

**JV “KAZAHDORSTROY” LLP/ABK-AVTODOR NC**



**WESTERN EUROPE – WESTERN CHINA  
INTERNATIONAL TRANSIT CORRIDOR  
UZYNAGASH – OTAR ROAD SECTION**



**ENVIRONMENTAL MANAGEMENT PLAN FOR UZYNAGASH – OTAR  
ROAD SECTION KM. 143-159**

**September 2018.**

**Prepared by**

<b>No</b>	<b>Surname, name</b>	<b>Position</b>	<b>Signature</b>
1	Kusman A.A.	Environmental Engineer JV "Kazhdorstroy" LLP/ "ABK-Avtodor NC"	

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	5
PROJECT DESCRIPTION .....	5
IMPACT ASSESSMENT .....	6
ENVIRONMENTAL PROTECTION MEASURES PLAN .....	9
1. INTRODUCTION .....	10
2. PROJECT DESCRIPTION .....	11
2.1 GENERAL INFORMATION.....	11
2.2 PROJECT SPECIFICATION .....	12
2.3 UZYNAGASH-OTAR ROAD SECTION KM. 63-159».....	12
2.4 ARTIFICIAL STRUCTURES.....	13
2.5 BORROW PITS.....	13
3. ENVIRONMENTAL IMPACT ASSESTMENT (EIA).....	14
3.1 INTRODUCTION .....	14
3.2 AIR IMPACT ASSESSMENT .....	16
3.3 NOISE IMPACT ASSESSMENT .....	18
3.4 HYDROLOGICAL IMPACT .....	18
3.5 SOIL AND LAND IMPACT .....	20
3.6 FLORA AND FAUNA IMPACT .....	21
3.7 WASTE FORMATION .....	23
4. MEASURES FOR MITIGATION OF NEGATIVE IMPACTS .....	23
4.1 AIR QUALITY MITIGATION .....	23
4.2 NOISE AND VIBRATION MITIGATION .....	23
4.3 HYDROLOGICAL MITIGATION .....	24
4.4 SOIL EROSION AND CONTAMINATION MITIGATION .....	25
4.5 FLORA AND FAUNA MITIGATION .....	26
4.6 WASTE REDUCTION .....	27
5. ENVIRONMENTAL ACTION PLAN MONITORING PLAN .....	29
5.1 ENVIRONMENTAL ACTION PLAN SECTION 143-159 KM.....	29
6.1 TABLE 6.1: PROJECT IMPACT DURING RECONSTRUCTION WORKS, MITIGATION, MONITORING, RESPONSIBILITY .....	30
6.2 MONITORING PLAN .....	33



## ABBREVIATIONS

Akimat	Regional body of executive branch in Kazakhstan
CfR	Committee for Roads (of MoID)
DE	Design Engineer
ESS	Environment and Social Sphere
EMPF	Environmental Management Plan Framework
EMP	Environmental Management Plan
ESIA	Environmental and Social Impact Assessment
FS	Feasibility Study
H&S	Health & Safety
HGV	Heavy goods vehicle
ME RoK	Ministry of Energy RoK
CERCaSI	Committee for Ecological Regulation, Control and State Inspection in oil and gas sector
MOID	Ministry of Investment and Development of RoK
IBRD	International Bank for Reconstruction and Development
PAP	Project Affected Person
HCL	historical and cultural legacy
PMC	Project Management Consultants
RAP	Resettlement Action Plan
RoK	Republic of Kazakhstan
RPF	Resettlement Policy Framework
SEE	State Environmental Expertise
SoW	Scope of Work
WB	World Bank



## EXECUTIVE SUMMARY

JV “Kazahdorstroy” LLP/ABK Avtodor NC is a General Contractor on reconstruction of Western Europe –Western China Corridor Project: Uzynagash – Otar km. 143-159, road section passing across the territory of Korday district, Zhambyl oblast. The project includes reconstruction and widening of 2 lanes existing road, with the length of 16 km. The Project has all the physical characteristics of a large linear infrastructure project with significant spatial extension, visible impact on landscape, biosphere and land use patterns, and also significant impacts on topography, climate, natural conditions and human activity. Road alignment crosses almost similar forms of land, land use types and micro-climatic zones.

It is intended that the project implementation will be partly financed by the International Bank for Reconstruction and Development (IBRD). The project has been developed and it is implemented in accordance with Kazakhstan National Requirements (Environmental Code of RK, 2007 and other instructions and regulations) and World Bank Safeguards Policies.

### Project Description

Uzynagash - Otar road section is a part of «Western Europe – Western China» transit corridor and passes through Korday district, Zhambyl oblast. The length of the designed section is 16 km. In 2006 the road was reconstructed, 49 km of which is category I (km 14-63) (4 lanes, 2 lanes on each directions with a median strip), 99 km (km 63-162) category II (2 lanes, 1 lane on each direction). In terms of administrative division the designed road section passes across the territory of Zhambyl District of Almaty oblast and Korday District of Zhambyl oblast.

- The length of designed road section 16 km.
- The road alignment section from km 143 to km 159 passes across flat bottom land.
- Climate of the area is continental, road-climatic zone - IV;
- The hottest month is July; Average temperature is +25,4°C; Absolute maximum of air temperature is +47°C; The coldest month is January; Average temperature is 11,7°C; Absolute minimum of air temperature is 46°C; Thickness of snow cover with estimated probability of 5% excess is 35 cm. Wind region - III.

The road alignment has good visibility, mostly straight, except for sections that pass across hilly and vicious pave sections.

The Right of Way of the existing road is 40 m. In connection with the road widening, according to the preliminary assessment along the alignment and proposed bypasses, there is the necessity of land acquisition. Some agricultural lands and irrigation system may potentially be affected. Approximately Около 80% of the section will pass along the existing road of far poor quality. The section ends near the bypass Korday at 159 km.

**Environmental Impact Assessment:** The main envisaged potential negative impacts during construction are the development of borrow areas, generation of waste (construction materials, expendable materials and spare parts, household waste and wastewater from camps), excessive land use, topsoil destruction/erosion. There is also a potential impact on groundwater and surface water like turbidity, silting and accidental spills of fuel and lubricants. During operation of the road, storm water drainage, noise, dust, air pollution may be considered as potential issues.



The EMP was developed to the level of detail, commensurate with the design stage and integrated into the tender and contract documentation to provide clear guidance and contractual obligations for environmental protection due diligence in the further design and implementation of the project.

**Natural Habitats:** Designed road will pass on the existing A2 road. At this moment, the existing A2 road does not affect protected zones or national parks close to the road, also no any detected “undisturbed” environmentally important natural environments close to the road.

**Forests:** Except for state forests, there are only small patches of mostly plantations at the western part of the road. No significant impacts on forests are expected and therefore, the policy is not triggered. Trees of roadside belts and other forest plantations are low-value plantations. They will be cut for the construction of road but compensation forest planting will be undertaken according to the measures of the EMP (Environmental management plan). This will be implemented in the framework of separate project of landscaping.

#### **Involuntary Resettlement.**

This policy covers the direct economic and social impacts that are caused by involuntary land acquisition, as a result of (i) relocation or loss of shelter; (ii) loss of assets or access to assets; or (iii) loss of income sources or means of livelihood, involuntary resettlement of the involved; or the involuntary restriction of access to legally designated parks and protected areas, which as a result can lead to negative social impact.

**Safety of Dams:** Potential problems with dam safety during the site inspection were not observed. The dams within the project area are low dams to control water level in rivers and irrigation channels, as well as flood protection facilities on river banks which do not pose safety risk.

**Projects on International Waters:** The project will not influence on the international waterways. Impact on the hydrological mode and rivers flows crossed by the project will be insignificant, as their hydrological mode completely remains invariable. The territory of the project is in a zone of the basin of Balkhash lake with closed (without exit to the sea) system of the rivers, flowing both in Kazakhstan (downstream as the receiver) and in China (upstream) with small part (upstream) in Kyrgyzstan. Waters flow down into the lake through seven rivers, the biggest of which is Ili, which brings the majority of river inflow. As both China and Kyrgyzstan are upstream, the cross-border hydrological influences will not occur from the project.

#### **Environmental and Social Baseline Conditions**

The design corridor lies parallel to Tien Shan ridge on all the length at distance from 10 to 30 km. Thus, the project will be in the alluvial valley, which has soft morphology. Relatively there are a lot of underground waters in the territory of the project, which depth varies from the superficial water-bearing horizons in young deposits to deep thermal waters.

The climate changes from temperate in the west, to dry in the east, with a clear continental character like cold winter and hot, dry summer, rainfall in relatively short period in spring and autumn. Natural cataclysms do not represent risk in the territory of the project. The greatest danger proceeds from the crossed rivers, many of which begin in mountains and have high seasonal variability with a considerable potential for floods during heavy rains. Erosion or mountain slides, landslides and mudflows do not represent risk for the road.

The major part of the road is in a zone of the existing human activities. The section is located to the north-west from Almaty city. It passes through Zhambyl district of Almaty oblast and Kordai



district of Zhambyl oblast. In the west of the section, the existing network of roads is the densest, with high economic activity, including productions, construction, extraction of materials and intensive irrigated agriculture. Zones of the irrigated agriculture are located throughout the entire corridor. In the whole design corridor, the anthropogenous influences in the form of animal husbandry, agriculture, residential zones and settlements, or infrastructure and transport corridors are noticeable. Significant transformations of natural landscapes and untouched natural complexes in the project area are not expected.

### **Impacts and its Mitigation and Management**

Measures for minimization of environmental impacts will be implemented into the road Design. The design will include measures for population protection from noise and improvement of traffic safety (speed restrictions, pedestrian crossings and underpasses). The design will also include requirements of farmers along the alignment for cattle droves construction and safe crossings for farm machinery. The underpasses for cattle will serve as crossings for other animals random movement of which is possible). The design will take into account the results from hydrographic and hydrological studies, installing sufficient culverts to avoid damming of permanent or seasonal watercourses and the creation of swamps or waterlogged areas. The dimension of bridges is calculated taking into account seasonal fluctuations of water discharge, as well as possible flash floods

Most impacts during the construction period (dust, noise, exhaust gases and wastewaters from camps and road) will be mitigated by standard procedures for the prevention and minimization of impacts. Surface watercourses will be protected by settling ponds and filters (e.g. straw bales) , if necessary. Wastewater from construction camps as well as septic sludge will be transported to the existing wastewater treatment plants. Project impact on surface water is not expected. Water for camps will be taken in relatively small quantities from the existing wells or from the existing water supply systems.

Inconvenience to the population will moreover be minimized by limiting work hours and not allowing nighttime works. In cases when works are carried out in close vicinity to residential areas additional measures, such as noise barriers, will be applied, if necessary.

Borrow pits will be operated by the Contractors only at locations for which both operational and environmental permits have been obtained. No borrow pits will be operated without a site specific Environmental Management Plan, which will contain a plan for borrow pit closure, remediation and re-cultivation of soil, approved by the environmental department (as required under Kazakhstan's legislation) and Construction Supervision Consultant (who will ensure that international good practice is followed).

All the environmental management measures to be carried out by the Contractors during the construction period will be integrated in the tender documents and become a part of the contractual works. It also includes guidance on accidental discoveries, which will be applied at random findings of PCR (physical and cultural recources) Contractors shall have to hire permanent staff on site with specific functions for environmental and social management (including a complaint specialist) who will report to construction supervision consultants.

During operation, the functionality of noise and traffic safety measures described above in the Section on design will be properly monitored and maintained. Any required modifications, upgrades or additions will be adopted and integrated into the road repair and maintenance plans.

### **Land withdrawal and resettlement**

The proposed Project invokes the withdrawal of land and related impacts, which is expected in the perspective of the project for potential road plans.



Reconstruction of the road will require a temporary withdrawal of land for the entire construction period to provide soil localization from remote quarries, construction camps, parking of road construction equipment and warehouses for road construction materials.

In addition, the land needed for temporary use will be received on a voluntary basis, through negotiations directly between landowners and contractors who will directly work and use the land during construction, contracts will be concluded to pay compensation for temporary use of land..

### **Public hearings and information disclosure**

In settlements along the road section, public hearings and consultations of interested parties should be conducted in order to get acquainted with the general details of the project and discuss the issues related to the environment, to learn the wishes and recommendations of the interested parties.

Additional public hearings and consultations of the Concerned Persons will be conducted on the basis of an EIA involving people from nearby villages and settlements along the road section.

Preparation and distribution of brochures in Kazakh and Russian, with a description of the project, work and the expected timeframe of work.

### **ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)**

The project-level Environmental and Social Management Plan (ESMP) has been prepared as part of the EISA and specified in this document in section 7 to define the environmental and social mitigation measures and procedures that will need to be followed by the contractors and other parties responsible for project implementation. The ESMP may need to be revised during the course of the project implementation.

- The project-level ESMP contains the following information:
- Potential environmental and social impacts
- Mitigation measures;
- Institutional roles for implementation of mitigation measures during construction and operation of the road;
- Environmental monitoring plan.

Site-specific Environmental and Social Management Plans (ESMPs) will be developed by the contractors for specific road sections/lots. These ESMPs will define the timing, frequency, duration and cost of mitigation measures in the form of implementation schedule, and these actions will be integrated into the overall project work plan.

ESMPs will include Monitoring Plan, through which monitoring of the environmental impacts and the implementation of the mitigation measures during the construction phase will be carried out.

### **Findings, Recommendations and Conclusions**

The proposed road widening project will have moderate environmental and social impacts. With appropriate mitigation measures during the project construction phase, the environmental impacts referred to in this report will be acceptable. Improvement and broadening of Uzynagash-Otar road section of Western Europe-Western China corridor will bring social and economic benefits for the population, living along the road alignment. High-speed, safe road that is and accessible under any weather conditions will allow effective and quick transportation between China, Kazakhstan, Russia, as well as towards Europe and Central Asia. Goods, produced in these countries, will be quickly delivered on route. Agricultural products and other products of local

production can be quickly transported to larger markets from that territory, where it is the main business. The labor force will also be able to move more freely between the countries, the most significant tourism for regional and international economy will also develop. There will be more opportunities for employment and development of businesses. On regional level, the population of Zhambyl and Almaty oblasts will receive more benefit from reduction of time of travel to other cities and regions of Kazakhstan.

Implementation of the road project will contribute to reduce accidents and the associated loss of resource and human lives.

The major adverse impacts with the project result from land take for new road pavement & material sites development. This will result in loss of some agriculture land, loss of settlement house, loss of scattered trees in the oblasts around.



## 1. INTRODUCTION

The length of “Uzynagash-Otar” road section is 16 km, which will be partly reconstructed within the existing right of way and bypass construction. The project passes through various reliefs, types of land use and (micro) climatic zones. Project highway is located in Korday district of Zhambyl oblast 16 km.

In August, 2014, the Government of RoK requested the World Bank to finance Otar-Uzynagash road section of 16 km length, which is a part of Western Europe – Western China Corridor in order to:

- Reduce vehicle-operating costs;
- Reduce travel times;
- Provide greater access to markets and job opportunities;
- Increasing economic opportunities; etc.

The purpose of ESIA is to identify the environmental and other impacts of the designed road development. This report includes the following main sections:

- Policy and Administrative Structure
- Project Description
- Analysis of Alternatives
- Environmental and social baseline data
- Potential environmental and social impacts of the project
- Social and environmental impact mitigation measures
- Environmental Management Plan
- Institutional responsibilities
- Information disclosure, consultations and public hearings. Parties’ participation and appeal mechanism.



## 2. PROJECT DESCRIPTION

### 2.1 GENERAL INFORMATION

"Uzynagash-Otar" road section project with a general extent of 16 km, is a part of "Almaty-Kordai-Blagoveschenka-Merke-Tashkent-Termez" road of republican importance, which in its turn will provide communication in the international corridor between Western China and Western Europe. The purpose of the corridor is providing separate road through Western China, Kazakhstan and Russia under any weather conditions. This corridor will increase economic profit, will significantly improve flow of goods, tourists, improve social communication between China and Kazakhstan.

The designed road section from km 143 to km 159 is a part of "Western Europe-Western China" transit corridor. Based on administrative division, 16 km of the designed section passes across the territory of Korday district of Zhambyl oblast.

In 2006 road reconstruction has been carried out, 49 km (km 14-63) – Category I (dual carriageway, two lanes in each direction with a median strip), 99 km (km 63-162) – Category II (2-lane, one lane in each direction).

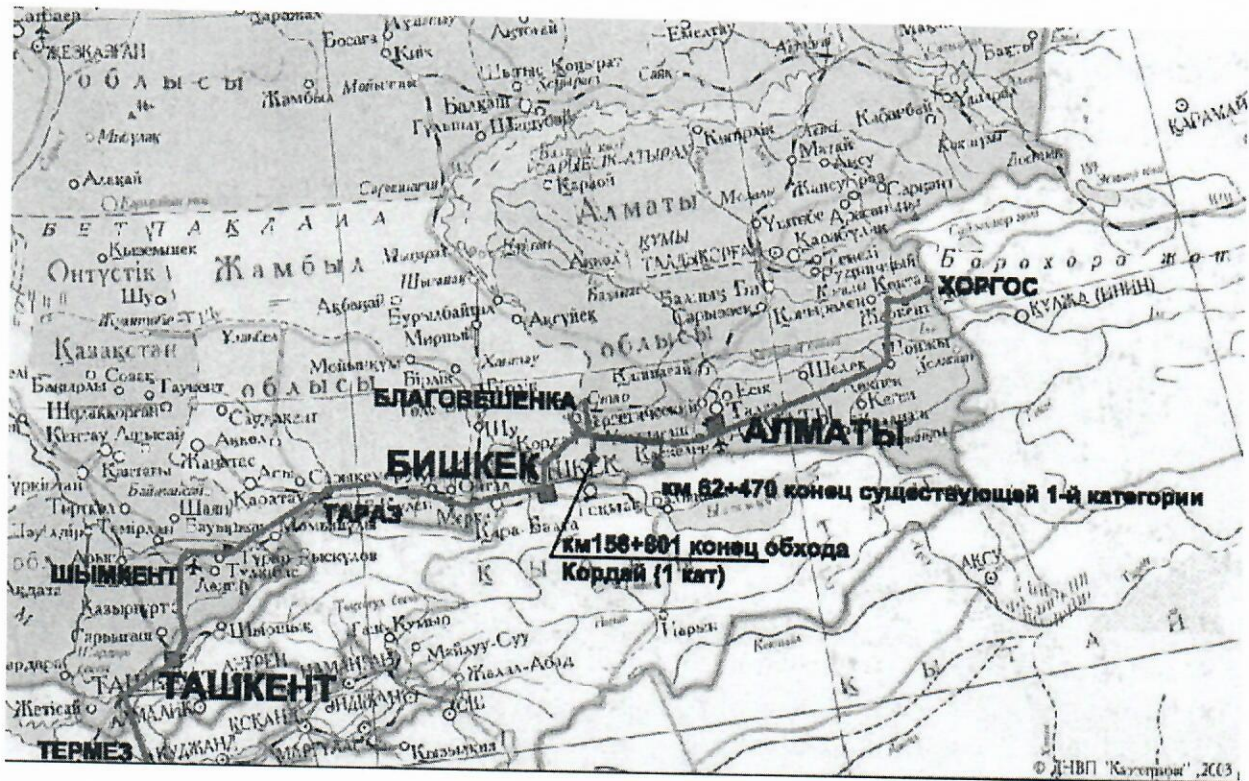


Fig. 2.1-1 – Situational Pattern of "Uzynagash-Otar" Section



## 2.2 PROJECT SPECIFICATION

Key features of the projected road:

- 1) Road category – 1b;
- 2) Length – 16 km;
- 3) Subgrade width – 27,5 m;
- 4) Number of traffic lanes – 4;
- 5) Traffic lane width– 3,75m
- 6) Median strip width – 3 m and 5 m;
- 7) Maximum width of right-of-way– 70 m;
- 8) Maximum estimated speed – 120 km/h;
- 9) Estimated average speed – 80 km/h;
- 10) Culverts
- 11) Type of road pavement and type of pavement is asphalt-concrete.

Estimated construction period: 16 months

Construction works include:

- 1) Site clearance and preparations;
- 2) Installation and development of borrow pits;
- 3) Construction of accommodation camps, warehouses and workshops;
- 4) Construction of subgrade;
- 5) Construction of road pavement;
- 6) Construction of intersections and junctions;
- 7) Construction of road signs and guard rails;
- 8) Road marking application;
- 9) Construction of drainage system from carriageway
- 10) Construction of flanking dike at artificial structures.

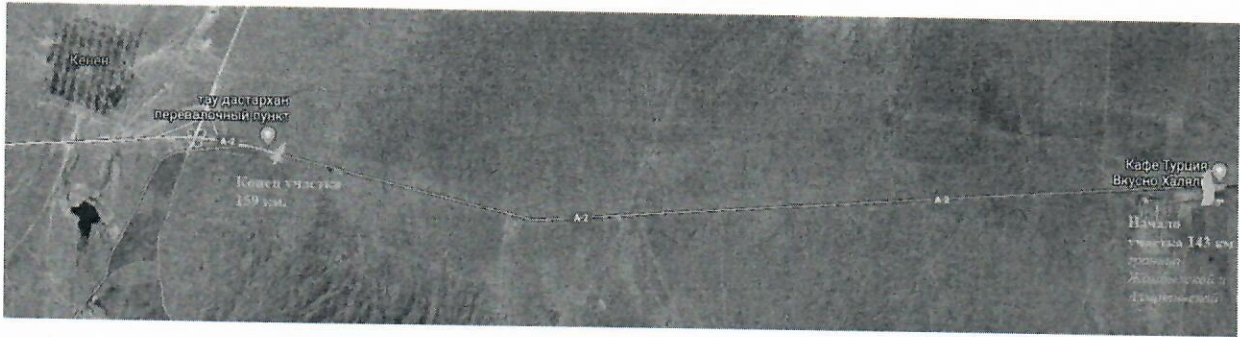
## 2.3 UZYNAGASH – OTAR ROAD SECTION

The section (km 63-km 159) begins to the North-West from Almaty city from Uzynagash village and ends with bypass of Korday in Otar. . "Uzynagash-Otar" road section lies through heights, the flat and hilly area. The road has initially northern direction, begins at the height of 765 m, passes the flat ground on Karatorpak narrow, falling to 685 m, then lies to 27 km in a mountainous terrain with several passes with heights to 760 m, the last one goes out to the flowing valley.

Samsy village is located at 13 km and Ungurtas village is located at 18,50 km from the end of the four-lane road, i.e. from 57 km of the road going from Almaty through Uzynagash towards Otar. Between Uzynagash and Otar villages other settlements are located along the road, namely Ulguli, Ungurtas, Targap, Kopa, Degeres, Beriktas.

*Fig. 2.3-1 – Situational Pattern for the road section km. 143-159*





The right-of-way of the existing road is equal to 40 m. Due to the expansion of the road, according to a preliminary estimate along the road and the offered bypasses there is a need of repayment of lands. Some farmlands and irrigating system will be affected along the Section. About 80% of a site will pass along the existing road much smaller worse on quality of the road. The section ends near the bypass of korday at 159 km.

Natural zones, ecosystems or sensitive habitats are not presented along this section.

## 2.4 ARTIFICIAL STRUCTURES

Along passing of "Uzynagash - Otar" road section the artificial constructions for the passage of maximum water expenses of rainfall floods, are presented by round and rectangular culverts of various diameters and sizes. All pipes have been constructed in 2004 and are in rather good operating condition.

On road section, passing through Kordai district of Zhambyl oblast all the existing 20 pipes need in increasing of mouth. The road highway, passing across the waste plain, brought into subjection to the general land relief. On the considered site the longitudinal profile has convex character. The most lowered district marks, where there is a concentration of a rain drainage are on the ends of a site of km 144 and km 157.

## 2.5 BORROW PITS

According to the technical specification for the development of a detailed project, the designer, based on engineering and geological surveys, offers several soil quarries, by registering on the Customer permit for exploration and production of common mineral resources, with the coordination of their location with land users and authorized bodies in the field of use and protection of the water fund, forestry, wildlife protection, reproduction and use of flora and specially protected natural areas, with the conclusion of the suitability of the soil and the availability of necessary volumes confirmed by the state expertise of mineral resources, as well with obtaining positive conclusions of the state ecological expertise of Committee for ecological regulation of the Ministry of Energy of RoK and sanitary and epidemiological expertise from Committee for consumer rights of the Ministry of National Economy of RoK (Enactment of the Government of RoK as of July 12, 2013, No. 721 "On approval of the rules of rights for subsoil usage").

As per Ministry of Agriculture of RoK, normally, borrow pits are not allowed to create less than 500 m from any river.

For the existing borrow pits recommended by the designers all EIA procedures are completed and ecologically applicable. Harmful impacts nsurface and underground water recources and other aspects are not expected. However, as soon as borrow pits which are used will be defined by the Contractor, proper observation will be carried out to confirm that, those sections are exactly functioning or operated in appropriate manner.

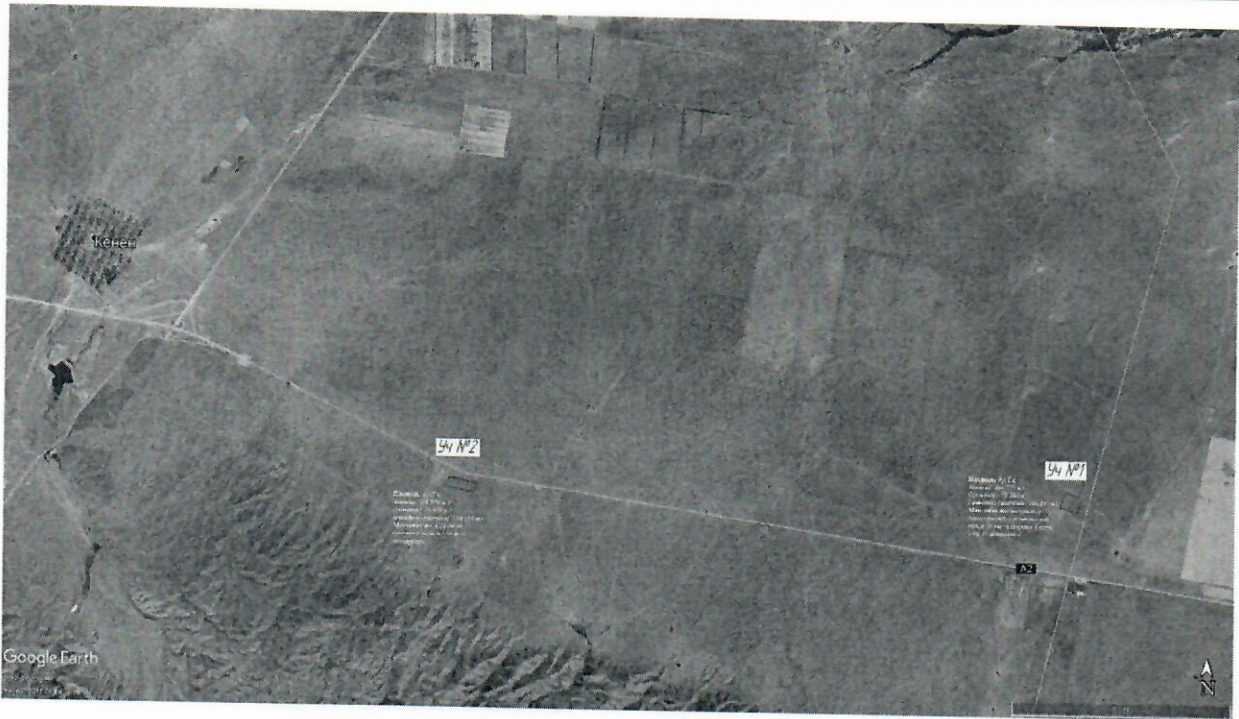
Regardless of what borrow pits will be used; the existing roads will be used for access to the construction sites. On the most likely, construction activities will have a slight effect on the traffic flow and noise levels near the settlements. Detailed monitoring will be carried out before the construction period begins. On secondary roads that are adjacent to the main road, construction



activities will significantly increase the traffic flow and possibly increase in pollution and noise levels. Calculation of transport traffic taking into account all the adjacent roads together with the monitoring program for the construction period as part of the environmental management measure will be prepared before the works start.

Table 2.6 Borrow pits

No.	Item	Material	Status	kilometrage, km/ distance from road
1	Borrow pit No1 (S = 9,4)	Loam, boulders and pebbles	Stocks approved	km 143 / 1,5 km (right)
2	Borrow pit No1 2 (S = 8,6 ha)	Loam, boulders and pebbles	Stocks approved	km 153/ 0,1 km. (left)



### 3. ENVIRONMENTAL IMPACT ASSESSMENT

#### 3.1 INTRODUCTION

*During the construction of roads the main types of environmental impacts normally are:*

- 1) air pollution caused by exhaust gases of various construction vehicles and various moving and stationary equipment;
- 2) pollution of environment by road-building machines and mechanisms, used on construction works;
- 3) noise caused by machines and equipment and other various construction activities;
- 4) pollution by dust and products of wear of road pavement and car tires at traffic, and also at transporting of road-building materials;
- 5) contamination of food production activities in the production of road-building materials, the development of soil sub-grade arrangement and road pavement;



- 6) possible pollution of soil, surface water sources, bordered to road of different types of flora;

*During operation phase impacts such as air, noise, etc. depends on the distance from the carriageway:*

- 1) Air pollution and noise from all vehicles passing along the new route;
- 2) contamination with dust and wear products pavement and car tire at vehicle traffic;
- 3) pollution of roadside strip by production and household waste;
- 4) pollution by surface drainage from carriageway;
- 5) possible pollution of underground waters from drainage and other sources from pollutions;

### **Zones of influence**

Territories for roads, suffering influence:

- 1) Influencing area: more than 3000 meters, which may be the effect of the road (eg, noise, dust, air pollution);
- 2) Protection zone: the territory that borders with the right of way has a quite significant impact. In some cases, the impact can be very significant; noise and air quality, drainage, soil pollution, etc.
- 3) Reserve-technological lane: road is adjacent to the territory, which is needed for emergencies, has the potential future use for roadside service, excavation and embankment. Significant impact and environmental changes will occur during the construction period.

The approximate sizes of a zone of influence, protective strip and reserve and technological strip, are specified in Table 6.1

Таблица 6.1 - Ориентировочные размеры зоны влияния, защитной полосы и резервно-технологической полосы

Name of territories of influences	Distance from carriageway, m, for ecological class of road		
	I	II	III
Zone of Impact	3000/1500	2000/1000	600
Protection strip	250/150	150/90	60/30
Reserve-technological strip	30	12	-

## **3.2 AIR IMPACT ASSESSMENT**

### **Construction and Operation Period**

Planned economic activity on the construction and further exploitation of Uzynagash – Otar road section will be accompanied by emissions of air pollutants and then spread them in the surface layer of the atmosphere during operation of construction equipment (emissions from construction activities and from the engines and machinery) during the construction period, and emissions from the engines moving vehicles on the track during operation.



In table 6.2.1 there are lists of work, name and description of sources of allocation of emissions to the atmosphere during the construction and operation of the highway.

Table 6.2.1 - Characteristics of emission sources into atmosphere

Types of work	Name and characteristics of emission sources	Name of potential air emissions
1	2	3
Road Construction	Emission of soil dust and construction materials during the work of machines and mechanisms	Inorganic dust
	Emission of products of combustion in CE of machines and mechanisms	Nitrogen dioxide, soot, carbon monoxide, benz(a)pyrene, hydrocarbons
	Welding	Iron oxide, manganese and its compounds, hydrogen fluoride
	Paint works	White spirit, xylol
Installation of production bases	Emissions of pollutants from concrete plants	Inorganic dust
Development of borrow pits	Emission from operating equipment, loading and unloading of materials.	nitrogen dioxide, carbon black, carbon oxide, benzapyrene, hydrocarbons, inorganic dust

The road construction is associated with concrete plants and stone crushers, work of which leads to high dust content. During the concrete production, cement and organic dust, as well as silicon, are emitted into the atmosphere. These substances can cause harm to the human health and environment. Prevention of air pollution as a result of the concrete plant and stone crushers operation is under responsibility of owners of the plant and quarries and is not included in the EIA within the road construction project.

The composition of engine emissions comprise: carbon monoxide, hydrocarbons, nitrogen dioxide, lead, sulfur dioxide and particulate matter (carbon black).

The assessment of the level of air pollution caused by exhaust gases shall be done based on predictions in accordance with calculations. The values of maximum permissible concentration (MPC) of pollutants is obtained from the sanitary-epidemiological regulations and guidelines "Sanitary-epidemiological requirements to the atmospheric air" No 629 of the Republic of Kazakhstan as of 18 August 2004. As the calculated value the concentration of harmful substances contained in exhaust gases from the various types of cars in mixed-flow traffic is accepted. The impact on the atmosphere is considered acceptable if the content of harmful substances in atmospheric air of populated areas does not exceed the maximum permissible concentration laid down in Sanitary Norms and Regulations "Sanitary-epidemiological requirements to the atmospheric air" as of August 18, 2004 No 629.

The assessment company's impact level on the air basin of the residential area is carried out on the basis of modeling of the distribution of emissions in the atmosphere, according to "Methods for calculating the concentrations of harmful substances contained in the emissions of enterprises in the air. RND 211.2.01.01-97 ». In calculating the dispersion of emissions from vehicles and determining the concentration of toxic substances at a distance of 20 meters from the road, the model of Gaussian distribution of impurities in the atmosphere at low altitudes.

Calculations have been made for a single concentration (MPC) in accordance with SanPiN«Requirements for atmospheric air of populated areas» No.3076 dated 18.09.2004, No.841 dated 3.02.2004, approved by Ministry of Health of Republic of Kazakhstan.

Calculations have been performed and presented in Appendix 3.



Table 6.2-2 – Results of calculations of emission dispersal from vehicle.

Emission types	Concentration of pollution in atmosphere at distance of 20 m from edge of carriageway of the road, mg/m <sup>3</sup>	Maximum permissible, maximum one-time concentration MPC M.P., mg/m <sup>3</sup>	Average daily maximum permissible concentration of toxic components exhaust in the air of settlements, mg/m <sup>3</sup>	Class of danger
1	2	3	3	4
Carbonoxide	0,056	5,0	3,0	4
Hydrocarbons	0,011	1,0	1,5	3
Nitrogenoxides	0,0056	0,085	0,04	2
Leadcompounds	0,000032	0,0010	0,0003	1

**Conclusions on the construction and operation period:**

**Construction period:** the results of calculations of air emissions in the construction and operation period were within the established limits. As the road passes through open land with only two sensitive areas, the harmful effects on health of the people will be minimal. The road passes close only to two sensitive zones: residential zones Samsy and Targap villages. Houses are located close to the existing road, the project offered bypasses of these villages which will improve the route of the road, and also road safety.

The future project of the Samsa bypass road is located about 400 m from the border of the settlement, and bypass of Targap village is located 250 m from the border of the settlement. On the bypasses supposed to be recreational areas where local residents will be able to develop small businesses, sell their livestock and crop production, which will positively influence the improving welfare of the abovementioned settlements population.

Guardrails are provided on bypasses, also directing grid for cattle pass will be installed to exclude cattle access to the highway, which is observed at present. Social Monitoring is set forth in Section 8 of the Resettlement Policy Framework Document.

It is very important not to allow the organization of construction warehouses or construction sections near this zone.

### 3.3 ASSESMENT OF NOISE AND VIBRATION LEVEL

**Construction Period**

The technological processes during the construction of roads are a source of intense noise, which can adversely affect human. The intensity of noise from road-building technique and mechanisms depends on the type of machinery and equipment, type of drive arrangement, work regime and the distance from construction work places to residential zone. Especially the noise is created at the work of bulldozers, jack-hammers, compressors, excavators, and Diesel Trucks. The noise produced during construction is temporary and localized, but can still create an annoying impact.

According to GOST 12.1.003-83 Section “Noise” the set forth for noise level MPL 70-80 dBA. Zones with noise level higher than 80 dBA must be marked with safety signs. To ensure acceptable noise levels, the construction plan should exclude work at night. For road machines engines soundproofing protection enclosures and hoods with multilayer coatings made from rubber, polyurethane foam shall be used. Such measures can reduce noise levels by 5 dBA.

**Conclusions. Construction Period:**

In view of the general isolatedness of the project area it can be assumed that the impact of noise on residential houses will be negligible. Here houses are located close to the existing road, which will be used during construction of new one. Based on the experience of road construction on



similar projects can be assumed that the noise level is below the recommended level in the regulations mentioned above. Due to the construction, the intensity of traffic on the existing road will slightly increase and in the access and adjoining roads leading to the highway project.

Location pits will be approved and the selected contractor, in consultation with engineers and local authorities on environmental issues, which will offer the most suitable locations to begin operational activities. However, no matter what career is used, the existing secondary roads will be used for the passage of the track to the project. On the existing road it is unlikely that the construction traffic will have a significant impact on traffic flows and noise disturbance to the existing communities. Nevertheless, this will need to be reviewed by the contractor, to be monitored in detail prior to the commencement of the construction period. For the minor roads that cross the new alignment and for any access routes, construction traffic will significantly increase traffic flows and potential noise disturbance.

A traffic count on all possible access roads to road construction site together with a regular monitoring program will be prepared prior to the commencement of the construction period as part of the environmental due diligence and management measures.

### **3.4 HYDROLOGICAL IMPACT**

This section covers: 1) the availability of water for the construction and operation of the road, and 2) the potential impacts, including contamination impacts that the road will have on water resources in the areas: surface and groundwater.

#### ***Water Needs for Construction Period***

In the process of construction of the facility, water is used for production needs and for drinking needs of workers involved in the construction.

The use of surface water and groundwater in the construction of roads is permitted only with the consent of the Committee for Water Resources under the Ministry of Agriculture of RoK. Sources of water for construction purposes will be determined after the completion of the design and obtaining a permit for special use by the Committee on Water Resources under the Ministry of Agriculture of RoK.

The use of water during construction is not much. On the construction, the water is consumed only for the preparation of concrete and mortar.

Calculation of households' drinking water consumption is carried out on the number of workers and the duration of the construction period.

In the course of construction, water is used for domestic and production needs (preparation of mixtures, making wheel washing system, irrigation of open soils). The source of drinking water is imported water from drinking well column of Kenen village. Safety and qualities of water will be provided according to "The instruction of quality and safety of food products", approved by the Government resolution of the Republic of Kazakhstan, from November 29, 2000 №1783.

According to information, resulting of the research of road section, the designers of "Kazdorproject" LLP, "DRI "Kazdorproject" LLP and "SK Engineering" LLP, the region is rich in groundwaters. Surface water is sufficient to meet the needs of water during construction. It is assumed that the reserves of water will not be depleted in construction activities.



### ***Conclusions on Water Resources during the Construction Period***

During the road construction process, water is used for household and industrial needs (preparation of mixes, feed of wheels washing system, open ground irrigation). The source of drinking water supply is imported water. Safety and quality of water will be provided according to "Instruction on Quality and Safety of Food Products" approved by the Resolution of the Government of the Republic of Kazakhstan No.1783 dated November 29, 2000.

According to information obtained during ESIA preparation, the area has abundant reserves of ground water. Surface water has the capacity to supply water for engineering purposes during the construction process. Based on the preliminary estimates for water requirements during the construction period, it is assumed that sufficient volumes of water for all construction activities and water are available, they will not be depleted.

### ***Conclusions on Contamination of Groundwater Resources: Construction and Operation Period***

Based on the groundwater levels which are available along the road section and the characteristics of the project, it can be concluded that contamination of underground sources during the construction and operation period will not occur. Significant work which is less fertile layer, such as dredging and drilling is not expected. Water for construction work and for the camps will be taken in small quantities from existing wells, or water pipes. In general, water availability is not a problem in the project area. Also, the top water level is not used for the drinking water, and will not be disrupted.

During the operation period, pollution of groundwater will not occur, provided that the provisions of good practice are reflected by the designer and properly implemented.

### ***Borrow pits***

Potential quarries are defined by designers, however the final choice is still with the Contractor. Existing borrow pits have to be approved by the ESIA from the competent authorities, and thus, it can be assumed that they will not affect the aquifers that are used as a source of drinking water. Moreover, apart from the occasional spill (unlikely, that is no specially) quarrying has a slight risk of contamination. The greatest risk associated with improper closure and reclamation of quarries can lead to their transformation into illegal landfills, which already have a significant risk of contamination. An important part of closing of borrow pits, thus, it is the dismantling and / or blocking all access roads.

### ***Construction camps***

In construction camps, a significant amount of waste and sewage accumulates, which is formed in a result of the vital activity of employees. At this scale of construction, the number of workers will simultaneously reach several hundred in the area. The location of the employees' camp will be determined by the Contractor and located at 81 km of the road at the area of 3Ha, measures are provided on collecting and removal of garbage, collection of sewage and pumping of septic. Since, the road section passes across agricultural land, the Contractors will take measures to prevent contamination of soil and groundwater. Moreover, the Contractor will provide an apparatus of sewage treatment systems and garbage removal, which should be provided in the draft employees camps.

### **Hydrology Conclusion**

Overall, the impact on groundwater and surface water is expected to be moderate or low. Streams and rivers will be crossed by bridges, with application of engineering solutions to prevent adverse effects on the river. In the sub-grade, a sufficient number of culverts are established to



prevent congestion of the water and subsequent waterlogging. Data on artificial structure are given in the Table 2.5 of this report.

### **3.5 SOIL AND LAND IMPACT**

#### ***Soil Damage***

Cleaning the area, excavation and backfilling of the mound, the subgrade device usually gives a major impact on soil and subsoil. A substantial amount of topsoil will be removed for the construction of roads and detours, quarrying, construction camps and other construction activities. In those areas, there is a possibility of contamination, disturbances and damage to the soil cover. In particular, the soil may be compacted and damaged along the temporary access roads and on construction sites. Violation of soil is inevitable, and it will be more critical in areas with high soil humus content, which are very fertile. However, this can be minimized at performing of correct construction procedures.

#### ***Soil Contamination***

There is a potential for contamination of soil during construction, as a result of the oil spill on quarrying along the route. Such contamination can then move on to the surface and underground water and agricultural activities in the vicinity of the alignment. Some contamination can occur during normal construction work, but the most serious contamination can occur during the accidental fuel spills and during the prolonged storage of building materials without precautions.

During the construction phase the most important potential for contamination will be on the sub soil, which will be exposed after the removal of fertile layer. Materials used for road layers can cause contamination. Provided that the sources of aggregates (sand, gravel, soil, crushed stone) for construction will be brought from local quarries, the base layer contamination is not expected.

Soil contamination may also occur during the operational period. The main criterion for evaluating the hygienic danger of soil contamination by chemicals is (MPQ) - the maximum permissible quantity of this substance in mg / kg of absolutely dry soil, which guarantees the absence of a negative direct impact on human health. Hazardous assessment of the effects are made on lead, it is an indicator which has a presence in the soil of other toxic elements. Maximum permissible concentration of lead in soil (MPC) in the Republic of Kazakhstan according to the "standards of maximum permissible concentrations of harmful substances, harmful microorganisms and other biological pollutants in the soil," is approved by the joint Order of the Minister of Health from 30.01.2004 No99 and Minister of Environmental Protection of 27.01.2004 of No21-p, and is set at 32 mg/kg.

Because of products of wear of pavings and car tires, decay of exhaust gases of engines of cars and construction equipment, the fuels and lubricants getting on the carriageway as a result of leak from fuel system of engines or negligent actions of drivers and the service personnel, impurity of the roadside territory and level of the content of lead can increase.

De-icing materials, especially salts of falling precipitation and melting snow from the road at the roadside, are less dangerous than other toxic materials. So, level – 0,04% is taken for a maximum permissible concentration CL (chlorides) at impact of deicing substances on soils in a roadside strip of this zone. With significant accumulation, they can change the biological soil composition of roadside strip.

### **3.6 WASTE FORMATION**

#### ***Waste formation during construction***

During construction and operation of the projected road, waste streams will be generated:

1. Inert mineral materials such as excavated soil, crushed aggregates from crushing plants, scrap metal, sand and gravel mix and concrete rubble, which will be entirely recycled and used as construction materials for filling, grading and landscaping.



2. Potentially noxious or hazardous materials such as waste from construction camps and workshops, barrels and containers from fuels, lubricants and construction chemicals, and spent welding electrodes. This will be disposed via existing municipal waste management facilities in accordance with Kazakh regulations.
3. Timber from sheared trees and other organic matter from the clearing of the alignment will be collected and stored in appropriate locations outside the immediate construction zone and if suitable made available for sale to the public as firewood.

The following table presents types of formed wastes and utilization methods:

Table 6.10 – Formation of constructed wastes (calculation has been prepared by designers)

No	Name, waste type	Classification	Storage and utilization methods
1	2	3	4
1	Construction debris	GG170 Green List Construction, construction sites Site improvement	Special polygon
2	Used oil	AC-030, amber list wastes	By special companies on utilization
3	Electrodestubs	GA090 GreenList	By special companies on utilization
4	Waste end	AC-030 Amberlist	By special companies on utilization
5	Solid municipal waste	GO060 GreenList	Polygon

Impacts on the atmosphere, water bodies, on soil, noise pollution in aggregate can have a significant impact on the landscape, and the ecosystem. Impacts associated with the project implementation, such as quarrying, water abstraction from surface waters or groundwater for construction and drinking needs, will be included in working projects, as well as in the EIA developed for each road section in accordance with applicable laws and regulations of the Republic of Kazakhstan.

The impact from the road construction project may be negligible, but in the future, in combination with the implementation of other projects in the area of passage of the impact route, a moderate or, in some cases, significant environmental impact may potentially occur. According to the applicable laws and regulatory documents of the Republic of Kazakhstan regulating the development of environmental projects for the conduct of economic and industrial activities, the EIA for each project is developed separately. Currently, the project impact zone is not developed and cumulative impacts due to already implemented projects/impact factors are not observed. It should be noted that at present there is no information on projects that are planned to be implemented in the future in the road area. For the implementation of each project, those responsible for the implementation of projects receive environmental permits, taking into account the cumulative impact on the environment. In order to reduce the load on the ecosystem in a certain area, the Committee for Environmental Regulation, Control and the State Inspectorate in oil and gas sector of the Ministry of Energy of the Republic of Kazakhstan may refuse to issue permits for the implementation of other projects in the road area and demand to change the location of the project.



## 4. MEASURES FOR MITIGATION OF NEGATIVE IMPACTS

### 4.1 AIR QUALITY MITIGATION

#### *Dust Mitigation during Construction period*

Dust can be a major problem during construction and is caused due to preparation and construction activities, including site preparation where the soil is disturbed, during aggregate and cement handling for concrete production, processing and transportation of rock material and soil.

To reduce dust pollution during construction and repair work on the road during operation the following mitigation should be carried out:

1. Dust elimination of road sections where there is intensive dust formation.
2. Periodic watering of dirt roads at a rate of 2 l/m<sup>2</sup> per watering cycle;
3. Set and enforce speed limit on sections of roads subject to intense dust formation;
4. To transport dusty materials in trucks equipped with tarpaulin or other covers, to prevent the emission of dust of the transported material to atmosphere.

### 4.2 NOISE AND VIBRATION MITIGATION

The level of traffic noise at any sensitive point generated by vehicles traveling on the highway, shall not exceed the values set in, SanPiN № 841 from 03.12.2004, Republic of Kazakhstan, at 70 dBA.

#### *Mitigation of Noise during Construction Period*

Level of the noise is high at traffic on the road. Significant noise can be created by bulldozers, scrapers, pneumatic hammers and road milling machines.

Reducing construction noise is achieved through the following activities:

1. Impose a speed limit of traffic during construction to 80km/h. This can reduce noise by 7 dBA;
2. Undertake construction work during the daytime to reduce any potential impact on sensitive uses particularly in construction access roads;
3. To the extent possible undertake soundproofing of all vehicles and equipment by the use of foam, rubber and other soundproofing materials, as well as through the use of hoods with multilayer coatings; ensure that Contractors either have modern equipment that fulfill noise reduction norms, or that equipment is retrofitted to meet the required standards;
4. Stationary units (e.g. aggregates or compressors) shall be placed in sound-absorbing areas or tents, which can reduce the noise level by up to 70%;
5. Zones with high sound levels above 80 dBA must be designated with safety signs, and workers in this area should be provided with personal protective equipment;
6. All warehouses, special construction sites, batching or mixing plants should be located at a distance from residential or any other sensitive areas;
7. To reduce the irritating and harmful impact, construction works at night in sensitive areas is prohibited.
8. To carry out regular monitoring of noise levels near sensitive areas during construction works.
- 9.



### ***Operation Noise Mitigation***

The calculation of noise level from vehicle indicated that traffic noise does not exceed the maximum permissible limits. However, it will be particularly important to monitor operation noise levels to ensure noise levels are not exceeded or no impact to residents.

### ***Vibration Mitigation***

Vibration normally occurs during piling. This may only occur at a number of locations mainly at bridge construction. If it does not take place near the sensitive uses the impacts on the community will be small. The most important impact will be the impact on workers on the construction site. All workers exposed to vibration should be provided with special clothing, earplugs and regular breaks.

## **4.3 HYDROLOGICAL MITIGATION**

### ***Construction period***

Overall the impact on groundwater and surface water is expected to be low. Deep excavations, which could impact on ground water dynamics and change the water system are not planned. Except for bridge constructions any impact on groundwater levels is likely to be minimal and contamination will be unlikely. Streams and rivers will be crossed by appropriately dimensioned bridges, and embankments will have sufficient culverts to prevent blocking and swamp formation.

During road construction conduction of constant monitoring is required of all watercourses to control entering of harmful toxic substances and pollution with particulate matter of mineral and organic origin, represented suspended particles of sand, clay, silt and other materials.

The Contractor shall be responsible for obtaining all permits required for the use of surface and groundwater resources from the district and competent authorities. Without obtaining these permits no water resources should not used.

### ***Discharge of Waste Water from Construction camps***

The discharge of wastewater to watercourses is only allowed with permission of the sanitary-epidemiological service and fisheries. The composition of the wastewater must comply with SanPiN to protect surface waters from pollution № 3 as of February 02, 2004.

To reset the waste water it is recommended to apply pit with the depth not less than 3 meters from reinforced concrete rings with a diameter of 1.5 m. So that sewage did not get into the ground water, it is necessary to concrete bottom of the pit. Waste water from these wells must be pumped into special water trucks and transported to the nearest facility for wastewater treatment.

### ***Surface and Groundwater Protection***

In water protection zones is prohibited pollution of the earth's surface, especially landfills, waste production, as well as parking, fueling, washing and repair of motor vehicles and road equipment. For the pollution and contamination of waters, commissioning works without devices to prevent pollution and contamination of water, wasteful water use, violation of water protection regime at watersheds and other violations, the perpetrators are liable in accordance with legislation.

Dimensions of water protective zone in to each direction from average summer river line for small rivers – 100 m, for large rivers – 500 m. Works within zone of water protection can be allowed under special permission by bodies of fish protection and sanitary services.

## **4.4 SOIL EROSION AND CONTAMINATION MITIGATION**

### ***Soil Erosion***

During the construction of the road to the number of priority works should include the elimination of pockets of erosion and the elimination of the causes of its occurrence. Due to the characteristics of the landscape and design solutions, even in extremely dry or humid conditions, landslides or erosion is likely will not occur. In spite of this, all construction work must be carried out with the prevention of erosion.



### ***Soil Reclamation***

The Construction of the road will require the use of land for a temporary period for construction activities and it is a legal requirement that all land used for a temporary period for construction must be reclaimed and returned to the original users and owners in a condition suitable for its original agricultural use. Any use of land that involves the removal of any soil creates instability to the local environment and wider environment and it is essential to preserve the natural topography and existing vegetation.

According to the Land Code of the Republic of Kazakhstan from 20.06.2003 and "Guidelines for the assessment of proposed economic and other activities on the environment in developing pre-design and project documentation", Astana, 2007 all land used must be returned in a condition suitable for agriculture.

Biological reclamation allows for the planting of grasses to encourage the restoration of fertility. Land reclamation should be done during or after the completion of the construction activities. It is important to reclaim in all places where soil and subsoil has been disturbed by construction and associated activities.

Remedial actions:

- 1) Removal of sand and detritus mixture (20 cm) from the surface of the road by a bulldozer moving into piles up to 50m, followed by loading an excavator to dump 0.65 m<sup>2</sup> to transport up to 1 km (35,000 x 0,20);
- 2) Levelling of the road surface by bulldozer;
- 3) Deep subsoil loosening by bulldozer;
- 4) Back movement of topsoil from the dumps to the prepared surface layer by the bulldozer;

Activities on the site after construction should include the following:

- 1) Secondary tillage by cultivator;
- 2) Mechanized sowing of perennial grasses as follows: alfalfa - 25% of 18 kg/ha 30% perennial ryegrass - 75% of 35 kg/ha of 30%.
- 3) Postseeding compaction of surface by star-wheeled roller
- 4) Plowing of perennial grass

Immediate and proper reclamation of land reduces the adverse impact of disturbed land on the environment. It will reduce dust and pollution, can have a beneficial impact on human health and eliminates environmental damage.

#### ***Soil contamination: Construction period***

During the construction period, it is very important that the contractor undertook all actions according to contract specifications, operated all activity on a site taking into account preservation of environment.

To prevent soil contamination the following actions shall be carried out:

- 1) To provide appropriate management of construction activity, so that there was no spill or leakage of hydrocarbons and other substances. If it occurs, immediately take measures to minimize impact on the soil.
- 2) To store construction materials only in specially designated area;
- 3) Immediate sorting and removal of wastes to specially designated area;
- 4) Dismantle of construction sites and access roads after use;
- 5) Use of topsoil on free area as soon as possible.



## 4.5 FLORA AND FAUNA MITIGATIONS

Construction and operation of the road will impact on flora and fauna. Air pollution, noise and vibration, wind and water erosion can potentially negatively affect local environment and ecosystem as a whole.

All above measures for mitigation of negative impact of emissions from motor transport, noise and vibration influence have direct relation to flora and fauna. Reduction of negative impact on flora and fauna at construction of the road requires implementation of the following mitigation measures:

- 1) Ensuring high quality condition of the road surface throughout the operation period to minimize noise and air pollution, which will negatively impact on flora and fauna;
- 2) Decrease in pollution of atmospheric air by ensuring access to the road only vehicles and road equipment of high quality with emission of admissible emissions;
- 3) Reduce the use of salt and chemical materials used to disperse snow and ice in winter so that soils, plant tissues, animals and birds are not adversely affected or destroyed. An alternative is to replace salt and other chemicals with friction materials such as sand or gravel;
- 4) Using less toxic for the environment deicing agents like HCF (calcium chloride inhibited by phosphates), or CMA (calcium-magnesium acetate), which do not lead to irreversible changes in the process of photosynthesis and subsequent destruction of plant tissues and death of animals;
- 5) Dust reduction by good maintenance road, regular cleaning, and watering to reduce the negative impact on flora.

Depending on chemical composition, dust specifically impacts plants, caused by the penetration of harmful compounds into leaves tissue. In this case, the accumulation of compounds in plant tissues causes disturbance of organisms metabolic functions, decrease in the amount of synthetically active energy absorbed by the leaves, and leads to acceleration of the aging processes. In addition, all transport and freight vehicles, including construction equipment, shall be covered with tarpaulins or other covers.

Temporary and continuous flooding can be avoided by culverts and drainage system, so that not to impact on flora and fauna.

Extraction of timber will be recovered by planting new trees with a ratio of at least 1: 1, plus a margin for non-grown seedlings (normally 25%). This will be implemented by another project of greening.

### *Fauna mitigation during Construction:*

The Contractor shall guarantee that no excessive disturbance to fauna within or close to the road alignment takes place. The Contractor and CSC shall monitor the events of meetings with large and unusual wild animals along or close to the road alignment and inform the akimat. Any injury or killing of large animals shall be reflected in reports and akimat notifications.

## 4.6 WASTE REDUCTION

### *Waste during Construction Period*

By the preparatory works project, special places for temporary warehousing of waste with the indication of ways and ways of their export to a place of burial, processing or sale have to be provided. Export of wood and waste from clearing of vegetation has to be carried out during the season felling and the rooting out works (it is preferable in winter time).



Contractors shall to have separate containers for collecting waste: metal, plastic, construction materials. The waste relating to category of secondary raw materials (scrap of metal) has to be stored separately. Waste for processing and a reuse on a construction site has to be accurately designated. In all cases, storage has to be made in the designated places and are taken out from a site if necessary. On all questions of waste consultations on control of waste have to be carried out. The contractor bears responsibility for garbage removal which has to be carried out according to standards. Harmful waste has to be taken out according to local and national norms. Garbage removal on the neighboring territories with or without the permission of the owner, out of a building site is prohibited until these sites are not approved as a place for export of waste.

Burning of any waste is prohibited until permission from Oblast department of Ecology is obtained.

All accumulated in construction camps and office area shall be removed by the Contractor to the closest area construction debris. Removal and burning on construction site is prohibited as well. Temporary places for collection of waste shall be provided on the site which shall be properly marked.

Upon completion of construction, all waste, and temporary facilities, installations and unused materials have to be removed from the site. No waste shall remain on the site after any construction activity.

Control of garbage removal is under responsibility of akimat. RMD will agree on the maintenance of garbage for export on a dump. Export of waste in other places has to be coordinated with regional Akimat. Any dangerous or medical wastes are taken out separately on the coordinated dumps. RMD is responsible for collecting garbage within the territory of the road and zones of service and its export in defined for this place. The garbage dump on the road and zones of service is forbidden. It is forbidden to burn garbage on the road or in service places if it is not allowed by local and national norms.

The issue, regarding crossing of cattle and agricultural machinery is also considered within EMP.



## 5.1 ENVIRONMENTAL MANAGEMENT PLAN: UZYNAGASH – OTAR ROAD SECTION km. 143-159

Table 5.1: ROJECT IMPACT DURING CONSTRUCTION - MITIGATION MEASURES, MONITORING AND RESPONSIBILITY

CATEGORY	POTENTIAL IMPACT	SIGNIFICANCE	LOCAL IMPACTS	MITIGATION	RESPONSIBILITY	MONITORING	RESPONSIBILITY	LONG TERM IMPACT
1. Air quality	Air pollution: emissions from construction machinery and equipment, emissions from cement-concrete, asphalt-concrete plants, crushing station, etc.  Dust: from construction activity borrow pits and crushing station transportation of materials	Potentially significant, especially during dry season	Generally in the main area of construction, the existing roads or bypass roads;  Potential impact on adjacent villages  Local influences on sites in Almaty and Zhambyl are not expected.	All vehicles and the equipment used in construction have to be modern, be appropriately maintained and used according to recommendations of manufacturers.  All access and bypass roads have to be watered.  All plants/dust-generating equipment shall be in good technical condition and be located far from residential area.	The contractor shall be responsible for implementation of mitigation measures.  Supervision Engineer monitors the compliance with mitigation plan.	Regular monitoring by sub-contracted laboratories at designated sampling points and on-site compliance checks by Construction Supervision Consultant (CSC).	Contractors  Construction Supervision Consultant (CSC)/Engineer	Long-term impact is limited.
2. Noise and vibration.	Noise from construction machinery and equipment  Noise from cement-concrete and asphalt concrete plants, crushers, etc.  Transport noise on the access roads	Potentially significant	The area of construction, access and bypass roads.  Potential impact on adjacent residential areas.  Potential impact on the settlements and villages  Local impacts on sections in Almaty, Zhambyl oblasts are not expected.	All vehicles and the equipment being in use in construction have to be modern, regularly maintained and used according to the recommendations of the manufacturers.  All plants/noise making equipment have to be in good technical condition and located far from settlements.  Any types of works during nighttime near residential areas of the villages/settlements of on Almaty and Zhambyl should be prohibited.  Speed limit for all construction	The contractor shall be responsible for implementation of mitigation measures.  Supervision Engineer monitors the compliance with mitigation plan.	Regular monitoring by sub-contracted laboratories at designated sampling points and on-site compliance checks by Construction Supervision Consultant (CSC), Engineer and local authorities (EP and SES bodies).	Contractors (through licensed laboratories)  Construction Supervision Consultant (CSC)/Engineer	No long term impact



<p>3. Water, drainage system and floods</p>	<p>Pollution by a runoff from the construction sites in the areas of bridge construction is possible</p> <p>Infiltration of the polluted water in the water-bearing horizons</p> <p>Pollution of underground waters at pits/quarries (accidental spills)</p> <p>Pollution of surface and underground water sewage from camps.</p>	<p>Influence is from moderate to insignificant. Places of water intakes from wells (drinking water and technical water) will be agreed with Committee on Water Resources.</p> <p>Pollution of underground waters is unlikely, as deep soil excavation is not planned.</p> <p>Pollution from rotational camps can be from moderate to significant</p>	<p>Potential impacts in the area of surface water, located along the alignment (bridge construction).</p> <p>Potentially all road track.</p> <p>Areas of location of the construction camps</p>	<p>equipment shall be 60 km/h.</p> <p>CR, Regional Departments and Akimats of districts in consultation with contractor shall provide water intake only from designated sources.</p> <p>Good management at construction sites.</p> <p>Areas of potential pollution of rivers will be designed to prevent accidental spills and runoff and protected by sedimentation pools</p> <p>Sewage at construction camps will be collected in septic reservoir and transported/discharged at wastewater treatment plants</p> <p>Careful organization works in water protected zone</p> <p>The construction of sediment traps / barriers to prevent stormwater</p>	<p>CR, Regional Departments of the Committee of water resources (permits for water intakes) and Akimats of districts in consultation with contractors</p> <p>The contractor shall be responsible for implementation of mitigation measures.</p> <p>Construction Supervision Consultant (CSC), Engineer monitors the compliance with mitigation plan.</p>	<p>Regular monitoring by licensed laboratories at designated sampling points and on-site compliance checks by Construction Supervision Consultant (CSC), Engineer and Regional office of the Committee on Water Resources implement control on site.</p>	<p>Contractors (through licensed laboratories)</p> <p>Construction Supervision Consultant (CSC)/Engineer</p> <p>Committee on water resources</p>	<p>Long-term impacts are possible in case of not execution of mitigation measures</p>
<p>4. Erosion and pollution of soils and subsoil layers</p>	<p>Soil erosion (wind and water) due to removal of vegetation and topsoil is possible.</p> <p>Pollution of the soil and subsoil layers as a result of construction and accidental spills.</p>	<p>Potential impacts are low to medium (earthworks on the alignment and operation of borrow pits).</p>	<p>Local impacts are expected only in the areas of borrow pits and earthworks on embankment along the alignment.</p>	<p>The contractor shall be responsible for implementation of mitigation measures.</p> <p>Construction Supervision Consultant (CSC)/Engineer monitor the compliance with design impact reduction plan.</p>	<p>The contractor shall be responsible for implementation of mitigation measures.</p> <p>Construction Supervision Consultant (CSC)/Engineer monitor the compliance with design impact reduction plan.</p>	<p>Contractors</p> <p>Construction Supervision Consultant, Engineer.</p>	<p>Contractors</p> <p>Construction Supervision Consultant (CSC)/Engineer</p> <p>Committee for Roads</p>	<p>Erosion is possible if there is no proper management and prevention during construction</p>
<p>5. Flora and fauna and the sensitive and protected territories</p>	<p>Impacts on vegetation along the road alignment</p> <p>Disturbance of fauna in the area of influence of the construction works</p>	<p>Potential impacts are Low to Medium</p> <p>Temporary disturbance of birds and animals in the immediate proximity to the construction sites, concrete plants, crushing plant or borrow pits is possible</p>	<p>Moderate loss of planting.</p> <p>Illegal hunting is possible</p>	<p>The contractor shall be responsible for implementation of the mitigation measures.</p> <p>Construction Supervision Consultant (CSC)/Engineer shall monitor the compliance of mitigation plan.</p>	<p>The contractor shall be responsible for implementation of the mitigation measures.</p> <p>Construction Supervision Consultant (CSC)/Engineer shall monitor the compliance of mitigation plan.</p>	<p>Regular monitoring of proper vegetation and topsoil management shall be carried out by the Contractor.</p> <p>Construction Supervision Consultant (CSC)/Engineer shall monitor the compliance of mitigation plan.</p>	<p>Contractors</p> <p>Construction Supervision Consultant (CSC)/Engineer</p> <p>Local management of Committee for forest and wild animals.</p>	<p>No significant long-term impact on flora and fauna is expected</p>
<p>6. Waste management</p>	<p>Formation of construction and household wastes to</p>	<p>Potential impact from low</p>	<p>Potential impacts near</p>	<p>Contractor together with</p>	<p>Contractor together with</p>	<p>Construction Supervision Consultant</p>	<p>Construction Supervision Consultant</p>	<p>Provided that all waste will be</p>



	be buried.	to medium.	construction camps	construction of subgrade. Household wastes shall be regularly removed from the site. Not determined sections.	local authorities.	(CSC)/Engineer should carry out regular monthly monitoring of sites and activities on waste management	(CSC)/Engineer and local authorities	taken out to designated landfills, long-term impacts aren't expected
10. Borrow pits/quarries and access roads	<p>Quarries/Borrow pits: Local violations in environment, especially dust and noise from equipment and vehicles.</p> <p>Inconveniences for agricultural activity</p> <p>Access roads: Inconveniences for agricultural activity</p>	<p>Potential impacts are possible. Existing pits have been already defined, but additional borrow pits will be needed.</p> <p>Location of access roads have to be coordinated with local authorities within 2 weeks after the beginning of works.</p>	<p>Considerable local impacts near pits and access roads are possible.</p>	<p>Location of borrow pits and access roads have to be coordinated prior to commence the works</p> <p>Only approved pits can be used, together with the plan of works on closing and reclamation</p>	<p>Contractors</p> <p>Territorial administration</p> <p>Committee for construction, housing and utilities infrastructure and land management of RK</p>	<p>Regular monthly and special monitoring of any influences, cases and complaints</p>	<p>Construction Supervision Consultant (CSC/Engineer ), and local authorities</p>	<p>Provided that impacts are mitigated properly, long-term influences aren't expected</p>



## 6.1 MONITORING PLAN

Monitoring of EMP performance is a very important aspect of environmental management during construction and operation of the facility. In response to the environmental impacts identified during the study, an environmental monitoring plan has been developed and is presented in Table 9.1 and Table 9.2. The contract will contain a list of all required mitigation measures and a timeframe for the compliance checks. The monitoring will include supervision to check the Contractor's execution of EMP provisions during construction.

The construction supervision consultant (CSC) in cooperation with MoID during project implementation will be required to:

- The Contractor shall prepare proper EMP for specific lot. The CSC will use this monitoring plan as a basis for supervision of the Contractor's compliance with these ESMP.
- Regularly control for environment monitoring conducting, and submission of quarterly reports: the main parameters to be monitored are outlined in Table 9.1 and 9.2. The CSC allocates an Environmental Specialist as part of the CSC team.
- Regularly prepare and submit quarterly reports based on the monitoring data and laboratory analysis report. The Contractor and the Supervision engineer will be responsible for data collection of environmental monitoring.

A lump sum budget is allocated to cover monitoring cost during construction phase of the project. PMC will hire a consultant for environmental monitoring and ensure that the road is monitored regularly during construction works.

The following measures will be taken to provide an environmental compliance monitoring program during project implementation:

The contract documents will clearly determine the contractor's obligations to undertake the environmental mitigation measures as set out in chapter 7 of this EIA and which shall be stipulated as enclosure to specifications.

The recommended environmental mitigation cost should be included as an item in the Bills of Quantities. It will guarantee that specific environmental mitigation budget is available. During the procurement, Contractors will be recommended to include these costs in their rates and present the mitigation cost as an item in the Bill of Quantities.

Control over construction, compliance with the requirements of safety, health and environment will be performed by the Construction Supervision Consultant (CSC) agreed with the Project Management Consultant (PMC).