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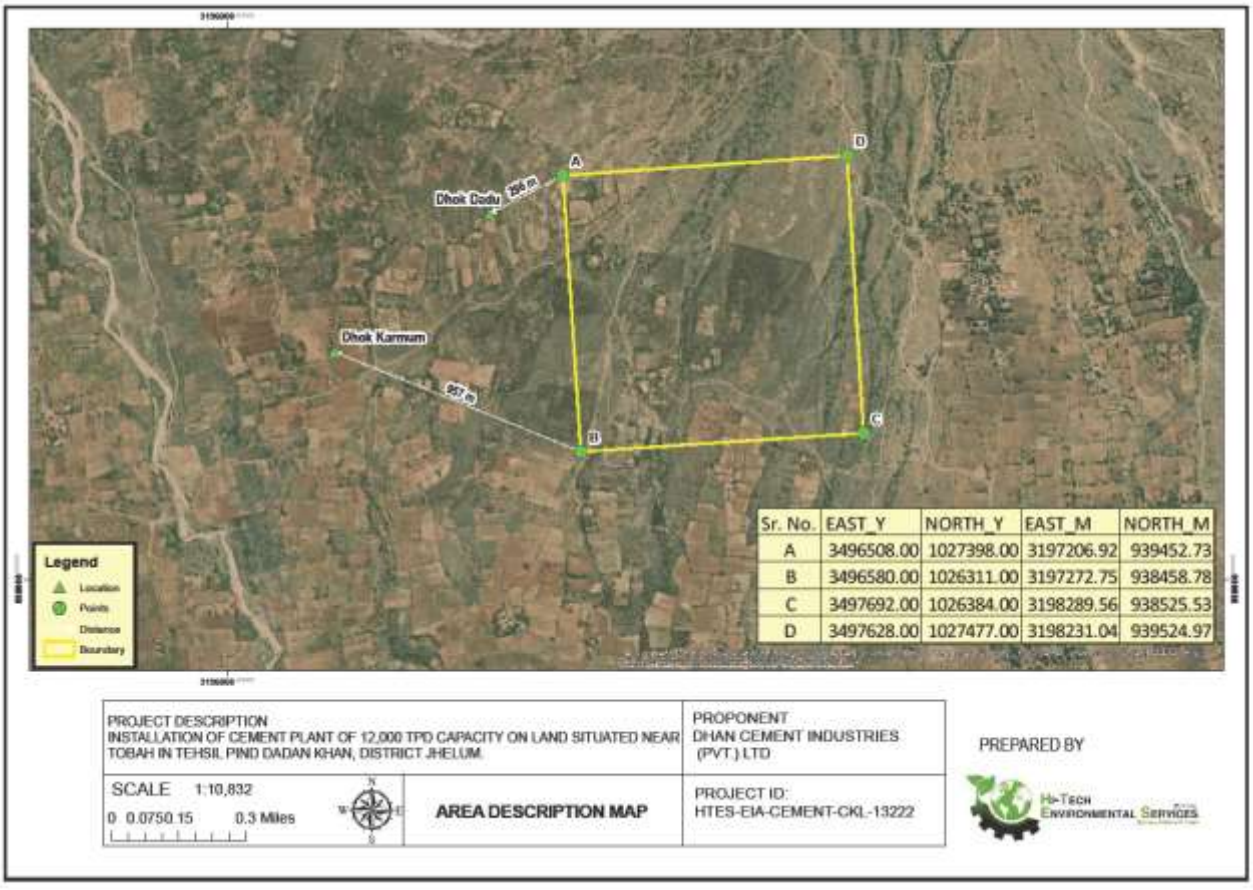
EXECUTIVE SUMMARY

Title and Location of the Project

M/s Dhan Cement Industries(Pvt.). Limited intends to Install Cement Plant with 12,000TPD Capacity Near Tobah in District Jhelum under the title of "Installation of Cement Plant of 12,000 TPD capacity near Tobah in District Jhelum".

Under the Section 12 of the Environmental Protection Act 1997, Environmental Impact Assessment (EIA) of cement plants has been made mandatory and has also been demanded by the Mines and Minerals Department.

The cement plant is located near Tobah District Jhelum. The google earth map showing the boundary of the lease is shown in Figure below. A more detailed colored google earth image is presented in ***Annexure III*** on A3 size.



Sr. No.	EAST_Y	NORTH_Y	EAST_M	NORTH_M
A	3496508.00	1027398.00	3197206.92	939452.73
B	3496580.00	1026311.00	3197272.75	938458.78
C	3497692.00	1026384.00	3198289.56	938525.53
D	3497628.00	1027477.00	3198231.04	939524.97

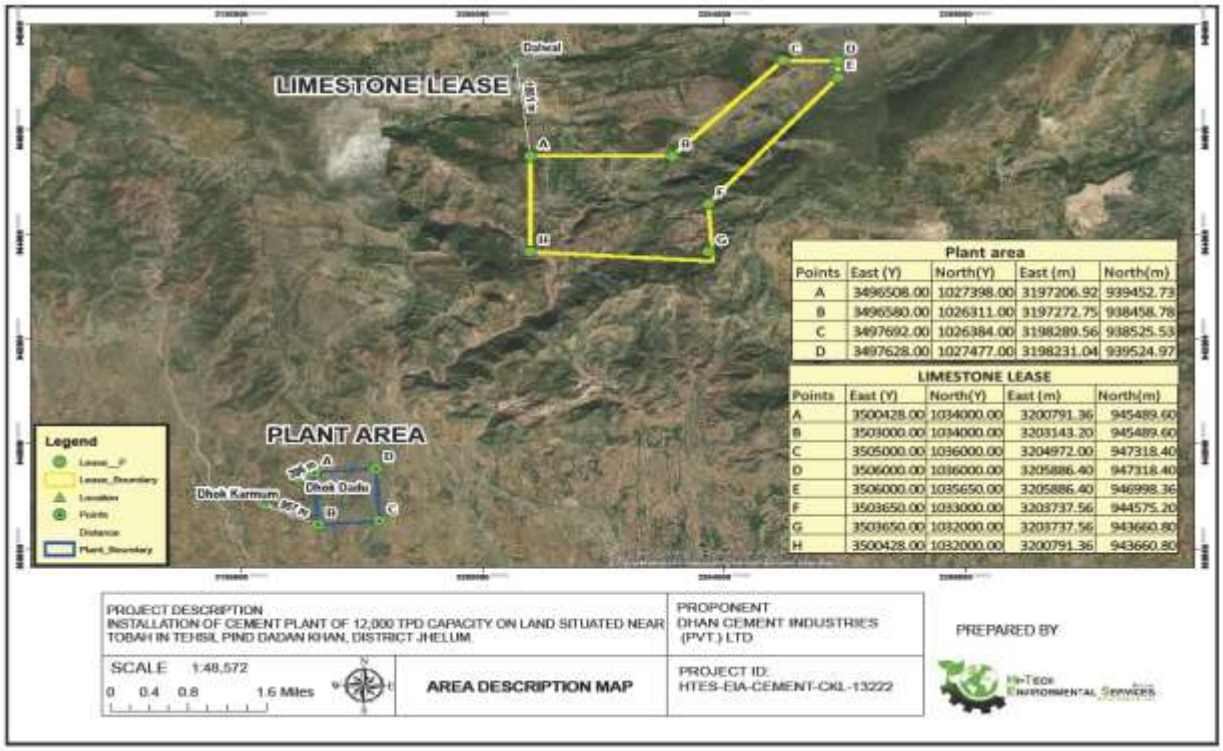
The coordinates of the Plant are as follows:

Points	East (Meters)	North (Meters)
1	3496508	1027398
2	3496580	1026311
3	3497692	1026384
4	3497628	1027477
Total Area: 252.40 Acres		

The coordinates of the Limestone Leases are given in Table below.

Points	East (Meters)	North (Meters)
A	3500428	1034000
B	3503000	1034000
C	3505000	1036000
D	3506000	1036000
E	3506000	1035650
F	3503650	1033000
G	3503650	1032000
H	3500428	1032000
Total Area: 2000.00 acres		

The google earth map showing distance of limestone lease from cement plant.



Name of the Proponent

M/s Dhan Cement Industries (Pvt.) Ltd. is the proponent of the proposed project that is installation of cement plant. The contact details of the representative is as shown below:

Company Name	Dhan Cement Industries(Pvt.) Ltd
Address	H/93, Gulshan-e-Ravi, Lahore.
Representative	Anwar Ul Haque Shad

Name of Organization Preparing the Report

Hi-Tech Environmental Services (Pvt.) Ltd. is a business entity managed by geoscientists. The company has the expertise of highly diversified experience and as such the business company with the sole proprietorship has a wide range service area as follows:

a) Economic Geology
b) Determination of geological exploratory techniques.
c) Mine design
d) Selection of mine machinery and equipment.
e) Mine development & management.
f) Preparation of feasibility reports, IEE report, EIA reports, Development Schemes &Prospecting Scheme.
g) Preparation of reports on HRD /Mines Rescue &Recovery.
h) Assessment of Impact of Mining on environment and mitigating measures.
i) Mine surveying & interpretation of boundary disputes.
j) Legal opinion on mine regulatory regime.
k) Energy fuels and selection of choice fuels for specific energy
l) Expertise in coal and rock salt mining.
m) Drilling and blasting for underground and surface mining techniques.
n) Safety measures for mines operation.
o) Specific alloys and their significance in the use of mine machinery.
p) Any kind of consultancy relating to manufacturing, marketing and service areas.

Contact Details	
Consultant Company	Hi-Tech Environmental Services
Address	26 B Zahoor Elahi Road, Gulberg II, Lahore
Representative	Advocate Chaudhry Awais Ahmed
Contact	(+92) 3219443210
e-Mail	consultantshtma@gmail.com | info@hitechma.com

Brief Outline of the proposal

The project aims at manufacturing of the cement in District Jhelum, Punjab. The production level of the plant will be 12,000 TPD. The project will also consist of one limestone lease over 2000.00 acres to fulfil the requirement of raw material. The Mines and Minerals Department has been requested for the grant of the lease. The FESCO and proponent are under discussion for project's electricity requirement from its transmission line. The feasibility study contains the details of the financial and technical aspects of the project and other necessary issues in totality as required by any industrial project installation.

According to the Pakistan Environmental Protection Agency (Review of IEE & EIA) Regulations, 2000, the proposed project falls in Schedule II under sub-section (1) of Clause B (Manufacturing and Processing).

- **Objectives of the Project**

a) To meet the market demand of cement.
b) To expedite more avenues for new entries based on techno-economical parameters.
c) To accelerate pace of development for technology-based business.
d) To enhance production, productivity coupled with safety by improvising with the adaptable technology-mechanization.
e) To add matching infra-structure, machinery and equipment along with other inputs needed as a factor of production to keep pace with the envisaged programs.
f) To undertake aggressive marketing to maximize export and domestic share.
g) To expand community development program and social fabrics.
h) To support economic agenda by creating job avenues.

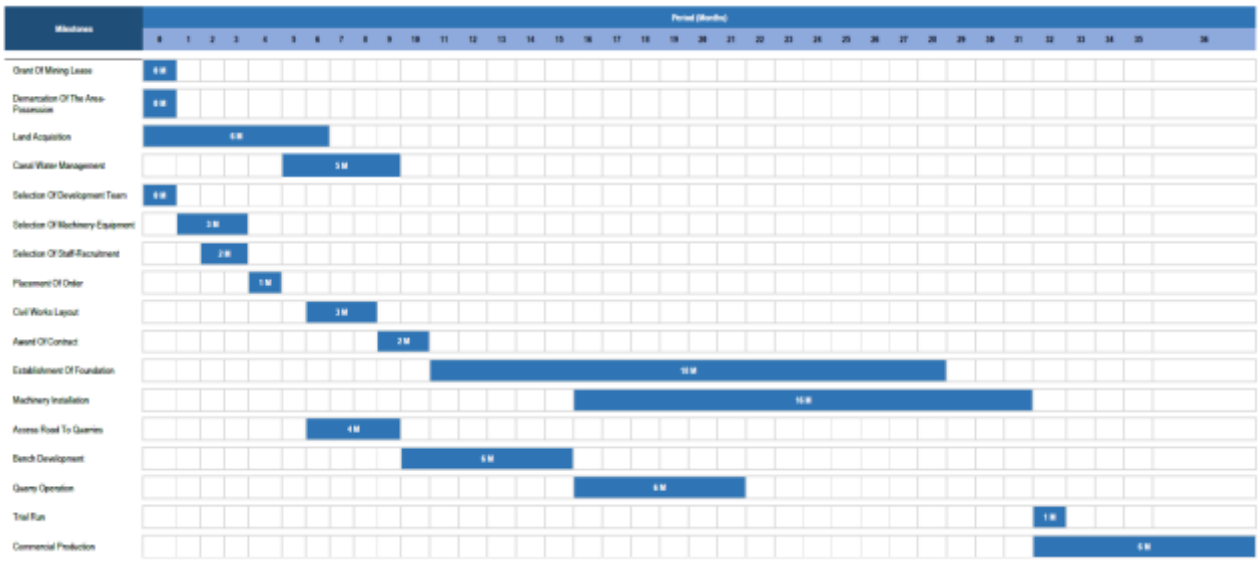
The cost and magnitude of the project may be judged from the information given below.

- **Project Cost**

The 12,000TPD plant will be installed in two phase. Financial assumptions are as under:

- Land, building and infrastructure will cost about 52 million *Euro*
- Plant, machinery and power system 460 million *Euro*
- Wages and salaries are expected to rise by 5%
- Repair& Maintenance are expected to rise by 5%
- Depreciation has been taken on the straight line basis at the rate of 7% on machinery and equipment and 5% on infrastructure and building and vehicles by 20%.
- Insurance expenses will be 1,000,000 *Euro* per annum
- Inflation rate is assumed to be 5%
- Sales price is expected to be adjusted accordingly in line of inflation.
- Admin cost is budgeted at 3,000,000 *Euro* including technical experts from Germany. Professional fees in the first year and then is expected to rise by 5%
- Distribution cost is budgeted at 5% of sales in the first year and then is expected to rise by 5%
- Tax rate to be 29%.

The project activities will be carried out by considering all the environmental parameters. No project activity will pose any threat and danger to the environment. The project operations will be carried with due care and vigilance. All the impacts will be assessed in detail on every environmental setting. The corresponding mitigation measures will be suggested for every impact resulting from the project activities. A tentative schedule of implementation for three years of project activities is given in Table below



- **Restoration and Rehabilitation Plan**

The restoration and rehabilitation plan are provided in Table given below.

Measures for Land Rehabilitation& Restoration	Timeframe	Responsible Party
The importance of the site is due to its economic activity; otherwise it is similar to a barren land. The question of rehabilitation therefore doesn't arise except re-coursing the land formed from the cavities of the mined-out area	At Mine Closure	Proponent
Trees will be planted at the project area by coordinating with the local farmers who are benefitted by the removal of Cement from their lands. The plantation estimate is provided in ***Annexure IX.***	Till Lease Tenure	Proponent
The site can be used for re-stocking the livestock	After Mine Closure	Proponent/Livestock Department
The land will be available for agricultural use	After Mine Closure	Land Owners/Farmers

The Major Impacts

The summary of the positive and the negative impacts observed on the environment by the cement production on the project area has been summarized in Table below. The impacts have been given magnitude based on the scaling given below

Scale Range	0 to 5
Major Impact	5
Moderate	4
Intermediate	3
Minor	2
Low	1
No Impact	0

(+) sign is used for positive impacts and (-) sign for negative impacts. The mitigation measures will be explained after a short while.

During Installation Phase

Sr. No.	Component	Environmental Issue	Impacts	
			Positive	Negative
1	Physical Environment			
	Water	Channel Water Quality		0

		Channel Water Discharge.		0
		Groundwater Quality		0
		Groundwater Level		0
		Surface Run-Off		0
		Flooding		0
		Drainage		0
	Land	Soil Salinity		0
		Soil Erosion		0
		Land Utility / Productivity	+3	
	Solid Waste	Land Pollution Breeding of flies and rodents Odor		0
	Climate	Micro-climate changes.		0
	Atmosphere	Dust		-3
		Noise		-2
	Sub-Total		**+3**	**-5**
2	**Biological Environment**			
	Flora	Forests /Trees	+2	
		Other Terrestrial Vegetation		0
	Fauna	Mammal Communities /Habitat		0
		Reptile Communities /Habitat		0
	Sub-Total		**+2**	**0**
3	**Socio-economic Environment**			
	Social	Population	+1	
		Land Ownership	+1	
		Land Lease	+2	
		Worker's Health and Safety		-2
		Security		0
		Social Cohesion/ Attitude	+1	
		Food/ Nutrition	+1	
		Health		0
		Education	+1	
	Economic	Income Levels	+1	

		Employment	+2	
		Land Value	+2	
	Institutional	Institutional Activities/Effectiveness	+2	
	Human Use	Cultivation	+1	
		Livestock	+1	
		Afforestation	+2	
		Infrastructure		0
		Domestic Water Supply		0
		Community Development	+2	
	Resettlement	Land Lease		0
		Dislocation of Population		0
		Loss of Property		0
		Loss of Infrastructure		0
		Resettlement of Affected		0
Sub-Total			**+20**	**-2**
Grand Total			**+25**	**-7**

During Operational Phase

Sr. No.	Component	Environmental Issue	Impacts	
			Positive	Negative
1	**Physical Environment**			
	Water	Channel Water Quality		0
		Channel Water Discharge.		0
		Groundwater Quality		0
		Groundwater Level		0
		Surface Run-Off		0
		Flooding		0
		Drainage		0
	Land	Soil Salinity		0
		Soil Erosion		0
		Land Utility / Productivity	+2	

	Solid Waste	Land Pollution Breeding of flies and rodents Odor		0
	Climate	Micro-climate changes.		0
		Climate Change		-2
	Atmosphere	Dust		-2
		Noise		-2
	Sub-Total		**+2**	**-6**
2	**Biological Environment**			
	Flora	Forests /Trees	+2	
		Other Terrestrial Vegetation		0
	Fauna	Mammal Communities /Habitat		0
		Reptile Communities /Habitat		0
	Sub-Total		**+2**	**0**
3	**Socio-economic Environment**			
	Social	Population	+1	
		Land Ownership	+1	
		Land Lease	+2	
		Worker's Health and Safety		-2
		Security		0
		Social Cohesion/ Attitude	+1	
		Food/ Nutrition	+1	
		Health		0
		Education	+1	
	Economic	Income Levels	+1	
		Employment	+2	
		Land Value	+2	
	Institutional	Institutional Activities/Effectiveness	+2	
	Human Use	Cultivation	+1	
		Livestock	+1	
		Afforestation	+2	
		Infrastructure		0
		Domestic Water Supply		0

		Community Development	+2	
	Resettlement	Land Lease		0
		Dislocation of Population		0
		Loss of Property		0
		Loss of Infrastructure		0
		Resettlement of Affected		0
Sub-Total			**+20**	**-2**
Grand Total			**+24**	**-8**

Recommendations for Mitigation Measures

The negative impacts resulting from Cement production can be controlled through means and measures demonstrated in Table below. Further, the implementation agencies are also identified who can help in reducing the negative impacts. The aim of these measures is to conserve the local environment commensurate with the NEQS. The implementation of the mitigation measures is however linked to the production tenure only.

During Installation Phase

Environmental Component	Sources	Potential Impacts	Mitigation Measures
Physical Environment			
Air Quality	• Cement plant installation • Movement of vehicles and machinery	• Dust emissions are generated from Cement plant installation activities. • Exhaust emissions from diesel engine vehicles.	• Controlled water sprinkling will be ensured to reduce PM_{10}. • Maintain appropriate buffers between the site and receptors. • Use of PPEs (face masks etc.) will be ensured by the workers and staff.
Solid Waste	• Workers activities • No solid waste will be generated from project installation.	• If not properly handled, it has the potential to degrade the quality of land. • Odor problem • Breeding of flies, birds, rodents etc.	• Proper waste management plan will be developed. • Waste will be stored at site in covered containers. • Containers will be emptied before they

		• Nuisance to the nearby communities if present within the proximity of the lease area.	reach their carrying capacity. • Littering will be prohibited at the site. • Awareness will be given to the staff and workers about handling of solid waste at site.
Noise	• Installation of heavy machinery and equipment for production of cement. • Movement of heavy machinery at site.	• Increased noise levels and vibrations. • Disturbance to workers and local residents (if any). • Reduced hearing issues for workers and staff.	• Use of PPEs (noise suppression equipment-ear mufflers, ear plugs etc.) will be ensured by the workers where noise levels are higher than 85 (dBA). • Project activities will be ensured at day time when background noise levels are high. • Vehicles speed limit will be maintained to avoid excessive vibrations. • Regular maintenance of machinery will be ensured.
Wastewater	Nil	• No wastewater will be generated from installation activities. Therefore, there will be no adverse impact on environmental setting due to this parameter.	Nil
Biological Environment			
Flora	Nil	• The project area is devoid of any forest cover. • There are no trees except some small size bushes at the project site not worth mentioning. • The proponent will not be cutting any	• Excessive plantation will be done in and around the boundary of the project area as a potential environmental enhancement measure.

		trees coming in direct way of mining activities. • Therefore, there is no question of tree cutting during the installation of the project as well.	(Subject to the agreement between proponent and consultant and consent of the land owner also)
Fauna	Nil	• Temporary migration of mammals and birds from the area.	• As this impact is temporary, hence, no significant mitigation measures are required.
Endangered Species	Nil	• No endangered species found within the vicinity of the project area, hence, no impact.	Nil
Socio-economic Environment			
Worker's Health and Safety	• Noise • Dust	• Health and safety risks to workers due to high levels of dust and noise. • Respiratory problems • Hearing issues	• Provision of first aid box at site. • Provision of Personal Protective Equipment (e.g. dust masks, ear muffs etc.) to workers and staff.
Community Amenity	• Noise • Dust	• Reduced visual amenity • Excessive dust impacts may be harmful for some people, for example, with some experiencing respiratory conditions.	• Adopt and maintain good management practices. • Maintain appropriate buffers between the site and receptors. • If these buffers include vegetative screens, they have the added benefit of providing improvements in visual amenity.

During Operational Phase

Environmental Component	Sources	Potential Impacts	Mitigation Measures
Physical Environment			
Air Quality	• Cement production activities • Vehicles and machinery	• CO_2 emissions from cement plant. • Dust emissions are generated from site clearing and project	• Proper plan will be developed to reduce CO_2 emissions. • Controlled water sprinkling will be

		activities. • Exhaust emissions from diesel engine vehicles.	ensured to reduce PM_{10}. • Maintain appropriate buffers between the site and receptors. • Use of PPEs (face masks etc.) will be ensured by the workers and staff.
Solid Waste	• Workers activities • No solid waste will be generated from project operations.	• If not properly handled, it has the potential to degrade the quality of land. • Odor problem • Breeding of flies, birds, rodents etc. • Nuisance to the nearby communities if present within the proximity of the project area.	• Proper waste management plan will be developed. • Waste will be stored at site in covered containers. • Containers will be emptied before they reach their carrying capacity. • Littering will be prohibited at the site. • Awareness will be given to the staff and workers about handling of solid waste at site.
Noise	• Heavy machinery and equipment such as excavators and tractor trolleys	• Increased noise levels and vibrations. • Disturbance to workers and local residents (if any). • Reduced hearing issues for workers and staff.	• Use of PPEs (noise suppression equipment-ear mufflers, ear plugs etc.) will be ensured by the workers where noise levels are higher than 85 (dBA). • Production activities will be ensured at day time when background noise levels are high. • Vehicles speed limit will be maintained to avoid excessive vibrations. • Regular maintenance of machinery will be ensured.
Wastewater	Nil	• No wastewater will be generated from project activities.	Nil

		Therefore, there will be no adverse impact on environmental setting due to this parameter.	
Biological Environment			
Flora	Nil	• The project area is devoid of any forest cover. • There are no trees except some small size bushes at the project site not worth mentioning. • The proponent will not be cutting any trees coming in direct way of mining activities. • Therefore, there is no question of tree cutting during the operation of the project as well.	• Excessive plantation will be done in and around the boundary of the lease area as a potential environmental enhancement measure. (Subject to the agreement between lessee and consultant and consent of the land owner also)
Fauna	Nil	• Temporary migration of mammals and birds from the area.	• As this impact is temporary, hence, no significant mitigation measures are required.
Endangered Species	Nil	• No endangered species found within the vicinity of the project area, hence, no impact.	Nil
Socio-economic Environment			
Worker's Health and Safety	• Noise • Dust	• Health and safety risks to workers due to high levels of dust and noise. • Respiratory problems • Hearing issues	• Provision of first aid box at site. • Provision of Personal Protective Equipment (e.g. dust masks, ear muffs etc.) to workers and staff.
Community Amenity	• Noise • Dust	• Reduced visual amenity • Excessive dust impacts may be harmful for some people, for	• Adopt and maintain good management practices. • Maintain appropriate buffers between the site and receptors.

		example, with some experiencing respiratory conditions.	• If these buffers include vegetative screens, they have the added benefit of providing improvements in visual amenity.

Proposed Monitoring

The environment, safety and health-monitoring program for the operational phase of the project are as follows:

- Regular monitoring of machinery and vehicles.
- River flow monitoring (if present within the vicinity of the project area).
- Monitoring of environmental parameters including ambient air and noise in terms of their quality.
- Monitoring of the environmental parameters as suggested and directed by EPA, Punjab.
- Monitoring of implementation of Environmental Management and Monitoring Plan.
- Monitoring of parameters including in Occupational Health and Safety. Some of them are as follows:
    1. Provision of PPEs to the workers and staff.
    2. Provision of First Aid box at site.
    3. Provision of fire-extinguisher for emergency situations etc.
- The project manager, being aware and conscious of its responsibilities towards environment is committed that the project operations will be made keeping in line with the internationally accepted sustainable measures/practices and methods thus leaving negligible adverse impacts on any segment of environment due to proposed activity.
- Environmental Management and Monitoring Program

The negative impacts resulting from the project activity will be mitigated and monitored through different management and monitoring practices. Each impact will be managed and monitored properly during the whole lifecycle of the project. The EMMP include the negative impact, its management and monitoring practices, timeframe, responsible authority and cost bear to mitigate that specific impact.

For Installation Phase

The EMMP for installation phase of the project includes following:

- Air quality management & monitoring plan
- Noise management & monitoring plan

- Solid Waste management & monitoring plan
- Health and safety management & monitoring plan

Air Quality Management & Monitoring Plan

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Reduce Dust Emissions					
1	Dust Emissions	Monitor speed limits of vehicles operating at project site.	Throughout installation period	Proponent	0/-
		Avoid installation activities in extremely dry weathers.	Throughout installation period	Proponent	0/-
		Sprinkle water at site when necessary to reduce dust spread.	Throughout installation period	Proponent & Contractor	7,000,000
		Ensure the use of Personal Protective equipment by workers and staff.	Throughout installation period	Proponent & Contractor	2,000,000
Reduce Exhaust Emissions					
2	Exhaust Emissions	Ensure minimization of Vehicle idling time.	Throughout installation period	Proponent & Contractor	0/-
		Alternatively, fueled equipment shall be used where feasible equipment shall be properly tuned and maintained.	Throughout installation period	Proponent & Contractor	0/-
		Give awareness to vehicle drivers and operators to avoid unnecessary racing of vehicle engines at loading/un-loading points. Ensure that vehicles engines must be switched off at these points.	Throughout installation period	Contractor	0/-
Sub-Total					**9,000,000**

- Noise Management & Monitoring Plan

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of Noise and Vibrations					

1	Noise and Vibrations	Aware vehicle and machinery operators to switch off engines of vehicles or machinery not being used to avoid excessive noise and vibrations.	During installation period	Proponent & Contractor	0/-
		Sensitize drivers to avoid gunning of vehicle engines or unnecessary hooting especially when passing through sensitive areas such as churches, mosques, residential areas and schools.	Throughout installation period	Proponent & Contractor	0/-
		Ensure that machinery is kept in good condition to reduce noise generation.	Throughout installation period	Proponent & Contractor	1,000,000
		The noisy installation works will entirely be planned during day time when most of the neighbors will be at work.	Throughout installation period	Proponent & Contractor	0/-
Sub-Total					**1,000,000**

- **Solid Waste Management & Monitoring Plan**

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	**Potential Impacts**	**Management & Monitoring Measures**	**Timeframe**	**Responsible Party**	**(PKR)**
Minimization of solid waste generation and ensure efficient solid waste management					
1	Increased solid waste generation	Donate recyclable/reusable or residual materials to local community groups, institutions.	During installation period	Proponent	0/-
		Proper waste management plan must be developed.	During installation period	Proponent	0/-
		Waste must be stored at site in covered containers.	During installation period	Proponent	500,000
		Containers must be emptied before they reach their carrying capacity.	During installation period	Proponent	0/-
		Littering must be prohibited at the site.	During installation period	Proponent	0/-
		Awareness will be given to the staff and workers about handling of solid waste at site.	During installation period	Proponent	0/-

		Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction 2. Reuse 3. Recycling	Throughout installation period	Proponent & Contractor	0/-
		Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time.	Throughout installation period	Proponent & Contractor	0/-
Sub-Total					**500,000/-**

- **Health and Safety Management & Monitoring Plan**

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of occupational health and safety risks					
1	Health and Safety Impacts	Implement all necessary measures to ensure health and safety of workers and the general public during installation of the project.	Throughout installation period	Proponent	0/-
		Suitable overalls, safety footwear, dust masks, gas masks, respirators, gloves, ear protection equipment etc. should be made available and personnel must be trained to use the equipment.	Once off	Proponent & Contractor	2,000,000
		Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises.	Continuous	Proponent	1,000,000
2	First Aid	Provision of well stocked first aid box must be ensured within the premises of the project area.	One-off/as per required	Proponent	500,000
		Provision must be made for persons to be trained in first aid.	One-off	Proponent	300,000
Sub-Total					**3,800,000**
Grand-Total					**14,300,000**

For Operational Phase

The EMMP for operational phase of the project includes following:

- Air quality management & monitoring plan
- Noise management & monitoring plan
- Solid Waste management & monitoring plan
- Health and safety management & monitoring plan
- **Air Quality Management & Monitoring Plan**

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Reduce Dust Emissions					
1	Dust Emissions	Monitor speed limits of vehicles operating at mining site.	Throughout operational period	Proponent	0/-
		Avoid operational activities in extremely dry weathers.	Throughout project lifecycle	Proponent	0/-
		Sprinkle water at site when necessary to reduce dust spread.	Throughout operational period	Proponent & Contractor	2,000,000
		Ensure the use of Personal Protective equipment by workers and staff.	Throughout operational period	Proponent& Contractor	2,000,000
Reduce Exhaust Emissions					
2	Exhaust Emissions	Ensure minimization of Vehicle idling time.	Throughout operational period	Proponent & Contractor	0/-
		Alternatively, fueled equipment shall be used where feasible equipment shall be properly tuned and maintained.	Throughout operational period	Proponent & Contractor	0/-
		Give awareness to vehicle drivers and operators to avoid unnecessary racing of vehicle engines at loading/un-loading points. Ensure that vehicles engines must be switched off at these points.	Throughout operational period	Contractor	0/-
Sub-Total					**4,000,000**

- Noise Management & Monitoring Plan

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of Noise and Vibrations					
1	Noise and Vibrations	Aware vehicle and machinery operators to switch off engines of vehicles or machinery not being used to avoid excessive noise and vibrations.	During operational period	Proponent & Contractor	0/-
		Sensitize drivers to avoid gunning of vehicle engines or unnecessary hooting especially when passing through sensitive areas such as churches, mosques, residential areas and schools.	Throughout operational period	Proponent & Contractor	0/-
		Ensure that machinery is kept in good condition to reduce noise generation.	Throughout operational period	Proponent & Contractor	1,500,000
		The noisy production works will entirely be planned during day time when most of the neighbors will be at work.	Throughout project life	Proponent & Contractor	0/-
Sub-Total					1,500,000

- Solid Waste Management & Monitoring Plan

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of solid waste generation and ensure efficient solid waste management					
1	Increased solid waste generation	Donate recyclable/reusable or residual materials to local community groups, institutions.	During operational period	Proponent	0/-
		Proper waste management plan must be developed.	During operational period	Proponent	0/-
		Waste must be stored at site in covered containers.	During operational period	Proponent	500,000/-
		Containers must be emptied before they reach their carrying capacity.	During operational period	Proponent	0/-

		Littering must be prohibited at the site.	During operational period	Proponent	0/-
		Awareness will be given to the staff and workers about handling of solid waste at site.	During operational period	Proponent	0/-
		Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction 2. Reuse 3. Recycling	Throughout operational period	Proponent & Contractor	0/-
		Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time.	Throughout operational period	Proponent & Contractor	0/-
Sub-Total					**500,000/-**

- **Health and Safety Management & Monitoring Plan**

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	**Potential Impacts**	**Management & Monitoring Measures**	**Timeframe**	**Responsible Party**	**(PKR)**
Minimization of occupational health and safety risks					
	Health and Safety Impacts	Implement all necessary measures to ensure health and safety of workers and the general public during operation of the project.	Continuous	Proponent	0/-
		Suitable overalls, safety footwear, dust masks, gas masks, respirators, gloves, ear protection equipment etc. should be made available and personnel must be trained to use the equipment.	Once off	Proponent & Contractor	2,000,000
		Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises.	Continuous	Proponent	1,500,000
2	First Aid	Provision of well stocked first aid box must be ensured within the premises of the lease area.	One-off/as per required	Proponent	200,000

		Provision must be made for persons to be trained in first aid.	One-off	Proponent	500,000
Sub-Total					**4,200,000**
Grand-Total					**10,200,000**

- **Conclusions and Recommendations**

At the end of this EIA study, following conclusions are drawn and recommendations have been given accordingly.

Conclusions	
General	• All the positive and negative impacts resulting from Cement production have been studied in due detail on environmental settings. All the negative impacts have been given magnitude based on the defined criteria and scoring. • Mitigation measures have been suggested for each negative impact resulting from Cement production activities. • The proponent is committed to ensure eco-friendly, sustainable, safe and sound environment.
Physical Environment	• The type of solid waste produced will be municipal waste only. The solid waste produced will be stored in covered containers at the site. • Proper mitigation measures may be adopted in the preliminary design including safe and environmental friendly disposal of solid waste. • All the baseline environmental parameters including ambient air and noise are well within the permissible limits of PEQS. • No wastewater will be generated during project activities. There is no water requirement during project operation except for drinking and sprinkling. • There are no human settlements present within the vicinity of the project site. The settlements are away from the project site at safer distances. All the sensitive receptors are located at safer distances from the project area.
Biological Environment	• No forest area or wildlife sanctuary exists within the vicinity of the project area, which may be affected by the project.
Socio-economic Environment	• The project activities will provide additional job opportunities to the community of the area.

	• The project will raise the income levels of the population of the area. • Social cohesion is optimal. • The environmental cost is negligible.
Recommendations	
General	• All measures as suggested in EMP should be adopted to minimize adverse impacts. • All appropriate environmental management & monitoring measures detailed in this report, together with any other environment management commitments should be implemented throughout out the entire life of the project. • Environmental Management and Monitoring Plan proposed will be implemented in the true spirit throughout the lifespan of the project. • Regular monitoring and auditing will be taken by the management to ensure the compliance of all the mitigation measures. • Environmental monitoring will be carried out by the company as suggested and communicated by EPA, Punjab.
Physical Environment	• Air pollution and high noise levels will be controlled with the use of good engineering practices. • Transportation vehicles and equipment must be properly maintained and tuned well.
Biological Environment	• Plantation must be carried out as potential environmental enhancement measure.
Socio-economic Environment	• Periodic monitoring on occupational health and safety must be conducted to avoid workplace hazards. • Proponent will take due care of the local community and its sensitivity towards local customs and traditions. • Firefighting arrangements will be made at site. Safety signs or boards may also be placed whenever and wherever needed within the premises of the project area. • Personal Protective Equipment (PPEs) will be provided and ensured that they are used by the workers during working hours. • The workers working near the noise generating areas will be strictly required to use ear muffs/ plugs. • Fire extinguishers or firefighting equipment will be provided at well notified points to cope with fire events (if

	any detected). • Good housekeeping will be ensured by the management of the project. • First aid box will be provided at the project site to act in case of injuries.

1 INTRODUCTION

1.1 Purpose of the Report

This report has been prepared to conform to the requirements of the Punjab Environmental Protection (Amendment) Act 2012 (PEPA), which states that:

"No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an initial environmental examination or where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Provincial Agency approval in respect thereof."

It is of utter importance to examine the environmental impacts, both beneficial and adverse, of the proposed project, and to recommend and propose mitigating measures to prevent, minimize or mitigate such impacts. The EIA study of the proposed project is necessary to assess the environmental consequences of the extraction at the proposed sites and to suggest appropriate, practical and site-specific mitigation as well as enhancement measures.

Furthermore, Environmental Impact Assessment (EIA) of cement plant has been made mandatory and has also been demanded by the Industries Department, Government of the Punjab, Pakistan.

The objectives of EIA study are to:

- To determine and document the state of the environment of the project area to establish a baseline in order to assess the suitability of the Proposed Project in that area.
- To identify pre construction, construction and operation activities and to assess their impacts on environment.
- Provide assistance to the proponent for planning, designing and implementing the project in a way that would strengthen environment, improve ecological resilience, eliminate or minimize the negative impact on the biophysical and socio-economic environment and maximizing the benefits to all parties in cost effective manner.
- To present Mitigation and Monitoring Plan to smoothly implement the suggested mitigation measures and supervise their efficiency and effectiveness.
- To provide opportunity to the public for understanding the project and its impacts on the community and their environment in the context of sustainable development.

- Prepare an EIA Report for submittal to the Environmental Protection Agency, Punjab for according Environmental Approval

This EIA Study presents the Environmental Impact Assessment (EIA) for this proposed cement plant. For this purpose, the proponent has engaged environmental consultants, M/s Hi-Tech Environmental Services (Pvt.) Ltd.

This EIA Report provides relevant information, as required under the officially approved format, to facilitate the decision makers i.e. EPA Punjab for the issuance of Environmental Approval/NOC.

1.2 Identification of the Project and Proponent

1.2.1 Details of the Project

M/s Dhan Cement Industries(Pvt.). Limited intends to Install Cement Plant Of 12,000TPD Capacity near Tobah in District Jhelum of Punjab, Pakistan.

1.2.2 Details of the Proponent

M/s Dhan Cement Industries(Pvt.) Limited plans to install a cement plant in Punjab, Pakistan. The company will engage in supplying cement for building infrastructure in the country. The detail of the proponent is as follows:

Table 1-1 Details of the Proponent

Company Name	Dhan Cement Industries(Pvt.) Ltd
Address	H/93, Gulshan-e-Ravi, Lahore.
Representative	Anwar Ul Haque Shad

1.3 Details of Consultant

Hi-Tech Environmental Services (Pvt.) Ltd. is a business entity managed by geoscientists and environmental experts. The company has the expertise of highly diversified experience and has completed a total of more than 500 environmental studies across Punjab. The consultant has a range of expertise available in following areas:

a) Economic Geology
b) Determination of geological exploratory techniques and mine design
c) Preparation of feasibility reports, IEE report, EIA reports, Development Schemes & Prospecting Scheme.
d) Preparation of Environment Management Plans
e) Preparation of reports on HRD /Mines Rescue &Recovery.
f) Assessment of Impact of mining on environment and mitigating measures.
g) Mine surveying & interpretation of boundary disputes.

h) Legal opinion on mine regulatory regime.
i) Energy fuels and selection of choice fuels for specific energy
j) Drilling and blasting for underground and surface mining techniques.
k) Safety measures for mines operation.

Table 1-2 Details of the Consultant

Contact Details	
Consultant Company	Hi-Tech Environmental Services (Pvt.) Ltd.
Address	26 B Zahoor Elahi Road, Gulberg II, Lahore
Representative	Chaudhry Awais Ahmed Director Operations and Legal
Contact	(+92) 3219443210
e-Mail	consultantshtma@gmail.com | info@hitechma.com

The team carrying out the research project is presented in the Table 1-3.

Table 1-3 Team Carrying Out the Study

Sr.	Name	Qualifications & Brief Experience	Roles Assigned
1.	Muhammad Hamza Tariq	Environmental Scientist BS Hon. Environmental Science	• Preparation of Environmental Management Plan (EMP) • Preparation of Environmental Monitoring Plan (EMP) • Author of EIA Report
2.	Engr. Maryam Nazir	Mining Engineer and GIS Management B.Sc. Mining Engineering	• Author of EIA Report • Development of Maps
3.	Ch. Awais Ahmad	LLM (London)	• Site Visits • Legal Reviews • Coordination with Locals
4.	Engr. Harris Naeem	B.Sc. Mining Engineering	• Mining Techniques

1.4 Brief Description of the Project

Dhan Cement Industries Pvt. Ltd is of the key players in cement sector of Pakistan. The proponent intends to establish a cement plant now in Punjab, Pakistan for which the area identified is under consideration. With the aforesaid background and introduction, the proponent now looks forward for the development of public exchequer through scientific and environment friendly cement production.

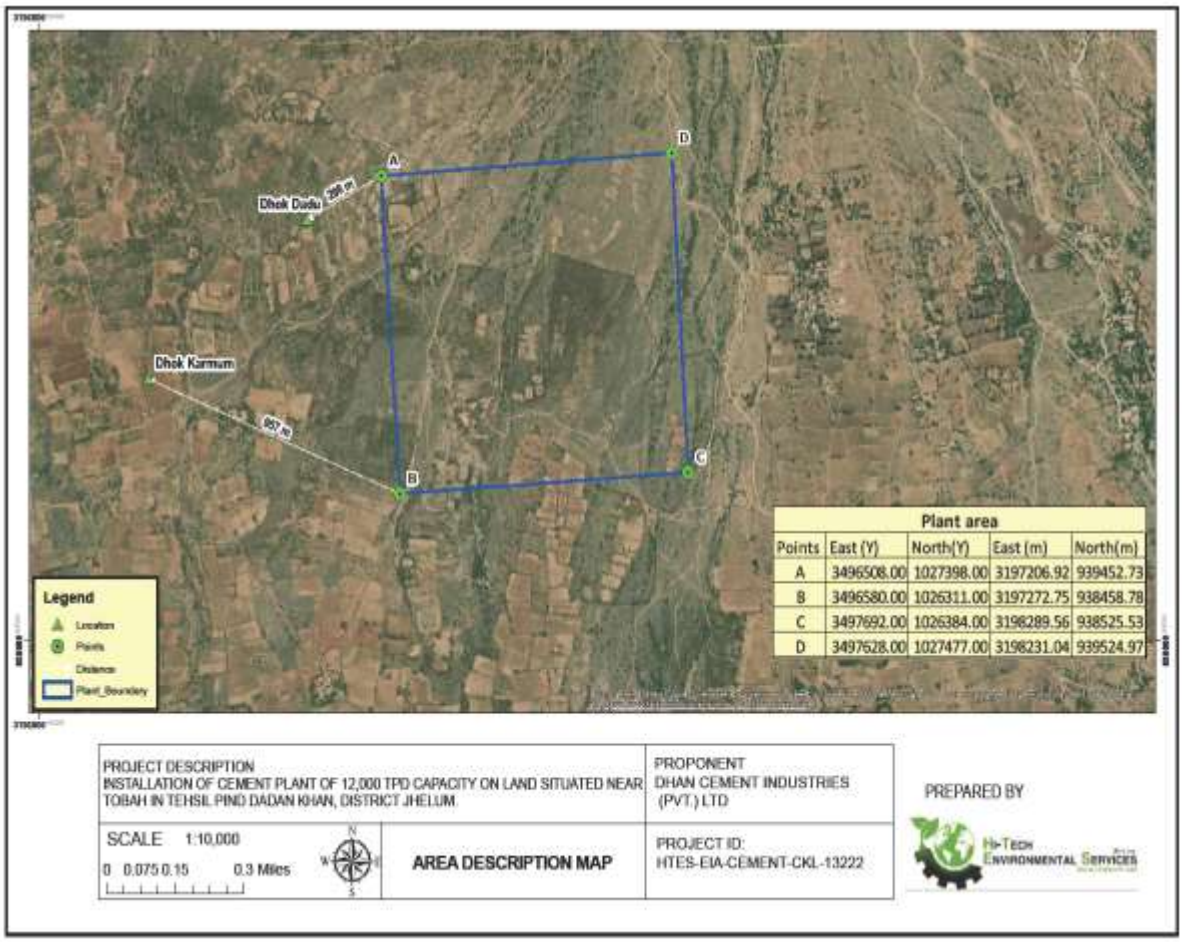


Figure 1-1 the location of Project

2 SCREENING AND SCOPING

2.1 Screening

Section 12 of Punjab Environmental Protection Act (PEPA), 1997 (Amended 2012) states:

"No proponent of a project shall commence construction or operation unless he has filed with the Government Agency designated by Federal Environmental Protection Agency or Provincial Environmental Protection Agencies, as the case may be, or, where the project is likely to cause an adverse environmental effects an Environmental Impact Assessment (EIA), and has obtained from the Government Agency approval in respect thereof."

As per Review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations, 2000 made under Section 12 of Punjab Environmental Protection Act, 1997 (Amended 2012), current project (Cement Plant) falls under Schedule II (List of projects requiring EIA), Category B-I (Manufacturing and processing) Cement Plants.

2.2 Scoping

2.2.1 Spatial and Temporal Boundaries of Environmental Assessment

Project site is open land. After its development with time nature of area will change from open land to project site. Already same industrial activity is taking place nearby. Currently there is no significant population center present in the lease area. The current project site is 5-6 kilometers from population centers and all the parameters are within PEQS. No environmental sensitive area is present that could be impacted due to the current project.

2.2.2 Important issues and concern raised during consultation

During consultation it was observed that maximum of people were in favor of project and following issues and concerns were raised which have also been discussed in length in Chapter 9 Stakeholder Consultation:

- Air pollution should be controlled effectively.
- Locals should be preferred for the job opportunities.
- Wastewater should be treated prior to final disposal.
- Solid waste should be managed effectively by adopting the standard practices of the area.
- Cleanliness of the area should be ensured.
- An effective EMMP should be designed and enforced with true spirit.
- Health of the workers should be ensured.

- Workers should be hired from local community.
- Indigenous tress around the facility should be planted to control air pollution.

2.2.3 Significant impacts and factors to be determined

Main impacts and factors to be determined are;

- Occupational Health and safety
- Site Security
- Traffic Management
- Hygiene management
- Community impacts
- Control Air emissions
- Job opportunities for locals
- Confined noisy activities
- Resource conservation
- Avoid excessive water consumption
- Energy efficient techniques must be adopted
- Proper site restoration after construction
- Tree plantation at designated green areas
- Emergency preparedness

3 CONSIDERATION OF ALTERNATIVES

3.1 Site Alternatives, their Selection and Rejection Criteria

Unlike industrial establishment the cement manufacturing projects are pegged with the favorable geology in the given/ granted area. There are proven limestone reserves in the area. Limestone existance is subject to geological variations.

The projects involving mining of minerals are located in the areas which geological favor the presence of limestone, clay, gypsum, coal or other minerals. The site selection needs very careful, well thought out and wise decision. The most important factors for such a site selection include availability of raw material and land, seismic stability of site, existence of basic infrastructure including roads, water, manpower, proximity to electric transmission system, project economic viability with reference to specific site, land use policies, further expansion possibilities etc.

From the standpoint of environmental sustainability, the site selection is based on numerous factors including proximity from residential areas, protected areas, surface water bodies, wild life reserves etc. The Government of the Punjab has notified the negative zone for the establishment of cement plants. The location where this project is intended lies out of the negative zone. The proponent coordinated with Mines and Minerals Department where the availability of limestone bearing area was identified at the subject location.

The project site is located in the area where geology favors the limestone mining activities as enough reserves of limestone are available. Hence, there is no alternative location available in this case.

Following are some of the additional parameters that favor cement plant establishment in the respective region:

i. Favorable geology
ii. The project operation doesn't involve human settlements displacement or relocation.
iii. Mining of the limestone in the respective zone has provided job opportunities to local people and improved their socio-economic status.
iv. The transportation from plant to market road is easily available.
v. The project has a sustainable life span.
vi. Moreover, there is no railway line, reservoir, canal or public building within 2 km distance of the mining area.

vii. No important religious, archaeological, recreational site, ecologically sensitive, declared protected area and human settlements exists within close vicinity of the selected site i.e., within 100 m which is considered to be a safe distance.

viii. The area for limestone and clay applied in Mines Department concedes with the fixed geology. There is no alternative to the fixed geology at site.

In view of these facts, it can be concluded that the chosen site per force is fixed. Considering the facts that mine site is at a safe distance from sensitive receptors and has advantage of not only to be environmentally friendly but also potentially sound to enhance sustainable development in the region. Therefore, given site is the most suitable.

3.2 Design/technology alternatives, their selection and rejection criteria

There are two processes for cement manufacturing:

- Dry process
- Wet process

Under these conditions only the dry process is economical and environment friendly. The cement raw material available at in Jhelum District, has been found suitable for dry process with pre-heater, kiln with pre-calcine. The major difference between dry and wet process is the consumption of fuel. In wet process, raw material slurry is used and to evaporate this fuel consumption is more while in dry process all raw materials is dry so fuel consumption is less. In said project, dry process will be used. In dry process, size of kiln required is also less. Also wet process is obsolete from the world. Residence time of raw material in dry process is approx. 19 min and in case of wet process is 2-3hrs).

Imported coal with low sulfur content will be used as a fuel.

3.3 Environmental Alternatives, their selection and rejection criteria

In proposed cement plant, the kiln and the raw mill will be equipped and de-dusted with latest technology and high efficiency bag house instead of electrostatic precipitator. As the particulate emissions standard limits have become increasingly stringent, ESPs have become larger and more expensive. Fabric filters are a potential alternative to ESPs because they offer high collection efficiency while remaining relatively independent of the type of coal burned. The relative indifference of a fabric filter to fuel characteristics allows for more variation in fuel characteristics, while still meeting particulate emissions limitations. Unlike ESPs, fabric filter design and performance is not restricted to tripping due to power failure. There are several disadvantages of ESPs compared to fabric filters: higher direct auxiliary power consumption (excluding the induced draft fan power consumption), lower ash collection efficiency during startup, lower collection efficiency of fine particulate and less flexibility in fuel and operating conditions. The fabric filter house has also the advantage that it still performs its functions tremendously unlike ESP even if

some fiber filter got inefficient with passage of time. On other hand in ESP performance dramatically dropped due to dead chambers. Furthermore, the inefficient fabric filter in bag house could be replaced in less time compare to ESP. The ESPs are also not as efficient in collecting particles in the range of 0.1 to 1.0 microgram. Finally, changes in the fuel, pulverizer grind, combustion efficiency or other operating conditions are much more likely to cause a degradation of ESP performance compared to a fabric filter. This can require retuning of controls or the addition of a flue gas conditioning system to improve the ash characteristics. Considering all above facts, Bag house filters are selected to be used as dust control technology for proposed cement plant. Water conservation strategies will be adopted i.e. rainwater harvesting pond instead of using only surface water.

3.4 Economic Alternatives, their selection and rejection criteria

Currently selected technology and design is economically efficient. WHRP will be installed to capture waste heat and will meet some of power consumption of the plant. Ash and dust collected will be re-used in process that will add-up in final product. Tree plantation will be done that will reduce temperature of the area and also act as noise barrier. Bag house filters will be installed that are economically efficient and their proper maintenance will be ensured. Waste should be used in cement kilns if and only if there are not more ecologically and economically better ways of recovery.

4 DESCRIPTION OF THE PROJECT

This section of the study concentrates on details of the project and its salient features; such as location, site layout, objectives, cost and magnitude of operation and various phases. Inputs and discharges relevant to different phases of the project, such as electricity & materials, etc. have also been examined as a response to possible environmental concerns.

4.1 Objectives of the Project

The objectives of the project are:

a) Expand business through added exploration and exploitation by new entries based on techno-economical parameters.
b) Accelerate pace of development in the existing mines.
c) Enhance production, productivity coupled with safety by improvising with the adaptable technology-mechanization.
d) Add matching infra-structure, machinery and equipment along with other inputs needed as a factor of production to keep pace with the envisaged programs.
e) Undertake aggressive marketing to maximize domestic share.
f) Expand community development program and social fabrics
g) Consider feasible options to utilize mine effluents if possible as a raw material for compatible industrial use and minimize the adverse impact of mining on environment (Use of shale in cement plants)
h) Supporting government's economic agenda by creating job avenues.

4.2 Location and Site Layout of the Project

To define the boundaries of the EIA study, location and site layout map is prepared. The lease of limestone is located near Dalwal in District Chakwal of Punjab. The project location is represented in Figure No. 4-1 and more detailed colored image is present in ***Annexure III*** on A3 size.

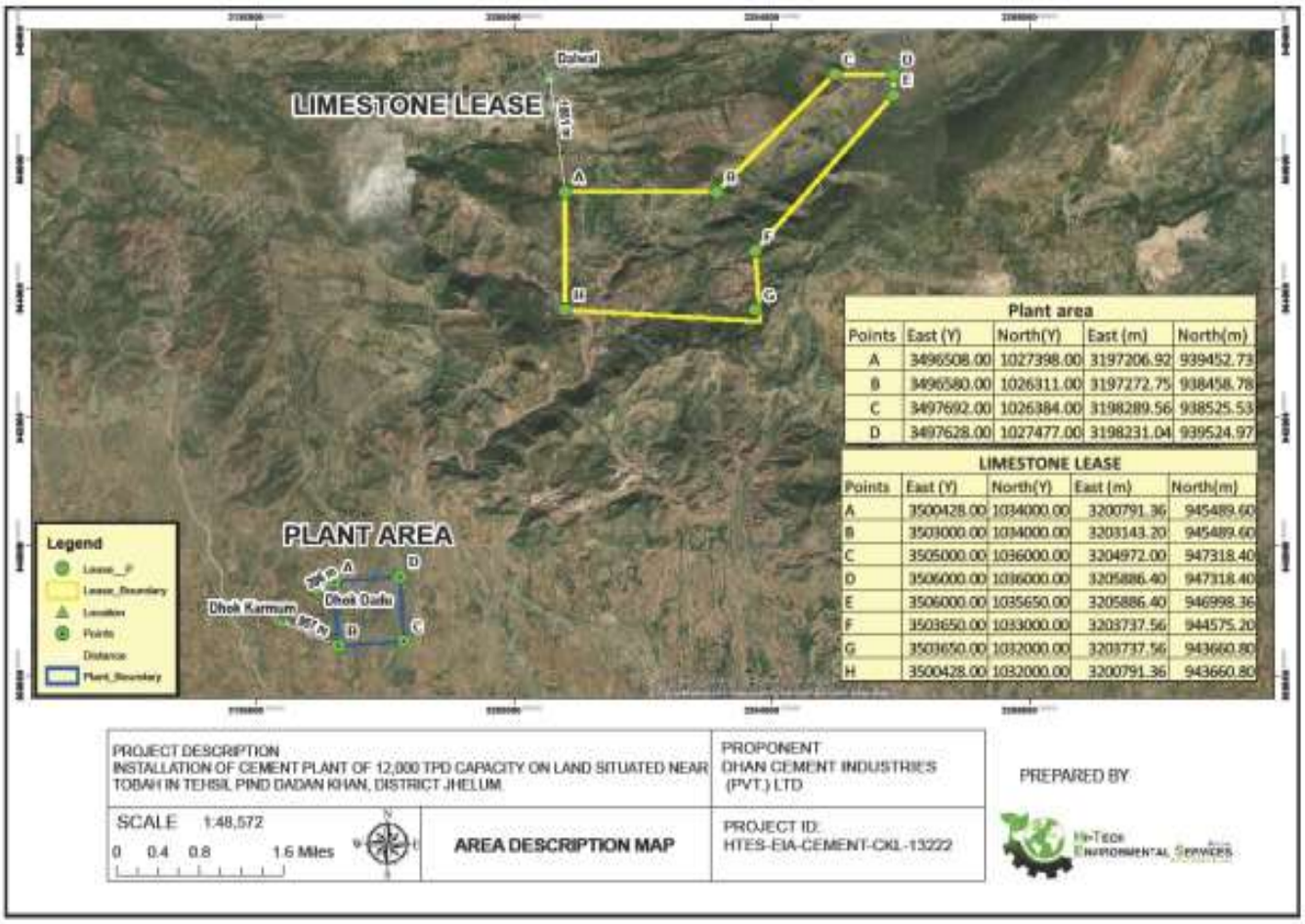


Figure 4-1 Area of Limestone Lease under Consideration

The proposed plant site boundary primarily falls within mainly inhabited and presently unused area. The coordinates of the Limestone Lease area are given in Table No. 4-1.

The coordinates of the Limestone Leases are given in Table below.

Points	East (Meters)	North (Meters)
A	3500428	1034000
B	3503000	1034000
C	3505000	1036000
D	3506000	1036000
E	3506000	1035650
F	3503650	1033000
G	3503650	1032000
H	3500428	1032000
Total Area: 2000.00 acres		

The Coordinates of the Proposed Plant are as follows:

Points	East (Meters)	North (Meters)
1	3496508	1027398
2	3496580	1026311
3	3497692	1026384
4	3497628	1027477
Total Area: 252.40 Acres		

The distances of major locations from project site are shown in Table.

Table 4-1 Distance of the Important Areas from the Project Site

Location	Approximate Distance (KM)
POPULATION CENTERS	
Warala	6.75
Karuli	8.92
Dhok Majhyal	6.10
Thati	3.95
Golpur	8.04
Kora	8.76
Choran	9.46
INDUSTRIAL & MINING PROJECTS	
National Cement Industries	11.14
Layaan Chemical Industries	10.62
FY Industries Pvt. Ltd	More than 80 km
WATER BODIES	
Kallar Kahar	19.83
Khabakki Lake	58.78
Uchalli Lake	75.49
FOREST AREAS	
Kussak Reserved Forest	18.80
Keri Reserved Forest	45.39
Hayat-ul-Mir Reserved Forest	50.78

4.3 Land Use on the Site

The areas where the mining and plant will be established is under no use. Most of proposed sites are abandoned. So, there won't be any loss or degradation of productive land.

4.4 Road Access

The preferred site is accessible through Lilla Interchange M2, District Jhelum, Punjab.

4.5 Vegetation Features of the Site

On the proposed mining areas, the land has no vegetation cover. The area is devoid of any vast tree cover. For the construction of said project site will be cleared and it will be re-vegetated after proposed plant installation. Plantation will be done in all open spaces and surroundings of project site.

4.6 Cost and the Magnitude of Operation

The approximate cost of the Proposed Cement Plant is PKR 180 Million.

The magnitude of operation includes:

- Detailed site survey, planning and demarcation of the various regions in the project area
- Site suitability assessment
- Process, electrical and civil designing
- Purchase and delivery of equipment
- Civil construction
- Mechanical and electrical erection
- Testing and commissioning
- Plantation of various ecologically important species on the designated green space

4.7 Schedule of Implementation

4.7.1 Planning

The proposed project is at its feasibility study stage. This EIA study is a basic and necessary part of the overall planning for the project and will be integrated into the feasibility study.

4.7.2 Design

The construction contractor and fabrication contractor will be hired based on the cost. The technology adopted for the proposed project establishment will be up to date. Tentative project implementation schedule is presented below in Table.

Table 4-2 Time Schedule for the Project Development

Sr.	Description	Months
1	Soil Report	2
2	Civil Design	4
3	Process and Electrical Design	8
4	Equipment Manufacturing and Delivery	12
5	Civil Construction	10
6	Mechanical and Electrical Erection	10
7	Testing & Commissioning	3
Total Months		**49**

4.8 Description of the Project

4.8.1 Raw Material Extraction

The main raw material used in the manufacturing of cement includes: limestone, clay and gypsum and it will be obtained from nearby leased areas. The quarries will be developed in accordance with a well thought out plan for meeting the daily requirements of the factory. Limestone and clay will be excavated per working day and will then be transported to the feed-hoppers of the crusher.

4.8.2 Limestone & Clay crushing and pre-blending

The limestone will be supplied from mine to the plant through dump trucks and will be fed into the limestone hopper. The clay will be conveyed from mine to the plant through belt conveyors and will be fed into the clay hopper. Big size clay can be conveyed from mine to the plant clay hopper through dump trucks directly.

Limestone and clay will be fed into the respective apron feeder and then to be crushed together in the same crusher. The feeding size of limestone will be 95% below 1200 mm and of clay will be 95% below 300 mm. One set Double Hammer crusher with capacity of 1800tph is adopted for crushing limestone & Clay mix. The product size shall be 90% below 75mm.

The crushed mix material shall be transported to pre-blending stockpile through belt conveyor. One set On-line Analyzer shall be installed for monitoring and control the raw material quality after crushing continuously, which shall record and control the quality of Limestone & Clay coming from crusher.

A longitudinal covered storage shall be provided for pre-blending the mix material Limestone & Clay, and H.G. Limestone, which storage capacity is 2×35000 +5000tons. A stacker with 1800tph and a re-claimer with 700t/h are adopted for stacking and reclaiming the mix material from the stockpile. The H.G. Limestone will be fed into the feed hopper by pay loaders.

4.8.3 Correctives storage and transport

The correctives, laterite and bauxite shall be stored in the rectangular shed in the new plant, which storage capacity is 2×3000 tons respectively for laterite and bauxite. A pay loader shall be adopted to feed the correctives to hopper, and then they will be transported to raw material grinding regulation station by belt conveyor.

4.8.4 Raw materials proportioning & conveying

The raw materials proportioning station has four hoppers, which respectively store mix of Limestone and Clay, H.G. Limestone, Laterite, Bauxite. Each material is discharged from bin via weighing feeder according to a certain proportion, and then fed into raw mill via belt conveyor. Weigh feeders shall be online calibration type. Magnetic separators, metal detectors shall be installed at convenient positions for removal of disgusted metals, for that, only pure and clean raw materials can be fed into raw mill. One set On-line Analyzer shall be installed for monitoring and control the raw material quality on the feeding belt conveyor, which shall record and control the quality raw material coming from weigh feeders.

4.8.5 Raw Meal Grinding System

One vertical roller mill will be adopted for raw meal grinding system with exterior circulating system, utilizing waste gas from pre-heater as the drying heat source. Materials from the proportioning station will be fed into the roller mill through a rotary airlock gate. On the mill table bed, material will be ground to fine powder and dried by hot air in the mill. With feeding size 90%<75mm, feeding moisture 3.8%, product moisture ≤1% and fineness of 90μm with the screen residue 12%, the system has a capacity of 650t/h.

In the mill, material will be forced to fly upwards by rising hot air. Going through the separator at the top of the mill, sufficient fined raw meal powder with gas will flow out of the mill and go into cyclone classifiers to separate meal from air. The collected meal powder will be conveyed into raw meal silo through air slide and elevator. The granularity of raw meal finished product can be controlled by adjusting rotor speed of the roller mill separator. A part of the waste gas, which goes out of cyclone classifiers, will go back into the mill as circulating air, and another part will go into waste gas processing system of kilns and mills. There is an automatic sampler set on the chute of the air-conveying slide. The sample will be sent to the lab for analysis to check the performance of raw meal product.

The exterior circulating system can save power consumption, and enlarge output. The exterior circulating materials, through belt conveyor and elevator, will be sent to the exterior circulating materials bin, and then conveyed into the mill for re-grinding by belt conveyor. To guarantee safe operation of the roller mill, electromagnetic metal separator and metal detector will be provided on the feed belt of mill, to safeguard the mill form iron or other metals. If there is metal in raw material feed, the metal will be discharged via a

dividing gate. System has fuel hot gas generator to supply heat to the mill at the start-up period of production, or when the raw material has high moisture.

4.8.6 Treatment of waste gas from kiln and mill

During compound operation, the high temperature waste gas from the pre-heater will be sent to raw meal and coal grinding system after the 2 ID fans, mixed with the waste gas from the raw mill fan. All waste gas after de-dusting and purifying in electrostatic precipitator will be released into atmosphere via the chimney. The dust content at outlet of chimney is less than 10mg/m^3. If the raw mill stops working but the kiln system is still operating (direct operation), the high-temp gas from the pre-heater will be cooled in the conditional tower by spray water then flow to the bag filter. Dust collected by the electrostatic precipitator and the conditional tower will be sent to kiln dust bin, Kiln dust shall be extracted in controlled quantity with the help of flow meter. Kiln dust extracted from the kiln dust bin shall be fed to kiln feed bucket elevator.

4.8.7 Raw Meal silo & Kiln Feed System

Raw meal will be conveyed into a φ22.4 m CF homogenizing silo by belt bucket elevator. The effective storage capacity of the silo is 25500t. The silo has multifunction of storage and homogenization. In the silo there are seven outlets, from which raw meal will be discharged into the kiln feed bin. After dosing by flow meter, raw meal will be conveyed into the ascending duct between the first and the second cyclones of the double string five-stage cyclone preheater through air slide and bucket elevator. There is a sampler set on the chute of the air-conveying slide. The sample will be sent to the lab for analysis.

4.8.8 Pre-calcining system

The kiln inlet adopts pre-calcining system with double-series five-stage cyclone pre-heater and CDC calciner, and material flow distribution system is adopted to reduce the sulphur circulating in the smoke chamber and the harmful consequences.

Qualified raw meal from the CF homogeneous silo, after pre-heated and pre-calcined, will come into Φ5.3×82m rotary kiln with two support for the rotary kiln, the pitch is 4%, rotary speed is 0.4～4 r/min, the capability is up to 12000tpd with its heat consumption of 705kcal/kg.cl. (Without bypass system).

A grate cooler will be adopted with grate area about 177m^2, cooling capacity up-to 12000t/d, and the discharging temp. of ambient temp. +65℃. Clinker from the grate cooler will be sent to the clinker silo by pan conveyor. Gas from the grate cooler will be

sent to the calciner at the kiln inlet as the secondary and the tertiary gas. All waste gas after deducting and purifying in an EP will be released into air via the chimney. The dust content at outlet of chimney is not more than 10mg/Nm^3.

4.8.9 Coal & pet coke transport and grinding

The Coal and Pet coke grinding system is designed based on the Atex standard. After transported to the plant by truck, the Coal is stored in the shed for 2×15000 tons (one for coal, one for pet coke) and unloaded by Samson feeder with a capacity 20~200t/h. The coal with size is 0~50mm and will be sent to mill feed bins directly. Three steel hoppers with each capacity of 250t (two for coal, one for pet coke) shall be provided for raw coal fed to mill. Coal and pet coke shall be extracted through slide gates and weight belt feeders and feed to the vertical mill. Weigh feeders shall be online calibration type.

One set Vertical mill is adopted for Coal grinding with the capacity of 65 t/h (max. 10% residue on 90 microns.) for coal, and 38t/h (max. 1% residue on 90 micron) for Pet coke. The mill exit gas will through a dynamic separator. Then be de-dusted in a bag filter. Pulverized Coal or pet coke from the bag filter shall be extracted by a set of rotary airlocks, screw conveyors and pneumatic conveyor pump. With the help of pneumatic conveyor pump, pulverized coal or pet coke shall be fed in to two steel bins (one for coal and one for pet coke) of capacity 150t each. As per the requirement of the 50% heat supply by coal and pet coke each from the final client, the pet coke is only used for pre-calciner burner, and the lack part of heat supplemented by coal, while only the coal can be used kiln burner. Hot gases from pre-heater exhaust shall be used to dry Coal in the mill. Suitable CO_2 injection system has been provided for Coal mill system, fine Coal bins and main bag filter. Small bag filters are equipped only with explosion flaps.

4.8.10 Storage & Bulking of Clinker

Clinker will be stored in a Φ45 m circular silo with its capacity of 60,000t. Clinker will be discharged through sector gates under the silo and to belt conveyors. Then conveyed to the clinker feed bin of the cement mills by pan conveyor. Another Φ15m off-spec clinker silo will be built with capacity of 4000t. In addition to the truck loading system under the silo, a belt conveyor 250tph will be set at the discharge of this silo to transport clinker up to the main conveyor from main clinker storage to the proportioning station for OPC grinding. During normal production period, the off-spec clinker silo can also be used as truck bulk loading silo.

4.8.11 Gypsum crushing and conveying

One hammer crusher with capacity of 100t/h is adopted for gypsum; and it will be fed into the crusher by a Samson feeder. After crushed, it will be sent to cement proportioning bins through belt conveyors. Another hopper will be set for additive. Additive will be directly sent to cement proportioning bins via belt conveyors. This additive can be limestone.

4.8.12 Cement proportioning station & Cement grinding system

There are two vertical mills for cement grinding. Cement mill capacity is 250tph each based on CEM-I with Blaine 3200cm^2/g.

There is a cement mill feed proportioning station for each grinding system. Each station has four bins for clinker, gypsum, limestone. According the different type of the cement, materials will be proportioned in a designed ratio by the weight feeders. The mixture after proportioning will be conveyed into the cement mill by belt conveyors.

In the mill, materials will be forced to fly upwards by rising air. Going through the separator at the top of the mill, cement powder with air will flow out of the mill and enter the bag filter. Collected cement from bag filter will be conveyed to cement silos by air slides and belt bucket elevators. The exterior circulating mill system can save power electrical, and enlarge output. The exterior circulating materials, through belt conveyor and elevator, conveyed into the mill for re-grinding.

4.8.13 Storage of cement

Cement storage adopts two silos of φ22m with capacity of 25000t each. There is a cement bulk loading device for truck with Weight Bridge and dispatch at each bottom of silo, which capacity is 200tph.

4.8.14 Cement Packing

Packing system adopts six sets of 8-spout rotary packers (single discharge), each of which has a capacity of 150t/h (for packing 50kg/bag) and packing tolerance of 50kg±150 g in paper bag as an average of 10 consecutive weighing from each spout. Each machine shall be equipped with automatic bags placer.

Cement out of the silo will be transported into the packers bin by elevator and vibrating screen of the packing system, then through an impeller feeder to the 8-spout rotary packer. The packed cement will be conveyed to trucks through discharging machine, electronic correcting scale and belt conveyor. The packing system consists of twelve manual truck loaders with 120 t/h each.

4.8.15 Air Compressor Stations

According to the requirement of each air-consuming item, there are two air compressor stations equipped with total 5+5 sets of compressor to meet the air consumption of the production line.

The capacity is 32m3/min, 0.85 MPa for every screw air compressor and relative accessories, such as dryers and filters are adopted in the station.

4.8.16 Laboratory

The existing central lab will be shared with the new line 4 for the chemical and the physical qualities tests of the fuel, semi-finished products and finished products throughout the plant.

4.8.17 De-Dusting

All the gas exhaust points and material transfer points will be provided with dust filters so as to ensure that the emission of dust anywhere in the plant is no more than permissible limit. The kiln and the raw mill will be de-dusted by primary bag filter. The dust will be returned to the kiln feed hopper or to the raw meal silos. Provision will be made to protect the filters from too high temperatures by providing an air dilution facility to the system.

4.9 Process Flow Chart

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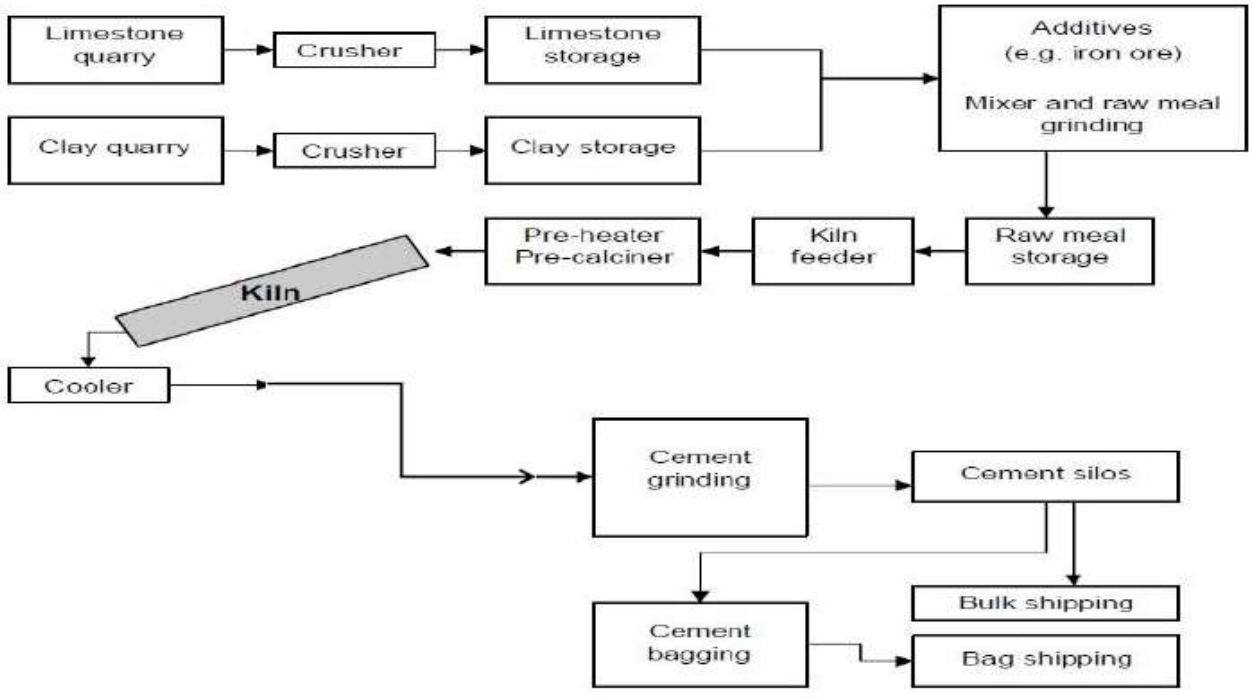

Figure 4-2 Process Flow Diagram

4.10 Supplies

Following supplies will be utilized for the installation and operation of instant project:

4.10.1 Manpower (Direct & Indirect)

During construction phase 160 workers will be involved. During the operation phase of the project, the total manpower requirement is estimated to be 180 people comprising administrative, technical, and non-technical persons. These include engineers, chemists, computer operators, accountants, administrative assistances, secretaries, etc. All recruited staff will be given appropriate training in order to educate them on the specific job tasks to be performed; safety procedures; and the concepts of quarrying and cement manufacturing.

4.10.2 Fire-Fighting System & Emergency Response Plan

The system covers the Fire Detection and Protection System for the cement plant. The system will include the following sub-system:

- Fire-fighting water supply system
- Outdoor hydrants system
- Indoor hydrants system
- Fixed water spray system
- Dry chemical and fire extinguishers
- Foam fire -fighting system
- Gas fire -fighting system
- Fire detection and alarm system
- Hand driven Fire engines

The scope of fire-fighting system design and supply will include the whole plant area, it include main block area, transformer area, coal-conveyance area and other auxiliary areas. Independent high-pressure fire water supply system will be provided for the plant. The system includes water storage tank, fire-fighting pumps and piping, etc.

4.10.3 Electricity

The power will then be distributed to the various load centers through a properly designed system of switchgears, cable, transformers, etc.

Waste gas heat power generation will also be available from this plant. WHRPP is part of cement plant construction and operation. WHRPP as embedded part of cement plant is

technological integration to achieve sustainable development through producing clean energy from the waste heat of cement manufacturing. Such technological innovation is highly on the part of climate mitigation to produce clean and green energy.

4.10.4 Fuels

Cement industries in Pakistan are normally using furnace oil and coal as fuel. Some plants are also using natural gas as a fuel. Due to heavy commitment of natural gas for power generation and fertilizer industry, the availability of natural gas for the proposed plant is doubtful. Improved/washed coal is considered as an alternative fuel in said project.

In current Project Coal, pet coke and HFO is used as fuel for this plant. Good quality local and imported coal will be used. Allowing some consideration for possible wastage during starting, stopping and the occasional disturbance in the process of the plant, an estimated quantity of 780.73 tons of coal will be needed per working day on dry basis while 887.19 t/d on wet basis.

4.10.5 Water Requirement & Wastewater Management

Water requirement in different steps/sections will be as mentioned in water balance below.

Plants with a clinker production capacity of 6,000 t/d usually require a total of approx. 600 - 800 m3 water per day. Using water saving technology this can be reduced. However, the minimum is significantly dependent on the raw materials properties during grinding which probably have to be improved by water addition. Further, technology is available which allows to reduce evaporation losses during water cooling. However, the respective investment costs are not negligible. Under optimal conditions and using respective water saving technology, a minimum water consumption for the production process could be in the range of 100 – 200 m3 water per day.Water balance of proposed plant is presented in Figure 4-3.

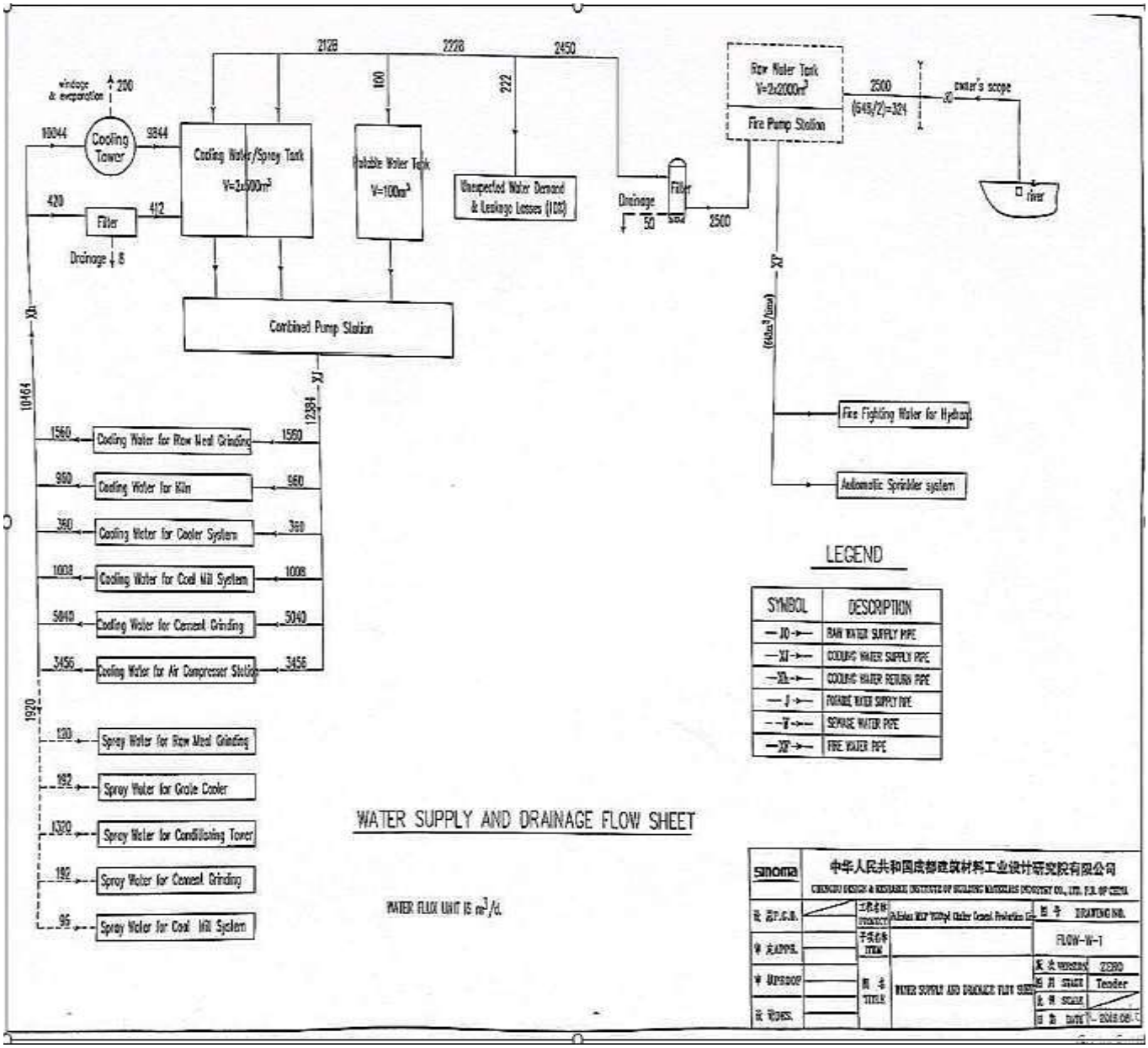

Figure 4-3 Water Balance of Proposed Plant

4.10.6 Noise

The principal noise emission sources will be associated with operation of; motors, fans, blowers, crushers, air compressor and mills. In-plant shielding of noise emissions will be adopted to ensure that noise levels at the boundaries are within the regulatory limits which demonstrates that the cement plant will be fully compliant with Punjab Environmental Quality Standards (PEQs) for noise emissions. It is environmentally friendly practice that loud sound equipment will be installed in specially designed sound proof buildings. All equipment to be employed for the proposed plant will be designed to operate with low noise levels and will not exceed the maximum allowable noise level for the surrounding

receiving land use. Secondly, as the nearest residence is at a safe distance from proposed project site so no disturbance to community is envisaged.

4.10.7 Air Emissions

Air pollutants generated during the operation of the proposed project consist primarily of particulates from quarrying, raw/finished materials as well as fuel combustion by-products. At all stages of process, appropriate methods will be used to prevent dust emissions. These include the use of enclosed conveyors, storage and dust collectors. All dust collectors will be designed and operated to ensure particulate emissions well below permissible limits. The kiln and the raw mill will be equipped and de-dusted with latest technology high efficiency bag house instead of electrostatic precipitator. Removal efficiency of bag filters is high and emissions will be in compliance with PEQS. The dust collected will be returned to the kiln feed hopper/ the raw meal silos for using in process. Quarry roads dust will be controlled by wet sprinkling.

Modern technology low NOx burners and proper dosing systems for fuel & kiln will be used to control NOx emissions. SOx emissions will be controlled by using good quality local and imported coal. Specification of bag filters is presented in Table.

Table 4-3 Specifications of Bag-House Filters

Cement Mill Bag House	Capacity: 650,000m^3/h Net Filtering area: ~14000m^2 Net Filtering speed:<0.88m/min Dust content at the inlet: ≤1000g/Nm^3 Dust content at the outlet: <10mg/Nm^3
Coal Mill Bag House	Capacity of bag filters: 165,000m^3/h Net Filtering area: ~3350m^2 Net Filtering speed:<1.0m/min Dust content at the inlet: ≤500g/Nm^3 Dust content at the outlet:<10mg/Nm^3

4.10.8 Mass Balance

Dust generated from raw mill, coal mill, cement mill and cooler will be collected in bag filters. This dust will be reused in raw meal. Mass balance for 12,000 t/d plant is given in Table.

Table 4-4 Mass Balance for the Production of the Cement

Raw material	Natural water content	Proportion Ratio On dry basis	Production loss	Consumption ratio (kg/t)			Raw Material Balance					
				Dry basis		Wet basis	Dry basis consumption (t)			Wet basis consumption (t)		
	(%)	(%)	(%)	Theoretical	Actual	Actual	Hour	day	year	hour	day	year
Limestone	2.68	70.69	0.5	1226.31	1232.48	1266.42	359.47	8627.33	2847018	369.37	8864.91	2925419
Laterite	6.25	3.52	0.5	40.76	40.97	43.70	11.95	286.78	94636	12.75	305.89	100945
Clay	6.56	24.78	0.5	278.78	280.18	299.85	81.72	1961.28	647222	87.46	2098.97	692660
Bauxite	6.25	1.01	0.5	16.59	18.53	17.79	4.86	116.72	38519	5.19	124.51	41087
Raw meal		100.0	0	1518.72	1518.72		442.96	10631.02	3508238			
Clinker							291.67	7000	2310000			
CEM-I		100.0					307.02	7368.42	2431579			
Gypsum	17.19	5.0	0.5		52.63	63.41	15.35	368.42	121578.95	18.50	443.88	146481
Coal	12.0		2.00		111.53	126.74	32.53	780.73	257641	36.97	887.19	292774

Ignition loss of raw meal=35.5 %

Operation rate of rotary Kiln=90.41% (330d/a)

Heat consumption of Clinker= 2948 kJ/kg.cl(705 kcal/kg.cl）

4.11 Restoration and Rehabilitation Plan

After completion of construction site will be restored, proper leveling will be done all leftover construction material will be reused in other construction activities Feasibility studies carried out in relation to the project indicate a useful life span (approximately 100 years). At the expiration of the useful life of the project, adequate arrangements will be made to remove all movable assets. These may be sold or moved to another factory. Almost all the equipment and machinery shall be re-used for other industrial purposes. All plant facilities and machinery that are not deemed to be of further use will be sold off as scrap or recycled at metal depots/rolling mills.

5 DESCRIPTION OF THE ENVIRONMENT

This chapter describes the environmental, social and biological baseline conditions of the project area. The baseline conditions have been established on the basis of the data collected from the field, and through unstructured interaction with the local communities as well as the officials from various departments. In addition, the published data (secondary data) was also used to provide background information about the project area.

5.1 Physical Resources around the Project

There is not much diversity in the physical features of the district and the area appears to be monotonous.

5.1.1 Alluvial Deposits

Project site is located in District Jhelum, which is situated entirely on the alluvium plain. Kanker is found all over the district. Sediment deposits are visible in the low velocity area of the river where initial plant colonizers can be seen at the early serial stages of succession of vegetation. Along the banks of the river, gradual accumulation of sediments has resulted in “Bela” formation, which supports tree growth and hence named as “Zakeeras”.

5.1.2 Physiography

Jhelum district is part of Pothohar Plateau. The district stretches from the River Jhelum to the vicinity of River Indus. Jhelum district consists of salt range consisting of Mayo mines. There are two coal-mines in the district. From the north-western coal-mine railway obtains partial supply.

5.1.3 Soil Type

There is a long strip of very rich and virgin soil along the river which could be made a paradise of citrus plantation by drip irrigation if the local people are motivated. The types of soil commonly found are silt loam, loam, sandy loam, sandy clay loam and riverine silt. The immediate project area soil is riverine alluvial silt tending to fall in sandy loam and silt loam with Kankers.

5.1.4 Land Use

On an average, within the direct influence of the river and in the immediate vicinity of the project area, 20% of the land is under agriculture. About 0% is under settlements, 20 % wetlands and 0percent forest/range land.

About 80% of total population depends upon agriculture. Most of the agriculture land is under cultivation. Rice is the main Kharif (summer) crop. Wheat is the main Rabi (winter) crop while fodder is the other crop. The cropping intensity is over 100% and multi cropping is quite common.

Table 5-1 Land Use in Jhelum District

LAND USE	AREA (Ha)	% of Total Distt. Area
Total Geographical Area	750	100
Area Reported	359	47.86
Area Under Forest	45	6.0
Not Available for Cultivation	133	17.73
Culturable Waste	56	7.46
Current Fallow (C.F)	59	7.86
Net Sown (N.S)	66	8.80
Area Sown more than once (A.S.M.T.O)	32	4.26
Net Cultivated Area (C.F + N.S)	125	–
Net Cropped Area (N.S + A.S.M.T.O)	98	–

5.1.5 Climate

Jhelum has a humid subtropical climate (Köppen climate classification Cfa) and is extremely hot and humid in summer, and cold and generally dry in winter. The maximum recorded temperature in the pre-monsoon season of April to June is 49.2 °C (120.6 °F), whereas in winter the minimum temperature recorded is −0.6 °C (30.9 °F). Average annual rainfall is about 850 millimetres (33 inch). Nevertheless, in the rainy season water torrents flow from the north to Jhelum River very rapidly and cause damage to the crops, bridges and roads. This is responsible for the soil erosion in the district.

Table 5-2: Average Rainfall & Temperatures in District Jhelum

MONTHS	J	F	M	A	M	J	J	A	S	O	N	D	Avg.
Mean Rainfall	39	32	28	20	14	42	95	95	44	18	15	39	40.0
Max. Temp.	16	20	25	31	36	38	35	34	33	30	25	18	28.4
Min. Temp.	3	5	9	16	21	24	24	24	21	15	9	5	14.6

5.1.6 Water Resource in the Vicinity of Project Area

- **Surface Water/Wetlands**

Main source of surface water in the nearest vicinity of project area is River Jhelum itself. However, the surface water consists of several Nullahs (torrents) and discharge from Mangla Dam. These seasonal Nullahs on both sides of the river carry rainwater from the hills and other adjoining areas into the river during period of heavy rain. The surface water supply plays an important role in irrigation and drainage of the extended project area. Major source of irrigation water is River Jhelum. It is considered to be suitable for irrigation purposes. Discharge data is collected, from the guage installed at Jhelum Bridge on Lahore Islamabad G.T. road, during two months i.e. September and October of every year.

- **Ground Water**

The ground water aquifer is recharged by surface water. The sub-soil ground water table within the immediate project area is about 30-60 feet. The quality of the groundwater is such that it is suitable for domestic use. It is sweet and of drinkable quality. By and large, the tube wells are owned privately by people of the area.

5.2 Ecological Resources around the Project

5.2.1 Biodiversity

The natural vegetation found throughout the district is thorny.

- **Forest and Flora**

Vegetation of the Jhelum Forest Division is dry deciduous scrub type, Phulai, Kau and Sanatha are the main species. The stocking on the whole is poor and the forests are open. Vegetation is poor on sandstone and redmarl. The southern slopes are often devoid of vegetation while north western slopes carry good forests. The forests of Jhelum Divisions are burdened with right of grazing, browsing and firewood. Under settlement out of total area 93,566 acres (378.65 km^2) only 5,468 acres (22.13 km^2) about (45%) are right free. Remaining 55% are open to grazing. Some other species such as eucalyptus, sheesham, keekar and mulberry are also present.

Agricultural crops like wheat in Rabi season and rice and pulses in Kharif season are grown. The riverian as well as the inland flora plays a significant role in the local economy by way of timber and fuelwood production, protection from wind and water erosion, habitat of birds and animals, environmental balance, cultural identification and rehabilitation of soils affected by water logging and salinity

- **Fauna**

The fauna of the District is mostly indigenous, restricted (confined), like the vegetation, but similarly varied. The rugged and rough terrain, low rainfall, the scanty cover of vegetation and the increasing number of hunters, all have their share in limiting the fauna in the District. The riverine area offers a better environment than elsewhere though the hills

support a more interesting wildlife. Urial and Chinckara are spot aids while wild bores are found in the Salt Range. Wolves, Foxes and Wild Cats are also found. Hare is fairly common. Chikor grey and black Partridge are also found in the parts of the district. Migratory ducks like Teal Pintail and Mallard and some geese visit during winter. Fish such as Teal, Sohal, Silver Carp, Sanghara Rahu and Grass Carp have been reportedly found.

5.3 Socio-Economic Perspectives

Socio-economic aspects of the project area were studied on the basis of Focus Group Discussions and by exploiting the available secondary data. The results of surveys carried out have been drawn which are presented in the section below:

5.3.1 Jhelum City

The district headquarter of Jhelum is Jhelum City. This is situated on the right bank of Jhelum River. Grand Trunk Road constructed initially in 16th century passes through the city. Jhelum is the 35th largest city of Pakistan in terms of population. A cantonment was built during the British rule, which has grown up into a Garrison with an Infantry Division commanded by a Major General. In the past few years, the city has experienced rapid expansion and has become a vibrant economic and cultural center. The old city has narrow streets and crowded bazaars.

5.3.2 Jhelum District

Jhelum district locates in the Punjab province of Pakistan. It is located in the northern part of the province. Jhelum district is bordered by Sargodha to its south, Gujrat and the Jhelum River to its south and east, Chakwal to its west, Mirpur to its east and Rawalpindi to its north.

According to Punjab Development Statistics 2011, total population of Jhelum district is 1,148 thousand persons out of which 574 thousand are males and 574 thousand are female. Density of population in the district is 320 persons per square Kilometer. The district of Jhelum stretches from the river Jhelum to the vicinity of River Indus. Salt range exists in the district including Mayo mine from where salt is quarried. The prime centre of the salt trade is Pind Dadan Khan. Jehlum is known for providing a large number of soldiers to the British and later on to the Pakistan armed forces. That is why the district is also known as city of soldiers or land of martyrs and warriors. The district is crossed by the main line of the North-Western railway, and also traversed along the south by a branch railway line.

5.3.3 Major Castes in the District

The major castes of the district are Awan, Akra, Bharat, Gakhar, Gujar, Janjua Rajput, Jalap, Jat (Cheema, Dhamial, Gondal, Ghuman, Sipra, Nagyal,thathal, Kashmiris, Khokhars, Lilla Qureshi, Phaphra Mughal,Bhakral, Bhatti, Chib, Minhas, Narma and Sohlan.

5.3.4 Languages

Punjabi language is spoken by the majority of the population in the District Jhelum.

5.3.5 Minerals

Jhelum has very rich reserves of mineral resources. Minerals like Rock Salt, Brine, Gypsum, Coal, Bentonite and Silica Sand are being exploited commercially by private and public sector agencies in the district. Khewra Salt mine also located in district Jhelum.

5.3.6 Industry

There are numbers of industry in and around Jhelum City. Major industries include tobacco factory, wood, marble, glass, flour mills, cement and soda ash manufacturing units.

5.3.7 Major Profession

The major professions adopted by local people are service in Armed Forces. A large number of people of this district are settled in foreign countries particularly Western Europe. Agriculture and labour (workers on daily wages in construction, agricultural and other sectors) are also significant professions of the people living in Jhelum district.

5.3.8 Source of Drinking Water

Ground water is the main source of drinking water in the district. Households residing along the project area mostly have water supply in their houses for domestic use. Ground water is sweet and fit for drinking.

5.3.9 Literacy Level

Literacy is a basis for lifelong learning and plays a foundational role in the creation of sustainable, prosperous and peaceful societies. The Literacy ratio (10 years age and above) of Jhelum District was 63.9 % percent in 1998 on an overall basis. The literacy ratio for males calculated 77.66 % percent as against 50.47 % percent for females.

5.3.10 Impact on Land

During the impact assessment survey, data regarding the impacts ofproject was collected. However, the field investigations revealed that overall adverse impacts of the project on the local people, land, structure, crops, trees, business, and employment etc. are not significant.

5.3.11 Indigenous People

There are no indigenous people in the sub-project area. No notable migration of any tribe inside the area was observed for many decades. So, the project does not fall in the categorization of indigenous people.

5.4 Institutional

5.4.1 Institutional Activities

There are a number of governmental and non-governmental institutions in the project area.

5.4.2 Institutional Effectiveness

The institutions are yet in infancy stage. These are not fully effective.

5.5 Human Use

5.5.1 Telephone

Nationwide and international telephonic and fax linkages are available.

5.5.2 Livestock and Agriculture

The project area is famous for buffaloes known as one of highest milk producing animals. Livestock such as goats/sheep, camel and other cattle are also reared by the locals. The livestock includes cattle, buffaloes, sheep, goats, camels, horses, asses and mules. Nearly 25% of the farmer's income is from livestock. At least 10% of the population is landless, cattle raisers and their living comes from cattle milk marketing. On the average each family possesses 5-6 cattle and 7-10 sheep and goats.

Jhelum District has a total area of 858,767 acres, out of which 316,815 acres are cultivated. Agriculture in the District Jhelum depends mainly on rainfall. The average rainfall of the area varies from 20 to 40 inches. The irrigated area at present is limited but the emphasis on construction of small Dams and Mini Dams is gradually increasing. Besides, Wheat, Sugarcane, Rice, Moong, Mash, Masoor, Gram, Ground Nut, Jawar, Oil Seed Such as Rape/Mustard and Sun Flower are grown in the district. About 80% of the population of project area depends upon agriculture. Most of the area is well cultivated. Rice is the main Kharif crop.

5.5.3 Cultural Heritage

The area does not boast of any significant cultural development. People follow the family/ village traditions.

5.5.4 Archaeological Monuments / Relics

No sites of archeological, historical, cultural or religious significance are known to exist in the areas where construction will take place or where different project facilities will be established / located. In case, if any such site is found during the subsequent phases of project, it can be handled as per Law and Procedures.

5.6 Ambient Quality of Environment

5.6.1 Ambient Air Quality

Field visit observations indicate that ambient air quality is generally acceptable. There will be mechanical equipment to be used in the mining works which may generate gaseous emissions. However, it is anticipated that these emissions will not be a threat to the environment in the project area since it can be managed through proper implementation of Environmental Management Plan. It is also anticipated that Carbon Monoxide and

Oxides of Sulphur and Nitrogen derived from powered vehicles can also be managed through proper implementation of environmental Management Plan.

5.6.2 Noise Level

Field visit observations indicate that ambient noise levels are within permissible limits as there is neither any mobility of vehicles nor industrial units exist in the project area. It is anticipated that powered mechanical equipment and vehicle to be used during construction period can generate noise of moderate level. This can be minimized through proper implementation of Environmental Management Plan.

5.6.3 Natural History Event/Seismic Hazards

The area has no history of any serious damages due to earthquake. The area lies in Zone 2B which is a Minor Hazard Region.

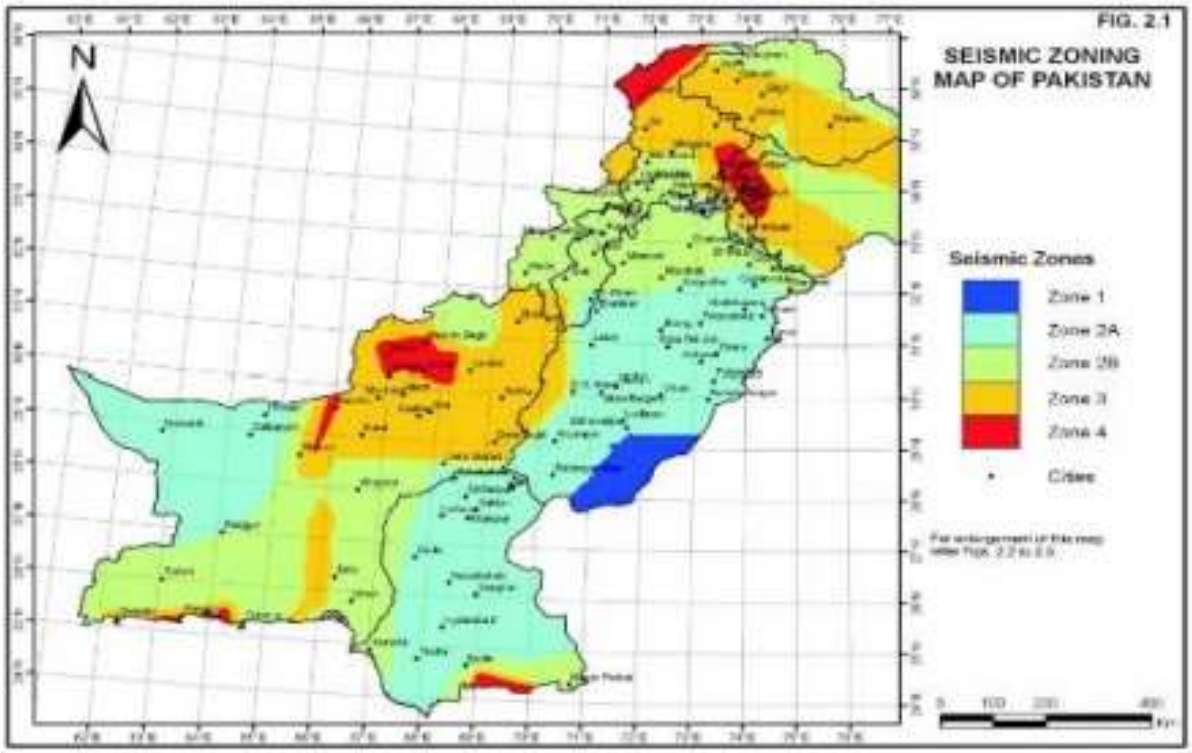

Figure 5-1 Seismic Hazard Zones of Pakistan

5.7 Lab Reports of Environmental Analysis

To assess the baseline conditions of the project area, following environmental components were monitored:

- Ambient air quality
- Water quality
- Noise levels

5.8 Suitability of the Site

The site does not fall in environmental sensitive area and all commodities are at a suitable distance from project site as they will not have impacted by the construction activities even locals will get more benefits and job opportunities. No replacement, relocation and rehabilitation are required for the development of proposed project.

6 ENVIRONMENTAL IMPACT ASSESSMENT

This section provides the analysis of the potential impacts during different stages of the proposed project on the physical, biological and socio-economic environment of the project area.

6.1 What is the Problem?

The problem is the environmental impacts resulting from project activities related to cement plant construction and production. The project is based on cement plant installation located near Tobah District Jhelum. The environmental impacts resulting from project operations on each environmental setting including physical, ecological and socio-economic environment.

6.2 When Problem Will Occur and When It Should Be Addressed?

The impacts may occur during different stages of the project activity. The impacts should be addressed at every stage of project operations. The environmental impacts should be addressed at installation and operational stage of project activities.

6.3 Where Problem should be addressed?

The problem as mentioned above should be addressed at project location where project activities are being carried out. All the impacts resulting from project location should be addressed, if any.

6.4 How the Problem should be addressed?

The problem should be addressed using specified criteria and methods as specified in Guidelines/Checklist. The impacts should be addressed using one or more methods as specified in the Checklist provided by EPA, Punjab.

6.5 Ways of Achieving Mitigation Measures

6.5.1 Changing in Planning and Design

The mitigation measures as specified in the EIA Report will be achieved by the implementation of Environmental Management and Monitoring Plan. Any significant changing in planning and design or EMMP will be made based on requirements in future. It may be communicated to EPA, Punjab in case of significant changes.

6.5.2 Improved Monitoring and Management Practices

Improved monitoring and management practices will be adopted to ensure the implementation of mitigation measures as suggested in the EIA Report. Improved monitoring and management practices may include the followings:

- Monitoring of all management measures as suggested in EMMP.
- Monitoring of Environmental parameters as suggested by EPA, Punjab.
- Monitoring of workers health and safety.
- Monitoring of implementation of potential environmental enhancement measures.

6.5.3 Compensation in Money Terms

Compensation in terms of money is only required in case of any relocation or replacement of community/settlement due to project activities.

6.6 Replacement, Relocation and Rehabilitation

Project activities have no effect on nearby communities or settlements as these are being carried out at safer distances from project site. There is no replacement or relocation of any settlement/community required due to project operations. The rehabilitation plan has already been given in Chapter No. 4.

6.7 Methodology for Impacts Identification

Environmental sensitivity of the project area is described through a thorough review of the project activities and the evaluation of significance of impacts is carried out through Environmental Checklists and GIS and computer expert system. In checklists, the impacts have been given magnitude based on their severity. A detailed map of the project area is developed on GIS to study the impacts on nearby environmental settings. This chapter then suggests effective mitigation strategies to help combat the adverse nature of these impacts and delivers a monitoring scheme to manage them.

6.8 Impacts Analysis and Prediction

The impacts on different environmental settings were analyzed by conducting different consultation sessions with environmental experts and individuals. Their views were recorded and incorporated in the report. The list of stakeholders and individuals consulted will be provided in the chapter of Stakeholder's Consultation.

6.9 Characterization of Impacts

Impacts were characterized based on the following parameters:

- Nature
- Magnitude
- Extent
- Duration
- Spatial Boundaries
- Reversibility

The impacts characterization has been given in Table 6-1.

Table 6-1 Characterization of Impacts

Environmental Component	Impacts		Nature of Impact		Duration			Spatial Boundaries			Likelihood			Reversibility	
	Positive	Negative	Direct	Indirect	Short Term	Intermediate	Long term	Local	National	Global	Low	Moderate	High	Reversible	Irreversible
Water Resources	Nil														
Land Resources	■		■				■	■				■			■
Air Quality		■	■		■			■			■			■	
Noise		■	■		■			■			■			■	
Solid waste		■	■		■			■			■			■	
Wastewater	Nil														
Flora & Fauna	■		■				■	■				■			■
Community Amenity		■		■	■			■			■			■	
Afforestation	■		■				■	■				■			■
Local Economy, Community Development and Employment	■		■			■		■				■		■	
Resettlement	Nil														
Health & Safety		■	■			■		■				■			■

6.10 Impact's Significance

After the evaluation of all the potential impacts, the impacts significance is to be given using Impact matrix. The impacts significance of Physical importance, Ecological importance, Social importance is given using the matrix approach. The impacts significance is given based on the characterization of impacts. From the Table 6-2 which is showing the characterization of each impact, the following significance is given to each physical, biological and socio-economic impact.

Table 6-2 Significance of Environmental Impacts

Environmental Parameter	Significance
Water Resources	None
Land Resources	None
Air Quality	Require mitigation
Noise	Require mitigation
Solid waste	Require mitigation
Wastewater	None
Flora & Fauna	Acceptable
Community Amenity	Acceptable
Afforestation	Acceptable
Local Economy, Community Development and Employment	Acceptable
Health & Safety	Require mitigation

7 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

7.1 Project Location

The project would pose aesthetic and noise impacts on the nearby areas. Dust would however have impacts on the areas bit far away. There is no water body found near the vicnity of the project site. Hence, there will be no impact on water quality due to project activities. The mitigation measures for dust and noise problems are discussed in following sections.

7.2 Mitigation Measures

Following are the steps that may be adopted to control noise and dust problems at site.

- Use of PPEs (noise suppression equipment-ear mufflers etc.) will be ensured by the workers where noise levels are higher than 85 (dBA).
- Project activities will be ensured at daytime when background noise levels are high.
- Vehicles speed limit will be maintained to avoid excessive vibrations.
- Regular maintenance of machinery will be ensured.
- Controlled water sprinkling will be ensured to reduce dust/PM_{10}.
- Maintain appropriate buffers between the site and receptors if practical.
- Use of PPEs (face masks etc.) will be ensured by the workers and staff.

7.3 Anticipated Environmental Impacts Related to Project Design

The project may have high blowing off rates and dust emissions. Better design can resist such impacts. Thus, barriers shall be developed by extensive vegetation and trees on the boundaries of the project.

7.4 Environmental Impacts during Installation Stage

The summary of the positive and the negative impacts observed on the environment by the cement production on the project area has been summarized in Table 7-1. The impacts have been given magnitude based on the scaling given below.

Scale Range	0 to 5
Major Impact	5
Moderate	4
Intermediate	3
Minor	2
Low	1
No Impact	0

(+) sign is used for positive impacts and (-) sign for negative impacts. The mitigation measures will be explained after a short while.

Table 7-1 Identification of Impacts during Installation Stage of the Project

Sr. No.	Component	Environmental Issue	Impacts	
			Positive	Negative
1	**Physical Environment**			
	Water	Channel Water Quality		0
		Channel Water Discharge.		0
		Groundwater Quality		0
		Groundwater Level		0
		Surface Run-Off		0
		Flooding		0
		Drainage		0
	Land	Soil Salinity		0
		Soil Erosion		0
		Land Utility / Productivity	+3	
	Solid Waste	Land Pollution Breeding of flies and rodents Odor		0
	Climate	Micro-climate changes.		0
	Atmosphere	Dust		-3
		Noise		-2
	Sub-Total		**+3**	**-5**
2	**Biological Environment**			
	Flora	Forests /Trees	+2	
		Other Terrestrial Vegetation		0
	Fauna	Mammal Communities /Habitat		0
		Reptile Communities /Habitat		0
	Sub-Total		**+2**	**0**
3	**Socio-economic Environment**			
	Social	Population	+1	
		Land Ownership	+1	
		Land Lease	+2	

		Worker's Health and Safety		-2
		Security		0
		Social Cohesion/ Attitude	+1	
		Food/ Nutrition	+1	
		Health		0
		Education	+1	
	Economic	Income Levels	+1	
		Employment	+2	
		Land Value	+2	
	Institutional	Institutional Activities/Effectiveness	+2	
	Human Use	Cultivation	+1	
		Livestock	+1	
		Afforestation	+2	
		Infrastructure		0
		Domestic Water Supply		0
		Community Development	+2	
	Resettlement	Land Lease		0
		Dislocation of Population		0
		Loss of Property		0
		Loss of Infrastructure		0
		Resettlement of Affected		0
Sub-Total			**+20**	**-2**
Grand Total			**+25**	**-7**

The potential environmental impacts resulting during installation phase of the project and their possible mitigation measures are given in Table 7-2.

Table 7-2 Environmental Impacts and their Mitigation Measures for Installation Phase

Environmental Component	Sources	Potential Impacts	Mitigation Measures
Physical Environment			
Air Quality	• Cement plant installation • Movement of vehicles and machinery	• Dust emissions are generated from Cement plant installation activities. • Exhaust emissions from diesel engine vehicles.	• Controlled water sprinkling will be ensured to reduce PM_{10}. • Maintain appropriate buffers between the site and receptors. • Use of PPEs (face masks etc.) will be ensured by the workers and staff.
Solid Waste	• Workers activities • No solid waste will be generated from project installation.	• If not properly handled, it has the potential to degrade the quality of land. • Odor problem • Breeding of flies, birds, rodents etc. • Nuisance to the nearby communities if present within the proximity of the lease area.	• Proper waste management plan will be developed. • Waste will be stored at site in covered containers. • Containers will be emptied before they reach their carrying capacity. • Littering will be prohibited at the site. • Awareness will be given to the staff and workers about handling of solid waste at site.
Noise	• Installation of heavy machinery and equipment for production of cement. • Movement of heavy machinery at site.	• Increased noise levels and vibrations. • Disturbance to workers and local residents (if any). • Reduced hearing issues for workers and staff.	• Use of PPEs (noise suppression equipment-ear mufflers, ear plugs etc.) will be ensured by the workers where noise levels are higher than 85 (dBA). • Project activities will be ensured at day time when background noise levels are high. • Vehicles speed limit will be maintained to avoid excessive vibrations. • Regular maintenance of machinery will be ensured.
Wastewater	Nil	• No wastewater will be generated from	Nil

		installation activities. Therefore, there will be no adverse impact on environmental setting due to this parameter.	
Biological Environment			
Flora	Nil	• The project area is devoid of any forest cover. • There are no trees except some small size bushes at the project site not worth mentioning. • The proponent will not be cutting any trees coming in direct way of mining activities. • Therefore, there is no question of tree cutting during the installation of the project as well.	• Excessive plantation will be done in and around the boundary of the project area as a potential environmental enhancement measure. (Subject to the agreement between proponent and consultant and consent of the land owner also)
Fauna	Nil	• Temporary migration of mammals and birds from the area.	• As this impact is temporary, hence, no significant mitigation measures are required.
Endangered Species	Nil	• No endangered species found within the vicinity of the project area, hence, no impact.	Nil
Socio-economic Environment			
Worker's Health and Safety	• Noise • Dust	• Health and safety risks to workers due to high levels of dust and noise. • Respiratory problems • Hearing issues	• Provision of first aid box at site. • Provision of Personal Protective Equipment (e.g. dust masks, ear muffs etc.) to workers and staff.
Community Amenity	• Noise • Dust	• Reduced visual amenity • Excessive dust impacts may be harmful for some people, for example, with some experiencing	• Adopt and maintain good management practices. • Maintain appropriate buffers between the site and receptors. • If these buffers include vegetative screens, they

		respiratory conditions.	have the added benefit of providing improvements in visual amenity.

7.5 Environmental Impacts during Operational Stage

The summary of the positive and the negative impacts observed on the environment by the cement production on the project area has been summarized in Table 7-3. The impacts have been given magnitude based on the scaling given below.

Scale Range	0 to 5
Major Impact	5
Moderate	4
Intermediate	3
Minor	2
Low	1
No Impact	0

(+) sign is used for positive impacts and (-) sign for negative impacts. The mitigation measures will be explained after a short while.

Table 7-3 Identification of Impacts during Operational Stage of the Project

Sr. No.	Component	Environmental Issue	Impacts	
			Positive	Negative
1	Physical Environment			
	Water	Channel Water Quality		0
		Channel Water Discharge.		0
		Groundwater Quality		0
		Groundwater Level		0
		Surface Run-Off		0
		Flooding		0
		Drainage		0
	Land	Soil Salinity		0
		Soil Erosion		0
		Land Utility / Productivity	+2	

	Solid Waste	Land Pollution Breeding of flies and rodents Odor		0
	Climate	Micro-climate changes.		0
		Climate Change		-2
	Atmosphere	Dust		-2
		Noise		-2
	Sub-Total		**+2**	**-6**
2	**Biological Environment**			
	Flora	Forests /Trees	+2	
		Other Terrestrial Vegetation		0
	Fauna	Mammal Communities /Habitat		0
		Reptile Communities /Habitat		0
	Sub-Total		**+2**	**0**
3	**Socio-economic Environment**			
	Social	Population	+1	
		Land Ownership	+1	
		Land Lease	+2	
		Worker's Health and Safety		-2
		Security		0
		Social Cohesion/ Attitude	+1	
		Food/ Nutrition	+1	
		Health		0
		Education	+1	
	Economic	Income Levels	+1	
		Employment	+2	
		Land Value	+2	
	Institutional	Institutional Activities/Effectiveness	+2	
	Human Use	Cultivation	+1	
		Livestock	+1	
		Afforestation	+2	
		Infrastructure		0
		Domestic Water Supply		0

		Community Development	+2	
	Resettlement	Land Lease		0
		Dislocation of Population		0
		Loss of Property		0
		Loss of Infrastructure		0
		Resettlement of Affected		0
Sub-Total			**+20**	**-2**
Grand Total			**+24**	**-8**

The potential environmental impacts resulting during operational phase of the project and their possible mitigation measures are given in Table 7-4.

Table 7-4 Environmental Impacts and their Mitigation Measures for Operational Phase

Environmental Component	Sources	Potential Impacts	Mitigation Measures
Physical Environment			
Air Quality	• Cement production activities • Vehicles and machinery	• CO_2 emissions from cement plant. • Dust emissions are generated from site clearing and project activities. • Exhaust emissions from diesel engine vehicles.	• Proper plan will be developed to reduce CO_2 emissions. • Controlled water sprinkling will be ensured to reduce PM_{10}. • Maintain appropriate buffers between the site and receptors. • Use of PPEs (face masks etc.) will be ensured by the workers and staff.
Solid Waste	• Workers activities • No solid waste will be generated from project operations.	• If not properly handled, it has the potential to degrade the quality of land. • Odor problem • Breeding of flies, birds, rodents etc. • Nuisance to the nearby communities if present within the proximity of the project area.	• Proper waste management plan will be developed. • Waste will be stored at site in covered containers. • Containers will be emptied before they reach their carrying capacity. • Littering will be prohibited at the site. • Awareness will be given to the staff and workers about handling of solid waste at site.

Noise	• Heavy machinery and equipment such as excavators and tractor trolleys	• Increased noise levels and vibrations. • Disturbance to workers and local residents (if any). • Reduced hearing issues for workers and staff.	• Use of PPEs (noise suppression equipment-ear mufflers, ear plugs etc.) will be ensured by the workers where noise levels are higher than 85 (dBA). • Production activities will be ensured at day time when background noise levels are high. • Vehicles speed limit will be maintained to avoid excessive vibrations. • Regular maintenance of machinery will be ensured.
Wastewater	Nil	• No wastewater will be generated from project activities. Therefore, there will be no adverse impact on environmental setting due to this parameter.	Nil
Biological Environment			
Flora	Nil	• The project area is devoid of any forest cover. • There are no trees except some small size bushes at the project site not worth mentioning. • The proponent will not be cutting any trees coming in direct way of mining activities. • Therefore, there is no question of tree cutting during the operation of the project as well.	• Excessive plantation will be done in and around the boundary of the lease area as a potential environmental enhancement measure. (Subject to the agreement between lessee and consultant and consent of the land owner also)
Fauna	Nil	• Temporary migration of mammals and birds from the area.	• As this impact is temporary, hence, no significant mitigation measures are required.
Endangered Species	Nil	• No endangered species found within the vicinity of the	Nil

		project area, hence, no impact.	
Socio-economic Environment			
Worker's Health and Safety	• Noise • Dust	• Health and safety risks to workers due to high levels of dust and noise. • Respiratory problems • Hearing issues	• Provision of first aid box at site. • Provision of Personal Protective Equipment (e.g. dust masks, ear muffs etc.) to workers and staff.
Community Amenity	• Noise • Dust	• Reduced visual amenity • Excessive dust impacts may be harmful for some people, for example, with some experiencing respiratory conditions.	• Adopt and maintain good management practices. • Maintain appropriate buffers between the site and receptors. • If these buffers include vegetative screens, they have the added benefit of providing improvements in visual amenity.

7.6 Potential Environmental Enhancement Measures

- Extensive plantation will be done in and around the project site to enhance the environmental quality.
- The vehicles used for transportation of cement will be properly designed, covered and cleaned to avoid any risk while departing to and from the project site.
- All vehicles used in the Cement transportation will be regularly inspected and maintained.
- Cement will be transported according to proper management practices.
- Vegetative buffers will be maintained regularly to keep them in good condition.
- The labor force will be trained to use personal protective equipment to avoid any accident/near miss at site.
- Environmental Management and Monitoring Plan (EMMP) will be strictly operational throughout the project life. All monitored data will be reported to the EPA Punjab, Lahore for scrutiny at their end.

8 ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

8.1 Description of Proposed Mitigation Action

This section presents the environmental management plan (EMP) for the proposed project. The EMP specifies the mitigation and management measures which the Proponent will undertake and shows how the Project will mobilize organizational capacity and resources to implement these measures.

The EMP covers information on the management and mitigation measures that will be taken into consideration to address impacts in respect of the operational phase of project.

8.1.1 Objectives

The objective of the Environmental Management and Monitoring Plan (EMMP) is to address all the major environmental issues and provide framework for the implementation of the proposed mitigation measures during the operational phase of the project. The proper implementation of the EMP will ensure that all the adverse environmental impacts identified in the EIA report are adequately mitigated, either totally prevented or minimized to an acceptable level and required actions to achieve those objectives are successfully adopted by the concerned institutions or regulatory agencies.

The EMMP provides a delivery mechanism to address potential impacts of the project activities, to enhance project benefits and to introduce standards of good practice to be adopted for all project works. The EMMP has been prepared with the objectives of:

- Defining roles and responsibilities of the project Proponent for the implementation of EMMP and identifying areas where these roles and responsibilities can be shared with other parties involved in the execution and monitoring of the project.
- Outlining mitigation measures required for avoiding or minimizing potential impacts assessed in the EIA report.
- Developing a monitoring mechanism and identifying requisite monitoring parameters to confirm effectiveness of the mitigation measures recommended in the EIA report.
- Defining the requirements for communication, documentation, training, monitoring, management and implementation of the mitigation measures.

8.2 Schedule for Implementation of EMMP and Environmental Budget

8.2.1 Schedule for implementation

The implementation of EMMP should be carefully coordinated with the design and operational program of the project. This will ensure the implementation of relevant mitigation measures at the appropriate project stages. It will also ensure that adequate

resources are properly allocated to achieve the desired results. This EMMP has been prepared to satisfy the requirement of "IEE and EIA Regulations, 2000".

8.2.2 Environmental Budget

The environmental budget of the project has been given in Table 8-1.

Table 8-1 Environmental Budget Breakdown

Sr. No.	Item/Activity		Quantity (No.s)	Budget (PKR)	Description
1	Plantation Campaign		100	90,000/-	Cost includes plantation and maintenance up to 5 years
2	Cost of EMMP		-	100,000/-	Installation + Operational Phases
3	Environmental Monitoring	Air Quality Monitoring	01	10,000	01 sample @ 10,000/- per sample
		Noise Level Monitoring	02	15,000	02 samples @ 7,500/- per sample
		Drinking Water Quality Monitoring	01	10,000/-	01 sample @ 10,000/- per sample
4	Miscellaneous			90,000/-	Lump sum
5	**Total Environmental and Social Management Cost**			**315,000/-**	

8.3 Environmental Team Along with their Roles and Responsibilities

Following functionaries will be involved in the implementation of EMMP:

- The project Proponent as owners of the EMMP.
- Project contractor(s) as executors of the EMMP during installation and operational phase of the project.
- Operational & Maintenance (O&M) and the Health, Safety and Environment team of the project as an executor of the EMMP during the installation and operational phase of the project.

Table 8-2 List of Individuals and their Responsibilities

List of Individuals and their Responsibilities

Designation	Responsibilities
Manager	• Direct operations at the site. • He will act as team lead. • Interact with other executives, mine staff and community residents. • Effectively motivate staff to follow protocols and to work productively. • Look after the Health and Safety Related issues. • Responsible for scheduling staff and ensuring that supplies are stocked. • He will play a direct role in developing business goals for the mine they run, and he will help to produce a business plan to ensure that those goals are met.
Accountant	• Proper management of the funds for the CSR. • Development of fund proposal for environment related expenses. • Ensuring the smooth transaction of funds for environmental related projects/activities. • He will prepare the yearly budget. • Taking minutes in meetings and other administrative duties. • During his shift timings, he will be responsible to look into smooth functioning of the process in environmentally sustainable way. • He will be responsible to rectify any problem regarding environmental matter in collaboration with concerned authorities. • Prepare reports on different events and incidents. • He will report all matters regarding E.M. to the manager.

8.3.1 Responsibilities of Functionaries

- **Responsibilities of Management of Project**

Management of the project will be responsible for the environmental management and supervisory affairs during the project activities. Environmental personnel designated by the management of the project will look after the environmental related issues during the project activities. The responsibilities of environmental personnel are as follows:

- Monitoring progress of the project as per planned schedule of activities.
- Exercising oversight over the implementation of environmental mitigation measures by the contractor.
- Documenting the experience in the implementation of the environmental process.
- Preparing training materials and implementing programs.
- Maintaining interfaces with the other lined departments/ stakeholders and

- Reporting to the management of the project on the status of EMMP implementation.

8.4 Proposed Environmental Management and Monitoring Plan (EMMP)

The Environmental Management and Monitoring Plan (EMMP) will be used as a management and monitoring tool for implementation of the mitigation measures identified in the EIA report.

The EMMP matrix lists down:

- The required mitigation measures recommended in the EIA report.
- The person/organization directly responsible for adhering to or executing the required mitigation measures and monitoring adherence to the mitigation measures.
- The parameters, which will be monitored to ensure compliance with the mitigation measures.
- The timing at which the mitigation or monitoring has to be carried out.
- Budget allocated for management practices (cost of EMMP).
- Project Proponent will hold primary and overall responsibility for ensuring full implementation of the EMMP.

The Environmental Management and Monitoring Plan have been provided for both installation and operational phases of the project below:

8.4.1 EMMP for Installation Phase

The EMMP for installation phase of the project includes following:

- Air quality management & monitoring plan
- Noise management & monitoring plan
- Solid Waste management & monitoring plan
- Health and safety management & monitoring plan

Table 8-3 : Air Quality Management & Monitoring Plan for Installation Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Reduce Dust Emissions					
1	Dust Emissions	Monitor speed limits of vehicles operating at project site.	Throughout installation period	Proponent	0/-
		Avoid installation activities in extremely dry weathers.	Throughout installation period	Proponent	0/-

		Sprinkle water at site when necessary to reduce dust spread.	Throughout installation period	Proponent & Contractor	7,000,000
		Ensure the use of Personal Protective equipment by workers and staff.	Throughout installation period	Proponent & Contractor	2,000,000
Reduce Exhaust Emissions					
2	Exhaust Emissions	Ensure minimization of Vehicle idling time.	Throughout installation period	Proponent & Contractor	0/-
		Alternatively, fueled equipment shall be used where feasible equipment shall be properly tuned and maintained.	Throughout installation period	Proponent & Contractor	0/-
		Give awareness to vehicle drivers and operators to avoid unnecessary racing of vehicle engines at loading/un-loading points. Ensure that vehicles engines must be switched off at these points.	Throughout installation period	Contractor	0/-
Sub-Total					**9,000,000**

Table 8-4 Noise Management & Monitoring Plan for Installation Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of Noise and Vibrations					
1	Noise and Vibrations	Aware vehicle and machinery operators to switch off engines of vehicles or machinery not being used to avoid excessive noise and vibrations.	During installation period	Proponent & Contractor	0/-
		Sensitize drivers to avoid gunning of vehicle engines or unnecessary hooting especially when passing through sensitive areas such as churches, mosques, residential areas and schools.	Throughout installation period	Proponent & Contractor	0/-

		Ensure that machinery is kept in good condition to reduce noise generation.	Throughout installation period	Proponent & Contractor	1,000,000
		The noisy installation works will entirely be planned during day time when most of the neighbors will be at work.	Throughout installation period	Proponent & Contractor	0/-
Sub-Total					1,000,000

Table 8-5 Solid Waste Management & Monitoring Plan for Installation Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of solid waste generation and ensure efficient solid waste management					
1	Increased solid waste generation	Donate recyclable/reusable or residual materials to local community groups, institutions.	During installation period	Proponent	0/-
		Proper waste management plan must be developed.	During installation period	Proponent	0/-
		Waste must be stored at site in covered containers.	During installation period	Proponent	500,000
		Containers must be emptied before they reach their carrying capacity.	During installation period	Proponent	0/-
		Littering must be prohibited at the site.	During installation period	Proponent	0/-
		Awareness will be given to the staff and workers about handling of solid waste at site.	During installation period	Proponent	0/-
		Use of an integrated solid waste management system i.e. through a hierarchy of options: 4. Source reduction 5. Reuse 6. Recycling	Throughout installation period	Proponent & Contractor	0/-
		Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time.	Throughout installation period	Proponent & Contractor	0/-
Sub-Total					500,000/-

Table 8-6 Health and Safety Management & Monitoring Plan for Installation Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of occupational health and safety risks					
1	Health and Safety Impacts	Implement all necessary measures to ensure health and safety of workers and the general public during installation of the project.	Throughout installation period	Proponent	0/-
		Suitable overalls, safety footwear, dust masks, gas masks, respirators, gloves, ear protection equipment etc. should be made available and personnel must be trained to use the equipment.	Once off	Proponent & Contractor	2,000,000
		Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises.	Continuous	Proponent	1,000,000
2	First Aid	Provision of well stocked first aid box must be ensured within the premises of the project area.	One-off/as per required	Proponent	500,000
		Provision must be made for persons to be trained in first aid.	One-off	Proponent	300,000
Sub-Total					3,800,000
Grand-Total					14,300,000

8.4.2 EMMP for Operational Phase

The EMMP for operational phase includes following:

- Air quality management & monitoring plan
- Noise management & monitoring plan
- Solid Waste management & monitoring plan
- Health and safety management & monitoring plan

Table 8-7 Air Quality Management & Monitoring Plan for Operational Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Reduce Dust Emissions					

1	Dust Emissions	Monitor speed limits of vehicles operating at mining site.	Throughout operational period	Proponent	0/-
		Avoid operational activities in extremely dry weathers.	Throughout project lifecycle	Proponent	0/-
		Sprinkle water at site when necessary to reduce dust spread.	Throughout operational period	Proponent & Contractor	2,000,000
		Ensure the use of Personal Protective equipment by workers and staff.	Throughout operational period	Proponent& Contractor	2,000,000
Reduce Exhaust Emissions					
2	Exhaust Emissions	Ensure minimization of Vehicle idling time.	Throughout operational period	Proponent & Contractor	0/-
		Alternatively, fueled equipment shall be used where feasible equipment shall be properly tuned and maintained.	Throughout operational period	Proponent & Contractor	0/-
		Give awareness to vehicle drivers and operators to avoid unnecessary racing of vehicle engines at loading/un-loading points. Ensure that vehicles engines must be switched off at these points.	Throughout operational period	Contractor	0/-
Sub-Total					**4,000,000**

Table 8-8 Noise Management & Monitoring Plan for Operational Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of Noise and Vibrations					
1	Noise and Vibrations	Aware vehicle and machinery operators to switch off engines of vehicles or machinery not being used to avoid excessive noise and vibrations.	During operational period	Proponent & Contractor	0/-
		Sensitize drivers to avoid gunning of vehicle engines or unnecessary hooting especially when passing through sensitive areas such as churches,	Throughout operational period	Proponent & Contractor	0/-

		mosques, residential areas and schools.			
		Ensure that machinery is kept in good condition to reduce noise generation.	Throughout operational period	Proponent & Contractor	1,500,000
		The noisy production works will entirely be planned during day time when most of the neighbors will be at work.	Throughout project life	Proponent & Contractor	0/-
Sub-Total					**1,500,000**

Table 8-9 Solid Waste Management & Monitoring Plan for Operational Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	Potential Impacts	Management & Monitoring Measures	Timeframe	Responsible Party	(PKR)
Minimization of solid waste generation and ensure efficient solid waste management					
1	Increased solid waste generation	Donate recyclable/reusable or residual materials to local community groups, institutions.	During operational period	Proponent	0/-
		Proper waste management plan must be developed.	During operational period	Proponent	0/-
		Waste must be stored at site in covered containers.	During operational period	Proponent	500,000/-
		Containers must be emptied before they reach their carrying capacity.	During operational period	Proponent	0/-
		Littering must be prohibited at the site.	During operational period	Proponent	0/-
		Awareness will be given to the staff and workers about handling of solid waste at site.	During operational period	Proponent	0/-
		Use of an integrated solid waste management system i.e. through a hierarchy of options: 4. Source reduction 5. Reuse 6. Recycling	Throughout operational period	Proponent & Contractor	0/-

		Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time.	Throughout operational period	Proponent & Contractor	0/-
Sub-Total					**500,000/-**

Table 8-10 Health and Safety Management & Monitoring Plan for Operational Phase

Management Plan			Monitoring Plan		Estimated Cost
Sr. No.	**Potential Impacts**	**Management & Monitoring Measures**	**Timeframe**	**Responsible Party**	**(PKR)**
Minimization of occupational health and safety risks					
1	Health and Safety Impacts	Implement all necessary measures to ensure health and safety of workers and the general public during operation of the project.	Continuous	Proponent	0/-
		Suitable overalls, safety footwear, dust masks, gas masks, respirators, gloves, ear protection equipment etc. should be made available and personnel must be trained to use the equipment.	Once off	Proponent & Contractor	2,000,000
		Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises.	Continuous	Proponent	1,500,000
2	First Aid	Provision of well stocked first aid box must be ensured within the premises of the lease area.	One-off/as per required	Proponent	200,000
		Provision must be made for persons to be trained in first aid.	One-off	Proponent	500,000
Sub-Total					**4,200,000**
Grand-Total					**10,200,000**

8.5 Training Needs

There is requirement of training of the members of Monitoring and Evaluation department of multifarious environmental aspects pertaining to cement production. Training may be arranged at a suitable institution.

8.5.1 Training Schedules

The proponent has special department of Training & Development that impart knowledge to young generation meeting the basic principle of sustainable development. The training covers all aspects of environment, Health & safety beside technical knowledge regarding cement manufacturing. Training and capacity building trainings will be conducted on the regular basis to enhance the capacity of the workers hired for proposed project. Following is the detailed plan along with the schedules of the training:

Table 8-11 Training Schedule

Sr.	Training Session	IH/EX	Facilitator	Particpants	Trg. Dur.	Venue	Cost/Session	Remarks
1	Personal Protective Equipment (PPEs)	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP
2	Risk Assessment	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP
3	Permit To Work	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP
4	LOTOTO	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP
5	Work at Height	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP
6	Confined Space Entry	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP
7	Fire safety and Prevention	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP
8	Emergency Planning and Response	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP
9	Safe use of Electrical Appliances & installation	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP
10	Road Transport Safety Procedure	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP
11	Cranes Safety	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP
12	Chemical Handling	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP

13	Tools Safety	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP
14	Machine Guarding	IH	DM HSE	AM & Above (Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP
15	Conveyor Belt Safety	IH	DM HSE	AM & Above(Total 135) Each Batch of 35 participants	2 Hours	HR Training Hall MH	2000	Total 4 Sessions of each SOP

8.6 Environmental Monitoring and Evaluation

8.6.1 Aim

In the context of cement production, the monitoring and evaluation is carried out to achieve following objectives:

- To access whether the project site is being managed in a sustainable manner as planned or certain bottlenecks are experienced both qualitatively and quantitatively.
- To ensure compliance of environmental parameters (i.e. ambient air and noise) with PEQS.
- To undertake timely assessment of enhanced cement production.
- To ensure the implementation of mitigation measures for overall conservation of environment at the project site.
- To undertake effective environmental surveillance of the site.
- To assess effectiveness of mitigation measures and potential environmental enhanced measures.
- To ensure compliance with national environmental obligations.
- To monitor rehabilitation of recovered land including afforestation.

8.6.2 Environment, Health & Safety Policies

Environment Policy

The environment policy right from initiation of project installation to its proper operations will be based on:

- Compliance of applicable regulatory requirements;
- Conservation of natural resources;
- Assurance of sustainable development;
- Maintaining a safe working environment;
- Providing high environmental expertise and know-how; and

- Regular training and refresher courses to achieve continuous improvement of environment.

Health & Safety Policy

We at Lucky Cement Limited Karachi ensure Quality of products; Health, Safety and Environmental conditions shall have the highest priority in planning, execution and all process operations at Plant with full commitment, consultation and participation of workers. We will provide healthy & safe working conditions for our personnel in a pollution free environment by applying the principles and practices of continual improvement. We apply effective implementation on all legal requirements related to Quality, Health, Safety and Environmental regulations related to cement manufacturing including power generation processes.

We further ensure that our QHSE policy is effectively implemented by key elements as under:

- Taking all the necessary steps to ensure that operating practices including associated services comply with the procedures stipulated by our client companies as well as with national and international regulations, guidelines and standards.
- As part of our resolve to fulfill requirements of all client companies & related regional criteria we are dedicated to conform to the European Standards EN 197-I & II.
- Providing effective Quality, Health, Safety and Environmental training to Lucky Team, which will enable them to produce quality products, eliminate Hazards, reduce OH&S risks to protect equipment, personnel and property of the organization.
- Ensuring adherence at all times to the operating procedures and periodically conducting internal, external auditing and improving our systems.
- Providing pertinent information and training with setting the objectives and goals for preventing, preparing and responding to emergencies in a timely and effective manner to ensure zero or minimal impacts of Health, Safety and environment from our activities.

Customer Satisfaction is our top priority at all levels, so Lucky Cement Karachi Plant QHSE Policy has received the full commitment of the Management and is endorsed and supported by all levels of workers throughout the organization.

8.7 Emergency Response Plan (ERP)

ERP is prepared for quarry and plant to act in emergency situtations.

8.7.1 Objectives of ERP

Following are some of the objectives to ERP.

- To provide an effective response to emergency situations.
- To develop responsibility levels and support coordination.
- To minimize the effect of emergencies on personnel, on the surrounding communities, and on the public.
- To minimize injury; damage to environment; property damage; damage to equipment; and losses to process that result from emergencies.
- To ensure timely communication and cooperation with government and outside agencies.
- To provide suitable information to be conveyed to the public.
- To define the Emergency Response Team as the combination of: site personnel in the area of the emergency, personnel from other areas, Mine Rescue Team, and other off site emergency personnel as needed.

Chief Inspectorate of Mines (CIM) is responsible for mines safety. Rescue stations are established by CIM at the mining areas. Emergency situations are responded through these rescue stations. Mines Labour Welfare Hospitals are also established in mining areas. All health and safety measures are made in compliance with Mines Act, 1923.

8.8 Firefighting Plan

A fire hydrant system will cover the entire area of new lines, pass by all the buildings, and includes an automatic sprinkler fire water system will be put for paper bag storage. Firefighting water is stored in TREATED (FIRE) WATER TANK (3000m^3) (V=3000m^3). Any other purpose of using fire water is not allowed. Firefighting water shall be restored within 3 days after fire.

The firefighting water supply pipelines become a circle around the process lines. Normal diameter of main pipe is not less than 200mm. The space between hydrants is less than 100m.

8.8.1 Other Firefighting System

Heavy duty ABC powder type fire extinguisher trolley industrial type shall be provided at important electrical area, particularly, e.g. switch gear and motor control center, fuel station. Automatic fire extinguishing system such as inert gas shall be provided for CCR. Portable extinguishers of ABC powder or CO_2 shall be provided in important electrical area, diesel room, CCR, buildings and other required locations according to the local standard.

The safety health and welfare of persons employed in mines is regulated through the provisions of the Mines Act 1923. The legislation is a very comprehensive checklist for making the standard operating procedure before the commencement during and post mining operations. The core of compliance starts with the appointment of qualified mine manager holding statutory qualifications are laid down under Regulation 23 read with Section 15 of Mines Act 1923. All other provisions with health and occupational safety are very well elaborated in the act and rules ibid.

The firefighting plan includes following measures:

- The conventional fire extinguisher is only used on surface.
- The point of installation of fire extinguishers will be decided based on the vulnerability of the area to fire hazard.
- Explosives will not be allowed to use at site without permission of an authorized person.
- No gunpowder or any other kind of explosive, except fuses and detonators, shall be issued for use in blasting operations in a mine or used in a mine except in the form of cartridges.
- An adequate amount of ventilation shall be constantly produced in every mine to clear away smoke and to dilute and render harmless inflammable and noxious gases to such an extent that the working places of the shafts, levels and workings of mine, and the travelling roads to and from these working places, shall be in a safe state for persons working or passing therein.

8.8.2 Salient Features of Rehabilitation Plan

- **Objective**

To return the land to conditions capable of further mineral deposition and extraction scientifically.

- **Upbringing of Natural Habitats and Ecosystem**

The natural local environment will be maintained as far as possible by the least disturbance of soil other than mining operation and plantation of native flora.

- **Compliance with the PEQS**

Compliance with the PEQS will be strictly observed regarding generation of the emissions, effluents and wastes.

8.9 Governmental Approvals

The main govermental approval required in present case is Environmental Approval/ No Objection Certificate from Enviornmental Protection Agency (EPA), Government of the

Punjab for installation and operation of the project. For securing Enviornmental Approval, the proponent has filed this case with EPA, Punjab.

8.10 Equipment Maintenance Details

8.10.1 Objectives

The maintenance of equipment and machinery used during project activities is carried out to achieve following objectives:

- To avoid environmental pollution including dust issues, exhaust emissions, excessive noise an vibrations etc.
- To avoid any risk to health and safety of the workers including injuries.
- To avoid any hinderance and to ensure smooth operation of project activities.

8.10.2 Measures for Equipment Maintenance

Measures for the maintenance of equipment involve:

- All the machinery and vehicles will be inspected and monitored.
- Always keep a suitable fire extinguisher ready for emergency situations.
- Always keep a first aid box within the premises of the project site.
- Secure unbolted heavy parts or engines if necessary to leave the work.
- Monthly tuning, servicing and cleaning of machinery and vehicles.

9 INVOLVEMENT OF STAKEHOLDER'S/PUBLIC CONSULTATION

9.1 Introduction

Stakeholder's consultation is a tool used for communication with a diverse group of stakeholders having multifarious aims such as information dissemination, exchanging views, soliciting feedback and suggestions on issues pertaining to the project, plan future actions. This practice initiates a need assessment and identifies areas of concern for all the parties that maybe affected by the project activities.

Stakeholders by definition are all those people and institutions who have an interest in the successful design, implementation and sustainability of the project. This includes those positively and negatively affected by the project.

9.2 Benefits and Objectives of Stakeholder's Consultation

Consultation with stakeholders leads to an overall better understanding of the project on the part of the communities and gives the Proponent a clearer understanding of the stakeholders' perspective. Effective public consultation can add substantial value to the EIA study process. The information gained through public consultation on the stakeholders' concerns, interests, and their ability to influence decision-making helps identify key cause of environmental problems.

This can be used to evaluate direct and indirect environmental impacts and assess short term and long-term resource use implications. The input from local communities and NGOs can help evaluate alternatives and strengthen the management planning by incorporating local input and know-how.

An informed public will better understand the tradeoffs between project benefits and disadvantages; be able to contribute meaningfully to the project design; and have greater trust with the project Proponent and support for the project, says the Asian Development Bank. These factors contribute towards improved project implementation sensitized to the human environment of the area. The objectives of stakeholders' consultation are to:

- Promote better understanding of the proposed operation through explaining its objectives and its potential positive and negative impacts.
- Identify and address concerns of all interested and affected stakeholders.
- Provide a mechanism to resolve issues identified by communities, before project plans are finalized and development begins, thereby, avoiding public outcry and resentment.
- Instill trust between various stakeholders and the Proponent to promote cooperation.

9.3 Identification and Classification of Stakeholders

During the field survey, significant efforts were made to identify the possible categories of stakeholders and their stakes. Identification of stakeholders is important for the sustainability of a developmental project and helps to evaluate and envisage the role of stakeholders. The influence or impact of the project on stakeholders can be elaborated in the form of a matrix and the mitigation measures are proposed accordingly. All the stakeholders had different types of stakes according to their professions.

9.4 Methodology for Consultation

Stakeholder consultation is a two-way flow of information and dialogue between the project Proponent and stakeholders, specifically aimed at developing ideas that can help shape project design, resolve conflicts at an early stage assist in implementing solutions and monitor ongoing activities.

Various techniques are used worldwide to carry out the stakeholder consultation that includes discussions, meetings and field visits. A series of scoping sessions and formal focus group discussions were carried out with environmental experts and individuals. The meetings were held at various locations.

9.5 Summary of Concerns of Consulted Stakeholders

The summary of stakes of consulted stakeholders is given below:

- The activities of the project must be studied in detail to assess all the impacts resulting from the project.
- All the environmental parameters i.e. ambient air quality, noise levels and water quality must be kept within permissible limits of PEQS.
- Project specific mitigation measures must be implemented during project's lifecycle.
- A proper Environmental Management and Monitoring Plan should be prepared to reduce adverse environmental impacts.
- Waste management must be taken into consideration (if generated during project activities).
- Management practices suggested in EMMP for solid waste should be implemented during operation of the project.
- The findings of the EIA report must be incorporated into the design and planning phase of the project.
- The EIA report should be compiled appropriately according to reporting style as suggested in Guidelines/Checklist.
- The project holds a good economic circulation. The advantages of the project seem more than its disadvantages. Therefore, the project should be operational as soon as possible.

9.6 Affected and Wider Community

Social survey was conducted to consult with local community. Their concerns were noticed and discussed with proponent and their team. Majority was in favor of project their details are given below in **Table**

Table 9-1 Consultation with local government

Sr. No.	Name	Age	Education	CNIC	Phone Number	Address	Comments
1	M. Imran	40	Metric	NA	0340-7666248	Tobah	Job opportunities for local and environmentally friendly
2	M. Nadeem	35	Metric	NA	0344-6665220	Tobah	Job opportunities for local
3	M. Faraz	31	MSc	NA	0349-5606379	Tobah	Environmentally Friendly
4	Farooq	47	BSc	37202-13243179	0333-5424502	Tobah	Environmentally Friendly
5	M. Anas	26	BSc	37202-37744641	0343-5153770	Tobah	Job opportunities for local
6	M. Habib	26	Metric	42401-38453511	0345-2877137	Tobah	Job opportunities for local
7	Sakhawat Ali	46	Metric	37202-20423647	0331-3585233	Tobah	Roads to be built and Job opportunities for local
8	Ali Raza	32	Metric	37202-04223985	0343-5625551	Tobah	Roads to be built
9	M. Khursheed Awan	60	Metric	37202-12182689	0300-5494494	Tobah	Should be no dust and environmentally friendly
10	M. Arshad	62	Metric	37202-25031201	0344-5744034	Tobah	Should be no dust and Roads to be built
11	M. Fakhar	29	Metric	37202-885876933	0344-5784178	Tobah	Roads to be built
12	M. Arslan	26	Metric	37202-52833061	0341-0023997	Tobah	Should be water availability and roads must be built
13	M. Sageer	38	Metric	37202-51762813	0344-4543545	Tobah	Job opportunities for local
14	M. Nauman	30	MA	37202-53444484	0332-8548996	Tobah	Job opportunities for local on merit base
15	Syed Ali	23	Metric	37202-60368241	0342-1452425	Tobah	Should be water availability and roads must be built

16	Abdul Khakiq	22	Metric	NA	0341-1408644	Tobah	Roads to be built and Job opportunities for local
17	Farhan Ahmad	22	Metric	37202-78652905	0343-1562586	Tobah	Roads to be built and Job opportunities for local
18	Shams Abbas	34	Metric	37202-98511785	0345-5726572	Tobah	No Benefits of factory establishment
19	Mehram	22	Metric	37202-88431005	0343-6822609	Thati	No Benefits of factory establishment
20	Tehseen Al-Hassan	52	Metric	NA	0346-5783191	Thati	Job opportunities for local
21	Adil	28	Metric	NA	0341-7944174	Thati	Job opportunities for local
22	Umer Rafiq	17	Metric	NA	0349-1567908	Thati	Job opportunities for local
23	Naqi	30	Metric	37222-55914039	0345-5776960	Thati	Should be job opportunities for local, water and pollution issues must be resolved and no deforestation
24	Amir kaleem	47	BA	37202-20304527	0346-4465789	Thati	water and pollution issues must be resolved
25	Marawat Hussain	32	Metric	37202-4447286-7	0341-5493220	Thati	Water and pollution issues must be resolved
26	Faisal	28	Metric	37201-26663014	0341-5006163	Thati	Roads to be built and Job opportunities for local
27	Naveed Hussain	40	Metric	NA	0332-5108593	Thati	Job opportunities for local
28	Sultan Hussain	25	Metric	37202-43151757	0334-9974698	Bhelowal	Job opportunities for local
29	Usman Khan	18	FSc	37202-13213569	0344-5470607	Bhelowal	Job opportunities for local
30	Ahsan Rafiq	22	Metric	37202-67310263	0344-5778693	Bhelowal	Should be job opportunities for local, no dust pollution and environmentally friendly

31	Mutbar	28	Metric	15602-19887565	0343-0300775	Bhelowal	Roads to be built and Job opportunities for local
32	Saqib Ali	27	FA	37202-49859901	0349-570343	Bhelowal	Roads to be built and Job opportunities for local
33	Gulber	37	Metric	NA	NA	Bhelowal	Job opportunities for local
34	Kamal	24	Metric	15602-13076019	0344-9780098	Bhelowal	Roads to be built and Job opportunities for local
35	Faisal	25	Metric	37202-91976107	0344-5531707	Bhelowal	Job opportunities for local
36	Musawar Hussain	40	Metric	37202-20731867	0336-5814135	Bhelowal	Negative impact on environment and no jobs for local
37	Sana ullah	45	Metric	37202-38442077	0345-1091524	Bhelowal	Negative impact on environment and no jobs for local
38	Mukhtar	76	Metric	37202-89641601	NA	Bhelowal	Water and pollution issues must be resolved
39	Arslan	18	Metric	NA	0332-5796428	Bhelowal	Roads to be built and Job opportunities for local
40	Ahsan	18	Metric	37202-30699267	0333-1553113	Tobah	Roads to be built and Job opportunities for local
41	Saqib	25	Metric	38201-58458901	0341-5006163	Tobah	Roads to be built and Job opportunities for local
42	Arslan	24	Metric	37202-07128859	0345-1214295	Tobah	Roads to be built and Job opportunities for local
43	Saleem	59	Metric	NA	0342-4469013	Tobah	Job opportunities for local
44	Abdul haq	59	Metric	35501-12004885	0346-8575033	Tobah	Job opportunities for local
45	Amin Ullah	26	Middle	35602-14580289	0347-5945844	Tobah	Job opportunities for local
46	Imtiaz	42	Metric	NA	0333-5903970	Tobah	Should be job opportunities for local, no dust

							pollution and environmentally friendly

Pictorial evidence of the local consultation survey is given in the table below

Table 9-2 Pictorial Evidence of the survey


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10 CONCLUSIONS AND RECOMMENDATIONS

Following conclusions have been drawn from this EIA study and corresponding recommendations have been given.

- The cement production is very crucial for meeting increased construction demands at national as well as international level.
- All the positive and negative impacts resulting from the plant and mining operations have been studied in due detail on environmental settings. All the negative impacts have been given magnitude based on the defined criteria and scoring.
- Mitigation measures have been suggested for each negative impact resulting from plant activities.
- No wastewater will be generated during project activities. All the wastewater will be treated.
- Proper mitigations may be adopted in the preliminary design including safe and environmentally friendly disposal of solid waste.
- Physical impacts like soil contamination, water contamination, air pollution, high noise level, etc. are of temporary nature. However, during the operational stage by adopting abatement technologies and development of buffer zones and green areas, intensity of negative impacts can be minimized.
- All the baseline environmental parameters including ambient air and noise are well within the permissible limits of NEQS.
- There are no human settlements present within the vicinity of the project site. The settlements are away from coal mines at safer distances. All the sensitive receptors are at a safer distance from the project area.
- No forest area or wildlife sanctuary exists within the vicinity of the Project Area, which may be affected by the Project. Few reptiles like lizards and snakes will be disturbed by the Project activities and may have to move into nearby areas. This will be a temporary insignificant impact. Anyhow the outskirts blank area is to be covered with green trees so project site will not give barren look.
- The other social issues like safety of public and workers, security problems, community accessibility issue, women accessibility to fields for their daily routine life etc. will be of temporary nature.
- The mining activities will provide additional job opportunities to the community of the area. The project will raise the income levels of the population of the area.
- Social cohesion is optimal.
- The environmental cost is negligible.
- M/s Dhan Cement (Pvt.) Ltd. is committed to ensure eco-friendly, sustainable, safe and sound environment.

Although comprehensive mitigation measures have been proposed in the report to minimize the negative impacts and to enhance the positive impacts of the Project, however, major recommended mitigation measures are summarized as under:

- The mining site and the road links should adopt such measures and select such machinery and their operations to minimize the dust spread.
- Periodic monitoring on occupational health and safety must be conducted to avoid workplace hazards.
- Dust suppression machine should be available on each site for wetting of all the materials to avoid effects of dust such as respiratory diseases.
- All appropriate environmental management measures detailed in this report, together with any other environmental management commitments should be implemented throughout out the entire life of the project.
- Water contamination, air pollution and high noise levels will be controlled with the use of good engineering practices.
- Proponent will take due care of the local community and its sensitivity towards local customs and traditions.
- Environmental Management and Monitoring Plan proposed will be implemented in the true spirit throughout the lifespan of the project.
- Safety signs or boards will be placed wherever needed within the premises of the PA.
- Personal Protective Equipment (PPEs) will be provided and ensured that they are used by the workers during working hours. The workers working near the noise generating machines will be strictly required to use ear muffs/ plugs
- Proper measures will be taken to control the air emission or high noise levels.
- Transportation vehicles and equipment must be properly maintained and tuned well.
- Regular monitoring and auditing will be taken by the management to ensure the compliance of all the mitigation measures.
- Extensive plantation must be carried out throughout the tenure of lease as an environmental enhancement measure.
- Fire extinguishers or firefighting equipment will be provided at well notified points to cope with fire events.
- Good housekeeping will be ensured by the management.
- First aid medical facility will be provided at the project site.
- Environmental monitoring will be carried out by the company as suggested and communicated by EPA, Punjab.

APPENDICES

Appendices-I: Glossary

Act means the Pakistan Environmental Protection Act, 1997.

Contaminationis introduction of impurities in the environment.

Environment means (a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the inter-relationships between any of the factors in sub-clause (a) to (f).

Environmental Assessment a technique and a process by which information about the environmental effects of a project is collected, both by the developer and from other sources, and taken into account by the planning authority in forming their judgments on whether the development should go ahead.

Environmental Management to carry out the developmental activities in sustainable manner.

Impact on Environment means any effect on land, water, air or any other component of the environment, as well as on wildlife harvesting, and includes any effect on the social and cultural environment or on heritage resources.

Mitigation Measures means the measures for the control, reduction or elimination of an adverse impact of a development on the environment, including a restorative measure.

Project Proponent is a person, company, NGO or any agency that sponsors and promotes a project.

Regulations means the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environment Impact Assessment Regulations, 2000.

Pollution means the presence in the environment or the introduction into it, of substances that have harmful or unpleasant effects.

Social Cohesion is defined as the willingness of members of a society to cooperate with each other in order to survive and prosper.

Screening is the first step of IEE/EIA study. It helps in determining whether a project requires an IEE or EIA.

Sensitive Receptors include, but are not limited to, hospitals, schools, daycare facilities, elderly housing and convalescent facilities. These are areas where the occupants are more susceptible to the adverse effects of exposure to toxic chemicals, pesticides, and other pollutants.

Afforestation is the planting of trees on land which was formerly used for land uses other than forestry is called afforestation.

Portland Cement is cement manufactured from chalk and clay which hardens under water and when hard resembles Portland stone in color.

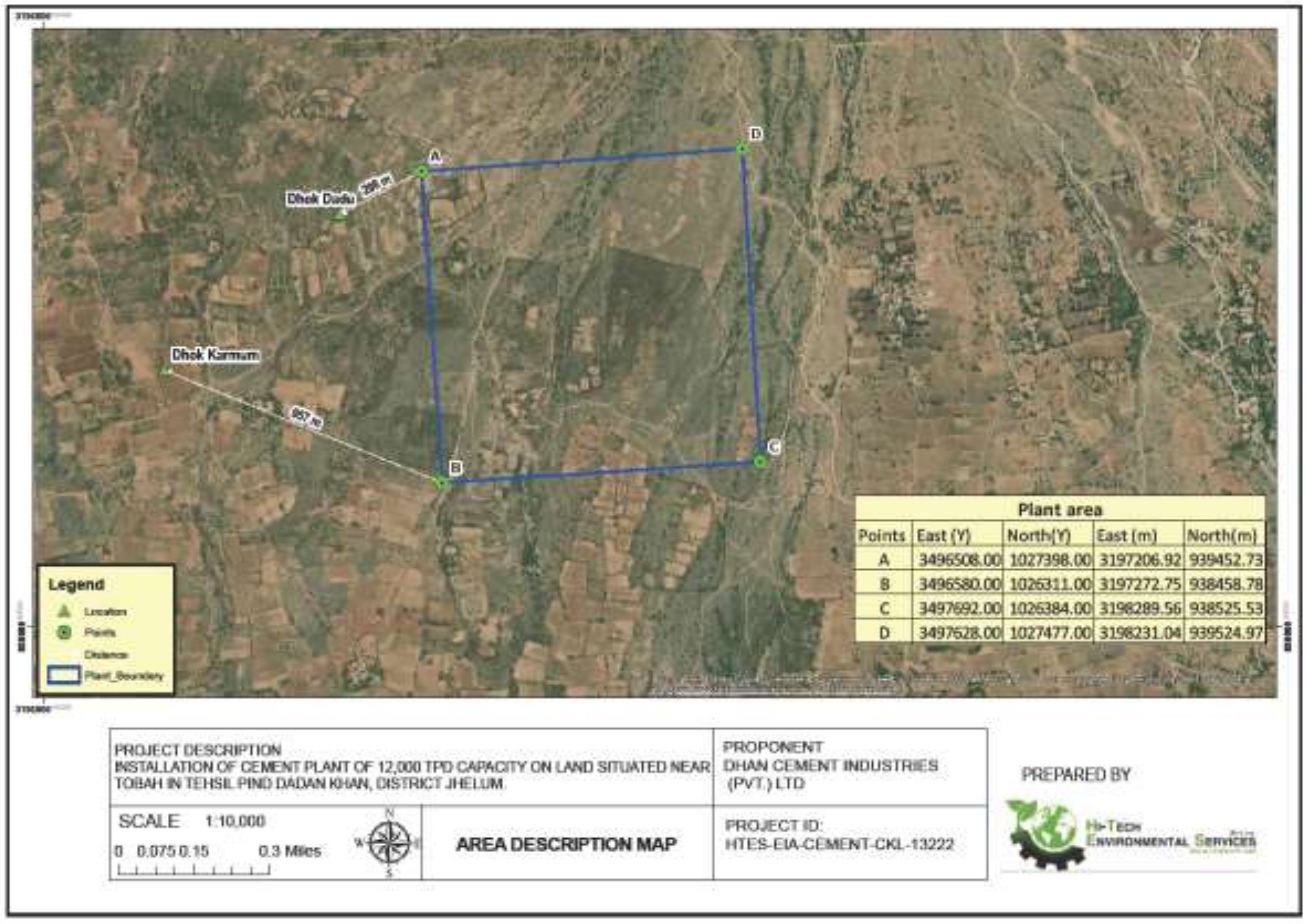
Marl or marlstone is a calcium carbonate or lime-rich mud or mudstone which contains variable amounts of clays and silt.

Cement Clinker is a solid material produced in the manufacture of Portland cement as an intermediary product.

Appendices-II: List of Abbreviations

NCS	National Conservation Strategy
NOC	No Objection Certificate
EA	Environmental Approval
OHS	Occupational Health and Safety
MICS	Multiple Indicator Cluster Survey
mm	Millimeters
EPA	Environmental Protection Agency
IEE	Initial Environmental Examination
NEQS	National Environmental Quality Standards
EMP	Environmental Management Plan
EMP	Environmental Monitoring Plan
GOP	Government of Pakistan
km	Kilometer
m	Meters
NGO	Non-Governmental Organization
BDL	Below Detection Limit
SWM	Solid Waste Management
TMA	Tehsil Municipal Authority
PPC	Pakistan Penal Code
PEPA	Pakistan Environmental Protection Act
NDWQS	National Drinking Water Quality Standards
LAA	Land Acquisition Act
sq mi	Square Miles
PPE	Personal Protective Equipment
MMD	Mines and Minerals Department
CSR	Corporate Social Responsibility
KHB	Khushab
M. Tons	Metric Tons
in	Inches
GLS	Ground Level Surface
MTa	Metric Tons Annually
TPD	Tons Per Day
HSE	Health Safety and Environment
CKL	Chakwal

Appendices-III: Environmental Map



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- Topographical Maps of Punjab.
- Punjab Environmental Quality Standards for Noise.
- The Canal and Drainage Act, 1873.
- The Punjab Plantation and Maintenance of Trees Act, 1974.
- The Punjab Wildlife (Protection, Preservation, Conservation and Management) Act and Rules, 1974.
- Information and data provided by the project proponent.
- Technical design data related to the project.
- Information gathered through discussions with the project related persons of the project proponent.
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Appendices-V: Terms of Reference of Environmental Reports

TERMS OF REFERENCE FOR EIA REPORT

The agreement hereinafter called Agreement, is made between M/s Hi-Tech Environmental Services (Pvt.) Ltd. (Consultancy Firm/Consultant) and M/s Dhan Cement Industries (Pvt.) Ltd. (Client) to prepare and carry out follow up of Environmental Study Report for obtaining Environmental approval under Section 12 of Punjab Environment Protection Act 1997 (Amended 2012) for proposed project of "*ESTABLISHMENT OF CEMENT PLANT OF 12,000TPD CAPACITY NEAR TOBAH, DISTRICT JHELUM, PUNJAB*".

The client has requested the consultancy firm to provide consultancy service to prepare and follow up of EIA Report and so that client may obtain Environmental Approval from EPA, Punjab under the Section 12 of PEPA 1997 (As Amended 2012) so mutually agreed terms and conditions are as under:

NOW THEREFORE, the parties here to hereby agree as follow:

- The client shall provide assistance and access to the information contained in the feasibility study, layout plan and other project relevant documents as and when required by the consultancy firm/consultant for performance of his obligations.
- The client shall provide all available data, maps, reports, etc. about the project including but not limited to layout plan of the project. Client will provide Lab Test Reports from EPA certified lab including noise level monitoring, wastewater analysis and air emissions report or any report/document/information demanded by the EPA.
- The client will provide to the consultancy firm with the letter of introduction and authorization and other documents as may be needed to enable consultancy firm consultant to perform the service.
- Responsible to pay all the dues of the consultants as per the agreed terms and conditions.
- The consultancy firm/consultant shall carry out the services in accordance with the provisions of the agreement including:
- Shall follow up the EIA Report and other file required with due diligence necessary/required for obtaining its approval from EPA Punjab under the statutory requirements of PEPA 1997 (amended in 2012).
- Shall give the consultancy for the preparation of the detailed Environmental Management & Monitoring Plan for enhancing the environmental conditions during installation and operational phases such as mitigation measures for wastewater, solid waste, air emissions, plantation, management of surface runoff, mitigation of socially adverse impact, if any.
- Will evaluate all the activities during the installation and operational phases and

recommend suggestions/actions to comply with PEQS.

- Will follow up the EIA Report and file documents considering information/documents provided by the client.
- Shall examine the entire activities and list of the details of activities likely to cause adverse impacts during and after installation phase.
- Shall suggest mitigation measures for all such activities which may cause adverse impacts.

For and Behalf of

M/s Hi-Tech Environmental Services (Pvt.) Ltd.
(Consultancy Firm/Consultants)

For and Behalf of

M/s Dhan Cement Industries(Pvt.) Ltd.
(Proponent)

Appendices-VI: Consultant Team

Hi-Tech Environmental Services (Pvt.) Ltd. is a business entity managed by geoscientists and environmental experts. The company has the expertise of highly diversified experience and has completed a total of more than 150 environmental studies across Punjab. The consultant has a range of expertise available in following areas:

l) Economic Geology
m) Determination of geological exploratory techniques and mine design
n) Preparation of feasibility reports, IEE report, EIA reports, Development Schemes & Prospecting Scheme.
o) Preparation of Environment Management Plans
p) Preparation of reports on HRD /Mines Rescue &Recovery.
q) Assessment of Impact of mining on environment and mitigating measures.
r) Mine surveying & interpretation of boundary disputes.
s) Legal opinion on mine regulatory regime.
t) Energy fuels and selection of choice fuels for specific energy
u) Drilling and blasting for underground and surface mining techniques.
v) Safety measures for mines operation.

Contact Details	
Consultant Company	Hi-Tech Environmental Services (Pvt.) Ltd.
Address	26- B Zahoor Elahi Road, Gulberg II, Lahore
Representative	Advocate Chaudhry Awais Ahmed
e-Mail	consultantshtma@gmail.com | info@hitechma.com

The team carrying out the research project is presented in the Table:

Sr.	Name	Qualifications & Brief Experience	Roles Assigned
1	M. Hamza Tariq	Environmental Scientist BS Hon. Environmental Science	• Preparation of Environmental Management Plan (EMP) • Preparation of Environmental Monitoring Plan (EMP) • Author of EIA Report
2	Engr. Maryam Nazir	Mining Engineer and GIS Management B.Sc. Mining Engineering	• Author of EIA Report • Development of Maps
3	Ch. Awais Ahmad	LLM (London)	• Site Visits • Legal Reviews • Coordination with Locals
4	Engr. Harris Naeem	B.Sc. Mining Engineering	• Mining Techniques

Appendices-VIII: Lab Reports

ENVIRONMENTAL PROTECTION AGENCY
GOVERNMENT OF THE PUNJAB
National Hockey Stadium, Gate No. 08
Gaddafi Stadium Complex, Lahore

Validation Performa for Wastewater & Drinking Water

Project / Unit Name with Address and contact details	Dhan Cement Industries Pvt Ltd.
Validation No.	
Name of Private Lab	ESPAK

Waste Water (WW) Treatment facility: Primary / Secondary / Tertiary / NA
Drinking Water (W) Treatment Facility: Chemical / RO / NA
Total GW collected Sample: 01
Total Collected Drinking water samples:

Sample Tag for testing parameter is assigned on sample container	Yes	NO	NA
Sample is preserved properly	Yes	NO	NA
Sample size is adequate for testing the target parameters	Yes	NO	NA
Wastewater Flow Measurement performed	Yes	NO	NA

No. of Waste Water outlets	Waste Water Flow m³/hr from each outlet	Water Intake m³/hr	Water Mass balance complied during sampling (Yes / No)	Water flow Measurement Method	Sample Type (Grab / Composite)
					Ground

Parameter	Matrix W	Matrix WW	Container	Sample Size	Preservation	Yes	NO	NA
Coliform, Total or Fecal	✓		Sterile Container	100 mL	Refrigerate 0 C	✓		
Coliform, Total or Fecal, Chlorinated Water	✓		Sterile Container	100 mL	0.008% Thiosulphate & cooled 6 C	✓		
Color, Turbidity	✓		P,G	500 mL	Cool 6 C	✓		
Hardness, Total	✓		P,G	500ml	HNO3 to pH<2	✓		
Nitrogen, Nitrate + Nitrite, Phenolic Compounds, Oil & Grease, COD, NH3	✓		P,G	2000 mL	H2SO4 to pH < 2, Cool 6C			
Metals, General	✓		P,G Rinsed HNO3	500 mL	HNO3 to pH < 2			
Cyanide, Total	✓		P,G	500 mL	NaOH to pH > 12, Cool 6C			
Pesticides, General	✓		Glass	1 Liter	Cool 6 C			

Field parameter measurement

Field parameter		pH meter, Model Make	Method	Calibrated in Field (Yes / NO)	Measured value
pH		Hanna	electrode	Yes / NO	
Temp		Thermometer			
Cl2					

Remarks: Sample representativeness for testing & analysis

Sample Repressiveness

For W	Poor	Good	Very Good	Excellent
For WW	Poor	Good	Very Good	Excellent

Signature
Research Officer
Environment Protection Agency
Punjab, Lahore

Dated
08/10/2022

Signature
Name of the Analyst
Designation
ESPAK

Environmental Services Pakistan (Pvt.) Ltd. Tel: +92 42 35154012

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ENVIRONMENTAL PROTECTION AGENCY
GOVERNMENT OF THE PUNJAB
National Hockey Stadium, Gate No. 08
Gaddafi Stadium Complex, Lahore

Validation for Stack & Ambient Monitoring / Sampling

Emission Monitoring under CTM-34 or OTM-39				
Facility Name & Address Phone	Dhan Cement Industries Pvt Ltd.	No of Stacks /Sampling Point		
	Near Tobah, Tehsil Pind dadan Khan, District Jhelum.			
Industry Category	Base line study			
Analyzer Model & Make				
Average stack emission Values of CO, NOx (in mg/nM3)				
Excess Air / Excess Oxygen (%age):-				
Analyzer exposed for Ramp-Up phase to the sample gas for 5 minutes		Yes	NO	NA
Analyzer flow rate and EC temperature monitored during calibration and testing		Yes	No	NA
Test Data Phase of sample gas recorded with 15 second interval		Yes	No	NA
All key requirements to ensure QA/QC complied for said EPA approved Method		Yes	No	NA
Particulate Matter (PM) Monitoring / Sampling under USEPA Method 5 / 17				
Model & Make of Iso-kinetic PM Assembly				
The PM sampling train is complete as per Method 5 & 17		Yes	No	NA
Leak Test performed prior to sampling		Yes	No	NA
Field data Sheet for PM Sampling filled during PM sampling		Yes	No	NA
Data for determining of "K" factor & DGM "Y" Factor filled during sampling		Yes	No	NA
All method key requirements during sampling were compiled to ensure QA/QC		Yes	No	NA
Filter of Particulate matter is suitable for metal Testing		Yes	No	NA
SOx sampling as per Method 8 (Thorin Indicator Method)				
The right absorbent solution are available for SOx Sampling		Yes	No	NA
The equipment is capable to maintain flow rate @ 2.0LPM or as per method 8 requirement		Yes	No	NA
Sampling for SOx is performed as per method		Yes	No	NA
Ambient Air Quality Monitoring by Automatic Monitors for CO, O3, SO2, NOx, PM2.5 & PM10				
In case of continuous monitoring at a site, One Point QC Check Single analyzer & Zero/span check is performed every 14 days.		~~Yes~~	No	NA
The CE of NOx analyzer is ensured to be maintained within 96% - 104.1%		~~Yes~~	No	NA
Zero/span check is performed prior to starting ambient monitoring		Yes	No	~~NA~~
All key requirements for Critical & Operational Criteria for ambient air monitoring by automatic monitors were compiled during monitoring		~~Yes~~	No	NA
The measuring techniques of monitors comply PEQS		~~Yes~~	No	NA
Ambient Air Sampling of SPM, PM10, Pb by High Volume Sampler				
In case of Sampling for SPM through samplers, the flow rate of sampler comply PEQS (1.1m3/min).		~~Yes~~	No	NA
Calibration of Sampler performed prior to sampling		Yes	No	~~NA~~
~~Vehicular Emissions~~ & Noise Measurement				
Sampling of Vehicle emissions and noise measurement have been performed as per method and SOPs		~~Yes~~	~~No~~	~~NA~~

Remarks (If Any):-

Dated 8/10/2022

Signature

Name of Assistant/Deputy Analyst

Research Officer
Environment Protection Agency
Punjab Lahore

Environmental Services Pakistan ESPAK Tel: +92 42 35154012-17

ENVIRONMENTAL SERVICES PAKISTAN

ESPAK

CHEMICAL ANALYSIS TEST REPORT (AMBIENT AIR)

Reference Number:	ESPAK/525P/22/AA/4695/00471	**Date:**	11/10/2022
Name of Industry/Client:	Dhan Cement Industries (Pvt) Ltd.		
Address:	Near Tobah, Tehsil Pind Dadan Khan, District Jhelum		
Validation Officer:	Muhammad Nadeem		
Nature of Sample:	Ambient Air	**Monitoring Location:**	Mid Point of Site (GPS: 32°37'40.36"N, 72°51'3.48"E)
Date of Sample Collection:	08/10/2022	**Grab / Composite:**	21 Hours- Continuous
Sample Collected/Sent By:	Nadeem Malik, Analyst (Field), ESPAK		
Date of Completion of Analysis:	09/10/2022		

S. No	Parameters	Limit Values (PEQS-24 Hours)	Concentration	Method / Equipment Used	Remarks
1	Carbon Monoxide (CO)	5 mg/m³ (8 Hours)	1.3 mg/m³	Non Dispersive Infrared Absorption (NDIR)	Within Prescribed Limits
2	Sulfur Dioxide (SO_2)	120 µg/m³	13.3 µg/m³	UV Fluorescence (UVF)	Within Prescribed Limits
3	Ozone (O_3)	130 µg/m³ (1 Hour)	34.5 µg/m³	Non Dispersive UV Absorption	Within Prescribed Limits
4	Oxides of Nitrogen as NO	40 µg/m³	12.4 µg/m³	Chemiluminescence Detection	Within Prescribed Limits
5	Oxides of Nitrogen as NO_2	80 µg/m³	20.3 µg/m³	Chemiluminescence Detection	Within Prescribed Limits
6	Particulate Matter $PM_{2.5}$	35 µg/m³	34.4 µg/m³	Particulate Sensor	Within Prescribed Limits
7	Particulate Matter PM_{10}	150 µg/m³	148 µg/m³	Particulate Sensor	Within Prescribed Limits

PEQS: Punjab Environmental Quality Standards for Ambient Air, 2016

- Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report, is based on the decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

Note:

The report should be reproduced as a whole and not in parts.
The responsibility of the ethical use of this report lies with the client.
The values represent sample conditions when monitoring/testing was carried out.
The report data is not intended to be used legally by the client.
Only parameters marked with asterisk (*) are ISO 17025:2017 accredited.

1. **Sample Analyzed By:** Nadeem Malik, Analyst (Field)
2. **Name of Chief Analyst with Seal:** Muhammad Arfan
3. **Signature of Incharge of the Environmental Laboratory:**

Name: Imran Malik
General Manager
Date: 11/10/2022

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End of Report

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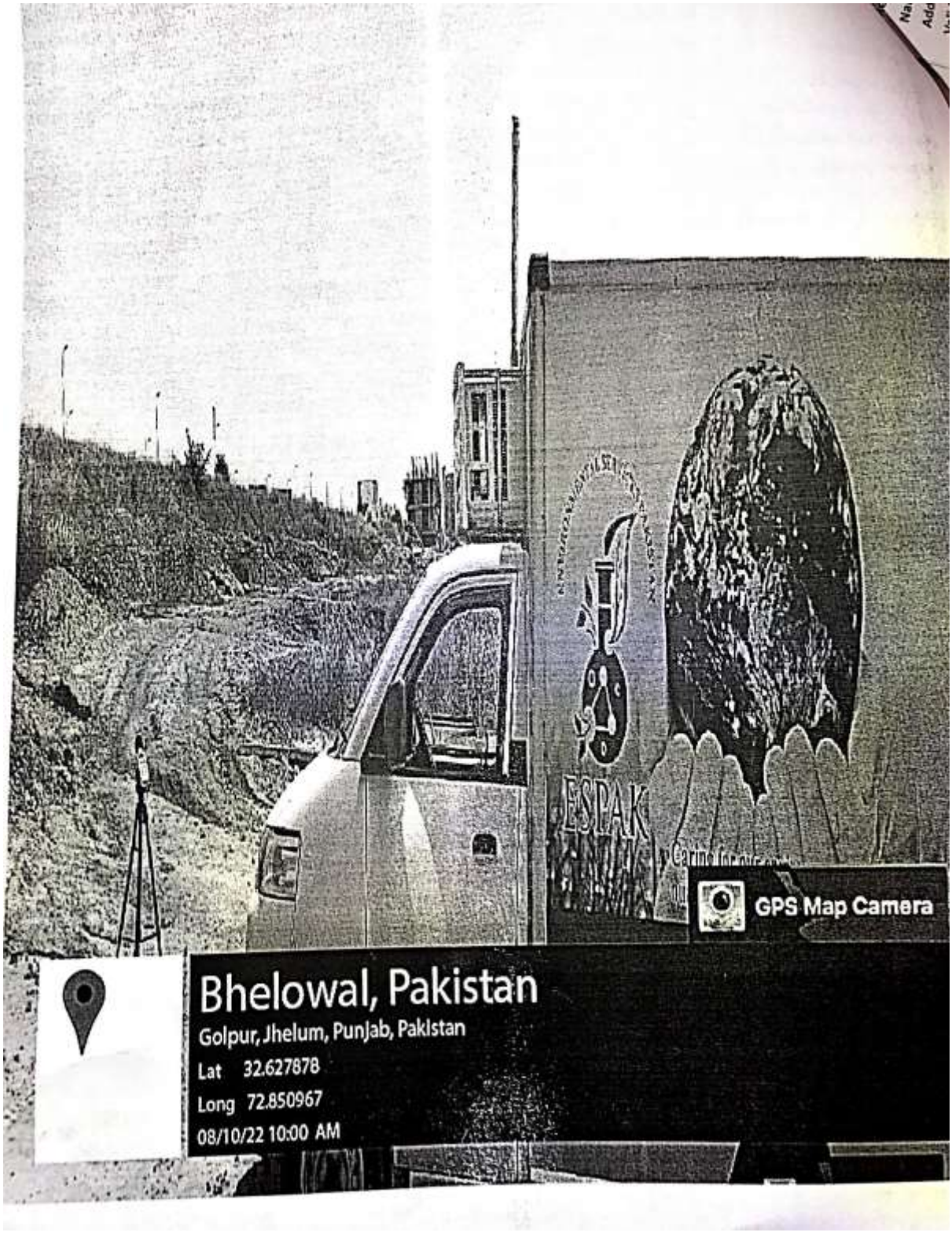
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Golpur, Jhelum, Punjab, Pakistan
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Long 72.850967
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PAK EPA & PUNJAB EPD CERTIFIED

ESPAK

NOISE MONITORING REPORT

Reference Number: ESPAK/525P/22/N/4696/00435 **Date:** 11/10/2022

Name of Industry/Client: Dhan Cement Industries (Pvt) Ltd.

Address: Near Tobah, Tehsil Pind Dadan Khan, District Jhelum

Validation Officer: Muhammad Nadeem

Nature of Sample: Noise

Date of Sample Collection: 08/10/2022 **Grab / Composite:** 24 Hours- Continuous

Sample Collected/Sent By: Nadeem Malik, Analyst (Field), ESPAK

Date of Completion of Analysis: 09/10/2022

Method/Equipment Used: Sound Level Meter

S. No	Measurement Point	Limit Values (PEQS)	Noise Level in dB(A) Leq	Remarks
1	Mid Point of Site (GPS: 32°37'40.36"N, 72°51'3.48"E)- Day Time	75 dB(A)	64 dB(A)	Within Prescribed Limits
2	Mid Point of Site (GPS: 32°37'40.36"N, 72°51'3.48"E)- Night Time	65 dB(A)	57 dB(A)	Within Prescribed Limits

Punjab Environmental Quality Standards for Noise in Industrial Area, 2016 Day Time Hours (6:00 am to 10:00 pm), Night Time Hours (10:00 pm to 06:00 am).

- Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report, is based on the decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

Note:

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1. **Sample Analyzed By:** Nadeem Malik, Analyst (Field)
2. **Name of Chief Analyst with Seal:** Muhammad Arfan
3. **Signature of Incharge of the Environmental Laboratory:**

Name: Imran Malik
General Manager
Date: 11/10/2022

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---------- End of Report ----------

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ESPAK

CHEMICAL ANALYSIS TEST REPORT (GROUND WATER)

Reference Number: ESPAK/525P/22/GW/4697/01026 **Date:** 12/10/2022

Name of Industry / Client: Dhan Cement Industries (Pvt) Ltd.

Address: Near Tobah, Tehsil Pind Dadan Khan, District Jhelum

Validation Officer: Muhammad Nadeem

Nature of Sample: Ground Water

Date Sample Received: 10/10/2022 **Grab / Composite:** Grab

Date of Sample Collection: 09/10/2022

Sample Collected / Sent By: Nadeem Malik, Analyst (Field), ESPAK

Date of Completion of Analysis: 12/10/2022

S. No	Parameters	Limit Values (DW-PEQS)	Concentration	Method / Equipment Used	Remarks
1	Total Coliforms	----	ND	SMWW 9221 B	----
2	E. Coli	Must not be detectable in any 100mL Sample	ND	SMWW 9221 F	Within Limits
3	Color	≤15 TCU	Nil	SMWW 2120 C	Within Limits
4	Taste	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
5	Odor	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
6	Turbidity	<5 NTU	0.3 NTU	SMWW 2130B	Within Limits
7	Total Hardness as $CaCO_3$*	<500 mg/L	89 mg/L	SMWW 2340C	Within Limits
8	Total Dissolved Solids (TDS)*	<1000 mg/L	425 mg/L	SMWW 2540C	Within Limits
9	pH*	6.5-8.5	7.2	SMWW 4500H+B	Within Limits
10	Nitrate (NO_3^-)	≤50 mg/L	3.1 mg/L	SMWW 4500NO_3^-B	Within Limits
11	Nitrite (NO_2^-)	≤3 mg/L	ND	SMWW 4500NO_2^-B	Within Limits
12	Residual Chlorine	0.2-0.5 mg/L	ND	SMWW 4500-Cl B	----
13	Chloride (as Cl^-)*	<250 mg/L	21 mg/L	SMWW 4500Cl^-B	Within Limits
14	Fluoride (F^-)*	≤1.5 mg/L	0.2 mg/L	U.S. EPA 9214	Within Limits
15	Phenolic Compounds (as Phenols)	NGVS	ND	SMWW 5530 C	----
16	Cyanide (CN^-)	≤0.05 mg/L	ND	SMWW 4500 CN^- F	Within Limits
17	Cadmium (Cd)*	0.01 mg/L	ND	U.S. EPA-200.7	Within Limits
18	Chromium (Cr)*	≤0.05 mg/L	ND	U.S. EPA-200.7	Within Limits
19	Copper (Cu)*	2.0 mg/L	ND	U.S. EPA-200.7	Within Limits
20	Lead (Pb)*	≤0.05 mg/L	ND	U.S. EPA-200.7	Within Limits
21	Mercury (Hg)	≤0.001 mg/L	ND	U.S. EPA-200.7	Within Limits
22	Nickel (Ni)*	≤0.02 mg/L	ND	U.S. EPA-200.7	Within Limits
23	Zinc (Zn)*	5.0 mg/L	ND	U.S. EPA-200.7	Within Limits

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Golpur, Jhelum, Punjab, Pakistan
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PAK EPA & PUNJAB EPD CERTIFIED

CHEMICAL ANALYSIS TEST REPORT (GROUND WATER)

Reference Number: ESPAK/525P/22/GW/4697/01026 **Date:** 12/10/2022

Name of Industry / Client: Dhan Cement Industries (Pvt) Ltd.

S. No	Parameters	Limit Values (DW-PEQS)	Concentration	Method / Equipment Used	Remarks
24	Arsenic (As)*	≤0.05 mg/L	ND	U.S. EPA-200.7	Within Limits
25	Barium (Ba)	0.7 mg/L	ND	U.S. EPA-200.7	Within Limits
26	Aluminum (Al)	≤0.2 mg/L	ND	U.S. EPA-200.7	Within Limits
27	Manganese (Mn)*	≤0.5 mg/L	ND	U.S. EPA-200.7	Within Limits
28	Boron (B)	0.3 mg/L	0.1 mg/L	U.S. EPA-200.7	Within Limits
29	Fecal Coliform Bacteria	Must not be detectable in any 100mL sample	ND	SMWW 9221 F	Within Limits
30	Antimony (Sb)*	≤0.005 mg/L	ND	U.S. EPA-200.7	Within Limits
31	Selenium (Se)	0.01 mg/L	ND	U.S. EPA-200.7	Within Limits

DW-PEQS: Punjab Environmental Quality Standards for Drinking Water, 2016
SMWW: Standard Methods for the Examination of Water and WasteWater 23rd Edition, American Public Health Association, American Water Works Association, Water Environment Federation USA (2017)
USEPA: United States Environmental Protection Agency
NGVS: No Guideline Value Set
ND: Not Detected

Laboratory tests and measurements were carried out at 25 ± 2 °C and 50 ± 10 % Relative Humidity conditions unless stated otherwise.
Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report, is based on the decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

Note:
The report should be reproduced as a whole and not in parts.
The responsibility of the ethical use of this report lies with the client.
The values represent sample conditions when monitoring/testing was carried out.
The report data is not intended to be used legally by the client.
Only parameters marked with asterisk (*) are ISO 17025:2017 accredited.

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Name: Imran Malik
General Manager
Date: 12/10/2022

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---------- End of Report ----------

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PNAC LAB-213

Appendices-IX: Plantation Estimates

The green belt development not only functions as foreground and background landscape features resulting in harmonizing byamalgamating the physical structures of project site with surrounding environment but also helps as pollution sink.

- **Objectives**

It is necessary to develop green belt in and around the project site with suitable plant species to achieve following objectives:

- To combat the air pollution effectively.
- To improve the quality of local as well as regional air.
- To avoid problems of soil erosion, noise and dust etc.

There will be no tree cutting at site due to project operations. Hence, there will be no disturbance to vegetation. In addition, the proponent will do plantation as a potential environmental enhancement measure.

Following plantation plan will be followed during project's lifecycle.

Item	Description
Spacing between two plants	2.0m×2.0m
Total plantation duration	Till Project Tenure
Total no. of saplings planted	100/- No.s.
Species of plants may be planted	Ornamental Plants/Indigenous Species

Noted that the plantation will start from first year and will only be carried out till project period subjected to the agreement between proponent and consultant and consent of the landowner.

- **Criteria for Selection of Plants Species**

The plant species will be planted based on their ease of availability in the local market and their suitability of growth in the project area. Mostly indigenous species will be preferred.

Appendices-X: Cement Plant Layout