

## SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT

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Project Number: 49042-005

Grant 0569 TAJ

Reporting period: July-December 2019

### Republic of Tajikistan: CENTRAL ASIA ECONOMIC COOPERATION CORRIDORS 2, 5, and 6 (DUSHANBE – KURGONTEPPA) ROAD PROJECT - Additional Financing

Prepared by Kocks Consult GmbH; Germany for the Ministry of Transport of the Republic of Tajikistan and the Asian Development Bank

Endorsed by: Project Implementation Unit for Road Rehabilitation

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January 2020



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(initial draft)

(July – December 2019)

GRANT 0569 – TAJ: CENTRAL ASIA ECONOMIC  
COOPERATION CORRIDORS 2, 5, and 6 (DUSHANBE –  
KURGONTEPPA) ROAD PROJECT - ADDITIONAL  
FINANCING

Ministry of Transport of the Republic of Tajikistan



Financed by:



January 2020

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## **ABBREVIATIONS AND ACRONYMS**

ADB	Asian Development Bank
BOD	Biological Oxygen Demand
BoQ	Bill of Quantities
CAREC	Central Asian Regional Economic Cooperation
CAP	Corrective Actions Plan
CEMP	Construction Environment Management Plan
CEP	Committee for Environmental Protection
CIS	Commonwealth of Independent States
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
CSC	Construction Supervision Consultant
EA	Environmental Assessment
ECA	Europe and Central Asia
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMR	Environmental Monitoring Report
ES	Environmental Specialist
FIDIC	The International Federation of Consulting Engineers
FinnOC	Finnish Overseas Consultants Ltd.
GoT	Government of Tajikistan
GRM	Grievance Redress Mechanism
HIV	Human immunodeficiency viruses
HSE	Health, Safety and Environment
IEE	Initial Environmental Examination
km <sup>2</sup>	Square kilometer
kWh	Kilowatt hour
LHS	Left Hand Side
m	meter
MoT	Ministry of Transport
MPC	Maximum Permissible Concentration
MSL	mean sea level
NO	Nitrogen Oxide
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Oxides of Nitrogen
NCN	Non-Conformance Notification
OFC	Optic Fibre Cable
PIU	Project Implementation Unit
POP	Persistent Organic Pollutant
PPE	Personal Protective Equipment
PPTA	Project Preparatory Technical Assistance
RHS	Right Hand Side
RoT	Republic of Tajikistan
RoW	Right of Way
SAEMR	Semi-Annual Environmental Monitoring Report
SEE	State Ecological Expertise
SSEMP	Site Specific Environmental Management Plan

**Semi-annual Environmental Monitoring Report**  
**Reporting period: (July – December 2019)**

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SEMR	Semi-Annual Monitoring Review
SNiP	Building Code
SO2	Sulfur Dioxide
SPS	Safeguard Policy Statement
STD	Sexually Transmitted Diseases
ToR	Terms of Reference
TSP	Total Suspended Particles

## **I. INTRODUCTION**

### **1.1 Preamble**

1. This is a Semi-Annual Environmental Monitoring Report (SAEMR) for Central Asia Economic Cooperation Corridors (CAREC) 2, 5, and 6 (Dushanbe –Kurgonteppa) Road Project – Additional Financing (Phase 2). The report covers the monitoring period from July to December 2019. The Construction Supervision Consultant of the project is Kocks Consult GmbH (hereafter CSC) and the contractor is Sinohydro Tajikistan Corporation Limited (hereafter Contractor).
2. This report provides a review of how the environmental measures, needed to prevent and/or mitigate negative environmental effects associated with the development project, have been carried out by the contractor during the monitoring period. The report also provides a summary of the currently outstanding major and minor environmental issues that need to be addressed, and suggestions for mitigation measures.
3. This report is the third SAEMR for the project. The next monitoring period will be from January to June 2020.

### **1.2 Headline Information**

4. The Project includes upgrade of the existent two lanes road to the four lanes highway designed under the modern standards. The Phase 2 (second phase) covers approximately 39.6 km of road section from Chashmasoron to the south, including the construction of the 330m bridge over Vahsh river.
5. The Department of the state ecological expertise of the Committee for Environmental Protection (CEP) issued a positive conclusion for the Project implementation on December 2016 (N920-15, 16.12.2016). The document covers the whole length of the Project including phase I and II and provides “No objection” to the Project implementation provided, that the mitigation measures stipulated will be observed.
6. The construction activities that have been carried out during the monitoring period have included: (i) clearing and grubbing; (ii) excavation and cutting; (iii) fixing and relocating of electrical, gas and communication lines; (iv) building embankments; (v) removal of top soils; (vi) preparation of embankment layers; (vii) construction of retaining wall; (viii) construction of bridges and culverts, laying up of sub-base and gravel base courses, tacking and asphalt bearing course.
7. Several issues related to the environmental management of the project were identified during the monitoring period, with regards to the compliance of the project with the ADB policy and Tajikistan Law on Environment. The issues were related to: (i) waste management (i) monitoring of the environmental indicators; (iii) use of PPE and (iv) the dust control and air quality.



8. During the monitoring period, the national ES of the supervising consultant carried out regular monitoring visits, discussed the identified issues with the contractor, and presented correction measures that need to be taken in to account in the implementation of the project.

## **II. PROJECT DESCRIPTION AND CURRENT ACTIVITIES**

### **2.1 Project Description**

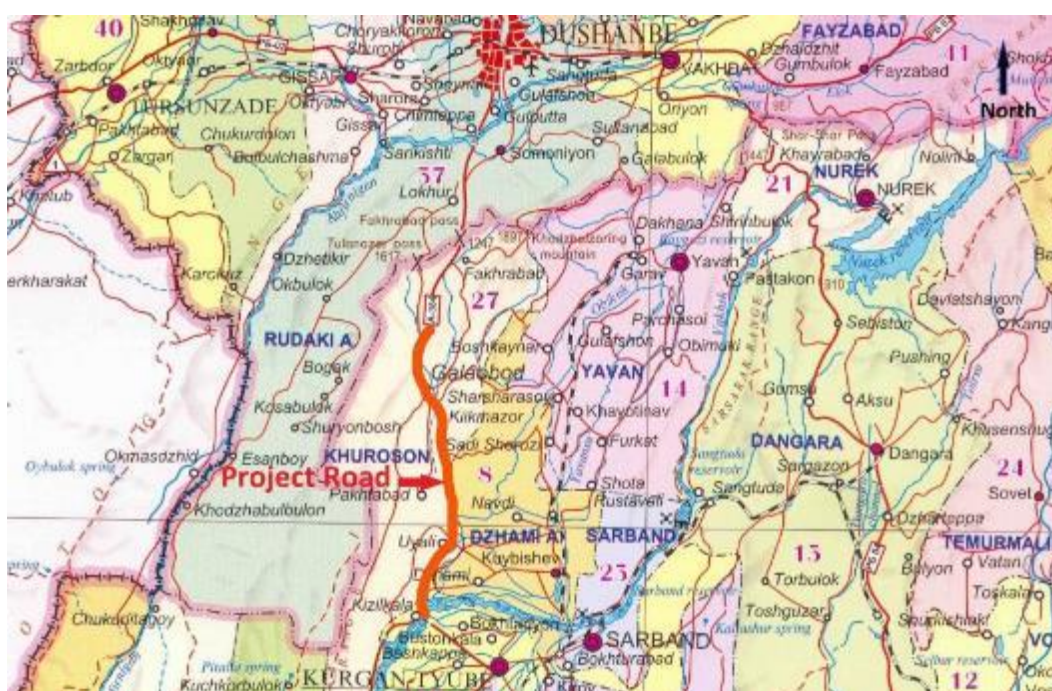
9. The Asian Development Bank (ADB) has provided funds to the Government of Tajikistan (GoT) in order to improve portions of the Central Asian Regional Economic Cooperation (CAREC) Corridors 2, 5, and 6 b Rehabilitation and Improvement of Dushanbe-Kurgonteppa Road, km37+475 – km73+050 upgrading the 82 km Dushanbe–Kurgonteppa road, for which ADB has programmed two projects (Phase 1 and Phase 2). The Table 1 shows the basic project information.

**Table 1: Basic Project Data**

<b>Project Name</b>	Grant 0569- CAREC Corridors 2,5 and 6 (Dushanbe – Kurgonteppa) Road Project – Additional Financing
<b>Contract Name</b>	Rehabilitation and Improvement of Dushanbe- Kurgonteppa Road, km. 37+475 – km. 73+050
<b>Employer (Executive Agency)</b>	Ministry of Transport of Tajikistan
<b>Contractor</b>	Sinohydro Tajikistan Corporation Limited
<b>Construction Supervision Consultant (Engineer)</b>	Kocks Consult GmbH, in association with FinnOC, and State Unitary Enterprise "Research, Design and Survey Institute
<b>Date of Award of Contract</b>	26th July 2018
<b>Commencement Date</b>	08 October 2018
<b>Contract Period</b>	36 months ( 1,095 days )
<b>Contract Completion Date</b>	07 October 2021

10. The road section from Dushanbe to Chashmasoron is implemented under the Phase 1 of the Project. The Phase 2 (second phase) covers approximately 39.6 km of road section from Chashmasoron to the south. The Construction Supervising Consultant (CSC) of the project is Kocks Consult GmbH and the contractor is Sinohydro Tajikistan Corporation Limited.
11. The project area is in a flat and hilly terrain ranging in altitude from 400 to 600 m. Regarding its surface morphology it can broadly be divided from North to South into a mountainous section which starts at km. 33 and ends at km.40, and generally flat section from Km 40+000 to 70+030 with short rolling parts at Km 59+000 and 69+000. The Project alignment is following the existing road alignment, which reduces the potential impacts of the construction works.

12. Ecologically significant components are the Vakhsh, Dahanakiik and Aksu rivers and tree rows that are stretching over many parts of the Project road. Among the planted species are pines, mulberry, juniper, wild cherry and different species of hawthorn. Where drainage or irrigation channels are running parallel to the Project road deciduous trees such as elms, planes, poplars and willows dominate.
13. The land use alongside the Project road can be divided into three broad main categories comprising urban environment and settlements, agricultural land and grassland (steppe) which for most of its part is used as seasonal pastures. Most prominent agricultural crops are apples, grapes, cherries, apricots, pistachio and cotton. The cultivated lands are the mainly irrigated except for small rain fed wheat fields in the beginning of the Project road.
14. In addition to the ecologically sensitive features, there are also socially sensitive receptors, namely residential areas, schools and hospitals along the road section.
15. Several issues related to the environmental management of the project were identified during the monitoring of the project compliance. The issues were related to: (i) the environmental management organization of the project; (ii) waste management; (iii) dumping of spoil; and (iv) monitoring of the environmental indicators
16. The Project Road crosses the areas of Khuroson and Jomi districts of Khatlon region of the Republic of Tajikistan (RT). The following map provides a general overview of the Project road location:



**Figure 1: Project Road location map**

17. The benefit of the proposed project will be improved connectivity and access to markets. The outcome of the project will be efficient movement of freight and passenger traffic along the Dushanbe – Kurgonteppa road. After implementation of both phases the project outputs will be: (i) 83.6 km of reconstructed road from Dushanbe to Kurgonteppa, (ii) strengthened road asset management system, and (iii) improved road safety.

18. The Project Road will be improved to Category I standard as a dual carriageway asphalt concrete paved road, in accordance with the Asian Highway Classification and Design Standards, 1993. The Works include a complete removal of the existing bituminous pavement layers and a partial removal of the granular pavement material. These materials are planned to be recycled and used, to the maximum extent practicable, for the construction of the new road. The bridge works include rehabilitation of existing and construction of new bridges and underpasses including the 350m bridge over Vaksh river. The Table 2 below shows a list of the main structures to be built under the Project.

**Table 2: The main Project road structures**

No	Structure	Location	Description
1	Bridge 6	Km 33+732	New underpass
2	Bridge 6A	Km 34+290	New bridge
3	Bridge 7	Km 36+625	Ravine crossing
4	Bridge 7A	Km 40+360	Pedestrian crossing
5	Structure 7CH7b	Km 40+950	Pedestrian underpass
6	Bridge 8	Km 41+653	New underpass
7	Bridge 9	Km 45+055	Mudflow crossing
8	Bridge 10	Km 46+720	Channel crossing
9	Bridge 10a	Km 50+710	New underpass
10	Bridge 11	Km 60+888	Crossing of Aksu river
11	Structure CH 11b	Km 61+960	Pedestrian underpass
12	Bridge12	Km 66+140	New Collector crossing
13	Bridge 13	Km 67+310	New Collector crossing
14	Bridge 14	Km 72+860	Rehabilitation of bridge over Vahsh
15	Bridge 14a	Km 72+860	New bridge over Vahsh

19. The road will be widened from two to four lanes, with a provision of 3.5m wide shoulders on both sides. A new, two-lane carriageway will be constructed parallel to the existing one, either on the western or eastern side of the existing road. A median between the opposite directional carriageways will be provided at some sections of the road corridor, except in a few populated and mountainous areas.
20. The Project is classified as B for environmental impacts, in line with the ADB (SPS, 2009). The results of Initial Environmental Examination (IEE) confirm that the implementation of the Project is not anticipated to result in significant environmental impacts that could not be prevented or whose results could not be mitigated to an acceptable level in accordance with the norms of the Republic of Tajikistan or

International Standards. No valuable habitat, natural protected area or valuable environmental structure will be significantly impacted, during the construction activities or after completion of work.

21. Most of the project corridor is flat and rolling. The highest point of the phase 2 is the starting point with true altitude of 850m above MSL from which it is almost continuously descending with several ascending sections. In terms of physical and biological environment, there are only few environmentally significant features located along the Project road.

## **2.2 Project Contracts and Management**

22. ADB and GoT signed the Memorandum of Understanding about the project on September 14, 2017. The document included general setting for the project implementation, including environmental management and monitoring requirements. The project owner is the Ministry of Transport of Tajikistan (MoT) acting through its Project Implementation Unit (PIU). The Project Implementation Unit (PIU) is responsible for overseeing the implementation on behalf of the MoT.
23. MoT Contracted the Kocks Consult GmbH; Germany in cooperation with FinnOC, and State Unitary Enterprise "Research, Design and Survey Institute" Tajikistan in August, 2018 as CSC for the project implementation. Duties of CSC include preparation of all documents, which are required according to the ToR including preparation of SAEMR.
24. The basic information of the Contract with CSC as follows:

**Table 3: Basic Consultancy Contract Information**

<b>Consultant Name</b>	Kocks Consult GmbH; Germany in cooperation with FinnOC, and State Unitary Enterprise "Research, Design and Survey Institute"
<b>Date of Contract signed</b>	August 17, 2018
<b>Commencement Date</b>	August 28, 2018
<b>Contract Period</b>	1095 days (36 month)

25. During the process of development and implementation of this Project, Contractor and Employer have concluded a Contract with an objective that, all specialists are qualified; Professional Contractor should provide to Employer with high quality of the construction, and as per Technical Proposals perform all necessary works in high level. CSC and Employer have necessary education and experience in order to objectively assess the requirements of the project. Works are implemented as per regulations of ADB, FIDIC, SniP and regulation norms of the Republic of Tajikistan (RoT) as well as, in accordance with Special Contract Conditions and Technical Specifications, which are set by the Employer. Quality Control is an integral part of the CSC work and their professional responsibility enabled maintain up to standards.

26. The agencies involved directly in the implementation of the project include: (i) Sinohydro Tajikistan Corporation Limited, the contractor; (ii) Kocks Consult GmbH, the Construction Supervision Consultant; and (iii) Project Implementation Unit (PIU) under the Ministry of Transport.
27. The responsible persons for the environmental management and monitoring of the project are as follows:
- a) PIU: Deputy Director Eraj Mirzoev; and Environmental and Safety Specialist: Mr. Saharmat Yormatov;
  - b) Supervising Engineer: International Environmental Specialist Mr. Toni Paju and National Environmental Specialist Mr. Igor Ziderer; and
  - c) The Contractor: International Health and Safety Specialist Mr. Lin Yong and National Environmental Consultant Mr. Bashid Suriev.
28. Mr. Eraj Mirzoev from PIU is responsible for the environmental management and monitoring from PIU's side. Mr. Toni Paju is responsible for carrying out intermittent monitoring, and providing training to the local counterparts and personnel who are involved in the day-to-day activities for environmental monitoring. Mr. Igor Ziderer is responsible for regular monitoring of the project compliance from the supervising engineer's side. Mr. Lin Yong is responsible for health and safety compliance and Mr. Bashid Suriev is responsible for the environmental monitoring and reporting from the contractor's side. The organizational diagram for the environmental monitoring in the project is presented below.



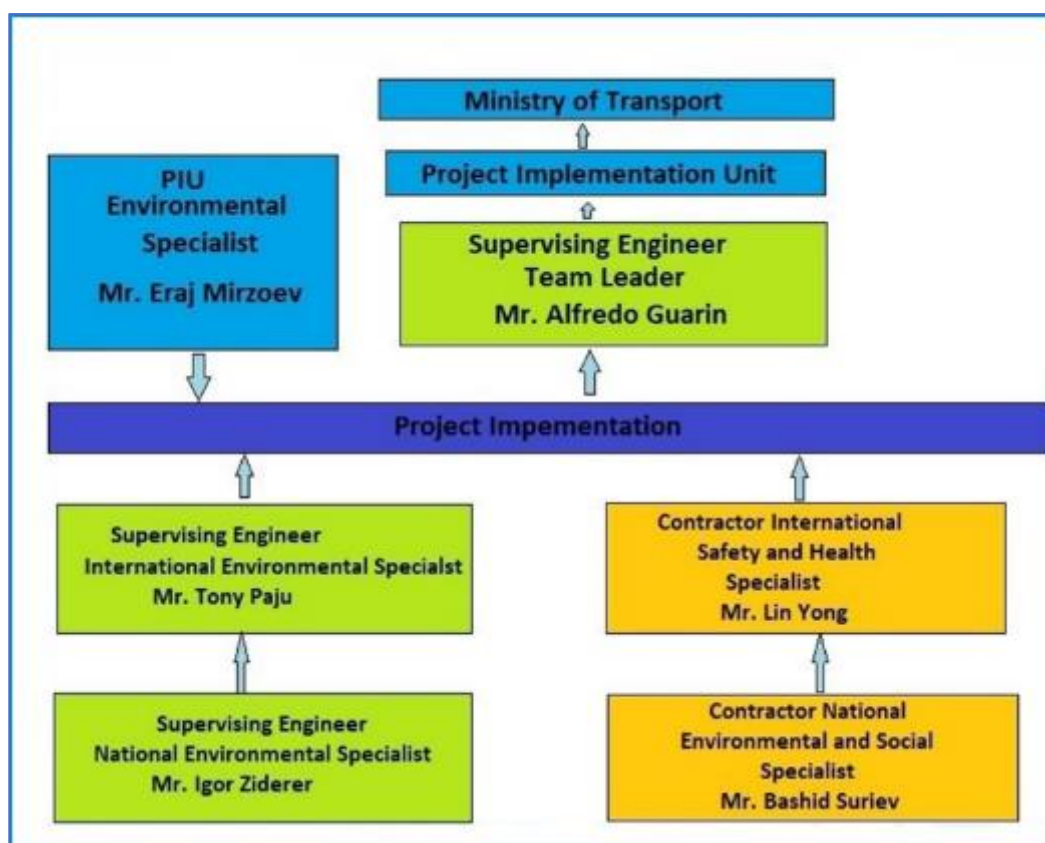


Figure 2: The environmental management diagram of the project

29. The contractor undertaken many types of works with local companies/sub-contractors. These works include relocation of utilities, construction of permanent office and accommodation for CSC and other services. The Table 4 below shows the list of the main Project sub-contractors

Table 4: The main subcontractors of the Project and their responsibilities

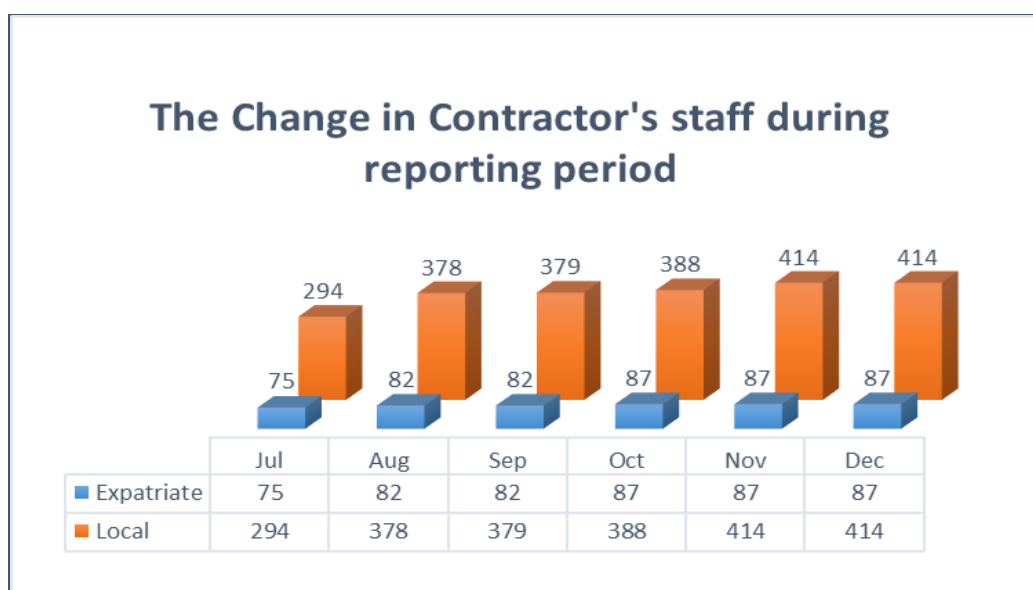
No	Name of sub-contractors	Scope of Works
1	CHDMM Muhandison-2013	Construction of Engineer's office and accommodation buildings
2	CHSP Tajikalokasohtmon	Relocation of Communication Lines, Optic Fiber Cables (OFC)
3	CHDMM Mizoiyor B	Relocation of Electric Power Lines

30. The contractor buys the majority of the food from local producers and markets. Some of the food stuff is imported from China (e.g. spices), if they are not available locally.
31. Weekly meetings conducted by PIU/CSC and the contractor during the monitoring period mandatory included into the agenda the environmental issues. Environmental issues were discussed and documented into the Minutes of Meetings.
32. The contractor signed the official agreement with the relevant organization of Khuroson district for collection of the waste from the camp. The Contractor pays for the collection of the waste, and the waste is collected on a regular basis.

33. Along the project road, there are several of medical facilities and hospitals with the capacity to provide the medial aid in the case of need and Contractor established informal communication with these facilities. The official agreement with the local hospital for taking care of any emergency issues that may arise during the project implementation is not necessary, as according to legislation of RoT the medical establishments are obliged to provide medical aid in the case of emergency. In addition, the Contractor set up well equipped first aid room in the Construction Camp room.
34. The Contract requires the providing of regular Environmental monitoring and reporting including preparation of SAEMRs. This is the third SAEMR since the Project commencement. This report provides a review on how the environmental, needed to prevent and/or mitigate negative environmental effects associated with the project, have been carried out by the contractor. The report also provides a summary of the currently open major and minor issues that need to be addressed.

### 2.3 Project Activities during Current Reporting Period

35. The reporting period was an active stage of the project implementation with many of physical activities at the most of road sections. The beginning of the reporting period of the Project implementation was a starting point for many types of construction. By the end of reporting period. Contractor received approval to proceed construction at the all project sections.
36. The staff of Contractor significantly increased during the reporting period. By the end of December 2019, Contractor has mobilized totally 501 of staff to the Project including 87 of International personnel and 414 of national specialist compared to 371 of staff including 77 of International personnel and 244 of national specialists and laborers by the beginning of reporting period. The average monthly quantity of employees over reporting period made up 467 people.



**Figure 3: Diagram for mobilization of staff by Contractor**

37. During the reporting period the Contractor continued demolition and removal of old asphalt pavement, site clearing, relocation of utilities, earth and rock excavation for road widening, laying and compaction of the pavement structure layers, construction of new bridges, culverts, pipes, protection walls.



**Photo 1 The laying of binder asphalt layer at km 34+600**

38. Contractor also started processing of asphalt and laying of the prime coat and binder asphalt layers at the sections from km 34+000- 39+000 and 52+000-58+000
39. Contractor completed the construction of Engineer's office and accommodations at km 42 and delivered it to CSC. The construction works started in the sections from km 42 to 46 a km 50 to 60 and from Km 60 to 66.
40. In addition to above mentioned road sections the Contractor conducted the concreting of foundations with accompanying earth work in the bridges No 12 and 13 as well as boring and concreting of piles in the location of the bridge 14a . To ensure the safe conducting of work the temporarily cofferdam was built on the left bank of Vahsh river to divert water. Table 5 below shows the summary of works by locations conducted during reporting period.



Table 5: Types of conducted work by location

No	Construction Activities Conducted at the Location	Chainage / Location (km-km)	Status
1	Preparation of detailed design drawings	The whole Project road length	on-going
1	The relocation of high voltage power-lines and communication lines.	39+000 -72+000	on-going
2	Construction of Engineer's office and accommodations	42+500	Completed in August 2019
3	Subgrade excavation in the sections	50+000 - 58+920	Completed in December 2019
4	Side soil excavation for the road widening	59+000-60+000	on-going
5	Construction compaction of embankment layers, including capping works	51+000 - 58+820;	on -going
6	Construction and compaction of sub-base layer	50+640-57+920	on-going
		35+540-39+8000	Completed in Nov 2019
7	Laying and compaction of gravel-base course	51+320-57+920	On-going
8	Site clearing and grubbing	51+140-54+400	on-going
8	Construction of the Underpasses	33+732 (Bridge #6) and 37+762	Completed in November 2019 except backfill
9	Boring and concreting of piles, and bridge foundations	Bridges 7, 14a	Going-on
		Bridges 12, 13	Completed in Nov. 2019
10	Construction of culverts	34+701; 34+974; 35+498	completed in June 2019
		38+095; 51+246; 51+596; 52+077; 52+692; 55+568;	on-going
11	Prefabrication of pipe culverts components and beams at the precast yard.	64+500	on-going

No	Construction Activities Conducted at the Location	Chainage / Location (km-km)	Status
12	Construction of retaining wall	37+492-37+779	Completed in December 2019
13	Construction of animal underpasses	50+110:	on-going
14	Temporarily stockpiling of the stripped top-soil	55+200-52+100 42+200	on going
15	Cutting and removal of trees.	47+000- 52+000	completed in October 2019
16	Disposal of unsuitable cut material	34+500; 35+200; 58+000; 60+000; 67+200	on-going
17	Fabrication of precast units at concrete-batching facilities and precast yard.	64+400	on-going
18	Excavation and stockpiling of the material from the quarries,	access road entry at the Km 37; 55, 66 and 69	on-going
19	Undertaking of instrumental measurements of the environmental quality parameters for air& water and level of noise.	Selected sensitive points	completed for 3 <sup>rd</sup> and 4 <sup>th</sup> Quarter, 2019

41. Contractor has also undertaken the various types of preparatory works, including the testing of material in the quarries, verification of topographic survey, procurement and delivery of machinery and materials. By the end of monitoring period, the total progress of work made up 29.62%. Table 6 below shows the progress by month since the beginning of the monitoring period.

**Table 6: Progress of work by month**

No	Month, 2019	Construction Works Progress (%)	
		Monthly	Cumulative
1	July	3.26	13.04
1	August	2.60	15.64
2	September	2.55	18.19
3	October	2.98	21.17
4	November	4.62	25.79
5	December	3.83	29.62

<b>Total progress of works</b>	19.84% from the beginning of reporting period	29.62% from the beginning of the project
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*\* The values are based on Monthly Progress Reports.*

42. By the end of reporting period the project accomplishment reached 29.62%, however there are still slippage of about (-) 2.70% compared to initial work program.

## **2.4 Description of Any Changes Project Design**

43. During the reporting period Contractor by the recommendations of CSC proposed several changes to the project design summarized in the variation orders 1 and 2.
44. Variation order No 1 includes changes of the bridge #14 superstructure in order to cut the construction cost and reduce the time required for the completion of bridge, In accordance with structural analysis the changes will not affect the stability of structure.
45. Variation order No 2 proposes the change of the initially designed alignment section from km36+400 to km 37+300 to the left side in order to avoid significant quantities of the rock excavation and blasting. It is expected that rock excavation will significantly affect the stability of rocky slopes and consequently the safety of the Project road due to increased risk of rockfalls and landslides. The shifting of alignment will require the additional construction of embankment and retaining wall. In addition the implementation of Variation No 2 will significantly reduce the future maintenance cost for this section.
46. The comprehensive environmental and social due diligence have been conducted for both variations and attached to the proposals. It is concluded that changes of the design will cause any significant environmental impacts.

## **2.5 Description of Any Changes to Agreed Construction Methods**

47. No changes to the approved Construction methods were proposed during the reporting period.

# **III. ENVIRONMENTAL SAFEGUARD ACTIVITIES**

## **3.1 General Description of Environmental Safeguard Activities**

48. This section presents the environmental Safeguard activities carried out during the monitoring period for the physical and natural environment by the ES involved in the implementation of the project. The base-line environmental conditions were examined at the feasibility study and detailed design stages and have been summarized in the Initial Environmental Examination (IEE). The IEE report was prepared by Kocks and approved by PIU and ADB. The IEE: (i) identified and analyzed all significant impacts; (ii) described their likely extent, duration and severity; and (iii) formulated the required

mitigation and monitoring measures and included them in the Environmental Management Plan (EMP).

49. The contractor has submitted environmental monitoring checklists after the end of each month. These environmental monitoring checklists have been prepared on a weekly basis by the national ES of the Contractor. The contractor also has been submitting the required environmental monthly reports regularly as required by the contract.
50. Contractor has also prepared the Quarterly Environmental Monitoring Reports (EMR), which present the results of instrumental monitoring. During the reporting period, the Contractor submitted two Quarterly EMRs covering the period from January to March and April to June 2019 respectively and six monthly reports.
51. During the reporting period both Environmental Specialists of CSC were undertook the following monitoring activities:
- Frequent visits to the site for inspections and of quarries, disposal sites, concrete and asphalt plants, camp sites, etc.;
  - Meetings with the Contractor and other stakeholders focused on: (i) preparation and implementation of SSEMP, including the efficiency of Environmental Management System (EMS); (ii) waste management (including hazardous waste); (iii) conducting of the environmental monitoring with instrumental measurements; and (iv) review of the submitted check-lists and Quarterly EMRs, with preparation of comments and discussion of SSEMP issues with the Contractor.
52. CSC ES periodically issued the non-conformance notes on the basis of findings of issues during the inspections and reviewed the documents and permits for quarries and disposal sites submitted by the Contractor.

### **3.2 Site Inspections**

53. The following table presents the inspections made by the environmental safeguard process staff during the current reporting period:

**Table 7: Environmental Inspections Schedule for July-December, 2019**

No	Date	Staff Present
1	Weekly during January-June	CSC National Environmental Specialist – Mr. Igor Ziderer
2	Weekly during January-June	Contractor's Environmental Specialist – Mr. Bashid Suriev
3	22 October, 2019	ADB mission including Environmental and Social inspection

54. The findings during the inspections were relating to the following issues: (i) the environmental management organization of the project; (ii) waste management; (iii) air

and soil pollution (iv) monitoring of the environmental indicators; (v) dumping of unsuitable material; (vi) improper storage of bitumen.

55. Site inspections were undertaken frequently as both scheduled and random inspections. The inspections usually combined examination of environmental, health and safety issues. In addition to the scheduled inspections, representatives of PIU and Engineer ensured permanent presence at the site during any activities undertaken by the Contractor.
56. The Monthly Site Inspections as part of the regular Site Inspection Program have been scheduled at the end of every month, when they are undertaken jointly by the Safety and Environmental staff of the Engineer, Contractor and PIU.
57. The only external environmental inspection undertaken during the reporting period was the ADB Mission on 22nd of October 2019. Inspection revealed a several issues summarized in the Inspection report such as: (i) improper storage of bitumen posing the risk of soil pollution; (ii) visual black smoke from the pipe of working asphalt plant; (iii) the lack of separate containers for potentially hazardous waste (oily clothes, filters, used batteries etc.). The results of the ADB mission are provided
58. The observed issues are summarized in ADB note prepared on the basis of site visit. The extract from the note relating to the Phase of the Project is attached (Annex 3). The finding of ADB were disclosed to the Contractor and discussed at the meeting with participation of CSC and Client(. Contractor was instructed to implement required mitigation measures immediately

### **3.3 Issues Tracking (Based on Non-Conformance Notices)**

59. The non-conformance issues during the monitoring period were either identified by the environmental staff of the CSC or were expressed by the local residents by phone or verbally during communication with them.
60. No written complaints relating to environmental issues were received through formal Grievance Redress Mechanism (GRM). Potential solutions to all issues have been discussed verbally between the appropriate experts from the contractor and CSC, as soon as they have emerged. Minor issues (e.g. content lacking from the reports) have been discussed directly with the person responsible for the Contractor's Safety and Environmental management.
61. There were a total of 14 issues that were identified and that require correction. Out of these, 7 issues have been closed by now. The issues that have emerged are as follows:

**Table 8: Identified Environmental Issues**

No	Issue	Significance	Status
1	Dustiness on the road, due to insufficient dust control	Medium	Closed. The issue was partially solved by a

**Semi-annual Environmental Monitoring Report**  
**Reporting period: (July – December 2019)**

No	Issue	Significance	Status
			temporary increase in watering.
2	Soil pollution due to leak of oil from equipment at km 52-53	Minor	Closed the Contractor cleaned up the area.
3	Dustiness at the road at night time	medium	The letter was sent of July 22. Closed. The water tanks were mobilized at night time.
4	Improper sanitary conditions in the Contractor's office	minor	Closed. The issue was partially solved by providing of extra sanitary supplies by the Contractor at the camp.
5	Insufficient safety equipment use	medium	Open. The issue remains open, because although the Contractor has supplied additional PPE to the workers, its usage is not properly enforced.
6	The trash at the Construction site on km 38	minor	Closed. Contractor removed the
7	The dumping of oil saturated material, used batteries at the workshop area. Noticed during the inspections	minor	Open. Despite the Non-Conformance notices the oily clothes are still on the soil. Contractor should prepare special properly marked containers for this type of waste.
8	Dumping of discarded samples with blue plastic bags in the yard of laboratory.	minor	Closed. The plastics bags were properly utilized.
9	Insufficient water supply to Engineer's office	minor	Closed. The contractor increased the frequency of water supply tanks and ensured the removal and proper disposal of sewerage material
10	The dumping of unsuitable material at km 59+ 880, to the natural gully	minor	Closed. By the order of Engineer Contractor stopped the dumping. The unsuitable material was forwarded to the approved dumping site at km 58+
11	Visual air (black smoke) pollution in the asphalt plant	medium	Open. Contractor conducted the air quality measurements confirming that the air quality within the tolerance limits.

No	Issue	Significance	Status
			However, no smoke clearing equipment was installed.
12	Storage of bitumen drums on without proper cover and impermeable foundations	minor	Open.
13	Open pits for excavated for relocated of power towers left unfenced for long time within the village.	medium	Closed. The pits were temporarily backfilled by the order of Engineer.
14	Improper treatment of stripped top-soil at km 42-43	minor	Closed. The location for dumping of top-soil was agreed with the local authorities and top soil was deposited in accordance with specifications.

62. Most of observed issues have been assessed as minor as they can be addressed by the relatively simple mitigation measures. The moderate issues such as dusting are generally persistent, potentially have higher impact to the environment and human health and require more systematic approach for solving.

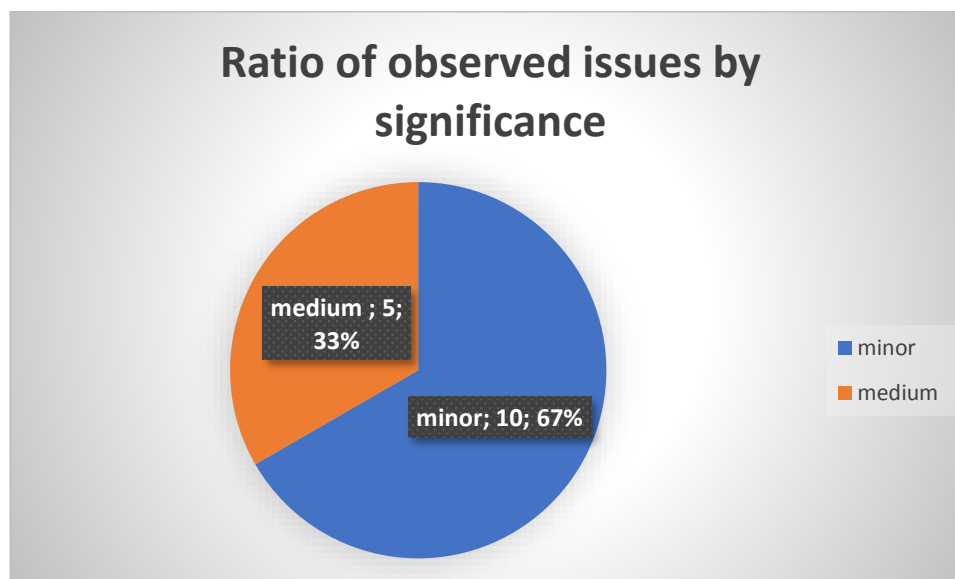


Figure 4 Ratio of observed issues by significance

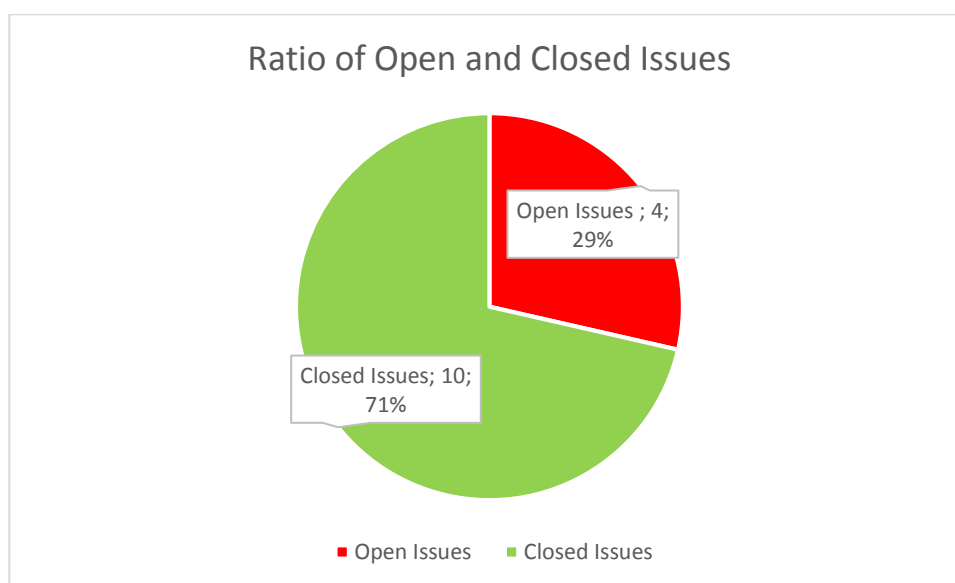
63. The issues during the Tracking period are summarized below :

**Summary Table**

<b>Total Number of Issues for Project</b>	14
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<b>Number of Open Issues</b>	4
<b>Number of Closed Issues</b>	10
<b>Percentage Closed</b>	71%
<b>Issues Opened This Reporting Period</b>	5
<b>Issues Closed This Reporting Period</b>	4

64. Seasonality has affected the emergence of some issues. For example, the aforementioned issue of insufficient dust management emerged after the ending of the wet season. At the same time, the dry weather decreased the risks of wind erosion and siltation of the slopes.
65. Compliance issues have been discussed the appropriate experts from the contractor and CSC always right after the issues have emerged.
66. Altogether 71 % of the issues that emerged during the monitoring period have been solved. The below diagram (Figure 4) shows the ratio of closed and open issues that have emerged during the reporting period.



**Figure 5: Ratio of open and closed issues during reporting period**

### **3.4 Trends**

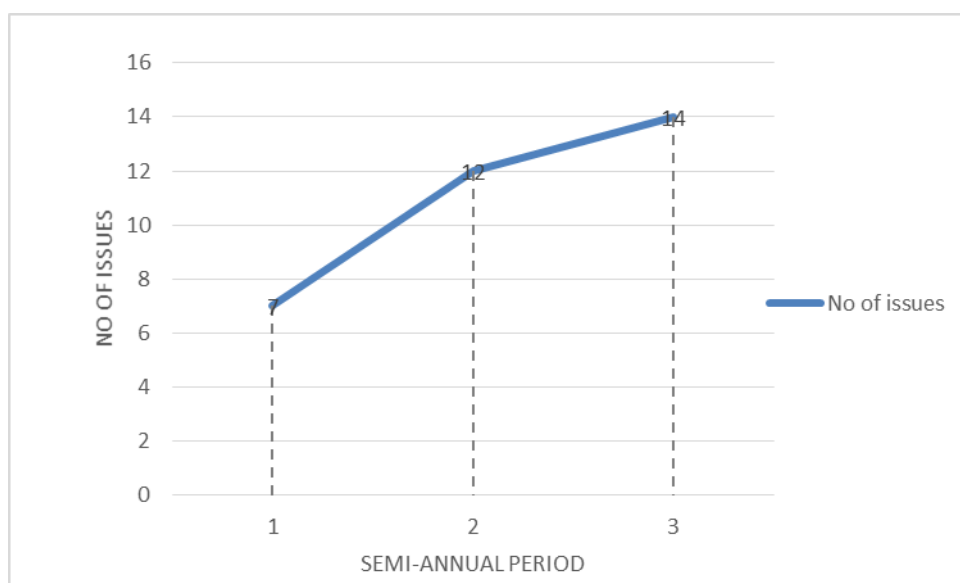
67. The trends in change of conformance level illustrates the table below:

**Table 9 Change of the conformance level since the beginning of the Project**

Semi-annual period No	Total No of Issues	% issues Closed	% issues closed late
1	7	14	0
2	12	58	15

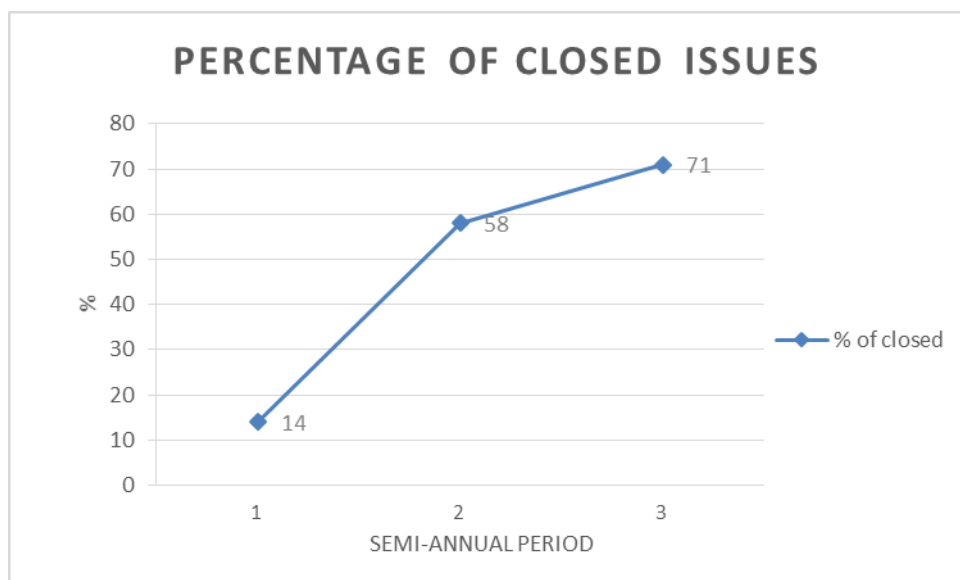


3	14	71	26
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**Figure 6 The number of identified environmental issues since the beginning of reporting period**

68. The No of the identified issues increases with the Project progress as Contractor accelerates the work productivity and starts new activities. Increase of actual construction works, naturally have more of environmental implications compared to preparatory works.



**Figure 7 Change of the percentage of the closed issues since the beginning of the period**

69. The increased percentage of closed issues illustrates the efficiency of environmental monitoring. Nonetheless, the significant percentage of identified issue is still open.

### 3.5 Unanticipated Environmental Impacts or Risks

70. The project implementation did not cause any unanticipated impacts and the impacts, that have emerged so far, had been identified already in the IEE/EMP for the project.

## IV. RESULTS OF ENVIRONMENTAL MONITORING

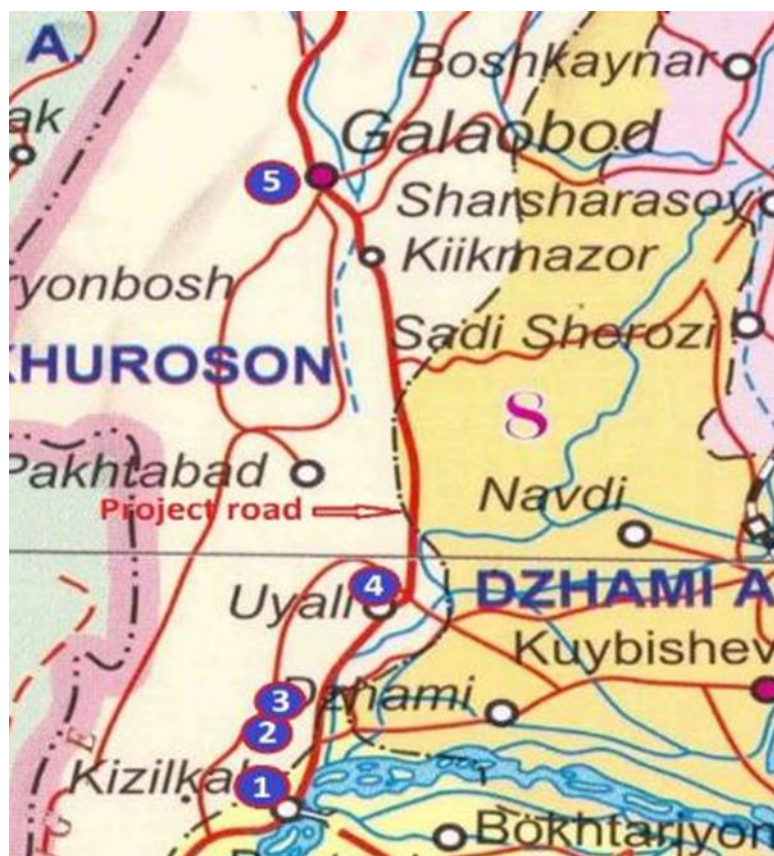
### 4.1 Overview of Monitoring Conducted During Current Period

71. This section is based on the monitoring activities undertaken by the environmental staff of the project during the reporting period, regarding the identified impacts of the project to physical and natural environment. The monitoring activities are in essence about checking whether the implementation of the project is in line with the requirements of the IEE/EMP and the SSEMP.

72. The contractor has submitted the required environmental monitoring reports in the form of completed checklists after the end of each month. The Contractor has also prepared and submitted comprehensive Quarterly EMRs, including the results of instrumental monitoring of air and water quality and noise levels, after the end of each quarter. These reports have provided quantitative information on the different monitoring indicators for the CSC. Upon the ADB mission Contractor conducted additional measurements of the air quality to monitor the possible impacts of the working asphalt plant to camp and local communities.

#### 4.1.1 Air Quality

73. The Law on Environmental Protection sets the framework of the management of air quality and control of air pollution in Tajikistan. It also sets the guidelines for the protection of the ambient air quality.
74. Emissions into the air are calculated according to the “Collection of methods for calculating emissions of pollutants into the atmosphere by various industries” (1986). The main existing stationary sources of air pollution in Tajikistan are point sources, such as mining, metallurgy, construction and thermal power plants, or diffuse sources, such as agriculture.



**Figure 8: Locations of air quality and noise monitoring points**

75. The contractor is carrying out quarterly monitoring for air quality. Air quality in the project is being monitored according to 6 indicators: (i) Total Suspended Solids (TSP); (ii) Oxides of Nitrogen (NO<sub>x</sub>); (iii) Carbon monoxide (CO); (iv) Sulfur dioxide (SO<sub>2</sub>); and (v) Carbon dioxide (CO<sub>2</sub>). These are in line with the SSEMP. According to Contractor the measurements were undertaken during the full length of the working day with taking a reading every hour. Then the readings were summarized and an average air quality levels were calculated for each pollutant during the period.
76. In accordance with the ADB requirements and instructions of CSC since November, 2019 the Contractor increased the frequency of air quality measurements and currently conducts it on the Monthly basis.
77. The values obtained for different pollutants from the air quality measurements have not exceeded the guideline values. The values had been obtained in September and December 2019, and they represent the baseline values to be used in the project. The Table 9 below represents the results of air quality results on the measurements conducted in September 2019, compared to tolerance limits established in Tajikistan. The attached 4th Quarterly EMR of Contractor (Annex 2) includes the results for set of measurements undertaken in December 2019.

Table 10: Air quality measurement results, December 2019.

No	Parameter	Standards (Maximum Permissible Concentrations (MPC) accepted in RT (mg/m <sup>3</sup> ))	Results of measurements in September, 2019
<b>Monitoring point 1 (Kyzilkala, Km71+800)</b>			
1.	TSP	0,15	0,15
2.	CO	3,0	1,9
3.	NO <sub>x</sub>	0,085	0,08
4.	SO <sub>2</sub>	0,05	0,019
5.	CO <sub>2</sub>	3900	1089,00
<b>Monitoring point 2 (Concrete Plant, Km64+600)</b>			
1.	TSP	0,15	0,13
2.	CO	3,0	1,5
3.	NO <sub>x</sub>	0,085	0,030
4.	SO <sub>2</sub>	0,05	0,020
5.	CO <sub>2</sub>	3900	1022,00
<b>Monitoring point 3 (Asphalt Plant, Km 64+600)</b>			
1.	TSP	0,15	0,13
2.	CO	3,0	1,2
3.	NO <sub>x</sub>	0,085	0,06
4.	SO <sub>2</sub>	0,05	0,020
5.	CO <sub>2</sub>	3900	1097,00
<b>Monitoring point 4 (Uyali , Km67+800)</b>			
1.	TSP	0,15	0,11
2.	CO	3,0	1,19
3.	NO <sub>x</sub>	0,085	0,022
4.	SO <sub>2</sub>	0,05	0,050
5.	CO <sub>2</sub>	3900	1098,00
<b>Monitoring point 5 (Khuroson, Km35+000)</b>			
1.	TSP	0,15	0,15
2.	CO	3,0	0,095
3.	NO <sub>x</sub>	0,085	0,016
4.	SO <sub>2</sub>	0,05	0,018
5.	CO <sub>2</sub>	3900	1117,00

78. No exceeds of the permissible concentrations of air pollutants has been observed by the monitoring activities.

#### 4.1.2 Noise and Vibration

79. The contractor is carrying out Quarterly monitoring for noise. The noise measurements were taken nearby the sensitive receptors along the road. According to Contractor the

measurements were undertaken during the whole working day with taking hourly readings. The reading were taken in all directions from the monitoring point (north, south, east and west) for both maximal and minimal values.

80. The values for every hour were summarized and divided by the number of measurements to get an average value of the noise levels. Contractor used the Testo-615 noise meter for noise monitoring. All measuring equipment was certified by Tajik standard laboratory. As this is not an optimal way for taking the noise measurements, the Consultant will advise the contractor to take three readings of at least 10 minutes during the working day in order to obtain a realistic estimate of the ambient noise levels.
81. The values obtained for noise measurements have not exceeded the guideline values, excluding a very minor exceeding in Uyali. The monitoring results along with the guideline values are presented in the attached Quarterly EMR of Contractor. No complaints related to noise received during the reporting period.
82. The SSEMP includes provisions for vibration monitoring, but the contractor has not carried out monitoring of vibration so far. During the compaction of embankment layers at the km 52+000 -54+000, the local residents were periodically expressing their verbal complaints relating to vibration. However, they were not interested in expressing their concerns through formal complaint channels.
83. The following inspection with the participation of Environmental and Social Specialists of nearby houses did not identify any evidence of the cracks or other damages of property, which might be associated with vibration. However, the local residents were advised to use the GRM mechanisms for complaints and proposals if needed. The Contractor was advised to carefully monitor the vibration while compacting ground near residential areas. So far, the Contractor still has not acquired the equipment for monitoring the levels of vibration at the sensitive locations. On the other hand, no complaints about vibration have been received. Since new reporting period all verbal complaints were also considered as complaints and registered in Complaints log. The contractor is advised to speed up their acquisition of the vibration monitoring equipment in order to ensure project compliance.

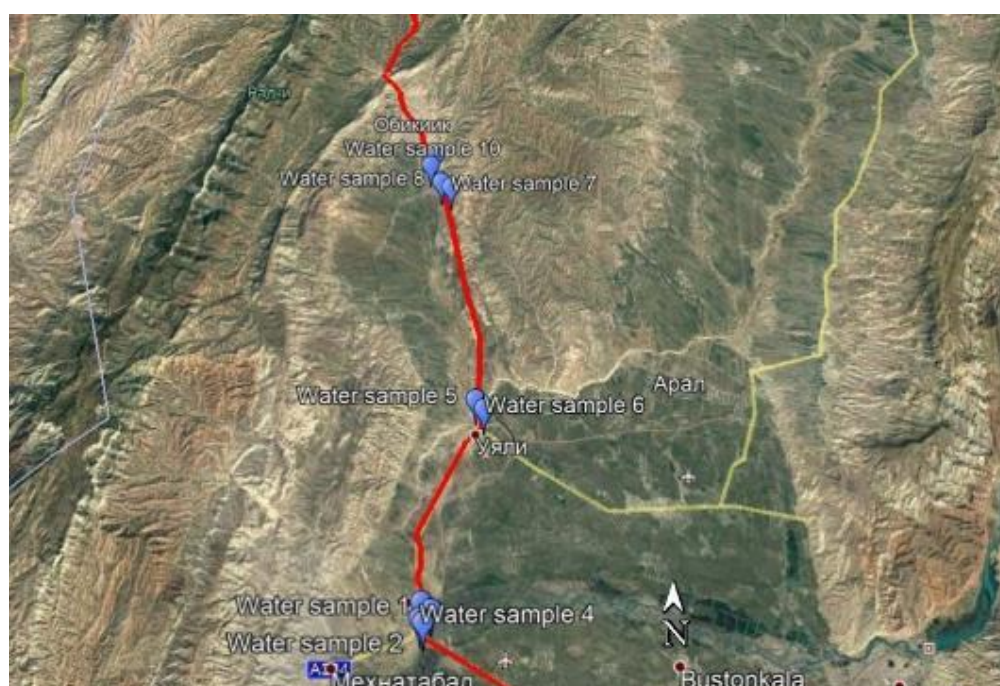
**Table 11: Noise measurement results, October 2019**

No	Location	Noise standards in decibels		Results of measurements
		07.00-23.00	23.00-07.00	
1.	Kyzylkala km 71 + 800	55	45	52,5-55,0
2.	Concrete Plant, km 64 + 600	80	80	55,0-60,0
3.	Asphalt Plant, km 64 + 600	80	80	57,5-65,0
4.	Uyali, km 67 + 800	55	45	53,0-55,0
5.	Khuroson, km 35 + 000	55	45	50,0-55,0



#### **4.1.3 Water Quality**

84. The surface waters of phase 2 belong to the Vakhsh river sub-basin of the Amudarya basin. In addition to Vaksh River, the Project road crosses several natural creeks and small rivers that drain from the slopes of Aktau and Karatau mountain ranges, as well as numerous irrigation and drainage collection channels of the Vahsh river irrigation system.
85. The contractor is carrying out quarterly monitoring of water quality. This is in line with the SSEMP. The 11 locations for the water sampling and quality measurements are presented in the map below.

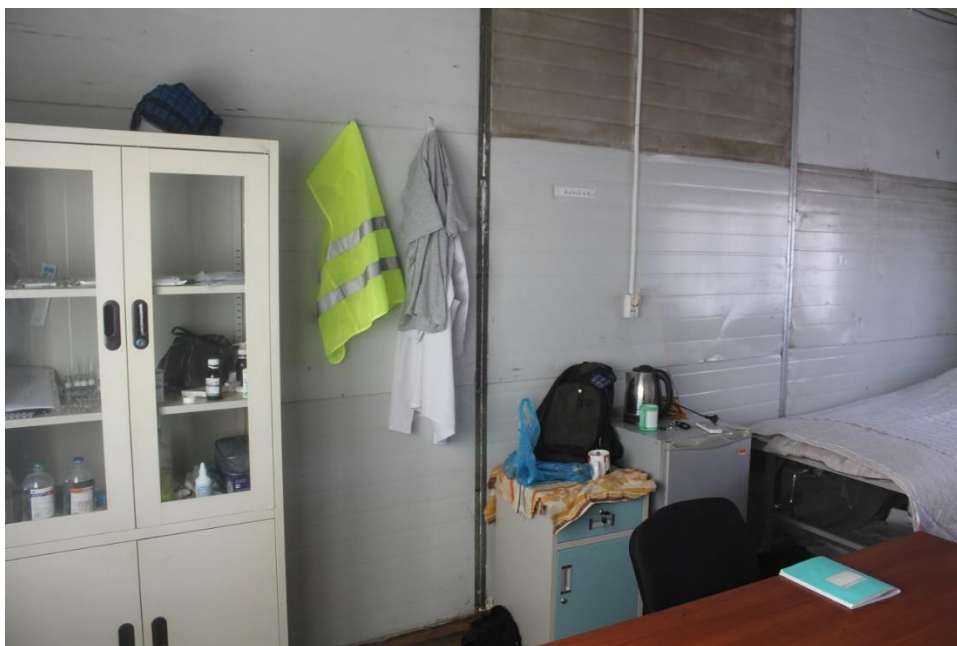


**Figure 9: Water quality sampling points, March and June 2019**

86. The results of the water quality measurements, along with the guideline values, have been presented in the Quarterly reports submitted by the Contractor. According to Contractor's reports<sup>9</sup>, the analysis of samples has not reveal any exceedances compared to National standards for Maximum Permissible Concentrations (MPC), except for the content of suspended substances in the right side of the Vahsh river and in the Aksu River (see Annex 2). For example, the suspended solids content in the samples from the Vakhsh River on the right side and the Aksu River exceeds the permissible limits (51.0-54.1 mg / l with a tolerance limit of 25 mg / l). However, this is a natural phenomenon and is not associated with activities of Contractor. The Aksu river has a natural high sedimentary load due to high loess content of the banks.

#### **4.1.4 Environmental, Health and Safety Issues**

87. Some issues regarding the use of PPE were observed during the monitoring period. The instances included people not wearing proper PPE and working at heights without proper harnesses. These issues were pointed out to the contractor and corrections were requested.



**Photo 2: The equipped first aid room in Contractors**

88. The contractor properly equipped first aid room at the main work camp and hired professional paramedic coordinate health issue and provide the first aid in the cases of emergency. The paramedic coordinates conducts regular examinations of the staff and coordinates with health facilities if necessary.

#### **4.1.6 Asphalt Plant**

89. The asphalt plant is located at the main camp of the contractor at km64+600. The plant has not yet been put to use, but as mentioned earlier, some impacts related to the leaks of the bitumen were observed during the monitoring period. CSC instructed to clean up the polluted soil and ensure the safety of the storage of bitumen.
90. The plant is located within approximately 500 meters from the nearest residential areas. This is in line with the SSEMP.
91. The Contractor transported significant quantities of bitumen (1,400 tons) to the camp for the asphalt plant operations and stored them in different locations of the camp. The bitumen was delivered within approximately 7,000 of barrels, which in many cases were not in a proper condition to be used as storage vessels for bitumen. Sufficient area for storage also was not prepared, and several barrels fell over after being jammed in a small space. This resulted in leaks of bitumen and soil contamination in several locations around the camp. CSC issued instructions to the Contractor to clean the contaminated areas and to store the barrels properly. The Contractor has since followed the

instructions, but a risk of further leaks remains due to large number of barrels with bitumen being in the storage area without a lid.

92. By the end of reporting period most of stored bitumen is already utilized for the project needs. The significant part of storage area is currently vacant and should be prepared for the safe storage of new deliveries of bitumen. Contractor was instructed to clean up the area properly and prepare impermeable platform (concrete lining or gravel foundation with plastic film on the top).

#### **4.1.7 Aggregate Crusher**

93. In the beginning of the reporting period Contractor stopped the purchase of aggregates and installed two crushing plants for preparing of aggregates for the base layer, concrete and asphalt mixtures. The crushing plants located nearby the quarry at km 72+660 located within the area of A. Jomi district.
94. No residential or other sensitive areas are located nearby the crushing plants.
95. The quarry supplies the granular material from the Description of the quarry provided in the table 15, item 5.

#### **4.1.8 Work Camps**

96. Currently two work camps operate within the Project; (1) camp of the Contractor including accommodation, offices and facilities and (2) camp of Engineer including office and accommodations.
97. Contractor's work camps is built at km64+600 and occupies an area of almost 20 hectares. Despite the large area, the land occupied by the camp is not suitable for agriculture due to the high level of salinity caused by the high groundwater level there.
98. The camp is located along a flat area, with some residential areas within 500 meters of the camp. The Camp area includes accommodation section, an office, fueling area, asphalt plant, maintenance and storage areas, etc. The camp has been designed to accommodate 100 persons, and by the end of reporting period most of the staff has been mobilized.
99. The National and expatriate staff live in different sections of the camp, however the living conditions between these areas do not differ significantly. The International section includes 38 rooms and accommodation area for the national staff includes just 18 rooms. This is due to the fact that most of the local employees live fairly nearby and return home at the end of working days. All rooms are equipped with sanitary facilities including lavatory and showers. Separate kitchens are available for expatriates and local workers. This is due to cultural difference in preferences for food.
100. Fire protection equipment, including water tanks, fire extinguishers and other instruments, are available at the camp. However the number of these equipment is not



sufficient. The Contractor has been advised to acquire a sufficient amount of fire-protection equipment, but by the time of preparation of this report they have failed to do so.

101. The office and accommodation of Engineer were built in 1 km on the left from the 42+000 km of the Project road. The Camp includes one stored building of office and two-stored accommodation building erected at the area of the District Road Authorities. The residence buildings accommodates about 20 of Engineer and PIU stuff, with each room provided with utilities. The water supply and sewerage system are not available in the area and camp equipped with the underground water reservoir. Upon the completion of the project the building will be delivered to the local authorities.



**Photo 3 New Engineer's office and accommodations buildings**

#### **4.1.9 Flora and Fauna**

102. The only significant issue observed regarding flora and fauna during the monitoring period was the cutting of trees during the clearance activities. Approximately 50 of trees were cut during the reporting period from both sides of road between km44+000 to km58+000. Most of cut trees had diameter measured at height of 1m from the surface less than 25cm. All of these trees have been planted by the road authority or private people and are mainly non-fruit species. The removed species included elm, mulberry, pine, etc.

103. The felled trees have been delivered to the local road authority and distributed to schools and kindergartens as firewood. The private trees were given to the owners. The required approach here will be the replacement of removed trees. The Contractor should carry out the tree planting with 2 trees for 1 felled tree planted. This amount is determined by the Contract obligations of Contractor as a mitigation measure.
104. At the km 42-45 there are several dozens of fruit trees within the RoW of the project road. It was decided to relocate the trees instead of cutting. The beginning of the site clearance at these sections was postponed due to inappropriate season for re-planting. The relocation of trees is planned for January 2020.



**Photo 4 The fruit trees designated for relocation**

105. The wild fauna is very scarce but still exists in the project area. The large ditch was excavated along the camp perimeter in order to isolate tortoise, snakes, mice and other animal's habitat from the camp. At the construction sites the workers were instructed to avoid damaging any wild species. No other endangered or valuable species have been identified by the ES.

#### **4.1.10 Soil and Spoil Management and Erosion Control**

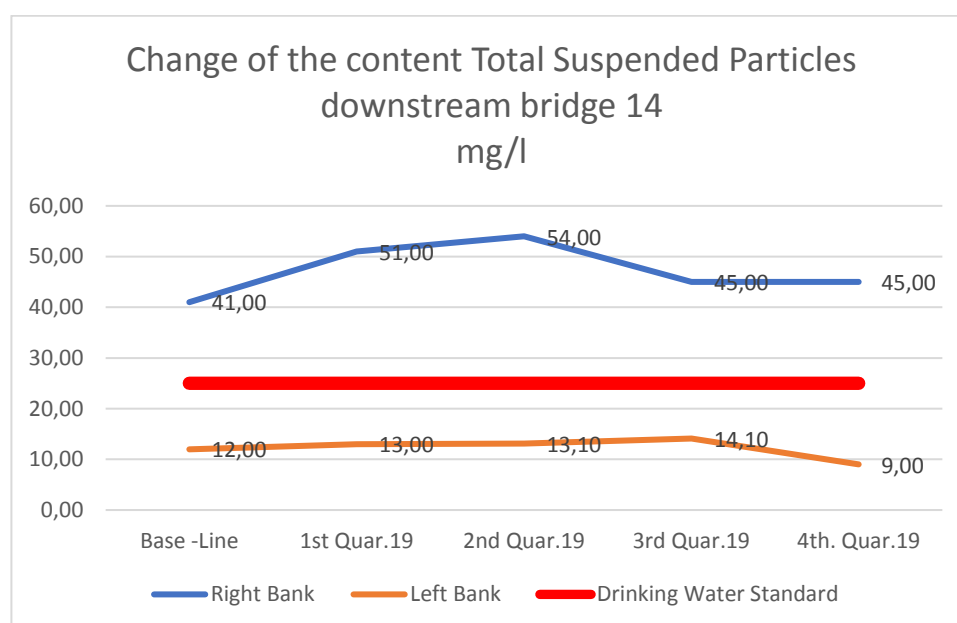
106. The Contractor has stockpiled any removed topsoil separately at the approved temporarily sites at km 55+200 and km 52+100. Stockpiling was undertaken in compliance with the SSEMP and significant impacts to surrounded areas were avoided. These areas are not included in the list of approved sites for disposal of unsuitable material as they will be used only temporarily during the construction period. The stored

topsoil will be utilized for the re-vegetation and other project needs or transferred to the local authorities.

107. Excavation was undertaken on the slopes on the right side of the road at the beginning of the road section during the monitoring period. The excavated material is mainly loose sediments with the inclusion of stones. The spoil is classified mainly as unsuitable material.

## 4.2 Trends

108. The monitoring activities did not reveal any significant changes in the state of environment compared to the past monitoring periods. Most of measured environmental parameters reported by the Contractor were within the tolerance limits established by the Government. The charts below show the changes of the number measured parameters over the periods of monitoring.



**Figure 10 The trend of TSD content**

109. The banks of Vahsh river nearby the Bridge 14 are very important water monitoring points. The quality of water at the left bank are determined by the settlement of particles in the Nurek reservoir and content of TSD is lower than even accepted Drinking Water Standard, while the quality of water on the right bank is affected by the junction with Aksu river about 800m upstream from the bridge, which natural carrying significant amount of sediments. Most of the Project activities such as building of cofferdams, drilling and concreting of piles were conducted at the left bank we couldn't observe any trends of noticeable increase of TSD during the reporting periods. The similar trends are observed for other measured water quality parameters.
110. The levels of noise are also remain stable over the previous periods and do not exceed tolerance limits. However, it should be noticed that nearby the sensitive locations the Project construction activities were very limited and conducted measurements



demonstrate mainly the background levels not associated directly with the Project implementation.

### **4.3 Summary of Monitoring Outcomes**

111. The monitoring of the works is progressing fairly well and the main issues outstanding in the project are well known. The Consultant has made efforts based on the findings of the monitoring period to train the Contractor's environmental staff and ensure that the project will be implemented in a manner that is compliant with the environmental requirements of the project.

### **4.4 Material Resource Utilization**

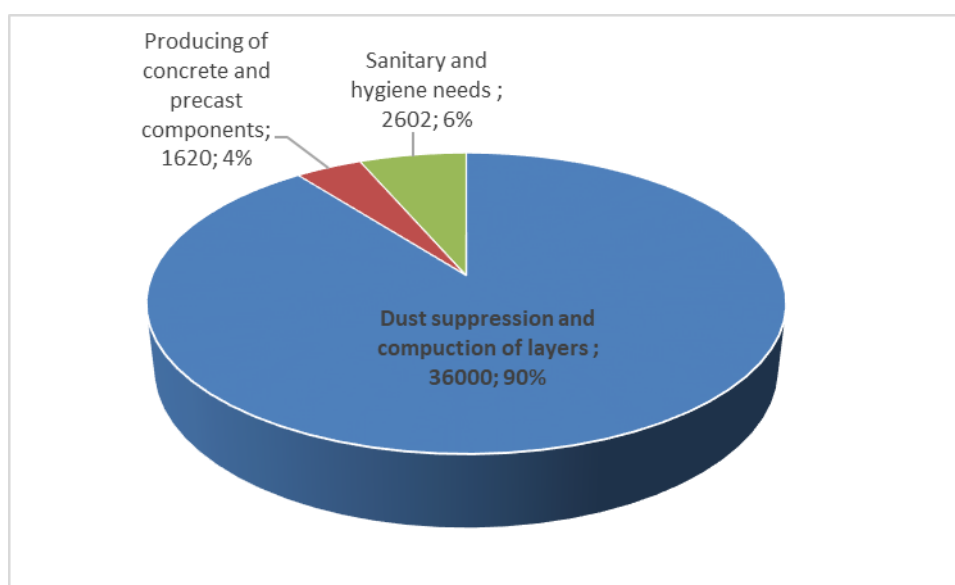
#### **4.4.1 Current Period**

112. For the reporting period, Contractor provided estimates on the usage of water, electricity and other material resource. The paragraphs below present the use of resources within the project during the monitoring period in terms of used water, borrow materials, and electricity. Table 14 shows the estimate of the consumption of water for various needs.
113. **Water:** The main sources of the water for the project needs are: (i) groundwater well in Chorbog village (ii) irrigation channels and rivers in the project area; (iii) bottled drinking water purchased from reliable supplier at the local market. The groundwater was mainly used for the manufacturing of concrete and precast components. Calculation of the exact volume of water which was used for these purposes is difficult due to lack of water meters in the water take location, however the Contractor followed approved engineering practices and methods minimizing the usage of water resources for these purposes that allowed to make an estimate.
114. During reporting period Contractor continued manufacturing approximately 45 m<sup>3</sup> of concrete per day, 0.2 m<sup>3</sup> of water is required for production of 1 m<sup>3</sup> of concrete. With such capability the Contractor spent approximately 1,620 m<sup>3</sup> of water on manufacturing of concrete during the period. As for the personnel, the contractor has mobilized 467 personnel to the project. With a conservative estimate of 0,025 m<sup>3</sup> of total water use per person per day, including cooking, sanitary, and hygiene needs, the contractor's personnel used approximately 2,102 m<sup>3</sup> of water during the period. Assuming that the watering of the roads was done once per day during the monitoring period. The camp of Engineer consumes approximately 100 m<sup>3</sup> of water per month, which is estimated to up of 500m<sup>3</sup> for reporting period as the facility operates since the beginning of August, 2019.
115. With a water consumption of around 1 liter per 2 m<sup>2</sup>, the total water consumption for the dust suppression would've been approximately 200 m<sup>3</sup> during the monitoring period. This brings the total consumption estimate at 36,000 m<sup>3</sup>.
116. For dust control and compaction of the road layers Contractor mainly used the water from irrigation and collector channels and some also from nearby groundwater wells. In accordance with progress reports, Contractor mobilized four water tanks, however no

more than two water tanks were observed on the road. According to the Contractor, each water tank was refilled 5 times per day for dust control. In average the volume of water tank is 10 m<sup>3</sup>

**Table 12: The estimated water usage for various purposes.**

Purpose	Water source	Consumption (tones)		
		Daily	Monthly	Reporting period (6 months)
Dust suppression and compaction of road layers	The existent streams	200	6000	36,000
Producing of Concrete and precast components	Ground water well	9	270	1,620
Consumption, cooking, sanitary and hygiene needs	Ground water wells, municipal water supply, local market	11.7	279	2,602
Total for reporting period				39,114








**Figure 11: Consumption of water for various purposes**

117. **Geological Resources:** Contractor actively extracted the material from borrow pits for construction of embankment, sub-base layers and backfilling. During the reporting period the material were delivered from the borrow pits located at approximately km37+600, km38+100, km55+000, km66+100, and km72+100. Part of the extracted material was stockpiled for future use.
118. During the reporting period Contractor reported the use of about 230,000m<sup>3</sup> of geological materials, such as sand, gravel, stones extracted from the quarries in Construction works. The information of the quantity of the material stockpiled for the temporary storage was nor provided.

119. The quarries and borrow areas were frequently inspected during the reporting period.
120. The borrow areas are located so that the hauling routes mostly avoid traversing residential areas. However, potential environmental impacts from the borrow areas and quarries may originate if the time limitations for carrying out work are not observed rigorously. Furthermore, watering must be done regularly to control dust emissions. The description of borrow pits (quarries) and environmental implications are presented in Table 12.

**Table 13: The borrow pits used by the contractor during the reporting period.**

No	The Location of the Operational Quarry (Borrow Pit)	Environmental and Social Considerations
1	Km 37+200 (RHS)	
		<p>The extracted material was used for embankment, sub-base and capping layers at around km 33+475-38+900. The quarry operation partially disturbed the local drain, however the water is intermittent and used by the local community only for irrigation.</p>
2	Km 38+200 (LHS)	
		<p>The quarry is located on a slope in the vicinity of the road. No residential areas are nearby. The material was mainly used for backfilling of culverts and retaining walls around the sections between km 34+710 and km 38+095</p>
	Km55+100 (RHS) in 1 km from the road	

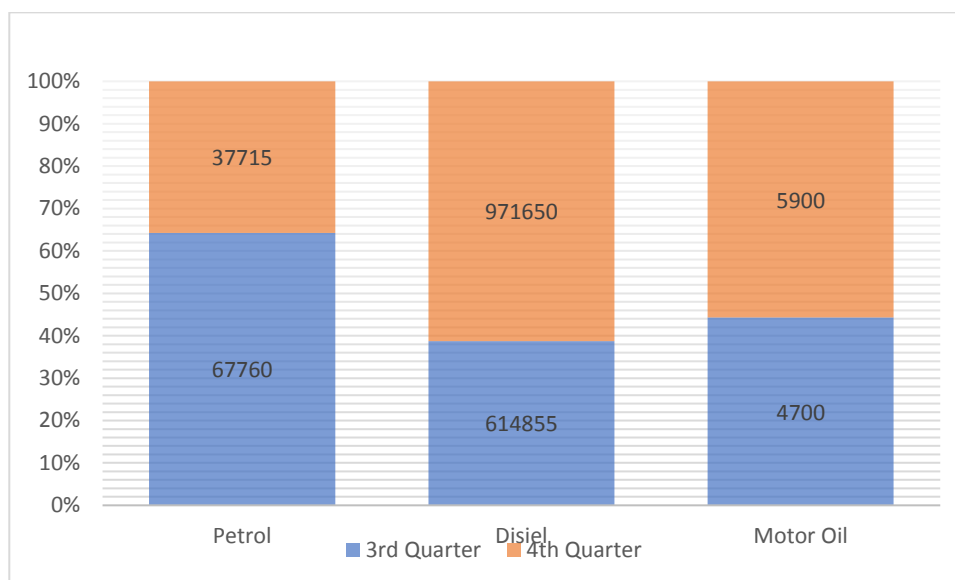
No	The Location of the Operational Quarry (Borrow Pit)	Environmental and Social Considerations
		<p>The extracted material was mainly used for embankment and capping layers between km 52+000 to km 58+000. The diversion of the local stream was avoided and it was further protected by an earth berm.</p>
4	Km 66+100 RHS located in 2 km from the road	
		<p>The quarry is located in a hilly vacant area, with no water bodies in the vicinity of the quarry. The material from the quarry was used for the sub-base and capping layers between km 52+000 to km 56+000.</p>
5	Km 72+600(LHS)	
		<p>The quarry provides material for two installed nearby crushing plants. Quarry is separated from the river channel by the gravel berm. No sensitive receptors are located in the vicinity of the site.</p>

121. No significant environmental impacts related to the use of the quarries and borrow areas were observed during the monitoring period. All borrow pits used within the reporting period are located outside of agricultural lands and resettlements, with very scarce to obsolete vegetation cover.

122. **Electricity:** Contractor has an agreement with Barki Tojik on the governmental energy network. The Contractor also has back-up generators for emergency situations and for pile boring works. Contractor reported the consumption of electricity of 768,860 kWh

during the reporting period. This was divided to 241,661 kWh in the 3rd Quarter of 2019, and 527,199 kWh in the fourth Quarter of 2019.

123. **Fuel:** During the monitoring period consumed the following quantity of fuel materials :



**Figure 12 Consumption of fuel materials by Quarter**

**Table 12: Consumption of the different types of fuel materials during monitoring period since the project**

Period	Used fuel (liters)		
	Petrol	Diesel	Oil
1 <sup>st</sup> Quarter	6,856	264,596	4,485
2 <sup>nd</sup> Quarter	41,400	555,610	4,510
3 <sup>rd</sup> Quarter	67,760	614,855	4,700
4 <sup>th</sup> Quarter	37,715	971,650	5,900
<b>Total</b>	<b>153,731</b>	<b>2,406,011</b>	<b>8,995</b>

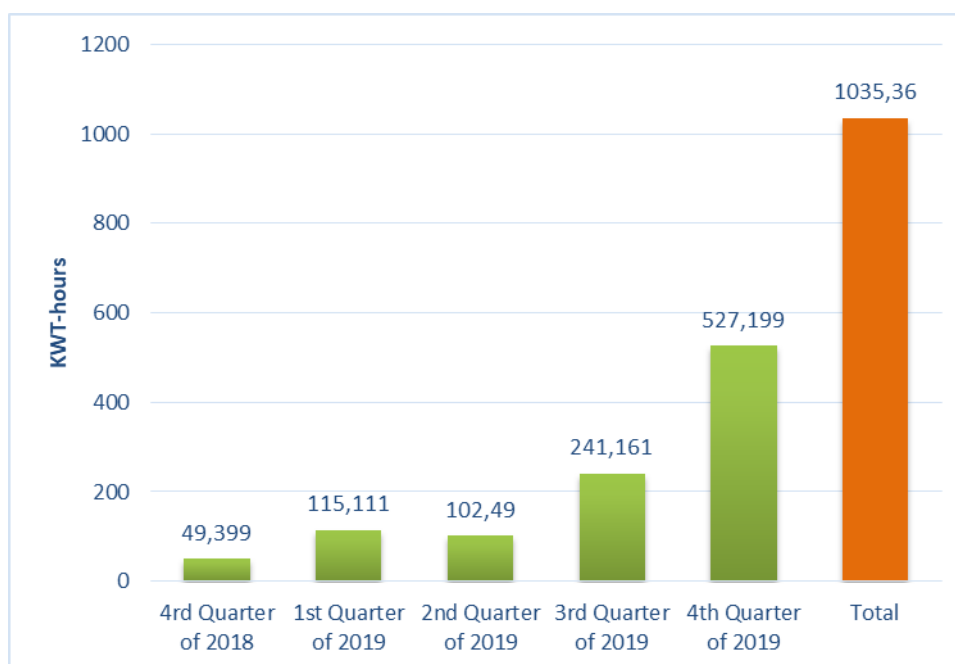
#### **4.4.2 Cumulative Resource Utilization**

124. The cumulative resource utilization estimate is approximate and based on the reported quantities of the completed works. In the initial stages of the project implementation Contractor did not report the accurate utilization of material resources and did not keep records on these items. Therefore, the data were available from the contractor on the cumulative use of energy, water, etc. are approximate estimate.



125. Fuel Consumption: As can be seen from the table 14 above, the total consumption of fuel during the period was as follows: (i) petrol 10,996 liters; (ii) diesel 820,206 liters; and (iii) oil 8,995 liters.

126. Figure 13. Shows the total quantity of the consumed electricity and indicates that consumption of power is increasing with the Project progress with about half of total electricity consumption accounts for the last Quarter of the reporting period.



**Figure 13: Consumption of the energy by the Project**

## **4.5 Waste Management**

### **4.5.1 Current Period**

127. The Project implementation caused the significant quantities of waste during the reporting period. In order to address it the Contractor has entered into a waste management contract with a local sub-contractor..

128. On April 1, 2019, the Contractor signed an agreement with the local road maintenance organization for removal of the waste from the site, transportation and safe disposal of the waste to the approved landfill of Khuroson area. The same sub-contractor provides similar services for the municipal administration and other organizations in the Khuroson district. The copy of the agreement was provided for approval to the Engineer.

129. Municipal waste was produced during the monitoring period mainly from the areas of camps, offices and utilities... The solid waste collected from door to door at the site camps with the help of waste tray and is then stored in the main collection point. The trucks then take the collected solid waste to the municipality landfill for further disposal.

130. According to the contractor, the average solid waste generation rate was 0.8 kg/capita/day. Therefore, the overall solid waste production in the camps is estimated to be 120 kg per day. This is calculated estimating that there are about 150 employees residing in the camp. The solid waste collection at the work camp is organized with the help of well-placed waste trays, where it is then taken to a main collection point. Trucks take the collected solid waste to the municipality landfill for final disposal. The estimated quantity of waste generated during the monitoring period is 21,600 kg. In addition the Engineer's camp generates about 24 kg of waste per day, that accounts to 3, 600kg for reporting period. Therefore, the total solid waste generated by the Contractor during reporting period estimates 24,900kg.
131. The Contractor claimed that it had disposed all of the generated waste at a designated landfill, which has been approved by the local authorities. The contract between the contractor and the sub-contractor does not specify exact location of landfill for disposal of waste. According to the contractor there are several landfills in Khuroson which are linked to appropriate municipal units (jamoats) and the sub-contractor will dispose of the waste in accordance with the type of waste and the distance of transportation. The main approved landfill area is located within a hilly desert area of Khuroson, approximately 3 km north-east from the location of new camp of Engineer.



**Figure 14: The route of transportation of garbage generated by the Project implementation**

132. Currently, the contractor reports the hauling of all waste to the municipal waste dump located in Khuroson district. Despite the Contractor signing an agreement with the local road maintenance organization for removal of the waste from the site, transportation and safe disposal of the waste to the approved landfill of Khuroson area the problems of proper waste management especially at the camp area still exist.
133. Although Contractor conducted a cleaning of most of the unauthorized garbage piles, the inspections revealed the heap of garbage behind the workshop at the southern corner of the camp. CSC ES instructed Contractor to remove the garbage in accordance

with the signed agreement, and avoid the piling of waste in future. The issue was closed immediately by relocation of the garbage to the collection point.

134. Mainly municipal waste was produced during the monitoring period according to the Contractor. In addition to municipal waste the Contractor produced significant amount of construction waste, most of which is not classified as hazardous waste but require special attention to treatment and disposal.
135. **Construction waste:** During the reporting Contractor emptied about 5,000 of the bitumen drums and actively works over their utilization. After treatment the drums they are being delivered to the (see photo below) interested organizations as metallic scarp and construction material. The demolished concrete beams and other structural components are hand over to the Road authorities for the re-usage at the rural roads.



**Photo 5 Emptied bitumen drums nearby the asphalt plant prepared for utilization**

136. **Old asphalt pavement:** During the reporting period Contractor reported demolishing of 16,261m<sup>3</sup> of the old asphalt pavement. The demolished material was disposed at approved sites at km 34+500; 38+000, 60+000. In the disposal site at the km 34+500 the asphalt material was dumped on the top of deposited earlier natural unsuitable material.
137. The excavated material that proved to be unsuitable for the construction needs, was disposed within the approved disposal sites by Contractor. The Contractor managed to avoid disturbance to the natural drainage channels and nearby residences during this process.
138. During the reporting period the by agreement with local authorities Contractor stored the oils and other chemicals, used batteries, oily rags, etc) which may be classified as hazardous waste at the section of area provided to Contractor for facilities. By the end of reporting period at least two tones of these material has been accumulated nearby



the building of laboratory and workshop. It is agreed that upon the completion of construction these material will be delivered to the Road Authority for utilization as they cannot be disposed at the municipal landfill. Contractor was instructed to provide special containers with the appropriate markings, however they are still pending.



139. The Contractor selected ten locations for disposal of inert construction waste. The Safety Management Plan describes the access to sites in detail. The permits endorsed by the local environmental authorities were acquired for all sites. The Table 15 below presents notes on some of the disposal areas. The table 16 presents the status of each disposal site.




**Table 13: Disposal sites for unsuitable material**

No	site location	approximate quantity (m <sup>3</sup> )	Approval Situation
1	km33+500 (LHS) (RHS)*	100,000	permitted (additional approval for RHS)
2	km34+600* (LHS)	20,000	permitted (additional approval)
3	km35+600* (LHS)	500,000	permitted (additional approval)
4	km37+700*(LHS)	20,000	permitted (additional approval)
5	km42+100 (LHS)	200,000	permitted
6	km48+900 (LHS)	250,000	permitted
7	km55+000 (RHS)	220,000	permitted
8	km58+500 (RHS)	306,000	permitted
9	km60+000 (RHS)	221,000	permitted
10	km67+700 (LHS、 RHS)	51,600	permitted

140. The detailed description of the initially approved sites for disposal of unsuitable material is presented in the 1st SAEMR for the Project (Table 7). However, Contractor did not used most of these sites during reporting period due significant distance to areas of excavation. The Contractor has most actively used the approved disposal area located at km33+500 both from RHS and LHS. By an agreement with the relevant authorities, the site was extended with locations along the left side of the road km34+600 to 35+700 and km37+700. The Table 16 describes the disposal areas, which were used during reporting period.

Table 14: The current status of the disposal areas

No	Site Location/ Photo	Environmental and social implications
1	km 33+500 LHS, RHS is given to Phase 1	
		View from the opposite slope. Contractor disposed the crushed asphalt on the top of excavated unsuitable material. The right side of the road has also been approved for disposal of unsuitable material.
2	km34+600 (LHS)	
		The disposal site is located from the left side of the road within the area of responsibility of road authority at the section km 34+300 – km 34+600. During the reporting period, the Contractor disposed unsuitable material excavated from km 34+800 – km 35+000 here.
3	km35+600 ( LHS)	
		Located at the left side of the project road at km 35+650. By agreement with the road-side restaurant owner, the Contractor used the unsuitable material from km 36+200 – km 36+400 for landscaping here.
4	Km 37+700	

No	Site Location/ Photo	Environmental and social implications
		Located at the left side of the road at km 37+700, the site is also used for stockpiling of borrowed granular material. The levelling of the disposed material will be required here to reduce the landscape impacts.
5	Km 60+000	
		Located from the right side of the road in approximately 200m. The site is a local depression used by the locals as improvised landfill for garbage. Contractor uses the site for disposal of removed old asphalt. It is expected that material will be recycled and re-used by the local Road Authority in future/
	Km 67+000	
		The disposal is allowed from the both sides of the road,

#### 4.5.2 Cumulative Waste Generation



141. No exact data was available for the first semi-annual period of the project. Contractor started submitting monthly reports since October 2018 and by the start of the 3rd Quarter of 2019 had mobilized less than a half of current staff. The estimate of generated waste for the first semiannual period was as follows:  $0.8 \text{ kg} \times 75 \text{ people} \times 90 \text{ days} = 5,400\text{kg}$ . Therefore, the cumulative amount of generated volume by the end of the second and third monitoring period is estimated at about  $5,400 \text{ kg} + 21,600\text{kg} + 25,200\text{kg} = 52,200 \text{ kg}$ . The figures are based on the World Bank's estimate on the amount of municipal solid waste produced by the people on average per day in the ECA region. The average figure is 1.1 kg per day, but it is likely that the centralized food production among others pushes the value below the average, and therefore the figure 0.8 kg per person per day was chosen.

#### **4.6 Health and Safety**

##### **4.6.1 Community Health and Safety**

142. No community health and safety issues were reported during the monitoring period. Contractor generally provided adequate warning signage and fencing, however in some cases the separation of traffic and construction areas is not sufficient.



**Photo 8: The temporary signage is available but not always sufficient**

##### **4.6.2 Worker Health and Safety**



143. Some instances of worker health and safety violations were observed during the monitoring period. The instances included people not wearing proper PPE and working at heights without proper harnesses. However, contractor did not report any accidents or injuries during the reporting period. The aid station in the camp is available and equipped with first aid equipment. The qualified nurse is hired and properly works. In addition there are at least 3 large medical facilities, including 2 stationary almost evenly distributed along the Project road. In the case of sickness or injury the qualified Contractor's nurse will accompany people to an appropriate medical facility. The Contractor has established good working relationships with the nearby hospital in Uyali.

#### **4.7 Training**

144. The CSC conducted regular environmental compliance orientation to the Contractor's staff during the weekly meeting with the presence of the representatives of PIU. In turn the new Contractor's employees were mandatorily introduced to the SHE rules during the introductory trainings provided by the Environmental and Safety Specialists.

### **V. FUNCTIONING OF THE SSEMP<sup>ef</sup>**

#### **5.1 SSEMP Review**

145. The Contractor submitted the Draft of the Site-Specific Environmental Management Plan (SSEMP) on October 4, 2018. Upon the review by the International Environmental Consultant, comments were provided, and the document returned to the Contractor for corrections. The Engineer approved final copy of the Contractor's SSEMP on November 12, 2018.
146. No changes regarding the SSEMP have been presented by the Contractor by the preparation of this report.

### **VI. GOOD PRACTICE AND OPPORTUNITY FOR IMPROVEMENT**

#### **6.1 Good Practice**

147. Contractor did not demonstrate particular best practices during the monitoring period, that would warrant a mention here. However, there were some small positive developments during the monitoring period.
148. The issues which are worth noting as follows:
- a) Contractor has organized its work camp in a good manner, and the locations for different activities have been chosen well so that they are in line with the SSEMP;

- b) Contractor made significant efforts to control dust and could eliminate it in the number of sections
  - c) Contractor signed the agreement on the collection and disposal of the waste in official landfill and managed to improve the sanitary conditions at the camp and facilities; and
  - d) Contractor communicated with local communities in disposal of unsuitable material for improvement of landscape and satisfaction of their needs.
149. No opportunities to address issues that are outside of the formal NCN process have been identified so far by the ES.

## **VII. SUMMARY AND RECOMMENDATIONS**

### **7.1 Summary**

150. The project is in the state of active implementation with approximately 29.62 % of the works to date completed during the monitoring period.
151. The construction activities that been carried out during the monitoring period have included: (i) clearing and grubbing; (ii) excavation and cutting; (iii) fixing and relocating of electrical, gas and communication lines; (iv) building of embankments, bypass roads and temporary cofferdams; (v) removal of top soils; (vi) preparation of embankment , sub-base and base layers; (vi) laying of primer and binder asphalt layers; and (vii) construction of bridges and culverts.
152. During the previous six months, no significant environmental impacts were caused by the project implementation, and no formal complaints regarding to environmental issues associated with project activities were received from the local population. The verbal and telephone complaints about minor environmental issues were registered and adequately addressed. The construction activities of the project have been limited to the design Right of Way (RoW), generally not exceeding 10 meters in width.
153. The medium and minor environmental impacts caused by the construction activities were mitigated through measures stated in the IEE and SSEMP of the Contractor. The CSC instructed the Contractor on proper spoil disposal, prevention of soil erosion and siltation, safety of public and workers, proper operation of borrow pits and quarries, control of dust nuisance etc. during the monitoring period.
154. Implementation of Corrective Action Plan (CAP) for period from January to June 2019 is shown in Table 17 below.

**Table 15 Status of implementation of Corrective Action plan for period from July to December 2019**

#	Issue	Action required	Due Date	Status of implementation
1	Dustiness on the road, due to insufficient dust control	The contractor should mobilize the sufficient number of water tanks and increase the quantity of rides due to dry and hot season. The details of the water spraying activities should be included in the daily reports of the Contractor.	1.08.2019	Dustiness on the road reduced significantly
2	Need in replacement of removed trees	Contractor should allocate the funds for re-planting and prepare Trees Replanting Plan.	30.12.2019	Replanting of small trees to different location is planned on the January 2020.
3	Insufficient safety equipment use	Contractor shall enforce the proper use of safety equipment and organize relevant training program.	1.09.2019	Contractor organized the regular training
4	The absence of device for measurements of vibration	As per approved Vibration Management Plan Contractor should procure the vibration meter and control vibration while working in the sensitive areas.	1.09.2019	Contractor reduced the vibration nearby the villages, no complaints has been received.
5	The soil pollution at the asphalt plant from the fallen bitumen barrels	Contractor shall ensure the proper storage and transportation of bitumen	30.08.2019	The storage is approved

## 7.2 Recommendations

155. The recommendations for better environmental compliance for the Contractor are included in the table below.

**Table 16: Corrective Action Plan for July-December 2019**

#	Issue	Action required	Due Date
1	Insufficient safety equipment use	Contractor shall enforce the proper use of safety equipment and organize relevant training program.	20.02.2020
2	The oily cloths and other hazardous material spread over the camp and workshop areas	Contractor shall submit the special container for the hazardous waste	14.02.2020
3	Need in replacement of removed trees	Contractor should allocate the funds for re-planting and prepare Trees Replanting Plan.	3.03.2020
4	Visual air (black smoke) pollution in the asphalt plant	Contractor should install the filters to control the air pollution from the asphalt plant	15.03. 2019
5	Storage of bitumen drums on without proper cover and impermeable foundations	The most of stored drums has already been used. Contractor should prepare the area for new storage by the preparation of concrete of gravel +plastic film foundation.	20.02.2020

## **ANNEX 1      CONTRACTOR’S ENVIRONMENTAL MONITORING CHECKLIST.**

## Weekly Baseline Environmental Monitoring Report

Prepared by Sinohydro Corporation Tajikistan Co.Ltd. (The Contractor)

**Weekly Environmental Checklists:** The following are the monthly environmental monitoring report that are regularly checked. It illustrates the updated evaluation of environmental impacts and its mitigation measures of ongoing construction activities in the site.

**Responsible Person:** Bashid Suriev -Environmental Specialist

**December 1- 31, 2019**

NA- Not applicable

No/No	Activity	December, 2019			
		Week I	Week II	Week III	Week IV
<b>1.</b>	<b>Land Use</b>				
1.1	Disposal of debris and spoil	Disposed to the approved site,	Disposed to approved site at (Km 59+100 and 60 +000)	Disposed to approved site at (Km 59+100 and 60 +000	Disposed to approved site at (Km 59+100 and 60 +000
1.2	Protection of agricultural land	No agricultural lands outside of RoW were damaged	No agricultural lands outside of RoW were damaged	No agricultural land outside of RoW were damaged	No agricultural lands outside of RoW were damaged
1.3	Protection of ground cover	Complied	Complied.	Complied	Complied
1.4	Erosion control	Complied.	Complied	Complied	Complied
1.5	Quarry operations	Complied, performed at the approved sites	Complied, performed at the approved sites	Complied, performed at the approved sites	Complied, performed at the approved sites
<b>2</b>	<b>Water Quality</b>				

No/No	Activity	December, 2019			
		Week I	Week II	Week III	Week IV
2.1	Protection of water sources	Complied with IEE and SSEMP. No contamination of water sources observed	Complied with IEE and SSEMP. No contamination of water sources observed	Complied with IEE and SSEMP. No contamination of water sources observed	Complied with IEE and SSEMP. No contamination of water sources observed
2.2	Prevention of water quality worsening	Complied	Complied	Complied	Complied
2.3	Siltation of water bodies	Complied with IEE and SSEMP	Complied with IEE and SSEMP	Complied with IEE and SSEMP	Complied with IEE and SSEMP
2.4	No alteration of drainage paths	Complied with IEE and SSEMP	Complied with IEE and SSEMP	Complied with IEE and SSEMP	Complied with IEE and SSEMP
2.5	Locating sanitation and waste disposal in Construction camps.	Engineer warned about the improper storage of trash within the camp area	Engineer warned about the improper storage of trash within the camp area	Engineer warned about the improper storage of trash within the camp area	Engineer warned about the improper storage of trash within the camp area
2.6	Adequate facilities for disposal of sewerage and solid waste.	Partially complied with the approved camp plan	Partially complied with the approved camp plan	Partially complied with the approved camp plan	The sewerage system in the camp is not properly working.
2.7	No impact to the public or community for Water supply.	Complied with agreement about water supply	Complied with agreement about water supply	Complied with agreement about water supply	Complied with agreement about water supply
<b>3</b>	<b>Air Quality and Dust Control</b>				



No/No	Activity	December, 2019			
		Week I	Week II	Week III	Week IV
3.1	Effective management of dust.	Engineer warned about the dusting at the number of sections	Complied	Complied	Complied
3.2	Delivering material effectively covered while Transporting.	Partially complied  Contractor didn't supply sufficient amount of tarpaulin	Partially complied  Contractor didn't supply sufficient amount of tarpaulin	Partially complied  Contractor didn't supply sufficient amount of tarpaulin	Partially complied  Contractor didn't supply sufficient amount of tarpaulin
3.3	Vehicle speed limit, which control the dust Emission.	Complied due to assistance of traffic police	Complied due to assistance of traffic police	Complied due to assistance of traffic police	Complied due to assistance of traffic police
3.4	Watering of construction & transportation Sites.	Complied	Complied	Complied	Partially complied as dusting nor fully controlled
3.5	Immediate clearing of debris, dust & other Material from the road.	Complied	Complied	Complied	Complied
3.6	Level of emissions from construction Vehicles, equipment & machinery.	Complied  All machinery units certificate from environmental	Complied  All machinery units certificate from environmental	Complied  All machinery units certificate from environmental	Complied  All machinery units certificate from environmental

No/No	Activity	December, 2019			
		Week I	Week II	Week III	Week IV
		subdivision of traffic police	subdivision of traffic police	subdivision of traffic police	subdivision of traffic police
3.7	Regularly serviced machinery, equipment & Vehicle	Complied	Complied	Complied	Complied
3.8	Level of air emission from material Extraction sites.	Complied	Complied	Complied	Complied
<b>4</b>	<b>Noise and Vibration</b>				
4.1	Level of noise from vehicles, plants & equipment.	Complied with National standards	Complied with National Standards	Complied with National Standards	Complied with National Standards
4.2	Level of vibration from machineries and Equipment.	No complaints about vibration received	No complaints about vibration received	No complaints about vibration received	No complaints about vibration received
<b>5</b>	<b>Flora and fauna</b>				
5.1	Minimize loss or damage of trees.	No cut of trees or bushes	No cut of trees or bushes	No cut of trees or bushes	No cut of trees or bushes
5.2	No destruction of other flora.	Complied	Complied	Complied	Complied
5.3	No impact on wild fauna and their habitats.	Complied	Complied	Complied	Complied
<b>6</b>	<b>Sanitary</b>				
6.1	Public & worker safety.	Complied	Complied	Complied	Complied

No/No	Activity	December, 2019			
		Week I	Week II	Week III	Week IV
6.2	Provide workers safety appliances (helmets, Goggles, mask, footwear etc.)	Partially complied Some workers still do not wear PPE	Partially complied Some workers still do not wear PPE	Partially complied Some workers still do not wear PPE	Partially complied Some workers still do not wear PPE
6.3	Adequate warning signals.	Partially complied	Partially Complied	Partially complied	Partially Complied
7	Safety				
7.1	Prevention and control of vector based diseases	No activities are required due to cold season	No activities are required due to cold season	No activities are required due to cold season	No activities are required due to cold season
7.2	Vector breeding sites in the vicinity to Labor camp.	The water collection channel near the camp is a potential breeding site for vector insects. Due to winter season no insects observed.	The water collection channel near the camp is a potential breeding site for vector insects. Due to winter season no insects observed.	The water collection channel near the camp is a potential breeding site for vector insects. Due to winter season no insects observed.	The water collection channel near the camp is a potential breeding site for vector insects. Due to winter season no insects observed.
7.3	Adequate actions for workers health and Safety.	Partially complied with Safety Plan. Not all workers wear PPE.	Partially complied with Safety Plan. Not all workers wear PPE.	Partially complied with Safety Plan. Not all workers wear PPE.	Partially complied with Safety Plan. Not all workers wear PPE.
7.4	First aid facility.	Complied The location is determined,	Complied The location is determined and	Complied The location is determined and	Complied The location is determined and

No/No	Activity	December, 2019			
		Week I	Week II	Week III	Week IV
		basically equipped and operates	basically equipped and operates	basically equipped and operates	basically equipped and operates
7.5	Adequate bathing, latrine facilities for Labors.	Complied partially The odor protection is not ensured in some locations	Complied partially The odor protection is not ensured in some locations	Complied partially The odor protection is not ensured in some locations	Complied partially The odor protection is not ensured in some locations
7.6	No affect to adjacent water courses by Sewerage system.	Complied	Complied	Complied	Complied
7.7	Garbage disposed.	Partially complied	Partially complied	Partially complied	Partially complied
<b>8</b>	<b>Landscaping</b>				
8.1	road –side landscape	Partially complied.	Partially complied	Partially complied	Partially complied
8.2	Re-planting of trees, re-vegetation of other Plants.	Not undertaken	Not undertaken	Not undertaken	Not undertaken
8.3	Reconstruction of removal- utilities such as water ,electricity , telephone	Complied	Complied	Complied	Complied

**ANNEX 2      REGISTER OF THE VERBAL  
COMPLAINTS RELATING TO  
ENVIRONMENTAL ISSUES**

### Register of the verbal complaints relating to Environmental issues

Date of complaint	Complainant Name	Complaint Received by	Method of Complaint e.g. verbal, letter, email	Main Issue	Summary of Complaint	Action/Passed to	Status	Date Closed
18.08.2019	Sobirov Safarbek	Kholikov. -CSC Social and Resettlement Specialist	Telephone call	Vibration	The vibration causes the concern for the integrity of house at Km 55=1	Kadamov and Ziderer	Closed	22.08.2019
3.09.2019	Kurbonov Bobokul	Ziderer.I- CSC local Environmental Specialist	Verbal on site	dusting	Dust caused the damage of trees and loss of harvest	Kadamov.S	Closed	10.09..2019
15.09.2019	Sobirov Safarbek	Ziderer- CSC local Environmental Specialist	Telephone call	Land encroachment	Contractor dumped the construction without consent	Kadamov	Closed	17.09.2019
23.09.2019	Bobokolonov Nazri, Chief of Hiloli Jamoat	Kholikov- CSC Social and Resettlement Specialist	Telephone call 987-53-91-19	Dusting on the main road and access road to the quarry at km 55+000	The call on the behalf of the local communities	Contractor's Manager	Closed	24.09.2019



## **ANNEX 3 THE FINDINGS OF ADB MISSION**

October 28, 2019

**From:** Malika Babadzhanova, Regional environment Specialist (Consultant)  
**Subject:** **TAJ: 49042-004 0509/0510/ 3451 and 49042-005 G0569 CAREC Transport Corridor 2, 5 and 6 (Dushanbe – Kurgonteppa) Road Project (Phase 1 and Phase 2); — Rudaki, Khuroson districts - Back-to-Office Report**

Mission type	Review of compliance, monitoring in situ and environment safeguards orientation
Destination	Tajikistan, Mission Date October 22, 2019
Mission Objectives	Aim of the visit is to review on-site compliance with the environmental safeguards and management plan, review the status of civil works progress and on-site safeguards compliance, status of quarries and borrow pits and their compliance, guidance of ES of PIURR and on-site consultations to PMU, ES of consultant and ES of Contractors as well as to development of recommendations.
Key findings, decisions, and outputs	<p>Site visits were conducted to the Rudaki and Khuroson districts. The Mission met with staff of PIURR established under Ministry of transport, Project implementation Consultants (Kocks Consult GmbH), Contractors Xinjiang Beixin Road &amp; Bridge Group Co (Phase 1) and Sinohydro Tajikistan Corporation Limited (Phase 2). The works progress is about 45% for the Phase 1 and 18% for the Phase 2. Total number of Contractors' workers is about 200 engaged for the Phase 1 and 380 for the Phase 2. Findings were as follows:</p> <p>Phase 2:</p> <p>All borrow pits (soil reserves) are located far from the residential houses. Contractor has issued permits from local authorities. The area of quarry at km 72 is currently levelled, no any ponds or deep holes are observed. No inert materials are dumped at the riverbanks. No any settlements are located near the quarry. The quarry is located at the distance of about 10 km from the main road; The trucks have tailboards. The height of inert materials at KM55 is more than 3 m, at KM66 – height of the part of materials is mote that 3 m;</p> <ul style="list-style-type: none"><li>• <i>Asphalt and concrete plants at KM64:</i> part of the are is graveled. The asphalt plant has no any filter and heavy emissions can be seen even visually. All barrels with bitumen are non covered and placed directly on the soil, without any protection. Spills of the bitumen can be observed at the area. The broken barrel with bitumen is placed at the bank of the channel and bitumen leaks directly to the water which goes to the settlement located at the distance of about 500 m from the area of asphalt plant – waste management is not in compliance; Not all workers here use the protective masks.</li><li>• <i>Contractor's working camp at km64:</i> Access of the people is prohibited by installing of fence and arrangement of guards. septic tank installed and purified in accordance with the approved procedures. All waste water sent to the septic tank. Containers for the non-hazardous waste is arranged, but no containers for the oily cloth, gloves were observed. Fire-fighting equipment is arranged, but box with the sand has no cover. Canteen with sanitary and hygieninc conditions are in place. Medical room, hired doctor and first aid means are in place and</li></ul>

	<p>compliant. Storage of the fuel has containment area. Fuel barrel is placed at impervious base. However, oils spills can be observed nearby.</p> <ul style="list-style-type: none"> <li>• <i>No environmental documentation (SSEMPs, permits etc.) was demonstrated by Contractor, because local ES is currently in vacation.</i></li> <li>• <i>Traffic and warning signs are installed at the construction sites along the road. Most of workers use PPE; TL of the SC mentioned that there is very small budget for the implementation of EMP/SSEMP requirements and actions – that is why Contractor has not enough means for the fulfilling of the safeguards requirements</i></li> </ul>	
	<b>Action required</b>	
	<p>Phase 2.</p> <ul style="list-style-type: none"> <li>• Asphalt plant at km 64: <b>Install filters</b> at asphalt plant and arrange additional monitoring of air quality on monthly basis; All area should be graveled properly, the barrels with bitumen should be placed on the impervious base (concrete, or thick film with the gravel layer); Collect remaining soils polluted by spills of bitumen at the area of asphalt plant and dispose them accordingly as per permission of local environmental department. <b>Clean bank of the channel</b> from the garbage and broken barrel with bitumen and dispose them relevantly. All workers should have and wear full set of PPE, including protective masks.</li> <li>• <i>Contractor's working camp at km64.</i> Install additional and labelled containers for the oily clothes, batteries. Correct polluted soil by oil spills and dispose them in accordance with the Waste management plan of Contractor;</li> <li>• Ensure that environmental documentation, including Complaints log book is in place</li> </ul>	<p>Contractor – by 15th November 2019</p> <p>Contractor – by 15th November 2019</p> <p>regularly</p>
	Check the status of corrective actions implementation	PIURR, ES CSC, ADB RETA ES – in November and December 2019
	Discuss budget issues for the implementation EMP/SSEMPs requirements	PTLs, CEF, PIURR

**ANNEX 4      THE MINUTES OF MEETING DEDICATED  
TO ENVIRONMENTAL ISSUES**

#### Minutes of the Meeting # 27

Date: November 15, 2019

Place: Contractor's Camp (km. 65 – RHS)

Time: 11:00 A.M. to 12:00 P.M.

#### 1. Attendants/Participants

##### Consultant:

Mr. Alfredo Guarin	Team Leader	Kocks
Mr. Sushil Rajbhandari	Senior Material Engineer	Kocks
Mr. Solim Nazrshoev	Deputy Team Leader	Kocks
Mr. Igor Zidener	Environmental Specialist	Kocks
Mr. Maxim Harlan	Translator (English/Russian)	Kocks

##### Contractor:

Mr. Chen Jin	Project Manager	Sinohydro
Huang Zutong	Chief Engineer	Sinohydro
Wang Bin	Highway Engineer	Sinohydro
He Jianming	Health and Safety	Sinohydro
Shen Yuchen	Translator	Sinohydro
Wang Ziming	Translator	Sinohydro
Liang Na	Translator	Sinohydro
Mr. Fazliddin Azimov	Translator (Tajik/Russian/ English/Chinese)	Sinohydro

#### Excerpts of the Minutes of Meetings:

#### Action Taken By

The meeting was presided by the Team Leader and discussed the following issues:

#### 1) Environmental Issues

##### 1.1. Environmental Compliance Issues

CR

Contractor was reminded about the environmental issues observed by the representative of ADB Mrs. Malika Babajanova during the mission on October 22, 2019. ADB required the addressing of issues until 15 November, 2019.

The main observed issues include:

- Improper storage of bitumen and emptied bitumen drums
- The air pollution due to visual black smoke from the exhaust pipe of asphalt plant
- The absence of container for hazardous waste
- The absence of the Complaint's log book at the site

The necessity of the following required mitigation measures was reminded to the Contractor:

- Installation of filters to the asphalt plant pump to reduce emissions and additional monthly monitoring of air quality;
- The arrangement of the proper storage of bitumen on impervious base (thick film with the gravel layer);
- Cleaning and proper disposal of the polluted soil
- Removal of garbage from the bank of channel
- Provide the additional labelled containers for oily clothes, batteries, and other hazardous waste.

- vi. Ensure that Complaint log book is in place.

It was decided to organize the join inspection directly after the meeting and discuss mitigation.

**2) Preparation and submission of Working Drawings**

ENG/CR

The Team Leader inquired from the Contractor the status of remaining working drawings for submission;

**2.1 U-Turns**

Submitted - 3 nos.

For Submission = 3 nos. ( Obikkik Area )

**2.2 Road Junctions** - still for inspection with PIU/Kocks/Sinohydro/Local Authorities {next week}

PIU/ENG/CR/LA

**2.3 For the 40 km. road length** ( all given approval)

CR

Contractor can start any section except where ROW issues.

**2.4 Retaining Walls**

CR

Km. 37 to km. 38 ( including Br.7 ) - next week

Km. 34 - next week

**3) Bridge 14a Pile Load Test** - New Jacking Apparatus for calibration at Tajikistan Standard. Jacking activities will resume after calibration next week.

CR

**4) Asphalt / Base**

CR

Team Leader directed the Contractor to carry-out levels of completed asphalt binder where on straight road will be every 20 m. interval and on curve every 10 m. interval.

**5) Cracks on Concrete**

CR

Contractor to properly proper curing of concrete works to avoid cracks during removal of forms.

Since there are no more other issues to be discussed, the meeting was adjourned at 12:00 noon time with a vote of thanks to the participants.

Alfredo Guarin, Jr.  
Team Leader

Chen Lin  
Contractor's Representative



## **ANNEX 5     SAMPLE OF NON- CONFORMANCE NOTE**

General Directors  
 Capt-Genl. Dr. Fleming Locke MA  
 Capt-Genl. Michael Curran  
 Capt-Genl. Keith Smith

*Photo 1 The topsoil heaps along the road between Km 42+000-43+000*



Sparkasse Koblenz, Swift MALADES1KOB  
IBAN DE56 5705 0120 0001 0243 89, Acc.: 1 024 386  
Deutsche Bank AG, Koblenz, Swift DEUTDE33HAN  
IBAN DE91 5707 0045 0024 0101 00, Acc.: 0 240 101

Inferior Court, Koblenz HR B 13 10  
Tax No. 22950/0527/1  
VAT Reg. No. DE148722247  
Certification: ISO 9001

Board of Directors  
Dipl.-Geol. Dr. Henning Kocks, MSA  
Dipl.-Ing. Michael Leinhos  
Dipl.-Ing. Ulrich Sprick

**ANNEX 6      QUARTERLY ENVIRONMENTAL  
MONITORING REPORT OF  
CONTRACTOR**



# **Asian Development Bank**

## **Project on rehabilitation and improving of road Dushnabe-Kurgonteppa from km 33+475 - 73+050**

Prepared for:

Ministries of Transport

Republic of Tajikistan.

Project Implementation Center road.

Quarterly Environmental Report

October-December 2019.



Sinohydro LLC  
“Tajikistan Stock”

Dushanbe, December – 2019

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## 1. Introduction

This report covers the element of environmental monitoring in phase II of the Dushanbe-Kurgonteppa road, section km 33 +475-73+050 from the Chashmasoron settlement in the Khuroson district to the Kyzylkala settlement of the Kushoniyon district of the Khatlon region.

In the fourth quarter of 2019, the camp and the office of engineers were functioning normally at km 64 + 600. As well as the Contractor continues to expand the road (km 48 + 200-km 67 + 000), the construction of bridges, culverts and underpasses. Asphalt plant and concrete plant are functioning normally. The Contractor paves the highway (km 48 + 900-km 59 + 000, km 34 + 000- km 38 + 000) and pours iron-concrete products (borders, square pipes, round pipes, bridge spans, etc.).

The volume of work for the fourth quarter 2019

№№	Name of works	unit of measurement	Volume of work performed
1	Widening of the road at km 34+360-39+380	%	100
2	Widening of the road at km 51+200-59+000	%	100
3	Extraction of material from the quarries	thous. m <sup>3</sup>	99,780
1	Power consumption	kw / h	102,490
2	Water consumption	m <sup>3</sup>	5,900
3	Petrol	L	37,715
4	Diesel consumption	L	971,560
5	Motor oil consumption	L	8,700
6	Cement consumption	tn	3,029
7	Crushed gravel production	tn	42,000.00
8	Sand production	tn	39,700
9	Excavation	tn	316,238
10	Waste storage	tn	
11	Expansion of the road	km	
14	Bridge construction		Piles 40 pc
15	Construction of underground waterways (pipes)	l/m	1420
16	Topsoil protection		Regularly
17	Erosion control		Regularly
18	Removal of old asphalt	tn	947
19	Cutting of trees	pc	50
20	Cutting of trees	pc	629
21	Safety meetings		14
22	Number of complaints from the public		not received

The purpose of this report is:

- Monitoring of water quality
- Monitoring of air quality
- Monitoring of flora and fauna
- Management of socio-economic characteristics:
  - infrastructure
  - transport
  - land use
  - agriculture
- Management of household and construction waste
- Management of social and cultural resources
  - community, health, education and safety
  - historical cultural sites
  - noise

## **2. Environmental monitoring. The legislative framework**

The environmental legislation of Tajikistan mainly consists of environmental and health laws, as well as Government decrees and orders from various ministries and committees.

### **Environmental laws of the Republic of Tajikistan:**

- Law on Environmental Protection
- Law on State Ecological Expertise.
- Law on Environmental Assessment
- Law on Environmental Monitoring

### **Air quality**

- Law on Air Protection.
- Law on hydrometeorological activity.

### **Minerals**

- Subsoil Law

### **Water**

- Water Code.

### **Land Management**

- Land Code;
- Law on Land Management;
- Law on Land Valuation .

## **Forest**

- Forest Code.

## **Animal and Plant Laws**

- Law on the protection and use of wildlife;
- Law on the protection and use of flora;
- The law on quarantine of plants.

## **Health and safety**

- Law on ensuring sanitary and epidemiological safety of the population;
- Law on Veterinary Medicine;
- Law on iodized salt;
- Law on the quality and safety of food;
- Law on industrial safety of hazardous production facilities;
- Law on Radiation Safety.

## **Waste and Chemicals Management**

- Law on production and consumption waste.
- Law on the production and safe handling of pesticides and chemicals.

The Republic of Tajikistan has ratified more than 10 international conventions and protocols, which are also included in its legislative system.

This report is an environmental impact monitoring for the second quarter of 2019.

### **3. Monitoring water quality**

The main water objects in the project impact zone are the Vakhsh and Oksu rivers and tributaries of the Amudarya.

Water samples for analysis were taken at the following points:

- Sample 1 Vakhsh river, left riverside, 500 m upstream the bridge;
- Sample 2 Vakhsh river, left riverside, 500 m downstream the bridge;
- Sample 3 Vakhsh river, right riverside, 500 m upstream the bridge;
- Sample 4 Vakhsh river, right riverside, 500 m downstream the bridge;
- Sample 5 Oksu river, 500 m upstream the bridge;
- Sample 6 Oksu river, 500m downstream the bridge;
- Sample 7 Well at km 64 + 600, camp water supply;
- Sample 8 irrigation canal, bridge No. 10, 500m upstream the bridge;
- Sample 9 irrigation canal, bridge No. 10, 500m downstream the bridge;
- Sample 10 Obikik river, 500 m upstream the bridge;

- Sample 11 Obikik, 500 m downstream the bridge;



Vakhsh River, right bank, 500 m upstream the bridge 28/12/2019

### Chemical analysis results

Vakhsh, river left riverside, 500 m upstream the bridge

No	Parameters	National Standards		Baseline values	Current monitoring results
		Fishery	Drinking water	12.2018	28.12. 2019
1.	Temperature			12,2	9,0
2.	Suspended matter, mg/l	75	25	12,5	8,55
3.	pH	6,5-8,85	6,5-8,85	6,2	5,0
4.	Mineralization mg/l	1000	1000	145,00	136,5
5.	BOD, mg/l	3,0	3,0	1,9	1,6
6.	Dissolved oxygen, mg/l	Not less 4,0	Not less 4,0	7,5	7,6
7.	Electrical conductivity	-	-	141,00	140,00
8.	Oil products mg/l	-	-	-	not detected

9.	Coli-index, pcs/l	1000	3	15,00	15,0
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Vakhsh river, left riverside, 500 m downstream the bridge

No	Parameters	National Standards		Baseline values	Current monitoring results
		Fishery	Drinking water	12.2018	28.12. 2019
1.	Temperature			11,9	9,0
2.	Suspended matter, mg/l	75	25	12,3	9,00
3.	pH	6,5-8,85	6,5-8,85	6,3	5,0
4.	Mineralization mg/l	1000	1000	143,00	138,00
5.	BOD, mg/l	3,0	3,0	1,85	1,7
6.	Dissolved oxygen, mg/l	Not less 4,0	Not less 4,0	7,4	8,0
7.	Electrical conductivity	-	-	142,00	140,00
8.	Oil products mg/l	-	-	-	oCT
9.	Coli-index, pcs/l	1000	3	15,5	14,0

Vakhsh river, right riverside, 500 m upstream the bridge

No	Parameter	National Standards		Baseline values	Current monitoring results
		Fishery	Drinking water	12.2018	28.12 2019
1.	Temperature			11,9	8,5
2.	Suspended matter, mg/l	75	25	46,0	40,0
3.	pH	6,5-8,85	6,5-8,85	6,2	6,0
4.	Mineralization mg/l	1000	1000	142,00	121,0
5.	BOD, mg/l	3,0	3,0	1,85	1,5
6.	Dissolved oxygen, mg/l	Not less 4,0	Not less 4,0	7,0	6,0
7.	Electrical conductivity	-	-	141,00	135,00
8.	Oil products mg/l	-	-	-	oCT
9.	Coli-index, pcs/l	1000	3	13,0	12,5

Vakhsh river, right riverside, 500 m downstream the bridge

No	Parameter	National Standards		Baseline values	Current monitoring results
		Fishery	Drinking water	12.2018	28.12 2019

1.	Temperature			11,7	8,0
2.	Suspended matter, mg/l	75	25	39,0	45,0
3.	pH	6,5-8,85	6,5-8,85	6,9	6,04
4.	Mineralization mg/l	1000	1000	145,00	138,00
5.	BOD, mg/l	3,0	3,0	1,85	1,5
6.	Dissolved oxygen, mg/l	Not less 4,0	Not less 4,0	7,06	5,0
7.	Electrical conductivity	-	-	142,00	136,00
8.	Oil products mg/l	-	-	-	oct
9.	Coli-index, pcs/l	1000	3	16,0	11,0

River Oksu, 500 m upstream the bridge

No	Parameter	National Standards		Baseline values	Current monitoring results
		Fishery	Drinking water	12.2018	28.12 2019
1.	Temperature			11,5	8,0
2.	Suspended matter, mg/l	75	25	52,0	44,0
3.	pH	6,5-8,85	6,5-8,85	6,9	6,0
4.	Mineralization mg/l	1000	1000	155,00	142,00
5.	BOD, mg/l	3,0	3,0	2,0	1,0
6.	Dissolved oxygen, mg/l	Not less 4,0	Not less 4,0	6,9	6,0
7.	Electrical conductivity	-	-	139,0	134,00
8.	Oil products mg/l	-	-	-	oct
9.	Coli-index, pcs/l	1000	3	25,0	16,5

River Oksu, 500 m downstream the bridge

No	Parameter	National Standards		Baseline values	Current monitoring results
		Fishery	Drinking water	12.2018	28.12 2019
1.	Temperature			11,3	9,0
2.	Suspended matter, mg/l	75	25	52,1	43,0
3.	pH	6,5-8,85	6,5-8,85	6,95	6,0
4.	Mineralization mg/l	1000	1000	154,5	141,00
5.	BOD, mg/l	3,0	3,0	2,1	1,2
6.	Dissolved oxygen, mg/l	Not less 4,0	Not less 4,0	6,5	6,0
7.	Electrical conductivity	-	-	155,0	140,00
8.	Oil products mg/l	-	-	-	oct

9.	Coli-index, pcs/l	1000	3	24,9	15,0
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Well at km 64 + 600, camp water supply

No	Parameter	National Standards		Baseline values	Current monitoring results
		Fishery	Drinking water	12.2018	28.12 2019
1.	Temperature			8,00	8,9
2.	Suspended matter, mg/l	75	25	15,9	10,5
3.	pH	6,5-8,85	6,5-8,85	7,9	6.8
4.	Mineralization mg/l	1000	1000	1510	750,00
5.	BOD, mg/l	3,0	3,0	1,9	1,2
6.	Dissolved oxygen, mg/l	Not less 4,0	Not less 4,0	7,8	5,5
7.	Electrical conductivity	-	-	1510	880,00
8.	Oil products mg/l	-	-	-	oCT
9.	Coli-index, pcs/l	1000	3	1,3	1,0

Irrigation canal, bridge number 10, 500m upstream the bridge

No	Parameter	National Standards		Baseline values	Current monitoring results
		Fishery	Drinking water	12.2018	28.12 2019
1.	Temperature			11,0	9,0
2.	Suspended matter, mg/l	75	25	22,9	17,5
3.	pH	6,5-8,85	6,5-8,85	6,9	6,1
4.	Mineralization mg/l	1000	1000	210,00	185,00
5.	BOD, mg/l	3,0	3,0	1,95	1,0
6.	Dissolved oxygen, mg/l	Not less 4,0	Not less 4,0	6,5	5,0
7.	Electrical conductivity	-	-	208,00	180,0
8.	Oil products mg/l	-	-	-	oTC
9.	Coli-index, pcs/l	1000	3	150,0	95,0

Irrigation canal, bridge number 10, 500m downstream the bridge

No	Parameter	National Standards		Baseline values	Current monitoring results
		Fishery	Drinking water	12.2018	28.12 2019
1.	Temperature			11,1	8,5



2.	Suspended matter, mg/l	75	25	22,5	16,5
3.	pH	6,5-8,85	6,5-8,85	6,8	6,0
4.	Mineralization mg/l	1000	1000	205,00	188,00
5.	BOD, mg/l	3,0	3,0	1,99	1,0
6.	Dissolved oxygen, mg/l	Not less 4,0	Not less 4,0	6,2	6,3
7.	Electrical conductivity	-	-	210,0	185,00
8.	Oil products mg/l	-	-	-	otc
9.	Coli-index, pcs/l	1000	3	148,00	95,0

River Obikik, 500 m upstream the bridge

No	Parameter	National Standards		Baseline values	Current monitoring results
		Fishery	Drinking water	12.2018	28.12 2019
1.	Temperature			10,9	8,0
2.	Suspended matter, mg/l	75	25	13,9	10,0
3.	pH	6,5-8,85	6,5-8,85	6,95	6,0
4.	Mineralization mg/l	1000	1000	185,00	145,00
5.	BOD, mg/l	3,0	3,0	2,1	1,0
6.	Dissolved oxygen, mg/l	Not less 4,0	Not less 4,0	5,9	5,3
7.	Electrical conductivity	-	-	183,0	180,00
8.	Oil products mg/l	-	-	-	otc
9.	Coli-index, pcs/l	1000	3	149,00	89,00

River Obikik, 500 m downstream the bridge

No	Parameter	National Standards		Baseline values	Current monitoring results
		Fishery	Drinking water	12.2018	28.12. 2019
1.	Temperature			10,8	8,0
2.	Suspended matter, mg/l	75	25	12,5	10,1
3.	pH	6,5-8,85	6,5-8,85	6,55	5,7
4.	Mineralization mg/l	1000	1000	178,00	162,00
5.	BOD, mg/l	3,0	3,0	2,2	1,2
6.	Dissolved oxygen, mg/l	Not less 4,0	Not less 4,0	5,4	5,3
7.	Electrical conductivity	-	-	187,6	169,00
8.	Oil products mg/l	-	-	-	otc
9.	Coli-index, pcs/l	1000	3	152,00	120,00

The examined water samples parameters do not exceed the maximum permissible concentration (MPC) except for the content of suspended substances in the Vakhsh River, the right riverside and in the Oksu River. The suspended matter content in samples of the Vakhsh River on the right side and the Oksu River exceeds the permissible limits (40.0-45.0 mg / l at a rate of 25 mg / l). The quality of drinking water at km 64 + 600 (camp) complies with the approved standards of the Republic of Tajikistan.

The high content of suspended solids in the Vakhsh River, (right riverside) and the Oksu River (40.0-45.0 mg / l) is a natural phenomenon and is not related to the activities of the Contractor.

## Monitoring of air quality

This report is an air quality monitoring for the fourth quarter of 2019 in the zone of rehabilitation and improvement of the Dushanbe-Kurgonteppa road, Chashmasoron-Kyzylkala section (km 33+475-73+050).

Instrumental measurements were made at the following sites, according to the approved Monitoring Plan.

- Sample 1- Kyzylkala km 71+800
- Sample 2 - DSU, km 64+600
- Sample 3 - ASU, km 64+600
- Sample 4 - Uyali, km 67+800
- Sample 5 - Khuroson, km 35+000

Additionally, measurements were made in the villages of Chorbog and Halki

### The results of testing the quality of the atmosphere.

Kyzylkala km 71 + 800

№	Month Parameters	National Standard (MPC) mg/m <sup>3</sup>	Baseline values	Next monitoring indicators
			12.2018.	28.12.2019
1.	TSP	0,15	0,08	0,03
2.	CO	3,0	1,4	1,5
3.	NO <sub>x</sub>	0,085	0,03	0,083
4.	SO <sub>2</sub>	0,05	0,015	0,029
5.	CO <sub>2</sub>	3900	1350,00	1082,00

DSU, km 64+600

№	Month	National Standard (MPC) mg/m <sup>3</sup>	Baseline values	Next monitoring indicators

	Parameters		12.2018	22.12.2019
1.	TSP	0,15	0,09	0,02
2.	CO	3,0	1,25	1,0
3.	NO <sub>x</sub>	0,085	0,027	0,082
4.	SO <sub>2</sub>	0,05	0,017	0,045
5.	CO <sub>2</sub>	3900	1370,00	1019,00

ASU, km 64+600

№	Parameters	National Standard (MPC) mg/m <sup>3</sup>	Baseline values	Next monitoring indicators
			12.2018	28.12.2019
1.	TSP	0,15	0,075	0,068
2.	CO	3,0	1,06	1,09
3.	NO <sub>x</sub>	0,085	0,02	0,03
4.	SO <sub>2</sub>	0,05	0,018	0,018
5.	CO <sub>2</sub>	3900	1410,00	1094,00

AMP, km 64+600

№	Parameters	National Standard (MPC) mg/m <sup>3</sup>	Baseline values	Next monitoring indicators
			12.2018	28.12.2019
1.	TSP	0,15	0,075	0,03
2.	CO	3,0	1,06	1,0
3.	NO <sub>x</sub>	0,085	0,02	0,082
4.	SO <sub>2</sub>	0,05	0,018	0,046
5.	CO <sub>2</sub>	3900	1410,00	1090,00

Uyali, km 67+800

№	Parameters	National Standard (MPC) mg/m <sup>3</sup>	Baseline values	Next monitoring indicators
			12.2018	28.12.2019

	Parameters			
1.	TSP	0,15	0,09	0,01
2.	CO	3,0	1,25	1,14
3.	NO <sub>x</sub>	0,085	0,018	0,081
4.	SO <sub>2</sub>	0,05	0,01	0,046
5.	CO <sub>2</sub>	3900	1420,00	1088,00

Khuroson, km 35+000

№	Month Parameters	National Standard (MPC) mg/m <sup>3</sup>	Baseline values	Next monitoring indicators
			12.2018	28.12.2019
1.	TSP	0,15	0,095	0,02
2.	CO	3,0	0,097	0,090
3.	NO <sub>x</sub>	0,085	0,013	0,082
4.	SO <sub>2</sub>	0,05	0,016	0,035
5.	CO <sub>2</sub>	3900	1460,00	1113,00

Chorbog, sports ground

№	Month Parameters	National Standard (MPC) mg/m <sup>3</sup>	Baseline values	Next monitoring indicators
			12.2018	28.12.2019
1.	TSP	0,15	0,095	0,02
2.	CO	3,0	0,097	0,091
3.	NO <sub>x</sub>	0,085	0,013	0,080
4.	SO <sub>2</sub>	0,05	0,016	0,043
5.	CO <sub>2</sub>	3900	1460,00	2300,00

Halki Jar, southern direction from the APP

№	Month Parameters	National Standard (MPC) mg/m <sup>3</sup>	Baseline values	Next monitoring indicators
			12.2018	22.12.2019
1.	TSP	0,15	0,095	0,01
2.	CO	3,0	0,097	1.6

3.	NO <sub>x</sub>	0,085	0,013	0,084
4.	SO <sub>2</sub>	0,05	0,016	0,045
5.	CO <sub>2</sub>	3900	1460,00	2250,00

Note:

TSP - the total number of suspended particles.

CO - carbon monoxide.

NO<sub>x</sub> - the amount of nitrogen oxides.

SO<sub>2</sub> - sulfur dioxide.

CO<sub>2</sub> - carbon dioxide

Concentration of harmful substances in atmospheric air at all points in the project's zone of influence is below the permissible norms (MAC).

Dust content in the zone of influence of the project by the Contractor is maintained at acceptable rates by the method of irrigation of the road. In June, the road irrigation was increased to 3 times a day.

References, on the basis of which the work was carried out, and all calculations were performed:

1. "Collection of methods for determining the concentrations of pollutants in industrial emissions", Leningrad, Gidrometizdat, 1987.

"Instruction on the procedure for the preparation and conduct of state control of organized emissions of harmful substances into the atmosphere at industrial enterprises." Ministry of Environmental Protection of the Republic of Tajikistan, - Dushanbe - 1993.



**Photo:** Air quality monitoring, in Khuroson, 12/28/2019,



**Photo:** Air quality monitoring in Halkajar area, 12/28/2019, 10:50.



**Photo:** Air quality monitoring, Contractor's Camp 12/28/2019, 12:00

#### 4. Monitoring of flora and fauna

For the fourth quarter of 2019. Negative impact on the state of flora and fauna in the area of influence of the project is not recorded.

It was made cutting down trees in the amount of 50 units. No cases of poaching have been recorded.





**Photo:** State of flora in the project's zone of influence,

## **5. Measures to protect the environment.**

### **6.1. Construction objects**

The main sources of environmental pollution in the period from 01/10/2019 to 31/12/2019 in the project's impact zone were:

#### **1. Stationary sources:**

- Quarries on km 69 + 000, km 55 + 000 and km 38 + 000
- Asphalt plant at km 64 + 600
- Concrete plant at km 64 + 600

#### **2. Mobile sources:**

- • Motor transport - 80 units.
- • Mobile mechanisms (compressors, bulldozers, graders, truck cranes) - 20 units.

Exhaust emissions from both carburetor and diesel vehicles and mechanisms did not exceed the permissible standards for carbon monoxide and smoke.



**Photo:** Construction activity at the bridge 14, 12/28/2019

#### **6.1.1. Temporary settlements for workers and office engineering staff**

Basic sanitary and environmental standards in this construction camp are observed. There are shower cabins, toilet facilities, a bathhouse, a playground and dining rooms.

The camp is also stored fuel appropriately, there are no violations. Fuel is stored in accordance with the requirements of the Environmental Management Plan. There are fire extinguishers, shovels, sand.

The port crane (18 m) was also installed in the camp.



Removal of household waste is carried out regularly in accordance with the agreement with utilities of Khuroson district.

There were no comments from environmental authorities and the sanitary-epidemiological service.

Refueling of fuels and lubricants is strictly controlled and regulated by formal procedures. On all places of refueling pallets are used. Appropriate fire prevention measures taken.



**Photo:** Camp at km 64 + 600, sports ground, 12/28/2019

### **6.1.2.      *Excavation***

Excavation work is carried out from km 33 + 475 to km 36 + 000 and from km 49 + 500 to km 60 + 000.



***Photo:*** Excavation work, 12/28/2019.

### 6.1.3. *Asphalt mixing Plan*

The asphalt plant is functioning normally.



**Photo:** Laying of asphalt at the sections Km 55+59 12/28/2019

#### **6.1.4. Concrete Plant**

The Contractor continues to produce concrete products (borders, trays, round and square pipes) and releases concrete mortar for pouring bridge supports, laying waterways and underground culverts.







Production of reinforced concrete products and pouring supports,  
12/28/2019

#### **6.1.5.      *Construction of bridges and waterways***

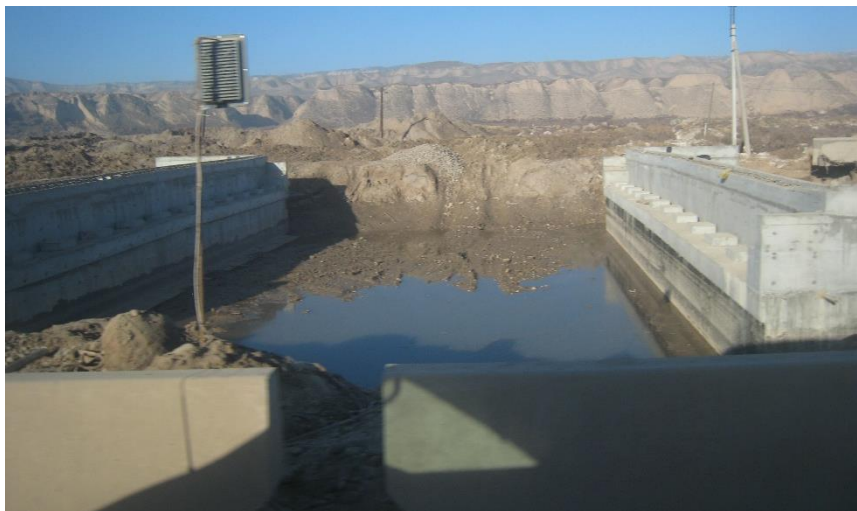
For the second quarter, 142 units of culverts (pipes) were installed and 5 bridges are being constructed.







The construction of a bridge over the Vakhsh River, 12/28/2019



Construction of underpasses and a bridge at km 69 + 500, 12/28/2019



## **6      *Waste management***

Construction waste will be placed on the site at km 64 + 700. Permit of Khuroson Hukumat district is available.

Municipal and household waste is sent to the official landfill of the Khuroson district in a timely manner.

## **7      *Health and safety***

The Contractor shall take all reasonable measures to reduce dust during construction. To suppress dust, the Contractor irrigates the road 2 times a day.

All vehicles and machinery were constantly maintained in a satisfactory working condition. Pollutant emissions were in compliance with current environmental control laws.

The maintenance of cars and their refueling is performed in such a way that the leakage of fuel and lubricants is not fixed.

The Contractor has taken all reasonable precautions to prevent unauthorized entry to the construction site of local residents.

For the fourth quarter, safety courses were organized 3 times.

Protective equipment and protective clothing were issued by the worker and engineer in a timely manner.

A first aid station is equipped.

The Contractor has taken measures to protect health, including protection from sexually transmitted diseases (STDs) and HIV / SPT.

Organized climate control inside the building (office and recreation room).

Close contact has been established with the health authorities of the Khuroson district.

As part of the health and safety department, with the technical support of the recruited medical staff, the Contractor developed an educational system and installed a post in the camp for construction workers.

## 8 Testing of noise

The noise level in the project area in the first quarter of 2019 did not exceed the permissible norms.

### Monitoring of noise.

№	Location	National Standard, dBA		Baseline values	Next monitoring indicators
		07.00-23.00	23.00-07.00	12.2018	28.12.2019
1.	Kyzylkala , km 71+800	55	45	49,3-54,5	50,0-55,0
2.	DSU, km 64+600	80	80	40,9-47,5	53,0-55,0
3.	ASU, km 64+600	80	80	41,7-52,3	54,5-60,0
4.	Uyali, km 67+800	55	45	54,9-55,4	50,0-55,0
5.	Khuruson, km 135+000	55	45	43,5-52,1	48,0-52,0
6.	Chorbog, sports ground	55	45	-	54,2-55,0
7.	Halki Jar, southern direction	55	45	-	49,0-45,0

### Note:

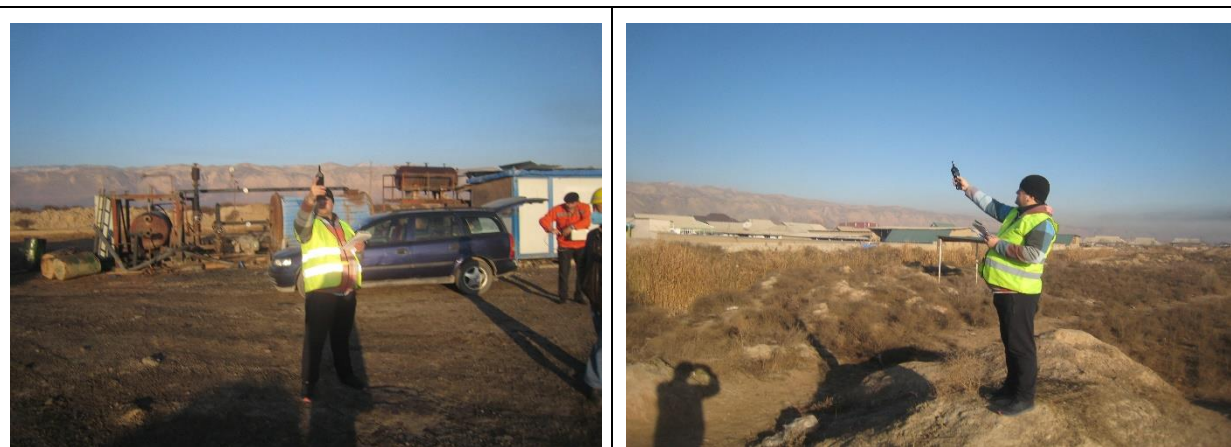
55-45 dBV (max) - residential area

75-45 dBV (max) - commercial zone

80-80 dBV (max) - industrial zone

50-40 dBV (max) - hospitals

55-55 dBV (max) - school, library



**Photo:** Monitoring of the noise level at the site of the Concrete Mixing Plant, 06/22/2019

## 9 Register of Communities' complains

Date	Location	Complaints	Undertaken actions	Quantity
During reporting period no complaints received from social organizations and individuals.				

## 10 Emergency brigade

During the reporting period, an emergency situation did not occur on construction sites and the emergency team was not involved.



Compaction of the asphalt cover on the road

### Construction progress and environmental monitoring

Data	Location	Activity in the reporting period	Effects	Mitigating measures	Corrective action
10/01/2019 to 12/31/2019	km 64 + 600 Crushing and screening plant	Pouring of reinforced concrete culverts-1420pcs. Small borders - 5500 pieces, large borders - 3900 pieces	Improve the CSP territory	Build a sump and water after settling dump into the drainage channel	Strengthen monitoring of compliance with these requirements
10/01/2019 to 12/31/2019.	km 64 + 600 Asphalt mixing plant	Asphalt production continues	Improve the AMP territory	Streamline storage of bitumen on site. Timely collection of bitumen and its storage.	Strengthen control
10/01/2019 to 12/31/2019	km 33+475-km 36+000, km 49+7000-km 58+000, Expansion of the road	Excavation work	Mechanical dust formation	Moisten the material during mining, loading and unloading	Strengthen control
10/01/2019 to 12/31/2019	Bridges construction (5 units)	Construction of bridge supports.	Pollution of the Vakhsh River and canals.	Prevent leakage of fuel into reservoirs in the zone of influence of bridge construction.	Strengthen control

## 6. Conclusion

The high content of suspended solids in the Vakhsh River, (right riverside and the Oksu River (40.0-45,0 mg/l) is a natural phenomenon and is not related to the activities of the Contractor.

When conducting instrumental monitoring of atmospheric air, noise exceeding the MPC standards was not observed.

At the time of monitoring, no significant anthropogenic impacts in the project area of influence were recorded.

The state of flora and fauna in the zone of influence of the project is stable.

## 7. Attachment

### 13.1. *List of used literature and regulatory documents:*

1. Law of the Republic of Tajikistan "On Environmental Protection".
2. The Law of the Republic of Tajikistan "On the Protection of Atmospheric air.
3. Water Code of the Republic of Tajikistan.
4. Maximum permissible concentration (MPC) of pollutants in the atmospheric air of populated areas (List 3086-84).
5. The maximum permissible concentration (MPC) of pollutants in the air of the working area.
6. Sanitary standards for the design of industrial enterprises CH 345-71.
7. Unified methods for studying water quality. Part 1, T.1: Methods of chemical analysis of water. M, 1987.
8. Unified methods for studying water quality. Part 1, v.2: Methods of chemical analysis of water. M, 1983.
9. A.S. Labinsk. Microbiology. M: "Medicine", 1972.
10. Manual on chemical analysis of surface land waters. Ed. HELL. Semenov. L.: Gidrometeoizdat, 1977.
11. Manual document. Protection of Nature. Atmosphere. Requirements for precision control of industrial emissions. Methodical instructions. RD 52704.59-85. M., 1986.

### 13.2. *Details of the initial environmental monitoring*

#### 1. Monitoring noise

##### 1.1. Monitoring Methodology

- The noise level was measured with a TESTO-815 brand sound level meter.

##### 1.2. Controlled parameters

- Noise level.

- All measuring devices are annually verified for compliance in Tajikstandard, for which there is a corresponding certificate from the Agency for Standardization and Metrology of the Republic of Tajikistan.

## **2. Air quality monitoring**

### **2.1. Monitoring Methodology**

- Collection of methods for determining the concentrations of pollutants on industrial emissions. L.: Gidrometeoizdat, 1987.
- Interim guidance on the control of emission sources of pollutants into the atmosphere using gas analytical devices. Part 1, 2. L., 1986.
- Guidelines for determining the parameters of gas flows to determine the calculation of emissions from stationary sources of different types. L., 1985.
- Guidance document. Protection of Nature. Atmosphere. Requirements for precision control of industrial emissions. Methodical instructions. RD 52704.59-85. M., 1986.

### **2.2. Controlled parameters**

- Dust (particulate matter)
- The amount of nitrogen oxides (NO + NO<sub>2</sub>)
- Carbon monoxide (CO)
- Sulfur dioxide (SO<sub>2</sub>)
- Carbon dioxide (CO<sub>2</sub>)

### **2.3. For aspiration of atmospheric air were used**

- Gas analyzer - GANG - 4 A and 4 R.
- Gas analyzer - Comet M.
- Gas analyzer - TEM - 4 A.
- KFK-3 photoelectric colorimeter.
- Analytical balance, Shimadzu brand.

## **3. Monitoring water quality.**

### **3.1. Monitoring Methodology**

Water samples taken at approved sites were delivered in Dushanbe to the laboratory of the Center for Analytical Control of the Committee for Environmental Protection under the Government of the Republic of Tajikistan for analysis.

Samples were analyzed by standardized chemical and physicochemical methods:

- Drinking water. GOST - 2874-82
- drinking water, field analysis methods / GOST - 1030-81
- Unified methods for the study of water quality, Part 1  
Methods of chemical analysis of water, volume 1, M., - 1987
- Unified methods for the study of water quality, Part 2

### 3.2. Controlled parameters

- Temperature
- pH
- Mineralization
- Dissolved oxygen
- BOD5
- Oil products
- Conductivity
- Koli-index

### 3.3. Equipment and calibration data

- pH - to potentiometric methods on a pH meter of pH Level-1.
- Suspended solids, dry residue, oil products by weight (gravimetric) method: on analytical scales of Japanese production (Shimadzu).
- BOD5 - titrametric method.
- Conductivity on a conductometer manufactured in India.

## 13.3. *Permit Documents*

№№	Title of the document	date of issue
1	The act of permitting the storage of off-grade soil at km 35 + 600-km 35 + 800 of the Dushanbe-Bokhtar highway	07.01.2019
2	Agreement on the use of quarries, dumps and camps	№ QHTT-2018-004 15.11.2018
3	Tree felling permit	No. 1/1255 dated 12/27/2018
4	Laboratory accreditation permit	№ TJ 762.37100.02.061- 2019 от 28.10.2019г.



## **13.4.        Protocols**

Committee of Environmental Protection under the Government of the  
Republic of Tajikistan

Center for Analytical Control

### **P R O T O C O L № 156**

Air quality monitoring

Object: Rehabilitation and improvement of the Dushanbe-Kurgantepp road,  
km 33 + 475-73 + 050

Representative of the Committee: E. Rustamov

Representative of the company: Suriev B.

Date of sampling: 22.06.2019

Date of analysis: 22.06.2019

№	Object	Ingredients, mg\m <sup>3</sup>				
		TSP	CO	NO <sub>x</sub>	SO <sub>2</sub>	CO <sub>2</sub>
1	Kyzylkala , km 71+800	0,11	1,6	0,04	0,012	1054,0
2	DSU, km 64+600	0,10	1,31	0,026	0,017	1011,0
3	ASU, km 64+600	0,068	1,09	0,03	0,018	1094,0
4	Uyali, km 67+800	0,09	1,21	0,020	0,03	1089,0
5	Khuruson, km 35+00	0,088	0,092	0,012	0,016	1092,0

Head of the Center analytical control

Rustamov E.

Committee of Environmental Protection under the Government of the  
Republic of Tajikistan

Center for Analytical Control

**P R O T O C O L № 157**

Noise testing

Object: Rehabilitation and improvement of the Dushanbe-Kurgantepp road,  
km 33 + 475-73 + 050

Representative of the Committee: E. Rustamov

Representative of the company: Suriev B.

Date of sampling: 22.06.2019

Date of analysis: 22.06.2019

№	Location	National Standard dBA		Indicators (max-min)
		Period from 7a.m. to 23 p.m.	Period from 23 p.m. to 7a.m.	
1	Kyzylkala , km 71+800	55	45	50,0-55,0
2	DSU, km 64+600	80	80	53,0-55,0
3	ASU, km 64+600	80	80	54,5-60,0
4	Uyali, km 67+800	55	45	50,0-55,0
5	Khuruson, km 35+00	55	45	48,0-52,0
6	Chorbog, sports ground	55	45	54,2-55,0
7	Halki Jar, southern direction	55	45	49,0-45,0

Head of the Center analytical control

Rustamov E.

Committee of Environmental Protection under the Government of the Republic of Tajikistan

Center for Analytical Control

P R O T O C O L № 158

Water test samples

Object: Rehabilitation and improvement of the Dushanbe-Kurganteppa road, km 33 + 475-73 + 050

Representative of the Committee: E. Rustamov /

Representative of the company: Suriev B.

*Date of sampling: 12.28.2019*

*Date of analysis: 12.28.2019 - 27.03.2019.*

№	Parameters	Vakhsh, river left riverside 500 m upstream the bridge	Vakhsh, river left riverside, 500 m downstream the bridge	Vakhsh, river right riverside, 500 m upstream the bridge	Vakhsh, river right riverside, 500 m downstream the bridge	Oksu river , 500 m upstream the bridge	Oksu river , 500 m downstream the bridge	Well at km 64 + 600, camp water supply	Irrigation canal, bridge number 10, 500m upstream the bridge	Irrigation canal, bridge number 10, 500m downstream the bridge	River Obikik, 500 m upstream the bridge	River Obikik, 500 m downstream the bridge
1	Temperature	9,0	9,0	8,5	8,0	8,0	9,0	8,9	9,0	8,5	8,0	8,0
2	Suspended matter, mg/l	8,55	9,00	40,0	45,0	44,0	43,0	10,5	17,5	16,5	10,0	10,1
3	pH	5,0	5,0	6,0	6,04	6,0	6,0	6.8	6,1	6,0	6,0	5.7
4	Mineralization mg/l	136,5	138,00	121,0	138,00	142,00	141,00	750,00	185,00	188,00	145,00	162,00
5	BOD, mg/l	1,6	1,7	1,5	1,5	1,0	1,2	1,2	1,0	1,0	1,0	1,2
6	Dissolved oxygen, mg/l	7,6	8,0	6,0	5,0	6,0	6,0	5,5	5,0	6,3	5,3	5,3
7	Electrical conductivity	140,00	140,00	135,00	136,00	134,00	140,00	880,00	180,0	185,00	180,00	169,00
8	Oil products mg/l	OTC.	OCT	OCT	OCT	OCT	OCT	OCT	OTC	OTC	OTC	OTC

9	Coli-index, pcs/l	15,0	14,0	12.5	11,0	16,5	15,0	1,0	95,0	95,0	89,00	120,00
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Head of the Center analytical control

Rustamov E.



### 13.5. Documents on laboratory accreditation and calibration of measuring instruments.

#### Certificate of accreditation-laboratories

№ 000414

  
**СИСТЕМАИ МИЛЛИИ АККРЕДИТАТСИЯИ  
ҶУМҲУРИИ ТОҶИКИСТОН**  
**МУАССИСАИ ДАВЛАТИИ**  
**«МАРКАЗИ МИЛЛИ ОИД БА АККРЕДИТАТСИЯ»**  
ш. Душанбе, кӯчаи Н. Қарабоев, 42/2, телефон: (+992 37) 233-50-44 (+992 44) 600-81-09

**АТТЕСТАТИ**  
**АККРЕДИТАТСИЯИ ОЗМОИШГОҲ**

Дар феҳристи давлатии системаи миллии  
аккредитатсияи Ҷумҳурии Тоҷикистон

аз «28» октябри соли 2019  
№ ТҶ 762.37100.02.061-2019  
ба қайд гирифта шудааст.  
то «28» октябри 2021 эътибор дорад.

Аттестати мазкур тасдиқ мекунад, ки Маркази назорати таҳлилии Кумитаи ҳифзи  
муҳити зисти назди Ҳукумати Ҷумҳурии Тоҷикистон  
номгуи озмоишгоҳи санҷишӣ (марказ)

шаҳри Душанбе, кӯчаи Шамсӣ-5/1.  
суроға

ба талаботҳои Системаи миллии аккредитатсияи Ҷумҳурии Тоҷикистон мутобики талаботи  
ИСО/МЭК 17025-2009 «Талаботҳои умумӣ оид ба салоҳиятнокии озмоишгоҳҳои таҳлиси ва  
калибровкакунонӣ» аккредитатсия карда шудааст.

Доправа аккредитатсия дар аттестат замима (6-саҳифа) оварда шудааст.

  
Директор  
Ч.М.  Чумазода Б. Ҳ.

#### Verification certificate



**АКЦИОНЕРНОЕ ОБЩЕСТВО  
«НАУЧНО-ПРОИЗВОДСТВЕННОЕ ПРЕДПРИЯТИЕ «ДЕЛЬТА»**

127299, РОССИЯ, Москва г, Клары Цеткин ул, д. 18

Аттестат аккредитации № 1425

**СВИДЕТЕЛЬСТВО О ПОВЕРКЕ**

№ СП 04620

Действительно до  
«07» ноября 2019 г.

Средство измерений Газосигнализатор серии ИГС-98 «Комета-3»

№ 21790-11

наименование, тип, модификация, регистрационный номер в Федеральном информационном фонде по обеспечению единства измерений

(если в состав средства измерений входят несколько автономных измерительных блоков, то приводится их перечень и заводские номера)

отсутствуют

серия и номер знака предыдущей поверки (если такие серия и номер имеются)

Заводской номер (номера) 10456

Поверено в соответствии с описанием типа

наименование величин, диапазонов, на которых поверено средство измерений (если предусмотрено методикой поверки)

Поверено в соответствии с ФГИМ 413415.001.МП

наименование документа, на основании которого выполнена поверка

С применением эталонов: Установка динамическая «Микрогаз Ф-11» ПГС ГСО 2987 9566 ИМ 36

наименование, тип, заводской номер (регистрационный номер (при наличии), разряд, класс или погрешность эталона, применяемого при поверке)

При следующих значениях влияющих факторов: температура окружающего воздуха 22<sup>0</sup>С,

атмосферное давление 100 кПа, относительная влажность 48 %

приводят перечень влияющих факторов, нормированных в документе на методику поверки, с указанием значений

и на основании результатов первичной (**периодической**) поверки признано соответствующим установленным в описании типа метрологическим требованиям и пригодным к применению в сфере государственного регулирования обеспечения единства измерений.

Знак поверки



Главный метролог-начальник отдела

подпись

К.И. Колтуновский

Поверитель

подпись

К.И. Колтуновский

Дата поверки  
«08» ноября 2018 г.

# Calibration protocol Gas analyzer GANG - 4

Протокол градуировки №: ПГ0005974

Страница 1 из 1

Протокол градуировки ГАНК-4(А) зав. № 1698

Универсальный газоанализатор ГАНК-4 Зав. № 1698

Место проведения: ООО "НПО "Прибор "ганк"

Представлен организацией (Заказчик) – Нано-Электрон ,

Дата выпуска 08.02.2012

Дата градуировки 04.06.2019

Условия проведения градуировки:

Температура - 20°C

Давление - 99 кПа

Влажность - 62%

## Результаты градуировки

1. Результаты внешнего осмотра Годен

2. Результаты опробования Годен

3. Средства измерений, оборудование и материалы используемые при градуировки приведены в таблице 1

Таблица 1

Наименование средств измерений, оборудования и материалов	Дата очередной поверки
Барометр - aneroid контрольный М-67, зав.№ 106	18.07.2020
Весы лабораторные электронные CE224-С, зав.№ 25625012	05.05.2020
Генератор газовых смесей комбинированный КГС-01, зав. № 03	16.12.2019
Дозатор одноканальный с варьируемым объемом дозирования Biohit (10-100) мкл, зав. № 6505572	05.05.2020
Дозатор одноканальный с варьируемым объемом дозирования Biohit (0,5-10) мкл, зав. № 6506272	05.05.2020
Прибор комбинированный Testo-608-H2, зав.№ 30030980	30.07.2019
Ротаметр РМ-А-0,063 ГУЗ, зав. № 0861934	04.06.2024
Ротаметр РМ-0,63 ГУЗ, зав.№ 0603674	16.07.2019
Шприц Ш-712, зав. № 1	06.05.2020
Азот (II) оксид NO, ГСО 10697-2015	12.03.2020
Азота диоксид NO2, ГСО 10547-2014, 0,0215 %	25.01.2020
Источник микропотока фенола ИМ 89-М-А2, зав. № 429-16	02.10.2019
Источник микропотока формальдегида ИМ 94-М-А2, зав. № 935	18.11.2019
Источник микропотока фтористого водорода ИМ130-М-А2, зав. № 145	02.10.2019
Кремний (IV) оксид, ГОСТ 9428-73	06.08.2019
Сера диоксид (Ангидрид сернистый) SO2, ГСО 10697-2015	14.08.2019
Углерод диоксид CO2, ГСО 10700-2015, 50,68 %	09.04.2020
Углерод оксид (Угарный газ) CO, ГСО 10700-2015, 1,016 %	18.06.2020

4. Результаты определения стабильности и основной относительной погрешности приведены в таблице 2

Таблица 2

Наименование вещества	Калибровка	Со		Смин		Сср		Смакс		Относительная погрешность измерений, %
		Концентрация ПГС, мг/м3	Показания прибора, мг/м3	Концентрация ПГС, мг/м3	Показания прибора, мг/м3	Концентрация ПГС, мг/м3	Показания прибора, мг/м3	Концентрация ПГС, мг/м3	Показания прибора, мг/м3	
Азот (II) оксид (А)		0	0	0,03	0,03435	1,25	1,0285	2,5	2,094	17,72
Азота диоксид (А)		0	0	0,02	0,02326	0,5	0,58575	1	0,9031	17,15
Гидроксибензол (Фенол) (А)		0	0	0,003	0,00339	0,075	0,08427	0,15	0,1355	13,15
Гидрофторид (Фтороводород) (А)		0	0	0,0025	0,00286	0,125	0,1038	0,25	0,22173	16,96
Сера диоксид (Ангидрид сернистый) (А)		0	0	0,025	0,02883	2,5	2,081	5	4,4355	16,76
Углерод диоксид (А)		0	0	1 950	2 207,5	2 250	2 511	4 500	5 131,8	14,04
Углерод оксид (Угарный газ) (А)		0	0	1,5	1,71615	5	5,25	10	8,91	14,41
Формальдегид (А)		0	0	0,005	0,00572	0,125	0,10641	0,25	0,21928	14,87
Пыль (70%>SiO2>20%) (А)		0	0	0,05	0,05721	0,5	0,55715	1	1,144	14,42

Дата: 04.06.2019

УСЛОВИЕ СТАБИЛЬНОСТИ ВЫПОЛНЯЕТСЯ

Исполнитель:

подпись





Таблица 6 – Поверка газоанализатора заводской № 1698

[illegible]

Основная относительная погрешность не более  $\pm 20 \%$ .

Межповерочный интервал один год

Поверка проводится по методике КПКУ 413322002 ДЛ

Prepared by:

Safety engineer \_\_\_\_\_

Environmental Engineer. \_\_\_\_\_

December - 2019

