ENVIRONMENTAL MONITORING REPORT

SEMI ANNUAL REPORT: JULY 2018 - DECEMBER 2018

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APPENDICES

Abbreviations

ADB	:	Asian Development Bank
AIDS	:	Acquired Immuno Deficiency Syndrome
ALDTP	:	Amochhu Land Development and Township Project
CDCL	:	Construction Development Corporation Limited
DHI	:	Druk Holdings and Investment Ltd.
EA	:	Executing Agency
EIA	:	Environmental Impact Assessment
EMP	:	Environmental Management Plan
HIV	:	Human Immunodeficiency Virus
IA	:	Implementing Agency
IEE	:	Initial Environmental Examination
IPP	:	Indigenous Peoples Plan
NEC	:	National Environment Commission
NLCS	:	National land Commission Secretariat
PIU	:	Project Implementation Agency
PMU	:	Project Management Unit
PPE	:	Personal Protective Equipment
PTDP	:	Phuentsholing Township Development Project
RGoB	:	Royal Government of Bhutan
SPS	:	Safeguard Policy Statement
STD	:	Sexually Transmitted Diseases

1. Semi-Annual Environmental Monitoring Report

This report presents the status of environmental safeguards compliance, for the period from July, 2018 to December, 2018. The report reviews the compliance of environmental activities set in EMP during the period and proposes practices/innovations leading to improved and sustainable environment in the future.

2. Project Background

1. The Construction Development Corporation Limited has taken up Phuentsholing Township Development Project (PTDP) with financial assistance from Asian Development Bank (ADB) under Load Agreement No. 3668-BHU.

2. The Government of Bhutan has proposed for Phuentsholing Township Development Project (PTDP) near Phuentsholing City which will include develop 460 hectares of riparian land near Phuentsholing City, provide protection from floods and erosion, and construct smart urban infrastructure to allow phased urban expansion. The City of Phuentsholing is located adjacent to the Amochhu River on Bhutan's southwestern border with India (Jaigoan, Alipurduar district, West Bengal). Phuentsholing is the country's economic capital and main trading gateway with India. The Royal Government of Bhutan's vision is for Phuentsholing to grow into an economically vibrant, ecologically sustainable, and energy efficient center that will support economic diversification, employment creation, and income generation.

3. The project aims to protect the existing and new towns from floods and riverbank erosion which currently threatens lives and livelihoods and disrupts connectivity with nearby communities. The project will train the river along both banks of Amochhu and the area reclaimed after river training will be used for the development of township. The project will be undertaken in phases which is anticipated to be completed within 15 years in accordance with the PTDP Master Plan.

4. The PTDP is divided into five zones: Zone A, Zone B, Zone C, Zone D and Zone E. Zone D represents Kaileshwar Hill which is currently not included in the project development. The remaining four Zones will require about 15 kilometers of riverbank protection works with subsequent development of about 464 hectares of Amochhu riparian land. The development comprises of new common urban infrastructure such as roads, bridges, water supply and waste water system, municipal solid waste system, power and telecommunications to support the habitation of 50,000 people. The implementation of the project is phased in relation to the scale and demand for the development. The allocation of land and riverbank protection for the project's development is shown in Table 1 below:

Table 1: Zone-wise Allocation of Land under PTDP

Zone	Area (ha)	Length of Riverbank (m)
A	66	3,974
B	94	3,046
C	277	4,872
E	27	3,083
Total	**464**	**14,975**

5. PTDP is proposed to be implemented in phase manner in relation to the scale and demand for development. In the first phase, PTDP has been taken up which include development of Zone A. In subsequent phases, the remaining zones will be taken up.

6. Phase 1 is financed with support from Asian Development Bank (ADB) and Druk Holding and Investments (DHI). DHI is the Project Owner and the Executing Agency (EA) and Construction Development Corporation Limited (CDCL), is the Implementing Agency (IA).

7. For convenience of construction, the development works of Zone-A has been divided into different construction packages. The Package CW-01 include includes construction of approximately 4.5 km of River Training and Embankment works along the Amochhu River in Phuentsholing. The scope of works include river training (diaphragm wall, Anchor slab), Embankment (retaining walls, outfalls and slope stability), General Earth Filling, Irrigation and Landscape works.

8. The Civil work contract of Package-CW-01 has been awarded to M/s AFCONS Infrastructural Limited, India in the month of September, 2018 for a period of 30 months. The CDCL has appointed M/s EGIS International as Project Implementation Consultant (PIC) who will act as Engineer for the project. The Contract of PIC was signed in the month of October, 2018.

1.1 Status of Construction Works:

9. The construction activities at site are in preliminary stage. The Contractor is still in mobilization stage and has started mainly pre-construction activities. During the reporting period, following activities were in progress:

   - Finalization of the site for establishment of their camp office, staff quarters, labour camp, batching plant, stockyards, etc. All these facilities will be located at the same place.
   - The construction works for different amenities at the camp site.
   - Re-survey of DGPS control points on NLCS points to establish control points for the Project.
   - Commencement of excavation for guide wall works in Part-8, chainage 734 R

- Commencement of excavation works at Open Outfalls No. 8 and 2 in Part No.8 and Part No. 5 respectively.

3. The environmental category of the projects

10. The PTDP fall under category "A" for environmental safeguards as per ADB categorization criteria based on ADB's Environmental Assessment Guidelines 2003, and Safeguard Policy Statement (SPS) 2009. The EIA report was prepared for all the Four Zones (A, B, C & E) based on which the anticipated environmental impacts; Environmental Management Plan (EMP) was formulated for mitigating, managing and enhancing the efficiency of environmental components wherever it is possible. The recommended EMP was included in domain of detailed design and bid documents for all the sub-projects. There is a separate budgetary allocation for implementation of EMP and have been included in the contracts.

4. Scope of the Present Report

11. The scope of this report is mainly to assess the compliance status on environmental safeguards during construction in all the construction packages, where works are in progress. The assessment of safeguards compliance cover the status of compliance with:
    - statutory requirements in each construction packages,
    - conditions of EMP stipulated in contract conditions and
    - monitoring of environmental attributes at different representative sites

12. The report also assesses the performance and effectiveness of implementation of environmental safeguards as per the contract specification. Information presented in this report is mainly based on review of the safeguards documents, contract agreement of Contractor and PIC and observations made during field inspections carried out by the PIU, the engineer's representative and the contractor.

5. Approach and methodology adopted for environmental monitoring of the projects

13. The monitoring of compliance of EMP and its performance is carried out through following tasks:
    - Site inspections by PIC Environmental Specialist, local environmental specialist and Environmental Manager of PIU
    - Review of Contractor's documents related to implementation of Environmental safeguards
    - Monitoring of selected environmental attributes identified under Environmental Monitoring Plan

14. Checklist method has been adopted by the PIC for monitoring the safeguards compliance at site. The checklist has been developed by the PIC, which shall be used for compliance monitoring at site by PIU and PIC environmental staff. The checklist is enclosed as **APPENDIX-1**

6. Institutional Arrangement for EMP Implementation

15. For the PTDP overall implementation and monitoring, an environmental safeguards arrangements at different institutional levels has been proposed as below:
    - PMU, CDCL,
    - Project Implementation Unit (PIU)
    - PIC (Engineer and his representatives)
    - Contractors

16. The contractor is the agency responsible for direct implementation of environmental mitigation measures at different locations whereas the others are having supervisory/monitoring roles.

17. At each level there is provision of environmental personnel for ensuring the effectiveness of implementation and monitoring of environmental mitigation measures. The status of appointment/ nomination of environmental personnel at different levels as on date are as follows:

6.1 CDCL Environmental Staff:

18. There is a provision of an Environmental Manager at PMU who will support the Project Director (PMU) and PIU environmental staff. The role of the Environmental Manager (PMU) will to oversee implementation of environmental safeguards work under the project. He will also be responsible for updating of EMP if necessary throughout project implementation in accordance with ADB's Safeguards Policy Statement (SPS, 2009) and the Environmental Assessment Act (2000), and submit to ADB for review, final approval, and disclosure prior to commencement of works; (ii) before expiry of the initial EIA after five years, review and revise (if necessary) the EIA and undertake necessary actions as required, to obtain NEC and ADB continued approval; and (iii) liaise with the relevant authorities to obtain all required clearances and environmental permits in a timely manner prior to construction;

19. There is also provision of Environmental Manager at PIU level. The Environment Officer in the PIU, assisted by the environmental specialist on the PIC team, will oversee implementation of environmental safeguards work under the project, including the following activities: (i) facilitate and confirm overall compliance with Government of Bhutan rules, oversee timely preparation and finalization of CEMP by contractors, and assist in obtaining all required clearances and environmental permits in a timely manner prior to construction; (ii) monitor CEMP implementation by the contractors during construction including all mitigation measures and environmental parameters (air and water quality, noise, etc.) and taking corrective actions where necessary; (iii) address and record grievances through the Grievance Redress Mechanism in a timely manner, and taking quick corrective actions where necessary; (iv) ensure that all required environmental study (e.g. biodiversity studies on aquatic ecosystem and elephant social behavior) are professionally and comprehensively carried out; (v) ensure that all environmental quality monitoring required for the project are comprehensively done; and (vi) review monthly environmental monitoring reports submitted to PIU by contractors and consultants, and preparing and submitting semi-annual environmental monitoring reports to ADB on behalf of the PMU.

20. CDCL has appointed Mr. Pushpa Raj Pradhan as Environmental Manager who is presently in-charge of both PMU and PIU Offices. He is responsible for overseeing his implementation of environmental safeguards, coordination with stakeholders, government officials and regulatory authorities on environmental issues, addressing the public grievances on environmental issues.

6.2 PIC Environmental Specialist:

21. There is provision of an International; Environmental Specialist in the PIC team, which is responsible for:

- Review of the EIA, SIA and EMP and the conditions of Approval of NEC;
- Laisoning and coordination with PIU's environmental manager and NEC personnel to ensure that roles and responsibilities are clear and documented;
- Review of bidding documents prepared for each contractor in Zone A and ensure that all safeguards requirements from the EIA and NEC approval are included;
- Ensuring appointment of suitably experienced persons of contractor at key environmental safeguards positions;
- Ensuring that these personnel are mobilized within one month of Contract Award;
- Supervision and approval of Contractor's EMP (CEMP) in Zone A and in close coordination with the National Safeguards specialist supervise and approve SSHP of each contractor before any construction work commences;
- Supervision of the implementation of each CEMP and SSHP to ensure that contractors submit monthly report on implementation of CEMP and SSHP to the PIU;
- Check and clear contractor's claims for all costs to address environmental Prepare semi-annual reports on overall implementation of EMP to be submitted to ADB by the EA;
- Prepare a detailed TOR for the proposed baseline study and monitoring BMBMS of flora and fauna ecosystems in Zone C;
- Supervise the implementation of the baseline study in Zone C;
- Ensure that all "critical" and/or "natural habitat" (defined in ADB Safeguards Policy Statement, 2009) are identified and using the results of the study prepare a Zone C Environmental Management Plan and any necessary review of the EIA for further approval by NEC;
- In case unexpected impacts occur during construction time, work closely with other PIU team and contractors to prepare remedial measures to manage those impacts;
- Make recommendations to improve or correct environmental management and monitoring for all other zones and other project components such as management of solid waste;
- Work closely with other PIU team members to ensure that all outputs under point 3 above are delivered.

22. The PIC has appointed Dr. Surjit Singh Deepak as Environmental Specialist-International, who will be mobilized at site from 3rd January, 2019. He is working as Environmental Expert of GC team and conducts periodical site inspection and reviews

environmental progress based on actual site visit and information supplied by the PMC. Time to time training workshops on Environmental implementation will be conducted for PIU/PMU and the contractors as capacity building measures on effective implementation and monitoring of EMP in the project during construction.

6.2 PIC Safeguard and Communication Specialist:

23. There is a provision for a national, Safeguard and Communication specialist in the PIC team, which is responsible for:
    - Review bidding documents prepared for each contractor and ensure that all safeguards requirements, if any, from SIA are included;
    - Ensure that each contractor has suitably experienced personnel in the key social and gender position;
    - Prepare and implement an overall Communications & Consultation Plan (CCP) for Zone A which includes sub plans on community relations, labour and employment and project induced in-migration (PIIM) also referred to as Influx;
    - In close consultation with each contractor in Zone A prepare an agreement on social monitoring locations and responsibility for collection and input to the Project GIS;
    - Prepare and implement a Social Monitoring Plan for Zone A in close consultation with the contractors and their sub-contractors and ensure all on-going results are documented in the Project GIS;
    - Ensure roles and responsibilities for collection of social monitoring data is agreed between PIU and each contractor and their sub-contractors;
    - Assist supervise the preparation and implementation of a Security Safety and Health Plan (SSHP) which includes a sub plan on Construction Camp Management by the main Contractors;
    - Monitor, report and advice on social issues, including relevant gender components, HIV/AIDS, human trafficking and core labour standards and equal payment for equal work provisions in the civil works contracts;
    - Work closely with international specialist to assist him/her in undertaking field monitoring on implementation of CEMP and SSHP and provide inputs on the preparation of semi-annual report for implementing EMP;
    - Prepare semi-annual social and monitoring reports for review and approval by PIU for submission to ADB for disclosure;
    - Ensure compliance with social impact mitigation requirements of civil works contracts, and providing information to PIU on those processes in the monthly progress reports;
    - Lead the implementation of Grievance Redress Mechanism for the project by developing systematic recording claim, organizing meeting to resolve grievances
    - Organize and coordinate gender awareness training for the PIU;
    - Coordinate with PIU to conduct awareness programs amongst key stakeholders.

24. The PIC has appointed Mr. Megay Penjore as the Safeguard and communication specialist, who has already been mobilized at site. He has been engaged in finalization of Emergency Response Plan, Traffic Management Plan, Occupational Safety and Health

Management Plan and which is attached as ***Annexure 3, 4 & 5 of CEMP*** (**APPENDIX 2**) respectively.

6.3 Contractor's Environmental Officers:

25. The Contractor has mobilized their Environmental and Safety Personnel. He will be responsible for the following activities on safeguards:

- Implementation of all environmental, health and safety measures as per approved CEMP and contract specification during construction including regular testing and monitoring of environmental parameters outlined
- Coordinating with the PIC during preparation and obtaining approval of the CEMP.
- Ensuring that the contractor engages a suitable expert as a resource person or organization to undertake STIs/ HIV/ AIDS briefings and awareness raising amongst the contractor's employees and neighboring communities with follow-up upon request.
- Coordinating with PIU and PIC in respect of community consultation.
- Participating in monitoring and coordinating with PIC to ensure that environmental management activities are reported as required.
- Coordinate and communicate with the PIC as required, to facilitate consultation with the affected villages, various stakeholders, and ensuring smooth implementation of the subproject.
- address public grievances by taking quick corrective actions and reporting status of grievances and redress to PIU/PMU; (iv) undertake its own monitoring of project related impacts and prepare an environmental section of the monthly report to CDCL environment team and PIC;
- The Contractor has appointed OHSE Manager supported by one Environmental Engineer and one Safety Manager for effective implementation of environmental and safety measures at site.

27. Following environmental and staff have been mobilized by the Contractor at site:

Table 2: Environmental and safety staff of contractor mobilized at site

S. No.	Name	Designation	Job Responsibility
1.	Mr. S. Ashok Kumar	OHSE Manager	Responsible for the overall occupational health safety and environmental performance of CEMP. He will be directly reporting to the Project Manager. For any issues arising related to the implementation of CEMP provisions, the EHS Manager shall appraise the issue to the Project Manager and the Project Manager will resolve the issue by assigning the task to the person(s) of his choice.
2.	Mr. Sunny	Environment In-charge	To assist OHSE Manager in day to day implementation of Environmental aspect of the CEMP. The Environment Engineer shall be responsible for the induction of all employees to create awareness on the CEMP.
3.	Mr. Bijender Kumar Singh	Safety Manager	To assist OHSE Manager in day to day implementation of Safety and social aspect of the CEMP. The manager shall be responsible for the induction of all employees to create awareness on the CEMP

28. In addition to above positions, the contractor has appointed 4 safety stewards, to oversee the safety at different sites of work.

7. Environmental Compliance Monitoring

29. For effective monitoring of Environmental Compliance, environmental parameters have been identified as indicators which may be qualitatively and quantitatively measured periodically and compared over a period of time to ensure the effectiveness of the safeguard measures during project execution.

30. The parameters selected as performance indicators are as follows:
    (i) Compliance with state and national statutes & regulations
    (ii) Compliance with the Environmental Management Plan
    (iii) Monitoring of environmental quality in terms of Air Water and Noise quality at critical locations and comparision with baseline environmental quality and state/National Standards.

7.1 Compliance with state and national statutes & regulations:

31. ***Environmental Clearance:*** The CDCL has already obtained Environmental Clearance in accordance with the Environmental Assessment Act 2000, Regulation 2002 from National Environmental Commission (NEC), RGoB on 1st September 2017 vide their letter no. NEC/ESD/Dzo-Chukha/3496/2017/1245 (**Annexure 1 of CEMP-APPENDIX 2**) which includes clearance the entire Zones (including Zone A) and is valid up to August 30, 2022 (5 years)

32. ***Work Permit:*** Immigration/Work permit is required to be obtained from Department of Immigration, Govt. of Bhutan for all the Non-Bhutanese Engineers, workers and labours for working in Bhutan. Till end of December, the Contractor has mobilized 23 engineers and other staff from India for which they already have obtained the work permit. Regarding non-Bhutanese labourers, the Contractor has appointed only those labours who has valid work permit. The same is reviewed for the sub-contractor's labours prior to their engagement. The copy of the Work Permit of AFCONS's staff is enclosed as **APPENDIX-3**

33. ***Emission certificates and driving license for drivers & operators****:* The emission certificate of all the vehicles engaged and driving licenses of all the drivers and operators of construction vehicles are being checked regularly and a record is maintained by the contractor at site.

34. The Contractor is installing one batching plant and heavy duty Gensets at camp site. Since the Environmental Clearance has been issued based on the EIA report, which already has provisions of batching plants and DG sets, there is no separate requirement of any permits or clearance.

7.2 Compliance with the Environmental Management Plan

35. It is the responsibility of the contractor to implement the stipulated environmental safeguard measures set forth in EMP during construction. The compliances with the safeguards requirements by the contractor during construction are being monitored by PIC and PIU at site.

36. The following key environmental issues are being reviewed for assessing the performances of compliances with the environmental safeguards in the projects during construction stage:
    - Compliance with the required preparation and submission of environmental documents by the Contractor
    - Pollution control measures at all potential sources including construction and plant sites
    - Labour Standards maintenance of facilities and general housekeeping at all construction sites and camps.
    - General safety at different sites
    - Supply and use of Personal Protection Equipment (PPE) for all the workers at all worksites
    - Maintenance of general public safety.
    - Periodical monitoring of environmental attributes such as air quality, water quality and, noise levels at different locations during construction
    - HIV/AIDS awareness and health checkup programme.

37. **Contractors Environmental Management Plan:** The Contractor has prepared the CEMP in compliance to the Contract requirement and submitted the same to PIC on 24th December, 2018. The draft CEMP was forwarded the same to ADB to meet the scheduled deadline of Aide Memoir on Dec 2018. Meanwhile, it was informed that the PIC environmental specialist would be also mobilized in the first week of January 2019 and thereby review the CEMP for finalization by him. The draft CEMP is attached as **APPENDIX 2**.

7.2.1 Compliance with pollution control measures at sites

38. Very limited activities are in progress at site till December, 2018. The work is in initial stage. Construction of Camp, erection of batching plant and other facilities at camp site is in progress. Also the excavation works are in progress for guide wall in part-8 and Open outfall No. 8 and 2 near chainage 734R. Fugitive dust emission is a major problem in the area. The Contractor is doing regular water sprinkling over the access road through water tankers fitted with sprinklers in their proposed camp area and at the excavation area to control dust and the dust generation from their own area is satisfactorily controlled. However, in the surrounding area cluster of quarrying activities, operation of stone crusher and transportation of quarry materials have been recorded, which generate significant amount of fugitive dust. Moreover the Phuentsholing Chamkuna Highway also passes along the project area. The highway is unpaved and in bad condition, which also results into generation of dust due to movement of traffic over the road.

39. The Contractor has been suggested to supply appropriate nasal mask to all the workers at site and camp in order to protect the workforce from respiratory infections.

7.2.2 Compliance with pollution control measures at plant sites

40. The erection of Batching plant is still under progress, so there is no emissions due to plant operation

7.2.3 Compliance with worker's safety requirements at site

41. The Contractor has supplied all the required PPEs to all their workers at different sites where works are in progress. Use of PPEs by the workers is good. The Contractor organizes induction training on environmental and safety aspects through the EHS Officer before allocating them work. The record of induction training is maintained by the contractor. Till date the observation with safety requirements by the workforce is good.

7.2.4 Traffic and public safety:

42. During the reporting period, the measures taken for traffic and public safety was generally found to be satisfactory. The Contractor has provided 3 bye-passes to avoid interference of local traffic with the Construction vehicles. Diversion sign boards have been installed at each diversion point. On all the diversion water sprinkling is carried out to curb dust generation from the diverted road. It is required to install additional caution/ warning signboards such as "Diversion Ahead", "Work in Progress", "Danger", "Road Closed", "Danger- Deep Excavation ahead" and "No Entry" at appropriate

locations. Retro reflective tapes/ paints over the delineator poles and the signboards to ensure visibility during night time are also proposed.

7.2.5 Debris/ Waste Management:

43. The work at site is at preliminary stage so no debris generated during the reporting period. For the domestic waste the Contractor has installed bins at camp site temporarily for collecting the waste and transported to the municipal waste collection point in the nearby area.

7.2.6 Labour Standards

44. Labours both from Bhutan and India (Jaigoan) have been engaged for different works. Majority of the labourers engaged for different construction activities are local day labourers. The Contractor has made exclusive arrangement for their pickup and dropping through bus. Presently no labours are staying at site. The construction of labour camp along with camp office, engineer's quarter is under progress. Till December, 2018 two units of toilets have been provided separately for male and female workers. The Contractor has proposed dwelling units for about 300 labourers, with all basic facilities at camp site.

7.2.7 Health check-up and AIDS awareness camps for workers:

45. Organizing HIV/AIDS awareness programme by the contractors in is a contractual requirement in the project. The main objectives of organizing such camps are to :
    - raise awareness amongst construction workers and the local community of the risk of infection with the HIV virus;
    - reduce the risk of transfer of the HIV virus between and among construction workers and the local community;
    - promote early diagnosis; and
    - assist affected individuals to access care and counseling
46. The Contractor has mobilized their team recently and their camp site is under construction. The contractor has submitted their plan for periodical Health checkups and AIDS awareness Camp. These camps are scheduled from February, 2019.

7.3 Monitoring of environmental quality attributes

47. The Contractor has submitted their periodical environmental monitoring schedule for conducting the monitoring of environmental attributes in terms of Air, water and noise quality at different locations. They have engaged *Bhutan Ecolab Services, Phuentsholing* for carrying out sampling and testing of these attributes. The Contractor has established two bore wells at camp site for using the water for drinking and other domestic purpose and at batching plant. To assess the suitability of water from bore well the Contractor has carried out water quality testing in the month of December, 2018. The test results reflect that all the measured parameters were well within the permissible limit and conforms quality criteria and Category A as per Bhutan Environmental standards. For assessing the surface water quality, one sample from Toorsa River was collected and tested. The test results reflect that all the parameters were within the permissible limit. The copy of test results is enclosed as **APPENDIX-4**

48. Till the reporting period no measurement of Air quality and Noise levels were made. The Contractor has planned for monitoring of the air and noise levels in the month of January, 2019. Similarly for Meteorological station, the equipment will be mobilized by the first week of Feb 2019.

8. Social and Environmental Grievance Redress Mechanism

49. The PIU in assistance with the PIC Safeguard and Communication Specialist framed a social and Environmental Grievance Redress Mechanism (GRM) for addressing public complains with respect to environmental and safety issues of the project. A Grievance Redress Committee (GRC) has also been formed. For disclosure of GRM, stakeholder Consultation has been planned on 23 January, 2019. The GRM will be publicized by using different mass media. A register for Grievance redress has been developed and maintained at PIU. The copy of GRM is attached as **Chapter 6 of APPENXIX (CEMP)**

50. The stakeholder consultation meeting which was scheduled within December 2018 as per the Aide Memoir deadline, has been now scheduled for 23rd January 2019 since many of the stakeholder members would not have been available due to Annual Financial closure and other pre-engagements. The stakeholder consultation meeting would be updating the progress of the project including the Standard Operating Procedure of the GRM.

9. Emergency Response Plan

51. An Emergency Response Plan has been formulated to address unforeseen injuries, losses and impacts to employees, equipment and environment. In addition to the onsite emergency plan, provisions are also planned for early flood warning systems upstream of project site at different sites.

10. Significant Non-Compliances

52. The work is in initial stage. No non-compliance were observed during the reporting period.

11. Any additional environmental issues and impacts

53. Till the end of the reporting period, no additional environmental issues were noticed during the implementation period that was not covered earlier in EIA.

12. Conclusion and Recommendations

54. The PIU office started function at Phuentsholing. The Environmental Manager has been appointed under the Project Manager-PIU to oversee the environmental issues of the project. The PIC team has also been mobilized at Phuentsholing in the month of October, 2018. The Contract for construction Package CW-01 has been awarded to M/s AFCON Limited, India and the Contractor's team initiated mobilization in the month of September, 2018.

55. The Contractor has mobilized their Environmental and Safety staff at site. The CEMP has also been submitted by the Contractor to PIC and forwarded the same to ADB.

56. The construction activities are in preliminary stage. The Contractor has initiated construction of their camp site which includes Camp Office, PIC & PIU Office, Laboratory, staff quarters, labour camp with all basic facilities, Batching Plant, stockyard, etc. The excavation for guide wall and out fall has also been initiated at Chainage 734R.

57. The statutory requirements of obtaining work permits have been complied.

58. The contractor has adequately taken care of worker's safety. Appropriate PPEs have been supplied to all the workers at site and their use has been ensured. Induction training and regular toolbox training of various safety aspects are done by the Contractor for their workers. For smooth and safe flow of traffic, the contractor has provided diversions and guided signboard has been installed at all the diversion.

59. Dust generation is a major issued in the area. Although the contractor is regularly carrying out water sprinkling within the camp area, over access road, internal road and the highway in the vicinity, still significant dust generation has been observed in the surrounding area due to various dust generation activities such as quarrying and stone crusher operations. The bad road condition around the project area also adds to the dust problem. The Contractor has been suggested to provide appropriate nasal mask to all the workers at site for protection from continuous exposure to fine dust.

60. The Contractor has carried out water monitoring at site and the test results reflect that all the measured parameters were within the permissible level as per NEC standards.

61. The PIU with assistance from the PIC has developed the Standard Operating Procedure for GRM for dealing with the public complaints with respect to environmental and social issue due to the project.

62. Few photographic Clips indicating the environment and safety compliance is presented below:

PHOTO CLIPS ON EMP IMPLEMENTATION AND SAFETY

Photo Clip 1: Project Information Signboard and Security Cabin at Entry of the Camp Site

Photo Clip 2: Regular Water Sprinkling Carried out to Control Dust

Photo Clip 3: Tool Box Talk about Safety

Photo Clip 4: Safety Signboard showing Mandatory PPE

Photo Clip 5: Bund Creation and blocking access to Stop Car Washing in River

Photo Clip 6: Samtse-Phuentsholing with Diversion Road Signage

Photo Clip 7: Toilets and bath rooms at site

Photo Clip 8: Labour camp under construction

Photo clip 9: Erection of Batching Plant in progress, Workers using PPE

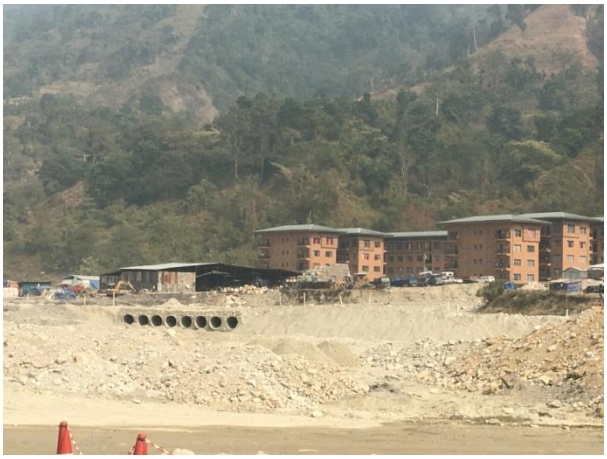

Photo Clip10: Hume pipe provided at diversion to ensure water flow across the road

ANNEXURE-1

GENERAL CONSTRUCTION MONITORING

CHECK LIST - ENV 01

CHECKLIST 01-V3

DD/MM/YYYY	/ /			**Inspected By** **PIC:** ☐ **PIU:** ☐ **Other (s)** ☐_____
Contractor Site Operating ☑/☒	**(Km... ...+ .....) L / R** ☐ ☐		**(Km.....+.....) L / R** ☐ ☐	

Weather **Photo taken** ☑ / ☒: ☐

Condition: ☑/☒	☐	☐	☐	.....	°C **Temperature:**

Wind: ☐ **Nil** ☐ ☐ ☐ **Remarks** ☐

					Monitoring Activities							
No.	**Date and Time**	**Work in Progress** *(Name of Work)*	**Station** *(Location)*	**Encroachment into Sensitive Habitats/ Water Bodies / Impact on Vegetation**	**Equipment/ Machines in Proper condition and safe**	**Dust Suppression and Control Measures in place**	**Noise and Vibration monitoring and controls**	**All workers with PPEs and safety measures**	**Waste Management (solid & liquid) including toilets.**	**Road Traffic and Accessibility Management**	**First Aid and Medical facilities**	**Any Community / Social Concerns**
OVERALL CONSTRUCTION SITES												
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

Legend: 1 – No concern, under control. 2 - Environmental or Safety concern, requires attention, 3- Serious Environmental or Safety Concern- report or react immediately,

Other Observations:

PIU/PMU Representative Contractor Representative PIC Representative

Signed.....

SITE INSPECTION CHECKLIST for CONSTRUCTION YARD / OFFICES

CHECKLIST – ENV 02

CHECKLIST 02-V3

DD/MM/YYYY	/ /	**Location**		**Inspected By**
Contractor Site Operating ☑/☒	**(Km… …+ ……..) L / R** ☐ ☐		**(Km……+…….) L / R** ☐ ☐	**PIC:** ☐ **PIU:** ☐ **Other (s) ☐:** _____

Weather **Photo taken ☑ / ☒:** ☐

Condition: ☑/☒	☐	☐	☐	…….	°C **Temperature:**

Wind: ☐ **Nil** ☐ ☐ ☐ **Remarks**

Tick each item as 'Yes', 'No' or 'N/A or not obs' as appropriate

	Item	Close-out on last audit Y/N	Yes	No NEED ACTION	N/A or not obs	Remarks
A	**ECOLOGY and SENSITIVE RECEIVER (SR)**					
1.	NO ecological activity on or near site					
2	NO Sensitive Receiver within 500m of workshop/ Office					
3.	NO encroachment into the farm land/ Settlement					
4.	Encroachment into the river/gullies/ forest / mangrove / estuary / beach					
B	**WORK STANDARDS**					
1.	General work area clean and tidy					
2.	Radio communications (emergency & general), call-up procedures adequate					
3.	Signage (PPE, safety & restricted access) visible, legible, good condition					
4.	Adequate signage at workshop yard entrance (e.g. Danger – Deep Excavation, Hazardous & Flammable materials, pressurised gasses etc.)					
C	**WORK ENVIRONMENT**					
1.	Adequate sealed areas & drainage, catch-pit/ drain for oily wastes					
2.	Stockpiles & materials stacked and maintained in safe condition					
3.	Traffic management in site & parking system in place and being adhered to					
4.	Adequate lighting on site, covered storage areas, vehicle maintenance pit					

5.	Segregated work areas and signage adequate (direction, warnings)				
6.	Dust control measures adequate (water truck & sprinklers, if necessary)				

D HAZARDOUS SUBSTANCES OR DANGEROUS GOODS

1.	Fuel storage tank within sealed area & bunded (inside wall in case of spill)				
2.	Hazardous substance containers labelled and not leaking				
3.	Safe disposal of containers (consider residual contents)				
4.	Workers exposed to hazardous substances trained, adequate instruction provided				
5.	Health/ Safety surveillance is undertaken where appropriate				
6.	Dangerous goods correctly stored, bunded, signposted				
7.	Material safety data sheet available for hazardous substances				

E TOILETs AND KITCHEN

1.	Offices, Toilets and washrooms maintained in sanitary condition				
2.	Toilets, Septic Tanks and Soak Pits being used properly and cleaned regularly				
3.	Properly labelled garbage bins installed around the kitchen & other areas and emptied regularly				
4.	Is the garbage in good management and disposed to Thromde collection system?				

Other Observations

PIU/PMU Representative	Contractor Representative	PIC Representative

Signed.....

SITE INSPECTION CHECKLIST for BACK Filling and Embankment

CHECKLIST – ENV 03

CHECKLIST 03-V3

DD/MM/YYYY	/ /	**Location**		**Inspected By** **PIC:** ☐ **PIU:** ☐ **Other(s)☐:** _____
Spoil Disposal Site ☑/☒	**(Km… …+ ……..) L / R** ☐ ☐		**(Km……+…….) L / R** ☐ ☐	

Weather **Photo taken ☑ / ☒:** ☐

Condition: ☑/☒	☐	☐	☐	……	°C **Temperature:**

Wind: ☐ **Nil** ☐ ☐ ☐ **Remarks**

Tick each item as 'Yes', 'No' or 'N/A or not obs' as appropriate

		Close-out on last audit Y/N	Yes	No NEED ACTION	N/A or not obs	Remarks
A	**ECOLOGY& PERMISSION / WAIVER**					
1.	Environmental / Ecological survey of site completed					
2.	Land Owner/ Thromde/ DOR or others consulted					
3	Owner Consent / Waiver signed & clarified (inc. map / area / Chain / L.or R.)					**m²**
4	PIC Environmental Specialist check environmentally acceptable (signed)					Photo
5	Protection from banks of river / Flood is well					
6	PIC Site Inspector / Team Leader checks Engineering Safety (signed)					
7	Filling PLAN / BIOENGINEERING PLAN APPROVED by PIC					
B	**SETUP & SOURCE of Backfill**					
1	Approval for sourcing the backfilling sought					
2	Source of the Backfilling is from designated quarry site					
3	Reclamation of the quarry site completed properly?					

Other Observations

PIU/PMU Representative Contractor Representative PIC Representative

Signed……

SITE INSPECTION CHECKLIST for Excavation and RIVER Leveling

CHECKLIST - ENV 04

CHECKLIST 04-V3

DD/MM/YYYY	/ /	**Location**		**Inspected By** **PIC:** ☐ **PIU:** ☐ **Other(s)☐:** _____
Borrow pit/quarry **☑/☒**	**(Km... ...+ .....) L / R** ☐ ☐ ☐		**(Km.....+.....) L / R** ☐	

Weather **Photo taken ☑ / ☒:** ☐

Condition: ☑/☒	☐	☐	☐	.....	°C **Temperature:**

Wind: Nil

Remarks:

Item	In last audit Y/N	Yes	No NEED ACTION	N/A or not obs	Remarks
A ECOLOGY					
1. No ecological activity at the site or surrounding area					
2 There is geotextile and other protection to prevent uncontrolled debris falling into the river					
3 No major spoil disposal into the river/gullies/riparian area					
4 No major siltation into the river/gullies/riparian area					
5 River width is not completely cut off with no major imminent threat to fishes and fishing risks					
B **CUT FACES AND EXTRACTION DEPTHS**:					
1 Levelling is controlled and sequential in cells / areas and phased					
2 Excavation is to agreed depth.					
3 Trench is secured properly without risk of materials falling back. Proper storage of excavated materials from the trench.					
4 There is safe accessibility inside the trench and machines are secured					

SITE INSPECTION CHECKLIST for Excavation and RIVER Leveling

CHECKLIST - ENV 04

C **REFUELING FROM TRUCK OVER DRIP TRAY**

1.	Truck refuelling carried out at Km …. (Construction camp)					
2.	Excavator refuelling carried out at refuelling area over drip tray					
3.	Is drip tray impervious (steel) with edge bunding to contain any fuel spillage					
4.	Are only dedicated refuelling vehicles with a hose and nozzle in use					
5.	Does the nozzle incorporate an automatic overfilling cut-off					

C **SPILLAGE -** If there is a **SPILL > STOP WORK > CLEAN UP**
NO VEHICLE MAINTENANCE ON SITE - Vehicles must be taken to construction camp work shop
.

1.	No vehicles on site leaking oil?					
2.	No spillage of oily or hydrocarbon fuel material					

D DUST

1	No visible dust clouds from excavation/ leveling activity.					
2	Vehicles within the area travelling at low speeds (>10 km/h).					

E Misc

1	First Aid Box is available at site					
2	Toilet is available at site					
3	Waste bins facilities are available at site					

Other Observations:

PIU/PMU Representative Contractor Representative PIC Representative

Signed……

SITE INSPECTION CHECKLIST for MANUFACTURING AREAS (CRUSHER AND BP#)

CHECKLIST – ENV 05

CHECKLIST 05-V3

DD/MM/YYYY	/ /	**Location**		**Inspected By** **PIC:** ☐ **PIU:** ☐ **Other(s)☐:** _____
Item/Plant operating ☑/☒	**(Km... ...+ .....) L / R** ☐ ☐		**(Km.....+.....) L / R** ☐ ☐	

Weather **Photo taken ☑ / ☒:** ☐

Condition: ☑/☒	☐	☐	☐	.....	°C **Temperature:**

Wind: ☐ Nil ☐ ☐ ☐ ☐ Remarks: ☐

Tick each item as 'Yes', 'No' or 'N/A or not obs' as appropriate

	Item	Action since last audit Y/N	Yes	No NEEDS ACTION	N/A or not obs	Remarks
A	**ECOLOGY and SENSITIVE RECEIVER (SR)**					
1.	No ecological activity on or near site					
2	No sensitive receiver within 500m of Batch Mix and crusher plant					
3.	No encroachment into undeveloped marine, river and terrestrial habitats					
4.	No encroachment into protected areas or ecologically sensitive areas					
B	**AIR QUALITY – DUST & SMOKE**					
1.	No dust from Crusher /BP					
2.	No dust from Conveyor and Stockpile Area					
3.	No dust from Precast Area					
4.	No dust from Cement Storage / Batching Plant					
5.	Vehicles travelling at high speed (>10 km/h) causing dust					
6.	Water sprayed to suppress dust					
C						
1.	Hazardous materials in working area (BP☐ Crush ☐ Stock☐ PreC ☐)					
2.	Fuel tank drum not within sealed bund (BP ☐ Crush ☐ Stock ☐ PreC ☐)					

SITE INSPECTION CHECKLIST for MANUFACTURING AREAS (CRUSHER AND BP#)

3.	Visible fuel or oil spill (BP☐ Crush ☐ Stock ☐ PreC ☐)					
4.	Waste collected in proper bins & emptied (BP☐ Crush ☐ Stock ☐ PreC ☐)					
5.	No Pollution in the river area due to spoil or fuels					
6.	Oil spillages/leaking around in Crusher or BP?					
7.	No sealed and bund for fuel re-fill area?					
D	**WATER QUALITY – BP**					
1.	Silty runoff (BP ☐ Crush ☐ Stock ☐ PreC ☐)					
2.	Site runoff entering river goes through sedimentation tank					
3.	Change in water quality due to release of oil (liquid waste) or sediment					
4.	Suitable materials or kits available to deal with spillages?					
E.	**CLEANLINESS**					
1.	Workers washing facilities and materials not adequate?					
2.	Do the signs comply with the OHS Regulation/Guideline/Rules in CEMP					
3.	Smoking, eating, and drinking allowed in the workshop area?					
4.	Are all the workshop equipment suitably placed to avoid overcrowding?					
F.	**GENERAL HEALTH AND SAFETY PRECAUTIONS**					
1.	Are First Aid Kits checked regularly to ensure that the Contractor is kept well stocked, with contents in good condition?					
2.	Do the signs comply with the OHS Regulation/Guideline/Rules in CEMP					
3.	Employees provided with and trained in the proper use and selection of face masks for respiratory protection					
4.	Employees are provided with and using hearing protection for noise hazards from equipment (noise level above 85 dBA)					
5.	Employees provided with and using safety goggles/face shields when needed					

Other Observations:

PIU/PMU Representative | Contractor Representative | PIC Representative

Signed.....

SITE INSPECTION CHECKLIST for CONTRACTOR WORKER ACCOMODATION

CHECKLIST – ENV 06

CHECKLIST 06-V3

DD/MM/YYYY	/ /	**Location**		**Inspected By** **PIC:** ☐ **PIU:** ☐ **Other(s)☐:** _____
Site operating ☑/☒	**(Km… …+ ……..) L / R** ☐ ☐		**(Km……+…….) L / R** ☐ ☐	

Weather **Photo taken ☑ / ☒: ☐**

Condition: ☑/☒	☐	☐	☐	……	**°C Temperature:**

Wind: ☐ Nil ☐ ☐ ☐ Remarks

Tick each item as 'Yes', 'No' or 'N/A or not obs' as appropriate

	Item	Action since last audit Y/N	Yes	No NEEDS ACTION	N/A or not obs	Remarks
A	**ACCOMODATION REQUIREMENTS**					
1.	Domestic animals controlled to avoid nuisance?					
2.	Camp clean and sanitary, litter collected, no burning waste?					
3	Information board to employees/method notification in the camp site?					
B	**WATER SUPPLY**					
1.	Proper Water Treatment done at site?					
2.	Water testing done on samples?					
3.	Adequate potable water at camp?					
4.	Adequate potable water at worksite?					
5.	Containers for water not used for other purposes?					
6.	Water containers securely closed with taps?					
C	**CAMPSITE**					
1.	Good drainage installed and not contaminating water in stream river					
2.	Gray water treatment done as per EMP?					

SITE INSPECTION CHECKLIST for CONTRACTOR WORKER ACCOMODATION

D COMMUNICABLE DISEASES

1.	Illnesses report?					
2.	No standing water for mosquitoes (if we put YES, meaning that we need action to create standing water for mosquitoes?)					
3.	Timely Pest Control and Preventive measures are carried out to prevent outbreaks					

E SEWAGE (TOILETS) AND GARBAGE (solid waste)

1.	Agreement with Thromde Landfill for disposal permission.					
2.	Soak pits are proper, covered, with no overflow?					
3	Kitchen sewage/waste disposed in infiltration pits, with ACF, closed system?					
4	Adequate water supply for wash basin & flush toilets?					
5	Garbage has good management and disposed to Thromde landfill area?					

Other Observations:

PIU/PMU Representative | Contractor Representative | PIC Representative

Signed……

SITE INSPECTION CHECKLIST for HEALTH AND SAFETY

CHECKLIST – ENV 07

CHECKLIST 07-V3

DD/MM/YYYY	/ /	**Location**		**Inspected By** **PIC:** ☐ **PIU:** ☐ **Other(s)☐:** _____
Site operating ☑/☒	**(Km… …+ ……..) L / R** ☐ ☐		**(Km……+…….) L / R** ☐ ☐	

Weather **Photo taken ☑ / ☒: ☐**

Condition: ☑/☒	☐	☐	☐	……	°C **Temperature:**

Wind: ☐ **Nil** ☐ ☐ ☐ **Remarks**

Tick each item as 'Yes', 'No' or 'N/A or not obs' as appropriate

	Item	**Action since last audit Y/N**	**Yes**	**NO NEED ACTION**	**N/A or not obs**	**Remarks**
A	**GENERAL HEALTH AND SAFETY DURING CONSTRUCTION**					
1.	All workers trained on safety and environmental hygiene at work? (Records)					
2	Site supervisors/ safety officers gives weekly tool box talks to reinforce training to all the labourers?					
3	Equipment (back hoe etc.), machines, and vehicles are in proper condition with details of registration- emission certificate/ fitness certificates.					
4	Workers equipped with PPE such as hard hats, eye and protection, ear protection, gloves, safety- shoes, and respirators					
5	High visibility clothing, including a vest to avoid "collision" in work area					
6.	Warning signs in place to shield workers from passing vehicle and segregation such as traffic cone and barrels					
7.	Fencing/ Markers installed on all areas such as excavation, concreting, and side of temporary work / pits greater than 1m deep					
8.	Information for workers and adequate awareness working near construction vehicles & equipment the operator/ driver knows where the person are located?					
9.	Communicate with the driver using a radio, hand signals, etc.					
10.	Reversing siren, whistle, air-horn on vehicles or other device to warn fellow workers when they are in danger.					
11.	Flag men in place with flags and radio fully equipped and completed training?					

Item	Action since last audit Y/N	Yes	NO NEED ACTION	N/A or not obs	Remarks
12. Warning signs before and after works to inform reduce hazard for passing drivers?					
13. Proper Traffic Management Plan is available and adhered to					
14. Training and awareness meetings for HIV/AIDs (STI) including prohibition of drugs / alcohol on construction site					
15 First aid boxes available and well stocked with bandages, antiseptic etc. First Aid Register is available					
16 OHS Statistics Board and Display Available at the site					
17 Employee register with gender, nationality, skills maintained at site					
18 Visitor Card, Register, Briefing and Management System adopted					

Other Observations:

PIU/PMU Representative	Contractor Representative	PIC Representative

Signed……

CONTRACTORS ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

PHUENTSHOLING TOWNSHIP DEVELOPMENT PROJECT (PTDP)

Client: Construction Development Corporation Ltd. (CDCL)

Consultant: EGIS International

Contractor: AFCONS Infrastructure Ltd.

ABBREVATIONS

ADB	:	Asian Development Bank
BOD	:	Biochemical Oxygen Demand
BMBMS	:	Biodiversity Monitoring and Bench Marking Study
COD	:	Chemical oxygen Demand
CDCL	:	Construction Development Corporation Limited
C & D	:	Construction and Demolition
CEMP	:	Contractor's Environmental Management Plan
CPUE	:	Catch Per Unit Effort
DoFPS	:	Department of Forest and Park Service
DHI	:	Druk Holding and Investments
EA	:	Executing Agency
EIA	:	Environmental Impact Assessment
ES	:	Environmental Standards
IA	:	Implementing Agency
IFC	:	International Finance Corporation
MoLHR	:	Ministry of Labour and Human Resource
NECS	:	National Environment Commission Secretariat
OHSE	:	Occupational Safety Health and Environment
PCR	:	Phuentsholing- Chamkuna Road
PIC	:	Project Implementation Consultant
PIU	:	Project Implementation Unit
PMU	:	Project Management Unit
PPE	:	Personal Protective Equipment
RENEW	:	Respect Educate Nurture Empower Women
SPS	:	Safeguard Policy Statement
STP	:	Sewage Treatment Plan

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1 Introduction

1.1 Project Description

1. The Phuentsholing Township Development Project (PTDP) will develop 464 hectares of riparian land near Phuentsholing City, provide protection from floods and erosion, and construct smart urban infrastructure to allow phased urban expansion. The City of Phuentsholing is located adjacent to the Amochhu River on Bhutan's southwestern border with India (Jaigoan, Alipurduar district, West Bengal). It is the country's economic capital and main trading gateway with India. The Royal Government of Bhutan's vision is for Phuentsholing to grow into an economically vibrant, ecologically sustainable, and energy efficient center that will support economic diversification, employment creation, and income generation.

2. The project aims to protect the existing and new towns from floods and riverbank erosion which currently threatens lives and livelihoods and disrupts connectivity with nearby communities. The project will train the river along both banks of Amochhu and the area reclaimed after river training will be used for the development of township. The project will be undertaken in phases which is anticipated to be completed within 15 years in accordance with the PTDP Master Plan.

3. The project is divided into five zones: A to E. Zone D represents Kaileshwar Hill which is currently not included in the project development. The remaining four Zones will require about 15 kilometers of riverbank protection works with subsequent development of about 464 hectares of Amochhu riparian land. The development comprises of new common urban infrastructure such as roads, bridges, water supply and waste water system, municipal solid waste system, power and telecommunications to support the habitation of 50,000 people. The implementation of the project is phased in relation to the scale and demand for the development. The allocation of land and riverbank protection for the project's development is shown in Table 1 below:

Table 1: Land Allocation for PTDP

Zone A	Area (ha)	Riverbank Protection Length (m)
A	66	3,974
B	94	3,046
C	277	4,872
E	27	3,083
Total	464	14,975

4. Phase 1 will develop Zone A while subsequent phases will develop the remaining zones. The current scope of work (CW-01) includes construction of approximately 4.5 km of River Training and Embankment works along the Amochhu River in Phuentsholing. Activities include river training (diaphragm wall, Anchor slab), Embankment (retaining walls, outfalls and slope stability), General Earth Filling, Irrigation and Landscape works.

5. Phase 1 is financed with support from Asian Development Bank (ADB) & Druk Holding and Investments (DHI). DHI is the Project Owner and the Executing Agency (EA) and Construction Development Corporation Limited (CDCL), is the Implementing Agency (IA). The Civil work contract CW-01 has been awarded to M/s AFCONS Infrastructural Limited, India for a period of 30 months and the consultancy service to M/s EGIS International for 60 months.

6. As required by the Environmental Assessment Act 2000, Regulation 2002 and the endorsed Terms of Reference (ToR), an EIA report was prepared for the entire project and subsequently submitted to National Environment Commission (NEC) via. Phuentsholing Thromde (PT). The Environmental Clearance (EC) was obtained on 1st September 2017, a scanned copy of which is attached as Annexure 1.

7. To comply with the ADB requirement, the project was screened by using ADB Safeguard Policy Statement (SPS) 2009 and was categorized as "A" project that needed an EIA study. Hence, the EIA report was prepared as per the RGoB requirement that also complies with ADB's SPS 2009. Hence, the EIA report serves as a guidance for managing the project's social and environmental concerns where the Environmental Management Plan (EMP) provides direction to the implementation of the environmental Safeguards component of the project.

8. Based on these, Contractors Environmental Management Plan (CEMP) has been prepared which provides a framework to ensure that the environmental mitigation measures are budgeted, have an organizational structures in place for implementing the mitigation measures and a Grievance Redress Mechanism (GRM) is in place for use by affected stakeholders that addresses issues arising during the construction phase. The plan also takes into consideration of the need of environmental monitoring of the Zone A for daily construction related activities and the seasonal long term environmental monitoring and assessment of the whole PTDP area for future developments. The CEMP also contains a number of sub-plans that address the issues of concern for each construction package.

1.2 Scope of the work

9. The scope of works are as follows:

A. River Training Works
   a. Diaphragm wall
   b. Cast in situ wall
   c. Anchor slab
   d. Dead man anchor

B. Embankment Works
   a. Embankment
   b. Retaining wall
   c. Special filling behind retaining wall
   d. Ducted outfalls
   e. Open outfalls
   f. Access
   g. Hill slope stability

C. General Earth Filling Works
   a. Earth filling

D. Promenade Finishing
   a. Lower Level Walkway
   b. Upper Level Walkway

E. Irrigation and Landscape Works
   a. Irrigation works
   b. Landscape works
      i. Vetiver plantations on sloped embankments
      ii. Tree plantation on lower walkway
      iii. Tree plantation on upper walkway

F. Miscellaneous works
   a. Site Access
   b. Logistics (Traffic Management)
   c. Mobilization of equipment (Equipment delivery and assembly)
   d. Mobilization of construction materials
   e. Work areas establishment with facilities
   f. Storage of site materials (Material storage)
   g. Accommodation including fencing, security and food facilities
   h. Staff welfare activities
   i. Documentation, meetings
   j. Vendor management
   k. Safety, Health & hygiene provisions
   l. Future interface works

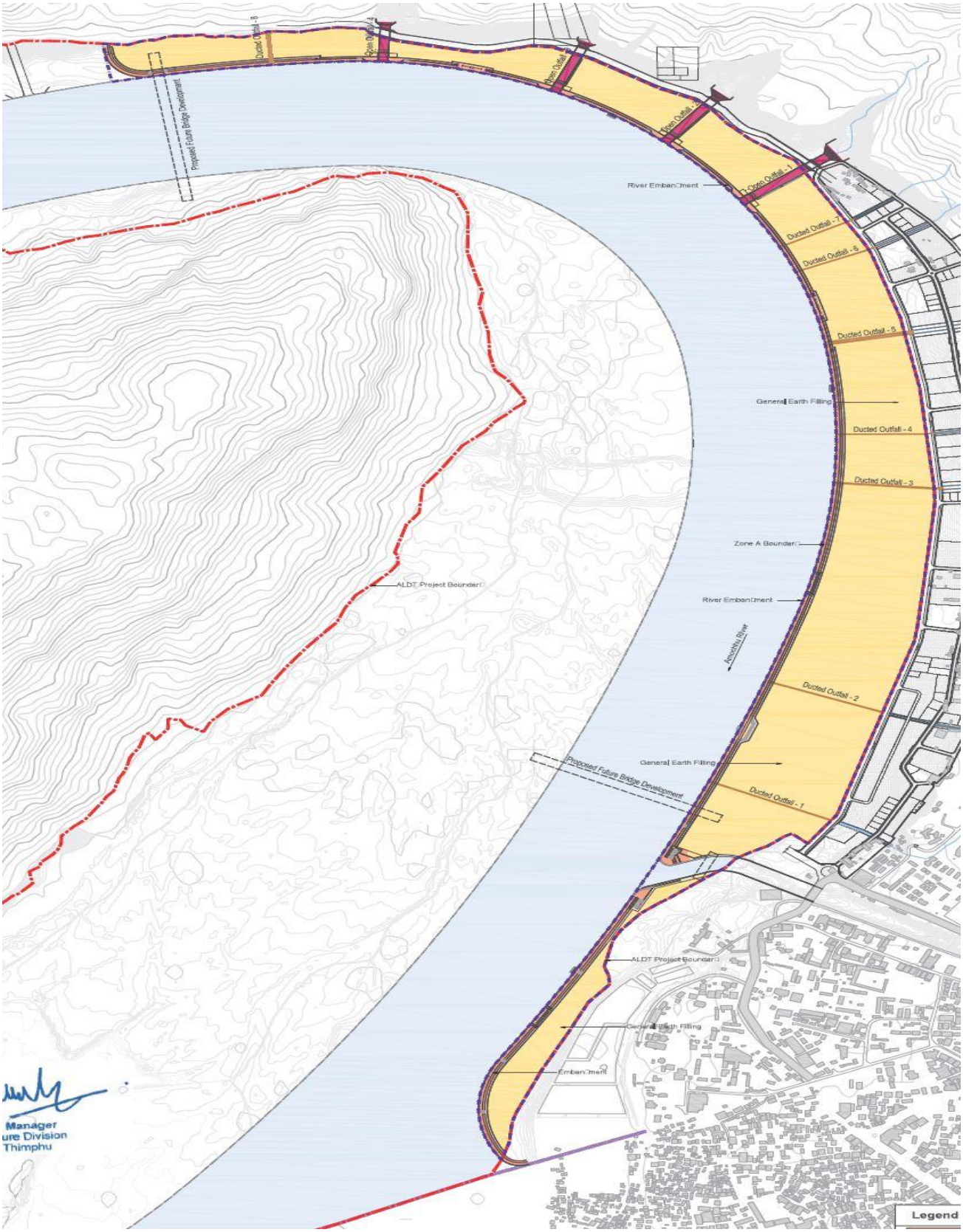
1.3 Environmental Setting

10. The following are the salient features surrounding the project besides the Amochhu River course and Kaileshwar Hill on the western side of the river:

A. International boundary with India with an access route near Jaigaon (Alipurduar district, West Bengal, India)
B. Phuentsholing - Chamkuna highway alongside hills on the western side of the river
C. Northern by-pass route
D. Alluvial fans observed at each junction where hill slope is aligning with river channel on the eastern side
E. Marshy land patches
F. Workshops to facilitate maintenance of equipment
G. Large fleet of trucks parked haphazardly and put into use for riverbed material carriage
H. Accumulated eroded river bed material including stones and boulders
I. Shrubs
J. Wastewater channel passing through temporary culverts
K. Stagnated water in septic state
L. Scrap yards
M. Agricultural crops
N. Jaldapara National Park to the south of the project area
O. Rocky structure in the middle of the Amochhu river course
P. Temporary structures such as culverts, bunds, deposits of screened river sand
Q. Rubble
R. Trucks carrying river bed material
S. Villagers travelling by passenger cars towards Samtse along the dry river channel
T. Crusher and concrete Batching plant alongside the river channel
U. Electricity Transmission system
V. Maintenance of trucks and construction equipment
W. Fugitive Dust generation, a dominant scene throughout the Zone-A and other zones due to movement of Trucks, passenger vehicles & construction equipment
X. Water sprinkling tankers for dust suppression

1.4 PTDP Overall Site Plan of Zone A

Figure 1: Overall Site Plan of Zone



2 CEMP Legal and Administrative Framework

11. The CEMP has been prepared in accordance with ADB's SPS 2009 and the overall framework for environmental and related regulations in the form of Policies, Acts, Rules, Notifications and Standards existing within RGoB. The applicability of relevant international statutes and guidelines that regulate the infrastructure sector development project has also been considered. The applicable legislations are summarized in Table 2 below as follows:

Table 2: Applicable legislation for preparing CEMP

SN	Applicable Legislations	Year
International		
1.	ADB Safeguard Policy Statement (SPS)	2009
2.	World Bank EHS guidelines	
Bhutan		
3.	Forest and Nature Conservation Act	1995
4.	The Environment Assessment Act	2000
5.	The Biodiversity Act	2003
6.	General Rules and Regulations on Occupational Health and Safety (OHS) in Construction, Manufacturing, Mining and Service Industries	2006
7.	National Environment Protection Act	2007
8.	The Labour and Employment Act of Bhutan	2007
9.	Waste Prevention and Management Act	2009
10.	The Local Government Act of Bhutan	2009
11.	Environmental Standards	2010
12.	The Water Act of Bhutan	2011
13.	Waste Prevention and Management Rules	2012
14.	Regulation on Occupational Health and Safety for Construction Industry	2012
15.	Water Regulation of Bhutan	2014
16.	Integrated Solid Waste Management Strategy	2014
17.	Regulation for Environmental Clearance of Projects	2016
18.	The Forest and Nature Conservation Rules and Regulations of Bhutan	2017
19.	Environmental Impact Assessment Report of PTDP	2017
20.	Terms and Conditions of Environmental Clearance from NEC	2017

2.1 ADB's Environmental Safeguard Policy and Requirement

12. The ADB Safeguard Policy Statement (SPS) 2009 covers three important risks to be taken into consideration for ADB's funded projects. These three risks are risks associated with environment impact, involuntary resettlement impacts, and indigenous people impacts. The SPS 2009 describes the objective of adopting these environmental requirements to ensure the environmental soundness and sustainability of ADB's funded projects, and to support the integration of environmental considerations into project decision making process. The environmental safeguard requirements are triggered by screening of the likely environmental impacts and environmental risks. Therefore, all ADB activities has to be screened as early as possible to determine the appropriate extent and type of environmental assessment, and appropriate study to be undertaken to enable identifying potential impacts and potential mitigation measures. Under the ADB SPS 2009, aside from category "A" project, ADB also categorizes a project with no significant environmental impacts as category "B" project, which require the preparation of Initial Environmental Examination (IEE). While a project with no potential environmental impacts will require only the inclusion of environmental requirements in the project design and no environmental impact study will be required

13. With regard to the critical habitat, ADB prohibited any activities in the critical habitat, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critical endangered species, and (iii) any lesser impact are mitigated. If a project is located within or nearby legally protected area, there must be no significant conversion or degradation unless (i) alternatives are not available, (ii) the overall benefit from the project substantially outweigh the environmental cost and any conversion or degradation is appropriately mitigated. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated.

14. On the basis of ADB's safeguard policy objective and considering ADB's principle of using a precautionary approach in dealing with a project located nearby a legally protected area (i.e. Jaldapara National Park, India), the PTDP has been categorized as a category "A" project. The environmental impact assessment is required to be prepared in order to identify potential impacts on the protected areas and prepare mitigation measures if required.

15. Category "A", projects will require careful monitoring and management of environmental and social implications to ensure that impacts are manageable, and will not become a trigger to generate cumulative and irreversible impacts. On this basis, the PTDP project will also become the subject of strict environmental monitoring, in which, a semi-annual report has to be submitted

to be used as a tool to monitor the effectiveness of implementation of environmental management and monitoring plan.

2.2 Institutional and Administrative Framework

16. The **National Environmental Protection Act** of 2007 is the overall law on environmental protection and specifies the powers, functions, and operational framework of the National Environment Commission Secretariat (NECS), the government agency with responsibility for all issues related to the environment. Their mandate includes the maintenance of environmental quality through the enforcement of environmental standards and promotion of best environmental management practices to address pollution and environmental hazards.

17. The **Environmental Assessment Act** of 2000 was enacted to establish procedures for the assessment of the potential effects of strategic plans, policies, programs, and projects on the environment, and for the determination of policies and measures to reduce potential adverse effects and to promote environmental benefits. Under this law, no development consent can be issued without first seeking an environmental clearance. The permission is given under Chapter III of the Act and is issued in writing by the secretariat or the competent authority, to let a project proceed, which includes terms to ensure that the project shall be managed in an environmentally sound and sustainable way. For PTDP, NEC environmental clearance is subject to review after five years.

3 Institutional Arrangements and Responsibilities for CEMP Implementation

3.1 Institutional Arrangement of CEMP

18. The pre-construction and particularly the construction stages of the project will present a variety of significant direct negative impacts with high risks unless these can be adequately mitigated. A clear set of implementation arrangements amongst the various stakeholders is an essential first step in reducing risks.

19. The key stakeholders in the implementation of environmental safeguards during the construction stage are as follows:

a) Druk Holding and Investments (DHI)
b) Construction Development Corporation Limited (CDCL)
c) PTDP Project Management Unit (PMU)
d) PTDP Project Implementation Unit (PIU)
e) EGIS International (PIC)
f) AFCON Infrastructure Ltd (Contractor)
g) Phuentsholing Thromde, and the affected village communities in the PTDP vicinity
h) Ministry of Labour and Human Resource (MoLHR)
i) National Environment Commission (NEC)
j) Asian Development Bank (ADB)

20. **Druk Holding and Investment (DHI)** is the EA and **Construction Development Corporation Limited (CDCL)** is the IA who is responsible for delivering the entire project including environmental management. It has Project Management Unit (PMU) located in Thimphu to coordinate activities within the National Government and a Project Implementation Unit (PIU) responsible for overall supervision and management with PIC support for the project implementation. The PIU and PIC offices are located in Phuentsholing.

21. **Project Management Unit (PMU)** oversees the implementation of environmental safeguards work under the project. They will also: (i) continue updating the EMP if necessary throughout project implementation in accordance with ADB's Safeguards Policy Statement (SPS, 2009) and the Environmental Assessment Act (2000), and submit to ADB for review, final approval, and disclosure prior to commencement of works; and (ii) before expiry of the initial EC after five years, review and revise (if necessary) the EIA and undertake necessary actions as required, to obtain NEC and ADB's continued approval.

22. **Project Implementation Unit (PIU)** will oversee implementation of environmental safeguards work under the project, including the following activities: (i) facilitate and confirm overall compliance with Government of Bhutan rules, oversee timely preparation and finalization

of CEMP by contractors, and obtaining all required clearances and environmental permits in a timely manner prior to construction; (ii) monitor CEMP implementation by the contractors during construction including all mitigation measures and environmental parameters (air and water quality, noise, etc.) and taking corrective actions where necessary; (iii) address and record grievances through the Grievance Redress Mechanism in a timely manner, and taking quick corrective actions where necessary; (iv) ensure that all required environmental study (e.g. biodiversity studies on aquatic ecosystem and elephant social behavior) are professionally and comprehensively carried out; (v) ensure that all environmental quality monitoring required for the project are comprehensively done; and (vi) review monthly environmental monitoring reports submitted to PIU by contractors and consultants, and preparing and submitting semi-annual environmental monitoring reports to ADB on behalf of the PMU. All semi-annual monitoring reports submitted to ADB will be disclosed on ADB's website, as per ADB safeguards and communication policies.

23. **EGIS International (PIC)** will support PIU in design review, construction supervision and monitoring and evaluation. The role of the PIC safeguards team is to oversee overall implementation of the EMP and CEMP, and prepare and implement ongoing ambient monitoring at the monitoring sites used for the completion of the EIA and prepare Environmental Monitoring Report (EMR) for submission to PIU/PMU. It will also advise the overall project engineer on addressing environmental and social management issues.

24. **AFCONS Infrastructure (Contractor)** play a critical role in implementing environmental safeguards including the following activities: (i) prepare and obtain approval of the CEMP, based on the EIA/EMP and outline CEMP prepared during detailed designs and comply with ADB's SPS 2009 and the EMP; (ii) carry out all environmental mitigation measures in the approved CEMPs during construction including regular testing and monitoring of environmental parameters outlined; (iii) address public grievances by taking quick corrective actions and reporting status of grievances and redress to PIU/PMU; (iv) undertake its own monitoring of project related impacts and prepare an environmental section of the monthly report to CDCL environment team and PIC; (v) the contractor is responsible for implementing all environmental, health and safety actions included in the CEMP and relevant clauses in the bidding documents; and (vi) the contractor is required to assign an Occupational Health, Safety and Environment Officer whose responsibilities will include:

a) Coordinating with the PIC during preparation and approval of the CEMP.
b) Ensuring that the contractor engages a suitable expert as a resource person or organization to undertake STIs/ HIV/ AIDS briefings and awareness raising amongst the contractor's employees and neighboring communities with follow-up upon request.
c) Coordinating with PIU and PIC in respect of community consultation.
d) Participating in monitoring and coordinating with PIC to ensure that environmental management activities are reported as required.

e) Coordinate and communicate with the PIC as required, to facilitate consultation with the affected villages, various stakeholders, and ensuring smooth implementation of the subproject.
f) Provision will be made in the bidding documents of each package for the costs of environmental management and monitoring including preparation of the CEMP and Environment daily, weekly and monthly progress report and submit to PIC for approval.

25. **National Environment Commission (NEC):** The NEC is the national body primarily responsible for environmental management of proposed and ongoing development. The NEC is responsible for administering the Act and to review the EIA and decide whether an Environmental Clearance can be issued or renewed. The NEC is also legally responsible for monitoring the implementation of the EIA and EMP of the ongoing project.

26. **Ministry of Labour and Human Resource (MoLHR**) is the apex body responsible for administering the Act and ensure an overall safety and health of the workers, taking into account inherent risks, any hazards in the work areas, including physical, chemical, biological, and radiological hazards. The ADB SPS also requires that MoLHR, through the CDCL, take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work.

27. **Asian Development Bank (ADB)** plays a due diligence role and emphasizes planning, environmental and social impact assessments and safeguard documentation. Through such due diligence and review, ADB will confirm (i) that all key potential social and environmental impacts and risks of a project are identified; (ii) that effective measures to avoid, minimize, mitigate, or compensate for the adverse impacts are incorporated into the safeguard plans and project design; (iii) that the borrower/client understands ADB's safeguard policy principles and requirements and has the necessary commitment and capacity to manage the risks adequately; (iv) that, as required, the role of third parties is appropriately defined in the safeguard plans; and (v) that consultations with affected people are conducted in accordance with ADB's requirements. The ADB ensures that the project adheres to international good practice, as reflected in internationally recognized standards such as the **World Bank Group's Environmental Health and Safety Guidelines.**

3.2 Institutional Responsibility of CEMP

28. The **Table 3** below sets out the Institutional responsibilities for the implementation of CEMP:

Table 3: Institutional Responsibility

Stakeholder	Main Role in Implementation of the EMP & OHSMP	Responsibilities						
		Decision maker, Policy Advice and Intergovernmental and Inter-Ministerial Coordination on Safeguards	Prep. of CEMP/Monthly report /EMR	Implementation of Mitigations and/or Management Programs in CEMP	Daily/Weekly Checklists and Monthly Reporting	Env. Quality Control/ Enforcement	Consultation, Advice, Complaint, Feedback	Audit Quality Assurance
CDCL	Implementing Agency	Responsible for overall project supervision & implementation	Decision making based on PIC reccs.	Decision making based on PIC reccs	Decision making based on PIC reccs	Decision making based on PIC reccs	Responsible for resolution of comments and grievances	Decision making based on PIC reccs
CDCL (PMU & PIU)	Project Management, Supervision, Contract Management	Support CDCL at meetings on Policy related to GOB Legislation and Contractual Requirements	Supervision and coordination of Environmental & OHSMP Implementation	Supervision and coordination of Quality control by engineering supervising engineers	Supervision and coordination of Quality control by engineering supervising engineers on contractual requirements	Supervision and coordination of Quality control by engineering supervising engineers on contractual requirements	Coordination	Support Implementation of QA Audit by NEC or Delegated authority to enforce if DEPC constrained by budget or personnel
EGIS International (PIC)	Support to PIU Project Manager& team	Support Project Manager at meetings	Coordination preparation and approval of CEMP documents	Responsible for Supervision	Responsible for Supervision	Input and Support	Preparation of feedback on comments and GRM	Implementation of QA Audit Delegated authority to enforce iDEPC constrained by budget or personnel

Stakeholder	Main Role in Implementation of the EMP & OHSMP	Responsibilities						
		Decision maker, Policy Advice and Intergovernmental and Inter-Ministerial Coordination on Safeguards	Prep. of CEMP/Monthly report /EMR	Implementation of Mitigations and/or Management Programs in CEMP	Daily/Weekly Checklists and Monthly Reporting	Env. Quality Control/ Enforcement	Consultation, Advice, Complaint, Feedback	Audit Quality Assurance
AFCONS (Contrator)	Construction	Provides technical support at meetings on request	Responsible for Preparation	Responsible for Implementation	Responsible for preparation	Implementation in accordance with legislative and contractual requirements	Provides requested information from site visits	Provides requested information from site visits
Pling Thromde	Consultation and advice	Input to Technical meetings	Inputs to regular consultation	Inputs to regular consultation	Inputs to regular consultation	Monitors contractor performance	Facilitation of feedback to communities	Input
Village Community	Consultation and advice	Provide Advice through CCP process	Inputs to regular consultation	Inputs to regular consultation	Inputs to regular consultation	Monitors contractor performance	Prepares comments and/or grievances	Input
NEC	Monitoring of Compliance of Project Impact Monitoring	Responsible for Safeguards Implementation Approval of EC Provide Advice to CDCL on conditions of approval	Review of CEMP	Monitoring of Implementation	Monitoring of Implementation	Monitoring of Implementation	Monitoring of Implementation	Responsible for review and enforcement of EMP & OHSMP provisions
ADB	Due Diligence and Monitoring of Safeguard Monitoring Reports	Review of EIA, EMR, and CEMP before approval	Review of CEMP	Monitoring of Implementation	Monitoring of Implementation	Monitoring of Implementation	Monitoring of Implementation	Monitoring of Implementation

3.3 OHSE Organization of AFCONS

29. **Project Manager** shall be responsible for the overall management of CEMP.

30. **OHSE Manager** shall be responsible for the overall occupational health safety and environmental performance of CEMP. He will be directly reporting to the Project Manager. For any issues arising related to the implementation of CEMP provisions, the EHS Manager shall appraise the issue to the Project Manager and the Project Manager will resolve the issue by assigning the task to the relevant person(s).

31. **Environment Engineer** shall assist OHSE Manager in day to day implementation of Environmental aspect of the CEMP. The Environment Engineer shall be responsible for the induction of all employees to create awareness on the CEMP.

32. **Safety Manager:** shall assist OHSE Manager in day to day implementation of Safety and social aspect of the CEMP. The manager shall be responsible for the induction of all employees to create awareness on the CEMP.

33. **Construction Manager** shall assist the project Manager for ensuring that the site civil works are carried out as per the Contract Agreement. The Construction Manager along with the team will also be responsible to comply with the Environmental terms and conditions as per the CEMP during the execution of the civil works.

34. **Activity In-charges (Admin, CPE, Stores, Batching plant, Logistics)** shall also comply as per the CEMP. They shall perform all their activities only with prior work permit. They shall be aware of the CEMP and the provisions therein. The activity in-charge is responsible for ensuring that all the workers under him are adequately inducted for understanding the CEMP topics and their implementation.

35. **Sub-Contractor personnel** shall also commit and comply the CEMP requirement for protection of environment. The sub-contractor representative shall attend the review meetings to set the course of action for the protection of Environment.

36. **Site Engineers, Supervisors, Operators and Workers** shall follow the instructions of respective Activity in-charge.

37. **All Visitors** shall be accompanied by the Security guard to the place of visit and ensure that proper safety gears are in place even for the visitors. He should report to the concerned Activity in-charge or his representative for the purpose he is visiting. A brief induction shall be

given to the visitor and the Activity in-charge shall maintain the induction details and submit the same to the OHSE Manager for records. The Activity in-charge may send the visitor to the OHSE manager for the EHS induction.

38. The List of officials and their position are shown below in Table 4

Table 4: List of AFCONS officials

S. No.	Name	Designation
1.	Mr. R. Ravichandran	Project Manager
2.	Mr. Dilip Kumar Suryavanshi	Assistant General Manager/Construction Manager
3.	Mr. S. Ashok Kumar	HSE In-charge
4.	Mr. Sanjiv Kumar Singh	Admin In-charge
5.	Mr. Muthukumaran	Manager CPE
6.	Mr. Bijender Kumar Singh	Sr. Safety Officer/First-Aider
7.	Mr. Sunny	Environment In-charge

4 CEMP Environmental Baseline and Monitoring plan

4.1 Environmental Baseline Map

Figure 2: Map Showing Sampling Locations of Surface Water (SW01-SW10) and Ground Water (GW01 & GW02)

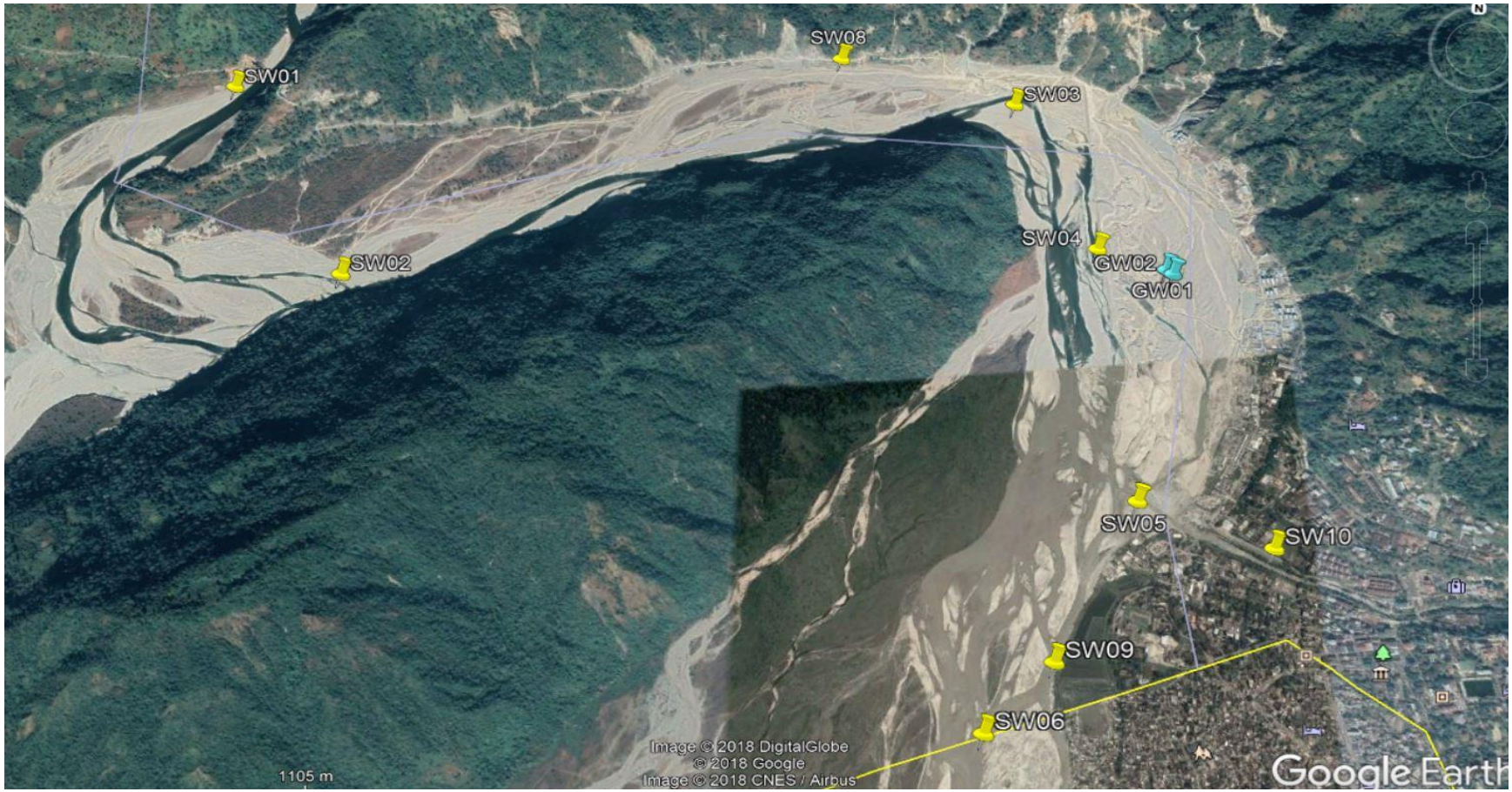
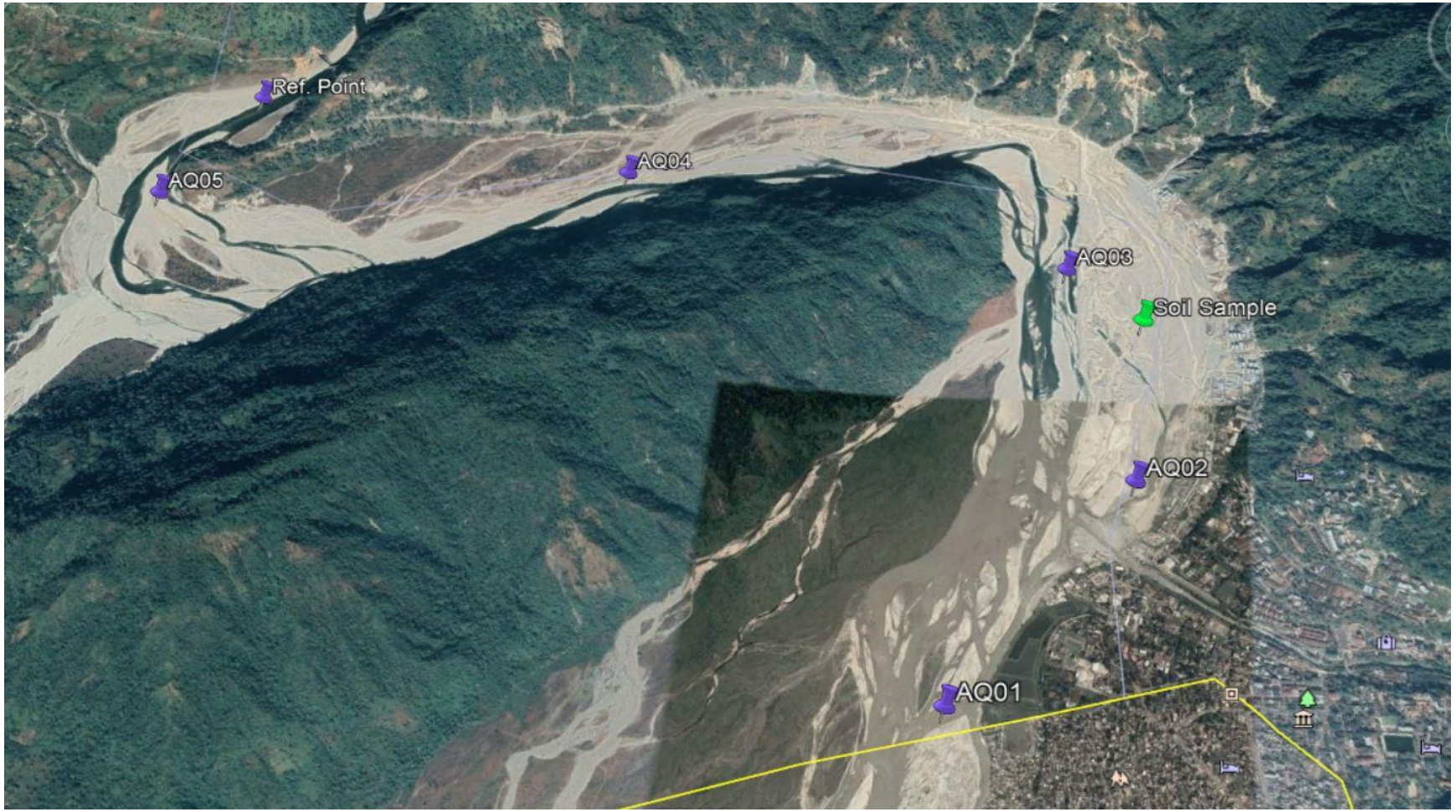


Figure 3: Map Showing Sampling Locations of Meteorology, Ambient Air (AA01-AA06) and Noise Quality (NL01-NL06)

Figure 4: Map Showing Sampling Location of Aquatic Study (AQ01-AQ05) and Soil



4.2 Project Environmental Project Impact Monitoring plan

Table 5: Project Impact Monitoring Plan

S. No.	Environment Component	Location	Frequency	Parameter	Remark
1.	Noise	1. Batch Mix Plant 2. DG Shed	Every Month	Decibel-(A)	Weekly checklist for noise level monitoring will be prepared by taking instant sampling from sound level meter
2.	Soil	Zone A (Near Batching Plant)	Every Month	Porosity, water holding capacity, permeability, moisture content, texture, Particle size distribution, SAR, pH, Electrical conductivity, Ca, Mg, Na, K, Dry bulk density, OC, Total nitrogen, P, K	To access the quality of soil, sample will be taken from near the batching plant
3.	Water Regime	1. River Bed levelling Area 2. River Embankment Area	Every Month	River Bed Level Change, Water Course Change	Photographs will be taken to measure the change in river water course and water level
4.	Land use / Land cover	Project Area (Zone A)	Every Week	Land pattern	Photographs will be taken to examine the change in land cover during the project.

4.3 Environmental Quality Monitoring Plan

Table 6: Environment Monitoring Plan

S. No.	Environmental Component	Frequency	Parameter	Number of Samples (Annual)	Month of Measurement/ Reporting
1.	Land Use	Once a Year	Land Use pattern	One	January
2.	Meteorology	Continuous	Wind speed, Wind Direction, Temperature, Relative Humidity, Rainfall	-	Report submitted every month both in hard and soft copy/data
3.	Air Ambient Quality	Twice Every Week (24-hour Sampling)	TSPM, $PM_{2.5}$, PM_{10}, SO_2, NO_X, CO	6 locations x 2samples x 4week x 12 months= 576	Every Month
4.	Surface Water Quality	8 locations once in every six months and SW04 & SW05 (at Zone A) Every month	pH, Colour (Hz), TSS (mg/l), Conductivity (µS/cm), Odour Mineral Oil, Nitrate (mg/l), Fluoride (mg/l), Sulphates (mg/l), Chloride (mg/l), Surfactants(mg/l), Phosphate (mg/l), DO (mg/l), BOD (mg/l), COD (mg/l), Oil & Grease (mg/l)	8 location x 2 times + 2 location x 12 times= 40	Location SW04 and SW05 will be measured every month and other 8 locations will be measured in month of May/June and November/December

S. No.	Environmental Component	Frequency	Parameter	Number of Samples (Annual)	Month of Measurement/ Reporting
5.	Ground water Quality	Once in Six Month at Zone A	TKN (mg/l), Ammonia (mg/l) T. Coliform (MPN/100ml), Faecal Coliform (MPN/100ml), Dissolved Iron (mg/l), Copper (mg/l), Zinc (mg/l), Arsenic (mg/l), Cadmium (mg/l), Total Chromium (mg/l) Lead (mg/l), Selenium (mg/l), Mercury (mg/l), Phenols (mg/l), Cyanides (mg/l), PAH (mg/l), Total Pesticides (mg/l), PCB (mg/l), SAR, Boron (mg/l), Floating Material	2 locations x 2 times= 4 samples	January and July
6.	Ambient Noise Level	Once every Month (24-hour Sampling)	Decibels- dB (A)	6 locations x 12 Months = 72 Samples	Every month of the year
7.	Ecology	Once per every Season	Terrestrial flora and fauna, Zooplankton, Phytoplankton, Benthos & fishes	-	February, May, August, November
8.	Socio-economics	Quarterly for GRM and consultation meeting whenever required	GRM and Consultation Meeting	-	-

39. The environmental quality monitoring will be done on certain location as per the EIA report. The details of the sampling location and methodology adopted for different environmental components are presented from Table 7 to 11 below:

Table 7: Ambient Air Quality, Meteorology & Soil Sampling Location with Environmental Standard

S. No.	Environmental Component	Location			Parameters	Environmental Standard (2010) (Mixed area)		IFC	
		Sampling Code	Location Coordinate (Lat. & Long.)	Description		Maximum (24 Hours)	Yearly Average	Maximum (24 hours)	Minimum (24 Hours)
1.	Meteorology	-	26°52'38.09" 89°22'33.34"	Zone A Office Area					
2.	Soil Quality	-	26°52'38.09" 89°22'33.34"	Batching Plant					
3.	Ambient Air Quality	AA01	26°52'01.29" N 89°22'23.7" E	Close to Zone C	TSPM (µg/m^3)	200	140-	-	-
		AA02	26°51'45.3" N 89°22'21.5" E	Nr. Existing STP Area	SPM (µg/m^3)	-	-	-	-
		AA03	26°52'42.68" N 89°22'44.87" E	Near Bangay bazaar	PM10 (µg/m^3)	100	60-	150	50
		AA04	26°53'20.1" N 89°21'52.1" E	Chamkuna Village	PM2.5 (µg/m^3)	-	-	75	25
		AA05	26°52'51.6" N 89°20'03.9" E	Toorsa Tar Village	SO_2 (µg/m^3)	80	60	125	20
		AA06	26°53'09.5" N 89°19'48.4" E	Nr. PCR Bridge	NO_X (µg/m^3)	80	60	200 (1 Hour) 40 (1 Year)	
					CO (µg/m^3) 8 Hour	2000	4000	160	100

Table 8: Surface and Ground Water Quality Sampling Location with Environmental Standard

S. No.	Environmental Component	Location			Parameter	Environmental Standard (2010)			IFC
		Sampling Code	Location Coordinate (Lat. & Long.)	Description		A (Very Good)	B (Good)	C (Moderate)	Guidelines
1.	Surface Water Quality	SW01	26°53'5.49" 89°20'1.84"	Nr. Doyagang (Nr. Bridge)	pH	6.5-8.5	6-9	6-9	6-9
					Colour (Hz)	5	50	-	-
					TSS (mg/l)	25	100	-	50
					Conductivity (µS/cm)	800	1000	2000	-
		SW02	26°52'31.89" 89°20'25.57"	Nr. Toorsatar (Nr. Kailashgiri West)	Odour	Unobjectionable	Unobjectionable	-	-
					Mineral Oil	No Film	No Film	-	-
					Nitrate (mg/l)	10	50	-	-
					Fluoride (mg/l)	1.0	2.0	-	-
					Sulphates (mg/l)	25	100	-	-
		SW03	26°53'8.52" 89°22'9.86"	Nr. Chamkuna Village	Chloride (mg/l)	50	200	-	-
					Surfactants (mg/l)	0.1	0.2	-	-
					Phosphate (mg/l)	0.5	<1.0	-	2.0
		SW04	26°52'42" N 89°22'22" E	Nr. Omchhu	DO (mg/l)	6	4	-	-
					BOD (mg/l)	2	5	50	30
					COD (mg/l)	-	-	-	125

S. No.	Environmental Component	Location			Parameter	Environmental Standard (2010)			IFC
		Sampling Code	Location Coordinate (Lat. & Long.)	Description		A (Very Good)	B (Good)	C (Moderate)	Guidelines
		SW05	26°52'1.16" N 89°22'25.49" E	Nr. Mobile Tower	Oil & Grease (mg/l)	-	-	-	10
					TKN (mg/l)	0.5	2	-	10
					Ammonia (mg/l)	0.05	0.5	-	-
					T. Coliform (MPN/100ml)	50	5000	10000	400
		SW06	26°51'28" N 89°22'03" E	Nr. India Bhutan Border	Faecal Coliform (MPN/100ml)	20	2000	5000	-
					Dissolved Iron (mg/l)	0.2	0.5	-	-
					Copper (mg/l)	0.05	0.1	-	-
		SW07	26°53'0.01" N 89°19'5.99" E	Nr. Purvey Village	Zinc (mg/l)	0.2	0.5	-	-
					Arsenic (mg/l)	0.01	0.05	-	-
		SW08	26°53'16.1" 89°21'41.2"	Nr. Chamkuna Village	Cadmium (mg/l)	0.003	0.003	-	-
					Total Chromium (mg/l)	0.05	0.05	-	-
					Lead (mg/l)	0.02	0.02	-	-
					Selenium (mg/l)	0.01	0.01	-	-
		SW09	26°51'37.83" N 89°22'12.73" E	Nr. Existing STP area	Mercury (mg/l)	0.0005	0.0005	-	-

S. No.	Environmental Component	Location			Parameter	Environmental Standard (2010)			IFC
		Sampling Code	Location Coordinate (Lat. & Long.)	Description		A (Very Good)	B (Good)	C (Moderate)	Guidelines
					Phenols (mg/l)	0.001	0.001	-	-
		SW10	26°51'54.96" 89°22'44.06"	Phuentsholing Omchhu	Cyanides (mg/l)	0.05	0.05	-	-
					PAH (mg/l)	0.0002	0.0002	0.001	-
					Total Pesticides (mg/l)	0.0005	0.0005	0.001	-
2.	Ground Water Quality	GW01	26°52'38.78" 89°22'32.26"	Camp Area	PCB (mg/l)	0.0002	0.0002	-	-
					SAR	-	-	26	-
					Boron (mg/l)	-	-	1	-
		GW02	26°52'38.09" 89°22'33.34"	Office Area	Floating Material	Absent	Absent	-	-

Table 9: Ambient Noise Quality Sampling Location with Environmental Standard

S. No.	Environmental Component	Location			Environmental Standard (2010)		IFC	
		Sampling Code	Location Coordinate (Lat. & Long.)	Description	Day	Night	Day	Night
1.	Ambient Noise Level	NL01	26°51'49.34" N 89°22'23.10" E	Nr. STP Area	65 dB(A)	55 dB(A)	55 dB(A)	45 dB(A)
		NL02	26°51'50.83" N 89°22'45.82" E	Nr. Old Truck Parking				
		NL03	26°52'15.72" N 89°22'44.43" E	Nr. Bhutan Concrete Shop				
		NL04	26°52'21.22" N 89°22'23.88" E	Nr. Bangay Bazar				
		NL05	26°53'20.19"N 89°21'51.51"E	Chamkuna Village				
		NL06	26°52'51.31"N 89°20'04.71"E	Torsatar Village				

Table 10: Aquatic Sampling Location and Parameters

S. No.	Environment Component	Sampling Code	Location Coordinates	Parameters	Methodology
1.	Aquatic Study	AQ 01	26°51'32.70"N 89°22'07.48"E	• Fishes and other aquatic species • Zooplankton • Phytoplankton • Benthos	• CPUE Method • Water sampling • Local Fish Market Survey
		AQ 02	26°52'09.91"N 89°22'32.90"E		
		AQ 03	26°53'06.86"N 89°22'14.16"E		
		AQ 04	26°52'53.47"N 89°21'04.93"E		
		AQ 05	26°52'37.42"N 89°19'46.99"E		
		Reference	26°52'59.15"N 89°19'57.51"E		

Table 11: Methodology for testing different environmental component

S. No.	Environmental Component	Parameters	Methodology
1.	Meteorology	Wind Speed	IS 8829-1978
		Wind Direction	
		Temperature	
		Relative Humidity	
		Rainfall	
2.	Ambient Water Quality	pH	APHA: 4500 - H+ B(22nd Edition), pH Meter
		Colour	APHA: 2120 B (22nd Edition), Visual Comparison
		Electrical Conductivity	APHA: 2510 B (22nd Edition), Conductivity meter
		TDS	APHA: 2540 C (22nd Edition), Gravimetric
		Turbidity	APHA: 2130 B (22nd Edition), Nephelometric
		Ammoniacal Nitrogen	IS:3025(part-34), 1988, Distillation & colorimetric
		Ca Hardness	APHA: 3500 – Ca B (22nd Edition) Titrimetric, (EDTA method)
		Mg Hardness	APHA: 3500 - Mg B (22nd Edition), By difference
		Calcium	APHA: 3500 – Ca B (22nd Edition) Titrimetric, (EDTA method)
		Magnesium	APHA: 3500 - Mg B (22nd Edition), By difference

S. No.	Environmental Component	Parameters	Methodology
		Sodium	APHA:3500 - Na B (22nd Edition), Flame emission Photometric
		Potassium	APHA: 3500- K B (22nd Edition) Flame emission Photometric
		Salinity	APHA: 2520 B (22nd Edition), Electrical Conductivity method
		COD	APHA: 5220 B(22nd Edition), Titrimetric Open reflux method
		BOD	IS: 3025(part-44), Iodometric
		Chlorides	APHA:4500 – Cl- B (22nd Edition), Titrimetric
		Phenol	APHA: 5530- D(22nd Edition), colorimetric
		Sulphate	APHA:4500- SO4 E (22nd Edition), Turbid metric
		Nitrate	IS:3025 (part-34), 1988 (RA 2003) (ii), Colorimetric
		Fluoride	APHA:4500 F- D(22nd Edition),Colorimetric
		Total Nitrogen	APHA: 4500 N Org, Micro Kjeldahl Distillation (22nd Edition), Titrimetric
		Total Phosphorous	APHA: 4500 P-C (22nd Edition), colorimetric
		DO	APHA: 4500 O-C (22nd Edition), Iodometric
		SAR	Flamephotmetric & EDTA method
		TSS	APHA: 2540 - D (22nd Edition), gravimetric
		Surfactants	APHA: 5540 - C (22nd Edition) tuition
		Cyanide	APHA: 4500 CN- D & E(22nd Edition), colorimetric
		Heavy Metals	
		Arsenic (As)	APHA: 3500-As-B (22nd Edition)
		Cadmium (Cd)	APHA: 3111-B (22nd Edition)
		Chromium (Cr)	APHA: 3500-Cr-B (22nd Edition), colorimetric
		Copper (Cu)	APHA: 3111-B & 3500-Cu-B (22nd Edition)
		Iron (Fe)	APHA: 3111-B & 3500-Fe-B (22nd Edition)
		Lead (Pb)	APHA: 3111-B (22nd Edition)
		Mercury (Hg)	APHA: 3111-B (22nd Edition)
		Zinc (Zn)	APHA: 3111-B (22nd Edition)
		Boron (B)	APHA: 4500 B-C (22nd Edition), colorimetric
		Total Coliform	APHA: 9221-B (22nd Edition), Multiple Tube Fermentation
		Fecal Coliform	APHA: 9221-E (22nd Edition), Multiple Tube Fermentation
3.	Ambient Air Quality	PM 10	Gravimetric (HVS) – IS: 5182: Part 4, with cyclone
		PM 2.5	Gravimetric (HVS) – IS: 5182: Part 4,

S. No.	Environmental Component	Parameters	Methodology
		SO_2	IS: 5182(part-2): 2001, Colorimetric
		NO_x	IS: 5182(part-6): 2006, Colorimetric
		CO	PID Sensor
4.	Ambient Noise Quality	Decibels- dB(A)	IS: 9989
5.	Soil Analysis	Porosity	IS: 2720 Part 7
		Water holding capacity	HMSO, UK
		Permeability	IS: 2720 Part 17
		Moisture content	IS: 2720 Part 2
		Texture	IS: 2720 Part 4
		Particle size distribution	IS: 2720 Part 4
		Cation Exchange Capacity	IS: 2720 Part 24 (1976)
		SAR	Calculation
		pH	APHA: 4500 - H+ B(22nd Edition)
		Electrical conductivity	IS 14767-2000
		Calcium (Ca)	APHA: 3500 Ca B
		Magnesium (Mg)	APHA: 3500 Mg B
		Sodium (Na)	APHA: 3500 Na B
		Potassium (K)	APHA: 3500 K B
		Dry bulk density	IS: 2720-29 (1975)
		Organic Carbon (OC)	IS: 2720-22 (1972)
		Total nitrogen	IS: 2720-22 (1972)
		Available Phosphorus	Olsen et. Al. (1954)
		Available Potassium	Jackson (1973)

5 Environmental Impact and Mitigation Measures for Zone A

5.1 Site access and traffic management related impacts

Table 12: Impact Identification Matrix during Site access and traffic management

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environment Component Impacted	Activity and Aspect	Impacts		
1.1	Preparing roads for access to site and management of traffic	Air	Movement of heavy vehicles for preparing site access roads for further work	➢ Dust from vehicles preparing access roads	➢ Ensure that road construction up to the construction site are sprinkled. ➢ Vehicles to be well maintained so as to not release objectionable fumes; ➢ Preparation and implementation of a Traffic and Safety Management Plan so as to ensure smooth traffic flow of project related vehicles as well as other vehicles.	➢ Traffic and Safety Management Plan(Refer Annex. 4)
1.2		Water Quality	Water runoff to the river during road preparation activities	➢ Muddy water generated due to road preparation activities ➢ equipment cleaning etc. may runoff and pollute the river	➢ Provision of barriers drains to arrest such water runoff	
1.3		Noise	Equipment operation	➢ Noise during construction.	➢ to maintain vehicles as per their maintenance schedule;	

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environment Component Impacted	Activity and Aspect	Impacts		
					➢ limit access road construction working hours to daytime only	
1.4		Ecology	Water runoff to river	➢ Muddy water generated due to road preparation activities ➢ equipment cleaning etc. may runoff and pollute the river	➢ Provision of catch Pits/sedimentation tanks ➢ Provision of barriers drains to arrest such water runoff;	
1.5		Risk Hazards	Construction hazards	➢ Construction hazards leading to injuries.	➢ pre-project job safety analysis to be done ➢ worker safety training prior to commencement of work ➢ use of Personal Protective Equipment (PPE) as required.	➢ Worker safety training plan(Refer Annex. 5)
1.6				➢ Construction hazards leading to permanent injury or fatality.	➢ Preparation and implementation of Occupational Safety and Health Management Plan (OHSMP) ➢ Preparation and implementation of a Traffic and Safety Management Plan so as to ensure smooth traffic flow of project related vehicles as well as other vehicles.	➢ Occupational Safety and Health Management Plan(Refer Annex. 5) ➢ Traffic and Safety Management Plan(Refer Annex. 4)

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environment Component Impacted	Activity and Aspect	Impacts		
1.7		Floods/ back waters	Flooding from the hillside outfalls during monsoon or backwaters	➢ The foods from the outfalls from the hillsides would damage access roads and other construction activities at the site	➢ Proper planning and development of the outfalls and their connection to the Amochhu or as side channel	➢ Traffic and Safety Management Plan(Refer Annex. 4)

5.2 Batching mix plant assembly, equipment delivery and related impacts

Table 13: Impact Identification Matrix during Batching mix plant assembly, equipment delivery

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environment Component Impacted	Activity and Aspect	Impacts		
1.1	Assembly of batch mix plant, and delivery of machineries, vehicles and other equipment	Air	Movement of heavy vehicles for getting equipment to site	➢ dust / gas generation	➢ Ensure that roads up to the construction site are sprinkled. ➢ Vehicles to be well maintained so as to not release objectionable fumes.	Traffic and Safety Management plan(Refer Annex. 4) & Camp Management Plan (Annex.2)
1.2			Batch mix plant assembly (silo, conveyor system, panel room ancillaries)	➢ dust / gas generation	➢ Ensure that the equipment is erected on a concrete paved apron so that impact dust generation is minimized.	
1.3		Noise	Movement of heavy vehicles for transporting equipment and establishing batch mix plant in the site	➢ Noise during set up.	➢ Preparation and implementation of a Traffic management plan so as to lessen noise generation.	➢ Traffic and Safety Management plan(Refer Annex. 4 and 5)
1.4		Soil	Construction activities	➢ Waste generation and accumulation	➢ Develop and Implement Construction & Demolition (C&D) Waste Management Plan	➢ C&D Waste Management Plan(Refer Annex. 6)
1.5		Ecology	water release to river and nearby	➢ Muddy water generated due to	➢ Provision of catch Pits/sedimentation tanks	

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environment Component Impacted	Activity and Aspect	Impacts		
			areas	road preparation activities, ➢ equipment cleaning etc. may runoff and pollute the river	➢ Provision of barriers drains to arrest such water runoff;	
1.6		Risk Hazards	Construction hazards	➢ Construction hazards leading to injuries.	➢ pre-project job safety analysis to be done; ➢ worker safety training prior to commencement of work; ➢ Use of PPE as required.	➢ Worker safety training plan(Refer Annex. 5)
1.7				➢ Construction hazards leading to permanent injury or fatality.	➢ Preparation and implementation of OHSMP ➢ Location of the equipment should be at an elevation higher than the High Flood Level (HFL).	➢ Occupational Safety and Health Management Plan(Refer Annex. 5) ➢ Mark/reference of High Flood Level (HFL)

5.3 Material storage, work areas and housing for workers related impacts

Table 14: Impact Identification Matrix during Material storage, work areas and housing for workers

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environment Component Impacted	Activity and Aspect	Impact		
1.1	Establishment of workers camp, material storage, work areas and parking areas	Air	Construction equipment use, including DG sets	➢ Nominal dust / noise generation for short duration with on-site impacts.	➢ Site barricading prior to commencement of construction work. ➢ Proper maintenance of equipment, including DGS set/s.	
1.2			Construction vehicles use	➢ dust / gas generation	➢ vehicles to be covered in case they are carrying construction materials or the like ➢ vehicles to be well maintained so as to not release objectionable fumes	
1.3			Cooking by workers or in canteen	➢ gas generation	➢ Liquid fuels or electricity to be provided to workers by contractor ➢ No fuelwood burning.	

1.4		Water Quality	Use of toilets Stagnation of water	➢ sewage discharge to river ➢ Outbreak of vector borne diseases	➢ Construct toilets for workers @ one toilet / 20 workers. ➢ Establish septic tank with soak pit prior to commencement of construction and connect each toilet to the septic system. ➢ Proper pest control, use of nets and regular monitoring	➢ Worker's camp design(Refer Annex. 2)
1.5		Noise	Construction work	➢ Nominal noise generation for short duration with largely on-site impacts.	➢ Site barricading prior to commencement of construction work.	
1.6			Construction vehicles use	➢ Noise from construction related vehicles moving in the area.	➢ Implementation of no-honking rules (except abnormal conditions) ➢ Vehicles with warning lights ➢ Roads on the construction site to have a median / partition for segregation of incoming and outgoing vehicles. ➢ Ensure proper maintenance and	➢ Traffic management plan(Refer Annex. 4)

					operation of DG set/s	
1.8		Soil	Construction activities	➢ Waste generation and accumulation	➢ Follow C&D Waste Management Plan	➢ C&D Waste Management Plan(Refer Annex. 6)
		Risk / Hazard	Construction hazards	Construction hazards leading to permanent injury or fatality.	➢ Follow Occupational Safety and Health Management Plan (OHSMP) ➢ Location of the camps should be at an elevation higher than the High Flood Level (HFL) of the River.	➢ Occupational Safety and Health Management Plan ➢ Mark/reference of HFL(Refer Annex. 5) ➢ Emergency Response Plan(Refer Annex. 3)
2.1	Establishment of stores, warehouse and parking areas	Water Regime	Water consumption: ground water drawl (tube well)	➢ Water drawn is an insignificant fraction of the water available.	➢ Extract as per the EC issued on the EIA report.	
2.2		Risk Hazard	Construction hazards	➢ Construction hazards leading to injuries.	➢ Pre-project job safety analysis to be done ➢ Worker safety training prior to commencement of work; use of personal protective equipment (PPE) as required.	

2.3				➢ Construction hazards leading to permanent injury or fatality.	➢ Preparation and implementation of OHSMP ➢ Location of the equipment should be at an elevation higher than the HFL	➢ Occupational Safety and Health Management Plan ➢ Mark/reference of HFL (Refer Annex. 5)
2.4	Installation/establishment of Flood warning system	Flooding risk hazard	Flood risk hazard	➢ Risk to machineries, workers and the project as a whole	➢ Construction of temporary gabion wall near the camp area and project start point. ➢ Designation of assembly points. ➢ Formulation of evacuation plan and Emergency response team. ➢ Identification of Flood monitoring stations at two locations extending beyond the project area	➢ Emergency Response Plan (Refer Annex. 3)

5.4 Impacts from Riverbed levelling activities

Table 15: Impact Identification Matrix during River bed levelling

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environmental Component Impacted	Activity and Aspect	Impacts		
1.1	Riverbed levelling (Riverbed levelling is required for making the river gradient uniform for hydraulic reasons. This will be done through earth moving equipment in dry riverbed)	Air	Equipment operation	➢ Dust generation will persist during the duration of the Riverbed levelling.	➢ Ensure that the earth is being levelled in moist conditions so that the dust is minimized or immediately settled.	
1.2		Water Quality	Excavated material mixing with water	➢ The activity of riverbed levelling can increase turbidity and suspended particles in the water	➢ Partial diversion of the river portion being levelled to ensure that levelling is only done in moist areas ➢ Levelling in areas where there are 'humps' on the riverbed only, and no other places ➢ Disposal of excess excavated materials to fill locations	
1.3		Noise	Riverbed levelling equipment operations	➢ Noise from riverbed levelling operations will increase ambient noise levels marginally.	➢ Enclose noisy equipment behind acoustic enclosures ➢ Use self-cleaning weigh hoppers ➢ Enclose compressors and pumps ➢ Fit silencing devices on all pressure operated equipment	

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environmental Component Impacted	Activity and Aspect	Impacts		
					➢ Muffling devices on engines ➢ Barricading all around the site.	
1.4		Soil	Riverbed levelling equipment operations	➢ Muck generation and dry deposition of dust on soil	➢ Ensure that air pollution control equipment (such as venturi cyclones / bag filters) are available in all equipment to reduce particulate air emissions to <100 mg/nm^3.	
1.5		Ecology	Changes in river bottom profile leading to disturbances to benthic organisms and fishes.	➢ Riverbed levelling and related increase in turbidity can lead to reduced fish availability in turbid waters such as Chepti (*Cyprinion semiplotum*) VU, Katli (*Neolissochilus hexagonolepis*) NT and Golden Mahseer (*Tor putitora*) EN	➢ Partial diversion of the river portion being levelled to ensure that levelling is only done in moist areas. ➢ Ensure that the river bed is not completely dry at any one particular cross section through proper planning. ➢ Levelling in those areas where there are 'humps' on the riverbed only, and no other places ➢ Disposal of excess excavated materials to fill locations ➢ Prepare and implement a fish conservation monitoring plan for important species.	➢ Baseline information of river species as per the EIA report

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environmental Component Impacted	Activity and Aspect	Impacts		
					➢ Supply and installation of geo-textile membranes to prevent debris from falling into the river.	
1.6		Risk Hazards	Construction hazards	➢ Construction hazards leading to injuries.	➢ pre-project job safety analysis to be done ➢ worker safety training prior to commencement of work ➢ Use of personal protective equipment (PPE) as required.	
				➢ Construction hazards leading to permanent injury or fatality.	➢ Preparation and implementation of OHSMP	➢ Occupational Safety and Health Management Plan(Refer Annex. 5)
2.0	Channelization and Earthworks	Air	Equipment / vehicle operation	➢ Dust generation will persist during the duration of the channelization.	➢ Ensure trucks used for transportation of materials are covered with HDPE sheets; ➢ trucks should be well maintained (as per manufacturer's instructions) with emissions complying with National Environmental Standards 2010 ➢ tyres should be cleaned	➢ National Environmental Standards 2010

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environmental Component Impacted	Activity and Aspect	Impacts		
					before entering public roads through suitable washing / scraping equipment.	
2.1		Water Quality	Equipment / vehicle operation	➢ Construction material or muck generated can enter River.	➢ Ensure adequate bunding around the muck storage area, preferably with garland drains and gabion structures to prevent muck from entering the River. ➢ Supply and installation of geo-textile membranes to prevent debris from falling into the river.	
2.2		Noise	Construction equipment and vehicles use	➢ Noise generation from works.	➢ Barricading portions of the construction site using materials which help muffle the noise where ever river levelling works are underway. ➢ Muffling devices on engines	
2.3		Soil	Construction works	➢ Muck will be generated and will be disposed in the low-lying areas	➢ Provisions for silt mesh installation shall be considered as per the site conditions	
2.4		Risk / Hazards	Construction hazards	➢ Construction hazards leading to injuries.	➢ pre-project job safety analysis to be done; ➢ worker safety training prior	

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environmental Component Impacted	Activity and Aspect	Impacts		
					to commencement of work ➢ Use of personal protective equipment (PPE) as required.	
2.5				➢ Construction hazards leading to permanent injury or fatality.	➢ Preparation and implementation of OHSMP	➢ Occupational Safety and Health Management Plan(Refer Annex. 5)

5.5 Embankment works Impacts

Table 16: Impact Identification Matrix during Embankment work

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environmental Component Impacted	Activity and Aspect	Impacts		
1.1	i. Construction of Diaphragm Wall ii. Construction of Dead Man Anchor and deadman anchor iii. Embankment construction including stone in wire crates	Air	Vehicular movement, excavation, earth works, concrete pouring Crushing and Batching plants with emissions	➢ Dust from works. ➢ Emissions from crushers and batching plants	➢ Provide Dust barriers to minimise dust travel ➢ Provide air pollution control equipment such as venturi cyclones/ bag filters as required. ➢ Water sprinkling as needed at the sites	
1.2		Water Quality	Constructions Works: mixing of construction debris or muck in water	➢ Construction material or muck generated can enter river.	➢ Provide Barriers to prevent entry of muck into the river ➢ Supply and installation of geo-textile membranes to prevent debris from falling into the river. ➢ Deposit muck by backfilling in low lying areas	
1.3		Noise	Noise from construction works	➢ Noise generation from works and machines	➢ Enclose noisy equipment behind acoustic enclosures ➢ fit silencing devices on all operated equipment ➢ muffling devices on engines ➢ barricading all around the site	

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environmental Component Impacted	Activity and Aspect	Impacts		
1.4		Soil	Works: muck generation and dry deposition of dust on soil; loss of topsoil Generation of Bentonite waste and contamination	➢ Muck will be generated and could be disposed in the low-lying areas within the project and may enter river. ➢ Leakage of bentonite and its ultimate disposal	➢ Provide Barriers to prevent entry of muck into the river ➢ Deposit muck by backfilling in low lying areas ➢ Proper sealing, and disposal.	
1.8		Risk Hazard	Construction hazards	➢ Construction hazards leading to injuries.	➢ pre-project job safety analysis to be done ➢ worker safety training prior to commencement of work ➢ use of PPE as required.	➢ Worker safety training
1.9				➢ Construction hazards leading to permanent injury or fatality.	➢ Preparation and implementation of OHSMP	➢ Occupational Safety and Health Management Plan (Refer Annex. 5)

5.6 Identification and addressing reclamation works

Table 17: Impact Identification Matrix during Reclamation work

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environmental Component Impacted	Activity and Aspect	Impact		
1.1	Reclamation Work – Cut, Fill and Compaction	Air Quality	Substantial cut and fill work for two years	➢ Dust suspension from site clearance and machinery operations	➢ Trucks transporting the materials should be covered with HDPE sheets ➢ trucks should be having emission norms (valid emission test certificate) or equivalent ➢ trucks should be following preventive maintenance requirements of manufacturers	➢ Emission test certificate (Refer Annex. 4)
1.2		Water Quality		➢ Dry deposition into the River. Runoff from reclamation areas	➢ Provision of runoff capture drains and conveying runoff downstream of the portion where the work is being carried out ➢ Supply and installation of geo-textile membranes to prevent debris from falling into the river.	➢ Environment Monitoring Plan
1.3		Noise		➢ Noise generation from works	➢ Installation of Noise level barriers ➢ Use of low noise generating equipment ➢ provision of ear plugs to workers	
1.4		Risk Hazard	Construction hazards	➢ Accidents and Hazards due to works	➢ pre-project job safety analysis to be done ➢ worker safety training prior to commencement of work	➢ Occupational Safety and Health Management

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environmental Component Impacted	Activity and Aspect	Impact		
					➢ use of personal protective equipment as required ➢ Follow the Occupational Safety and Health Management Plan	Plan(Refer Annex. 5)
2.1	Transport of borrow materials from local quarries	Air	Transport of borrow materials Excavation of materials at the local quarries	➢ Transmission of dust to atmosphere en-route to site ➢ Mining of materials at the local quarries	➢ Transport will be carried out with permission of local authorities ➢ Trucks transporting the materials should be covered with HDPE sheets; ➢ trucks should be having emission norms complying with National Environmental Standards ➢ trucks should be following preventive maintenance requirements of manufacturers ➢ Measures should be put in place to conduct the operation of mines as per RGOB regulations and minimum noise, air pollution and soil pollution.	➢ National Environmental Standards, 2010 ➢ Traffic Management Plan (refer Annex.4)
2.2		Water Quality / Resources	Loading / Unloading of materials	➢ Possibility of materials entering the river during landfilling	➢ Provision of runoff capture drains	
2.3		Noise	Daily truck trips from one or more	➢ Vehicle and machine operation noise	➢ Enclose noisy equipment behind acoustic enclosures ➢ fit silencing devices on all	

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environmental Component Impacted	Activity and Aspect	Impact		
			sources	due to loading and unloading of materials	operated equipment ➢ muffling devices on engines ➢ barricading all around the site	
2.5		Ecology	Material transport	➢ increase in turbidity due to dry deposition of light materials being transported	➢ Continuous spraying of water at the cut and fill area to prevent large increases in baseline PM_{10} and $PM_{2.5}$ levels ➢ All dispatch of aggregate / fill materials should be watered at the time of commencement of the trip to reduce emissions.	
2.6		Socio-Economics	Traffic Management in transportation of materials	➢ Traffic issues	➢ A thorough Traffic and Safety Management Plan needs to be put in place to ensure that trucks conveying material to the site do not choke up traffic within Phuentsholing and surrounding areas. ➢ If required, transportation of materials may have to be only done during the night time or early mornings. ➢ Special roads will have to be made near the site to ensure that the traffic from the Samtse-Phuentsholing area is not held up due to the transport of borrow	➢ Traffic and Safety Management Plan(Refer Annex. 4)

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environmental Component Impacted	Activity and Aspect	Impact		
					materials.	
2.7		Risk Hazard	Transport: accidents leading to injuries / fatalities	➢ The possibility that transport of materials will pose a risk to safety of surrounding communities.	➢ A very strict transport safety management plan to be put in place and approved by the project authorities prior to commencement of borrow material transport, covering driver training, transport timings, transport routes, traffic segregation (separation of construction and non-construction traffic) near the construction site and liaison with local community.	➢ Traffic and Safety Management Plan(Refer Annex. 4 & 5)

5.7 Solid Waste Management related impacts

Table 18: Impact Identification Matrix during Solid Waste Management

S. No.	Activities	Identification of Impact			Mitigation Measures	Remarks
		Environment Component Impacted	Activity and Aspect	Impacts		
1.1	Solid Waste Management – Generation of Solid Wastes, Construction wastes and scrap	Air	Odour	➢ There would be odours by waste kept haphazardly in the open.	➢ Ensure closed dust bins / waste containers ➢ Implement provisions of Bhutan's Waste Prevention and Management Regulation 2012, as amended in 2016,	➢ Waste Prevention and Management Regulation 2012, as amended in 2016
1.2		Water	Generation of leachate (as a result of water mixed with stored wastes)	➢ Spillages may occur when waste comes in contact with water.	➢ Provision of drains with traps ➢ Provision of storm water drains in the facility ➢ Clean-up of spillages	
1.3		Soil/land	Contamination	➢ Soil / Land may get contaminated if MSW comes in contact with it.	➢ Provision of impervious floors in the facility	
1.4		Risk/Hazard	Disease vectors accessing the wastes; Exposure to diseases and creation of	➢ There are chances of accidents occurring during waste handling operations.	➢ Ensure closed dust bins / waste containers ➢ Implement provisions of Bhutan's Waste Prevention and Management Regulation 2012, as amended in 2016 ➢ Preparation and	➢ Waste Prevention and Management Regulation 2012, as amended in 2016

S. No.	Activities	Identification of Impact			Mitigation Measures	Remarks
		Environment Component Impacted	Activity and Aspect	Impacts		
			un-hygienic living conditions within labour camps, Exposure to sharp wastes having injury risks		implementation of OHSMP ➢ Work with the Thromde to ensure proper collection and disposal of Municipal Solid Waste	➢ OHSMP

5.8 Decommissioning of the Construction Facilities/ Activities in the Project site

Table 19: Impact Identification Matrix during Decommissioning

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environmental Component Impacted	Activity and Aspect	Impacts		
1.1	Includes removal of staff housing, equipment, labour camps and all temporary structures safely from the project site	Air	Demolishing or removal of temporary structures	Air pollution.	➢ No change.	
1.2		Water Quality / Resources	Disposal of debris or wastes	Debris from decommissioning activities can be dumped into the river if not properly supervised.	➢ Ensure that the decommission procedure clean-up of spillage ➢ Securing of wastes and their sale / disposal to authorised dealers / landfill or suitable disposal site.	➢ C&D Waste Management Plan(Refer Annex. 6)
1.3		Noise	Noise levels	construction noise	➢ Provision of Noise barriers & enclosures ➢ Provision of ear plugs	
1.4		Soil	Spillage of waste	The materials likely to be spilt will not be toxic or harmful but can cause deterioration of soil fertility.	➢ Establish and supervise a waste collection and removal plan ➢ Comply with National Environmental Standards and International Good Practices.	
1.5		Risk / Hazards	Construction hazards	Construction hazards leading to permanent injury or fatality.	➢ Follow the Occupational Safety and Health Management Plan (OHSMP) Plan	➢ Occupational Safety and Health Management Plan

5.9 Zone A Landscape Development Activities

Table 20: Impact Identification Matrix during Landscape development

S. No.	Activities	Identification of Impact			Mitigation Measures	Related Documents
		Environmental Component Impacted	Activity and Aspect	Impacts		
1.1	Includes collection of top soil and saplings from other places and their plantations in the project area	Soil	Top soil removed from other places	Soil degradation at the source	➢ Establish and supervise a waste collection and removal plan ➢ Comply with National Environmental Standards and International Good Practices.	➢ Refer Annex. 6
1.2		Ecology	Introduction of alien species and contamination	Introduction of alien species and contamination of the local biodiversity	➢ Follow the Occupational Safety and Health Management Plan (OHSMP) Plan and good environmental practices	➢ Occupational Health and Safety Management Plan(Refer Annex. 5)

6 Grievance Redress Mechanism (GRM)

6.1 Objectives of GRM

40. The ADB's SPS states of the following:

"The borrower/client will establish a mechanism to receive and facilitate the resolution of affected persons' concerns and grievances about physical and economic displacement and other project impacts paying particular attention to the impacts on vulnerable groups. The grievance redress mechanism should be scaled to the risks and adverse impacts of the project. It should address affected persons' concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to the affected persons at no costs and without retribution. The mechanism should not impede access to the country's judicial or administrative remedies. The borrower/client will inform affected persons about the mechanism."

41. Accordingly, the project is required to have a platform for the affected people to submit their grievances and resolve it. GRM provides a predictable, transparent and credible process to all parties, resulting in outcomes that is seen as fair, effective and lasting. Accordingly, GRM is appointed to take necessary steps in order to harmonize project activities as well as the wellbeing of the general public.

6.2 Standard Operating Procedure for GRM

42. The project's Grievance Redress Mechanism (GRM) will be institutionalized by the PMU to address grievances which may arise due to project implementation as indicated in Figure 5 below. A two tier mechanisms will be adopted by the project. The first tier will be in the field at the PIU led by PIU head and the second level/tier GRM will be led by the PMU head at a higher level.

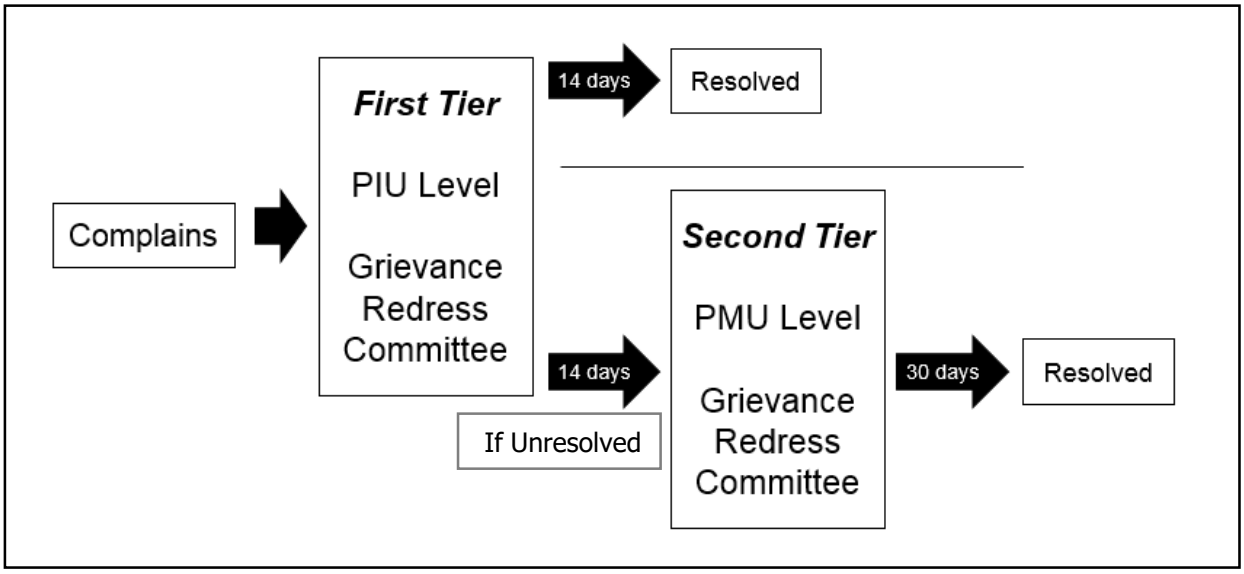


Figure 5: GRM structure for the Phuentsholing Township Development Project.

6.1 First Tier

6.1.1 Secretariat

43. The first level secretariat of GRM will be established in the PIU office, with PIC's Safeguard and Communication Specialist acting as the secretary. The secretariat (comprising of members as listed in Table 21 below), will actively check with other grievance received and record submitted grievance, complainant's name, date, concerns/ grievance type. Only complaints related to the project will be accepted and no anonymous complaints will be entertained. The secretariat will call a regular **quarterly** meeting inviting all members, and conduct special meetings as and when the grievances are received. The secretariat will be responsible to review the grievance, identify suitable solutions, and call the meetings with relevant party. Meeting to resolve a grievance should involve the person who submits the grievance. The time to resolve the grievance at the first level will be maximum 14 days. If the first GRM level cannot resolve the grievance, it will go to second tier GRM.

6.1.2 Composition

44. At the first level GRM, the team called as Grievance Redress Committee (GRC) will be established at the PIU level with PIU head as the lead of GRC. The composition of the first tier GRM is shown in Table 21.

Table 21: Composition of the 1st Tier GRM

Positions	Names	Remark
PIU Project Manager	Mr. Kamal Dhakal	Chairman
PIU Deputy Project Manager	Mr. Dawa Tshering	Member
PIU Environment Manager	Mr. Pushpa Raj Pradhan	Member
PIC Team Leader/Dy. Team leader	Mr. Robert / Mr. Edwin	Member
PIC Safeguard and communications specialist	Mr. Megay Penjore	Secretary
Representative of local leader	Mr. Nar Bahadur Rai	Local Area Representative (Member) (Nyedra Tshogpa)
Representative from District office	Mr. Sonam Tenzin	Phuentsholing Thromde (Member) (Building Inspector)
Representative from reputable community-based organization	Ms. Dechen	RENEW (Member), (CBSS Volunteer)
Contractor	Mr. R. Ravichandran	AFCONS (Member), Project Manager
Members on call basis based on the nature of grievance representing relevant section of Dzongkhag/Dungkhag office	-	

6.1.3 Information Dissemination Methods

45. GRM process will be widely available to the public. The GRM will be advertised in the local newspaper at the start of the project and signage boards will be placed at prominent locations in the project area. The PIU, assisted by PIC will be responsible for information dissemination to affected persons and general public through the first public consultation

meeting and provide details on whom to contact and when, where/ how to register grievance and stages of grievance redress process and procedures. The consultation will ensure that the vulnerable (women) groups and others are made aware of grievance redress procedures.

46. The public will have several mechanisms for lodging a complaint:

a) GRM dedicated office address and PIU Phone no.
b) Grievance Register to be kept at PIU office
c) Grievance Drop Box in:
i. PIU office
ii. Contractor office
d) Email address and Phone number of local leader office representative
e) Phone number of the Thromde office.

47. At any time, an aggrieved person can convey his/her complaint, name and contact details by e-mail, letter or in person to the designated means. All grievances received will be recorded and will be screened for the project relevancy by the committee. Relevant Grievances received and responses provided will also be documented and reported back to the affected persons. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the PIU office, as well as reported in the semi-annual safeguard monitoring reports to be submitted to ADB.

48. The broad outline of the first tier level mechanism and flow of information is given below:

a) The PIC Safeguard and Communication Specialist will communicate any received grievance to the PIU. The GRC will check the grievance readdress boxes regularly.

b) Each complaint will be issued a reference number. The PIU Environment Manager will issue each aggrieved person acknowledgement that they have received the complaint and details on the process to follow.

c) The GRC will work with aggrieved person to resolve the complaint. On settlement of the complaint, the Environment Manager of the PIU will verify that the complaint is addressed (through consultation with the affected parties) and issue a letter to the aggrieved person citing the findings of the GRM investigation and any action taken with regard to the complaint.

d) The decision on the grievance must be communicated to the aggrieved person by the GRC within a maximum timeframe of 14 days with appropriate action taken for resolution of the issue.

e) All grievances will be documented and indexed. The meeting proceedings and actions against each of the grievance will be documented by the PIC Safeguard and communications Specialist.

f) If grievance require a policy decision, the case will be forwarded to PMU Level for further resolution within 14 days.

49. All complaints lodged with the GRM will be recorded and reported to ADB within the bi-annual safeguard report. Details of the aggrieved person's name, nature of complaint, status of complaint, and outcome will be included within the safeguard report. ADB's Independent Environmental Specialist will undertake routine inspections of the GRM to ensure that the GRM is functioning.

6.1.4 Cost

50. All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the PIU through provisional sum of the contract document.

6.2 Second level

6.2.1 Composition

51. The second level/tier GRM will be led by the PMU head with members from the PIU. (Project Manager/Dy. Project Manager, and Environment Manager), relevant PMU staff and relevant member from the central government level, as well as reputable community-based organization (Table 22). All grievance should be resolved at this level. The total time required will not be more than 30 days after PIU receiving the grievance. Depending on the severity of the case, an additional time my agreed by the complainant to resolve the grievances. The meeting to resolve a grievance will be held by involving the people who submit the grievance.

Table 22: Composition of the GRM at Second Tier

Positions	Names	Remark
PMU Head	Mr. Tshering Dupchu	Chairman
PMU Urban Planner	Ms. Kamala Thapa	Member
PIU Head	Mr. Kamal Dhakal	Member

Environment Officer of PIU	Mr. Pushpa Raj Pradhan	GRC Secretary
Central Government Department	Mr. Namgay Tshering	DoFPS (Member), Forestry Officer
Reputable community-based organization	Ms. Lhaden	RENEW (Member) Social Welfare officer

52. The broad outline of the second tier level mechanism and flow of information is given as follows:

a) The PIC Safeguard and Communication Specialist will communicate to the PMU head on any grievance not resolved in the PIU level within 5 days.

b) The assigned PMU head will work with the PIU, contractor and aggrieved person to resolve the complaint. On settlement of the complaint, the Environment Manager of the PIU will verify that the complaint is addressed and issue a letter to the aggrieved person stating the findings of the GRM investigation and action taken.

c) The decision on the grievance must be communicated to the aggrieved person by the PIU within a maximum timeframe of 30 days from the date of receiving it from the First Tier and with the action taken. Depending on the severity of the case, an additional time mutually agreed between the two parties, may be agreed with the complainant to resolve the grievances.

d) All grievances must be documented and indexed. The meeting proceedings and actions against each of the grievance will be documented by the PIU Environment Manager

53. All complaints lodged with the GRC will be recorded and reported to ADB within the bi-annual safeguard report. Details of the aggrieved person's name, nature of complaint, status of complaint, and outcome will be included within the safeguard report. ADB staff will undertake routine inspections of the GRM to ensure that the GRM is functioning.

6.2.2 Cost

54. All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the PIU through provisional sum.

7 Zone A Landscape Development Activities

55. The landscape development in proposed ALDTP comprises of a lower walkway, upper walkway and sloping embankment. The tree plantation is proposed at upper & lower walkway and shrub lawns are proposed on the sloping embankment.

56. Landscape work tentatively will start from 1st February 2020, it will be carried out phases and part and will continue till 30th January 2021.

57. The plantation of trees will be done in pit of size 1m x 1m x 1m on both lower and upper walkway. The tree placement will be at 10m center to center on upper walkway and 5m center to center on lower walkway. Tree guard will be provided around the planted tree and soil for covering the trees will be excavated from the area near Zone C.

58. The detail of plants species and their respective locations is shown in Table 23:

Table 23: Tree Plantation location and species

S. No.	Location of Plantation	Species	Quantity
1.	Slopped Embankment	Viteveria zizanoides (Vetiver Grass)	22,480(Approx)
2.	Lower Walkway	Azadiracta Indica	128
		Mesua Ferrea	68
		Pongamia Glabra	142
		Fillicium Decipens	122
		Alsotnia Scholaris	126
3.	Upper Walkway	Classia Javanica	69
		Delonix Regia	36
		Peltophorum Ptericarpum	75
		Tebabuea Roasea	53
		Kigelia Pinnata	26
		Samanea Saman	115

Annexure 1: NEC Environmental Clearance

Annexure 2: Camp Management Plan

Annexure 3: Emergency Response Plan

Annexure 4: Traffic Management Plan

Annexure 5: Occupational Safety and Health Management Plan

Annexure 6: Construction and Demolition Waste Management Plan

Annexure 7: Weekly Environment Inspection Checklist

Annexure 8: Monthly Environment Management Report Outline

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དཔལ་ལྡན་འབྲུག་གཞུང་།
National Environment Commission
Royal Government of Bhutan

NECS/ESD/Dzo-Chukha/3496/2017/ 1245 **September 1, 2017**

Environmental Clearance

In accordance with Section 34.1 of the Environmental Assessment Act 2000 and Section 34 of the Water Act 2011, this Environmental Clearance (EC) is hereby issued to the Chief Executive Officer, Construction Development Corporation Limited, Thimphu for Amochhu Land Development and Township Project proposed at Phuentsholing under Phuentsholing Throm and Samtse Dzongkhag with the following terms and conditions:

I. General

The holder shall:

1. comply with provisions of the National Environment Protection Act 2007, Environmental Assessment Act 2000 and its Regulation 2016, Waste Prevention & Management Act of Bhutan 2009 and its Regulation 2016, The Water Act of Bhutan 2011 and its Regulation 2014 and Revised Regulation on the Control of Ozone Depleting Substances (ODS) 2008;
2. ensure that the activities are in line with Initial Environmental Examination and Environmental Impact Assessment reports submitted for EC;
3. ensure that local communities, properties and any religious, cultural, historic and ecologically important sites are not adversely affected by the activities;
4. restore the damage of any public or private properties caused by the activities;
5. inform NECS and any other relevant authorities of any unanticipated or unforeseen chance-find of any precious metals or minerals or articles, that have economic, cultural, religious, archeological, and/or ecological importance; and
6. erect a signboard at the take-off point of the main entry of the project site stating the name of the project and contact address.

II. Environmental standards

The holder shall comply with the existing Environmental Standards.

III. Import and use of secondhand equipment and ODS

The holder shall:

1. ensure that import and use secondhand equipment and machineries are strictly prohibited; and
2. ensure that import and use ODS are in line with the Revised Regulation on the Control of ODS 2008.

IV. Protection and management of water resources

The holder shall ensure that the activities does not disrupt the water flow and pollute the water bodies.

NATIONAL ENVIRONMENT COMMISSION THIMPHU:BHUTAN

V. Waste prevention and management

The holder shall:

1. manage wastes generated from the project (Project site, labour camps, offices etc.) with the application of 4R (Reduce, Reuse, Recycle, Responsibility) principle and other environmentally friendly methods of waste management; and
2. ensure that import and use of hazardous wastes are strictly prohibited.

VI. Management of excavated materials and run-off

The holder shall:

1. dispose excess excavated materials generated from the activities at the pre-identified approved dumpsite; and
2. put appropriate measures for management of surface run-off to avoid erosion and landslides.

VII. Implementation plan

The holder shall prepare a detailed implementation plan focusing on the implementation of terms and conditions of this EC and submit to NECS within three (03) months from the date of issue of this EC.

VIII. Monitoring and reporting

The holder shall:

1. ensure that the effective day-to-day monitoring of the EC terms and conditions are carried out by the environmental unit or designated environment focal person; and
2. maintain proper records on wastes generated and its management, stating types of wastes, quantities and characteristic and submit to NECS annually.

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IX. Renewal and modification

The holder shall:

1. ensure that renewal of this EC is processed at least three (03) months prior to its expiry along with a copy EC and a report on the implementation of its terms and conditions; and
2. obtain prior approval from NECS for any modification to the existing proposal/application .

Reservation

1. The NECS may stop the activity or impose additional terms and conditions, as may be deemed necessary; and
2. The EC shall be subject to periodic review and modifications as per Article 25 of the EA Act 2000, without any liability on the part of the Royal Government.

The holder may adopt best practices in executing these terms and conditions to avoid adverse environmental impacts.

THIMPHU: BHUTAN
NATIONAL ENVIRONMENT COMMISSION

Failure to comply with any of the above terms and conditions shall constitute an offence and the proponent shall be liable in accordance to the Environmental Assessment Act 2000 and/or existing environmental laws.

Validity:
This EC is issued with valid from **September 1, 2017** until **August 30, 2022** for Amochhu Land Development and Township Project only.

(Sign & seal)
Secretary

NATIONAL ENVIRONMENT COMMISSION
THIMPHU:BHUTAN

To,
Chief Executive Officer
Construction Development Corporation Limited
Thimphu

Copy to:
1. Dasho Dzongdag, Dzongkhag Administration, Samtse for kind information.
2. Dasho Thrompon, Phuentsholing Thromde, Phuentsholing for kind information.
3. Chief Environment Officer, Compliance Monitoring Division, NECS, Thimphu for information.
4. Environment Officer, Dzongkhag Administration, Samtse and Chukha for information.
5. Guard-file (Dzo-Chukha), ESD, NECS for record.

ANNEXURE 2: CAMP MANAGEMENT PLAN

Table of Content

1. SITE LAYOUT:

1. Temporary Site will be constructed on the eastern side of Amochhu River. Site consist of following:

a) offices for both the employer and contractor,
b) accommodation for staff, supervisors and labours,
c) kitchen area for staff, supervisors and labours,
d) storage area for material and aggregate,
e) batching plant with silos for storing cement,
f) DG shed,
g) weigh bridge,
h) laboratory containers,
i) Toilets,
j) Gym,
k) parking area,
l) Guard Cabins

2. The site will be guarded parametrically with galvanised iron sheets to prevent unauthorised entry. Two entry gates will be provided one for the access in office and one for the transport carrying materials and aggregate. Both the gates will have guard post, only authorised persons with valid identity card will be allowed to enter the area. On the other side of the road there will be accommodation area for staffs and labour workers, living area will also have security cabins to prevent unauthorised entry. The site layout that will be constructed shown is below

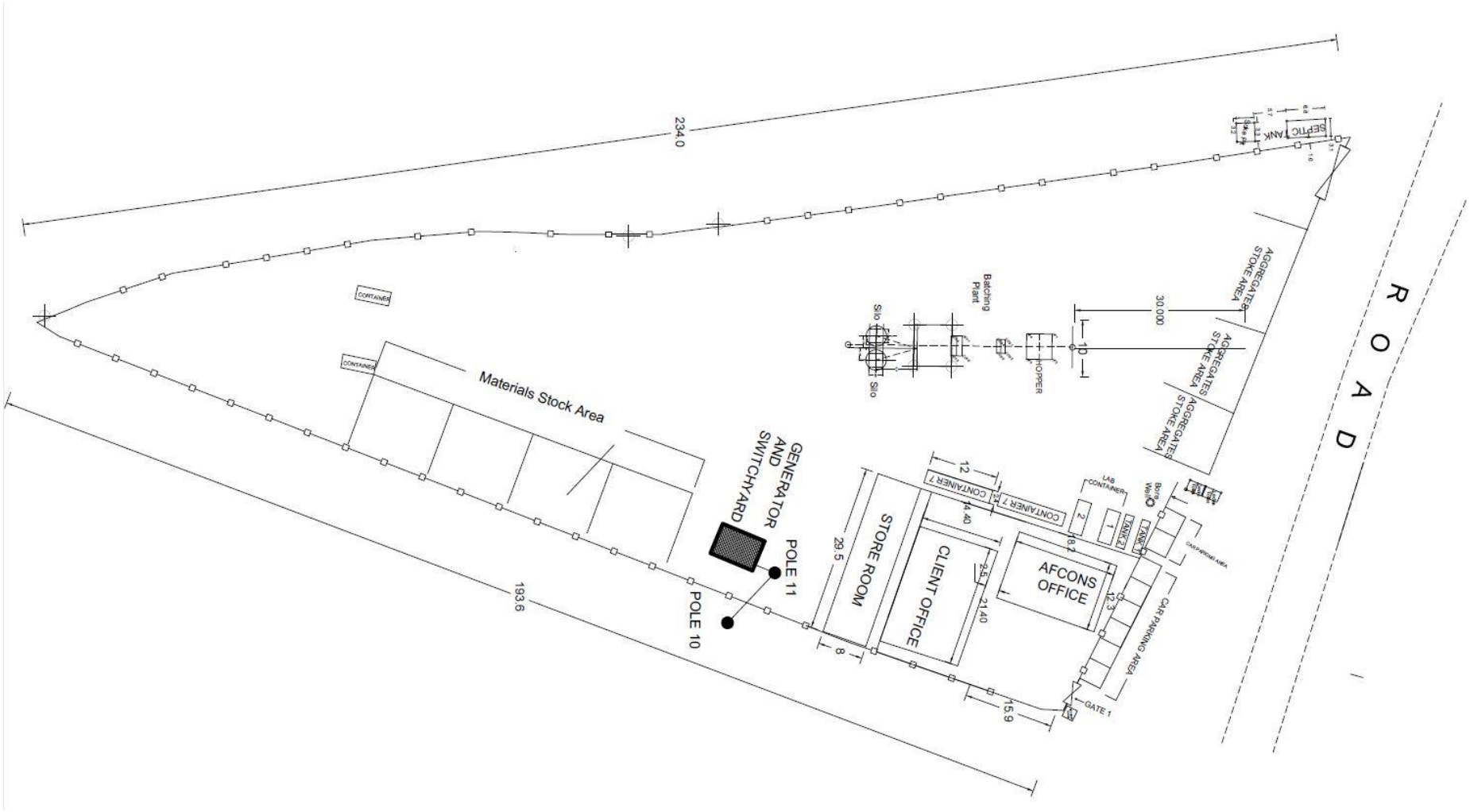

Figure 1: Office Area Layout

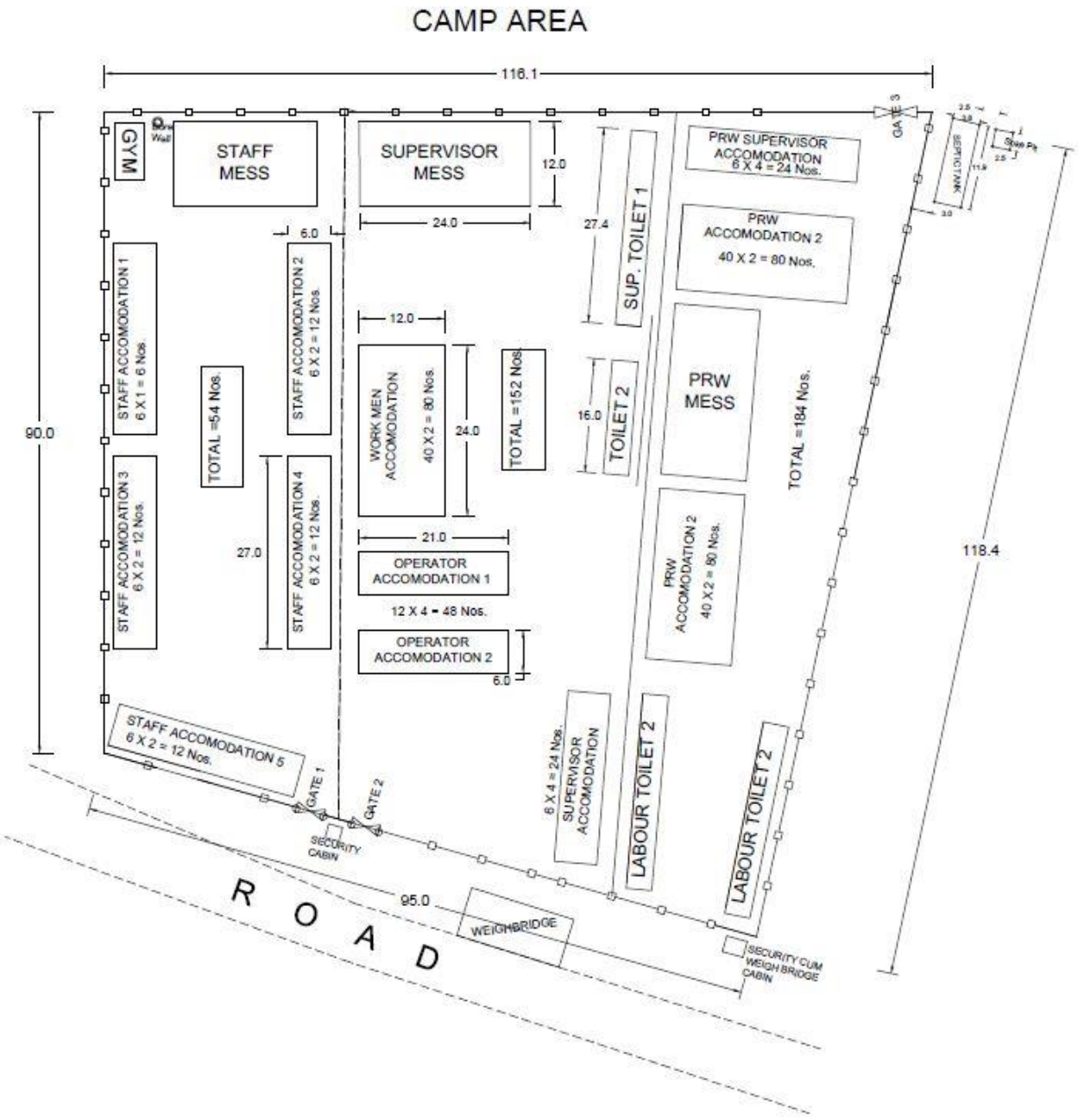

Figure 2: Accommodation Camp Area layout

2. Workforce Employment breakdown

3. The project requires large number of workforces to be employed. Manpower will be recruited from both India and Bhutan (35-38% local employment). According to the requirement Engineers, Skilled, semi-skilled and unskilled manpower will be deployed at different stages of the project.

Table 1: Category wise workforce breakdown

SN.	Type	Number of Manpower
1.	Engineers	50
2.	Highly Skilled	8
3.	Skilled	271
4.	Semi-skilled	28
5.	Unskilled	343
	Total	700

3. Camp Workforce Community & Security Rules

4. All staff/ workmen residing in the project Camp shall abide by the rules of the company and maintain strict discipline and not indulge in activities detrimental to the interest of the Company. Security is utmost important for all of us to follow certain guidelines and protocols to ensure safety of all.

3.1 Security installations:

a) Heightened boundary wall thought the main Camp.
b) Security check posts will be installed for access control on main gate.
c) Installation of CCTV cameras at strategic locations.
d) Security agency – M/s JSS has been deployed for round the clock security supervision.

3.2 Gate timing:

Main Gate (Residential Camp): Will be locked from 10PM to 5AM;

3.3 Visitors:

a) Contractors, labours, drivers, milkman, newspaper vendor, car washing person, cable TV payment collectors, courier personnel i.e. anybody other than Employees & Residents Staffs

needs to enter register during in and out only from front gate and will be frisked. They should display "Visitor" card while staying inside premises. Card to return up on leaving premises.

b) Visitors arriving at late nights after 10.00 PM and early morning before 6.00AM will be escorts by security guards shall escort.
c) In case of any doubt by security personnel, respective member may be called to seek permission of the person entry.
d) No beggars, hawkers, company/person for promotional activity will be allowed inside without permission of Administration.

3.4 Vehicles:

5. Vehicle entry/ exit:

a) Car entry from main gate only by documenting entry and exit with proper frisking.
b) Any other vehicle cars, buses, office pick up cars needs to enter and exit from main gate only.
c) Overnight parking for outside vehicles/ Sub Contractors will not be allowed, unless member provides information to security. These cars may be towed out.

3.5 Alcohol and Drugs Policy:

a) Any kind of intoxication will strictly be prohibited on the site.
b) Drinkers will be suspended/terminated from the site without any notice.
c) Routine alcohol test will be conducted

3.6 Safety

6. A register will be kept at security gate where any member can register their complaints. The register is regularly checked by Security in-charge and take necessary actions.

3.6.1 Fire extinguishers and Fire Bucket:

7. Fire extinguishers and fire buckets are kept with security personnel at main gates and Camp Premises which can be used by any members up on emergency.

3.6.2 Emergency Numbers:

8. Emergency telephone numbers will be displayed.

4. Proposed Water Supply and Treatment

9. On an average it is estimated that, about 60 KLD of water will be demanded by 700 workers for domestic purpose, for that it will sourced from the bore well/tube well dig within the camp area. The water will be stored in tanks and supplied for use. The water quality in general is good (Based on EIA Report) and does not requires any elaborate treatment. However, it is proposed to disinfect the water prior to distribution, for that R.O. water purifier/filters will be setup

5. Proposed Drainage System

10. Waste water generated from the camp will be drained from underlying HDPE drainage pipe line to the septic tank and separate drainage system will be there for the wastewater from Mess. At every 15-meter distance there will be manhole for routine maintenance of drainage system. The drainage line proposed will have adequate slope for the flow of wastewater under gravity. The figure shown below is tentative proposed drainage system.

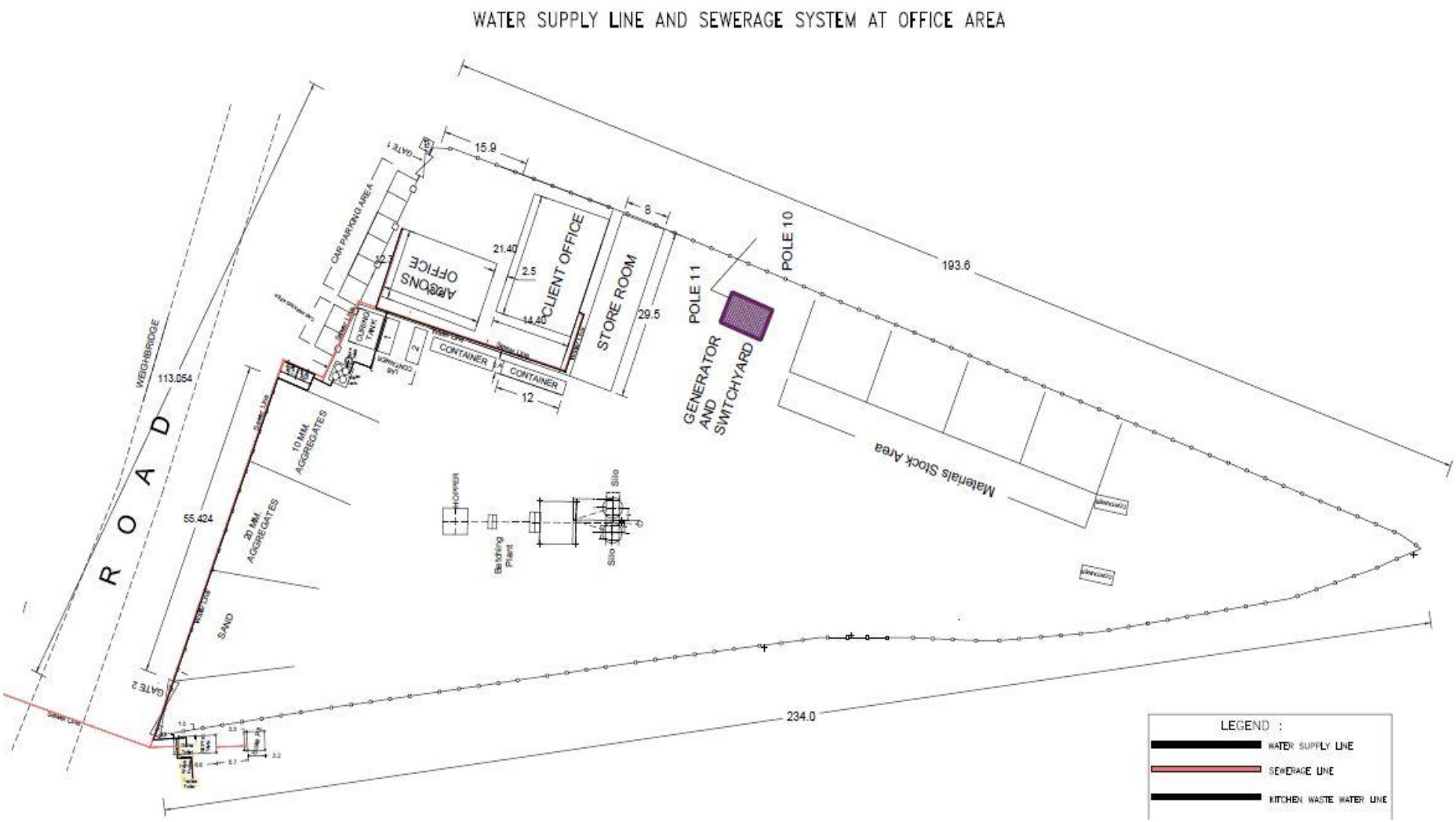

Figure 3: Sewerage Drainage System (Office area)

Annexure 2: Camp Management Plan

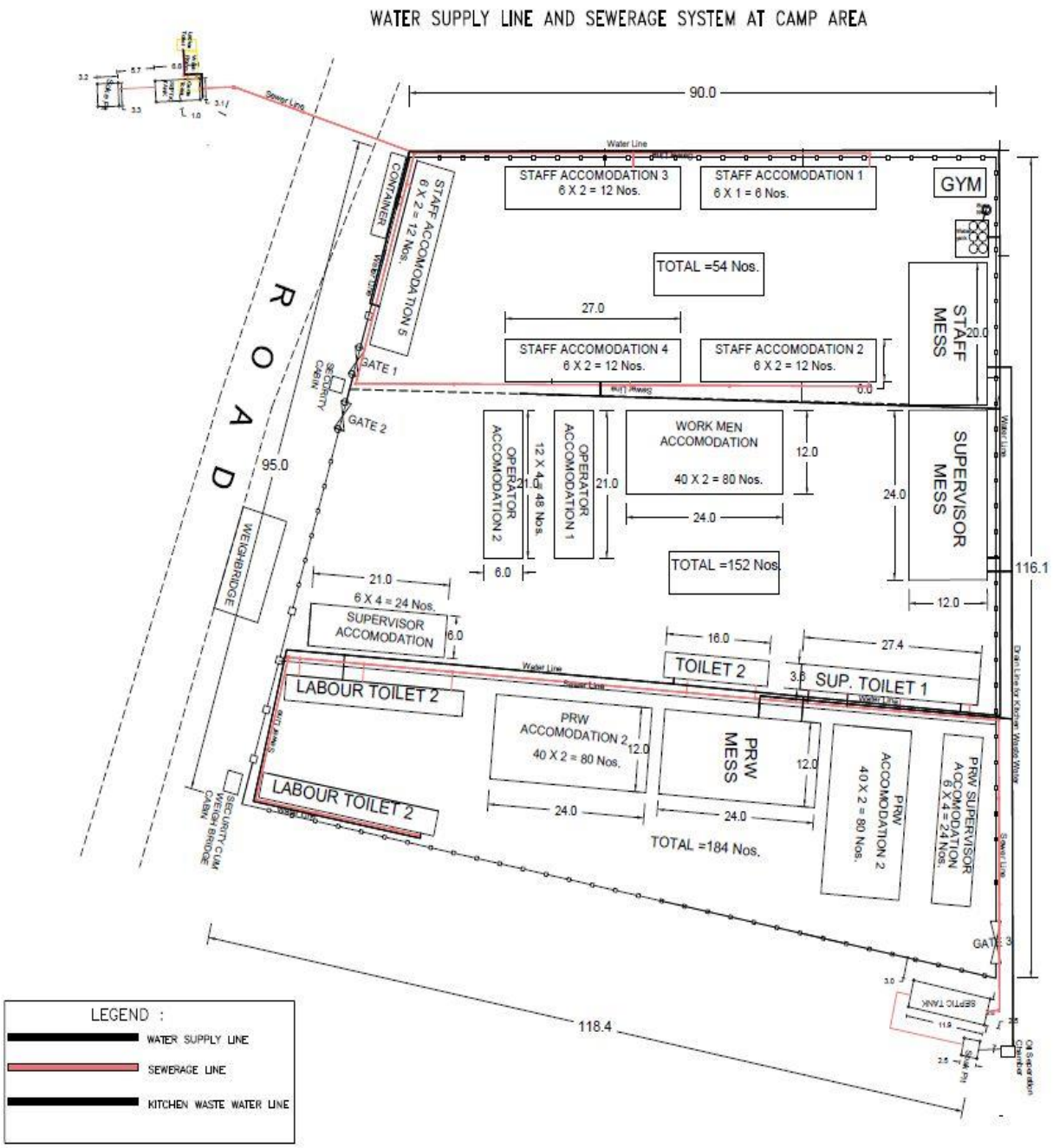

Figure 4: Sewerage drainage system (Accommodation Area)

6. Liquid Waste Management

11. Liquid waste or wastewater will be generated from toilets and kitchen. About 45KLD of wastewater is going to be generated from camp area which is to be treated before final disposal. A separate treatment will be laid for grey water i.e. kitchen area and black water i.e. toilet area.

6.1 Grey Water Treatment

12. Effluent coming from kitchen area contains oil & greasy material which will be removed before treatment for that kitchen area drain line is fitted with grease trap followed by ACF before discharging it into the soak pit. It will be insured that the treated effluent will be under prescribed discharge standard limit before disposal.

6.2 Black water Treatment

13. Thereare15 toilets proposed in camp for the staff and other labours, out of which about 45 KLD sewage will be generated, the details of which are shown in Table 2 below. The sewage from toilet will be treated in septic tank followed by soak pit as shown in figure 5 and 6 below. Two septic tanks will be constructed in camp one near office area and one near accommodation area. The sludge from septic tank will be cleaned periodically with local operator at Phuentsholing Thromde.

Table 2: Specification of septic tanks and soak pits

S. No.	Location	Technical Specification
1.	**Accommodation Area**	
	Septic Tank	
	Population Demand	700 persons
	Quantity/Flow of Sewage	45 KLD(Approx.)
	Quantity of Sludge generation(yearly)	21 KLD(Approx.)
	Detention Period	24 Hours
	Length of the tank	11.5 meters ~ 12 meters
	Breadth of the tank	3.8 meters ~ 4 meters
	Height of the tank	1.5 meters + 0.3-meter free board
	Soak Pit	
	Length of the pit	2.5 meters
	Breadth of the pit	2.5 meters
	Height of the pit	1.8 meter
2.	**Office Area**	
	Septic Tank	
	Population Demand	300
	Quantity/Flow of Sewage	18 KLD (Approx.)
	Quantity of Sludge generation (Yearly)	9 KLD (Approx.)
	Detention Period	24 Hours

S. No.	Location	Technical Specification
	Length of the tank	7.5 meters
	Breadth of tank	2.5 meter
	Height of the tank	1.5 metes + 0.3 meter free board
	Soak Pit	
	Length of the pit	2.5 meters
	Breadth of the pit	2.5 meters
	Height of the pit	1.8 meter

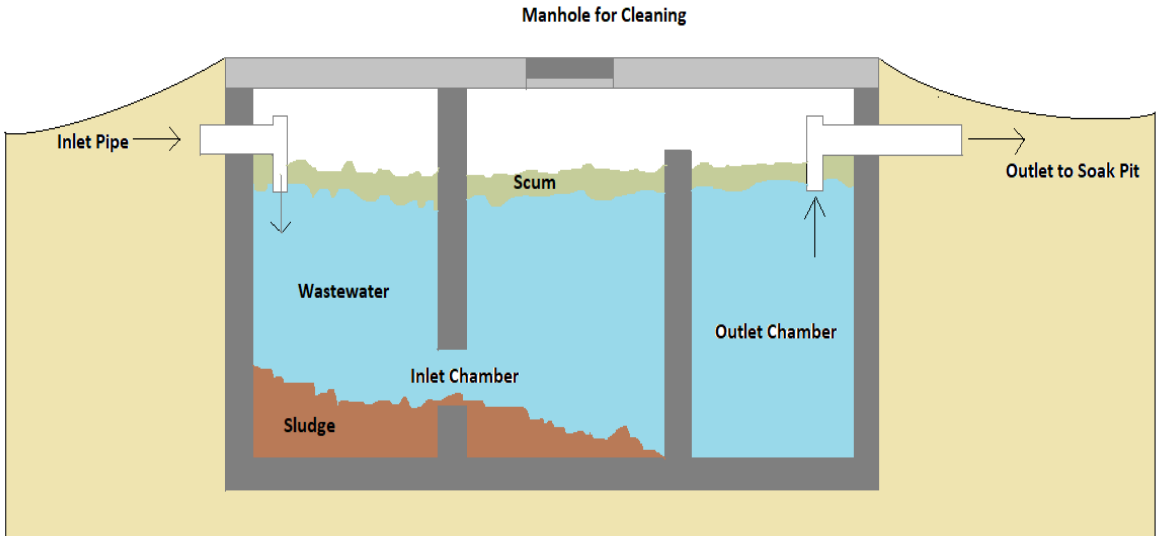

Figure 5: Schematic Diagram showing the layout of septic tank

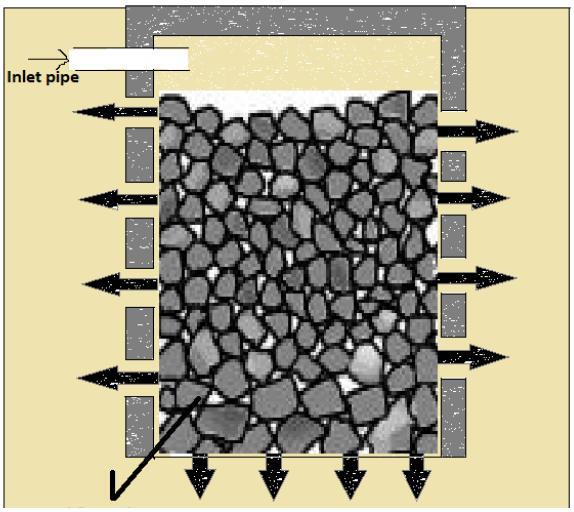

Figure 6: Schematic diagram of soak pit

7. Solid Waste Management

14. During the construction phase of the project, there will be an influx of technical staff, laborers and other service providers into the project area, for that there will be temporary office and employee's accommodation area. About 650 labors and 50 technical staff will envisage. The solid waste that likely to be generated from camp is about 3.65 MT/Day. The main sources of the waste being generated from camp area are:

a) Biodegradable and food waste from Kitchen
b) Soil waste from Septic Tank
c) Non-Biodegradable waste from both office and accommodation area
d) E-Waste from Office area
e) Bio-medical waste from First-aid Area
f) Hazardous waste from store and mechanical work shop

15. The waste being generated will be segregated and collected in colour coded dustbins. The segregated waste from the site will be collected by Phuentsholing Thromde on regular interval of 3 times a week and that will be disposed at the existing landfill site. Even small amount of medical waste from first-aid activities will also be disposed in existing landfill site.

16. The hazardous waste like empty paint, admixtures drums, unused Bentonite and waste fuel and oil will be generated from store and mechanical work shop, these wastes will be recycled to authorised recycler and waste will be store at designated place within the premises.

17. Bentonite used for Diaphragm wall is sodium based on the average 150 metric tonne will be generated as a waste and that will be disposed after proper drying in cakes.

18. Dry cakes of Bentonite will be disposed at the Phuentsholing Landfill

Table 3: Waste characteristics and its storage and disposal methods

S. No.	Types of Waste	Source	Storage/Segregation	Disposal
1.	Biodegradable Waste	1. Kitchen/Mess Area 2. Office Area	Green Bin with Biodegradable Label	Phuentsholing Thromde
2.	Non-Biodegradable Waste	1. Accommodation Area 2. Office Area	Blue Bin with Non-Biodegradable Label	
3.	Soil Waste	1. Septic Tank	-	
4.	Bio-Medical Waste	1. First-Aid Area	Red Bin with Bio-Hazard Label	

S. No.	Types of Waste	Source	Storage/Segregation	Disposal
5.	E-Waste	1. Office Area	Yellow Bin	Authorised Recycler
6.	Bentonite	1. Diaphragm Wall Construction	Within Waste storage area	Dry cakes and then disposed to decided disposal site at Phuentsholing Landfill

8. Storage Area for fuel, Lubricants & hazardous material

19. During construction diesel, lubricants and hazardous chemical materials like paints, admixtures, solvent etc. will be used for different purposes. All the material will be purchased in bulk or stock will be kept, for this well protected storage area will be constructed within camp area. Storage area will have entry prohibited sign-only authorised personnel is allowed to enter the store area, fire extinguishers and proper label will be displayed for designated storage of material. Storage and handling procedure of such material is discussed below:

8.1 Storage of fuel, oil and lubricants:

a) The availability of separate measuring cans (of different capacities – 1 liter, 2-liter. 5-liter) and funnels for the issue of the various grades of oils.
b) Proper labelling and handlings instructions will be displayed in containment area.
c) Placement of oil drums, cans in drip trays should be ensured for contamination of any spillage.
d) Availability & use of appropriate pumps / transfer equipment for the transfer of spilled oil.
e) Any spillage of oil will be wipe with wasted cotton & thrown in the designated bin.
f) The fresh left-over oil will be kept/poured back into the respective containers kept in the maintenance section / sub store-using funnel to avoid spillage.

8.2 Storage of paint, chemical and hazardous material

a) Hazardous material will be stored on impervious surface to avoid contamination of land and MSDS will be refer for proper handling of the hazardous material.
b) Storage of incompatible, flammable/reactive solvents and chemical will be stored separately.
c) Proper labelling and PPE will be used.
d) While transferring chemicals and solvents, proper safety will be ensured to prevent any spillage and if spillage occurs, wipe clean with cloth and put in designated bin.

e) Chemicals and solvents that are stored for a long period will be check for leakage from time to time.
f) Empty containers of chemicals and solvents will be disposed as per Waste Management guidelines.

9. Source and Impact of Backfilling Materials Quarry

20. It has been estimated that significant quantities of burrow material will be required for the backfilling of the zone A. The estimated material for backfilling will be approximately 3.1 million m^3.

21. It is proposed to extract and use the Amochhu Riverbed material for backfilling that will be within the project site. The impact associated with the site is already cited and plan is prepared to monitor and mitigate it.

22. If backfilling material will not be sufficient from within the project site for that an alternate quarry site will be used which is near Purbay Khola that contain large alluvial fan.

23. The impact associated with the Purbay Khola quarry site is studied and discussed below:

a) Several serious environmental impacts related to quarrying activities on and near the river, such as vibrations, land degradation, land subsidence and landslides, water pollution, occupational noise pollution, and air pollution, will lead to health-related problems and loss of biodiversity.
b) Quarrying operations can adversely alter pre-existing ecosystems, and change hydrogeological and hydrological regimes. This adverse influence of stone and sand quarrying induces damage of nature, loss of fertile topsoil, degradation of forests, deterioration in aquatic biodiversity and public health. On the other hand, haphazard quarrying of sand from riverbeds may cause a rapid change in bed configuration in response to the changes in flow.

10. Proposed Operational Compliance Checklist

Table 4: Daily inspection checklist for camp

AFCONS INFRASTRUCTURE LIMITED / Shapoorji Pallonji	PHUENTSHOLING TOWNSHIP DEVELOPMENT PROJECT (6462) Daily Inspection Checklist for Camp		
Doc. No.: CEMP/CMP/6462/01	AFCONS INFRASTRUCTURE LIMITED		Revision No:00
S. No.	Description	Yes/No	Remarks
I	WATER/SANITARY FACILITY		
1.	Adequate drinking water is provided		
2.	Sufficient water facility is provided for cooking, bathing and laundry purpose		
II	TOILET/BATHING &WASHING FACILITY		
3.	Toilet facility is sufficient as per the strength		
4.	Toilet is regularly cleaning		
5.	Floor drain provided in and around the area to remove the waste water and facilitate cleaning		
III	ACCOMMODATION FACILITY		
6.	Sufficient accommodation is provided with proper ventilation		
IV	ELECTRICAL & LIGHTING FACILITY		
7.	Sufficient illumination is available in and around the camp		
V	MESS FACILITY		
8.	Hygienic food is provided to workers		
VI	FIRST AID & FACILITY		
9.	Adequate first aid facilities are available		
10.	First-aid kit contains all necessary items		
11.	Ambulance is available on site		
12.	Ambulance equipment are working properly		
VII	FIRE PREVENTION FACILITY		
13.	Are there sufficient fire points with suitable equipment available		
VIII	HEALTH SURVEILLANCE		
14.	In case of emergency the medical facility is available.		
IX	TRANSPORT FACILITY		
15.	Always the condition of company transport vehicles are fit & maintained.		
X	SECURITY FACILITY		
16.	Appropriate security systems are functioned		
XI	HOUSEKEEPING FACILITY		
17.	Appropriate skips are used in camp premises		
18.	Disposal of waste material, cleaning of camp area and cleaning of drainage block work are carried out on a regular basis		
Date:			
Checked By:	Name and Sign:		

Reviewed By:	Name and Sign:	
Joint Review:	Name and Sign:	Name and Sign:
	HSE In-Charge	Admin In-Charge

Table 5: Weekly inspection checklist for camp

AFCONS INFRASTRUCTURE LIMITED / Shapoorji Pallonji	PHUENTSHOLING TOWNSHIP DEVELOPMENT PROJECT (6462) Weekly Inspection Checklist for Camp		
Doc. No.: CEMP/CMP/6462/02	AFCONS INFRASTRUCTURE LIMITED		Revision No:00
S. No.	Description	Yes/No	Remarks
I	WATER/SANITARY FACILITY		
1.	Adequate drinking water is provided		
2.	Sufficient water facility is provided for cooking, bathing and laundry purpose		
3.	The distribution lines of water supply is frequent an in good condition.		
4.	Are water tanks cleaned		
5	R.O. plant filter and membrane quality		
II	TOILET/BATHING &WASHING FACILITY		
6.	Toilet facility is sufficient as per the strength		
7.	Toilet is regularly cleaning		
8.	Floor drain provided in and around the area to remove the waste water and facilitate cleaning		
III	ACCOMMODATION FACILITY		
9.	Sufficient accommodation is provided with proper ventilation		
10.	Is there notice board with all information		
11.	Proper signage is provided		
IV	ELECTRICAL & LIGHTING FACILITY		
12.	Sufficient illumination is available in and around the camp		
13.	DG's & other electrical equipment are properly maintained		
14.	Wires and cables used for connection are of Industrial standard.		
15.	Drip tray provided for DGs		
V	MESS FACILITY		
16.	Hygienic food is provided to workers		
17.	Sufficient workers are provided for kitchen work		
18.	Food waste is disposed at proper location		
VI	FIRST AID & FACILITY		
19.	Adequate first aid facilities are available		
20.	First aid kit contains all adequate items.		
21.	All time first aider is available		
22.	All time centralized ambulance is available		
23.	Inspection of in ambulance equipment and oxygen cylinder		
24.	Bio-medical waste is disposed as per rules		
VII	FIRE PREVENTION FACILITY		
25..	Are there sufficient fire points with suitable equipment available		
26.	Fire equipment inspected daily		

Annexure 2: Camp Management Plan

27.	Emergency evacuation plan is displayed		
28.	Proper fire exit signs with arrow marks is provided		
VIII	HEALTH SURVEILLANCE		
29.	In case of emergency the medical facility is available.		
30.	Person's employment medical report is available		
31.	Medical examination is done by qualified medical doctor		
IX	TRANSPORT FACILITY		
32.	Always the condition of company transport vehicles is fit & maintained.		
33.	Transport service by bus or car available		
X	SECURITY FACILITY		
34.	Appropriate security systems are functioned		
35.	Emergency alarm system is available		
36.	CCTV cameras are working properly		
XI	HOUSEKEEPING FACILITY		
37..	Appropriate skips are used in camp premises		
38..	Disposal of waste material, cleaning of camp area and cleaning of drainage block work are carried out on a regular basis		
XII	STORE AREA		
39.	Fuel, lubricants, paints etc. are stored at designated place with proper handling guidelines.		
40.	Proper warning signs are displayed.		
41.	Fire extinguisher is provided.		

Date:		
Checked By:	Name and Sign:	
Reviewed By:	Name and Sign:	
Joint Review:	Name and Sign:	Name and Sign:
	HSE In-Charge	Admin In-Charge

Table 6: Health and Hygiene Checklist

AFCONS INFRASTRUCTURE LIMITED / Shapoorji Pallonji	PHUENTSHOLING TOWNSHIP DEVELOPMENT PROJECT (6462) Health & Hygiene Checklist	
Doc. No.: CEMP/CMP/6462/03	AFCONS INFRASTRUCTURE LIMITED	Revision No:00

S. No	Description	Frequency	Yes / No	Remarks
A	General			
1	Water accumulation / stagnation are cleared.	Daily		
2	Illumination level is checked and records maintained. (50 - 60 lux at night time)	Weekly		
3	Septic tanks and drains are inspected to prevent overflow or clogging.	Monthly		(Mention last inspection date)
4	Pest control done, mention last pest control date and due date.	Quarterly		
B	Living Quarters / Rooms			
1	Floors are cleaned with disinfectant.	Daily		
2	Dust bins with lid are provided in each room and cleaned.	Daily		
3	Windows are fitted with mosquito screens and air tight.	Weekly		
C	Bathrooms and Toilets			
1	Bathrooms and toilets clean and cleaned using disinfectant.	Daily		
2	Water supply via tap or bucket is provided in each toilet.	Daily		
3	Liquid soap or similar for hand-washing are available at hand wash unit.	Daily		
4	Leakages to be checked.	Daily		
5	Bathrooms and walkway areas are kept dry and anti-slip.	Daily		
D	Drinking Water			
1	Drinking water is provided by dispenser and ensures no leakage.	Daily		
2	RO servicing performed regularly as per manufacturer instructions, if available and records maintained.	Monthly		
3	Drinking water analysis performed and records maintained.	Quarterly		(IS 10500:2012)
E	Kitchen, Storage and Dining Area			
1	Food handlers are provided with disposal caps, aprons and plastic hand gloves and are they using while handling food.	Daily		
2	Kitchen is made restricted area and sticker placed.	Daily		
3	Hand-wash soap / liquid are provided in kitchen at sink.	Daily		
4	Exhaust fans are properly working and area well ventilated.	Daily		

5	Waste bins with lid are provided and emptied.	Daily		
6	Kitchen and serving utensils are cleaned with hot water.	Daily		
7	Foods items are properly covered after preparation. Spice / container lids are closed.	Daily		
8	Vegetable stored in shelves at least one foot above the ground.	Daily		
9	Detergent, soap, insect killers and other chemicals are stored in a separate location away from food storage.	Daily		
10	Area illumination level checked (200 lux).	Weekly		
11	Medical examinations (physical and blood investigation) are carried out for all food handlers.	Half-yearly		
F	First Aid Facility			
1	Hand-wash facility is available with liquid soap or similar.	Daily		
2	Bio-medical wastes are disposed in three different color bags (Red, Blue and Yellow) and maintained and disposed regularly with authorized agency.	Daily		
3	First Aider/Doctor visits conducted. Records maintained.	Weekly		(Where first aid room is available)
4	Bed-sheets and pillow cover changed.	Weekly		(or after contamination)
5	First aid box has sufficient items as per list provided in box and inspection checklist is maintained.	Monthly		

Date:		
Checked By:	Name and Sign:	
Reviewed By:	Name and Sign:	
Joint Review:	Name and Sign:	Name and Sign:
	HSE In-Charge	Admin In-Charge

Annexure 3: Emergency Response Plan

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1. Purpose

1. The aim of this emergency preparedness and response plan is to guide personnel in an accident or emergency situation to prevent or minimize injury, damage and material loss and also to prevent or mitigate environmental impact from the accident or emergency. To ensure communication of information related to Occupational Health and Safety to public involved in PTDP construction activities.

2. Definition and Scope

2. The major emergency is defined as one which may affect one or several areas of the site and may cause serious injuries, loss of containment or environmental impacts and may require the help of outside resources in addition to our own to handle it efficiently and effectively.

3. AFCON's **"EMERGENCY PREPAREDNESS & RESPONSE PLAN"** has been framed in such a manner so as to take immediate action by various groups to meet and control the critical situation within shortest time period with minimum loss of Material, Machine and Property & also to minimize the loss of personnel injuries.

4. It is the responsibility of all the individuals in their respective areas to take the necessary safety measures to eliminate the possibility of the emergency and if at all it occurs limit its impact.

3. Definitions

a) PTDP - Phuentsholing Township Development Project
b) OHS - Regulations On Occupational Health and Safety (OHS) in Construction, Industry (2012)

4. Legal Requirement.

a) Regulation on Occupational Health and Safety (OHS) for Construction Industry (2012)
b) Electricity Act of Bhutan 2001
c) The Pesticides Act of Bhutan 2000
d) Labour and employment act 2007

5. Approach

5. The aim of this emergency preparedness and response plan is to guide personnel in an accident or emergency situation to prevent or minimize injury, damage and material loss and also to prevent or mitigate environmental impact from the accident or emergency.

6. **Rationale:** This plan has the two fold purposes. One is to prepare PTDP for the emergency situations by means of Mock Drill Exercises & Other Training programs. The

other purpose is to handle emergencies and effective use of all resources in the command of AFCONS with complete liaison and coordination with outside agencies to minimize the effect of such a disaster /emergency. The major functions of this plan are to:-

a) Prepare the associates for the emergency situations described above by Mock Drills & Other Safety Trainings.
b) Rescue the potential victims and treat them suitably.
c) Safeguard others (evacuating them where necessary).
d) Contain the incident and control it with minimum damages.
e) Identify the persons affected.
f) Inform relatives of the casualties / effected person.
g) To provide information to all relevant authority.
h) Preserve relevant records and equipment needed as evidence for any subsequent inquiry.
i) Rehabilitate the affected areas
j) All Associates & Visitors registration at gate office for identification.

6. Potential Emergency Situations

7. Following have been identified as potential emergencies:

a) Incidence of Fire
b) Spillage/leakage of raw materials;
c) Leakage/short circuit of any electrical supply;
d) Major engineering failures such as:
   i. Collapse of structures/excavation
   ii. Major utility collapse
e) Plant/Machinery/Vehicle related accidents;
f) Unintended explosions;
g) Flooding at site
h) Toxic gases.
i) Evacuation of injured from working area
j) Food poison
k) Snake bite
   i. Stay calm and do not panic
   ii. Wrap the bitten limb tightly as you would a sprained ankle
   iii. Attach a splint where possible and immobilize the affected area
   iv. Keep the victim still and seek immediate medical attention
   v. If possible try to identify the snake without putting yourself at risk

7. Emergency Response Team

8. Emergency response team comprises:

a) Main controller

b) Incident controller

c) Incident Action Team Members

d) Site Supervisors

9. The Emergency response team identified at the project site are shown in Table 1 below:

Table 1: PTDP Emergency Response Team

Description	Responsibility	Name	Contact No
Incident Controller	Project Manager	Mr. R.Ravichandran	**17309990**
	Construction Manager	Mr. Dilip kumar Suriyavansi	**17284748**
	Chief Safety Manager	Mr. S. Ashok Kumar	**17325971**
Fire Fighting/Rescue Team	Site Supervisor/Worker	Prepared and Displayed Site Wise On Project Notice Board	
Safety Team	Site Safety	Prepared and Displayed Site Wise On Project Notice Board	
First Aid Team	Site First Aider	Mr. Bijendra Kumar Singh	**17327152**
Administration Team	Admin Head	1.Mr. Sanjeev Kumar Singh	**17327427**
		2. Mr. Kamlesh Mamgain	**17327152**
Engineering Team	1.Civil	1.Mr. UdayKalore	**17326374**
	2.Plant	2.Mr.Muthukumar	**17326744**
	3.Electrical	3.Mr.RatheeshNair	**17327010**
Ambulance	Health	Ambulance service	**112**
Police	Police	Traffic Crime	**111** **113**
Fire Brigade	Fire Tender/ Fire Extinguisher	Emergency number	**110**

Description	Responsibility	Name	Contact No
PIC	Project Manager	Mr. Robert Jeancenelle	**17298145**
	Environment	Mr. Chhimi Dorji	**17556306**
	Social Safeguard Specialist	Mr. Megay Penjore	**17618624**
PIU	Project Manager	Mr. Kamal Dhakal	**77341447**
	Environment Manager	Mr. Pushpa Raj Pradhan	**17951067**

8. Incident Control Center

10. Cabin of Construction Manager(s) has been identified as Incident Control Centre. Following items have been provided in the incident control centre:

a) Mobile telephone

b) Site plan with following details:

1) Details of the surrounding community

2) Site entrances, road plan, emergency escape routes and assembly points

3) Vehicle parking areas

4) Location of incident control centre, medical treatment centre (if provided)

5) Storage points of large quantities of hazardous materials including tanks, reactors, drums and compressed gas cylinders

6) Location of water sources including hydrants, fire-fighting and other safety equipment

7) Location of spill control equipment

8) Location of emergency lights, sirens, bells, alarm buttons and other warning devices

9) Location of emergency instruction notice boards

9. Emergency Response kits

a) Pen, Pencil & Notebook

b) Clipboard and blank A4 paper.

c) Camera.

d) Personal Protective Equipment

e) First Aid Kit

f) Torch and Spare Batteries.

g) Copy of procedure and forms.

h) Hazard Warning tape.

i) Traffic batten light

j) Life jackets

10. Emergency Response Procedures

11. General Guidelines

a) Do not panic.

b) Do not approach the incident site as a spectator. Instead, stay at your place unless otherwise instructed.

c) Do not engage communication channels/Mobile except for handling emergency.

d) Do not move unnecessarily.

e) Conduct your guest / visitors away from the site.

10.1 Emergency Procedures of Injury

a) Individuals who are evident of incident of injury shall report to Site supervisor and Rescue team. All other workmen shall rush to assembly point as per evacuation plan available at site for head counting, and head counting will be done by administrative representative with daily man power report.

b) Rescue Team shall carry the injured to first Aid centre and then as per requirement can be referred to hospital for further treatment. Rescue Team further act as search team if any workmen has been missed during head counting at assembly point.

c) Site supervisor shall report about the incident to Site in charge, Safety and Administration for communication to Project Manager, HOD Safety & HOD Administration for necessary arrangement.

d) HOD Safety will investigate the incident /Accident in order to stop re-occurrence of the same incident/accident and submit the report to Project Manager for necessary action.

e) HOD Administration will make necessary arrangement for recovery of injured person and to deal with local administration issues.

f) Site In charge will restore the situation to normal for work.

10.2 Emergency Procedures in case of fire

a) Individual who is evident of fire should shout 'fire –fire ', call Rescue team and Site Supervisor will rush to fight fire. All other workmen shall rush to assembly point as per evacuation plan available at site for head counting, and head counting will be done by Administration representative with daily man power report.

b) Rescue team along with fire marshal shall fight fire and if fire is big, site supervisor shall call local fire department. Rescue Team further acts as search team if any workmen are missing during head counting at assembly point. Fire marshal shall be competent to extinguish fire and shall know type of fire and method or which type of fire extinguisher to be used.

c) Site supervisor shall report about the incident to Site in charge, Safety and Administration for communication to Project Manager, HOD Safety & HOD Administration for necessary arrangement.

d) HOD Safety will investigate the incident /Accident in order to stop re-occurrence of the same incident/accident and submit the report to Project Manager for necessary action.

e) HOD Administration will make necessary arrangement for recovery of injured person if any workmen have burnt injury and to deal with local administrative issues.

f) Site In charge shall restore the situation to normal for work.

10.2.1 General fire protection rules:

a) Maintain good housekeeping practices.
b) Ensure that all aisles, entrances and exits, and stairways are always kept free of obstruction.
c) Check emergency exits to ensure they are not blocked and that the exit signs are clearly visible.

10.2.2 Types of fire extinguishers:

12. Fire extinguishers, of the right kind and in the proper operating condition, are the first line of defence against a fire. Know the location of fire extinguishers and type of fire each is designed to extinguish. These types are:

CLASS "A" – Ordinary combustibles

CLASS "B" – Flammable liquids

CLASS "C" – Gaseous substances

CLASS "D" - Combustible metals

13. The details are explained in Table 2 below:

Table 2: Class of Fire and Suitable type of appliances

TYPE	CLASS OF FIRE	SUITABLE TYPE OF APPLIANCES
A	Fires in ordinary combustibles (wood, vegetable, fibers, rubber, plastics, paper and the like)	Gas expelled water type and anti-freeze type extinguishers and water buckets
B	Fires in flammable liquids, paints, grease solvents and the like.	Chemical extinguishers of carbon dioxide and dry powder types and sand buckets.
C	Fires in gaseous substances under pressure including liquefied gases.	Chemical extinguishers of carbon dioxide and dry powder types.
D	Fires in reactive chemicals, active metals and the like.	Special types of dry powder extinguishers and sand buckets.

10.2.3 Firefighting equipment maintenance

Responsibility

a) Mechanical In charge will be responsible for the maintenance of all fire extinguishers & equipment's.
b) Regular checking of fire equipment shall be done by the contracted party & record shall be kept.
c) All associates are advised to inform any observations on fire safety to his area manager or Manager HSE.

10.3 Action Plan for Construction Material/Chemical Spillage during transport

a) Drive carefully with bulk road tanker to a pre-identified open space.

b) Alert the people to be at a safe distance.

c) If the spillage is of flammable chemical (HSD, LDO) do not allow any spark producing activity in the vicinity of spillage.

d) Extinguish all naked flames in the vicinity.

e) If the spilled chemical is of toxic nature do not stand in down wind direction. Evacuate the people in down wind direction to crosswind and upwind direction.

f) If possible; without endangering life, try to put sand on spillage. This will help to disperse spillage in controlled way.

g) Stop all traffic on road coming in vulnerable zone of hazard.

h) If there are any burn/poison affected causalities, move them to the nearly hospital

10.4 Accidental Release Measures; Spills and Leaks

a) Contain spill, if possible.

b) Eliminate all possible causes of ignition to avoid fires and explosions – empty containers' residues and should not solder, drill grind or exposed to heat or flame;

c) Fire extinguishers must be in the vicinity;

d) Scrub contaminated area with detergent and water;

e) Prevent entry of spillage into drains and waterways.

f) Store the recovered product in the sealed air-tight containers/drums;

g) Supervisors should be informed of spill incidents at site;

h) Use inert fuel/oil absorbent (such as buckets of sand, sawdust) to cover and remove spilled material or contaminated soil collected for storage in a special drum for later disposal of the waste at dumpsite.

10.5 Action Plan for Engineering Emergencies/natural Calamities

a) Rush to emergency site on hearing the emergency alarm and/or message.

b) Set up the task forces with the available persons, consisting of firemen, Security guards. Task force should carry out following jobs:

i. Clear the approach road for fire tender and ambulance.

ii. Remove the injured person for medical treatment.

iii. Control the traffic around the emergency site.

iv. Arrange to rescue people, property and materials.

v. Ensure the availability of adequate water supply at incident site. Shut off electrical supply to the emergency site, if required in consultation with incident controller as per above emergency procedure.

10.6 Action Plan In Case of fall from Height / Serious Injury

a) Concerned person shall not be moved in case he has had a fall from height and is suspected to have injured his back.

b) First aid for any other injury sustained shall be provided at site.

c) The patient shall be gently lifted and placed on a stretcher so as not to disturb his back.

d) He shall be made comfortable by removing his shoes, loosening his clothes and given some water to drink.

e) Immediately a vehicle will be summoned and the stretcher gently lifted and placed inside the vehicle.

f) Simultaneously the Doctor with whom the site has made standing arrangements shall be contacted on telephone and informed about the condition of the patient and told to be ready to receive the patient.

g) Some responsible person shall accompany the patient to the Doctor. Remember too many people do not help and are rather a nuisance.

h) All others concerned shall then be informed by the fastest means.

i) Work shall be stopped; all personnel shall be collected and delivered a tool box talk highlighting the reasons for the accident, lapses that took place and corrective actions that need be taken. We have to learn from our mistakes and ensure that they are not repeated.

10.7 Action Plan during night and non- working hours

a) Never work alone in night and non–working hours and if required necessary communication system shall be made available and shall be communicated at regular interval for verification purpose.

b) Security shall be alert during this hour and if any emergency as noted above shall be communicated as per emergency response team to control the emergency situation and recover to normal situation as soon as possible.

10.8 Action Plan for Abnormal weather such as strong wind and hail stone

a) All temporary and permanent work shall be designed considering such weather factor.

b) During such weather it could result to catastrophe, mishap, calamity causing substantial loss of human suffering, or damage to or degradation to environment and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area. For such situation we will have disaster management team for implementing measures for evacuation, rescue and relief. Rehabilitation and re-construction and bring the site to normal condition.

10.9 Emergency Procedures for Earth quake

a) **React instantly:** Stay Calm! Think clearly and use common sense. Duck and cover!
b) **At Home**: Stay indoors. Crouch under a heavy table or desk and hang onto it. If there is no protective furniture; crouch and brace yourself against an inside doorway, inside corner, or wall.
c) **Office Building or In a Store:** Don't run for the exit; there may be a stampede. Stay on the same floor. Move away from windows. Crouch under a desk, bench, or table. Do not use the elevator. Expect the fire alarm and sprinkler to activate.
d) **On Foot:** Stay outside, in the open, away from trees, signs, utility poles and lines, and buildings. If you are near a building, duck into a doorway to avoid falling debris. Do not enter the building.
e) **In A Vehicle:** Quickly pull to the side of the road. Keep away from buildings, trees, bridges, signs, overpasses, and utility lines and poles. Stay in the vehicle until it stops shaking.
f) Check for injuries and treat the injured with first aid. Take steps to stop bleeding and call for medical assistance if there is an emergency. Don't attempt to move severely injured persons unless they are in immediate danger of further injury. Cover them with blankets.
g) Stay calm and use common sense.
h) Use the telephone only to report severe emergencies.
i) Put out fires. Don't use matches, lighters, candles, electrical switches or appliances in case there is a gas leak; use flashlights.
j) Check gas, water and electrical lines and check appliances for damage. If you smell gas or see a broken line, shut off the main valve.
k) Wear heavy shoes and gloves in areas near fallen debris and broken glass.
l) Do not touch downed power lines or broken appliances.
m) Clean up dangerous spills such as glass, bleach or medicines.
n) Turn on a battery-powered or car radio for instructions and information.
o) Check to see that sewage lines are intact before using toilet.
p) Check water and food supplies. If water is cut off, use emergency supplies found in toilet tanks and water heater.
q) Check the building for damage and cracks. Do not use the fireplace until it is inspected.
r) Check cabinets and closets. Open carefully and beware of falling objects.
s) Watch for falling objects when you enter or leave buildings. Do not enter severely damaged structures.
t) Do not use your vehicle, unless there is an emergency. Do not go sight-seeing to view damage. You may hamper the relief effort. Keep streets clear for passing emergency vehicles.
u) Render aid and assistance to your community as needed.
v) Be prepared for aftershocks. They can cause added damage. If near large body of water, evacuate to higher safe ground.

w) If evacuation is necessary, post a message of where you can be found in clear view. Have designated reunion points. Have a 72-hour survival kit ready to take with you that includes: medicines, first aid kit, flashlight, radio batteries, important papers, cash, food, water, sleeping bags, blankets, and extra clothes.

10.10 Emergency Procedures for Flood

14. Emergency Protection Against Lay Down/Camp from flood includes:

a) Lay down /Camp Planned at a level which is around 1metre above the highest flood level appeared in a century
b) Existing temporary bound built by Thromde/Local crushing unit shall be retained till end of august 2019 to act as first line of protection for site installation
c) Outfalls and Diaphragm wall around site installation area shall be completed before 2019 monsoon to lockup the entire area for second line of defence against flood.
d) A temporary measurement (gabion wall) will also be constructed along the starting northern point of construction at Outlet No. 8.
e) Area at higher elevation marked in the site shall be ready for emergency shelter with necessary food stock for 15 days
f) Two nos. of inflatable boats with engine shall be made available for Emergency evacuation
g) 50 nos. of life jacket and 10 nos. life buoys shall be made available
h) Regular communication with upstream flood monitoring team
i) Before monsoon period we are planning to build a temporary structural stair cases to climb the mountain during Emergency
j) Before Monsoon Week points along with temporary trench shall be identified and necessary strengthening shall be done
k) Outfalls rain water around and nearby area to be measured based upon that heightening the camp and lay down area before monsoon. Already identified required level and making the trenches and heightening the area
l) Required protection of camp and lay down area by diaphragm wall and boulders to be placed by nearby camp area and making trenches to avoid the water pressure to camp area
m) Flood Monitoring team is available and contact with nearby **DOYAGANG** hydro met station and getting rainfall data from the station and **DOROKHA** it is the place from around 30 kilometres from Phuentsholing so any contact numbers to be identified through client (CDCL/EGIS) and keep on communicating with the person regarding the rainfall from the area and water level in the river.

n) The site layout for the flood protect is outlines in figure 1

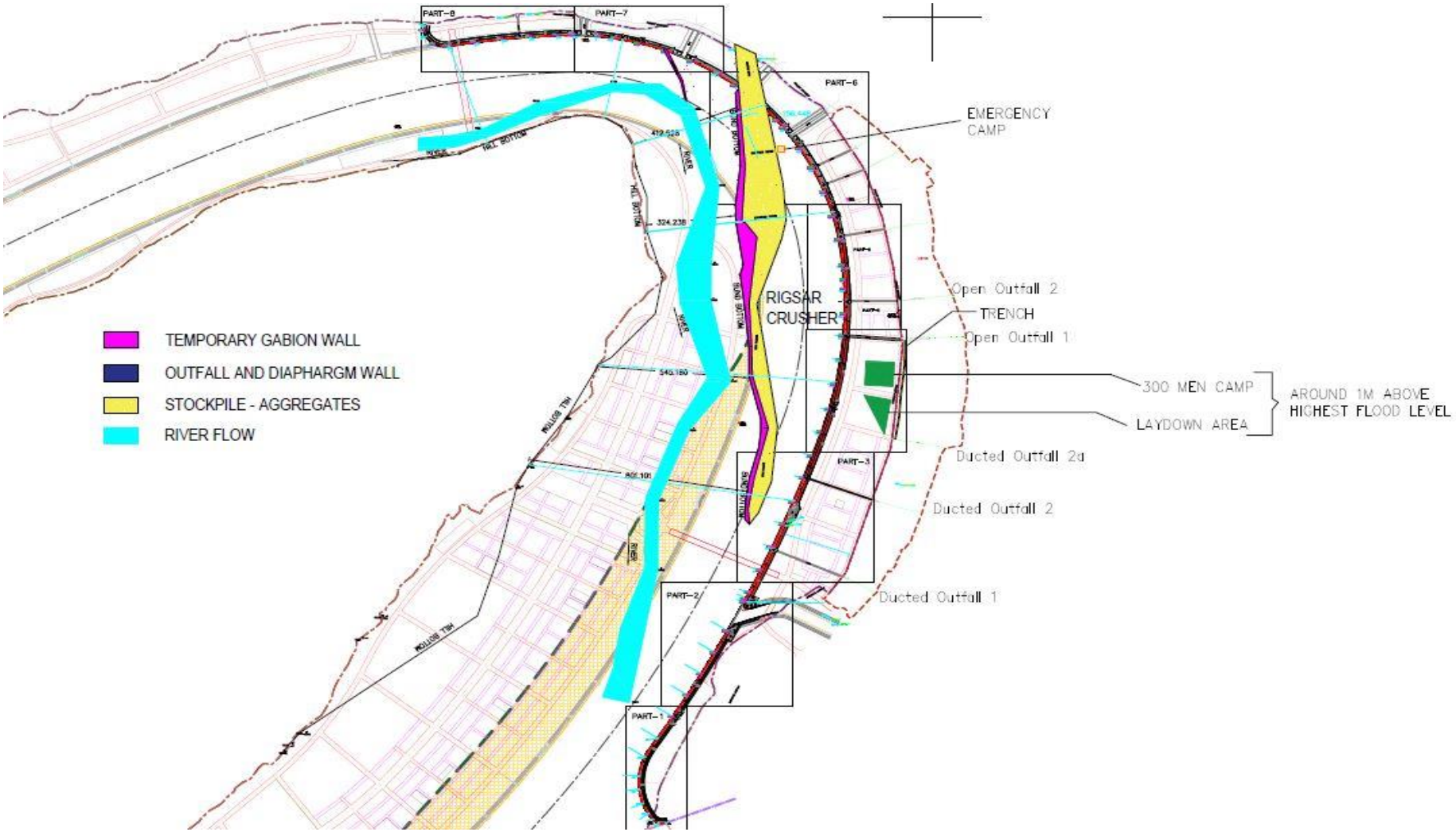


Figure 1: Site Layout Flood protection

Annexure 3: Emergency Response Plan

10.11 Emergency Procedures for Landslide

10.11.1 Before Landslide

15. Evacuation plan: If the site is in danger of being hit by a landslide consider opening of alternative access roads to avoid getting cut off from supplies and access to medical care. Access roads shall be such to allow emergency services to get to our community to provide aid and relief services in the shortest time possible.

16. Preparation of Grab Bag: In an emergency, there will be no time to pack. Escaping and staying out of harm's way is the utmost priority. Prepare in advance a Personal Grab Bag which includes:
    a) Non-perishable food
    b) Drinking water
    c) Identification documents
    d) Soap and other personal hygiene items
    e) A change of clothes
    f) Personal medication
    g) Cell phone and charger
    h) Torchlight (with extra batteries)
    i) Whistles to signal for help
    j) Wrench or pliers to turn off facilities

17. The landslide may break water pipes and bring down electricity lines in your area, so you may be without basic services for a while. Make sure that you are stocked up with foodstuff in case food relief does not get to you immediately.

18. **Familiarize our self with the land around you:** Watch out for changes in how rainwater flows onto slopes near our site, and especially the places where runoff water meets, increasing flow over soil covered slopes. Watch the all sides around our site for any signs of land movement, such as small landslides or debris flow, or progressively tilting trees. Noticing small changes will alert us to an increased threat of a landslide.

10.11.2 During Landslide

a. Contact local fire, police, or public works department.
b. Leave
c. Getting out of the path of a landslide or debris flow is our best protection. If it is at all possible, run across the path of the landslide, rather than away from it on its path. It is impossible to outrun a landslide.

10.11.3 After Landslide

a. Stay away from the disaster area. There may be danger of additional slides. Listen carefully for cracking sounds from trees or debris falling down the scar surface of the slope. Stay back from the slide area.

b. Check for injured and trapped persons and animals near the slide, without entering the slide area. Direct rescuers to their locations – the window of opportunity for survival are generally estimated at two hours.
c. Help people who require special assistance – elderly people, those without transportation, who may need additional help in an emergency situation, people with disabilities, and the people who care for them. Take them to a relief or operations centre where they can be cared for.
d. Listen to local stations on a portable, battery-powered radio or television for the latest emergency information.
e. Watch out for flooding, which may occur after a landslide or debris flow.
f. Floods sometimes follow landslides and debris flows.
g. Check our Site's foundation and surrounding land for damage.
h. Look out for and report broken utility lines to appropriate authorities. Reporting potential hazards will get the utilities turned off as quickly as possible, preventing further hazard and injury. Be especially careful of live electricity cables which may come into contact with water from flooded areas.
i. Listen for instructions from the emergency personnel or our Relief Centre representative on evacuation, food delivery, road access, and resumption of services.

10.12 Emergency Procedures in case of attacks from miscreants

a) Report the incidence to the security in-charge immediately
b) Remain calm and be patient.
c) Follow the advice of local emergency officials.
d) If the incidence occurs near you, check for injuries. Give first aid and get help for seriously injured people.
e) Shut off any other damaged utilities.
f) Confine or secure your pets.
g) Call your family contact—do not use the telephone again unless it is a life-threatening emergency.

10.13 Emergency Procedures in case of civil riots

a) Report to incident controller.
b) Stay at site office.
c) Lock the site gate.
d) Get information from phone or radio or from local authority.
e) Wait for returning to normal condition.

10.14 Emergency Procedures for Storm

a) When a thunderstorm or lightning threatens is seen. Stay indoors and don't venture outside unless absolutely necessary.

b) Stay away from open doors and windows, fireplaces, radiators, stoves, metal pipes, sinks and plug-in appliances.
c) Don't use plug-in electrical equipment such as hair dryers, electric blankets or electric razors during the storm.
d) Except for emergencies, don't use the telephone during the storm. Lightning may strike telephone lines outside.
e) If outside, with no time to reach a safe building or an automobile, follow these rules:

i. Do not stand underneath a natural lightning rod such as a tall, isolated tree in an open area.
ii. Avoid projecting yourself above the surrounding landscape, as you would do if you were standing on a hilltop, in an open field, on the beach, or fishing from a small boat.
iii. Get out of the water and off small boats.
iv. Get away from tractors and other metal farm equipment.
v. Stay away from wire fences, clotheslines, metal pipes, rails, exposed sheds or anything that is high that would conduct electricity. Some of these could carry electricity to you from some distance away.
vi. Don't use metal objects like fishing rods and golf clubs. Golfers' cleated shoes are particularly good lightning rods.
vii. Stay in your automobile if you are traveling. Automobiles offer excellent lightning protection.
viii. Get off and away from motorcycles, scooters, golf carts and bicycles.
ix. If no buildings are available, your best protection is a cave, ditch or canyon, or under head-high clumps of trees or shrubs.
x. If only isolated trees are nearby, your best protection is to crouch in the open, keeping twice as far away from isolated trees as the trees are high.
xi. When you feel the electrical charge - if your hair stands on end or your skin tingles - lightning may be about to strike. Drop to the ground immediately.

19. **First Aid:** Persons struck by lightning receive a severe electrical shock and may be burned, but they carry no electrical charge and may be handled safely.

20. A person "killed" by lightning can often be revived by prompt mouth-to-mouth resuscitation, cardiac massage, and prolonged artificial respiration.

21. In a group struck by lightning, the apparently dead should be treated first; those who show vital signs will probably recover spontaneously, although burns and other injuries may require treatment.

10.15 Emergency Procedures in case of Gas leakage

a) Check piping and appliances for damage.
b) Check for fires or fire hazards.
c) Do not use matches, lighters or other open flames.
d) Do not operate electrical switches, appliances or battery operated devices if natural gas leaks are suspected. This could create sparks that could ignite gas from broken lines.
e) If gas line breakage is suspected, shut off the gas at the meter. This should be done, however, only if there is a strong smell of cooking gas or if you hear gas escaping.
f) Wear heavy shoes in all areas near broken glass or debris. Keep your head and face protected from falling debris.
g) Turn on a battery operated radio (if no gas leaks are found) or car radio to receive disaster instructions.
h) Do not use your telephone except in extreme emergency situations.

10. 16 Emergency Procedures in case of collapse of building, Shed or Structure.

a) This is highly unlikely but still something that could unexpectedly happen without warning.
b) Leave as quickly as possible.
c) Stay calm.
d) Do NOT use the elevators. In the event that the power goes out you may become stuck.
e) If possible take your emergency kit and cell phone with you.
f) If you can't get out of the building, then hide under a stable piece of furniture, like a table or a desk.

22. If you get trapped by debris, here are some tips to stay alive:

a) Try not to move around too much. You might kick up too much dust, making it hard to breathe.
b) Cover your nose and mouth with a cloth to avoid breathing harmful dust and smoke.
c) To let rescuers, know where you are, tap on a pipe or wall. Or you can use a whistle. Avoid shouting since this could cause you to breathe in a dangerous amount of dust.
d) If you have a flashlight, use it to see and to let rescuers know where you are.

11. Hazard Analysis

23. **Emergency Risk Assessment**

Step -1 Identify potential Hazard in the workplace. Establishments or organization holding more than specified quantities of dangerous substances will have to notify their presence to the enforcing authority and plan emergency procedure for the same;

Step -2 Decide who may be harmed in the dangerous event in the workplace or while trying to escape from it, and note their location. Public, worker, Staff and assets of company?

Step -3 Evaluate the risk from the hazard and decide whether existing emergency evacuation are adequate or not to control the risk. Applying appropriate controls based on an assessment of the hazards, risks and possible consequences, the likelihood of a major accident can be minimized; and Mitigation with even with the best controls, major accidents will never be totally eliminated so the effects of any that do occur should be kept as small as possible. Emergency planning is one of the principal steps to achieve this. Conduct Emergency drill and record the actions.

Step-4 Record finding and communicate it among employees. Mock drill report with deficiencies noted to be circulated for information

Step-5 Keep the assessment under review and revise it when necessary. Review Mock drill report every month.

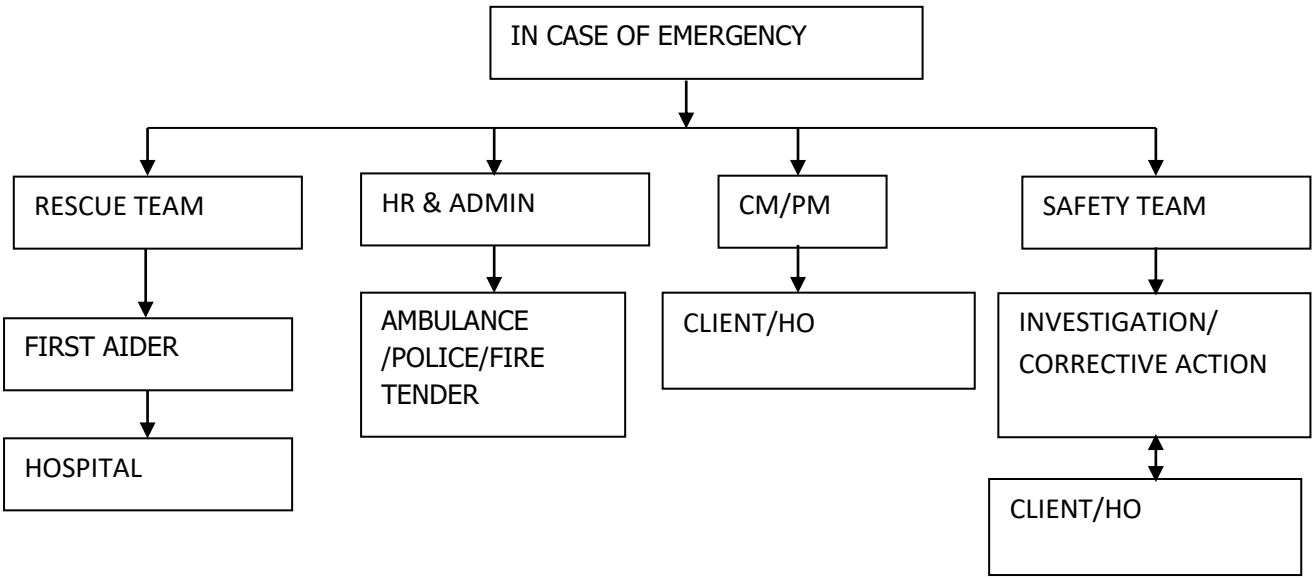
12. Assembly point

24. Assembly points during emergency have been identified and notified at the site (Figure 2). Safe emergency assembly point board displayed at above 2 meter height at designated safe assembly point and signage's at conspicuous level for directing the workmen and visitors to the safe assembly point easily at the time emergency evacuation made. Access of assembly point must be cleared at all times.

25. Assembly point-Office Area (APA-1 to APA-3) & Assembly point-Camp Area (APA-4 to APA-6) is identified in Figure 2.

13. Reporting System

26. Reporting system for incidences is attached and emergency contact numbers are displayed at the site.



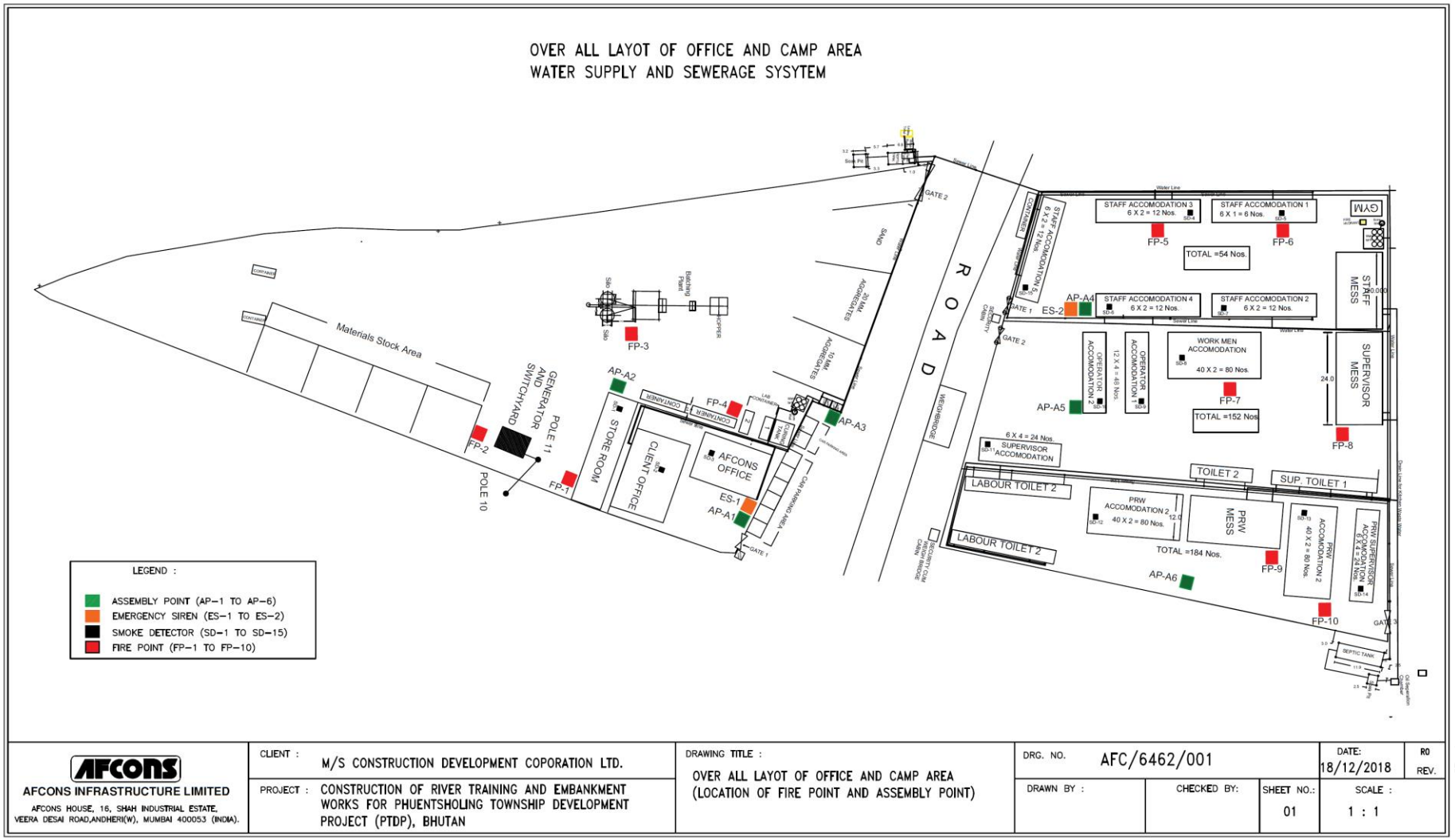


Figure 2: Site Layout assembly point, Emergency Sirens, Smoke Detectors and fire points

Annexure 4: Traffic Management Plan

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1. Contractor's Traffic Management Plan

1. The infrastructure development in Bhutan takes place with a balanced and environmentally sustainable development in its projects.
2. As such, Bhutan is located entirely within the Himalayan mountain range, and increasingly experiencing water induced disasters such as floods and flash floods. Such disasters occurred from Amochhu river have encroached the scarce agricultural land and unsafe terrain including steep hillsides and floodplains of Phuentsholing city.
3. In the process of prioritizing economic and infrastructure development, the Eleventh Five year plan identified Phuentsholing as a Regional growth centre that can be safely expanded through construction of flood protection works and planned Urbanization.
4. The Asia Development Bank after conducting due diligence on Technical, Financial, Environmental safeguards and other aspects had approved loan and grant for the project to be implemented by CDCL.
5. Subsequent to the funding to the project, AFCONS has entered into an Agreement with CDCL for the execution of certain Sections of the Works mentioned therein.
6. For performing those works in detail, under the Specific Provisions of the 'Particular Conditions of Contract', a Contractor's Construction Environmental Management Plan shall be prepared and submitted for approval and hence this document is established

2. Scope of the Document

7. The scope of this document is defined by the following reference documents:
   a) Contract Document Sub-clause 4.18 of Contract Conditions
   b) CLAUSE 6.7: HEALTH AND SAFETY
   c) Terms and Conditions mentioned in the approvals granted by statutory authorities as applicable for this Project.
   d) Standing Instructions of the Engineer as per the provisions of the Contract Document, if any during the works
   e) Standards and Codes of Practices as applicable for certain activities.
   f) RGoB standards stipulated by Environmental department (such as NEC) and HEALTH AND SAFETY
   g) Road Safety And Transport Regulations (1999)

3. Terms & Definitions

A. Transport – It refer to all vehicles, plants or equipment used to transport personnel or Materials.

B. Roads – it refers to all routes used by transport, whether they are blacktop or gravels.

C. Light Vehicles – it refers to vehicles with maximum loaded weight up to 3500 kg.

E. Medium Vehicles – It refers to the vehicles with maximum loaded weight over 3500 kg and up to 7500 kg.

F. Heavy good vehicles – It refers to the vehicles with maximum loaded weight over 7500 kg or articulated vehicles consisting of prime mover and tailor or prime mover alone.

G. Traffic control supervisor – A person nominated by the contractor to approve journey arrangements and carry out the activities.

H. Onsite Traffic Management Plan – It aims to highlight the need to reduce the level of risk by prevention of unnecessary journeys, provision of training and adequate maintenance routine.

I. Working Zone – The Excavation, Chamber opening etc. at which workmen is working.

J. Working Space- The space around the work area that will need to store tools, excavated materials, equipment and plant. It is also the space to allow workers, movement and operation of plant (e.g. Swing of jibs, excavator arms) to move around to do the job. Material and equipment must not be stored in the working zone either. Workers will only need to enter the zone to maintain cones and other road signs.

K. Safety zone – The zone that is provided to protect workers from the traffic and to protect from them.

L. Approach Transition Zone-This will vary with the speed limit and the width of the works.

M. Longitudinal buffer zone – This is the length between the end of the lead –in taper of cones and the working space. It will vary with the speed limit.

N. Lateral buffer zone – This is the width between the working space and moving traffic. It will vary with the speed. The lateral buffer zone safety clearance is measured from the outside edge of the working space to the bottom of conical sections of the cones on the side nearest to the traffic.

O. Construction Zone- Construction Zones are an integral part of any road construction system. The safety practices in construction will, therefore, be oriented towards reducing unsafe conditions, which lead to hazards and consequent stress whereby risk of accident increases. Safety measures will be aimed at avoiding hazardous conditions especially in work sub zones where major construction activities are going on.

P. Signage's- The construction and maintenance of signage's fall into the three major categories such as regulatory, mandatory and Informatory signage's Some other signboards will also be used to regulate the traffic, which have not been standardized. However they confirm with the general requirement of shape and color, and their message is brief, legible and clearly understandable, i.e.

"**CAUTION- Men at work and Machinery at work Go slow"**,

"**CAUTION- Work in Progress Go Slow"** etc.

8. The location, frequency and type of signboards will be governed by the kind of traffic situations arising during the construction. Signboards of 'men at work' and 'speed limit' will be provided at locations wherever required on a case-to-case basis**.**

4. Legal & Other Requirements

Road Safety and Transport Regulations (1999)

5. Purpose

9. The Purpose of this plan is to outline the requirements for road and transport during the construction In PHUENTSHOLING TOWNSHIP DEVELOPMENT PROJECT and it applies to all operation-utilizing roads or off road transportation, applicable to all contractor and subcontractors in this project.

10. However, the overall traffic management plan is also designed and intended to specify adequate safety measures against identified hazards and to stipulate implementation of safe traffic movement during construction as per contractual requirement.

11. The objective is to provide safe travel to the drivers of vehicles plying near to the project at all times and provide protection to the project workers when they are at work. The overall onsite traffic management plan delineates the safety standards in terms of Construction zones, Signage's and Safety measures in work zones and during normal operations. The onsite traffic management plan has been broadly dealt with-

    a) Traffic Management in Construction Zone.
    b) Safety in different activities while working on roads.

6. Terminology and Concepts

12. The purpose and function of components of a traffic management plan and their relationship to a traffic management strategy are explained.

6.1 Fundamental Definitions.

6.1.1 Proponent.

13. The party directly constructing or maintaining works on Highways, Arterial Roads, Sub arterial roads, collector roads is responsible for obtaining authorization from the Thromde and Phuentsholing City Traffic police to work on the roadway, if the project area belongs to our client there is no need of permission to any traffic police and developing an acceptable traffic management plan, and for implementing the plan in accordance with statutory requirements. AFCONS Infrastructure Limited is the Proponent for the Traffic management in this project under the guidance of CDCL and EGIS.

6.1.2 Traffic Control Supervisor

14. Traffic Control supervisor is an individual tasked allocated by the contractor approved by the employer with the responsibility for preparing, implementing and managing the Traffic Management Plan

a) Responsible for implementing all the necessary Traffic Management Safety measures on site.
b) Direct the implementation of the Traffic Control Plan.
c) Ensure that the Traffic Management Plan is up to date.
d) Oversee modifications to the Traffic Management Plan required by construction schedule changes.
e) Supervising and Training the Traffic marshals.
f) Designing site basis Traffic Diversion Plan as per standards.
g) Developing, regularly reviewing and, as appropriate, revising the project traffic management plan to ensure that it continues to meet the specific requirements of the project.
h) Establishing a monitoring regime to ensure that unsafe systems, places are identified and remedied at the earliest.
i) Attend regular meetings with the concern traffic department discuss performance, issues and plans with the concern with the client

6.1.3 Traffic Marshal

15. Persons who under the traffic control supervisor to execute and maintain the existing traffic management plan station wise.

15.1.4 Onsite Traffic Management Strategy

16. Onsite Traffic Management Strategy (OTMS) is defined as follows:
17. Onsite Traffic Management Strategy defines the statutory requirements for traffic management for a project. Onsite Traffic Management Strategy identifies requirements the Onsite Traffic Management Plan made up of the following sub plans: Traffic Control Plan, Public Information Plan, Incident Plan and Implementation Plan. A strategy is developed to ensure that project needs are identified and that plans developed that address those needs over the project life cycle.

6.1.5 Onsite Traffic Management Plan (OTMP)

18. Onsite Traffic management plan is an integral part in the delivery of traffic management and traffic control services.
19. Onsite Traffic Management Plan (OTMP) is defined as follows:
20. Onsite Traffic Management Plan details specific plan to implement the project's Traffic Management Strategy. Onsite Traffic Management Plan is comprised of sub-plans required by the strategy. Onsite Traffic Management Plan integrates these plans into a single document that demonstrates an understanding of site-specific issues and project requirements. A Traffic Management Plan shall make provision for updates and revisions throughout the project life cycle to address issues as they occur.

6.1.6 Authorization

21. This refers to the authorization given by CDCL, Phuentsholing Traffic Police, and Corporation of the city to proponents to work on a CDCL Project area, Traffic and city roads respectively where there may be impact to existing traffic. Normally there are conditions associated with such authorization, such as a requirement that the proponent must undertake traffic control in accordance with the Traffic Highway Manual, Road Safety and Transport Regulations (1999) and other statutory for Work on Roadways.

6.1.7 Approval

22. This refers to the approval of specific plans, drawings, layouts, etc. but the process will vary somewhat for different plans:

6.1.8 Responsibility

Driver

a) Take the responsibility of the vehicle, the load and passenger being carried out.

b) Daily checks log and reporting of defects.

c) Understand travel plan.

d) Ensure that all personnel in the vehicle are wearing seat belts if provision is there.

e) Keep safe distance between its vehicle and the vehicle in front of him. Safe distance shall be increase while driving in wet condition.

f) Notify traffic control supervisor before leaving site and after arriving to site.

Driving Requirement

23. The following guidelines apply to the qualification and requirement for driving on projects

a) Professional drivers shall undergo a medical examination and be certified fit before taking up a driver's job.

b) Hours of working, maximum work directions and minimum rest intervals.

24. Vehicles shall be registered as per local law and have construction standard. Vehicle owners shall keep all inspection /maintenance records.

Vehicle Registration Requirement

25. All vehicles movement shall be recorded in a register stating the vehicle type, registration number, and driver's name, number of passengers, Route details and planned stops.

Transportation

26. All vehicles convoy movement / major loads etc. shall be coordinated with Safety Representatives.

Driver Induction Training

27. All drivers must attend an induction course before being allowed to operate or drive.

Accident

28. In case of an accident the driver shall immediately

a) Inform the police for the accident and obtain survey report.

b) Inform Traffic control supervisor

c) Assist the police in enquiry.

28. In case of Accident driver shall not:

a) Move the vehicle from the scene of the accident until the police orders.

b) Leave the place of accident

Condition of vehicle

29. The driver is responsible for inspecting a vehicle before operating it as per checklist attached.

7. OTMP Preparation

7.1 Concerns of Local Community and Client, other contractor Limiting Traffic Movements

30. Proponent project concern for the local community of the working areas and the surrounding areas will be any disturbances caused by traffic. Therefore, we have developed our construction design and methodology to:

a) Minimize generation of traffic.
b) Safely manage pedestrians.
c) Endeavour to ensure that materials delivered by road travel as short a distance as possible.
d) Maintain access for site offices and stores.
e) Coordination with the Phuentsholing Chamkuna Road(PCR) regarding traffic control and if any diversion communication in regular intervals
f) Outside materials Vehicles timings to be maintained from 2pm to 5pm to avoid heavy traffic in peak time
g) If required major good vehicles called for late night and delivery in early morning avoid heavy traffic in peak time

7.1.1 Design

31. Throughout Phuentsholing Township Development Project of Proponent, Traffic Management has been an integral part of the proposed solution. Measures include:

a) Use of concrete for civil construction by transit mixtures.
b) Removal and Disposing of excavated soil from site.
c) Material transporting vehicles.
d) Visitor's vehicles.

7.1.2 Construction

32. The philosophy of minimizing road use as far as reasonably practicable has continued through the construction planning and the development of the OTMP. All planning and procurement relating to large items of plant and their usage has been based around keeping these items on site for the duration of an activity, rather than the normal practice of plant coming and going from site to keep hire rates/standing time to a minimum, this will be a greater cost to the project.

33. All abnormal (low loaders) movements will be planned in advance and, will be done in accordance with an appropriate risk assessment. Where such vehicles are brought onto site, a banks man will be utilized at all times.

34. A record of all materials and method of transportation will be kept, monitored, and made available for the Client at all times.

35. All the above measures for bringing vehicles on to site will be adhered to when vehicles are leaving the premises.

7.2 Control Measures

7.2.1 Access Control

36. The principal means of reducing traffic hazards on site is by effectively eliminating the presence of unnecessary vehicles. Vehicles may only access the site through specific gates/entry, and only then if the driver is in possession of an appropriate license. The issue of vehicle passes will be subject to continuing scrutiny.

7.2.2 Site Speed Limit

37. A speed limit of 10 KMPH has been established across the site. It is clearly indicated at entrances, and is further informed in the induction training to all the interested parties. Reversing of vehicles permitted with reverse alarm/horn or banks man to be deployed for reversing. Reversing of vehicles only at designated areas only where sign of reversing vehicle placed.

7.2.3 Interfaces between On-Site and Off-Site Road Movement

38. When necessary to minimize the spread of material from the area of the excavation. In addition, the site roads will be regularly cleaned. These steps will ensure that material will not be transferred to the public highway. Dust suppression measures will be implemented which will prevent the generation of fugitive dust.

7.2.4 Interfaces with Public

39. Pedestrian barriers will be erected at the site access to control the interface between public and site construction activities.

40. A crossing point for pedestrians over the site access will be established and clearly demarked and signed.

7.2.5 Visitors to Site

41. A security cabin and security personnel will be positioned at the site entrance. Access to the construction site is controlled and manned by a trained security guard at the site entrance. Visitors to site must sign in and out at security. The security guard will issue a copy of the visitor induction form to all visitors. All visitors must be accompanied at all times while on site.

7.2.6 Trespassing onto Site and project Area

42. It will be the duty and responsibility of site security to prevent unauthorized entry onto the site. The treatment works site will be completely monitoring and controlled trespassing by regular monitoring by securities and any trespasser found any activities like car washing initially verbal instruction provided and send them out. the relevant sign boards displayed around the project area

7.2.7 Parking on Site.

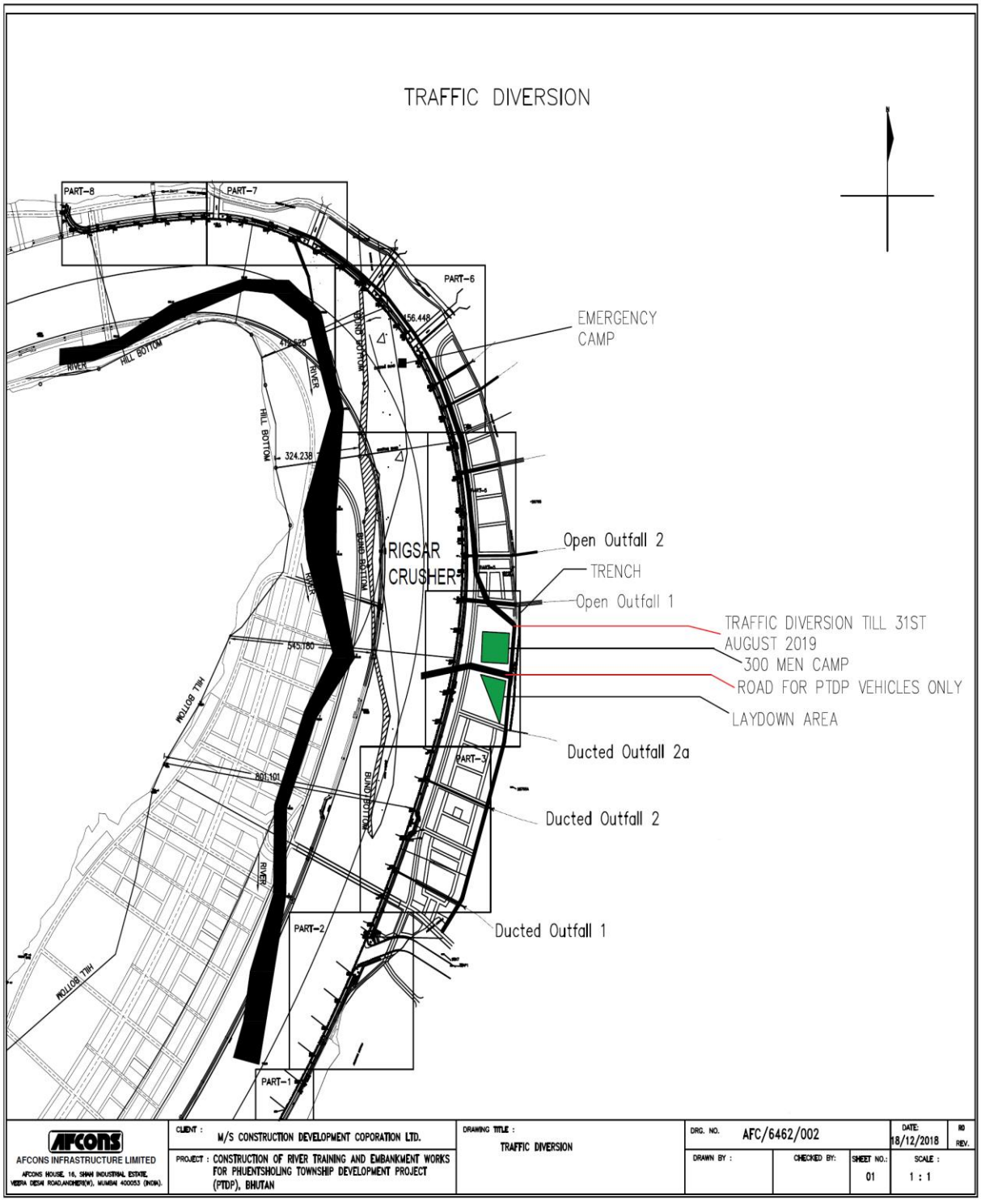
43. Proponent has designated parking & office area for the use of its employees, including subcontractors during construction phase. The traffic control supervisor will monitor the parking of all vehicles associated with the site works and he will apply the proponent disciplinary code as outlined in the OHS&E plan for breeches of the proponent site rules in relation to parking in prohibited area.
44. Depending on the stage the project and the number of employees on site, other options such as car, two wheeler, earth moving equipment and alternative parking will be utilized if parking becomes a problem.
45. Cones and/ or barriers to be used where necessary to prevent parking adjacent to the construction site and along the access roads towards the site. If required cones / barriers will be used to assist in the free flow of traffic on the surrounding road network to enhance traffic and pedestrian safety at all times.
46. On site Traffic management plan layout are shown in the Annexure A

8. Review

47. This plan will be reviewed every six month depending upon hazardous condition of the project.

9. Appendix -1

FIGURE1: PROPOSED SITE LAYOUT TRAFFIC DIVERSION



Annexure 4: Traffic Management Plan

FIGURE2: PROPOSED TRAFFIC SIGN BOARDS

Annexure 5: Occupational Health and Safety Management Plan

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1. INTRODUCTION

1. The infrastructure development in Bhutan takes place with a balanced and environmentally sustainable development in its projects.

2. As Bhutan is located entirely within the Himalayan mountain range, it is increasingly experiencing water induced disasters such as floods and flash floods. Such disasters occurring from time to time along the Amochhu River have encroached the scarce agricultural land and unsafe terrain including steep hillsides and floodplains of Phuentsholing city.

3. In the process of prioritizing economic and infrastructure development, the Eleventh Five year plan identified Phuentsholing as a Regional growth centre that can be safely expanded through construction of flood protection works and planned Urbanization along the Amochhu river bed.

4. The Asian Development Bank after conducting due diligence on Technical, Financial, Environmental safeguards and other aspects had approved loan and grant for the Phuentsholing Township Development Project (PTDP) (Figure 1) to be implemented by CDCL.

5. Subsequent to the funding of the project, AFCONS has entered into an Agreement with CDCL for the execution of certain Sections of the Works mentioned therein.

6. For performing those works in detail, under the Specific Provisions of the 'Particular Conditions of Contract', a Contractor's Occupational Health and Safety Management Plan shall be prepared and submitted for approval and hence this document is established.

2. SCOPE OF THIS DOCUMENT

7. The scope of this document is defined by the following reference documents:

a) Contract Document Sub-clause 4.18 of Contract Conditions

b) CLAUSE 6.7: HEALTH AND SAFETY

c) Terms and Conditions mentioned in the approvals granted by statutory authorities as applicable for this Project.

d) Standing Instructions of the Engineer as per the provisions of the Contract Document, if any during the works

e) Standards and Codes of Practices as applicable for certain activities.

f) RGoB standards stipulated by Environmental Ministry of Labor and Human Resource

3. BRIEF SCOPE OF WORK

8. The HSE Plan has been prepared for Project: "**PHUENTSHOLING TOWNSHIP DEVELOPMENT PROJECT, BHUTAN."** This HSE Plan is a guideline for all employees of AFCONS INFRASTRUCTURE LTD as well as its subcontractors for ensuring minimum risk to environment, property and human beings working on site or at the interfaces where construction activity is in progress. This HSE Plan will enable the control of Environment, Health & Safety risks and help in the continual improvement of its HSE performance. AFCONS will strive towards achieving a good safety culture throughout the Project to promote Safety as a "***SHARED RESPONSIBILITY"*** among all levels in the organization and with sub-contractors. This plan shall be revised as necessary in parallel to the progress and development of the project.

9. In addition to this HSE plan **AFCONS INFRASTRUCTURE LTD,** shall comply with all requirements stated in contract requirements-as well as the bound legal and other requirements.

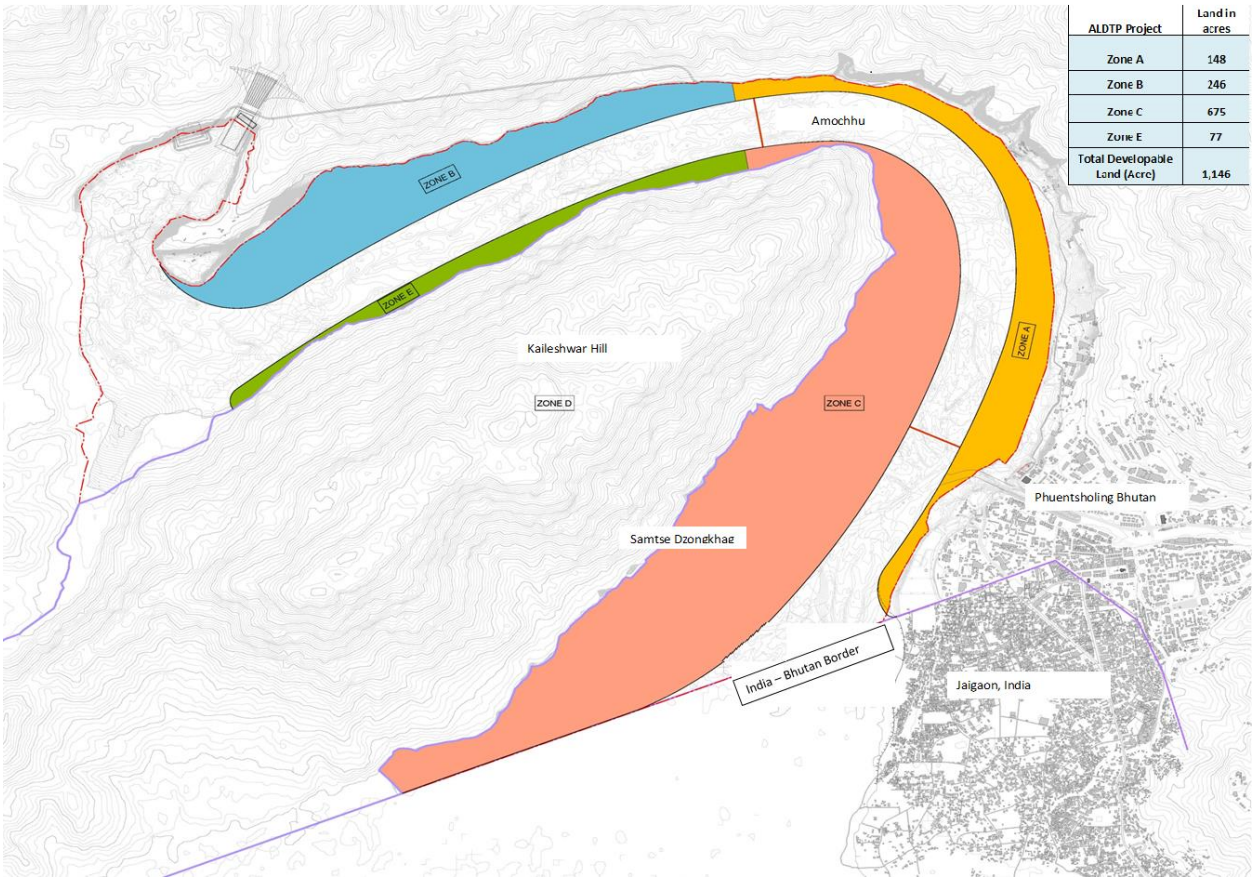

Figure 1: Project Zoning

10. The scope of works are as follows:

1. Riverbank protection length : 3,974m
2. River Training Works
    a) Diaphragm wall
    b) Cast in situ wall
    c) Anchor slab
    d) Dead man anchor
3. Embankment Works
    i. Embankment
    ii. Retaining wall
    iii. Special filling behind retaining wall
    iv. Ducted outfalls
    v. Open outfalls
    vi. Access
    vii. Hill slope stability
4. General Earth Filling Works
    i. Earth filling
5. Promenade Finishing
    i. Lower Level Walkway
    ii. Upper Level Walkway
6. Irrigation and Landscape Works
    i. Irrigation works
    ii. Landscape works
    iii. Vetiver works on sloped embankments
    iv. Tree plantation on lower walkway
    v. Tree plantation on upper walkway
7. Miscellaneous works
    i. Site Access
    ii. Logistics (Traffic Management)
    iii. Mobilization of equipment (Equipment delivery and assembly)
    iv. Mobilization of construction materials
    v. Work areas establishment with facilities
    vi. Storage of site materials (Material storage)
    vii. Accommodation including fencing, security and food facilities
    viii. Staff welfare activities
    ix. Documentation, meetings
    x. Vendor management
    xi. Safety, Health & hygiene provisions
    xii. Future interface work

4. REFERENCES

11. In making this plan, assistance has been taken from

a) ISO 14001:2015 Environmental Management System

b) OHSAS 18001:2007 Occupational Health & Safety Management Systems Specification / ISO 45001:2018 OHS Management System

c) CLIENT Conditions of Contract Document on Health, Safety & Environment

d) Environment Impact Assessment Report, CDCL, Bhutan

e) Regulation on Occupational Health and Safety (OHS) for Construction Industry (2012)

5. TERMS AND DEFINITIONS

12. **Project Name: "PHUENTSHOLING TOWNSHIP DEVELOPMENT PROJECT"**

13. **Executing Agency: Asian Development Bank (ADB) & Druk Holding And Investments Ltd. (DHI)**

14. **Implementing Agency (PMU & PIU): Construction Development Corporation Ltd. (CDCL)**

15. **Project Implementing Consultant (PIC): EGIS International**

16. **Contractor Name: AFCONS Infrastructure Ltd**

17. Subcontractor: Any individual or company which is engaged by AFCONS Infrastructure Ltd to perform work at the site or to provide labour, equipment, facilities or material, to be used at the site.

18. Vendors Acts & Regulation: Any acts and regulation of Bhutan together with the relevant amendments and revision thereof that the AFCONS Infrastructure Ltd and its subcontractors are required to comply with during the contract period.

19. Environment – Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interaction

20. Environment aspect – Element of an organization's activities or products or services that can interact with the environment

21. Environment Impact – Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects

22. Hazard – Source, situation, or act with a potential for harm in terms of human Injury or ill health, or a combination of these.

23. Ill Health – Identifiable, adverse physical or mental condition arising from and/or made worse by a work activity and / or work-related situation

24. Incident – Work related event (s) in which an injury or ill health (regardless of severity) or fatality occurred, or could have occurred. An accident is an incident which has given rise to injury, ill health or fatality. An incident where no injury, ill health or fatality occurs may also be referred to as a "near-miss" , "near-hit:, "close call or "dangerous occurrence" An emergency situation is a particular type of incident

25. Audit – Systematic examination to determine whether activities and related results conform to planned arrangements are implemented effectively and are suitable for achieving the organization policy and objectives.

26. Interested Parties – Individual or group concerned with or affected by the HSE performance of an organization.

27. Non-Conformity – Any deviation from work standards, practices, procedures, regulations, management system performance, etc. that could either directly or indirectly lead to injury or illness, property damage, damage to workplace environment, or a combination of these.

28. Objectives – Goals in terms of HSE performance that an organization sets itself to Achieve.

29. Occupational Health & Safety – Conditions and factors that affect the well-being of employees, temporary workers, contractor personnel, visitors and any other person in the workplace.

30. HSE Management System – Parts of overall management system that facilitates the management of the HSE risk associated with the business of the organization. This includes the organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the organization's HSE Policy.

31. Organization – Company, operation, firm enterprise, institution or association, or part thereof, whether incorporated or not, public, that has its own functions and Administration.

32. Performance – Measurable results of the HSE management system, related to the organizations control of environment, health & safety risk, based on its HSE policy and Objectives.

33. Risk – combination of the likelihood and consequences of a specialized hazardous event occurring.

34. Risk assessment – overall process of establishing the magnitude of risk and deciding whether or not the risk is tolerable.

35. Safety – freedom from unacceptable risk of harm.

36. acceptable risk – risk that has been reduced to a level that can be tolerated by the organization having regard to its legal obligations and its own HSE policy

37. Deviation or non-conformity – is defined as something not in compliance with quality standard, specification or measuring requirements, or as deviations from specified procedures or way of working within production, environment, working environment (safety) or security.

38. Corrective action – action taken to eliminate the causes of an existing non-conformity, defect or other undesirable situation.

39. Preventive action – Action taken to eliminate the causes of a potential non-conformity, defect or other undesirable situation in order to prevent occurrence or Recurrence.

6. HSE POLICY

40. **CDCL Occupational Health and Safety Policy Statement declaration**

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Construction Development Corporation Limited

Head Office

Thimphu: Bhutan

OCCUPATIONAL HEALTH AND SAFETY POLICY STATEMENT

DECLARATION

The management of Construction Development Corporation Limited (CDCL) is firmly committed to a policy enabling all work activities to be carried out safely and with all possible measures taken to remove or at least reduce risks to the health, safety and welfare of workers, contractors, visitors and anyone who may be affected by our operations.

We are committed to fully comply with the Labour and Employment Act of Bhutan 2007, and relevant occupational Health and Safety Legislations.

The management will:

1. **Provide and maintain safe working environment through recognizing, assessing, controlling and evaluating hazards at workplace periodically;**
2. **Provide and maintain plant at toxic substances in safe condition;**
3. **Implement emergency management plans/procedures;**
4. **Provide and maintain facilities for welfare of workers;**
5. **Provide information, instruction, trainings and supervision that is reasonably necessary to ensure that each worker is safe from injury and risk to health;**
6. **Assign clear roles and responsibilities at different levels in terms of health and safety at work;**
7. **Provide adequate budget for occupational safety and health programs including return to work program;**
8. **Integrate health and safety in all decisions including those dealing with purchase of plants, equipment, machinery, material and selection and placement of personnel;**
9. **Provide a commitment to continually improve our performance through periodically reviewing policy, regular monitoring and effective management.**

We ensure that each worker of the Company shall:

1. **Comply with any direction given by management for health and safety;**
2. **Comply with safe work practices with the intent of avoiding harm/injury to himself or herself and others and damage to plant and equipment;**
3. **Take reasonable care of the health and safety of himself or herself and others;**
4. **Wear and maintain personal protective equipment and clothing wherever necessary;**
5. **Not misuse of unnecessarily interfere with anything provided for health and safety;**
6. **Report accidents and incidents no matter how minor, occurring on the job immediately;**
7. **Report all known or observed hazards to their supervisor or manager.**

We ensure that all contractors, sub-contractors, transporters other agencies entering the premises of the enterprise and visitors shall adhere to the health and safety rules of the company.

(Phuntsho Gyeltshen)
Chief Executive Officer

Endorsed on 30th April 2018

Registered Office: Jangsam Lam, Changangkha, Thimphu 11001, Bhutan
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Figure 2: CDCL OHS statement

41. AFCONS has **corporate OHSE policy** which is applicable to all its project sites and offices.

AFCONS

OCCUPATIONAL HEALTH, SAFETY & ENVIRONMENTAL POLICY

AFCONS is a largescale infrastructure business entity engaged in the construction of Jetty works, Bridges, Roads, Heavy Civil Engineering Structures, Viaducts, Underground Metro and Foundation Engineering works in concrete and steel in India & Overseas and Engineering, Procurement, Construction, Installation and Commissioning of Oil & Gas Platforms & Subsea Pipeline works.

At AFCONS, we are devoted to achieve excellence in Infrastructure business complying with Health, Safety and Environmental Standards. Good HSE performance is critical to the success of our business.

We are committed to;

- Identify and comply with Occupational Health, Safety and Environmental related laws, rules and regulations and agreements.
- Clearly define responsibilities for achieving HSE objectives & to ensure adequate resources are provided for imparting training and motivation.
- Identify hazards; perform an OH, S & E risk assessment for all site activities to reduce risk to acceptable limits to achieve ZERO accidents.
- Report, investigate, document & take corrective action to prevent re-occurrence of workplace accidents/incidents.
- Follow a systematic approach in pollution prevention, waste management and conservation of natural resources by their responsible and efficient use in all our operations.
- Have updated Emergency Response Plan to attend to all types of emergencies and disasters offsite & on site.
- Innovate, design and develop inputs using latest national and international best practices to achieve continual improvement in HSE performance & management.
- Review this policy periodically for its continuing suitability and make it available to all the employees and interested parties.

Place: Mumbai

Date: 07/05/2018

S. Paramasivan

Managing Director

Figure 3: AFCONS OHSE Policy

42. A **site HSE Policy** is developed for individual construction sites, focusing mainly on the type of construction activities related to the site.

AFCONS Shapoorji Pallonji	**Project: Construction of River Training and Embankment Works for PTDP, Phuentsholing, Bhutan**	**Rev:0**

SITE HSE POLICY

We at **6462– Construction of River Training and Embankment Works Project, Bhutan** strive to continually improve the effectiveness of the Occupational Health Safety and Environment Management System by:

1. Adopting and implementing Environmentally responsible and safe working practices, Methods and Standards.
2. Providing Policies to ensure a Safe & Healthful workplace, Preventing work related injury and ill health
3. Identifying hazards to perform risk assessment for all site activities to reduce risk to acceptable limits to achieve zero incidents.
4. Ensuring all employees are made aware of the hazards in their work areas and are trained to carry out Their duties in a safe manner by providing adequate resources and motivation.
5. complying legal and applicable other requirements.
6. Protecting the Environment, Prevention of Pollution, conserving energy and natural resources and institutionalizing an effective and efficient waste Management System.
7. Promoting Awareness amongst employees, sub-contractors, customers and any other interested Parties for enhancing the well-being of personnel and the environment.
8. Involving the workmen and staff to present their ideas for improvement of safety at site
9. Ensuring firm Commitment to Consultation and participation of workers or their representatives in occupational health safety and environmental matters.
10. Reviewing this policy periodically for it's continuing suitability and make it available to all the employees and interested parties.
11. Prevention of occupational injury ill health and Environment Pollution is our paramount intention

Date: 15-12-2018

Place: Bhutan

Project Manager

Figure 4: Site HSE Policy

7. HSE OBJECTIVES.

43. AFCONS maintains procedures to establish detailed HSE objectives and performance criteria. We have identified five principle objectives. Our long term objectives shall be supported with half yearly, short and medium term objectives set during the HSE Committee meetings, to enable structured advancement in overall performance. Our Short and medium term objectives aim to facilitate effective monitoring and measurement practices to identify where a directional change may be necessary, Our Long term objectives are:

a) To eliminate or minimize any unwanted impacts of hazards and risks to the workforce, members of the public, stake holders & the environment, who may be exposed to the undertakings associated with the Phuentsholing Township Development Project.

b) Establish and maintain an effective, robust HSE Management system.

c) Actively contribute to our employees and Sub-contractors' development through support, encouragement and transfer of knowledge and skills.

d) To simplify the risk, to ensure a sensible approach to risk management and provide hazard awareness training during the entire stages of the project

e) Conduct Mock drill periodically for awareness during emergency situation.

44. To achieve the objectives a program(s) shall be established. The program shall consider the resources required (financial, human, infrastructure) and the tasks to be performed. Depending on the complexity of a particular objective, AFCONS shall assign responsibility, authority, and completion dates for individual tasks to ensure that the HSE objective can be monitored and measured through its accomplishment. The Objectives shall be in consistent with the site HSE Policy and applicable requirements. The results of assessment of risks and opportunities and the results of consultation with workers shall be taken into account while establishing the objectives. The HSE objectives and program (s) shall be communicated via training and/or group briefing sessions to relevant personnel.

45. **Target: ZERO**

a) Complete the project with "ZERO" Lost Time Accident.
b) Provide safe working practices for carrying out normal operation of the work site.
c) Provide for the identification of aspects & hazards and establish safeguards against Significant aspects and hazards
d) Provide for response to Emergency situations.
e) Strive to continuously improve HSE management skills.
f) Create awareness that environment, health and safety is an integral part of work and that production and safety are inseparable.
g) Provide thorough investigation into incidents or near miss incidents and establish safeguards to prevent recurrence.
h) Provide a safe place of work
i) Identify lines of responsibilities for health, safety & environment

j) The objectives shall be communicated to all levels of employees with the intent that employees are made aware of their individual HSE obligations.

46. Improvement Program: To meet the HSE policy and objectives, the organization shall establish and maintain improvement program that include the documentation of designated responsibilities for achieving the objectives at relevant functions and levels within the organization and the means and time scale by which the objectives are to be achieved.

8. HSE PLANNING

8.1 Hazard Identification, Assessment & Determining control.

47. The establishment of procedures for hazard identification, risk assessment and the implementation of necessary control measures and the maintenance of these procedures are vital for the project organization. The results from these assessments and the effects of these controls are considered when setting the HSE Objectives & Targets

48. Aspect analysis and risk assessment will be carried out and attached to the Method statement at the work planning stage. After receiving approval from all relevant sections including Health & Safety, the work shall be executed.

49. For any planned, new or modified activity the aspect analysis and risk assessment will be carried out and the HSE management system will be based on the significant aspect and risks encountered. The following hierarchy of controls shall be considered in making the action plans for improvements:

a) Elimination

b) Reduce/Substitution

c) Controls such as Engineering controls, Administrative controls and procedural controls

d) Isolation

e) Personal protective equipment

f) Disciplinary action

8.2 Management of change

50. All risk aspects and impacts of a proposed change are thoroughly evaluated, shall be used and the identified change management forms completed and filled. All proposed, temporary or permanent changes to organization, personnel, systems, procedures, equipment, products, materials or substances shall be formally evaluated to ensure that the health, safety, environmental and financial risks arising from these changes remain at an acceptable level.

8.3 Procurement

51. The HSE in-charge shall liaise with the procurement team in respect of all plant equipment and PPEs that may be purchased in order to ensure specification where provided is fully honored.

52. In the procurement of PPEs, the standards shown in Table 1 are followed

Table 1: PPE Standard range

Description of the PPE	Level of protection offered by PPE
Equipment for eye and ear protection during welding	**Goggles, Hand shields and helmets:** Direct exposure to moderate and injurious radiation of light, heat, sparks and particles of hot metal.
Rubber Gloves for electrical purpose	**Voltage limit:** For type 1, 2, 3, & 4; 650, 1100, 7500 and 17000 ac-rms respectively.
Guide for selection of industrial safety equipment for face, ear and eye protection.	**Safety spectacles with side shield:** Impact against chipping, grinding, stone dressing etc.: Reflected light from sheet metal and lathe work, electrical arc welding etc. **Face shield:** Impact against chipping, grinding, stone dressing etc.: splashes from molten metals acids, alkali etc., and reflected light and injurious radiant energy. **Ear protectors:** Noise
Guide for selection of equipment for protection of arms and hands	**Leather gloves:** Hot work such as welding. **Cotton gloves:** Light abrasion. **Rubber gloves:** Light abrasions-Handling cement, concrete, solvents, oil, grease etc.:
Recommendation for selection use and maintenance of respiratory protection equipment	**Particle filter:** Only particle filtration **Gaseous filter:** Protection against gases and vapors **Self-contained breathing apparatus:** Kind of Rescue equipment. Where fresh air is not available or cannot breathe (under water and fume) situations.
Guide for selection of equipment for protection of foot and leg.	**Leather safety shoe:** Protection from striking against stationary object, Stepping onto hot objects, stepping onto sharp objects, heat radiation and welding sparks and chemicals. **Industrial gum-boots:** Handling strong acids, chemicals etc.
Guidelines for selection of industrial safety helmet	**Chin Strip:** Should withstand 10Kgf for 5 minutes **Shock absorption:** Should withstand 40 KN impact load, independent of the period of application.
Industrial safety belts and harness specifications	**Strength:** Shall be able to hold a load up to 2000 Kg

9. LEGAL AND OTHER REQUIREMENTS

53. The Chief HSE Manager is responsible for reviewing and updating (as and when required) the register of applicable legal and client requirements and for communicating the changes to the relevant personnel, verifying compliance to these requirements. The organization will keep this information up to date.

54. The HSE legal and other requirements applicable to the Project are listed below:

a) The Environment Assessment Act (2000)

As per this Act, whenever CDCL has any Environmental Assessment documents to be submitted to statutory authority, AFCONS shall provide necessary data on written request.

b) Regulation for Environmental Clearance of Projects (2016)

As per this Act, AFCONS shall comply with the Environmental Clearance conditions that are communicated by CDCL / Engineer.

c) The Biodiversity Act (2003)

As per this Act, AFCONS shall strive to conserve and sustainably use the biological resources, if required in the project.

d) Forest and Nature Conservation Act (1995)

As per this Act, AFCONS shall provide protection to the forests, wildlife and use the natural resources optimally during the course of project duration.

e) National Environment Protection Act (2007)

As per this Act, AFCONS shall be participating in replenishing alternative natural resources as part of probable excess resources utilized during the performance of the Contract.

f) Waste Prevention and Management Act (2009) and Waste Prevention and Management Rules (2012)

As per this Act, AFCONS shall be adopting 3R's principle of resource utilization and management. In accordance to this Act and Rules, AFCONS will manage the waste by segregating and disposing to the Authorized recycler.

g) The Water Act of Bhutan (2011) and Water Regulation of Bhutan (2014)

As per this Act, AFCONS shall ensure prevention and control of water pollution.

h) Regulation on Occupational Health and Safety (OHS) in Construction Industry (2012)

As per this Act, AFCONS shall provide facilities to ensure safe and healthful working conditions for the workers and other persons present at workplaces.

i) Integrated Solid Waste Management Strategy (2014)

As per this Act, AFCONS shall adopt to the objectives of promoting "Zero Waste Bhutan". Our procurement team will be made aware of Extended Producers Responsibility principles to enable them to adopt to the requirements while procuring ancillary materials. AFCONS shall adopt the segregation of waste at the source itself and dispose them in designated color bins as follows:

j) All organic waste shall be segregated in GREEN bins and non-organic waste in BLUE bins.

k) All kinds of Healthcare wastes should be kept in RED bags / bins and other domestic hazardous waste and E-waste such as bulbs, CFL, batteries etc. shall be kept in a YELLOW bag / bin and shall not be mixed with any other waste.

l) All municipalities shall strive for separate collection of inert wastes like road sweep, drain silt, etc.

m) Construction and demolition wastes shall be stored separately.

n) Environmental Standards, 2010

As per this standard, AFCONS shall comply with the Ambient Air Quality, Ambient Water Quality, Wastewater Discharge standards, Noise limits and Vehicle Emission Standards and any other standard relevant to the construction activity.

o) Electricity Act of Bhutan 2001

p) The Pesticides Act Of Bhutan 2000

q) Road Safety And Transport Regulations (1999)

r) Labor and Employment Act 2007

10. IMPLEMENTATION AND OPERATION

10.1 Resources, Roles, Responsibilities, Authority and Accountability

A. Position: Project Manager

Responsibilities and accountability

55. The Project Manager is responsible and accountable for project safety and for working with various departments, employer's representative, and assigned staff to ensure that from project inspection to contract completion adequate resources and top management support are provided to ensure a safe work site in accordance with project safety plan. This includes proper staffing, financial support, safe design and management support for necessary actions taken.

56. The responsibilities and accountabilities shall include the following:

a) Delegate specific responsibilities and accountabilities to all field management staff and Ensure such functions are carried out.

b) Establish a realistic Safety Policy for the site.

c) Make clear and stress at every opportunity that safety and Health are a line responsibility. 'Lead by example'.

d) Direct field management in carrying out their duties, responsibilities and accountabilities.

e) He shall be Chairman of Safety Committee Meeting and attend all the internal HSE meetings and delegate this responsibility and accountabilities to Deputy Project Manager or Safety Manager when unable to attend.

f) Make final decision on matters affecting field construction work, after consultation with various groups within the field organization.

g) Advise and/or instruct subordinates regarding any actions necessary to correct any hazardous activities or work conditions.

h) Review and finalize AFCONS INFRASTRUCTURE LTD Safety Management System and Safe Work practices and other Safety Documents.

i) Authorize Safety Incentive Scheme.

j) Regular safety walks to the site as frequently as possible to ascertain the work and safety status.

k) Establish and direct an Accident Investigation Team when an accident occurs.

l) Suspend work or prohibit the use of facilities, if emergency measures are required, to correct the hazardous activities or work conditions, until their rectification is confirmed.

m) Remove any person from the site who seriously or repeatedly fails to comply with the safety and security requirements and rules.

n) Take the lead in promoting housekeeping at the highest standards.

o) Review safety performance, safety topics, and safety activities, status with the Deputy Project Manager, HSE Manager and the Construction Manager on a regular basis.

p) Report on safety performance, safety activities, and any accident or near misses, to the employer's representative in a regular and timely manner.

q) Review and assign the responsibilities and duties of each position.

r) To monitor and measure, with the field Management Staff and Staff and Safety Department, the safety performance of each employee. Recognition shall be awarded to those who have performed consistently well. Corrective, measure / disciplinary actions

s) Shall be applied to those who fail to comply with their designated duties, responsibilities and accountabilities.

B. Position: Construction Manager

Reports To: Project Manager

Responsibilities and Accountabilities

57. The Construction Manager is to assist the Project Manager to manage, supervise and control construction and safety activities.

58. The responsibilities and accountabilities shall include the following:

a) Assist Project Manager in construction, co-ordination., schedule / plan, budgeting and technical activities.

b) Implement Project manager directive as required and acts in his absence or assume fieldwork responsibility when directed.

c) To Preside over Safety Committee Meeting upon delegation from Project Manager.

d) Advocate the setting up of the HSE Procedures, Rules and Regulations, HSE Training Plan, etc.

e) Conduct any other safety meeting and follow up meeting whenever necessary.

f) Remove any person from the site who seriously or repeatedly fails to comply with the safety and security requirements and rules

g) Take the lead in promoting housekeeping at the highest standards.

h) Review HSE performance, HSE topics, and safety activity status with the PM / Chief HSE Manager on a regular basis.

C. Position : HSE Manager

Reports to: Project Manager

Responsibilities and Accountabilities

59. To carry out his duty of ensuring the health, safety & environment of the person employed on site, then he/she shall:

a) Advice AFCONS INFRASTRUCTURE LTD management on the measures to be taken in the interest of health, safety & environment of persons employed therein.

b) Develop HSE Management System, HSE Rules and Regulations and Safe Work Practice for the project and monitor its implementation and compliance. Make rules for the disciplinary action in case of any defaults by co-employees or sub contractor's personnel.

c) Inspect the site personally or direct his/her *safety officer to* Inspect the site on his/her behalf to determine whether there is any Machinery, Plants, Equipment, appliances or any type of manual labor being used in the site which is of such nature that is liable to cause risk or badly injure to any person working or employed in the site.

d) Investigate any fatal accident and/or dangerous Occurrence, which occurs within the site and any industrial disease contracted in the site.

e) Compile and maintain HSE statistics and present HSE Performance Report to the AFCONS INFRASTRUCTURE LTD management.

f) Organize training courses, competitions, contest and other activities, which will develop and maintain the interest of the persons employed on site so as to establish a safe and healthy working condition therein.

g) Review the Method Statements and Risk Assessment and Suggest improvement or any safety requirement, which needs to be incorporated into the above. Ensure that the respective Engineer applies the approved method statements and safety control stipulated in the Risk Assessments during the execution of the work.

h) Manage and control situation arising during an emergency. Continuously review the emergency procedure and update accordingly.

i) Monitor the implementation of the Security Procedure.

j) Act as Secretary to the Safety Committee established at site and assist the Chairman in directing the functions of the Site Safety Committee.

k) In the absence of the Chairman, preside at all meeting of the Site Safety Committee.

l) Monitor the records and compliance of the Maintenance Regime for Construction Equipment and machinery. Shall advice the supervisor on any equipment or machinery, which is due for inspection.

m) Lease with Statutory Bodies with regards to HSE matters.

D. Position: Electrical Manager (Electrical Engineer)

Reports To: Project Manager

Responsibilities and Accountabilities

60. The responsibilities and accountabilities shall include the following:

a) Design of PM / CM Plan of Electrical Equipment as per stipulations in Rules.
b) Construction, Installation, Protection, Operation and Maintenance of Electrical System, equipment, Instruments and Apparatus at Project sites in line with Rules and conformance of all requisites as per Electrical Rules.
c) PM and CM of Electrical Equipment as per plan.
d) Safe Distribution and Utilization of Electrical Power and laying down and compliance of Safety Practices at Batching Plant, Casting Yard and Construction Sites.
e) Understanding the client's requirements of Electrical safety and communication.
f) Implementation of best practices at all times.
g) Maintenance of Bulk Petroleum Storages as per Electrical Norms set forth in Petroleum Act.
h) Prevention of Electrical Fires- Electrical Energy Management and Control.
i) Inspection of Own and Contractors Electrical Equipment i.e. ELCB / RCCB Portable Equipment and Tools, Relays, Breakers Welding Sets and Cables etc.
j) Understanding, Implementation and Training on the following.

i. National Electrical Code.
ii. Codes of Practice in Electrical Safety set forth by BIS.
iii. Codes applicable to Electrical PPE's (And Purchase and Inspection accordingly)

k) Electrical Energy Conservation Practices and Development of Method Statements.
l) Energy Budgeting, Monitoring, Control and Optimization.
m) Analysis of Electrical Breakdowns for CPA and promotion of Safe and Efficient Practices at all levels.
n) Development of Inspection Protocol in Electrical System in line with Electricity Rules and Check Lists
o) Calibration of Electrical Equipment / Instruments as per requirement/plan.
p) Electrical Safety Education, Electrical safety and Energy Audits and Inspection.
q) Lighting / Illumination and Site Electricity Management.
r) Operation and Maintenance of DG Sets, Noise Control of DG Sets, Efficient Operation of DG Sets.

s) Inspection and Audit of Electrical Contractors based on established and controlled Checklists. Licensing of Contractors.

t) Understanding Aspects/Impacts and Hazards/Risks in Electrical Systems and laying down control practices in line with regulatory provisions and client's requirements to establish, Maintain and Implement HSE System as per ISO 14001: 2015 and OHSAS 18001: 2007/45001:2018 OHS & MS

u) Electrical Audits by client, Internal Electrical Audits, Inspections and Reporting System adequacy to client's Electrical Engineer.

v) Training on Bhutan Electrical Rules and Maintenance and Operation of Electrical System and Apparatus.

E. Position: Plant Manager (Mechanical Engineer)
Reports To: Project Manager

61. The responsibilities and accountabilities shall include the following:

a) Shall report to the Project Manager

b) Demonstrate personal commitment to set HSE objectives

c) Ensure that all plant sent to site is safe and fully efficient, is guarded and equipped with safety devices and third party tested in accordance with the Construction regulations

d) Make certain that all plant operators and banks men are only employed on equipment for which they have been thoroughly trained

e) Check that periodic tests, inspections and maintenance are carried out

f) Ensure that all repair and maintenance work carried out in site are done in a proper manner by a competent person

g) Attend promptly to all plant defects notified or call the attention of site management to the need for dangerous plant to be put out of service until it can be properly repaired

h) Check that hired plant is safe and that, where appropriate, copies of current test certificates and relevant documents are available

i) Arrange maintenance as per the manufacturer's recommendations

F. Environment Engineer:
Reports To: HSE Manager

62. The responsibilities and accountabilities shall include the following:

a) The EHS Manager is assisted by the Environment Engineer for the day to day implementation of the approved CEMP.

b) For any issues arising related to the implementation of CEMP provisions, the EHS Manager appraises the issue to the Project Manager and the Project Manager resolves the issue by assigning the task to competent person(s).

c) The Environmental Engineer shall be responsible for the induction of all employees to make them aware of the CEMP provisions relevant to them.

G. Position : HSE Engineer
Reports To: HSE Manager

63. The responsibilities and accountabilities shall include the following:

a) Shall report to HSE Manager

b) Provide support to the construction department for implementation of project HSE Plan and Set HSE Objectives

c) Provide leadership, planning and motivation in the implementation of Health, Safety & Environment.

d) Assist in development and the review of procedures and systems designed to facilitate safe work

e) Developing, regularly reviewing as appropriate, revising the project HSE plan to ensure that it continues to meet the specific requirements of the project

f) In consultation with Project Management, regularly review safe work procedures

g) Establishing a monitoring regime to ensure that unsafe systems, places or practices are identified and remedied at the earliest

h) Ensure that all reportable accidents and serious incidents are documented and reported to Project Management and the Employer's Representative

i) Carryout a detailed investigation of major accidents/incidents including near miss on site and convey the findings to all to prevent the recurrence of such type of accidents/incidents in future

j) Manage and organize the general activities of site safety and give guidance to the Section Managers

k) Prepare reports at monthly intervals or, as required by Project Management, regarding overall Project HSE Management

l) Initiate HSE training programmes

m) Ensuring that the attendance at safety meetings is comprehensive and appropriate. He/she will also ensure that the minutes of such meetings assign actions and timings to named individuals and are promptly distributed to all relevant personnel

n) Accountable for implementation of HSE plan across the project

o) Ensuring suitable arrangements are in place to monitor that HSE performance targets are being achieved

p) Shall ensure that safety committee meeting is conducted on regular basis

H. Position: Safety Supervisors
Reports To: HSE Manager/ Safety Engineer
Responsibilities and Accountabilities

64. The Safety Steward/Supervisor is responsible for the administration of the project HSE plan. Safety steward/Supervisor shall assist the HSE Engineer/ safety officer with HSE matters and ensure liaison and coordination Channels are maintained among the sub-contractor's management on health, safety and environment control.

65. The responsibilities and duties shall include the following:-

a) Provide HSE information and guidance to supervisors on proper HSE procedures, current and potential hazards and employee training requirements.

b) Conducts project HSE inspection and reports infractions to the applicable supervisor and the engineer and subsequently inspect to see that infractions are corrected.

c) Ensure that the respective supervisor applies the approved method statement and HSE control stipulated in the risk assessment during the execution of the work.

d) Maintain register of any defects or violations observed and of remedial action taken.

e) Conduct investigation of all fatal, lost time accidents, significant first aid cases, near misses accident and damage to property or equipment. Complete and analyze each accident investigation report.

f) Conducts the HSE induction programme for new employees and subcontractors.

g) Assist in HSE training, courses and seminars.

h) Assist construction supervisors and foremen during the tool box meeting to be held every morning or weekly depending on the working status.

i) Inspect for fire hazards and check that fire protection equipment is adequate,

j) Supervise and implement security procedure.

k) Assist in supervising medical facilities and maintaining medical records.

I. Position : Sr. Engineer / Site Engineer

Reports To: Manager
Responsibilities, Accountabilities and Duties

66. The Sr. Engineer shall take the initiative to ensure that the total construction work progress smoothly and safely.

67. The responsibilities and accountabilities shall include the following:

a) Co-ordinate, plan the work, schedule, and liaise with other necessary department to ensure that conflicts of interest between subcontractors do not occur and are performed in a safe and efficient manner.

b) Direct Site Engineers on their safety accountabilities and responsibilities.

c) Attend the Construction/Progress Co-ordination Meeting and lead at addressing safety issues in the meetings.

d) Analyze all works, identify any serious hazards and be proactive in implementing procedures that encourage safety construction.

e) Ensure that the works are carried out as per the approved Method Statement and Risk Assessment.

f) Ensure that Method Statements, which incorporate adequate safety provisions for safety, have been provided for all critical work.

g) Direct Site. Engineers to check that the work at the site complies fully with the Method Statement and the precautions given.

h) Patrol the site daily and ascertain the work and safety Status.

i) Advice and/or instruct Site Engineer regarding necessary corrective actions for unsafe activities and hazardous or unhealthy working conditions.

j) Review the Tool Box Meeting activities carried out by Subcontractors. Dictate the frequency of Tool Box Meeting of each work group with the advice of the Engineers and Safety Personnel.

k) Confirm that Subcontractors are fulfilling their responsibilities with regard to safety requirements.

l) When critical measures are required to correct unsafe activities or work conditions, suspend work or prohibit the use of facilities until rectification is confirmed.

m) Promote regular housekeeping at the highest standard.

n) Ask advice from the Safety Personnel when any doubt exists about Safety Procedure at the site.

o) Reports to Assistant Manager on any anticipated matters of concern.

p) Participate in Safety Meetings as required.

q) Provide assistance and support in any accident investigation.

r) Identify and instruct/encourage subordinates to participate Safety training, Courses and Seminars.

s) Familiarize with the AFCONS INFRASTRUCTURE LTD Safety Policy, Safety Manual, Emergency and Evacuation Procedures and any other relevant Safety Programme. 'Lead by Example'

J. Position : Supervisor/Foreman
Reports To: Site Engineer
Responsibilities, Accountabilities and Duties

68. Supervisors are responsible to ensure that

a) Employees are aware of the Project Health and Safety Plan, Construction Methods, Risk Assessment and Safety Requirements relevant to the individual's specific area of responsibility.

b) Employees under their direct supervision are working in compliance with the approved safe systems of working.

c) Respond to the recommendation or instructions of the HSE in-charge or designate immediately.

d) Report all accidents or incidents immediately to the HSE in-charge.

e) Conduct pre-task briefings to operational teams prior to commencing a task and record such briefings.

f) Ensure employees are provided with and are using equipment correctly and as per the manufacturer's recommendation.

g) Ensure that all tools, machinery and equipment used by the subcontractor are adequate for the job and meet satisfactory standard.

h) Ensure that housekeeping standards are maintained and arrangements for waste disposal are made.

i) Instruct the subcontractor's personnel under their control on the measures necessary to perform the work safely and without health risks.

j) Ensure that all workers are familiarized with the Emergency and Evacuation Procedure and ensure compliance with the requirement of the above.

K. Position: Stores Manager.
Reports To: Project Manager
Responsibilities and Duties

69. The responsibilities and accountabilities shall include the following:

a) Purchase of material as per standards and specifications.

b) Maintain specifications for various goods /material to be purchased.

c) Maintaining minimum inventory levels for Personal Protective equipment (PPE's)

d) Storage of oils, fuels, chemicals, compressed gases and safe handling of the same

e) Arrangement of fire extinguishing arrangement at oil, fuel, gas storage areas & site office.

f) Storage of heavy and bulky material in lower racks and vice-versa

g) Arrangement of safe loading and unloading of materials

h) Implementation of FIFO (First In First Out)

i) Evaluation of Contractors, their Inspections.

j) Emergency Prevention During Transportation, Motor Vehicles Rules, Vehicle Fitness,

k) Identify the Areas of Resource Loss and Planning for Improvement.

L. Position : Subcontractors
Reports To: Concern Department Head

70. Subcontractors who intend to carryout out work on the Project Sites must comply with these requirements:

a) Comply with all of the elements of the HSE Plan and any regulations applicable to the work

b) Comply with the Construction Method Statements and any document provided in the interests of Health, Safety and Environment.

c) Ensure that all of their employees designated to work on site are properly trained and competent

d) Ensure that all plants and equipment brought on to site have been inspected and serviced in accordance with legal requirement and manufacturer's or suppliers' instructions

e) Make arrangements to ensure that all employees designated to work or visits to the site present themselves for site induction prior to commencement of work

f) Provide details of any hazardous substances to be brought on-site

g) Submit all proposed HSE procedures and construction methods to AFCONS for review

h) Ensure that a responsible person accompanies any of their visitors to site

i) Sign and accept the contractor's Safety Agreement

j) Understand the Disciplinary procedures and make their personnel aware of the same

M. Position: Workers
Reports To: Concern Supervisor

71. All workers, including subcontractor workers:

a) Use the correct tools and equipment for the job and use safety equipment and protective clothing supplied, e.g. helmets, goggles, ear protection, etc. as instructed.

b) Keep tools in good condition.

c) Report to the Supervisor any unsafe or unhealthy condition or any defects in plant or equipment.

d) Develop a concern for safety for themselves and for others.

e) Prohibit horseplay.

f) Not to operate any item of plant unless they have been specifically trained and are authorized to do so.

N. Suppliers

72. The responsibilities and accountabilities shall include the following:

a) Abide by all Safety Standards and - Codes applicable to the materials/products/goods (to be) delivered onto the project site;

b) Be aware of the Safety Rules, Regulations and Procedures in effect on the project site as prescribed in this Project H.S.E. Plan;

c) Comply with the established safety rules, regulations and procedures as well as safe working practices during operations on and visits to the project site;

d) Be responsible for notifying in writing any adverse impact on Health, Safety & Environment of their materials/ products/goods delivered onto the project site;

e) Deliver a Material Safety Data Sheet (MSDS) together with each chemical material or product;

f) Check in with Consortium site supervision before entering the project site and/or commencing their operations

O. Persons representing Client, Employer's representative and Visitors

73. The responsibilities and accountabilities shall include the following:

a) Be aware of the Safety Rules, Regulations and Procedures in effect on the project site as prescribed in this Project H.S.E. Plan;

b) Abide by all safety rules, regulations and procedures established for the project site as well as safe working practices;

c) Check in with one of the members of the Project Management team so that personal protective equipment will be provided such as hardhat, Safety shoe, eye protection and respirator, where necessary;

d) Inform the Supervisor concerned before entering the workplace in operation under the supervision and responsibility of that Supervisor.

P. Visitors:

74. A visitor shall be accompanied by the Security guard to the place of visit. He should report to the concerned Activity in-charge or his representative for the purpose of his visit. A brief induction is given to this person and the Activity in-charge shall maintain the induction details and submit the same to the EHS manager for records.

75. The Activity in-charge may send the visitor to the EHS manager for the EHS induction.

10.2 Context of the organization

76. AFCONS 6462 At Bhutan Project shall determine external and internal issues that are relevant to purpose and that affects its ability to achieve the intended outcome(s) of its OHSE management system. Internal & external issues can be positive or negative & include conditions, characteristics, changing circumstance that can affect the OHSE management system.

77. Examples of external & internal issues which can be relevant to the context of the organization include:

i. Environmental conditions related to climate, air quality, water quality, land use, existing contamination, natural resource availability and biodiversity, that can either affect the organization's purpose, or be affected by its environmental aspects;

ii. The external cultural, social, political, legal, regulatory, financial, technological, economic, natural and market competitive circumstances, whether national, regional or local;

iii. The internal characteristics or conditions of the organization, such as its activities, products and services, strategic direction, culture and capabilities (i.e. people, knowledge, processes, systems)

iv. New knowledge on products and their effects on health & safety.

v. Introduction of new competitors, contractors, sub-contractors, suppliers, partners and providers, new technologies, new laws and emergence of new occupations.

vi. Key drivers and trends relevant to the industry or sector having impact on the organization.

vii. Relationships with, as well as perceptions and values of, its workers and external interested parties.

viii. Governance, organizational structures, roles and accountabilities;

ix. Policies, objectives and the strategies that are in place to achieve them;

x. The capabilities, understood in terms of resources, knowledge and competence (e.g. capital, time, human resources, processes, systems and technologies);

xi. Information systems, information flows and decision making processes (both formal and informal);

xii. Introduction of new products, materials, services, tools, software, premises and equipment;

xiii. The culture in the AFCONS project;

xiv. Standards, guidelines and models adopted by the AFCONS 6462 at Bhutan project;

xv. The form and extent of contractual relationships, including for example, outsourced activities

xvi. Working time arrangements;

xvii. Working conditions; Changes in relation to any of the above.

xviii. An understanding of the context of AFCONS 6462 at Bhutan project is used to establish, implement, maintain and continually improve its OHSE Management System. The internal and external issues that are determined can result in risks and opportunities to the organization or the OHSE management system. The organization determines those that need to be addressed and managed.

10.3 Needs & Expectations of Workers & Other Interested Parties

78. An organization is expected to gain a general understanding of the expressed needs and expectations of those internal and external interested parties that have been determined by the **AFCONS 6462 at Bhutan project** to be relevant. The organization considers the knowledge gained when determining which of these needs and expectations it has to or it chooses to comply with i.e. its compliance obligations.

79. In the case of an interested party perceiving itself to be affected by the organization's decisions or activities related to OHSE performance, the organization considers the relevant needs and expectations that are made known or have been disclosed by the interested party to the organization.

80. Interested party requirements are not necessarily requirements of the organization. Some interested party requirements reflect needs and expectations that are mandatory because they have been incorporated into laws, regulations, permits and licenses by governmental or even court decision. The organization may decide to voluntarily agree to or adopt other requirements of interested parties (e.g. entering into a contractual relationship, subscribing to a voluntary initiative). Once the organization adopts them, they become organizational requirements (i.e. compliance obligations) and are taken into account when planning the OHS management system.

10.4 Consultation & Participation of Workers

81. To ensure that pertinent HSE information is communicated to and from employees and other interested parties the following meetings are required in order to give instructions and consultation related to risk, accident prevention, safe work practices, safety performance and changes that could affect workplace Health, Safety and Environment.

Table 2: Consultation and Participation of workers

Activity	Responsible	Purpose	Participants	Interval	Remark
Monthly Safety Committee Meeting	Safety Dept.	Review of monthly safety issues, discussions on Accidents/incidents, corrective and preventive actions	Management team, section managers, safety department and contractor and employee representatives	Every month on last Friday	To be communicated to all sections, sub-contractors
Tool Box Talk	Site Engineer	To highlight safe work practice	Construction staff, workers,	Every day	Records to be maintained

Activity	Responsible	Purpose	Participants	Interval	Remark
			sub-contractors	Before start of work	
Management Review	Chief HSE Manager	Functioning of HSE Plan in the Project	Top Management	Six Months	
Induction Training	Safety Dept.	To highlight Site safety rules and instructions of work area	New employees	At the time of joining	Records to be maintained

82. Workers shall participate in risk assessment and deciding on controls, incident investigation and review of policy and objectives.

83. The consultation and participation of workers, and where they exist, workers' representatives, can be key factors of success for AFCONS 6462 Bhutan project site OH&S management system.

84. Consultation implies a two-way communication involving dialogues and exchanges. Consultation involves the timely provision of the information necessary for workers, and where they exist, workers' representatives to give informed feedback to be considered by the management before making a decision.

85. Participation enables workers to contribute to decision-making processes on OH&S performance measures and proposed changes.

86. At AFCONS 6462 Bhutan project site, workers at all applicable levels are encouraged to report hazardous situations, so that preventive measures can be put in place and corrective action can be taken. Feedback on OH&S management system is dependent upon worker participation.

87. In order to ensure effective worker consultation & participation:

a) The initial documents (Records & procedures) will be shared through email to all concerned workers, and, where they exist, workers' representatives for consulting their views to improve the OHSE management system. Clear, understandable and relevant information will be provided to all workers through emails and through intranet related to OHSE management system. Necessary training and resources will be identified and provided in order to ensure effective consultation & participation.

b) In order to encourage the participation of workers, AFCONS 6462 Bhutan project site ensures that wherever possible determine & remove obstacles and barriers to participation & minimize those that cannot be removed.

c) The reception of suggestions will be more effective if workers do not fear the threat of dismissal, disciplinary action or other such reprisals when making them.

88. AFCONS 6462 Bhutan project site emphasizes Consultation of non-managerial workers on the following:-

a) Determining the needs & expectations of interested parties.

b) Establishing the OH&S policy.

c) Assigning AFCONS 6462 project site employees' roles, responsibilities and authorities, as applicable.

d) Determining how to fulfill legal requirements and other requirements.

e) Establishing OH&S objectives and planning to achieve them.

f) Determining applicable controls for outsourcing, procurement and contractors.

g) Determining what needs to be monitored, measured and evaluated.

h) Planning, establishing, implementing and maintaining an audit programme.

i) Ensuring continual improvement.

89. AFCONS 6462 Bhutan project site emphasizes the participation of non-managerial workers in the following:-

a) Determining the mechanism for their consultation and participation.

b) Identifying hazards and assessing risks and opportunities.

c) Determining actions to eliminate hazards and reduce OH&S risks.

d) Determining competence requirements, training needs, training and evaluating training.

e) Determining what needs to be communicated and how this will be done.

f) Determining control measures and their effective implementation and use.

g) Investigating incidents and non-conformities and determining corrective actions.

10.5 Competence, Training and Awareness

90. The Safety Department shall develop HSE-training programme for all employees including workers to create a general safety awareness and safe work practice.

91. Health and safety training shall be given:

- Upon being recruited
- Upon being exposed to new or increased risk

Table 3: HSE training program

Training Packages	**For all new emp.**	**Lifting Supervisor Bank's men Operators and Riggers**	**All Engineers And Supervisors**	**All involved In confined space work activities**	**All employees including workers**	**All emp.**	**All Emp.**	**All**	**Periodicity**
Trainer	Safety Officer	Safety Officer	Safety Officer	Consultant	Safety Officer	Fire SO	SO/ Site Engg	SO	
Basic HSE Induction Courses	■								At the time of Joining new employee
HEALTH BRIEFING STD/HIV AIDS training		■							Monthly
Safe slinging and rigging training		■							Monthly
Job hazard analysis and risk assessment training			■						Monthly
Confined space training				■					Monthly
Fire fighting training					■				Monthly
Emergency preparedness / evacuation and rescue Training(Mock Drill)						■			Six Months
Tool box Talks							■		Every Day
Job Specific								■	Every Day

92. HSE training shall be conduct at site by site safety department having sufficient qualification and experience. External HSE trainings will also be coordinated at site as and when

such opportunities are there. Selection of external HSE trainer shall be ensured by top management for his competency in same field.

93. **OHS INDUCTION**: It is briefing about the available provisions/resources for the implementation of the CEMP as applicable to the inductee.

94. It covers topics that give information about the project; site OHSE Policy; battery limits; PPE zones; locations of emissions, discharges, noise generating activities; waste segregation and handling; about the organization; and environmental performance with significant environmental aspects and legal applicability.

95. Every person who enters the site premises shall undergo the OHS Induction. The activity in-charge shall be responsible for his or any of his team members do not get inducted. Refer Appendix-2 (HSE INDUCTION PROGRAM)

Table 4: HSE Training Details

1. The Law and Safety	**2. Policy and Administration**
Statutory requirement Appropriate regulations Effect of incentive on accident prevention Duties of employer and employee	Effect of incentive on accident prevention Duties of employer and employee Human relations Consultation Safety Officer: duties, aims, objectives
3. Safety and the Supervisor	**4. Principles of Accident Prevention**
Safety and efficient production go together Attitudes of management, supervision and operations Accidents affect morale and public relations	Attitudes of management, supervision and operations Accidents affect morale and public relations Methods of achieving safe operations Accident and injury causes
5. Site Inspection	**6. Human Behavior**
The role of management Hazard Identification Procedure Records results Follow-up procedures Feedback	Motivating agencies Individual behavior Environmental effects Techniques of persuasion
7. Site housekeeping	**8. Health**
Site organization Relationship of site housekeeping to accident Occurrence Site access Equipment storage	Medical examination Hazard to health on site Sanitation and welfare Protective clothing First Aid/CPR

Material stacking Materials handling	
9. Personal Protective Equipment	**10. Electricity**
Eye, face, hands, feet and legs Respiratory protective equipment Protection against ionizing radiation	Appreciation of electrical hazards Power tools Arc welding Low voltage system Lighting and power system on sites ELCB, RCCB, Grounding/Ground fault circuit interrupters (GFCIs)
11. Oxygen and Acetylene Equipment	**12. Equipment**
Cylinder storage and maintenance Condition and maintenance of valves, regulators, and gauges Condition and maintenance of hoses and Fittings Pressures	Accidents related to moving parts of machinery Appreciation of principles of guarding Importance of regular maintenance
13. Transportation	**14. Excavations**
Transport to and from site Hazard connected with site transport Competent drivers Dumpers Tipping trucks Movement near excavations	Method of shoring Precautions while shoring Precautions at edge of excavations Removal of shoring Sheet steel piling
15. Working platforms, Ladders, and Scaffolding	**16. Cranes and other Lifting Machines**
Hazards connected with the use of ladders Maintenance and inspection Type of scaffold Overloading Work on roofs Fragile material Openings in walls and floors Use of safety belts and nets	Licensing, certification and training required for operation of cranes Slinging methods Signaling Access to crane(s) Maintenance and examination Ground conditions Hazards and accident prevention methods connected with the use of different types of cranes/heavy equipment Crane Lift Plan for all lifts
17. Lifting Tackle	**18. Fire Prevention and Control**
Slings - single and multi-legged Safe working loads (SWLs)	Principle causes determining fire Understanding fire chemistry

Safety hooks and eyebolts Cause of failure Maintenance and examination	Firefighting equipment Firefighting training
19. Communications	**20. Job Specific Activities**
Effective methods of communication (particular interest to non-English speaking workers)	
Method and preparation of reports	
Safety committees	
Safety meeting	

96. P & A has been entrusted with the Role of Trainings and Human Resource Development in this direction. Training Plans shall be prepared and the designated agencies shall be contacted for such trainings to all concerned.

97. The Other Inputs in Effective understanding and implementation of the requirements is further elaborated in various Inspection Check Lists which further provide adequate inputs for effective functioning at all levels.

a) HSE Policies.

b) Root causes of Failures, Accidents and Non Conformances emerging out of Internal and External Audits.

c) Legal and Other Requirements.

d) Method Statements

e) Design Inputs on HSE Requisites etc.

f) Changing Requirements to the system if any.

g) EMS and OHSAS Standards and their Applicability to Project.

h) Fire Protection, General Measures for Personnel Hygiene and Health Protection

i) Guide lines given by client

98. It will be ensured that the Sub Contractors and their workforce working on company's behalf are also included in the Training Process. The Records of Trainings shall be maintained by HSE Group.

99. The Operators, Drivers and attendants holding certificates of proficiency are employed to operate particular vehicles, lifting appliances and such other equipment.

10.6 Documentation

100. Documentation shall demonstrate compliance with specified requirements of the HSE Management System for maintaining efficiency of the system

10.7 Control of Documents

101. The identified HSE controlling documents are as follows:

Table 5: HSE controlling documents

Document	Location (Physical)	Issued By	Revised By	Approved By
HSE Policy	Main Office, All Sections	Chief HSE Manager	Chief HSE Manager	Project Manager
HSE Objectives	Safety Dept. (HSE Plan Document)	Chief HSE Manager	Chief HSE Manager	Project Manager
HSE Plan	Safety Dept.	Chief HSE Manager	Chief HSE Manager	Project Manager
HSE Management Records	Safety Dept.	Chief HSE Manager	Chief HSE Manager	Project Manager

10.8 Operational Control

102. The organization shall plan the activities for ensuring that they are carried out under specified conditions by maintaining the following documented procedures that could lead to non-conformities in the HSE Management System:

a) HSE risk assessment / method statement

b) Emergency preparedness and response

c) Communication

d) Legal and other requirements

e) Recruitment and Training

f) Internal Audits

g) Control of records

h) Corrective and Preventive Actions

i) Control of Non-conformities

j) Document and Data Control

k) Requirement of PPEs

l) Management Review

103. The project plan document is describing and controlling the operating procedures related to HSE issues occurring at Project level.

10.9 Maintenance and Inspection of plant and machinery

104. **Objective:** The objective of the maintenance regimes is to ensure that all equipment and machinery used at the site are in good condition and do not present any safety hazard due 1to inadequate repair and maintenance.

105. **Procedure:**

a) A list of relevant details, test certificates and legal documents shall be submitted by plant dept. to the safety dept. for records

b) All equipment and machinery that is to be used on site shall be inspected by mechanic to verify that it is in safe working condition. Relevant records will be maintained as per procedure.

c) Competent or approved person as required by factories act must inspect all statutory equipment.

d) Regular maintenance will be done as per manufacturer's requirement and company procedure. Records of it will be made available when asked for.

e) Operators of heavy machinery will be issued competency certificate by plant in-charge after ascertaining his skill and experience.

10.10 Subcontractor Evaluation, Selection and Control

106. The objectives of subcontractor evaluation, selection and control are to assist the site management in selecting sub-contractors with respect to their ability to carry out work in conformance with AFCONS INFRASTRUCTURE LTD Project Safety Plan.

107. This Procedure is intended for use in the selection and installation of subcontractors. The Project Manager or any other persons appointed by him will be responsible for undertaking this evaluation and selection.

108. **Safety Requirement:** AFCONS INFRASTRUCTURE LTD Project Safety Plan shall be made available to subcontractors bidding work to AFCONS INFRASTRUCTURE LTD and bidding instructions shall include requirements that subcontractors comply with the Project to the above requirements.

109. In the tendering process the sub-contractor shall include in its cost estimating all the items necessary for it to comply with both the general and specific safety requirements.

110. **Selection of Subcontractor:** The Project shall select a sub-contract after evaluating their proposal taking into consideration its cost, quality, schedule and safety.

111. It is recognized that it is not simple to apply quantitative weighting to these considerations.

112. However the project shall avoid awarding of work to lowest bidder without regard to their Safety Management Plan and Performance record.

113. At the time of selecting a sub-contractor, the sub-contractor will be informed that in the event that they select the subcontract out part of its work to others, he shall ensure that its own subcontractors:

- Are aware of and understand their safety obligation described in AFCONS INFRASTRUCTURE LTD Project Safety Plan.
- Have the capacity and ability to perform the work in conformance with AFCONS INFRASTRUCTURE LTD Project Safety Plan.

114. The contractor shall be fully responsible for the actions of its selected subcontractors

11. EMERGENCY PREPAREDNESS AND RESPONSE

115. **Purpose and Scope**: The purpose of emergency planning is to document set of actions and guidelines to be carried out in the event of an emergency if it arises during the course of project operation in the project execution area. The likelihood emergency situations are as identified in risk assessment:

a) Earthquake

b) Excavation collapse

c) Flood & Natural calamities

d) Structural or Tunnel collapse

e) Fire & Explosion

f) Gas leakage

g) Violence

h) Storm and Cyclone

116. The Annexure 3: Emergency Preparedness and Response Plan can be referred for detailed information.

12. HSE COMPLIANCE AND MONITORING

12.1 Performance Monitoring Measurement

117. The general procedures are attached in the Project Plan document and shall include:

a) Monitoring and measurement programme

b) Monitoring and measurement results

c) Amendment of monitoring and measurement schedule

12.2 Evaluation of Compliance

118. The organization shall maintain procedures to evaluate compliance on a regular basis and cover the following applicable categories:

a) Regulatory Compliance

b) Regulation on Occupational Health and Safety (OHS) in Construction Industry (2012)

c) PTDP EMP guidelines

12.3 Incidents, Non-conformities and Corrective and Preventive Action

12.3.1 Incidents

119. The routines to be followed upon identification of accidents, incidents must ensure that corrective or preventive action is taken to eliminate the causes of actual or potential accidents or to reduce its re-occurrence.

Table 6: Responsibility and authority for the accident and incidents handling

Action	Responsibility	Support By
Report of accidents and incidents	Section Manager	Safety Department
Investigation Management of accidents and incidents	Section Manager	Safety Department
Mitigation of consequences	Section Manager	Safety Department
Initiation and completion of corrective and preventive actions	Section Manager	Safety Department
Effectiveness of corrective and preventive actions taken	Section Manager	Safety Department

120. The employer and the Employer's Representative shall be notified by the quickest possible means, for example by telephone of the following classifications of accidents and incidents and by subsequent written notification within twenty four hours on the Contractors Accident and incident form.(Appendix 5 FORMATS: Incident Report Form)

121. The Safety department is responsible for the record keeping and reporting of all accidents and incidents. Internal distribution of the accidents and incident reports on site shall be arranged by the Safety department and should include the Site Supervisors.

122. Every month, statistics of accidents and incidents will be submitted to the Client as and when demanded.

12.3.2 Non-conformities:

123. Non-conformities may follow within the following categories:

a) Failure to the programme or procedures relating to specific applicable regulatory requirements
b) Failure in the implementation of HSE System

124. The identification of the NC is made within the project, by means of visual inspections, tests or any other observation and control procedure.

125. If a part of the work is found not to conform with the contract, drawing and specification is or any other valid description or requirement (Project Plan, Quality, Environment and Safety procedures) the person responsible for the concerned part of work shall write a Non-conformity Report.

126. Any person, including the client, can alert about an element or action that does not fulfill the specified requirements.

127. Special investigation of HSE non-conformities shall be carried out considering repetitive failures and other recurrent and high potential problems. The types of non-conformities and the effectiveness of reporting and investigation will be assessed. The results of the investigation will be documented and analyzed.

12.3.3 Corrective and Preventive Actions

128. The procedure to define the responsibilities and authority for taking the appropriate corrective and/or prevention action(s) to ensure that these action(s) have been implemented and that there is systematic follow up to ensure their effectiveness are described below:

a) An accident or major incident to persons or involving machinery / plant also requires corrective and/or preventive action. In such cases, an Accident Investigation shall be completed, and informed to the Safety Manager.

b) The relevant supervisor, the safety officer and/or the staff member appointed by the Manager, shall analyze the operations and associated factors related to the occurrence of the accident / major incident (in conjunction with the relevant subcontractor if appropriate). The analysis shall identify and attend to the root cause of the event.

c) Following identification of the root cause, the safety officer shall notify the safety manager of the proposed corrective and/or prevention action(s) by completing and returning the Control of Corrective Action Form to the safety manager for review and approval.

129. A copy of the record shall be retained by the person responsible for the corrective and/or prevention action(s), for reference until the specified corrective and/or preventive action(s) has been effected.

130. The status of corrective and/or preventive action(s) shall be monitored through a Verification Inspection to ensure that the specified action is taken and found to be effective in eliminating the cause(s) of the accident / major incident. In the event that corrective and/or preventive action(s) is not taken as specified, or if corrective and/or preventive action(s) taken is found to be ineffective, further requests for corrective and/or preventive action(s) shall be initiated until the action is taken and found to be effective.

131. Corrective and/or prevention action(s) shall be presented to the Tool Box meeting and the management review meeting. Elimination of the identified causes shall be implemented in accordance with this procedure

132. Conclusion shall be drawn and corrective and preventive actions taken, this analysis shall be presented to the senior management for review. Management of the identified causes shall be implemented in accordance with this procedure.

Table 7: Persons responsible for non-conformities, corrective and preventive actions

Action	Responsibility
Determination of the appropriate corrective and preventive action(s). Review and approval of corrective and/or preventive actions. Monitoring of the status of pending Corrective and preventive action(s). Identification of suitable staff to determine corrective and preventive action.	Relevant Site Supervisor /Sr. Engineer / Section Manager Chief HSE Manager Safety Officer / Section Manager Section Manager

12.4 Safety Promotion

133. The objective of safety promotion is to develop and maintain awareness among all personnel of the work sites commitment to safety and of the individual's responsibility to support that commitment.

12.4.1 Procedure

134. Posters and Signs: Posters and signs shall be adopted as visual aids for accident and fire prevention. Posters shall be written in English and will be conspicuously displayed. The following safety signage will be displayed wherever necessary at site:

a) 'Hard Hat Area'.
b) 'Wear Safety Footwear'.
c) 'Wear Hearing protection'.
d) 'Wear Eye protection'.
e) 'Danger Electricity'.
f) 'Deep Excavation'
g) 'Danger Crane Overhead'.
h) 'Stop, Look, Listen and proceed'.
i) 'No Smoking'.
j) 'First Aid'.
k) 'No Entry sign'.
l) 'Fire Precautions'.

135. The Appendix-1 (GENERAL SAFETY RULES & REGULATIONS) can be referred for detailed information

136. Safety Handbooks and brochures: To increase safety awareness and as part of personnel safety training, safety handbook or brochures will be issued.

137. Safety Talks: AFCONS Safety Department will conduct a Safety Talk (Minimum weekly) to the workforce for promotion of the safety and health of workers on site. The topic of the Safety Talk will be decided by the AFCONS INFRASTRUCTURE LTD based on the site activities. Record of attendance will be kept by the Safety Department. Respective AFCONS INFRASTRUCTURE LTD Department Head and Sub-contractors Management shall ensure the attendance of these personnel.

138. Penalties and Fines: AFCONS has implemented a policy whereby persons, both AFCONS and sub-contractor's staff, found violating safety rules are subject to fines. Persons are warned in advance and given the opportunity to correct their infractions. Persons with poor records of overall safety performance found to be in violation of safety rules and who fail to correct their offenses when verbally instructed to do so, will be fined. AFCONS safety staff can provide

additional information on which violations involve fines. Note that all funds collected through safety violation fines are channeled back into and used for safety promotion activities (Refer Appendix -3(DISCIPLINARY PROCEDURE)).

12.4.2 Safety Incentive Program

139. AFCONS INFRASTRUCTURE LTD will develop a procedure to recognize and acknowledge good safety performance by individuals, teams or the subcontractors. The development of the Safety Incentive Program, which includes how it should run and types of awards, will be developed with the consensus of the AFCONS INFRASTRUCTURE LTD Safety Committee. The Safety Incentive Program will be implemented within six months after the inauguration of the AFCONS INFRASTRUCTURE LTD Safety Committee.

12.4.3 HSE Committee

140. The HSE Committee shall be established and shall be chaired by the Project Manager. The safety Committee shall sit every month for the duration of the contract.

141. Member representation from all departments will be ensured. Representatives from the workmen category also will be included in the committee.

142. The Committee shall review the previous month's performance, to include, inspections and audits undertaken, accidents and incidents and any concerns or complaints that have been raised. Short term objectives and targets for improvement shall be set for completion by the next scheduled Committee meeting.

143. Minutes of the Committee meeting shall be issued within 2 days and promulgated to all members.

12.5 Control of Records

144. A system of control of HSE records shall be maintained by the Safety Department with the purpose of demonstrating the status and performance of the HSE Management Systems.

Table 8: Control of records

OH&S Reporting documents	Location	Maintained By	File No.
HSE Plan	All Sections and Safety Department	Section Managers	File numbers will be dedicated for each OHS document
Induction	Safety Department	Safety Department	
Training	Safety Department	Safety Department	

Tool Box Talks	Safety Department	Safety Department	
Inspection	Safety Department	Safety Department	
Accident / Incident	Safety Department	Safety Department	
Risk Assessment	Safety Department	Safety Department	
Safety Committee	Safety Department	Safety Department	
Minutes of Meeting	Safety Department	Safety Department	
Fire Extinguisher	Safety Department	Safety Department	
Monthly Report	Safety Department	Safety Department	
Weekly safety walk through report	Safety Department	Safety Department	

12.6 Internal Audit

145. Internal audits are performed with a frequency of minimum six months in accordance with an Audit schedule. The scope and programme of internal audits shall be determined with regard to the relative importance of individual elements of the HSE System and the results of findings of previous internal audits. Emphasis is placed on those elements of the HSE System, which are least effective bearing on the achievement of objectives.

146. A summary of all audit results must be discussed on a monthly basis and recommendations made to company management on improving Health, Safety and Environment. The top management shall, at intervals, review the HSE Management System to ensure its continuing suitability, adequacy and effectiveness.

13. Management Review

i. The organization's management shall, at intervals (that it determines), review the HSE Management system, to ensure its continuing suitability, adequacy, effectiveness and that necessary information is collected to allow the management to carry out this evaluation. The review will be documented.

ii. The management review must address a range of specified issues about the overall performance of the HSE Management Systems and the possible need for changes to policy, objectives and other HSE elements in the light of audit reviews for continual improvement.

iii. The results and findings of the Management Review are to be reported and appropriate actions must be completed (Appendix-4 Management Review)

APPENDIX 1: GENERAL SAFETY RULES & REGULATIONS

Entry Permit: Inside the premises of AFCONS INFRASTRUCTURE LTD. everybody must possess the entry permit / ID badge of the company. All vehicles entering inside the premises must have the vehicle entry permit.

Speed Limit: All vehicles shall follow the site traffic regulations. Vehicle shall not exceed the speed limit of 20 KMPH in construction site and work areas.

Misconduct: Fighting, gambling and possession or use of fire alarms, ammunition, alcoholic beverages and illegal drugs are prohibited.

No Smoking: Smoking is strictly prohibited in all office areas/sites except in designated areas.

Equipment: All necessary tools and equipment including personal protective equipment shall be properly maintained and shall be appropriate for the safe accomplishment of the task. Further only trained personnel shall use construction equipment.

Orderliness: Scrap, trash and other wastes shall be placed in the designated bins. Work area shall be cleaned up as the job progresses. All materials, tools or equipment shall be secured to avoid rolling or falling. A safe access shall be maintained to all work areas and emergency exits.

Inspections: All work areas shall be checked at the beginning of each shift to ensure safe conditions and at the end of each shift to ensure that all flames are extinguished and other hazards are properly contained.

Roads and Drains: All sub-contractors shall maintain the drains and roads in their area. No material should be unloaded on the road so as to obstruct the free movement of vehicles.

Medical

i. First aid medical facilities in case of emergency are available at First Aid center. All injury/illness shall be reported. Fully equipped ambulance to be made available at site round the clock.

ii. In case of emergency AFCONS INFRASTRUCTURE LTD shall send to the government hospital near the site. Inform the PIC and PIU if required

iii. First aid unit is identified by a Red Cross on a white background and staffed by qualified personnel. Essential medicines are stocked in the first aid box which shall be periodically replenished.

Personal Protective Equipment

i. Company must provide to their workers suitable Personal Protective Equipment (PPEs) required for their protection. Wearing of safety shoes & hard hat is mandatory on the site. However, charge hand and above may wear trouser and short while at work. All PPEs to be worn must be maintained in good condition and as per standard. Rings, bracelet, ear

rings, long neck chains shall not be worn near moving machinery or where electrical work is being carried out. Personal with long hair or beard with un-tucked long ties, loose clothing, unbuttoned or loose long sleeves shall not work near moving machinery. Complete arm protection may be required on some sites.

Table 9: Classification of PPE

Type of PPE :	Areas/Locations with risk of :
* safety shoes	standard rule in all areas
* working gloves	working with materials which may affect hand injury like wire ropes, rough timber, re-bars, paint
* safety helmet / hard hat	falling, dropping, toppling and flying objects as well as head bumping
* safety goggles / spectacles	Sparks, flying particles, dust, etc.
* ear muffs or plugs	Noise exceeding 85 dB (A).
* respiration protection filter/cap	Dust, fine gliding sand and the like.
* safety harness	Falling more than 2.00m at locations where no other safety devices minimize this risk.
*welding face shield	

Eyes and Ears

i. Safety glasses shall be worn by everyone who is doing –

- Mechanical / electrical work
- Any work in an area where mechanical / electrical work is carried out

ii. Side covered goggles or face protection shall be worn by cement feeders, concrete chippers, those involved in drilling operations above shoulder height or anyone who is doing any work in which foreign particles may enter the eyes.

iii. Those who are performing grinding or abrasive cutting shall wear full face shields. Special eye protection devices shall be worn during sand blasting operation.

iv. Eye protection with minimum required density of filter should be worn by welders and gas cutters.

v. Hearing protection (e.g. Ear plugs, ear muffs) shall be worn in areas where noise level exceeding 90 dB (A) exposure exceeds eight hours a day, or where warning sign is posted.

Fingers, Hands and Wrists: Hand gloves suitable for the job must be worn unless the job cannot be done with gloves or unless wearing of gloves increases the hazard.

Respiratory Protection: Suitable respirators approved as per specifications shall be worn wherever necessary.

Feet and Legs: Proper safety shoes shall be worn by all at every work site. Rubber gumboots with toe protection shall be worn by masons / concerting gang or those working in wet area. Foot guards shall be worn for using jack hammers / backfill tampers and similar equipment.

Skin: If there is any possibility of skin irritation while handling or using any material, proper PPE shall be used as specified in the MSDS of that material

Excavation: Surface excavation may be relatively shallow excavations for the foundations of buildings, for civil engineering structures, for the laying of services and utilities such as water supply pipes, sewers, gas pipelines, electric cables, telephone cables, etc. The surface excavations may be in earth, soil, and clay or in rock. At times, there may be ground water intercepted by the excavations. The safety measures in surface excavations are, accordingly divided in two main groups viz.

- Those that are required to be observed during surface excavations in earth, soil, clay, sand, etc. and
- Those that are required to be observed during surface excavations in rock.

Open Excavation: Slides of every excavation (where there is danger of falling or dislodgment of earth, rock or other material forming the sides or adjacent to any excavation) shall be securely supported by adequately braced timber of suitable quality of other material unless the sides of the excavation are sloped to a safe angle. Safe angle should always be greater than angle to repose of the material when saturated.

Excavation of Trenches

i. Excavation, if over 1.5 M in depth, unless in solid rock or hard shale shall be either shored, erected and braced or sloped to an angle greater than the angle of repose. All shoring and bracing shall extend to the bottom of excavation where necessary.

ii. To hold banks of loose and unstable materials from sliding, adequate shoring shall be used and undercutting of banks shall not be permitted. The bracing and shoring of trenches shall be carried out along with the excavation. Additional precautions by means of bracing and shoring shall be taken to prevent slides, slips or cave-in where excavations are being carried out in the vicinity of source of vibration like Pile driving rigs.

iii. Loose materials and loads shall be stored at a distance equal to depth or at 1.5m away from the edge of excavation whichever is more. During hours of darkness all public sidewalks and walkways shall be adequately illuminated and warning signs/lights around the excavation shall be placed to ensure safety of pedestrians and the vehicular traffic. There should be proper means of access and egress to and from excavated area, at least from two sides

iv. Adequate precautions shall be taken for underground pipelines, electrical/data cable, work permit is essential. In case dewatering is required prior arrangement shall be made.

Excavation in Earth, Soil, Clay

i. Safe means of access and egress should be provided for the workers carrying out the excavation. Excavations should be kept free from water. The accessible part of all excavations should be protected by an adequate barrier and prominent hoarding to warn the public about the danger. No materials should be placed or stacked near the edge of any excavation. No load, plant or equipment should be placed or moved near the edge of any excavation where it is likely to cause a collapse of the side of the excavation and thereby endanger any person.

ii. All struts, braces and waling in excavations should be adequately sourced so as to prevent their accidental displacement. Trenches in the built up areas should be fenced. Deep trenches and pits should be provided with adequate ladders, which should extend at least one meter above ground level. The ladders should be firmly fixed in position. Footboards and platforms supported by bracings should be adequately secured by brackets.

1) Safe Work Practice- Excavation.

Excavation is one of the most important phases of any construction activity. All excavation works will be supervised by well-experienced Supervisors. Before carrying out any excavation one must follow:

A. PRIOR TO COMMENCEMENT.

a) Obtain maximum information about the underlying services e.g. power cables, water supply & sewage pipelines, telephone cables, gas pipelines.
b) Obtain excavation plans clearly showing side slopes, firm levels, widths, and shoring.

B. DURING EXCAVATION:

a) Proper maintenance of side slopes of shoring.
b) Barricade the area and display warning boards.
c) Make catch drains around the area. Inspect these regularly and ensure that they are in good condition.
d) De watering / lowering of groundwater table to be carried out as per specific instructions.
e) Ensure stability of excavated materials at the disposal area.
f) Do not go below bottom of foundation level. Unless specifically instructed.
g) Do not load edge of the pit.
h) Provide steps or ladder if depth is more than 1200mm.
i) Entry to unsupported excavation shall be avoided.
j) Never work ahead of support.

2) Safe Work Practice: Earth Filling

a) Maintained the speed limit of 20 KMPH strictly.

b) Vehicle must have reverse horn.

c) Provide proper illumination while working at night.

d) Do not allow any unauthorized person in working area.

e) Signal man should be present when for vehicle movement in filling area.

3) Safe Work Practice: Soil Investigation

a) Barricade the area and display sign board

b) Keep good housekeeping around the drill rig.

c) Pit should be made near drill area to accumulate slurry.

d) Stability of tripod should be checked before starting the drilling.

e) Do not keep fuel in open container

f) Keep one fire extinguisher near working area.

g) Ensure that only authorized trained operators operate drill rig.

4) Safe Work Practice: Form Construction And Concreting

a) Formwork poses certain hazards due to poor housekeeping, leaving materials and tools where they may fall and cause injuries

b) Those who are placing concrete should wear safety helmets and rubber boots

c) Shirt sleeves should be rolled down, gloves should be worn and every precaution should be taken to prevent contact of skin with cement and concrete

d) All mixture gears, chains and rollers should be guarded

e) Concrete mixing plant/batching plant shall be adequately designed and precaution shall be taken to protect workmen from falling objects

f) Suitable dust mask should be worn wherever necessary

g) Workmen involved in handling bulk cement in confined spaces shall wear tight fitting goggles, dust masks and protecting clothing

5) Safe Work Practice: Cranes And Other Lifting Equipment:

a) Safety during lifting and handling, requires careful consideration of all aspects

b) All fabricated units should have a distinctive mark to ensure that structures are correctly assembled

c) The necessity to work at height can be reduced by the assembly of all possible items and ground level

d) Time spent at working at height should also be reduced by ensuring that bags of bolts are tied to rafters and beams adjacent to point of connections

e) Regular maintenance of all crane and lifting equipment at offshore /onshore will be done on regular basis by CPE department and it will be verified by safety Officer. If any defect found will be attended by CPE Engineer and rectify before use.

Adverse Weather Conditions

Erection work should not take place in weather conditions which introduce an undue element of risk. Examples of these conditions include:

a) High winds

b) Heavy rain

c) Poor visibility

Safety Checklist

Conduct a site survey to identify all hazardous site features such as;

a) Underground services

b) Proximity to and condition of adjacent structures

c) Has a satisfactory method statement been produced and agreed

d) Have all persons involved in the works been briefed on the method statement

e) Are people competent

f) Are appropriate type and number of cranes employed

g) Have anchor points been checked to ensure that they are able to resist any force likely to be placed upon them

The safety precautions are as follows:

a) The electrode holder should have a fully insulated holder fitted with a shield

b) The electrode holder should be unplugged when not in use

c) The welding current must be returned from the welding piece to welding set by means of a separate welding lead

d) The work piece must be connected to earth

e) Welding earths and welding returns should be securely attached to the work

f) Person assisting the welder, should also wear the protective eye wear

g) A suitable approved fire extinguisher should be ready for instant use

h) Areas below welding and cutting operation shall be barricaded

6) Safe Work Practice- Diaphragm Wall

a) Grabbing machine shall be placed over firm base, by checking soil conditions.

b) Do not erect grabbing machine close to live electric lines.

c) All employees should wear necessary PPEs.

d) Barricade the grabbing machine swing area so that workers cannot be drawn into them.

e) Take adequate precaution for preventing overturning of grabbing machine.

f) Provide stirrups or other effective means to prevent rope coming out from the top pulley.

g) Ensure that only authorized trained operators operate grabbing machine.

h) Use tag lines for holding cage and ensure that all workers and general public are kept away from the reach of cage.

i) Bentonite, in no case is allowed coming over the road and create nuisance.

j) During reinforcement cage insertion, its lifting shall not be done over at the site. A signalman/safety supervisor shall restrict traffic movement during this activity.

k) Ensure that crane capacity is adequate.

l) Minimize distance for traveling of crane with load of the rebar cage.

m)Dispose of grabbed muck as early as possible.

n) Provide barricade for grabbed area

7) Safe Work Practice- Material Handling

All lifting appliances, including synchronized mobile jacks, pit jacks, mobile cranes, tower cranes, gantry cranes, launching beams and lorry mounted cranes etc., prior to being are allowed to work on site will be available for safety inspection at the site and should have certificates of safe operation. Load indicators/ charts shall be fitted with these equipment. All lifting appliances will be maintained in accordance with the manufacturer's instructions and will be subjected to the preventive maintenance programme. Fully trained and well-experienced operators will be allowed to operate the cranes

8) Safe Work Practice: Lifting Operations

One shall ensure that during the course of any lifting operations the following minimum requirements shall be followed:

a) Only thoroughly trained and experienced persons are allowed to sling loads and give directions to crane operators.

b) A standard code of hand signals shall be adopted for controlling the movements of the crane and both the driver and the signal man shall be thoroughly familiar with the signals.

c) Before commencing any lifting operations the ground conditions on which the crane is to stand shall be investigated in order to ensure that the load bearing capabilities are adequate.

d) No unauthorized persons are not allowed into the lifting zone.

e) All crane hooks shall be fitted with an operable safety latch.

f) Wherever practicable all load shall have tag lines attached in order to ensure that the load can be safely removed from the latch once they have been landed.

g) All lifted loads and stacked materials shall be left in a secure and stable condition at all times.

h) No close working to any live overhead power-lines is permitted without the operation of a strict Permit to Work System being in place.

9) Safe Work Practice-Heavy Plant and Machinery.

1. It shall be ensured that only safe and well-maintained plant and equipment shall be allowed to operate on any of the sites.
2. No unauthorized person shall be permitted to ride on plant.
3. The operators shall conduct daily inspections of their respective items of plant.

Crawler / Truck Crane

i. Check daily that all ropes are correctly positioned on their Shelves and drums have not been displaced.

ii. Visually check that no Electrical equipment is exposed to contamination by oil, grease, water or dirt and that no loss of fluids such as lubricating oil and coolant is apparent.

iii. Check that the correct air pressure is maintained in pneumatic control system.

iv. Check that lights operate efficiently.

v. Visually check the security of wheels and the condition of tyres on wheel-mounted cranes.

vi. Check correct function of all crane controls without load. Always lift loads gently to avoid swinging of loads. Do not pull a load sideways. Do not lift loads while the crane is on a slope.

vii. Ensure that the signal man stands in a secure position where he can see the load and can be seen clearly by the driver.

viii. Check satisfactory operation of all audible – warning devices

10) Safe Work Practice- Electrical Safety:

a) A Graduate Electrical Engineer shall be appointed, under whose able supervision only, all electrical systems will function.

b) Qualified and suitably categorized electricians shall execute rest supervisory works.

c) All cabling shall be done at high level, wherever possible and firmly secured. Cables should not be kept lying on the ground and are protected from sharp edges of objects.

d) Earthing and bonding shall be provided for all electrical installations.

e) Plugs and fittings of weatherproof type shall be used.

f) All DB shall be given numberings.

g) RCCB/RCB/MCCB/MCB etc. may be used at site at required locations.

h) Electrical engineer shall also carry out strict maintenance and regular checks. He will maintain the record of electrical maintenance schedule and inspections and will submit to the employer as and when required.

i) Contact number of electrical engineer shall be given to all site engineers/supervisors to contact in case of emergency.

j) All personnel engaged in electrical work shall be made familiar with method of giving artificial respiration.

k) Current more than 50 m.a. are dangerous.

l) Working under overhead lines shall be carefully inspected for required clearances.

m)All personnel shall wear necessary PPEs.

Golden Rules for Electrical safety:-

i. Use of correct size cable with right specifications.

ii. Good insulation.

iii. Correct rating of fuses.

iv. Use of circuit breakers.

v. Proper earthing.

Live high voltage line work

i. Electrical work on exposed live high voltage conductors or exposed live parts of high voltage electrical equipment must not be carried out unless authorized in writing.

ii. A person may be authorized to carry out live line work if

- He/she has successfully finished a course of training approved by the electricity safety regulator and provided by a training provider approved by the electricity safety regulator;
- Has been assessed (proof of which is required) by the training provider as competent to carry out the work and;
- Is equipped with the necessary specialized Personal Protective Equipment to protect the worker from the risks of Arc Flash.

iii. All workmen working on the Project shall ensure that all portable appliances, extension leads and flexible chords are tested. Records of such inspections/tests are to kept and produced on request.

Reporting of Incidents:

i. Persons witnessing an incident or near miss occurrence shall report same to the safety officer/his appointed representative. In the event of the incident, accident or near miss, persons on site shall assist safety investigators by providing security information in a timely manner. Persons found to have intentionally withheld requested information during a safety investigation will be subject to disciplinary action that may include dismissal from the project.

ii. The safety officer/his or her appointed representative and duty supervisor/foreman/first aider shall administer first aid treatment to the injured person(s). If the injuries are minor, the safety officer/his/her appointed representative shall arrange for the injured to see a doctor. For major injuries, the safety officer/his or her appointed representative shall call an ambulance and inform the next – kith & kin, statutory bodies and if necessary, the police. The duty supervisor/foreman shall accompany the injured person (S) to the hospital.

iii. If the information is given to the safety officer or his/her appointed representative, he/she will inform the safety officer immediately. The safety officer shall inform the project manager of the accident as soon as possible. If the accident resulted is a major incident or serious injury than the project manager shall in turn report to the employer's representative.

iv. For a major incident or serious injury, the safety committee members shall assemble to investigate the causes of the accident. The duty supervisor/foreman shall write an accident report within 24 hours of the accident occurrence and submit it to the project manager and safety officer.

v. The Project Manager shall organize an extra-ordinary meeting of the safety committee to discuss the findings of their investigation and propose corrective and preventive measures to prevent recurrence of similar accident. All supervisors/foreman shall inform all workers of these measures and implement them.

vi. The safety officer shall complete the accident/incident report and submit to CPM/client within 24 hours and compile the monthly accident statistics. For major accident, he shall submit a copy of the report to safety department/client as per requirement.

vii. The safety officer shall investigate all the dangerous occurrence/accidents incidents as per the statutory requirement.

11) Safe Work Practice- Hot Works (Welding and Cutting)

i. All equipment must be in good condition, properly installed and routinely inspected by a competent person.

ii. Any Hot Works before starting of the work will get Permit to work for hot work weekly permit from concern person and get it signed from authorized person

iii. Flexible hoses, cables and connections must be free from damage or risk of damage in service. Cables and hoses shall have adequate carrying capacity.

iv. Welders shall wear the correct personal protective equipment, which includes the following:

- Face and eye protection with approved make of shield.
- Gloves.
- Safety footwear.

v. Safety guidelines –

- Remove combustible materials beyond the area of sparks and spatters.
- No tarpaulin shall be used as protection against sparks.
- Work site after completion of work shall be thoroughly checked to ensure that fire is not smoldering.
- A fire extinguisher shall be placed at each section (Location – Near DG).
- Heated surfaces should be cleaned, which may have tendency of emitting noxious fumes.
- Cylinder trolley use shall be enforced and cylinders be kept upright.
- Gas leakages should be checked routinely.
- Flash back arresters shall be utilized.

12) Safe Practice For Diesel Or Flammable Liquid Storage, Handling And Monitoring:

STORING

i. Container shall be stored in a prefabricated structure made up of steel or block or masonry work.

ii. Containment wall and floor shall be restricting any chance of rain water accumulation, fire and vehicle.

iii. Stored in isolated place, minimum employees are exposed

iv. Properly ventilated with designated walkways and non-slip floors

v. Provided with spillage retaining arrangements

vi. Free of source of ignition, such as unprotected electrical equipment, sources of static electric sparks, naked flames or smoking materials

vii. Arranged so that incompatible chemicals do not be mixed together, even during fire emergency

viii. Clear of from combustible materials

ix. Firefighting arrangements such as foam type extinguishers should be made available

HANDLING

a) The person handling diesel must be competent to consider the risk and the adequacy to control and other measures put in place

b) The person handling must be provided with appropriate PPE and necessary instruction on personal hygiene and safety.

c) Emergency contact numbers should be available to the person handling diesel

d) The person handling diesel must be provided with procedures for avoiding and dealing with spillage

e) The MSDS must be avoidable with the person handling diesel

f) Proper housekeeping to be ensured by handler of diesel

g) Storing of inflammable material nearby diesel storage area avoided

x. Sign boards shall be written in English and Dzongkha and Hindi and will be conspicuously displayed

MONITORING

i. Housekeeping procedures (example keeping lids on container and avoiding contaminated rags

ii. Personal hygiene and information instruction and training to the handler

iii. Drum shall be maintained with proper marking and tags...

iv. Any new hazard and movement of unauthorized persons

v. Lack of control, fault / weakness or omission in performance standard

vi. Storing of inflammable material nearby diesel storage area

vii. Sign boards shall be written in English and Dzongkha and Hindi and will be conspicuously displayed

MATERIAL SAFETY DATA SHEETS (MSDS)

i. Materials from chemical origin often embody either physical or health hazards to a certain extent during use/operations. A Material Safety Data Sheet (MSDS) of that specific material and information on how to use, handle and store it safely shall be available. The MSDS also contains emergency and First Aid information for treating overexposure. The purchase of chemical materials, such as concrete mixtures, paints, solvents/thinners, silicone & other kits, adhesives/glues, must also include the supply of the MSDS of that specific material together with the delivery of the goods.

SAFE PRACTICE DURING WORK OVER WATER

HAZARDS: FALL IN THE WATER

WORK INSTRUCTION:

LIFE JACKETS- :

a) Read the life jackets instructions.

b) Adjust the life jacket according to the instructions

c) Jumping from heights over 10 meters should be avoided. Because when one jumps the life jacket wants to go up while one are going down. This may result in serious injuries.

d) Therefore one should keep One's life jackets in place by firmly holding it down. With the other hand one should protect one's nose against an injection of cold water.

e) Swimming with a life jacket on, should be done on one's back, by using both the hands as raft.

f) Never throw the life jacket away but take it with you in the raft.

LIFE BUOYS- :

i. There should be minimum of 6 numbers of life buoys on the working platform. The buoys should be made of a solid buoyant agent. A lifeline should be fixed around the buoy to make it easier for the person in distress to hold on to it.

ii. All the approved buoys should be either white and red or orange colored, carry a reflecting band & identification mark in working platform

iii. The function of life buoys is not primarily to be used during abandonment but they are also provided for saving individuals in the water that are in danger of drowning**.**

iv. One enters the life buoy by putting both the hands on the buoy & then pressing it down and away from you so that it tilts over your head. Then place the buoy under your arms and wait for assistance (Move as less as possible). This will reduce the heat loss.

v. If you throw a buoy to a person in the water, you should throw it so that he can first seize the line. This is the easiest way.

Housekeeping:

i. Adequate attention will be given for HOUSEKEEPING and it will be ensured that all scraps, wastes, etc. generated at work sites due to work activities will be removed from there and disposed-off at suitably identified locations as per statutory requirements.

ii. It will also be ensured that proper access and egress will be maintained at work site while storing/D-wall the materials for the execution works and, no unwarranted materials will be kept abandoned at the work locations.

Manual Handling

i. Prior to any manual-handling task a hazard assessment shall be conducted to determine:

- Does the load need to be moved?
- Can it be handled by one person or is help required?
- Can mechanical lifting aids be used?
- Is the route and destination clear?
- Are there stairs or grade involved in the move?
- Required PPE utilized? (Gloves)
- Has the worker been trained on manually handling procedures?

ii. Mechanical lifting aids will be considered as the first option in moving any load. All manual lifting activities will be conducted by ensuring personnel have been trained in

- Proper lifting techniques. All personnel must ensure that they first consider mechanical lifting devices as primary option, and as the secondary option personnel should

request assistance with the lift, planning the lift, ensuring the area of travel is clear of tripping hazards, lift with your legs and not with your back.

Critical Lifts

1. A critical lift is defined as one that:

   - Exceeds 20 tons;
   - Exceeds 75% of the crane's rated capacity;
   - Requires two or more cranes for critical lifts
   - Is conducted over operating or power plants;
   - Is conducted over electrical/instrument cable trays or within 10m of power lines;
   - Is conducted over live or sensitive operating equipment;
   - Is working over or near water;
   - Is over occupied quarters and buildings;
   - Involve personnel cages/work boxes.

2. All critical lifts will require lift plans signed and sealed by a professional engineer. They will also require a JSA specific to the work being carried out.

Operator Competency:

i. All personnel that will operate a crane or other lifting and any other mobile equipment shall be required to submit photocopies of all appropriate qualifications and their employer shall be required to submit documented proof of a competency test prior to operating machinery on the site.

APPENDIX 2: HSE INDUCTION PROGRAM

i. All new personnel will be given safety induction course on basic safety

ii. Requirements of the project and significant features of the construction work relating to the safety when he or she arrives at site. The lesson shall be given by Safety Officer or his subordinates.

iii. The primary objectives of the induction course are to:

- Stress the important of safety
- Teach how to avoid accidents
- Contribute to developing Project Safety
- Guide employee in exercising safe working condition
- Stress the importance to meet the safety target
- stress the importance of good housekeeping
- Instruct on the proper use of personnel protective equipment
- Inform employees of the Emergency Evacuation Procedure
- Highlight main hazards/risks involved in the works
- To explain safety Rules & Regulations implemented on the project

iv. It is a mandatory that all employees attend the safety induction course prior to starting their work. No employee will be permitted to work on the construction site without having attended the safety induction course.

v. The safety induction course will also serve to inform all personnel that failure to work safely and follow safe practice will result in disciplinary action, which may include expulsion from the site.

Safety Training for Managers

i. Management training is intended to provide the knowledge, motivation, skill necessary to manage the safety and health programme. A two-day training programme on "Construction Safety" as per the content enclosed in table: 9 above will be conducted to all Supervisors/Managers. Safety Officer in consultation with PM (Project Manager) / Dy.PM will identify who should attend a particular course relevant to his / her work.

Trade and Skill Training

a) Safety officer, in consultation with the PM/ DY. PM, will determine that a jobholder is competent to do his job safely and ensure that appropriate training is given. Trade and skill training that is required in the construction industries are:

- Lifting Supervisor
- Crane operator
- Scaffold Supervisors

- Excavation/Shoring/Piling Supervisor
- Excavation Work
- Welding/ gas cutting operator
- Batching plant operator
- Excavation/Shoring/Piling Supervisor.
- Excavation work
- Excavator/ dumper/ tipper operator
- Electrical workers

b) First- Aid training

c) Emergency preparedness training

d) Job specific training

e) **AFCONS** and Sub-contractors shall ensure that such training is provided either by approved institutions or in-house.

Other safety training

i. Other safety training such as emergency preparation, first aid training and firefighting training and Health briefing training STD/HIV AIDS Awareness will be developed and carried out by AFCONS or in conjunction with the relevant body or organization Safety training will be a continuous exercise and will be regularly imparted through refresher courses, seminars, talks, symposiums etc.

ii. Refresher training shall be given once in every six months.

Safety Training Attendance Records

a) **Environmental Training**

Regular environmental training for both staff and workers will be conducted to increase environmental awareness. The details of the training given to employees will be maintained.

b) **Health checkup and Pest control**

Health checkup will be done once in a year for all the employees and workers and to find out HIV/AIDS and malaria and dengue fever and two week once fogging and chemical spraying will be done in and around office and camp area based on the requirement, the frequency will also be increased as per the requirement. All the workers and employees who are monitored regularly and who are in doubt for drugs will be out to drug test. All the workers and employees will only be allowed to join the duty after the normal medical screening.

APPENDIX 3: DISCIPLINARY PROCEDURE

i. AFCONS has implemented a policy whereby persons, both AFCONS and subcontractor's staff, found violating safety rules are subject to disciplinary actions.

ii. Persons are warned in advance and given the opportunity to correct their infractions.

iii. Persons with poor records of overall safety performance found to be in violation of safety rules and who fail to correct their offence when verbally instructed to do so, will be fined Nu.200/ per occasion- individually.

iv. AFCONS safety staff can provide additional information on which violations involve fines. Note that all funds collected through safety violation fines are channeled back into and used for safety promotion activities.

- Fines will be assessed for safety offence and infractions.
- The fines will be deducted from the progress payments for the subcontractor's work.
- The Safety Officer shall inform workers of safety offence and infractions that are subject to fines.
- Severe actions will include removing the person from the project involved in repeated transgressions of Safety requirements.

APPENDIX 4: AGENDA FOR THE MANAGEMENT REVIEW MEETING

I. Confirmation of the Minutes of Previous Meeting

II. Overview of Site HSE Performance

III. Accident/Incident Investigation/Dangerous Occurrence/near miss report

IV. Report from CLIENT

V. Internal Audit Findings

VI. Risk assessment

VII. Corrective and Preventive Actions

VIII. Suitability of HSE Policy

IX. Status of achievement of HSE Objectives and Targets

X. Concerns of Interested Parties

XI. Legal changes and their effect

XII. Any other business

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INDUCTION TRAINING FORMAT

Date:

Topics:

Conducted By:

Sl.no	Name	Designation	Signature

Signature of Safety Officer_____

TOOL BOX TALKS

Date:

Topics:

Conducted By:

Sl.no	Name	Designation	Signature

Site Engineer: _____

Safety Officer: _____

ACCIDENT/ INCIDENT REPORT FORM

Project:

Date and Time of the accident:

Location:

Name of sub- contractor if any:

Particulars

1. Equipment involved :

(b) Operator/ Driver:

(c) Supervisor/Engineer:

(d)Activity going on:

(e)Name of the injured:

(f)Damage to equipment:

(g)Damage to outsider's property:

Description of the accident

Causative Factors:

1. Unsafe conditions

(b) Unsafe Acts:

Action to be taken to prevent reoccurrence:

Project Manager **Safety In-Charge**

CRANE OPERATION CHECKLIST

PROJECT :					
DATE :	**TIME :**				
No	**ITEM**	**Compliance**			**ACTION**
		Yes	**No**	**N/A**	
1	Has the crane been inspected by an approved within the past 12 months?				
2	Is the driver or operator of the crane certified crane driver?				
3	Is the crane provided with safe working load indicator visible to the operator, showing the radius of the jib and the corresponding safe working load and giving a warning signal when the crane is overloaded?				
4	Have all hooks, slings, shackles, rings, ropes, swivels/eyebolts etc. been inspected by an approved person during the past 6 months?				
5	Are the safe working loads of hooks, slings, shackles etc. clearly marked?				
6	Are lifting hooks provided with safety latches to prevent lodes from slipping off accidentally?				
7	Are the booms or jibs of the cranes and pilling Machines during operation or at standstill position, orientated in such a manner as to prevent the possibility of a collapse across the carriageway, public area etc. ore against adjacent building/structures?				
8	Is the footing for the crane provided?				
9	Is the lifting operations supervised by a lifting Supervisor?				
10	Are crane lodes ,lifted vertically so as to prevent swinging during hoisting				
11	For loads, which have a tendency to swing or turn freely, is a tag line used to the load?				
12	Is any load lifted over personal? (this is not permitted)				
13	Are all 'loose' lifting gear e.g. wire ropes shackles etc. in good visible condition?				
14	Is the crane cabin locked when the crane is not in use and during meal breaks?				
15	Is the crane being operated where it can over swing public roads and have appropriated precaution been taken?				
16	Is the crane operated more than 3 meters away from any live power line and have appropriated precautions been taken?				
17	Is the crane operated more than 6 meters away from any rail line and have appropriated precaution been taken?				

CPE / SITE ENGINEER SAFETY OFFICER

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CHECKLIST FOR DIAPHRAM WALL

Safety Checklist for D-wall works

Contractor		AFCONS infrastructure Limited	Project Name	PTDP	
Location			Inspection Date		
Weather	Sunny Cloudy Rainy Typhoon		Inspection Time		Week day

No	Items of Inspection	Status		Rectification
		(Yes)	(No)	
1	Check for PPE, hardhat, used by the workers			
2	Check the Certificates of Plant, equipment and Operators are valid			
3	Warning Signboards around construction area			
4	Security/Traffic Marshal measures for prohibiting entry of Unauthorized personnel			
5	Work area free from high-voltage power lines			
6	Work area barricading			
7	Proper arrangement of equipment installation			
8	Competent supervisor is available at work location			
9	Crane swing area is cordoned for mucking operation			
10	Tool Box talk Meeting conducted prior to commencing of work			
11	Bentonite/Polymer Slurry plant has been properly placed and its operations checked w.r.t working plat form			
12	Work methodology of the activity explained to all the key personnel and workmen involved in that activity			
13	Availability of First Aider Facilities at site			
14	Utility services inside the construction area is protected			
15	Utility markers inside the construction area is provided			

Safety Checklist of D-wall works (contd.)

No.	Items of Inspection	Status		Rectification
		(Yes)	(No)	

Today's Work Status		Instructions by Construction Manager	
Inspected and signed by Site Engineer Safety Officer			

Format no: F-HSE-12

CHECKLIST FOR EXCAVATION

Sr. No.	Item	Yes	No	Remarks
1	Prior to start, whether all existing utilities has been Identified & removed / isolated / protected?			
2	Whether the sides adequately supported by bracing and shoring for trenches more than 1.5 m depth in Loose soil / clay?			
3	Did all excavated or other materials store or retain at least 1m or more from the edges of the excavation?			
4	Barricades have been provided to all excavations?			
5	Are employees equipped with adequate PPE's i.e. Reflective jacket, safety helmet, safety shoes etc.?			
6	Are excavations inspected by a competent person after every rainstorm or other hazard increasing Occurrences?			
7	Is there an emergency control measure available in Case of side collapse?			
8	Whether adequate access has been provided to excavated pit i.e. ramp, ladder etc.?			
Inspected and signed by : **Site In-charge :** **Safety Officer**				
Date:	**Location:**			

HOT WORK PERMIT

PERMIT NO ---------- *INITIATION DATE: ----------*

CONTRACTOR ---------- Name of the person doing Hot work----------

WORKDESCRIPTION----------

LOCATION----------

DATE REQUIRED FROM ---------- TO ----------

VALIDITY ----------

SAFETY PRECAUTIONS TO BE TAKEN

Sl. No.	PRECAUTIONS	YES	N.A	REMARKS IF ANY
1	Has the area immediately below or near by the work spot been cleared away or non-movable are covered from flammable materials?			
2	Has gas concentration been tested in case there is gas valve / gas line nearby?			
3	Have suitable fire extinguishers been kept handy at site?			
4	Has tin sheet/fire blanket been placed to prevent sparks from causing fire?			
5	Any fire watch personnel posted till 1 hrs. Of finishing the job?			
6	Has the supervisor informed the associated risks to the workforce? (Finding of risk assessment in form of TBT)?			
7	Gas cylinders fitted with a vertical position on a trolley and fitted with regulator and flash back arrestor?			
8	Are all required personnel protective appliances (Apron, welding sheets, gloves, etc.) provided?			

	PERMIT INITIATOR	

I CONFIRM THAT THE SAFETY PRECAUTIONS SPECIFIED SHALL BE ADHERED TO

NAME: ---------- SIGNATURE: ----------

CONTRACTOR: ---------- DATE: ----------

I hereby authorize the operation to proceed subject to full compliance with the necessary precautions: -

AREA MANAGER / DEPUTY	**PERMIT CONTROLLER**
NAME: ----------	**NAME: ----------**
SINGNED: ----------	**SIGNED: ----------**
DATE: ----------	**DATE: ----------**

Note: -

1. Copy of the permit must be made available with the working crew and should be projected to safety representative.
2. Only certified welders are permitted to do the welding/hot work.
3. Carrying out HOT WORKS without having valid permit is not permitted.
4. 4. Report any incident to your immediate authority at once.

APPENDIX 6: JOB SAFETY ANALYSIS

AFCONS INFRASTRUCTURE LIMITED

JOB SAFETY ANALYSIS

Assessment date:20-11-2018 Doc No.JSA/6462/HSE/01
Job No: 6462 **Activity: Guide wall & D wall** Revision: 0
Assessor: Ashok Kumar Reviewed on:

Sl. No	Task/Activity	Potential Hazard	Hazard effect	Control Measures	Re-marks
1	Mobilization (Shifting of Material)	Fall of material while loading /unloading by manual and mechanical means.	Injury to persons Damage to property	a) Toolbox talks to be given before starting of the work b) Tested Cranes c) Tested lifting tools & tackles d) Standard lifting procedure e) Competent operator f) Use of PPE, Safety Helmet, Safety Shoes and safety vest	
2	Construction of Bentonite/Polymer tanks and installation of M.S water tanks with pumps and fitting	a)Fall of Person into the excavated pit from inside overhead tank b)Collapse of excavation	Injury to persons	a) Toolbox talks to be given before starting of the work b) All excavated area should have proper slope according to angle of response c) Barricades around excavated pits d) Use of PPE. Safety Helmet, Safety Shoes and safety vest	

3	Equipment/Vehicles movements	Failure due to wrong signaling & absence of reverse horn on vehicles	Injury to persons	a) Toolbox talks to be given before starting of the work b) An authorized signalman should control all lifting operations at site c) reversing procedure to be followed d) Use of reverse horns	
4	Erection & Operations of crane	a)slipping of wire b)snapping of wire	Injury to persons	a)Toolbox talks to be given before starting of the work b) Use tested quality wire rope c) Use correct No. of dog clamps. d) wire to be inspected once a week e) personnel to be kept away from radius of operation of crane	
		Failure of boom	Injury to persons Damage to property	a) inspect boom once a week for damages if any b) lift only with SWL c) Ensure that the area is barricaded and personnel kept away d) Limit switches to be in place	
5	Guide wall Excavation	a)Collapse of excavation b)person fall in to excavated pit	Injury to persons	a) Toolbox talks to be given before starting of the work b) All excavated area should have proper slope according to angle of response	

				c) Barricades around excavated pits d) Use of PPE. Safety Helmet, Safety Shoes and safety vest	
6	Grabbing of D wall	Non provision of grating and spillage due to Bentonite muck & boring mud in or around the trench	Chances of person to fall into the trench.	a) Toolbox talks to be given before starting of the work b) Fabrication of proper and good quality grating for covering the trench. As soon as boring is completed it should be covered immediately. c) Fully equipped ambulance to be made available at site round the clock	
		Removal of muck Slip/trip spillage of muck	Injury to persons	a) Toolbox talks to be given before starting of the work b) Provide bunds where muck is stored c) Dispose-off muck to low lying area fillings d) Removal of muck through trucks without any spillage e) Barricade the area by hoarding board f) use of PPE's Safety Helmet, Safety Shoe, and Safety vest	
		Collapsing of cage at	Injury to persons Damage to property	a) Use standard slings b) Trained Signalmen/ bank's man	

				c) Certified lifting gear	
		Presence of person under the swing area of crane	Injury to persons	a) Mark the swing area of crane with caution tape and displaying signboard	
		Breaking of steel wire rope and falling on	Injury to persons	a) Steel wire rope to be checked for damage.	
			Damage to property	b) Ensure operator shed is available	
7	Concreting	Tremmie pipe swing or fall	Injury to persons	a) Toolbox talks to be given before starting of the work b) Always use single guy rope while lifting and double guy rope while shifting of tremmie pipe	
		Reversing of transit mixer	Chances of person getting Struck-Injury of persons Run over by vehicle	a) Provision of banks man/helper and installation of reverse horn while reversing transit mixer.	
		Concrete pouring in concrete pump	Injury to persons Eye injury due to splash	a) Operator should always wear white goggles and hand gloves during concrete operation.	
8	River leveling	Collapse of soil Equipment unbalanced	Injury to persons Damage to property	a) Toolbox talks to be given before starting of the work b) check the ground condition provide proper support to the equipment c) Check the vehicle condition	

				d) before starting of the work e) proper barricades should be done wherever required and sign boards f) Proper bank's man provided for vehicles	
9	Back Filling	Un-leveled soil condition Unloading of materials for back fill	Injury to persons Damage to property	a) Toolbox talks to be given before starting of the work b) water sprinkling should be done c) proper barricades should be done wherever required and sign boards d) Proper bank's man provided for vehicles	

Annexure 6: Construction and Demolition Waste Management Plan

1. During the project about 0.60 MT/Day construction waste will be generated from various construction works and activities. According to the waste management hierarchy, waste reduction, reuse and recycling is most preferred than disposing it in landfill. The general construction waste that will be generated are:
   a) Concrete Debris
   b) Concrete blocks
   c) Steel or metal
   d) Wooden waste
   e) Plastics
   f) Tiles, bricks, etc.
   g) Soil
   h) Mortar
   i) Cement Bags

Measures to manage the construction waste

2. The majority of construction and demolition waste that will be inert material and will be utilized or reused within site as filling material after proper testing.

3. Plastic is now considered a highly recyclable material, much of the plastic generated during construction will be diverted from landfill and recycled through locals crap dealer. The plastic will be segregated at source and stored in scrap yard.

4. There will be timber waste generation form the construction work as off-cuts or damaged pieces of timber. That timber will be reused for shuttering purpose.

5. Steel is highly recyclable waste material, the steel that will not be reused or recycled will be sold to authorized metal scrap dealers in Phuentsholing.

6. Proper waste management will be done only by proper segregation for that various waste categories are mentioned in **table 1** with its storage method along with their suitable disposal method.

7. Cements bags will not be generated in much quantity as the cement for batching plant will be taken from the manufacturer directly in bulkers and stored in silos.

Table 1: Waste Segregation and Disposal Technique

S. No.	Types of Waste	Storage	Disposal Technique/Method
1.	Concrete waste, brick, tiles	Designated construction waste yard	Reuse at site as filling material
2.	Metal & Plastic waste	Scarp yard	Sold to scrap Dealer
3.	Wood waste	Scrap yard	Reuse for shuttering purpose
4.	Reused Bentonite	Designated area within Project area	Designated landfill

Annexure 7: Weekly Environment Inspection Checklist

AFCONS INFRASTRUCTURE LIMITED / Shapoorji Pallonji	PHUENTSHOLING TOWNSHIP DEVELOPMENT PROJECT (6462) Environment Inspection Checklist			
Inspection Date:				
Inspected by:				
Environmental Protection Measure	Compliance?			Remarks/Comments (i.e. specify location, good practices, problem observed, possible cause of non-conformity and/or proposed corrective/preventative actions)
	Yes	No	N/A	
1. Air Pollution Control				
1.1. Are the construction sites watered to minimize dust generated?				
1.2. Are stockpiles of dusty materials (size with more than 20 bags cement) covered or watered?				
1.3. Cement debagging process undertaken in sheltered areas				
1.4. Are all vehicles carrying dusty loads covered/watered over prior to leaving the site?				
1.5. Are demolition work areas watered? (e.g. trimming activities by using breaker)				
1.6. Are dusty roads paved and/or sprayed with water?				
1.7. Are plant and equipment well maintained? (any black smoke observed, please indicate the plant/equipment and location)				
1.8. Is dark smoke controlled from plant?				
1.9. Is black smoke detected from DG sets?				
1.10. Are there enclosures around the main dust-generating activities?				
2. Water Pollution Control				
2.1. Is wastewater treatment system being used and properly maintained on site?				
2.2. Is on-site drainage adequate and working appropriately?				
2.3. Are all manholes on-site covered and sealed?				

3. Noise Control				
3.1. Do air compressors and DGs operate with doors closed?				
3.2. Is idle plant/equipment turned off or throttled down?				
3.3. Any noise mitigation measures adopted (e.g. use noise barrier / enclosure)?				
3.4. Are all vehicle and equipment properly maintained?				
4. Waste Management				
4.1. Is the site kept clean and tidy? (e.g. litter free, good housekeeping)				
4.2. Are Wastes segregated in designated containers?				
4.3. Are all waste containers suitably labelled and in good condition?				
4.4. Are construction wastes / recyclable wastes and general refuse removed off site regularly?				
4.5. Are chemical wastes, if any, collected and disposed of properly by licensed collectors?				
4.6. Are chemical wastes properly stored and labelled?				
4.7. Are oil drums and plants/equipment provided with drip trays?				
4.8. Are drip trays free of oil and water?				
5. Storage of Chemicals and Dangerous Goods				
5.1. Are chemicals stored and labelled properly?				
5.2. Are proper measures to control oil spillage during maintenance or to control other chemicals spillage? (e.g. provide drip trays)				
5.3. Are spill kits / sand / saw dust used for absorbing chemical spillage readily accessible?				
6. Resource Conservation				
6.1. Is water recycled wherever possible for dust suppression?				
6.2. Is water pipe leakage and wastage prevented?				

6.3. Are diesel-powered plants and equipment shut off while not in use to reduce excessive use?				
6.4. Are energy conservation practices adopted?				
6.5. Are metal or other alternatives used to minimize the use of timber?				
6.6. Are materials stored in good condition to prevent deterioration and wastage (e.g. covered, separated)?				

(HSE In-charge) (Environment In-charge)

Annexure 8: Monthly Environment Monitoring Report Outline

1. Introduction

    1.1. Report Purpose

    1.2. Project Update

2. Work in Progress

    2.1. River Training Works

    2.2. Embankment Works

    2.3. General Earth Filling Works

    2.4. Promenade Finishing

    2.5. Irrigation and Landscape Works

    2.6. Site Access and mobilization

    2.7. Work Areas, Storage, Camps and office establishment

    2.8. Environmental Monitoring and Assessments

3. Ambient Environmental Monitoring of the site

    3.1. Details of monitoring

    3.1.1. Air Quality

    3.1.2. Water Quality

    3.1.3. Noise

    3.1.4. Soil

    3.1.5. Weather

    3.1.6. Biodiversity

3.2. Summary on status of the ambient environment

4. Waste Monitoring Program

4.1. Details of Monitoring conducted

4.1.1. Waste

4.1.2. Discharge

4.2. Results of monitoring

4.3. Assessment[1]

5. Occupational Health and Safety Monitoring Program

5.1. Details of trainings, awareness and inductions carried out

5.2. Summary of Occupational Health and Safety Monitoring

5.3. Accident statistics of the month

5.4. Issues, Challenges and recommendations on OHS

5.5. Assessment[2]

[1] Discharge levels should be compared to the relevant discharge standards and/or performance indicators noted in the CEMP. Any exceed should be highlighted for attention and follow-up. In addition, discharge levels could be compared to baseline conditions and described in qualitative terms or be evaluated based on a ranking system, such as the following:

1. Very Good (overall conditions are generally improved)
2. Good (conditions are maintained or slightly improved)
3. Fair (conditions are unchanged)
4. Poor (conditions are moderately degraded)
5. Very Poor (conditions are significantly degraded)

Additional explanatory comments should be provided as necessary.

[2] Discharge levels should be compared to the relevant discharge standards and/or performance indicators noted in the CEMP. Any exceed should be highlighted for attention and follow-up. In addition, discharge levels could be compared

6. Actions Tracking Report

6.1. Actions Identified from last month and Status

6.2. Additional issues and actions required for next month

7. Conclusion

7.1. Overall Progress of Implementation of Environmental Management Measures[3]

7.2. Problems Identified and Actions Recommended

Appendices

1. Site Inspection / Monitoring Reports (daily, weekly)
2. Ambient Monitoring Results
3. Photographs

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to baseline conditions and described in qualitative terms or be evaluated based on a ranking system, such as the following:

1. Very Good (overall conditions are generally improved)
2. Good (conditions are maintained or slightly improved)
3. Fair (conditions are unchanged)
4. Poor (conditions are moderately degraded)
5. Very Poor (conditions are significantly degraded)

Additional explanatory comments should be provided as necessary.

[3] Overall sector environmental management progress could be described in qualitative terms or be evaluated based on a ranking system, such as the following:

1. Very Good
2. Good
3. Fair
4. Poor
5. Very Poor

4. Permits and clearances

5. Others

ANNEXURE-2

Work Permit Details of Afcon's Staff

S. No.	Name	Job Category	Work permit No.	Issue Date	Sanction	Validity
1	Ravichandran	Project Manager	202120041306357	05.10.2018	1000000245842	30.09.2019
2	Dilip Kumar Suryawanshi	Construction Manager	202110031319142	15.11.2018	100000024799 7	13.11.2019
3	Bhaskara Rao Bondala	Quality Control Manager	202113051321206	23.11.2018	1000000248224	18.11.2019
4	Muthukumaran	Mechanical Engineer	202120111318624	15.11.2018	100000024781 5	08.11.2019
5	Sourav Das	Civil Engineer	202120111318621	15.11.2018	100000024781 5	08.11.2019
6	Manohar Lal	Civil Engineer	202120111318622	15.11.2018	100000024781 5	08.11.2019
7	Sunny	Environmental Engineer	202120111318623	15.11.2018	100000024781 5	08.11.2019
8	Kalore Uday	Civil Engineer	202120111318625	15.11.2018	100000024781 5	08.11.2019
9	Rateesh Sankarankutty	Electrical Engineer	202120111318626	16.11.2018	100000024781 5	08.11.2019
10	Selvakumar Manickam Pilla	Civil Engineer	202120111318627	19.11.2018	100000024781 5	08.11.2019
11	Goutam Chowdhury	Civil Engineer	202120111318628	19.11.2018	100000024781 5	08.11.2019
12	Deepak Karoda	Civil Engineer	202120111318629	20.11.2018	100000024781 5	08.11.2019
13	Pranay Das	Survey Engineer	202120111318630	23.11.2018	100000024781 5	08.11.2019
14	Dhananjayan Elango	Civil Engineer	202120151318631	28.11.2018	100000024781 5	08.11.2019
15	Boominathan	Civil Engineer	202120211318632	20.12.2018	100000024781 5	08.11.2019
16	Sujit Mallick	Procurement Officer	202112951319141	15.11.2018	100000024799 7	13.11.2019
17	Panda Bhagaban	Finance Manager	202110031319143	16.11.2018	100000024799 7	13.11.2019
18	Kamlesh Mamgain	Procurement Officer	202112801319144	16.11.2018	100000024799 7	13.11.2019
19	Pulak Das	Finance Manager	202111161319145	19.11.2018	100000024799 7	13.11.2019
20	Sanjiv Kumar Singh	Accounts Officer	202111161319146	26.11.2018	100000024799 7	13.11.2019
21	Deepak kumar ojha	System Analyst	202110671319194	14.11.2018	1000000248009'	13.11.2019
22	Ashok Kumar Shanmugam	Environmentalist	202110471322337	28.11.2018	100000024829 3	19.11.2019
23	Bijendra Kumar Singh	Environmentalist	202120471325884	12.12.2018	100000024887 7	19.11.2019

ANNEXURE-3

WATER MONITORING REPORT

BHUTAN ECOLAB SERVICES, PEKARZHING, P/LING.

INSPIRING ENVIRONMENTAL SERVICES...

TEST REPORT

REPORT NO.:	BES/BW/02
NAME OF CLIENT:	M/s AFCONS
NAME OF SAMPLER:	AFCONS (Environment)
SAMPLE TYPE:	TOORSA RIVER
SAMPLE VOLUME:	1000 ml
DATE OF RESULT DISPATCH:	27/12/2018

Water Quality Analysis (TOORSA RIVER)-Toorsa Township Development Project

PARAMETERS	UOM	WHO PERMISSIBLE LIMIT	CBCB PERMISSIBLE LIMIT	NECS PERMISSIBLE LIMIT	Result	Test Ref.
pH		6.5-8.5	6.5-8.5	6.5-8.5	7.76	Electrometric
mV Ph	µm/cm				-36.5	Electrometric
Dissolved Oxygen Coc. %					75.98	Modified Winkler's method
Electrical Conductivity (EC)	° C		800		94	Electrometric, HI83099, US EPA approved method
Total Dissolved Solute (TDS)	mg/L	750-1500			47	Electrometric,HI98194, USEPA approved method
Temperature	mg/L				20.5	Thermometer
Biochemical Oxygen Demand (BODs) at 20 °C	mg/l	2	2	2	1.098	HI93732-01, US EPA approved method
Chemical Oxygen Demand (COD)	Mg/l				2.801	H193754B-25 US EPA approved method
Total suspended solids (TSS)	Mg/l	25	100	5		Can be analysed in next test
Color	PSU	5	5		1.05	HI93732-01, US EPA approved method
Dissolved Oxygen (mg/L)	mg/l	6	6		9.86	HI93732-01, US EPA approved method
Salinity	mg/l				0.04	Electrometric, Hanna US EPA approved
Phenol	mg/l	0.001	0.001	0.001	BDL	HI 9459-01 US EPA
Sulphate	mg/l	25	25	25	BDL	HI 93751-01, US EPA approved method
Nitrate	Mg/l	45-50	10	10	0.509	HI 93728-01, US EPA approved method
Fluoride	mg/l	1.5	1.5		BDL	HI 93729-01-US EPA approved method
SAR	mg/l					
Ammonical Nitrogen	mg/l	0.05	0.05	0.05	0.0025	HI 93700-01, US EPA approved method

CONTACT NO. +975-17449115/77734954; EMAIL : tenzin85yeshi@gmail.com

TEST REPORT

REPORT NO.:	BES/BW/02
NAME OF CLIENT:	M/s AFCONS
NAME OF SAMPLER:	AFCONS (Environment)
SAMPLE TYPE:	Office Area Bore well
SAMPLE VOLUME:	1000 ml
DATE OF RESULT DISPATCH:	27/12/2018

Water Quality Analysis (Office Area Borewell)-Toorsa Township Development Project						
PARAMETERS	**UOM**	**WHO PERMISSIBLE LIMIT**	**CBCB PERMISSIBLE LIMIT**	**NECS PERMISSIBLE LIMIT**	**Result**	**Test Ref.**
pH		6.5-8.5	6.5-8.5	6.5-8.5	7.99	Electrometric
mV Ph	µm/cm				-62.9	Electrometric
Dissolved Oxygen Coc. %					91.9	Modified Winkler's method
Electrical Conductivity (EC)	° C		800		192	Electrometric, HI83099, US EPA approved method
Total Dissolved Solute (TDS)	mg/L	750-1500			96	Electrometric,HI98194, USEPA approved method
Temperature	mg/L				20.5	Thermometer
Biochemical Oxygen Demand (BODs) at 20 °C	mg/l	2	2	2	0.905	HI93732-01, US EPA approved method
Chemical Oxygen Demand (COD)	Mg/l				1.847	H193754B-25 US EPA approved method
Total suspended solids (TSS)	Mg/l	25	100	5	---	Can be reanalysed
Color	PSU	5	5	5	2.3	HI93732-01, US EPA approved method
Dissolved Oxygen (mg/L)	mg/l	6	6		10.59	HI93732-01, US EPA approved method
Salinity	mg/l				0.08	electrometric
Phenol	mg/l	0.001	0.001	0.001	BDL	HI 9459-01 US EPA
Sulphate	mg/l	25	25	25	BDL	HI 93751-01, US EPA approved method
Nitrate	Mg/l	45-50	10	10	2.31	HI 93728-01, US EPA approved method
Fluoride	mg/l	1.5	1.5		BDL	HI 93729-01-US EPA approved method
SAR	mg/l					
Ammonical Nitrogen	mg/l	0.05	0.05	0.05	0.0025	HI 93700-01, US EPA approved method

BHUTAN ECOLAB SERVICES, PEKARZHING, P/LING.

INSPIRING ENVIRONMENTAL SERVICES...

Water Quality Analysis (Camp Area Borewell)-Toorsa Township Development Project						
PARAMETERS	**UOM**	**WHO PERMISSIBLE LIMIT**	**CBCB PERMISSIBLE LIMIT**	**NECS PERMISSIBLE LIMIT**	**Result**	**Test Ref.**
Mg	mg/l	50	100		0.056	937521-01, US EPA
Na	mg/l	200	200		2.808	HI 937520-01, US EPA
K	mg/l	10	10		0.23	HI937533-01
Chloride	mg/l	200	1000	50	0.067	HI93750-01 US EPA
Cyanide	mg/l	0.05	0.05	0.05	BDL	HI 9358-01
Heavy Metal (lead)	mg/l	0.02	No Relaxation	0.02	BDL	HI 93740-01
Total Coliform	MPN/100ml		No Relaxation	50	MPN/100ml	Can be reanalyzed
Faecal coliform	MPN/100ml		No Relaxation	20	MPN/100ml	Can be reanalyzed
Note: The Given Water sample is healthy and fit for drinking.						

PREPARED BY:

For Bhutan Ecolab Services (BES);

BHUTAN ECOLAB SERVICES ★ PHUENTSHOLING ★

[Authorized Signatory

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