ENVIRONMENTAL ASSESSMENT (EA) REPORT

Name of the Sub-project: Municipal Market (Azim Shah Hawkers Market)

Lakshmipur Municipality

Lakshmipur Sadar, Lakshmipur

Municipal Governance and Services Project (MGSP)

Bangladesh Municipal Development Fund (BMDF)

November, 2017

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1.0 Sub-project Description

1.1 Sub-project Background

This is a proposed sub-project relates to the establishment of a Municipal Market-2 (Azim Shah Hawkers Market) under the Municipal Governance and Services Project (MGSP) by Lakshmipur Municipality. The Lakshmipur Municipality aims to providing the modern facilities and availability of daily necessities under the same roof to its citizens. The name of the sub-project is construction of Municipal Market-2 (Azim Shah Hawkers Market) at Lakshmipur Municipality. Lakshmipur Municipality was established in 1976 under Lakshmipur Upazila of Lakshmipur District. Total area of Lakshmipur Municipality of 34.88 sq km is bounded by Parboti Nagar and a part of Dalal Bazar union on the North, Mandary and a part of Laharkandi Union on the East, parts of Laharkandi and part of Tomchar Union on the South and Charruhita and a part of Dalal Bazar union on the West. The total population of the Municipality is 83112 (source: Lakshmipur Municipality). There are some markets in Lakshmipur Town. The proposed sub-project is located at Chalkbazar area; this is the commercial area of Lakshmipur Municipality. Lots of people come to this area for their necessities. In that case, Lakshmipur Municipality wants to construct a 6 storied market in this area from where people will get their necessities from the market. The location of the proposed sub-project is now used as Tin Shed Market. Therefore, a well designed super market is needed for the population of the municipality instead of a Tin Shed Market.

The significant features of the sub-project are mentioned below:

Name of the sub-project	: Municipal Market (Azim Shah Hawkers Market)
District Name	: Lakshmipur
ULB Name	: Lakshmipur Municipality
Market side Wards Number	: Ward – 2, 3, 4, 6, 7, 8
Estimating visiting Population	: 2000/day
Wards population	: 83112 (total municipality)
Tribal people	: 89
Land acquisition	: Owned by Lakshmipur Municipality
Estimated cost	: BDT. 100 Million
Sub-project duration	: 18 months
Tentative start date	: January 2018
Tentative completion date	: June 2019

Subproject component of the proposed 5 storied Municipal Market (Azim Shah Hawkers Market) is given below.

Project component: Ground floor= 8262 sft.

1st floor= 8710 sft.
2nd floor= 8710 sft.
3rd floor= 8710 sft.
4th floor= 8710 sft.

Occupancy of floor:

Ground floor= shop, male & female toilet, sub-station, generator, security guard room, stair & lift.
1st floor= shop, male & female toilet, stair & lift.
2nd floor= shop, male & female toilet, stair & lift.
3rd floor= office space, male & female toilet, stair & lift, prayer room.
4th floor= multipurpose use, market office, male & female toilet, stair & lift.

1.2 Location of the sub-project

The proposed sub-project site is located within the Lakshmipur Municipality under Ward no. 5 (figure 1) about 18o km South from Dhaka City. 86 km South West from Dhaka-Chittagong 4 Lane Highway at Comilla and 67 km West from Dhaka-Chittagong 4 lane Highway at Feni. Geographic co-ordinate of the proposed sub-project is 22°56'17.0"N latitude 90°49'43.2"E longitude. An area of approximately 25 Decimals has been identified for the project development. The proposed site is the economic activity area of Lakshmipur Municipality at Chalkbazar near Lakshmipur Municipality Office connected with Lakshmipur Main Road, Chalkbazar Road and Chalkbazar Masjid Road. The adjacent areas are Ward No. 2 (Banchanagar), 3 (Kala Gazi Paikbari), 4 (Dakkhin Paschim Banchanagar), 6 , 7 (Somserabar Para) , 8 (Tumchar Area) where about 17009 households are situated around the proposed market (source: Population and Housing Census 2011, Lakshmipur Municipality). Map of Lakshmipur municipality with indicating wards number is shown in figure 2.

Figure 1: Proposed Sub-project Location (source: maps.google.com)

Through the World Bank financial support and overall guidance of BMDF, Lakshmipur Municipality intends to develop this sub-project. The sub-project will be designed to handle a maximum items need for daily consumptions with ensuring modern, hygienic, customers and environmental friendly infrastructural facilities. This Environmental Assessment (EA) report presents the screening of potential environmental impacts of the proposed sub-project and contains the mitigation measures in order to eliminate or reduce the negative impacts to an acceptable level, describes the institutional requirements and provides an environmental management plan.

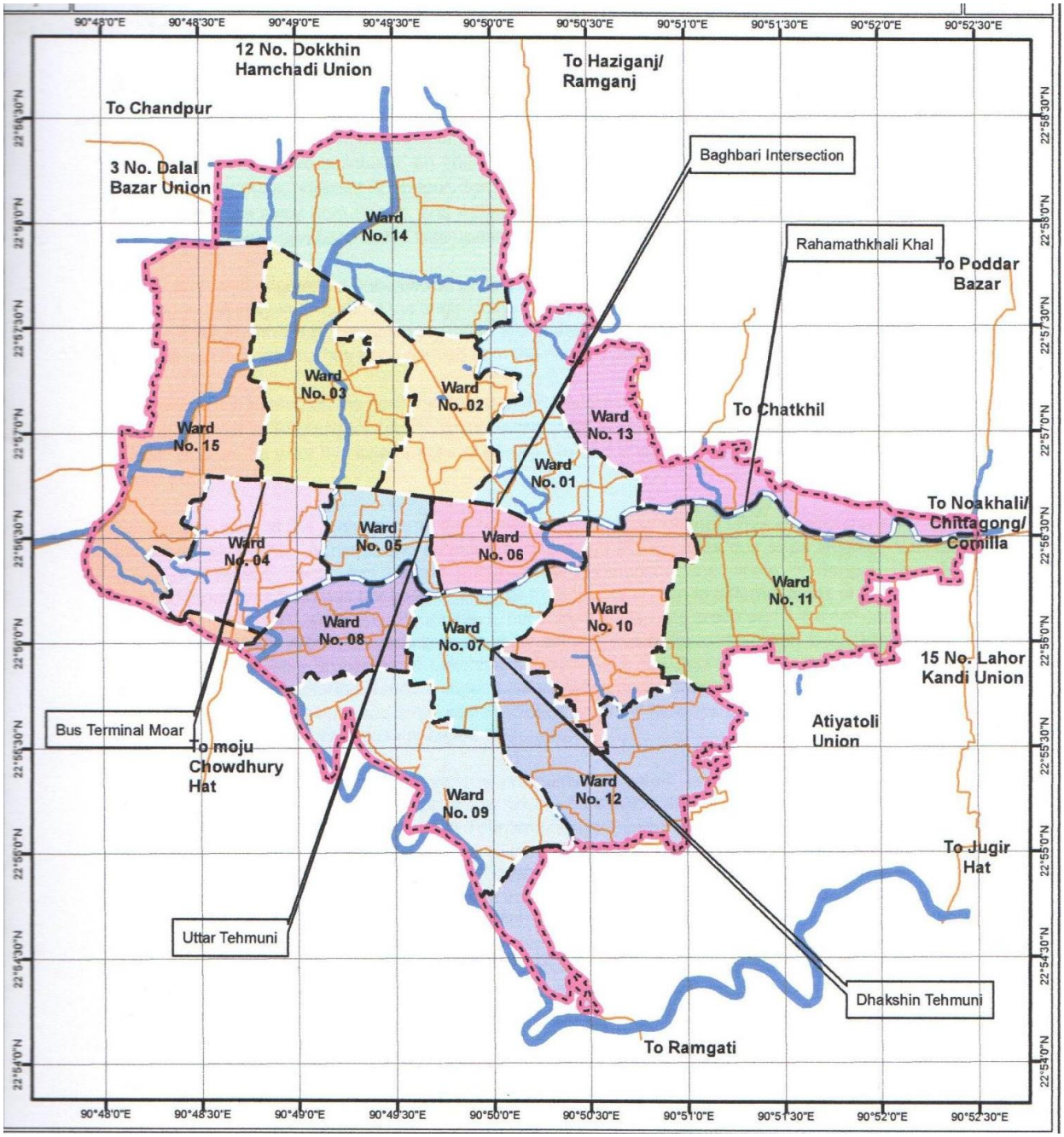


Figure 2: Map showing Lakshmipur Municipality with Wards.

1.3 Present status of the sub-project site

The present status of the proposed sub-project site area is not vacant. There is a Tin Shed Market named Pouro Hawkers Market. The market was established about 20 years ago. There are 84 shops in the market (top view of proposed sub-project site is shown in figure 4. The land is owned by the Lakshmipur Municipality. This is well connected with wide roads in two sides with Chalkbazar, Lakshmipur Municipality, Lakshmipur Thana and Bus Stand and with different Wards under Lakshmipur Municipality. The wide road from Lakshmipur Bus Stand and Lakshmipur Town, is very suitable for carrying goods from anywhere of the country as well as

people can come from their residents on foot, Car, truck, pickup etc. or by Rickshaw through existing roads. There is a covered drain passes in front of the proposed Market site which could be used for discharge the waste water generated from the proposed market.

Figure 3: Top view of the site

1.4 Objectives and justification of selecting of this sub-project

The Capital Investment Plan (CIP) of Lakshmipur Municipality lists a number of sub-projects. The PMU-MGSP of BMDF along with Lakshmipur Municipality has made field visits and evaluated existing site conditions of the proposed sub-projects. Presently there is a Tin Shed Market with 84 shops. There is a market in North and East side of the proposed project site (out side of the project site). Currently there is no traffic congestion in the site area. Only rickshaw, CNG and small vehicles are moving in the site area. There are some markets in municipality area but the present condition of the project site should be improved by construction of building with modern facilities for the population of Lakshmipur Municipality.

In fact, after completion of the sub-project, it will provide a structural, customer and environment friendly easy shopping facilities for both male and female buyers and sellers in all seasons and it will helps to create employment opportunities for the local people.

1.5 Key sub-project activities and implementation process

The key activities of this proposed Municipal Market-2 (Azim Shah Hawkers Market) subproject will include earth work, brick work, CC and RCC works, reinforcement work; tiles work, plastering work, grill work, glass work, electrical work, plumbing works. The materials to be used for the key activities are soil in earth work, sand, bricks, brick chips, stone chips and reinforcement. Furthermore, kerosene/diesel will be used for vibrator, pilling machine, electric generator. Saline free water will be consumed in two ways for domestic purposes (safe water) and for construction works such as for mixing concrete and curing. Electricity will be used for reinforcement fabrication and domestic purposes. The wood/gas will be used for cooking by the workers at the Labor sheds. The major equipments to be used for the implementing the subproject are diesel machine, brick breaking or stone breaking machine, steel cutter, dump truck, water tanker, excavator and trucks for carrying construction materials. For supplying water in the market there is arrangement of water supply from municipal water supply line. Storm water and other water from soak pit and septic tank an internal drainage system will be constructed and it will be connected with municipal drainage system.

1.6 Category of sub-project

(a) According to ECR 1997 : Green/ Orange A/ **Orange B**/ Red/ Not Listed ✓

(b) According to WB Classification: **Category B**/Category C ✓

1.7 Analysis of Alternatives

The objective of this analysis of alternatives is to identify the suitable location for this proposed sub-project of construction of Municipal Market-2 at Lakshmipur Municipality that would generate the least adverse impact and maximize the positive impacts. According to capital investment plan (CIP) in 2017, Lakshmipur municipality selected a number of projects and this is their priority project. In Lakshmipur Municipality Master Plan in 2017 ward no 5 is the commercial area of Municipality and the selected location for the proposed sub-project was mentioned in CIP 2017. From the physical observation it was observed that the present location of the sub-project is suitable for communication and no other location was found for the proposed sub-project. It is near the Lakshmipur Municipality Office,

Chalkbazar, and Lakshmipur Thana. Map of commercial area of Lakshmipur Municipality is shown in figure 5.

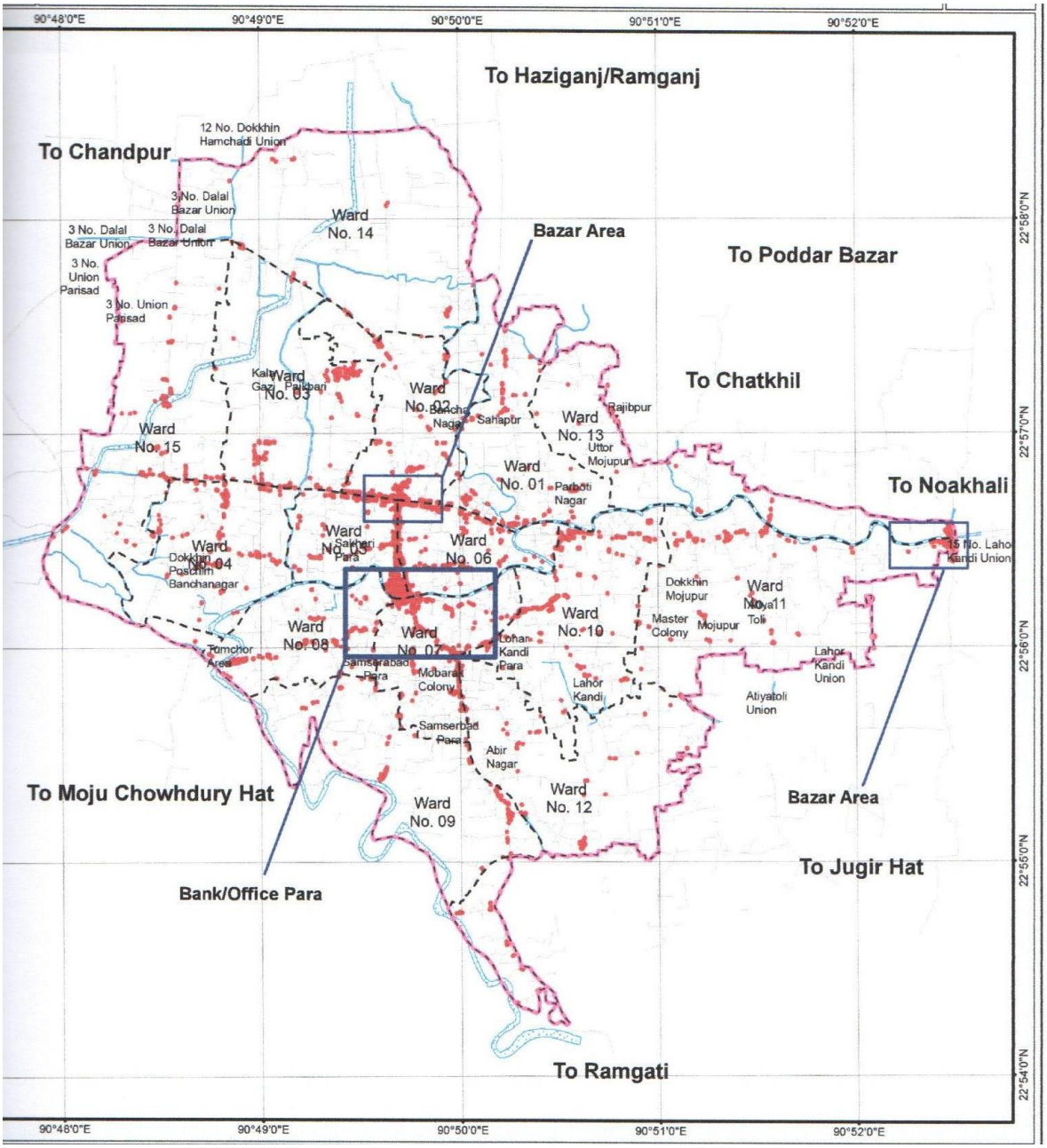


Figure 4: Map of Commercial area of Lakshmipur Municipality

2.0 Detailed Environmental and Land use Features

Generally, preparations for these sub-projects need a detailed conditional survey to get a clear profile. However, due to immediate requirement for the ULB and the BMDF, the Environmental Consultant prepared this Environmental Assessment (EA) Report by conducting quick field survey. The data collected from the field visits and addressed in the sub-projects EA report. Therefore, minor adjustments may be needed at a later stage when the sub-projects will be implemented and in operational stages. Efforts have been given for obtaining environmental features within100 m at four directions (North, South, East and West) from the centre point of the proposed Market .The findings of this effort given in Table 1. Outside view of the proposed sub-project site is shown in figure 9.

Table 1: Major Environmental Features around the proposed Market

Sides/Direction	Major Environmental Features
North	Chalkbazar Road, Chalkbazar Jame Mosque, Chalkbazar Jame Mosque Market, Sattar Market. Electric Line, Drain
South	Local market, Shops, Road, Rahamatkhali Khal .
East	Main Road, Electric Line, Drain, Local Market, Shops
West	Chalkbazar, Local Market, Shops

Figure 5: Outside view of the proposed sub-project site

3.0 Baseline Analysis of Environmental Condition

3.1 Physical environment

Geology, topography and soils

Lakshmipur is located on the bank of Rahamatkhali River and it is a flood plain area. Type of soil of Lakshmipur is Calcareous dark grey and brown floodplain soils.

Calcareous Dark Grey Floodplain soils occur extensively on the Ganges floodplain and locally on the soils that comprise cambic B-horizon and lime in part or throughout the column and with a dark grey topsoil and/or upper subsoil. There are continuous dark grey gleans as well in the Ganges tidal floodplain. They are Calcaric Gleysols (Source: banglapedia.org).

Climate and meteorology

The climate is tropical in Lakshmipur . During most months of the year, there is significant rainfall in Lakshmipur . There is only a short dry season. This location is classified as Am by Köppen and Geiger. In Lakshmipur , the average annual temperature is 25.7 °C. The average annual rainfall is 2547 mm. The driest month is January. There is 6 mm of precipitation in January. Most precipitation falls in July, with an average of 545 mm. With an average of 29.1 °C, May is the warmest month. In January, the average temperature is 19.3 °C. It is the lowest average temperature of the whole year. The precipitation varies 539 mm between the driest month and the wettest month. The average temperatures vary during the year by 9.8 °C.

Table 2: Climate table of Lakshmipur .

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Temperature (°C)	19.3	21.8	25.9	28.3	29.1	28.3	28	28	28.3	27.4	23.9	20.4
Min. Temperature (°C)	12.9	15.4	20.2	23.7	25.1	25.6	25.6	25.6	25.5	24	19	14.4
Max. Temperature (°C)	25.8	28.2	31.7	32.9	33.1	31.1	30.4	30.5	31.1	30.9	28.9	26.4
Precipitation (mm)	6	18	46	131	273	500	545	474	321	177	47	9

(Source: climate-data.org)

Hydrology (surface water, ground water, and rainwater)

Lakshmipur Municipality has some ponds and a khal named Rahamatkhali Khal in the municipality area. In Lakshmipur tube-well is the major source of drinking water in the zila as well as urban and rural areas. Tube-well as a source of drinking water of the general households has increased from 84.91% to 88.37% and from 84.89% to 90.87% in zila and rural area respectively during the decade. The facilities of tap water are found basically confined to urban area only. It is seen in the table that the facility of tap water in urban area have increased to 20.71% in 2011 from 7.81 in 2001 in consequence of which the use of tube-well possibly has gone down to 74.23% in 2011 from 85.01% in 2001. 'Others' source of drinking water has declined in 2011 in the zila as well as in urban and rural areas compared to 2001 (population and housing census 2011).

Flooding, water logging, and drainage pattern

According to previous data this area is not affected in severe flood events such as 1988 and 1998. Therefore, this area is temporarily considered as a normal flood prone zone not severe. Due to continuous heavy rain or monsoon season this area goes under water logging. Structured drainage system in this sub-project area is basically absent except for a few narrow drains that are not enough to carry storm and domestic waste water. The existing drainage system is not functional because people throw and dispose wastes in the drains. Therefore, the drain is being filled up and the land floods when it rains heavily.

Air quality and dust

Air quality data of the sub-project area is not readily available. From physical observation of the proposed project area it can be said that air quality will be same as the average air quality of Lakshmipur town. There is no possibility of air pollution by industries because there is no industries in this area, Air pollution by transportation is very low because a very few number vehicle move in this area that driven by CNG. There as many trees found in this area that helps to balance the air components. A few amount of dust was observed in road due to transportation.

Noise level

Noise is an important factors that obstruction for the quality of the environment in the proposed sub-project area. No big vehicles such as Buses, Trucks was found during field visit in the project area. Only Three Wheeler (CNG), Motor Cycles and rickshaws are generally moved on the road

during day and night. These vehicles generate insignificant noise in the sub-project area. No other perceptible sources of noise generation such as factories or industries were found near the proposed sub-project area.

3.2 Biological Environment

Flora and fauna

Wild animals and endangered fauna species were not found as the site areas. As the proposed area is vacant and above flood level, there is no possibility of availability of aquatic species.

Biodiversity status

From physical observation and discussion with local community there is no special or site specific terrestrial and aquatic ecosystems heavily disturbed by this proposed sub-project construction.

3.3 Socio-economical environment

Land use

The proposed sub-project market construction site is used as a Tin Shed Market for last 20 years. Now the municipality authority and the shop's owner of the existing market want to make a building in the proposed sub-project site. A memo of understanding between existing shop keepers and Municipal authority signed on temporary relocation and future allotment in new proposed market which is attached in the annex in the Lakshmipur Municipality Social Safeguards Assessment Report..

Beneficiary population

This proposed market is situated in Ward no-5, and other adjacent areas are Banchanagar, Kala Gazi Paikbari, Dakkhin Paschim Banchanagar, Somserabar Para, Tumchar Area, Chalkbazar Area, Municipality area. The adjacent areas are Ward No. 1 (Parboti Nagar), 2(Banchanagar), 3 (Kala Gazi Paikbari), 4 (Dakkhin Paschim Banchanagar), 5 (shakhari Para), 6 , 7 (Somserabar Para, Mobarak Colony) , 8 (Tumchar Area), 9, 10 (Lohar Kandi Para, Lahor Kandi), 11 (Dakkhin Mojupur, Master Colony, Mojupur), 12 (Abir Nagar), 13 (Uttar Mojupur), 14 (Dalal Bazar Parta), 15 (Dalal Bazar Part)where about 17009 households are situated and 83112 people are living around the proposed Market area and will be benefitted from this proposed market directly and indirectly. (Source: Population and Housing Census 2011).

Education

Overall rate of literacy in Lakshmipur town is 63.88% according to population census 2011. The differences come in a period of 6 years from 2011 to 2016. From the Table 4-8, it can be seen that literacy rate is highest in Ward NO.7. Besides this literacy rate are also high in Ward No.6, 5 and 1.

Table 3: Ward Wise Literacy Rate in Lakshmipur Municipality

Ward No.	Literacy Rate (%) in 2011 Census		
	Both	Male	Female
1	71.8	73.3	70.3
2	62.6	63.4	61.9
3	51	51.1	51
4	51.4	50.1	52.6
5	70.3	71.9	68.7
6	74.7	77.5	71.9
7	77.3	79	75.5
8	54.1	56	52.2
9	54.4	57.4	51.3
10	70.2	73.1	67.2
11	60.9	62.6	58.9
12	60.9	62.4	59.4

(Source: Population and Housing Census, 2011-Community)

Among the literates overall 17.50% has education up to primary level. Only 15% have education up to junior secondary level. However, 3.50% have not taken any formal education, 17.50% can sign only and 17.50% have primary level of education. Figure 4-10 illustrates the education level of household members in Lakshmipur Municipality.

Tribal communities

There are some ethnic groups reside in Lakshmipur Municipality, like Chakma and others. Figure 6 represents these ethnic peoples location in different wards in Lakshmipur Municipality.

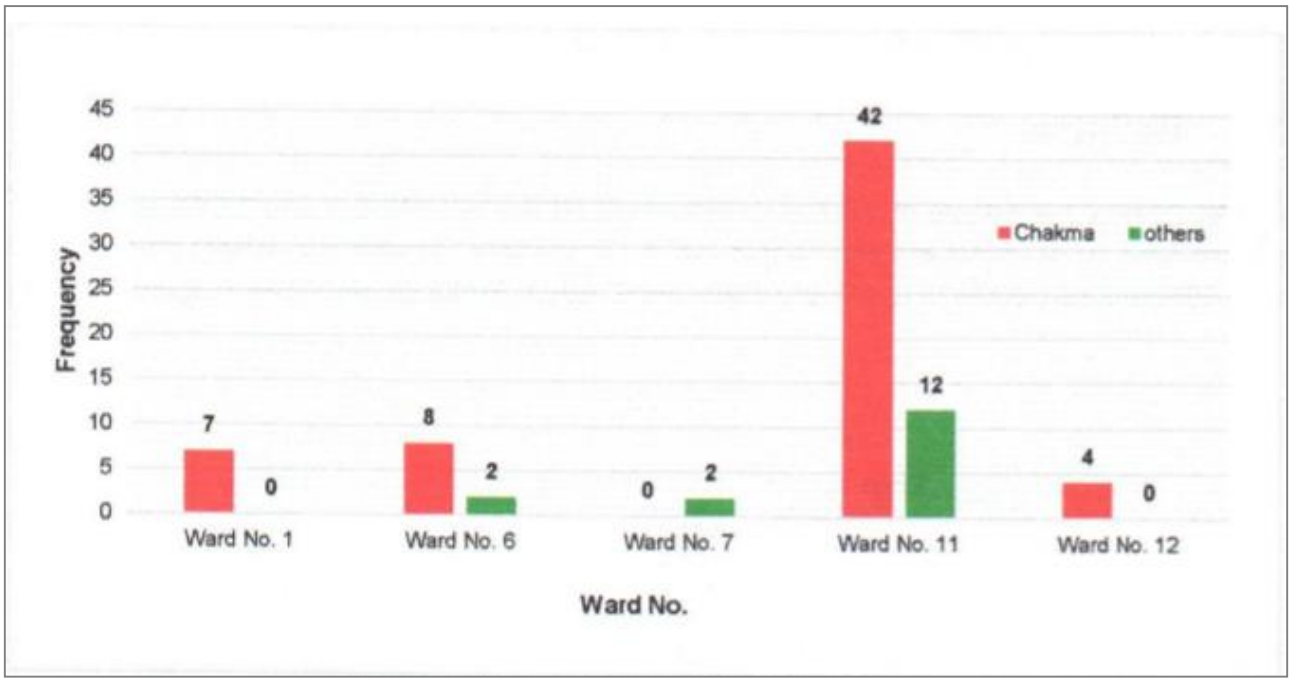


Figure 6: Ethnic people in different wards

Land acquisition and resettlement

The total proposed sub-project market area is owned by the Lakshmipur Municipality and presently it is used as a Tin Shed market, hence there is no need of additional land acquisition and it is need resettlement for the implementation of this sub-project. A memo of understanding already made between existing shop keepers and Municipal authority and enclosed in Social Safeguards Assessment Report.

4.0 Environmental Screening

Environmental Screening (ES) for the sub-project has been conducted with the purpose of fulfilling the requirements of DoE and WB. Environmental Screening ensures that environmental issues are properly identified in terms of extent of negative and positive impacts. A field visit for preparing the ES was carried out on November 2017 in the sub-project area. Environmental Screening Checklist, as adopted in Appendix C of the Environmental Management Framework (EMF) of MGSP, was followed for identifying the impacts and their extents. The screening data and information for this sub-project have been analyzed and are shown in below.

1) Potential environmental impact during construction phase:

(a) Ecological impacts:

- Felling of trees : ☐ Significant ☐ Moderate ☑ Minor
- Clearing of vegetation : ☐ Significant ☐ Moderate ☑ Minor
- Potential impact on species of aquatic (i.e., water) environment
  : ☐ Significant ☐ Moderate ☑ Minor

(b) Physico-chemical impacts:

- Noise pollution : ☐ Significant ☑ Moderate ☐ Insignificant
- Air pollution : ☐ Significant ☑ Moderate ☐ Insignificant
- Drainage congestion : ☑ Very likely ☐ Likely ☐ Unlikely
- Water pollution : ☐ Significant ☐ Moderate ☑ Insignificant
- Pollution from solid/ construction wastes
  : ☐ Significant ☐ Moderate ☑ Insignificant
- Water logging : ☐ Significant ☐ Moderate ☑ Insignificant

(c) Socio-economic impacts:

- Traffic congestion : ☐ Very likely ☐ ikely ☑ nlikely
- Health and safety : ☐ Significant ☑ Moderate ☐ Insignificant
- Impact on archaeological and historical
  : ☐ Significant ☐ Moderate ☑ Insignificant
- Employment generation : ☑ Significant ☐ Moderate ☐ Insignificant

2) Potential environmental impact during operational phase:

(d) Ecological impacts:

- Potential impact on species of aquatic

: ☐Significant☐ Moderate ☑Minor

(e) Physico-chemical impacts:

- Potential air quality and noise level

:☐ Improvement ☑No-improvement ☐Deterioration

- Drainage congestion :☐ Improvement ☐ Minor Improvement☑No Impact
- Risk of Water pollution : ☐Significant ☐ Moderate ☑Minor
- Pollution from solid waste :☐ Improvement ☑No-improvement ☐Deterioration

(f) Socio-economic impacts:

- Traffic : ☐mprovement ☑No-improvement ☐dverse
- Safety : ☐mprovement ☑No-improvement ☐Adverse
- Employment generation : S☐gnificant M☑oderate M☐inor

3) Summary of possible environmental impacts of the sub-project

From the above environmental screening it can be said that there is no ecological impacts of construction of sub-project because there is no trees and water bodies. No significant physico-chemical impacts of the proposed project construction work. Moderate noise and air pollution may occur during construction time. There are very minimal possibilities of adverse impacts on socio-economic environment of the sub-project area, traffic congestion may occur unlikely. The sub-project is also expected to produce a large number of positive benefits on the overall community in respect of social and economic strengthening of the area through resource mobilization, employment generation etc. There are some possibilities of producing moderate or minor adverse environmental impacts, which can be mitigated at the initial stage by taking mitigation measures. It is possible to limit noise levels and dust blowing during construction and operation of the project, proper disposal of solid and liquid waste through collection and drainage system development. Maintain air quality by limiting dust and toxic gas emissions from equipment and vehicle exhaust will be monitored and will take necessary steps to control it. Health and safety for workers will be ensured by following prescribed measures of World Bank's Health and Safety guidelines. Finally it can be said that the proposed sub-project will help to improve social safety, create employment opportunities and income generating of the Municipality.

5.0 Specific Impact and Mitigation & Enhancement Measures To Safeguard Environment during Construction Period

5.1 Labor Shed Construction

Two (2) separate labor shed are needed to be constructed for both male and female with separate accommodation and toilet facilities and one site office. There would have safe water supply, light, ventilation and separate cooking places.

Common Mitigation Measures: There is an old Pouro Bhaban (figure 7) 150 meter away from the proposed sub-project site will be used for labor shed. There is a toilet and water supply facility is available. Health and safety of workers will be ensured through providing health and hygiene training to the workers by PIU- Lakshmipur Municipality and contractor as mentioned in the Environmental Management Framework (EMF) prepared for MGSP-BMDF. Waste bins/cans will be provided near labor shed and erecting no litter signs at labor shed and site areas. Wastes will be collected in daily by waste collector and dispose the waste about 2 km away from the site at waste disposal site under ward no-4 of Lakshmipur Municipality.

Figure 7: Old Pouro Bhaban for Labor shed

5.2 Earthwork

The sub-project of market construction work consists of present building demolition, removal of demolished buildingmaterials, earth cutting, earth filling and removal of unsuitable materials. These works lead dust blowing, noise and vibration which disturb the local adjacent people, pedestrians.Excavation and trenching are hazardous construction activities that involve soil removal.

Common Mitigation Measures: Heavy equipment like excavator, truck, tractors will be used for old building demolition. The debris will be used in filling the low land area near Municipility. Additional safety measures will be taken for labors during old building demolition. During carrying debris by truck "terpal" (thick synthetic cover) will be used for controlling dust and brick cheeps. Heavy equipment will keep away from trench edges. Trenches will be inspected at the start time of each shift.Water will be spraying during day time to stop dust blowing. Adequate safety barriers with clearly visible signs will be given in appropriate place to alert both drivers and pedestrians. Adequate lighting will be provided to the barriers and signs to make them clearly visible at night from a distance sufficient to respond. Temporary arrangement will be facilitate for pedestrian and vehicular traffic. Excavated soil and unsuitable materials will be kept in safe places so that pedestrian can walk smoothly. Cutting soils and unsuitable materials will be used as land fill items about 2 km away from the siteat cattle market under ward no 15 of Lakshmipur Municipality (figure 8). For earth filling of the proposed sub-project construction, the required quantity of soil will be collected from Mouzanondi area of ward no 15 of Lakshmipur Municipality(5 km away from the site) and it will be ensured to avoid the top soil collection.

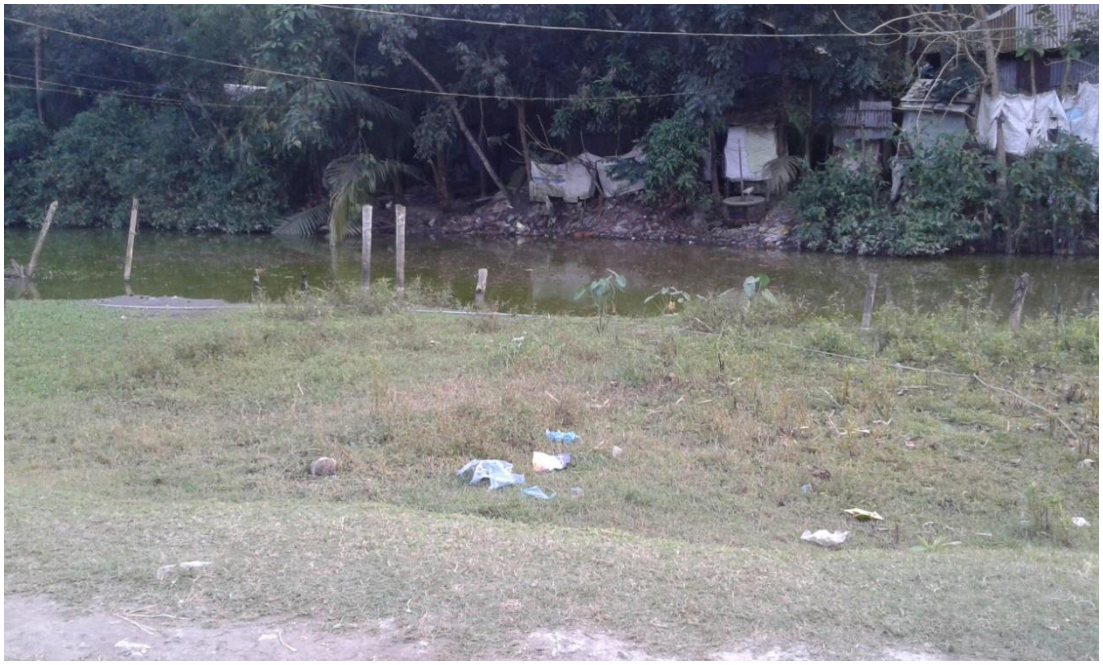


Figure 8: Proposed area for debris and unsuitable materials dumping site

5.3 Construction material sourcing

The construction materials such as sand and bricks are generallyobtained from the local vendors. Bricks are produced using clay and firing by coals and somewhere wood. Uncaring purchase of these materials from unlicensed operators indirectly supports, encourages and promotes environmental degradation at the illegal quarry sites, creates air pollution from using energy inefficient technologies and cause medium to long-term negative impacts at source.

Common Mitigation Measures: Construction materials will be obtained from government license holders and approved quarries and brick fields. The copies of the relevant licenses will be made available for inspection at the site by the contractor. Sylhet sand and white sand will be collected from Mojuchowdhury Hat about 8 km away from the site. Stones will be collected from other places (Sylhet/Sunamganj) of the country. All the materials will be carried, stored by cover and in a safe places and ensure safe transportation and handling by regular monitoring site engineer.

5.4 Air quality and dust

Air polluting substances like dust, smoke, SO_x, NO_x are produced during construction works from land preparation, operation of diesel engines, welding, burning of fossil fuels etc. The construction site generates high levels of dust (typically from concrete, cement, wood, stone, and

sand). Construction dust is classified as PM_{10} / $PM_{2.5}$ - particulate matter less than 10/2.5 microns in diameter, invisible to the naked eye. Oil spillage from engine causes soil pollution.

Common Mitigation Measures: Water will be sprayed regularly during construction works to control dust blowing. During carrying of construction materials like sand, soil, brick, cements will be covered by "terpal" and continually damp down with low levels of water except cement sacks. Cover piles of building materials like cement, sand and other powders, should be regularly inspected for spillages, and located them where they will not be washed into drainage areas. Non-toxic paints, solvents and other non-hazardous materials should be used wherever possible. Spilled oil will be collected by using plastic container to control soil pollution by oil spillage. Catalytic converter system will be used in diesel engine to reduce smoke, SO_x, NO_x from burning of fuel oil in engine.

5.5 Noise and vibration

Construction sites will produce a lot of noise, mainly from generator, iron cutting, brick breaking machines, equipment, and machinery, but also from workers shouting, radios at the project site. Excessive noise is not only annoying and distracting, but can lead to hearing loss, high blood pressure, sleep disturbance, and extreme stress to nearest residential areas. Vibration also occurs during pilling works that is an issue for safety of nearby building and can causes landslides.

Common Mitigation Measures: Noise pollution will be reduced as possible through careful handling of materials; modern, quiet power tools, equipment and generators; low impact technologies. Protective measures will be taken to control landslides during pilling works.

5.6 Solid Waste Disposal

From the demolition of existing Tin Shed Market building at the proposed site will generate huge quantity of salvage materials. It will need to carry the salvage items to a safer place for storage/dumping and reuse. Solid waste also causes for clogging of drains. Health safety is an issue for the workers during demolition.

Common Mitigation Measures: The salvage items from the old buildings will be used as landfills of low land at cattle market of Lakshmipur Municipality. The better bricks from old building will be used in non-metal link road connected with Municipality. During the demolition time a safety barrier will be setup around the site to control dust spreading and disturbance of

local people. Safety measures will be taken to ensure the health safety of workers by providing safety equipments.

5.7 Workers safety

There is a general risk of accidental injury of workers, especially from working in open trenches of yard excavation, work in outside of multistoried buildings. Most of the cases accident is happened due to unconsciousness and for not using personal protective equipment. There is also a potential health risk from contamination at work sites.

Common Mitigation Measures: Health safety training will be given to the workers. Personal protective equipment such as helmet, hand gloves, musk, goggles and gumboot will be provided to the workers and it will make sure that they will used it properly. A first aid box would be kept at work site and some of them will be trained about first aid. Health and safety of workers and work site would be monitored regularly to reduce health risk and negative impacts on workers health and life.

6.0 Specific Impact and Mitigation & Enhancement Measures to Safeguard Environment during Operation Period

6.1 Solid Waste Disposal

It is also anticipating that a considerable volume of organic (Food waste, vegetable waste) and inorganic waste (pieces of polythene bag, cane, bottle etc.) will be generated from the proposed market. The lack of suitable methods for proper disposal of this waste will lead to the development of breeding grounds for disease vectors, foul smells from decaying waste and deterioration in the aesthetic value of the entire area. Solid waste also causes for clogging of drains.

Common Mitigation Measures:

A number of small bins would be placed inside the market premises where the traders and visitors can put the solid waste within short distance and time. The waste collector will collect the solid waste from the bin in two times in a day. The waste collector will be put it in a secondary solid waste dumping site at market premises. The waste collector of municipality will collect the waste from secondary dumping station and finally dispose it at the waste dumping site of municipality about 2 km away from the site at ward no 2 of Lakshmipur Municipality . Total area of the solid

waste dumping site is 3 acre. In near future the Lakshmipur Municipality authority will take necessary step to make composting system of biodegradable solid waste generating from the municipal area. An efficient and effective solid waste management and disposal mechanism will be established and implemented during operational phase of the sub-project.

Figure 9: Solid waste dumping site

6.2 Waste Water Disposal

Waste Water Disposal

Waste Water will generate from domestic use, toilets, food shops and floor cleaning activities. This will create environmental hazards on surrounding areas and pollute surface water if not properly managed. The Rahamatkhali Khal is very nearest to the Municipality where possibility of dispose municipal waste water.

Common Mitigation Measures: Septic tank would be constructed under the market for discharging sewage from toilets. Periodically sludge from septic tank will be collected by vacuum truck. These will dispose into sludge pit which is situated at Municipal landfill area. The sludge

pit will be covered by earth to stop spreading in the surrounding areas or surface water. During collection of sludge, all hygiene and safety measures will be ensured. Waste water from septic tank and floor cleaning will pass to a soak pit where settle the solid content. It will also be made sure that the solid waste will not be discharged into the municipal drainage system. So there is no possibility of pollution of surface water by municipal drain.

6.3 Traffic Congestion

Huge number of people will come to the market and number of rickshaws and other small vehicle will move for market development. There are possibilities of traffic congestion in front of proposed market due to conglomeration of people and vehicle at day time.

Common Mitigation Measures: Effective traffic management system would be developed by managing all vehicles (motorized and non-motorized) in front of the proposed market. Market committee will manage the traffic problem by deploying community police in front of the market.

6.4 Rain water harvesting reservoir

There will need volume of water for drinking purpose, toilets and washing activities. To reduce dependency on ground water, required number of water reservoir would be placed on the roof top and basement of the market to harvest rain water in rainy season following rain water harvesting procedure. There is possibility of generating bacteria in the stored rain water in the long run.

Common Mitigation Measures: An effective rainwater harvesting system would be established in the proposed sub-project. Water reservoir would be constructed in basement or roof top of the proposed market to reserve rain water. Quality of reserved water would be monitored regularly and test in laboratory. The water reservoir would be cleaned regularly.

6.5 Solar Energy and Glass Wall

This is a general tendency of shop keepers having additional lights to show their selling items too brighten at day and night time. Including all other electric power demand, there will need huge electric power for the proposed market. This demand can be reduced by using solar energy. On the other hand, if Glass wall use from certain heights at the top, sunlight can be reached where day time electric consumption will reduce.

Common Mitigation Measures: A quality full solar system would be established in the proposed market. Solar panel would be setup at roof top and it will be maintained regularly. For entering sunlight in the market glass wall will be used where possible.

6.6 Fire Fighting Equipment

The proposed Market will be a place of different shops like food shop, restaurant etc. where may be use of stove. The firefighting items are very important at the proposed market.

Recommended Mitigation: Fix firefighting devices at strategic points in all floors. Provide training on device use to the staffs who will be on duties at the Market areas.

6.7 Toilet for Male and Female

It is expected that 2000 (approx.) visitors will visit the market for shopping, selling and other related purposes which will be comprised of male, female, children, and disabled peoples.

Recommended Mitigation:There would be separate toilets in every floor for male and female separately. Special arrangement would be ensured for the disabled people.

7.0 Environmental Management Plan (EMP)

7.1 Access to information

The environmental assessment report will be translated into Bengali and disseminated locally. The final assessment report will also be uploaded in the BMDF website and the World Bank website.

7.2 Grievance redress mechanism

Sub-project specific Grievance Redress Mechanism (GRM) will be set up by the Lakshmipur Municipality. This is for timely receive, ground truthing and mitigate the solution of affected person/s as per EMF. This will be transparent, time-bound approach where the affected person (AP) has scope to raise voice without any fear with facts and documents.

7.2.1 Grievance redresses committee (GRC)

For this proposed sub-project specific Grievance Redress Committee has been formed by Lakshmipur Municipality. The Grievance Redress Committee of Lakshmipur Municipality for the proposed sub-project is given below.

Lakshmipur Pourashava
Lakshmipur

Memo No: 1534 date : 07-11-2017

GRC Committee

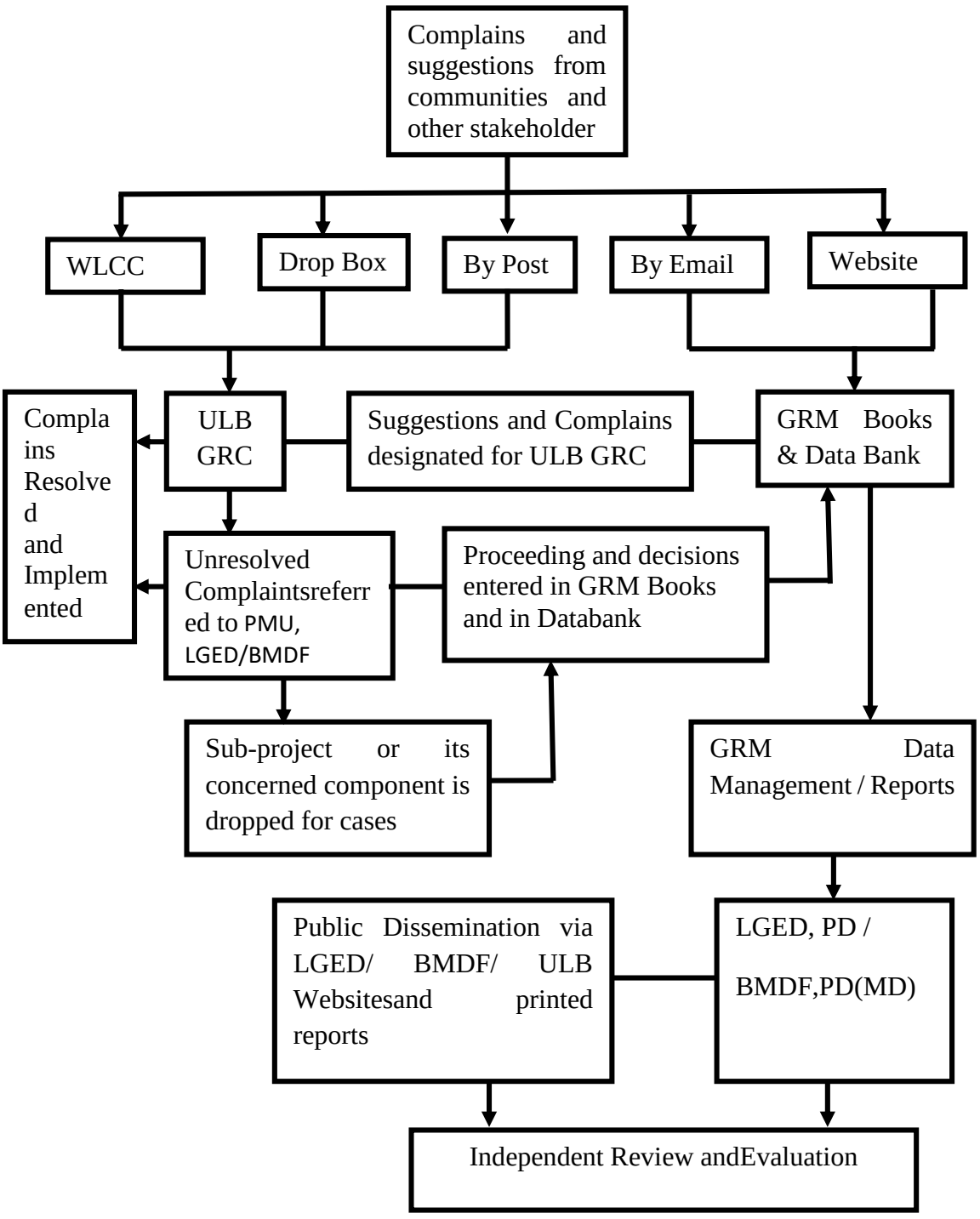
Name and the designation of the members present in the Meeting are as follows:

Sl. No.	Name	Designation
01	Md. Abu Taher	Mayor Lakshmipur Pourashava Chairperson GRC.
02	Dr. Ashpakur Rahman Mamun	President B. M A & Member GRC.
03.	Ayub Khan	DD S O I Lakshmipur & Member GRC
04	Rupali prova Nath	Teacher Lakshmipur & Member GRC
05	Abul Khare (Shawapon)	MD. Trabedy & Member GRC.
06	Jasmin Akter	Mohila Councilor Lakshmipur Pourashava & Member GRC.
07.	Md. Abul Bashar	Executive Engineer Lakshmipur Pourashava & Member Secretary GRC

Mayor
Lakshmipur Pourashava

7.2.2 Grievance resolution process

Flow chart of Grievance resolution process for this proposed sub-project is given below.



7.3 Capacity building

A training program has been developed by the PMU to build the capability of PIU of Lakshmipur Municipality. This has been conducted by the PMU-BMDF. The training based on (i) Environmental screening, (ii) EMP implementation, including environmental monitoring requirements related to mitigation measures; and (iii) taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of the implementation. The contractor will be required to conduct environmental awareness and orientation of the workers and other support staff before deploying to the work sites in order to achieve the expected standards.

7.4 Environmental management action plan (EMP)

Table 4: Environmental Management Plan (EMP)

Sub-project Activity.	Activity/ Issues	Potential Impact	Proposed Mitigation & Enhancement Measures	Estimated Mitigation Cost	Frequency of monitoring	Responsible for monitoring	
						Implement	Supervision
Pre-Construction Phase							
Construction and operation of labor shed	Construction of labor shed in minimum distance; Local people cannot be disturbed by worker; Establish of sanitary latrine and tubewell	Solid waste and waste water generation; Environmental pollution; Workers health	An old Pouro building with toilet and water supply will be used as labor camp; Keep waste bin; Erection of "no litter" sign	Tentative cost BDT 20000	During Construction	Contractor	Environmental Specialist-PMU, MGSP, PIU/ULB
Construction Phase							
Earth work	Earth cutting; Earth filling; Erosion of slope of the foundation trench.	Slope erosion; Dust blowing	Safety barriers will be provided; Heavy equipment will keep at safer distance; Water will be spraying.	Tentative cost BDT 10000	During Construction	Contractor	Environmental Specialist-PMU, MGSP, PIU/ULB
Construction material sourcing	Construction materials especially Sand, Bricks at the local level collect from local source.	Environmental degradation.	Construction materials will be obtained from officially licensed and approved quarries and brick fields.	N/A	During Construction	Contractor	Environmental Specialist-PMU, MGSP, PIU/ULB

Air, Water Quality and Dust	Air. water quality monitoring through lab test; Control air pollution and dust blowing	Air pollution, Water Pollution	Water will be spraying at certain interval to control the dust especially in day time; Air quality will be measured, tests and monitoring. Ground water quality test	Tentative cost BDT 60000	During pre-construction, construction and operation period	Contractor	Environmental Specialist-PMU, MGSP, PIU/ULB
Noise and Vibration	Keep noise level within tolerance level; Measured and monitoring of noise level.	Noise pollution; Vibration at the construction site	Proper scheduling of transportation will be maintained for noise generated work; All vehicles and equipment used in construction would be fitted by exhaust silencers, maintain regularly to minimize noise.	N/A	During pre-construction, construction and operation period	Contractor	Environmental Specialist-PMU, MGSP, PIU/ULB
Water Logging	Construction materials and construction waste causes drainage congestion and water logging.	Drainage congestion	Construction material will be kept in distance from drain and drain will be cleaning.	Tentative cost BDT 10000	During Construction	Contractor	Environmental Specialist-PMU, MGSP, PIU/ULB

Workers safety	Health risk and Safety issues of workers	Physical illness; Accidental Injury	Healthy environment will be ensured in labor shed; proper use of personal protective equipments (Helmet, Gloves, Eye protecting glass, Boot, Jacket etc.) will be ensured. A first aid box will be placed at work place.	Tentative cost BDT 50000	During Construction	Contractor	Environmental Specialist-PMU, MGSP, PIU/ULB
Operation Phase							
Solid Waste Disposal	Generation of solid waste; Solid waste management system.	Environmental degradation	Small bin will be established in market premises and ensure proper solid waste collection and management.	Tentative cost BDT 60000 yearly	During Operation phase	Contractor, Market Management Committee	PIU/ULB
Waste Water Disposal	Waste water generation; pollution of water bodies.	Environmental degradation; Water pollution	Septic tank will be constructed; Ensure use of municipal drain to dispose waste water.	Tentative cost BDT 20000 yearly for drain water quality test.	During Operation phase	Contractor, Market Management Committee	PIU/ULB
Traffic Congestion	Create traffic congestion by both traders and visitors	Traffic congestion; Accident	Proper handling of vehicles by separating area for motorized and non-motorized vehicles will be ensured and deploy community policing.	Tentative cost yearly BDT 150000 for traffic control. BDT 20000 for noise level monitoring	During Operation phase	Contractor, Market Management Committee	PIU/ULB

Solar Energy and Glass wall	Saving electricity by using solar energy and day light	Energy consumption and load shading.	Solar panel will be set up at roof top and used of solar energy will increased as possible. Glass wall will be used where possible.	Cost should include in the electrical cost in BoQ	During Operation phase	Contractor	PIU/ULB
Rain water harvesting	Saving ground water by using Rain water	Ground water depletion.	Rain water harvesting will be ensured and rain water reservoir will be constructed at roof top and ground floor.	Tentative cost BDT 50000 yearly for reservoir cleaning and water testing	During Operation phase	Contractor	PIU/ULB

7.5 Cost of environmental enhancement works in BOQ

Table 5: Cost of environmental enhancement works.

Item No.	Description of Item	Costs (BDT in million)
1	labor shed modification (Old building)	0.08
2	Demolition waste disposal	0.10
3	Safety barriers	0.05
4	Water spray for controlling air pollution and dust	0.03
5	Air, Water, Noise Quality test	0.09
6	Personal Protective Equipment	.10
7	Water logging	.002
	Total	**0.452**

Operational		
	Rain water reservoir cleaning and water quality testing,	0.05
	Drain water, Noise level lab test	0.08
	Solid Waste Management	0.06
	Total	**0.19**

8.0 Public Consultation and Participation

8.1 Methodology

For carrying out public consultation and participation a focus group discussion (FGD) (Figure 10) was conducted to identify problems, issues, suggestions from the local people about the proposed sub-project. This sub-project was selected from the CIP where stakeholder, ULB, Local People, Mayor, Counselors, NGO and Community people were participated. In the CIP, some sub-project was selected and this sub-project was taken in priority basis.

Figure 10: Focus Group Discussion

Stakeholders at the sub-project were identified under three main groups: (i) beneficiaries in the sub-project area; (ii) community leaders and Government officials and (iii) NGOs working at the local and regional levels. Stakeholder participation was completed in two steps: (i) firstly to collect and disseminate information through briefing and discussion meetings; and (ii) secondly to receive feedback for formulating appropriate mitigation measures against the adverse impacts.

In order to ensure appropriate feedback a range of information sharing techniques was used. Techniques used for different stakeholder groups included (i) Discussion with stakeholders (ii) Semi-structured interviews; (iii) Small group meetings with concerned officials in presence of stakeholder Site visits- stakeholder discussion in the field level .

Special efforts were made to include the elderly, women, and vulnerable groups and to allow them to express their views regarding the sub-project implementation. In all cases, the impression of stakeholders & general mass regarding sub-project implementation was positive.

8.2 Issues raised by the participants

- Modern facilities to community people
- Traffic congestion
- Noise pollution during construction
- Environment friendly
- Quality maintaining of the construction works
- Opportunity for present shops owner

8.3 Feedback, suggestions, and recommendations of the participants

Local people and shops owner of the Tin Shed Market are very much interested about the market and they are hopeful that the market will be visible within the time frame. They suggested making the market well facilitated, environment friendly. The participants requested the PIU-Lakshmipur to maintain the quality of the construction work of the building. Other shop owner of near the proposed site requested PIU-Lakshmipur to reduce noise level and disturbance by construction works as possible. Shop owner of existing Tin Shed Market wants to get opportunity and preference to get space/shop in new market just after completion of the proposed market.

9.0 Conclusions and Recommendations

It has been understood from several discussions with stakeholders like community leaders, local representatives, existing shop keepers, and Lakshmipur Municipal authority that the proposed Market has been a vision project from long ago to develop. But it was not possible due to lack of fund.

These project will enhance the revenue generation of municipality as well as to meet the requirements of Municipal dwellers. Like other construction work this project has some impacts on environment but these are not significant. Normally there will generation of noise during construction work but the Contractor should take measures to reduce it. There is a khal near the proposed site, so it should be careful that any harmful substances do not discharge to the khal through drainage system. Emphasis will be given to make the market environment friendly during design and construction phase. Renewable resource, energy would be used in water supply and in energy use. Close monitoring of implementation of design, specification and suggested environmental parameters as mentioned in the EMP are very essential and responsibility of both Municipality and BMDF. There should have strong Market Committee during operational phase for managing and maintaining the facilities which will be provided in the Market during construction and as per objectives set out during plan and design. Quality of construction and environment parameters should be monitored by the Municipal Authority-PIU and ULB for the sustainability of the Market .

Annex A: Attendance of Focus Group Discussion (FGD)

Laxmipur Municipality
Focus Group Discussion on
Construction of Proposed Municipal Market -2 (Azim Shah Hawker Market)

Sl. No.	Name	Address	Status	Mobile No.	Signature
1				01716099921	
2				01715230826	
3				01779703944	
4				01843	
5				01712275255	
6					
7	Kala MIAH			01720591115	
8				01834740013	
9	M·A-AWAL			01830174166	
10				01779703944	
11	Kazi Kowshed Alam			01771799858	
12					
13				01687753829	
14					
15	MD·MOMEN			01757805104	
16				01711088501	
17				01712017476	
18					
19				01817003442	
20					