
Environmental Assessment Report

Union Road (UNR)

Name of the Sub-project : Kashil UP office-Aisara Bazar via Janjanina Road

Slice No. : UNR-35

Upazila : Basail

District : Tangail



Second Rural Transport Improvement Project
Local Government Engineering Department

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1. Sub Project Description

Name of the Sub-project : Kashil UP office-Aisara Bazar via Janjanina Road

ID No. : 393093002

District Name : Tangail

Name of the Upazila : Basail

Length of the Road : 11.86 km (Effective Length 3.849 km)

Location of the sub-project

Basail Upazila is located at 24.2167°N 90.0500°E and bounded by Kalihati, Shakipur, Mirzapur, Delduar and Tangail Sadar Upazila. The road is 11.86 km (Effective Length 3.849 km) long, starts at Kashil UP Office and ends at Ayshara Bazar [details are listed in **Table-1.1**].

Name of the unions the road passes through	Name of the road side villages (at least 5 nos)	Starting point of the road	End point of the road	Year of construction/Last maintenance	Major items included in estimates
Ksahil, Fulki	Bathuli sadi, Gatchpara, Moytha, Jhanjanina, Fulki, Tironj, Ayshara	Kashil UP Office	Ayshara Bazar	1999	Earth Work, WBM, ISG, Brick on End Edging, Dense Carpeting, Seal Coat & Surface Drain

Table-1.1

Brief Description of the sub project

Union road (UNR) improvement includes construction of bituminous road on the existing earthen road. Major components of the works includes earthwork at whole chainages (earth volume 7016 cum), base coarse Improve sub grade, Brick at edge, 25mm dense carpeting, Surface Drain at chainages 7700m, 9175m, 7575m and 8300m to 8375m. Protective work at chainages 340m to 360m R/S, 375m to 400m L/S, 535m to 560m L/S, 550m to 610m R/S, 770m to 785m R/S, 855m to 920m R/S, 990m to 1032m R/S, 967m to 987m L/S, 1170m to 1200m R/S, 1500m to 1550m L/S, 1690m to 1755m R/S, 2015m to 2050m R/S and 2500m to 2550m R/S (Total=502 m).



Photograph of the proposed Road

2. Detail Environmental Features

The UNR has a length of 11.86 km (Effective Length 3.849 km). Detail Environmental features within 100m of the both sides from the centre line were collected @300m longitudinal intervals. The findings of the survey for the aforementioned road can be seen in the table below:

Chainage	Right	Left	Environmental Features
00-300	√		UP Office, Bazar, Housing Area, GPS, NGO Office, Saw Mill
		√	Bazar, Housing Area, NGO, Saw Mill
300-600	√		Housing Area, Pond, Agricultural Land
		√	Housing Area, Pond, Agricultural Land, Mosque
600-900	√		Housing Area, Pond, Hand Loom, Agricultural Land
		√	Housing Area, Pond, Shop, Hand Loom, Agricultural Land
900-1200	√		Housing Area, Hand Loom, Agricultural Land
		√	Housing Area, Agricultural Land
1200-1500	√		Housing Area, Hand Loom, Agricultural Land
		√	Housing Area, Agricultural Land, Mosque
1500-1800	√		Agricultural Land
		√	Agricultural Land
1800-2100	√		Agricultural Land
		√	Agricultural Land
2100-2400	√		Agricultural Land
		√	Agricultural Land
2400-2700	√		Housing Area, Agricultural Land
		√	Housing Area, Agricultural Land
2700-3000	√		Housing Area, Agricultural Land
		√	Housing Area, Agricultural Land
3000-3300	√		Housing Area, Agricultural Land
		√	Housing Area, Agricultural Land
3300-3600	√		Housing Area, Pond, Agricultural Land
		√	Housing Area, Pond
3600-3900	√		Housing Area, Pond, Agricultural Land, GPS
		√	Housing Area, Agricultural Land, Eidgah, Madrasha.
3900-4200	√		Housing Area, Agricultural Land
		√	Housing Area, Agricultural Land
4200-4500	√		Housing Area, Moytha New Bazar, Graveyard
		√	Housing Area, Moytha New Bazar, Mosque
4500-4800	√		Housing Area, Agricultural Land, Moytha New Bazar
		√	Housing Area, Agricultural Land, College
4800-5100	√		Housing Area, Agricultural Land
		√	Housing Area, Agricultural Land
5100-5400	√		Housing Area, Agricultural Land, Shop
		√	Housing Area, Agricultural Land, Shop
5400-5700	√		Housing Area, Agricultural Land
		√	Housing Area, Agricultural Land, Clinic
5700-6000	√		Housing Area, Agricultural Land, Shop

Chainage	Right	Left	Environmental Features
		√	Housing Area, Agricultural Land, Shop
6000-6300	√		Housing Area, Agricultural Land, GPS, Fulki Bazar, Mosque
		√	Housing Area, Agricultural Land, Fulki Bazar
6300-6600	√		Housing Area, Agricultural Land, Pond
		√	Housing Area, Agricultural Land
6600-6900	√		Housing Area, Agricultural Land, Pond
		√	Housing Area, Agricultural Land, Pond
6900-7200	√		Housing Area, Agricultural Land
		√	Housing Area, Agricultural Land
7200-7500	√		Housing Area, Agricultural Land
		√	Housing Area, Agricultural Land, Pond
7500-7800	√		Housing Area, Agricultural Land
		√	Agricultural Land
7800-8100	√		Housing Area, Agricultural Land
		√	Housing Area, Agricultural Land
8100-8400	√		Housing Area, Agricultural Land
		√	Housing Area, Mosque
8400-8700	√		Housing Area, Agricultural Land
		√	Housing Area
8700-9000	√		Housing Area, Agricultural Land, Ananda Bazar
		√	Housing Area, Agricultural Land, Ananda Bazar
9000-9300	√		Housing Area, Agricultural Land, Hand Loom
		√	Housing Area, Agricultural Land, Shop
9300-9600	√		Housing Area, Agricultural Land
		√	Housing Area, Shop
9600-9900	√		Housing Area, Agricultural Land, Mosque
		√	Housing Area, Agricultural Land
9900-10200	√		Canal, Agricultural Land
		√	Housing Area, Agricultural Land
10200-10500	√		Housing Area, Agricultural Land, Canal, KG School
		√	Housing Area, Agricultural Land, Shop
10500-10800	√		Housing Area, Agricultural Land, Canal
		√	Housing Area, Agricultural Land, Pond
10800-11100	√		Ayshara Bazar, Saw Mill, Housing Area, NGO office
		√	Ayshara Bazar, GPS, Agricultural Land, High School, NGO office
11100-11400	√		Housing Area, Agricultural Land, Canal
		√	Housing Area, Agricultural Land
11400-11700	√		Housing Area, Agricultural Land
		√	Housing Area, Agricultural Land

3. Baseline Data

3 (a) Physical Environment

3. a.1 Atmosphere and Climate

Meteorological conditions of the area are more or less similar as in central part of the country with respect to temperature, rainfall and humidity. The project area is situated in humid sub-tropical climate with large variations between summer and winter temperatures and significantly influenced by monsoons during the months of May to September when 90% of the rainfall occurs. The annual average maximum temperature is about 36⁰C and minimum temperature is about 12.7⁰C. Annual rainfall is about 1,469 mm (ref. Tangail, 2012).

3.a.2 Topography

The sub-project area mainly comprises of plain agricultural land and almost flat with few undulations. River Lohajang flows nearby the sub-project area. The depressions and canals are dominated by organic clay and peats. Most depressions and canals are tectonically controlled. The average ground elevation of the project area is about 13.5m PWD. According to the information collected through public consultation, this area is considered as a flood affected area and affected in severe floods of 1988 and 1998. A general topographic condition is found in the flowing photograph:



3.a.3 Drainage

Water logging was observed at chainage 7700m, 9175m and 8300m to 8375m on the road due to insufficient drainage facilities. Water logging was also observed at chainage 7575m as the road lacks adequate opening to drain out water. At present there is no existing drainage facility in the proposed UNR.

3.a.4 Water Quality

3.a.4.1 Ground Water: Information on ground water quality of the nearest tube-wells along the road has been collected on spot discussion and consultation with the villagers. The depth of ground water level varies from 3m to 6m. Potable ground water is available at an average depth of 40m to 60m. Ground water quality of HTWs used for drinking purposes is provided in the following table:

Drinking water quality parameters	Average contents of HTW water (mg/L)	Permissible limit (mg/L), Bangladesh standard	Comments
Arsenic	0.002	Up to 0.05	Within permissible limit
Iron	2.37	Up to 1.00	Within permissible limit
Chloride	14	150-600	Below the standard

Source: Bangladesh National Drinking Water Quality Survey, 2009 by BBS and UNICEF

3.a.4.2 Surface Water

The road sub project crosses large number of water bodies such as small and medium ponds (about 8 nos.), which are used for multiple purposes. The surface water in ponds is not saline but is not suitable for drinking purposes due to various pollutions. All the ponds are man-made and used for fishing, water supply and domestic use. River Lohajang is situated few kilometres away from the sub-project area. Several small industries were observed but there is no remarkable sources of water pollution such as heavy industries, brick fields, etc observed in the sub-project area.

3.a.5 Noise:

Noise is an impediment to the quality of the environment in the study area. Many vehicles such as tractor, cars, tempo, motorcycle, votvoti move on the road during day and nights. These vehicles generate noise in the subproject area but within tolerable limit. Several small industries were found near by the sub-project areas which are the major source of noise pollution.

3.a.6 Air Quality

Ambient air quality data was not available. There was no a remarkable source of air pollution such as brick field observed near the sub-project area. Several small industries were found near by the sub-project areas which pollute air. Generally, quality of air is clean but due to poor condition of road surface, dust is generated that contributes to air pollution.

3.Base line data:(b) Biological Environment

Flora & Fauna

The subproject area has some flora of commercial importance. The major tree species found in the area are Mahogany, Betel nut, Rain-tree and (in Bengali and colloquial) Simul, Sishu, Arjun, Minjiri, Krishnacura, Jarul, Hizal, Sheora, Chambal, Siris etc. No endangered floral species are reported. The dominant fruit-bearing trees include Mango, Jackfruit, Banana, Coconut, Litchi, Pine apple, Papaya etc.

Besides domestic animals, wild dogs, jungle cat, jackal, mongoose and rodents like ants and snakes of various species are reported, though having a decreasing trend. The endangered

animals like Wild cow, Wild Buffalo, Pea fowl, Mugger Crocodile etc. are not reported. Some birds found in common Bengali name include Chorui, Doel, Ghugu, Shalik, Chil, Pecha, Tia, Bok, Machranga, Bok, Kak, Tuntuni, Bou katha kow, Bulbuli, Kokil etc

3.(c). Stakeholder Consultation:

During the data collection, public consultation meeting were held at Kashil UP office, Moytha New Bazar and Ayshara Bazar. The list of participants, photograph and details of the discussion meeting are attached as Annex-1 and their recommendations are highlighted below:

- All effective measures to be taken to minimize all the adverse impact of construction works.
- Steps to be taken for minimizing the air pollution by spraying water at the construction sites.
- Adequate drainage facilities at chainage 7700m, 9175m, 7575m and 8300m to 8375m should be provided to avoid water accumulations or drainage congestion.

4. Screening Format

Screening format was administered for identifying the impacts and their extents and the screening data sheet for this subproject is given below:

Screening Questions	Yes	No	Scale of Impact			Remarks
			High	Medium	Low	
A. Potential Environmental Impacts during planning and design phase/ Sub-project sitting. Is the sub-project area adjacent to or within any of the following environmentally sensitive areas?						
▪ Protected Area (Forest)		√				The area is not included in designated protected area.
▪ Wetland (Beel, Haor)		√				The area is not located in designated Wetland.
▪ National Park		√				The road has no encroachment of any national park.
▪ Wildlife sanctuary		√				The road is not included in any wildlife sanctuary.
▪ Buffer zone of protected areas		√				The area does not belong to buffer zone of any protected area.
▪ Special area for protecting biodiversity		√				The area does not belong to any special area for protecting biodiversity
B. Potential Environmental Impacts from construction of new roads. Will the sub-project cause.....						
▪ Loss of agricultural land?		√				Required earth will not be collected from agricultural land.
▪ Negative effects on rare (vulnerable), threatened or endangered species of flora or their habitat?		√				No rare species of flora and fauna occur near by the sub-project area.
▪ Negative effects on designated wetlands?		√				The area is not included in any designated wetland.
▪ Negative effects on wildlife habitat, populations, corridors or movement?		√				No wildlife habitat reported to exist nearby the sub-project area.
▪ Negative effects on locally important or valued ecosystems or vegetations?	√				√	Care will be taken, so that local important or valued ecosystem or vegetation is not damaged. Turfing will be done to compensate the loss of

Screening Questions	Yes	No	Scale of Impact			Remarks
			High	Medium	Low	
						vegetation.
▪ Destruction of trees and vegetation?	√					Vegetation may be removed during construction of road. Turbing will be done after the construction.
▪ Impact on fish migration and navigation?		√				The sub-project does not cross any water bodies.
▪ Obstruction of natural connection between river and wetlands inside project area?		√				The sub- project does not cause any obstruction to any natural connection between river and wetlands
▪ Water logging in areas?	√				√	Baseline data shows that water are logged at 7700m, 9175m, 7575m and 8300m to 8375m Water logging may also occur due to construction activities. Drainage structure and sufficient opening to drain out water at the above mentioned chainage will be provided to avoid water logging.
▪ Insufficient drainage?	√				√	From baseline date it has been observed that there is insufficient drainage at the above mentioned chainage. So, drainage structure will be provided to increase drainage facility.
▪ Negative effects on surface water quality?	√				√	No liquid / solid waste will be disposed off in water bodies
▪ Negative effects on groundwater quality, quantity or movement?		√				Liquid / solid waste will not be allowed to dispose in ground directly.
▪ Loss of existing buildings, property, economic livelihood?		√				No land acquisition or resettlement is required
▪ Increased soil erosion and/or sedimentation?	√				√	Soil may erode during earth work at slope but turbing and compaction will be carried out after completion of earth work.
▪ Negative impact on soil stability and compactness?	√				√	Turbing on embankment top and slope will be provided to mitigate negative impact on

Screening Questions	Yes	No	Scale of Impact			Remarks
			High	Medium	Low	
						soil stability and compactness.
▪ Impacts on sustainability of associated construction waste disposal?		√				Construction waste will be disposed in safe place.
▪ Traffic disturbances due to construction material transport and wastes?	√				√	Minimum disturbance is anticipated
▪ Increased noise due to transportation of equipment and construction materials?	√				√	Occur some disturbance within acceptable limit
▪ Increased noise due to day-to-day construction activities?	√				√	Occur some noise disturbance but within acceptable limit
▪ Increased wind-blown dust from material (e.g. fine aggregate) storage areas?	√				√	Proper environmental code of practice will be in place by spraying of water during construction to reduce dust emission.
▪ Health risks to labors involve in activities?	√				√	Some risk during construction is anticipated which will be taken care of by adopting remedial measures incorporated in the contract
C. Potential Impacts of the Improved road. Will the improved road cause						
▪ Negative effects on neighborhood or community characters?		√				No negative effect anticipated
▪ Negative effects on local business, institutions or public facilities?		√				Improved road will enhance the local business
▪ Potential social conflict between occupational groups-farmers vs. fisheries?		√				The proposed road will not cause any conflict between occupational groups, e.g farmers and fishermen
▪ Degradation or disturbance of historical or culturally important sites (mosque, graveyards, monuments etc.)?	√				√	There exists no historical or cultural important sites to be damaged/degraded by the proposed road., there exist mosques, where some care to be involved during

Screening Questions	Yes	No	Scale of Impact			Remarks
			High	Medium	Low	
						construction, where communication will be improved afterwards.
▪ Blockage of navigation system?		√				No navigation system will be blocked by the road. However, if such issue arises the road alignment to diverted to avoid blockage of navigation
▪ Impediments to movements of people and animals?	√				√	No impediment to movement of people and impediment to movement of animals will be negligible since the road is not wide enough.
▪ Conflicts in water supply rights and related social conflicts?		√				Will not create any social conflict over water supply rights.
▪ Air quality?	√				√	Construction work will involve Earth work, WBM, Brick on end Edging, Carpeting and Surface drain etc. will lead to increase in dust/suspended particulate matter (SPM) around the construction site. Spraying of water; bituminous burning unit to be placed away from residential area, educational/religious institutions to reduce air pollution.

Assessment:

The proposed sub-project (Road improvement) is not located within any environmentally sensitive area and thus will not create intimidation to important environmental features. Drainage congestion has been observed at some locations and drainage system will be developed to minimize the water logging of those particular locations. Some earthwork will be involved, but no agricultural productive soil will be used for the purpose. Earth will be compacted for stabilization. The inputs will be mainly at construction phase and limited within project boundary. Moreover, mitigation measures will be taken according to the EMP for minimizing the air, dust and noise pollution.

5. Specific Impact and Mitigation

This sub-project involves the improvement work of 11.86 km (Effective Length 3.849 km) road, which passes through different types of environmental features like pond, agricultural land, shop/bazar, mosque, school etc. For the purpose environmental studies have been carried out (with all the details of individual environmental components) since it is apprehended that, some adverse environmental effects will take place on the existing physical environment. The possible impacts of the improvement work on the road and their mitigation measures have been discussed (component-wise) below:

5.1 Earth Work: The road improvement work consists of earth excavation, earth filling and cutting, removal of unsuitable materials or top soil, preparation of embankment layer, hard shoulder preparation, protective work, etc. These works lead to slope erosion, silt deposition on crop fields, dust blowing, noise and vibration disturbing the local people. As no massive earth work is involved at any specific location, several small volumes of earth from different areas will be arranged by the contractor. However, if large volume of earth is required, the borrow pit may be converted to deeper pond (suitable for fish cultivation).

Mitigation:

- Proper care will be taken during cutting and filling so that slope or toe of the road embankment remain within the right of way and does not disturb the crop.
- Turfing & compaction will be done on the shoulder and slope.

5.2 Temporary interruption of natural drainage and local drainage congestion: Drainage congestion was observed at chainage 7700m, 9175m and 8300m to 8375m on the road due to insufficient drainage facilities. Water logging was also observed at chainage 7575m as the road lacks adequate opening to drain out water. Temporary interruption of natural drainage and local drainage congestion may also occur during construction of drainage structures.

Mitigation:

- Two numbers of X-drains at chainage 7700m & 9175m and one V-drain at chainage 8300m to 8375m will be provided to avoid water accumulations or congestion. These structures will be constructed newly, where no such structures exist at the locations.
- One Box-Culvert at chainage 7575m will be provided to avoid water accumulations or congestion.
- Proper diversion structure and sufficient opening to drain out water should be developed during construction of drainage structure to avoid water congestion.

5.3 Pollution from construction materials: Dumping of construction spoils, including accidental leakage of bitumen, fuel etc in equipment yards, is an important hazard. Both surface and groundwater might be polluted from these contaminants.

Mitigation:

- Safe transport, storage and disposal provisions for construction materials, equipment especially bitumen, fuel etc have to be carried out in order to avoid accidental spillage and loss.
- Bitumen, fuels, lubricants etc and other hazardous materials have to be stored over raised platform not directly on the ground.
- The playground of the educational institutions shall not be allowed to use as a stack yard or work camp site.

5.4 Dust: Different construction activities, machinery movement and other works generate dust and impair the air quality. Road improvement work involves breaking up, digging, crushing, transporting and dumping of materials.

Mitigation:

- Water will be sprayed to control the dust, which is the main way to suppress dust in the working site.

5.5 Noise: Movement of vehicles generates noise. However, in this sub-project sensitive area like School (5 nos.), College (1 no.), Mosque (6 nos.), Health Clinic (2 nos.) etc. are likely to be affected from the road side noise.

Mitigation:

- Transportation of the construction materials have to be carried with scheduled time, mainly day time.
- All powered mechanical equipment and machinery shall be fitted with noise abating gear such as mufflers for effective sound reducing

5.6 Water Quality: The road passes by few number of water bodies such as pond (about 8 nos.), and there are no remarkable sources of water pollution (except some small industries) has found. The water may deteriorate if construction material including borrow/fill material and sand, construction waste, effluent from work camps, food waste etc are allowed to dump in the water bodies.

Mitigation:

- Proper construction management including waste management, training of operators and other workers will be provided to avoid pollution of water bodies.
- Construction waste will be managed in specified bins opening a ditch (not in water bodies or lowland), for which contractor will be made aware.

5.7 Occupational Safety and Sanitation: It involves the safety problems of the construction workers and the provision for sanitation and drinking water facilities at work sites. Lack of the latter facilities might severely affect the construction workers' health condition and work efficiency.

Mitigation

- Provision for tube well to ensure potable drinking water and separate toilets for male and female to maintain proper sanitation condition will be made.
- First Aid Box with health facility at each camp site will also be made available.
- Ensure wear of proper PPE (helmet, gloves, safety glass, safety shoes etc) of all workers during work to avoid any personal as well as construction related accident.

6. Environmental Management Plan

Specific Environmental Management Plan (EMP) has been prepared to eliminate, reduce or regulate the adverse impacts for this subproject. This EMP shall be a part of contract document.

6.1 Environmental Mitigation Plan

One of the components of Environmental Management Plan is Environmental Mitigation Plan. The environmental activities and management measures for this sub-project of RTIP-II are addressed and shown in the table below:

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Preconstruction					
Construction of labour camp	May occur loss of agricultural land, improper waste disposal may affect environment. Also improper sanitation facility will generate health hazard situation for the workers and the area.	Identify the location of construction camps so that minimum disturbance on agricultural land. Camps shall not be located near settlements or near water supply intakes. Place will be kept neat and clean strictly to ensure good sanitary condition. Proper toilet and water supply facilities required.	As shown in section-7	Contractor	LGED & D & SC
Removal of Vegetation	May cause soil erosion and their deposition on nearby crop field, affecting soil quality and productivity.	Vegetation will be removed from the ROW before the commencement of construction after obtaining necessary permissions	As shown in section-7	Contractor	LGED & D & SC
Setting up of Hot mix Plants and crushers	Emission of hot and polluting fumes affecting air quality, causing health hazard and damaging green habitation.	Hot mix plants, crushers and batching plants shall be located at a safe distance from the nearest habitation and dense tree area. The contractor shall obtain necessary approvals from LGED.		Contractor	LGED & D & SC

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Identification of debris dumping sites	Indiscriminate dumping may cause nuisance to human habitat, cause hindrance to natural drainage of the surrounding areas.	Location of debris dumping sites shall consider the following and approved by the LGED. <ul style="list-style-type: none"> • Shall not be located within designated forest areas. • Dumping shall not impact natural drainage courses. Settlements are located at least 1 km away from the site.	As shown in section-7	Contractor	LGED & D & SC
Construction					
Earthwork	Slope erosion, silt deposition on crop fields, dust blowing	Proper care will be taken during cutting and filling so that slope or toe of the road embankment remain within the right of way and does not damage the crop.	As described in GCC and in Section 7	Contractor	LGED & D & SC
Material sources	Improper transportation of construction materials may cause environmental pollution through dust generation and spillage	Adequate safety precautions shall be ensured during transportation of quarry material from quarries to the construction site. Vehicles transporting the material shall be covered to prevent spillage. Operations to be undertaken as per the direction and satisfaction of the LGED		Contractor	LGED & D & SC
Disposal of Debris	Improper disposal of debris may cause pollution of surrounding environment, particularly pollution of nearby water courses and hindrance to traffic.	The disposal of debris shall be carried out only at sites identified for the purpose. All arrangement for transportation during construction including provision, maintenance, dismantling and clearing debris, where necessary will be considered incidental to the work and should be planned and implemented as approved and directed by LGED.	As shown in Section 7	Contractor	LGED & D & SC

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Dust	Cause air pollution	<ul style="list-style-type: none"> • Vehicles delivering materials should be covered to reduce spills and dust blowing off the load. • In laying sub-base, water spraying is needed to aid compaction of the material. After the compaction, water spraying should be carried out at regular intervals to limit the dust to below • Plants, machinery and equipment shall be so handled (including dismantling) as to minimize generation of dust 	As shown in Section 7	Contractor	LGED&D &SC
Noise	Increase of noise level of the construction site	<ul style="list-style-type: none"> • Noise standard at processing sites, eg. Aggregate crushing plants, batching plant, hot mix plant, any machinery will be strictly monitored to prevent exceeding of noise standards. • Workers in vicinity of loud noise, and workers working with or in crushing, compaction, concrete mixing operations shall wear 	As described in GCC	Contractor	LGED&D &SC
Surface water	Contamination of surface water	<ul style="list-style-type: none"> • No excavation from the bund of the water bodies. • No debris disposal near any water body. • Prior written permission from authorities is required for use of water for construction activity. • Construction labours to be restricted from polluting the source or misusing the source • Labour camps will be located away from water bodies 	As described in GCC	Contractor	LGED&D &SC

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Water Logging	During construction work or in rainy season water logging may take place	Drainage structure will be built to drain out the rain water. During construction work, diversion structure and sufficient opening should be developed to drain out water	As per BOQ of bidding document	LGED	LGED&D &SC
Construction Safety	<p>Improper stack yard (without fence, light, signboard) may cause accident/health hazard.</p> <p>Improper equipment (not conforming the relevant standard) may lead to environmental pollution leakage of fuels, lubricants and emitting black smoke.</p>	<ul style="list-style-type: none"> Adequate precautions will be taken to prevent danger from electrical equipment. No material or any of the sites will be so stacked or placed as to cause danger or inconvenience to any person or the public. Fencing and lights shall be provided to protect the public. All machines to be used in the construction will conform to the relevant Standards, will be free from defect, will be kept in good working order, will be regularly inspected and properly maintained as per norms and to the satisfaction of LGED. 			
Health and Safety Measures	Working without health safety gear (PPE) may cause injury to the workers	<ul style="list-style-type: none"> At every workplace, a readily available first aid unit including an adequate supply of sterilized dressing material and appliances will be provided as per the Labour Act-2006. Adequate safety measures and PPE for workers during handling of materials at site will be taken up. 	As described in GCC	Contractor	LGED&D &SC

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Operation Phase					
Traffic Movement	Road accidents may increase due to higher number of vehicles using the roads at increased speeds.	Sight views should be clear and speed breaker/rumble strip should be provided at some crowdly places. Traffic sign to be installed		LGED	LGED
	Noise levels may also marginally increase as more vehicles use the road at higher speeds	Awareness building and administrative measures should be taken		LGED	LGED

6.2 Environmental Monitoring Plan

Environmental Monitoring Plan for this sub-project will help to evaluate the extent and severity of environmental impacts against the predicted impact and the performance of environmental protection measures. The following table has been prepared for monitoring the operation & maintenance phase activities of the sub-project:

Environmental Indicator	Parameters/Units	Means of Monitoring	Frequency / Duration Standards	Responsibilities		Estimated Cost
				Implementation	Supervision	
Air Quality	Measurement PM	Inspection	Once	Contractor	D&SC & LGED	According to GCC and clause 7 of this report
Dust Control	Spraying of water	Visual	Daily	Contractor	D&SC & LGED	According to GCC and clause 7 of this report
Noise Control	Measurement db	Inspection	Once	Contractor	D&SC & LGED	According to GCC
Waste management	Monitoring of collection, transportation and disposal of solid waste. Inspection of construction camp.	Inspection	Daily	Contractor	D&SC & LGED	According to GCC and clause 7 of this report
Health and safety	Monitoring health and safety of workers	Inspection	Daily	Contractor	D&SC & LGED	According to GCC and clause 7 of this report

7 Cost of Environmental Enhancement Works and Mitigation Measures in BoQ's of Bidding Document

In consideration to the above mentioned environmental impacts and their mitigation measures for this sub-project, the following items are included in the BOQ of this sub-project.

Item No.	Description of Item	Costs (Tk)
	ENVIRONMENTAL MITIGATION & ENHANCEMENT WORKS	
1	Overall environmental management in addition to compliance to the clauses 27 & 29 of GCC to the entire satisfaction of E-I-C	
	a) Temporary camp site waste disposal facility improvement 1no@Tk.50000.0	50,000.00
	b) Dust suppression measures [4.0@Tk. 2000.00/Km]	8,000.00
	c) Prevention of spillage, leakages of polluting materials	5,000.00
2	Providing and maintaining adequate potable water supply and sanitation facilities at camp site and work site to the entire satisfaction of E-I-C	
	a) Water supply: 1 no of Tube well including test results @Tk.10,000.00	10,000.00
	b) Sanitation: 2 nos. of Toilet (1 no for women and 1 no for men) @Tk. 5000.00	10,000.00
3	Rehabilitation of ancillary sites including stockpile sites, brick crushing sites, borrow areas, workforce camp to the entire satisfaction of the Engineer in charge	30,000.00
4	Drainage facilities improvement: Two numbers of X-drain, one Box-Culvert and one V-drain would be provided.	2706979.36
5	Turfing on embankment top and slope [16214.29 sqm @Tk. 15.5/sqm]	251321.5
6	Clearing and grubbing	20148.98

Annex-1: Public Consultation

Public Consultations Findings for Kashil UP office-Aisara Bazar via Janjania Road

Site: Kashil UP office (chainage 0+000 km)

Road: Kashil UP office-Aisara Bazar via Janjania Road

Date: 14. 01. 2014

Time: 10.00 a.m. to 11.30 a.m.

A public consultation meeting was held during 10.00 a.m. to 11.30 a.m. on 14th January, 2014 at Kashil UP office located in the sub-project area. Around 14 people participated in the meeting. Md. Tofazzel Hossain Khan, a UP Chairman was selected by the participants to chair the meeting. Md. Babul, a Farmer, Md. Julhas Khan, a Businessman and Mrs. Hanifa Begum, UP member, were nominated by the participants to speak for them

Md. Abdul Mojib Biswas, Field Engineer and, Md. Salimur Rahman, Field Supervisor were present as Facilitators.

During the consultation the participants appreciated the road improvement project, as according to them it will improve their mode of communication, which will help various socio-economic development of the people of the area. At present they face many problems in communication due to the poor road conditions, which worsens during the rainy season.

Consultation was also continued on the potential adverse environmental impacts, which might take place during the road construction activities, like dust/air pollution, water pollution, waste disposal pollution, air pollution etc. it was also discussed that spraying of water will reduce dust pollution, although people did not consider noise pollution to be a severe one.

According to the people, road improvement is very important and they expected that all steps to be taken for reducing the environmental hazards and they also expressed to offer all cooperation required during construction of the proposed road.

The queries of the participants were answered by Md. Abdul Mojib Biswas, Field Engineer up to their satisfaction.

The summary of the important suggestions during discussion are as follows:

- All effective measures to be adopted to minimize all the adverse impacts of construction works.
- Steps to be taken for minimizing the air/dust pollution by spraying water at the construction sites.

- Drainage facilities at chainage 7700m, 9175m, 7575m and 8300m to 8375m to be provided to avoid drainage congestion.

List of Participants-01

Attendance of Local Participants in Screening Exercise

(1)

Component: RPM/UNR/UNR/GCM/RJ (Put ✓)

Package/Slice :

Location/Chainage:

Date: 14/01/14

Time: 10 AM - 11-35 AM

Sl. No	Name of Respondent/Participant	Gender Male/Female	Social Status /Profession	Contact Number	Signature/ LTI
1	ଶ୍ରୀ. ଡାକ୍ତରୀନାଥ	M	ଡାକ୍ତରୀ	01816205759	
2	ଡାକ୍ତରୀନାଥ ଶର୍ମା	M	ଡାକ୍ତରୀ	01763520554	
3	ଶ୍ରୀ. ଡାକ୍ତରୀନାଥ	M	ଡାକ୍ତରୀ	01819779257	
4	ଶ୍ରୀ. ଡାକ୍ତରୀନାଥ	M	ଡାକ୍ତରୀ	01858424688	
5	ଡାକ୍ତରୀନାଥ	M	ଡାକ୍ତରୀ	01747755215	
6	ଡାକ୍ତରୀନାଥ	M	ଡାକ୍ତରୀ	01775324794	
7	ଡାକ୍ତରୀନାଥ	M	ଡାକ୍ତରୀ	01732354144	
8	ଶ୍ରୀ. (1) ଡାକ୍ତରୀନାଥ	M	ଡାକ୍ତରୀ	01721956580	
9	ଶ୍ରୀ. (2) ଡାକ୍ତରୀନାଥ	F	ଡାକ୍ତରୀ	01843750245	
10	ଶ୍ରୀ. ନରାୟଣ	M	ଡାକ୍ତରୀ	01741708508	
11	ଶ୍ରୀ. ନରାୟଣ	M	ଡାକ୍ତରୀ	01758206569	
12	ଶ୍ରୀ. ନରାୟଣ	M	ଡାକ୍ତରୀ	01782852382	
13	ଶ୍ରୀ. ନରାୟଣ	F	ଡାକ୍ତରୀ	01722629709	
14	ଶ୍ରୀ. ନରାୟଣ		ଡାକ୍ତରୀ	01738818856	



Photograph of the Public Consultation

Annex-2: Public Consultation

Public Consultations Findings for Kashil UP office-Aisara Bazar via Janjanina Road

Site: Moytha New Bazar

Road: Kashil UP office-Aisara Bazar via Janjanina Road

Date: 14. 01. 2014

Time: 12.00 p.m. to 2.00 p.m.

A public consultation meeting was held during 12.00 p.m. to 2.00 p.m on 14th January, 2014 at Moytha New Bazar located in the sub-project area. Around 15 people participated in the meeting. In consultation meeting; environmental and social issues were discussed. The main focus was to dig out information on how does indiscriminate use of natural resources cause poverty and environmental degradation by declining the homestead forests, depleting biodiversity and decreasing livelihood of people. The issue on potential impact of maintenance works has also been raised.

During the consultation the participants appreciated the road improvement project explaining their desires and expectations. The subproject will increase and improve the quality of their life. Currently, the main medium of transport is foot and some people use motor cycle for long distance travel. The sub-project will ease their turmoil and reduce their commuting time. Moreover, barrier for transporting goods and products will be removed.

From the consultation meeting, it is evident that not much people have knowledge and idea about noise pollution. Most of them are willing to tolerate noise pollution to some extent. Another problem they raised is air pollution during the maintenance work. Some of them suggested that spraying of water can minimize the dust pollution. For minimize the water pollution they expect necessary measure will be taken during maintenance work.

Field Engineer Md. Abdul Mojid Biswas and Field Supervisor, Md. Salimur Rahman were present as facilitators. Md. Tofazzel Hossain Khan, a UP Chairman was selected by the participants to chair the meeting. The participants were spontaneous and gave their full consent regarding the road improvement project.

Md. Ashraf Ali, a farmer, Md. Borhan Uddin, a businessman and Md. Anwar Hossain, a teacher were nominated by the participants to speak for them. They spoke on the project and its impact like noise and dust involved during the operation stages. Their queries were answered by Md. Abdul Mojid Biswas up to their satisfaction.

The summary of the important suggestions during discussion are as follows:

- Effective measure to be taken to minimize all the adverse impact of construction works.
- Steps to be taken for minimizing the air pollution by spraying water at the construction sites.
- Noise pollution should be effectively mitigated in order to reduce up to a tolerable limit.

- Adequate drainage facilities at chainage 7700m, 9175m, 7575m and 8300m to 8375m should be provided to avoid water accumulations or drainage congestion.

List of Participants-02

Component: RPM/KZR/UNR/GCM/RJ (Put ✓)

Package/Slice :

Date: 17/01/14

Location/Chainage: Moytha Bazar (New)

Time: 12 PM - 2 PM

Sl. No	Name of Respondent/Participant	Gender Male/Female	Social Status /Profession	Contact Number	Signature/ LTI
1	শ্রী: মনজুর আমজাদ খান	M	সহকারী প্রকৌশলী	01752655413	[Signature]
2	শ্রী: মনজুর আমজাদ	M	ফরাস	01716973357	[Signature]
3	শ্রী: মন: মনজুর	M	মহানগর	01726473679	[Signature]
4	শ্রী: মনজুর খান	M	ফরাস	01833451137	[Signature]
5	শ্রী: মনজুর	M	মহানগর	01714716056	[Signature]
6	শ্রী: মনজুর (মহানগর)	M	মহানগর	01721642885	[Signature]
7	শ্রী: মনজুর আমজাদ খান	M	মহানগর	01721642389	[Signature]
8	শ্রী: মনজুর আমজাদ	M	মহানগর	01715799727	[Signature]
9	শ্রী: মনজুর আমজাদ	M	মহানগর	01720257377	[Signature]
10	শ্রী: মনজুর আমজাদ	M	মহানগর	—	[Signature]
11	শ্রী: মনজুর আমজাদ	M	মহানগর	01742215170	[Signature]
12	শ্রী: মনজুর	M	মহানগর	01951233947	[Signature]
13	শ্রী: মনজুর আমজাদ	M	মহানগর	0164154225	[Signature]
14	শ্রী: মনজুর	M	ফরাস	—	[Signature]
15	শ্রী: মনজুর	M	মহানগর	01763596337	[Signature]



Photograph of the Public Consultation

Annex-3: Public Consultation

Public Consultations Findings for Kashil UP office-Aisara Bazar via Janjania Road

Site: Ayshara Bazar

Road: Kashil UP office-Aisara Bazar via Janjania Road

Date: 14. 01. 2014

Time: 03.00 p.m. to 05.00 p.m.

A public consultation meeting was held during 03.00 p.m. to 05.00 p.m. on 14th January, 2014 at Ayshara Bazar located in the sub-project area. Around 15 people participated in the meeting. In consultation meeting; environmental and social issues were discussed. The main focus was to dig out information on how does indiscriminate use of natural resources cause poverty and environmental degradation by declining the homestead forests, depleting biodiversity and decreasing livelihood of people. The issue on potential impact of maintenance works has also been raised.

During the consultation the participants appreciated the road improvement project explaining their desires and expectations. The subproject will increase and improve the quality of their life. Currently, the main medium of transport is foot and some people use motor cycle for long distance travel. The sub-project will ease their turmoil and reduce their commuting time. Moreover, barrier for transporting goods and products will be removed.

From the consultation meeting, it is evident that not much people have knowledge and idea about noise pollution. Most of them are willing to tolerate noise pollution to some extent. Another problem they raised is air pollution during the maintenance work. Some of them suggested that spraying of water can minimize the dust pollution. For minimize the water pollution they expect necessary measure will be taken during maintenance work.

Field Engineer Md. Abdul Mojid Biswas and Field Supervisor, Md. Salimur Rahman were present as facilitators. The participants were spontaneous and gave their full consent regarding the road improvement project.

Md. Badol Mia, a farmer, Md. Gias Uddin Sarkar, a businessman and Md. Lutfor Rahman, a teacher were nominated by the participants to speak for them. They spoke on the project and its impact like noise and dust involved during the operation stages. Their queries were answered by Md. Abdul Mojid Biswas up to their satisfaction.

The summary of the important suggestions during discussion are as follows:

- Effective measure to be taken to minimize all the adverse impact of construction works.
- Steps to be taken for minimizing the air pollution by spraying water at the construction sites.
- Adequate drainage facilities at chainage 7700m, 9175m, 7575m and 8300m to 8375m should be provided to avoid water accumulations or drainage congestion.

List of Participants-03

Component: RPM/UZR/UNR/GCM/RJ (Put ✓)

Package/Slice :

Location/Chainage: Aysharwa Bagate .

Date: 14/01/19

Time: 3 PM - 5 PM

SL No	Name of Respondent/Participant	Gender Male/Female	Social Status /Profession	Contact Number	Signature/ LTI
1	ശ്രീ: ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	01715-479719	ജിഗ്മാ
2	ശ്രീ: ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	01743238178	ജിഗ്മാ
3	ശ്രീ: ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	01726282162	Alu.
4	ശ്രീ: ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	01716045167	A. Kaveem
5	ശ്രീ: ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	01715591684	ജിഗ്മാ
6	ശ്രീ: ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	01763369437	ജിഗ്മാ
7	ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	-	-
8	ശ്രീ: ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	01731021880	ജിഗ്മാ
9	ശ്രീ: ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	01731942235	ജിഗ്മാ
10	ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	0175848483	ജിഗ്മാ
11	ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	01721905812	ജിഗ്മാ
12	ശ്രീ: ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	01745190605	ജിഗ്മാ
13	ശ്രീ: ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	-	ജിഗ്മാ
14	ശ്രീ: ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	01770581657	ജിഗ്മാ
	ശ്രീ: ജിഗ്മാ ജിഗ്മാ	M	മുൻപ്	01718609864	ജിഗ്മാ



Photograph of the Public Consultation