

Ministry of Transport and Roads of the Kyrgyz Republic

Environmental Management Plan for PBM Stages

KGZ: CAREC Corridors 1 and 3 Connector Road Project

- **LOT 1: (Section 1: Balykchy (km 0) - Post 43 (km 43))**
- **LOT 2: (Section 2A: Kochkor (km 62+400) to – Epkin (km 89+500))**

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This Environmental Management Plan for PBM Work has been prepared by Japan Overseas Consultants in association with DI"KYRGYZDORTRANS PROEKT for MOTR.

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Project Details

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1. Designation

This report describes the Environmental Management Plan (EMP) for the period of the Performance Based Maintenance (PBM) works for Lot 1 and Lot 2 in accordance with following legislation:

- Kyrgyz environmental law No. 60 of 13/02/2015.
- ADB's SPS 2009.
- IEE Reports on Sections 1 and 2A
- Part B of the Technical specifications CAREC Corridor 1 and 3 Connector Road LOT 1 (Section 1, Balykchy – Post 43 [km +000 - km 43+000]) and LOT 2 (Section 2A, Kochkor - Epkin [km 62+400 - km 89+500])

Other draft EMPs for the periods of construction and operation were presented in the Initial Environmental Examination (IEE) which was approved by the Government of the Kyrgyz Republic and the ADB on 25th June 2018 and are not repeated in this report.

After the initial approval, JOC was requested to update the earlier IEE submission to cover also the subsequently added PBM party of the work. Because of the small-scale of impact envisaged by the Consultant due to the nature of the PBM work to be undertaken, a simplified IEE in the form of an EMP, was developed.

2. Performance-Based Contract

The services to be provided by the Contractor include all activities both preparatory and physical that the Contractor will need to carry out in order to comply with the Service Levels and the Performance Measures indicated in the PBM Works part of the Contract or with any other requirements of the main body of the Contract.

They include management tasks and physical works associated with the following assets and infrastructure:

- (i) Pavements.
- (ii) Road shoulders (paved or unpaved).
- (iii) Signals, street lighting and road safety furniture.
- (iv) Drainage structures and surface drainage facilities.
- (v) Vegetation control.
- (vi) Bus stops.
- (vii) Road reserve area [RoW].
- (viii) Side slopes (cuts and embankments).
- (ix) Bridges and other structures (limited to routine maintenance only).
- (x) Traffic horizontal and vertical road line.
- (xi) Data collection.

The start of PBM work is scheduled for January 2022 and the overall duration is to be 5 years. Standard service levels are to be met as defined in 'Part B' of the Technical Specifications included in the Bid Document.

3. Project Area Description

3.1 Location of Project Sections

Project routes are summarized in **Table 1: Project Sections**. Works Contract locations are indicated in **Figure 1: Location of Sections**.

Table 1: Project Sections

Lot	Limit	Chainage, km		ADT	Length km
		Start	End		
Lot 1	Balykchy-Kochkor	0+000	43+000	583	43.0
Lot 2	Kochkor-Epkin	62+400	89+500	1,498	27.1
				Total	70.1



Figure 1: Section Location Map

(Lot 1)

The first Contract recently re-named as Lot 1 for bidding purposes, covers Section “Balykchy (km 0) to kilometer-post 43 (km 43)” is a 43-km long east to west stretch of highway. This Section begins at a roundabout located at the entrance to Balykchy town. There are 5 roads that converge at this point one of which is the subject Section of the project radiates in a south-westerly direction towards the community of Kochkor. Generally, this Section follows the existing alignment up to post 43 (km 43). A good stretch of this section (around 29 km) is within the Issyk-Kul oblast while around 14 km lies within the Kochkor District of Naryn Oblast.

(Lot 2)

The project road Section “Kochkor (km 64) to Epkin (km 89)” is a 25-km east to west highway. This Section begins at the junction of three roads – the road that goes through the village of Kochkor, the Bishkek-Naryn-Torugart Highway serving as Kochkor Bypass and this particular Section of the Project road. Generally, this Section again follows the existing alignment up to Epkin (km 89). The entire of this section is within Naryn Oblast and it traverses only one district, namely Kochkor (Kochkor, as the capital).

3.2 Physical Environment

(Lot 1)

The road corridor is entirely contained within the mountain ranges of the Northern and Inner Tien Shan. The route passes through the mountains and plains part of the Issyk-Kul, Naryn Regions at an altitude of between 700 and 1800 m above sea level, crossing the valleys of the rivers Chu. The climate in Issyk-Kul is referred to as a local steppe climate, described as continental with cold winters and hot summers. There is little rainfall throughout the year with the average annual rainfall of 390 mm. During the summer months (June-August), the average monthly high temperatures on the shores of the lake are around 20-25°C. Due to the confinement of the Terskey Ala-Too ranges, most of the climatic conditions of the project road are that of Issyk-Kul region. As part of the baseline information, parametric measurements were taken for water quality in selected rivers, along with air quality and noise/vibration levels at sensitive receptors.

(Lot 2)

The project road Section “Kochkor (km 64) to Epkin (km 89)” is a 25-km long east to west highway. This Section begins at the junction of three roads – the road that goes through the village of Kochkor, the Bishkek-Naryn-Torugart Highway serving as Kochkor Bypass and this section of the Project road. Generally, this Section follows the existing alignment up to Epkin (km 89). The entire of this section is within Naryn Oblast and it traverses only one district, namely Kochkor (Kochkor, as the capital).

The territory of Kochkor District contains vast tracts of agricultural lands devoted to farming and animal stock-raising. Kochkor valley is limited to in the north by the Kyzart Pass from the south Karagatty Kyzart Mountain Ridges. The mountain area has highly broken relief with high slopes. The difference of elevations in the valley varies from 1,700 to 2,400 meters, the mountain areas from 2400 to 4502 m. The terrain is characterized as undulating and mountainous and covered with grasses suitable for grazing.

3.3 Ecological Environment

(Lot 1)

The general characteristics of the areas are according to geo-botanical zones in Tong district - deserted steppe with fragments of forests and spruce forests remaining. The flora of the Issyk-Kul Biosphere Reserve comprises around 1,500 species of plants within which there are some 30 species of very important wild medicinal plants. It has diverse and interesting fauna, with numerous endangered species finding refuge in its many unpopulated areas. As observed, the lake's western and eastern shores serve as a wintering place for waterfowl. It was estimated that the number of waterfowl and near water-living birds is around 67,000 from 29 different species. The mammals in the lake were known to be consisting of six orders and 34 species (including insectivores, chiropters, rodents, carnivore, lagomorphs and artiodactyls). Most of the rural population along the project road depends on subsistence agriculture and livestock. As a rural and countryside setting, agriculture is noted to be the main industry with the main crops as cereal crops and potatoes.

The considered sensitive receptors in close vicinity to the project road are Balykchy (km 00+000), start of the road section and with considerable number of people around; and Tash-Saray (km 11 + 000) Residential areas near the road. The project road, and

likewise this road section partly passes the Issyk-Kul Biosphere Reserve with four (4) Zones as:

- (i) Core Zone;
- (ii) Buffer Zone;
- (iii) Transitional Zone; and
- (iv) Rehabilitation Zone.

As per Regulation Biosphere Territory "Issyk-Kul", start of the road reconstruction of the Balykchy (00+000km) and highways are part of the Rehabilitation Zone.

(Lot 2)

Naryn oblast is considered rich in flora and fauna. Some of the species that thrive there are relict Tien Shan blue spruce, herbs: buckthorn, ephedra, zverovoy, yarrow, valerian, wild rose and many others. There are reserves: Naryn and Karatal-Zhapyryk reserves, hunting reserves: Kochkor, At-Bashy, Ugut etc. Territory of the Kochkor - Epkin section refers to arable irrigated land on the site of steppes and deserts. According to geobotanical subdivision, the territory refers to Inner Tien Shan province.

Range of vegetation types are; Desert thorn cushion plant, sod-grass steppes, tall grass meadow, cryophilic cushion plant, swamps, spruce forests, leafy summer green forests, deciduous shrubs and juniper stands. Dominant vegetation is: Sympegmargeli, Silver willow (*Salix acutifolia*), Sea buckthorn (*Hippophaerhamnoides*), Geranium regellii, Geranium himalayense, Kalidiumcuspidatum, Reaumuriasoongorica, Acantholimonatalaticum, Artemisia tianschanica, Stipacaucasica, Festucasulcate, Phlomisoreophila, Carexstenocarpa, Iris halophila Pall (*Iris sogdiana* Bunge). Out of medicinal plants, there grow Begger's rose, loose rose, Ural licorice.

Representative fauna species of the given territory are:

- (i) Reptiles: desert lidless skink, lizard, arrow-snake, copperhead;
- (ii) Birds: little owl, mongolian plover, short-toed lark, tawny pipit, common chats, black redstart, rocky nuthatch, desert mongolian finch, roodyshelduck (in reservoirs), bearded partridge, chukar partridge (in open habitats), turtle dove, black-bellied sandgrouse flies;
- (iii) Animals: great horseshoe bat, sharp-eared owl-moth, tolai hare, sand eel, steppe polecat, stone marten, gray marmot, muskrat (in reservoirs).

3.4 Social Environment

(Lot 1)

By the 2009 census, Issyk-Kul Oblast had a population of 425,116 people with more than 2/3 of the total population residing in rural areas. The capital of the oblast is Karakol.

Within the oblast there are six colleges and lyceums with some 2,580 students and 295 teachers. Higher education consists of six universities, with the largest being in Karakol. Humanitarian education prevails over technical education. The districts in Issyk-Kul (and the respective capitals) are as follows: Ak-Suu District (Karakol); Jety-Oguz District (Kyzyl-Suu); Tong District (Bokonbaev); Tup District (Tyup); and Issyk Kul District (Cholpon-Ata).

Ton region was formed in 1936 and is located on the southwestern part of the Issyk-Kul

hollow. The region's territory is about 7,230 km², the region borders on Zheti-Oghuz region on the east, on the south-west - on Naryn oblast, on the north-west - on Chu oblast.

In administrative terms the region is divided into 9 village authorities: Ak-Terek (6 settlements), Kel-Tor (3 settlements), Kok-Moinok (3 settlements), Bolot Mambetovskiy (4 settlements), Kun-Chygysh (2 settlements), Ton (3 settlements), Tort-Kul (3 settlements), Ulakol (5 settlements), and Kadzhi-Sai (a settlement). In territorial terms, the region includes Balyckchy Town of oblast significance (of 19 km² area), which includes Balyckchy Town and Orto-Tokoy urban-type settlement. According to data of the National Statistical Committee of the Kyrgyz Republic, the total number of the residential population of the region was 50,800 people as of January 1, 2014. Balyckchy in of the oblast's has an area of 38.0 km² with residential population of 45,100 people (Balyckchy Town – 44,600 people, Orto-Tokoy urban-type settlement with 500 people).

The average population density of the region is 7.8 persons per 1 km². The administrative center of the region is Bokonbaevo village with a residential population of 10,648 people (according to 2009 census results). The number of households in the region is 10,986.

The region's territory is located between the southern bank of the Issyk-Kul Lake and Teskei Ala-Too range and has natural exit to the west from the hollow through Boom ravine. The range's piedmont is composed of Meso-Cainozoic deposits which is severely dissected by gorges and river valleys. Coastal zone of the lake is covered by lakeside flat lands, river fans; it is sometimes interrupted by giving place to piedmont ridges. Szyrts stretch to the south from the Teskei Ala- Too range. Balykchy-Karakol and Bishkek - Torugart highways pass through the region's territory.

Settlements are located at: Balykchy (km 00+000), the start of the road section and with a considerable number of people around (industrial zone, 3-4 km). Tash-Saray (km 11 + 000) – Residential areas near the road (nearest house from the ROW 10-11 m). No resettlement issue is caused by the road rehabilitation and road maintenance during work in the PBM stages should be of low impact.

(Lot 2)

Naryn Oblast is situated in the southeast of Kyrgyzstan and is bordered in the east by the Issyk-Kul, in the north - Chui, in the west - Jalal-Abad and Osh provinces in the south - with China. The region consists of 5 districts (Ak-Talaa, At-Bashy, Jungal, Kochkor Naryn). Naryn City is the administrative center of the region and the largest city in the Inner Tien Shan area. Its total land area is 45,200 square kilometres, accounting for 25% of the territory of Kyrgyzstan, and with 249,100 people, which is 5.2% of the country's population.

The Oblast's main imports include industrial chemicals, metals and machinery, while the exports are comprised of livestock, livestock products including hides, minerals, textiles and textile products. The main livelihood in Naryn Oblast is engaging in animal husbandry or agriculture. Private farms cover less than 5% of the utilized land area of the Oblast, with significant overgrazing in many places as distant pastures are not accessible due to poor road networks.

The Section - "Kochkor (km 64) to Epkin (km 89)" - of the project road passes through the several villages in Kochkor Rayon. Basic social infrastructure is available in these villages, such as drinking water, and electricity. For heating, local people use coal and firewood. All of the villages have schools, with kindergartens in the larger villages.

Village medical facilities are found in every village and in rayon centers there are hospitals. Transport infrastructure consist of the main road with an asphalt surface (cold asphalt) and dirt roads. The bulk of the population is engaged in agricultural activities and the rearing of livestock. The main products are wheat, potatoes, barley, meat, milk, wool and eggs.

3.5 Archaeological Environment

In accordance with the Law of the Kyrgyz Republic relating to historical cultural heritage, in the event of cultural monuments being found, all construction works in the area must stop and the findings reported to the local executive authorities or other competent organization (e.g. the Institute of History and Cultural Heritage, the National Academy of Sciences; Department of History, Kyrgyz National University after Balasagyn), MoCIT KR.

(Lot 1)

Within the section the known significant archaeological resources consist of the following:

- 1) Sary-Bulun Northern 1 (Figure 2) and 2- around 8 km from Balykchy in the direction of Kochkor, (RHS) 35 m to the north-west from the road. Roughly in a square, with sides of 40 metres. The maximum height of the surviving walls reach about 1.5 metres. This is the ruin of roadside inn discovered in 1971-1973 by Vinnik D.F.
- 2) Graves and a cemetery of ethnographic time (18th-19th centuries), a medieval settlement bronze-age village in the Tash-Saray locality was recorded in Section 1 at 10,800 metres from the beginning of the road. The sites are located on the east side of the existing road. The earlier graves have since been overgrown by more modern cemeteries. The graves are located about 40 metres from the existing road.



Figure 2: Archaeological Site Sary-Bulun Northern 1

- 3) Archaeological complex Orto-Tokoy 1, about 33,000 - 34,000 metres from the beginning of the road. The complex consists of 4 villages dating from the Bronze Age (I-II millennium BC) having a complex structure, the burial ground of the Saks (VIII-III centuries BC), burial mounds located 75 m away from road in the minimum
- 4) The burial ground of Orto-Tokoy 2, located at 34,800 – 34,900 metres from the beginning of the road and from the south side of the road away about 30m. Consists of 6 barrows of round shape with a diameter of up to 7 metres and a stone-earth embankment with a height of 0.5 metres. Located 30 metres from the existing road but appears to have been disturbed during the laying of a fiber-optic cable

- 5) The burial ground of Orto-Tokoy 3, located 35,500 – 36,400 metres from the beginning of the road and on the south side of the road. Consists of 29 barrows of rounded size with diameters of from 5 to 10 metres. There are rock and earth mounds of up to 0.5 metres in height. Located 60 metres from road
- 6) The burial ground of Ortho-Tokoy 4, located between 39,100 – 39,450 metres from the beginning of the road. On the south side of the road the site contains five mounds of round shape with a diameter of up to 7 metres. Rock and earth mounds are up to 0.5 metres in height are present at a distance of about 120-180 metres from the road.
- 7) Further investigations are being planned (July 2019) and other sites of importance may be discovered.

(Lot 2)

There are several objects of cultural and historical significance in the project area.

- 1) One notable item though is the presence of burial sites and cemeteries along the roadsides. It is important that the road design and consequently the construction will ensure that impacts will be avoided or at least minimized.
- 2) In March 2016 and April 2018, archaeological investigations were performed by a local archaeologist at historical and cultural heritage sites and objects recovered from the vicinity of the project within the territories of Ton district of Issyk-Kul, and Kochkor and Jumgal district of Naryn oblast, Jaiyl district of Chui oblast. Work was done in accordance with the strict technical requirements and norms used for archaeological investigations.
- 3) Within the section, the known significant archaeological resources consist of
 - (i) Eight (8) objects noted to be stone-earth mounds of the early nomadic times made up of mainly of small size gravel aggregates with a height from 0.2 to 0.7 metres and a diameter of 4 to 11 metres. These artifacts are located about 80-100 metres south side of the road south-west of the village of Cholpon (or LHS from the road) in Kochkor district (coordinates 42.18314 E75.45456 of N) between arable agricultural lands (see Photos below). Due to its distance from the road, the site should not be directly affected by construction activities. However, the Contractors should be informed of its presence and be instructed to avoid any disturbance to this area as shown in Figures 3 and 4.



Figure 3: Location of Archaeological Sites near Cholpon Village



Figure 4: Archaeological Site near Cholpon Village.

- (ii) Burial ground Chekildek 1, consisting of more than 10 large and small mounds, apparently related to the Saks time (VIII-III centuries BC) (Fig. 10). On the stretch of road 74,900 – 75,250 metres from the south-west side of the road at 115 metres.
- (iii) Burial mound Chekildek 2 is completely located to the north side of the road and consists of 22 large round mounds with stone-soil fill. The height of the embankment is about 0.20-0.30 cm, diameter 5-7 metres. One of the mounds is located 48 metres from the road about km 75-76.
- (iv) Burial mound Chekildek 3 also dates from the Saks time (VIII-III BC), refers to the royal type and has 3 large mounds. The diameter of the mounds is 10-12 metres; the height is up to 1.5 metres. Located north of the road at a distance of about 100 metres
- (v) Burial mound Chekildek 4 on the south side of the road consists of 28 mounds

lying in a chain from west to east. All the mounds are located further than 50 metres south of the road

- (vi) Five burial mounds of the Saks burial ground of the royal type Buguchu 1 are located along the road. Distance to the road is 15m in the minimum at section of the road at 77,930 – 79,300 metres near the village of Buguchu.
- (vii) Burial mound Cholpon at about km 81.5
- (viii) Cholpon 2 burial ground at 83,000 – 83,600 metres 240 m to the west of the modern cemetery.

It shall be noted here that additional survey for archaeology is being implemented (August 2019) and further number of monuments will be revealed afterwards.

4. Scope of Work

4.1 Outline of Work

The road is presently maintained by the MOTR's maintenance unit in charge of that road section. This work will continue without appreciable changes, except for the improvement in regularity and quality of maintenance.

The scope of PBC work is to maintain the road over 5 years, with implementation of the required routine and periodic maintenance works, unchanged from the past. The level of service that the road has to provide during the contract period is defined in the contract in terms of quality of the carriageway (cleanness of the carriageway, number of potholes, cracks, rutting) and road assets (presence of road marking and signalization, etc.). The quality of the maintenance activity will be monitored by the Construction Supervision Consultant (CSC), with monthly payments tied to the quality of the maintenance as defined during the monthly inspections.

During the five years, the physical maintenance works on the whole section will be:

- Repair of potholes, cracks, surface rutting, raveling, edge drops/ adjustment of height differences
- Cleaning of road surface Bus Stops and Reserved Area (Row Area)
- Cleaning of ditches and drainage structures
- Small Repairs to Bridges, Culverts, Retaining wall and Guardrails
- Slope Stabilization (Cuts and Embankments) Removal of Loose Materials
- Vegetation control
- Cleaning of Road Surface, Bus Stops and Reserved Area (Row Area)
- Removal of snow and ice on the surface of carriage way
- Maintenance of traffic signs, road marking and street lighting.

All of these activities are currently carried out by the territorial subdivisions of the Ministry of Transport through the traditional maintenance arrangement but will be contracted to a private contractor for the three years.

4.2 Work Details

For above maintenance activities the following are defined in more detail.

- **Repair of potholes, cracks, surface rutting, raveling, edge drops/ adjustment of height differences**

The lengths of road are 43.0 km for Lot 1 and 27.1 km for Lot 2. Road surface will be degraded due to the passing of traffic vehicles, among all, at the junctions, ramps and slope climbing where excess tire pressures be applied on. As the results, the surface of pavements is partially/totally damaged and base course/subbase material be hacked out or subside making potholes, rutting, raveling or any other forms of height differences of road surfaces. Maintenance works shall be done to adjust such height differences of surface by:

1. To scarify degraded portion and dump scarified material at proper disposal area
2. To backfill with base material (gravels), adjusting the height to be laid
3. Spray bitumen over gravel and compact to requires density
4. After curing, inspection be made to check if the achieved quality is within required standard.

For the above works, traffic control shall be made during work and curing period after completion. Workers are prohibited to unnecessarily move out of ROW, or archaeology sites appointed.

- **Cleaning of road surface Bus Stops and Reserved Area (Row Area)**

Road surface including bus stop will be littered by windblown dust, sprayed sand for icing prevention remained in spring, garbage etc. RoW area out of road shall be watched so that no illegal land occupation be occurred or garbage be dumped.

- **Cleaning of ditches and drainage structures**

To promote the surface drainage of rainwater out of the road, side drains be dug along the road where existing ground is higher than the road surface and runoff water is not flow out. There are 8 km length of side drain in left side of carriageway while it is 4km in right side. The depth is 1m. The shape is "V" shape and depth is 1m from the top of road surface.

- **Small Repairs to Bridges, Culverts, Retaining Wall and Guardrails**

Bridges are of concrete slab. The culverts are reinforced concrete pipes with diameter of 1m crossing carriageway below ground surface and are concrete box culverts of 1m square for ramps and sidewalks, No. of bridges and culverts for Lot 1 and 2 is indicated below.

Table 2: No. of Bridges and Culverts

	No. of Bridges	No. of Culverts	Remark
Lot 1	3	69	Rehabilitation and reconstruction
Lot 2	4	52	Rehabilitation

Those structures have no flow during the summer season where repairs can be made without affecting the seasonal flows. Small concrete repair works may be needed at the outlets (in case of scour) or inside the pipes (at the joints between culvert sections). Repairs are expected to take up small volumes of materials for each structure, mixed by hand on in a small concrete mixer, and placed and finished manually. Works consist in removal of dirt and debris and eventually grading to ensure a smooth water flow. Without this maintenance the culverts will likely clog leading to flooding, road overtopping, erosion and potentially traffic delays. Therefore, this activity has a net positive impact.

- **Slope Stabilization (Cuts and Embankments) Removal of Loose Materials**

In Lot 1, the area is mostly flat except km12, 13, 14 and 20 where 20m high cut slope will be made in the maximum. Other area than these, embankment will be made with a maximum height of 4m above the toe of the slope will be filled with vertical to horizontal is 1 to 1.5. In Lot 2, this area is also so flat. There will be cut slopes 100m to 200m long with maximum height of 6m at km71, 81 and 89. Other area is filling area with maximum fill thickness is less than 4m where embankment of slope will be formed with height difference of 5m in the maximum.

Cut slope is of mostly weathered rock and the potential of failure is low except falling of unstable small gravel. These shall be removed out of the road. Earth embankment is also very stable due to the excellent filling material available at the site. The only concern is washing away or gully erosion of slope surface by run-off water from road or rainwater on the slope. Such small valley on the slope surface, eroded in wet season,

shall be back filled by hands /scoop and compacted well in dry season. If the gully erosion cannot be stopped, some slope surface protection measure, such as installation of gabion wall may be studied.

- **Vegetation control (roadside trees)**

Same species shall be replanted if the tree has been dead at the appointed area in the duration between March and October.

- **Removal of snow and ice on the surface of carriage way**

When excess snow has been accumulated on the carriageway, such snow shall be pushed aside the carriageway. In addition, sand/salt be sprayed over remained snow layer to prevent slipping of tires or snow icing. Remained sand on the road surface after snow has melt away in the spring shall be cleaned. Use of salt shall be discouraged at agricultural area.

- **Maintenance of traffic signs, road marking, paint for steel member of bridge and street lighting.**

Traffic signs, road markings and street lightning shall be maintained as necessary. Work shall be done under the traffic control

- **Traffic Control during PBM Work on Road**

Disturbance to public/ private vehicles may be caused due to the On-Road PBM works. Flag persons to guide smooth traffic and temporary road signs/ guardrails shall be provided

- **Protection of archaeological monuments along road**

Along road, archaeological survey is being implemented (august 2019) and, based on the results, new monuments other than described in the present IEE Repots for Lot 1 and Lot 2 will be newly revealed and enclosed by fence or pole connecting with rope as well as old ones.

- **Protection of Issyk Kul Ramsar Convention Lake (for Lot 1 only)**

No mitigation measure is required so far the PBM works are done within ROW and wastes are dumped at the formal disposal site.

- **Protection of construction workers**

All workers engaged in PBM shall be properly protected by establishing an Occupational, Environmental and Safety (OES) Standard to follow.

5. Environmental Management Plan (EMP)

The maintenance contract will consist of many small tasks requiring the use of lubricants, and small quantities of hazardous substances such as bitumen and fuels for construction vehicles, and under varying climatic conditions. While there is little chance that negative impacts will result from the maintenance work, a basic Environmental Management Plan has been prepared, defining actions/impacts, mitigative measures and monitoring tasks that the contractor and CSC will need to implement during the 5 years.

It is hoped that the actions defined in the EMP (Table 4), which can be used as a code of environmental practice, will be adopted permanently by whomever continues the road maintenance after the this PBM contract is over.

5.1 *Technical/Legislative Capacity and Enforcement*

While all legal instruments necessary to regulate and enforce environmental safeguards relate to road maintenance are in place both at the national and local levels, they have not been enforced as maintenance was always carried out by Ministry's own staff. One government agency does not enforce requirements in another agency!

The EMP will become a legally binding part of the PBM contract, making enforcement of environmental safeguard requirements easier. As defined by ADB, using the EMP to prepare a compliance-monitoring checklist, an independent specialist will complete a semiannual due diligence audit. This audit report will be submitted to the Project Management Unit for submission to ADB.

Using the EMP's monitoring table and simply replacing the last 2-3 columns with headings such as 'outputs identified' and 'effectiveness of actions', a compliance monitoring checklist matching the EMP and its numbering can be easily prepared.

5.2 *Implementation Arrangements and Timetable*

The EMP is organized into two sections (cross referenced tables), one for mitigation and the second for monitoring. Within that division the impacts, mitigative measures and monitoring actions split into effects or actions likely to occur. Who does what and when has also been defined in the Environmental Monitoring Plan (Table 5).

While IPIG of MOTR will have oversight and management decision responsibility for the project, the CSC will manage the contract and contractor, making sure that the EMP is implemented and will also be completing the mandatory semi-annual monitoring reports.

5.3 *Mitigation and Monitoring Details*

While the actual maintenance tasks such as painting lines on the road or replacing bridge guardrails will generate few negative impacts, it is how the work is carried out by the contractor that could lead to problems. It is for this reason that the implementation section of the EMP focuses on contractor work methods and proper handling and storage of materials and prompt clean up after work has been completed or while unwanted conditions, such as excessive dust have been created. Ten actions, mostly related to contractor good housekeeping practices are defined in detail. The implementation period mitigative and monitoring also address proper contractor liquid and solid waste management, including storage of materials and surface runoff controls.

Construction materials required by the contractor, such as asphalt, bitumen and aggregate, cement and possibly concrete will all be obtained from existing licensed

operators, thus no action will be needed as these sources are operating within the law. Contractors will be required to provide confirmation that materials suppliers are licensed and operating legally.

The EMP is presented in Table 3 while monitoring plan is shown in Table 4.

Table 3: Environmental Management Plan

N°	PBM activities	Environmental impact	Mitigative Measures	Time Frame	Location	Implementer	Supervisor
1	All PBM Works	Disturbance to Archaeological and Cultural Sites	All workers are strictly prohibited not to invade the archaeological monuments. Awareness campaign shall be held before the work	During the work	Location where archaeological monument are there	Awareness campaign by contractor /CSC /IPIG and watching at site by contractor	IPIG /MOTR
		Disturbance to Ramsar Lake	Works done within ROW and waste is disposed in predetermined formal dumping site	At all PBM works	PBM working location	Contractor	CSC /IPIG /MOTR
		Workers' Occupational and Environmental Health and Safety Problem	To establish an Occupational and Environmental Health and Safety Standards for all work including emergency plan and provide Personal Safety Equipment to all workers	Right after PBM contract awarded	-	CSC	IPIG /MOTR
			To confirm all the workers are protected as per OEHS standard	Each time the environmental report be submitted	-		
2	All PBM activities including vehicle parking on road	Disturbance to public/private vehicle traffic	Flag persons to guide smooth traffic and temporary road signs/ guardrails shall be provided	At all PBM works	PBM working location	Contractor	CSC /IPIG /MOTR
3	Repair of potholes, cracks, surface rutting, raveling, edge drops/ adjustment of height differences	Generation of noise, air pollution, vibration and/or water pollution by equipment such as material hauling, road surface scarifying, backfilling, compaction and bitumen spreading	Low level and short duration. No measures is required other than public notification beforehand. Public consultation before start of work is important to ease unnecessary suspicions of local to construction work	During the work	Location of the work	Contractor	CSC /IPIG /MOTR
			Use of low emission (noise/ exhausted gas) type equipment without idling and daily maintenance				
			Plant producing bitumen /concrete /gravels shall be chosen that are properly located away from settlements or river, facilitated with pollution prevention equipment		Batching plants		

N°	PBM activities	Environmental impact	Mitigative Measures	Time Frame	Location	Implementer	Supervisor
			Care should be taken not to use excess amount of bitumen as would overflow to other area than road				
4	Cleaning of road surface Bus Stops and Reserved Area (Row Area)	Generation of waste	Waste shall be disposed at proper dumping site	During the work	Location of the work and disposal site	Contractor	CSC /IPIG /MOTR
5	Cleaning of ditches and drainage structures						
6	Small Repairs to Bridges, Culverts, Retaining Wall and Guardrails	No impact predicted	No measure required	-	-	-	-
7	Slope stabilization (Cuts and embankments) Removal of Loose Materials	Collapse /slip of slope	Slopes, cut or filled, are generally stable without general failure. However, small gully erosion on the slope surface may be suspected in rain season. In such case, gully shall be backfilled by scoop and compacted manually.	During the work	Location of the work	Contractor	CSC /IPIG /MOTR
		Generation of loose material (waste)	Loose material fallen down from slope shall be disposed at proper dumping site as waste	During the work	Location of the work and disposal site	Contractor	CSC /IPIG /MOTR
8	Vegetation control (roadside trees)	Loss of green	Same species shall be replanted if the tree has been dead	During the work	Where respective work to be done	Contractor	CSC /IPIG /MOTR
9	Removal of snow and ice on the surface of carriage way	Sand and salt used to prevent tire slipping and delaying freezing of snow	Sand on the road shall be washed away into the roadside. Salt should not be used along agricultural field	During the work	Location of the work	Contractor	CSC /IPIG /MOTR
10	Maintenance of traffic signs, road marking, paint for steel member of bridge and street lighting.	Surface water quality degradation by dropping paint into river while repainting of bridge member	Full protection measure shall be taken not to drop chemical paint into river.	During the work	Location of the work	Contractor	CSC /IPIG /MOTR

Table 4: Environmental Monitoring Plan

N°	Environmental impact	Mitigative Measures	Monitoring	Time Frame	Location	Implementer	Supervisor
1	Disturbance to Archaeological and Cultural Sites	All workers are strictly prohibited not to invade the archaeological monuments	Attendance at the awareness meeting and watching of workers at the site	Awareness meeting shall be done before work and workers be watched not to do so	Location where archaeological monuments are there	Contractor and CSC at awareness meeting and contractor at each site	CSC IPIG /MOTR
	Disturbance Issyk Kul Ramsar Lake	Works done within ROW and waste is disposed in predetermined formal dumping site	Watching if workers would go side of ROW and waste is dumped at proper disposal site	All PBM working time	PBM working location	Contractor	CSC /IPIG /MOTR
	Workers' Occupational and Environmental Health and Safety Problem	To establish an Occupational and Environmental Health and Safety Standards for all work including emergency plan and provide Personal Safety Equipment to all workers	Review of OEHS proposal before construction start and environmental monitoring report submitted monthly	Right after PBM contract awarded and monthly	-		
2	Disturbance to public /private vehicles traffic	Flag persons to guide smooth traffic and temporary road signs/ guardrails shall be provided	Watching	All PBM working time	PBM working location	Contractor	CSC /IPIG /MOTR
3	Generation of noise, air pollution, vibration and/or water pollution by equipment such as material hauling, road surface scarifying, backfilling, compaction and bitumen spreading	Low level and short duration. No measure is required other than public consultation beforehand. Public consultation before start of work is important to ease unnecessary suspicions of local to construction work	Attendance at public notification	During the work	Working location	Contractor	CSC /IPIG /MOTR
		Use of low emission (noise/exhausted gas) type equipment without idling and daily maintenance	Inspection of equipment	Before and during PBM work	Depo of contractor and working location	CSC	IPIG /MOTR
		Plant producing bitumen /concrete /gravels shall be chosen that are properly located away from settlements or river, facilitated with	Inspect if the plan is properly equipped	Before start of work	Batching plants		

N°	Environmental impact	Mitigative Measures	Monitoring	Time Frame	Location	Implementer	Supervisor
		pollution prevention equipment					
		Care should be taken not to use excess amount of bitumen as would overflow to other area than road	Watching	During the work	Location of work	Contractor	CSC /IPIG /MOTR
4 & 5	Generation of waste	Waste shall be disposed at proper dumping site	Watching	During the work	Location of work and disposal site	Contractor	CSC /IPIG /MOTR
6	Small Repairs to Bridges, Culverts, Retaining Wall and Guardrails	No impact predicted	No measure required	-	-	-	-
7	Collapse /slip of slope	Slopes, cut or filled, are generally stable without general failure. However, small gully erosion on the slope surface may be suspected in rain season. In such case, gully shall be backfilled by scoop and compacted manually.	Inspection	Before the work	Location of work	CSC	IPIG /MOTR
	Generation of loose material (waste)	Loose material fallen down from slope shall be disposed at proper dumping site as waste	Watching	During the work	Location of work and disposal site	Contractor	CSC /IPIG /MOTR
8	Loss of green	Same species shall be replanted if the tree has been dead	Watching	During the work	Location of work	Contractor	CSC /IPIG /MOTR
9	Sand and salt used to prevent tire slipping and delaying ice freezing	Sand on the road shall be washed away into the roadside. Salt should not be used along agricultural field	Watching	During the work	Where excessive sand be remained	Contractor	CSC /IPIG /MOTR
10	Surface water quality degradation by dropping paint into river while repainting of bridge member	Full protection measure shall be taken not to drop chemical paint into river.	Watching	During the work	Location of work	Contractor	CSC /IPIG /MOTR

6. EMP Implementation Cost

Undertaking the environmental safeguard steps as defined in the “implementation” section of the EMP should be “business as usual” activities. In other words, environmentally aware contractors take these precautions as a matter of course, especially as this work is dealing with routine maintenance activities.

That being said, the 10 actions required of the contractor will take additional time and therefore the following estimate is provided.

Table 5: EMP Implementation Cost Estimate

Period & Participants	Total No. of Months	General Implementation days/ month	Report Preparation or Review (days/month)	Total for Period (days)
Contractor		8	2	600
			Semi Annual report Prep/Review; days/year	
CSC		4	20	340
IPIG		0	8	40
Grand Total	Total Environmental Safeguard Days			
Contractor	600-700			
CSC	300-400			
IPIG	40			

Depending on the performance of the contractor, level of reporting required due to non-compliance, and need for additional inspections, the estimate may increase by as much as 15%. This 15% will be for CSC’s use, since the contractor will provide the complete estimate for the implementation of all actions. The expenses associated with these person-days, such as travel, per diem and communication have not been included.