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# SAND EXCAVATION BY USING DREDGER
## (LEASED AREA 30129.234 ACRES)
## At Chiniot Bridge Upstream Zone (1) Near Chenab Bridge, District Chiniot.
## (BY M/S STAR TRADERS)

# *REVISED ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT*

D(EIA) No. 1782
Dated: 16-05-22

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(86)

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# LIST OF ACRONYMS

| | |
|---|---|
| EA | Environmental Approval |
| EMMP | Environment Management and Monitoring Plan |
| EMP | Environmental Management Plan |
| EPA | Environmental Protection Agency |
| EPC | Environmental Protection Council |
| GOP | Government of Pakistan |
| HSE | Health Safety Equipment |
| IEE | Initial Environmental Examination |
| FESCO | Faisalabad Electric Supply Company |
| M&E | Monitoring and Evaluation |
| MSDS | Material Safety Data Sheets |
| MW | Mega Watt |
| NCS | National Conservation Strategy |
| NGOs | Non–Government Organizations |
| NOC | No Objection Certificate |
| O&M | Operation and Maintenance |
| OHS | Occupational Health and Safety |
| Pak–EPA | Pakistan Environment Protection Agency |
| PEPA | Punjab Environmental Protection Agency |
| PEQS | Punjab Environmental Quality Standards |
| PKR | Pak Rupees |
| PM | Project Manager |
| PPC | Pakistan Penal Code |
| PPE | Personal Protective Equipment |
| PSDP | Public Sector Development Project |
| PSQCA | Pakistan Standards Quality Control Authority |
| QA | Quality Assurance |
| SFA | Social Framework Agreement |

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## EXECUTIVE SUMMERY

Rivers are the most important life supporting system of nature. For centuries, humans have been enjoying the natural benefits provided by rivers. Rivers provides the main sources of water reservoirs in addition to other sources like sand, clay etc for its utilizations of other fundamental development of the society. During the rain and the natural water flow in river much of sand deposits in the river bed, thus may cause undue filling / overburden in river bed. This sand is an essential constituent of construction material required in a range of civil works including house buildings, road/infrastructure network, bridges, dams etc, thus removing of sand from river bed may be healthy for river bed as well as for commercial point. Therefore, Mines and Mineral Depart offers/ grant open auction / lease for surface excavation of sand from river to maintain the surface of river bed which ultimately also cause commercial activities beneficial both for the department in terms of revenue generation as well as construction sector of the country. This simultaneously has introduced sand mining on scientific scale. Particularly in the water flowing areas of rivers, the sand excavation can also be done through dredger. In addition to traditional use of manual or excavator machinery etc for sand excavation, the use of dredger would require submission of Environmental Impact Assessment (EIA) to the Environmental Protection Agency (EPA) Punjab.

1. **Title and Location of Proposal**

| | |
|---|---|
| **Project Title:** | Excavation of Ordinary Sand by Using Sand Dredger over an Area of 30129.234 acres |
| **Location:** | Situated at Chiniot Bridge Upstream Zone (1) near Chenab Bridge, District Chiniot. |

2. **Name of the Proponent**

| | |
|---|---|
| **Firm** | Star Traders |
| **Proponent** | Nadeem Akhter |
| **Address:** | PO Railway Road Lundpur, District Gujrat |

3. **Name of the Organization Preparing Report**

**Integrated Environment Consultants**

**Head Office:** ` Office # 11, 2nd Floor, Anwar Tower, 99-Shadman Chowk, Lahore, Pakistan.

**Phone:** (042)-35960091

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4. **Purpose & Scope of the EIA Study**

According to the review of the Initial Environmental Examination (IEE)/Environmental Impact Assessment (EIA) Regulation 2022, as prescribed by the Environmental Protection Agency, Government of the Punjab, hence, the project falls schedule-II category C (3)

**"Commercial Extraction Of Sand using Dredger"** in the category of the projects requiring Initial Environment Examination (EIA).

Therefore, to fulfill the legal requirements of Section-12 of the Punjab Environment Protection Act-2012, the client is required to submit the EIA report in the Environmental Protection Agency, Government of the Punjab, Lahore to obtain the required Environmental Approval (EA).

This EIA shall also satisfy the regulatory requirements of Mining and Mineral Department, Government of the Punjab. This report has been prepared according to the category defined in Schedule –II of review of IEE and EIA Regulations 2022". As desired under the "Guidelines for the Preparation and Review of Environmental Reports October 1997/2000", the elements of this EIA report address the followings:

i. Executive or non-technical summary (title and location of the project, name of the proponent, name of the organization preparing the environment report, brief outline of the report, major impacts, recommendations for mitigation and compensation and proposed monitoring).

ii. Description of the objectives of the proposal.

iii. Description of the proposal and its alternatives (status of the proposal in the project cycle, description of planning, design and implementation stages, requirements for raw materials, water, energy and equipment).

iv. Discussion of the proposal and current land use and policies (current land use controls in the context of the Government policies).

## 5. Brief Description Of Project

The project envisages with the excavation of sand. The total area of the project is **30129.234** Acres. To plan ordinary sand excavation for commercial activity and for the purpose of mining activities, the project is commercial in nature. The area is leased by the project proponent vide Mines and Mineral Department letter No. ADC/ML-CHINIOT/ORDINARY SAND/CHINIOTBRIDGEUPSTREAM ZONE (1)/249-256 dated 22-02-2022.

**Table 0-1 Project Description**

| **BRIEF OUTLINE OF PROJECT** | | | |
|---|---|---|---|
| **Project Name** | Excavation of Ordinary sand over an area of **30129.234 acres** | | |
| **Project Location** | Situated at Chiniot Bridge Zone (1) Upstream zone near Chenab Bridge, District Chiniot. | | |
| **Total Lease Area** | **30129.234 acres** | | |
| | **Points** | **Easting(Yards)** | **Northing(Yards)** |

| BRIEF OUTLINE OF PROJECT | | | |
|---|---|---|---|
| UTM COORDINATES | A | 3210300 | 843350 |
| | B | 3210300 | 850000 |
| | C | 3214000 | 850000 |
| | D | 3221000 | 852000 |
| | E | 3225000 | 858000 |
| | F | 3229000 | 858398 |
| | G | 3228615 | 852231 |
| | H | 3226000 | 847000 |
| | I | 3219327 | 847000 |
| | J | 3215000 | 843600 |
| | K | 3213000 | 843000 |
| | L | 3212240 | 843400 |

## 6. Sand Excavation Methodology

Dredging is an excavation activity or operation usually carried out at least partly underwater, with the purpose of gathering up bottom sediments and disposing of them at a different location. In all situations the operation is undertaken by special floating plant, known as dredger. A dredger is a piece of equipment which can dig, transport and dump a certain amount of underwater laying sand in a certain time. The quantity of sand moved per unit of time is called production.

Portable river sand suction dredger is widely used for sand dredging, mud dredging, port building and deepening, the centrifugal sand pump can produce certain amount of vacuum, the sand and mud is conveying and discharging by pipeline and floater. The working process of this potable river sand suction dredger is as followed. The high pressure sand pump can produce certain amount of vacuum so the underwater sand and mud can be mixed into slurry; the mixing slurry is conveyed through the pipeline to the specified place.

## 7. The Major Impacts

Mitigation measures of anticipated impacts during the development and excavation phases of the Project are summarized as below.

**Table E-1: Summary of Impacts and Their Mitigation Measures during Development & Excavation Phase**

| Impacts and their Mitigations | | | |
|---|---|---|---|
| **Sr. No.** | **Project Component/ Impact** | **Targets to be Achieved** | **Mitigation/ Preventive Action** |
| **Development Phase** | | | |
| 1) | **Minor Erosion of Land**<br>Loss of topsoil due to the soil erosion and mixing with overburden activities due to earth activities | – Compliance with prescribed PEQS | – Take topography, natural drainage and also site runoff patterns into accounts.<br>• Ensure adequate drainage.<br>• Stabilize all slopes, re-vegetating with native species to reduce/avoid erosion.<br>– Break-up compacted surfaces and replace topsoil, brash, seed source, leaf litter, etc.<br>– Excavation and conservation of topsoil before the commencement of mining operations may involve some overburden waste which will be preserved all along the boundary barrier for afforestration<br>– All erosion and sediment control measures will be maintained in a functioning condition |

| Impacts and their Mitigations | | | |
|---|---|---|---|
| **Sr. No.** | **Project Component/ Impact** | **Targets to be Achieved** | **Mitigation/ Preventive Action** |
| 2) | **Contamination of land and water** | – Compliance with prescribed PEQS to control water and land pollution | – Essential services like water supply, sewerage disposal and solid waste management must be in working condition |
| 3) | **Air Quality**<br>– Dust resulting from initial preparation of site<br>• Boundary positioning<br>• Mobilization of workforce<br>• Site clearing<br>– Use of heavy machinery can generate exhaust | – Compliance with prescribed PEQS to control air pollution | – The staging of the project will reduce the generation of dust.<br>– Periodic maintenance and management of all the machinery and vehicles<br>– Cutting and burning shrubs for fuel will be prohibited. Similarly waste burning will not be allowed. |

| Impacts and their Mitigations | | | |
|---|---|---|---|
| **Sr. No.** | **Project Component/ Impact** | **Targets to be Achieved** | **Mitigation/ Preventive Action** |
| | and dust emissions | | |
| 4) | **River flow**<br>– Flow pattern might be changed due to river bed extraction.<br>– Project activities depth will be increased, which may result in increase of flow velocity | – Minimization of any adverse impact on the flow patterns of River Chenab during excavation | – No diversion is proposed. There will not be any adverse impact on flow pattern, surface hydrology and ground water regime.<br>– Extraction activities will be restricted to 3.0m depth, which will not cause much change in flow pattern of the river<br>– An offset will be left from both sides of river, which will minimize the chances of bank failure |
| 5) | **Waste**<br>– Generation of solid & liquid waste from camp sites<br>– The solid waste will be reduce as | – Control of groundwater or surface water pollution from activities | – Ensure prevention of inappropriate disposal of waste material<br>– Conduct separate collection of and domestic waste to promote recycling and re-use<br>– Proper disposal of waste on agreed site as per agreed method. The area to be leveled and contoured after disposing excess material. No waste or debris will be thrown in the nearest canal water or other water bodies |

| Impacts and their Mitigations | | | |
|---|---|---|---|
| **Sr. No.** | **Project Component/ Impact** | **Targets to be Achieved** | **Mitigation/ Preventive Action** |
| | all the workers are commuting daily on site. | | |
| 6) | **Noise**<br>– Noise caused by machinery and vehicles used for mobilization of equipments | – Proper & safe handling and disposal of related waste<br>– Implementation of waste management plan | – The contractor will strictly follow the PEQS for ambient noise<br>– Control noise through control of working hours and selection of less noisy equipment.<br>– A interval will be established, used and adhered to<br>– Prohibit use of pressure horns<br>– Proper maintenance of vehicles and equipment.<br>– Minimize/avoid unnecessary use of pneumatic drills and other noisy machinery<br>– The personal protective equipment (PPEs) will be provided to the workers and its usage will be made mandatory<br>– Activities will be conducted during daytime. |

| Impacts and their Mitigations | | | |
|---|---|---|---|
| **Sr. No.** | **Project Component/ Impact** | **Targets to be Achieved** | **Mitigation/ Preventive Action** |
| 7) | **Socio-economic Impacts** | – Empowerment of locals to possible extent<br>– Increase in employment and business opportunities for locals | – Provide walkways and metal sheets where required to maintain access for public or vehicle<br>– Lighting on the site shall be pointed downwards and away from oncoming traffic<br>– The site must be kept clean to minimize the visual impact of site<br>– Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors<br>– Noisy activities must be restricted to the times given in the Project Specification or General Conditions of contract<br>– Employ local residents as much as possible |
| **Excavation/Operational phase** | | | |

| Impacts and their Mitigations | | | |
|---|---|---|---|
| **Sr. No.** | **Project Component/ Impact** | **Targets to be Achieved** | **Mitigation/ Preventive Action** |
| **1.** | **Air quality**<br>- Due to dust generation, dispersion during the earth-moving and excavation operations<br>- Excavation of ordinary sand<br>- Loading of ordinary sand | Compliance with PEQS | - Use of best practice management techniquesduring excavation and loading of ordinary sand.<br>- All the loaded vehicles going to and leaving the excavated site should be adequately covered to prevent the spillage of materials during transport of the ordinary sand.<br>- Use of new, efficient vehicles, driver training to minimize emissions (e.g. prevention of overrevving, shut off engines when vehicles not inuse), proper maintenance, rationalization of traffic management system to optimize transport efficiency<br>- Establish hoarding and maintain the vegetation stripes along the site boundary to minimize the spread of fly dust. |
| **2.** | **River flow**<br>– Flow pattern might be changed due to river bed extraction.<br>– Obstruction in river flow / course. | – Minimization of any adverse impact on the flow patterns of River Chenab during excavation | – No diversion is proposed. There will not be any adverse impact on flow pattern, surface hydrology and ground water regime.<br>– Extraction activities will be restricted to 3.0m depth, which will not cause much change in flow pattern of the river.<br>– An offset will be left from both sides of river, which will minimize the chances of bank failure |

| Impacts and their Mitigations | | | |
|---|---|---|---|
| **Sr. No.** | **Project Component/ Impact** | **Targets to be Achieved** | **Mitigation/ Preventive Action** |
| | – Erosion of channel bed. | | – Extraction of minerals will be started from dip side towards rise at the centre and also laterally in 1.0m slice. Unwanted material or spillage (if any) will not be stacked by the side of the excavation voids created. Excavation will be carried out in a manner so that water flow / course will not be obstructed.<br>– Extraction is to be done leaving safety barrier or offset on both sides and maximum barrier should be on concave side of river preferably the flow channel (excavation void created) should be kept straight so as to help avoid erosion as side cutting or collapsing.<br>– Safety zone or buffer area will be created from the river banks to minimize the instability & erosion and to increase the stability of structures. These safety zones will not be mined out<br>– Quantities will be strictly limited so that sand accumulation rates are sufficient to avoid extended impacts on channel morphology<br>– Extraction will be carried out as per approved Mine Plan in scientific and systematic way. |

| Impacts and their Mitigations | | | |
|---|---|---|---|
| **Sr. No.** | **Project Component/ Impact** | **Targets to be Achieved** | **Mitigation/ Preventive Action** |
| **3.** | **Water Quality**<br>Change in surface water quality and ground water quality | – Control of groundwater or surface water pollution from activities | – There will be no change in surface water quality as river is seasonal.<br>– Ground water quality will not be affected due to excavation activities as it is restricted to 3.0m depth and the water level is 9-15 m below the surface of river bed.<br>– The extraction will not be allowed below the water table<br>– Regular monitoring of water samples will be done as precautionary measures. |
| **4.** | **Waste**<br>– Generation of solid & liquid waste<br>– The solid waste will be less as all the workers are commuting daily on site. | – Control of groundwater or surface water pollution from activities | – Ensure prevention of inappropriate disposal of waste material<br>– Conduct separate collection of and domestic waste to promote recycling and re-use<br>– Proper disposal of waste on agreed site as per agreed method. The area to be leveled and contoured after disposing excess material. No waste or debris will be thrown in the nearest canal water or other water bodies<br>– Portable Bio-toilets will be used; hence no sewage / liquid effluent will be generated and contamination is also not expected due to percolation. |

| Impacts and their Mitigations | | | |
|---|---|---|---|
| **Sr. No.** | **Project Component/ Impact** | **Targets to be Achieved** | **Mitigation/ Preventive Action** |
| 5. | **Noise & Vibration**<br>– Noise from vehicles used for mobilization of items | – Compliance with prescribed PEQS to control Noise pollution | - Control noise through control of working hours and selection of less noisy equipment.<br>- Installation of low noise/ low vibration type equipment<br>- Proper maintenance of equipments<br>- Provision of ear muff to workers working near noisy machinery |
| 6. | **Habitat**<br>– Destruction of fauna and habitat (mammals, birds, reptiles, amphibians, invertebrates). | – Habitat rehabilitation (if any disturb during excavation ) | - Further ecological/fauna survey at appropriate seasons and translocations monitored by the proponent specialist<br>- Moving fauna to neighboring sites may help short-term survival, but not medium-term if these sites are already occupied. In long term populations may recover on restored sites. |

| Impacts and their Mitigations | | | |
|---|---|---|---|
| **Sr. No.** | **Project Component/ Impact** | **Targets to be Achieved** | **Mitigation/ Preventive Action** |
| 7. | **Access to social services**<br>– Employment opportunities | – Improved social infrastructure | - Provision of employment to every affected person on fair basis |
| 8. | **Work environment (including work safety and security)**<br>– Labor accidents due to handling heavy loads; working<br>– | – Prevention measures against labor accidents and health problems<br>– Provide appropriate security | - Labor accidents<br>- Prepare a manual for labor accident prevention including safety education and training<br>- Prohibit over lifting through workers<br>- Provide workers with appropriate protective equipment<br>- Inspect and ensure that any lifting worker, are appropriate for expected loads<br>- Keep lifting devices well maintained and perform maintenance checks as appropriate<br>- Use equipment that protects against electric shock<br>- Observe related standards and provide workers with appropriate facilities<br>- Provide appropriate security to site |

| Impacts and their Mitigations | | | |
|---|---|---|---|
| **Sr. No.** | **Project Component/ Impact** | **Targets to be Achieved** | **Mitigation/ Preventive Action** |
| **9.** | **Groundwater Recharge Potential**<br>– Impact on ground water recharge potential as the thickness of the natural filter materials (sediments) is reduce causing less infiltration. | – Minimization of excavations face during development. Temporary drainage grooves and sedimentation ponds for surface run-off collection. | - Extraction will be done as per approved Mine Plan and applicable Rules & Regulation, so that there is no damage on ground water recharge potential due to sand extraction. |
| **10.** | **Traffic collisions – onsite**<br>– There may be noise increases at residential properties in proximity to the chosen access | | - Driver fatigue management to be incorporated.<br>- Enforce speed restrictions;<br>- Ensure in-vehicle communications equipment;<br>- Ensure communication policy between vehicles in operational area;<br>- Ensure roll-over protective structures fitted to vehicles as appropriate;<br>- Ensure regular vehicle maintenance schedule; |

| Impacts and their Mitigations | | | |
|---|---|---|---|
| **Sr. No.** | **Project Component/ Impact** | **Targets to be Achieved** | **Mitigation/ Preventive Action** |
| | route, and then from the link road once completed | | |

## 8. Proposed Monitoring

The monitoring program is designed to ensure that the requirements of the environmental approval awarded by the EPA are met. Monitoring Program (MP) provides important information that allows for more effective planning and an adaptive response based on the assessment of the effectiveness of mitigation measures. The monitoring of various parameters will help to determine the extent to which project construction/operation activities will cause environmental disturbance.

**Table E-2: Proposed Monitoring**

| Components | Parameter | Location | Monitoring Mechanism | Monitoring and Reporting Frequency |
|---|---|---|---|---|
| Dust Emissions | ▪ According to PEQS | ▪ Tracks along the roads during developme nt period. | Ambient Particulate Matter Monitoring. | ▪ Sampling and laboratory testing should be done on monthly basis during the development and annually during the excavation stage. |
| Noise Levels | ▪ According to PEQS | ▪ Camp sites,<br>▪ Selected locations along the project access. | Continuous source appropriate monitoring using Noise meter | ▪ Monthly during the development and excavation stage. |
| Air emission | CO, $NO_2$, $SO_2$, $PM_{10}$ | Silencers of trucks and other vehicles during development and excavation phase | Emissions monitoring system.<br>Monitoring of ambient air quality. | ▪ Monthly monitoring of air pollution parameters including $PM_{10}$, $NO_X$, $SO_X$, CO, Hydrocarbons during the development period, and quarterly monitoring of |

| | | | | |
|---|---|---|---|---|
| | | | | $PM_{10}$, $NO_X$, $SO_X$, CO, VOCs during the excavation stage. |
| Inconvenience to community | - | All around the Project Area | Consultations with community to get feedback about inconvenience due to the development activities to perform their daily routine chores. | • Monthly monitoring and reporting during the development period. |

## 9. Conclusion

It is concluded that the project should run in an environmentally sustainable order and in full compliance with the Punjab Environmental Protection Act (PEPA) 1997 (amended 2012), rules, regulations and the Punjab Environment Quality Standards (PEQS). The project, therefore, provides the necessary safeguards for the protection of all the elements/segments of environment including in particular human and environmental health.

No sensitive habitat with any particular ecological value was identified in the project area. There are no forests or fish farming activities in the vicinity of the project area.

In conclusion, the EIA of the project shows that by adopting environmental management and mitigation measures, the project will not have any adverse impact on the environment and the surrounding community.

# 1. INTRODUCTION

This chapter of the Environmental Impact Assessment (EIA) Study Report for sand excavation by using dredgers presents the information relevant to the EIA carried out by Integrated Environment Consultants. Details of the project title and project proponent, and EIA consultants are discussed below.

## 1.1 OBJECTIVE OF THE REPORT

The main objective of the current study was to identify the potential impacts of the project and to recommend mitigation measures to be followed. The ultimate aim was to establish if the proposed project will be environmentally sound.

**Methodology**

The following methods were used in undertaking this study:

**Literature review**

Literature review of reports, documents and other relevant information about the project was conducted. The review also included other literature & data found important.

**Site visit**

Site visits were made to get a general understanding of the target area and assess the environmental impacts of the project.

**Consultations**

Consultations were made with stakeholder, district officials, local leaders and other key informants who will be affected by the project.

## 1.2 PROJECT TITLE & PROPONENTS

Excavation of Ordinary Sand by Using Sand Dredger over an area of 30129.234 acres

**Location of Project:** Situated at Chiniot Bridge Upstream Zone (1) near Chenab Bridge, District Chiniot.

**Name of the Contact Person**

**Lease Holder Firm:** Star Traders.

**Proponent:** Nadeem Akhter

**Address:** PO Railway Road Lundpur, District Gujrat

**NAME OF ORGANIZATION PREPARING THE REPORT**

**Integrated Environment Consultants**

**Head Office:** Office # 11, 2nd Floor, Anwar Tower, 99-Shadman Chowk, Lahore, Pakistan.

**Phone:** (042)-35960091

**Email:** inenvconsultants@yahoo.com, **Web:** www.iec-consutants.com

## 1.3 DETAILS OF CONSULTANTS

Study team of M/S **Integrated Environment Consultants** which completed the EIA report consists of following experts:

**Table 1.1: List of Experts**

| Members | Qualification | Status in Project |
|---|---|---|
| Mr. Ahtasham Raza | M.Phil (Env. Sciences)<br>GC University, Lahore<br>Ph.D Scholar,<br>(Env. Sciences) University of the Punjab, Pakistan | Project Incharge |
| Mr. Adnan Sharif | Diploma of Environmental Law,<br>University of the Punjab | Team Leader |
| Mr. Mehmood Amjad | B.S (Hons.) Environmental Sciences,<br>NFC, IET. Multan | Environmentalist |
| Miss. Iram Naz | MSc Water Resources Management, CEWRE, U.E.T, Lahore | Water Resource Analyst |
| Ms. Gul Naz Malik | PhD (Environmental Sciences) University of the Punjab, Pakistan. | Environmentalist |

## 1.4 Brief Description of Nature, Size and Location of Project

The project envisages with the establishment of a sand excavation by using sand dredgers at Chiniot Bridge Zone (1), Upstream zone near Chenab Bridge, District Chiniot. The total area of the project is 30129.234 acres. To plan sand excavation for commercial activity and for the purpose of activities, the project is commercial in nature. The area is leased by the project proponent vide Mines and Mineral Department letter No. ADC/ML-CHINIOT/ORDINARY SAND/CHINIOTBRIDGEUPSTREAM ZONE (1)/249-256 dated 22-02-2022.

According to the Punjab Environmental Protection Act (PEPA), Section 12 - Initial environmental examination, and environmental impact assessment: "No proponent of a project shall commence construction or operation unless he has filed with the Government Agency or, where the project is likely to cause an adverse environmental effects an environmental impact assessment, and has obtained from the Government Agency approval in respect thereof." It is this legal requirement from the Government of Punjab that this Environmental Impact Assessment (EIA) report has been prepared to get Environmental

Approval (EA) from the Environmental Protection Department (EPD), Government of Punjab, Lahore.

This EIA report has been prepared according to the category defined in "Pakistan Environmental Protection Agency (review of IEE and EIA) Regulation 2000".

This report provides detailed basic specific information and facts; including environmental, economic, social, etc., enabling its assessment and justification that the project will meet the requirements of environmentally sustainable practices; during regular excavation stage; as desired under the Punjab Environmental Protection Act, 1997 (amended 2012), the Punjab Environment Quality Standards and the rules and the regulations thereof.

This report is being prepared under the "Guidelines for the Preparation and Review of Environmental Reports October 1997/2000". Details are available in the individual and respective sections of this report.

**Table 1-1 Project Description of Selected Area**

| | |
|---|---|
| **Project Name** | Excavation of Ordinary sand over an area of **30129.234 acres** |
| **Project Location** | Situated at Chiniot Bridge Zone (1) Upstream zone near Chenab Bridge, District Chiniot. |
| **Total Lease Area** | **30129.234 acres** |

## 2 SCREENING OF THE PROPJECT

According to the Punjab Environmental Protection Agency (review of IEE and EIA) regulations, 2022: Section - 4 Projects requiring an EIA

> *"A proponent of a project falling in any of the categories listed in Schedule II shall file an EIA with the Agency, and the provisions of Section 12 shall apply to such project."*

According to the review of the Initial Environmental Examination (IEE)/Environmental Impact Assessment (EIA) Regulation 2022, as prescribed by the Environmental Protection Agency, Government of the Punjab, hence, the project falls schedule-II category C (3) **"Commercial Extraction Of Sand using Dredger"** in the category of the projects requiring Initial Environment Examination (EIA).

Therefore, to fulfill the legal requirements of Section-12 of the Punjab Environment Protection Act-2012, the client is required to submit the EIA report in the Environmental Protection Agency, Government of the Punjab, Lahore to obtain the required Environmental Approval (EA).

# 3 SCOPING OF THE PROJECT

## 3.1 SPATIAL AND TEMPORAL BOUNDARIES OF ENVIRONMENTAL ASSESSMENT

Spatial boundaries for projects related to the environmental effects and cumulative effects for Valued Environmental Components. It depends on the Project Development Area and Local and Regional Assessment Area. Temporal boundaries are based on the timings and duration of project activity that will happen during the sand excavation phase. Excavation will be done in an environmentally friendly manner that will not harm any existing boundaries and surroundings of the project area. While the entire period of the lease all quality tests and flow measurements of the river will be done to achieve Punjab Environmental Quality Standards (PEQS). Safety roads, and access roads/approaches will be maintained. Maximum plantation will be done to rehabilitate the project site

The location of the project is Chiniot Bridge Upstream Zone (1) near Chenab Bridge, District Chiniot. Excavation of ordinary sand by using a sand dredger is over an area of 30129.234 acres (Google Map is attached)

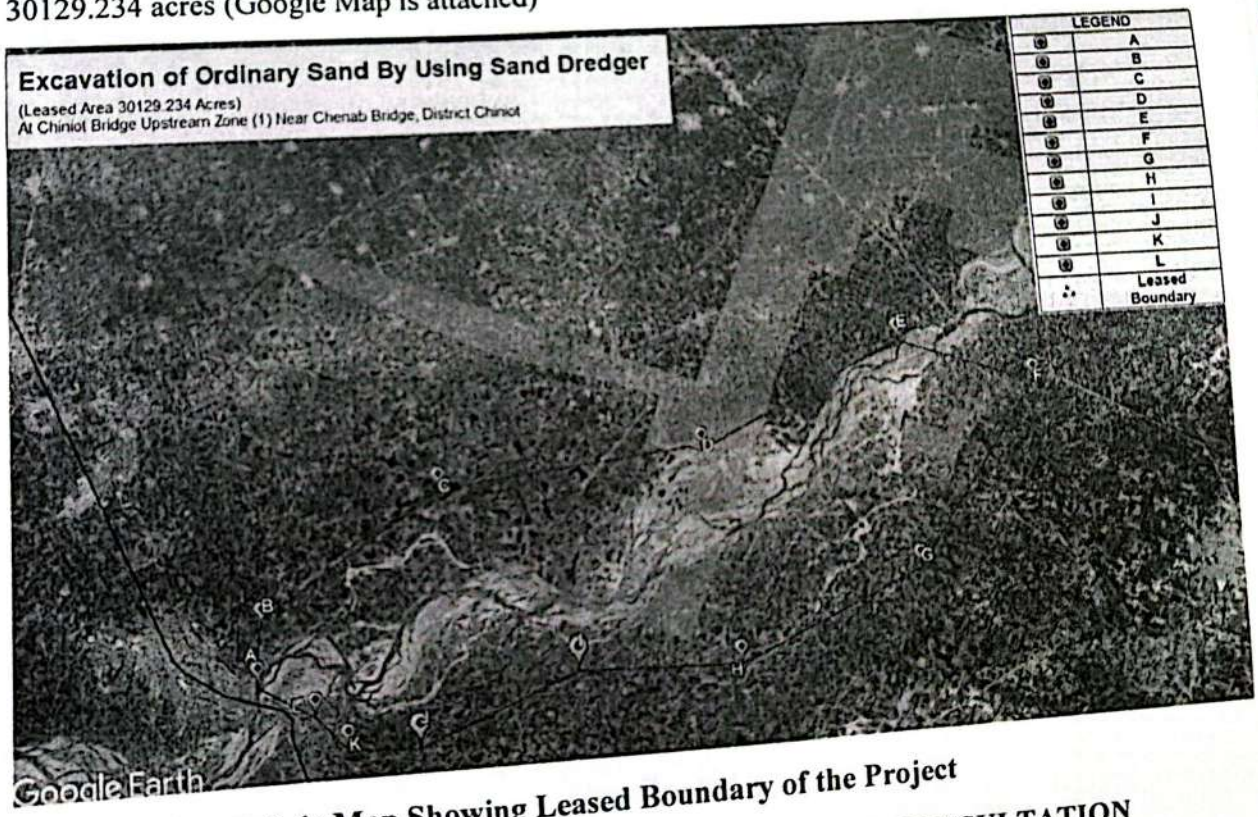



**Figure 3-1: Map Showing Leased Boundary of the Project**

## 3.2 IMPORTANT ISSUES AND CONCERNS RAISED DURING CONSULTATION

The regular survey and background studies were conducted to identify the stakeholders. People from surrounding areas were gathered who are likely to be affected, focus group meetings were conducted by the representatives. They were all briefed about the project's whereabouts in a nontechnical and understandable way. Certain issues and suggestion about the project that is included and raised by the locals were filed and recorded. Some important points raised during the consultation with locals are

- The project will not cause intrusion upon the privacy of residents of the area
- There must be a proper system for solid waste management and its final disposal
- There must be a proper system for the wastewater generated
- This project will not cause any hustle and bustle in the area due to the incoming and outgoing heavy traffic
- It is creating great employment opportunities for the local people
- Local people should be given preference for employment in the project;
- There will be a disturbance in the ecological and biodiversity patterns of the project area
- Proper management of traffic during project activities must be done to avoid disturbance to locals

Overall,the people of the area are satisfied with the project because the project will provide the labor opportunities to the locals and improve the economic condition of the area. The project will also provide the good quality of sand which is the basic raw material of construction

The consultation with the government officials and welfare organizations was conducted in a formal way which includes the technical approaches to the project and the verdict of the affected or local community was also kept in view. It was unanimously agreed by almost all the consultation participants of government officials and organizations that the project has not any adverse impact. Also, the project is necessary to provide high-quality sand to clients/customers.

## 3.3 SIGNIFICANT IMPACTS AND FACTORS TO BE DETERMINED

The following impacts are considered to be significant and proper mitigation and maintenance plans for these are made

- Increase risk of dust pollution
- Noise propagation within the work zone
- Impacts on aquatic life due to excavation during heavy rainfall/flood season.
- Impacts on workers during excavation activity
- Incidents of equipment
- Impact on quality of water body and river morphology
- Solid waste & Sludge from workers' camp

# 4 CONSIDERATION OF ALTERNATIVES

## 4.1 SITE ALTERNATIVES, THEIR SELECTION AND REJECTION CRITERIA

Proposed project is excavation of sand at Chiniot Bridge Upstream Zone (1) near Chenab Bridge, District Chiniot. Mines & Minerals department has granted the lease to the project proponent and site considered suitable both in terms of environment and physical constraints. As this project is excavation of Sand that will be used in different construction activities and to overcome the overburden layer of sand in river.

- **No Project Option**

The project is extraction of sand from Chiniot Bridge Upstream zone (1), Chiniot. The project is generating mass employment opportunities to the local population as well as to the labor working at associated activities. The 'No-Project' option, if taken, will raise large number of unemployment and secondly all associated development works at private or Government level will be affected.

- **Project Excavation at the Proposed Site with No Alteration**

In viewing the enriched sand deposit in Chiniot Bridge Upstream zone (1), the best solution to provide quality of sand for construction purposes is excavation of sand from this region by using an efficient and state of the art sand excavation machinery.

Dredger will be use at that site which will be cost effective and most suitable for sand excavation in high flow period. Additionally that site will not pose severe adverse impacts on the human health and environment. In this regard, Chiniot Bridge Upstream zone (1), Chiniot is considered most appropriate site for sand excavation.

## 4.2 DESIGN / TECHNOLOGY ALTERNATIVES, THEIR SELECTION AND REJECTION CRITERIA

### 4.2.1 Alternative (No Excavation of sand) Excavation Methods

Dredging is the excavation of material from a water environment. Possible reasons for dredging include improving existing water features; reshaping land and water features to alter drainage, navigability, and commercial use; constructing dams, dikes, and other controls for streams and shorelines; and recovering valuable mineral deposits or marine life having commercial value. In all but a few situations the excavation is undertaken by a specialist floating plant, known as a dredger.

The increased demand of sand use for different construction activities increased the sand excavation from the rivers. There are two main types of hydraulic dredges – hopper dredges and cutter suction dredges.

#### 4.2.1.1 Hydraulic Dredger

Hydraulic dredging focuses on pumping dredged materials from the excavation site to a processing site where the materials are sifted and sorted. This form of dredge relies on

creating slurry, or a liquidized mixture of rock, sand, dirt, gravel, etc. that is then sucked to a sorting area

**Advantages**

The operation procedures are that, from the floating pontoon, the suction pipe is lowered into the sea bottom and by suction action of the dredge pump which is often mounted on the suction ladder, seabed material is sucked up After raising the material through the suction pipe, the material is either hydraulically discharged through a floating pipeline to shore, or more often, loaded into a barge

**Weakness**

Hydraulic dredger has the disadvantages that the accuracy of dredging location is low and that considerable spill is possible due to relatively uncontrolled process of applying suction. Water is added to the excavated material for transportation purpose. Thus, dilution of excavated material is significant. Depending on the size of the suction dredger and the characteristics of the excavated material, the output rate can vary widely, from 50 to 5,000 $m^3$/hr.

#### 4.2.1.2 Hoper Dredger

A trailing suction hopper dredger is a ship that has a full sailing capacity used to maintain navigable waterways, deepening the maritime canals that are threatened to become silted, to construct new land elsewhere or to replace sand eroded by storms or wave action on the beaches.

**Advantages**

- Minimization of sediment/turbidity clouds on surface water by avoiding overflow and the possible related water pollution problems;
- Increased material flow in relation to transport water which in turn increases dredge efficiency by reducing loading time; and
- Decreased pressure drop inside the drag head, which reduces dredge pulling force. Thus, it reduces energy

**Weaknesses**

- Physical factors – These include, but not limited to, weather conditions and properties of materials to be dredged. Strong wind conditions will affect maneuvering and positioning of the dredging plant. Materials to be dredged in maintenance dredging are usually weak and contain many fines in the more exposed areas
- Operational factors – These usually relate to constraints due to marine traffic and limited working areas such as dredging adjacent to edges of marine structures. Maintenance dredging in a busy fairway can be difficult to carry out due to the need to maintain marine traffic. Capital works dredging is generally less affected by marine traffic.

- Environmental factors – These relate to environmental impacts of dredging and disposal operations on the water quality and the marine ecology, especially those operations connected with disposal of contaminated mud.
- Maintenance has generally been of a small scale and of short duration. Environmental factors need to be considered but have not been a major issue. Capital works dredging, on the other hand, is often close to sensitive receivers and the construction period may be up to few years for sizeable projects, thus

### 4.3 Environmental alternatives, their selection and rejection criteria

The major aim of proposed Project is to extract sand from overburden river area. The excavation Process results in reusable natural resource help to contribute in economy as well as availability of sand to local construction companies.

#### 4.3.1 Selection Criteria

- Prevention of illegal extraction which will help in sustaining the river and its aesthetic value.
- Dredging reverses the effects of soil erosion
- Dredging reduces the flood risks and used for cleanup of rivers.

#### 4.3.2 Rejection Criteria

- Increase in demand of sand for construction activities
- Illegal and insufficient miming leading to ecological disasters.
- Increase of sand overflow in rivers.

### 4.4 ECONOMIC ALTERNATIVES, THEIR SELECTION AND REJECTION CRITERIA

#### 4.4.1 Selection Criteria

- High quality of sand
- Near to city area
- Improvements in physical infrastructure
- Improvements in social Infrastructure.
- Increase in employment potential.
- Contribution to the exchequer.
- Direct Employment

#### 4.4.2 Rejection Criteria

- Large quantity of sand require for construction activities
- High operational, maintenance and transportation cost involves

# 5 DESCRIPTION OF PROJECT

Rivers are the most important life-supporting system of nature. For centuries, humans have been enjoying the natural benefits provided by rivers. Rivers provide the main sources of water reservoirs in addition to other sources like sand, clay, etc for its utilizations of other fundamental development of the society. During the rain and the natural water flow in river much of sand deposits in the river bed, thus may cause undue filling / overburden in river bed. This sand is an essential constituent of construction material required in a range of civil works including house buildings, road/infrastructure network, bridges, dams etc, thus removing of sand from river bed may be healthy for river bed as well as for commercial point. Therefore, Mines and Mineral Depart offers/ grant open auction / lease for surface excavation of sand from river to maintain the surface of river bed which ultimately also cause commercial activities beneficial both for the department in terms of revenue generation as well as construction sector of the country. This simultaneously has introduced sand mining on scientific scale. Particularly in the water flowing areas of rivers, the sand excavation can also be done through dredger. In addition to traditional use of manual or excavator machinery etc for sand excavation, the use of dredger would require submission of Environmental Impact Assessment (EIA) to the Environmental Protection Agency (EPA) Punjab.

## 5.1 TYPE AND CATEGORY OF THE PROJECT

Project of Sand Excavation by Using Sand Dredger by M/S Star Traders intends to excavate the sand deposited as overburden lease area at Chiniot Bridge Upstream zone (1), near River Chenab, Tehsil & District Chiniot. The project purpose is the excavation of sand by using dredgers for commercial purposes.

According to the review of the Initial Environmental Examination (IEE)/Environmental Impact Assessment (EIA) Regulation 2022, as prescribed by the Environmental Protection Agency, Government of the Punjab, hence, the project falls schedule-II category C (3) **"Commercial Extraction Of Sand using Dredger"** in the category of the projects requiring Initial Environment Examination (EIA) Therefore, as per new order any project involving use of dredger should conduct an Environmental Impact Assessment of the project.

Therefore, to fulfill the legal requirements of Section-12 of the Punjab Environment Protection Act-2012, the client is required to submit the EIA report in the Environmental Protection Agency, Government of the Punjab, Lahore to obtain the required Environmental Approval (EA).

## 5.2 OBJECTIVES OF THE PROJECT

The main objective of the project is to provide sand for commercial purposes like construction activities. River Sand for Construction is used as fine aggregate in mortars and concrete. Natural river sand is the most preferred choice as a fine aggregate material. River sand is a product of natural weathering of rocks over a period of millions of years.

## 5.3 LAND USE ON THE SITE

Land use on site is river land which is leased by Mines and Minerals Department because of the presence of high deposits of sand.

## 5.4 ROAD ACCESS

The project site is easily accessible from Chiniot Ring road which connects the project area through a link Katcha road.

## 5.5 VEGETATION FEATURES OF THE SITE

Proposed project site is river land having no vegetation.

## 5.6 COST AND MAGNITUDE OF OPERATION

Lease cost of Chiniot Bridge Upstream Zone (1), for sand excavation site is Rs. 32, 80, 32,232/-. Transportation cost and operation and maintenance of machinery and vehicles are the costly activities involved in the operation phase of the project. Equipment facility will be assured if these operations are carefully managed.

**Table 5-1 Cost Break-up of Project**

| ACTIVITY | COST |
|---|---|
| Lease Cost | 3280 Million |
| Operational | 50 Million |
| Environmental Management and Monitoring Cost | 10 Million |
| **Total** | **3340 Million** |

## 5.7 SCHEDULE OF IMPLEMENTATION

The project will be executed as soon as the no objection certificate from the environmental protection agency, Punjab will be issued, as the proponent has applied for other mandatory approvals from concerned departments The Project will be implemented in 1 week after the issuance of the EPA NOC.

The schedule of implementation should do in three different stages that are as follow;




**Figure 5-1 Implementation Schedule**

## 5.8 LOCATION OF PROJECT

The project site is located at Chiniot Bridge Upstream zone (1), near River Chenab, Tehsil & District Chiniot. The project layout map is in **Figure - 5.2.**

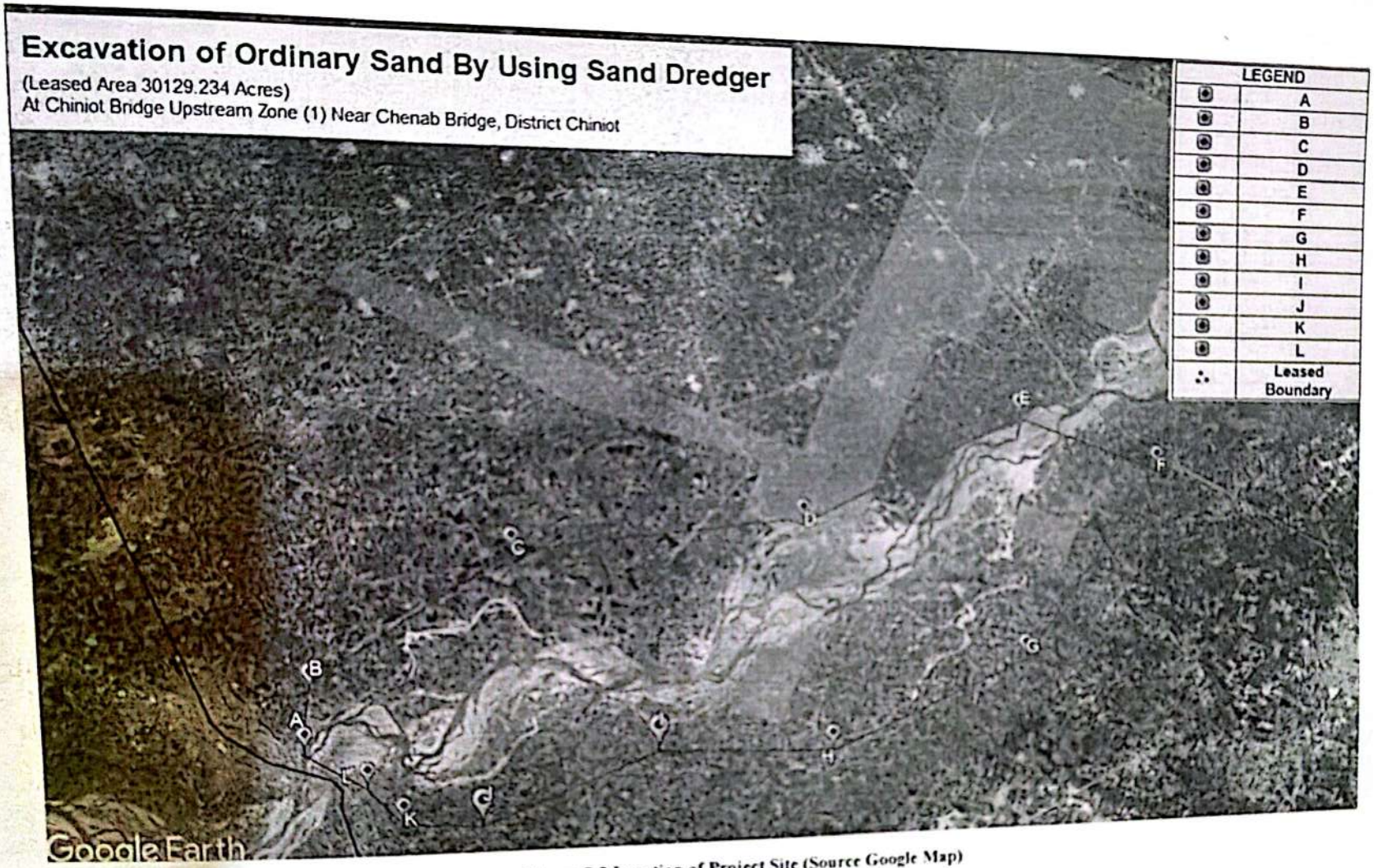



Figure 5-2 Location of Project Site (Source Google Map)

## 5.9 PROPOSED INFRASTRUCTURE AND BASIC AMENITIES

| | |
|---|---|
| Proposed Basic Amenities will be provided to workers at the excavation site | Rest room shelter/Tents, first-aid facility, PP temporary structure office and Portable Bio toilets, etc |
| Power requirement | Only day time extraction operations will be carried out, hence no electricity is required |
| Nearest source of Water supply & Demand | Daily water demand will be procured through tanker of nearby villages as per demand. |
| Manpower Requirement | Total employment in the extraction activities will be around 50 people and local villagers will be preferred for skilled and non-skilled jobs. |

## 5.10 DESCRIPTION OF PROJECT

**Nature Of The Project**

Extraction of sand using sand dredger from Chiniot Upstream Bridge zone (1), near River Chenab, Tehsil & District Chiniot, Punjab.

**Depth:**

As per Mines & Mineral Rules, No sand mining shall be done 200 feet upstream and 500 feet downstream of a structure. Excavation activities will start in the blocks from the upstream to the downstream side. This will not obstruct the movement of water, if any, during the monsoon period in the river course.

**Storage Area:**

Stockpile area will be limited to 0.5 hacter and will be located on an even surface.

**Loading And Unloading And Transportation Detail:**

The sand placed in the form of a stockpile and will be loaded to transport trucks with front-end loaders for sale to the local market. Roads in the lease area for the movement of loaded tippers/ trucks will not have slopes more than 1 in 10 feet. Roads will be properly maintained in the lease area and water sprinkling will be done for dust suppression

**Duration Of Lease:**

The area is on lease for two years. The total area of the project is 30129.234 acres.

(Lease documents are attached in the annexure)

**Benefits Of The Project**

- Being based on the use of a submersible pump, the dredger is more efficient and drastically reduces fuel consumption
- The particular design of the dredger allows for getting only good quality material avoiding waste of energy and granting the end user to work with high-quality sand for construction purposes.
- To reduce damages from future flood disasters
- Increase flow-carrying capacity

**Coordinates Of The Proposed Location**

The coordinates of the proposed site are as follows:

**Table 5-2 Project Descriptions**

| **Project Name** | Excavation of Ordinary sand over a lease area of **30129.234 acres** | | |
|---|---|---|---|
| **UTM Coordinates** | **Points** | **Easting(Yards)** | **Northing(Yards)** |
| | A | 3210300 | 843350 |
| | B | 3210300 | 850000 |
| | C | 3214000 | 850000 |
| | D | 3221000 | 852000 |
| | E | 3225000 | 858000 |
| | F | 3229000 | 858398 |
| | G | 3228615 | 852231 |
| | H | 3226000 | 847000 |
| | I | 3219327 | 847000 |
| | J | 3215000 | 843600 |
| | K | 3213000 | 843000 |
| | L | 3212240 | 843400 |

## 5.10.1 METHODS OF SAND EXTRACTION

Sand extraction will be done in two seasons during low flow and high flow respectively.

i. **Low Flow Season**

Excavators will be used for the excavation of the sand during the dry season. The excavation will be limited to the river bed only. Sand will be extracted through excavators, loaded in dumpers, trolleys, or trucks transported to the local market.




**Figure 5-3 Excavator**

ii. **High Flow Season**

Dredging is an excavation activity or operation usually carried out at least partly underwater, in shallow seas or freshwater areas to gather up bottom sediments and dispose of them at a different location. In all situations, the operation is undertaken by special floating plant, known as dredger. A dredger is a piece of equipment which can dig, transport and dump a certain amount of underwater laying soil in a certain time. The quantity of soil moved per unit of time is called production.

Portable river sand suction dredger is widely used for sand dredging, mud dredging, port building and deepening, the centrifugal sand pump can produce certain amount of vacuum, the sand and mud is conveying and discharging by pipeline and floater. The working process of this potable river sand suction dredger is as followed. The high pressure sand pump can produce certain amount of vacuum so the underwater sand and mud can be mixed into slurry; the mixing slurry is conveyed through the pipeline to the specified place.

- **Features of river sand suction dredger:**
  - High efficiency, large output and long distance of pump.
  - Very simple and fast assembly and dis-assembly, afloat or onshore, simple operation, easy to control.
  - Good economic performance. The digging and delivery of material can be completed one time.
  - Highly efficient fuel consumption and minimum overall operational costs
  - Good access to all parts, especially the dredge pump wearing parts.
  - The dredgers can be made according to the customers' request.
- **Application**
  - Dredger is used for cleaning river silt, sand production and mining project.

- Applied to dredging rivers, lakes and ponds, reclaiming land, cleaning ports and pumping sand.
- Mainly service for the master dredger and transporter for delivering sand to land

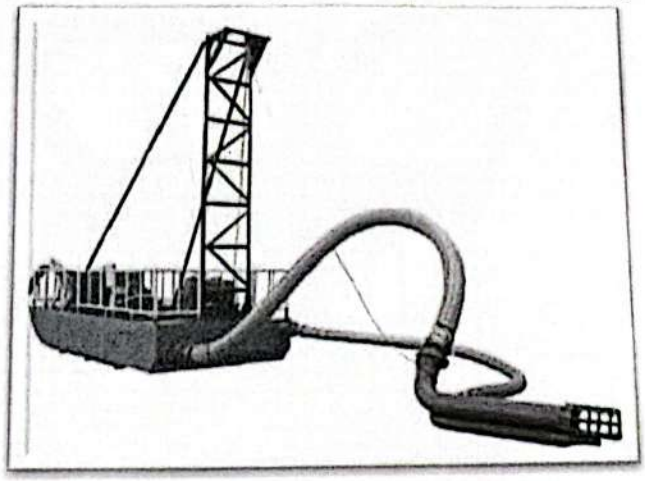


**Figure 5-4 Portable river sand suction dredger**

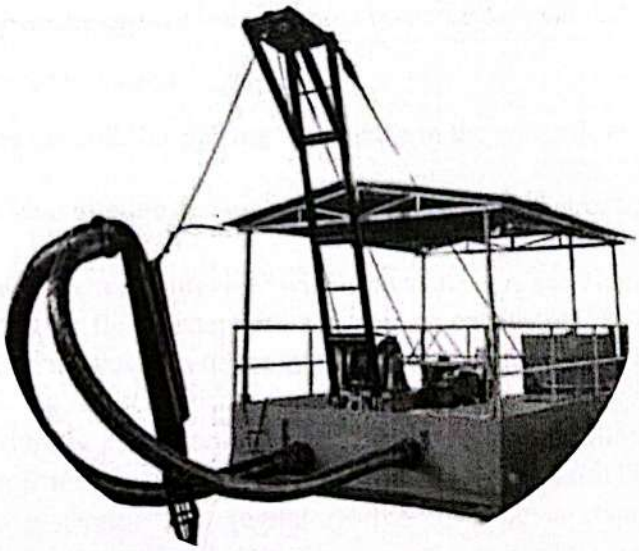


**Figure 5-5 Mini portable sand suction dredger**

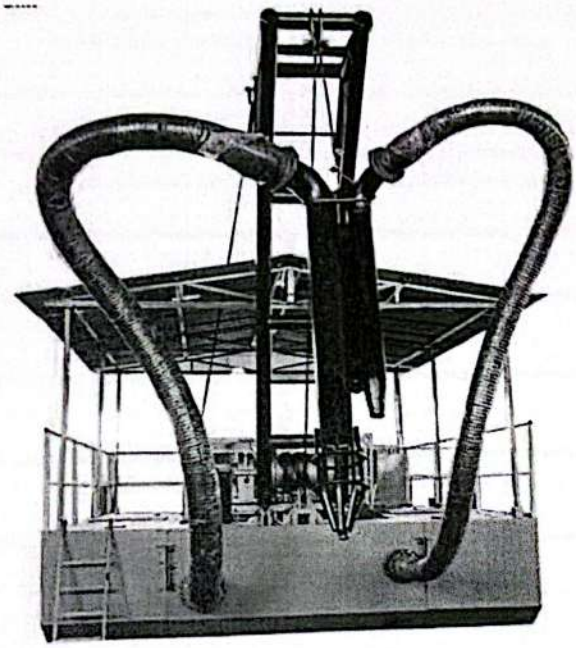


**Figure 5-6 Mini portable sand suction dredger**

### 5.10.2 THE DREDGING PROCESS

The dragging process consists of two steps

1. Digging the sand from the river for making it available to the water flow at the inlet of the suction pipe
2. Generating the water sand mixture and moving it to the suction inlet of the dredging pump.

   The dredge is provided by a "cutter device" which excavates the sand before it is sucked up by the flow of water. Drag flow cutters are a couple of excavators, running in a counter direction for keeping fix the position of the system as well as for conveying the material to the suction mouth.

   In drag flow, the mixture is generated by the mechanical effect of the agitator. Once the mixture is generated it is transferred to the pump inlet, the inlet mouth of the impeller is so close to the mixture generator area (agitator) that no pipe is required so the solid sedimentation is not an issue.

### 5.10.3 PROCESS FLOW CHART

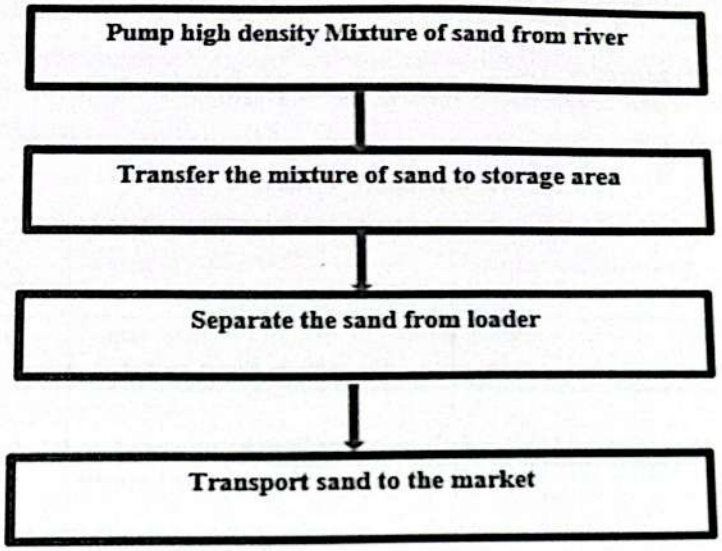



**Figure 5-7: Process Flow Diagram**

### 5.10.4 MAIN SPECIFICATIONS

The Dredger hull is made of 6 mm thickness steel plate

**Table 5-3 Specifications of Sand Dredger**

| Model (inch) | Dredger Size L*W*H(m) | Sand Capacity (m3/h) | Max. dig depth (m) | Max. discharge distance (m) |
|---|---|---|---|---|
| 4 | 4.5*2.0*0.7 | 25-30 | 5-6 | 50-80 |
| 6 | 5.8*2.2*0.75 | 45-60 | 6-8 | 80-100 |
| 8 | 5.8*2.2*1.00 | 60-80 | 8-15 | 100-120 |
| 10 | 5.8*4.2*1.00 | 80-100 | 15-20 | 120-200 |

## 5.11 HOURS OF OPERATION

The extraction will operate for 10 to 12 hours per day for 6 days per week.

## 5.12 COMPARISON OF PROPOSAL OPTIONS

### 5.12.1 Size

For assessment of the project economic viability, basic parameters including product demand and investment considerations are of major relevance. However, other important considerations also include environment, availability of adequate raw materials for its life-cycle and the basic infrastructure.

### 5.12.2 Work Force and Work Machinery

The details of the construction staff has been shown below in Table 5.3. The labor will work in one shift of eight (8) hours. The construction machinery which will be utilized for construction is shown in Table 5.4.

**Table 5-4List of Construction Staff**

| Sr. No. | Category of Staff | Tentative Number |
|---|---|---|
| 1 | Supervisor | 1 |
| 2 | Foreman | 2 |
| 3 | Skilled Worker | 10 |
| 4 | Semi Skilled Worker | 20 |
| 5 | Machinery Operator | 8 |
| 6 | Admin. | 1 |

**Table 5-5List of Construction Machinery to be used for Construction**

| Sr. No. | Type of Machinery | Quantity |
|---|---|---|
| 1 | Excavator | 2-4 |
| 2 | Dumper & Loader | 3-6 |
| 3 | Tractor & Trolley | 6-8 |
| 4 | Water Bowser | 2 |
| 5 | Generator | 1 |
| 6 | Water Pump | 2 |

## 5.13 RESTORATION/REHABILITATION AT THE END OF PROJECT LIFE

Land rehabilitation is the process of returning the area to some degree of its former state, after some process (industry, natural disasters, etc.) has resulted in its damage. Many projects and developments will result in the land becoming degraded, for example mining, farming etc.

After sand extraction area must undergo rehabilitation. Native species of the plants will be planted during the rehabilitation phase. The proponent may be carry out adequate restoration including landscaping. After the proposed extraction activity the area will be restored and reclaimed with maximum plantation. None of the locals or residents will be relocated or any vegetation or infrastructure affected or destructed. The area is acquired on lease from mines and mineral department.

# 6 DESCRIPTION OF ENVIRONMENT

## 6.1 GENERAL

This part portrays the pattern conditions, which cover the current physical, natural, and financial condition of the Study Area. Data on these viewpoints has been gotten from the work area investigation of accessible information, field visits to the study area just as data got through visits to the Government departments and different offices in particular Irrigation Department, Meteorological Department, Forest office and prevailing ecological laws and natural quality standards and so on.

## 6.2 DESK STUDIES

Wastewater Treatment Plant information was gathered from project area. This information incorporated the accessible records, illustrations, documents, and so forth identified with the subjected project. The specialists led a detailed work area investigation of the above accessible information before the field visit. Striking highlights of the project were completely investigated to evaluate their natural ramifications.

## 6.3 SITE VISITS

A team of experts visited to the project site for collection of baseline environmental data for ambient air, noise levels, drinking water and waste water sampling, public consultation, baseline ecological environment data etc. After the survey of the project area the environmental data regarding physical, ecological and socioeconomic aspects were collected for carrying out environmental assessment. Secondary data were also collected from various sources mainly studies carried out by project proponents and reports of other line Departments. A social survey of the proposed area was carried in which people living around the proposed site were interviewed to ascertain their views about the storage and utility facilities commissioning and operational activities to perceive the impacts on the natural and socioeconomic environment around the proposed project site. This included information on land, surface water, groundwater, air, vegetation, animals and human.

## 6.4 STUDY AREA

The proposed project will be installed in District Chiniot. Chiniot is situated in centre of Punjab province on bank of river Punjab in Faislabad division. Boundaries are attached with Faisalabad, Jhang, Hafizabad and Sargodha. Chiniot was Tehsil of district Jhang and it was declared a separate district in February 2009. Chiniot is further divided in two Tehsil's named as Bhuwana and Lalian. According to different sources, history of this city begins before capturing Multan by Mohammad Bin Qasim. Different castes of people from different schools of thoughts are living there. Chiniot is famous in all over world due to handicraft and carving on wooden utensils. Culture of this specific area is not much different from culture of Punjab province.

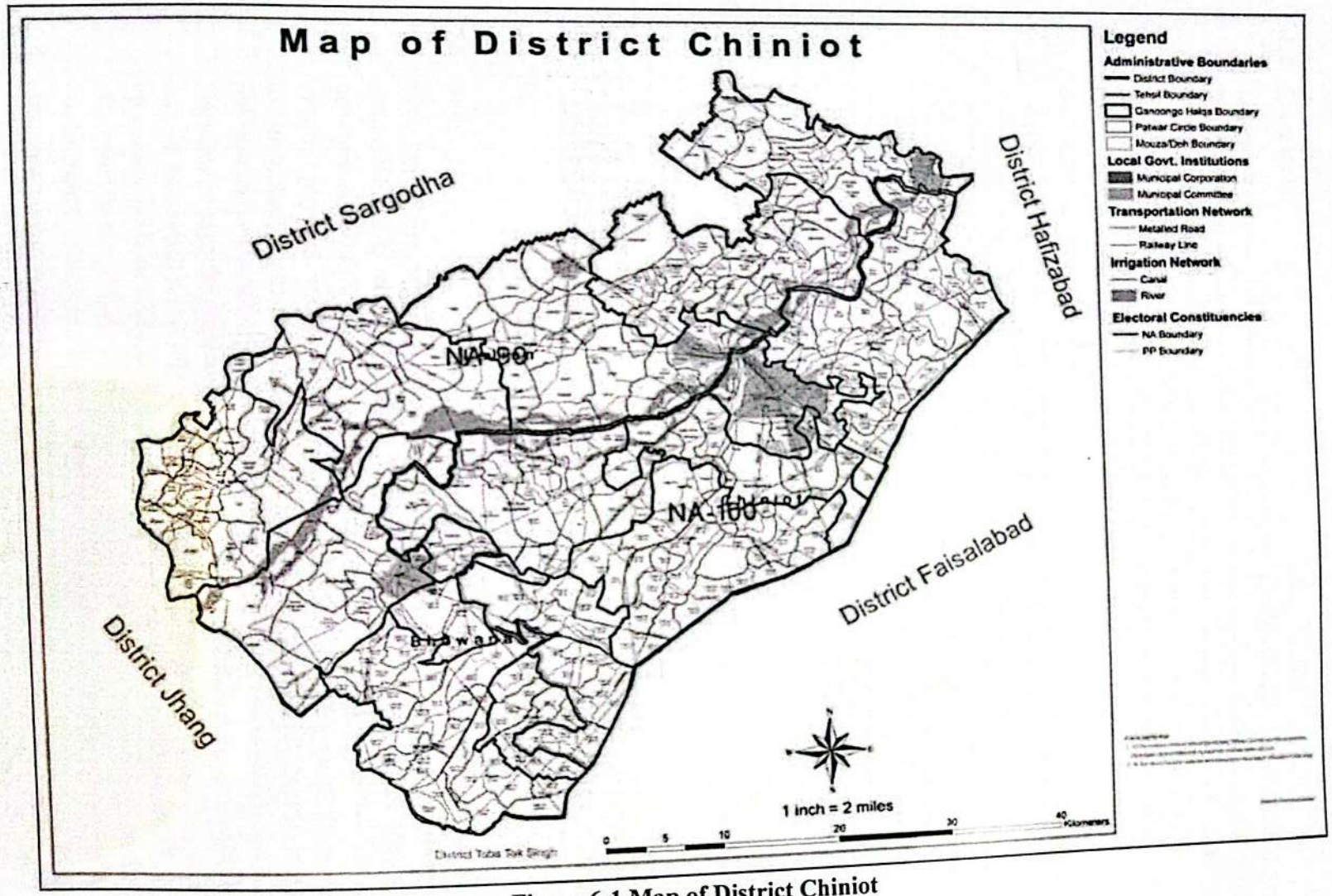



**Figure 6-1 Map of District Chiniot**

## 6.5 PHYSICAL ENVIRONMENT

### 6.5.1 Geography

Chiniot city lies on left bank of the Chenab River amidst small rocky hills. It is located at the intersection of the Faisalabad-Sargodha and Lahore-Jhang roads. It is 158 kilometres north-west from Lahore and 38 kilometres north of Faisalabad. Chiniot city is spread over an area of 10 square kilometers with an average elevation of 179 meters (587 ft). Rabwah city, the headquarters of the Ahmadiyya Community is located on the other side of the Chenab River. In the center of river a worship center (or Chilla Gah) of the Sufi Bu Ali Shah Qalandar is located.

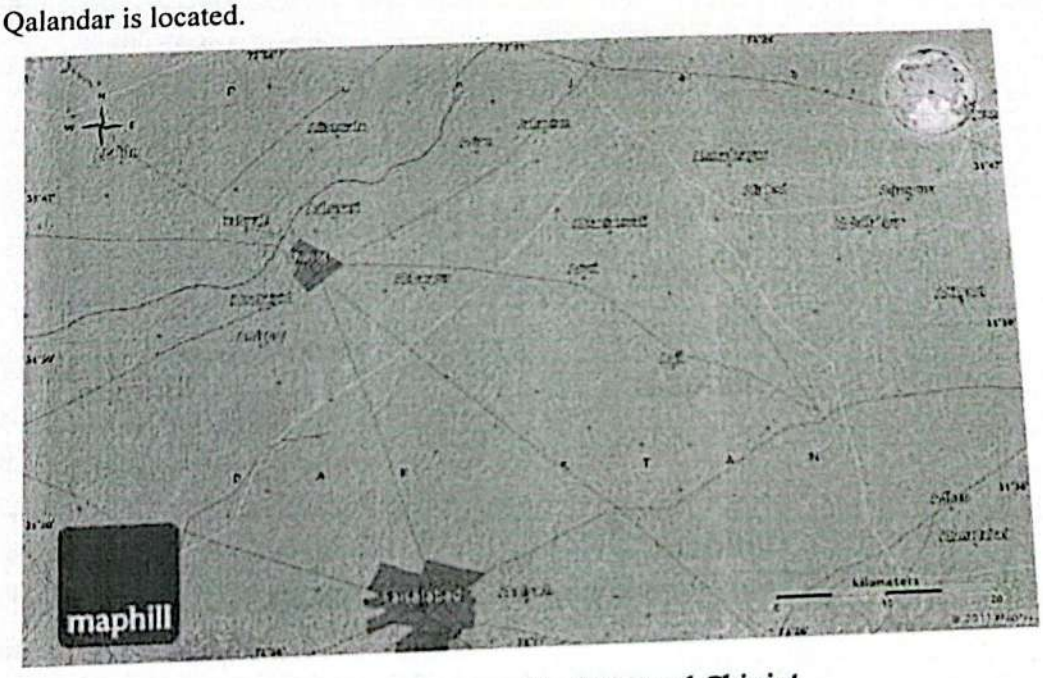



**Figure 6-2 Geographical Map od Chiniot**

### 6.5.2 Soil

Soils form major part of environment. Their fertility and other special characteristics have great relationship with environment. Climate has great influence on the formation of soil; therefore, study of these factors is of great importance. Soil is dynamic layer in which many complex physical, chemical and biological activities are taking place. Therefore, soil is a dynamic changing body. The land of Chiniot is generally plain and fertile. Chiniot lies on left bank of the Chenab River amidst small rocky hills. It is located at the intersection of the Faisalabad-Sargodha and Lahore-Jhang roads. It is 158 kilometres north-west from Lahore and 38 kilometres north of Faisalabad. Chiniot city is spread over an area of 10 square kilometers with an average elevation of 179 meters (587 ft). The soil of the district of alluvial character of very recent origin formed by rivers and their changing courses and sand can be found a few feet below the surface. The course of the rivers within area is winding and often subject to frequent alternations. In the rainy season, the currents are very strong.

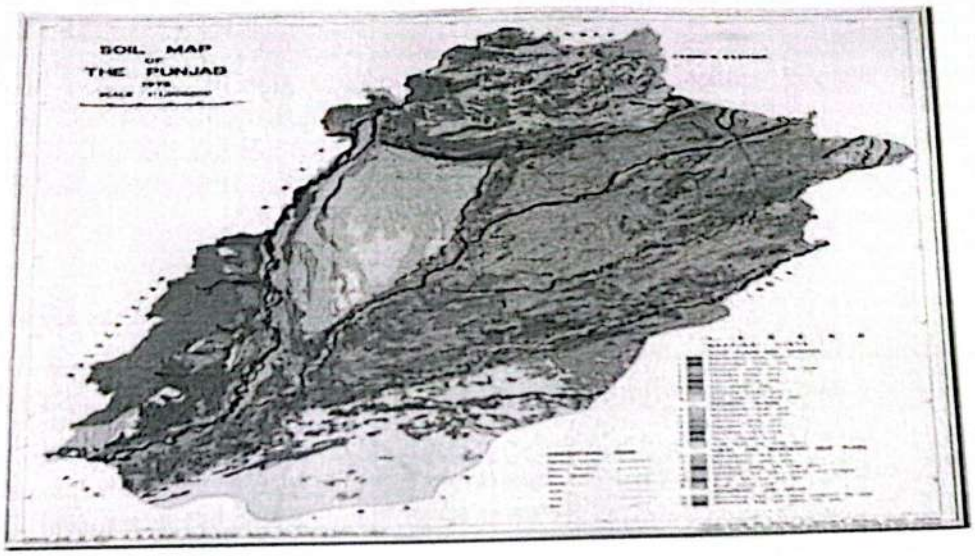



Figure 6-3 Soil Map of Punjab

### 6.5.3 Seismology

Earthquakes are generated due to tectonic processes in the upper part of the earth called lithosphere, which is divided into several rigid parts called "Plates". Due to the movement of these plates, stress build up takes place and results in the deformation of the crustal mass in the form of folding and faulting. The energy produced due to movement along the faults is depicted in the form of earthquakes.

Pakistan Earth Quake zone map showing the location of project site is presented as Figure – 3.2.

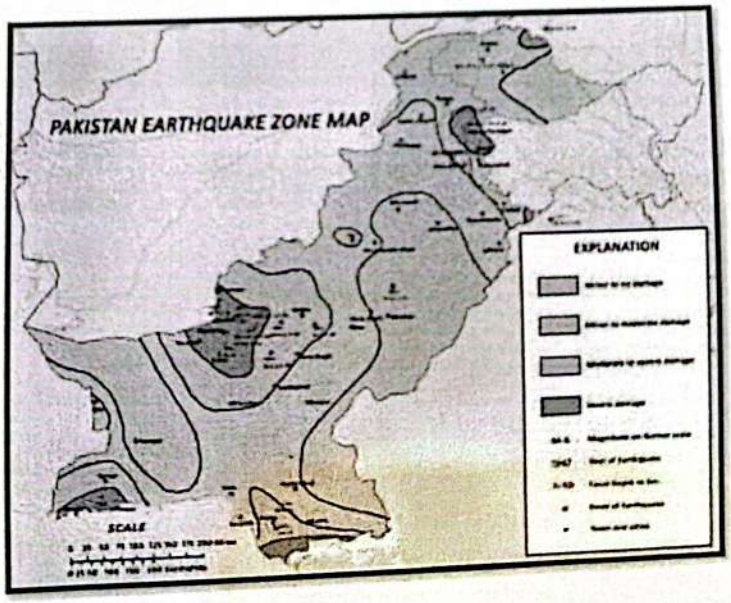



Figure 6-4 Seismic Zoning Map of Pakistan

### 6.5.4 CLIMATE

The weather in Chiniot is variable. Chiniot is hot in summer, and cool in winter. In Chiniot, the summers are sweltering, humid, and clear and the winters are short, cool, dry, and mostly clear. Over the course of the year, the temperature typically varies from 42°F to 105°F and is rarely below 38°F or above 112°F.

Based on the beach/pool score, the best time of year to visit Chiniot for hot-weather activities is from mid September to late October.

#### i. Temperature

Throughout the month of March daytime temperatures will generally reach highs of around 27°C that's about 81°F. At night the average minimum temperature drops down to around 16°C, that's 60°F.

In recent times the highest recorded temperature in March has been 36°C that's 97°F, with the lowest recorded temperature 5°C, about 40°F.

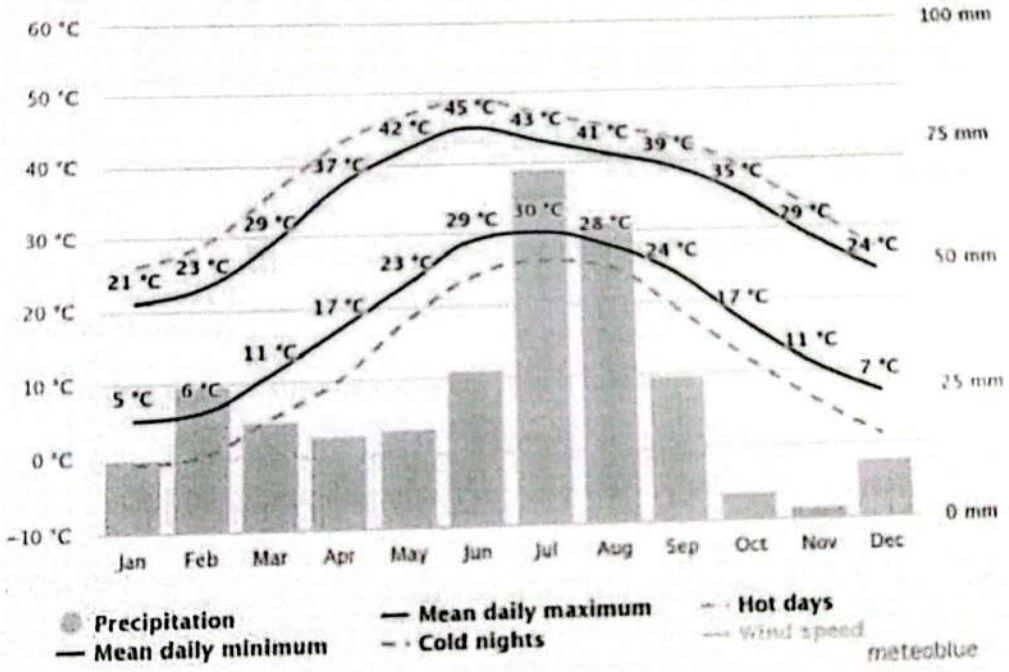



**Figure 6-5 Temperature Graph of Chiniot**

#### ii. Precipitation

A wet day is one with at least 0.04 inches of liquid or liquid-equivalent precipitation. The chance of wet days in Chiniot varies significantly throughout the year.

The wetter season lasts 2.5 months, from June 22 to September 6, with a greater than 21% chance of a given day being a wet day. The chance of a wet day peaks at 40% on July 23.

The drier season lasts 9.5 months, from September 6 to June 22. The smallest chance of a wet day is 2% on November 8.

Among wet days, we distinguish between those that experience rain alone, snow alone, or a mixture of the two. Based on this categorization, the most common form of precipitation throughout the year is rain alone, with a peak probability of 40% on July 23.

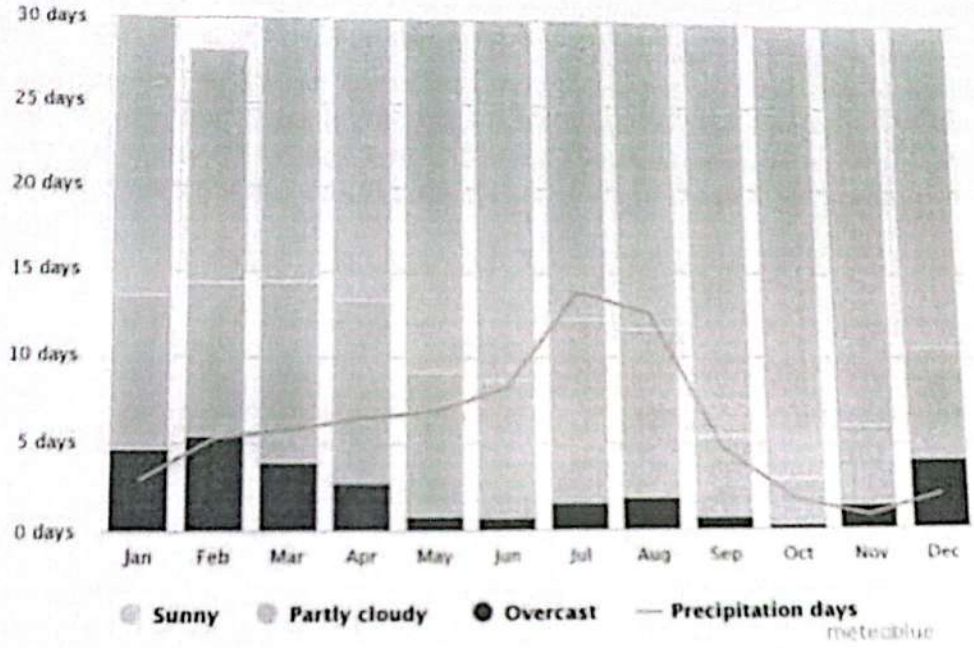



Figure 6-6 Average Precipitation in Chiniot

### iii. Relative Humidity

The average daily relative humidity for March is around 54%.

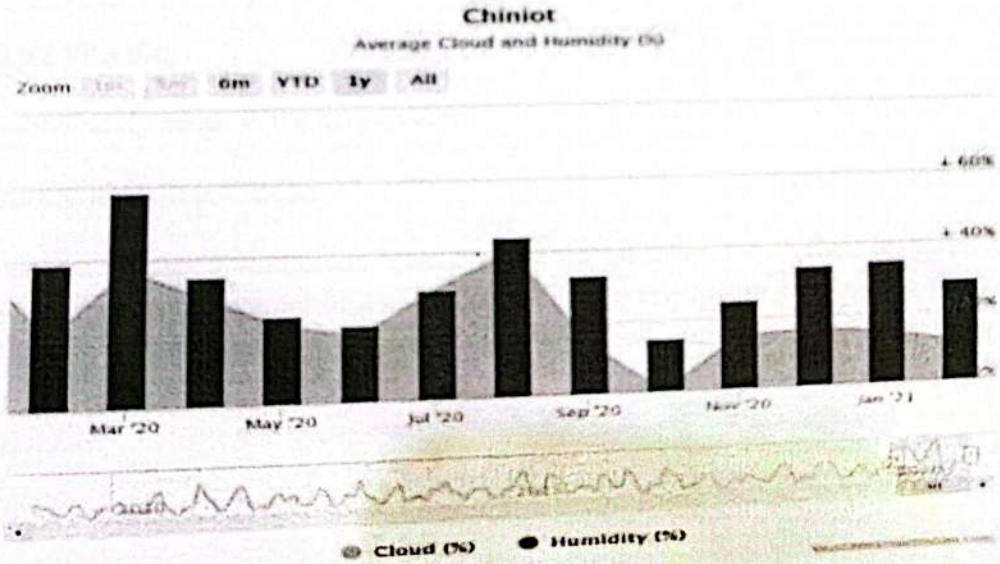



Figure 6-7 Average Humidity at Chiniot

iv. **Wind**

The average daily wind speed in March has been around 4 km/h, that's the equivalent to about 2 mph, or 2 knots. In recent years the maximum sustained wind speed has reached 56 km/h, that's the equivalent of around 35 mph, or 30 knots.

The wind rose for Chiniot shows how many hours per year the wind blows from the indicated direction. Example SW: Wind is blowing from South-West (SW) to North-East (NE). Cape Horn, the southernmost land point of South America, has a characteristic strong west-wind, which makes crossings from East to West very difficult especially for sailing boats.

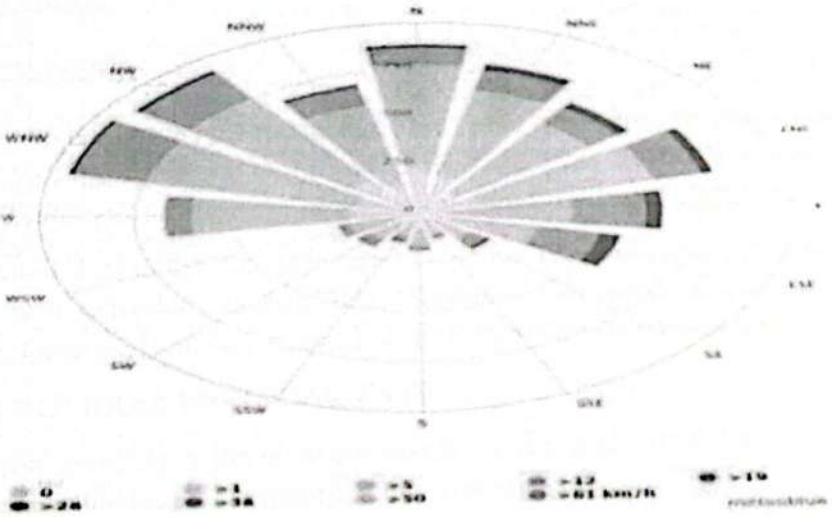


**Figure 6-8 Average Wind rose at Chiniot**

v. **DUST STROMS**

Storms rarely occur in the project area.

## 6.5.5 BIOLOGICAL RESOURCES

Mainly a country's wilderness areas and scenic landscapes with their associated flora and fauna form natural capital of a country. Both collectively and within each level, the range or variety of the resources is referred to as the "Biological Diversity". The contribution of the "Natural capital" is recognized at three distinct levels including genera, species, and community -habitat and ecosystem.

## 6.5.6 FISHERY & AQUATIC BIOLOGY

The nearest natural drain has no fish. There is no fish farming in the area either naturally or commercially

### 6.5.7 BIODIVERSITY

Mainly a country's wilderness areas and scenic landscapes with their associated flora and fauna form natural capital of a country. Both collectively and within each level, the range or variety of the resources is referred to as the "Biological Diversity". The contribution of the "Natural capital" is recognized at three distinct levels including genera, species, and community -habitat and ecosystem.

Pakistan comprises of a total of nine major ecological zones and the term has relevance for each of Pakistan's administrative units—district, province, and particularly country. The greater the number of genera, species and habitats and ecosystems present within these units, the greater is the Biodiversity. It is in this background that the biodiversity of the area is discussed below

### 6.5.8 FLORA AND FAUNA

The fauna and flora of the district include: Jand trees (*Prosopis spicigera*), Karir *(Capparis aphylla), Beri (Ziziphus jujuba),* Van (*Salvadora abeoides),* Kikar (*Acacia arabica),* *Shisham (Dalbergia* ) and Aak (*Calotropis hamiltoni)* are found within the district

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## 6.6 SOCIO-CULTURAL ENVIRONMENT

This section provides a detailed discussion of the socio-economic and socio-cultural environment of the local community in the project.

### 6.6.1 Introduction & History of City

The City Chiniot is an old, pre-historic settlement. It is originally situated on the slope of a rocky hill about two miles from the left bank of Chenab River. Its origin is traced back to considerable antiquity. The historian Lala Bai Kushion has mentioned existence of this for the last many 100 years. Another historian has stated that the settlement was called. Chandikot at that time.When Sikandar-i-Azam attacked Punjab in 325 BC, he encamped his forces in the surroundings of this settlement. Chankia a renowned scholar and great politician, who was an Advisor to Chandar Gupt Mooriah during 305 to 298 BC has named Chiniot as his native town in his famous book "Earth Shaster".

According to one tradition Chinese traders used to come to this place in the very old days and called it Cheenot. Another tradition connects its foundation to farmers" tribe "Chandana" who lived here in reed huts. Chiniot is situated on North West of Chenab River. It is located at distance of 86 Km from Jhang and is connected by 60 feet wide metalled road. The town of Chiniot is also connected with major cities namely Lahore, Faisalabad and Sargodha by metalled road. Lahore is 160 Km, Faisalabad is 30 Km while Sargodha is 58 Km away.

Physical growth of the town can be divided into three phases.

### I. Old Town:

It was more or less a small village before the times of Shah Jehan. Chiniot Town saw its prosperous most days during the rule of this Mughal Emperor. Qallah Raikhti, fortification wall, a market and many other important buildings were constructed by Nawab Wazir Ali Khan during his Governorship of the area. All of these structures have disappeared, except for a few signs of the Qallah, the wall and the market near Shahi Mosque. Shahi mosque and' tomb of Saint Burhan shah were constructed by Nawab Saadullah Khan which still stand as sights of historical interest. This part of town including Bazar Kalan, Muslim Bazar and the residential localities like Mohallah Garhe, Mohallah Lahori gate , Mohallah Rikhti, Mohallah Aali, Mohallah Kamangran etc, had grown by the end of Mughal Empire.

### II. Down Town Area:

The city witnessed no considerable growth till the English took over Punjab in 1849. It regained some significance and some building activities restarted when it was made Tehsil Headquarter during the same period. The buildings like railway Station, Government Offices i.e. Police Station, Courts, Municipal Committee Office etc; and residential localities like Abadi Eisawala, Mohallah Chah Jogian, Thati Sharqi and Thathi Gharbi were constructed during the English Period. The most outstanding residential building of this area is Mahal of Rai Ummer Hayat, which still exists in this part of the town.

### III. Peripheral Town:

After partition, the Hindu families shifted to India and rich Muslim Khoja families established their business in other cities like Faisalabad, Karachi, Multan and Lahore. As a result the Growth of the town was allowed down considerably. Apart from this, permanent danger of flooding also discouraged the building activities in the town.

## 6.6.2 Population

The total population of District Chiniot is 1.369 m according to the 2017 census statistics.

**Table 6-1 Population of the District Chiniot**

| POPULATION - 2017 | |
|---|---|
| Male | 0.739 m (53.98%) |
| Female | 0.630 m (46.02%) |
| Total Population (Estimated) | 1.369 m |

## 6.6.3 Employment and Sources of Income in the Project Area

Occupation of villagers is totally related to agriculture and live stock. Main crops which are cultivated in Chiniot are rice, wheat, sugarcane, peas, vegetables, potato, seasonal vegetables and corn. Land of Chiniot is very fertilize for agriculture purpose. Farmers irrigated their crops by two means, one is from canals and other is from tube wells. There

are different social classes are living in village one is the rich and wealthy agriculturist. Rich people employed other for work and give them yearly wages and fulfill their all basic needs.

Most of the people living in city are doing their own business and some of them are doing jobs in different sectors. Most of the business is related to furniture. Chiniot is famous for its furniture in all over Pakistan as well as in other countries. People have their own workshops where they made furniture. There is at least one shop or workshop of furniture in each and every street and one man in every 10 mans are making furniture. There is very highly skilled labor which is making beautiful carving on furniture items. Furniture of Chiniot is only famous for two things or specifications which are durability and carving on furniture items.

### 6.6.4 Basic Facilities Available in the Study Area

### 6.6.5 Economy

The important products of Chiniot includes silk, cotton, wheat, sugar, rice, milk, pottery and wooden furniture etc. The city's agricultural economy is largely derived from "canal colonies" established during British rule when a vast network of canals were laid to irrigate Punjab.

Chiniot is famous for its wooden furniture and developed as a centre of woodworking given its close proximity to the Chenab River - as timber from Kashmir would be floated down the river towards Chiniot District. Chiniot's artisans are renowned for their skill and were employed in the construction of both the Taj Mahal and Wazir Khan Mosque. The city's metalworkers along with those of Lahore were considered the best in Punjab during the British period and Chinioti designs were considered superior to those of Hoshiarpur or Jalandhar. Ramzan Sugar Mills is located at Faisalabad Road.

### 6.6.6 Literacy rate

58% men and 29% women aged 10 years and older are literate in Chiniot. Overall, the district is ranked 34 among 36 districts on literacy indicator1.

### 6.6.7 Cultural and Aesthetic Values

Culture of Chiniot is same like culture of Punjab. Current population of Chiniot is round about 0.5 million. Around 40% of the population lives in the city while rest is living in villages. Chiniot city is divided in less than fifteen Mohallas and famous Mohallas are Raje Wali, Qaiziaan, Aali, Hussainabad, Usmanabad and etc. Different castes of people are living in different Mohallas. As far as religious school of thought is concerned around 35% to 40% population belongs to Fiqa e Jafria and the same percentage of population is divided in different schools of thoughts. A place which is called Chenab Nagar which is also known as Rabwah is dominated by Ahmedi's school of thought. Ahmedi people are followers of Mirza Ghulam Ahmed Qadiani. People belong to this group were declared as non Muslims by the constitution of Pakistan 1973.

[1] http://aserpakistan.org/document/aser/2012/drc/punjab/Chiniot.pdf

### 6.6.8 Cuisine

People like to eat spicy food and their favorite food is Baryani. About each and every family cooks rice or Baryani on every Friday because Friday is off for most of them especially for workers of furniture markets. Their other favorite dish or recipe is Chiniot Kuna, Chinioti Kuna is made up of beef or mutton which is cooked in mud pot under soil. They mix each and every ingredient of recipe in Kuna which is a pot made up of mud, then they sealed the Kuna with flour as steam didn't come out, then they place that Kuna on fire under soil. This item of food is famous in all over Pakistan and people often visit Chiniot from other cities to have or enjoy Chiniott Kuna.

### 6.6.9 Language

People living in city have same background but few of them are Urdu speaking, but all have same norms and values.

### 6.6.10 Tribes

Chiniot region was an agricultural region with forests during the Indus Valley Civilization. Chiniot is a district of multi-tribes nation. Tribes of Chiniot include Rajput Dhudhi Sahmal Sipra, Janjua, Dogar, Syed, Sial, Mufti, Arain, Laali, Marath, Aheer, Awan, Makhdoom, Baloch, Bhatti, Bhutta, Butt, Bhowana, Chohan, Dhera, Durrani, Gujjar, Hanjra, Indra, Sipra, Walara, Haral, Tamimi, Hashmi, Jappa, Jatt, Koli, Kamoky, Kharal, Khokhar, Marral, Naul, Nakokara, Traggar / Tragar, Nissowana, Puri, Pathan, Slara, Wassi, Dhawan, Wadhawan, Sehgal, and Kalyar.

### 6.6.11 Transport

Chiniot is very well-connected with rest of Pakistan by a main highway and a rail line. The nearest international airport is Faisalabad International Airport, which is 48.5 kilometers from Chiniot. Chiniot has a railway track passing from it since 1927 for the easiest and cheapest way of transportation. Chiniot railway is a main source of transporting the furniture from Chiniot to the rest of Pakistan. And it is a main source of importing the woods for furniture from all over the Pakistan. Chiniot Railway Station was built in 1927 during British Empire was a great step for the help in economy of Chiniot. Khatm-e-Nabuwat Chowk is the main place of and main intersection between GT roads connecting large cities of Pakistan. Chiniot Bridge is crossing over Chenab River on the Chiniot-Sargodha road.

## 6.7 SITE SUITABILITY

The site suitability analysis of the study area was done by different techniques and it was recommended that the project area has great value in the case of the sand resources and this could be considered as a good step towards a better spatial understanding of the sand resources in the study area. However, taking advantage of these available resources no conflicts implies with other land use interests. There are no ecological important species found at the site. The project site is not located in any prohibited, environmentally sensitive area. Hence the project site is suitable for the extraction of sand.

# 7 ASSESSMENT OF IMPACTS

The EIA Regulations require "a description of the significance of any significant effects, including cumulative effects, which may occur as a result of the undertaking of the activity".

The Table below indicates a summary of identified environmental impacts. These impacts are categorized into the various relevant stages of the life cycle of the proposed development. The environmental assessment section of the Scoping Report and the consequent EMP shall also be compartmentalized into these phases.

## 7.1 Potential Environmental Impacts

The identified environmental impacts associated with the proposed sand mining activities are listed in Table 6 below and the complete list of all potential impacts will be presented in the EMP.

**Table 7-1 Summary of the potential Impacts**

| Key Issue | Impacts |
|---|---|
| **Biophysical Environment** | • Vegetation clearance<br>• Impact on natural habitants<br>• Impact local geology and soil<br>• Impact on groundwater and surface drainage<br>• Impact on hydrology and ecology<br>• Alteration of the landscape<br>• Soil erosion due to disturbance of the soil<br>• Archaeological impacts<br>• Rehabilitation and restoration<br>• Impact on existing and adjacent properties<br>• and safety |
| **Pollution and Waste Management** | • Waste generation<br>• Impacts on ground water |
| **Socio-Economic** | • Noise and Dust<br>• Impacts on public health & safety<br>• Traffic<br>• Employment creation<br>• Secondary business opportunities (spin-offs) |

## 7.2 Method of Assessment

In assessing the impact of the proposed development, four rating scales were considered. Each issue identified was evaluated in terms of the most important parameter applicable to environmental management. The potential environmental impacts associated with the proposed activity will be evaluated according to its nature, extent, duration, intensity, probability and significance of the impacts.

**Table 7-2: Classifications of Impacts**

| CRITERIA | DESRCIPTION | | | |
|---|---|---|---|---|
| **EXTENT** | National (4)<br>The whole country | Regional (3)<br>neighboring regions | Local (2)<br>Within a radius of 2 km of the proposed site | Site (1)<br>Within the proposed site |
| **DURATION** | Permanent (4)<br>Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient | Long-term (3)<br>The impact will last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter. | Medium-term (2)<br>The impact will last for the period of the construction phase, where after it will be entirely negated | Short-term (1)<br>The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase |
| **INTENSITY** | Very High (4)<br>Natural, cultural and social functions and processes are altered to extent that they permanently cease | High (3)<br>Natural, cultural and social functions and processes are altered to extent that they temporarily cease | Moderate (2)<br>Affected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way | Low (1)<br>Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected |
| **PROBABILITY** | Definite (4)<br>Impact will certainly occur | Highly Probable (3)<br>Most likely that the impact will occur | Possible (2)<br>The impact may occur | Improbable (1)<br>Likelihood of the impact materialising is very low |
| **SIGNIFICANCE** | Is determined through a synthesis of impact characteristics. Significance is also an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact. | | | |

**Table 7-3 Criteria for significance ratings**

| | |
|---|---|
| **Low impact** | ▪ A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction or operating procedure. |
| **Medium impact** | ▪ Mitigation is possible with additional design and construction inputs. |
| **High impact** | ▪ The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment. |
| | ▪ Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a "very high impact" is likely to be a fatal flaw. |
| **Status** | ▪ Denotes the perceived effect of the impact on the affected area. |
| **Positive (+)** | ▪ Beneficial impact |
| **Negative (-)** | ▪ Deleterious or adverse impact. |
| **Neutral (/)** | ▪ Impact is neither beneficial nor adverse |
| It is important to note that the status of an impact is assigned based on the status quo – i.e. should the project not proceed. Therefore not all negative impacts are equally significant. | |

## 7.3 Purpose of Mitigation and Impact Assessment

The purpose of conducting an EIA is to identify and understand (assess) and then prevent or minimize (mitigate) the adverse impacts of the planned project on the environment and people. Impact assessment is indispensable to provide systematic and detailed descriptions of the probable impacts in comparison to the identified project alternatives. Mitigation measures are a critical part of the EIA process, as these actions aim to prevent adverse impacts from the planned project on the environment and people, ensuring that unavoidable impacts are maintained within acceptable levels

## 7.4 Environmental Monitoring Plan (EMP)

Environmental Monitoring is undertaken during project activities to ensure the effectiveness of the mitigation measures. To respond to the anticipated environmental concerns at an early stage and to determine the intensity of the impact, prediction is required. Specific monitoring programs are outlined below as well as responsibilities for the collection and analysis of data and the reporting requirements. The table given below is showing the environmental monitoring plan suggested for the proposed project activity.

**Table 7-4: Anticipated Impacts and their Magnitude of the Project**

| ASPECT | POTENTIAL IMPACTS | SIGNIFICANCE RATING | | | |
|---|---|---|---|---|---|
| **BIOPHYSICAL** | | **Extent** | **Duration** | **Intensity** | **Probability** |
| **Ecological impacts** | ▪ Vegetation clearance<br>▪ Habitat destruction and land degradation | Site | Medium-term | Medium-term | Probable |
| **Topography** | ▪ Change of visual and aesthetic view | Local | Short-term | Low | Probable |
| **Land use** | ▪ Mining activity will cause changes to land use both present and future | Local | Long-term | Medium | Probable |
| **Soil** | ▪ Possibility of erosion soil erosion during site clearance & rainy season due to altered drainage<br>▪ Contamination of soil from leakage, spills, or temporary ablution facilities | Local | Long-term | Medium | Probable |

| | | | | | |
|---|---|---|---|---|---|
| **Impact on Groundwater** | ▪ Leakages from earthmoving vehicles and accidental fuel, oil or hydraulic fluid spills.<br>▪ Salinization of soil and ground water as a result of standing water where quarries reach the water table. | Local | Long-term | Medium | Probable |
| **Impact on Surface** | ▪ Oil Spills may form a film on water surfaces causing physical damage to organisms.<br>▪ Oxygen transfer could be impaired.<br>▪ Increased riverbed and bank erosion may also increase suspended solids during runoffs at the excavation sites. | Local | Long-term | Medium | Probable |
| **Air quality** | ▪ Release of dust from excavation and rehabilitation activities, equipment and construction vehicles | Local | Short -term | Medium | Probable |



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| | | | | | |
|---|---|---|---|---|---|
| | ▪ Generation of fumes from vehicles and construction equipment may pollute the air. | | | | |
| **Waste management** | ▪ Generation of waste through operational and rehabilitation activities mainly domestic, commercial and waste generated from the sand sieving exercise.<br>▪ Sewage waste will be generated from temporary construction toilets on site | Local | short-term | low | Probable |
| **SOCIOECONOMIC** | | | | | |
| **Traffic impact** | ▪ Increase in traffic congestion within the area during excavation and rehabilitation activities.<br>▪ Damage other to vehicles due to stones/sand falling from tipper trucks on main road. | Site | Medium term | Moderate | Probable |



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| | | | | | |
|---|---|---|---|---|---|
| **Noise and vibration** | ▪ Increase in traffic congestion within the area during excavation and rehabilitation activities.<br>▪ Damage other to vehicles due to stones/sand falling from tipper trucks on main road. | Site | Medium term | Moderate | Probable |
| **Impact on Employees** | ▪ Noise impacts during rehabilitation and excavation activities phase will occur from vehicles etc. which might be a nuisance to residents in proximity and employees' onsite | Site | Medium term | Moderate | Probable |
| **Employment opportunities** | ▪ Occupational Health and Safety<br>▪ Excavation activities will create economic opportunities for the local businesses e.g. building materials, business prosperity etc. (+ve) | Local | Long-term | Medium | Probable |

| | | | | | |
|---|---|---|---|---|---|
| **Economic Development** | ▪ The increase in demand for sand excavation for construction purposes will placed immense pressure these resource which will result in environmental degradation | Local | Long-term | High | Less probable (manageable by means of permit control) |

UEDA/F-65/EIA/2023

# 8 SCREENING OF ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

## 8.1 GENERAL

This chapter examines the potential impacts that project can impose on the surrounding environment, during both its preparation, operation and abandonment stages. It will attempt to identify and assess the equilibrium displacements that could be experienced by specific environmental receptors as a result of the activities that will be carried out during all the stages of the project. Legal requirements of the PEPA and the PEQS Punjab will be the rating standard for the activities. Compliance with the EMP and EMP, as per recommendations in this EIA report will be adhered to with full spirit.

The project proponent is filing with the EPA Punjab, written Affidavit and Undertaking on judicial papers, that the project throughout its life will operate under Environmental Management Order. Under these conditions the project at its all stages including from to regular operation will go in compliance with the PEQS. The project activities will, therefore, neither adversely affects the population nor the environment around the project site. Evaluation of the anticipated impacts from the project activity and their mitigation measures are described below;

## 8.2 ENVIRONMENTAL PROBLEMS DUE TO PROJECT LOCATION

Sand extraction takes place from various locations of the river. Choice of locations depends on sand availability and convenience for transportation. The proposed project site is located at Chiniot Bridge Upstream zone (1), near River Chenab, Tehsil & District Chiniot. River Chenab is formed by alluvial deposits, frequently facing riverbank and river channels dynamics due to floods. The River Chenab in highly snaking river with several prominent sections where the river has been suffering immensely with the shifting and erosion characteristics.

River flows carries sediment from steep slope and high elevation catchment which is naturally erodes sediment from the bed, banks of rivers in steep mountain areas and move toward downstream gradually over time, particularly during high flows and floods.

Extensive volumes of sediment can be moved rapidly in extreme high floods and deposited at near flat valley and river meanders on a temporary basis then moved along to another location during the next high flood event.

In determining suitable sites for sand mining extraction the following factors should be considered:

- Select the sites if sand removal reduce the risk of flooding and investigate how much it and sediment deposition continue to increase or will it reach a stable state that will not increase flood risk.
- Minimize the sand lease area affected: If possible, extract sand only from the dry deposits (evade working in the low flow channel. Do not extract excess sand in anticipation of future floods.
- Only remove sand from dry un-vegetated deposits such as gravel bars and islands.
- Sand Removing areas must be away from the river reserve.
- Sand mining at the concave side of the river channel should be eschewed to obviate bank erosion. Similarly meandering segment of a river should be culled for mining in such a

way as to eschew natural eroding banks and to promote mining on naturally building (aggrading) meander components

- Sand mining should be avoided at V-shaped and fast flowing river sections with steep channel slopes and high risk river bank erosion sites.
- When sand extraction is being carried out, measures should be taken to reduce the peril of fine sediments causing pollution of other sections of the river.
- Ideally sand should be extracted from a depositional area as it accumulates, commensurable to the natural rate of sediment movement.

Environmental problems related to location of the project are mostly in the areas of physical setting, socioeconomic setting, ecological setting and special areas.

Sand mining can cause erosion and shrinkage of river banks, leading to the loss of fertile land and property.It can also destabilize the ground and cause the failure of bridges, dikes, and roads. Sand mining in beaches and sand banks of rivers harms local wildlife and destroys aquatic ecosystems. Sea sand mining can increase coastal abrasion and erosion, reduce the quality of the marine and coastal environment, and increase coastal pollution

Field survey of the proposed site revealed that the impacts of the project due to its location are insignificant in nature. This site is taken on leased by proponent and as the excavated ordinary sand will supply to the nearby market therefore selected site is most feasible for project.

The only issue which can arise due to the location of the subject project could be the issue

**Impact significance:** Low or may be positive

**Nature of impact:** Direct

**Duration:** Long-term

**Reversibility:** NA

**Likelihood:** Low (unlikely),

**Consequences:** Mild or may be positive

## Mitigation Measures for Impacts Due to Project Location

- Project site has an access to road that is in good condition.
- Location can be considered as the positive impact due to provision of sand to different units in the same District.
- The project will provide the jobs to the local residents as well as to those from the suburban areas.

If the project proponent maintain HSE conditions and comply with the PEQS limits than, there will not be any significant impacts of the project on the environment. If the mitigation measures are effectively implemented, the residual impact of the Subject project activities on the area's geophysical environment is expected to be insignificant

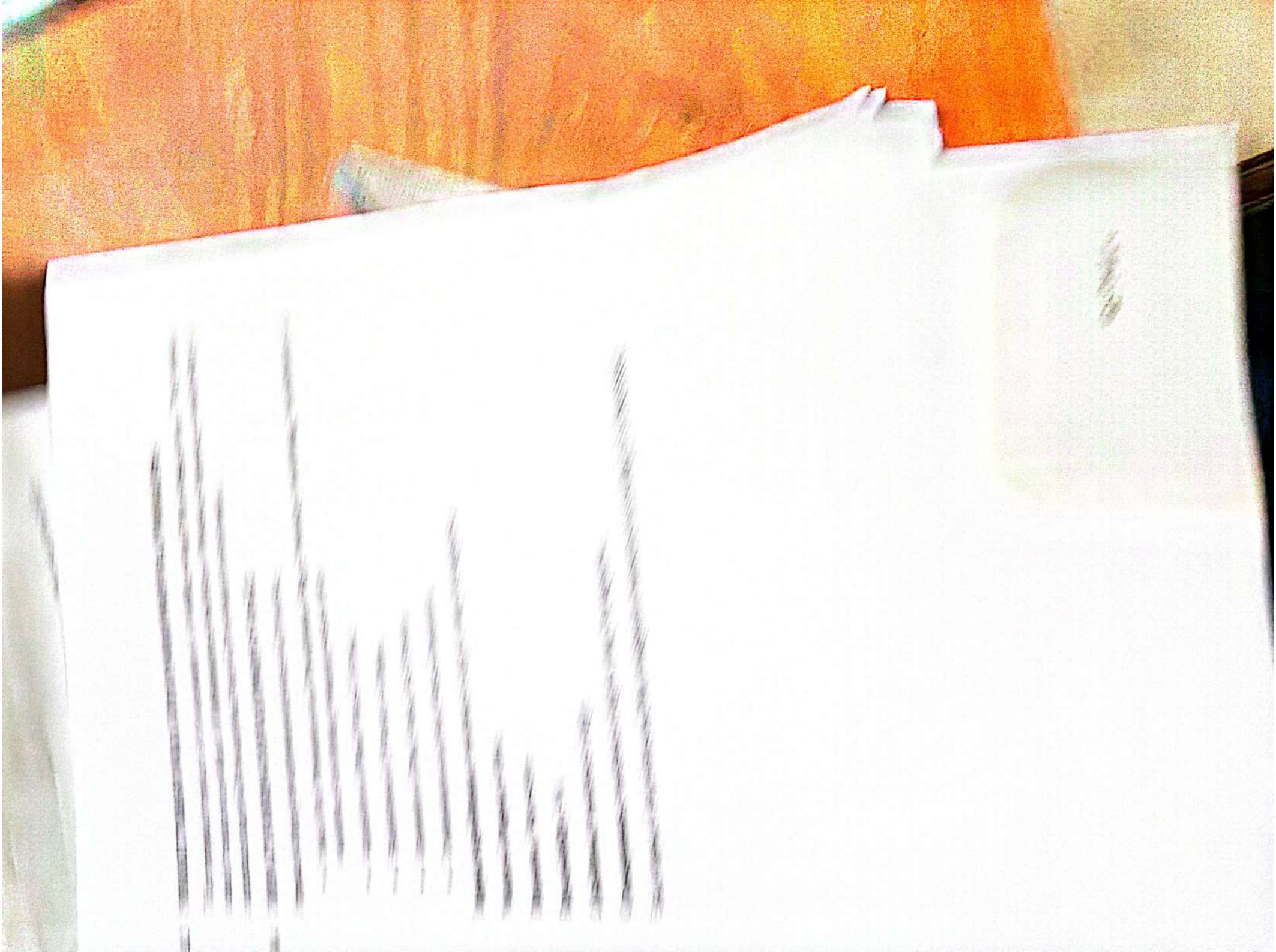


**Table 8-1 Evaluation of Development Phase Impacts**

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action |
|---|---|---|---|
| 1) | **Minor Erosion of Land**<br>Loss of topsoil due to the soil erosion and mixing with overburden activities due to earth activities | – Compliance with prescribed PEQS | – Take topography, natural drainage and also site runoffpatterns into accounts.<br>• Ensure adequate drainage.<br>• Stabilize all slopes, re-vegetating with native species to reduce/avoid erosion.<br>– Break-up compacted surfaces and replace topsoil, brash, seed source, leaf litter, etc.<br>– Excavation and conservation of topsoil before the commencement of mining operations may involve some overburden waste which will be preserved all along the boundary barrier for afforestration<br>– All erosion and sediment control measures will be maintained in a functioning condition |
| 2) | **Contamination of land and water** | – Compliance with prescribed PEQS to control water and land pollution | – Essential services like water supply, sewerage disposal and solid waste management must be in working condition |
| 3) | **Air Quality** | – Compliance with prescribed PEQS to control air pollution | – The staging of the project will reduce the generation of dust. |

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action |
|---|---|---|---|
| | – Dust resulting from initial preparation of site<br>• Boundary positioning<br>• Mobilization of workforce<br>• Site clearing<br>– Use of heavy machinery can generate exhaust and dust emissions | | – Periodic maintenance and management of all the machinery and vehicles<br>– Cutting and burning shrubs for fuel will be prohibited. Similarly waste burning will not be allowed. |
| 4) | **River flow**<br>– Flow pattern might be changed due to river bed extraction.<br>– Project activities depth will be increased, which may result in increase of flow velocity | – Minimization of any adverse impact on the flow patterns of River Chenab during excavation | – No diversion is proposed. There will not be any adverse impact on flow pattern, surface hydrology and ground water regime.<br>– Extraction activities will be restricted to 3.0m depth, which will not cause much change in flow pattern of the river<br>– An offset will be left from both sides of river, which will minimize the chances of bank failure |

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action |
|---|---|---|---|
| 5) | **Waste**<br>– Generation of solid & liquid waste from camp sites<br>– The solid waste will be reduce as all the workers are commuting daily on site. | – Control of groundwater or surface water pollution from activities | – Ensure prevention of inappropriate disposal of waste material<br>– Conduct separate collection of and domestic waste to promote recycling and re-use<br>– Proper disposal of waste on agreed site as per agreed method. The area to be leveled and contoured after disposing excess material. No waste or debris will be thrown in the nearest canal water or other water bodies |
| 6) | **Noise**<br>– Noise caused by machinery and vehicles used for mobilization of equipments | – Proper & safe handling and disposal of related waste<br>– Implementation of waste management plan | – The contractor will strictly follow the PEQS for ambient noise<br>– Control noise through control of working hours and selection of less noisy equipment.<br>– A interval will be established, used and adhered to<br>– Prohibit use of pressure horns<br>– Proper maintenance of vehicles and equipment.<br>– Minimize/avoid unnecessary use of pneumatic drills and other noisy machinery<br>– The personal protective equipment (PPEs) will be provided to the workers and its usage will be made mandatory<br>– Activities will be conducted during daytime. |

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action |
|---|---|---|---|
| 7) | **Socio-economic Impacts** | – Empowerment of locals to possible extent<br>– Increase in employment and business opportunities for locals | – Provide walkways and metal sheets where required to maintain access for public or vehicle<br>– Lighting on the site shall be pointed downwards and away from oncoming traffic<br>– The site must be kept clean to minimize the visual impact of site<br>– Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors<br>– Noisy activities must be restricted to the times given in the Project Specification or General Conditions of contract<br>– Employ local residents as much as possible |

## 8.5 ENVIRONMENTAL IMPACTS DURING OPERATION/ EXCAVATION STAGE

Impacts during the excavation operation involve;

Clearing of land, overburden stripping, excavation, loading and transportation of ordinary sand)

Main environmental issues associated with Project operation are as follows.

Soil erosion, air pollution, noise generation, water pollution

**Impact significance:** low to moderate or may be positive

**Nature of impact:** direct

**Duration:** Long-term

**Timing:** operational/excavation phase

**Reversibility:** NA

**Likelihood:** low to moderate

**Consequences:** moderate to high or may be positive

**Table 8-2 Evaluation of Operational Phase Impacts/ Excavation**

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action |
|---|---|---|---|
| 1. | **Air quality**<br>– Due to dust generation, dispersion during the earth-moving and excavation operations<br>– Excavation of ordinary sand<br>– Loading of ordinary sand | Minimize atmospheric emissions and dust Generation | – Use of best practice management techniquesduring excavation and loading of ordinary sand.<br>– All the loaded vehicles going to and leaving the excavated site should be adequately covered to prevent the spillage of materials during transport of the ordinary sand.<br>– Use of new, efficient vehicles, driver training to minimize emissions (e.g. prevention of overrevving, shut off engines when vehicles not in use), proper maintenance, rationalization of traffic management system to optimize transport efficiency<br>– Establish hoarding and maintain the vegetation stripes along the site boundary to minimize the spread of fly dust. |
| 2. | **River flow**<br>– Flow pattern might be changed due to river bed extraction.<br>– Obstruction in river flow / course.<br>– Erosion of channel bed. | – Minimization of any adverse impact on the flow patterns of River Chenab during excavation | – No diversion is proposed. There will not be any adverse impact on flow pattern, surface hydrology and ground water regime.<br>– Extraction activities will be restricted to 3.0m depth, which will not cause much change in flow pattern of the river.<br>– An offset will be left from both sides of river, which will minimize the chances of bank failure<br>– Extraction of minerals will be started from dip side towards rise at the centre and also laterally in 1.0m slice. Unwanted material or spillage |

| | | | |
|---|---|---|---|
| | | | (if any) will not be stacked by the side of the excavation voids created. Excavation will be carried out in a manner so that water flow / course will not be obstructed.<br>– Extraction is to be done leaving safety barrier or offset on both sides and maximum barrier should be on concave side of river preferably the flow channel (excavation void created) should be kept straight so as to help avoid erosion as side cutting or collapsing.<br>– Safety zone or buffer area will be created from the river banks to minimize the instability & erosion and to increase the stability of structures. These safety zones will not be mined out<br>– Quantities will be strictly limited so that sand accumulation rates are sufficient to avoid extended impacts on channel morphology<br>– Extraction will be carried out as per approved Mine Plan in scientific and systematic way. |
| **3.** | **Soil Erosion** | – Minimize soil erosion | – Restrict river access to only one corridor through the Riparian buffer. Ensure water course is not altered to the extent that the integrity of the river banks are compromised and eroded.<br>– Excavated filled slopes and stockpiles must be kept at a stable angle and capable of accommodating normal expected water flows<br>– Topsoil stripped from the operation footprint must not be spoiled but stockpiled and preserved for use in rehabilitation. Top-soil and sub-soil stockpiles and spoil sites to be placed on opposite sides of the access roads as this is where they will cause the least impact |

| | | | |
|---|---|---|---|
| 4. | **Visual impact** | – Reduce the visual impact | – Site must be kept neat and tidy at all times |
| 5. | **Water Quality**<br>Change in surface water quality and ground water quality | – Control of groundwater or surface water pollution from activities | – There will be no change in surface water quality as river is seasonal.<br>– Ground water quality will not be affected due to excavation activities as it is restricted to 3.0m depth and the water level is 9-15 m below the surface of river bed.<br>– The extraction will not be allowed below the water table<br>– Regular monitoring of water samples will be done as precautionary measures. |
| 6. | **Waste**<br>– Generation of solid & liquid waste<br>– The solid waste will be less as all the workers are commuting daily on site. | – Control of groundwater or surface water pollution from activities | – There is not any worth mentioning solid waste will generate on site. If any solid waste will generate on site it will be disposed of in clearly marked bins and solid waste will be handover to the contractor.<br>– Domestic/general waste and hazardous waste must be separated and bins clearly marked.<br>– Empty fuel storage drums will be handover to the authorized contractor<br>– Proper disposal of waste on agreed site as per agreed method. The area to be leveled and contoured after disposing excess material. No waste or debris will be thrown in the nearest canal water or other water bodies<br>– Portable Bio-toilets will be used; hence no sewage / liquid effluent will be generated and contamination is also not expected due to percolation. |

| | | | |
|---|---|---|---|
| | | | – No waste may be buried or burned. |
| 7. | **Noise & Vibration**<br>– Noise from vehicles used for mobilization of items | – Compliance with prescribed PEQS to control Noise pollution | – Control noise through control of working hours and selection of less noisy equipment.<br>– Installation of low noise/ low vibration type equipment<br>– Proper maintenance of equipment<br>– Provision of ear muff to workers working near noisy machinery |
| 8. | **Habitat**<br>– Destruction of fauna and habitat (mammals, birds, reptiles, amphibians, invertebrates). | – Habitat rehabilitation (if any disturb during excavation ) | – Further ecological/fauna survey at appropriate seasons and translocations monitored by the proponent specialist<br>– Moving fauna to neighboring sites may help short-term survival, but not medium-term if these sites are already occupied. In long term populations may recover on restored sites.<br>All operation activity will be contained within the designated permit area. The Environment Officer and Project Manager must establish working and no-go areas, which need to be strictly adhered to.<br>The "no go" areas where possible must be clearly demarcated. There shall be no un-authorized entry, litter, stockpiling, dumping or storage of equipment or materials within the demarcated "no go" areas. If this does occur the developer shall be reliable for rehabilitation.<br>– Keep surrounding vegetation, especially larger trees and shrubs, to create a screen that reduces flood impacts. |

| | | | |
|---|---|---|---|
| | | | – Protected trees must be marked, their location recorded and must be avoided as best as possible. If any protected species cannot be avoided a permit must be applied for.<br>– All effort must be made to minimize the disturbance of wild animals on and within the close vicinity of the permit site<br>– No trapping, snaring, hunting, fishing or killing of any animal may occur on the permit site.<br>– Disturbed areas will be rehabilitated and vegetation planted to resemble the area prior to operation, both in terms of vegetation cover and habitat |
| 9. | **Access to social services**<br>– Employment opportunities | – Improved social infrastructure | – Provision of employment to every affected person on fair basis |
| | **Work environment (including work safety and security)**<br>– Labor accidents due to handling heavy loads; working<br>– | – Prevention measures against labor accidents and health problems<br>– Provide appropriate security | – Labor accidents<br>– Prepare a manual for labor accident prevention including safety education and training<br>– Prohibit over lifting through workers<br>– Provide workers with appropriate protective equipment<br>– Inspect and ensure that any lifting worker, are appropriate for expected loads<br>– Keep lifting devices well maintained and perform maintenance checks as appropriate<br>– Use equipment that protects against electric shock |

| | | | |
|---|---|---|---|
| | | | – Observe related standards and provide workers with appropriate facilities<br>– Provide appropriate security to site<br>– Site access, including stockpile areas and loading areas will be fenced off to prevent unauthorized access.<br>– Correct signage must be erected at the main access road and entrance of haul road to areas – includes authorization, access authorization, warning activity, safety warning signs (protective equipment, fire & medical equipment) and contact numbers<br>– No open fires shall be allowed on site under any circumstances |
| 10. | **Groundwater Recharge Potential**<br>– Impact on ground water recharge potential as the thickness of the natural filter materials (sediments) is reduce causing less infiltration. | – Minimization of excavations face during development. Temporary drainage grooves and sedimentation ponds for surface run-off collection. | – Extraction will be done as per approved Mine Plan and applicable Rules & Regulation, so that there is no damage on ground water recharge potential due to sand extraction. |
| 11. | **Vehicles access** | – To avoid any spills and leaks and to keep roads clean from mud and sand | – The access road to the permit area must be established before operation commences and existing roads shall be used as far as possible<br>– Vehicle access must be strictly contained onsite. Vehicles may only use designated roads and access points as determined by the Environment officer and project Manager before operations commence |

## 8.6 ENVIRONMENTAL IMPACTS OF SAND EXTRACTION THROUGH DREDGER

Since the main focus of dredging is to remove the deposits submerged under, the environmental effects of the process also revolve around this focal point. Some of the effects of sand excavation through dredging can be enumerated as follows:

- The soil deposits in any water body have a certain pre-disposed composition. Through dredging this composition is altered
- Because of the said alteration, the existing habitat of creatures and organisms that depends on the original composition of the soil dies out due to the unfavourableness of the changes caused
- Extraction of bed material in excess of replenishment by transport from upstream causes the bed to lower (degrade) upstream and downstream of the site of removal of sand.
- Degradation may change the morphology of the river bed, which constitutes one aspect of the aquatic habitat.
- Lowering of the water table can destroy riparian vegetation.
- Rapid bed degradation may induce bank collapse and erosion by increasing the heights of banks

The turbidness of the soil under the water also changes because of this alteration in the underwater soil composition. This poses problems by way of the creation of newer and harmful organisms, transferring unwanted organisms to other parts of the water body leading to a wider spread of contamination and organic processes by way of the release of extra and unwanted nutrients. The turbidness also causes the already existing contaminations to spread further into the water body which also affects the marine environment adversely

However, all the points mentioned above pertain to the dredging of water bodies with clean soil deposits.

But sometimes, dredging is also carried out to weed out the contaminations present in the soil. The effects and the biodiversity impacts of contaminated deposit-dredging are:

- The dredging of contaminated materials will cause the harmful particles to regroup and spread to a larger area in the water body
- Since dredging loosens up the soil, those substances which were previously held fast to the contaminated deposit will find their way into the water and the un-dredged soil. If these substances are harmful organisms then they will cause substantial degradation to the environment even after dredging the area
- The water could get polluted because of the soil particles mixing with the water. And while this does not have huge biodiversity impacts, it is indeed an unwanted side-effect of dredging

To ensure that the process of dredging is carried out without any debilitating effects, it is important to use the right dredgers. For example, the hopper dredgers that suction out the deposits are considered to be a major cause of turbidness in the dredged water part. It has been recommended that those dredgers which present a chance for pollution and extensive contamination be avoided and replaced with other safer methodologies.

The marine world is facing a precarious scenario. This is why it becomes necessary for us to take all possible measures to ensure its safety for the generations in the days to come. By employing proper methods for the process of dredging, we can make quite a substantial contribution to putting an end to the negative environmental effects of dredging.

## 8.7 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

The proposed project will be installed with all precautionary measures to enhance and safe the environment. Following necessary measures will be adopted during and operation:

- Sprinkling of water will be done on dusty roads and tracks.
- PPEs will be provided during activity.
- Constructional waste and domestic solid waste will be disposed-off or utilized properly.
- Local people will be informed in advance when work is about to start in an area.
- Machinery will never be left unattended.
- Efforts will also be made to discuss traffic conditions so that regular traffic is not disturbed. Transporters engaged for the project would be forced to adhere to the load specifications of the access road. No overloading would be allowed in any case.
- Safety signs and boards will be placed during construction.
- To prevent erosion, moving the road or footpath will be kept away from the river's edge.
- The vehicles will be maintained to control the air emissions.
- The loaded vehicles will be covered with tarpaulin to control air emissions
- Machinery will be kept maintained.
- Waste water will be treated through waste treatment system that will be installed within the premises of the subject project.
- Proper SOPs will be followed with proper schedule along with the HSE conditions.
- Area will be restored with native plants. A proper tree plantation plan will be formulated to save the environment.
- The land use will be done in an away that it will not create any threat to the privacy of the adjoining buildings.
- Noise will be controlled by adopting proper measures.
- PPEs will be provided to workers during working.
- Firefighting equipment's and system will be installed.
- Safety signs will be placed at all locations where required.
- First aid facilities will be made available.

In order to assess the existing environmental status of the project area, on site environmental monitoring for the ambient air quality regarding gaseous emissions including Particulate Matter and noise pollution was carried out.

**Covid-19 Measures:**

- SOP regarding covid-19 prevention and sanitization of all the buildings/facilities will be made.
- Staff will be trained to practice and implement social distancing.
- No one would be allowed to enter the premises of the subject project without wearing proper mask.
- Proper sanitization of all the facilities will be done.
- Guards will check the temperature of everyone walking/coming at the entrance gate.
- Standardized and DRAP approved sanitizers should be made available.
- Awareness campaigns regarding spread of Corona virus and personal hygiene must be carried out by the management of the proposed project.
- Soaps/Hand-wash must be made available in at site
- The proponent and management must strictly follow and adopt all the Covid-19 laws, policies and guidelines provided by Federal/Provincial government and International bodies.

# 9 ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

This section provides brief description of environmental issues, mitigation measures to eliminate and/or reduce environmental and social impacts to an acceptable level, institutional arrangement for the implementation of the mitigation measures and also carrying out environmental monitoring for air quality, water quality and noise pollution related parameters

## 9.1 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

This EMP describes the mitigation and management measures to address the environmental issues during construction, its regular operation and decommissioning phases of the proposed project.

The Environmental Management Plan (EMP) aims to provide:

a) To outline functions and responsibilities of responsible persons.
b) To state standards and guidelines, which are required to be achieved in term of environmental legislation.
c) To outline mitigation measures and environmental specifications which are required to be implementation for all phase of the project in order to minimize the extent of environmental impacts and to manage environmental impact associated with the proposed project.
d) To prevent long term or permanent environmental degradation

**Table 9-1 Users Of This EMMP Would Include But Not Be Restricted To The Following**

| Sr. # | EMMP Elements | End Users |
|---|---|---|
| 1 | Background | All stakeholders – internal and external Community groups<br>Approval or consent authority e.g. EPA Punjab |
| 2 | Environmental Management | The management and supervisory staff |
| 3 | Implementation | The management and supervisory staff, Community groups,<br>EPA Punjab |
| 4 | Monitor and review | The management and supervisory staff |

### 9.1.1 Purpose and Objectives of the EMP:

The objectives of the EMP are as follow:

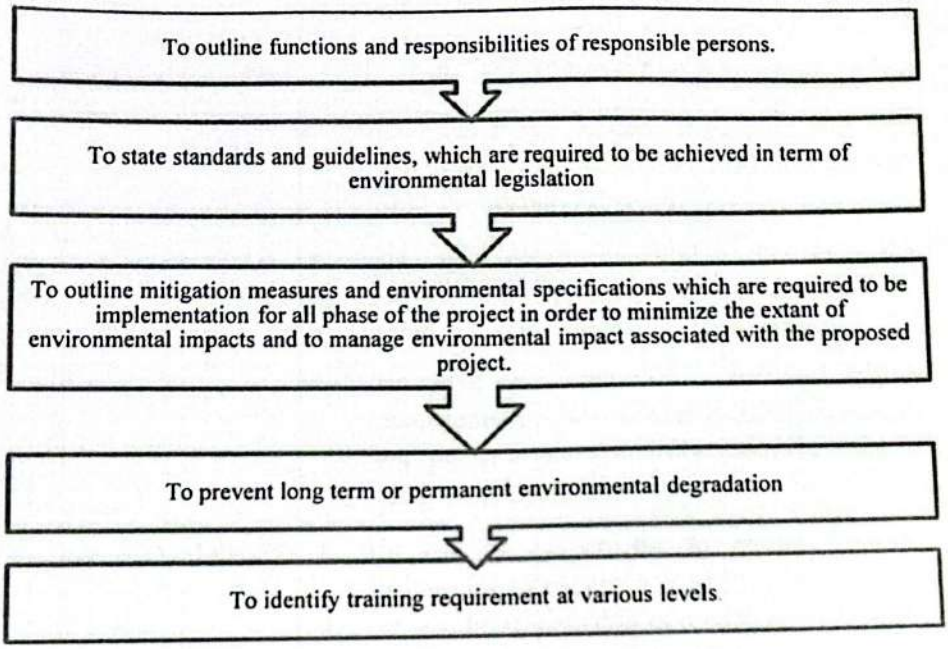



**Figure 9-1 Objectives of EMP**

### 9.1.2 Management Approach

The overall responsibility for compliance with the environmental management plan rests with the project proponent. A certain degree of redundancy is inevitable across all management levels, but this is in order to ensure that compliance with the environmental management plan is crosschecked.

**Assigning responsibility for implementation (by name or position)**

In order to ensure implementation and effective operation of the Environmental Management Plan (EMP), it is of utmost importance that responsibilities be fixed to specific persons so that each one of them should be answerable in case of lapse or mishap. Accordingly, hereunder the same responsibilities have been described:

**Table 9-2 Responsibilities of Management**

| OFFICIAL CONCERNED | RESPONSIBILITY |
|---|---|
| Works Manager | i. Ultimate in-charge and responsible for all the operations of Environmental Management Plan (E.M.P) set up.<br>ii. He will be responsible to ensure smooth functioning of the E.M.P system.<br>iii. Daily progress on the state of the environmental status will be reported to him in writing by the Shift Production Foremen. |

| OFFICIAL CONCERNED | RESPONSIBILITY |
|---|---|
| | iv. All other E.M.P matters, issues and problems will be reported to him (for rectification) by the Shift Production Foremen.<br>v. He will work as bridge between the Governments concerned authorities and the senior most management of the project.<br>vi. He will be answerable to the higher management in all matters relating to E.M.P. and report at least monthly about the state of the E.M.P. operations. |
| 2- Site Manager | i. He will be responsible to ensure smooth functioning of the entire E.M.P.<br>ii. He will be responsible to rectify any problem regarding environmental matter.<br>iii. He will directly report to the Works Manager. All matters relating to E.M.P. on daily basis |

### 9.1.3 Training Schedule

In order to effectively operate the EMP all the staff to be engaged in this activity will be trained extensively. The person to monitor gaseous emissions, PM and noise levels will be extensively trained to handle his job capably. Training program will include use of monitoring instruments, data generation, processing, interpretation, recording and presentation. Proponent will also be conducting the Personal Training Program at different level to address different responsible persons which involved in project.

Training for the management/contractors/engineers and workers on environmental aspects of the project will be arranged on biannually basis during the constructional phase of the project and on quarterly basis during the operational phase of the project. It will be impacted by a team of experienced trainers.

**Table 9-3 Personnel Training Program**

| PROVIDED BY | CONTENTS | TRAINEES/EVENTS |
|---|---|---|
| Organizations specializing in environmental management and monitoring | Short seminars and courses Environmental laws and regulations daily monitoring and supervision | One day seminar for Project staff |
| Organizations specializing in social management | Short seminars and courses on social awareness | One day seminar for Project staff dealing in social matters |

| PROVIDED BY | CONTENTS | TRAINEES/EVENTS |
|---|---|---|
| and monitoring | | |
| Organizations specializing in occupational health and safety issues | Short lectures relating to occupational health and safety | One day seminar for workers |

**Training of Workers**

Training of building contractor & workers will be the part of the TORs regarding the of the scheme. The provisions given in EIA Report Chapter 4 Screening of Potential Environmental Impacts & Their Mitigation Measures will be followed. TORs will be including the training and submission of reports in the following area:

- Handling of Machineries in a safe way
- Use of PPEs
- Maintenance of vehicles and submission of Environmental Monitoring Reports
- Placement of safety signs/boards during operation
- Sprinkling of water on the roads and dusty tracks
- Monitoring of generator emissions Training regarding all other aspects of HSE will be ensured by the contractor during the phase.

**Provision of Personal Protective Equipments**

The following equipments will be provided to workers;

**Safety glasses:** Eye protection may sometimes be incorporated with a full respirator, but otherwise glasses or goggles must be provided to workers. Dust and dirt are often floating around the mine and glasses will keep the debris from going into the eye.

**Mask/Respiratory protection:** Dust exposure, especially in excavating procedures, poses a huge risk to workers. Each workplace will have to be individually evaluated to ensure the proper level of respiratory protection is chosen.

**Hearing protection:** The loud machines, tools, and vehicles miners use on a daily basis combined with the confined spaces of a mine can be a dangerous mixture for workers' hearing. Ear muffs or ear plugs will need to be provided to keep workers from experiencing irreversible hearing loss.

**Hand & foot protections:** Miners should wear durable steel-toed boots when working in a mine. These boots can be different depending on the environment; a boot may need to be waterproof or may need to have a puncture-proof sole. Hand protection is a bit simpler. In most cases, a general safety glove in cotton or leather will work just fine.

**Life Safety Jackets:** Workers should wear safety jackets in case of any emergency situation.

### 9.1.4 Responsibility of EMP

Overall responsibility for implementation of EMP will be that of project proponent. He will appoint a HSE/Project Manager of relevant qualification. HSE/Project Manager will act as Environmental Manager and will manage all HSE condition at the PEQS.

## 9.2 PROJECT BENEFITS

### i. EMPLOYEMENT

- **Direct Employment**

During the operational phase, about 17 people will be employed directly. Considering that some of the skilled personnel to be employed for the project will be from outside the area and unskilled/ semiskilled personnel will be from within the study area, the project will add to the well being of the area. In addition to the workforce the indirect employment will also be generated for local persons. It will help in bringing prosperity to the area

- **Indirect Employment**

The project will also provide some indirect employment to the people of nearby area of mine site. Some people will get engaged in some pet shops like tea shop, vehicle repair centre etc. It will also provide some need based opportunity to the local public. The project will provide following indirect employment to the local people:-

- Transportation and warehousing in the region required to transfer the mineral will eventually be needed and therefore trucks and jobs in logistical activities will come up.
- There will be development of externalities for the workers petty shops (tea, repair stations for trucks etc.) as supporting services.
- This would create Indigenous Technologies for sustainable development.

### ii. IMPROVEMENTS IN PHYSICAL AND SOCIAL INFRASTRUCTURE

The proposed project will enhance the socio-economic activities in the adjoining areas. This will result in following benefits:

- Improvements in physical infrastructure
- Improvements in social Infrastructure.
- Increase in employment potential.
- Contribution to the exchequer.
- Prevention of illegal extraction which will help in sustaining the river and its aesthetic value.

## 9.3 ENVIRONMENTAL MANAGEMENT PLAN (FOR DEVEOLPMENT & OPERATION/EXCAVATION PHASE)

Environmental Management Plan (EMP) given in table, will be implemented for the better management of environmental issues which can be arises by the project activity.

**Table 9-4 Environmental Management Plan for Development Phase**

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action | Responsibility | |
|---|---|---|---|---|---|
| | | | | Implementation | Monitoring |
| 8) | **Minor Erosion of Land**<br>Loss of topsoil due to the soil erosion and mixing with overburden activities due to earth activities | – Compliance with prescribed PEQS | – Take topography, natural drainage and also site runoffpatterns into accounts.<br>• Ensure adequate drainage.<br>• Stabilize all slopes, re-vegetating with native species to reduce/avoid erosion.<br>– Break-up compacted surfaces and replace topsoil, brash, seed source, leaf litter, etc.<br>– Excavation and conservation of topsoil before the commencement of mining operations may involve some overburden waste which will be preserved all along the boundary barrier for afforestration<br>– All erosion and sediment control measures will be maintained in a functioning condition | – Lease Holder | |
| 9) | **Contamination of land and water** | – Compliance with prescribed PEQS to control water and | – Essential services like water supply, sewerage disposal and solid waste management must be in working condition | – Lease Holder | |

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action | Responsibility | |
|---|---|---|---|---|---|
| | | | | Implementation | Monitoring |
| | | land pollution | | | |
| 10) | **Air Quality**<br>– Dust resulting from initial preparation of site<br>• Boundary positioning<br>• Mobilization of workforce<br>• Site clearing<br>– Use of heavy machinery can generate exhaust and dust emissions | – Compliance with prescribed PEQS to control air pollution | – The staging of the project will reduce the generation of dust.<br>– Periodic maintenance and management of all the machinery and vehicles<br>– Cutting and burning shrubs for fuel will be prohibited. Similarly waste burning will not be allowed. | – Lease Holder | |
| 11) | **River flow**<br>– Flow pattern might be changed due to | – Minimization of any adverse impact on the flow patterns of River | – No diversion is proposed. There will not be any adverse impact on flow pattern, surface hydrology and ground water regime. | Lease Holder | |

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action | Responsibility | |
|---|---|---|---|---|---|
| | | | | Implementation | Monitoring |
| | river bed extraction.<br>– Project activities depth will be increased, which may result in increase of flow velocity | Chenab during excavation | – Extraction activities will be restricted to 3.0m depth, which will not cause much change in flow pattern of the river<br>– An offset will be left from both sides of river, which will minimize the chances of bank failure | | |
| 12) | **Waste**<br>– Generation of solid & liquid waste from camp sites<br>– The solid waste will be reduce as all the workers are commuting daily on site. | – Control of groundwater or surface water pollution from activities | – Ensure prevention of inappropriate disposal of waste material<br>– Conduct separate collection of and domestic waste to promote recycling and re-use<br>– Proper disposal of waste on agreed site as per agreed method. The area to be leveled and contoured after disposing excess material. No waste or debris will be thrown in the nearest canal water or other water bodies | – Lease Holder | |
| 13) | **Noise** | – Proper & safe handling and | – The contractor will strictly follow the PEQS for ambient noise | – Lease Holder | |

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action | Responsibility | |
|---|---|---|---|---|---|
| | | | | Implementation | Monitoring |
| | – Noise caused by machinery and vehicles used for mobilization of equipments | disposal of related waste<br>– Implementation of waste management plan | – Control noise through control of working hours and selection of less noisy equipment.<br>– A interval will be established, used and adhered to<br>– Prohibit use of pressure horns<br>– Proper maintenance of vehicles and equipment.<br>– Minimize/avoid unnecessary use of pneumatic drills and other noisy machinery<br>– The personal protective equipment (PPEs) will be provided to the workers and its usage will be made mandatory<br>– Activities will be conducted during daytime. | | |
| 14) | **Socio-economic Impacts** | – Empowerment of locals to possible extent<br>– Increase in employment and business opportunities for locals | – Provide walkways and metal sheets where required to maintain access for public or vehicle<br>– Lighting on the site shall be pointed downwards and away from oncoming traffic<br>– The site must be kept clean to minimize the visual impact of site | – Lease Holder | |

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action | Responsibility | |
|---|---|---|---|---|---|
| | | | | Implementation | Monitoring |
| | | | – Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors<br>– Noisy activities must be restricted to the times given in the Project Specification or General Conditions of contract<br>– Employ local residents as much as possible | | |

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**Table 9-5 Environmental Management Plan for Operation/Excavation Phase**

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action | Responsibility | |
|---|---|---|---|---|---|
| | | | | Implementation | Monitoring |
| 1. | **Air quality**<br>– Due to dust generation, dispersion during the earth-moving and excavation operations<br>– Excavation of ordinary sand<br>– Loading of ordinary sand | Compliance with PEQS | – Use of best practice management techniques during excavation and loading of ordinary sand.<br>– All the loaded vehicles going to and leaving the excavated site should be adequately covered to prevent the spillage of materials during transport of the ordinary sand.<br>– Use of new, efficient vehicles, driver training to minimize emissions (e.g. prevention of over revving, shut off engines when vehicles not inuse), proper maintenance, rationalization of trafficmanagement system to optimize transport efficiency<br>– Establish hoarding and maintain the vegetation stripes along the site boundary to minimize the spread of fly dust. | – Lease Holder | |
| 2. | **River flow**<br>– Flow pattern might be changed due to river bed extraction. | – Minimization of any adverse impact on the flow patterns of River Chenab during excavation | – No diversion is proposed. There will not be any adverse impact on flow pattern, surface hydrology and ground water regime.<br>– Extraction activities will be restricted to 3.0m depth, which will not cause much change in flow pattern of the river. | – Lease Holder | |

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action | Responsibility | |
|---|---|---|---|---|---|
| | | | | Implementation | Monitoring |
| | – Obstruction in river flow / course.<br>– Erosion of channel bed. | | – An offset will be left from both sides of river, which will minimize the chances of bank failure<br>– Extraction of minerals will be started from dip side towards rise at the centre and also laterally in 1.0m slice. Unwanted material or spillage (if any) will not be stacked by the side of the excavation voids created. Excavation will be carried out in a manner so that water flow / course will not be obstructed.<br>– Extraction is to be done leaving safety barrier or offset on both sides and maximum barrier should be on concave side of river preferably the flow channel (excavation void created) should be kept straight so as to help avoid erosion as side cutting or collapsing.<br>– Safety zone or buffer area will be created from the river banks to minimize the instability & erosion and to increase the stability of structures. These safety zones will not be mined out<br>– Quantities will be strictly limited so that sand accumulation rates are sufficient to avoid extended impacts on channel morphology | | |

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action | Responsibility | |
|---|---|---|---|---|---|
| | | | | Implementation | Monitoring |
| | | | – Extraction will be carried out as per approved Mine Plan in scientific and systematic way. | | |
| 3. | **Water Quality**<br>Change in surface water quality and ground water quality | – Control of groundwater or surface water pollution from activities | – There will be no change in surface water quality as river is seasonal.<br>– Ground water quality will not be affected due to excavation activities as it is restricted to 3.0m depth and the water level is 9-15 m below the surface of river bed.<br>– The extraction will not be allowed below the water table<br>– Regular monitoring of water samples will be done as precautionary measures. | – Lease Holder | |
| 4. | **Waste**<br>– Generation of solid & liquid waste<br>– The solid waste will be less as all the workers are commuting daily on site. | – Control of groundwater or surface water pollution from activities | – Ensure prevention of inappropriate disposal of waste material<br>– Conduct separate collection of and domestic waste to promote recycling and re-use<br>– Proper disposal of waste on agreed site as per agreed method. The area to be leveled and contoured after disposing excess material. No waste or debris will be thrown in the nearest canal water or other water bodies | – Lease Holder | |

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action | Responsibility | |
|---|---|---|---|---|---|
| | | | | Implementation | Monitoring |
| | | | – Portable Bio-toilets will be used; hence no sewage / liquid effluent will be generated and contamination is also not expected due to percolation. | | |
| 5. | **Noise & Vibration**<br>– Noise from vehicles used for mobilization of items | – Compliance with prescribed PEQS to control Noise pollution | – Control noise through control of working hours and selection of less noisy equipment.<br>– Installation of low noise/ low vibration type equipment<br>– Proper maintenance of equipments<br>– Provision of ear muff to workers working near noisy machinery | – Lease Holder | |
| 6. | **Habitat**<br>– Destruction of fauna and habitat (mammals, birds, reptiles, amphibians, invertebrates). | – Habitat rehabilitation (if any disturb during excavation ) | – Further ecological/fauna survey at appropriate seasons and translocations monitored by the proponent specialist<br>– Moving fauna to neighboring sites may help short-term survival, but not medium-term if these sites are already occupied. In long term populations may recover on restored sites. | – Lease Holder | |

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action | Responsibility | |
|---|---|---|---|---|---|
| | | | | Implementation | Monitoring |
| 7. | **Access to social services**<br>– Employment opportunities | – Improved social infrastructure | – Provision of employment to every affected person on fair basis | – Lease Holder | |
| 8. | **Work environment (including work safety and security)**<br>– Labor accidents due to handling heavy loads; working<br>– | – Prevention measures against labor accidents and health problems<br>– Provide appropriate security | – Labor accidents<br>– Prepare a manual for labor accident prevention including safety education and training<br>– Prohibit over lifting through workers<br>– Provide workers with appropriate protective equipment<br>– Inspect and ensure that any lifting worker, are appropriate for expected loads<br>– Keep lifting devices well maintained and perform maintenance checks as appropriate<br>– Use equipment that protects against electric shock<br>– Observe related standards and provide workers with appropriate facilities<br>– Provide appropriate security to site | – Lease Holder | |

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action | Responsibility | |
|---|---|---|---|---|---|
| | | | | Implementation | Monitoring |
| 9. | **Groundwater Recharge Potential**<br>– Impact on ground water recharge potential as the thickness of the natural filter materials (sediments) is reduce causing less infiltration. | – Minimization of excavations face during development. Temporary drainage grooves and sedimentation ponds for surface run-off collection. | – Extraction will be done as per approved Mine Plan and applicable Rules & Regulation, so that there is no damage on ground water recharge potential due to sand extraction. | – | |
| 10. | **Traffic collisions – onsite**<br>– There may be noise increases at residential properties in | | – Driver fatigue management to be incorporated.<br>– Enforce speed restrictions;<br>– Ensure in-vehicle communications equipment;<br>– Ensure communication policy between vehicles in operational area;<br>– Ensure roll-over protective structures fitted to vehicles as appropriate;<br>– Ensure regular vehicle maintenance schedule; | – | |

| Sr. No. | Project Component/ Impact | Targets to be Achieved | Mitigation/ Preventive Action | Responsibility | |
|---|---|---|---|---|---|
| | | | | Implementation | Monitoring |
| | proximity to the chosen access route, and then from the link road once completed | | | | |

**Table 9-6 Social Impacts during Operational Phase**

| Social Impact | Proposed Mitigation | Residual Impact | Residual Impact Rating |
|---|---|---|---|
| Increased Employment. (Positive Change) | • Measures to maximize local employment. Recommended:<br>• Local recruitment and training.<br>• Prioritization of employment of Project area<br>• Identification of targets of local people to be employed by skill levels. | This depends on skills of the people. Enhanced apprenticeship/training for some local people whose skills could be improved including Recruitment Policy to extend in future to limited sponsorship for workers / local people children. | Major beneficial. |
| Increased National tax and budget (Positive Change). | Assistance to villagers to formulate projects and strengthen advocacy. Money from improved royalty budget can be used to realize these objectives. Proponent may offer skills training for improved planning & project formulation. | Increased Regional & National Budget and secondary impact on local Communities. Residual impact will depend on effectiveness of allocation process in favour of affected villages. An ineffective process would cause conflict / discontent. | Major beneficial. |
| Extended and improved road and implications for local economy (minor/moderate beneficial). | Regulations relating to road side and commercial activities to be adhered to by business persons and enforced by Community. Monitoring of health, road safety issue. Curative and preventive action to be taken if issues identified by monitoring. | Improved opportunities should be seen in increased opportunities and wealth of villages. It may be difficult to apportion this only to the new road or cement works given the current increasingly dynamic economic environment. | Minor beneficial. |

## 9.4 SOCIAL MANAGEMENT PLAN

### 9.4.1 Recommendations and Mitigation Measures

(The following recommendations are made preliminary and will be adjusted based on the results of the Social Impact Assessment process.)

Based on the initial benchmark study, the following preliminary recommendations will be further adjusted according to the results of the Social Impact Assessment process to be conducted at a later stage:

- The management of the Project can capitalize on the positive attitude of the people of area towards proposed Project by offering them maximum employment opportunities at the development stage and any stage of operational phase.
- Insufficient and inadequate socio-economic structure of the community of the area also provides ample opportunities to Company management to win sympathies of local people in their favor, by introducing meaningful and manageable plan of community development.
- Aggressive and comprehensive plantation plan can also lessen fear of local people towards environmental issues.
- Sustainable development approach through conservation of natural resources would be the best strategy to compensate negative socio-environmental impacts.
- Social responsible attitude and stewardship of company management towards local people and resources can make project people friendly.
- Prior to action of the Project installation a comprehensive awareness campaign may be launched at masses level to avoid any conflict.
- To avoid any political, ethnic and value conflict, the administration of the plant may win the confidence of local powerful elites, authorities, leaders and interest groups by adopting informal confidence building measures.

### 9.4.2 Traffic Management Plan

A Construction Traffic Management Plan (CMTP) is necessary to minimize traffic delays, maintain motorist and worker safety, complete roadwork in a timely manner, and maintain access for businesses and residents. It is a mandatory requirement for all roads and highways projects and is defined in several places in the contract specifications of the bid package.

For each if the road projects the contractor will work closely, identify the work areas and activities requiring traffic diversion or safety delays, discuss with local communities and then initiate a traffic control program at each work site.

A typical CTMP addresses the following key issues and processes identified within a construction work zone, defined by the contractor:

- Safety and amenity of road users and the public;
- Site security, site access and signage;
- Project identification, including advertising and site signage;

- Traffic and road user delay and inconvenience management;
- Speed limit signage;
- Traffic transfer (switch) arrangements and procedures;
- Maintenance during construction;
- Traffic and safety management responsibilities;
- Construction staging including detailing the intersection layout and capacities for each and every construction stage;
- Impact of construction traffic on local roads, in particular; and
- Emergency and Incident Response Plans.

The contractor will provide at least two traffic control people at each end of the worksite, supplied with two-way communication and signs or flags. For larger detours, the contractor will provide signage and diversion barriers such as fences or wooden, metal barriers kept in place during the work.

The schedule and level of traffic control will be matched with the work to be done and the specifications on the contract documents.

The Table below (Table 8.8) lists the traffic related issues to be dealt with by the contractor and the actions needed to prevent or mitigate negative effects. The contractor is expected to know the details of this table and any instructions defined in the contract specifications and any special conditions

**Table 9-7 Traffic Issues and Mitigation Actions**

| Issue | Impact | Proposed Prevention/Mitigation Measure |
|---|---|---|
| Construction methods may cause disruption to traffic. | Traffic delays causing frustration to drivers. | Consider construction methods at design stage to reflect community needs & reduce delay times, minimizing impact on traffic. |
| Traffic management inadequate anticipation & communication of issues. | Potential community issues causing dissatisfaction & frustration. | • Determine traffic routes & engage with community to refine details.<br>• Confirm pre-existing conditions. Consider the need for night assessment<br>• Identify any short-term corrective actions. |
| Severe traffic delays perceived by community as a direct result of the construction activities. | Community dissatisfaction, claims for loss of trade, time delays. | • Establish good public relations from start.<br>• Erect early warning information signs<br>• Early engagement of affected property/business owners to explain process and ascertain needs & potential effects of changed access. |
| Access for emergency services restricted. | Emergency vehicles & personnel unable to attend to an emergency situation. | Liaise with emergency services at an early stage to establish requirements and measures to be adopted in the vehicle movement plan. |
| Local bus & other commercial operators. | Impact bus routes, commercial operations, and disruption to business causing frustration. | Bus routes to remain unchanged where possible to avoid changes due to construction activities. |
| Major traffic incidents. | Local traffic disrupted upsetting locals. | • Regular checking of TMP implementation<br>• Have procedures in place for rapid recovery and keep locals informed. |
| Access to site for deliveries. | Traffic disruption or interference. | • TMP development in conjunction with local administration, police & community. |

| Issue | Impact | Proposed Prevention/Mitigation Measure |
|---|---|---|
| | | • High-risk locations will need additional & detailed considerations.<br>• Simplification of traffic staging will simplify access arrangements & minimize impacts. |
| Traffic Speed. | Works in multiple areas may result in intermittent speed changes that may frustrate road users. | • Reduced traffic speeds within construction zone.<br>• Construction zone to be in manageable lengths.<br>• CTMP to consider simplifying traffic staging to avoid construction zone impacting on traffic. |
| Pedestrian access. | Potential disruption to progress causing pedestrians to not comply with pedestrian provisions. | Liaise closely with the relevant bodies from an early stage to ensure pedestrian access provisions are adequately addressed, well established and maintained. |
| Lowering speeds, when it is perceived unnecessary. | Poor public opinion and safety for workers if motorists start ignoring limits. | • Appropriate design of traffic protection measures, intersections, alignments etc. to allow consistent speed limits.<br>• Coordination with local communities. |
| Too many changed configurations. | Unfamiliarity causing potential confusion of road users that may cause traffic incidents. | • Keep motorists on existing alignment for as long as possible.<br>• Effective use of VMSs for advanced notification & clear direction during any traffic flow adjustments. |

| Issue | Impact | Proposed Prevention/Mitigation Measure |
|---|---|---|
| Inadequate provisions for breakdowns during construction. | Traffic delay. | Design temporary break down bays. Consider temporary verges where possible during design of traffic staging. |
| Public or livestock entering work-site or access to site. | Traffic Incident. | • Provide clear delineation and fencing. Educate community work cover requirements.<br>• Channel interests through formally organized tours |
| Dangerous entry & exits to sites & properties. | Traffic Incident. | Ensure that entries /exits are designed to cater for expected traffic volumes & with respect to sight distances, acceleration & deceleration provision & clear advanced warning signage. |
| Seasonal traffic variations not allowed for. | High volumes during holidays and weekends. | • Consider seasonal volumes in programming works.<br>• Keep RMS informed and up to date. Be aware of reporting and notification requirements. |
| Reduced allowable movements. | Traffic delay, confusion to commuters that may lead to an incident. | Implement effective community engagement strategies that will consider businesses, property owner's requirements. |
| Cyclists demand for better access & routes during construction including safety measures. | Confusion to pedestrians & cyclists resulting in dangerous movements. Community dissatisfaction | Engagement with locals, cycle groups & commuters to ensure provision for cyclists is well addressed & notified to the community. |
| Damage to local roads due to heavy vehicle movements. | Vehicle damage and potential incidents. Poor community and council relationship. | • Allow for heavy vehicle movements in traffic staging and planning ensuring existing, temporary alignment & pavements are suitable during the construction period.<br>• Carry out road dilapidation surveys.<br>• Early repair of damaged roads. |

| Issue | Impact | Proposed Prevention/Mitigation Measure |
|---|---|---|
| Impact of construction traffic on local side roads. | Increased traffic & damages to the local roads. | • Monitor the road safety on during construction.<br>• Implement measures where reasonable and feasible, in consultation with Project manager, should additional road safety issues be identified appropriate road safety |

## 9.5 EQUIPMENT MAINTENANCE DETAIL

Equipment should only be inspected, tested and maintained by qualified trained personnel. If any equipment is not in good operating condition, it should be repaired immediately. Authorized dealers will be responsible for maintenance of equipment's. Equipment procedures and maintenance guidelines should be kept in a central location for quick reference when needed.

The proponent shall maintain PPEs, medical facilities, firefighting Equipment's as fire buckets, and records for their periodic filings or replacement.

## 9.6 ENVIRONMENT MANAGEMENT COST

The total cost for the environmental management is estimated as 10 Million. Details are given below in table:

**Table 9-8 Environment Management Cost**

| **Environmental Component** | **Quantity** | **Amount PKR**(Million) |
|---|---|---|
| (i) Restoration cost | - | 9 |
| (ii) Health and Safety Measures and Provision of PPEs | L.S. | 0.50 |
| (iii) Air and Water Quality & Noise Monitoring | L.S. | 0.50 |
| Total Environmental Management and Monitoring Cost | | 10 Million |

## 9.7 COSTED ENVIRONMENTAL MANAGEMENT PLAN

**Table 9-9: Costed Environmental Management Plan**

| Aspect | Action | Cost PKR(Million) | Frequency | Responsibility |
|---|---|---|---|---|
| Restoration/Rehabilitation | ↓ If any topsoil removed during the operation phase it must be conserved and used in the rehabilitation and close out phase. No topsoil will be sold. This soil must be kept safe from erosion<br>↓ The stockpile pad will be Re-shaped to remove any steep embankments and Re-vegetated during the final rehabilitation and closure phase.<br>↓ After rehabilitation is complete, no topsoil will be left over.<br>↓ Any access road or portions thereof, constructed by the permit holder shall be removed and or rehabilitated to the satisfaction of the Environmental Officer.<br>↓ Rehabilitating the access point, the original profile of the river-bank | 9 | After completion of operational | Environmental Manager |

| | | | | |
|---|---|---|---|---|
| | will be re-established by backfilling the access point with the original material excavated or suitable material | | | |
| Health And Safety | ➢ Site access, including stockpile areas and loading areas will be fenced off to prevent unauthorized access.<br>➢ Correct signage must be available at the main access road and entrance of haul road to operation areas - includes authorization, access authorization, warning of activity, safety warning signs (protective equipment, fire & medical equipment) and contact numbers<br>➢ No open fires shall be allowed on site under any circumstances<br>➢ 0.5 Million is reserved for Health and safety budget. | 0.50 | After 3 months or when required | HSE officer |
| Monitoring | ➢ Monitoring of air, water and noise during operation and during rehabilitation to ensure that objectives are being met | 0.50 | During and after operation | Environmental Manager |

| | | | |
|---|---|---|---|
| Total cost of EMP | 10Million | | |

## 9.8 ENVIRONMENTAL MONITORING PROGRAM

The monitoring program is designed to ensure that the requirements of the NOC awarded by the EPA are met Monitoring Program (MP) provides important information that allows for more effective planning and an adaptive response based on the assessment of the effectiveness of mitigation measures. The monitoring of various parameters will help to determine the extent to which project construction/operation activities will cause environmental disturbance.

Following is a tentative plan for environmental monitoring;

**Table 9-10 Environmental Monitoring Plan**

| Components | Parameter | Location | Monitoring Mechanism | Monitoring and Reporting Frequency |
|---|---|---|---|---|
| Dust Emissions | ▪ According to PEQS | ▪ Tracks along the roads during development period. | Ambient Particulate Matter Monitoring. | ▪ Sampling and laboratory testing should be done on monthly basis during the development and annually during the operational stage. |
| Noise Levels | ▪ According to PEQS | ▪ Leased sites,<br>▪ Selected locations along the project access. | Continuous source appropriate monitoring using Noise meter | ▪ Monthly during the development and operational stage. |
| Air emission | CO, $NO_2$, $SO_2$, $PM_{10}$ | Silencers of trucks and other vehicles during development and operational phase | Emissions monitoring system.<br>Monitoring of ambient air quality. | ▪ Monthly monitoring of air pollution parameters including $PM_{10}$, $NO_X$, $SO_X$, CO, Hydrocarbons during the development period, and quarterly monitoring of $PM_{10}$, $NO_X$, $SO_X$, CO, VOCs during the operation stage. |
| Inconvenience to community | - | All around the Project Area | Consultations with community to get feedback about inconvenience due to the development activities to perform their daily routine chores. | • Monthly monitoring and reporting during the development period. |

## 9.9 TREE PLANTATION PLAN

The plan for development of buffer zone for attenuation of the noise and odor and air pollutant levels include design of plantation around the site boundary, road side, and stretches of open land.

### 9.9.1 Green Belt Design

Extensive tree plantation will be carried out to act barrier to control escape of odor, if any, in the surrounding areas. As a part of tree plantation plan, plants which are moderately tolerant to the pollutants but are endowed with fast growing, dense foliage canopy will be planted. The number of plants to be grown along the boundary line of the area will be estimated after physical survey of the during and will be approximately **100** in single row with a tree to tree distance of **5ft/l.5m**. The trees planted here will have dense spreading canopy. The trees will also be grown along the roads and the open stretches. This area will not only act as to reduce the pollution but also will increase the aesthetics of the area. So the trees grown in this area must be flowering as well ornamental plants. All along the boundary of the treatment plant, a strip of plantation with trees which are tall in nature and evergreen in habit. This area will act as a barrier and as far as possible check the pollutants from their escape and potential contamination of other components of local environment.

### 9.9.2 General Landscape Protection

Planting areas and plants shall be protected all times against trespassing and damage of all kinds for the duration of maintenance period. If any plant/s become damage or injured, they shall be treated or replaced. Protection shall also include all temporary protections fences and barriers, all signs and all other work incidental to proper maintenance.

## 9.10 CONCLUSION

Various aspects of project activities were considered and related impacts were evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan was prepared and fund has been allocated for the same. The EMP is dynamic, flexible and subjected to periodic review. For project where the major environmental impacts are associated, EMP will be under regular review.

Senior Management responsible for the project will conduct a review of EMP and its implementation to ensure that the EMP remains effective and appropriate. Thus, the proper steps will be taken to accomplish all the goals mentioned in the EMP and the project will bring the positive impact in the study area

# 10 STAKEHOLDERS/PUBLIC CONSULTATION

It is a mean of involving the both primary and secondary stakeholders in the project decision making process in order to address their concern, improve project design and give the project legitimacy. The stakeholders' consultation has been conducted in a participatory and objective manner to enhance the project stability.

Public discussions were held with the inhabitant of the surrounding area. They are quite positive to the project and see the project as growing business. The people observe strong positive impacts regarding employment, business and structural development due to this project. EIA findings depict that people perceive overall positive social and economic impacts by the project. Their attitude towards the project operation is highly optimistic. Majority of the people are convinced for development in the area and they correlate this progress with the pace of their social mobility but they were also concerned with scenic beauty of the area and employment which the proponent has ensured to maintain the aesthetics of the area, reclaim the land and also to provide jobs/employment during construction and at the time of functioning of the project. Moreover, project proponent admitted to adopt all the mitigation measures to control any impacts resulting from the subject project.

For the purpose of engaging stakeholders for maximization of the project benefits, open invitation of participation in public hearing through newspaper advertisement will be given to local public, where project information will be disclosed. Reviews of general public will be taken and their concerns will be addressed.

## 10.1 OBJECTIVES OF STAKEHOLDERS CONSULTATION

The process of public participation and consultation was endorsed in the United Nations Conference on the Environment and Development (UNCED) in 1992 through one of the key documents of the conference named as Agenda 21.

Agenda 21 is a comprehensive strategy for global action on sustainable development and deals with issues regarding human interaction with the environment. It emphasizes the role of public participation in environmental decision-making for the achievement of sustainable development.

A study was carried out with the broad objective to evaluate the impact of the project on the local population through public consultation process. The specific impact assessment aims were:

- Promote better understanding of the project, its objective, and its likely impact
- Identify and address concerns of all interested and affected parties of project area.
- Provide a means to identify and resolve issues before plans are finalized and potentially costly delays development commences, thus avoiding public anger and resentment.
- Encourage transparency and inculcate trust among various stakeholders to promote cooperation and partnership with the communities and local leadership.

## 10.2 CONSULTATION PROCESS

Primary stakeholders were consulted during informal and formal meetings held in the project area. The consultation process was carried out in the Punjabi and Urdu languages. During these meetings a simple, non-technical, description of the project was given, with an overview of the project's likely human and environmental impact. This was followed by an open discussion allowing participants to voice their concerns and opinions. In addition to providing communities with information on the proposed project, their feedback was documented during the primary stakeholder consultation. The issues and suggestions raised were recorded in field notes for analysis, and interpretation.

By reaching out to a wider segment of the population and using various communication tools such as participatory needs assessment, community consultation meetings, focus group discussions, in-depth interviews, and participatory rural appraisal; present EIA involved the community in active decision-making. This process will continue even after this EIA has been submitted, as well as during future EIAs in which similar tools will be used to create consensus among stakeholders on specific environmental and social issues.

In the Secondary stakeholder consultations were more formal as they involved government representatives and local welfare organizations, NGO's consulted during face-to-face meetings and through telephonic conversations. They were briefed on the EIA process, the project design, and the potential negative and positive impact of the project on the area's environment and communities. It was important not to raise community expectations unnecessarily or unrealistically during the stakeholder consultation meetings in order to avoid undue conflict with community's leaders or local administrators. The issues recorded in the consultation process were examined, validated, and addressed in the EIA report.

## 10.3 IDENTIFICATION OF STAKEHOLDERS

In recognition of the diversity of views within any community, it is very important to obtain a clear understanding of the different stakeholders and to analyze their capacity and willingness to be involved in some or all of the project and its planning process. It is important to be aware of how different power relations can distort participation. It is also important to examine how community skills, resources, and 'local knowledge' can be applied to improve project design and implementation. All of this can be achieved by careful use of the various tools of Stakeholder Consultation. Therefore, the following participatory techniques were employed during stakeholder consultations:

- Informal meetings with communities.
- Focus Groups with participants in communities.
- In the consultation process for EIA, following key stakeholders were consulted:
- Local communities,
- Men
- Women and Community's elders attended meetings

Meetings with stakeholders consisted of community consultation meetings, focus group discussions, and in-depth interviews with men and limited focus-group discussions with women.

### 10.3.1 Proponent

All possible impacts and mitigation measure related to the project were discussed with the proponent and management. They assured to take all suggested mitigation measures to control any discrepancy arose by the project and to make the project environment friendly.

### 10.3.2 The Responsible Authority

The proponent will be the responsible authority to take all measures prior to start the project and during operation.

### 10.3.3 Other Departments and Agencies

For the impact analysis detailed consultation with the management of Mine and Minerals departments, Environment Protection Department, institutes, health institutes, hospitals and NGOs were carried out. All issues were discussed related to implementation of the project. Scoping sessions, focused group discussion and way side consultations were held with the relevant stakeholders in the area. Findings of the consultation are

- Proponent should strictly follow Environmental Management plan.
- Proponent should plant trees.
- Provision of Personal Protective Equipment (PPE) to all the workers. First aid will be provided immediately and in case of any serious accident, affected person will be shifted to the nearest hospital immediately.
- Unauthorized persons will not allow at the project site
- As the project is sand extraction/mining from river, proponent has to submit Environmental Impact Assessment Report

### 10.3.4 Environmental Practitioners and Experts

Team of Integrated Environment Consultants visited the project site, had discussion with stakeholders and consulted with the local people of nearby and other villages to evaluate the project socio-economic impacts. People of the area belong to different professions like mostly belong to employment, own businesses, doctors, in Army, teaching, in agriculture etc. women were also consulted for their point of view regarding the betterment of the area by this project, some of them communicated but according to social value of the area they mostly hesitate to communicate comfortably and get pictured. People provide the massive information about the project and have positive remarks regarding the project development. Finding of the consultation with Environmental Practitioners and Experts are

- Proponent should strictly follow Environmental Management plan

- Consider all guidelines of Punjab EPA during preparation of Environmental Impact Assessment.
- Proponent should plant trees.

### 10.3.5 Affected and Wider Community

There is no affected community present in the area of proposed project. Consultant's team has consulted with the inhabitants of different villages near the proposed site. The people of the area are satisfied with the project because the project will provide the labor opportunities to the locals and improve the economic condition of the area. The project will also provide the good quality of sand which is the basic raw material of construction.