

Initial Environmental Examination

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Development Department

For the Government of Nagaland
North-eastern Region Capital Cities Development Investment Program (NERCCDIP)

The initial environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

ABBREVIATIONS

ADB	— Asian Development Bank
KMC	— Kohima Municipal Council
BOQ	— Bill of quantity
CBO	— Community-based organization
CDP	— City Development Plan
CFE	— Consent for Establishment
CFO	— Consent for Operation
CGWB	— Central Ground Water Board
CLC	— City Level Committee
CPHEEO	— Central Public Health and Environmental Engineering Organization
DSMC	— Design Supervision and Management Consultant
DTW	— Deep Tube Well
PHED	— Drinking Water and Sanitation
EAC	— Expert Appraisal Committee
EARP	— Environment Assessment Review Procedure
EARF	— Environmental Assessment Resettlement Framework
EIA	— Environmental Impact Assessment
EMP	— Environmental Management Plan
EMS	— Environmental Monitoring Specialist
EPA	— Environmental Protection Agency
FFA	— Framework Financing Agreement
GAPA	— Greater Kohima Planning Area
GLSR	— Ground level Storage Reservoir
GRC	— Grievance Redress Committee
GWTU	— Ground Water Treatment Unit
H&S	— Health and safety
IEE	— Initial Environmental Examination
INR	— Indian Rupee
IRP	— Iron Removal Plant
JNNURM	— Jawaharlal Nehru National Urban Renewal Mission
LPCD	— Liters per capita per day
MFF	— Multitranches financing facility
MLD	— Million liters per day
MOEF	— Ministry of Environment and Forests
NAAQS	— National Ambient Air Quality Standards
NER	— North Eastern Region
NERCCDIP	— North Eastern Region Capital Cities Development Investment Program
NGO	— Nongovernmental organization
NRW	— Non-revenue water
O and M	— Operation and maintenance
OHSA	— Occupational Health and Safety Administration
OHSR	— Overhead storage reservoirs
OMC	— Operations and Maintenance Contractors
PFR	— Periodic Financing Request
PHED	— Public Health Engineering Department

PWD	—	Public Works Department
ROW	—	Right of way
SEIAA	—	State Environment Impact Assessment Authority
SIPMIU	—	State-level Investment Program Management and Implementation Units
SPS	—	Safeguard Policy Statement
SR	—	Service Reservoir
TA	—	Technical Assistance
TDS	—	Total dissolved solids
TOR	—	Terms of reference
UDD	—	Urban Development Department
UFW	—	Un-accounted For Water
ULB	—	Urban local body

WEIGHTS AND MEASURES

dbA		decibels
ha		hectare
km	—	kilometer
km ²		square kilometer
l		liter
m	—	meter
m ²		square meter
M ³		cubic meter
MT		metric tons
MTD		metric tons per day

NOTES

- (i) In this report, "\$" refers to US dollars.
- (ii) "INR" and "Rs" refer to Indian rupees.

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EXECUTIVE SUMMARY

1. The North Eastern Region Capital Cities Development Investment Program (NERCCDIP) envisages achieving sustainable urban development in the Project Cities of Kohima, Aizawl, Agartala, Gangtok and Shillong through investments in urban infrastructure sectors. NERCCDIP will be implemented over a six year period beginning in 2010, and will be funded by a loan via the Multitranche Financing Facility (MFF) of the Asian Development Bank (ADB).
2. The Ministry of Urban Development (MOUD) is the national Executing Agency. A State-level Investment Program Management and Implementation Units (SIPMIU) in each state is responsible for overall technical supervision and execution of all subprojects funded under the Investment Program. The SIPMIU is being assisted by: design, management and supervision consultants (DMSC), who are designing the infrastructure, managing the tendering of contracts, and will supervise construction.
3. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for Environmental Assessment are described in ADB's SPS (2009). This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, loans involving financial intermediaries, and private sector loans.
4. This Initial Environmental Examination (IEE) has been prepared for the Kohima Water Supply Subproject, specifically for the provision of 322-km secondary water distribution network.
5. An Environmental Management Plan (EMP) is proposed as part of this report which includes (i) mitigation measures for significant environmental impacts during implementation, (ii) environmental monitoring program, and the responsible entities for mitigation, monitoring, and reporting; (iii) public consultation and information disclosure; and grievance redress mechanism.
6. Detailed design began in the middle of 2010. Procurement of civil works will begin in August 2011 and construction will begin in August 2012.
7. The subproject locations are located in the built-up area of Kohima City. The subproject locations are generally undulating but are not located in areas prone to water-logging and flash flood. There are no protected areas, wetlands, mangroves, or estuarines in or near the subproject location. Trees, vegetation (mostly shrubs and grasses), and animals are those commonly found in urban areas. The subproject location are not located in or near any historically-, culturally-, archaeologically- or architecturally-significant or tourists area.
8. Potential negative impacts were identified in relation to construction and operation of the infrastructure. A number of impacts and their significance have already been reduced by amending the designs thus no impacts were identified as being due to the project design or location. Mitigation measures have been developed to reduce all negative impacts to acceptable levels.
9. During the construction phase, impacts mainly arise from the need to dispose of moderate quantities of waste soil; and from the disturbance of residents, businesses, and traffic. These are common impacts of construction in urban areas, and there are well developed methods for their mitigation.

10. Once the system is operating, most facilities will operate with routine maintenance, which should not affect the environment. The area is isolated and hence direct impact to nearby environment is minimum. The main impacts of the operating water supply system will be beneficial to the citizens of Kohima. They will be provided with a constant supply of water thus improve the quality of life of people as well as benefit individual and public health with improvements in hygiene. This will reduce the incidence of disease associated with poor sanitation. This will also lead to economic gains as people will be less away from work and indirectly increase their income.

11. There were limited opportunities to provide environmental enhancements, but certain measures were included. For example it is proposed that the project will employ in the workforce people who live in the vicinity of construction sites to provide them with a short-term economic gain; and ensure that people employed in the longer term to maintain and operate the new facilities are residents of nearby communities.

12. Mitigation will be assured by a program of environmental monitoring conducted during construction and operation to ensure that all measures in the EMP are implemented and to determine whether the environment is protected as intended. This will include observations on- and off-site, document checks, and interviews with workers and beneficiaries, and any requirements for remedial action will be reported to the SIPMIU. There will also be longer-term surveys to monitor the expected improvements in the quality of domestic water and the health of the population.

13. The stakeholders were involved in developing the IEE through face-to-face discussions on site and public meeting held in the city, after which views expressed were incorporated into the IEE and the planning and development of the project. The IEE will be made available at public locations in the city and will be disclosed to a wider audience via the ADB website. The consultation process will be continued and expanded during project implementation, when a nationally-recognised NGO will be appointed to handle this key element to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.

14. Therefore the subproject is unlikely to cause significant adverse impacts. The potential adverse impacts that are associated with design, construction, and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures. Based on the findings of the IEE, the classification of the Project as Category "B" is confirmed, and no further special study or detailed EIA needs to be undertaken to comply with ADB SPS (2009) or GoI EIA Notification (2006).

I. INTRODUCTION

A. Purpose of the Report

1. The North Eastern Region Capital Cities Development Investment Program (NERCCDIP) envisages achieving sustainable urban development in the Project Cities of Kohima, Aizawl, Agartala, Gangtok and Shillong through investments in urban infrastructure sectors. The urban infrastructure and services improvement is proposed in the following sectors (i) water supply, (ii) sewerage and sanitation, and (iii) solid waste management. The expected impact of NERCCDIP is increased economic growth potential, reduced poverty, and reduced imbalances between the NER and the rest of the country. The expected outcomes of the Investment Program will be an improved urban environment and better living conditions for the 1.65 million people expected to be living in the NERCCDIP cities by 2018. To this end, NERCCDIP will (i) improve and expand urban infrastructure and services in the cities including in slums and (iii) strengthen urban institutional, management, and the financing capacity of the institutions, including the urban local bodies. Based on considerations of economic justification, absorptive capacity and sustainability of the implementing agencies, sub-projects have been identified in each city in the priority infrastructure sectors.

2. Though NERCCDIP aims to improve the environmental condition of urban areas, the proposed improvements of infrastructure facilities may exert certain adverse impacts on the natural environment. While developing urban infrastructure facilities, impacts during the construction stage are expected to be more severe than impacts during the operation phase, though for a short duration. Exceptions being some facilities such as solid waste landfills and sewage treatment plants, which may also exert adverse impacts during the operation phase, if due care is not taken.

3. NERCCDIP will be implemented over a six year period beginning in 2010, and will be funded by a loan via the Multitranches Financing Facility (MFF) of the ADB. The Ministry of Urban Development (MOUD) is the national Executing Agency. A State-level Investment Program Management and Implementation Units (SIPMIU) in each state is responsible for overall technical supervision and execution of all subprojects funded under the Investment Program. The SIPMIU is being assisted by: design, management and supervision consultants (DMSC), who are designing the infrastructure, managing the tendering of contracts, and will supervise construction.

4. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for Environmental Assessment are described in ADB's SPS (2009). This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, loans involving financial intermediaries, and private sector loans. ADB has provided on its part, a Project Preparatory Technical Assistance (TA 4348-IND) for the preparation of an urban sector profile of the North Eastern states, followed by a Technical Assistance (TA 4779-IND) for Project Implementation and Urban Management in the North Eastern Region (Phase-I) to initiate the works under Tranche-I.

5. This Initial Environmental Examination (IEE) has been prepared for the Kohima Water Supply Subproject as part of NERCCDIP-Tranche 2. The subproject covers provision of 322-km secondary water distribution network.

6. This IEE report covers the general environmental profile of Kohima and includes an overview of the potential environmental impacts and their magnitude on physical, ecological, economic, and social and cultural resources within the subproject's influence area during design, construction, and operation stages. An Environmental Management Plan (EMP) is also proposed as part of this report which includes mitigation measures for significant environmental impacts during implementation of the Project, environmental monitoring program, and the responsible entities for mitigation and monitoring.

B. Extent of the IEE Study

7. This IEE report was prepared on the basis of detailed screening and analysis of all environmental parameters, field investigations and stakeholder consultations to meet the requirements for environmental assessment process and documentation per ADB's Safeguard Policy Statement (SPS, 2009) and Government of India Environmental Impact Assessment (EIA) Notification of 2006.

1. ADB Policy

8. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for Environmental Assessment are described in ADB SPS 2009. This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, loans involving financial intermediaries, and private sector loans.

9. **Screening and Categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature and magnitude of its potential impacts, and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impact are assigned to one of the following four categories:

- (i) **Category A.** Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.
- (ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
- (iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.
- (iv) **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all Projects will result in insignificant impacts.

10. **Environmental Management Plan.** An EMP which addresses the potential impacts and risks identified by the environmental assessment shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the Project's impact and risks.

11. **Public Disclosure.** ADB will post the following safeguard documents on its website so affected people, other stakeholders, and the general public can provide meaningful inputs into the project design and implementation:

- (i) For environmental category A projects, draft EIA report at least 120 days before Board consideration;
- (ii) Final or updated EIA and/or IEE upon receipt; and
- (iii) Environmental Monitoring Reports submitted by SIPMIU during project implementation upon receipt.

2. National Law

12. The Government of India EIA Notification of 2006 (replacing the EIA Notification of 1994), sets out the requirement for environmental assessment in India. This states that Environmental Clearance is required for specified activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are categorised as A or B depending on the scale of the project and the nature of its impacts.

13. Categories A projects require Environmental Clearance from the National Ministry of Environment and Forests (MOEF). The proponent is required to provide preliminary details of the project in the form of a Notification, after which an Expert Appraisal Committee (EAC) of the MOEF prepares comprehensive Terms of Reference (TOR) for the EIA study, which are finalized within 60 days. On completion of the study and review of the report by the EAC, MOEF considers the recommendation of the EAC and provides the Environmental Clearance if appropriate.

14. Category B projects require environmental clearance from the State Environment Impact Assessment Authority (SEIAA). The State level EAC categorises the project as either B1 (requiring EIA study) or B2 (no EIA study), and prepares TOR for B1 projects within 60 days. On completion of the study and review of the report by the EAC, the SEIAA issues the Environmental Clearance based on the EAC recommendation. The Notification also provides that any project or activity classified as category B will be treated as category A if it is located in whole or in part within 10 km from the boundary of protected areas, notified areas or inter-state or international boundaries.

15. The only type of infrastructure provided by the NERCCDIP that is specified in the EIA Notification is solid waste management. EC is not required for this subproject.

3. Others

16. There are no WTPs to be constructed thus Consent for Establishment (CFE) before construction and Consent for Operation (CFO) under the Water and Air (Prevention and Control of Pollution) Acts are not required for this subproject.

II. DESCRIPTION OF THE PROJECT

A. Type, Category and Need

17. **Type.** This is an urban water supply subproject intended to improve the current situation of Kohima in terms of improved water supply distribution system. This is one of a series of subprojects designed by NERCCDP that are intended to raise the standards of the municipal infrastructure and services of Kohima and the other urban centres to those expected of modern Asian towns.

18. **Category.** Environmental examination indicates the proposed subproject falls within ADB's environmental Category B projects. The subproject components will only have small-scale, localized impacts on the environment, and can be mitigated. Under ADB procedures such projects require an IEE to identify and mitigate the impacts.

19. **Need.** The bunched system of secondary distribution network in Kohima has to be replaced with a properly designed loop system.

20. Augmentation of source is not covered in this project. The Government of Nagaland has started taking up new schemes for the supply of the required quantity of water through the State Public Health Engineering Department (PHED).

B. Location and Implementation Schedule

21. The subproject is located in Kohima City of Nagaland State. The proposed infrastructures will be located in and around the city.

22. Detailed design began in the middle of 2010. Procurement of civil works will begin in August 2011 and construction will begin in August 2012.

C. Description of the Subproject

1. Existing Water Supply and Service Delivery

23. **Need.** At present, the water for Kohima Municipal Council (KMC) is drawn by gravity from the Dzuna River and Phesama stream. The "Dzuna water supply scheme" draws water from the Dzuna River – a surface water source situated about 13 km from the Municipal limit. The second scheme "Phesama water supply scheme" draws water from Phesama spring near Phesama village, which is located about 8 km away from the town. The Public Health Engineering Department (PHED) is supplying 1.8 million liters per day (MLD) of water through an internal water distribution network; and water is supplied once in three days. The per capita water supply level during lean months is only 18 liters per capita per day (lpcd).

24. Dzuna headworks have a small weir for drawing surface water from Dzuna River. From the headworks, water reaches the Jotsoma WTP¹ by gravity through a 300-millimeter (mm) diameter cast iron (CI) 8-km pipeline. Designed capacity of this source is 7 MLD. However, this source is reliable for delivering the full designed capacity only during monsoon season.

¹ The water drawn from the Dzuna river flows by gravity to Jotsoma WTP for full scale treatment. The unit operations in this WTP include flocculation, clarification and rapid sand filtration.

25. The Phesama water supply scheme collects water from Phesama stream and it flows to two service reservoirs in Kohima town through 100-mm diameter CI pipeline. Designed capacity of this source is 0.3 MLD. This source is seasonal due to low yield during lean months.

26. There are 19 existing SRs in Kohima. Out of these, 17 SRs receive treated water through a 300-mm diameter CI main from Jotsoma WTP. The other two SRs receive water directly from Phesama source. The condition of all these 19 SRs is not satisfactory due to old age and hence requires replacement. Replacement of these 19 service reservoirs has been taken up under Tranche-1.

2. Subproject Components

27. The subproject covers provision of 322-km secondary water distribution network. Details of the subproject component are provided in **Table 1**. The descriptions shown in the table are based on the present proposals, which are expected to be substantially correct, although certain details may change as development of the subproject progresses.

Table 2: Kohima Water Supply Subproject Components

Infrastructure	Description	Location	Construction Method
Secondary distribution network	322 km of GI/HDPE/DI pipe of diameter 32-350 mm	Pipelines will be buried in a trench within the RoW of existing roads. If there are encroachments into the RoW, especially in narrow lanes, will be removed and will be compensated per Resettlement Plan	No tree cutting is required. Excavation will be carried out manually. Pipes will be placed in the trench and refilled with the excavated soil. Surplus soil (2-3%) will be disposed safely.

Note: DI = ductile iron; GI = galvanized iron; HDPE = high density polyethylene; RoW = right of way; mm = millimetres

III. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

1. Administrative Boundaries

28. Kohima, the capital town of Nagaland in the north eastern part of India is a picturesque town, situated amidst lush green wealth of the nature. Kohima is a typical Naga town and a pretty hill station, displaying the exotic tribal culture of the northeast. Kohima is located at 25.67°N 94.12°E North-Eastern corner of Nagaland. It is also one of the three Nagaland towns with Municipal Council status along with Dimapur and Mokokchung.

2. Topography and Natural Hazards

29. **Topography.** The hills of Kohima are nestled within higher peaks and the terrain is hilly and most of the roads and paths are steep, with buildings built on terraced ground alongside them. The city growth indicates an increasing densification along the ridgeline. The spread onto other directions has been constrained by steep slopes and vulnerability to landslides, forest cover, and inadequate access.

30. **Natural Hazards.** According to the Bureau of Indian Standards, the town falls under seismic zone-IV (on a scale of I to V, in the order of increasing seismic activity), near the

convergent boundary of the Indian and the Eurasian tectonic plates. Earthquakes here are generally shallow but some focus events have also occurred.

3. Geology and Soils

31. **Geology.** Geologically the area in and around Kohima city are dominated by the presence of tertiary rocks of Disang and Barail series. The Disang series consists of unfossiliferous Sand Stone, Shale, Slates and Phyllites. Due to the splintery Character of the Shales and the softness of the resulting soil, often underlain with a layer of clay, there is frequent occurrence of landslides in the city. Rocks of Disang series make very steep angles of dip

32. **Soils.** There are four orders of soil in Kohima region. They are 1) Inceptisols, 2) Entisols 3) Alfisols and 4) Ultisols. The most important soil of this region is the Inceptisol. The soil texture consists of fine clay, clay loamy and the fine loamy clay. These soil types are predominant near the river beds. About 23 percent of the land area is enveloped by the Utisols. The soil is characterized by its low base saturation feature. This soil type is found in the forested regions which receive a high amount of rainfall. The texture of the soil remains clayey. Entisols cover 7.3 percent of the land area and comprises of the fine loamy and the fine categories of soil textures. The light colored and mineral rich, Alfisols cover a meager 2.9 percent of the land area. Soil in Kohima are fertile except on extreme slopes. The soil is mainly acidic and rich in organic carbon and has high water holding capacity.

4. Climate

33. Kohima is a place that is situated fairly at a high altitude and the climatic conditions are pleasing. The climate of the city is of tropical monsoon type. The summer is not too warm and the winters is not too severe. December and January are the coldest months of the year. The summer is accompanied by fairly heavy rainfall (June to September). The average annual rainfall vary from 150 centimetre (cm) to 280 cm and the temperature varies from 4o C in winter to about 25o C in summer. There is only about 15 cm of rain from December through May. During this period, severe shortage of water arises in the city.

5. Air Quality

34. The air quality of Kohima is comparatively good due to the absence of polluting industries. Although there has been a rapid rise in vehicular population over the years, there are no reported air pollution health hazards.

6. Surface Water

35. Three major rivers influence the drainage pattern of Kohima and adjacent areas. Dzuna River located at a distance of 13 km, originating from the southern hills of the city and draining the southwestern region, Dzuvu Ru River draining the southeastern region and Sanou Ru River draining the northern region of the city. Dzuna River is the main water source for Kohima. Another river called Phesama draining the southern parts of the city is also an important water source. The drainage configuration has developed in a radial pattern.

36. As found out through Public Consultations, the quality of water supplied by PHED from Dzuna River is good. Also the water quality of most of the other rivers and springs in the uphill areas is said to be good while some have very moderate pollution levels. However these rivers

and streams on reaching the city turn into carriers of solid waste and sewage making the water unfit for drinking or for any other domestic purposes.

7. Groundwater

37. The major water bearing formations in the area are Disang and Barail formations of lower tertiary age. Sandstone is fine grained, compact and hard and supports high degree of run off character. However, the highly jointed and fractured nature of rocks, tectonic lineaments & fractures promote ground water percolation through secondary porosity. The ground water is commonly manifested as springs and available upto depth of 150-200m depths. The ground water quality considered to have higher levels of iron, however, is overall good.

B. Biological Resources

38. Kohima city falls under the extended areas of globally recognised “Eastern Himalayan Biodiversity Hot spot area”. Kohima city is a part of the Arakan extension, having influence of few rich and unique bio-geographic zones. The northeast region of Nagaland has biodiversity of Indo-Chinese and Indo Malayan characteristics and elements; where as west of Nagaland has Indian elements. The species both in terms of flora and fauna found in Kohima region, at least for some species, are of great taxonomic, ecological and biotechnological importance; as Kohima and its adjoining areas come under the confluence of Indo-Malayan, Indo-Chinese and Indian bio geographic regions.

39. The only protected area and sanctuary located within the Greater Kohima Planning Area, although outside the Kohima Municipal Council area, is Pulie Badze, an area notified under the Nagaland Jhum land Act, 1979. No proposed water supply improvements are slated to occur within the boundary of the Pulie Badze. The Dzuku valley, a long stretch of natural forest, runs parallel to the Kohima Master Plan Area. Pulie Badze Wildlife Sanctuary (with an area of 9 sq Km) is an important catchment area of Kohima Town. Dzuku valley (10,000 ha) and Japfu peak, the two important features in the area are located adjacent to the sanctuary and have been designated as Important Bird Areas (IBA). The Khonoma Nature Conservation and Tragopan Sanctuary, another important community protected area (also on IBA), are adjacent to the Dzuku valley. All these four sites form a single large continuous area of 20,000 ha or more and are very important for avifauna conservation in southern Nagaland. Pulie Badze forests and the adjoining Dzuku valley are the habitat of some rare and endangered Avi Faunal species like Blyth's Tragopan (*Tragopan blythii*) and Dark Rumped Swift (*Apus acuticauda*).

C. Economic Development

1. Land Use

40. The total area as specified in the Kohima Maser Plan is 6,936.30 hectares, out of which 5,565 hectare is located outside the municipal area and is predominantly vacant land. The total area of Kohima Municipal Council is 1,371 hectares of which the total developable land is only 729.89 hectares.

2. Commerce, Industry and Agriculture

41. The total numbers of industrial units in Kohima is around 80. Most of the industries within the town are service oriented like bakeries, automobile workshops, printing presses, electronic

repairs and furniture making etc. Numerous Bazaars and market complexes have come up in the recent years reflecting the growing influence of Kohima as an important commercial center.

3. Infrastructure

42. **Water Supply.** In Kohima water is supplied from two main river/spring sources; the river Dzuna located 13km away and the spring Phesama located 7.5 km away from Kohima Town. The PHED is the main organization looking after water supply in Kohima. The PHED caters domestic water to around 40% population; that too at a very low percapita rate. The remaining population of about 85,000 persons get water from community springs & wells, private cable line water suppliers (through small plastic pipes criss-crossing the city in bunches), water tankers and through rainwater harvesting whenever possible. The supply from all these sources become uncertain, irregular, erratic and meagre in quantity during the lean months from January till June.

43. **Sewerage and Sanitation.** At present there is no sewerage system in Kohima except a very small arrangement in D Block, which is built and operated by the community. Under this system, the sewage from 20-25 households is collected and disposed off. The rest of the city is not covered by any sewerage system. About 81% of households have independent septic tanks. 11% have access to shared toilets and 3.5% defecate in the open. Wards 5, 6, and 7 have a large number of open pit latrines. In a good number of the private residential buildings, sanitary latrines are not provided and people use dug-well latrines, which is a small enclosure, made of Hessian clothes, constructed outdoor.

44. **Solid Waste Management.** Kohima city generates about 54 metric tons of garbage per day. The major sources of waste are from the residential, commercial, institutional sources which account for 90% of the generated garbage. Biomedical wastes of the order of 0.5 m mtpd is generated in the hospitals of Kohima. At present, only 35-40% (i.e. about 21 mtpd) of the waste generated is collected. No house-to-house waste collection or source segregation of waste is followed. The existing waste collection is a manual/multi-handling system. The waste collected is transported to the disposal site through refuse vehicles and dumped crudely on a sloping site beside NH-39, at a location known as the Bypass area, about 8 km from the city. The site is spread on 0.6 ha of land and has been in use for the past 10 years.

45. **Roads and Transportation.** Kohima has two main roads NH 39 and NH 61 passing through the city. The total length of roads in Kohima is 100 km, of which the length of the NH system within the city is nearly 15 km. Many stretches of the roads are very narrow due to encroachments on both sides mostly by commercial establishments. The major city roads are the High School Road and roads leading to the Secretariat and Office Complex, Kohima Village, Agriculture Colony, Ministers Hill and various housing colonies. The average width of these roads is 7 metres but due to heavy pedestrian flow and kerb parking only three fourth of the road width can be actually used for traffic movement. Congestion is heavy and frequent on most major roads. There is no rail linkage or airport in the city. The nearest airport and rail station is 70 km away at Dimapur.

46. **Drainage and Landslip Protection.** Storm water is drained through a series of kutcha and pucca drains down the slope. The drains are filled up with garbage, mud and silt choking the flow of water. During heavy rains, the roadside drains get choked and the roads itself turn into drains. The total length of storm water drains in the city is 60 km. 50 % of the city is drained by open drains. The poor drainage conditions along with unregulated construction activities and

porous soils have increased the incidence of landslides within Kohima. The landslips have affected about 11% of households so far and severely damaged substantial areas of the city.

47. **Health Facilities.** Kohima has fairly good health facilities. There is a Government Hospital, the Naga Hospital, located west of the famous War Cemetery. Besides, there are numerous private nursing homes and clinics.

D. Social and Cultural Resources

48. **Demography.** The population of Kohima Municipal Council (KMC) area is 78,584 as per 2001 census. Although the sex ratio in the city (870 females per 1000 males, 2001) has shown a positive trend, it is still lower than the state average (909 females/1000 males) and the national average (933 females/1000 males).

49. In Kohima and the entire state of Nagaland, the tribes constitute the mainstream society. There are 16 tribes in Nagaland. These tribal communities (IPs) account for nearly the entire population. The major tribes include Angami, AO, Sema, Lotha, Chakesang, Rengma, Zeliang, Naga and Sangtam. An estimated 89.6% of the population in the city is Scheduled Tribes. Each of the 16 tribes traditionally occupy a distinct area of Nagaland. Angami is the dominant tribe in Kohima, and constitute more than half of the city population.

50. The literacy rate for the state of Nagaland is 67.11%. In terms of education, around one third of the population are having education upto class X, while about 26% are at least graduates. The workforce participation rate in Kohima have declined from 35% in 1991 to 33% in 2001. The female work force has however, increased implying improved participation of women in the society. This increase in female workforce is accompanied with an increasing proportion of female marginal workforce. Although, there has been an overall increase in the proportion of marginal workforce (0.05% in 1991 to 7% in 2001), the increase in female marginal workers is more significant (0% to 11% between 1991-01). Increasing marginalization of labour is mainly due to lack of adequate economic opportunities and absence of required skill sets for the prevailing employment opportunities. Occupational profile of the population shows that government sector is the largest employer with 54.5% of the population engaged in various government sector jobs. This is followed by 17.5% having own shops and business.

51. **History Culture and Tourism.** The district of Kohima was established in the year 1881 as a sub-division of the formerly Naga Hills district within Assam. To prevent the frequent raids into the British territory of Assam by the Naga tribes, the British authorities established an outpost at Samagutting in 1866 followed by the establishment of a chief administrative centre for the area at Kohima in 1878. The former Naga Hills district and a part of North East Frontier Agency (NEFA) were transferred from Assam state and NEFA respectively by an act called the Naga Hills Tuensang Area Act of 1957 to form a separate administrative unit under the control of the Central Government. This area consisting of three districts namely Kohima, Mokokchung and Tuensang was redesignated as Nagaland. In December 1963, Nagaland was declared as a full-fledged state within the Indian union with Kohima as the capital of the new state.

52. Historically significant sites of Kohima include a War Cemetery, a memorial built in memory of the officers and men who laid down their lives during World War II. The Catholic Cathedral at Aradura Hill is one of the most important cathedrals in the Northeast region and is a landmark of the town. Nagaland State Museum preserves a collection of carved statues, pillars, gate posts, and jewellery besides a rare collection of artifacts belonging to the Naga

tribes. The Zoological Park built on a beautiful hill slope is a yet another attraction in Kohima. Another important place of interest and tourist attraction is the Kohima Village (Bara Basti).

IV. ANTICIPATED IMPACTS AND MITIGATION MEASURES

53. This section of the IEE reviews possible subproject-related impacts, in order to identify issues requiring further attention and screen out issues of no relevance. ADB SPS (2009) require that impacts and risks will be analyzed during pre-construction, construction, and operational stages in the context of the subproject's area of influence. As defined previously, the primary impact areas are the sites for secondary distribution pipelines; (ii) main routes/intersections which will be traversed by construction vehicles; and (ii) borrow pits as sources of construction materials. The secondary impact areas are: (i) entire Kohima area outside of the delineated primary impact area; and (ii) entire Nagaland district in terms of overall environmental improvement.

54. The ADB Rapid Environmental Assessment Checklist for Water Supply in http://www.adb.org/documents/guidelines/environmental_assessment/eaguidelines002.asp was used to screen the subproject for environmental impacts and to determine the scope of the IEE investigation. The completed Checklist is found in **Annex 2**. All the proposed subproject components will interact physically with the environment.

55. In the case of this subproject (i) most of the individual elements are relatively small and involve straightforward construction and operation, so impacts will be mainly localized and not greatly significant; (ii) most of the predicted impacts are associated with the construction process, and are produced because that process is invasive, involving excavation and earth movements; and (iii) being located in the built-up area of Kohima city, will not cause direct impact on biodiversity values. The subproject will be in properties held by the local government and access to the subproject locations is thru public rights-of-way and existing roads hence, land acquisition and encroachment on private property will not occur.

A. Pre-construction – Location and Design

56. **Design of the Proposed Components.** The Central Public Health and Environmental Engineering Organization (CPHEEO) manual suggests a design period of 15/30 years² in general while designing the system for water supply components.

57. **Location of the Proposed Components.** The subproject envisages providing new secondary water distribution network for a length of 322 km. These pipelines will be buried in trench along the existing roads, within the right of way. No land acquisition is required for the new pipelines. The pipelines are not passing adjacent to any sensitive environmental features. There are no trees in the alignment. Hence, no location impacts are anticipated due the proposed pipelines.

58. **Utilities.** Telephone lines, electric poles and wires, water lines within the proposed subproject locations may require to be shifted in few cases. To mitigate the adverse impacts due to relocation of the utilities, DSMC will (i) identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services

² As per CPHEEO, pumps, motors, storage reservoirs are to be designed for a life of 15 years.

during construction phase; and (ii) require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services.

59. **Social and Cultural Resources.** Nagaland is an area of large numbers of temples (some of them are historic) and other religious sites, so there is a risk that any work involving ground disturbance can uncover and damage archaeological and historical remains. For this subproject (construction of GWTU & SR), excavation will occur in open area, so it could be that there is a medium risk of such impacts. Nevertheless, DSMC/SIPMIU will:

- (i) Consult KMC to obtain an expert assessment of the archaeological potential of the site;
- (ii) Consider alternatives if the site is found to be of high risk;
- (iii) Include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available; and
- (iv) Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.

60. **Site selection of construction work camps, stockpile areas, storage areas, and disposal areas.** Priority is to locate these near the subproject locations. However, if it is deemed necessary to locate elsewhere, sites to be considered will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems. Residential areas will not be considered for setting up camps to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). Extreme care will be taken to avoid disposals near the forest, water bodies, swamps, or in areas which will inconvenience the community. All locations would be included in the design specifications and on plan drawings.

61. **Site selection of sources of materials.** Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution. To mitigate the potential environmental impacts, locations of quarry site/s and borrow pit/s (for loose material other than stones) would be included in the design specifications and on plan drawings. Priority would be sites already permitted by Mining Department. If other sites are necessary, these would be located away from population centers, drinking water intakes and streams, cultivable lands, and natural drainage systems; and in structurally stable areas even if some distance from construction activities. It will be the construction contractor's responsibility to verify the suitability of all material sources and to obtain the approval of Urban Local Body. If additional quarries will be required after construction is started, then the construction contractor shall use the mentioned criteria to select new quarry sites, with written approval of KMC.

B. Construction

1. Screening of No Significant Impacts

62. The construction work is expected not to cause major negative impacts, mainly because:

- (i) Most of the activities will be on the built-up areas of Kohima city thus could be constructed without causing impacts to biodiversity;

- (ii) Most of the sites are located on an government-owned land which is not occupied or used for any other purpose;
- (iii) Overall construction program will be relatively short and is expected to be completed in 18 months with activities to be conducted by small teams and specified location so most impacts will be localized and short in duration; and
- (iv) Most of the predicted impacts associated with the construction process are produced because the process is invasive, such as involving excavation. However the routine nature of the impacts means that most can be easily mitigated and the impacts are clearly a result of the construction process rather than the design or location, as impacts will not occur if excavation or other ground disturbance is not involved.

63. As a result, there are several aspects of the environment which are not expected to be affected by the construction process and these can be screened out of the assessment at this stage as required by ADB procedure. These are shown in **Table 6**. These environmental factors are screened out presently but will be assessed again before starting of the construction activities.

Table 6: Fields in which construction is not expected to have significant impacts

Field	Rationale
Topography, Drainage, and Natural Hazards	Activities are not large enough to affect these features.
Geology, Geomorphology, Mineral Resources, and Soils	Activities are not large enough to affect these features. No mineral resources in the subproject location.
Climate	Activities are not large enough to affect this feature.
Air Quality	Short-term production of dust is the only effect on atmosphere
Geohydrology and Groundwater	Activities will not be large enough to affect these features
Protected Areas	No protected areas nearby the Kohima city and project locations
Flora and Fauna	No rare or endangered species.
Land Use	No change in major land use.
Socio-economic	Subproject site is located partly in private land so there is some need to acquire land from private owners.
Commerce, Industry, and Agriculture	Activities are not large enough to affect these features
Population	Activities are not large enough to affect this feature.
Health and education facilities	Activities are not large enough to affect this feature.
Historical, Archaeological, Paleontological, or Architectural sites	No scheduled or unscheduled historical, archaeological, paleontological, or architectural sites

2. Construction method

64. Trenches will be dug by manual digging. Excavated soil will be placed alongside, and the pipes (brought to site on trucks and stored on unused land nearby) will be placed in the trench by hand or using ropes. Pipes will be joined by hand, after which filling will be done with the excavated soil manually up to the ground level and compacted by a vibrating compressor. Where trenches are to be dug into an existing roadway, the bitumen or concrete surface will be broken by hand-held pneumatic drills and the appropriate surface will be reapplied on completion.

3. Anticipated Impacts and Mitigation Measures

65. Although construction of the subproject components involves quite simple techniques of civil work, the invasive nature of excavation and the subproject locations in the built-up areas of

Kohima city. There are a variety of human activities which will result to impacts to the environment and sensitive receptors such as residents, businesses, and the community in general. These anticipated impacts are temporary and for short duration. Physical impacts will be reduced by the method of working and scheduling of work, whereby the project components will be (i) constructed by small teams working at a time; (ii) any excavation done near sensitive area like school, religious places and house will be protected as per standard norms³.

66. **Sources of Materials.** Gravel, sand, and cement will be required for this subproject. The construction contractor will be required to:

- (i) The material sources permitted by government;
- (ii) Verify suitability of all material sources and obtain approval of State Investment Program Management & Implementation Unit (SIPMIU); and
- (iii) Submit to DSMC on a monthly basis documentation of sources of materials.

67. **Air Quality.** Emissions from construction vehicles, equipment, and machinery used for excavation and construction will induce impacts on the air quality in the construction sites. Anticipated impacts include dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons) but temporary and during construction activities only. To mitigate the impacts, construction contractors will be required to:

- (i) Consult with SIPMIU/DSMC on the designated areas for stockpiling of clay, soils, gravel, and other construction materials;
- (ii) Excavate the OHSRs foundations at the same time as the access roads (if needed) are built so that dug material is used immediately, avoiding the need to stockpile on site;
- (iii) Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather;
- (iv) Use tarpaulins to cover sand and other loose material when transported by trucks; and
- (v) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly.

68. **Surface Water Quality.** Due to hilly topography and high intensity of rainfall, there is likelihood of large scale erosion from the construction areas. This may lead to silting and blockage of drains and water bodies. Run-off from stockpiled materials, and chemical contamination from fuels and lubricants during construction works can contaminate downstream surface water. These potential impacts are temporary and short-term duration only and to ensure these are mitigated, construction contractor will be required to:

- (i) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
- (ii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with SIPMIU/DSMC on designated disposal areas;

³ Occupational Health and Safety of employees working only in factories and mines have been specifically covered in GOI laws. However, the Constitution of India has provisions to ensure that the health and well-being of all employees are protected and the State has the duty to ensure protection. For this subproject, the mitigation measures were based on the World Bank Environmental, Health, and Safety (EHS) Guidelines.

- (iii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- (iv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
- (v) Dispose any wastes generated by construction activities in designated sites; and
- (vi) Conduct surface quality inspection according to the Environmental Management Plan (EMP).

69. **Noise Levels.** Construction works will be on settlements, along and near schools, and areas with small-scale businesses. The sensitive receptors are the general population in these areas. Increase in noise level may be caused by excavation equipment, and the transportation of equipment, materials, and people. Impact is negative, short-term, and reversible by mitigation measures. The construction contractor will be required to:

- (i) Plan activities in consultation with SIPMIU/DSMC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
- (ii) Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
- (iii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; and
- (iv) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s.

70. **Landscape and Aesthetics.** The pipe laying work will generate surplus soil. As small diameter pipes are being used about 4-6% of soil will be generated as surplus that needs to be disposed safely. The construction works will also produce excess construction materials, and solid waste such as removed concrete, wood, plants, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. These impacts are negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Prepare and implement Waste Management Plan;
- (ii) Avoid stockpiling of excess excavated soils;
- (iii) Coordinate with SIPMIU for beneficial uses of excess excavated soils or immediately dispose to designated areas;
- (iv) Recover used oil and lubricants and reuse or remove from the sites;
- (v) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- (vi) Remove all wreckage, rubbish, or temporary structures which are no longer required; and
- (vii) Request SIPMIU/DSMC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.

71. **Surface and Groundwater Quality.** Another physical impact that is often associated with excavation is the effect on drainage and the local water table if groundwater and surface water collect in the voids. To ensure that water will not pond in pits and voids near subproject location, the construction contractor will be required to conduct excavation works on non-monsoon season.

72. **Accessibility.** Transport infrastructure will be affected by the pipeline laying work, as in the narrower streets there are no enough space for excavated soil to be piled off the road. The road itself may also be excavated in places where there is no available land to locate pipes alongside. Traffic will therefore be disrupted, and in some very narrow streets the whole road may need to be closed for short periods. Potential impact is negative but short term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;
- (ii) Schedule transport and hauling activities during non-peak hours;
- (iii) Locate entry and exit points in areas where there is low potential for traffic congestion;
- (iv) Keep the site free from all unnecessary obstructions;
- (v) Drive vehicles in a considerate manner;
- (vi) Coordinate with Govt. Traffic Department for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and
- (vii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

73. **Socio-Economic – Income.** The subproject components will be located in Government land. Construction works will impede the access of residents to specific site in limited cases. The potential impacts are negative and moderate but short-term and temporary. The construction contractor will be required to:

- (i) Leave spaces for access between mounds of soil;
- (ii) Provide walkways and metal sheets where required to maintain access across for people and vehicles;
- (iii) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools;
- (iv) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and
- (v) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.

74. **Socio-Economic – Employment.** Manpower will be required during the 18-months construction stage. This can result to generation of contractual employment and increase in local revenue. Thus potential impact is positive and long-term. The construction contractor will be required to:

- (vi) To the extent possible semi-skilled and un-skilled labor force must be drawn from the local community; prioritizing vulnerable APs, if any; and
- (i) Secure construction materials from local market.

75. **Occupational Health and Safety.** Workers need to be mindful of the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures. The construction contractor will be required to:

- (ii) Develop and implement site-specific Health and Safety (H&S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use Personal Protective Equipment; (c) H&S Training⁴ for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;
- (iii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
- (iv) Provide medical insurance coverage for workers;
- (v) Secure all installations from unauthorized intrusion and accident risks;
- (vi) Provide supplies of potable drinking water;
- (vii) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;
- (viii) Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;
- (ix) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;
- (x) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- (xi) Ensure moving equipment is outfitted with audible back-up alarms;
- (xii) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and
- (xiii) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.

76. **Community Health and Safety.** Hazards posed to the public, specifically in high-pedestrian areas may include traffic accidents and vehicle collision with pedestrians. In most of the cases location of project sites at isolated area, hence health and safety risk to community is minimum. Potential impact is negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Plan routes to avoid times of peak-pedestrian activities.
- (ii) Liaise with SIPMIU/DSMC in identifying risk areas on route cards/maps.
- (iii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.

⁴ Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

- (iv) Provide road signs and flag persons to warn of dangerous conditions, in case of location near the road.

77. **Work Camps.** Operation of work camps can cause temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants. Potential impacts are negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Consult with SIPMIU/DSMC before locating project offices, sheds, and construction plants;
- (ii) Minimize removal of vegetation and disallow cutting of trees;
- (iii) Provide water and sanitation facilities for employees;
- (iv) Prohibit employees from poaching wildlife and cutting of trees for firewood;
- (v) Train employees in the storage and handling of materials which can potentially cause soil contamination;
- (vi) Recover used oil and lubricants and reuse or remove from the site;
- (vii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- (viii) Remove all wreckage, rubbish, or temporary structures which are no longer required; and
- (ix) Request SIPMIU/DSMC to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.

78. **Social and Cultural Resources.** For this subproject, excavation will occur at specific isolated location, so it could be that there is a low risk of such impacts. Nevertheless, the construction contractor will be required to:

- (i) Strictly follow the protocol for chance finds in any excavation work;
- (ii) Request SIPMIU/DSMC or any authorized person with archaeological/historical field training to observe excavation;
- (iii) Stop work immediately to allow further investigation if any finds are suspected; and
- (iv) Inform SIPMIU/DSMC if a find is suspected, and take any action they require ensuring its removal or protection in situ.

C. Operation and Maintenance

1. Screening out areas of no significant impact

79. Because a water supply system should operate without the need for major repair and maintenance, there are several environmental sectors which should be unaffected once the system begins to function. These are identified in **Table 7** below, with an explanation of the reasoning in each case. These factors are thus screened out of the impact assessment and will not be mentioned further.

Table 7: Fields in which Operation and Maintenance of the Water Supply Component is Not Expected to have Significant Impacts

Field	Rationale
Climate	No impact expected
Fisheries and aquatic biology	Not related to project components

Wildlife, forests, rare species, protected areas	There are no wildlife, forests, rare species, and protected areas.
Coastal resources	Kohima is not located in a coastal area.
Industries	The water supplied by the new system will not be for industrial use

2. Operation and Maintenance of the Improved Water Supply System

80. O and M of the water supply system will be the responsibility of PHED. Local contractors will be employed to conduct repairs, and contractors should be required to operate the same kinds of Health and Safety procedures as used in the construction phase to protect workers and the public.

81. The system have a design life of 30 years, during which shall not require major repairs or refurbishments and should operate with little maintenance beyond routine actions required to keep the pipes in working order. The stability and integrity of the system will be monitored periodically to detect any problems and allow remedial action if required. Any repairs will be small-scale involving manual, temporary, and short-term works involving regular checking and recording of performance for signs of deterioration, servicing and replacement of parts.

3. Anticipated Environmental Impacts and Mitigation Measures

82. **General.** The work will follow the same procedures during the construction stage. PHED needs to require its O and M contractor to:

- (i) Conduct work during non-monsoon period; and
- (ii) Cover construction material like cement to prevent dusts.

83. **Ecological Resources.** There are no significant ecological resources in or around the city as well as project location, so any repairs or maintenance work can be conducted without ecological impacts.

84. **Economic Development.** There are no major anticipated economic development impacts during O and M of the facilities. Nevertheless PHED needs to require its O and M contractor to:

- (i) Inform all residents, businesses and sensitive receptors about the nature and duration of any work well in advance so that they can make preparations if necessary;
- (ii) Consult city authorities regarding any such work so that it can be planned to avoid traffic disruption as far as possible, and road diversions can be organised if necessary.

85. The provision of an improved secondary water supply distribution system is not expected to have direct economic benefits for business or industry, as connections will only be provided to domestic users. However businesses will almost certainly benefit from the expected improvement in the health and well-being of their workforce as this should result in fewer days lost through illness, and overall increased productivity.

86. **Social and Cultural Resources.** Although there is a medium risk of excavation in the city discovering material of historical or archaeological importance, there will be no need to take precautions to protect such material when areas are excavated to repair.

87. Repair works could cause some temporary disruption of activities at locations of social and cultural importance such as schools, hospitals, temples, tourist sites etc, so the same precautions as employed during the construction period should be adopted. PHED needs to require its O and M contractor to:

- (i) Consult the city authorities to identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
- (ii) Complete work in these areas quickly;
- (iii) Consult municipal authorities, custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.

88. The citizens of the Kohima city will be the major beneficiaries of the improved water supply, as they will be provided with a constant supply of better quality water, piped into their homes. In addition to improved environmental conditions, the subproject will improve the overall health condition of the town as diseases of poor sanitation (such as diarrhoea and dysentery) will be reduced.

D. Cumulative Impact Assessment

89. The cumulative impact assessment (CIA) examined the interaction between the subproject's residual effects (i.e., those effects that remain after mitigation measures have been applied) and those associated with other past, existing and reasonably foreseeable future projects or activities. The interaction of residual effects associated with multiple projects and/or activities can result in cumulative impacts, both positive and negative. The subproject's potential cumulative effects were considered with respect to Valued Components (VCs) in the categories of environmental, socio-economic, and heritage resources in four areas:

- (i) Of any potential residual project effects that may occur incrementally over time;
- (ii) Consideration of other known relevant projects or activities within the specified study area boundaries, even if not directly related to the subproject;
- (iii) Potential overlapping impacts that may occur due to other developments, even if not directly related to the proposed project; and
- (iv) Future developments that is reasonably foreseeable and sufficiently certain to proceed.

90. In addition, the CIA considered the scope or influence of the subproject. Two boundaries, spatial and temporal⁵, were used.

91. The subproject IEE has identified the VCs as air quality, noise, geophysical (hydrogeological), traffic management, social-economic and socio-community, and human health. Other foreseeable projects that will overlap with the subproject are the future

⁵ Spatial boundary refers to the area immediately surrounding the alignment; while the temporal area considers the potential cumulative effects associated with subproject construction, and operation and maintenance, and those associated with other past, existing and reasonably foreseeable projects in the vicinity of the subproject.

construction of the other water supply subproject components, in particular rehabilitation and expansion of the water distribution system (namely storage, transmission, and primary distribution networks). The spatial boundary of the subproject is the area along the alignment and the existing ROWs. The temporal boundary can be considered as the whole Kohima city.

92. Air quality effects will occur during construction. Consequently, although emissions of common air contaminants (CAC) and fugitive dust may be elevated in proximity to active work sites, this impact will be short-term and localized to the immediate vicinity of the alignment. Greenhouse Gas (GHG) emissions may increase as a result of project construction activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material). Given the subproject's relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible.

93. During construction noise levels in the immediate proximity of most work sites are expected to increase. The duration of this exposure will be relatively brief. This exposure represents a temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the project operations will be largely imperceptible.

94. Trenching activities for pipelaying will not be an obstacle to groundwater flow because it is far too small a structure to form a significant barrier. The subproject is not expected to have any residual effects on hydrogeology, groundwater flow regimes, or groundwater quality.

95. Land use/traffic management concerns will occur spatially during construction. During construction, site-specific mitigation measures will be implemented to address temporary disruptions to land use and access in the vicinity of the alignment such as road and sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction-related traffic. There should be improved traffic movement along the alignment once construction is completed. Since the subproject will be built along existing road corridors, it will not conflict with existing or planned land use.

96. Adverse impacts such as localized disruption of vehicle traffic, parking, cycling and pedestrian movements and public transit bus service in areas along the alignment, and elevated CAC and fugitive dust emissions in proximity to work sites, elevated noise and vibration levels and visual impacts will occur during construction. These short-term effects will be mitigated by providing alternate travel routes or alternating traffic movements and, where possible, access to businesses, schools and residences. However, upon completion of construction the socio-community will benefit from the improved water supply system. This is considered a long-term cumulative benefit.

97. No adverse residual effects to human health will occur as a result of project construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short-term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public by contributing to the long-term improvement of water supply and community livability in Kohima.

V. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Project Stakeholders

98. The primary stakeholders are:

- (i) Residents, shopkeepers and businesspeople who live and work alongside the roads in which improvements will be provided and near sites where facilities will be built;
- (ii) Custodians and users of socially and culturally important buildings in affected areas;
- (iii) State and local authorities responsible for the protection and conservation of archaeological relics, historical sites and artefacts; and
- (iv) State and local tourism authorities.

99. The secondary stakeholders are:

- (i) Urban Development Department (UDD) as the Executing Agency;
- (ii) Other government institutions whose remit includes areas or issues affected by the subproject (state and local planning authorities such as PWD, KMC);
- (iii) Non-government organizations (NGOs) and community-based organizations (CBOs) working in the affected communities;
- (iv) Other community representatives (prominent citizens, religious leaders, elders, women's groups);
- (v) The beneficiary community in general; and
- (vi) ADB, Gol, and Ministry of Finance.

B. Consultations and Disclosures Conducted

100. Informal discussions were held with the local people during site visits. Issues discussed are:

- (i) Awareness and extent of the project and development components;
- (ii) Benefits of the subproject for the economic and social upliftment of community;
- (iii) Labour availability in the subproject locations or requirement of outside labour involvement;
- (iv) Local disturbances due to construction works; and
- (v) Drinking water problem.

101. A town level meeting was organized in Kohima on June 3, 2010 to discuss the proposed project. The meeting was presided over by Mr Alung Hangsing, the Administrator of KMC and was attended by elected public representatives of KMC (Councilors), and representatives from public, youth organisations, chairmen of Panchayaths and agencies like PHED and SIPMIU. Appendix 2 shows local advertisements and media announcements and attendance sheets.

102. Following are the comments / suggestions of the participants:

- (i) The Project work should be completed within the shortest possible time as people face a lot of problems due to the absence of the proposed infrastructure at present.

- (ii) Provisions should be made to include all the households to be linked to the water supply system facility so that the maximum number of people is benefited.
- (iii) People are willing to cooperate by all means to implement the project successfully and are willing to pay higher water charges if levied within their affordable means.
- (iv) Inconvenience and traffic disturbances due to construction work in the city should be minimized as far as possible.
- (v) Equitable distribution of water should be ensured
- (vi) The supply should be regular
- (vii) The supply during lean period should be adequate.

103. English version of the Environmental Assessment and Review Framework (EARF) has been placed in the offices of KMC, PHED and SIPMIU. The EARF and IEE will be provided during workshops to ensure stakeholders understood the objectives, policy, principles, and procedures.

C. Future Consultation and Disclosure

104. UDD extended and expanded the consultation and disclosure process significantly during implementation of NERCCDIP. They have appointed an experienced NGO to handle this key aspect of the programme. The NGO continuously (i) conducts a wide range of activities in relation to all subprojects in the city; and (ii) ensures the needs and concerns of stakeholders are registered and are addressed in subproject design.

105. For this subproject, the NGO/Capacity Development Consultant will develop, in close coordination with SIPMIU and DSMC, a public consultation and disclosure program which is likely to include the following:

- (i) Consultation during detailed design:
 - (a) Focus-group discussions with affected persons and other stakeholders (including women's groups, NGOs and CBOs) to hear their views and concerns, so that these can be addressed in subproject design where necessary; and
 - (b) Structured consultation meetings with the institutional stakeholders (government bodies and NGOs) to discuss and approve key aspects of the project.
- (ii) Consultation during construction:
 - (a) Public meetings with affected communities (if any) to discuss and plan work programmes and allow issues to be raised and addressed once construction has started; and
 - (b) Smaller-scale meetings to discuss and plan construction work with individual communities to reduce disturbance and other impacts, and provide a mechanism through which stakeholders can participate in subproject monitoring and evaluation;
- (iii) Project disclosure:
 - (a) Public information campaigns (via newspaper, TV and radio) to explain the project to the wider town population and prepare them for disruption they may experience once the construction programme is underway;

- (b) Public disclosure meetings at key project stages to inform the public of progress and future plans; and
- (c) Formal disclosure of completed project reports by making copies available at convenient locations in the study towns, informing the public of their availability, and providing a mechanism through which comments can be made.

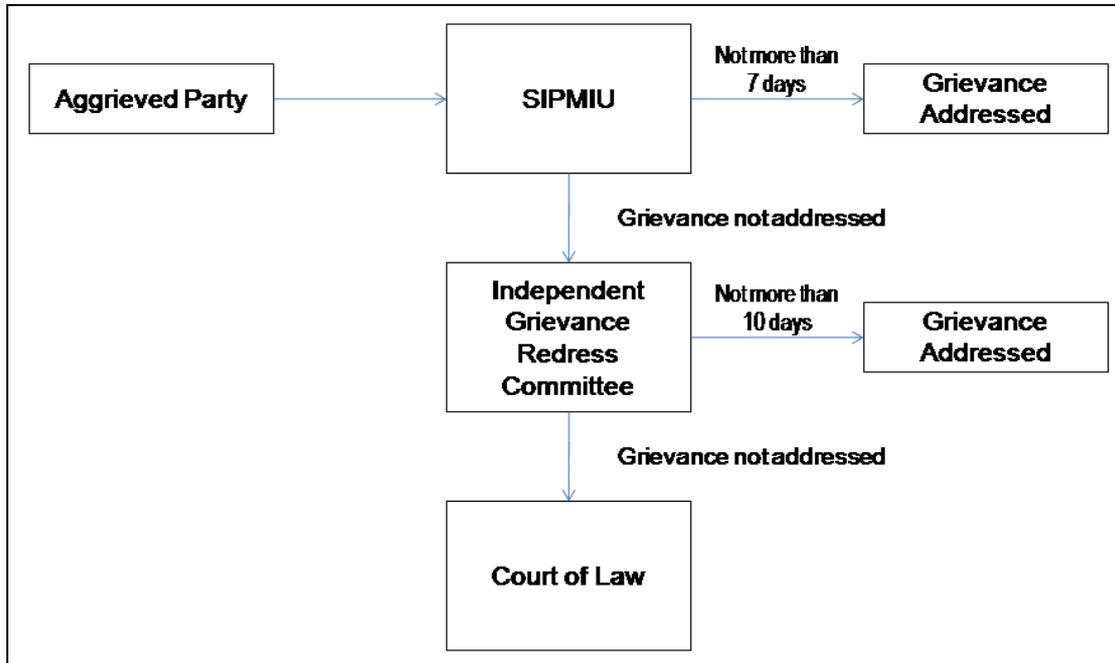
106. Based on ADB requirements, the following will be posted on ADB website: (i) this IEE, upon receipt; (ii) a new or updated IEE, if prepared, reflecting significant changes in the Project during design or implementation; (iii) corrective action plan prepared during Project implementation to address unanticipated environmental impacts and to rectify non-compliance to EMP provisions; and (iv) environmental monitoring reports, upon receipt.

VI. GRIEVANCE REDRESS MECHANISM

107. Grievances of affected persons will first be brought to the attention of the SIPMIU. Grievances not redressed by the SIPMIU will be brought to the Independent Grievance Redress Committee (IGRC) set up to monitor project implementation in Kohima. The GRC will determine the merit of each grievance, and resolve grievances within 10 days of receiving the complaint. Grievance not redressed by the IGRC will be referred to the appropriate courts of law. The DSMC will keep records of all grievances received including: contact details of complainant, date that the complaint was received, nature of grievance, agreed corrective actions and the date these were effected, and final outcome. The grievance redress process is shown in **Figure 4**.

108. All costs involved in resolving the complaints will be borne by the SIPMIU. The GRCs will continue to function throughout the project duration.

Figure 1: Grievance Redress Mechanism



VII. ENVIRONMENTAL MANAGEMENT PLAN

A. Institutional Arrangements

109. The main agencies involved in managing and implementing the subproject are:

- (i) The national-level Executing Agency (NEA) for the Investment Program is MOUD;
- (ii) Investment Program Coordination Cell (IPCC) is established in MOUD. IPCC is responsible for overall management of the Investment Program in the city and they include social/environmental safeguard specialists whose tasks include monitoring Program implementation and reviewing and screening the subprojects submitted by State in accordance with subproject selection criteria, including the environmental provisions;
- (iii) State Investment Program Management and Implementation Unit (SIPMIU) established in SEA and headed by a Program Director (PD). SIPMIU will oversee the Program's environment and resettlement planning. This includes the preparation of all documentation needed for decision-making, contracting, and supervision of work and providing progress-monitoring information to the PD;
- (iv) The SIPMIU shall comprise of a Safeguards and Social Cell staffed with an Environmental Officer (EO). The EO shall be responsible for implementing the environmental safeguard provisions in the project including (i) ensuring environmental criteria for subproject selection in the EARP are followed, (ii) ensuring mitigation requirements are in contractor bidding documents, and (iii) liaising with various Central and State government agencies on compliance matters. The SIPMIU will appoint and manage Construction Contractors (CC) to

- build elements of the infrastructure who are required to submit Environmental Implementation Plans (EIPs) for SIPMIU approval;
- (v) The SIPMIU is assisted by the DSMC, who is responsible for design the infrastructure, manage tendering of contracts, and supervise the construction process;
 - (vi) An Environmental Specialist (ES) in the DSMC is responsible for addressing the environmental issues in the project components during design and implementation. The ES will ensure all mitigation requirements are in contractor bidding documents and EIPs, and will supervise the effective implementation of environmental provisions during construction. In addition, the ES will assist the SIPMIU on the procurement needs and other project implementation aspects and shall play a central role in ensuring capacity building on environmental management of the SIPMIU, Contractor and Line Departments through capacity development support and training;

1. Responsibilities of SIPMIU

110. The execution of this subproject comprising of mainly construction of water storage reservoirs and installation a network of water supply pipe lines will be carried out in three contract packages procured through competitive bidding on item rate basis. The comprehensive contract management including billing and payment shall be the responsibility of unit.

111. **Contract Management.** Interpretation of contract clauses, time management and monitoring, of construction problems and delays (if any) shall be the responsibility of the SIPMIU which shall initiate all efforts to resolve these problems. Time Management shall be effected at Site by prioritizing and allocating the works monthly, weekly and daily. Dispute settlement, issuing notices to contractors on work related issues, levying of liquidated damages for non fulfillment of contractual obligations, issuing of statutory certificates agreed upon in the contract agreement ,settling contractor's claims etc shall also be the responsibility of the unit.

112. **Supervision of Work – Preliminaries.** The formal handing over of the site to the contractor shall be the responsibility of the unit. Utility shifting, if found essential, shall be initiated after assessing the requirement and preparing and submitting the request with drawings to the concerned owner. Making request for diversion of traffic to the concerned authority and managing diversion shall also be done by the unit. Scrutiny of construction - drawings, issuing approval, checking and fixing the alignment of the proposed pipe lines, setting out at site of the proposed civil structures like water storage reservoirs after verification and checking with design and all other similar supports to the contractor shall be provided by the implementing unit.

113. **Supervision of Work – Excavation.** Ensuring adequacy of safety measures, classification of soil, certifying width and depth of the pipe line trenches as well as foundation trenches of civil structures and obtaining & communicating permission for blasting shall be the responsibility of SIPMIU.

114. **Supervision of Work – Concreting and Other Civil Works.** Collecting and sending samples for testing, certifying quality of materials, verifying water to cement ratio/ compaction / curing, certifying formwork and accepting quality of the finished structure shall also be taken care of by the implementing unit.

115. **Supervision of Work – Electrical and Mechanical Works.** The unit shall ensure the conformity of supplied materials to specification, check the installation and witness satisfactory trial run of the electro mechanical units & accessories.

116. **Supervision of Work – Daily Supervision.** On site daily supervision, taking pre-measurements and measurements, recording measurements in Measurement Books ,taking check measurements and checking of "as built" drawings shall be the responsibility of SIPMIU.

117. **Supervision of Work – Billing and Payment.** The implementing unit shall conduct pre & final verification of the measurements & bills and quality certificates pass the bill and effect payment to the contractors. Post auditing of all the accounts related to contract settlements shall be invariably done by the unit.

118. **Supervision of Work – Obtaining Power Connection.** The unit shall also take care of the contractors request for obtaining connection both temporary for the site and permanent for the subproject.

119. **Supervision of Work – Completion and Handing Over.** Issuing completion certificate, ensuring compliance to warranty during Defect Liability Period, preparation of O & M plan and final report on the contract shall be systematically ensured by the implementing unit at the final stage of the works.

120. **Supervision of Work – Variation in Quantity and Time.** In case additional and excess quantity of works are found essential, suitable decision shall be taken by the SIPMIU after checking the design & schedule and recommending to the Technical Committee for approval.

121. **Supervision of Work – Environmental Monitoring** The SIPMIU shall be responsible for establishing a system for monitoring /review of the environmental impact of the construction activities of the contractor and suggest remedial action, if any, found necessary.

122. The complete management of the works at site shall be the responsibility of the technical wing of the SIPMIU. Some of the routine duties are:

- (i) Visit the project site regularly and monitor day-to-day activities.
- (ii) Ensure time management through effective monthly, weekly and daily allocation of works.
- (iii) Prioritize the works in consultation with the DSMC and the Contractor.
- (iv) Ensure proper planning of diversion of traffic during the work and coordinate with police and transport departments in this regard.
- (v) Ensure that prior notice is given to the public about the disruption of water, electricity and/or communication lines during the execution of works and the situation brought back to normalcy within minimum time.
- (vi) Ensure that caution boards are erected at prime locations displaying the nature of works.
- (vii) Check the line, level and layout of the progressing construction works to ensure conformity with the approved estimate and drawing.
- (viii) Ensure adherence to the contract conditions and laws of the government regarding labor and labor welfare measures and ensure availability & proper utilization of adequate safety equipments at the site.
- (ix) Maintain control over quality and quantity of various items of works executed.

- (x) Get the tests conducted as per the required frequency & supervise the testing of samples at specified laboratories. Whenever the test fails, the materials shall not be used. The work where this test fails shall have to be got redone.
- (xi) Conduct joint measurement along with DSMC & Contractor and record the measurement in the measurement book.
- (xii) Inspect the works regularly to see that the works are executed strictly as per approved drawings and specifications. Any changes from the approved drawings for any reason needs to be got approved by competent authority.
- (xiii) Ensure checking 100 % of the bills submitted by the Contractor with reference to the measurement rate and ensure the satisfactory quality certification from the DSMC before processing the bills for release of payment.
- (xiv) Consider issuance of variation orders during the course of work, if necessary. Such variation due to change in material, specification, size, soil classification etc., from the approved agreement should be brought to the notice of the TC for consideration.
- (xv) Co-ordinate with the DSMC in the preparation of the Final Report summarizing the construction activities undertaken indicating, among other things, contract changes, claims or disputes or any other substantive matters having effect on the cost and progress of the work.
- (xvi) Co-ordinate with the DSMC in the preparation of the Project Completion Report.
- (xvii) Provide any information called for from SMB and perform any other duties/responsibilities assigned from time-to-time.
- (xviii) Prepare satisfactory reports to audit enquires with respect to works & contracts.
- (xix) Exercise a thorough and efficient control and check on all the project components till the end of handing over the project.

123. **Quality Control.** The subproject shall be executed adhering to the bid specifications. The Manuals on Quality Control and Quality Assurance (QA/QC Manual) and the volume of Standard Specifications prepared by the SIPMIU for the Program will supplement the bid specifications.

2. Responsible for carrying out mitigation measures

124. During construction stage, implementation of mitigation measures is the construction contractor's responsibility while during operation stage, PHED will be responsible for the conduct of maintenance or repair works.

125. To ensure implementation of mitigation measures during the construction period, contract clauses (**Annex 4**) for environmental provisions will be part of the civil works contracts. Contractors' conformity with contract procedures and specifications during construction will be carefully monitored by SIPMIU and DSMC.

3. Responsible for carrying out monitoring measures

126. During construction, Environmental Specialist (ES) of DSMC and the Environmental Officer (EO) of SIPMIU will monitor the construction contractor's environmental performance.

127. During the operation stage, monitoring will be the responsibility of PHED.

4. Responsible for reporting

128. DSMC will submit periodic monitoring and implementation reports to SIPMIU, who will take follow-up actions, if necessary. SIPMIU will submit monitoring reports to the PD who will then submit to ADB. SIPMIU will also prepare annual monitoring reports for IPCC and assist IPCC in preparing an annual monitoring report to ADB. The annual report is to focus on the progress of implementation of the EMP and EARP and issues encountered and measures adopted, follow-up actions required, if any, as well as the status of Program compliance with subproject selection criteria, and relevant loan covenants. IPCC will seek clearance for submission and disclosure of the annual environmental monitoring report to ADB.

B. Environmental Mitigation Plan

129. **Table 9 to 11** shows the potential adverse environmental impacts, proposed mitigation measures, responsible parties, and estimated cost of implementation. This EMP will be included in the bid documents and will be further reviewed and updated during implementation.

C. Environmental Monitoring Program

130. **Table 12 to 14** shows the proposed environmental monitoring program for this subproject. It includes all relevant environmental parameters, location, responsibility of mitigation and monitoring, method of monitoring and frequency of monitoring. Monitoring activities during the detailed engineering design stage will form part of the baseline conditions of the subproject location and will be used as the reference for acceptance of restoration works by the construction contractors.

Table 9: Anticipated Impacts and Mitigation Measures – Pre-construction Environmental Mitigation Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Utilities	Telephone lines, electric poles and wires, water lines within proposed project area	(i) Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; and (ii) Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services.	DSMC	(i) List of affected utilities and operators; (ii) Bid document to include requirement for a contingency plan for service interruptions
Social and Cultural Resources	Ground disturbance can uncover and damage archaeological and historical remains	(i) Consult Archaeological Survey of India (ASI) or concerned dept. of Nagaland Govt. to obtain an expert assessment of the archaeological potential of the site; (ii) Consider alternatives if the site is found to be of medium or high risk; (iii) Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.	SIPMIU & DSMC	Chance Finds Protocol
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	Disruption to traffic flow and sensitive receptors	(i) Prioritize areas within or nearest possible vacant space in the subproject location; (ii) If it is deemed necessary to locate elsewhere, consider sites that will not promote instability and result in destruction of property, vegetation, irrigation, and	SIPMIU and DSMC to determine locations prior to award of construction contracts.	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		drinking water supply systems; (iii) Do not consider residential areas; (iv) Take extreme care in selecting sites to avoid direct disposal to water body which will inconvenience the community.		
Sources of Materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.	(i) Prioritize sites already permitted by the Mining Department; (ii) If other sites are necessary, inform construction contractor that it is their responsibility to verify the suitability of all material sources and to obtain the approval of SIPMU and (iii) If additional quarries will be required after construction is started, inform construction contractor to obtain a written approval from SIPMU.	SIPMIU and DSMC to prepare list of approved quarry sites and sources of materials	(i) List of approved quarry sites and sources of materials; (ii) Bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary.

CPHEEO = Central Public Health and Environmental Engineering Organization, DSMC = Design Supervision Management Consultant, EIA = Environmental Impact Assessment, O&M = operation and maintenance, SIPMIU = State-level Investment Program Management and Implementation Units, UD&PAD = Urban Development & Poverty Alleviation Department.

Table 10: Anticipated Impacts and Mitigation Measures – Construction Environmental Mitigation Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Sources of Materials	Extraction of rocks and material may cause ground instability	(i) Use quarry sites and sources permitted by government; (ii) Verify suitability of all material sources and obtain approval of Investment SIPMIU; (iii) If additional quarries will be required after construction has started, obtain written approval from SIPMIU; and; (iv) Submit to DSMC on a monthly basis documentation of sources of materials.	Construction Contractor	Construction Contractor documentation
Air Quality	Emissions from construction vehicles, equipment, and machinery used for excavation and construction resulting to dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons)	(i) Consult with SIPMIU/DSMC on the designated areas for stockpiling of clay, soils, gravel, and other construction materials; (ii) Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather; (iv) Use tarpaulins to cover sand and other loose material when transported by trucks; and (v) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly.	Construction Contractor	(i) Location of stockpiles; (ii) Complaints from sensitive receptors; (iii) Heavy equipment and machinery with air pollution control devices; (iv) Ambient air for respirable particulate matter (RPM) and suspended particulate matter (SPM); (v) Vehicular emissions such as sulphur dioxide (SO ₂), nitrous oxides (NO _x), carbon monoxide (CO), and hydrocarbons
Surface water quality	Mobilization of settled silt materials, run-off from stockpiled materials, and chemical contamination from fuels and lubricants during construction works can contaminate nearby surface water quality.	(i) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets; (ii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with SIPMIU/DSMC on designated	Construction Contractor	(i) Areas for stockpiles, storage of fuels and lubricants and waste materials; (ii) Number of silt traps installed along drainages leading to water bodies; (iii) Records of surface water quality inspection; (iv) Effectiveness of water management measures;

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		disposal areas; (iii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies; (iv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies; (v) Dispose any wastes generated by construction activities in designated sites; and (vi) Conduct surface quality inspection according to the Environmental Management Plan (EMP).		(v) For inland water: suspended solids, oil and grease, biological oxygen demand (BOD), and coliforms.
Noise Levels	Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, materials, and people	(i) Plan activities in consultation with SIPMIU/DSMC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; (ii) Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach; (iii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; and (iv) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s.	Construction Contractor	(i) Complaints from sensitive receptors; (ii) Use of silencers in noise-producing equipment and sound barriers; (iii) Equivalent day and night time noise levels
Existing Infrastructure and	Disruption of service and	(i) Obtain from SIPMIU/DSMC	Construction Contractor	Existing Utilities Contingency

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Facilities	damage to existing infrastructure at specified project location	the list of affected utilities and operators if any; (ii) Prepare a contingency plan to include actions to be done in case of unintentional interruption of service		Plan
Landscape and Aesthetics	Solid wastes as well as excess construction materials	(i) Prepare and implement Waste Management Plan; (ii) Avoid stockpiling of excess excavated soils; (ii) Coordinate with KMC/PWD for beneficial uses of excess excavated soils or immediately dispose to designated areas; (iv) Recover used oil and lubricants and reuse or remove from the sites; (v) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; (vi) Remove all wreckage, rubbish; and (vii) Request SIPMIU/DSMC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.	Construction Contractor	(i) Waste Management Plan; (ii) Complaints from sensitive receptors; (iii) SIPMIU/DSMC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.
Accessibility	Traffic problems and conflicts near project locations and haul road	(i) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites; (ii) Schedule transport and hauling activities during non-peak hours; (iii) Locate entry and exit points in areas where there is low potential for traffic congestion;	Construction Contractor	(i) Traffic Management Plan; (ii) Complaints from sensitive receptors; (iii) Number of signages placed at subproject location.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		(iv) Keep the site free from all unnecessary obstructions; (v) Drive vehicles in a considerate manner; (vi) Coordinate with Kohima Municipal Traffic Office for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and (vii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints. (viii) Provide planks across trenches in front of businesses, and ensure works are completed quickly to avoid disruption		
Socio-Economic – Income.	Impede the access of residents and customers to nearby shops	(i) Leave spaces for access between mounds of soil; (ii) Provide walkways and metal sheets where required for people; (iii) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools; (iv) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and (v) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	Construction Contractor	(i) Complaints from sensitive receptors; (ii) Number of walkways, signages, and metal sheets placed at subproject location.
Socio-Economic	- Generation of contractual	(i) Employ at least 50% of the	Construction Contractor	(i) Employment records;

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Employment	employment and increase in local revenue	labour force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available; and (ii) Secure construction materials from local market.		(ii) records of sources of materials
Occupational Health and Safety	Occupational hazards which can arise during work	(i) Develop and implement site-specific Health and Safety (H&S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use Personal Protective Equipment like helmet, gumboot, safety belt, gloves, nose musk and ear plugs; (c) H&S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents; (ii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site; (iii) Provide medical insurance coverage for workers; (iv) Secure all installations from unauthorized intrusion and accident risks; (v) Provide supplies of potable drinking water; (vi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances; (vii) Provide H&S orientation training to all new workers to ensure that they are apprised	Construction Contractor	(i) Site-specific Health and Safety (H&S) Plan; (ii) Equipped first-aid stations; (iii) Medical insurance coverage for workers; (iv) Number of accidents; (v) Supplies of potable drinking water; (vi) Clean eating areas where workers are not exposed to hazardous or noxious substances; (vii) record of H&S orientation trainings (viii) personal protective equipments; (ix) % of moving equipment outfitted with audible back-up alarms; (xi) sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		<p>of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;</p> <p>(viii) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;</p> <p>(ix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;</p> <p>(x) Ensure moving equipment is outfitted with audible back-up alarms;</p> <p>(xi) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and</p> <p>(xii) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.</p>		
Community Health and Safety.	Traffic accidents and vehicle collision with pedestrians	(i) Plan routes to avoid times of peak-pedestrian activities.	Construction Contractor	(i) Traffic Management Plan;

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
	during material and waste transportation	(ii) Liaise with SIPMIU/DSMC in identifying high-risk areas on route cards/maps. (iii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. (iv) Provide road signs and flag persons to warn.		(ii) Complaints from sensitive receptors
Work Camps	Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants	(i) Consult with SIPMIU/DSMC before locating project offices, sheds, and construction plants; (ii) Minimize removal of vegetation and disallow cutting of trees; (iii) Provide water and sanitation facilities for employees; (iv) Prohibit employees from poaching wildlife and cutting of trees for firewood; (v) Train employees in the storage and handling of materials which can potentially cause soil contamination; (vi) Recover used oil and lubricants and reuse or remove from the site; (vii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; (viii) Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and (ix) Request SIPMIU/DSMC	Construction Contractor	(i) Complaints from sensitive receptors; (ii) Water and sanitation facilities for employees; and (iii) SIPMIU/DSMC report in writing that the camp has been vacated and restored to pre-project conditions

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.		
Social and Cultural Resources	Risk of archaeological chance finds	(i) Strictly follow the protocol for chance finds in any excavation work; (ii) Request SIPMIU/DSMC or any authorized person with archaeological field training to observe excavation; (iii) Stop work immediately to allow further investigation if any finds are suspected; and (iv) Inform SIPMIU/DSMC if a find is suspected, and take any action they require ensuring its removal or protection in situ.	Construction Contractor	Records of chance finds

DSMC = Design Supervision Management Consultant, H&S = health and safety, RPM = respirable particulate matter, SIPMIU = State-level Investment Program Management and Implementation Units, SPM = suspended particulate matter, UD&PAD = Urban Development & Poverty Alleviation Department.

Table 11: Anticipated Impacts and Mitigation Measures – Operation and Maintenance Environmental Mitigation Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
General	General impact	(i) Conduct work during non-monsoon period; and (ii) Cover or wet excavated material to prevent dusts.	PWD (PHED) and O and M Contractors	Complaints from sensitive receptors
Economic Development	Impediments to residents and businesses	(i) Inform all residents and businesses about the nature and duration of any work well in advance so that they can make preparations if necessary; (ii) Conduct these works to provide wooden walkways near any excavated site.	PHED and O and M Contractors	Complaints from sensitive receptors
Social and Cultural Resources	Temporary disruption of activities	(i) Consult the town authorities to identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity; (ii) Complete work in sensitive areas quickly; (iv) Consult municipal authorities, custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.	PHED and O and M Contractors	Complaints from sensitive receptors

Table 12: Pre-construction Environmental Monitoring Program

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
Utilities	As per site requirement	DSMC	(i) List of affected utilities if any and operators; (ii) Bid document to include requirement for a contingency plan for service interruptions	Checking of records	(i) List of affected utilities and operators prepared; (ii) Requirement for a contingency plan for service interruptions included in bid documents	Once	SIPMIU
Social and Cultural Heritage	As per site requirement	SIPMIU and DSMC	Chance Finds Protocol	Checking of records	Chance Finds Protocol provided to construction contractors prior to commencement of activities	Once	SIPMIU
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	As per site requirement	SIPMIU and DSMC to determine locations prior to award of construction contracts.	List of selected location for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	Checking of records	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas provided to construction contractors prior to commencement of works.	Once	SIPMIU
Sources of Materials	As per site requirement	SIPMIU and DSMC to prepare list of approved quarry sites and sources of materials	(i)List of approved quarry sites and sources of materials; (ii) Bid document to include requirement for verification of	Checking of records	(i) List of approved quarry sites and sources of materials provided to construction contractors (ii) Bid document	Once	SIPMIU

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
			suitability of sources and permit for additional quarry sites if necessary.		included requirement for verification of suitability of sources and permit for additional quarry sites if necessary.		

DSMC = Design Supervision Management Consultant, O&M = operation and maintenance, SIPMIU = State-level Investment Program Management and Implementation Units.

Table 13: Construction Environmental Monitoring Program

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
Sources of Materials	Quarries and sources of materials	Construction Contractor	Construction Contractor documentation	(i) Checking of records; (ii) visual inspection of sites	(i) Sites are permitted; (ii) Report submitted by construction contractor monthly (until such time there is excavation work)	Monthly submission for construction contractor As needed for DSMC	DSMC
Air Quality	Construction sites and areas designated for stockpiling of materials	Construction Contractor	(i) Location of stockpiles; (ii) complaints from sensitive receptors; (iii) heavy equipment and machinery with air pollution control devices; (iv) vehicular emissions such as sulphur dioxide (SO ₂), nitrous oxides (NO _x), carbon monoxide (CO), and hydrocarbons (HC)	(i) Checking of records; (ii) visual inspection of sites	(i) Stockpiles on designated areas only; (ii) complaints from sensitive receptors satisfactorily addressed; (iii) air pollution control devices working properly; (iv) GOI Vehicular Emission Standards for SO ₂ , NO _x , CO and HC.	Monthly for checking records	DSMC in coordination with Pollution Control Board
Surface Water Quality	(i) Construction sites; (ii) areas for stockpiles, storage of fuels and lubricants and waste materials;	Construction Contractor	(i) Areas for stockpiles, storage of fuels and lubricants and waste materials; (ii) number of silt traps installed along drainages leading to water bodies; (iii) records of	visual inspection	(i) Designated areas only; (ii) silt traps installed and functioning; (iii) no noticeable increase in suspended solids and silt from construction activities	Monthly	DSMC in coordination with Pollution Control Board

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
			surface water quality inspection; (iv) effectiveness of water management measures				
Noise Levels	(i) Construction sites; (ii) areas for stockpiles, storage of fuels and lubricants and waste materials; (iii) work camps	Construction Contractor	(i) Complaints from sensitive receptors; (ii) use of silencers in noise-producing equipment and sound barriers; (iii) Equivalent day and night time noise levels	(i) Checking of records; (ii) visual inspection	(i) Complaints from sensitive receptors satisfactorily addressed; (ii) silencers in noise-producing equipment functioning as design; and (iii) sound barriers installed where necessary	Monthly	DSMC in coordination with Pollution Control Board
Existing Utilities and Infrastructure	Construction sites	Construction Contractor	(i) Existing Utilities Contingency Plan	(i) Checking of records; (ii) visual inspection	Implementation according to Utilities Contingency Plan	As needed	DSMC
Landscape and Aesthetics	(i) Construction sites; (ii) areas for stockpiles, storage of fuels and lubricants and waste materials; (iii) work camps	Construction Contractor	(i) Waste Management Plan; (ii) complaints from sensitive receptors; (iii) SIPMIU/DSMC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.	(i) Checking of records; (ii) visual inspection	(i) No accumulation of solid wastes on-site; (ii) implementation of Waste Management Plan; (iii) complaints from sensitive receptors satisfactorily addressed.	Monthly	DSMC
Accessibility	(i) Construction sites; (ii) traffic haul	Construction Contractor	(i) Traffic Management Plan; (ii)	Visual inspection	(i) Implementation of Traffic Management Plan,	Monthly	DSMC

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
	road		complaints from sensitive receptors; (iii) number of signages placed at subproject location.		if required; (ii) complaints from sensitive receptors satisfactorily addressed; (iii) signages visible and located in designated areas		
Socio-Economic - Income	Construction sites	Construction Contractor	(i) Complaints from sensitive receptors; (ii) number of walkways, signages, and metal sheets placed at subproject location.	Visual inspection	(i) Complaints from sensitive receptors satisfactorily addressed; (ii) walkways, ramps, and metal sheets provided (iii) signages visible and located in designated areas	Quarterly	DSMC
Socio-Economic - employment	construction sites	Construction Contractor	(i) Employment records; (ii) records of sources of materials	Checking of records	Number of employees from Kohima equal or greater than 50% of total workforce	Quarterly	DSMC
Occupational Health and Safety	construction sites	Construction Contractor	(i) Site-specific Health and Safety (H and S) Plan; (ii) Equipped first-aid stations; (iii) Medical insurance coverage for workers; (iv) Number of accidents; (v) Supplies of potable drinking water; (vi) Clean eating areas where workers are not exposed to hazardous or	(i) Checking of records; (ii) visual inspection	(i) Implementation of H and S plan; (ii) number of work-related accidents; (iii) % usage of personal protective equipment; (iv) number of first-aid stations, frequency of potable water delivery, provision of clean eating area, and number of sign boards are according to approved plan; (v) % of moving equipment	Quarterly	DSMC

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
			noxious substances; (vii) record of H and S orientation trainings (viii) personal protective equipments; (ix) % of moving equipment outfitted with audible back-up alarms; (x) sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal.		outfitted with audible back-up alarms		
Community Health and Safety	Construction sites	Construction Contractor	(i) Traffic Management Plan; (ii) complaints from sensitive receptors	Visual inspection	(i) Implementation of Traffic Management Plan; (ii) complaints from sensitive receptors satisfactorily addressed	Quarterly	DSMC
Work Camps	Work camps	Construction Contractor	(i) Complaints from sensitive receptors; (ii) water and sanitation facilities for employees; and (iii) SIPMIU/DSMC report in writing	Visual inspection	(i) Designated areas only; (ii) complaints from sensitive receptors satisfactorily addressed	Quarterly	DSMC

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
			that the camp has been vacated and restored to pre-project conditions				
Chance Finds	Construction sites	Construction Contractor	Records of chance finds	Checking of records	Implementation of Chance Finds Protocol	As needed	DSMC

BOD = biological oxygen demand, DSMC = Design Supervision Management Consultant, H&S = health and safety, RPM = respirable particulate matter, SIPMIU = State-level Investment Program Management and Implementation Units SPM = suspended particulate matter.

Table 14: Operation and Maintenance Environmental Monitoring Program

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/Standards	Frequency	Responsible for Monitoring
General Maintenance work	subproject location	PHED and O and M Contractors	Complaints from sensitive receptors	Checking of records	Complaints from sensitive receptors satisfactorily addressed	As needed	SIPMIU
Community Health and Safety	subproject location	PHED and O and M Contractors	Complaints from sensitive receptors	Checking of records	complaints from sensitive receptors satisfactorily addressed	As needed	SIPMIU
Accessibility	subproject location	PHED and O and M Contractors	Complaints from sensitive receptors	Checking of records	Complaints from sensitive receptors satisfactorily addressed	As needed	SIPMIU

D. Environmental Management Plan Costs

131. Most of the mitigation measures require the Construction Contractors to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance. Regardless of this, any costs of mitigation by the construction contractors or DSMC are included in the budgets for the civil works and do not need to be estimated separately here. Mitigation that is the responsibility of UDD will be provided as part of their management of the project, so this also does not need to be duplicated here.

132. The remaining actions in the EMP are the various environmental monitoring activities to be conducted by the Environmental Monitoring Specialist. These have not been budgeted elsewhere, and their costs are shown in Table 15. The figures show that the total cost of environmental management and monitoring for the subproject as a whole (covering design, 1.5 years of construction and the three years of operation) is INR 2.865 million.

Table 15: Environmental Management and Monitoring Costs (INR)

Item	Total Cost	Source of Funds
Design Supervision and Management Consultant – DSMC Environment Specialist	480,000	DSMC (cost already allotted)
Survey Expenses during Construction - Air, noise, water (Specific sites will be provided to construction contractors after awarding of the project)	200,000	Construction Contractor

VIII. FINDINGS AND RECOMMENDATIONS

133. The process described in this document has assessed the environmental impacts of all elements of the infrastructure proposed under the Kohima Water Supply Subproject. Potential negative impacts were identified in relation to both construction and operation of the improved infrastructure, but no impacts were identified as being due to either the project design or location. Mitigation measures have been developed in generic way to reduce all negative impacts to acceptable levels. These were discussed with specialists responsible for the engineering aspects, and as a result some measures have already been included in the outline designs for the infrastructure. This means that the number of impacts and their significance has already been reduced by amending the design.

134. During the construction phase, impacts mainly arise from the disturbance of residents, businesses, traffic and important buildings by the construction work. These are common impacts of construction in urban areas, and there are well developed methods for their mitigation.

135. One field in which impacts are much less routine is archaeology, and here a series of specific measures have been developed to avoid damaging important remains if any present at project location.

136. There were limited opportunities to provide environmental enhancements, but certain measures were included. For example it is proposed that the project will employ in the workforce people who live in the vicinity of construction sites to provide them with a short-term economic gain; and ensure that people employed in the longer term to maintain and operate the new facilities are residents of nearby communities.

137. Once the system is operating, the secondary distribution network will operate with routine maintenance, which should not affect the environment. The area is isolated and hence direct impact to nearby environment is minimum.

138. The main impacts of the operating water supply system will be beneficial as the citizens of Kohima city will be provided with a supply of water, which will serve a greater proportion of the population, including slum-dwellers. This will improve the quality of life of people as well as benefiting both individual and public health as the improvements in hygiene should reduce the incidence of disease associated with poor sanitation. This should lead to economic gains as people will be away from work less and will spend less on healthcare, so their incomes should increase.

139. Mitigation will be assured by a program of environmental monitoring conducted during construction and operation to ensure that all measures are implemented, and to determine whether the environment is protected as intended. This will include observations on- and off-site, document checks, and interviews with workers and beneficiaries, and any requirements for remedial action will be reported to the SIPMIU. There will also be longer-term surveys to monitor the expected improvements in the quality of domestic water and the health of the population.

140. Finally, stakeholders were involved in developing the IEE through face-to-face discussions and on site meeting held in the city, after which views expressed were incorporated into the IEE and the planning and development of the project. The IEE will be made available at public locations in the city and will be disclosed to a wider audience via the ADB website. The consultation process will be continued and expanded during project implementation, when a nationally-recognised NGO will be appointed to handle this key element to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.

IX. CONCLUSIONS

141. The subproject is unlikely to cause significant adverse impacts. The potential adverse impacts that are associated with design, construction, and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

142. Based on the findings of the IEE, the classification of the Project as Category "B" is confirmed, and no further special study or detailed EIA needs to be undertaken to comply with ADB SPS (2009) or GoI EIA Notification (2006).

APPENDIX 1: ADB RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST (WATER SUPPLY)

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the project area...			
<ul style="list-style-type: none"> Densely populated? 	✓		The Subproject activities extend to the entire city including the densely populated areas. There are no major negative impacts envisaged, because network improvements will be along the side of existing roads and can be constructed without causing disturbance to houses and commercial establishments. In narrow streets, disruption to road users is likely, and measures like best activity scheduling, alternative routes, prior information to road users, houses and shops will minimize the impact to acceptable levels.
<ul style="list-style-type: none"> Heavy with development activities? 	✓		The Subproject is proposed in an urban area with heavy development activities. The Subproject, however, will not cause negative impacts on development.
Adjacent to or within any environmentally sensitive areas?			
<ul style="list-style-type: none"> Cultural heritage site 		✓	There are no protected monuments. However, there is the historically important War Cemetery in the City; but the subproject is not adjacent to this site.
<ul style="list-style-type: none"> Protected Area 		✓	There are no protected areas within or adjacent to the city.
<ul style="list-style-type: none"> Wetland 		✓	There are no wetlands in the subproject
<ul style="list-style-type: none"> Mangrove 		✓	There are no mangrove areas in Kohima.
<ul style="list-style-type: none"> Estuarine 		✓	There are no estuarine zones in Kohima.
<ul style="list-style-type: none"> Buffer zone of protected area 		✓	There are no buffer zones or protected areas adjacent to or within the city.
<ul style="list-style-type: none"> Special area for protecting biodiversity 		✓	There are no special areas for protecting bio diversity within or adjacent to the city
<ul style="list-style-type: none"> Bay 		✓	There are no bays in Kohima.
B. Potential Environmental Impacts Will the Project cause...			
<ul style="list-style-type: none"> pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff? 		✓	Not applicable. The civil works are limited to improvement of distribution system.
<ul style="list-style-type: none"> impairment of historical/cultural monuments/areas and loss/damage to these sites? 		✓	Not applicable. Pipe-laying will not be adjacent or within the War Cemetery.
<ul style="list-style-type: none"> hazard of land subsidence caused by excessive ground water pumping? 		✓	Not applicable. The subproject will not involve groundwater pumping
<ul style="list-style-type: none"> social conflicts arising from displacement of communities? 		✓	No displacement of communities is anticipated as are being conducted within the government lands and road right-of-way.

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters? 		✓	Not applicable. The subproject will not involve abstraction of raw water.
<ul style="list-style-type: none"> unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)? 		✓	Water to be supplied is already being treated at the existing water treatment plant by chlorination.
<ul style="list-style-type: none"> delivery of unsafe water to distribution system? 		✓	Improvement in the secondary distribution network will improve current exposed and leaking water pipes.
<ul style="list-style-type: none"> inadequate protection of intake works or wells, leading to pollution of water supply? 		✓	The existing source is adequately protected.
<ul style="list-style-type: none"> over pumping of ground water, leading to salinization and ground subsidence? 		✓	Not applicable. The subproject will not involve groundwater pumping.
<ul style="list-style-type: none"> excessive algal growth in storage reservoir? 		✓	Not applicable. The subproject will not involve construction/rehabilitation of service reservoirs.
<ul style="list-style-type: none"> increase in production of sewage beyond capabilities of community facilities? 		✓	Not expected since sanitation facilities are available in most of the people in Kohima. However, improvement in the sewerage system is being considered under NERCCIP Tranche 3.
<ul style="list-style-type: none"> inadequate disposal of sludge from water treatment plants? 		✓	Not applicable. The subproject does not include treatment facilities
<ul style="list-style-type: none"> inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities? 		✓	Not applicable. The subproject does not include pumping and treatment plant.
<ul style="list-style-type: none"> impairments associated with transmission lines and access roads? 	✓		The subproject does not involve transmission lines or new access roads. Construction works will be limited to existing right of ways. Temporary short-term disturbance is anticipated for congested areas. The Environmental Management Plan will include mitigation measures to address impacts on accessibility.
<ul style="list-style-type: none"> health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals. 		✓	Not applicable. The subproject will not involve rehabilitation of the chlorinator in the existing water treatment plant.
<ul style="list-style-type: none"> health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants? 		✓	Not applicable. The subproject will not involve construction and operation of new water treatment plant.
<ul style="list-style-type: none"> dislocation or involuntary resettlement of people 		✓	The construction works will be on existing right-of-ways thus no dislocation or involuntary resettlement of people. However there may be temporary relocation of hawkers and vendors particularly in narrow streets. The EMP and Resettlement Plan will include mitigation measures to address the impacts.
<ul style="list-style-type: none"> social conflicts between construction workers from other 		✓	The subproject will prioritize employment of labourers from the local communities.

SCREENING QUESTIONS	Yes	No	REMARKS
areas and community workers?			
<ul style="list-style-type: none"> noise and dust from construction activities? 	✓		Trenching for the pipes is likely to generate noise. The EMP will include mitigation measures to address the impacts such as limiting work schedules during daytime, increasing work force in sensitive areas, and avoidance of stock piling of materials that have potential to generate dust.
<ul style="list-style-type: none"> increased road traffic due to interference of construction activities? 	✓		Linear activities like pipe replacement/laying along the roads is likely to disrupt traffic. Vehicle movement for construction purpose will increase the traffic. Identification of alternate routes, allowing limited - at least one-way traffic, prior information about the works and alternative arrangements, providing information/sign boards etc will reduce the impact.
<ul style="list-style-type: none"> continuing soil erosion/silt runoff from construction operations? 	✓		Due to hilly terrain this is anticipated. Construction works (pipe laying) will not be carried out during heavy rains. Work will be taken up in small stretches, all the activities excavation, pipe laying and refilling will be completed in 2-3 days. Surplus soil/unprotected construction material will be removed from the sites. Special precautions like protection bunds will be constructed where required.
<ul style="list-style-type: none"> delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems? 		✓	O&M system of the existing water treatment plant is already in place. Chlorine dosage is based on the specified standards and regular monitoring of water quality is conducted.
<ul style="list-style-type: none"> delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals? 		✓	The existing water treatment plant does not use chemicals other than chlorine. The chlorine concentration of the treated water is regularly monitored and ensured to comply with the Bureau of Indian Standards for Drinking Water.
<ul style="list-style-type: none"> accidental leakage of chlorine gas? 		✓	Not applicable. The subproject does not include chlorination facilities, which are already available.
<ul style="list-style-type: none"> excessive abstraction of water affecting downstream water users? 		✓	Not applicable. The subproject will not involve abstraction of water.
<ul style="list-style-type: none"> competing uses of water? 		✓	Not applicable. The subproject will not involve abstraction of water.
<ul style="list-style-type: none"> increased sewage flow due to increased water supply 		✓	Not expected since sanitation facilities are available in most of the people in Kohima. However, improvement in the sewerage system is being considered under NERCCIP Tranche 3.
<ul style="list-style-type: none"> increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant 		✓	Not expected since sanitation facilities are available in most of the people in Kohima. However, improvement in the sewerage system is being considered under NERCCIP Tranche 3.

APPENDIX 2: RECORDS OF PUBLIC CONSULTATION

OFFICE OF THE
KOHIMA MUNICIPAL COUNCIL
KOHIMA: NAGALAND

No.KMC/NOT-01/10/_____

Dt. Kma. the _____ May, 2010.

Information

An "Awareness Programme for NECCDIP (ADB Funded Project) under Kohima Municipal Council along with SIPMIU & Wilbur Smith Association, DSMC will be organized by Kohima Municipal Council in order to highlights the projects to be implemented under ADB (Asian Development Bank) and its Analysis of Project Component and implementation system, which will be followed by discussion & question hours on 3rd June'10 from 11:00 am to 1:00 pm at D.C Conference Hall, Kohima.

All Colony Panchayat Chairman and Colony Youth President are requested to kindly attend the meeting without fail.

Sd/-

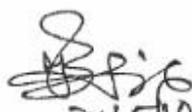
Alun Hangsing
Administrator,

Kohima Municipal Council.

Dt. Kma. the 31 May, 2010.MEMO.No.KMC/NOT-01/10/ 7763

Copy to:

1. Advisory Board Member, KMC for information.
2. All Colony Panchayat Chairman for information and necessary action.
3. All Colony Youth President for information and necessary action.
4. All Concerned.
5. All Editors, Local dailies for kind publication as news item.
6. Field Staff, KMC.
7. Guard File.


 31/5/10
 Office Secretary,
 Kohima Municipal Council.



NECCDIP awareness programme

KOHIMA: An awareness programme for NECCDIP (ADB Funded Project) under Kohima Municipal Council along with SIPMIU Wilbur Smith Association, DSMC will be organized by Kohima Municipal Council in order to highlight the projects to be implemented under ADB (Asian Development Bank) and its Analysis of Project component and implementation system, which will be followed by discussion and question hour on June 3 from 11 am to 1pm at DC conference hall, Kohima. All colony panchayat chairman and colony youth, president has been requested to attend the meeting.



Nagaland Post

KMC holds awareness on Asian development bank

KOHIMA: Under the aegis of Kohima Municipal Council, a meeting of all Panchayat chairmen, youth president of Kohima, under municipal jurisdiction with KMC advisory board members, State infrastructure project management & investment unit SIPMIU officials and consultant was held Thursday from conference hall of DC, Kohima. The meeting was chaired by Man Hangsing, Administrator KMC.

The main agenda of the meeting was to highlight and create awareness of the projects to be taken up under Asian Development Bank (ADB) for State capital Kohima, specially in management of water distribution, sewage system and solid waste along with setting up of SWM composed plan at Lirie colony.

Main resource persons Seno Haruh, Program Director (PD) SIPMIU and

Er. Khapi Additional Director SIPMIU elaborated on range of aspects of project with a power point presentation on various upcoming projects that were going to be undertaken in Kohima city.

Advisory Board Member KMC K. Seyte also highlighted suggestions and views of advisory members in regard to sanitation management and other important relevant matters for the betterment and improvement of Kohima citizens.

Earlier, SIPMIU officials appealed to all citizens representative to extend cooperation in the course of survey by State infrastructure project management & investment unit consultants for data's collection and other technical assessment by Wilbur Smith, and also explained about significance of benchmark.

Meeting with all Panchayat chairman/G.B's/Y.O. President on 30th Jun 10

No.	Name	Designation	Address	Contact No.	Sign.
1.	K. Kiso.	Chairman	Nagabajar	9856908808	
2.	THEPPUSAVI Surothu	President	"	9856137103	
3.	N. S. Hakkiratu	Chairman	A.E.F. Canal	9436005794	
4.	Lyathoc's Ppiko	Youth President	DITSABOZOU	9436010189	
5.	Theppuzile kutso	Chairman	Kitaubozou	9856473039	
6.	VAZHIMO SOLO	CHAIRMAN	D. BLOCK	9856788597	
7.	Ahikhe Thyo	Member	Upper chandua	9436844664	
8.	Nithoumi Chitro	Member	Joint Colony	9856231697	
9.	Vishalichu Kets	Member	Upper A.G.	9436004460	
10.	Vigoro Solo	—do—	Naga Hospital	943601624	
11.	THEMECHULE LOOS SOLO	PRESIDENT	PERELIATSE	9612375478	
12.	FEISONGULIE DEUVICHU	PRESIDENT	KBBIKO	9177441794	
13.	HEIKHONYU	G.B.	Midland	9436010166	
14.	Methatso Tetsu	Vice Chairman	Midland	943617386	
15.	SHURHO-O SOLO	Chairman	NewMuniskothel	8014061270	
16.	NUNGOTA SWURO	President	N.M.H.	—	
17.	Medoyalhar	G.B.	Lower P.O.	9856070639	
18.	Sakin	Chairman	—do—	9856038437	
19.	Zehoyi Keso	G.B. 1	P.O. B.W.	9402114490	
20.	Shalle	—do—	—do—	—	
21.	illa	G.B.	Joint Colony	9436222647	

22	KUMBUK JAMIR	G.S.(L.C.Y.O)	L CHANDHARI.	8014574795	<i>Handwritten initials</i>
25	Hokings	G. B.	A.L. Colony		<i>Handwritten initials</i>
29	A Kuo Lil	G B	A.G Colony		<i>Handwritten initials</i>
25	Neibal	G B	A.G Colony	9436001798	<i>Handwritten initials</i>
26	KHOLI NIMHAL	YOUTH PRESIDENT	MIDLAND	9856206689	<i>Handwritten initials</i>
27	AKHRIED SORHIE	CHAIRMAN	A.G. COLONY	9863173866	<i>Handwritten initials</i>
28	ATSATO SEMA	president (T.F.Y.O)	A.G. Colony	9863198711	<i>Handwritten initials</i>
29	PaoKeng Sitlhu	Jt Secy L&P Kobins	Lower Chandmani	9856282680	<i>Handwritten initials</i>
30	JOHN KA GA	Secy PLCC	Lower Chandmani	94024896	<i>Handwritten initials</i>
31	Tevorlio	Chairman	Lieria Colony	9436400599	<i>Handwritten initials</i>
32	HUKATO CHISMI	Gen. Secy MRHVS	MRH (Paramedical Colony)	9856493132	<i>Handwritten initials</i>
33	K. SONO	CHAIRMAN	MRH COLONY	9436005132	<i>Handwritten initials</i>
34	Ketrolie Kedite	Chairman	U/Chandmani	9436607643	<i>Handwritten initials</i>
35	Kerilkaulie	Treasurer	- do -	985637308	<i>Handwritten initials</i>
36	Kelousito chitso	G. B.	Police new to service Kina	9436011558	<i>Handwritten initials</i>
37	Vipekie Reshimio	Chairman	Police Med Assoc Kobins, etc	9856262083	<i>Handwritten initials</i>
38	Rivisilio kuter	Chairman	North Block Parchayat ward 3	9856075587	<i>Handwritten initials</i>
39	Bijoy Baerit	Press. Secy G.B'S & B'S			
40	Lipde G. 13	Joint forum Kobins & B's	L Chandmani	9774002417	<i>Handwritten initials</i>
41	Ketodit	A.G. Colony chairman	Kobins	9856161982	<i>Handwritten initials</i>
42	Troli	Chairman	P.W.D. Colony Forest Colony	9436421329 9436008426	<i>Handwritten initials</i>
43	Toulet	G. 3	KEZIKI		<i>Handwritten initials</i>
44	Ngulboulie dila	G.B	Dezilitie	9862109566	<i>Handwritten initials</i>
45	THINK Aymu	G.B			<i>Handwritten initials</i>

46	KHRIEKUO RÜPREO	Soc. & cult. secy New Market Kohina	NEW MARKET	9856301543	
47	KETOUSELIE SUOHU	Asst. Gen. Secy. New Market Kohina	New Market (Ward 8)	9856775600	
48	WIKHOTSOLO MEKRISUH	President 'D' BLOCK	'D' BLOCK (Ward 6)	9856714806	Wekhotso
49	A. Tranchano. G.B.	Lower Area Colony Kohina	Ward 18.		
50	ZHASAVIKIE KEHIE	President, Lower Area Youth Org.	Ward No. 18	9862333441	 5/6/10
51	NOTSOL NEIKHA	PRESIDENT YOUTH ORG. WARD-17	WARD-17	9436605046	 5/6/11

APPENDIX 3: RECOMMENDED CONTRACT CLAUSES

A. Sources of Materials

- (i) Use quarry sites and sources permitted by government;
- (ii) Verify suitability of all material sources and obtain approval of SIPMIU and DSMC;
- (iii) If additional quarries will be required after construction has started, obtain written approval from SIPMIU; and;
- (iv) Submit to DSMC on a monthly basis documentation of sources of materials.

B. Air Quality

- (i) Consult with DSMC on the designated areas for stockpiling of clay, soils, gravel, and other construction materials;
- (ii) Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather;
- (iii) Use tarpaulins to cover sand and other loose material when transported by trucks;
- (iv) Carry out air quality monitoring as per EMP; and
- (v) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly.

C. Surface Water Quality

- (i) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
- (ii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with SIPMIU/DSMC on designated disposal areas;
- (iii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- (iv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
- (v) Dispose any wastes generated by construction activities in designated sites; and
- (vi) Conduct surface quality inspection according to the Environmental Management Plan (EMP).

D. Noise Levels

- (i) Plan activities in consultation with SIPMIU/DSMC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
- (ii) Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
- (iii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor;
- (iv) Measurement of noise level at construction site as per EMP, and
- (iv) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s.

E. Existing Infrastructure and Facilities

- (i) Obtain from SIPMU/DSMC the list of affected utilities and operators;
- (ii) Prepare a contingency plan to include actions to be done in case of unintentional interruption of services

F. Accessibility

- (i) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;
- (ii) Schedule transport and hauling activities during non-peak hours;
- (iii) Locate entry and exit points in areas where there is low potential for traffic congestion;
- (iv) Keep the site free from all unnecessary obstructions;
- (v) Drive vehicles in a considerate manner;
- (vi) Coordinate with Traffic Police/ concerned department for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and
- (vii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

G. Landscape and Aesthetics

- (i) Prepare and implement Waste Management Plan;
- (ii) Recover used oil and lubricants and reuse or remove from the sites;
- (iii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- (iv) Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and
- (v) Request SIPMIU/DSMC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.

H. Socio-Economic – Income

- (i) Leave spaces for access between mounds of soil;
- (ii) Provide walkways and metal sheets where required to maintain access for people and vehicles;
- (iii) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools;
- (iv) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and
- (v) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.

I. Socio-Economic – Employment

- (i) Employ at least 50% of the labour force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available; and
- (ii) Secure construction materials from local market.

J. Occupational Health and Safety

- (i) Develop and implement site-specific Health and Safety (H and S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use Personal Protective Equipment; (c) H and S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;
- (ii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
- (iii) Provide medical insurance coverage for workers;
- (iv) Secure all installations from unauthorized intrusion and accident risks;
- (v) Provide supplies of potable drinking water;
- (vi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;
- (vii) Provide H and S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;
- (viii) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;
- (ix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- (x) Ensure moving equipment is outfitted with audible back-up alarms;
- (xi) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and
- (xii) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.

K. Community Health and Safety

- (i) Plan routes to avoid times of peak-pedestrian activities.
- (ii) Liaise with SIPMIU/DSMC in identifying high-risk areas on route cards/maps.
- (iii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.
- (iv) Provide road signs and flag persons to warn of dangerous conditions.

L. Work Camps

- (i) Consult with SIPMIU/DSMC before locating project offices, sheds, and construction plants;
- (ii) Minimize removal of vegetation and disallow cutting of trees;
- (iii) Provide water and sanitation facilities for employees;
- (iv) Prohibit employees from poaching wildlife and cutting of trees for firewood;
- (v) Train employees in the storage and handling of materials which can potentially cause soil contamination;
- (vi) Recover used oil and lubricants and reuse or remove from the site;
- (vii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;

- (viii) Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and
- (ix) Request SIPMU/DSMC to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.

M. Social and Cultural Resources

- (i) Strictly follow the protocol for chance finds of any historical remnants in any excavation work;
- (ii) Request SIPMIU/DSMC or any authorized person with field training to observe excavation;
- (iii) Stop work immediately to allow further investigation if any finds are suspected; and
- (iv) Inform SIPMIU/DSMC if a find is suspected, and take any action they require ensuring its removal or protection in situ.