SITE-SPECIFIC ENVIRONMENT MANAGEMENT PLAN (SSEMP)

Loan 4099-Pak: Central Asia Regional Economic Cooperation (CAREC) Corridor Development Program – Tranche-II Project

Contract No: OCB/CAREC/T-II: Construction of Additional Carriageway from Shikarpur to Rajanpur Of N-55 (221.95 Km) Under One Package Comprising Four Lots

Tranche-II: Lot-2 : kandhkot-Kashmore Section (km 105+820 to km 164+600) Length 58.78km

Funding Agency: Asian Development Bank (ADB)

Executing Agency:

Project Management Unit (PMU) -CAREC/T-II
National Highway Authority (NHA)

Project Consultant:

- Minconsult SDN. BDH- Malaysia
- Creative Engineering Consultant (CEC)
- Asif Ali & Associate Pvt. Ltd (AAA)
- Associate Consulting Engineers (ACE)
- Associated Consultancy Center (ACC)
- AA Associate Pvt. Ltd

Project Contractor:

- China Civil Engineering Construction Corporation (CCECC)

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Abbreviations	
ADB	Asian Development Bank
CO	Carbon monoxide
CSSP	Construction Safety and Security Plan
dB	Decibels (A measure of audible noise)
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ERC	Emergency Response Coordinator
ERT	Emergency Response Team
ES	Environment Specialist
GOP	Government of Pakistan
GRM	Grievance Redress Mechanism
HSE	Health, Safety and Environment
ICB	International Competitive Bidding
KM	Kilometer
L/S	Left Side
SDS	Safety Data Sheet
NOC	No Objection Certificate
NO_x	Oxides of Nitrogen
PD	Project Director
SEQS	Sindh Environmental Quality Standards
PM	Project Manager
NHA	National Highway Authority
$PM_{2.5}$	Particulate Matter of 2.5 micron
PM_{10}	Particulate Matter of 10 microns
PIU	Project Implementation Unit
PPE	Personal Protective Equipment
ROW	Right of Way
RD	Reduce Distance
RE	Resident Engineer
R/S	Right Side
RTA	Road Traffic Accidents
SC	Supervision Consultant
SPM	Suspended Particulate Matter
SSEMP	Site Specific Environmental Management Plan
SOx	Oxides of Sulphur
SWMP	Solid Waste Management Plan
TBT	Tool Box Talk
CCECC	China Civil Engineering Construction Corporation

1 INTRODUCTION

1. The site-specific environmental management plan (SSEMP) for construction of additional carriageway from Kandhkot to kashmore at N-55 (total length 58.78 km) identifies the principles, approach, procedures and methods, that will be used to control and minimize the environmental and social impacts during the instant project execution. This SSEMP also explains the purpose, procedures and responsibilities associated with implementation of Lot-2 project.

2. In compliance with the ADB SPS 2009, the contractor is liable to submit the site-specific environment management plan before the start of the project implementation.

3. This SSEMP has been compiled for the Construction Additional Carriageway from Kandhkot - Kashmore Section (from km 105+820 to km 164+600 [58.78 km]) Lot-2.

1.1 Location of the Project:

4. The CAREC Lot-2 subproject starts from Kandhkot to Kashmor in Sindh province. The google coordinates of the project site are given below:

   - Point A Start Point = Kandhkot 28^0 22'63 N, 69^0 17'01 E
   - Point B End Point = Kashmore 28^0 28'41 N, 69^0 39'53 E

5. The figure 1-1 below shows the project location map of Lot 2 kandhkot to Kashmore section.

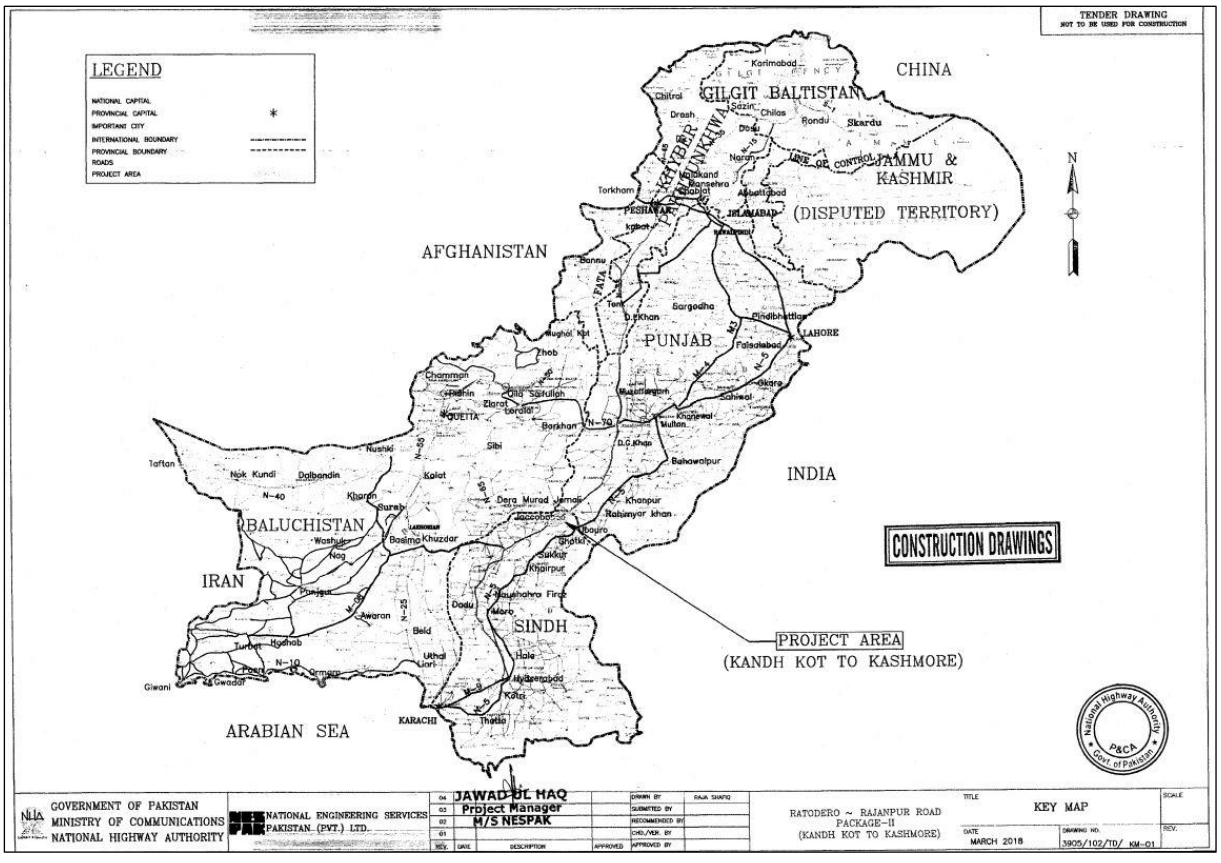


Figure 1-1(a) : Project location Map of Lot 2 Kandhkot to kashmore section.

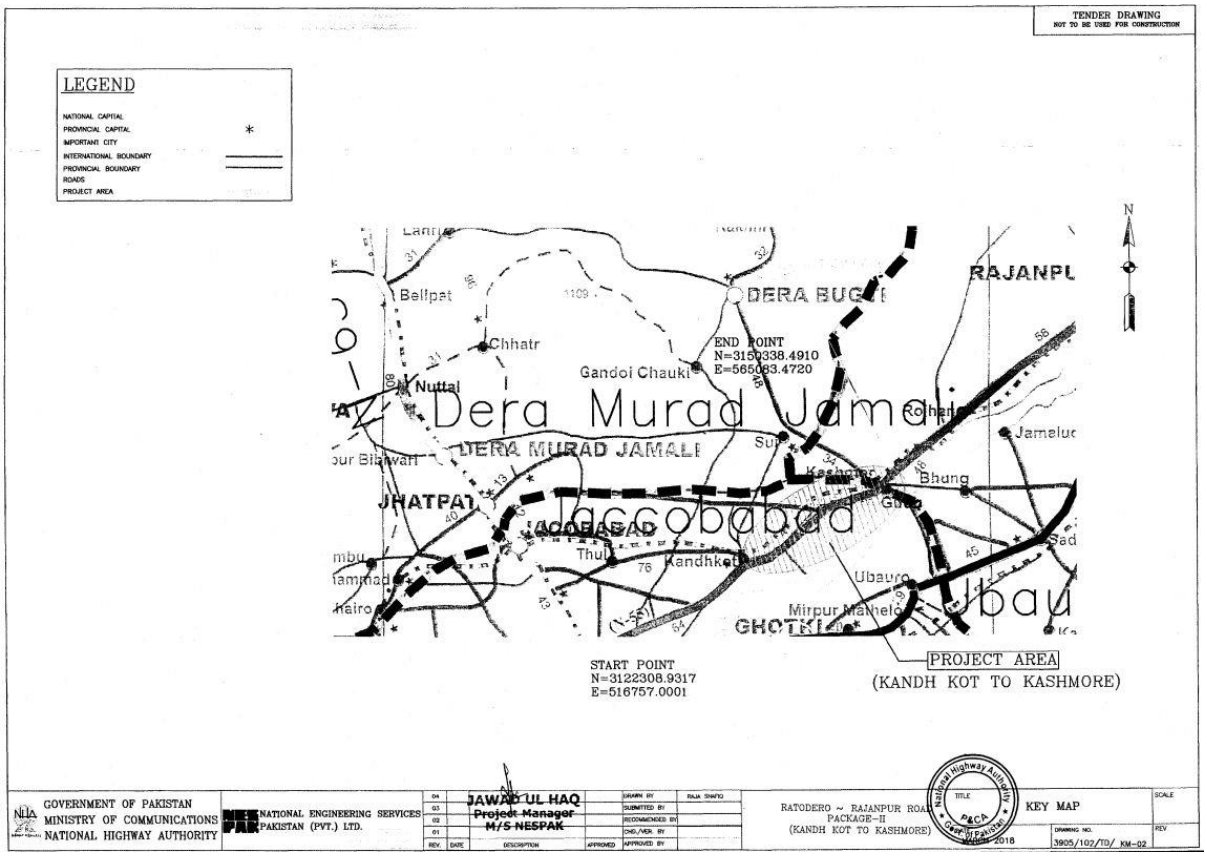


Figure 1-1 (b) : Project location Map of Lot 2 Kandhkot to kashmore section.

1.2 Donor Agency:

6. The Asian Development Bank (ADB) is the financing agency for the subproject of Tranche 2, Lot-2.

1.3 Project Administration:

7. The overall project management of the Tranche 2, Lot-2 is detailed as below:

1.3.1 Executing Agency Details:

8. Tranche 2, Lot 2 (km 105+820 to km 164+600) subproject is being managed by the Project Management Unit (PMU) of National Highway Authority (NHA) table 1-1.

Table 1-1: Correspondence Details of Executing Agency

Executing Agency Details	Information
Name of EA	National Highway Authority (NHA) Ministry of Communications of Pakistan. (Federal Government of Pakistan)
Head Office Address	28 Mauve Area, Sector G-9/1, Kashmir Highway, Service Road South, G 9/1 G-9, Islamabad.
Project office: Site office Address	NHA Complex Airport Road Sukkur.

1.3.2 Construction Supervision Consultants:

9. The Construction Supervision Consultant is a joint venture of various companies as given in table 1-2. M/s Minconsult Sdn. Bhd-Malaysia is the lead firm that will serve as supervision consultants for the instant project.

Table 1-2: Correspondence Details Supervision Consultant

Supervision Consultant	Information
Name of Consultants	M/s Minconsult Sdn. Bhd-Malaysia (lead Firm) JV of • Asif Ali & Associate Pvt.Ltd (AAA), • Creative Engineering Consultant (CEC), • Associate Consulting Engineers (ACE), • AA Associate Pvt Ltd & • Associated Consultancy Center (ACC) Pvt Ltd.
Head Office Address	Apartment # 12, Al-Safa Heights 2 Street No. 73 Sector F-11/1, Islamabad
Site office Address	CCECC camp Lot-2,Indus Highway N-55, Kandhkot.

1.3.3 Project Contractor:

10. China Civil Engineering Construction Corporation (CCECC) Company has been awarded the construction contract. The construction contractor (CCECC) contact details is provided below in table 1-3.

Contractor s	Information
Name of Contractor	China civil engineering construction corporation (CCECC)
Head office Address	Head office Add: No.18, St.35, F-7/1, Islamabad
Telephone	+92 3202375670
Project Site Office	CCECC camp Lot-2,Indus Highway N-55, Kandhkot.

Table 1-3 Contractor Contact Details

1.4 Requirements of SSEMP:

11. Under the contractual obligations, the contractor of the project is liable to submit a site-specific Environmental Management plan for mitigations of environmental impacts of the sub-project (Lot-2)

12. "This SSEMP has been formulated to ascertain the identification of all requisite measures and the contractor's dedication to their implementation for environmental protection and compliance with the following:

    i. ADB SPS 2009

    ii. Environmental legislations under the Sindh Environmental Protection Act 2014

iii. Environmental Assessment IEE/EIA Regulation 2021.

iv. WHO and Sindh Environmental Quality Standards.

1.5 Aims and Objectives of SSEMP:

13. For the main stakeholders, the Employer (NHA), Project Implementation Unit (PMU), CSC and the Contractor of project, this SSEMP will provide a guide on

i. Risks identification, evaluation and Assessment

ii. Mitigation measures need to be taken, and

iii. When and where they are needed to be invoked.

iv. Implementation, monitoring and evaluating the plans

v. Thus, it will help in mitigating adverse impacts associated with the project execution which ultimately results in maximizing project benefits.

14. Following are the core objectives of SSEMP

a) Identify the potential negative environmental impacts that can result from the construction activities and identify measures to control or avoid these impacts.

b) Outline specific roles and responsibilities of project staff related to environmental management and mitigation measures.

c) Take actions and conduct monitoring to show the compliance with Provincial, National, International legislative requirements and ADB Safeguard Policy Statement 2009.

d) Avoid or reduce negative impacts on the nearby community (if any) and maintain amicable relationship between local communities and camp residents.

e) Maintain good standards for worker welfare and living conditions at the camp that provide a healthy, safe and comfortable environment.

1.6 Administration of SSEMP Implementation:

15. Copies of this SSEMP will be kept at the site office and will be distributed to all senior project officers i.e. Project Manager, Construction Managers, OHS/EHS Managers and site engineers, RE etc. All senior officers will be required to understand and familiarize themselves with the contents of this document

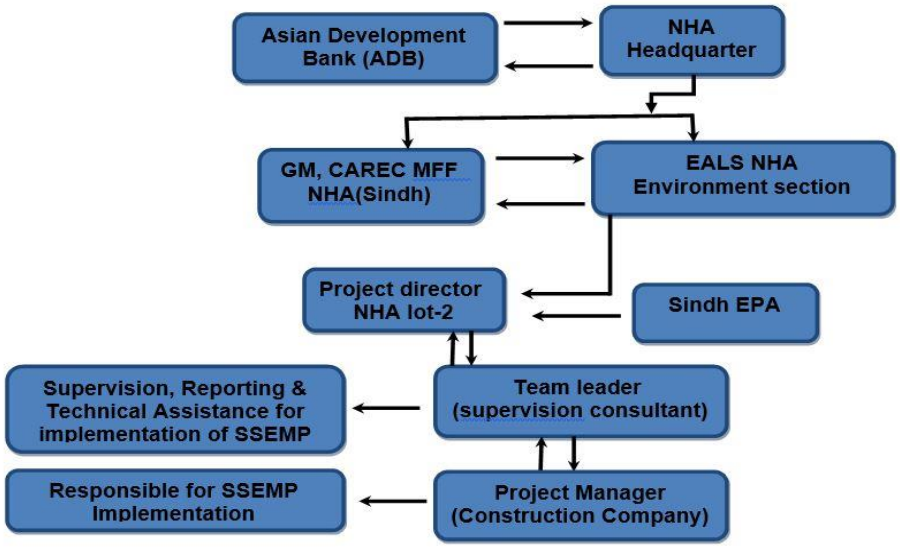


Figure 1-2: Organizational Arrangement for SSEMP Administration.

1.7 Institutional Arrangements for implementation of SSEMP:

16. The effective execution of the SSEMP relies on engaging multiple stakeholders, each playing a distinct yet crucial role in ensuring robust environmental management and compliance throughout the construction phase. The specific responsibilities of key organizations/individuals are outlined below.

1.7.1 Asian Development Bank (ADB):

- The Bank team's responsibilities include:
  Periodically verifying the SSEMP compliance in coordination with NHA/PMU..
- Conducting periodic site visits and supervision missions for detailed review in projects with significant impacts.
- Reviewing periodic safeguard monitoring reports to ensure planned compliance.
- Addressing grievances, especially those received directly by ADB.
- Concurrence of the SSEMP/IEE report
- Review concurrence and disclosure of the semi annual environmental monitoring reports.

1.7.2 EALS (NHA):

17. The NHA (EALS) operates a distinct environmental section overseen by the Deputy Director Environment to manage environmental tasks comprehensively, guiding project preparation, construction, and maintenance work. Institutions involved for the executing of SSEMP would involve: EALS (NHA) Environmental Unit and PMU headed by (GM) CAREC-MFF.

18. The responsibilities of EALS, NHA as a borrower include:

- The NHA collaborates with the donor agency (ADB) to ensure the efficient execution of the SSEMP.
- Facilitate, coordinate, and provide support to ensure compliance with safeguard requirements.
- Develop and ensure the effectiveness of internal and external monitoring mechanisms.
- Guarantee the efficient and effective operation of the Grievance Redressal Mechanism (GRM) across all (Lot-2) tiers.
- Update/Review IEEs/SSEMPs as necessary.
- Conduct field inspections to verify project implementation findings.
- Prepare Corrective Action Plans and monitor their implementation.
- Maintain collaboration with other relevant departments and stakeholders.
- Ensure the Project Implementation Unit (PMU) submits regular project progress reports to the ADB, including a separate safeguards chapter.
- Report to the Environmental Protection Agency (EPA) as required for the NOC (No Objection Certificate).
- Provide annual reports to the ADB, or more frequently if new issues arise or sensitivities occur.

1.7.3 Project Management Unit (PMU):

19. The General Manager (GM) of CAREC serves as the head of the Project Management Unit (PMU), and the Project Director within the PMU is responsible for ensuring the timely implementation of policies on the sub-project (LOT-2).

- Supervision and efficient monitoring the implementation of SSEMP
- Establish regular reporting by supervision consultant and contractor and environmental safeguard as a part of progress report
- Undertaking regular visits to project sites and report to the Bank on the status and any new / unexpected issues
- Follow up with contractors and consultants on environmental compliance and ensure its enforcement
- Submission of semi – annual monitoring reports to NHA (EALS) head office for review and onward submission to ADB

1.7.4 Construction Supervision Consultant (CSC):

20. The Chief Resident Engineer (CRE) acts as the “Team Leader” of the construction supervision consultant, while Deputy Team Leader along with their team (RE, ARE, Environmental staff) will supervise the Project Contractors to ensure quality of work and fulfillment of contractual obligations. The environmental specialist within the construction supervision consultant is tasked with ensuring the implementation of safeguard policies for the Lot-2 sub-project.

21. Environmental Specialist of CSC would be responsible for:

- Review and endorsement of SSEMP, and giving the input, if required, to assist contractor
- Review of monthly and quarterly environmental monitoring reports by the third-party contractor (Labs)
- Overseeing the execution of SSEMP and providing assistance to contractors to ensure environmental compliance.
- Checking and endorsement of environmental part of method statements
- Preparing the training material and assist or providing the training
- Addressing environmental incidents/accidents which have been reported.
- Grant approval for all facilities (establishment of camp, asphalt and batching plants, borrow areas) in light of the SSEMP requirements.
- Overall responsible for the monitoring and supervision of the environmental safeguards including Environment, Health and Safety, Traffic Management plan (TMP), Covid 19 measures, etc.
- Prior to construction, review and update SSEMPs, TMP prepared by the contractor
- Ensure the hygienic requirements of contractor's camps.
- Preparation of quarterly and semi-annual environmental monitoring reports and submission to PMU

1.7.5 Contractor:

22. The Project Manager and Environmental Specialist of the construction contractor are accountable for directly ensuring the implementation of safeguard policies for the sub-project (Lot-2).

23. The contractor Environmental Specialist will be responsible for:

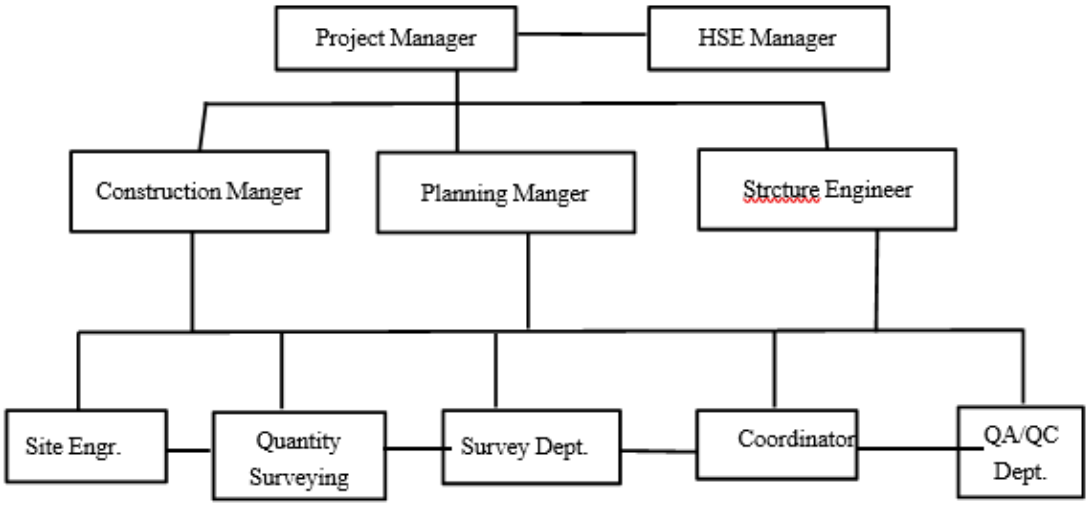
- Implementation of environmental mitigation measures at preconstruction and construction stage
- Drafting the SSEMP outlining the procedure for compliance and seeking approval from the CSC Environmental unit and PMU Environmental unit before project mobilization.
- Frequent monitoring and reporting of compliance of SSEMP

24. The HSE Manager of contractor with assistance of his HSE team shall perform following duties.

- Daily inspection of all workplace areas and make sure the safe execution of the ongoing activities.
- Ensure that hygienic food is served to the labor
- Ensure proper living facilities have been provided to labor and staff at site.
- Ensure proper disposal of waste water and sludge.
- Ensure Water Sprinkling water at all the time to suppress the dust emission.
- Conduct trainings and internal audits with the Contractor staff to minimize the non-compliances.

- Conduct quarterly Environmental Monitoring as per monitoring schedule given in later sections of the SSEMP.
- Ensure proper solid waste collection and disposal.
- Filling of compliance monitoring checklist.
- Preparation of Monthly and weekly Environmental Monitoring/HSE Progress Reports and onward submission to the Consultant.
- Address health issues and disposal of medical waste.
- Address social complaints and maintaining record of these complaints.
- Conduct periodic meetings/consultations with Grievances Redressal Cell.
- Keep record of any oil/water spillage/leakage and to adopt necessary mitigation measures.

Figure 1-3: CCECC Organization Chart LOT-2



2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

25. This section provides an overview of the regulatory requirements and policy framework national and provincial legislation that applies to this sub-project. The Contractor shall ensure compliance with these regulatory restrictions during the implementation of the Sub-Project.

2.1 Applicable Regulatory Requirements:

26. The applicable regulatory requirements both national and international for the subproject are listed below table 2-1:

Table 2-1: Summary of Applicable Laws, Policies and Conventions

Applicable Laws, Rules, Policies & Standards	Regulatory Details	Relevance with the subproject
ADB Policy and Operation Manuals		
Safeguard Policy Statement	To ensure environmentally and socially sustainability in projects supported by ADB. ADB does not finance any project that don't comply with ADB Policy and National Laws of Developing Members Countries (DMCs)[3]	The subproject will comply the ADB SPS 2009 requirements during its implementation.
National Laws & Policies		
Sindh Environmental Protection Act (SEPA)	Provide protection, conservation, rehabilitation and improvement of the environment for Prevention and control of pollution and sustainable development	In compliance of this act the lot-2 has already obtained the environmental approval and the terms and conditions will be complied with the approval.
	Section 11 of the SEPA is related with prohibition of certain discharges or emissions	The subproject will comply the requirements of provision of these cluses of the SEPA during its implementation.
	Section 13 of the SEPA is related with Handling of hazardous substances	
	Section 15 of the SEPA is related with regulation of motor vehicles	
	Section 22 of the SEPA is related with penalties punishable with fine	
Sindh Environmental Quality Standards (SEQS)	Sindh Environmental Quality Standards, 2016, specify the following standards: • Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents. • Maximum allowable concentration of pollutants (16 parameters) in gaseous and ambient air. • Noise levels for day and night times	The subproject will comply the SEQS requirements during its implementation
Labor Laws (Amended) Ordinance, 1972/ Sindh Occupational health and Safety Law	Construction and operational activities can affect the occupational health of the workers. Through this law the	The subproject will comply the requirements of this law during its implementation

Applicable Laws, Rules, Policies & Standards	Regulatory Details	Relevance with the subproject
Highway Safety Ordinance	This ensures safe driving on highways to maintain safety on the highways for protecting human lives and property.	The subproject will comply the requirements of this law during its implementation

2.2 Applicable Environmental Quality Standards:

27. The applicable provincial and international standards (extracted after comparison with various standards such as SEQS/WHO/USEPA) for ambient air, noise and drinking water quality levels are given in Table 2-.2, 2-3, 2-4. These most stringent standards will be complied during the subproject implementation as given in below tables.

Table 2-2: Applicable Air Quality Standards

Pollutants	USEPA		WHO/IFC		SEQS	
	Avg. Time	Standard	Avg. Time	Standard	Avg. Time	Standard
SO_2	3 hrs 1 hr	0.5 ppm 75 ppb	**24 hr** **10 min**	**40 ug/m^3** **500 ug/m^3**	Annual Mean 24 hrs	80 ug/m^3 120 ug/m^3
CO	8 hrs 1 hr	9 ppm (11 mg/m^3) 35 ppm (43 mg/m^3)	8 hr 1 hr 15 min 24 hr	10 35 100 4	**8 hrs** **1 hr**	**5 mg/m^3** **10 mg/m^3**
NO_2	Annual Mean 1 hr	100 ug/m^3 (53 ppb) 100 ppb	**1 yr** **24 hr** **1 hr**	**10 ug/m^3** **25 ug/m^3** **200 ug/m^3**	Annual Mean 24 hrs	40 ug/m^3 80 ug/m^3
O_3	8 hrs	0.07ppm (148 ug/m^3)	**8 hrs** **Peak season****	**100 ug/m^3** **60 ug/m^3**	**1 hr**	**130 ug/m^3**
TSP	-	-	-	-	**Annual Mean** **24 hrs**	**360 ug/m^3** **500 ug/m^3**
PM_{10}	24 hrs	150 ug/m^3	**1 yr** **24 hr**	**15 ug/m^3** **45 ug/m^3**	Annual Mean 24 hrs	40 ug/m^3 150 ug/m^3
$PM_{2.5}$	Annual Mean 24 hrs	15 ug/m^3 35 ug/m^3	**1 yr** **24 hr**	**5 ug/m^3** **15 ug/m^3**	Annual Average 24 hrs 1 hr	75 ug/m^3

Table 2-3: Applicable Noise Standards

Category of Area/ Zone	SEQS	
	Day time	Night-time
Residential area (A)	55	45
Commercial area (B)	65	55
Industrial area (C)	75	65
Silence Zone (D)	50	45

Table 2-4: Applicable Drinking Water Quality Standards

Parameter	Unit	SEQS	WHO/IFC
Bacterial Parameters			
E-Coli	numbers/ml	Must not be detectable in any 100 ml sample	
Total Coliform	numbers/ml	Must not be detectable in any 100 ml sample	
Physical Parameters			
Color	TCU	≤ 15 TCU	-
Taste	No objectionable /Acceptable	No objectionable /Acceptable	-
Odor	No objectionable/Acceptable	None	-
Turbidity	NTU	< 5 NTU	
Total Hardness	mg/l	< 500 mg/l	
TDS	mg/l	< 1000	
pH		6.5-8.5	
Chemical Parameters			
Aluminum	mg/l	≤0.2	
Antimony	mg/l	≤0.005 (P)	
Arsenic	mg/l	≤0.005 (P)	
Barium	mg/l	0.7	0.3
Boron	mg/l	0.3	0.3
Cadmium	mg/l	0.01	0.0003
Chloride	mg/l	<250	
Chromium	mg/l	≤0.05	
Copper	mg/l	2	
Cyanide	mg/l	≤0.05	
Fluoride	mg/l	<1.5	
Lead	mg/l	≤0.05	0.01
Manganese	mg/l	≤0.5	
Mercury	mg/l	≤0.0001	
Nickel	mg/l	≤0.02	

Parameter	Unit	SEQS	WHO/IFC
Nitrate	mg/l	≤0.50	
Nitrite	mg/l	≤3	-
Selenium	mg/l	0.01	
Residual Chlorine	mg/l	0.2-0.5 at consumer End	-
Zinc	mg/l	5.0	3

2.3 Penalties of Non-Compliance:

28. In case of any non-compliance regarding environmental and safety safeguards, the CSC shall be liable to hold the five percent (05%) lump sum payment from each Interim Payment Certificate (IPC) of the contractor till the compliance of reported non-conformity. This condition has been added keeping in view the previous experience and behavior of the contractor at similar nature of project. The 05% amount estimated keeping in view the cost of corrective actions i.e. Waste Disposal non-compliances, instrumental monitoring and Environmental /Safety Staff related non-compliances.

2.4 Data Recording and Maintenance:

29. Standard format will be utilized for recording information during the environmental and other aspects monitoring. The Project data will include information regarding following aspects:

- Training Sessions for workers
- Staff deployment / local employment
- Non-compliance and Corrective actions
- Soil and land pollution
- Disposal of excavated material
- Disposal of waste
- Water resource
- Fuel oil and chemical spills
- Vegetation record
- Noise pollution
- Air and dust pollution

2.5 Meetings:

30. The following environmental meetings during the Project will take place. Primary meeting will be done for setting out the requisite end frame sounding for the regular meetings. Scheduled meetings between Contractor and Supervising Consultants will also take place. The purpose of the meeting will be to discuss the conduct of the operation, non – compliances noted by the consultant's environmental team and measures for their remedy. The meeting will be recorded in the form of a daily/monthly environmental report

2.6 Social and Environmental Complaint Register:

31. The Contractor will maintain a complaint register at the Camp where complaints record from local communities will be registered and measures shall be taken by the Contractor to mitigate these concerns. Contractor's HSE Manager shall check the register on daily basis and deploy resources to mitigate the registered complaints on prior basis.

2.7 Reporting Mechanism:

32. Contractor will prepare the monthly based Environmental Monitoring / HSE Progress Report that will include detailed implementation procedures and practices regarding EMP/SSEMP/HSE management along with sufficient supporting photographic evidences. The Contractor will submit this report to the SC's Environmental Engineer/Scientist and he will be responsible for submitting monthly compliance report for the Project to the Project Director (PD), who will submit it ultimately to regulatory body. The reporting mechanism to be followed during construction phase is summarized below:

Table 2-5: Detail of Reporting Mechanism

Reporting responsibility	Reporting Requirement	Report submitted to
Contractor	• Weekly and Monthly compliance report	CSC
Construction Supervision Consultant (CSC)	• Quarterly Environmental Compliance Report • bi-annual environmental monitoring reports	PMU
PIU	• Semi Annual reports	EALS NHA
EALS NHA	• Final Environmental report after completion of defect liability period.	ADB, EPA

3 SCOPE OF WORK / CONSTRUCTION ACTIVITIES IN SUBPROJECT

33. The Lot 2 sub-project (CARECT/II), spanning 58.78 km from Kandhkot to Kashmore in Sindh, focuses on dualling the existing single-lane National Highway-55. The goal of this extensive effort is to convert the existing roadway into a modern, dual carriageway. The main objective of this initiative is to enhance road safety, reduce travel times, and facilitate economic growth by enabling smooth and efficient movement of both goods and people.

34. CAREC, sub-project (Lot-2) dualization of G.T road (N-55) is a crucial infrastructure development project aimed at enhancing connectivity and facilitating efficient transportation between kandhkot and kashmore in Sindh, Pakistan. This route is a historic and trading route connecting various regions of the country.

35. Construction/Rehabilitation involves scarification of existing bituminous concrete layer/surfacing and improving the pavement structure with granular sub-base, aggregate base course, asphalt base course, asphalt wearing course and in widening of the sub-base layers where necessary to achieve the desired profile and providing new granular and asphaltic concrete sub-base base and riding surface. An additional carriageway will be constructed will be constructed as per the NHA specifications.

36. The construction phase of the subproject will have the following schedule of works:

- Asphaltic Concrete Wearing Course (ACWC) : 50 mm
- Asphaltic Concrete Base Course (ACBC) : 160 mm
- Aggregate Base Course (ABC) : 200 mm
- Granular Sub-base (GCB) : 200 mm
- Improved Subgrade : 300 mm (25% CBR)

37. Structures: Rehabilitation/reconstruction of existing bridges will require earthworks on the slopes and construction of culverts. Access roading, which sidles across steep slopes, will need to be managed to prevent erosion. Use of concrete for construction will need to be managed to prevent concrete discharge to the water ways.

38. The environmental impacts and mitigation measures for minimizing these impacts have been discussed in subsequent sections of the document.

- Vegetation clearing and Earth Work (for additional lanes)
- Excavation and Road Work (Sub-Base and Base Course)
- Tack Coat and Surface Course
- Box & Pipe Culverts
- Retaining Walls and Toe Walls
- Causeways
- Construction of RCC Bridges extension
- Drainage and Anti Erosion Works

- Slope Protection Works
- Ancillary Works

39. The major structures of the subproject and detail of structures are described in the following table 3-1.

Table 3-1: List of Major Structures in Lot 2

Design of Tranche -II	**Dualization of N-55. 80/120 km/hr**
Length of Lot-2	58.78 km
RDs start from	from km 105+820 to km 164+600
Road Bridges	09
No of culverts	48
Pipe Culverts	23

40. The geometric design of the road subproject meets the following criteria:

- Geometric design - AASHTO policy on Geometric design of highways & streets -2004 Material & testing - AASHTO – ASM
- Pavement Design -AASHTO guide for Design of Pavement Structures 1993
- Seismic Design - Uniform Building Code (UBC) and seismic zone map of Pakistan &AASHTO

17. The recommended pavement thickness for the additional carriageway is given below:

- Asphaltic Concrete Wearing Course (ACWC) : 50 mm
- Asphaltic Concrete Base Course (ACBC) : 160 mm
- Aggregate Base Course (ABC) : 200 mm
- Granular Sub-base (GCB) : 200 mm
- Improved Subgrade : 300 mm (25% CBR)

Typical cross section of alignment

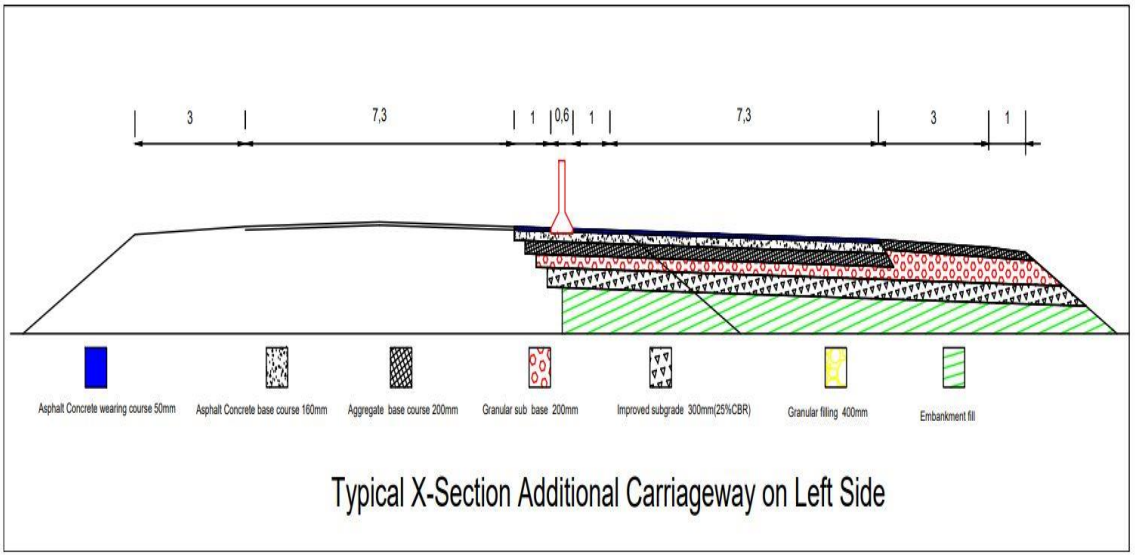


Figure 3-1(a) : Typical Cross section of the subproject.

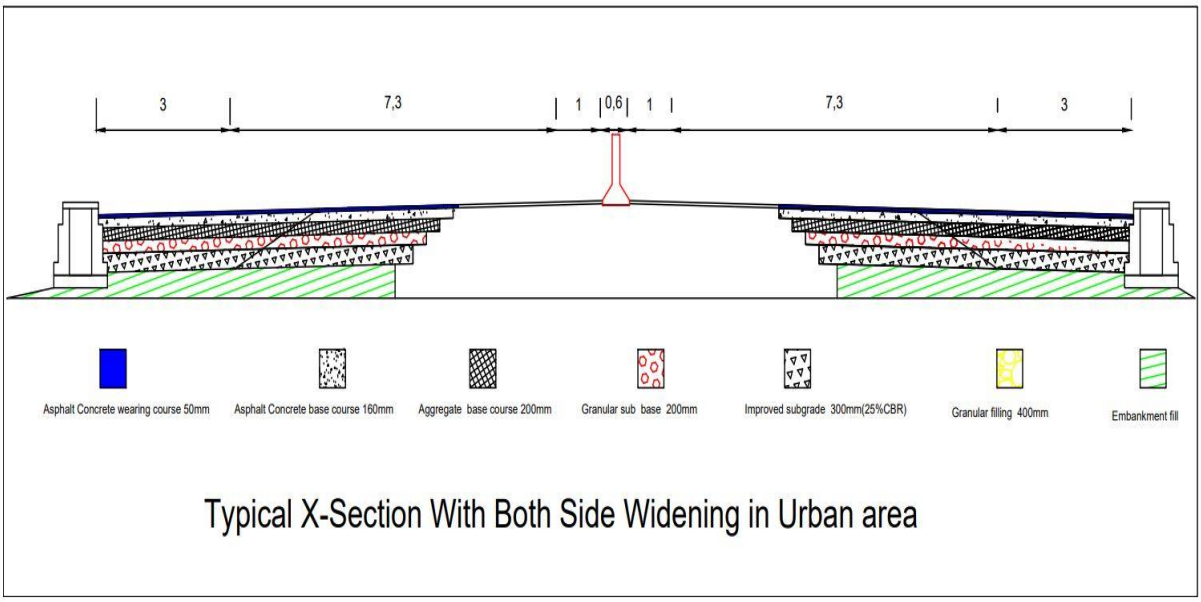


Figure 3-1(b) : Typical Cross section of the subproject.

41. The design features of the Lot-2 are detailed in table 3-2.

Table 3-2: Salient Design Features of Lot-2

Design Speed:	
Design Speed for Plain Terrain:	100 km/hr.
Design speed on few constrains:	80 km/hr.
Road Cross Section:	
Number of Lanes:	4 Lanes (Two Additional Lanes & Two already exists)
Lane Width:	3.65 m
Paved Shoulder:	
Inner Shoulder:	1 m
Outer Shoulder:	2.5 m to 3.0 m (with 0.5m to 1m earthen rounding)
Road Cross Slope	
Carriage Way:	2 %
Shoulders:	4%
Right of Way:	20 m for additional carriageway 100 m for bypass

3.1 Machinery to be used on Lot-2:

42. The machinery to be use in the sub-project is listed in below Table 3-3.

Table 3-3: List of Major Equipment's of Lot 2

Sr. No	Type of Machinery/ Equipment	Total No's	Type of Machinery/ Equipment
1	Bulldozer	04 No's	Rollers
2	Excavator	04 No's	Tandem
3	Dump Trucks	10 No's	Vibratory Combination Rubber Mounted Tandem Roller
4	Grader	10 No's	Crane
5	Grader with Scarifier	08 No's	Beam Launching Truss
6	BackHoe	05 No's	Piling Equipment
7	Water Tanker	05 No's	Vibrator for Concrete
8	Front End Loader	05 No's	Road Marking Machine
9	Paver	05 No's	Concrete Batching Plant
10	Power Broom	05 No's	Asphalt Premix Plant
11	Bitumen Pressure Distributor	05 No's	Laboratory with Equipment (1 permanent & 1 mobile)
12	Vibratory Rollers	05 No's	02
13	Concrete Batching Plant	01 No's	For Concrete mixing plant
14	Asphalt plant	01 No's	Road making asphalt
15	Small vehicle	15 No's	For site personnel's
16	Oil tankers	02 No's	Fuel distribution
16	Transit mixers	05 No's	For carrying concrete

3.2 Construction Materials:

43. The materials to be used in construction of tranche-II, CAREC lot-2 are included;

- Coarse aggregates (crush)
- Fine Aggregates (sand),
- Soil, Water, Asphaltic course,
- Cement, Steel, etc.
- Bitumen, diesel, lubricants

44. The source and quantities of the raw materials is given in table 3-4.

Table 3-4: Quantities and Source of Raw Materials for Lot 2

Sr. No	Description of Material to be used	Unit	Lot-2	Tentative Location to be Purchased From
1	Asphaltic Wearing Course/Bitumen	m^3	28675.92	National refinery Karachi, PARCO DG Khan
2	Asphaltic Base Course	m^3	90376.94	
3	Aggregate Base Course	m^3	160161.12	Kashmore, Sui, DG khan
4	Sub Base Course	m^3	204202.32	Local vendors
5	Improved Subgrade	m^3	22091.4	Sui, Kashmore and DG khan
6	Embankment from Borrow Exc.	m^3	801902.15	Local Vendors
7	Steel(Ton)	Ton	6129.19	Itfaq, Mughal.pak steel
8	Sand for Concrete	m^3	33564.932	sui and Kashmore
9	Crush for Concrete	m^3	55730.825	D.G Khan,Rohdi,Kashmore
10	Cement (Ton)	Ton	28508.937	DG.Khan,Kohat, Lucky

3.3 Construction of Camp, Asphalt and concrete Batching Plant:

45. M/S CCECC has acquired a temporary private land from Mr. Sahib Dino Khan S/O Gul Muhammad Khan (copy of agreement attached in annexure with) for the construction of camp and batching plants yard. Location of camp is at RD 117+140 The location of camp is at Kandh kot near 10 km to kandh kot city The total area, which acquired for the camp and batching plant site will be 04 Acre. This contractor camp will include Offices, Residential Areas, Well Equipped First Aid Station, Material Testing Laboratory, Mechanical Workshop, Store yard, steel yard and Batching plant yard. The contractor camp will be temporarily built and will be restored according to the term and condition set with the land owner.(figure 3-2)

46. One building has been hired on rental basis for offices and residence of senior staff in sukkur (Figure 3-3) with all camp allied facilities Google coordinates of private accommodation are 27°05'53.6"N 70°19'44.0"E

47. The google coordinates of the piece of land for camp and batching plant are Latitude: 28°16'44"N, Longitude: 69° 15'54"E.

48. Lease agreement is attached in **Annexure-10.**

49. M/S CCECC face a unique challenge, project is located in a threatened area. This area is surrounded by local thieves who have taken control the neighboring area of

the project sites, leaving us with a precarious situation. But we recognize the importance of this project not only in terms of economic growth of the country but also as a symbol of progress and connectivity for the entire region. Despite the challenges posed by the presence of local thieves, we are committed to collaborate with local law enforcement agencies for the safety and security of the project that allows us to continue our work while ensuring the safety of all involved. Local enforcement agency enforcement agencies the environmental health and safety of our project personnel, as well as the successful execution of the project, are of paramount importance to us. In response to this challenge, we are working closely with local law enforcement agencies, and they have selected the campsite to ensure the safety and security of our camp. Collaboration with these agencies is vital for addressing security concerns and maintaining a safe working environment for our team.

50. The contractor obtains No Objection Certificate (NOC) from Deputy Commissioner Kandhkot. In return for providing employment opportunities and medical facilities from the contractor's camp, the contractor will construct a wall acting as a noise barrier between the surrounding area and the campsite to ensure privacy.

Figure 3-2 : Camp and Batching plant site before construction

Figure 3-3: Furnished building for accommodation for management staff in Sukkur.

3.4 Asphalt Plant and Batching plant Installation:

51. Concrete batching plant will be installed in at Second quarter of 2024. After finalizing the asphalt plant location, the reports will be submitted to the consultant as per COC.

3.5 Camp Allied Facilities in Living Areas:

52. Following measures shall be taken to establish and maintain allied facilities at proposed Camp site:

- Suitable and adequate living accommodation shall be provided to all workers.
- The living rooms/ dormitories shall be airy/ventilated and lighted. No congestion inside the rooms shall be allowed.
- Toilets shall have waste flush system for correct disposal and operation of sewage system. Toilets shall be provided with facilities such as Water Closets WCs. Use of antiseptics shall be made on daily basis to ensure proper hygiene and sanitation.
- Recreational facilities shall be arranged including common TV rooms, badminton court, volley ball ground, etc.
- Heating and cooling facilities shall be provided in the living rooms.
- Ample space shall be provided to the labor to maintain keep good housekeeping inside their living areas.
- Uninterrupted electricity supply shall be provided round the clock.
- Water coolers shall be installed for labor.
- Separate messing facility shall be arranged for labor and supervisory/managerial staff, where free of cost good quality food shall be served as well as good hygienic conditions shall be maintained.
- Garbage cans and refusal collection container shall be placed for collection of waste. The Contractor shall arrange tractor trolley to transfer waste from Camp to the recommended waste dumping site.

- Rain water drainage shall be established for proper disposal of water in rainy season.
- Drinking water free of any contamination shall be provided at all locations of the Camp.
- Dengue/Mosquitoes/Disinfecting Chlorinated sprays shall be conducted frequently in all living areas of the Camp.

3.5.1 Kitchens:

- HSE Staff shall ensure periodic checks of the cooking staff, particularly for symptoms of hepatitis B, C and HIV AIDS, covid-19 and other contagious diseases
- All the cooking places shall be enclosed with fly's net or covered lids
- LPG Cylinders will be used inside the camp for cooking purpose or in Tandoors, wood will not be used at camp site.
- No tree cutting shall be done or no local bushes shall be burnt for cooking purpose.
- All the cook houses shall be regularly monitored by the HSE personal and medical staff to check the hygienic and sanitation conditions, apart from ensuring the medical fitness of the cooks.
- Good quality cooking oils and other ingredients including vegetables, cereals etc. shall be used for cooking purposes which may not cause any negative impact on labor health.

3.5.2 Dining Areas:

53. Dining areas shall be spacious, airy and well lighted. All floors in the dining areas shall be tile soled. HSE staff shall ensure that all dining areas, including those of the sub-Contractor's and canteens etc. will be fly proof and remain clean at all times.

3.5.3 Drainage, Sewerage and Septic Tank in Camp:

54. For better hygiene and sanitation, temporary sewerage line having variable dia shall be laid down which shall culminate in 03 No's of septic tanks having three chambered and soakage pit(s) sewage water will be finally disposed off in closed sewage pipe into the nearby barren pits/Nalla (See Camp Layout Plan). A separate sewage system shall be established for each living/accommodation facility of Camp and shall be kept well maintained. Likewise, necessary, open drains shall be constructed in the Camp for the disposal of storm water.

3.5.4 Material Storage Site:

55. The construction material will be placed in respective plant areas for use i.e., aggregate, cement, sand shall be placed in batching plant area and crusher rock material from quarry site shall be stored in crusher plant area. The Contractor will allow only 3-4 material trailers inside the material yard area. T-card will be provided to all trailer operators/helpers and unauthorized persons shall not be allowed to enter inside the construction and material storage areas.

56. All personnel will strictly follow safety procedures in all risk prone areas. Separate ingress and exit points will be marked in batching plant and crusher plant area. If there will be potential source of dust emission, dust will be suppressed by daily

sprinkling of water. Contractor shall fix water sprinkling inside the plants and plant area to minimize the dust or material will be washed prior to final use.

3.5.5 Security Arrangements:

57. In light of the security challenges posed by the threatened zone near our project camp and site, we would like to inform all stakeholders that we have taken proactive measures to ensure the safety and security of our personnel and project assets.

58. We M/S CCECC have engaged private security services to provide 24/7 security coverage for our project camp and construction site at,Material Store, Equipment Yards and location of the work in progress on the work site. Coordination will be necessary with nearby law enforcing agencies.

59. Trained security personnel will be stationed at key entry points and strategic locations to deter unauthorized access and ensure the safety of our workforce.

3.5.6 Medical Assistance:

60. Since it is the Contractor's contractual obligation to provide medical assistance facilities at the Camp and Work Sites. Dispensary along with availability of paramedic staff, necessary medicines/equipment shall be established at the Camp that shall remain functional round the clock. First aid kits with necessary medicines/equipment shall be provided at all active working sites.

3.5.7 First Aid:

61. First aid arrangements shall be ensured at Camp and Work Sites. The first aid provider (or nominated person who has been trained in giving first aid) at sites shall perform following duties:

- Keep all necessary first aid medicines and bandages in the first aid box.
- Replace the medicines before their expiry dates to avoid any health hazard.
- Provide first aid to the injured in the event of accident
- Immediately report any accident/incident to HSE Manager for necessary action
- Call ambulance in case of any serious emergency.
- Ring the emergency siren to make others alert about specific emergency.

3.5.8 Dispensary Arrangement:

62. Following measures shall be adopted for establishment of Camp Dispensary:

- Furnished dispensary shall be established at the Camp that shall remain functional round the clock.
- Paramedic staff shall be appointed in the camp dispensary round the clock.
- Ambulance shall remain available at camp round the clock.
- Dispensary shall be provided with all necessary medicines, first aid items and equipment where free of cost medical treatment shall be given to all workers

63. Civil Hospital Kandhkot, nearby medical facilities along the project alignment shall be taken on panel for the detailed medical examination of workers in case of any major emergency.

3.6 Camp and Site Waste Disposal Points:

64. The majority of the project alignment for Lot-2 is characterized by barren land. In line with our commitment to responsible construction practices, we have established a plan for material disposal that aligns with environmental regulations and local community involvement.

65. All solid waste disposal records, including dates, quantities, disposal methods, and disposal site locations, will be diligently maintained and updated regularly throughout the project's duration. This information will facilitate compliance with waste management regulations and ensure transparency in waste disposal practices

3.6.1 Site Waste:

66. We M/S CCECC are pleased to report that we have identified various safe locations along the road construction site for the disposal of site waste, specifically for landfilling purposes. These locations have been carefully chosen to address multiple needs, including managing waterlogged areas and accommodating requests from local settlements. Google coordinates of some site disposal for site generated wastes/unsuitable material, e.g. debris, scarifying material, demolished material etc. are given below.

28°15'41"N 69°13'15"E

28°28'10"N 69°38'57"E

28°27'27"N 69°37'23"E

28°28'34"N 69°39'41"E

67. We will responsibly manage the material extracted during the site scarifying process. This material will be disposed off in designated landfill areas along the project alignment. Additionally, we are collaborating with the local community, allowing them to use the material for their landfilling purposes, thereby contributing to local development while reducing environmental impact. Site waste disposal Plan see Annexure-9.

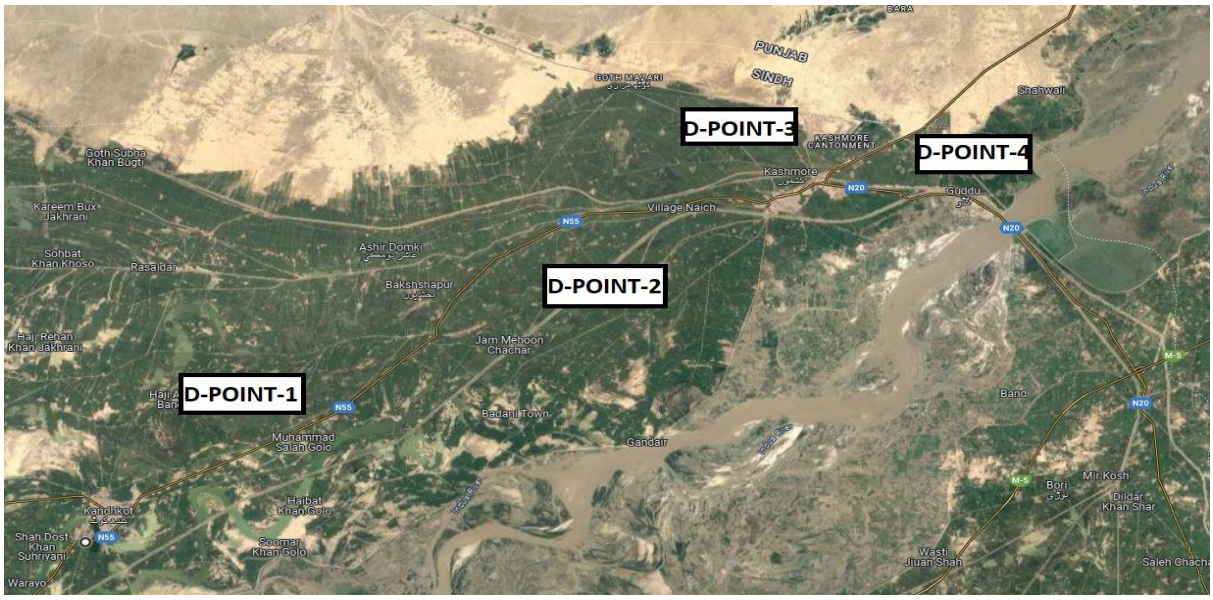


Figure 3-4: Map of Disposal sites for LOT-2

Figure 3-5: Site Waste Disposal Point-1

Figure 3-6: Site Waste Disposal Point-2

Figure 3-7: Site Waste Disposal Point-3

Figure 3-8: Site Waste Disposal Point-4

3.6.2 Camp Waste:

68. The waste generated at our campsite will be handled with utmost care. To ensure efficient disposal, we have designated the TMA Kandhkot as the designated location for camp waste disposal. Waste materials will be transported by contractor tractor trolleys on a weekly basis, following appropriate waste management protocols.

69. Our approach to material and waste disposal reflects our commitment to environmental stewardship, community engagement, and responsible construction practices. We appreciate the cooperation of all stakeholders in maintaining a clean and sustainable project environment. Camp Solid Waste Plan see Annexure- 9.

3.7 Sensitive Receptors:

70. During our site evaluation of the CAREC N-55, Tranche-II sub-project Lot-2 area, we've identified several noteworthy sensitive receptors in close proximity, including local settlements, a mosque, water channels, and a police check post.

71. While these elements represent valuable components of the local community, their presence does not pose significant environmental or logistical challenges to our project. Our commitment to responsible and sustainable construction ensures that we will take all necessary precautions to minimize any potential impact on these sensitive receptors.

72. M/S CCECC dedicated to maintaining open and constructive communication with the local community, addressing any concerns, and working collaboratively to ensure that the CAREC N-55 Project Lot-2 progresses in a manner that benefits all stakeholders, while respecting the local environment and heritage.

73. The sensitive receptors are shown in the Table 3-5 and a comprehensive map showing environmental sensitive receptors of the project area such as surface water bodies, animal corridor, agricultural land, urban areas, mosques, etc.

Table 3-5: Sensitive receptor detail along the carriageway at Lot-2

Receptor Name	Location	Photographs
Masjid	**132+180**	
Masjid	**121+620**	

Receptor Name	Location	Photographs
Masjid	138+920	
Graveyard	137+900	
Hospital	116+820	
Masjid	120+900	
Masjid	120+350	
Masjid	116+100	

Receptor Name	Location	Photographs
Masjid	115+720	
Masjid	113+020	
School	157+209	
Lake	106+375	
Masjid	108+475	

4 RISK ASSESSMENT

4.1 Risk Assessment and Management:

74. Risk assessment and management techniques have been adopted so that potential hazards are identified and evaluated prior to execution of critical job or the job which is going to be conducted first time. In the Risk Assessment Matrix, the environmental impacts and the control measures are explained with respect to the construction activities. Special attention needs to be paid during construction with adequate protection, to create friendly environment.

75. These potential risk activities can damage the community badly if not controlled. In order to prevent or mitigate any potential adverse impacts of the construction, it is necessary to implement the recommendations

76. On the most common failures of environmental management is that the construction teams have no guidance as to what environmental management measures are required and so there is a high probability that environmental damage will occur. Once the damage has taken place it is often impossible to put right again, therefore the environmental management measures have failed right at the point when they are most needed. It also becomes difficult to retrofit the environmental management requirements after the construction activities have started. Proper planning is therefore essential.

Table 4-1: Risk Assessment Objectives and Expected Outcomes

Objectives For Risk Assessment	Expected Outcomes
Identify major design and construction risks	Better understanding of environmental engineering, and construction issues faced by each project alternative
Identification, quantification, and likelihood of major scope, budget and schedule risks for all major project components	List of major project risks Reasonable estimate of risk costs and probable total project costs and duration
	Long list of risks mitigation strategies
	Preliminary risk management plan focused on design and constructability risks
	Preliminary risk allocation planning
Targeted assessment of construction problems, causes, and potential cost/schedule impacts Identification and systematic evaluation of possible corrective actions	Analysis of specific problems Costs/Benefits of possible corrective actions that will allow project sponsors/owners to maintain (or recover) schedule and avoid cost overruns

4.2 Risk Identification:

77. The risk identification process identifies and categorizes risks that could affect the project. The objective of risk identification is the early and continuous identification of events that, if they occur, will have negative impacts on the project ability to achieve performance or capability outcome goals. The tools and techniques outlined in this

chapter will support the risk identification process, but it will be the people involved in the exercises who are most critical to the success of the process.

4.3 Risk Assessment Process:

78. Risk is assessed as the likelihood that the activity will have an effect on the environment as well as the consequence of the effect occurring. It is often described like this:

Risk = Likelihood × Consequence

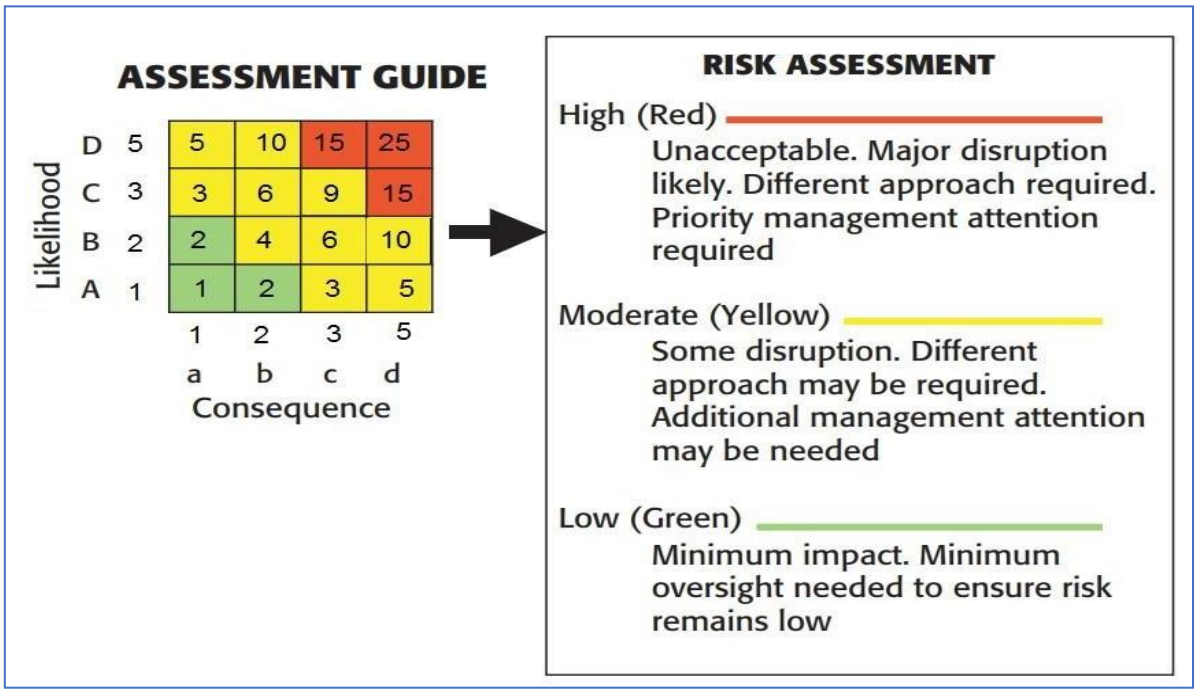


Figure 4-1: Risk Assessment Model.

79. The above model has been adopted from ADB - Environmental Management for Construction Handbook. Any Medium to Significant risk requires an environmental management measure to manage the potential environmental risk. Judgment will be required concerning the application of an environmental management measure to mitigate low risk situations.

4.3.1 Response Options:

80. Risk identification, assessment, and analysis exercises form the basis for sound risk response options. A series of risk response actions to avoid or mitigate the identified risks is considered is follows. The likelihood scale and consequence scale is described in Table 4.2 and 4.3 respectively.

Table 4-2: Likelihood Scale

Likelihood	Definition	Scale
Certain	Will certainly occur during the activity at a frequency greater than every week if preventative measures are not applied	5

Likelihood	Definition	Scale
Likely	Will occur more than once or twice during the activity but less than weekly if preventative measures are not applied	3
Unlikely	May occur once or twice during the activity if preventative measures are not applied	2
Rare	Unlikely to occur during the project	1

Table 4-3: Consequence Scale

Consequence	Definition	Score
Catastrophic	The action will cause unprecedented damage or impacts on the environment or surrounding community e.g. extreme loss of soil and water resources and quality from storm water runoff extreme pollution of soil and water resources including major contamination from hazardous materials widespread effects on ecosystems with deaths of fauna/flora widespread community impacts resulting in illness, injury or inconvenience loss or destruction of archaeological or historical sites Occurrence will almost certainly result in the work being halted and a significant fine.	5
Major	The action will cause major adverse damage on the environment or surrounding communities' e.g. major loss of soil and water resources and quality from storm water runoff major pollution of soil and water resources including contamination from hazardous materials significant effects on ecosystems with isolated deaths of non-vulnerable flora and fauna significant annoyance or nuisance to communities major damage to or movement required to archaeological or historical sites Occurrence may result in work being halted and a fine	3
Moderate	No or minimal adverse environmental or social impacts e.g. no measurable or noticeable changes in storm water quality. Water quality remains within tolerable limits little noticeable effect on ecosystems no or isolated community complaints no or unlikely damage to archaeological or historical sites no likelihood of being fined	2
Minor	No or minimal adverse environmental or social impacts e.g. No measurable or noticeable changes in storm water quality. Water quality remains within tolerable limits little noticeable effect on ecosystems no or isolated community complaints no or unlikely damage to archaeological or historical sites no likelihood of being fined	1

81. All the assessed risks are handled by providing mitigation, management or both. Special consideration and specific management sub plans are formulated for moderate and major risks. The consideration of issues in risk assessment matrix is

carried out with respect to construction activities. The risk assessment process is undertaken with a risk assessment matrix and is provided in Table 4.4 below. The list of construction activities involved in the project is given in Table 4.5

4.4 Risk Assessment:

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
CONSTRUCTION PHASE								
1	Haul Routes, transportation of raw material for Road Works (Sub-Base and Base Course) and Construction of RCC Bridges in rehabilitation of Lot-2 Road (Kandhkot to Kashmore), culverts, etc.)	• Improper haul routes may cause the community inconvenience and incident hazards • Dust emissions on the haul routes may deteriorate the ambient air quality.	3	2	6	• All trucks carrying construction material will have to travel on the defined routs. • All trucks carrying construction material will be covered with tarpaulin • Speed limit of 20km/h will be followed by all trucks carrying construction material.	Contractor's Project Manager/ EHS person	ES-CSC/ PMU-NHA/ADB
2	Vegetation removal for construction of comp site and construction facilities complex as define and along the road	• Any tree cutting due to construction of road and its rehabilitation activities may cause the tree cutting if present within RoW. • The location of camp, batching plant site may cause the potential impacts on flora and fauna	3	3	9	• No hunting and poaching will be allowed • Compensatory trees will be planted (1:3 ratio) • Trees cutting is inevitable in RoW, prior permission from CSC/PMU will be obtained and the PMU will be responsible through EASL section of NHA	EASL	PMU-NHA/ADB
3	Development of construction waste disposal areas for disposal of waste from kandhkot-kashmore Road rehabilitation works	• During the construction waste material will be generated which will require safe disposal. Therefore, waste disposal site/s should be identified before to start the construction.	3	2	6	• A total of four locations have been selected for waste disposal, before to utilize these sites the contractor will get permission from CSC.	Contractor's Project Manager/ EHS person	ES-CSC/ PMU-NHA/ADB
4	Development of Quarrying material and borrow areas for	• Improper quarrying and borrow area may cause environmental damages like	3	2	6	• Already approved site or such site as may be approved by the RE of	Contractor's Project Manager/	ES-CSC/ PMU-NHA/ADB

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
	obtaining the construction material for rehabilitation works (Sub-Base and Base Course), rehabilitation of Bridges and culverts	dust emissions, soil erosion				CSC will be used for quarrying purposes. • No river bed material will be allowed to use for this project.	EHS person	
5	Development of construction facilities (Camp site batching plant site etc)	• The duration of the construction activity for the kandhkot – kashmore Road development is expected to be three years and a considerable amount of work force will be engaged. As a result, worker camps will need to be developed and ancillary facilities will need to be provided such as electricity, washrooms for labor with suitable effluent and sewage disposal facilities as well as water for their everyday use for drinking and bathing etc. • The batching and asphalt plant location near to any sensitive receptor may cause the potential social (community movement, movement of vehicles, privacy issues) and environmental impacts (air & noise pollution and water contamination). • Health and safety of community and the workers could be impacted during construction activities in execution phase of the project.	3	2	6	• In order to prevent a nuisance, specific locations shall be designated for development of the labor camps. All necessary facilities and amenities shall be provided in these camps such as electricity, sufficient supply of water, solid and liquid effluent waste disposal facilities etc. • The contractor has selected a land near the kandkot. • While site for asphalt plant is located near kandhkot • no SR is located within a radius of 500m from the asphalt plant site.	Contractor's Project Manager/ EHS person	ES-CSC/ PMU-NHA/ADB
6	All Activities in project	• COVID-19	5	2	10	• Reporting Employees who are showing symptoms such as fever	Contractor's Project Manager/	Environment Specialist of

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
	(Earth Work, Road Work (Sub-Base and Base Course, Surface Course, Culverts, Retaining Walls and Toe Walls, Causeways, Construction/rehabilitation of RCC Bridges, Drainage and Anti Erosion Works, Slope Protection Works, Ancillary Works)	• Health Hazard (Respiratory illness caused by COVID-19 Infection that may lead to fatality) • Dust Emission				or high body temperature, coughing, difficulty of breathing or chest pain. Sending them to clinic or nearest hospital immediately. • Body temperature monitoring through Thermal Scanner or other devices to monitor the body temperature of each employee entering/leaving the site or at camp. • Awareness and implementation of Quarantine Procedure for all Employees who came back from vacation. • No Hand Shake Policy and ensure at least 1 meter distance at workplace. • Conduct regular housekeeping and sanitation for all access/egress points as well as Log-in/Log-out devices. If possible, deactivate Log-in/Log-out devices such as biometrics. Conduct awareness on how to protect yourself against the infection of COVID-19 through campaign (posters, distribution of brochure). Communicating and implementing COVID-19 Guidelines • Ensure Disinfection of offices and machinery periodically,	EHS person	CSC/ PMU-NHA/ADB

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
						temperature screening at project entrances, provision of hand sanitizers to office and labour staff, provision of surgical facemasks, instruction boards and signage at different locations for COVID-19 awareness. • Everybody wearing of facemask at the work place and residence. • Provision of N55 mask to the visitors and staff will be ensured.		
7	Site Preparation and Site Clearing for road rehabilitation works and construction of construction facilities complex and additional carriageway.	• Exposed to high-speed moving vehicles /(high-speed vehicle and may lead to fatality)	3	3	9	• To install traffic cone and safety warning signage to indicate man at work. • To provide flagman to control traffic flow. • Conduct Tool Box Talk on life traffic hazard prior to survey work. • Wearing of safety helmet, safety shoes/ boots and high visibility safety vest should be made mandatory.	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB
		• Expose to hit by any moving vehicle/stones/Fallen scaffolding	3	4	12	• Supervisor in-charged to ensure there is no one come too close within the perimeter of fallen scaffolding in the work area. • To install/place visibly safety warning signage and notice within the perimeter of tree fallen work	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
						area. • Conduct Tool Box Talk prior on unloading work safety. • Wearing of safety helmet, safety vest and safety shoes/ boots should be made mandatory.		
		• Expose to inhalation of mineral dust. (Potential to sustain multiple respiratory Problems)	4	3	12	• To provide water bowser to minimize mineral dust spreading. • To organize for more frequent short break to the worker • Conduct Tool Box Talk on mineral dust hazard prior to site clearing. • Wearing of safety helmet, safety vest and safety shoes/ boots should be made mandatory.	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB
		• Expose to excessive Noise from machinery (Potential to cause hearing issues)	3	2	6	• Install silencer at the source of noise when the noise level exceeded 65 dbs. • To organize work rotation. • To conduct Toolbox, Talk on noise hazard prevention. • Regular water sprinkling near the SRs, to control the dust • Use of low noise machinery during the construction • Regular maintenance/tunning of	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
						construction machinery		
8	Mobilization and operations of construction machineries at the work site Camp site and active construction sites	• Poor access and egress (Machinery accident and overturned) • Traffic issues along the road	5	3	15	• To prepare safe designated access and egress road for construction machineries mobilization. • To provide guide to lead machineries to machinery yard. • To install sufficient safety road signage and route indicator. • To provide flagman to control machineries movement. • Conduct Tool Box Talk on machinery safe operation. • Wearing of safety helmet, safety vest and safety shoes/ boots should be made mandatory.	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB
		• Expose to inhalation of mineral dust (Potential to sustain multiple respiratory problems) due to construction activities	3	4	12	• To provide water bowser to minimize mineral dust spreading. • To organize for more frequent short break to the welder. • Conduct Tool Box Talk on mineral dust hazard prior to site clearing. • Wearing of safety helmet, safety vest and safety shoes/ boots should be made mandatory.	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB
9	Traffic Issue due to Earth Work, Road Work (Sub-Base	Traffic congestion due to machinery	3	3	9	• Ensure the road will be properly	Contractor's Project Manager/	Environment Specialist of

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
	and Base Course, Surface Course, Culverts, Retaining Walls and Toe Walls, Causeways, Construction/rehabilitation of RCC Bridges, Drainage and Anti Erosion Works, Slope Protection Works, Ancillary Works) and additional carriageway	movement, construction activities, etc.				demarcated with sign board • Development of comprehensive designated road plan to regulate heavy and light machineries in order to avoid accidents and traffic congestion. • Installation of traffic warning signs and enforce traffic regulations during transportation of materials and machinery. • Ensured skilled drivers and site supervisor presence on-site for supervision	EHS person	CSC/ PMU-NHA/ADB
10	Health and Safety during the construction activities	• Inconvenience to Community including their Health and Safety during the construction hours.	5	3	15	• Work areas outside the project site, especially where machinery is involved, will be roped off and will be constantly monitored to ensure that local residents, particularly children stay away. Also, no machinery will be left unattended, particularly in running condition. • Local communities in the project area will be briefed on traffic safety, especially women who are the main care providers to children. • Speed limit of 20 km/hr. will be maintained by all project related vehicles and night-time driving of project vehicles will be limited	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
						where possible. • Educate drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances and other construction materials during transport. • The movements of the labour and site staff engaged for the project will be restricted to the project site and the Contractor will ensure that the female students/staff of the institutions and offices in the project area do not face any privacy or safety issues due to the labour and site staff.		
		• Occupational Health and Safety during the construction hours	5	3	15	• Ensuring that all workers are provided with and use appropriate Personal Protective Equipment (helmet, hand gloves, boots, masks etc.); • Follow standard practices of safety checks as prescribed before use of equipment; • Provide on-site Health and Safety Training for all site personnel; • Local labor will be actively sought out by the contractor, thereby reducing or completely eliminating the need for work camps. Local labor can reduce social concerns,	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
						as these people will return to their homes at night and act in accordance with accepted community norms. • Monitoring will be required to ensure that the health and safety plan based on contract specifications is followed. • Cement feed hopper areas will be inspected daily to ensure compliance with the requirement of dust masks.		
11	Construction of road (Earth Work, Road Work (Sub-Base and Base Course, Surface Course, Culverts, Retaining Walls and Toe Walls, Causeways, Construction//rehabilitation of RCC Bridges, Drainage and Anti Erosion Works, Slope Protection Works, Ancillary Works) and additional carriageway	• Dust emissions during the construction hours	3	3	9	• Regularly water sprinkling the sites and roads/streets • Use covered trucks while hauling powder construction materials • Dust mask will be provided to the workers.	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB
		• Noise during the construction hours	3	2	6	• Limit night work in residential areas • Avoid usage of machines/equipment with extra noise, installation of silencers if needed use of temporary noise shields/barriers especially at sensitive receptors.	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB
		• Infringement of pedestrian and vehicle	3	3	9	• Provide safe area for trucks and	Contractor's	Environment

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
		traffic during the construction hours				machineries • Proper barricading of the construction site with designated entry and exit points. • Carry out construction by stages, aware the population about construction activities • Provide effective road signs, temporary safety bridges as alternative walk way, protective barricades. • Provide adequate lighting on the site • Provide adequate lighting in the places where passers-by or entry by public is likely	Project Manager/ EHS person	Specialist of CSC/ PMU-NHA/ADB
		• Construction waste generation during the construction hours	3	2	6	• Remove construction waste to corresponding waste disposal site of the community, having in advance a contract agreement with the community heads	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB
		• Pollution with fuel and lubricants during the construction hours	2	3	6	• Store fuels and lubricants on the sealed surface, away from the soil and water resources, • Regularly examine the used equipment and their technical condition	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
12	Establishment of Work Camp, Batching Plant etc.	• Vegetation Clearance (Flora)	2	2	4	• Siting of construction camp in way so as to minimize the removal of existing macro plants at camp sites and to avoid conflicts between residence; • Compensatory plantation to be scheduled when construction works near ends. • Preparation of photographical and botanical inventory of vegetation before clearing the site should be ensured.	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB
		• Solid waste (construction, municipal and hazardous waste)	5	3	15	• Solid waste generated during at construction and camp sites should be safely disposed of at designated waste disposal sites; • Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site. • The contractor should ensure that Construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste; • Recyclable material will be taken out of the waste stream for recycling. All recyclable waste	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
						(e.g., paper, packaging material, plastics, aluminium foils etc.) to be collected, and sold locally for re-use into respective recycling industry. • No open burning to be allowed in the vicinity of the project area. • Training of Employees, involved in the transportation of hazardous material regarding emergency procedures should be ensured; • A comprehensive plan for construction waste should be adopted; as given in SSEMP.		
		• Water resources and Quality including surface water and water storage ponds along the road, Health and safety (health risks to workers and associated communities)	3	2	6	• No equipment washing is allowed in any surface water bodies and water storage ponds along the road throughout the project implementation period; • No wastewater shall be dumped into any water bodies (canal and water storage ponds along the road) • Wastewater from labor camp and construction site should be canalized into septic tanks without contacting ground. • Septic tanks should be timely emptied by a hired septic truck	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
						and transported to legally approved treatment facility or dumpsite • Fuel storage, equipment maintenance, repair workshops, and vehicle washing areas shall be stationed at least 300m away from any water body • Camps should be designed to be self-contained to reduce demand on infrastructure and services of nearby communities; • Formulation and implementation of a training program for GOP site workers residing in construction camps comprised of a brief on camp rules, an orientation on awareness about the local area and cultural norms;		
		• Erosion and Soil Contamination at active construction sites	5	3	15	• Petroleum products, hazardous materials and wastes should be stored covered from precipitation, on an impermeable surface, and secured from acts of vandalism • Fuel tanks shall be installed on an impermeable ground in a bunded area with capacity of 110% of fuel tank. • Avoid soil contamination with petroleum products, lubricants, or	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
						hazardous materials during equipment maintenance and repair, field refueling, and hazardous material handling • Organize spill response kit at each construction site for collection and storage of contaminated soil and provide training for workers on use of spill response kit • Maintain proper record keeping and documentation on waste management. • All hazardous material waste should be handed over to certified vendors for recycling or treatment to avoid		
		• Stockpile erosion during the construction hours	3	3	9	• All stockpiles should be managed to reduce dust emissions; • Stockpiles should be located downwind of sensitive receptors; • Stockpiles emitting dust should be sprayed with water prior to moving; • If a stockpile is within 300 m of sensitive receptors, precautions should be taken to avoid dust generation, including using of a reusable stockpile cover and fencing to form a high barrier to	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
						prevent wind lifting and dispersing. Settling ponds, silt fences and screens should be used to prevent sediment transport into surface water/drain.		
		• Noise and Vibration during the construction hours	3	5	15	• Avoid locating machinery and equipment near sensitive receptors (near building). • Schedule noisy activities towards the middle of the day. • Ensure that all pieces of machinery are equipped with proper silencers and exclude those that are improper state for minimizing noise generation at source. • Ensure workers and drivers are provided with appropriate PPE including ear protective equipment. • Using Low-level vibration equipment near sensitive receptors (near residual `buildings).	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB
		• Traffic Congestion during the construction hours	3	3	9	• Provide a temporary passage way for general traffic. • Locate parking of machinery in designated sites only. • Adjustment of working hours to	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
						local traffic patterns, e.g., avoiding major transport activities during rush hours. • Clear signs shall be installed in view of public, warning people of potential dangers, such as moving vehicles, hazardous materials, etc.; all dangerous sites should be secured from unauthorized access. • Speed breakers will be constructed at critical pedestrian crossings		
		• Fuel Spills during the construction hours	2	3	6	• Check that vehicles are regularly maintained to prevent fuel and oil leakages and to meet national regulative requirements. • Stop the operation of leaking machinery and replace with those in proper working condition. • Store equipment for cleaning up spillages properly to ensure it is easily available when needed. • Clean the area of spillage immediately to prevent potential contamination of soil and groundwater using a dedicated absorbent material.	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB
		• Dust generation and smoke during the	3	3	9	• All dust generating roads should	Contractor's	Environment

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
		construction hours				be watered to suppress dust formation during movement of vehicles, as frequent as necessary depending on circumstances. • Trucks carrying earth, sand or stone should be covered with tarpaulins or other suitable cover. • Ensure that all vehicles and machinery are fitted with appropriate emission control equipment, maintained frequently and serviced to the manufacturers' specifications. • Smoke from internal combustion engines should not be visible for more than ten seconds.	Project Manager/ EHS person	Specialist of CSC/ PMU-NHA/ADB
13	Sensitive receptors disturbance due to construction of road and its ancillary facilities	• Inconvenience due to construction activities to SRs. • Construction activities may cause the increase in air emission, noise levels and construction waste disposal near the SR.	3	5	15	• Provision of SSEMP and subplan may be implemented with letter and spirit. • Regular water sprinkling near the SRs, to control the dust • Use of low noise machinery during the construction • Regular maintenance/tunning of construction machinery • Implementation of Dust management plan, OHS plan, Waste Management plan etc	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU-NHA/ADB

SR. NO	CONSTRUCTION ACTIVITY	IMPACTS	LIKELIHOOD	CONSEQUENCE	RISK SCORE	MITIGATION MEASURES	IMPLEMENTED BY	MONITORED BY
14	Natural Hazards (Flooding, earthquake)	• May cause the damage to the project activities and workforce.	3	5	15	• The implementation of the project should 100% in compliance with the approved drawings and SSEMP	Contractor's Project Manager/ EHS person	Environment Specialist of CSC/ PMU/ADB

4.5 Environmental Issues and Mitigation Measure:

82. The specific mitigation measures for the risks assessed in Table 4.4 above are superimposed on the project layout as shown in Figure 4.2 below, followed by details of the mitigation measures in Table 4-4.

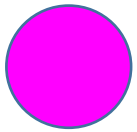
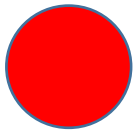
Figure 4-2: Map Showing The Location Of Mitigation Measure At Camp.

Table 4-4: Environmental Issues and Mitigation Measure

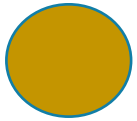
Legends	Issues	Specific Mitigation Measures	Role of Contractor	Role of CSC	Role of PMU & ADB
	Noise and Vibration	• On-site maintenance of construction vehicles and equipment will be avoided, as far as possible. • Construction vehicle will be inspected before first use at a project site located near sensitive noise receptors and at least once during construction for compliance with noise reduction measures. • Any Activity outside of normal construction hours will be minimized or avoided completely when located in the vicinity of sensitive noise receptors. • Machinery/equipment noise will be reduced at source by proper design, maintenance and repair of construction machinery and equipment. Noise from vehicles and power generators will be minimized by use of proper silencers and mufflers. • Excessive noise creating equipment will not be allowed to operate and will be replaced. • Blowing of horns will be prohibited on access roads to project site. • As a rule, the operation of heavy equipment shall be conducted in daylight hours. • Hammer-type percussive pile-driving operations shall not be allowed at night time.	The project Manager and Environment and Safety Staff will implement	The Environment Specialist of CSC will monitor and if so required will guide the contractor	The PMU-ES will verify and will report to ADB

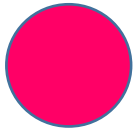
Legends	Issues	Specific Mitigation Measures	Role of Contractor	Role of CSC	Role of PMU & ADB
		• Construction equipment, which generates excessive noise, shall be enclosed or fitted with effective silencing apparatus to minimize noise. • Speed limit of 20 km/h will be observed and enforced for construction traffic			
	Air Pollution	• Spraying of water will be adopted at and around the project site to control dust emissions. Since there will be a high level of suspended dust in the project area due to the earth works, thus sprinkling of water on road surfaces, including haulage routes, will be undertaken regularly during construction. • Trucks carrying spoil materials will have tarpaulin covers to prevent spills during haulage. • SPM will be monitored at the main dust-creating sites such as crushers, and dust masks will be issued to workers. • The need for large stockpiles shall be minimized by careful planning of the supply of materials from controlled sources. Stockpiles should not be located within 500m of schools, hospitals or other public amenities and shall be covered with tarpaulins when not in use and at the end of the working day to enclose dust. If large stockpiles (>25m^3) of crushed materials are	The project Manager and Environment and Safety Staff will implement	The Environment Specialist of CSC will monitor and if so required will guide the contractor	The PMU-ES will verify and will report to ADB

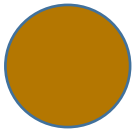
Legends	Issues	Specific Mitigation Measures	Role of Contractor	Role of CSC	Role of PMU & ADB
		necessary, they should be enclosed with side barriers and also covered when not in use. • Aggregate material will be delivered to the batching plant in a damp condition, and water sprays will be applied, if needed, to reduce dust emissions. • A minimum distance of 300 meters will be ensured between the batching plant(s)) and the nearest receptor(s) such as hospitals, schools, communities etc.			
	Ground Water Pollution	• No equipment washing is allowed in any surface water bodies throughout the project implementation period; • No wastewater shall be dumped into any water bodies • Wastewater from labor camp and construction site should be canalized into septic tanks without contacting ground. • Septic tanks should be timely emptied by a hired septic truck and transported to legally approved treatment facility or dumpsite • Fuel storage, equipment maintenance, repair workshops, and vehicle washing areas shall be stationed at least 300 m away from any water body	The project Manager and Environment and Safety Staff will implement	The Environment Specialist of CSC will monitor and if so required will guide the contractor	The PMU-ES will verify and will report to ADB

Legends	Issues	Specific Mitigation Measures	Role of Contractor	Role of CSC	Role of PMU & ADB
	Traffic Congestion	• Provide a temporary passage way for general traffic. • Locate parking of machinery in designated sites only. • Adjustment of working hours to local traffic patterns, e.g., avoiding major transport activities during rush hours. • Clear signs shall be installed in view of public, warning people of potential dangers, such as moving vehicles, hazardous materials, etc.; all dangerous sites should be secured from unauthorized access. • Speed breakers will be constructed at critical pedestrian crossings	The project Manager and Environment and Safety Staff will implement	The Environment Specialist of CSC will monitor and if so required will guide the contractor	The PMU-ES will verify and will report to ADB
	Workers Health and Safety	• Ensuring that all workers are provided with and use appropriate Personal Protective Equipment (helmet, hand gloves, boots, masks etc.); • Follow standard practices of safety checks as prescribed before use of equipment; • Provide on-site Health and Safety Training for all site personnel; • Local labor will be actively sought out by the contractor, thereby reducing or completely eliminating the need for work camps. Local labor can reduce social concerns, as these people will return to their homes at night and act in accordance with accepted community norms.	The project Manager and Environment and Safety Staff will implement	The Environment Specialist of CSC will monitor and if so required will guide the contractor	The PMU-ES will verify and will report to ADB

Legends	Issues	Specific Mitigation Measures	Role of Contractor	Role of CSC	Role of PMU & ADB
		• Monitoring will be required to ensure that the health and safety plan based on contract specifications is followed. • Cement feed hopper areas will be inspected daily to ensure compliance with the requirement of dust masks.			
	Community Health and Safety	• Work areas outside the project site, especially where machinery is involved, will be roped off and will be constantly monitored to ensure that local residents, particularly children stay away. Also, no machinery will be left unattended, particularly in running condition. • Local communities in the project area will be briefed on traffic safety, especially women who are the main care providers to children. • Speed limit of 20 km/hr. will be maintained by all project related vehicles and nighttime driving of project vehicles will be limited where possible. • Educate drivers on safe driving practices to minimize accidents and to prevent spill of hazardous substances and other construction materials during transport. • The movements of the labor and site staff engaged for the project will be restricted to the project site and the Contractor will	The project Manager and Environment and Safety Staff will implement	The Environment Specialist of CSC will monitor and if so required will guide the contractor	The PMU-ES will verify and will report to ADB

Legends	Issues	Specific Mitigation Measures	Role of Contractor	Role of CSC	Role of PMU & ADB
		ensure that the female students/staff of the institutions and offices in the project area do not face any privacy or safety issues due to the labor and site staff.			
	Soil Contamination	• It will be ensured that spill prevention trays are provided and used during refueling. Also, on-site maintenance of construction vehicles and equipment will be avoided as far as possible. In case on-site maintenance is unavoidable, tarpaulin or other impermeable material will be spread on the ground to prevent contamination of soil. • Regular inspections will be carried out to detect leakages in construction vehicles and equipment and all vehicles will be washed in external commercial facilities. • Fuels, lubricants and chemicals will be stored in covered bounded areas, underlain with impervious lining. Appropriate arrangements, including shovels, plastic bags and absorbent materials will be available near fuel and oil storage areas.	The project Manager and Environment and Safety Staff will implement	The Environment Specialist of CSC will monitor and if so required will guide the contractor	The PMU-ES will verify and will report to ADB

Legends	Issues	Specific Mitigation Measures	Role of Contractor	Role of CSC	Role of PMU & ADB
	Waste Management (Hazardous and Non-Hazardous)	• Excavated material from water distribution network cells will be stored at site and it will be used as cover after laying of transmission lines. • All types of combustible and non-combustible waste including plastic or glass bottles and cans will be temporarily stored on site and later sold/handed over to a waste/recycling contractor who will utilize these wastes for recycling purposes. • Waste management training for all site staff to be included in Contractor's training plan. • Fuel storage areas and generators will have secondary containment in the form of concrete or brick masonry bunds. The volume of the containment area should be equal to 120% of the total volume of fuel stored. • Fuel and hazardous material storage points must be included in camp layout plan to be submitted for approval. Hazardous material storage areas shall include a concrete floor to prevent soil contamination in case of leaks or spills. Fuel tanks will be checked daily for leaks and all such leaks will be plugged immediately. • Designated vehicles/plant wash down and refueling points must be included in camp layout plan to be submitted for approval.	The project Manager and Environment and Safety Staff will implement	The Environment Specialist of CSC will monitor and if so required will guide the contractor	The PMU-ES will verify and will report to ADB

Legends	Issues	Specific Mitigation Measures	Role of Contractor	Role of CSC	Role of PMU & ADB
	Camp & Batching Plant Effluent	• It will be ensured that no untreated effluent is released to the environment. • A closed sewage treatment system including soak pits and septic tank will be constructed to treat the effluent from the construction/labor camps. • Sewage treatment system will be installed at each respective labor camp based on the number of laborers residing at the respective camp. • Wastewater from laundry, kitchen washings and showers will be disposed-off into soak pits or septic tank (where soak pit cannot be constructed) and after treatment it will disposed of in TMA provided drains in the project area. • Soak pits will be built in absorbent soil and shall be located 300 m away from a water well, hand pump or surface water body. Soak pits in non-absorbent soil will not be constructed. • Ensure that the soak pits remain covered all the time and measures are taken to prevent entry of rainwater into them. • Sprinkling of grey water or sewage will not be allowed; in case the septic tank gets filled with sludge, septic tank shall be emptied through vacuum truck and material shall be transferred to treatment facility or approved municipal drain. • Water being released from any batching	The project Manager and Environment and Safety Staff will implement	The Environment Specialist of CSC will monitor and if so required will guide the contractor	The PMU-ES will verify and will report to ADB

Legends	Issues	Specific Mitigation Measures	Role of Contractor	Role of CSC	Role of PMU & ADB
		plant(s) must be treated as per requirements of SEQS prior to release to sewerage system/any other water body. • Sewage at the end of construction period to be disposed of in nearest municipal drains after getting approval from concerned municipal authorities.			
	Natural Hazards (Flooding, earthquake)	The implementation of the project should 100% in compliance with the approved drawings	The project Manager and Environment and Safety Staff will implement	The Environment Specialist will monitor and if so, required will guide the contractor	The PMU-ES will verify and will report to ADB

5 INSTRUMENTAL ENVIRONMENTAL MONITORING PLAN

83. Monitoring Plan is an essential part of the SSEMP. It is Contractor's contractual obligation to implement the SSEMP. In this regard, Contractor has engaged full time technical staff capable of carrying out the suggested measures in the SSEMP. The detail of environmental monitoring schedule and frequency is given in Table 5.1 and Table 5.2

5.1 Objectives of Environmental Monitoring:

84. The main objectives of the monitoring will be to:

- Monitor the actual project impact on physical, biological and socio-economic environment.
- Check the implementation status of SSEMP.
- Recommend mitigation measures for any unexpected impact or where the impact level exceeds from stringent values (national and international standards)
- that anticipated in the SSEMP
- Ensure compliance with legal and community obligations including safety on construction sites.

85. The mmonitoring tests outlined in Table 5.1 below shall be performed through KP EPA certified environmental laboratory and reports of monitoring tests would be shared with supervisory consultant for further guidance.

Table 5-1: Pre-Construction Environmental Monitoring Plan

Environmental Parameter	Objective of Monitoring	Parameters to be Monitored	Measurements	Location	Frequency	Responsibilities		
						Execution	Supervision	Monitoring
Noise	To determine the baseline sound pressure levels and to propose the mitigation measures	Ambient noise level near key receptors:	Noise Meter (24hrs)	Near Camp Site and near sensitive receptor.	Once before Site Preparation	Project Manager (PM)/ Environment specialist of Contractor (ESC)	Environment Specialist of CSC	PMU and ADB
Air Quality	To determine the the baseline air quality and to propose/adopt the mitigation measures	PM_{10},$PM_{2.5}$, SO_2, CO, and NO_x	24-hr concentration levels	At three random receptor locations along the project area	Once before Site Preparation	PM / ESC	Environment Specialist of CSC	PMU and ADB
Groundwater Quality	To establish Groundwater quality in project Area before the commencement of works	pH, TDS, TSS, Coliform, E-coli, EC, Metals, Alkalinity, Total Hardness, Cl, F, As, etc	Water samples for comparison against PEQS / WHO parameters	At two locations around the site in the project area Camp site Nearest Water sources	Once before Site Preparation	PM / ESC	Environment Specialist of CSC	PMU and ADB
Soil Quality	To prevent contamination of soil from oil and toxic chemical spills and	Incidents of oil and toxic chemical spills	Visual inspections	At construction site and at vehicle and machinery refuelling & maintenance	Once before Site Preparation	Environment specialist of contractor	Environment Specialist of CSC	ES and ADB

Environmental Parameter	Objective of Monitoring	Parameters to be Monitored	Measurements	Location	Frequency	Responsibilities		
						Execution	Supervision	Monitoring
	leakages			areas				

Table 5-2: Construction Environmental Monitoring Plan

Environmental Parameter	Objective of Monitoring	Parameters to be Monitored	Measurements	Location	Frequency	Responsibilities		
						Execution	Supervision	Monitoring
Noise	To determine the effectiveness of noise abatement measure on sound pressure levels	Ambient noise level near key receptors:	Noise Meter (24hrs)	Near Camp Site Active Construction Site Near residential building and near sensitive receptor.	Monthly	Project Manager (PM) / Environment specialist of Contractor (ESC)	Environment Specialist of CSC	PMU and ADB
Air Quality	To determine the effectiveness of dust control program on dust at receptor level	PM_{10}, $PM_{2.5}$, O_2, CO, and NO_x	24-hr concentration levels	At three random receptor locations along the project area	Quarterly	PM / ESC	Environment Specialist of CSC	PMU and ADB
Groundwater Quality	To establish groundwater quality in project area	pH, TDS, TSS, Coliform, E-coli, EC, Metals, Alkalinity, Total Hardness, Cl, F, As etc	Water samples for comparison against PEQS /WHO parameters	At two locations around the site in the project area	Quarterly	PM / ESC	Environment Specialist of CSC	PMU and ADB

Environmental Parameter	Objective of Monitoring	Parameters to be Monitored	Measurements	Location	Frequency	Responsibilities		
						Execution	Supervision	Monitoring
				Camp site Nearest Water pump				
Waste water Quality	To establish waste water quality in project site	pH, TDS, TSS, EC, Metals, Alkalinity, BOD_5, COD, Total Hardness, Cl, F, As etc	Water samples for comparison against PEQS /WHO/IFC parameters	Final Discharge from the camp	Quarterly	PM / ESC	Environment Specialist of CSC	PMU and ADB
Safety precautions **by workers**	To prevent accidents for workers and general public	Number of near miss events and accidents Near Camp Site Active Construction Site Near residential building and near sensitive receptor.taking place Active Construction Site Near residential building and near sensitive receptor.taking place	Visual inspections	Construction site	Once Daily	Environment specialist of contractor	Environment Specialist of CSC	ES and ADB

Environmental Parameter	Objective of Monitoring	Parameters to be Monitored	Measurements	Location	Frequency	Responsibilities		
						Execution	Supervision	Monitoring
Soil Contamination	To prevent contamination of soil from oil and toxic chemical spills and leakages	Incidents of oil and toxic chemical spills	Visual inspections	At construction site and at vehicle and machinery refuelling & maintenance areas	Once a month	Environment specialist of contractor	Environment Specialist of CSC	PMU -ES and ADB

5.2 Pre-construction Ambient Environment Monitoring:

86. Environmental Monitoring locations have been identified for Ambient Air, Noise and Water Quality monitoring. The criteria for selection of monitoring locations along with map showing environmental monitoring and sampling points are attached in Section Environmental monitoring has been conducted, started from 18 January 2024 to 20 January 2024 and results of ambient air, noise monitoring and water testing are provided as **Annex-12**

5.3 Environmental Awareness Training:

87. The Contractor shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the SSEMP.

88. The presentation shall be conducted, as far as is possible, in the English/Urdu language. The trainings will be conducted on quarterly basis for each defined working groups. As a minimum, training should include:

- Explanation of the importance of complying with the SSEMP.
- Discussion of the potential environmental impact of construction activities.
- The benefits of complying with the health, safety and environmental procedures.
- Employees' roles and responsibilities, including emergency preparedness and response.
- Explanation of the mitigation measures against the health, safety and environmental hazards, which must be implemented when carrying out their activities.
- Explanation of the specifics of this SSEMP and its specification.
- The contractor shall keep records of all the training sessions, including names, dates and the information presented.

89. A suitable training program is to train the Contractor staff who will be involved in the Construction Phase and the professional staff from the proponent involved at the operational stage of the Project.

Table 5-3: Detail of Environmental Awareness Training

Training Provided by	Content	Trainees	Duration
Training consultants/ Organizations specializing in environmental management and monitoring	Short seminars and courses on Environmental laws and regulations, daily monitoring and supervision	➢ CAREC Lot-2 staff Contractor ➢ Project staff ➢ Project implementation staff	1 day
Training consultants/ organizations specializing in social management and monitoring	Short seminars and courses on social awareness	➢ Project staff dealing in Social/lands matters	1 day
Training consultants/ organizations specializing in Occupational, health and safety issues	Short lectures relating to Occupational Safety and Health	➢ Contractor's staff	2 days

5.4 Environmental Technical Assistance and Training Plan:

90. To raise the level of professional and managerial staff, there is a need to upgrade their knowledge in the related areas. Director Environment (EALS) should play a key role in this respect and arrange the training programs

91. Training would be required to all the three agencies including contractor, CSC, PIU, to build their capacity with the following objectives:

- Full understanding of the EMP
- Understanding of their responsibilities
- Enhance the capability to undertake their responsibilities

92. There will be three levels of trainings and CSC will maintain the training register

Table 5-4: Training of Institutions involved in Environmental Compliance

Level of Training	Responsibility	Contents
Project Induction	CSC	Overview of environmental policy of Project, Environmental approval conditions, response to environment incidents, PPEs, Environmental receptors, environmental conformances. Sanitation and Healthcare
Tool Box talks	Filed level by Contractor	Environmental aspect of managing waterways crossings, soil erosion and sedimentation control, dust & noise control, wild life protection, safety of workers, waste management etc.
Capacity Building of NHA, PIU, Contractor, and CSC national staff	International consultant to develop the training material and conduction	ADB safeguard Policy. Environmental laws, Monitoring & Evaluation of EMP, EHS guidelines, Standards, Institutional responsibilities, reporting & feed back

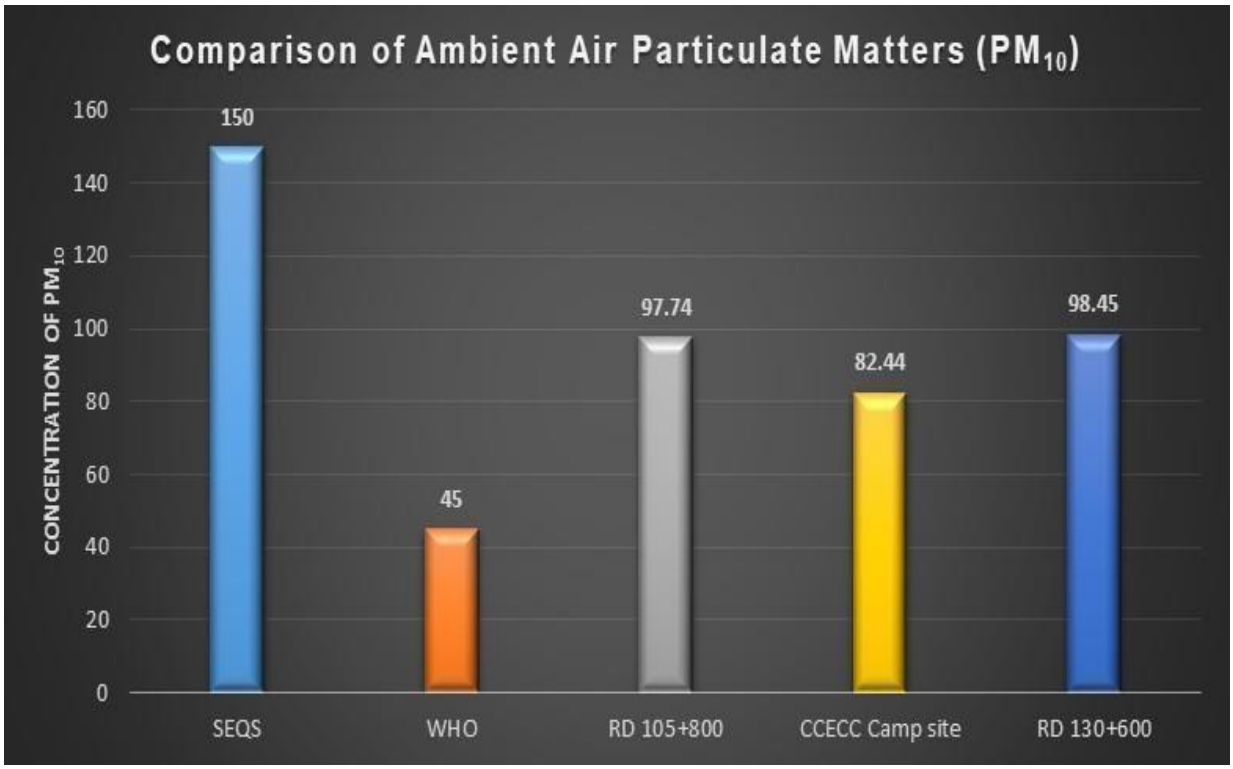
5.5 SSEMP Cost:

93. "The cost of, environmental parameters monitoring is not included in the BOQ" suggests that within the Bill of Quantities (BOQ), which is a document detailing the items, quantities, and costs of environmental parameters monitoring have not been accounted for in terms of their costs.

94. The allocated cost for implementation of SSEMP is given in table below 5-3.

Table 5-5: Environmental Management Plan Indicative Cost

Item	Cost Rupees	Remarks
Mitigation Cost		
Environmental Monitoring		
Environmental Monitoring (air, noise and water for baseline) at key points	5,000	Once for air, noise and water for baseline
Environmental Monitoring (air, noise and water during construction stage) at key points	60,000	Quarterly for air, noise and water for 3 years
Training Arrangements (Training will be carried out by CSC)	50,000	Contractor will pay for the Arrangements
Hiring of Staff	**Cost in Rupees**	
Contractor Environment Specialist	195,000	39 Person months
CSC Environment Specialists (International + 3 National)	(130,000 +189000) 319,000	4 person months for international + 26 person months for 3 position[23]
OHS Manager	150,000	24 months
PIU Environment Staff PIU Grievance Redress Staff	156,000 39,000	39-man months 39-man months
Equip OHS Manager its necessary ccessorlels'e stationery laptop etc. for proper monitoring of OHS activities	500,000.	Lumsum
Health safety & Environment Equipment's for Execution		
conduct-OHS Awareness trainings for employer and contractor staff and conducted courses to visitors and new comers	100,000x24	For 24 months
Road safety furniture's for Diversion plans,	5000,000	
Monthly OHS Manual	500,000	Lumpsum
Vehicles	100,000	Lumpsum
Fire extinguishers	4,500	Lumpsum
PPEs	700,000	Lumpsum
Drinking water facilities	5,000	Lumpsum
First Aid	300,000	Lumpsum
Tarpaulin	10,000	Lumpsum
Borrow pits	-	Included in project cost
Disposal area	-	Included in project cost
Total Cost	100 million RS	
Note: Environmental Mitigation Cost of PKR 300 M (2.14 M)		



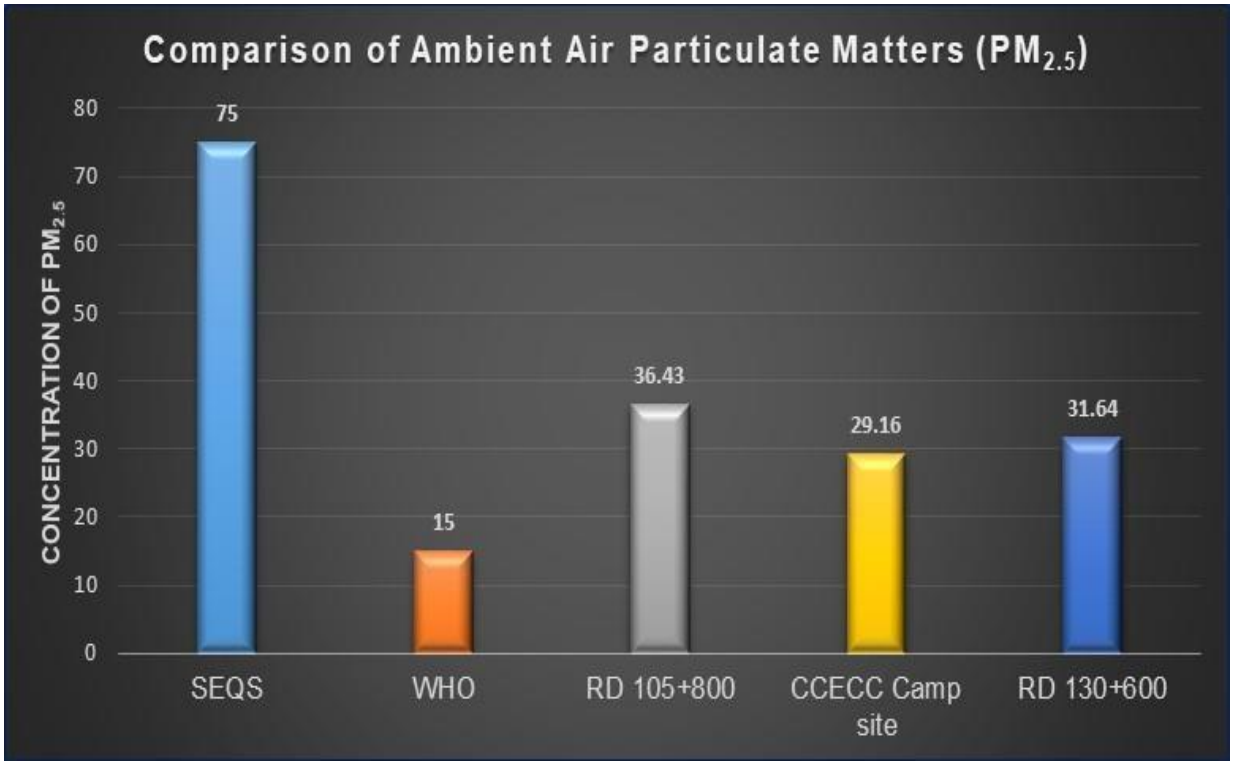


Figure 5-1 : Graphs Showing Concentration of PM10 and PM2.5 at Various Monitored Locations

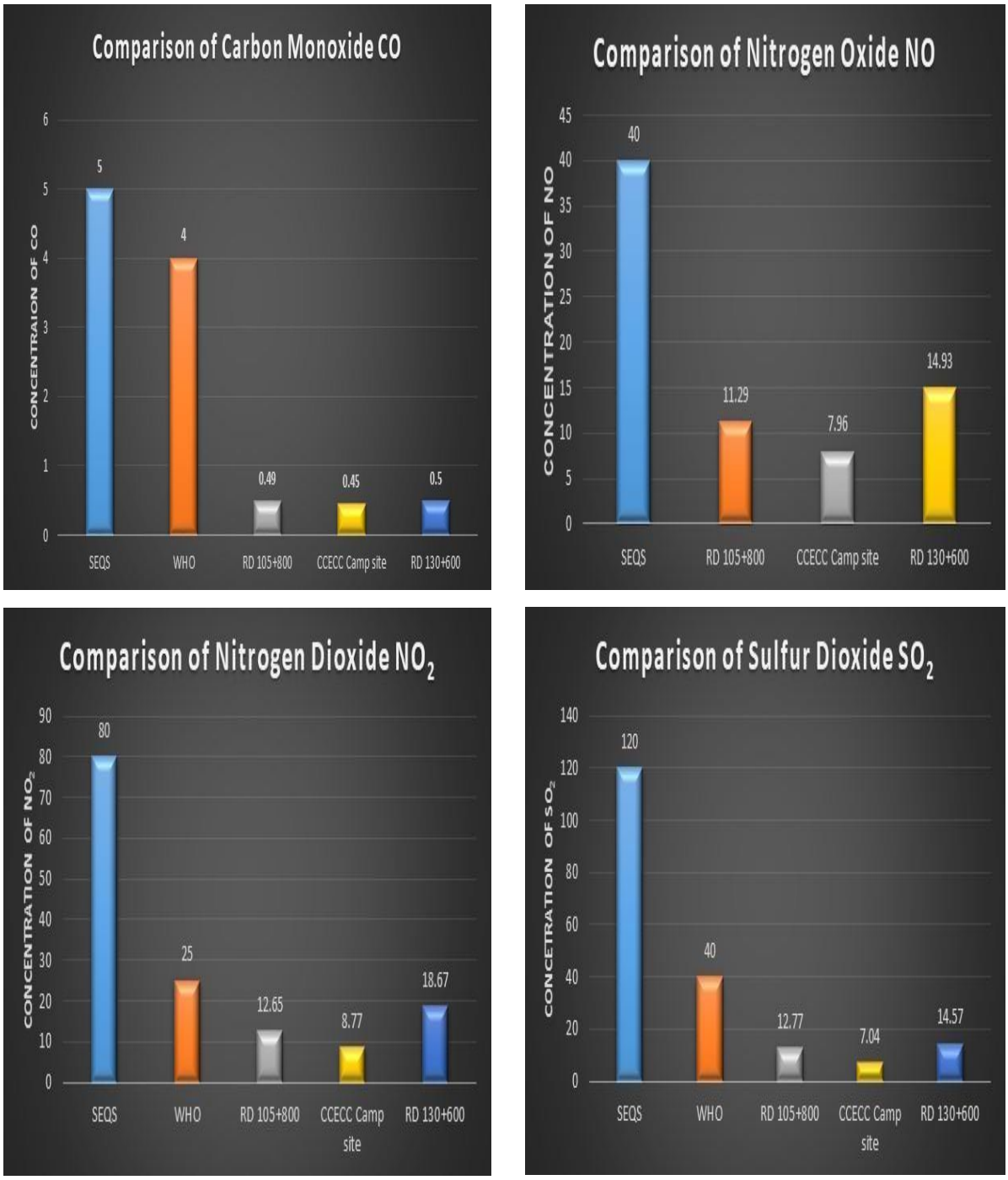


Figure 5-2: Graphs Showing Concentration of CO, NO, NO2 and SO2 at Various Monitored Locations

6 ENVIRONMENTAL WORK PLANS

6.1 Construction Safety & Security Plan:

95. The construction safety plan for the project covers the safety and health policy, safety rules, job safety training, vehicle safety, hazard communication program, etc.

6.2 Conduct of Work:

96. Contractor and sub-contractors shall familiarize their staff and work crews with known hazards on jobsites, provide training, and ensure work proceeds in a safe and secure manner. Jobsite rules must be followed and no work shall be conducted in an unsafe manner or unsafe environment. Project and contractor staff shall not tamper with or otherwise render any safety or security measure ineffective, to include alarms, signage, notices, guardrails, lighting, or any other measure.

97. Contractor shall ensure that hazard analysis and vulnerability assessments are undertaken and completed, and that mitigations of hazards and vulnerabilities are implemented. Any hazards or vulnerabilities that cannot be mitigated to an acceptable risk level must be communicated to all work crews and visitors.

6.3 Types of Safety & Security Events:

98. The variety of safety and security events, impacts, locations, levels of severity, and combinations with other elements or other emergencies makes it impossible to define and plan for every scenario. However, general types of events can be identified that may be faced by contractors, whether natural (e.g., flooding), accidental (e.g., fall), intentional (e.g., theft), or technological (e.g., communications failure). Contractor SSEMPs must adequately address reasonable possibilities.

99. Listed below are safety and security events and emergencies for which Contractor shall be prepared to respond to.

- Natural events such as extreme temperatures
- Structural collapse or imminent collapse of structures or buildings
- Fire or smoke at or near works areas
- Accidental or intentional release of hazardous and non-hazardous material
- Loss of power, lighting or communications at job sites
- Collision involving private vehicles and/or construction vehicles/equipment
- Person struck by vehicle or construction equipment
- Unauthorized access onto the worksite
- Theft of material or equipment from job sites
- Vandalism or criminal acts

- Response to injuries, fatalities, medical emergencies or equipment/facility damage
- Pandemic of communicable or infectious disease
- Site evacuation, including persons with disabilities and
- Other scenarios deemed reasonable and appropriate.

6.4 Signage & Access Control:

100. Proper signage shall be placed on the exterior of each worksite so that persons approaching the site from any area, sidewalk or known or anticipated access point are sufficiently informed that they are approaching a controlled area.

101. Signage must identify the site as a worksite, with restricted public entry, and warn of the potential dangers. A phone number must be provided for notification of hazardous or emergency conditions or to report suspicious or inappropriate activity.

102. Signage shall be placed within the site prohibiting unauthorized crewmembers from operating machinery or equipment for which they are not qualified or trained, informing site crews and visitors of Personal Protective Equipment (PPE) requirements and any other safety or security requirements.

103. Appropriate access controls shall be implemented at all worksites. Access control shall include barriers, fencing and gates or other methods to prevent unauthorized individuals and vehicles from entering the worksite.

104. All worksites on and along public roadways shall provide physical separation through traffic control and pedestrian control, using barrels, barriers, tape, signage, or other means as appropriate. Work performed in close proximity to traffic must comply with all SOPs set by the Contractor. Work zones must be adequately protected from live traffic.

105. Contractor shall keep entry/exit records of all construction work zone visitors. Each visitor shall be briefed and trained as appropriate about concerned hazards and dangers present at the work site before they are allowed to enter. All authorized work site visitors shall be required to wear proper personal protective equipment (PPE).

Figure 6-1: Signage to be used during construction.

6.5 Drugs and Alcohol Usage:

106. No person shall be working on or otherwise present at any contractor's construction site while under the influence of alcohol or any prescription drug that was not specifically prescribed to that person and taken in the directed amounts. No person shall operate any vehicle or machinery, or work in hazardous areas while under any narcotic or drug that impairs judgment or cause dizziness or drowsiness unless there is written approval by the attending physician. Particular concern shall be applied if this individual performs a safety sensitive role and/or operates equipment or machinery at the job site. Any person found in such condition must be immediately removed by the site foreman. Contractor shall enforce all alcohol and drug-free workplace policies and requirements.

107. The use of illegal drugs and alcohol is strictly prohibited on all contractors' construction project sites. As part of their Construction Safety and Security Plan, construction contractors and all subcontractors are required to have a Program that addresses the prohibited use of alcohol and drugs, including pre-placement, periodic, for cause, and post-accident/incident testing.

6.6 Fall Protection:

108. Contractors are committed to 100% continuous fall protection, whenever workers are exposed to fall hazards of six feet (6') or greater. This policy applies to all personnel working for or on behalf of Contractors.

- Contractors will take all practical measures to eliminate, prevent, and control fall hazards. All work will be planned with the intent to eliminate identified fall hazards. When a fall hazard has been identified, and cannot be eliminated, then effective means of fall protection will be implemented.
- Employees who are exposed to falls of six feet (6') or greater while working on scaffolds, elevated decks, elevated platforms, low-slope roofing, stairways, stairwells, reinforced steel, and any other elevated area or equipment, and excavations with a slope greater than 40 degrees will be protected from falls. There is no set safe distance from a leading edge or perimeter that would exempt a worker from fall protection.
- Any employee who must remove a guardrail, wall or floor opening cover, or other fall protection system in the course of their work will be responsible for providing interim protection for themselves as well as others and immediately replacing the protective system when their work is complete, during breaks or at the end of the work shift.
- When no other practical means of fall protection can be used, employees will be tied off at all times utilizing a personal fall arrest system.
- Employees may work from ladders without personal fall protection when the following criteria are met:
- Working at height does not exceed 6 feet.
- Ladder is properly tied off/secured or in the case of a stepladder; legs are fully extended and spreaders are locked.
- Work does not involve working within 15 feet of a fall exposure such as an elevated slab perimeter.

6.7 Amber Lights on Vehicles:

109. Amber warning lights shall be used on all vehicles in work zones to identify them in protected areas from adjacent traffic and other work or construction vehicles and to improve their visibility within traffic areas.

6.8 Hazardous Materials – Usage and Storage:

110. The use of any toxic materials must be properly labeled, handled only with proper PPE, and used as directed by the manufacturer and in compliance with the safety data sheets (SDS). Use of all such materials must be in accordance with OSHA specifications.

111. All hazardous materials, if stored on site, must be properly stored in safe, designated locations in appropriate containers, and shall be adequately protected from inappropriate access. MSDS for all materials used on site must be kept at the worksite and be available for audit, or in case of accidental or intentional release or exposure. Contractor safety and security personnel shall be advised as to what material is on site and where within the site it is located to allow for any personal protective equipment (PPE) or ventilation requirements that must be followed when patrolling or handling such material. All hazardous materials shall be disposed of through proper means and locations based on the material type.

6.9 Tools and Equipment:

112. All tools and equipment shall be either securely locked up each day before leaving a worksite or shall be removed from the site. No machinery or equipment shall be left unsecured and unattended such that a non-authorized person may move, start, and/or operate such machinery or equipment.

6.10 Lighting:

113. All worksites shall have adequate lighting to provide a safe and secure working environment. If natural light is insufficient for the task or to provide a safe environment and to support police, security, or patrols of worksites, supplemental lighting will be provided. If CCTV will be used, the lighting shall be sufficient to provide adequate illumination for the CCTV system.

6.11 Personal Protective Equipment (PPE) & No: of Workers:

114. All personnel, including visitors to the work site locations associated with the project, shall wear the following minimum PPE:

- Head Protection: Hard hats will be properly worn at all times.
- Eye and Face Protection: Safety glasses.
- Foot Protection: All employees shall wear work boots that cover the ankle at a minimum and shall keep their footwear in good condition at all times.
- High Visibility Clothing: Employee will wear glowing jackets
- Hearing Protection: Hearing protection will be worn like ear plugs etc.
- Hand, Arm and Leg Protection: Employees will wear task specific gloves.

115. Numbers of workers depends on volume of construction activity being executed at site, workers/labors number varies with the time and construction phase of the project contractor should ensure the availability of PPEs accordingly and record of PPEs should be kept consequently. All job specific PPEs will be provided to all workers and ensure to be properly used by all workers.

6.11.1 Fire Protection & Fire Prevention:

1 Temporary fire protection measures, such as fire extinguishers will be installed at required places. If a fire extinguisher is discharged for any purpose, it will be reported to a supervisor and removed from the work area.

- Combustible refuse from construction operations will not be burned or dumped anywhere on the construction site. Such refuse will be removed at frequent intervals, as needed.
- Oily rags and waste are to be stored separately in metal containers fitted with
- Self-closing lids. Trash and refuse must be placed in trash containers provided for this purpose.
- No open fires are permitted.
- A minimum clearance of 15 feet from fire hydrants must be maintained at all times for stored materials.
- All fire safety rules and signs will be observed and obeyed.
- No Smoking will be allowed nearby such points.

6.11.2 Fire Fighting:

116. Wood burning will not be allowed in the camp site. Immediate and appropriate action is the key to preventing major losses due to fires. If a fire occurs, call HSE Staff immediately and assist with evacuation of the area if necessary. If possible, remove or shut off the fuel source such as removing debris or material or shutting off the fuel supply. Evacuation routes shall be kept clear. After the fire has been extinguished, a thorough investigation shall be conducted and documented.

6.11.3 Severe Weather:

117. The project activities shall include procedures to address severe weather that affects construction sites, including the protection of machines/equipment and the crew working on location. Protection and hydration will be provided for workers in extreme heat. Rain must not be permitted to enter electrical equipment, which may cause electrocution to the user.

6.11.4 Housekeeping & Material Storage:

118. All equipment, tools and materials will be stored, stacked, located, placed, temporarily spotted, or set up for manipulation in such a manner as to render it highly improbable that an accident/incident or injury could occur in the work area.

119. The following measures regarding housekeeping will be taken;

- All material, spoils, debris, etc. is to be cleaned-up as it accumulates and at the end of each work shift.
- Accumulation of trash and debris will not be tolerated.

- Access walkways, roadways, and fire lanes will not be blocked with material, tools, ladders, scaffolds, welding leads, air hoses or electrical cords.
- Trash containers will be placed at appropriate locations.
- Stacks of lumber, structural steel, and similar materials shall be maintained so the stack is stable, to prevent falling or collapsing. No lumber, structural steel, or similar materials will be stacked/stored above fourteen feet (14').

6.12 Security Risk:

120. In view of the present security situation, the Contractor will have to make necessary security measures to avoid the risk of security. Due to the uncertainty of the attacker the measures for security will be with the orientation of precaution. The following precaution measures will be taken strictly.

- All camps will be fenced with temporary arrangement and at the entry of fenced the camp, security guards will be deployed for the security checking. All persons who enter or exit from the camp will be asked and searched. All vehicles coming inside will be thoroughly searched to avoid taking any hazardous materials. The person who is not cooperative with the security staff for checking will be rejected to enter or exit from the gate.
- All staff working for the project from the contractor will be issued a company working card to identity and such identity card will be required to be put on the obvious position. Anyone who is not taking such cards may be asked and searched by the security person. If the person cannot answer these questions satisfactorily they may be treated as the suspect and taken by the police deployed at the camps or from the nearby police station.
- Coordination with local police & authorities will be done to acquire more support and facilities from these authorities.

6.13 Site Inspections:

121. Daily inspections of construction sites, by competent trained persons, shall be performed to ensure the physical and behavioral conformance with this Plan, the Contractor SSEMP, and applicable local, state, and Federal regulations. Each inspection shall be logged. Any findings of non-conformance shall be escalated as a safety/security finding and brought to resolution in a timely manner. For findings of imminent danger, corrective action must be taken immediately; if immediate corrective action is not possible, the job location shall be shut down until the condition can be remedied.

6.14 Construction Safety and Security Reporting:

122. Anyone witnessing or otherwise having knowledge of unsafe behavior or an unsafe condition on or around the construction site shall immediately report it to the foreman, supervisor or designated Safety and Security Manager at the site. The responsible party must take immediate action to remedy the situation. If the unsafe

condition or practice cannot be immediately corrected (e.g., a risk resulting from defective equipment), then work shall be halted at the impacted part of the job site. Police shall be called immediately if a life-threatening situation is present.

123. A written report following the incident shall be submitted to the PM or CM within one day of the event, to include details of the event, persons involved, time/date and work conditions of the event, action taken, and suspected/known causes of the event. A full report to be submitted within three days of the incident shall include the above information as well as detailed findings as to the cause of the event and the corrective action taken to prevent, if possible, future recurrences.

6.15 Hazards and Vulnerability Identification & Management:

124. A central element of a construction safety and security program is the management of construction site hazards and vulnerabilities. A key tool to support this is a safety and security risk assessment, which identifies hazards and vulnerabilities for the physical construction aspects of the project and then develops methods to mitigate or control such risks to acceptable levels or to eliminate them. Contractor must include a methodology for assessing hazards and vulnerabilities within their work site areas. Contractor will perform the hazard and vulnerability assessment prior to performing work on the project. The outcome from the risk assessment and the plan for appropriate mitigations must be provided to the environment specialist of CSC for approval prior to the start of field work on the project.

6.16 Training:

125. The Contractor shall develop a health, safety and security training program and provide instructional health, safety, and security training for all staff working at construction sites. Training shall advise all employees at construction sites of the potential hazards on the site; the knowledge and procedures to identify, mitigate, and/or avoid such hazards; and actions to be taken in the event of a health, safety, or security incident.

126. All trainings shall be conducted by a qualified competent person familiar with the work and hazards at the job sites, and deemed competent in terms of education, relevant experience, and instructional capability.

6.17 Internal Audit & Review:

127. Contractor shall do internal audit & review to ensure compliance with this Plan and the Contractor's SSEMP, to ensure a safe, healthy, and secure environment, both physically and behaviorally, for workers, equipment, property, visitors and the general public at and near work sites. Internal audit maybe (i) At least once every year; (ii) after a major safety or security incident.

6.18 HSE Tool Box Talk:

128. A "toolbox talk" is another term for a safety meeting. The term "Toolbox Talk" was originally used as a way to encourage building workers to have a regular documented safety meeting. The best time to do this was considered to be when they stood around the tool box in the morning before starting work, so the term Toolbox Talk was born.

129. Today the Toolbox Talk is widely accepted as a common way of ensuring consultation occurs between workers, and is a practical way to raise workers' awareness of specific problems on site. It also helps to remind workers that health and safety are an important part of the working day. Toolbox Talks should be scheduled as needed, depending on the level of risks faced on the job, or the levels of experience of the workers. Management should assess how often and for how long Toolbox Talks should be held in your company.

130. The Toolbox Talk should generally, but not necessarily, be conducted by an employee of supervisory level or with basic OHS awareness. Any issues raised that cannot be resolved should be addressed by senior management.

131. The following information should be included when completing a Toolbox Talk Form:

- names and signatures of all persons present – this is important to show who has participated in the meeting,
- topics discussed – this shows what topics were covered during the meeting,
- any job specific training or instructions that have been given in the meeting, and
- Who raised the issue or added to the discussion, to show that there has been active consultation with all persons attending the meeting, and that all parties have had a chance to raise issues rather than the Toolbox Talk just being a lecture conducted by the supervisor.

132. Toolbox Talks are an excellent way of allowing open consultation within any business structure and should always be documented and reviewed.

7 GRIEVANCE REDRESS MECHANISM (GRM)

7.1 GRM Overview:

133. The social and environmental issues relating to the implementation of the Project works and their mitigation shall be identified in the SSEMP document. However, in spite of best efforts, there is very every chance that the individuals / communities affected by the project are dissatisfied with the measures adopted to address the adverse environment or social impacts of the project. In this situation an effective Grievance Redressal Mechanism (GRM) is established to ensure timely and successful implementation of the project. It will also provide a public forum to the aggrieved to raise their objections and through conflict resolution, address these issues adequately.

134. The main objective of the GRM is to investigate charges of irregularities and complaints received from any affected person and provide an early, transparent and fair resolution. Keeping in view the findings of the baseline study, it is anticipated that the nature of such complaints maybe as following

- Problems in the location of contractor's infrastructure like camp site, etc.
- Any disruption by the civil works by contractor/s like water channel disturbance, etc.
- Non-observance of project principles as laid down in the contract documents
- Any other issue arising during the project implementation including the dust generation, tree cutting, indiscriminate disposal of solid waste, involuntary resettlement, if any, traffic issues, etc.

7.2 GRM Mechanism:

135. The formal GRM proposed and provided for this project has a three-tiered structure including: first at local/village level set-up through community involvement; second at PIU level where a formal GRC is established and operational and third at NHA (PIU/EALS) level. This will enable to resolve simpler and less complex grievances at local and project level by mobilizing local recourse and provide a higher-level review system to look into and address more difficult and complex issues that are not resolved at the PIU or local level. To ensure that all geographic reaches and relevant administrative units involved in the project are covered under the GRM, it will include

(i) first level of GRM consisting of the Displaced Person Committees (DPCs) as a grievance redress focal points for each affected village; and (ii) a project based grievance redress committee (GRC) at PIU level and the iii) the PIU/ELAS level grievance redress focal points. The functions and responsibilities for each level of GRM are explained below.

7.2.1 First Level of GRM:

136. The first level of grievance redress system includes the village level displaced person committee (DPC) selected and nominated by the displaced person from each affected village/settlement located along the project road alignment. The DPC will be presided by its president who will be selected by the committee members nominated by the

displaced persons. These DPCs will be a formal node for coordination and communication with the project execution authorities and are required to act as local node for recording and redress of grievances as per their local customs and practices. The project LAR units and the technical staff will maintain a close liaison with the DPCs to guise and assist them in recording and resolution of grievances as per provision of this LARP/EMP. In this regards, the Environmental specialist/resettlement specialist and social mobilizers will closely coordinate and work together with the DPC members and the local community to ensure grievances are recorded, investigated and discussed during DPC's meetings and guide them to explore and recommend remedial measures at their level in accordance with provisions of the resettlement plan. They will also liaise with the counterpart engineering staff, and contractors to ensure implementation of the DPC's recommendations and/or raising the complaint to sub-project GRC for review and redress if the issues are not resolved at DPC level.

7.2.2 Second Level of GRM:

137. If the grievance is not resolved at village DPC level, it shall be raised to formal grievance redress mechanism which is first level of GRM. A formal complaint will be tendered with the Project GRC by the aggrieved persons or through the social mobilizers. A complaint register will be maintained by the GRC through DD/AD (land management, implementation and social) to record the complaints received covering complaint receipt date, name and address of the complainant, gist of complaint, gist of field report, decision of GRC with its communication date to the DPs and decision implementation status or elevating the complaint to next level of GRM in case of disagreement by the aggrieved Persons

138. Once the complaint is submitted with the Project GRC, it shall record it in complaint register and send acknowledgement to the affected person without delay; and initiate the process of investigation within 7 days through its technical and resettlement/environment field teams

139. After receipt of directions of GRC, the field teams including resettlement/environment specialist and Land Staff will coordinate with complainant and complete its investigation of facts in consultation with aggrieved person, DPC representatives and local community and submit its fact-finding report and recommendations to the GRC within 15 days from the receipt of complaint. Upon receipt of the fact finding report, the GRC will summon and hear the aggrieved person and decide the complaint in light of SSEMP and communicate its decision to the PIU and aggrieved persons within next 15 days. On an overall basis,

140. The GRC will decide the grievances within 30 days of receipt of complaint in GRC. If the final decision made by GRC is not acceptable to the DPs they may advise GRC for elevation of their grievance to next higher level of GRM. However, the project based GRM will not bar aggrieved persons to avail remedies available under the court of law and they will be at liberty to approach the court of law as and when they wish to do so.

7.2.3 Third Level of GRM:

141. In case the aggrieved person is unsatisfied with GRC decision, he himself or through GRC can elevate his complaint to third level of GRM i.e. at PIU/EALS in NHA HQ,

within 7 days after GRC decision on complaint. Once the complaint is received at PIU/EALS along with GRC proceedings, it will be registered and the complainant will be informed accordingly. The GRC record and complainants' claim will be scrutinized and the complainant will be advised to produce any additional record in favor of his claim. After thorough review and scrutiny of the available record PIU/ EALS can visit the field to meet the complainant, collect additional information and evidence if required. Once the investigations are completed the PIU/EALS shall get its recommendations approved by Member (aided projects) and forward them to the Project Director and the complainant accordingly within 30 days of receipt of the complaint. Moreover, the aggrieved person/party (s) is free to go to the Court of Law as and when desired.

142. **Awareness:** The stakeholders will be informed of the establishment of the PIU, GRC and GFPs through a short and intensive awareness campaign. Under the awareness campaign, the proponent will share

- Objective, function and the responsibilities of the PIU, GRC and GFPs;
- Means of accessing the PIU and the mechanics of registering a grievance at the PIU,
- GRC and GFPs;
- Operating principles of the PIU, GRC and GFPs; and contact detail

143. Additional awareness campaigns may be organized, if necessary.

7.2.4 Complaints Management Register (CMR):

144. Under the GRM, community complaint registers will be maintained by contractor and review by the RE/ARE of CSC and kept at various site offices. All complaints and grievances will be logged in these registers by RE/ARE concerned along with details including date of complaint, name and address of complainant, and description of complaint. The GRC will then fill additional details in the register including the corrective action needed, timeframe for corrective action to be taken, and person/project entity responsible for corrective action. Once the corrective action is implemented, the complainant will be informed and the GRC will document the associated details in the register including the description of action taken, date of action completed, views of the complainant regarding the corrective action, and any residual grievance.

145. The GRM will be operated in a transparent and participatory manner. Complete details of the GRM including its procedures, actions planned, and action taken will be widely disseminated particularly among the local communities, the GRM registers will remain accessible to communities and other stakeholders, and complete information of the corrective actions taken in response to the grievances will be shared with the stakeholders particularly the complainant and related community.

7.3 Constitution and Function of the GRC:

146. The project based GRC will be a public forum for raising concerns and invoking conflict resolution system available within the project for addressing LAR related and other social or environmental issues adequately. The GRCs will continue to function, for the

benefit of the DPs/aggrieved persons, during and after implementation of LARP/SSEMP till completion of the project.

147. The GRC will be headed by the Project Director, including DD/AD (land) or AD (environment) as member and focal person for social and environmental grievances, the Land Acquisition Collector and resettlement /environment Specialist mobilized through supervisions consultants as members. Besides, the GRC may also include one representative form District Revenue Office and Village level Displaced Persons Committees (DPCs).

148. For redress of grievances, the GRC will meet at least once in a month. For the purpose of social safeguards, the GRC will review grievances involving all resettlement issues including, compensation, relocation, and other assistance. GRC will perform following functions:

- Record grievances; categorize and acknowledge the complainants about receipt of grievances; investigate the issue and summon aggrieved persons/parties to produce the evidence and explain their claims; and resolve the grievances within stipulated time frame preferably in 30 days;
- Communicate its decisions and recommendations on all resolved disputes to Project executors and the aggrieved persons for implementation and follow the implementation progress;
- Forward the un-resolved cases, at its own or as required by the unsatisfied aggrieved parties, to PIU (second level of GRM) within an appropriate time frame with reasons recorded and its recommendations for review and resolution at second level of GRM;
- Develop an information dissemination system and acknowledge the aggrieved parties about the development regarding their grievance and decision of PIU level;
- Maintain a complaint register accessible to the all stakeholders with brief information about complaints and GRC decision with status report; and
- Maintain complete record of all complaints received by the GRC with actions taken.

149. The flow chart of the proposed redress mechanism is shown below in **Figure 7-1.**

Figure 7-1: Flow Chart of the Grievance Redress Mechanism.

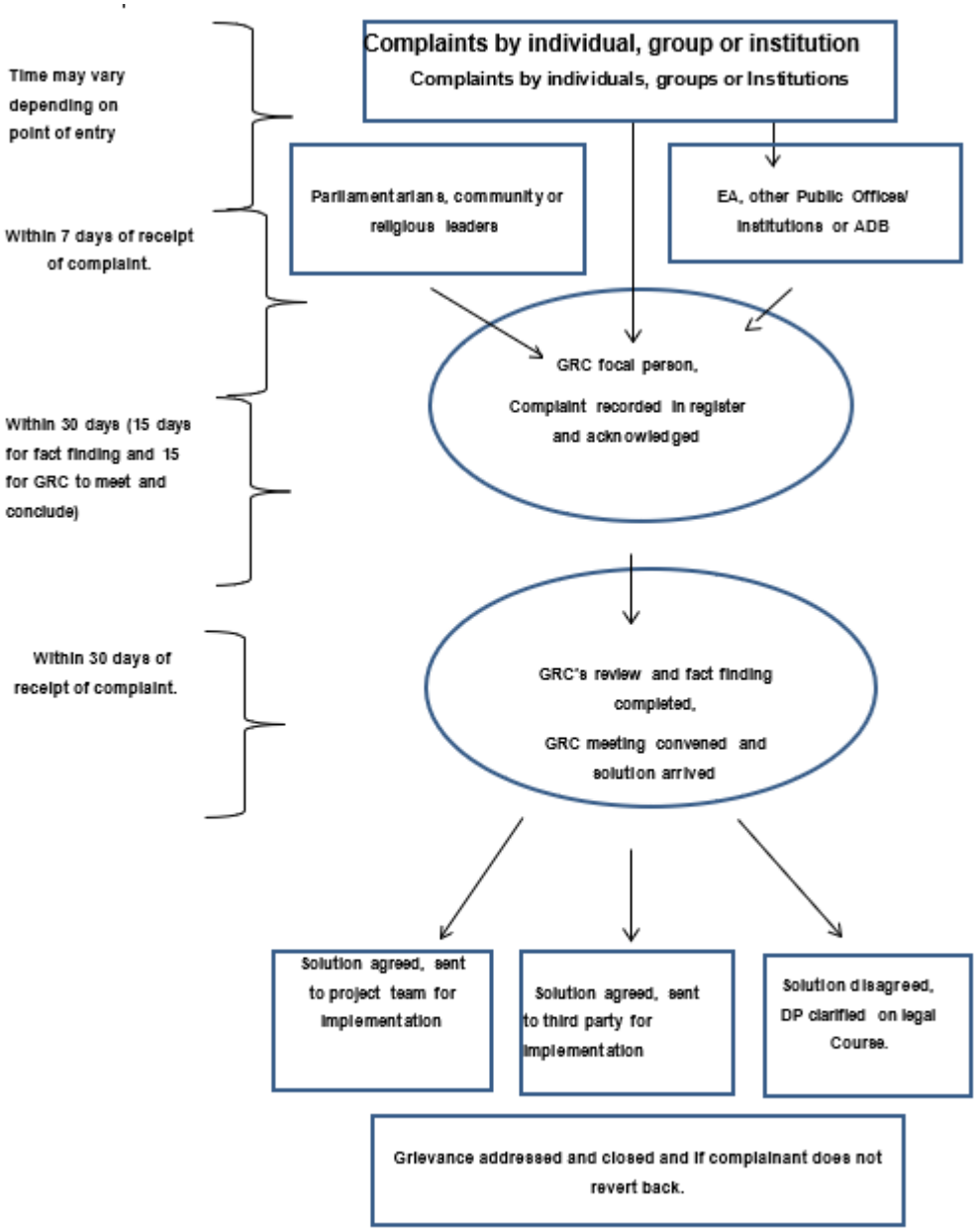


Figure 7-2: Grievance Registration form.

Grievance Registration Form

Name of Complainant: _____

Date:

Received by: _____

Grievance Details: _____

_____

_____

_____

_____

Contact Details: _____

Desired Solution by Complainant

_____

_____

_____

_____

Remarks by Environmental Engineer

_____

_____

_____

_____ _____

Name & Signature / Thumb of Complainant Official Person Name & Signatur

ANNEXURE'S

ANNEXURE 1 COVID 19 MANAGEMENT PLAN

Project Name: Central Asia of Regional Economic Corridor (CAREC) N-55, LOT-2

1. Introduction:

The purpose of this COVID-19 Management Plan is to outline the measures and protocols in place for the safe operation of our road construction project, [**Central Asia of Regional Economic Corridor (CAREC) N-55, T-II LOT-2**], which includes a campsite and working site with more than 300 workers. This plan is submitted in accordance with the Site-Specific Environmental Management Plan (SSEMP) requirements and aims to prevent the spread of COVID-19 among workers and stakeholders.

2. Objectives

The primary objectives of this COVID-19 Management Plan are:

i. To protect the health and safety of all workers on the construction site.

ii. To prevent the spread of COVID-19 within the campsite and working site.

iii. To ensure compliance with local health regulations and guidelines.

iv. To maintain project continuity while adhering to COVID-19 safety measures.

3. Responsibilities:

I. **Project Manager:** Responsible for overall implementation and oversight of COVID-19 measures.

II. **Contractor EHS Manager:** Ensures compliance with environmental, health and safety guidelines.

III. **Medical Personnel:** Available for immediate medical assistance.

IV. **Workers:** Responsible for following all COVID-19 protocols.

4. Risk Assessment:

HSE Manager will Identify and assess COVID-19 risks, considering the size and nature of the project. Risk factors may include worker density, proximity to residential areas, and local COVID-19 infection rates.

5. Communication:

M/S CCECC Establish clear communication channels for COVID-19 information dissemination, including:

Daily briefings to workers.

Posting signage and guidelines throughout the campsite and working site.

Providing contact information for reporting symptoms or concerns.

6. Health Screening:

Medical team Implement daily health screenings for all workers, including:

Temperature checks.

Symptom questionnaires.

Isolation of symptomatic individuals.

7. Hygiene and Sanitation:

HSE Officer Maintain high standards of hygiene and sanitation, including:

Frequent hand washing stations.

Availability of hand sanitizers.

Regular cleaning and disinfection of common areas.

Proper disposal of used personal protective equipment (PPE).

8. Personal Protective Equipment (PPE):

HSE Team will ensure the availability and proper use of PPE, including:

Masks for all workers.

Gloves as needed.

Face shields or goggles where necessary.

9. Social Distancing:

HSE Team enforce social distancing measures:

Restructure work areas to maintain a minimum of 6 feet between workers.

Stagger work shifts or breaks to reduce crowding.

Limit the number of individuals in shared spaces.

10. Campsite Management:

Security team will be responsible to control the access of limited visitors to the campsite.

Implement strict access controls.

Maintain proper ventilation in sleeping quarters.

Isolate and test any worker displaying symptoms.

11. Food Services:

Implement measures to ensure safe food preparation and service.

Promote distancing during meal times.

Increase cleaning and disinfection of dining areas.

12. Transportation:

Ensure vehicles are disinfected regularly.

Limit occupancy to allow for social distancing.

Wearing of masks during transportation.

13. Training and Awareness:

HSE team will conduct regular training sessions to ensure workers understand and adhere to COVID-19 protocols.

14. Reporting and Response:

Establish a protocol for reporting positive cases.

Isolate and provide medical assistance to affected individuals.

Communicate with local health authorities as required.

15. Record Keeping:

Maintain detailed records of all COVID-19 measures, including screenings, incidents, and responses.

16. Compliance and Monitoring:

Regularly audit and update the COVID-19 Management Plan as needed.

Appoint a compliance officer to oversee adherence to protocols.

17. Exit Strategy:

Develop an exit strategy for when the pandemic subsides, including the phased removal of COVID-19 measures.

18. Emergency Response:

In the event of a COVID-19 outbreak, develop a clear emergency response plan for the campsite and working site.

شکل 5: اسکریننگ

2۔ کام کی جگہ پر سکریننگ

آپ کا درجہ حرارت ٹھیک ہے اور آپ سائٹ میں داخل ہو سکتے ہیں۔ براہ مہربانی ہیلتھ سکریننگ فارم جمع کروائیں

سائٹ پر داخلے کی اجازت دینے سے پہلے درجہ حرارت کی سکریننگ کی جائے گی

» سائٹ میں داخل ہونے سے پہلے کارکن چہرے پر ماسک پہنیں گے اور صرف کھاتے یا پیتے وقت ہی ہٹائیں گے۔ کام کی جگہ پر تمام افراد اپنے درجہ حرارت کی انفراریڈ تھرمامیٹر سے سکریننگ کریں گے اور صحت کا چیک لسٹ فارم بھریں گے۔ ایک ہیلتھ چیک لسٹ فارم اس کتابچے میں بھی فراہم کیا گیا ہے (نمونہ چیک لسٹ 1)، چیک لسٹ میں مندرجہ ذیل سمیت دیگر امور شامل ہیں:

- کیا آپ مندرجہ ذیل کا سامنا کر رہے ہیں: کچھ دنوں سے گلے میں درد، جسم میں درد، سر درد یا بخار؟
- کیا آپ نے ایک مصدقہ کووڈ-19 کیس کے قریب رہ کر کام کیا ہے؟
- کیا آپ کا گزشتہ دو ہفتوں میں بخار، کھانسی، زکام یا گلے میں درد والے کسی شخص سے کوئی رابطہ ہوا ہے؟
- کیا آپ نے پچھلے چودہ دنوں میں ملک سے باہر سفر کیا ہے؟

3۔ تعمیراتی سائٹس پر کووڈ-19 سے بچاؤ کے لیے رہنما خطوط

1۔ سیلف چیک سکریننگ

» کووڈ-19 کی وبا کے بارے میں تازہ ترین معلومات سے آگاہ رہیں جو قومی، ریاستی اور مقامی پبلک ہیلتھ اتھارٹی کی طرف سے فراہم کی گئی ہیں۔

» کارکن اپنی صحت کی حالت کا جائزہ لے اور ان علامات پر نظر رکھے جو کووڈ-19 سے متعلق ہو سکتی ہیں۔ اگر کارکن ان علامات میں سے کوئی محسوس کرتا ہے تو کارکن کو مشورہ دیا جاتا ہے کہ وہ صحت حکام سے رابطہ کرے اور ای ایچ ایس آفیسر یا آن سائٹ سپر وائزر کو مطلع کرے۔

» اگر کسی کارکن میں کووڈ-19 کی علامات پائی جاتی ہوں تو وہ کام کی جگہ پر نہ آئے۔

شکل 4: کووڈ-19 کی علامات

» قابل قبول حد سے زیادہ درجہ حرارت رکھنے والے کارکنوں (5 منٹ کے آرام کے بعد بھی) یا ایسے کارکن جن میں کوئی علامت پائی جاتی ہو انہیں ٹھیکیدار کی طرف سے مقرر کردہ علاقے میں الگ تھلگ کیا جائے گا اور ایک طبی پیشہ وران کی دیکھ بھال کرے گا۔

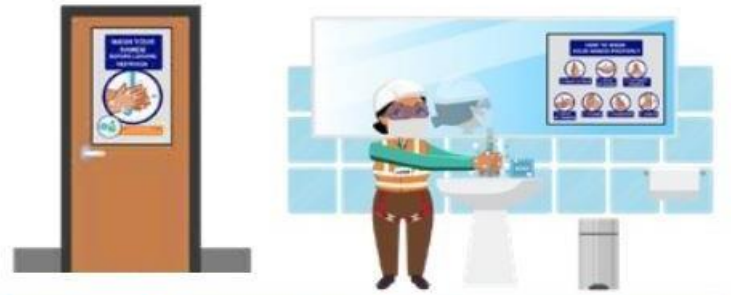
» کارکن اور مہمان علامات کی خود جانچ پڑتال کریں اور کووڈ-19 علامات نہ پائے جانے کی تصدیق کروائیں گے۔ ہیلتھ سکریننگ چیک لسٹ (سیمپل چیک لسٹ 1) اور دستاویزات اس بات کو یقینی بنانے کے لئے کلیدی ہیں کہ کارکنوں نے خود جانچ پڑتال کی ہے۔

» ای ایچ ایس آفیسر اور آن سائٹ سپر وائزر تمام کارکنوں کو سکریننگ اور دستاویزات کی اہمیت بتائیں گے۔ چیک لسٹ اور دیگر معلوماتی مواد بھی مقامی زبان میں دستیاب ہونا چاہئے۔

4۔اشارے اور یاد دہانی

»ہر ٹول باکس میٹنگ میں کارکن اس بات کی تصدیق کریں گے کہ وہ صحت مند ہیں (سر درد، بخار، زکام یا کھانسی کی کوئی علامات نہیں) اور متعدی بیماریوں کے پھیلاؤ سے بچنے کے لیے جگہ جگہ پروٹوکول کا خیال رکھیں گے۔

»ہر ورک سائٹ پر ایک لیمینیٹڈ کووڈ-19 حفاظتی رہنما خطوط اور ہاتھ دھونے کی ہدایات موجود ہونی چاہئیں۔



سائن ایج اور پوسٹر ایسی نمایاں جگہوں پر آویزاں ہونے چاہئیں جہاں یہ بآسانی نظر آسکیں

شکل 7: سائن ایج اور یاد دہانیاں

»قابل قبول حد سے زیادہ درجہ حرارت رکھنے والے کارکنوں (5 منٹ کے آرام کے بعد بھی) یا ایسے کارکن جن میں کوئی علامت پائی جاتی ہو انہیں ٹھیکیدار کی طرف سے مقرر کردہ علاقے میں الگ تھلگ کیا جائے گا اور ایک طبی پیشہ وران کی دیکھ بھال کرے گا۔

»کارکن اور مہمان علامات کی خود جانچ پڑتال کریں اور کووڈ-19 علامات نہ پائے جانے کی تصدیق کروائیں گے۔ ہیلتھ سکریننگ چیک لسٹ (سپیشل چیک لسٹ 1) اور دستاویزات اس بات کو یقینی بنانے کے لئے کلیدی ہیں کہ کارکنوں نے خود جانچ پڑتال کی ہے۔

»ای ایچ ایس آفیسر اور آن سائٹ سپروائزر تمام کارکنوں کو سکریننگ اور دستاویزات کی اہمیت بتائیں گے۔ چیک لسٹ اور دیگر معلوماتی مواد بھی مقامی زبان میں دستیاب ہونا چاہئے۔

5۔مناسب حفظان صحت

»کم از کم بیس سیکنڈ کے لیے اکثر صابن سے ہاتھ دھوئیں۔

»ہینڈ سینیٹائزر استعمال کریں۔

»اپنی پانی کی بوتل استعمال کریں، برتن شیئر نہ کریں۔

»اپنے ہاتھوں میں نہ چھینکیں۔

»اپنے ہاتھوں سے آنکھوں، ناک، منہ کو چھونے سے گریز کریں۔

شکل 8: موزوں حفظان صحت

ANNEXURE 2 DUST MANAGEMENT PLAN FOR ROAD CONSTRUCTION CAMPSITE AND WORKING SITE

Project Name: Central Asia of Regional Economic Corridor (CAREC) N-55, Tranche-II,

Project Location: Kandh kot to kashmore

1. Introduction

This Dust Management Plan outlines the strategies and measures that will be implemented to control and minimize dust emissions at the campsite and working site during the construction of N-55. The plan aims to comply with environmental regulations, protect the health and safety of workers, and minimize the impact on the surrounding environment.

2. Responsibilities

2.1. Project Manager: The project manager will oversee the implementation of the dust management plan and ensure that all measures are followed.

2.2. Contractor Environmental Officer: An environmental officer will be appointed to monitor dust control measures and compliance with environmental regulations.

2.3. Site Supervisor: The site supervisor will be responsible for supervising dust control activities on a daily basis.

3. Site Assessment and Dust Sources

3.1. Conduct an initial assessment to identify potential dust sources, including construction activities, vehicle movement, material handling, and stockpiles.

3.2. Identify sensitive receptors, such as nearby communities, schools, Hospital, Madarsas, Mosque, water bodies, and wildlife habitats

4. Dust Control Measures

4.1. Watering and Dust Suppression:

Twice a day water sprinkling will be carried out to minimize dust.

Use dust suppressants when necessary.

4.2. Road and Site Stabilization:

Apply soil stabilizers to roads and pathways.

Use gravel or similar materials on access roads to reduce dust.

4.3. Vehicle Management:

Enforce speed limits within the construction site.

Maintain vehicles to prevent excessive emissions.

Establish designated routes for vehicles to minimize dust generation.

4.4. Material Handling:

Cover and wet down materials to prevent dust during loading and unloading.

Implement dust control measures during excavation and earthwork activities.

4.5. Stockpile Management:

Cover stockpiles of materials.

Regularly wet down stockpiles to prevent dust emissions.

4.6. Equipment Maintenance:

Ensure all construction equipment is well-maintained to reduce emissions.

4.7. Waste Management:

Properly manage construction waste to prevent dust from debris.

date	Time of Sprinkling	Duration (minutes)	Area Covered (approx. meters)	Weather Conditions	Remarks/Notes
1.					
2.					
3.					
4.					
5.					
6.					

Data log book form to keep a record of water sprinkling frequency for dust management

5. Training and Awareness

5.1. Provide training to all site personnel on the importance of dust control measures and their role in implementing them.

5.2. Display informative signage regarding dust control at strategic locations on-site.

6. Monitoring and Reporting

6.1. Regularly monitor dust levels at the campsite and working site using dust monitoring equipment.

6.2. Conduct visual inspections to ensure that dust control measures are being followed.

6.3. Maintain records of dust monitoring results and inspection reports.

7. Emergency Response

7.1. Develop an emergency response plan for addressing unexpected dust-related issues promptly.

7.2. Ensure all workers are familiar with emergency response procedures.

8. Compliance with Regulations

8.1. Comply with all relevant environmental regulations and obtain any necessary permits.

8.2. Cooperate with regulatory authorities during inspections and audits.

9. Communication and Stakeholder Engagement

9.1. Communicate with local communities and stakeholders regarding the dust management plan and its objectives.

9.2. Address any concerns raised by stakeholders promptly and transparently.

10. Plan Review and Revision

10.1. Periodically review and update the Dust Management Plan as needed based on changing conditions and feedback from monitoring and stakeholders.

This Dust Management Plan will be an integral part of our commitment to minimizing dust emissions and ensuring a clean and safe working environment during the construction of N-55. We will regularly assess the effectiveness of these measures and make adjustments as necessary to meet our environmental and regulatory obligations

ANNEXURE 3 BORROW AREA MANAGEMENT PLAN AND REHABILITATION PLAN FOR ROAD CONSTRUCTION

Project Name: **Central Asia of Regional Economic Corridor (CAREC) N-55, Lot-2**

Project Location: Kandhkot - Kashmore

1. Introduction

This Borrow Area Management Plan and Rehabilitation Plan outlines the strategies and measures for the responsible management of borrow areas during the construction of N-55 LOT-2. The plan aims to ensure the sustainable use of natural resources, minimize environmental impact, and comply with relevant regulations.

2. Borrow Area Identification and Assessment

2.1. Borrow area will be identified for construction activities, such as excavation, material sourcing, and earthworks, it will be 300 meters away from the ROW.

2.2. Comprehensive environmental and geotechnical assessment will be conducted of the borrow areas to determine their suitability for extraction.

2.3. 300 meters away borrow area will be selected from sensitive receptors & ecosystems, water bodies, hospital, school, mosque and cultural heritage sites.

2. Borrow Area Management

3.1. Borrow Area Selection:

- CCECC will prioritize the use of existing borrow areas over the creation of new ones to minimize habitat disruption.
- Minimize the number of borrow areas to reduce environmental impact.
- Borrow site should have minimum setback of 300m from environmentally sensitive areas.
- No borrow pit shall be located within 300 meters from right of way.

3.2. Excavation and Material Handling:

- CCECC will implement best practices for excavation to prevent soil erosion and habitat destruction.
- CCECC will store excavated materials in designated areas to prevent soil erosion.
- To ensure that stockpile site shall be located 300 m distant from any waterway.

3.3. Site Rehabilitation:

- Plan will be developed for rehabilitation of each borrow area.
- Implement progressive rehabilitation during and after construction activities.

- .Borrow pits shall be refilled as per standard practice of agricultural/barren land

3.4. Material Stockpiling:

- Properly manage stockpiles to prevent soil and material erosion.
- Implement dust control measures in stockpile areas.

3.5. Vegetation Preservation:

- Avoid the removal of mature vegetation when feasible.
- Replant native vegetation in and around borrow areas to enhance ecosystem restoration.

4. Rehabilitation Plan

4.1. Progressive Rehabilitation:

- CCECC will implement rehabilitation measures concurrently with construction activities.
- Re-contour borrow areas to match surrounding topography.

4.2. Vegetation Restoration:

- CCECC will replant native vegetation in accordance with an approved rehabilitation plan.
- Ensure adequate watering and maintenance of planted vegetation.

4.3. **Erosion Control**:

- Implement erosion control measures such as mulching, silt fences, and sediment basins.
- Monitor and maintain erosion control structures regularly.

4.4. Water Management:

- Project Manager CCECC will be responsible to divert storm water away from borrow areas.
- Implement sediment control measures to prevent sedimentation in nearby water bodies.

4.5. Monitoring and Reporting:

- Regularly monitor the progress of rehabilitation efforts.
- Maintain records of rehabilitation activities and report progress to regulatory authorities.

5. Compliance with Regulations

5.1. Comply with all relevant environmental and mining regulations.

5.2. Obtain necessary permits and approvals for borrow area excavation and rehabilitation.

6. Stakeholder Engagement and Communication

6.1. Communicate with local communities and stakeholders regarding the borrow area management and rehabilitation plan and its objectives.

6.2. Address any concerns raised by stakeholders promptly and transparently.

7. Plan Review and Revision

7.1. Periodically review and update the Borrow Area Management Plan and Rehabilitation Plan as needed based on changing conditions, feedback from monitoring, and stakeholder input.

This Borrow Area Management Plan and Rehabilitation Plan will guide our efforts to responsibly manage borrow areas and ensure their effective rehabilitation during the construction of Road. We are committed to the sustainable use of natural resources and the preservation of the environment.

ANNEXURE 4 OCCUPATIONAL HEALTH AND SAFETY PLAN

1 GENERAL

Occupational Health and Safety covers all personnel working under the project and will be in line with the EHS guidelines on health and safety.

The Occupational Health and Safety program will aim to ensure that the workplace is safe and healthy by: addressing the hazards and risks at the workplace; outlining the procedures and responsibilities for preventing, eliminating and minimizing the effects of those hazards and risks; identifying the emergency management plans for the workplace or workplaces; and, specifying how consultation, training and information are to be provided to employees at various workplaces.

- Some of the risks/hazards associated with workplaces are due to working close to or at sites associated with the various project construction activities. Other risks associated with the project construction phase include risk of increase of vector borne and other different diseases.
- The following sections will be implemented during the construction phase to address and ensure workers' health and safety.

2 Screening and regular unannounced checking of workers

- As per the procedure for hiring workers, all contractors and labor agencies are required to make all prospective workers undergo medical tests to screen for diseases and sicknesses, prior to selection and employment of any worker. The contractor is also responsible for ensuring that no worker who has a criminal record is employed at the project site. It will be ensured that all workers undergo medical tests to screen diseases at source and at sites in consultation with the designated Health Officer.
- In addition to this, the PIU will also undertake sudden, unannounced checks on workers to look for diseases such as HIV, STDs, and hepatitis and take necessary steps as mandated by the Contractual agreement between the Contractor and the Worker(s).

3 Minimizing hazards and risks at the workplace.

To ensure safety at all work sites, the following will be carried out:

- Installation of signboards and symbols in risky and hazardous areas, to inform workers to be careful.
- Construction of barricades around construction sites and deep excavated pits, to cordon off and deter entry of unauthorized personnel and workers into these areas.
- Providing a safe storage site/area for large equipment such as power tools and chains, to prevent misuse and loss.
- Proper Housekeeping: Ensuring that materials are all stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling, or collapse. Brick stacks will not be more than 7 feet in height and for concrete blocks they will not be more than 6 feet high.
- Removing all scrap timber, waste material and rubbish from the immediate work area as the work progresses.

- Where scaffolds are required, ensuring hat each scaffold or its components shall be capable of supporting its own weight and at least 4 times the maximum intended load applied or transmitted to it. The platform/scaffold plank shall be at least 15 inches wide and

  1.5 inches thick. The rope should be capable of supporting at least 6 times the maximum intended load applied or transmitted to that rope. Pole scaffolds over 60 feet in height shall be designed by a registered professional engineer and shall be constructed and loaded in accordance with that design. Where scaffolds are not provided, safety belts/safety nets shall be provided;

- Ensure that all ramps or walkways are at least 6 feet wide, having slip resistance threads and not inclined at more than a slope of 1 vertical and 3 horizontals.
- Stacking away all excavated earth at least 2 feet from the pit to avoid material such as loose rocks from falling back into the excavated area and injuring those working inside excavated sites.
- Constructing support systems, such as bracing to adjoining structures that may be endangered by excavation works nearby.
- Install fire extinguishers and/or other fire-fighting equipment at every work site to prepare for any accidental fire hazards.

4 Provision of Personal Protective Equipment

- Risks to the health and safety of workers can be prevented by provision of Personal Protective Equipment (PPEs) to all workers. This will be included in the construction cost for each Contractor. Depending on the nature of work and the risks involved, contractors must provide without any cost to the workers, the following protective equipment:
- High visibility clothing for all personnel during road works must be mandatory.
- Helmet shall be provided to all workers, or visitors visiting the site, for protection of the head against impact or penetration of falling or flying objects.
- Safety belt shall be provided to workers working at heights (more than 20 ft.) such as roofing, painting, and plastering.
- Safety boots shall be provided to all workers for protection of feet from impact or penetration of falling objects on feet.
- Ear protecting devices shall be provided to all workers and will be used during the occurrence of extensive noise.
- Eye and face protection equipment shall be provided to all welders to protect against sparks.
- Respiratory protection devices shall be provided to all workers during occurrence of release of particulate matter, or vehicular emissions.
- Safety nets shall be provided when workplaces are more than 25 feet (7.5 m) above the ground or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors or safety belts is impractical.
- First aid kits will be made available at all times throughout the entire construction period by the respective contractors. This is very important,

because most work sites will be at some distance from the nearest hospital. In addition to the first aid kits, the following measures should be in place:

- The specific PPE requirements for each type of work are summarized below.

5 PPE Requirement List

Type of Work	No of Workers	Description of PPEs
Elevated work	10	Safety helmet, safety belt (height greater than 07 ft.), footwear for Elevated work.
Handling work safety	02	Helmet, leather safety shoes, work gloves.
Welding and cutting work	02	Eye protectors, shield and helmet, protective gloves.
Grinding work	01	Respirator, earplugs, eye protectors.
Work involving handling of chemical substances	05	Respirator, gas mask, chemical-proof gloves. Chemical proof Clothing, air-lined mask, eye protectors.
Wood working	04	Hard hat, eye protectors, hearing protection, safety footwear, leather Gloves and respirator.
Concrete and masonry work	10	Hard hat, eye protectors, hearing protection, safety footwear, leather Gloves and respirator.
Excavation, heavy equipment, motor graders, and bulldozer operation	10	Hard hat, safety boots, gloves, hearing protection.

6 Provision of dispensaries by the individual contractor.

- A vehicle shall be on standby from the Project Office so that emergency transportation can be arranged to take severely injured/sick workers to the nearest hospital for immediate medical attention.
- A designated Health Officer/worker for the Project will be identified as a focal person to attend to all health and safety related issues. This employee's contact number will be posted at all work sites for speedy delivery of emergency services. The focal person shall be well versed with the medical system and facilities available at the hospital.
- Communication arrangements, such a provision of radios or mobile communication for all work sites, for efficient handling of emergencies, will be made.

7 Record Maintenance and Remedial action

- The PIU will maintain a record of all accidents and injuries that occur at the work site. This work will be delegated by the contractor to the site supervisor and regularly reviewed every quarter by project management. Reports prepared by the contractor shall include information on the place, date and time of the incident, name of persons involved, cause of incident, witnesses present and their statements. Based on such reports, the management can jointly identify any unsafe conditions, acts or procedures and recommend for the contractor to undertake certain mitigate actions to change any unsafe or harmful conditions.

8 Compensation for Injuries and Death

- Any casualty or injury resulting from occupational activities should be compensated as per the local labor laws. Where compensation is sought by the injured party, proper procedures for documentation of the case will be followed, including a detailed report on the accident, written reports from witnesses, report of the examining doctor and his/her recommendation for treatment. Each individual contractor will be responsible for ensuring compensation for the respective workers.

9 Awareness Programs

- The PIU will undertake awareness programs through posters, talks, and meetings with the contractors to undertake the following activities:
- Dissemination sessions will clarify the rights and responsibilities of the workers regarding interactions with local people (including communicable disease risks, such as HIV/AIDS), work site health and safety, waste management (waste separation, recycling, and composting), and the illegality of poaching.
- Make workers aware of procedures to be followed in case of emergencies such as informing the focal health person who in turn will arrange the necessary emergency transportation or treatment.

10 Nomination of a Health and Safety Focal Person

- Within each site (especially if different sites are being implemented by different contractors), a Health and Safety Focal Person will be appointed. The Terms of Reference for the focal person will mainly be as follows:
- Function as the focal person/representative for all health and safety matters at the workplace;

GENERAL GUIDELINES FOR HEALTH AND SAFETY

The following points are vital to a successful health and safety program:

- No person shall be instructed or required to work under conditions that are dangerous to their health.
- Each employee is responsible to carry out works in a safe manner, including the use of Personal Protective Equipment (PPE) when required and general personal safe work practices. Each employee shall report unsafe conducts of work, preventing avoidable accidents to site personnel. Reporting shall be made to the designated, safety representative (EHS), PM or SE on site.
- Worksite shall have person(s) available on site that can translate information in relevant languages when required.
- Inductions shall take place for each individual employed at the project site, together with visitors. The induction will identify the known site safety and health risks as well as mitigating measures.

11 Ensuring Site Safety

- The most valued resources are employees, the client and the communities. It must be dedicated to providing a safe and healthful environment for employees and customers, protecting the public, and preserving contractors' properties and assets.

- The Safety Plan will assist management and employees in controlling hazards and minimizing employee and customer injuries, damage to resident's property and damage to contractors, clients and community's properties.
- All employees of the project and sub-contractors will follow this program. Noncompliance to this program by employees or sub-contractors will result in one of the following:
  - Verbal Warning; if minor violation (i.e. violation resulting in non-injury/damage)
  - written Warning; if second minor violation or minor injury/damage caused.
  - Immediate dismissal; if third minor violation, or second minor injury/damage caused, or first Major injury/damage caused.

5۔ مناسب حفظان صحت

» کم از کم بیس سیکنڈ کے لیے اکثر صابن سے ہاتھ دھوئیں۔

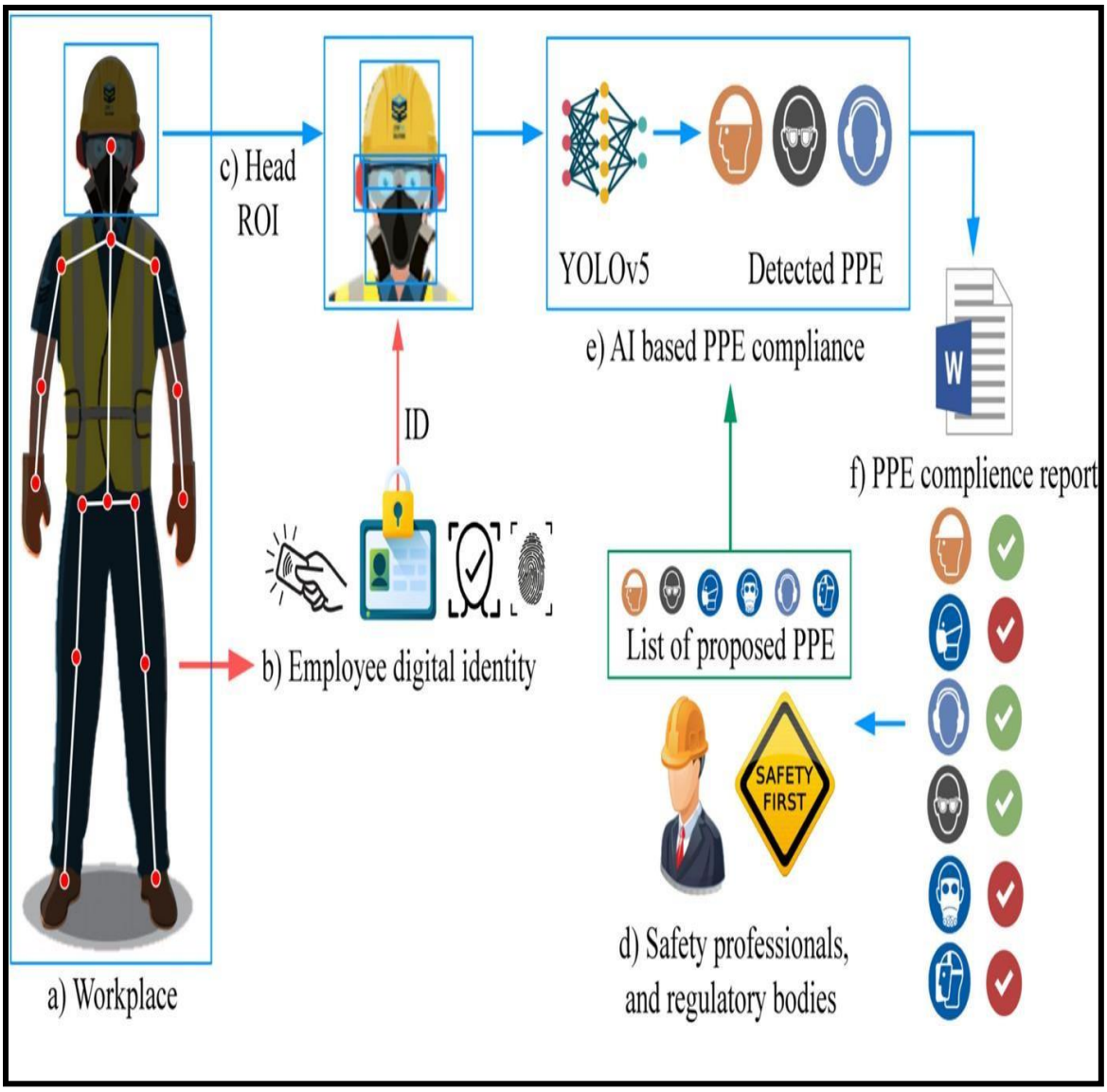
» ہینڈ سینیٹائزر استعمال کریں۔

» اپنی پانی کی بوتل استعمال کریں، برتن شیئر نہ کریں۔

» اپنے ہاتھوں میں نہ چھینکیں۔

» اپنے ہاتھوں سے آنکھوں، ناک، منہ کو چھونے سے گریز کریں۔

شکل 8: موزوں حفظان صحت


c) Head
ROI
YOLOv5
Detected PPE
e) AI based PPE compliance
f) PPE complience report
ID
b) Employee digital identity
List of proposed PPE
SAFETY
FIRST
d) Safety professionals,
and regulatory bodies
a) Workplace

INCIDENT / NEAR MISS REPORT	QUALITY RECORDS / FORMS	
	Doc. Level:	Doc. Version:1
	Doc. No	

HS.T.02	INCIDENT / NEAR MISS REPORT	
Title of Project:		
Location:		Date:

Objective(s)

To implement immediate and effective process in order to provide immediate treatment against any fatality, Injuries, Casualty.

SECTION A: TO BE COMPLETED BY PERSON INVOLVED (OR BY SUPERVISOR OR HEALTH AND SAFETY REPRESENTATIVE IF WORKER IS INCAPACITATED) AND BY THEIR SUPERVISOR

Details of the person involved in the incident/near miss

Employee #: ..... **Site Address** ..... **Work phone:** .....

Name: ..... **Father Name:** .....

Position: ..... **Date of birth:** ..... ☐ **Male** ☐ **Female**

Please select one: ☐ Member ☐ Client Member ☐ Sub Contractor ☐ Visitor/Other

Details of the: ☐ Incident ☐ Near miss ☐ Medical

Date: ..... **Time:** ..... A.M /P.M

City: ..... **Location:** .....

Was the incident/near miss reported to your supervisor, immediately: ☐ Yes ☐ No

Part of the body injured

Head	Trunk	Internal	Arm	Hand	Leg	Foot eye
☐ neck	☐ heart	☐ left	☐ left	☐ left	☐ left	☐ ear
☐ hip	☐ lungs	☐ right	☐ right	☐ right	☐ right	☐
☐ nose	☐ chest	☐ systemic	☐ shoulder	☐ thumb	☐ knee	☐ great toe
☐ mouth	☐ stomach		☐ upper arm	☐ fingers	☐ lower leg	☐ other toes
☐ teeth	☐ groin		☐ elbow	☐ palm	☐ ankle	
☐ face	☐ back		☐ forearm		☐ thigh	
☐ skull	☐ multiple		☐ wrist		☐ upper leg	☐ psychosocial

Nature of injury

☐ abrasion	☐ puncture	☐ heart attack	☐ sprain	☐ burn	☐ traumatic shock
☐ bruise	☐ laceration	☐ hearing loss	☐ strain	☐ scald	☐ electric shock
☐ fracture	☐ amputation	☐ foreign body	☐ hernia	☐ rash	☐ psychosocial
☐ concussion	☐ bite	☐ minor cuts		☐ allergy	☐ chemical

☐ aggravation of previous injury or medical condition *(please describe)*: .....

Type of incident which caused injury

☐ striking against	☐ stumbling	☐ lifting	☐ pushing	☐ ingestion
☐ struck by	☐ slipping	☐ bending	☐ pulling	☐ absorption
☐ caught in/on	☐ tripping	☐ twisting	☐ jumping	☐ inhalation
☐ stepping on	☐ falling	☐ stress	☐ vehicle	☐ needlestick
☐ other *(please describe)*:				

ANNEXURE 5 EMERGENCY RESPONSE PLAN

Purpose

The purpose of this Emergency Response Plan is to provide measures and guidance for the establishment and implementation of emergency preparedness plans for the project. The aim of the Emergency Response Procedure is to:

(i) Ensure all personnel and visitors to the office/job sites are given the maximum protection from unforeseen events.

(ii) Ensure all personnel are aware of the importance of this procedure to protection of life and property.

Emergency Preparation and Response Measure Scope

The emergency management program is applied to all Project elements and intended for use throughout the Project life cycle. The following are some emergencies that may require coordinated response.

(i) Construction Accident

(ii) Road & Traffic Accident

(iii) Hazardous material spills

(iv) Structure collapse or failure

(v) Trauma or serious illness

(vi) Sabotage

(vii) Fire

(viii) Environmental Pollution

(ix) Loss of person

(x) Community Accident

On-Site Person In charge

The Contractor's on-site in-charge shall be responsible for handling emergency situations for concerned site. He will act as Emergency Response Coordinator (ERC) and shall be responsible for ensuring that all subcontractors, staff, on-site visitors and others adhere to the appropriate emergency response procedures as stated in this Plan.

Nomination of Project In Charge

Sr. #	Name	Designation	Contact No.
1	Gull nabi	Project Representative	03336670882
2.	Navid khan	HSE Manager	03479105605

Emergency Response Team (ERT)

Emergency Response Team shall be formatted at all camps, each team comprised of 3 or 5 members including and lead by the ER Coordinator or the concerned person in-charge. All the members of the ER Team shall be trained in basic First Aid, search & rescue and firefighting; that will further provide search & rescue, first aid and arrange transportation in case of accidents and emergencies, and extinguish fires, guide workers and staff to assembly points and other safe places. The ERT shall assist the ER Coordinator in accidents investigation. The contact details of the ERTs shall be posted at prominent places so that all workers are aware of "Emergency Contact Numbers".

Detail of Emergency Response Team

Sr. #	Designation		Contact No.	Responsibilities
1	Admin Manager	Sajjad ali	03128443331	Coordinate and oversee the overall emergency response plan. Communicate with relevant authorities, internal teams, and stakeholders during emergencies, Ensure necessary resources and support are available for the response team. Coordinate the logistical aspects of the response.
2	HSE Manager	Navid khan	03479105605	Develop and update the emergency response plan. Conduct regular emergency drills and training for the team. Oversee the implementation of health, safety, and environmental protocols during emergencies. Evaluate and improve response procedures based on post-incident analysis.
3	HSE officer	Will be deputed	Will be provided	Assist in the implementation of health, safety, and environmental protocols. Participate in emergency drills and exercises.
4	Male Nurse	Will be deputed	Will be provided	Provide immediate medical assistance and first aid during emergencies. Assess and attend to the injured or affected individuals. Coordinate with medical facilities for more extensive medical needs if required
5	Fire Man	Will be deputed	Will be provided	Operate firefighting equipment and tools in the event of a fire

				emergency. Conduct fire suppression activities and assist in evacuation procedures. Participate in fire drills and ensure the maintenance of firefighting equipment.
6.	Emergency Coordinator	Will be deputed	Will be deputed	The Emergency Coordinator will support and advise the Site Safety Supervision as necessary. Serves as public relations spokes persons,
7.	Security Supervisor	Will be deputed	Will be deputed	Ensure that the exit route is regularly tested and maintained in good working order. Maintain station at the security gate or most suitable location to secure the area during any emergency such that only authorized personnel and equipment may enter, prevent access to the site of unauthorized personnel.

Action Group	Person Responsible	Responsibilities
		Assist with strong/activation of services during an emergency. Ensure vehicles and obstructions are moved to give incoming emergency vehicles access to the scene, if ambulance or emergency services are attending the site, ensure clear access and Personnel are located to direct any incoming emergency service to the site of emergency.
Rescue & Medical Team	Certified CPR/Health Safety officer	Protect the injured from further danger and weather. Provide treatment to the victim(s) to the best of their ability by first aid and then transfer to hospital. Remain familiar with the rescue activities and rescue apparatus. Assist outside medical services personnel when they arrive
General Administration Team	Sajjad	Response to support any requested general facilities for assisting Emergency Response Team in their work.
Environment Team	Environment Specialist at site	In case of emergency related to the environmental pollution such as the chemical spill, oil spill into the ambient, the environment team will support the Technical advice to control and mitigate the pollution until return to the

		normal situation.
Other Staff and Employees	All workers at site	All other staff and employees will remain at their workstations or assembly point unless directed otherwise from Emergency Response Team. Each supervisor will ensure that all members of his work group are accounted for and keep in touch with each of their Department Head.

PROCEDURE

Emergency situation and injuries to person can occur at any time or place either on Project site or elsewhere. The most two common types of emergencies on site are fire and serious accident.

General Administration Team

- Upon advice of medical emergency, maintain contact with first aid personnel and summon ambulance if required.

Security Team

- If ambulance or emergency services are attending the site, ensure clear access and personnel are located to direct vehicle closest to the scene.
- Prevent access to the site of unauthorized personnel (press, etc.).

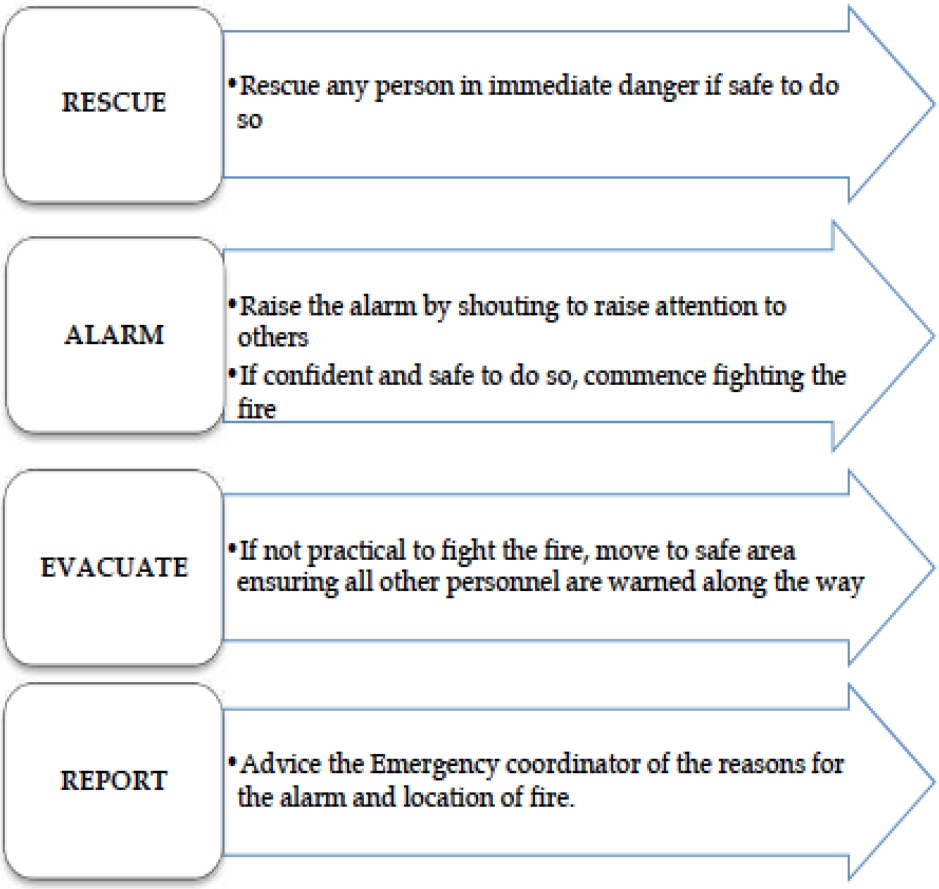
Emergency Coordinator

- The Emergency Coordinator shall assist emergency personnel at the scene as required through allocation of company resources.
- The Emergency Coordinator shall ensure next-of-kin are properly notified as soon as possible and give whatever company support and assistance is necessary to assist them bundle the situation.

First Aid Persons

- Upon advice of medical emergency, make immediate assessment to response required and if necessary, advise security to summon ambulance or medical assistance, the qualified first aid attendant should also,
- Provide treatment to the victim(s) to the best of his/her ability.
- Ensure the safety of victims by ceasing any work activity in the area.
- Protect the injured from further danger and weather.
- Assist medical services personnel when they arrive

FIRE



Assess the patient by checking for Airway, Breathing, Pulse and obvious

Report directly to First Aid or Security Centers, when raising the alarm you must clearly give the following in formation;

- Your name and the detail of accident
- The location of the injured person(s)
- The number of persons injured
- The extent of the injuries, if known
- What known hazards are in the area

Make the injured person as comfortable as possible

Treat the obvious injuries

Reassure the injured person

ANNEXURE 6 DAILY AND WEEKLY MONITORING CHECKLIST

Daily Monitoring Checklist

Project Name: _____ **Package #** _____

Monitoring Location: _____ **Date:** _____/_____/_____

Daily Monitoring Checklist

Description	Status	Additional Comments
A- Physical Conditions		
1- Ambient air quality		
Are dust emissions being regulated through sprinkling water on the routes being used by the Contractor?	☐ Yes ☐ No	
Are vehicle speeds being maintained to avoid excessive dust emissions at dust prone areas?	☐ Yes ☐ No	
Are vehicle properly tuned/maintained to reduce air emissions?	☐ Yes ☐ No	
2- Noise Control		
Are noise levels remained within safe limits?	☐ Yes ☐ No	
In case excessive noise levels are detected have appropriate mitigation measures been taken?	☐ Yes ☐ No	
3- Waste Material		
Has any natural drainage been disturbed or altered?	☐ Yes ☐ No	
Are the waste bins emptied regularly?	☐ Yes ☐ No	
Is food waste disposed in the open?	☐ Yes ☐ No	
Is medical waste being generated at camp sites and disposed of properly?	☐ Yes ☐ No	
4- Fuel/Lubricant		
Are the fuel tanks properly marked with their contents?	☐ Yes ☐ No	
Are the fuels and oils handled in a safe manner, ensuring no leakage or spillage?	☐ Yes ☐ No	
Any spillage of liquid waste occurred?	☐ Yes ☐ No	
If spillage occurred, managed properly?	☐ Yes ☐ No	
5- Traffic Management		
Is vehicle speed limit of 15 km/hr being followed?	☐ Yes ☐ No	
Is the movement of all project vehicles and personnel been restricted to within the work areas?	☐ Yes ☐ No	
Do all vehicles and generators have muffles to reduce noise levels whilst working close to communities?	☐ Yes ☐ No	
Movement of machinery restricted to designated routes?	☐ Yes ☐ No	
Construction vehicles, machinery and equipment parked at designated places within ROW?	☐ Yes ☐ No	
B- **Biological Conditions**		

1- Flora		
Have trees and branches from canal plantation been used as fuel wood?	☐ Yes ☐ No	
Has vegetation clearing been minimized?	☐ Yes ☐ No	
2- Fauna		
Are the drivers careful and watchful about wild and domestic animals?	☐ Yes ☐ No	
Any damage to animals?	☐ Yes ☐ No	
C- **Socio-economic**		
1- Community		
Are complaints from local communities being registered and responded to?	☐ Yes ☐ No	
Is un-necessary interference to adjoining private agriculture land avoided?	☐ Yes ☐ No	
Are damages (if any) to private property repaired and/or compensated by the Contractor?	☐ Yes ☐ No	
Are unnecessary visits to the nearby settlements avoided?	☐ Yes ☐ No	
Is Traffic Management Plan followed?	☐ Yes ☐ No	
2- Work Force		
Are safety equipments being used by the workers?	☐ Yes ☐ No	
3- Safety		
Are storage rooms containing hazardous material locked?	☐ Yes ☐ No	
Are sufficient guards for security deployed?	☐ Yes ☐ No	

Contractor Environmentalist: _____ **PIC Environmentalist:** _____

Additional Comments: _____

_____

Weekly Monitoring Checklist

Project Name: _____ **Package #** _____
Monitoring Location: _____ **Date:** _____/_____/_____

Weekly Monitoring Check List

Description	Status	Comments
A- Physical Condition		
1- Soil Conditions		
Is any soil erosion observed?	☐ Yes ☐ No	
Has the movement of Construction equipment been restricted to work areas to avoid unnecessary disturbance to the soil types?	☐ Yes ☐ No	
Have the area along the access road been visually monitored and show any sign of soil erosion?	☐ Yes ☐ No	
2- Fuel / Lubricants		
Is regular inspection carried to check leaks & spills?	☐ Yes ☐ No	
Is there any combustible or flammable material in the fuel storage area ?	☐ Yes ☐ No	
Are the fuels and oils handled in a safe manner, ensuring no leakage & Spillage ?	☐ Yes ☐ No	
Have the entire oil and fuel storage areas provided with impervious floor underneath to prevent soil contamination from leaks or spills?	☐ Yes ☐ No	
Are the spilled oil or fuel and used clean up material being disposed of properly ?	☐ Yes ☐ No	
Are the spills and leak thoroughly cleaned?	☐ Yes ☐ No	
3- Waste Material		
Is waste being stored temporarily on camp & sites within the designated area?	☐ Yes ☐ No	
Is any type of solid waste is being disposed of in the fields?	☐ Yes ☐ No	
Do the vehicles carry adequate container / trash bags for litter garbage and are they emptied at the camp site or other designated location regularly?	☐ Yes ☐ No	
4- Traffic Management		
Are the existing routes being used to access the project area?	☐ Yes ☐ No	
Are the number of routes kept to a minimum?	☐ Yes ☐ No	
Are shortcuts been used?	☐ Yes ☐ No	
Are all the vehicles and construction machinery properly maintained and tuned to maintain NEQS level?	☐ Yes ☐ No	
Are pressure horns being used?	☐ Yes ☐ No	
5- Borrow Areas		
Is necessary approval for the borrow areas been obtained from the Engineer?	☐ Yes ☐ No	
Is the top soil of the borrow pits removed and conserved for rehabilitation of borrow areas?	☐ Yes ☐ No	
Is the condition of approval for excavation of the borrow pits are being compiled with?	☐ Yes ☐ No	
Is the drainage profile of the area is maintained to avoid any impoundment of the agriculture runoff or storm water in the borrow areas?	☐ Yes ☐ No	
6- Camp Site		
Are the generator in the construction camp properly maintained?	☐ Yes ☐ No	
Is the emergency response plan available in the camp	☐ Yes ☐ No	

Contractor Environmentalist: _____ **PIC Environmentalist:** _____

Additional Comments: _____

_____

ANNEXURE 7 GENERAL TRAFFIC MANAGEMENT PLAN (TMP)

Purpose:

General Site Traffic management plan has been developed which aims minimizing local traffic congestions during the construction activities of CCECC in the specific project area. The plan has been developed to smoothen inconvenience to the local settlement, motors and the pedestrians.

Transportation management program has been chalked out which is based on coordinated transportation management strategies which describes how the transportation will be used to minimize work zone impact.

Traffic Management:

For smooth flow of traffic in the project areas the following traffic management plan is adopted.

- Construction work will be arranged as per traffic flux / volume.
- Construction activities will be undertaken on the new alignment.
- The local public authorities will be invited for setting up traffic regulations.
- Check and monitoring system will be mentioned for controlling smooth traffic flow.
- For safety of labors / flag men fluorescent type jackets shall be used by the flagman. This will be certainly reducing the occurrences of road accidents.
- On diversions fluorescent type of sign boards shall be displayed specially on dead ends.
- The safety officer of CCECC will make round of entire project on daily basis to ensure the display of sign board / cones especially at diversions and will also fill daily safety monitoring format, and will record every incident etc on this format and will also use improvement action report format for documentation of any incident report etc,
- There should be sufficient readymade stock of traffic sign boards available in store to immediately replace the damaged or missing sign boards.
- Record of total numbers of sign boards installed and missing sign boards will be presented to HSE Manager by the safety officer on daily basis for prompt replacement.
- Report of accident occurrences will be initiated by the safety officer to HSE Manager at the soonest.

- Temporary site specific plans shall be generated according to the safety requirement which will be applicable on all diversions, bridges, during the course of construction activities

Responsibility:

Safety officer will be responsible for all matters concerning road safety.

Complaint Register:

Record of complaints lodged from travelers, motorist pedestrians and local public shall be maintained on a complaint Register at site office for registering any complaint regarding traffic constraints etc. or even the complaints of excessive dust will be registered by the safety officer and necessary investigating measures adopted.

(Copy of format is attached with GRM Fig-9-3)

Traffic management plan for the entire project area at the specific road crossing points will be submitted separately, for the overall safety of workers of CCECC working at site, motorists and residents of the area of activity and to control occurrences of road accidents etc. CCECC shall ensure that their drivers and heavy equipment operators exercise utmost diligence in their work to avoid accidents and ensure safety and protection against accidents of all staff and labor engaged on the works and the public traveling through the work area.


CONSTRUCTION SAFETY SIGNS
CONSTRUCTION SITE
‹EXIT›
CAUTION
CONSTRUCTION IN PROGRESS
Danger
Construction traffic
SafetySignsPH.com
ASSEMBLY POINT
ہنگامی حالات میں اکھٹے ہونے کی جگہ
20
KM/H
SPEED LIMIT
آگے سڑک بند ہے متبادل راستہ استعمال کریں
زحمت کیلئے معذرت
ATTENTION: ROAD CLOSED AHEAD.
USE DIVERSION ROAD.
SORRY FOR INCONVENIENCE.
√ √
Site Safety Starts here
سائٹ سیفٹی کا آغاز ہوتا ہے - یہاں سے
FIRST AID + STATION
ابتدائی طبی امداد کی جگہ
UNDER CONSTRUCTION

ANNEXURE 8 SPILLS MANAGEMENT PLAN

Plan for Management of spilled chemicals / Oils

Purpose

The purpose for this procedure is to ensure that case of liquid Chemicals / oils spillage is managed in an environmentally safe and correct Manner.

Responsibilities

It is the responsibility of site foreman /Engineer to ensure compliance with this procedure and site engineer / foreman Concerned shop should be is familiar with this procedure.

Slope.

This procedure describes how to control Emergency of Chemical/ oil Spills within the project area.

Procedure:

In case of minor / major spillage the following steps are to be taken by the concerned supervisor / foreman.

(1) In case of major spillage carry all the safety items.
(2) Try to stop the sources of spillage.
(3) After stopping the source try to recover the chemical / Oil
(4) Collect all the spilled chemical / Oil in the Drums and shift the Drums to oil collection point after proper identification.
(5) Clean the surface with cotton rages and others in a specified area.
(6) Inform / Report to the Environmental Engineer and superiors.

Check the potential spillage areas to avoid such happenings in future

Training on spillage control:

Environmental engineer will arrange special training sessions to the workers CCECC and arrange rehearsal to organize spill drills from time to time and record of the trained Employees will be maintained.

ANNEXURE 9 SOLID WASTE DISPOSAL PLAN AND PROCEDURE

Solid waste disposal procedure for a construction project involves a systematic approach to manage various types of waste generated during the course of the project. Here's a tabular format for the disposal procedure for different types of waste:

Waste Type: Clinical Waste Disposal (Dispensary):

Step	Procedure	Responsible Party	Disposal Method
1	Segregation: Separate medical waste (e.g., used medical supplies, sharps, needles, used cotton, syringes bandages etc.) from other waste	On-Site Medical Staff	Use designated medical waste Bins.
2	**Collection:** Place medical waste in sealed, labeled biohazard bags or Bins.	On-Site Medical Staff	Store in a secure area within the medical dispensary.
3	**Disposal:** medical staff will coordinates with local hospitals for their waste disposal generated at site to collect and transport the waste for proper treatment and disposal.	EHS Manager	Follow local regulations for medical waste disposal.

Waste Type: Office, Main Store, Workers' Living Area, and Play Yard:

Step	Procedure	Responsible Party	Disposal Method
1	Collection and Segregation of waste in designated bins, which will be placed around the camp. office, kitchen, living area and lawn	Camp In Charge	Use separate drainage systems for effluent waste.
2	Small bins should be strategically placed for waste collection. Camp in charge should segregate	Camp In Charge	Regularly monitored and transported by using tractor trolley at TMA kandhkot disposal site

	their waste into general waste, recyclables, and hazardous waste if applicable. This waste will be transported to the main waste collection points		from the main solid waste collection points
3	Treatment: and from there, it will be transported to the TMA Kanhkot waste disposal site in accordance with local waste disposal regulations.	Camp In Charge	Follow local guidelines for waste disposal

Waste Type: general effluents from washrooms

Step	Procedure	Responsible Party	Disposal Method
1	Segregation: Segregate liquid effluent waste (e.g., wastewater, sewage) from solid waste.	Camp In Charge	Use separate drainage systems for effluent waste.
2	Collection: Collect effluent waste in designated Septic Tank.	Camp In Charge	Regularly monitored and pump when required and dispose off effluent waste at an approved treatment facility.
3	Treatment: Treat effluent waste in three chambered septic tank and discharge the water through pipes(having 2 feet dia) into local Nalla	Camp In Charge	Follow local guidelines for effluent treatment.

Waste Type: Kitchen Waste Disposal

Step	Procedure	Responsible Party	Disposal Method
1	Segregation: Segregate kitchen waste (e.g., food scraps, disposable	Camp Kitchen Staff	Use separate bins for kitchen waste.

	utensils) from other waste.		
2	Collection: kitchen waste will be collected in sealed bins.	Camp Kitchen Staff	Dispose of kitchen waste at a designated composting or disposal facility.
3	Composting: Compost organic kitchen waste where possible, following local guidelines.	Camp Kitchen Staff	Follow composting procedures and local regulations.

Waste Type: Site Demolition Material Waste

Step	Procedure	Responsible Party	Disposal Method
1	Segregation: Separate demolition materials (e.g., concrete, bricks, metal, etc.) from other waste. Site-demolished materials, such as debris and scarifying material from asphalt, should be sorted and stored in designated areas for recycling, reusing, or proper disposal.	Site construction Manager	Material will be segregated first and then transported into designated place.
2	Collection: Store demolition waste material temporarily at site in suitable place for the material type.	Site construction Manager	Transport the unsuitable material for landfilling process and other material will be transported for recycling centers or waste disposal sites for appropriate processing.
3	Recycling: Recycle materials like concrete and metal, where possible, according to local recycling guidelines.	Project Manager	Ensure compliance with recycling regulations.

Waste Type: Asphalt Plant Waste

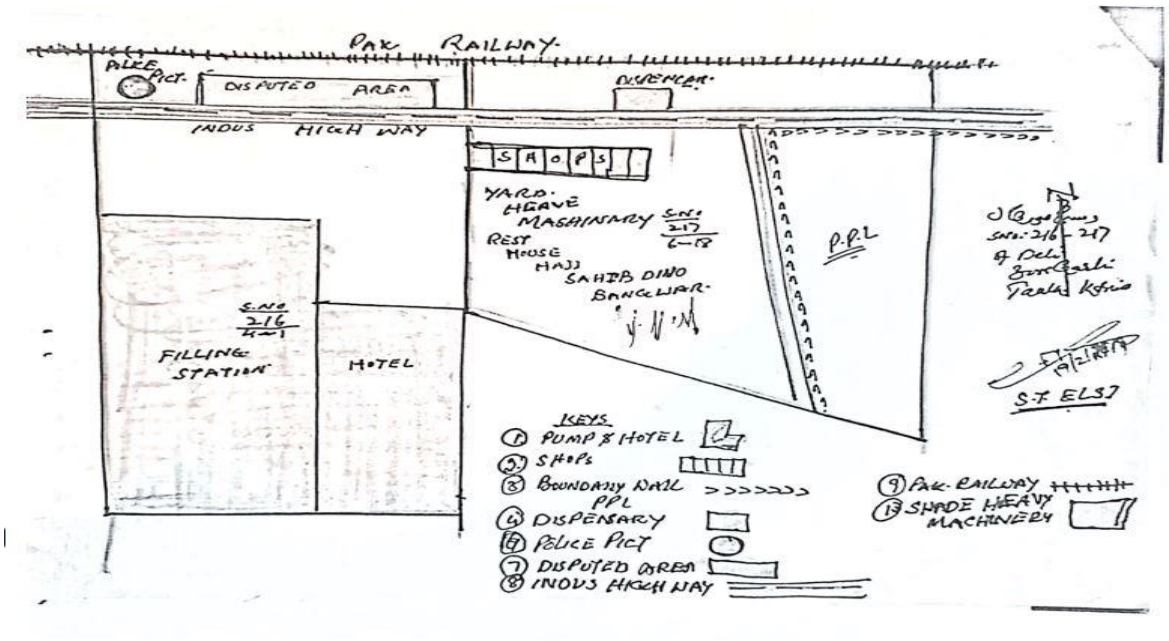
Step	Procedure	Responsible Party	Disposal Method
1	Segregation: Separate asphalt waste from other waste materials.	The plant manager and operators are responsible for the proper disposal of waste generated at the asphalt plant.	Use designated areas for asphalt waste.
2	Collection: Waste material from the asphalt plant, including slush from recycling water tanks and reaming/leftover asphalt, should be collected and segregated at the plant.	Plant Manager	Transport asphalt waste to a recycling facility or dispose of it in compliance with local regulations.
3	Recycling: Any recyclable materials should be processed for reuse, while the remaining waste should be transported to approve disposal site, following local waste management regulations.	Project Manager	Ensure adherence to recycling regulations.

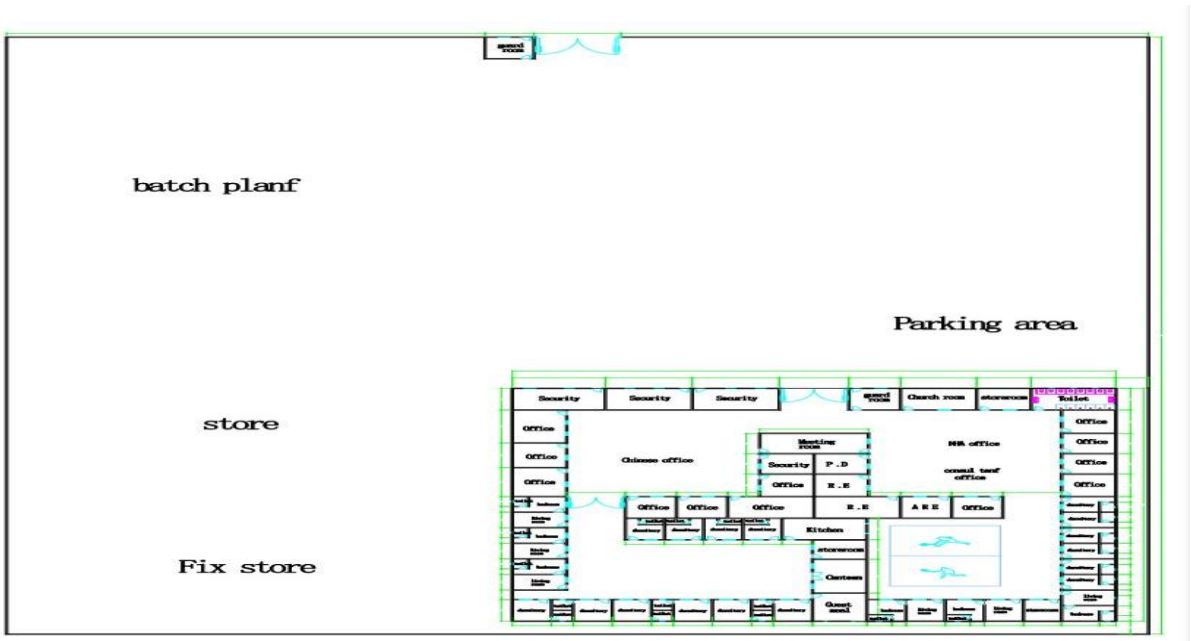
General Procedures for All Waste Types:

- All waste containers should be clearly labeled to indicate the type of waste they contain.
- Regular waste audits should be conducted to ensure compliance and identify areas for improvement.
- Transport vehicles for waste disposal must adhere to safety and environmental regulations.
- All disposal activities should be documented and reported to authorities as required.

Annexure 10 Camp Layout Plan, NOC & Lease Agreement

Camp Layout Plan





NOC From DC Kandhkot

OFFICE OF THE DEPUTY COMMISSIONER
KASHMORE @ KANDHKOT

No.Dev: Br:/ 18 /2024.
Kandhkot Dated. 1st January, 2024.

Office # 0722-921640-1
Fax # 0722-921642

READ.

1. A letter No: CCECCN55-Lot2/2023/025, dated.19th December, 2023 received from Project Manager, China Civil Engineering Construction Corporation (CCECC) Indus Highway (N-55) Additional Carriageway Road Kandhkot-Kashmore Section (Including Kashmore Bypass) Project requesting for issuance of "No Objection Certificate" for establishment of Base Camp at Gul Traders near PPL Oil Field Kandhkot for working on the Kandhkot-Kashmore N-55 Project.
2. The NOC issued by the Superintendent of Police, Kashmore @ Kandhkot, vide his office letter No:DIB/-3006, dated.31-12-2023.

ORDER.

The No Objection Certificate is hereby granted to Project Manager, China Civil Engineering Construction Corporation (CCECC) Indus Highway (N-55) Additional Carriageway Road Kandhkot-Kashmore Section (Including Kashmore Bypass) Project, Site Office Airport Road Sukkur, to establish Base Camp at Gul Traders near PPL Oil Field Kandhkot, on fulfillment of the following conditions.

- The Company should follow the SOP regarding Chinese Nationals Security to provide them bulletproof vehicle during their travelling.
- CCTVs must be installed by the Company on all the entry / exit points and also at all the corners to cover the constructions site for surveillance at and around the site.
- The boundary wall must be atleast **10 feet** higher than the floor.
- Barbed wire must be installed on the top of the wall.
- Watch tower must be established on every corner of the site.
- The Company higher Private Security Guards from authorized Security Company for internal security.
- That the officials of the Company must coordinate with District Police for their movement from site to other places as necessary may be provided to them.
- Sufficient number of Police Personnel will be deputed for the outer cordon / security of the site.
- The Company should follow the SOP rules and regulations for their stations at site and also for their travelling throughout the district.

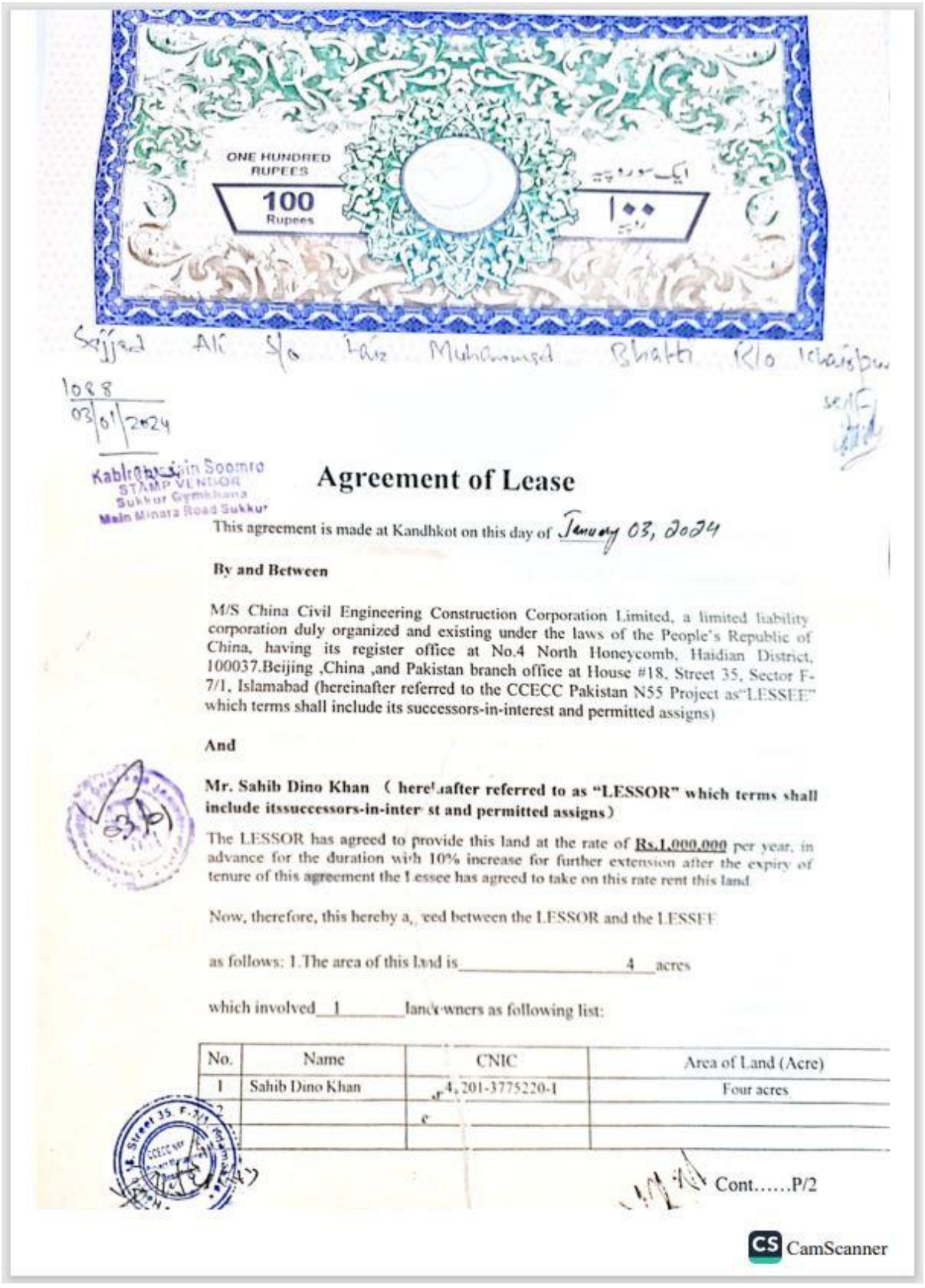
The parties i.e China Civil Engineering Construction Corporation (CCECC) and Gul Traders shall submit record of Labour on site or inside premises on monthly basis at Deputy Commissioner office Kashmore @ Kandhkot. Both the parties shall ensure compliance of Fire Safety, First Aid Medical Services and Labour Laws of Pakistan in true letter and spirit.

DEPUTY COMMISSIONER
KASHMORE @ KANDHKOT

Copy for information to:

1. The Commissioner, Larkano Division, Larkano.
2. The Member (Planning) National Highway Authority, Islamabad.
3. The Member (Aided Projects) National Highway Authority, Islamabad.
4. The General Manager (P&CA), National Highway Authority, Procurement & Contract Administration Section 28 MAUVE Area G-9/1, Islamabad.
5. The Senior Superintendent of Police, Kashmore @ Kandhkot.
6. The Project Manager, China Civil Engineering Construction Corporation, Indus Highway (N-55) Additional Carriageway Road Kandhkot-Kashmore Section Project

Lease Agreement



ONE HUNDRED RUPEES
100 Rupees

Sajjad Ali S/o Faiz Muhammad Bhatti R/o Khairpur

1088
03/01/2024

Kabir Bux Soomro
STAMP VENDOR
Sukkur Gymkhana
Main Minara Road Sukkur

Agreement of Lease

This agreement is made at Kandhkot on this day of January 03, 2024

By and Between

M/S China Civil Engineering Construction Corporation Limited, a limited liability corporation duly organized and existing under the laws of the People's Republic of China, having its register office at No.4 North Honeycomb, Haidian District, 100037.Beijing ,China ,and Pakistan branch office at House #18, Street 35, Sector F-7/1, Islamabad (hereinafter referred to the CCECC Pakistan N55 Project as"LESSEE" which terms shall include its successors-in-interest and permitted assigns)

And

Mr. Sahib Dino Khan （ hereinafter referred to as "LESSOR" which terms shall include itssuccessors-in-interest and permitted assigns）

The LESSOR has agreed to provide this land at the rate of Rs.1,000,000 per year, in advance for the duration with 10% increase for further extension after the expiry of tenure of this agreement the Lessee has agreed to take on this rate rent this land

Now, therefore, this hereby agreed between the LESSOR and the LESSEE

as follows: 1.The area of this land is 4 acres

which involved 1 landowners as following list:

No.	Name	CNIC	Area of Land (Acre)
1	Sahib Dino Khan	4,201-3775220-1	Four acres
2			

Cont.....P/2

CamScanner

ONE HUNDRED RUPEES

100 Rupees

ایک سو روپیہ

۱۰۰ روپیہ

Sajjad Ali S/o Hafiz Muhammad Bhatti R/o Khairpur

.088
03/01/2024

Kabir Hussain Soomro
STAMP VENDOR
Sukkur Gymkhana
Main Minara Road S...

Page No.02

2. As this land involves one landowner, a power of attorney from that landowner must be submitted. To enter into this Agreement with and receive payment from Lessee as its authorized representative. Upon receipt of the payment, the land rent must be released to all landowners immediately. The power of attorney will be one of the attachments to the agreement.

3. The original Certificate of Land Property must be showed to LESSEE before signing the agreement. The LESSEE will keep the photocopy as an attachment of this agreement.

4.The tentative lease term will be four years, Start from January 03rd 2024. The actual lease time will be written notice by lessee. The written notice be an attachment.

5.This Agreement of Lease will be kept valid 4(Four) years. This agreement can be extended for next period by Lessee. If the extension of the period is more than one year, then the rental will be paid on the rate of **Rs. 1,000,000 Four** acres per year by agreement. If the extension of the period is less than one year,the rental will be paid on the rate of **Rs. 2739.7** per day Four acres.

6.The LESSEE has right to terminate this agreement with giving 6 months prior notice.

7. The Lessor agrees that the lessee will use the land as the construction service base for concrete mixing plant, asphalt mixing plant, water stable mixing plant, office, residence and the materials and equipment left behind. During the contract period, the Lessor shall not have the right to terminate the contract without notice, otherwise the Lessor shall pay the lessee all the expenses for the constructionof the base. Upon termination of the Contract, the non-removable buildings and structures shall be retained to the lessor without compensation.

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Sajjad Ali S/o Faiz Muhammad Bhatti R/. Khaipur

Page No.03

8.The land rent is **RS.1,000,000** per year. Payment will be provided to LESSOR within 3 days through cheque for the first one years after sign the agreement. Then the payment will be once a year through cheque . **The payee only for Mr Sahib Dino Khan (CNIC: 42201-3775220-1) s/o Gul Muhammad Khan , any other people come to our side is ineffective. This amount of rent cost is exclusive all kinds of fees (exclusive of TAXES), and also including but not limited to use land fees, and any other if possible to make and suppose to pay, the LESSEE will not deduct alltaxes according to local tax department requirement.**

9.During the period of Agreement, the Lessor could not re-rent this land to the other party. If Lessor sales this land to the other party, the Lessor must be obtained from the consent of Lessee. And the Agreement will be kept valid with the new owner of land until the completion of the Agreement.

10.During the term of this Agreement, all disputes arising from the use of the land by the Lessee shall be settled by the Lessee with the assistance of the Lessor. It also includes disputes with local government, taxation, public security, forestry, environmental protection and other relevant departments etc. The lessor shall provide the necessary documentation support when the lessee needsit.

11.During the period of Agreement,if any dispute arises between Lessee and nearer landlord, the Lessor will resolve that matter.

12.All the land should be not rehabilitated by Lessee before returning the said land to the Lessor.

13.All disputes arising out of or in connection with the Contract shall be finally settled by arbitration. The arbitration shall be carried out in accordance with the rules and provisions of Arbitration Act 1940 of Islamic Republic of Pakistan.In accordance with the provision of Arbitration Act 1940, each Party shall appoint one Arbitrator and the Arbitrators shall appoint an Umpire by mutual consultation,before the commencement of Arbitration proceedings. The Arbitrators and the Umpire shall not be (or have previously been) employee(s), consultant(s), contractor(s) or agents of any Party to the proceeding and shall be independent and/or exhibit no past or present relationship with any Party to the proceedings. The language of Arbitration shall be English and the venue of the Arbitration shall be Islamabad/Karachi or any other city of Sindh, Pakistan. The award made by such Arbitrators or the Umpire ,as the case may be ,shall be final and binding on the Parties and shall not be subject to appeal at any forum or court, The courts in Islamabad shall have exclusive jurisdiction in respect of any dispute relating to any matter contained

Cont.....P/4

ONE HUNDRED RUPEES 100 Rupees ایک سو روپیہ ۱۰۰ روپیہ

Ijjad Ali S/o Faiz Muhammad Bhatti R/6 Khaipur

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14.The existing fence must be used by the lessee, the lessee has the right to modify or raise the fence and install barbed wire, and the lessee shall maintain the fence during lease.

15.The agreement shall be prepared. One copy for LESSOR and two copies for LESSEE. Thematters not mentioned herein will in triplicate compromise settlement.

16.Lessor shall provide unskilled labor inside the camp.

ENCLOSED:

1. The Certificate of Land Property.
2. The copy of Landowners Identification Card.
3. Notice of actual time of the lease.
4. Power of attorney.
5. Measurement sheet of land.

For and on behalf of China Civil Engineering Construction Corporation LtdPakistan branch office

Signature:

Designation:

Seal:

Branch Pakistan N-5 Project

Signature:

Designation: Landlord

Seal:

Witness

Signature:

Witness:

Signature:

CamScanner

ANNEXURE 11 Re Vegetation Plan

Purpose:

6048 trees will be felled in CAREC Lot-2, the plan outlines the methods and standards for rehabilitating areas temporarily disturbed during road construction. The purpose of revegetation is to temporarily restore degraded areas to pre-construction condition or better.

Replanting Plan:

- Active replantation method (by hand installation of plants) should be followed.
- For every tree removed, 03 trees will be planted in which similar facilities will be provided.
- The following scheme of planting will be followed as per the suitability of the area.
- From Kandhkot - kashmore section, flora of the project area falls in the scrub dry Tropical Thorn Forest Zone. This is the natural vegetation of the Indus Basin. It has the capacity to survive and grow in areas with extremely high temperatures and low precipitation. The flora consists of spiny and hard wooded species. Acacia species are the dominant one. The trees usually have short boles and low branching areas. Their usual height is 6-9 meters. The leaves are small, except in a few genera like Salvadoran and Caltrops. Main trees in the project area are Acacia nilotica (Keekar), Eucalyptus camaldulensis (Safaida), Phoenix dactylifera (Date Palm), Dalbergiasissoo (Shisham). Azadirachtaindica (Neem), Salvadoraoleoides (Peelu) and Ficusreligiosa (People).
- In medium, shrub species should be planted after approval from consultant environment specialist.

A Replanting Plan Has Been Developed:

- Minimize site disruption.
- Maximize the use of native species and/or climate-adapted species.
- Maximize water conservation.
- Screen out visually offensive uses (utilities, appliances, etc.) as much as possible.
- Use natural materials for fencing.
- Achieve visual harmony with the surrounding environment.
- Planting roadsides can strengthen the road structure against erosion.
- Rapid establishment of fast growing grass, shrub and tree species suitable for the site.

Selected and Proposed Species of Plant for Plantation

Name of Plant	Origin	Sapling Height	Pictorial View
Oleander	Ornamental	4.0ft or At least one year Age	

Name of Plant	Origin	Sapling Height	Pictorial View
Shisham	Indigenous	4.5ft	
Kikar	Indigenous	At least one year Age	
Phulahi	Indigenous	4.0ft	
Siris	Indigenous	At least one year Age	
Temrix	Indigenous	At least one year Age	
Sok chain	Indigenous	4.5ft	

Name of Plant	Origin	Sapling Height	Pictorial View
Hibiscus	Indigenous	At least one year Age	
Duranta	Indigenous ornamental	At least one year Age	

Responsible Authorities:

- The Project Manager (CCECC) will be responsible for planting trees after the completion of the road construction project to maintain the natural beauty of the area.
- The Consultant Environment Specialist will approve the plant species with the help of the contractor as per his area survey.
- Monitoring will be done and growth rate of success will be checked otherwise the plan will be modified as directed by the consultant ecologist.
- The contractor shall be responsible for maintenance of vegetation till handover of the project to NHA

ANNEXURE 12 Pre- Construction/ Baseline Environmental Monitoring Results

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	CCECC/ENV/07-2024	**Client Name**	China Civil Engineering Construction Corporation
Project Name:	Lot-2:kandhkot-Kashmore Section (58.78 km)	**Monitoring Location:**	RD 105+800 (Kandhkot)
Monitoring Date:	18-01-2024	**Reporting Date:**	26-01-2024
Source: **GPS Coordinates:**	Ambient Air 28.226369, 69.170075	**Monitoring Instrument:**	AQMS 65, Serial # 1310

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	44.1	112.04		
2.	10:00 A.M	45.24	112.91		
3.	11:00 A.M	43.32	111.36		
4.	12:00 P.M	42.57	114.65		
5.	01:00 P.M	42.6	113.1		
6.	02:00 P.M	42.96	112.39		
7.	03:00 P.M	42.9	109.86		
8.	04:00 P.M	42.5	108.64		
9.	05:00 P.M	34.4	95.89		
10.	06:00 P.M	33.17	94.37		
11.	07:00 P.M	32.4	92.64		
12.	08:00 P.M	32.8	94.12		
13.	09:00 P M	33.3	91.4	36.43 ($\mu g/m^3$)	97.74 ($\mu g/m^3$)
14.	10:00 P M	33.67	90.67		
15.	11:00 P M	31.41	90.15		
16.	12:00 A M	33.29	87.42		
17.	01:00 A M	32.43	86.89		
18.	02:00 A M	34	88.18		
19.	03:00 A M	33.3	88.61		
20.	04:00 A M	32.88	86.92		
21.	05:00 A M	32.47	87.77		
22.	06:00 A M	31.6	90.05		
23.	07:00 A M	33.28	90.96		
24.	08:00 A M	33.8	94.95		
SEQSAA				75 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

SEQSAA: Sindh Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

- Selected measurement units were $\mu g/m^3$ otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst:

Signature of Chief Chemist

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FOR ENVIRONMENTAL MONITORING, ANALYSIS & SURVEYS

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	CCECC/ENV/07-2024	**Client Name**	China Civil Engineering Construction Corporation
Project Name:	Lot-2:kandhkot-Kashmore Section (58.78 km)	**Monitoring Location:**	CCECC Camp Site at N-55 near PPL Mirpur Buriro
Monitoring Date:	19-01-2024	**Reporting Date:**	26-01-2024
Source: **GPS Coordinates:**	Ambient Air 28.279258, 69.264772	**Monitoring Instrument:**	AQMS 65, Serial # 1310

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	(µg/m³)	(µg/m³)		
1.	09:00 A.M	35.43	90.38	29.16 (µg/m³)	82.44 (µg/m³)
2.	10:00 A.M	33.16	91.25		
3.	11:00 A.M	31.24	89.7		
4.	12:00 P.M	30.49	92.99		
5.	01:00 P.M	30.52	91.44		
6.	02:00 P.M	30.88	90.73		
7.	03:00 P.M	30.82	88.2		
8.	04:00 P.M	30.42	86.98		
9.	05:00 P.M	29.32	83.76		
10.	06:00 P.M	28.09	82.24		
11.	07:00 P.M	27.32	80.51		
12.	08:00 P.M	27.72	81.99		
13.	09:00 P M	28.22	79.27		
14.	10:00 P M	28.59	78.54		
15.	11:00 P M	26.33	78.02		
16.	12:00 A M	28.21	75.29		
17.	01:00 A M	27.35	74.76		
18.	02:00 A M	28.92	76.05		
19.	03:00 A M	28.22	76.48		
20.	04:00 A M	27.8	74.79		
21.	05:00 A M	27.39	75.64		
22.	06:00 A M	26.52	77.92		
23.	07:00 A M	28.2	78.83		
24.	08:00 A M	28.59	82.82		
SEQSAA				75 (µg/m³)	150(µg/m³)
WHO				15 (µg/m³)	45 (µg/m³)

SEQSAA: Sindh Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

- Selected measurement units were µg/m³ otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst:

Signature of Chief Chemist

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AMBIENT PARTICULATE MATTERS MONITORING REPORT

Reference Number	CCECC/ENV/07-2024	**Client Name**	China Civil Engineering Construction Corporation
Project Name:	Lot-2:kandhkot-Kashmore Section (58.78 km)	**Monitoring Location:**	RD 130+600 Bakhshapur
Monitoring Date:	20-01-2024	**Reporting Date:**	26-01-2024
Source: **GPS Coordinates:**	Ambient Air 28.350037, 69.374586	**Monitoring Instrument:**	AQMS 65, Serial # 1310

Sr. No	Time	Parameters		Results (Average 24 Hrs)	
		$PM_{2.5}$	PM_{10}		
		Units		$PM_{2.5}$	PM_{10}
	Hours of Monitoring	($\mu g/m^3$)	($\mu g/m^3$)		
1.	09:00 A.M	37.52	107.06		
2.	10:00 A.M	36.64	107.93		
3.	11:00 A.M	34.72	106.38		
4.	12:00 P.M	33.97	109.67		
5.	01:00 P.M	34	108.12		
6.	02:00 P.M	34.36	107.41		
7.	03:00 P.M	34.3	104.88		
8.	04:00 P.M	33.9	103.66		
9.	05:00 P.M	31.39	99.44		
10.	06:00 P.M	30.16	97.92		
11.	07:00 P.M	29.39	96.19		
12.	08:00 P.M	29.79	97.67	31.64 ($\mu g/m^3$)	98.45 ($\mu g/m^3$)
13.	09:00 P M	30.29	94.95		
14.	10:00 P M	30.66	94.22		
15.	11:00 P M	28.4	93.7		
16.	12:00 A M	30.28	90.97		
17.	01:00 A M	29.42	90.44		
18.	02:00 A M	30.99	91.73		
19.	03:00 A M	30.29	92.16		
20.	04:00 A M	29.87	90.47		
21.	05:00 A M	29.46	91.32		
22.	06:00 A M	28.59	93.6		
23.	07:00 A M	30.27	94.51		
24.	08:00 A M	30.79	98.5		
SEQSAA				75 ($\mu g/m^3$)	150($\mu g/m^3$)
WHO				15 ($\mu g/m^3$)	45 ($\mu g/m^3$)

SEQSAA: Sindh Environmental Quality Standards for Ambient Air
WHO: World Health Organization
Note:

- Selected measurement units were $\mu g/m^3$ otherwise stated.
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Signature of Analyst:

Signature of Chief Chemist

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AMBIENT GASES MONITORING REPORT

Reference Number	CCECC/ENV/07-2024	**Client Name**	China Civil Engineering Construction Corporation
Project Name:	Lot-2:kandhkot-Kashmore Section (58.78 km)	**Monitoring Location:**	RD 105+800 Kandhkot
Monitoring Date:	18-01-2024	**Reporting Date:**	26-01-2024
Source: **GPS Coordinates:**	Ambient Air Gases 28.226369, 69.170075	**Monitoring Instrument:**	AQMS 65, Serial # 1310

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.69	13.21	15.68	14.37
2.	10:00 A.M	0.74	14.06	15.86	14.24
3.	11:00 A.M	0.66	14.13	16.13	13.51
4.	12:00 P.M	0.77	14.88	15.04	13.64
5.	01:00 P.M	0.8	14.28	14.91	13.79
6.	02:00 P.M	0.69	14.46	15.02	12.87
7.	03:00 P.M	0.67	15	15.38	13.49
8.	04:00 P.M	0.62	14.14	15.53	14.68
9.	05:00 P.M	0.38	9.22	11.31	11.13
10.	06:00 P.M	0.44	8.99	11.43	11.62
11.	07:00 P.M	0.3	9.77	12.01	13.05
12.	08:00 P.M	0.36	10.1	11.12	12.72
13.	09:00 P M	0.32	10.91	11.55	12.29
14.	10:00 P M	0.37	9.19	11.4	11.95
15.	11:00 P M	0.3	8.76	12.23	12.8
16.	12:00 A M	0.42	9.94	11.48	13.08
17.	01:00 A M	0.39	10.01	11.02	12.01
18.	02:00 A M	0.4	9.26	11.18	11.82
19.	03:00 A M	0.38	11.05	11.06	11.6
20.	04:00 A M	0.39	10.26	10.69	11.91
21.	05:00 A M	0.44	10.02	10.12	12.26
22.	06:00 A M	0.42	9.55	10.98	12.44
23.	07:00 A M	0.44	10.3	11.27	12.73
24.	08:00 A M	0.47	9.54	11.37	12.6
Average Concentration		**0.49**	**11.29**	**12.65**	**12.77**
SEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

SEQSAA: Sindh Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$ & mg/m^3 otherwise stated.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for court.

Signature of Analyst:

Signature of Chief Chemist

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Project Name:	Lot-2:kandhkot-Kashmore Section (58.78 km)	**Monitoring Location:**	CCECC Camp Site at N-55 near PPL Mirpur Buriro
Monitoring Date:	19-01-2024	**Reporting Date:**	26-01-2024
Source: **GPS Coordinates:**	Ambient Air Gases 28.279258, 69.264772	**Monitoring Instrument:**	AQMS 65, Serial # 1310

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.46	7.58	9.54	10.17
2.	10:00 A.M	0.48	8.14	9.9	8.06
3.	11:00 A.M	0.5	8.54	10.55	7.41
4.	12:00 P.M	0.45	7.85	10.9	8.37
5.	01:00 P.M	0.47	9.33	11.38	6.43
6.	02:00 P.M	0.46	9.11	11.55	7.81
7.	03:00 P.M	0.48	8.87	10.35	6.21
8.	04:00 P.M	0.49	8.82	10.59	7.06
9.	05:00 P.M	0.45	8.34	7.88	7.11
10.	06:00 P.M	0.46	7.65	8.23	7.06
11.	07:00 P.M	0.47	7.46	8.9	7.14
12.	08:00 P.M	0.48	8.14	8.66	6.84
13.	09:00 P M	0.45	7.15	7.65	7.5
14.	10:00 P M	0.44	7.02	7.63	7.1
15.	11:00 P M	0.46	7.34	7.88	6.82
16.	12:00 A M	0.47	7.12	8.14	6.41
17.	01:00 A M	0.48	7.38	7.91	6.81
18.	02:00 A M	0.45	8.46	7.66	7.06
19.	03:00 A M	0.44	8.34	7.95	6.21
20.	04:00 A M	0.43	8.24	7.46	6.54
21.	05:00 A M	0.44	8.68	7.66	5.84
22.	06:00 A M	0.42	7.45	7.52	6
23.	07:00 A M	0.43	7.87	7.2	6.21
24.	08:00 A M	0.44	6.34	7.56	6.95
Average Concentration		**0.45**	**7.96**	**8.77**	**7.04**
SEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

SEQSAA: Sindh Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$ & mg/m^3 otherwise stated.
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Signature of Analyst:

Signature of Chief Chemist

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AMBIENT GASES MONITORING REPORT

Reference Number	CCECC/ENV/07-2024	**Client Name**	China Civil Engineering Construction Corporation
Project Name:	Lot-2:kandhkot-Kashmore Section (58.78 km)	**Monitoring Location:**	RD 130+600 Bakhshapur
Monitoring Date:	20-01-2024	**Reporting Date:**	26-01-2024
Source: **GPS Coordinates:**	Ambient Air Gases 28.350037, 69.374586	**Monitoring Instrument:**	AQMS 65, Serial # 1310

Sr. No	Time	Parameters			
		CO	NO	NO_2	SO_2
		Units			
	Hours	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
1.	09:00 A.M	0.59	15.2	19.26	19.56
2.	10:00 A.M	0.61	15.76	19.62	17.45
3.	11:00 A.M	0.63	16.16	20.27	16.8
4.	12:00 P.M	0.58	15.47	20.62	17.76
5.	01:00 P.M	0.6	16.95	21.1	15.82
6.	02:00 P.M	0.59	16.73	21.27	17.2
7.	03:00 P.M	0.61	16.49	20.07	15.6
8.	04:00 P.M	0.62	16.44	20.31	16.45
9.	05:00 P.M	0.58	15.96	17.6	16.5
10.	06:00 P.M	0.46	14.22	18.24	13.47
11.	07:00 P.M	0.47	14.03	18.91	13.55
12.	08:00 P.M	0.48	14.71	18.67	13.25
13.	09:00 P M	0.45	13.72	17.66	13.91
14.	10:00 P M	0.44	13.59	17.64	13.51
15.	11:00 P M	0.46	13.91	17.89	13.23
16.	12:00 A M	0.47	13.69	18.15	12.82
17.	01:00 A M	0.48	13.95	17.92	13.22
18.	02:00 A M	0.45	15.03	17.67	13.47
19.	03:00 A M	0.44	14.91	17.96	12.62
20.	04:00 A M	0.43	14.81	17.47	12.95
21.	05:00 A M	0.44	15.25	17.67	12.25
22.	06:00 A M	0.42	14.02	17.53	12.41
23.	07:00 A M	0.43	14.44	17.21	12.62
24.	08:00 A M	0.44	12.91	17.57	13.36
Average Concentration		**0.50**	**14.93**	**18.67**	**14.57**
SEQSAA		**05**	**40**	**80**	**120**
WHO		**04**	**---**	**25**	**40**

SEQSAA: Sindh Environmental Quality Standards for Ambient Air
WHO: World Health Organization

Note:

- Selected measurement units were $\mu g/m^3$& mg/m^3 otherwise stated.
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AMBIENT NOISE MONITORING REPORT

Reference Number	CCECC/ENV/07-2024	**Client Name**	China Civil Engineering Construction Corporation
Project Name:	Lot-2:kandhkot-Kashmore Section (58.78 km)	**Monitoring Location:**	RD 105+800 Kandhkot
Monitoring Date:	18-01-2024	**Reporting Date:**	26-01-2024
Source: **GPS Coordinates:**	Ambient Noise 28.226369, 69.170075	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	62.3	65.2	63.75
2.	10:00 A.M		62.1	65	63.55
3.	11:00 A.M		61.9	64.8	63.35
4.	12:00 P.M		61.7	64.6	63.15
5.	01:00 P.M		61.5	64.3	62.9
6.	02:00 P.M		61.2	64.1	62.65
7.	03:00 P.M		61	63.9	62.45
8.	04:00 P.M		60.8	63.7	62.25
9.	05:00 P.M		54.3	57.2	55.75
10.	06:00 P.M		54.1	57	55.55
11.	07:00 P.M		53.9	56.7	55.3
12.	08:00 P.M		53.6	56.5	55.05
13.	09:00 P M		53.4	56.3	54.85
14.	10:00 P M		53.2	56.1	54.65
15.	11:00 P M		53	55.9	54.45
16.	12:00 A M		52.8	55.7	54.25
17.	01:00 A M		52.6	55.5	54.05
18.	02:00 A M		52.4	55.3	53.85
19.	03:00 A M		52.2	55.1	53.65
20.	04:00 A M		52	54.8	53.4
21.	05:00 A M		51.7	54.6	53.15
22.	06:00 A M		51.5	54.4	52.95
23.	07:00 A M		52.4	54.8	53.6
24.	08:00 A M		49.7	53.2	51.45

SEQS limit : 45-55 dB
55-65 dB
65-75 dB
WHO limit: 70 dB

SEQS: Sindh Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

- Selected measurement units were dB (A) otherwise stated.
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- The report is not valid for court.

Signature of Analyst:

Signature of Chief Chemist

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AMBIENT NOISE MONITORING REPORT

Reference Number	CCECC/ENV/07-2024	**Client Name**	China Civil Engineering Construction Corporation
Project Name:	Lot-2:kandhkot-Kashmore Section (58.78 km)	**Monitoring Location:**	CCECC Camp Site at N-55 near PPL Mirpur Buriro
Monitoring Date:	19-01-2024	**Reporting Date:**	26-01-2024
Source: **GPS Coordinates:**	Ambient Noise 28.279258, 69.264772	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	56.8	58.2	57.5
2.	10:00 A.M		58.6	60.2	59.4
3.	11:00 A.M		58.3	61.2	59.75
4.	12:00 P.M		54.8	57	55.9
5.	01:00 P.M		61	61.5	61.25
6.	02:00 P.M		61.4	61.6	61.5
7.	03:00 P.M		60.2	62.3	61.25
8.	04:00 P.M		58.3	58.7	58.5
9.	05:00 P.M		54.3	56.1	55.2
10.	06:00 P.M		58.7	60.2	59.45
11.	07:00 P.M		57.1	58.7	57.9
12.	08:00 P.M		50.7	53.9	52.3
13.	09:00 P M		50.8	58.3	54.55
14.	10:00 P M		55.1	55.4	55.25
15.	11:00 P M		52.8	57	54.9
16.	12:00 A M		55.1	59.6	57.35
17.	01:00 A M		51	52.3	51.65
18.	02:00 A M		51.2	57.6	54.4
19.	03:00 A M		54.7	56.8	55.75
20.	04:00 A M		53	54.2	53.6
21.	05:00 A M		51.8	53.6	52.7
22.	06:00 A M		51.3	57.6	54.45
23.	07:00 A M		56.8	61.4	59.1
24.	08:00 A M		55.1	56.2	55.65

SEQS limit : 45-55 dB
55-65 dB
65-75 dB

WHO limit: 70 dB

SEQS: Sindh Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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AMBIENT NOISE MONITORING REPORT

Reference Number	CCECC/ENV/07-2024	**Client Name**	China Civil Engineering Construction Corporation
Project Name:	Lot-2:kandhkot-Kashmore Section (58.78 km)	**Monitoring Location:**	RD 130+600 Bakhshapur
Monitoring Date:	20-01-2024	**Reporting Date:**	26-01-2024
Source: **GPS Coordinates:**	Ambient Noise 28.350037, 69.374586	**Monitoring Instrument:**	Noise Meter-IEC651-Type-2

Sr. No.	Monitoring Time	Unit	Minimum	Maximum	Leq
1.	09:00 A.M	dB(A)	66.1	68.4	67.25
2.	10:00 A.M		67.2	69.4	68.3
3.	11:00 A.M		65.2	66	65.6
4.	12:00 P.M		65.1	67.7	66.4
5.	01:00 P.M		68.6	71.5	70.05
6.	02:00 P.M		68.6	69.3	68.95
7.	03:00 P.M		65	66.2	65.6
8.	04:00 P.M		67.7	68.1	67.9
9.	05:00 P.M		70	72.2	71.1
10.	06:00 P.M		57.6	58.5	58.05
11.	07:00 P.M		60.1	62.5	61.3
12.	08:00 P.M		54.1	56	55.05
13.	09:00 P M		52.1	53.6	52.85
14.	10:00 P M		56.4	58.2	57.3
15.	11:00 P M		54.1	55.3	54.7
16.	12:00 A M		56.4	56.9	56.65
17.	01:00 A M		58.1	59.5	58.8
18.	02:00 A M		53.6	55	54.3
19.	03:00 A M		56	57.5	56.75
20.	04:00 A M		54.3	56.7	55.5
21.	05:00 A M		53.1	54.1	53.6
22.	06:00 A M		52.4	54.5	53.45
23.	07:00 A M		64.8	67.4	66.1
24.	08:00 A M		69	71.5	70.25

SEQS limit : 45-55 dB
55-65 dB
65-75 dB
WHO limit: 70 dB

SEQS: Sindh Environmental Quality Standards **WHO:** World Health Organization
Leq: Log Equivalent Continuous Sound Level

Note:

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GROUND WATER ANALYSIS REPORT

Reference Number	CCECC/ENV/07-2024	**Client Name**	China Civil Engineering Construction Corporation
Project Name:	Lot-2:kandhkot-Kashmore Section (58.78 km)	**Sampling Location:**	RD 105+800 Kandhkot
Sampling Date:	20-01-2024	**Reporting Date:**	26-01-2024
Source: **GPS Coordinates;**	Ground Water 28.226369, 69.170075	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	SEQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.8
2.	Temperature	---	°C	---	----	8
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	4
5.	Turbidity	APHA-2130 B	NTU	<5	<5	2
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	681
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	327
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤0.05	1.13
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.42
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.0027
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	164
14.	Chlorine	APHA-4500 CL	mg/L		---	0.27
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D.
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.76
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.18
21	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	<0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.03
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	0.98
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	Detected

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst: ***Signature of Chief Chemist***

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DRINKING WATER ANALYSIS REPORT

Reference Number	CCECC/ENV/07-2024	**Client Name**	China Civil Engineering Construction Corporation
Project Name:	Lot-2:kandhkot-Kashmore Section (58.78 km)	**Sampling Location:**	RD 130+600 Bakhshapur
Sampling Date:	20-01-2024	**Reporting Date:**	26-01-2024
Source: **GPS Coordinates;**	Ambient Noise 28.350037, 69.374586	**Analysis Method**	APHA/USEPA Standard Methods

Sr. No.	Parameters	Standard Methods	Units	WHO	NDWQS	Results
1.	pH	APHA-4500H+ B	--	6.5-8.5	6.5-8.5	7.5
2.	Temperature	---	°C	---	----	10
3.	Taste & Odor	In-house	--	Non-Objectionable	Non Objectionable	Objectionable
4.	Color	APHA-2120 B/C	TCU	≤ 15	<15	6
5.	Turbidity	APHA-2130 B	NTU	<5	<5	3.4
6.	Total Dissolved Solids (TDS)	APHA-2540 C	mg/L	< 1000	<1000	653
7.	Total Hardness as $CaCO_3$	APHA-2340 C	mg/L	-------	<500	308
8.	Nitrate (NO_3)	APHA-4500NO3 B	mg/L	50	≤0.05	1.01
9.	Nitrite (NO_2)	APHA-4500NO2 B	mg/L	3	≤3	0.66
10.	Arsenic (As)	APHA-3500As B	mg/L	0.01	≤0.05	N.D.
11.	Nickel (Ni)	ASTM E3047-16	mg/L	0.02	≤0.02	0.0051
12.	Antimony (Sb)	APHA-3500Sb B	mg/L	0.005	<0.005	N.D.
13.	Chloride (Cl)	APHA-4500Cl- B	mg/L	250	<250	159
14.	Chlorine	APHA-4500 CL	mg/L		---	0.47
15.	Lead (Pb)	APHA-3500 Pb-B	mg/L	0.01	≤0.05	N.D.
16.	Fluoride	APHA-4500F- C	mg/L	1.5	≤1.5	0.53
17.	Aluminum	APHA-3500 Al	mg/L	≤ 0.2	≤0.2	N.D.
18.	Manganese (Mn)	APHA-3500 MN-B	mg/L	0.5	≤0.5	N.D.
19.	Cadmium (Cd)	APHA-3500 Cd-B	mg/L	0.003	0.01	N.D.
20.	Barium (Ba)	APHA-3500 Ba B	mg/L	0.3	0.7	0.22
21.	Mercury (Hg)	APHA-3500 Hg-B	mg/L	0.001	≤0.001	N.D.
22.	Copper (Cu)	APHA- 3500 Cu-B	mg/L	2	2	0.06
23.	Zinc (Zn)	APHA- 3500 Zn B	mg/L	3	5	1.2
24.	Boron (B)	APHA 4500 B- C	mg/L	0.3	0.3	N.D.
25.	Chromium (Cr)	APHA 3500 cr B	mg/L	0.05	≤0.05	N.D.
26.	Selenium (Se)	APHA- 3500 Se C	mg/L	0.01	0.01	N.D.
27.	Cyanide (CN)	APHA 4500-CN	mg/L	0.07	≤0.05	N.D.
28.	E-Coli	APHA:9222 D	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0
29.	Total Coliform	APHA:9222 B	Number/100 mL	Must not be detectable in any 100 ml sample	0 Number/100 mL	0

NDWQS National Drinking Water Quality Standards **WHO** World Health Organization
N D Not Detected

Signature of Analyst:

Signature of Chief Chemist

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