevated turbidity level and bacteriological properties of water flowing into network and potable water network.(ANNEX 2) Water quality sampling (according to physical-chemical parameters only - no bacteriological assessment) is conducted on a monthly basis by the Ministry of Health at several locations.)

No large settlements are present in the vicinity of the sources, limiting the likelihood of contamination pathways – though this may be possible through agricultural or livestock activities.

*Distribution.*The Bilesuvar water supply system currently has no functional water storage capacity. The urban centre system originally included two subterranean reservoirs at the treatment plant, for a total design capacity of 1,800 cubic meters. Like the adjacent treatment plant, both are out-of-order, with one totally collapsed. The distribution mechanism is via pressure (not gravity), as all water supply is pumped. The pipe network is assumed to date from 1979 – 1985, the period when the two main pump stations and treatment plants were constructed. The network totals about 84 km of cast iron and steel pipes, with the main pipes reportedly in a ring structure (for better network security and flow). While the utility reports "official" leakages at about 5 percent, according to standard billing practices, the overall condition of visible system assets leads to the conclusion that leakages are likely to be significantly higher (leakages are estimated at 50 percent in the water balance). Without treatment of the turbid raw water, especially sedimentation, it is likely that the network is filled with high amounts of sediment. Water supply is typically rationed (10-12 hours/ day), in part according to power limitations and unreliability of the pumping stations. Lower pressure levels in the network result in opportunities for backflow of untreated groundwater or even sewage into the distribution system. No meters are installed at the customer connection, in part due to the high turbidity levels and likelihood of clogging.

Wastewater And Stormwater Systems

Sewage is generally collected in simple pits on the customer property (a potentially unsafe condition – but as yet without public health consequences). Elementary storm water evacuation according to open channels along road sides and natural drainage. None of the town is covered by an official community sewerage system. The population and businesses have informal, improvised wastewater evacuation system or rely on private septic pits. The primary sources of wastewater are the residential and commercial population, with no significant industry base reported. Storm water is collected via roadside, open channels and evacuated to nearby waterways according to local topography. Sewage is deposited directly into the receiving waters without any treatment, which poses risk of disease for the community and environmental degradation of the downstream regions. Accordingly, the local

and regional surface and ground water hydrology are at risk of contamination, especially local streams (Bulharchay və Misharchay rivers) and groundwater. Sewerage flows from Bilesuvar contribute to the degradation of the local waterways, perhaps even the Azizbekov Canal (the local water source and irrigation canal) to the Araz and Kur Rivers to the Caspian Sea.

A2.1.2. SAATLI

General information

Saatli Rayon is located in southern plains-steppe of Azerbaijan. The main economic activities are based in agriculture and commerce. Area is 1,180km^2.

Population – 87,053 in Rayon (of which 17,000 in Urban Centre).
Climate hot, dry summers and cold, wet winters. Annual Rainfall – 230-280 mm.

Agriculture and commerce are main economic activities. For many years cotton-growing has been developing, as a main agricultural branch in the Rayon. Several small-size industrial enterprises are operating in the Rayon. Significant part of soils in the Rayon area is subjected to erosion, and it is of saline nature. Due to non-observation of necessary agro technical conditions, absence of necessary irrigation system, violation of irrigation rules (including absence of drainage) are also accounted for main reasons. Some pesticides, including residues of DDT, are also observed in the Rayon soils. Kura and Araz rivers flow through the Rayon area. These rivers are considered, as main rivers of the region. These rivers are also of exclusive importance at irrigation of sowing areas of Saatly rayon.

These papers determine principles of rational water use, its state registration, settlement of water disputes and responsibility for violation of water legislation:

Drinking water systems

Overall, the drinking water service in the urban centre of Saatly is characterized as unsound and unable to satisfactorily fulfil the basic utility mandate of community service.

The service area of the "urban centre" water supply system, the focus of this evaluation, encompasses about 60 percent of the Town of Saatli, with a population of about 17,000. Therefore, about 60 percent residents in the urban centre remain unconnected to the system and rely on informal/vendor systems or public taps.

Water Resources. A canal to the Araz River is the raw water source for the town of Saatli. The raw water from the canal is transmitted to the water treatment plant via two adjacent pumping stations located at the edge of the town. No meters are present at key water collection or distribution points.

Water Quality and Treatment. The water source flows through the countryside and settlements - presenting the possibility of contamination pathways - through human, agricultural or livestock activities. It appears to be used also for irrigation purposes. The original treatment plant (conventional type – sedimentation, filtration) was built in 1969, but has been out-of-operation for several years. In water treatment plant have reinforced concrete reservoir in capacity 500m^3. Conventional type 2 sedimentation reservoirs and 4 sand filtrations. At the present moment plant is not work. Water is still run through the plant, however, and an "improvised" chlorination station is used at the dilapidated sedimentation tank of the

treatment plant, on occasion, to provide disinfections for delivery through the network. The lack of consistent use of a treatment facility or disinfections station may present significant public health risks to the general population. Water quality is reported in compliance with national standards, except for elevated turbidity levels. Water quality sampling (according to physical-chemical parameters only - no bacteriological assessment) is conducted on a monthly basis by the Ministry of Health at several locations.

Distribution. The town system has three reservoirs for a total design capacity of 2,500 cubic meters. One reservoir is located at the water treatment plant and the other two in the network at the booster pump station. From the reservoirs, all water supply is pumped to the network from the high lift pump station at the treatment plant and from the booster pump station in the network. The central portion of the pipe network dates from 1969 with further expansions taking place as the town expanded between 1970s and 1980s. The network totals about 10 km of main and 30 km of secondary pipes, both of cast iron and steel pipes. While the utility reports "official" leakages at about 10 percent, according to standard billing practices, the overall condition of visible system assets leads to the conclusion that leakages are likely to be significantly higher (leakages are estimated at 50 percent in the water balance). Without treatment of the turbid raw water, especially sedimentation, it is likely that the network is filled with high amounts of sediment. Water supply is typically rationed (6 hours/ day) according to network zone, in part due to power limitations and unreliability for pumping (and the associated costs). Lower pressure levels in the network result in opportunities for backflow of untreated groundwater or even sewage into the distribution system.

Wastewater and Stormwater Systems

The primary sources of wastewater are the residential and commercial population, with no significant industry base reported. None of the town is covered by an official community sewerage system. All neighbourhoods have informal, improvised wastewater evacuation system or rely on private septic pits. Wastewater evacuation is generally nonexistent within the service area. Storm water is collected via roadside, open channels and evacuated to nearby waterways according to local topography. Treatment: Sewage is deposited into the receiving waters via drainage ways or seepage without any treatment, which poses risk of disease for the community and environmental degradation of the downstream regions. Accordingly, the local and regional surface and ground water hydrology are at risk of contamination. Receiving:Sewege waters flows from Saatli contribute to the degradation of the Araz River and is part of the Kur River and Caspian Sea Basins.

A2.2. GANJA-GAZAKH ECONOMIC GEOGRAPHICAL REGIONS

A2.2.1. AGSTAFA

General information

The Rayon of Agstafa is located in the western part of the country and borders on Georgia to the north and Armenia to the south. The town of Agstafa is located on a broad plain surrounded by hills and mountains, but not directly along the Agstafa River. The main economic activities are based in agriculture and commerce. Area is 1504 km^2. Population – 75,604 in Rayon (of which 12,500 in Urban Centre).

Climate hot, dry summers; cold, wet winters. Annual Rainfall – 470-520 mm
It is the main transport junction of Agstafa. Motor roads and railway cross the Rayon, along with this, bridges of strategic importance are located on the Kura river (for example, Poylu bridge).

Kura, Agstafa and Hasansu rivers cross the Rayon. Garayazi reserve, stretching along the Kura river, borders with the Georgian Republic from one side and with the Tovuz rayon from other side. Oak tree, hornbeam, alder tree, linden and other trees are predominantly distributed in Garayazi reserve. Deer, fox, wild boar and hare prevail from animal species, partridge, willow grouse, duck and goose prevail from bird species in forests, surrounding Kura and Garayazi reserve.

Springs, medicinal water, medicinal grass are available in the Rayon. Jeyranchol, presenting wide pastures, plays an important role in economy of hilly rayon,. The Rayon area is abundant with natural resourses. Thus, golden deposits, granite stone, limestone and raw materials for production of kəc stone are available in the Rayon.

Drinking water systems. Overall, the drinking water service in the urban centre of Agstafa is characterized as unsound and unable to satisfactorily fulfil the basic utility mandate of community service. Unhygienic water supply: groundwater is inconsistently disinfected via an improvised mechanism; daily water rationing allows backflow of untreated water into the network (overall an unsafe condition – but as yet without public health consequences). Ineffective water delivery: existing water resources are squandered, but would meet existing demand with proper design, maintenance and management of the pipe network (to reduce leakages, maintain pressure levels and control customer usage). Rationing is necessary with 6-hour service twice per day, despite sufficient reservoir capacity for this size water supply system. The service area of the "urban centre" water supply system, the focus of this evaluation, encompasses 70 percent of the Town of Agstafa, about 30 percent of the municipal population are not connected to the system and rely on informal/ vendor systems or public taps.

Water Resources .A total of six wells provide groundwater for the urban centre; (two additional wells were originally drilled, but were never brought on line). The system resources appear sufficient to meet current water demand, but poor network management over the past decades results in squandering of resources (via leakages, no demand metering, etc.). This is based on "reported" water flows and capacities (see table below); no meters are present at water collection or distribution points.

Water Quality and Treatment. An "improvised" chlorination station (plastic bucket with hand-mixed chlorine powder solution) is used at the collection tank of the well field to provide disinfections for delivery through the network. The lack of consistent use of a treatment facility or disinfections station may present significant public health risks to the general population. Yet, water quality is reported in compliance with national standards, except for the parameter of hardness, which moderately exceeds both Azeri and World Health

Organisation standards. Water quality sampling (according to physical-chemical parameters only - no bacteriological assessment) is conducted on a monthly basis by the Ministry of Health at several locations. No large settlements are present in the vicinity of the well field, limiting the likelihood of contamination pathways - though this may be possible through agricultural or livestock activities.

Distribution The town system has one reservoir for a total design capacity of 1,000 cubic meters. All drinking water is distributed via gravity, once pumped out of the ground at the source. The central portion of the pipe network dates from 1966. The network totals about 25 km of cast iron and steel pipes. Leakages are estimated at 50 percent of production in the water balance. No meters are installed at the customer connection.

Wastewater And Stormwater Systems

About 25 percent of the urban centre is covered by an official community sewerage system. The remaining neighbourhoods have informal, improvised wastewater evacuation system or rely on private septic pits. The primary sources of wastewater are the residential population and small local business, with no significant industrial base reported. The sewerage network is a gravity system with about 3 km of combined sanitary and storm sewer pipes leading to a local waterway. The utility has improvised three basins along the drainage way outside of town, enroute to the Agstafa River. Nearby villagers complain of the stench and pollution (also near the location of the informal landfill). Storm water is collected via roadside, open channels and evacuated to nearby waterways according to local topography. Sewage is deposited directly into the receiving waters without any treatment (except passage through the improvised, earthen settling basins), which poses risk of disease for the community and environmental degradation of the downstream regions. Accordingly, the local and regional surface and ground water hydrology are at risk of contamination, especially local streams and groundwater. Sewerage flows from Agstafa contribute to the degradation of the Agstafa River and is part of the Kur River and Caspian Sea Basins.

A2.2.2. GORANBOY

General information

Gorenboy Rayon is located on a plain – steppe in central Azerbaijan. The main economic activities are based in agriculture and commerce. Area is 1,731 km^2.

Population –87,700 in Rayon (of which 19,800 in Urban Centre).
Production and processing of agricultural goods are main economic branches, and gypsum is a natural resource of the Rayon.

Climate Hot, dry summers and cold, wet winters. Annual Rainfall – 550-630 mm.
Qarachay and Kurakchay rivers cross the Rayon.

Drinking Water Systems

Unhygienic water supply: surface and groundwater are inconsistently disinfected via an improvised mechanism (treatment plant out-of-order); daily water rationing allows backflow of untreated water into the network (overall an unsafe condition – but as yet without public health consequences). Ineffective water delivery: existing water resources are squandered, but would meet existing demand with proper design, maintenance and management of the pipe network (to reduce leakages, maintain pressure levels and control customer usage). Unreliable service: rationing is necessary with 8 hour service per day, except 24 hour/ day service during the spring months, despite sufficient reservoir capacity for this size water supply system. As a result, the general population and customers endure an unsatisfactory product and service, despite the best efforts of the utility, which is limited in resources, outfitting and expertise. The service area of the "urban centre" water supply system, the focus of this evaluation, encompasses about 73 percent of the Town of Gorenboy, about 27 percent perceresidents in

the urban centre remain unconnected to the system and rely on informal/vendor systems or public taps.

*Water Resources/.*Surface (2 mountain streams) and groundwater, located both in (5 wells) and out of (6 wells) town, resources provide raw water for the town of Gorenboy. The system resources appear sufficient to meet current water demand, but poor network management over the past decades results in squandering of resources (via leakages, no demand metering, etc.). This conclusion is based on "reported" water flows and capacities (see table below); no meters are present at key water collection or distribution points. The raw water sources located outside of town are transmitted to the water treatment plant site (a distance of about 47.5 kilometres for the surface water source – but all via gravity). The groundwater wells in town are pumped directly into the separate "technical" pipe network. The cost of electricity impacts the frequency of well pumping; the power supply appears to be reliable in Gorenboy.

*Water Quality and Treatment.*The original groundwater wells in the town are reported of poor quality, which is the reason the original distribution network appears to have been converted into a "technical" network. Indeed, sampling results exceed national standards for minerals and sulfates, as well as calcium, magnesium. The surface water and out-of-town wells were originally treated in a sand-filter plant with disinfection station (chlorine), including backwashing (apparently water only) pumps. An "improvised" chlorination station (plastic bucket with hand-mixed chlorine powder solution) is used at the reservoirs for disinfection. A recently (2003) partially rehabilitated chlorination station is now also off line, due to inappropriate installations (stainless steel piping not used). Surface water is often bypassed around the reservoirs and improvised chlorination station directly to the town. The lack of consistent use of a treatment facility or disinfection station may present significant public health risks to the general population. Water quality sampling (according to physical-chemical parameters only - no bacteriological assessment) is conducted on a monthly basis by the Ministry of Health at several locations. Settlements and livestock are present in the vicinity of the wells, elevating the likelihood of contamination pathways.

Distributions. The town system has three reservoirs for a total design capacity of 3,000 cubic meters. The network dates from 1960 with further expansions taking place in 1970s and totals about 55 km of cast iron pipes, apparently configured in a ring structure. According to standard billing practices, the overall condition of visible system assets leads to the conclusion that leakages are likely to be significantly higher (leakages are estimated at 50 percent in the water balance). The surface water is directed to a separate network of 57 public taps located throughout the town. Customers are billed for the technical water, but water at public taps. Water supply is typically rationed (8 hours/ day), except during the spring months when water is more plentiful.

Wastewater And Stormwater Systems. About 25 percent of the town is covered by an official community sewerage system. The remaining neighbourhoods have informal, improvised wastewater evacuation system or rely on private septic pits. The primary sources of wastewater are the residential and commercial population, with no significant industry base reported. The evacuation network is a gravity system with about 1 km of (combined) sanitary and storm sewer pipes leading to the local waterways from the central, most dense part of town. Storm water is collected via roadside, open channels and also evacuated to nearby waterways according to local topography. Sewage is deposited directly into nearby drainage channels and waterways without any treatment, which poses risk of disease for the community and environmental degradation of the downstream regions. Accordingly, the local and regional surface and ground water hydrology are at risk of contamination. Sewerage

flows from Gorenboy contribute to the degradation of the Qaracay (10 km distance) and Kur River watersheds and further in the Caspian Sea Basin

A2.2.3. XANLAR

General information

Khanlar Rayon is located in the central steppe-plain of Azerbaijan. The main city of the Rayon is Ganje, with Khanlar being the second largest town. The main economic activities are based in agriculture and commerce. Area is 1,380 km2. Population – 32000 in Rayon (of which 23000 in Urban Centre).
Climate hot, dry summers and cold, wet winters. Annual Rainfall – 600-750 mm.

Drinking Water Systems

The service area of the "urban centre" water supply system, the focus of this evaluation, encompasses about 75 percent of the Town of Gorenboy ,about 25 percent perceresidents in the urban centre remain unconnected to the system and rely on informal/vendor systems or public taps.

Water Resources. Three water resources provide raw water for the town of Khanlar. The original system source, Lake Goy-Gol, is shared with the City of Ganje and the collection mechanism was installed in the early 1950s. A second source was added in 1980; the Ganja River basin water is captured via infiltration gallery and pumped to the reservoirs. A third source, the Zurnabad spring, added in 2004. No records exist regarding these expansion projects. The three existing surface - ground water resources appear sufficient to meet current water demand, even during periods of low flow, but poor network management over the past decades results in squandering of resources (via leakages, no demand metering, etc.). This conclusion is based on "reported" water flows and capacities; no meters are present at key water collection or distribution points. The raw water from two sources is transmitted over dozens of kilometres via gravity. The total length of the transmission pipes is about 32 kilometres.

Water Quality and Treatment. An "improvised" chlorination station (plastic bucket with hand-mixed chlorine powder solution) is used at the reservoirs to provide disinfection for delivery through the network. The original chlorination station is dilapidated and has been taken off line. The lack of consistent use of a treatment facility or disinfection station may present significant public health risks to the general population. Water quality sampling (according to physical-chemical parameters only - no bacteriological assessment) is conducted on a monthly basis by the Ministry of Health at several locations. (This does not appear fully substantiated through a complete set of testing records). No large settlements are present in the vicinity of the sources, limiting the likelihood of contamination pathways - though this may be possible through agricultural or livestock activities

Distribution. The central portion of the pipe network dates from 1906 with further expansions taking place in the 1950s, 1970s and 1980s. The network is maintained in three distinct zones, which is the basis of rationing. Water supply is typically rationed (4 hours/ day), in part according to power limitations and unreliability for pumping groundwater. Lower pressure levels in the network result in opportunities for backflow of untreated groundwater or even

sewage into the distribution system. The network totals about 35 km of cast iron and steel main and secondary pipes. According to standard billing practices, the overall condition of visible system assets leads to the conclusion that leakages are estimated at 50 percent in the water balance.

Wastewater And Stormwater Systems

About 35% of the town - the denser central, business district - is covered by an official community sewerage system. The remaining neighbourhoods have informal, improvised wastewater evacuation system or rely on private septic pits. The primary sources of wastewater are the residential and commercial population, with no significant industry base reported. The evacuation network is a gravity system with about 3.5 km of (combined?) sanitary and storm sewer pipes; a 7 km trunk main will transport sewage to the treatment plant. Sewers are being installed in one neighbourhood in 2006. Storm water is collected via roadside, open channels and evacuated to nearby waterways according to local topography. The sewage treatment plant is reported to consist of mechanical and biological level treatment. The project is being realised by Birleschmish Sukanal and is expected to be completed by 2007. However, most sewage is directed to drainage ways or latrines without any treatment, which poses risk of disease for the community and environmental degradation of the downstream regions. Accordingly, the local and regional surface and ground water hydrology are at risk of contamination. Sewerage flows from Khanlar contribute to the degradation of the Ganje River and is part of the Kur River and Caspian Sea Basins.

A2.2.4. TOVUZ

General information

Tovuz Rayon is located in western Azerbaijan and shares a boundary with Armenia. Population 14,900 in Rayon (of which 13,000 in Urban Centre). The main economic activities are based in agriculture and commerce. Area is 603 km^2. Climate hot, dry summers and cold, wet winters. Annual Rainfall – 550-630 mm.
Zayam and Tovuzchay rivers flow from the Rayon area.

Drinking Water Systems

The drinking water service in the urban centre of Tovuz is characterized as unsound and unable to satisfactorily fulfil the basic utility mandate of community service.

The service area of the "urban centre" water supply system, the focus of this evaluation, encompasses about 50 percent of the Town of Tovuz, with a population of about 6,500.

Water Resources. Water resource, consisting of the Spring and Surface Water sources (Tovuz and Zayam rivers, catchment of about 35 springs), provide raw water for the town of Tovuz. The clear water is pumped about 4.5 kilometres via two separate transmission pipelines to the network.

Water resource, consisting of the Spring and Surface Water sources (Tovuz and Zayam rivers, catchment of about 35 springs), provide raw water for the town of Tovuz. The clear water is pumped about 4.5 kilometres via two separate transmission pipelines to the network.

The existing surface water resources appear sufficient to meet current water demand, even during periods of low flow, but poor network management over the past decades results in squandering of resources (via leakages, no demand metering, etc.).

*Water Quality and Treatment.*At the current time, water is not treated or disinfected prior to delivery through the network. The original ultra-violet radiation plant is dilapidated and has been taken off line. The lack of consistent use of a treatment facility or disinfection station may present significant public health risks to the general population. No water quality data is available. Water quality sampling (according to physical-chemical parameters only - no bacteriological assessment) is conducted on a monthly basis by the Ministry of Health at several locations. No large settlements are reported present in the vicinity of the sources, limiting the likelihood of contamination pathways - though this may be possible through agricultural or livestock activities.

Distribution. The clear water is pumped about 4.5 kilometres via two separate transmission pipelines to the network. The pump station is dilapidated. All water supply is distributed under pressure to separate high and low zones. The pipe network dates from 1969 with further expansions taking place as the town expanded. The network totals about 25 km of cast iron and steel pipes. According to standard billing practices, the overall condition of visible system assets leads to the conclusion that leakages are likely to be significantly higher (leakages are estimated at 50 percent in the water balance). Water supply is typically rationed (9 hours/ 2 to 3 days), in part according to power limitations and unreliability for pumping. Lower pressure levels in the network result in opportunities for backflow of untreated groundwater or even sewage into the distribution system

Wastewater And Stormwater Systems

About 10 percent of the town is covered by an official community sewerage system. The remaining neighbourhoods have informal, improvised wastewater evacuation system or rely on private septic pits. The primary sources of wastewater are the residential and commercial population, with no significant industry base reported. The evacuation network is a gravity system with about 7 km of (combined sanitary and storm sewer) asbestos cement pipes leading to the local waterways. Storm water is collected via roadside, open channels and evacuated to nearby waterways according to local topography. Sewage is deposited into drainage and waterways without any treatment, which poses risk of disease for the community and environmental degradation of the downstream regions. Accordingly, the local and regional surface and ground water hydrology are at risk of contamination. Sewerage flows from Tovuz contribute to the degradation of the Tovuzcay River and is part of the Kur River and Caspian Sea Basins.

A2.3. SHEKI-ZAGATALA EGR

A2.3.1.GABALA

General information

Gabala Rayon is a mountainous region located in northern Azerbaijan with a boundary with the Russian Federation. The main economic activities are based in agriculture and commerce. Some resorts are under construction. Area is 1,548 km^2. Population 88,980 in Rayon (of which 11,900 in Urban Centre).

Climate Hot, dry summers and cold, wet winters. Annual Rainfall – 700-1200 mm.
Garachay and Damiraparan rivers flow from the Rayon area.Gravel, medicinal grass, forest reserves and fish are available, as natural resourses. From view point of economic characteristics, the basis of agriculture is composed of cattle breeding, weaving, tobacco-growing, vine-growing and silworm breeding. Enterprises, processing agricultural goods in

the Rayon, including juice, tinned goods, grape processing, initial procesing of grape and tobacco fermenting plant are functioning in the Rayon. The Rayon is famous, as a resourt (tourist) zone. Shahdag National park, which is presently under establishment, covers the Rayon area.

Generally, processing of tobacco, qərzəkli (predominantly, hazel-nut, walnut) and seedy (apple, pear) fruit, including essential oil plants, grape and products of cattle-breeding are developing in the Rayon.

Drinking Water Systems

Unhygienic water supply: surface and groundwater is neither treated nor disinfected (overall an unsafe condition). Ineffective water delivery: existing water resources are squandered, but would meet existing demand - even in summer when rationing is typically required - with proper design, maintenance and management of the pipe network (to reduce leakages, maintain pressure levels and control customer usage). Unreliable service: rationing is necessary during the summer months, aggravated by reservoirs being out-of-service. The service area of the "urban centre" water supply system, the focus of this evaluation, encompasses about 70 percent of the Town of Gabala. Therefore 30 percent residents in the urban centre remain unconnected to the system and rely on informal/vendor systems or public taps.

Water Resources. Gabala is located in a water rich area, with many springs and rivers flowing from the mountains. Numerous (at least 8, but possibly more) surface water resources, plus groundwater via infiltration gallery, provide raw water for the town of Gabala. The original "old line" provides spring water to the centre city, and the other sources were added in succession - apparently in organic fashion, as the town and water demand grew, without an overall water supply system strategy. No records exist regarding these expansion projects. The result is a maze of springs, basins, infiltration gallerys, etc. directed in some manner - layout not always clear - toward the town. The existing surface (ground) water resources appear sufficient to meet current water demand, even during periods of low flow in the summer, but poor network management over the past decades results in squandering of resources (via leakages, no demand metering, etc.). The raw water from the numerous are transmitted over several kilometres to the town reservoirs, all via gravity. Again, the precise layout of the transmission pipelines is unclear. For example, a collection tank stores water from the infiltration gallery and basins.

Water Quality and Treatment. The raw water from the numerous are transmitted over several kilometres to the town reservoirs, all via gravity. Again, the precise layout of the transmission pipelines is unclear, but estimated in the figure below. For example, a collection tank stores water from the infiltration gallery and basins. Two "improvised" chlorination stations (plastic bucket with hand-mixed chlorine powder solution) are used at the functional reservoirs to provide disinfection for delivery through the network. The effectiveness of this mechanism, in consideration of the evident turbidity levels, is unclear. The lack of consistent use of a treatment facility or disinfection station may present significant public health risks to the general population. Yet, water quality is reported in compliance with national standards (including turbidity levels – clearly this requires further clarification as all water sources viewed onsite demonstrated significant levels of turbidity). Water quality sampling (according to physical-chemical parameters only - no bacteriological assessment) is conducted on a monthly basis by the Ministry of Health at several locations. In any case, treatment mechanisms are not adapted to the turbidity levels, with the turbid water being directed into the distribution network. No large settlements are present in the vicinity of the sources,

limiting the likelihood of contamination pathways – though this may be possible through agricultural or livestock activities and the new construction of vacation homes.

Distribution. All water supply is distributed via gravity. The central portion of the pipe network dates from 1959 with further expansions taking place between 1979 and 1992. The network totals about 35 km of cast iron and steel pipes. According to standard billing practices, leakages are estimated at 50 percent in the water balance. The network appears to be structured in 5 zones, one corresponding to each reservoir, as a strategy to cope with the sloped character of the service area. However, it appears these zones have since been interconnected. Without treatment of the turbid raw water, especially sedimentation, it is likely that the network is filled with high amounts of sediment. During the winter, spring and fall the Town of Gabala receives water service 24 hours per day. However, water supply is typically rationed (6 hours/ day) during the dry months of June, July, August and September. Pressure levels are often reduced in the upper elevations, especially when consumption surpasses delivery capacity.

Wastewater And Stormwater Systems

None of the town is covered by an official community sewerage system. All neighbourhoods have informal, improvised wastewater evacuation system or rely on private septic pits. The primary sources of wastewater are the residential and commercial population, with no significant industry base reported. Wastewater evacuation is generally nonexistent within the service area. Storm water is collected via roadside, open channels and evacuated to nearby waterways according to local topography. Sewage is deposited directly into the drainage ways and receiving waters without any treatment, which poses risk of disease for the community and environmental degradation of the downstream regions. Accordingly, the local and regional surface and ground water hydrology are at risk of contamination. (ANNEX 2) Sewerage flows from Gabala contribute to the degradation of the Qaracay and Damiraparan Rivers and is part of the Kur River and Caspian Sea Basins

A2.3.2.OGUZ

General information

Oguz Rayon is a hilly and mountainous region located in the northern part of Azerbaijan with a boundary with the Russian Federation. . Area is 1,216 km^2. Population 38,433, in Rayon (of which 8,000 in Urban Centre). The main economic activities are based in agriculture and commerce. Some resorts are under construction. Climate Hot, dry summers and cold, wet winters. Annual Rainfall – 700-1200 mm.

Oquz and Ealicocay rivers flow from the Rayon area. Limestone, gravel, medicinal grass, forest re Garachay and Damiraparan rivers flow from the Rayon area.
Limestone, gravel, medicinal grass, forest reserves and fish are available, as natural resourses. From view point of economic characteristics, the basis of agriculture is composed of cattle breeding, weaving, vine-growing and silworm breeding. Enterprises, processing agricultural goods in the Rayon, including juice, tinned goods, grape processing, initial procesing of grape plant are functioning in the Rayon.
The Rayon is famous, as a resourt (tourist) zone. Shahdag National park, which is presently under establishment, covers the Rayon area.

Drinking Water Systems

Overall, the drinking water service in the urban centre of Oguz is characterized as unsound and unable to satisfactorily fulfil the basic utility mandate of community service. Unhygienic water supply: groundwater is inconsistently disinfected via an improvised mechanism; water rationing in the summer months allows backflow of untreated water into the network (overall an unsafe condition – but as yet without public health consequences). Ineffective water delivery: existing water resources are squandered, but would meet existing demand with proper design, maintenance and management of the pipe network (to reduce leakages, maintain pressure levels and control customer usage). Unreliable service: rationing is necessary only in summer months, aggravated by insufficient reservoir capacity for this size water supply system.

Water Resources Two springs provide raw water (Sazur və Almalı) for the town of Oguz. The original system source and the collection mechanism was installed in the 1956; the second source was added in 1959. The two existing spring water resources appear sufficient to meet current water demand, even during periods of low flow, but poor network management over the past decades results in squandering of resources (via leakages, no demand metering, etc.). This conclusion is based on "assumed" (per rationing regime) water flows and capacities; no meters are present at key water collection or distribution points, nor could the water utility present any estimates of flow rates. The raw water from the two sources is transmitted over 4 to 5 kilometres each via gravity.

Water Quality and Treatment. An "improvised" chlorination station (plastic bucket with hand-mixed chlorine powder solution) is used at the reservoirs to provide disinfection for delivery through the network. The original chlorination station is dilapidated and has been taken off line; the chlorination building is still used. The lack of consistent use of a treatment facility or disinfection station may present significant public health risks to the general population. Yet, water quality is reported in compliance with national standards, except for elevated turbidity and ammonium levels. Water quality sampling (according to physical-chemical parameters only - no bacteriological assessment) is conducted on a monthly basis by the Ministry of Health at several locations. (This does not appear fully substantiated through a complete set of testing records). No large settlements are present in the vicinity of the sources - though this may be possible through agricultural or livestock activities.

Distribution. The town system has two reservoirs for a total design capacity of 250 cubic metres. All water supply is distributed via gravity to two separate parts of the network configured along a hill side to reduce the effects of slope. The central portion of the pipe network dates from 1956 with further expansions taking place according to town growth. The network totals about 36 km of cast iron and steel pipes. While the utility reports "official" leakages at about 30 percent, indicated a more realistic view of this matter, the overall condition of visible system assets leads to the conclusion that leakages are likely to be significantly higher (leakages are estimated at 50 percent in the water balance). During the winter, spring and fall the Town of Oguz receives water service 24 hours per day. However, water supply is typically rationed (6 hours/ day) during the dry months of June, July, August and September. Pressure levels are often reduced in the upper elevations, especially when consumption surpasses delivery capacity.

Wastewater And Stormwater Systems

None of the town is covered by an official community sewerage system. All neighbourhoods have informal, improvised wastewater evacuation system or rely on private septic pits. The primary sources of wastewater are the residential and commercial population, with no significant industry base reported. Wastewater evacuation is generally nonexistent within the service area. Storm water is collected via roadside, open channels and evacuated to nearby waterways according to local topography. Sewage is deposited directly into the receiving waters or sludge into landfills – both without any treatment, which poses risk of disease for the community and environmental degradation of the downstream regions. Accordingly, the local and regional surface and ground water hydrology are at risk of contamination. Sewerage flows from Oguz likely contribute to the degradation of the Oguz and Ealiconcay Rivers which are part of the Kur River and Caspian Sea Basins.

A2.3.1. ZAQATALA

General information

Zaqatala Rayon is a mountainous region located in northern Azerbaijan with a boundary with the Russian Federation. The main economic activities are based in agriculture and commerce. Some resorts are under construction. Area is 1,350 km^2. Population 84,000 in Rayon (of which 27,900 in Urban Centre).

Climate Hot, dry summers and cold, wet winters. Annual Rainfall – 700-1200 mm.
Bakmazchay and Jar rivers flow from the Rayon area.Gravel, medicinal grass, forest reserves and fish are available, as natural resourses. From view point of economic characteristics, the basis of agriculture is composed of cattle breeding, weaving, tobacco-growing, vine-growing and silworm breeding.

Generally, processing of tobacco, qərzəkli (predominantly, hazel-nut, walnut) and seedy (apple, pear) fruit, including essential oil plants, grape and products of cattle-breeding are developing in the Rayon.
The Rayon is famous, as a resourt (tourist) zone.

Drinking Water Systems

Overall, the drinking water service in the urban centre of Zaqatala is characterized as unsound and unable to satisfactorily fulfil the basic utility mandate of community service. Unhygienic water supply: groundwater is inconsistently disinfected via an improvised mechanism; water rationing in the summer months allows backflow of untreated water into the network (overall an unsafe condition – but as yet without public health consequences). Ineffective water delivery: existing water resources are squandered, but would meet existing demand with proper design, maintenance and management of the pipe network (to reduce leakages, maintain pressure levels and control customer usage). Unreliable service: rationing is necessary only in summer months, aggravated by insufficient reservoir capacity for this size water supply system.

The service area of the "urban centre" water supply system, the focus of this evaluation, encompasses about 64 percent of the Town of Zaqatala, about 36 percent perceresidents in the urban centre remain unconnected to the system and rely on informal/vendor systems or public taps.

Water Resources.. Surface (Jar, Siliban , Tala , Mesres1, Mesres2 mountain rivers) and groundwater (artezian wells) resources provide raw water for the town of Zaqatala. The system resources appear sufficient to meet current water demand, but poor network management over the past decades results in squandering of resources (via leakages, no demand metering, etc.).

Water Quality and Treatment. The raw water from the numerous are transmitted over several kilometres to the town reservoirs, all via gravity. Again, the precise layout of the transmission pipelines is unclear, but estimated in the figure below. For example, a collection tank stores water from the infiltration gallery and basins. Two "improvised" chlorination stations (plastic bucket with hand-mixed chlorine powder solution) are used at the functional reservoirs to provide disinfection for delivery through the network. The effectiveness of this mechanism, in consideration of the evident turbidity levels, is unclear. The lack of consistent use of a treatment facility or disinfection station may present significant public health risks to the general population. Yet, water quality is reported in compliance with national standards (including turbidity levels – clearly this requires further clarification as all water sources viewed onsite demonstrated significant levels of turbidity). Water quality sampling (according to physical-chemical parameters only - no bacteriological assessment) is conducted on a monthly basis by the Ministry of Health at several locations. In any case, treatment mechanisms are not adapted to the turbidity levels, with the turbid water being directed into the distribution network. No large settlements are present in the vicinity of the sources, limiting the likelihood of contamination pathways – though this may be possible through agricultural or livestock activities and the new construction of vacation homes.

Distribution. The town system has three reservoirs for a total design capacity of 2,500 cubic meters. The network totals about 27.3 km of main and 40 km of secondary pipes, both of cast iron and steel pipes According to standard billing practices, the overall condition of visible system assets leads to the conclusion that leakages are estimated at 50 percent in the water balance During the winter, spring and fall the Town of Zaqatala receives water service 24 hours per day. However, water supply is typically rationed (6 hours/ day) during the dry months of June, July, August and September. Pressure levels are often reduced in the upper elevations, especially when consumption surpasses delivery capacity. .
No meters are installed at the customer connection.

Wastewater And Stormwater Systems

About 35% of the town - the denser central, business district - is covered by an official community sewerage system. The remaining neighbourhoods have informal, improvised wastewater evacuation system or rely on private septic pits. The primary sources of wastewater are the residential and commercial population, with no significant industry base reported. The evacuation network is a gravity system with about 28 km of sanitary and storm sewer pipes. Storm water is collected via roadside, open channels and evacuated to nearby waterways according to local topography. Most sewage is directed to drainage ways or latrines without any treatment, which poses risk of disease for the community and environmental degradation of the downstream regions. Accordingly, the local and regional surface and ground water hydrology are at risk of contamination. Sewerage flows from Zaqatala contribute to the degradation of the Bakmaz and Jar Rivers.

A2.4. GUBA-XACHMAZ EGR

A2.4.1. QUBA

General information

Guba Rayon is a mountainous region located in northern Azerbaijan. The main economic activities are based in agriculture, commerce and tourism. Some resorts are under construction. Area is 2,610 km^2. Population 143,100 in Rayon (of which 22,500 in Urban Centre).

Climate Hot, dry summers and cold, wet winters. Annual Rainfall – 750-1300 mm.

Springs, medicinal water, medicinal grass are available in the Rayon.
Processing of potasso and cucumber, hazel-nut, walnut , seedy (apple, pear) fruit, grape and products of cattle-breeding are developing in the Rayon.
The Rayon is famous, as a resourt (tourist) zone. Shahdag National park, which is presently under establishment, covers the Rayon area.

Drinking Water Systems

Overall, the drinking water service in the urban centre of Guba is characterized as unsound and unable to satisfactorily fulfil the basic utility mandate of community service.

The service area of the "urban centre" water supply system, the focus of this evaluation, encompasses about 75 percent of the Town of Guba. Therefore, about 25 percent residents in the urban centre remain unconnected to the system and rely on informal/vendor systems or public taps.

Water Resources. Water Resources.Numerous groundwater resources (one extended infiltration gallery plus 16 wells) provide raw water for the town of Guba. The infiltration gallery under the Gudyalchay River was constructed in 1973 and the wells were added, apparently in response to town and water demand growth, during the 1980s, generally in proximity to the existing reservoirs. The infiltration gallery was also extended. No records exist regarding these expansion projects. An additional spring is reported as a source, but details were not provided. The existing ground water resources appear sufficient to meet current water demand, even during periods of low flow, but poor network management over the past decades results in squandering of resources (via leakages, no demand metering, etc.). The raw water from the infiltration gallery, the primary source, is transmitted about 6 kilometres via gravity to the town. All wells are pumped into the closest reservoir; often the wells are adjacent to the reservoir, but some are located at greater (undetermined) distances.

Water Quality and Treatment. A "restored" liquid chlorination station is the only treatment facilitiy and is applied at the main reservoir (No. 3) to provide disinfection for delivery through the network. The treatment strategy appears to focus on the primary water source, raw water from the infiltration gallery, with the intention that chlorinated water is transported to the other reservoirs connected in sequence, in order to disinfect the other well sources. However, the extended distances between reservoirs and bypass pipelines provide no guarantee of complete system disinfection. The lack of consistent treatment application throughout the entire system presents public health risks to the general population. Yet, water quality is reported in compliance with national standards, except for elevated turbidity levels. Water quality sampling (according to physical-chemical parameters only - no bacteriological assessment) is conducted on a monthly basis by the Ministry of Health at several locations. (This does not appear fully substantiated through a complete set of testing records). No large settlements are present in the vicinity of the sources, limiting the likelihood of contamination pathways – though this may be possible through agricultural or livestock activities

Distribution. The town system has four reservoirs for a total design capacity of 6,500 cubic meters. This appears to exceed the system storage needs to meet peak day demand, per gross calculation, for current and future scenarios. Water is typically directed from the main reservoir (No.3) to the other reservoirs (No. 2 and in turn No. 1) in sequence via gravity. Water flows from each reservoir different sections of the distribution network. All water supply is distributed via gravity from the reservoirs, though some wells may be pumped directly into some newer sections of the network. The central portion of the pipe network dates from 1973 with expansions taking place in the 1980s. The network totals about 54 km of main and 74 km of secondary pipes, both of cast iron and steel pipes. While the utility reports "official" leakages at about 10 percent, according to standard billing practices, the overall condition of visible system assets leads to the conclusion that leakages are likely to be significantly higher (leakages are estimated at 50 percent in the water balance). Water supply is typically staggered between 3 zones (5 hours/ day). However, the "upper zone", which includes businesses and apartment buildings (5-6 story – need greater pressure), typically receives precedence and often has 24 hour service.

Wastewater And Stormwater Systems

About 65 percent of the town is covered by an official community sewerage system. The remaining neighbourhoods have informal, improvised wastewater evacuation system or rely on private septic pits. The primary sources of wastewater are the residential and commercial population, with no significant industry base reported. The evacuation network is a gravity system with about 61.5 kilometres of (combined? sanitary and storm) sewer pipes leading to a regional wastewater treatment plant shared with Gusar and Khachmaz, at a distance of 34 kilometres (pipeline reported to be 800 diameter via gravity). The treatment plant has been operated by a private company, but Azersu is taking over the operations in 2006. Storm water is collected via roadside, open channels and evacuated to nearby waterways according to local topography. Sewage from the sewerage network is treated at the regional facility, which is reported to be a mechanical – biological treatment plant. The plant is just completing an upgrade and expansion in 2006. Sewage from unconnected neighbourhoods either flows informally to local drainage ways or is emptied by sewage trucks for informal disposal. Both may pose risk of disease for the community and environmental degradation of the downstream regions. Sewerage flows from Guba contribute to the degradation of the Qudyalcay and is part of the Caspian Sea Basin.

ANNEX 3. LABORATORY RESULTS OF CHEMICAL - BACTERIOLOGICAL TESTS OF WATER AND WASTEWATER

Table A3.1. Qabala City. Laboratory results of chemical - bacteriological tests of water
Sampling Date: 30.10.06 "SUKANAL" Scientific-Research and Design Institute

№	Item	Criteria	Sampling Point: Area					
			Occuational limits	Cold spring	Garasu river	Artezian well	Durca river	Damiraparan river
1.	Odour	bal	<2	0	0	0	0	0
2.	Color	degree	<20(35)	0	1.4	0	0	0
3.	Suspended solids	mg/1	<1.5(2.0)	12.4	1.4	0.6	1.17	17.3
4.	PH	-	6-9	7.70	8.26	7.6	8.22	8.22
5.	Ammonium, (N-	mg/1	<2.0	0.082	0.044	0.048	0.13	0.014
6.	Total Alkalinity, (HCO_3^-)	mg/1	>30	183	231.8	219.6	170.8	156.2
7.	Calcium, (Ca)	mg/1	<250	68.1	66.5	72.1	50	63.3
8.	Magnesium, (Mg)	mg/1	<50	9.7	9.2	7.3	9.5	9.2
9.	Total dissolved solids	mg/1	<1000	326.5	327.8	334.3	254.6	325.5
10.	Sodium + potassium (Na+K)	mg/1	<200(Na)	2.8	2.5	2.5	0.5	10.8
11.	Nitrate, ($N0_3^-$)	mg/1	<45	1.98	0.57	3.68	2.27	1.42
12.	Nitrite, ($N0_2^-$),	mg/1	<0.1(3)	0.006	0.005	0.007	0.01	0.008
13.	Total hardness	mmol/1	<7(10)	4.2	4.08	4.2	3.28	3.92
14.	Carbon hardness	mmol/1	<7(10)	3.0	3.8	3.6	2.8	2.56
15.	Sulphate, ($S0_4^{2-}$)	mg/1	<500	59	14.9	27	20	83
16	Solid residue	mg/1	<1000(150	237	213	230	170	252
17.	Chloride, (Cr)	mq/l	<350	1.9	2.27	2.13	1.35	1.56
18.	Electrical conductivity, γ25	μs/sm	<1500	376	340	371	293	374
19.	Iron, (Fe)	mg/1	<0.3	0.14	0.074	0.065	0.076	0.13
20.	Chemical oxyden demand (COD	mg/1	<5.0	1.21	1.62	0.74	1.21	0.85
21.	Copper, Cu	mg/1	<1.0	0.04	0.02	0.03	0.04	0.05
22.	Manganese, (Mn)	mg/1	<0.1	0.0185	0.014	0.012	0.017	0.016
23.	Chromium, (Cr)	mg/1	<0.05	0.0	0.007	0.0	0.00	0.0
24.	Zink, Zn	mg/1	<5	0.04	0.08	0.035	0.04	0.06
25.	Aliminium, (Al)	mg/1	<0.5	0.007	0.006	0.008	0.008	0.007
26.	Fluorides, F	mg/1	<0.7	0.09	0.085	0.08	0.06	0.15
27.	Poliphosphate ($P0_4^{-3}$)	mg/1	<3.5	0.01	0.01	0.01	0.01	0.01
28.	Plate count	Colony number formed in 1ml of	<100	37	104	22	5	12
29.	Coliform organisms, (coli-indeks)	Intestinal bacillus number formed in 1 litr	<3	20	28	14	7	9

Table A3.2 .Laboratory results of Sanitary-Chemistry Sewage Analysis **of Qebele City**
Realization time of the analysis: 02.11.06 - 08.11.06.
"SUKANAL" Scientific-Research and Design Institute

№	Activities	Unit	Place of the sample		
			Asenizasion machine	Shambo	Sewage flow at the out of city
1	Sediment volume	%	8.0	7.3	
2	Colour		dark yelow	dark yelow	
3	Smell		fecal	fecal	
4	PH		9.3	9.2	7.6
5	Chemical oxygen demand (COD)	mqO/1	3780	3500	81
6	Biochemical oxygen demand (BOD_5)	mq/1	1020	1130	36.0
7	Arid residue	mq/1	3870	3980	430
8	Suspended solids (SS)	mq/1	8450	8033	42
9	Chloride *(Cl)*	mq/1	1000	1140	70
10	Ammonia *{N-NH_4)*	mqN/1	1570	1720	12
11	Nitrite *(NO_2^-)*	mq/1	0	0	0.44
12	Nitrate *(NO_2^-)*	mq/1	0	0	0.5
13	Phosphate *(PO_4^{-3})*	mq/1	190	150	2.8

Table A3.3 Bilesuvar city. Laboratory results of chemical - bacteriological tests of water
Sampling Date: 21.10.06 "SUKANAL" Scientific-Research and Design Institute

№	Item	Criteria	Sampling Point: Area			
			Occuational limits	Azizbekov Canal (Magistral way)	Azizbekov Canal (Village Askerabad	Azizbekov Canal (Vilage Fioletovka
1.	Odour	bal	<2	0	0	0
2.	Color	degree	<20(35)	2.3	2.46	2.16
3.	Suspended solids	mg/1	<1.5(2.0)	103.4	99.0	99.3
4.	PH	-	6-9	8.1	8.14	8.12
5.	Ammonium, (N-	mg/1	<2.0	0.12	0.03	0.01
6.	Total Alkalinity, (HCO_3^-)	mg/1	>30	183.0	195.2	187.9
7.	Calcium, (Ca)	mg/1	<250	94.2	102.2	102.2
8.	Magnesium, (Mg)	mg/1	<50	37.7	32.8	38.91
9.	Total dissolved solids	mg/1	<1000	1051.4	1061.9	1058.9
10.	Sodium + potassium (Na+K)	mg/1	<200(Na)	184.4	186.9	175.9
11.	Nitrate, ($N0_3^-$)	mg/1	<45	3.2	1.9	3.8
12.	Nitrite, ($N0_2^-$),	mg/1	<0.1(3)	0.02	0.01	0.01
13.	Total hardness	mmol/1	<7(10)	7.8	7.8	8.3
14.	Carbon hardness	mmol/1	<7(10)	3.0	3.2	3.08
15.	Sulphate, ($S0_4^{2-}$)	mg/1	<500	373.3	360	373.3
16	Solid residue	mg/1	<1000(1500)	962	969	968.0
17.	Chloride, (Cr)	mq/l	<350	175.6	182.9	176.9
18.	Electrical conductivity, γ25	μs/sm	<1500	1425	1428	1453
19.	Iron, (Fe)	mg/1	<0.3	0.07	0.08	0.08
20.	Chemical oxyden demand (COD Mn)	mg/1	<5.0	2.26	2.02	2.26
21.	Copper, Cu	mg/1	<1.0	0.02	0.025	0.03
22.	Manganese, (Mn)	mg/1	<0.1	0.0195	0.008	0.0135
23.	Chromium, (Cr)	mg/1	<0.05	0	0	0
24.	Zink, Zn	mg/1	<5	0.105	0.08	0.06
25.	Aliminium, (Al)	mg/1	<0.5	0.006	0.006	0.007
26.	Fluorides, F	mg/1	<0.7	0.45	0.5	0.45
27.	Poliphosphate ($P0_4^{-3}$)	mg/1	<3.5	0.01	0.01	0.01
28.	Plate count	Colony number formed in 1ml of test water	<100	900	710	670
29.	Coliform organisms, (coli-indeks)	Intestinal bacillus number formed in 1 litr of test water	<3	730	620	610

Table A3.4 Sanitary-Chemistry Sewage Analysis of **Bilesuvar City**
Realization time of the analysis: 25.10.06 – 31.10.06
"SUKANAL" Scientific-Research and Design Institute

№	Activities	Unit	Place of the sample	
			Asenizasion machine	Shambo
1	Rainfall	%	8.0	9
2	Colour		dark yelow	dark yelow
3	Smell		fecal	fecal
4	PH		9.5	9.5
5	Chemical oxygen demand (COD)	mqO/1	2588	2624
6	Biochemical oxygen demand (BOD_5)	mq/1	957	978
7	Arid residue	mq/1	4952	5158
8	Suspended solids (SS)	mq/1	10000	10100
9	Chloride (Cl^-)	mq/1	1320	1420
10	Ammonia ($N\text{-}NH_4$)	mqN/1	2320	2400
11	Nitrite (NO_2^-)	mq/1	0	0
12	Nitrate (NO_2^-)	mq/1	0	0
13	Phosphate (PO_4^{-3})	mq/1	157.4	162.0

ANNEX 4.ECOLOGICAL SENSITIVE SITES IN THE PROJECT AREA

A. Table A4-1.Ecological sensitive sites in the project area

Town	Sensitive site	Component
Zakatala	• Strict Nature Reserve "Zakatala" • Gatachay, Jar, Siliban , Tala , Mesres1, Mesres2 • Rivers and many sources • State Forest (1-st category protection) around the project area • Rest zones	*Biodiversity:* -Rare and endangered species (included in Red Book as well - *Corylus avellona Taxus baccata, Hedera pastuchowii *Meles meles,Lutra lutra meridionalis Felis lynx,Rupicarpa rupicarpa caucasica) -natural forest- Quercus, Carpinus, Acer *Water ecosystems* -rivers and sources *Health of people*
Oguz	• National Park "Shahdag" • Alinjachay River and many sources • State Forest (1-st category protection) around the project area • Rest zones	*Biodiversity:* *-Rare and endangered species (included in* Red Book as well - *Quercus castaneifolia, Parrotia persica Taxus baccata, Hedera pastuehowii Pterocarya pterocarpa, Diospyros lotus *Meles meles,Lutra lutra meridionalis Felis lynx,Rupicarpa rupicarpa caucasica) *-natural forest-* Quercus, Carpinus, Acer *Water ecosystems* -river and sources *Health of people*
Gabala	• National Park "Shahdag" • "Turianchay", "Garachay and Vandamchay River and many sources • State Forest (1-st category protection) around the project area • Rest zones	*Biodiversity:* -Rare and endangered species (included in Red Book as well - *Quercus castaneifolia, Parrotia persica Taxus baccata, Hedera pastuehowii Pterocarya pterocarpa, Diospyros lotus *Meles meles,Lutra lutra meridionalis Felis lynx,Rupicarpa rupicarpa caucasica) *-natural forest-* Quercus, Carpinus, Acer *Water ecosystems* -river and sources *Health of people*
Guba	• National Park "Shahdag" • Gudialchay River and sources and many sources • Rest zones	*Biodiversity:* -Rare and endangered species (included in Red Book as well - Water ecosystems -rivers and sources - *Health of people*

B. List of flora and fauna (*plants* and animals) within the Project Area included into the Red Book in the Azerbaijan

Table A4-2. Flora

Pseudovesicaria digitata	Ophrys caucasica	Tulipa biebersteiniana	Rosa sosnowskyi
Ferula persica	Orchis purpurea	T. eichleri	Betula raddeana
Cladochaeta candissima	Steveniella satyrioides	Galantus caucasicus	Juniperus foetidissima
Astragalus bakuensis	Primula juliae	Rosa azerbajdzanica	Diospyros lotus
Gentiana lagodechiana	Atropa caucasica	Rhododendron luteum	Quercus castaneifolia
Iris acutiloba	Woodsia alpine	Vitis sylvestris	Parrotia persica
I.Reticulata	Sternbergia fischeriana	Pyracanta coccinea	Pterocarya pterocarpa
Alcea kusariensis	S. colchiciflora	Acantholimon schemachense	Punica granatum
Cephalantera longifobia	S. lutea	Danae racemosa	Salix kuznetzowii
Himantoglossum formosum	Nectaroscordum dioscoridis	Hedera pastuchowii	Taxus baccata

TableA4- 2.Amphibia and Reptilia

AMPHIBIA	REPTILIA
Triturus cristatus	Testudo graeca
Bufo viridis	Emys orbicularis
Hyla arborea	

Table.A4-3 Birds

Pelecanus nocrotalus	C. bevickii Yarr.	.Aquila rapax Temm.	Falco. cherrug Gray
Pelecanus crispus	Marmaronetta angustirostris	A. clanga Pall.	Falco peregrinus
Phalacrocorax pygmeus	Aythya nyroca	.A. Heliaca Sav.	Falco naumanni
Platalea leucorodia	Oxyura leucocephala	A. Chrysaetos L.	Francolinus francolinus .
Phoenicopterus roseus	Pandion haliaetus	Gypaetus barbatus	Phasianus colchicus Talischensis
Branta ruficollis	H. albicilla	Aegipius monachus .	Crex crex L.
Anser erythropus	Accipiter gentiles	Ciraetus gallicus (ferox) Gm	Porphyrio porphyrio L.
Cygnus olor	.A. Badius Gmel.	Cyrcus macrourus .	

Table A4-4 .Mammals

Lutra lutra	*Vermela peregusna* Guld.
Hyaena hyaena	*Rupicapra rupicapra* L.
Felix.lynx L.	Lutra lutra

ANNEX 5.NATIONAL WATER SUPPLY AND SANITATION PROJECT CHECK LISTS

ANNEX 5.1: Check List: Water Supply

Environmental Components	Possible Impacts	Mitigation Measures
Physical Environment		
Soils	• Damage to soil structure due to material storage, construction traffic, etc. • Loss of topsoil during excavation • Effects of excavation for/disposal of soil and other materials • Erosion due to uncontrolled surface run-off and wastewater discharge	• Protect non-construction areas, avoid work in sensitive areas during highly adverse conditions, provide temporary haul roads as appropriate, restore damaged areas • Strip topsoil where necessary, store and replace post construction • Design drainage and other disposal facilities to ensure soil stability
Land	• Damage to land during construction Landslips on embankments, hillsides, etc. • Impacts from excavation for/disposal of soil and other materials	• Protect non-construction areas • Design works to minimize land affected • Design slopes & retaining structures to minimize risk, provide appropriate drainage, soil stabilization/vegetation cover • Strip topsoil as necessary and store, replace/reuse post construction • Take/dispose of materials from/at approved sites
Water Resources	• Over-exploitation, causing changes in resources, flow patterns, etc., with possible impact on downstream users/ users elsewhere (if groundwater) • Interruption of surface and underground drainage patterns during and post construction, creation of standing water Contamination/pollution of resource and/or supply by construction, human and animal wastes, including fuel & oil, hazardous wastes, wastewater, etc.	• Determine sustainable use/yield (test as required) • Resource planning and management, in conjunction with authorities & communities • Careful design - maintain natural drainage where possible, provide suitable wastewater drainage, safe/sanitary disposal of hazardous wastes • Careful design, adequate protection from/control of livestock; agriculture, casual human contact, hazardous materials - fuel (including storage), etc.
Air Quality	• Dust and fumes during construction • Impacts from water treatment	• Control dust with water, control construction methods and plant, timing of works, vehicle speeds • Minimize major works inside communities • Appropriate design, training in O&M, safety

Environmental Components	Possible Impacts	Mitigation Measures
Acoustic Environment	• Noise disturbance from construction works, pump stations (if near house/s)	• Time work to minimize disturbance • Use appropriate construction methods & equipment • Restrict through-traffic in residential areas • Careful siting and/or design of plant, provide noise barriers e.g. embankments of waste soil
Biological Environment		
Natural Habitats	• Disturbance of natural habitats from construction, e.g. dust, noise, un-seasonal working, poor siting of new works, disposal of untreated wastes, etc. • Changes in water resources regime	• Careful siting, alignment, design of pipelines and structures, and/or timing of works (seasonal) • Select disposal areas and methods carefully Protect sensitive areas within/close to site • Ensure compliance with minimum seasonal flow requirements
Fauna and Flora	• Loss or degradation during and post construction, especially due to un-seasonal working, changes in environment regimes, etc (see also above)	• Careful siting, alignment and/or design to minimize impacts, especially for any sensitive/rare species • Select appropriate construction methods • Protect sensitive areas within/close to site
Social Environment		
Aesthetics and Landscape	• Local visual impact of completed works and some intrusions into general manmade and natural landscape, loss of trees, vegetation, etc. • Noise, dust, wastes, etc., during and post construction	• Careful siting and design of works, screening of intrusive items • Replace lost trees, boundary structures, etc., re-vegetate work areas • Careful de-commissioning of construction areas and disposal of wastes • See also Soil, Land, Air Quality and Acoustic
Human Health	• Health and safety hazards during and post construction • Health impacts and diseases from hazardous construction materials wastes, contaminated water, improper water treatment	• Appoint experienced contractors. Incorporate safety and environmental requirements in contract documents. Provide information on mitigating measures. Capacity building to emphasize need for safe working, good supervision, careful planning and scheduling of work activities, involve communities, fence hazardous areas • Correct design and adequate training in O&M of plant, safety procedures, water testing, etc. • Correct disposal of waste

Environmental Components	Possible Impacts	Mitigation Measures
Historical/Cultural Sites	• Disturbance/damage/degradation to known and undiscovered sites	• Careful siting/alignment of works; special measures to project known resources/areas • Immediately halt work in vicinity of discoveries, pending instructions from relevant authorities

ANNEX 5.4: Check List: Wastewater and Sewerage

Environmental Components	Possible Impacts	Mitigation Measures
Physical Environment		
Soils	• Damage to soil structure due to material storage, construction traffic, etc. • Loss of topsoil during excavation for/ disposal of construction materials • Erosion due to uncontrolled surface run-off • Pollution at discharge point, possibly leading to groundwater pollution	• Protect non-construction areas, avoid work in sensitive areas during highly adverse conditions, provide temporary haul roads as appropriate, restore damaged areas • Strip topsoil where necessary, store and replace post construction • Design drainage and other disposal facilities to ensure soil stability and appropriate treatment
Land	• Landslips on embankments, hillsides, etc. • Impacts from excavation for/disposal of soil and other materials	• Protect non-construction areas • Design works to minimize land affected • Design slopes & retaining structures to minimize risk, provide appropriate drainage and vegetation cover • Strip topsoil as necessary and store, replace/reuse post construction • Take/dispose of materials from/at approved sites
Water Resources	• Changes in regime from excavation for/disposal of soil, waste materials, etc • Contamination/pollution from construction, human and animal wastes, including fuel & oil, hazardous wastes, wastewater and sewage – especially from discharge if not connected to existing sewer. • Eutrophication of surface water leading to habit changes, etc.	• Store hazardous materials and wastes carefully, provide suitable wastewater drainage and safe waste disposal • Select appropriate technology for wastewater treatment to minimize pollution, especially in sensitive locations, e.g. close to drinking water source, and operate and maintain correctly/ according to agree discharge standards provide O&M training • Site treatment works appropriately, or incorporate into larger wastewater systems, provide any treatment necessary to meet required standards, plus training
Air Quality	• Dust and fumes during construction • Hazardous gases in manholes and during disinfection (if chlorine gas)	• Control dust with water • Control construction methods and plant, timing of works • Restrict vehicle speeds in residential areas • Appropriate design • Proper operation, monitoring system in place

Environmental Components	Possible Impacts	Mitigation Measures
Acoustic Environment	• Noise disturbance from construction works and traffic	• Time work to minimize disturbance • Use appropriate construction methods & equipment • Restrict vehicle speeds in residential areas, especially trucks
Biological Environment		
Natural Habitats	• Disturbance or loss of natural habitats and disturbance of protected areas, during and post construction • Changes due to eutrophication of surface water	• Careful siting/design of structures and/or timing of works (seasonal) • Select disposal areas and methods carefully, Protect sensitive areas within/close to site
Fauna and Flora	• Disturbance or loss, especially aquatic animals and vegetation from eutrophication of surface water, (effect of water pollution)	• Careful siting, alignment and/or design to minimize impacts, especially for any sensitive/rare species • Select appropriate construction methods • Protect sensitive areas within/close to site • Abatement of pollution by a proper effluent treatment and disposal.
Social Environment		
Aesthetics and Landscape	• Local visual impact of completed works and some intrusions in general manmade and natural landscape, loss of trees, vegetation, etc. • Noise, dust, wastes, etc., during and post construction • Unpleasant odors from treatment facility, disposal point and/or polluted water course	• Careful siting and design of works, screening of intrusive items • Replace lost trees, boundary structures, etc., re-vegetate work areas • Careful de-commissioning and reinstatement of construction areas, and disposal of wastes during and post construction, including proper O&M of treatment facility and training in both • See also Soil, Land, Air Quality and Acoustic
Human Health	• Health and safety hazards during and post construction • Health impacts from hazardous construction materials and untreated wastes	• Appoint experienced contractors. Incorporate safety and environmental requirements in contract documents. Provide information on mitigating measures. Capacity building to emphasize need for safe working, good supervision, careful planning and scheduling of work and O&M activities, involve communities, fence hazardous areas • Careful siting and design of works • Correct disposal of wastes, based on selection of most appropriate technology; training in O&M operation and maintenance plans

Environmental Components	Possible Impacts	Mitigation Measures
Human Communities	• Impacts may be concentrated downstream in other communities	• Adequate treatment prior to discharge • Adequate consultation of potentially affected communities
Historical/Cultural Sites	• Disturbance/damage/degradation to known and undiscovered sites	• Careful siting/alignment of works; special measures to project known resources/areas • Immediately halt work in vicinity of discoveries, pending instructions from relevant authorities

ANNEX 6. MAIN INDICATORS OF USE WATER RESOURCES

Table A6-1. Areas of agricultural plants by project towns (ha) and main indicators of use water resources (mln cube metr) in 2004

№	Towns and regions	Areas for agricultural plants (ha)	For public needs mln/m^3	For production needs mln/m^3	Irrigation mln/m^3	Other mln/m^3
	Total on Republic	1293752	498	2264	5220	17
1	Agstafa	17213	0,7	-	66,6	-
2	Bilasuvar	29906	0,6	-	123,8	-
3	Goranboy	23683	-	-	115	-
4	Khanlar	8126	0,2	0,2	30,5	
5	Gabala	19261	0,4	-	28	0,7
6	Guba	12828	0,02	-	20	-
7	Oguz	15866	0,4	0,1	19,8	-
8	Saatli	44549	0,1	0,1	268,6	-
9	Tovuz	22070	0,1	-	55,5	3
10	Zagatala	21058	1,4	-	35,2	-

ANNEX 7.MAIN CONDITIONS FOR USE OF WASTE WATER AND SLUDGE AS ADDITIVE AT IRRIGATION AND FERTILIZATION IN AGRICULTURE

1.General requirements

Application of certain methods of watering of waste water at irrigated fields depend on preliminary preparation, with consideration of natural conditions and type of cultivated crops.

Assessment of waste water quality and its sludge, applied for irrigation and fertilization is conducted in complex way according to agrochemical and sanitary-hygienic and veterinary-sanitary indications.

Regulation of indicators of quality of watering water and its sludge is made with consideration of soil-climatic, hydro-geologicla conditions of territory of specific object, biological specific features of cultivated crops and technology of irrigation. Chemical composition of waste water, used for irrigation is assessed on base of activity of hydrogen ion (pH), composition of amount of highly solved salts, correspondence of one and two valence cations, availability of main biogenic elements (nitrogen, phosphorus, potassium), micro-elements, organic substances.

Depending on chemical composition of waste water, physical and chemical properties of soil, specific features of cultivated crops, technology of use of waste water for regular (by water use) or fertilizaer watering.

For use of waste water and sludge in agriculture at irrigation and, as additive to fertilizer, the principal conditions are to be regulated by following docments:

- State standard 17.4.3.05-86 (ST SEV 5297-85)
- SniP 2.04.03-85 Sanitation, External networks and structures
- SniP 2.06.08-85 Irrigation systems and structures
- Sanitary rules of installation and operation of agricultural fields of irrigation, N 3236-85.
- Irrigation systems with use of waste water. Norms of designing VSN 33-2.2.02-86. Requirements to waste water and sludge for irrigation and fertilization.
- Corresponding rules of FAO and WHO

2. Requirements concerning quality of waste water and its sludge

Quality of waste water and its sludge, used for irrigation is regulated by chemical, bacteriological and parasitological indications.

Admissible concentration of heavy metals in waste water is established depending on irrigation norm, and it is defined in each specific case in accordance with acting requirements to waste water quality and its sludge, used for irrgigation and fertilization.

Waste water, containing microelements, including heavy metals in quantities not exceeding MAC for economy-potable water use, may be used for irrigation without restrictions.

Microbiological and parasitological indications of waste water quality, relevant for irrigation, are cited in table 1.

Table A7-1 Microbiological and parasitological indications of waste water quality, relevant for irrigation

Indicators	admissible composition in 1 cub.dm1
Number of LPB (lactose positive bacillus)	<10000
Pathogenic microorganisms	absence
Viable eggs of geohelminths, ascarid, whipworm, hookworm	<1
Viable eggs of biohelminths (oncosphere, heniide, eggs of liver fluke)	<1
Viable cyst of intestinal pathogenic protozoa (cyst of lamblias, Balantidium, oocyst, cryptosporidiosis)	<1

Possibility of use of treated industrial and mixed waste water in at irrigated fields is settled in each specific case by bodies and institutions of state sanitary-epidemiology and veterinary services on base of results of special researches, directed for learning of degree and character of impact of waste water on soil, cultivated crops, live-stock and cattle breeding production.

3. Requirements concerning sludge of waste water, applied for fertilization

Use of sludge of waste water for fertilization may be admitted after its sterilization by one of methods in accordance with acting Sanitary rules of installation and operation of agricultural fields of irrigation.

Before use of sludge at lots for fertilization, agrochemical examination of soil on following parameters is to be conducted: pH, composition of active forms of phosphorus, potassium, heavy metals-lead, cadmium, chromium, copper, nickel, mercury, zinc. Examination is made on base of methods, accepted at agrochemical service.

Regulatory requirements, concerning sludge of waste water, are indicated in ANNEX 7.

As a rule, content of heavy metals in sludge of waste water from enterprises, reprocessing agricultural production is lower, however, nutritive substances are higher, than in sludge from city treatment facilities. With aim to exclude hazard of pollution of soil, production and environment by heavy metals sludge of waste water purposed for fertilization are to be obligatorily analyzed for checking of heavy metals: lead, cadmium, chrome, copper, nickel, mercury, and zinc.

Application of sludge of industrial –domestic waste water, containing heavy metals and composts from them is prohibited, if introduction of these fertilizers will increase level of pollution of soils up to values 0,7-0,8 MACs

4. Quality control of waste water and its sludge, which are applied for irrigation and fertilization

Production laboratory control on envisaging of sanitation rules and standards at operation of at irrigated fields includes:

- control of effectiveness of operation of plants on preliminary preparation of waste water and its sludge before introduction at agricultural fields;

- quality control of underground and surface water, whcih are in the area of impact at agricultural fields
- quality control of soil and agricultural production

Check points, terms of selection of samples of waste water and main indicators of its content are defined in each specific case at designing and they are specified at operation of irrigation systems in agreement with local control bodies.

Analysis of content of sludge of waste water is conducted before its use. Background content of heavy metals in soils is defined at lots, purposed for irrigation.

ANNEX 8. ENVIRONMENTAL MONITORING STANDARTS

A. Environmental Monitoring Rules for the Wastewater Treatment Plants

According to rules (, discharge of wastewaters into water bodies is allowed only after obtaining a permit for "special water-use". The degree to which discharged wastewaters have to be treated (purified) is determined by the Maximum Allowable Discharge (MAD) norms for polluting substances. These norms are normally imposed in order to gradually improve surface water quality and meet the sanitary-hygienic requirements in proximity to water-intake structures.

Norms (MACs or EALs) for the water chemical composition and its properties in water bodies are set depending on the category of water-use. (MAC - maximal allowable concentrations of substances are such concentrations, that these substances do not impose any direct or indirect influence on human health (both -immediate and cumulative effects) and do not lead to deterioration of hygienic conditionsof water usage); (Chapter 2.3.1, 8-11)

Water bodies of the first category are the water bodies, used as the source for centralized or non-centralized economic-potable water supply as well as for water supply of foodprocessing industry enterprises.

Water bodies of the second category are the water bodies, used for cultural and community purposes, recreation, sport and water bodies, located inside settlement borders (USSR Ministry of Health, 1988a).

So-called Emission Limit Values (ELVs) are calculated in order to meet the Maximum Allowable Concentrations (MACs) in the receiving media. ELVs constitute the basic permit requirements.

B. Environmental Monitoring Standard for the Drinking Water

Main monitoring standards on quality of drinking water are defined on base of document "QOST (State standards) 2874-82. Drinking water. Hygienic Requirements and water quality control".

Monitoring parameters of drinking water and standards are given in Table A8-1

Table A8-1. Environmental Standards for the Drinking water

Environmental Parameter	Standard
pH	6.0 – 9.0
Turbidity	1.5 mg/l
Microorganisms *(Colony number formed in 1ml of test water)*	<100
Coliforms (coli-index). Intestinal bacillus number formed in 1 litr of test water	<3

Environmental Parameter	Standard
Nitrates ($N0_3^-$)	45 mg/l
Nitrites ($N0_2^-$),	3 mg/l
Chlorides	350 mg/l
Phosphates	1.0 mg/l
Sulfates ($S0_4^{2-}$)	500 mg/l
Total hardness	7 mmol/1
Residual chlorine	0.3-0.5
Al	0.5 mg/l
As	0.05 mg/l
Fe	0. 3 mg/l
Ni	0.1 mg/l
Cr(Cr^{6+})	0.05 mg/l
Cu(Cr^{2+})	1 mg/l
Zn	5 mg/l
Cd	0.001 mg/l
Pb	0.03 mg/l
Hg	0.0005 mg/l

C. Environmental Monitoring Standard for the Treated Sludge

Table A8-2.Environmental Monitoring Guidelines for the Treated Sludge

Environmental Parameter to be Monitored	Standard
pH	5.5-8.5
Coli-titr	<0.01
Viable eggs of biohelminths (in 1 dm^3)	0
Viable cyst of intestinal pathogenical entrobacterium	0
Heavy Metals (mg/kg sludge):	
Cd	<30
Cu	<1500
Ni	<400
Pb	<1000
Zn	<4000
Cr	<1200
As	<20
Hg	<15

D. Maximal Allowable Concentrations for Inorganic and Organic components in drinking water

Table A8-3.

Environmental Parameter	WHO	US EPA	EC	AR (SanPiN,QOST)
Inorganic components, mg/dm^3				
Ammonium, (N-NH_4^+),	1.5	-	0.54	-
Chlorine: - Residual free -Residual connected	0.5-5.0*	-	-	0.3-0.5 0.8-1.2
Nitrates ($N0_3^-$)	50.0	44.01	50.03	45.0
Nitrites ($N0_2^-$),	3.0	3.31	0.53	3.0
Sulfates ($S0_4^{2-}$)	250.0	250.02	250.04	500.0
H_2S	0.05	-	-	0.03
Al	0.2	0.22	0.24	0.5
Al	0.2	0.22	0.24	0.5
Ba	0.7	2.01	0.16	0.1
Be	-	0.0041	-	0.0002
B	0.3	-	1.03	0.5
V	-	-	-	0.1
Bi	-	-	-	0.1
W	-	-	-	0.05
Eu	-	-	-	0.3
Fe	0.3	0.32	0.24	0.3
Cd	0.003	0.0051	0.0053	0.001
K	-	-	12.05	-
Ca	-	-	100.06	-
Co	-	-	-	0.1
Si	-	-	-	10.0
Li	-	-	-	0.03
Mg	-	-	50.05	-
Mn	0.5 (0.1)	0.052	0.054	0.1
Cu	2.0 (1.0)	1.02 -1.31	2.03	1.0
Mo	0.07	-	-	0.25
As	0.01	0.051	0.013	0.05
Na	200.0	-	200.04	200.0
Ni	0.02	-	0.023	0.1
Nb	-	-	-	0.01
Hg	0.001	0.0021	0.0013	0.0005
Rb	-	-	-	0.1
Sm	-	-	-	0.024
Pb	0.01	0.015	0.01	0.03
Se	0.01	0.05	0.01	0.01

Environmental Parameter	WHO	US EPA	EC	AR (SanPiN,QOST)
Ag	-	0.12	0.015	0.05
H_2S	0.05	-	-	0.03
Sr	-	-	-	7.0
Sb	0.005	0.006	0.005	0.05
Tl	-	0.002	-	0.0001
Te	-	-	-	0.01
P	-	-	-	0.0001
F^-	1.5	2.0-4.0	1.5	1.5
Chlorine: - Residual free -Residual connected	0.5-5.0*	-	-	0.3-0.5 0.8-1.2
Cl^-)	250.0	250.0	250.0	350.0
Cr^{3+}	-	0.1	-	0.5
Cr^{6+}	0.05		0.05	0.05
CN^-	0,07	0.2	0.05	0.035
Zn	3.0	5.0	5.0	5.0
Organic components, µg/dm^3				
chlorinated alkanes				
carbon tetrachloride	2	5	-	6
dichloromethane	20	5	-	7.5
1,2- dichloroethane	30	5	3	-
chlorinated ethylene				
vinyl chloride	5	5	0.5	50
1,1-dichloroethylene	30	7	-	-
1,2- dichloroethylene	50	170	-	-
trichloroethylene	70	5	10	-
tetrachloroethylene	40	5	10	-
aromatic hydrocarbons				
benzol	10	5	-	10
toluol	700	1000	-	500
xylene	500	10000	-	50
ethylbenzene	300	700	-	10
styrene	20	100	-	100
polycyclik aromatic hydrocarbons	-	-	0.1	-
benzpyrene	0.7	0.2	0.01	0 - 5
Benzpyrene benzol				
Mono chlorbenzene	300	100	-	20
1,2- dichlorobenzene	1000	600	-	2
1,4-dichlorobenzene	300	-	-	-
Trichlorbenzol	20	70	-	30
Next compo				
acrolein	-	-	-	20

Environmental Parameter	WHO	US EPA	EC	AR (SanPiN,QOST)
Di (2-ethylhexyl)adipate	80	400	-	-
Di (methylheptyl)ftalaat	8	6	-	-
acrylamide	0.5	-	-	10
epichlorhydrin	0.4	-	0.1	10
hexachlorobutadiene	0.6	-	-	10
hexachlorochiklopendadiene	-	50		1
EDTA	200	-	-	-
Nitrilotriacetic acid	200	-	-	-
Surface active substances (SSAS)	-	-	-	500

ANNEX 9.ENVIRONMENTAL MITIGATION PLAN

				Cost		Institutional Responsibilities		
Phase	**Environmental components**	**Impacts**	**Mitigating Measure**	**Install**	**Operate**	**Install**	**Operate**	**Comments**
Design Phase	**Ecological and Social**	**Ecological and Social impact**	• Site selection for any new construction to avoid impacts on endangered or threatened flora and fauna, sensitive ecological areas, human habitations or economic assets • For any new or increased water offtake from a given source, investigation to ensure water resources are sufficient to meet projected demand without negative environmental impacts	**n.a**	**n.a**	**n.a**	PMU, Design team	
Design, Construction-repairing works	**Air Quality**	Dust and fumes during construction (internal and/or external, including volatile construction materials)	Dust control by water or otherwise: • Excavation work will be sprayed with water • Cover the material transporting trucks • Construction activities causing dust will not be carried out on excessively windy days.	n.a.	Minor and Covered by construction / renovation budget	n.a.	Contractor	
			• Prohibit use of non-standard paints and other materials • Control construction methods and plant, timing of works • Avoidance of use or reduce to the minimum the use of open fire, specifically use of fuel, hot insulation coating (asphalt), and use the energy with low efficiency and high pollution;	n.a.	n.a.	n.a.	Desingn team, Contractor	

Phase	Environmental components	Impacts	Mitigating Measure	Cost		Institutional Responsibilities		Comments
				Install	Operate	Install	Operate	
	Soils	• Contamination from waste materials, especially construction and human wastes; • Damage to soil structure due to material storage, construction traffic, etc. • Loss of topsoil during excavation for/ disposal of construction materials; • Erosion due to uncontrolled surface run-off and • wastewater discharge	• Protect non-construction areas, avoid work in sensitive areas during highly adverse conditions, • Provide temporary haul roads as appropriate, restore damaged areas • Provide adequate storage, and appropriate treatment and disposal of all wastes • Proper erosion control should be incorporated into construction planning. • Design drainage, structures to ensure soil stability • Connection to nearest sewage network or construction of latrines / septic tanks	n.a.	Covered by construction / renovation budget	n.a.	Design team, Contractor	
	Land	• Damage to land during construction Landslips on embankments, hillsides, etc. • Impacts from excavation for/disposal of soil and other materials	• Design works to minimize land affected • excavated spoil should not be disposed of on agricultural land; • Design slopes & retaining structures to minimize risk, provide appropriate drainage and vegetation cover; • Include specific-area environmental problems into Contract documents Package	n.a.	Covered by construction / renovation budget	n.a.	Design team Contractor	
			• Strip topsoil as necessary and store, replace/reuse post construction; • Take/dispose of materials from/at approved sites • activities to prevent landslides.	n.a.	Covered by construction / renovation budget	n.a.	Contractor	
	Water Resources	• Contamination/pollution	Careful design, maintain natural drainage where possible, consider alternative alignments	n.a.	n.a.	n.a.	PMU/ Design Team	

Phase	Environmental components	Impacts	Mitigating Measure	Cost		Institutional Responsibilities		Comments
				Install	Operate	Install	Operate	
		of resource by construction, human and animal wastes, including fuel & oil, hazardous wastes, wastewater, etc. • Interruption of surface and underground drainage patterns during and post construction, creation of standing water	• Store hazardous materials and wastes carefully, provide suitable wastewater drainage and safe waste disposal, with treatment as necessary; • Mitigate run-off velocities and volumes, provide retention/sedimentation ponds as necessary • Untreated effluents shall not be allowed to be directly disposed of in water bodies • Ensure proper control on fuel and oil spillage. • Not to use any hazardous chemicals and their disposal to the public sewage system or to the site land; • Connection to nearest sewage network or construction of latrines / septic tanks	n.a.	Covered by construction / renovation budget	n.a.	Contractor	
	Noise	Noise disturbance from construction works, traffic – speed, quantity and type of traffic during and post construction	• Use appropriate construction methods & equipment • Time work to minimize disturbance, Confining noisy work to normal working hours in the day. • Using of noisy equipment (ex. Breakers, compressors, etc.) should be minimized and better avoided during late and non-working hours • Restricting construction traffic movements during the night time.	n.a.	Covered by construction / renovation budget	n.a.	Contractor	
	Natural Habitats	• Disturbance of natural habitats, especially from improper waste disposal; • Disturbance or loss of natural habitats and disturbance of protected areas, during and post construction	• Store, treat and dispose of wastes appropriately • Careful siting/alignment/placement/ /design of structures, and/or timing of works (seasonal) • Select disposal areas and methods carefully, Protect sensitive areas within/close to site	n.a.	Covered by construction / renovation budget	n.a.	Contractor	
	Fauna and Flora	• Loss or degradation due to improper waste disposal; • Loss or degradation during and post construction, especially due to un-seasonal working, changes in environmental regimes, e.g. disruption to wildlife movements causing increased road kills, etc. (see also above)	• Store, treat and dispose of wastes appropriately • Careful siting and/or design to minimize impacts, especially for sensitive/rare species • Select appropriate construction methods • Protect sensitive areas within/close to site • Work seasonally, as appropriate *See also Natural Habitats*	n.a.	Covered by construction / renovation budget	n.a.	Contractor	

Phase	Environmental components	Impacts	Mitigating Measure	Cost		Institutional Responsibilities		Comments
				Install	Operate	Install	Operate	
	Aesthetics and Landscape	• Local visual impact of parts of completed works and some intrusions in landscape, loss of trees, vegetation, etc. • Noise, dust, wastes, etc., during and post construction	• Careful siting and design of works, screening of intrusive items • Replace lost trees, boundary structures, etc., re-vegetate work areas • Careful de-commissioning of construction areas and disposal of wastes *See also Soil, Land, Air Quality and Acoustic*	n.a.	Covered by construction / renovation budget	n.a.	Design team, Contractor	
	Human Health	• Health and safety hazards during construction ; • Health impacts from hazardous construction materials (i.e. heavy-metal (lead) containing paints, asbestos-cement tiles, pipes, copper pipes, inflammable and toxic materials etc.)	• Incorporate safety and environmental requirements in contract documents. • Construction employees shall be trained in safety procedures for all relevant aspects of construction • Use of materials should be in accordance with sanitary norms of Azerbaijan Republic and be specified in bidding documents	n.a.	n.a.	n.a.	PMU, Design team	
			• fence hazardous areas • careful disposal of wastes	n.a.	Covered by construction / renovation budget	n.a.	Contractor	
	Historical/ Cultural Sites	Protection of neighbouring Historical and cultural heritage against degradation and damages	• Immediately halt work in vicinity of discoveries, pending instructions from relevant authorities and agreed actions • Take a special care for protection of existing cultural heritage of the work-in building or near it while at work site, and those of archaeological historical, ethnological, scientific, cultural and spiritual local.	n.a.	n.a	n.a.	PMU, Construction supervision team, Contractor	
Operation (Water Supply)	**Health and environmental risks.**	**water quality**	• Ensure proper operation and maintenance of the water treatment plant. • Continuous monitoring of raw water and treated water as well as water quality at various locations within the water supply system; avoid cross contamination with sewage; • Chlorination should be monitored and controlled so that contaminant free water is available to consumers without excessive amount of chlorine.	n.a.	Budget of WSS	n.a.	WSS C RegionalSanitary offices,	
		Accidents and Emergency	• Train the concerned officials of the WTP about health and safety procedures • Emergency procedures will be developed in the event of the release of chlorine gas.	n.a.	Budget of WSS	n.a.	WSS C RegionalSanitary offices,	

Phase	Environmental components	Impacts	Mitigating Measure	Cost		Institutional Responsibilities		Comments
				Install	Operate	Install	Operate	
	Economic-Sosial	Reduction in available water supply	• Prohibit illegal connections to the network; • ensure proper maintenance of the system including treatment plant, pumping stations, pipelines and house connections.	n.a.	n.a.	n.a.	WSS C	
Operation (Sanitation services)	**Health and environmental risks**	Health and environmental risks associated with discharge of treated effluent	• Regular monitoring of effluent quality discharging from the SWTP • Dispose of wastewater into rivers after proper treatment • Capacity building, training and awareness	n.a.	Budget of WSS	n.a.	WSS C Regional Environmental and Sanitary offices	
		Sludge quality and the risk of public and farmers acquiring infection	• Composting and Drying beds for one-year storage will be provided to dry and store sludge following de-watering and digestion. • Monitoring of nematodes, coliforms and heavy metal content of treated sludge. • Transportation of treated sludge in closed containers. • Capacity building, training and awarenes	n.a.	Budget of WSS	n.a.	WSS C Regional Environmental and Sanitary offices	
		Odor generation from the wastewater treatment plant	• Careful planning and implementation of operation and maintenance. • Providing covers to equipments and containers that are likely to cause odor nuisance	n.a.	Budget of WSS	n.a.	WSS C Regional Environmental and Sanitary offices	
			• All employees SWTP will get suitable training in occupational health, safety, and emergency preparedness procedures; • All site employees will be trained in hygienic procedures designed to avoid infection from wastewaters and sludge. • Emergency procedures will be developed in the event of the release of chlorine gas.	n.a.	Budget of WSS	n.a.	WSS C	

ANNEX 10. ENVIRONMENTAL MONITORING PLAN[6]

						Cost		Responsibilities	
Phase	**What** *parameter is to be monitored?*	**Where** *is the parameter to be monitored?*	**How** *is the parameter to be monitored/type of monitoring equipment?*	**When** *is the parameter to be monitored - frequency of measurement or continuous?*	**Why** *is the parameter to be monitored (optional)?*	**Install**	**Operate**	**Install**	**Operate**
Construction / Repairing Works	Dust	At construction / renovation sites	Visual monitoring	Regularly through site visits	In order to identify if the environment requirements are relevantly maintained		Project construction supervsvion budget		Construction supervision team/PMU
		At construction Sites and Surroundings	sampling and analysis	Monthly	required norms (0.15-0.5 mg/m^3)				
	Waste water from construction/renovation sites	At construction / renovation sites	Visual monitoring .	Regularly through site visits	In order to identify if the environment requirements are relevantly maintained		Project construction supervsvion budget		Construction supervision team/PMU
	Collection of solid wastes	At construction / renovation sites	Visual monitoring	Regularly through site visits	In order to identify if the environment requirements are relevantly maintained		Project construction supervsvion budget		Construction supervision team/PMU

[6] Monitoring should measure the compliance with the following norms applicable to environment protection in Azerbaijan

Phase	What *parameter is to be monitored?*	Where *is the parameter to be monitored?*	How *is the parameter to be monitored/type of monitoring equipment?*	When *is the parameter to be monitored - frequency of measurement or continuous?*	Why *is the parameter to be monitored (optional)?*	Cost		Responsibilities	
						Install	Operate	Install	Operate
	Disposal of solid wastes	At the disposal sites	Visual monitoring	Regularly through site visits	In order to identify if the environment requirements are relevantly maintained		Project construction supervsvion budget		Construction supervision team/PMU
	Use of materials that may damage health (i.e. heavy-metal (lead) containing paints, asbestos-cement tiles, pipes, copper pipes, inflammable and toxic materials etc.)	At construction / renovation sites and through documentation	Visual monitoring, analysis of documentation	Monthly	In order to identify if the environment requirements are relevantly maintained		Project construction supervsvion budget		Construction supervision team/PMU
	Construction site protection activities	At construction / renovation sites	Visual monitoring	Monthly	In order to identify if the environment and safeguard requirements are relevantly maintained		Project construction supervsvion budget		Construction supervision team/PMU
	Protection of habitats	At construction / renovation sites	Visual monitoring	Monthly	In order to identify if the environment requirements are relevantly maintained		Project construction supervsvion budget		Construction supervision team/PMU
	Restoration of lands damaged by excavation	At construction / renovation sites	Visual monitoring	At the completion of construction / renovation process	In order to identify if the environment requirements are relevantly maintained		Project construction supervsvion budget		Construction supervision team/PMU

						Cost		Responsibilities	
Phase	**What** *parameter is to be monitored?*	**Where** *is the parameter to be monitored?*	**How** *is the parameter to be monitored/type of monitoring equipment?*	**When** *is the parameter to be monitored - frequency of measurement or continuous?*	**Why** *is the parameter to be monitored (optional)?*	**Install**	**Operate**	**Install**	**Operate**
	Noise	At construction Sites/ Near the settlements	Portable noise meters	Regularly through site visits	In order to identify if the environment requirements are relevantly maintained (45-65 dB)		PMU budget		PMU construction specialist ,monitors and Local Sanitary Specialist
	Traffic Disruption	At construction / renovation sites	Visual monitoring of a) use of designated routes and b) coverage of material transporting trucks.	Regularly through site visits	In order to identify if the environment requirements are relevantly maintained		PMU budget?		PMU construction specialist and monitors and Representative of Local Authorities
Operation	Solid wastes disposal	At the disposal sites	Visual	After completion of construction / renovation works	In order to identify if the environment requirements are relevantly maintained		Budget of WSS		WSS C Regional Environment Specialist,
	Raw water quality (pH, Turbidity,Coliforms Fecal Streptocoques)	At Water Sources (treatment plant, wells)	sampling and analysis	Compliance with the guidelines (managing rules) for WTP	will meet the required norms		Budget of WSS/ Budget of relevant authorities		WSS C RegionalSanitary offices,
	Treated water quality (bacteriological , physical and chemical parameters as well as heavy metals and pesticides residues)	At Distribution Network	sampling and analysis	Compliance with the guidelines (managing rules) for WTP	Drinking water quality standarts		Budget of WSS/ Budget of relevant authorities		WSS C Regional Sanitary offices ,
	Treated Effluent quality (bacteriological , physical and chemical parameters)	At Wastewater Plants and in river after discharge	sampling and analysis	Montly	Compliance with the standards for discharge to surface water resources and the WHO guidelines for agriculture re-use		Budget of WSS/ Budget of relevant authorities		WSS C/ Regional Environmental and Sanitary offices

Phase	What *parameter is to be monitored?*	Where *is the parameter to be monitored?*	How *is the parameter to be monitored/type of monitoring equipment?*	When *is the parameter to be monitored - frequency of measurement or continuous?*	Why *is the parameter to be monitored (optional)?*	Cost		Responsibilities	
						Install	Operate	Install	Operate
	Sludge Quality	At Wastewater Plants	sampling and analysis	Every Batch	In the case of dried sludge re-use by farmers, the sludge quality will have to comply with the FAO guidelines for the use of sludge in agriculture		Budget of WSS/ Budget of relevant authorities		WSS C/ Regional Environmental and Sanitary offices

ANNEX 11A.PUBLIC MEETING REPORT N1

National Water Supply and Sanitation Project

On November 24, 2006, ACEP Company hold the meeting with participation of a stakeholders at the Conference Hall of Azersu Joint Stock Company in order to take into consideration the public opinion on Environmental Impact Assesment that should be prepared by ACEP Company in the frames of the Water and Sanitation Services Project.

List of participants

№	Organization	Name	Position
1	Tashabbus NGO	Orxan Arabov	Chairman
2	ANAS Intellectual development Center	Tubakhanım Kasumova	Vice- Chairman
3	ANAS Intellectual development Center	Rashad Salimov	expert
4	ANAS Intellectual development center	Teymur Mehdiyev	expert
5	NGO EKOS	Kamran Ahmadov	Prog. Manager
6	ARGTM (NGO)	Amin Mammadov	Dep.foreign relations
7	Piligrim (NGO)	Yura Valuyev	Chairman
8	Piligrim (NGO)	Kahraman Gambarov	expert
9	Birleshmish Sukanal	Nabiyev S.	Vice -Chairman
10	Birleshmish Sukanal	Bayramov O.	Technologist
11	Asersu JSC	Farrukh Heybatov	Expert
12	Asersu JSC	Ilqar Tagiyev	Head of the Sector
13	Sport Club"Mountain" (NGO)	Cavid Rahimov	Vice- Chairman
14	Teta Xazri (NGO)	Sevil Yuzbasheva	Chairman
15	SANIYA" (NGO)	Elchin Sardarov	Director
16	ACEP Company	Elchin İsgandarov	Director
17	ACEP Company	Tofik Hasanov	Progect manager
18	ACEP Company	Asif Karayev	Expert
19	Center of Environment Unit (NGO)	Ali Orucov	Expert
21	PICIB Chevra (NGO)	Talat Kangarly	Chairman
22	Center of the Biodiversity (NGO)	Manaf Suleymanov	Chairman
23	Ministry of Ecology and Natural Resources	Rasim Sattar-zade	Head of the Sector
24	Caspian Envir.Programm	Baxtiyar Muradov	manager

At the Workshop the representative of the Azersu JS Company Mr. Ilgar Tagiyev provided the general information about the Project to participants and answered for the questions they were interested in.

The Manager of the Project, Mr. Tofig Hasanov made a presentation about proposals of Environment Impact Assessment, Scheduled Activities for Environment Management Plan, process and phases of environmental assessment and problems of the Project, important environmental components and decrease of its impacts.

The Presentation followed up with interest discussions. The essential questions and proposals by Companies' Representatives during the presentation:

1. To get an opportunity for more closly familiarization with the information on the Project, the importance of taking into consideration of specificities of each region (water sources, climate, hydrology and etc) and the duration of the general work (S. Yuzbasheva).

2. Restrictions (difficulties) in sewerage system management in the regions, environmental problems arisen by those restrictions (S. Nabiyev)

3. The importance of participation in the Project of local communities from these regions, payment of population for water supply and the prices for water supply (E. Sardarov).

4. Environmental situation in the regions and the main of them (A. Mamedov).

5. How will be organised the Waste management (K. Ahmedov)?.

6. Clarification of sewage waters, their impacts, potential impacts during the construction works and further operation (A. Orudjov).

7. Pollution of water sources by the population, implementation of public awareness (S. Yuzbasheva).

8. Damages to the local landscape, rehabilitation works (K. Ahmedov).

The Manager of the EIA informed that provided proposals will be considered in the EIA.

Since the Terms of References for each region has not been prepared, the participants of the Workshop proposed that the common document should be prepared including 10 regions as this is an important phase for financing of investement for environmental situation and its assessment in the regions.

ANNEX 11B. PUBLIC MEETING REPORT N1

National Water Supply and Sanitation Project
Azerbaijan - World Bank

Public discussions of the report of Environment Impact Assessment, developed by ACEP company on Project of Regional Water Supply and Sanitation services, were held in the conference hall of AzerSu Joint Stock Company, 14 February 2007.

Community was informed about public discussions in advance. Thus:

- EIA report was placed in Azərsu JSC site (www.azersu.az) on 01.02.2007.
- By means of electronic distribution information about conducting of discussion on EIA developed for RWSSS in Ecoforum of NGO was sent to Baku NGOs on 02.02.2007.
- Announcement about conducting of public discussion was conducted in newspaper "Respublika" on 13.02.07.

The representative of AzerSu Joint Stock Company, Head of the Sector Ilgar Tagiyev presented to participants brief information on the project.

Team Lider of the EIA Report Tofig Hasanov reported on Environment Impact Assessment by project and environment management plan. Participants were informed on contents of the document, policy on Environment Impact Assessment conducted by the World Bank and Azerbaijan legislation, by corresponding projects and on its realization by this project.

Presentation on project alternatives, potential environment impacts of executed works and/or mitigation of those impacts, monitoring plan on level of envisaging of environment management was made. It was informed, proposals, given during initial discussions 2006 November 24 were considered at presented EIA statement.

Broad discussions were made after presentation. Contents of main questions and proposals given during presentation, are as follows:

1. **Sadykh Hasanov** – NGO "Healthy life":
    a. What potential impacts on landscape will during construction activity effect?
2. **Anakhanym Mammadova** –NGO "Teta Khazri":
    a. Where waste water is discharged presently and will be discharged in future?;
    b. in which rayons treatment plants are located and its operation state?;
3. **Nariman Agayev**: Agrotechnician (NGO):
    a. Where will opinions and consultations of seminar be collected? and how these results will be considered during realization of project?;
    b. Was the population presently notified about the project? and how will the population in rayons be notified in future;
    c. On what principles project are rayons selected?
    d. According to policy of WB on ecological requirements to projects, he informed about necessity of enabling of local communities to get introduced with EIA document, developed for each rayon;
4. **Kamran Ahmadov:** "EKOS" (NGO) :
    a. How noise and waste wil be managed during execution of works in sensitive zones or in its vicinity at constuction phase?
    b. How will monitoring be conducted?

5. **Farida Huseynova**: Azerbaijan Green Movement:
    a. What technology treatment plants are planned in future projects and where will waste water be discharged?
    b. How will waste management be conducted:
    c. To what extent were opinions of AzerSu JSC employees used?
    d. During description of existing situation of EIA she expressed her doubt concerning results of analyses, conducted by Azersu in Gabala and Bilasuvar at water sources, water network and drainage water.

Team Lider of the EIA Report Tofig Hasanov and representative of AzerSu JSC, I. Tagiyev answered questions.

Main results of discussion:

i) Questions on Environment impacts of project, EMP (envionment impacts, mitigation measures, monitoring), policy of World Bank concerning projects and envisaging of this policy in RWSSS projects were answered thoroughly. It was informed, that social assessment of the project was conducted according to procedures of the WB. Social assessment covers all project rayons and public is correspondingly informed about it.

ii) It was informed, that meantime there were no specific projects and engineering solutions for each rayon. Because, technical details of the projects, to be conducted in rayons (for example, what treatment technologies are used, selection of water sources etc.), will be given in projects developed for specific rayon. This introduced EIA is of framework character and according to this general requirements of framework nature are set for projects realized in rayons. For example, independent on: what technology and in what rayon will be used, what treatment method will be used (surely, modern treatment methods), quality of treated water is to meet with standards and norms proposed in EIA based on Azerbaijan and international standards and norms. Certainly, the justification of application of specific technology in each specific project developed, namely, for that rayon will be given.

iii) It was informed during discussions, it was revealed, that results of analyses taken in Gabala and Bilasuvar at water sources, water network and drainage water, submitted by Azersu JSC to EIA executors do not coincide with results conducted by "SUKANAL" Scientific-Research and Design Institute Azersu.

It was proposed, local companies and specialists are to be involved into the process of development of projects for rayons. For each rayon EIA document is to be developed and in this case, at least, at initial stage of activity local independent laboratory, possessing corresponding certificate and with good reputation, is to be involved for assessment of existing situation and analyses.

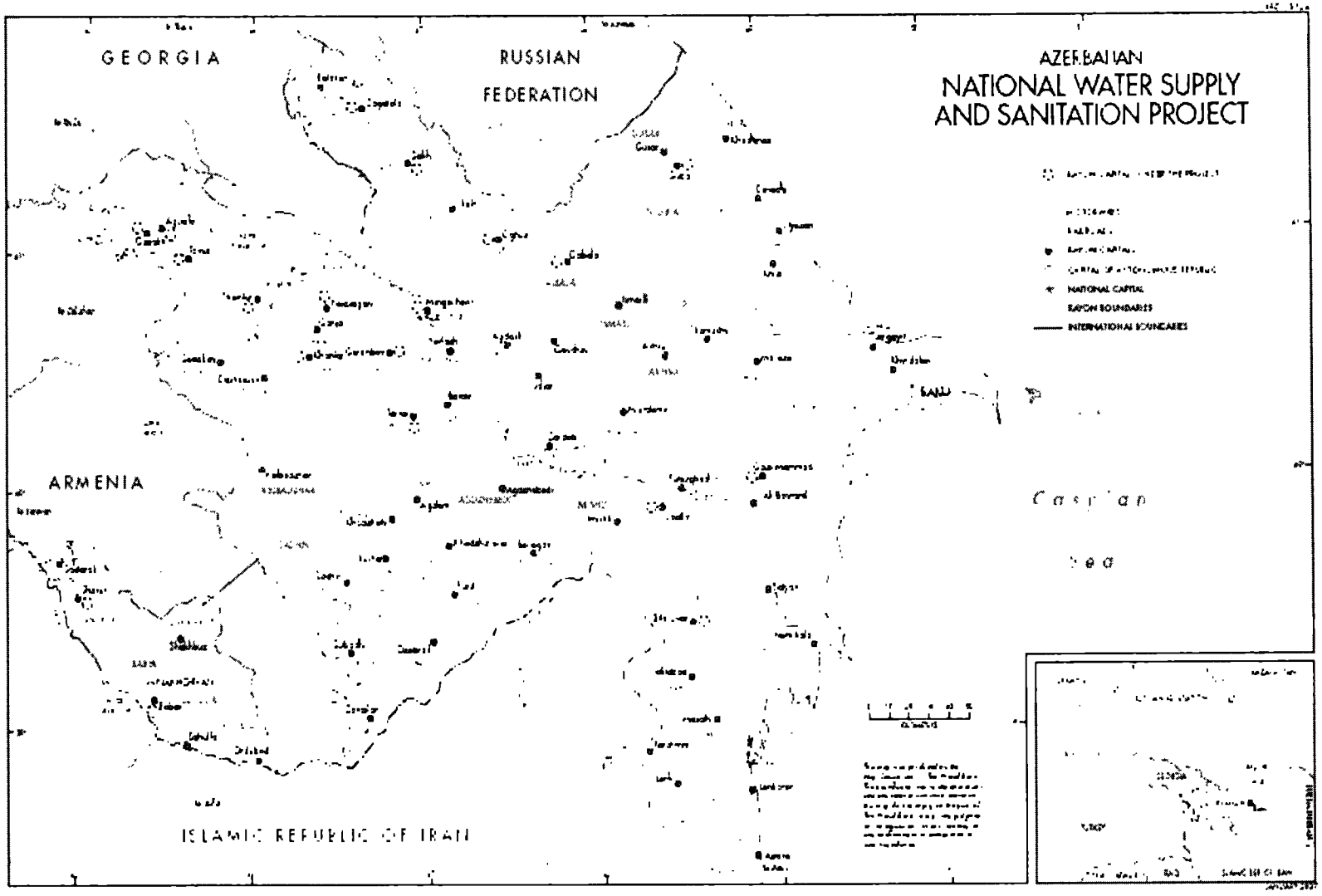
iv) It was proposed, Azərsu JSC is to create corresponding conditions for getting introduction of population in rayons with EIA developed for rayon. It would be preferable, that copies of EIA projects to be developed in future will be distributed in public libraries. Opinions of rayon population, to be developed for each rayon, are to be aken into consideration.

Azersu representative informed that, all opinions and proposals on EIA will be collected in Azərsu JSC and they will be studied.

The leader of working group on EIA Report informed, submitted proposals in Final Report of EIA will be taken into consideration.

List of participants **February 14 , 2007**

№	Organization	Name	Position
1.	Ekograf (NGO)	Galina Kozlova	Chairman
2.	Center for the Biodiversity (NGO)	Manaf Suleymanov	Chairman
3.	ACEP Company	Asif Karayev	Expert
4.	EKOS (NGO)	Kamran Ahmadov	Prog. Manager
5.	GAAMC (NGO)	Faig Mammadov	Vice- Chairman
6.	ARGTM (NGO)	Amin Mammadov	Dep.foreign relations
7.	ARGTM (NGO)	Ziya Agayev	Dep.foreign relations
8.	Tashabbus (NGO)	Orxan Arabov	Chairman
9.	ARGTM (NGO)	Nicat Zeynalov	Advicer
10.	ACEP Company	Nataliya Nazarova	GIS Specialist
11.	Piligrim (NGO)	Yura Valuyev	Chairman
12.	Azerbaijan Green Movement	Farida Huseynova	Chairman
13.	PICIB Chevra (NGO)	İlkin Kangarli	Executive Chairman
14.	Ecological Union (NGO)	Ali Orucov	Expert
15.	Health Life (NGO)	Sadig Hasanov	Chairman
16.	Azerbaijan Green Movement	Cavanshir Hamidzadeh	Head of the Sector
17.	Center for the Biodiversity (NGO)	Tafakkul İsgandarov	Direktor
18.	ACEP Company	Elchin İsgandarov	Director
19.	ACEP Company	Tofik Hasanov	Project manager
20.	AserSu JSC	Ilqar Tagiyev	Head of the Sector
21.	Asersu JSC	Farrukh Heybatov	Expert
22.	Caspian Envir. Programm	Baxtiyar Muradov	Manager
23.	ACEP Company	Agasi Mammadov	Vice-Dierktor
24.	NGO	Nariman Agayev	Agrotechnician
25.	Teta Xazri (NGO)	Anaxanim Mammadova	Expert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AZERBAIJAN
NATIONAL WATER SUPPLY
AND SANITATION PROJECT
NATIONAL CAPITAL
RAYON BOUNDARIES
INTERNATIONAL BOUNDARIES
ARMENIA
Caspian
Sea
ISLAMIC REPUBLIC OF IRAN