

# Initial Environmental Examination (Updated)

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November 2013

## India: North-Eastern Region Capital Cities Development Investment Program – Kohima Solid Waste Management (Tranche 1)

Prepared by the State Investment Program Management and Implementation Unit (SIPMIU), Urban Development Department for the Asian Development Bank. This is an updated version of the draft originally posted in December 2011 available on <http://www.adb.org/sites/default/files/projdocs/2011/35290-033-ind-iee-07.pdf>



## CURRENCY EQUIVALENTS

(as of 12 November 2013)

Currency unit	–	rupee (INR)
INR1.00	=	\$ 0.02
\$1.00	=	INR 63.24

## ABBREVIATIONS

ADB	—	Asian Development Bank
KMC	—	Kohima Municipal Council
BOQ	—	Bill of Quantities
CBO	—	Community-based organization
CDP	—	City Development Plan
CTE	—	Consent to Establish
CTO	—	Consent to Operate
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
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
GRC	—	Grievance Redress Committee
H&S	—	Health and safety
IEE	—	Initial Environmental Examination
INR	—	Indian Rupee
MFF	—	Multitranchise financing facility
MLD	—	Million liters per day
MOEF	—	Ministry of Environment and Forests
NAAQS	—	National Ambient Air Quality Standards
NERCCDIP	—	North Eastern Region Capital Cities Development Investment Program
NGO	—	Nongovernmental organization
O & M	—	Operation and maintenance
OHSA	—	Occupational Health and Safety Administration
OMC	—	Operations and Maintenance Contractors
PFR	—	Periodic Financing Request
PHED	—	Public Health Engineering Department
PWD	—	Public Works Department
RCC	—	Reinforced Cement Concrete
ROW	—	Right of way
SEIAA	—	State Environment Impact Assessment Authority
SIPMIU	—	State-level Investment Program Management and Implementation Units

SPS	—	Safeguard Policy Statement
TA	—	Technical Assistance
TDS	—	Total dissolved solids
ToR	—	Terms of reference
UDD	—	Urban Development Department

## **WEIGHTS AND MEASURES**

dbA	—	decibels
Ha	—	hectare
Km	—	kilometer
km <sup>2</sup>	—	square kilometer
L	—	Liter
M	—	meter
m <sup>2</sup>	—	square meter
M <sup>3</sup>	—	cubic meter
MT	—	metric tons
MTD	—	metric tons per day

## **NOTES**

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

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## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	1
I. INTRODUCTION.....	4
II. DESCRIPTION OF CHANGES IN THE SUB PROJECT .....	5
III. ANTICIPATED IMPACTS AND MITIGATION MEASURES .....	11
IV. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE .....	18
V. GRIEVANCE REDRESS MECHANISM .....	20
VI. FINDINGS AND RECOMMENDATIONS .....	20
VII. CONCLUSIONS .....	21

## APPENDICES

Appendix 1. Details of Awareness Program on Solid Waste Management Conducted at Kohima .....	22
Appendix 2. Notification on Constitution of Independent Grievance Redress Committee.....	24
Appendix 3. Layout map of the landfill site showing existing structures and the proposed additional works including step drains and two culverts within and adjacent to the site .....	25
Appendix 4. Photographs of sites where additional works are proposed .....	26
Appendix 5. Records of consultation with owners of affected structures for the retaining walls .....	28
Appendix 6. Rapid Environmental Assessment (REA) Checklist.....	32



## **EXECUTIVE SUMMARY**

1. The North-Eastern Region Capital Cities Development Investment Program (NERCCDIP) envisages achieving sustainable urban development in the Project Cities of Aizawl, Agartala, Gangtok, Kohima and Shillong through investments in urban infrastructure sectors. NERCCDIP began implementation in 2010 and will be implemented over a six-year period. It is being 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. State-level Investment Program Management and Implementation Units (SIPMIUs) in each state are responsible for overall technical supervision and execution of all subprojects funded under the Investment Program. The SIPMIU is being assisted by a design, management and supervision consultant (DMSC) who are designing the infrastructure, managing the tendering of contracts, and supervising 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 the ADB Environmental Policy (2002). This states that ADB requires environmental assessment of all project loans, loans involving financial intermediaries and private sector loans.

4. Detailed design for Solid Waste Management sub project in Kohima was prepared in 2009 as part of ADB TA 4779-IND. An Initial Environmental Examination (IEE) report was also prepared in 2009 as per the ADB Environmental Policy (2002) and approved by ADB (prior to ADB's Safeguards Policy Statement, 2009, which replaced the Environmental Policy, 2002). The main components of this sub project are civil works and procurement of equipment for development of sanitary land fill, compost plant, leachate treatment plant, associated infrastructure and internal access. The sub project is being implemented as a design, build, operate and transfer project. The civil components of all these works are in different stages of progress. The Contractor has placed orders for plants & machineries, land fill equipments etc.

5. During the implementation, it was felt that some additional civil works and infrastructure are required for the smooth functioning of the sub project during the operation stage. Additional infrastructure proposed at the landfill site are, (i) A 70 mm Trommel unit for pre-sorting of Municipal Solid Waste, (ii) A shredding, pressing and packing unit for recyclable wastes, (iii) Provision of basic amenities such as canteen, barracks and separate toilet block for males & females, (iv) Retaining walls at various locations to control landslide and to develop a Y junction on the access road to landfill site and (v) Step drains and two culverts for the control of storm water flow through the drains along the access road. This updated IEE report has been prepared to address the impacts due to these changes in the sub project.

6. The subproject site is located on a hill slope on the suburb of Kohima City, but not located in areas prone to water-logging and flash flood. There are no protected areas, wetlands, mangroves, or estuaries in or near the subproject location. Trees, vegetation (mostly shrubs and grasses), and animals are those commonly found in urban areas. The subproject locations are not located in or near any historically-, culturally-, archaeologically- or architecturally-significant or tourists areas.

7. Impacts due to newly proposed construction activities at the landfill site were reviewed and 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 challenging due to the project design or location. An environmental monitoring plan was developed and included in the original IEE report to reduce all negative impacts to acceptable levels. The environmental monitoring plan was made part of the bid documents and contract agreement also. The environmental monitoring plan has been revised due to proposed additional components and to include additional measures to be implemented by construction contractor.

8. During construction phase, impacts mainly arise from the need to manage solid wastes generated on-site and in workers camp, risks to workers health and safety, disposal of moderate quantities of waste soil, and from the disturbance of traffic. These are common impacts of construction in urban areas, and there are well developed methods for the mitigation of such impacts.

9. 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 minimal. The main impacts of the operating solid waste management system will be beneficial to the citizens of Kohima. They will be provided with a clean environment due to proper treatment of municipal solid waste. This will improve the quality of life through better hygiene thereby reducing the incidence of diseases associated with poor sanitation. Operation of additional facilities proposed at the SWM site such as canteen, barracks and toilets will have the impact of waste water generation and solid waste generation. The waste water from baths and canteen will be handled in designed porous soak pits constructed along with the buildings. Septic tanks and soak pits of adequate capacity will be provided to handle the waste from the toilet blocks. Solid waste from these amenities will be comparatively small quantity and they can be treated and disposed at this site since the compost plant and the dry waste handling units are available in the site itself. Health problems for the SWM workers will be an impact of the solid waste collection, transportation, unloading, and processing. Leachate treatment plant workers also may have health problems. To avoid health problems, manual handling of waste will be avoided to the extent possible. The SWM workers will be well trained & equipped with protective accessories. Possible accumulation of waste in the City will be an impact of MSW collection. To avoid this, sufficient number of collection vehicles will be provided and the MSW will be collected regularly. City traffic problems and noise pollution to nearby dwellers of the SWM site will be the impacts of waste transportation. To avoid this, early hour collection will be enforced before the peak traffic hours and vehicles will comply with noise regulations and will have regular maintenance. Odour and spill off to roads can be other impacts of MSW transportation. Regular collection of waste will avoid odour problems. Covered vehicles will be used for waste collection to avoid spill off to roads. Leachate and dust generation will be the impacts of composting in addition to the health problems for SWM workers. Leachate will be recycled in the composting process. Excess leachate will be treated in the leachate treatment plant. Dust will be extracted and separated in cyclone separator installed as part of the compost plant. Green belt will be developed around the SWM site to act as a barrier for dust pollution. Discharge of treated leachate to the stream near the landfill site will be an impact of leachate treatment. Discharge will be required only during monsoon season when the treated leachate cannot be used for irrigation within the site. It will be ensured that the treated leachate meets the discharge standards for disposing to rivers. Air pollution due to landfill gas emission and land dispersion of landfill gas will be the impacts of landfill, in addition to the leachate generation. Only inert waste will be sent to landfill so that landfill gas formation is minimum. Proper landfill gas collection and disposal system will ensure safe disposal of landfill gas.

10. Certain environmental enhancement measures were included in the original environmental monitoring plan. For example it is proposed that the project will employ people living in the vicinity of construction sites to provide them with a short-term economic gain during the construction phase and a long term gain during the O&M phase.

11. Mitigation will be accomplished by a program of environmental monitoring during construction and operation stages to ensure that all measures in the environmental monitoring plan are implemented and the environment is protected as intended. This will include observations on- and off-site, document checks, interviews with workers & beneficiaries and subsequent remedial actions.

12. At the stage of planning and development of the project itself, the stakeholders were involved in developing the IEE through face-to-face discussions and public meetings held in the city and incorporating the views expressed. The original IEE was made available at public locations in the city and disclosed to a wider audience via the ADB website. The updated IEE will also be disclosed in the same manner. The consultation process will be continued and expanded during project implementation also to ensure that stakeholders are continuously involved in the project and have the opportunity to participate in its development and implementation.

13. The change in design of the solid waste management sub project will not have any significant adverse impact. The number of beneficiaries of the subproject also will remain the same. 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 in the original environmental monitoring plan and additional mitigation measures as discussed in this updated IEE. Based on the findings of the updated IEE, the classification of the Project as Category -B" is confirmed, and no further special study or detailed Environmental Impact Assessment (EIA) needs to be undertaken to comply with the ADB Environmental policy (2002) or the Government of India's EIA Notification (2006).

## **I. INTRODUCTION**

14. 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 North-Eastern Region (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 in the Program 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 urban local bodies and other institutions related to the Project. Based on considerations of the need, economic justification and capacity and sustainability of the implementing & maintaining agencies, few sub-projects have been identified in each city in the priority infrastructure sectors.

15. 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.

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

17. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for Environmental Assessment are described in the ADB Environmental Policy (2002). 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 1

18. This report is an updated IEE for the subproject named as "Civil works and procurement of equipment for development of sanitary land fill, compost plant and internal access" taken up under tranche-1 of the Program. Detailed design for this subproject was prepared in 2009 as part of ADB TA 4779-IND. An IEE report was also prepared in 2009 as per ADB Environmental Policy (2002) and approved by ADB (prior to ADB's Safeguards Policy Statement, 2009, which replaced the Environmental Policy, 2002).

19. This sub project is being implemented as a design, build, operate and transfer project. The main components under this subproject as per the original DPR are (i). Approach road to the SWM site (ii) Retaining wall on the rear side of sanitary landfill & fencing the site (iii) Compost plant (iv) Facility for 24000 m<sup>2</sup> of sanitary landfill area to make 3 cells (v) Construction of a 8000 m<sup>2</sup> of sanitary land fill cell (vi) Leachate treatment plant (vii) Ancillaries like waste receiving yard, monsoon shed etc attached to compost plant (viii) Electrical substation and diesel generator back up (ix) Garages for vehicles, equipments & machines (x) Other buildings like administrative block, security room, toilet block etc (xi) Facilities like weigh bridge, laboratory, fire fighting etc (xii) Internal roads, electrification of buildings & yard, water supply etc (xiii) Green belt around the site, rain water harvesting etc.

20. Consent to establish under Air (Prevention and Control of Pollution) Act, 1981 and Water (Prevention and Control of Pollution) Act, 1974 and authorization to setup landfill and compost plant under the Municipal Solid Wastes (Management and Handling) Rules 2000 and Hazardous Wastes (Management and Handling) Rules 1989 for this sub project was issued by Nagaland Pollution Control Board vide consent no. 202 dated 07.07.2009. Conditions of the Consent states that the applicant shall ensure environmentally sound management practices, and ensure that SWM facility will be taken up as per the DPR and MSW Rules. The applicant shall apply for consent to operate before operation of the facility. The consent is liable to be cancelled if terms and conditions are not implemented. Environmental Monitoring Plan is being implemented to ensure environmentally sound management practices. SWM facility is being taken up as per the DPR and any changes in design will be intimated to PCB. The civil components of all these works are in different stages of progress. The Contractor has placed orders for the fabricated structures of roofing for the compost plant and vehicle garages. Similarly orders have been placed for all the plants & machineries, land fill equipments etc. The whole work is targeted to be completed in June 2014. Application for Consent to operate will be submitted prior to the completion of works.

21. During the implementation, it was felt that some additional civil works and infrastructure are required for the smooth functioning of the sub project during the operation stage. Additional infrastructure proposed at the landfill site are, (i) A 70 mm Trommel unit for pre-sorting of Municipal Solid Waste along with ancillaries for shredding, pressing and packing (ii) Provision of basic amenities such as canteen, barracks and separate toilet block for males & females, (iv) Retaining walls at 5 locations to control landslide and to develop a Y junction on the access road to landfill site and (v) One step-drain and two culverts for the control of storm water over flow from the approach road drain to the farm lands below.

22. This updated IEE report covers the description of changes in the sub project, the potential environmental impacts due to the changes and the mitigation measures for them. Public consultation and information disclosure carried out during the implementation of the project as per original design, during the changes made in the design and the proposed consultations and disclosure are described in this updated IEE. Grievance redressal mechanism established during the implementation of the sub project is also described in this updated IEE.

## **II. DESCRIPTION OF CHANGES IN THE SUB PROJECT**

23. Details of additional works proposed at the landfill site and compost plant are described in this section. Layout map of the landfill site showing existing structures and the proposed additional works including step drains and two culverts within and adjacent to the site has been provided as Appendix 3. Photographs of sites where additional works are proposed have been

provided as Appendix 4. Records of consultation with farmers and owners of affected structures for the retaining walls have been provided as Appendix 5.

24. **70 mm Trommel unit with ancillaries for Shredding, Pressing and Packing:** The present SWM site under implementation does not have proper units for recovery of recyclable wastes such as plastics, cans, tins and metals prior to processing of the wastes. Since the volume of recoverable waste in Kohima is high, it is proposed that this unit is also included so that the non-bio degradable wastes can be processed and packaged to facilities outside Nagaland for recycling. The 70 mm trommel can pre sort the MSW so that this kind of waste can be segregated before composting. The major components of inert waste in Kohima are the plastic bags and water bottles. The plastic bags can be pressed and bundled in the packing unit. The bundles are useful in some factories as fuel for burning. These bundles can also be used along with bitumen for road construction. The PET bottles can be shredded and packed for sale. It is anticipated that with the addition of this unit the site will have a more integrated system for management of municipal solid waste.

25. **Provision of Basic Amenities:** The SWM site on commissioning will be owned by the Kohima Municipal Council (KMC). The KMC has requested for some facilities which are essential during O & M. They have requested building units for canteen, separate barracks and toilet blocks for male & female. There is sufficient land in the northern side of the project land, far from the Landfill and Compost Plant.

26. **Slope Protection:** Due to continuous heavy rains during the current monsoon season, landslip issues have arisen. Retaining walls are required at two locations along the approach road to protect it. The slope near the Compost Plant also needs protection work to prevent erosion as it may affect the foundation. Similarly, two retaining walls are proposed for the development of a Y junction where one newly developed road from the City joins the approach road of SWM site. Altogether 5 retaining walls are required.

27. **Control of Storm Water:** Lined drains were constructed along one side of the Approach Road, though not in the original scope of work. However, the capacity of the lined drain is not enough to handle the torrential flow of the storm water in the very steep stretch near hair pin bend no. 2. As a result, excess water overflows from the drain causing substantial soil erosion along the sides of the approach road. Some farmers have complained that their farm lands are being affected due to this. As soon as the complaint was received, SIPMIU and DSMC officials visited the site and it was decided to propose one step drain and two culverts additionally so that excess storm water can be diverted into a natural drain to solve this issue.

**Table 1: Detailed Description of Proposed Additional Work**

	<b>Additional Work</b>	<b>Location</b>	<b>Purpose</b>	<b>Design Requirements</b>	<b>Existing Structures within or adjacent to the site</b>	<b>Remarks</b>
1.	70-mm trommel and ancillary units for shredding,	Within SWM Site.	Segregating, shredding, pressing and packing of recyclable wastes	20m x 6.50m floor size semi permanent shed is required for housing the	Adjacent to compost plant	Electricity is required for operation and has been considered while designing the capacity of

	<b>Additional Work</b>	<b>Location</b>	<b>Purpose</b>	<b>Design Requirements</b>	<b>Existing Structures within or adjacent to the site</b>	<b>Remarks</b>
	pressing and packing			units. Approximately 130 cubic metres (m <sup>3</sup> ) of soil to be excavated for the foundation.		the dedicated transformer for the SWM site. The total construction time required is 6 months
2.	<b>Provision of Basic Amenities</b>					
	i. Canteen building.	Within SWM Site	No Canteen facility in the Original Scope of the Sub Project. During O&M, more than 30 workers are anticipated at site.	6m x 5.50m semi permanent shed is required. About 40 m <sup>3</sup> of soil to be excavated for the foundation.	Location is behind Administrative building	Electricity and water required will be provided from the originally planned sources. The total construction time required is 6 months
	ii. Two separate barracks for male & female	Within SWM Site	Two Separate restroom cum barracks for O&M workers are essential. This is not in the Original Scope of the Sub Project	20m x 6.50m area is required. Around 260m <sup>3</sup> of soil to be excavated for the foundation of the unit.	Location is behind Administrative building	Electricity and water required will be provided from the originally planned sources. The total construction time required is 6 months
	iii. Two separate toilet blocks for male & female	Within SWM site	Two separate toilet blocks for the O&M Workers are essential. This is not in the Original Scope of the Sub Project	6.m x 4 m area is required. Around 50 m <sup>3</sup> of earth to be excavated for the foundation of the toilet blocks. Septic tank unit designed for 20 users will be provided.	Two Separate blocks are proposed near the new barracks	Electricity and water required will be provided from the originally planned sources. The total construction time required is 6 months

	<b>Additional Work</b>	<b>Location</b>	<b>Purpose</b>	<b>Design Requirements</b>	<b>Existing Structures within or adjacent to the site</b>	<b>Remarks</b>
3.	Slope Protection					
	(a). retaining wall no. 1	Please see Appendix 3 and 4	To protect the Weigh Bridge Control (WBC) room endangered due to landslide	100m long retaining wall of coursed rubble masonry reinforced with RCC skeleton structures like beams & columns are proposed. Around 1200 m <sup>3</sup> of earth excavation is required.	Near WBC Room.	The sliding of earth from the land occupied by the squatters started while excavating for the approach road widening during 2012 near the WBC. In 2013 monsoon, the problem has aggravated. The retaining wall will stabilize the land above the WBC room. The total construction time required is 4 months
	(b). retaining wall no. 2	Please see Appendix 3 and 4	Retaining wall to protect the approach road from sliding down into the landfill area.	50m long retaining wall of coursed rubble masonry reinforced with RCC skeleton structures like beams & columns are proposed. Around 600 m <sup>3</sup> of earth excavation is required	Above landfill cell no. 1	Sinking of approach road on the opposite side of weigh bridge control room was observed in 2012. During 2013 monsoon, the problem has aggravated. The retaining wall will stabilize the approach road. The total construction time required is 4 months.
	(c). retaining wall no. 3	Please see Appendix 3 and 4	Retaining wall to protect the compost plant from sliding down into the low	60m long retaining wall of coursed rubble masonry reinforced with RCC skeleton	Behind compost plant building	Due to very steep terrain of the SWM site and large size of the building (70x50m), the Compost Plant

	<b>Additional Work</b>	<b>Location</b>	<b>Purpose</b>	<b>Design Requirements</b>	<b>Existing Structures within or adjacent to the site</b>	<b>Remarks</b>
			lying area near the stream at the southern boundary of the SWM site.	structures like beams & columns are proposed. Around 700 m <sup>3</sup> of earth excavation is required.		building floor is above 5m from ground level at the valley side (the entire floor of the building needs to be at the same level for easy vehicle movement inside) The portion where the plinth level is 5m above ground needs protection as it is standing in a very sloping terrain prone to landslide. The total construction time required is 4 months.
	(d). retaining wall no. 4a	Please see Appendix 3 and 4	Retaining wall at the lower side of the Y junction to protect the approach road near Y junction from sliding down into the landfill area and the temporary buildings of squatters and widen the Junction to make smooth turning of vehicles	80m long retaining wall in coursed rubble masonry reinforced with RCC skeleton structures like beams & columns are proposed. Around 100 m <sup>3</sup> of earth excavation is required.	Near temporary buildings (2 nos.) of Squatters (reported in updated RP of Kohima Solid Waste Management: Tranche 1).	A new road from the AG colony ward of the City to the landfill site approach road has been formed by the Government recently. This road (called as New AG Road) will provide easy and shorter access to the SWM site from 4 City wards. But this road joins the approach road to SWM site in an acute angle and turning of vehicles is difficult now. The total construction time required is 4

	<b>Additional Work</b>	<b>Location</b>	<b>Purpose</b>	<b>Design Requirements</b>	<b>Existing Structures within or adjacent to the site</b>	<b>Remarks</b>
						months.
	(d). retaining wall no. 4b	Please see Appendix 3 and 4	Retaining wall at the upper side of the Y junction to protect the approach road and widen the Junction to make smooth turning of vehicles	The engineering features of this 100m long wall is same as wall no:4a.	This is at the upper side of Y junction	This wall will protect the upper side of Y-Junction. The total construction time required is 4 months.
4.	<b>Control of Storm Water</b>					
	a. step drains	Please see Appendix 3 and 4. This is outside SWM Site. This drain will pass along one side of the farm land affected by storm water	To bring the overflowing storm water down from the approach road portion in hair pin curve no: 1, 2 & 3 safely to a natural stream.	95 m long drain. The drain will be stepped to dissipate the energy of water flow as it is in a steep slope.	The drain crosses the new AG Road mentioned above. A culvert will be constructed across this road (Culvert No. 2 mentioned second below)	Some portion of the farm land at the lower side of the Approach Road was affected due to spillage of storm water from the road drains. The newly proposed step drain and 2 culverts will solve the problem permanently. The total construction time required is 4 months.
	b. culvert no. 1	Please see Appendix 3 and 4. This culvert is across the Approach Road of the SWM site	Only 5 pipe culverts are in the original scope. This is an additional box culvert to divert water to the above mentioned step drain.	The culvert shall be with coursed rubble masonry abutments and RCC slab over it. There will be a catch pit in the upstream side and a dispersion trench in the	This culvert is across the approach road and connected to the step drain which will pass through one side of the farm	This culvert will divert the overflowing storm water from the drain along the approach road to the step drain leading to a natural stream. The total construction time required is 4

	<b>Additional Work</b>	<b>Location</b>	<b>Purpose</b>	<b>Design Requirements</b>	<b>Existing Structures within or adjacent to the site</b>	<b>Remarks</b>
		(above the farmland affected by storm water		downstream side to discharge the storm water in to the step drain.	land affected by storm water.	months.
	c. culvert no. 2	This pipe culvert is about 600m from Y Junction, across the New AG road towards AG Colony	The storm water diverted through the step drain from the approach road will cross the New AG road through this culvert	This is a pipe culvert made with 900mm RCC non pressure pipes.	No existing structure other than the road across which the culvert is to be made.	The storm water after crossing the New AG road through this culvert will flow to a natural stream. The total construction time required is 2 months.

### **III. ANTICIPATED IMPACTS AND MITIGATION MEASURES**

28. 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 Environmental Policy (2002) requires 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 Landfill site and the access road to the landfill site. The secondary impact areas are: (i) entire Kohima area outside of the delineated primary impact area; and (ii) entire Nagaland district in terms of over-all environmental improvement.

29. 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 suburb 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 location is through public rights-of-way and existing roads hence, land acquisition and encroachment on private property will not occur.

**Table 2: Anticipated Impacts Due to Proposed Additional Works and Mitigation Measures**

	Additional Work	Location	Construction Method	Impacts	Mitigation Measures
<b>A.</b>	<b>Construction Phase</b>				
1.	70-mm trommel unit for pre-sorting municipal solid waste and ancillary units for shredding, pressing and packing of recyclable wastes	Within SWM site	One semi permanent sheet roofed structure will be constructed near the compost plant building. The trommel and shredding, pressing and packing units will be purchased from the manufacturer and installed on concrete bases.	Requirement of additional raw materials such as stones, sand and cement for construction of building.  Excavation and disposal of soil leading to soil erosion causing water pollution and dust generation causing air pollution.	Already proposed mitigation measures for similar impacts of ongoing works
2.	Provision of Basic Amenities				
	a. Canteen	Within SWM site	One Semi Permanent Sheet Roof Structure of coursed rubble masonry for foundation & plinth, brick masonry for walls and tubular truss for roof.	Same as above	Same as above
	b. Barracks	Within SWM site	Two Semi Permanent Sheet Roof Structures as above	Same as above	Same as above
	c. Toilet blocks	Within SWM site	Two Semi Permanent Sheet Roof Structure as above.	Same as above	Same as above
3.	Slope Protection				
	a.Retaining wall no.1	Within SWM site. Please see Appendix 3 and 4.	Coursed Rubble Masonry Wall with RCC columns & beams	Same as above	Same as above
	b.Retaining wall no.2	Within SWM site. Please see Appendix 3 and 4.	Coursed Rubble Masonry Wall with RCC columns & beams	Same as above	Same as above
	c. Retaining wall no.3	Within SWM site.	Coursed Rubble	Same as above	Same as above

	Additional Work	Location	Construction Method	Impacts	Mitigation Measures
		Please see Appendix 3 and 4	Masonry Wall with RCC columns & beams		
	d. Retaining wall no. 4a & b	Y junction on the access road to the landfill site. Please see Appendix 3 and 4.	Coursed Rubble Masonry Wall with RCC columns & beams Rubble Masonry wall	Same as above	Same as above
4.	Control of Storm Water				
	a. Step drain	This is outside SWM Site. This drain will pass along one side of the farm land affected by storm water. Please see Appendix 3 and 4	RCC Step drain	Same as above	Same as above
	b. Culvert no. 1	It is Across the SWM approach road. Please see Appendix 3 and 4	Coursed Rubble Masonry box Culvert	Same as above	Same as above
	c. culvert no. 2	It is across the New AG road towards AG Colony. Please see Appendix 3 and 4	This is a pipe culvert. It will be laid across the road after trenching	Excavation and disposal of soil leading to soil erosion causing water pollution and dust generation causing air pollution.	Same as above

**Table 3: Updated Anticipated O&M Impacts and Mitigation Measures**

	Activity	Location	Impacts	Mitigation Measures
1.	Operation of On-site Facilities	Canteen, Barracks and Toilets	Waste water generation	The onsite facilities are for about 20 males & females each during the day time working hours. The wash water from baths and kitchen will be handled in designed porous soak pits constructed along with the buildings. Septic tanks and soak pits of adequate capacity will be provided to handle the waste from the toilet blocks.
			Solid waste generation	Since the compost plant and the dry waste handling units are available in the site itself, comparatively small quantity of solid waste from the amenities can be treated and disposed at this site.

	Activity	Location	Impacts	Mitigation Measures
2.	Waste Collection	Entire area of Kohima	Possible accumulation of waste.  Health problems for waste collection workers	The Kohima Municipal Council is planning to collect segregated waste from households. Wet waste will be emptied directly from the bins to primary collection vehicles on alternate days and dry waste normally twice in a week. Sufficient no of vehicles, bins etc will be procured through Tranche-3. The wet waste will go for composting. The personnel associated will be educated and provided with safety measures.
3.	Waste Transport	Waste from Primary Collection Vehicles will be transferred directly & mechanically to larger secondary transportation vehicles with tipping facility, then brought to the SWM site. In the commercial areas of the City (identified to be around 10 locations), mobile waste bins will be provided. These bins will be lifted, replaced & transported to SWM site in the early hours of the day. Apart from the above identified locations in the City, there will be no other collection/transfer points as the Kohima is thickly inhabited and space constrained.	City traffic problems  Odour, sometimes  Spill offs to roads, sometimes  Noise pollution to nearby dwellers of the SWM site.	Early hour collection will be enforced before the peak traffic hours.  Regular collection of waste will avoid odour problems.  Covered vehicles will be used for waste collection to avoid spill off to roads.  Vehicles will comply with noise regulations and will have regular maintenance.
4.	Waste receipt	The garbage entering the SWM site will be weighed on board before sending to compost plant for further processing. There is a deck type weigh bridge with automatic recording facility at the entrance of the secluded SWM site.	No commendable impact	The SWM personnel at this entry point will be trained properly
5.	Waste unloading	The wet waste will be brought to site in plane secondary collection vehicles provided with mild steel containers of 50kg carrying capacity. The contents will be manually unloaded (2 men) to the compost plant. The dry waste arrive the site in compacted form through secondary collection vehicles with suitable accessories. This waste will be unloaded mechanically	Health problems for waste unloading workers	The SWM workers will be well trained & equipped with protective accessories

	Activity	Location	Impacts	Mitigation Measures
		in the recycling shed (70mm trommel shed)		
6.	Waste processing and storage	The dry waste will be segregated for reusables like plastic, bottles, wood, metal, paper, hard board, rubble, brick etc. A 70mm trommel will be used to segregate plastic bags for further pressing and bundling. Pet bottles and similar wastes will be shredded and packed. All reusables will be sold out from the site. This will minimise the land fill waste and it is targeted to be 20 to 30% of the total waste in the beginning with further reduction. The land fill will be compacted every day and covered with ordinary earth stacked at site for the purpose.	Health problems for waste processing workers	The SWM workers will be well trained & equipped with protective accessories
7.	Composting	Composting will be done in widrows sprinkled with inoculum (microbial culture) and periodically overturned to form compost manure in 21 days. The mass will be segregated in trommels and the fine manure will be packed in commercially labelled bags for sale. The remaining inert will be sent to the land fill.	Leachate generation during composting.  Dust generation during screening of compost.  Health problems for waste processing workers.	Leachate will be recycled in the composting process. Excess leachate will be treated in the leachate treatment plant.  Dust will be extracted and separated in cyclone separator installed as part of the compost plant. Green belt will be developed around the SWM site to act as a barrier for dust pollution.  The SWM workers will be well trained & equipped with protective accessories
8.	Leachate treatment	The leachates from the land fill and compost plant will be collected in a leachate tank and a portion will be sprinkled over the windrows. The excess quantity will be further treated in stages including the process of Reverse Osmosis. The treated leachate will be used for irrigating the green belt around the SWM site as	Discharge of treated leachate to the stream near the landfill site.  Health problems for leachate treatment plant operators	It will be ensured that the treated leachate meets the discharge standards for disposing to rivers.  The SWM workers will be well trained & equipped with protective accessories

	Activity	Location	Impacts	Mitigation Measures
		well as the gardens inside during dry months of the year .Only during heavy monsoons, treated excess leachate is anticipated to discharge from the site.		
9.	Emission of landfill gas	The land fill gas will be sent to atmosphere through tall gas emission pipes.	Air pollution due to landfill gas emission.  Land dispersion of landfill gas	Only inert waste will be sent to landfill so that landfill gas formation is minimum. Proper landfill gas collection and disposal system will ensure safe disposal of landfill gas.

Table 4: Updated Environmental Monitoring Plan

Monitoring Category	Type of Monitoring	Minimal Frequency	Monitoring Agency
<b>Construction Phase</b>			
<b>Soils</b>			
Excavation and Back filling	Monitor adherence to contract specification  Visual inspection to check separate stockpiling of topsoil. Stockpiles of earth not to be higher than 2m and side slopes shall not be more than 1:2.	Daily	Contractor / SIPMIU
Erosion	Monitor proper management of excavated soils including timely removal of material from project site	Daily	Contractor / SIPMIU
<b>Surface and Ground Water Quality</b>			
Surface runoff management	Monitor measures to divert surface runoff	Daily	Contractor / SIPMIU
Contamination from waste and sewage generated from construction activities	Monitor measures taken to prevent contamination of ground and / or surface water from waste and sewage generated from construction activities	Daily	Contractor / SIPMIU
Water Quality Analysis (ground water and surface water)	Monitor drinking water quality ( <b>IS 10500: 1991</b> ) parameters like Arsenic , Cadmium, Chromium, Copper, Cyanide, Lead, Mercury, Nickel, Nitrate as NO <sub>3</sub> , pH, Iron, Total hardness (as CaCO <sub>3</sub> ), Chlorides, Dissolved solids, Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), Zinc, Sulphate (as SO <sub>4</sub> )	Before construction	Contractor
<b>Air / Noise Pollution</b>			
Dust emission during site preparation, excavation	Monitor the adequacy of dust suppression measures undertaken	Daily	Contractor / SIPMIU
Storage and transportation of construction materials, excavated soil and silt	Monitor the adequacy of measures undertaken to prevent fugitive dust	Daily	Contractor / SIPMIU
Noise and emission from construction vehicles	Monitor whether ' <i>pollution under control</i> ' certificate are current for construction vehicles	Quarterly	Contractor / SIPMIU

Monitoring Category	Type of Monitoring	Minimal Frequency	Monitoring Agency
Noise pollution from construction activities	Monitor the preventive measures being implemented to curb noise	Daily	Contractor / SIPMIU
Ambient air quality monitoring	Sulphur dioxide, Suspended Particulate Matter, Methane, Ammonia daily average (Sample duration 24 hrs), Carbon monoxide	Before during and after construction	Contractor
Noise Pollution	Noise Level	Before, during and after construction	Contractor
<b>Solid Waste</b>			
Disposal of excavated soil and silt	Ensure that the excavated soil and silt is disposed off in approved sites only.	Daily	Contractor / SIPMIU
Disposal of construction debris and solid wastes from construction camps	Ensure that the construction site is free of all kinds of construction debris on completion of work at each site. Ensure that no sharp or hazardous objects are scattered in the work site at any point of time. Ensure that the construction debris and solid wastes are disposed off in approved sites only.	Daily	Contractor / SIPMIU
<b>Flooding / water logging</b>			
Blockage of drainage due to construction activities	Ensure that the construction activities do not cause flooding or water logging at project site. Also proper drainage arrangements to be provided	Weekly	Contractor / SIPMIU
<b>Health and safety of construction works</b>			
Healthy and safety requirements	Monitor the adherence to all occupational and safety requirements. Ensure that all workers are using the protective gears.	Daily	Contractor / SIPMIU
Training on occupational health and safety	Conduct periodic training to all workers on occupational health and safety	Quarterly	Contractor / SIPMIU
Health check up of workers	Monitor the adequacy of health checkup services provided including the attendance of the physician retained and the extent to which the workforce is availing this service	Monthly	Contractor / SIPMIU
Maintenance of health and safety records of work force (accident report register)	Review and monitor the health and safety records to ensure that all project related accidents are being properly investigated and reported	Monthly	Contractor / SIPMIU
Sanitary condition of construction camp site	Monitor the provisions of shelter, water supply, excreta and solid waste management at the camp site	Monthly	Contractor / SIPMIU
<b>Road Safety and Traffic Management</b>			
Traffic management plan	Obtain approval to traffic management plan from Kohima traffic police	Whenever necessary	Contractor / SIPMIU
Review road safety records	Review and monitor the road safety records to ensure that all project related road accidents are being properly investigated and reported	Fortnightly	Contractor / SIPMIU
<b>Community Life and Economic Activities</b>			
Access to public and private properties	Monitor the impacts of this project on dwelling and business in the project area	Daily	Contractor / SIPMIU

Monitoring Category	Type of Monitoring	Minimal Frequency	Monitoring Agency
Hardships and inconvenience to public and business	Ensure that the communities and business face minimal hardship and inconvenience due to construction activities	Weekly	Contractor / SIPMIU
<b>Operation Phase</b>			
Water Quality Analysis (ground water and surface water)	Drinking water quality ( <b>IS 10500: 1991</b> ) parameters like Arsenic, Cadmium, Chromium, Copper, Cyanide, Lead, Mercury, Nickel, Nitrate as NO <sub>3</sub> , pH, Iron, Total hardness (as CaCO <sub>3</sub> ), Chlorides, Dissolved solids, Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH), Zinc, Sulphate (as SO <sub>4</sub> )	After construction Summer, Monsoon, Post monsoon period	Contractor
Leachate quality analysis	Monitor the discharge of leachate effluent including review of <i>consent to operate forms</i> .  Parameters: Suspended solids, Dissolved solids (inorganic), pH, Ammonical nitrogen (as N), Total Kjeldahl nitrogen (as N), Biochemical oxygen demand (3 days at 27 <sup>o</sup> C), Chemical oxygen demand, Arsenic (as As), Mercury (as Hg), Lead (as Pb), Cadmium (as Cd), Total Chromium (as Cr), Copper (as Cu), Zinc (as Zn), Nickel (as Ni), Cyanide (as CN), Chloride (as Cl), Fluoride (as F), Phenolic compounds	Monthly	Contractor
Ambient air quality monitoring	Sulphur dioxide, Suspended Particulate Matter, Methane, Ammonia daily average (Sample duration 24 hrs), Carbon monoxide	Two times in a year	Contractor
Noise Pollution	Noise Level	Two times in a year	Contractor
Compost quality analysis	Visual inspection to ensure that glass, plastic and other physical inerts and fragments are absent in compost and it has no offensive smell. Also testing of compost to meet standards for Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, C/N ratio, pH	Daily	Contractor
Odour monitoring in peripheral residential areas of the landfill site in the down wind direction	Hydrogen Sulphide (H <sub>2</sub> S) and Ammonia (NH <sub>3</sub> ) at southern periphery of the site	Once in 6 months for the first three years of operation	Contractor
Vegetative Buffer Survival Rate	Survival Rate of Proposed Trees around the disposal site	Twice a year till the trees are minimum height of 2 m	Contractor

NOTE: Analysis for the quality of ambient air, water, noise, leachate and compost shall be carried out by the concerned authority/approved laboratories by the State Pollution Control Board

#### IV. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

##### A. Consultation and Disclosure during Detailed Design

30. At the stage of planning and development of the project itself, the stakeholders were involved in developing the IEE through face-to-face discussions and public meetings held in the City and incorporating the views expressed. The original IEE was made available at SIPMIU

and other related offices in the city and disclosed to a wider audience via the SIPMIU and ADB websites.

## **B. Consultation and Disclosure during Implementation**

31. During implementation, an awareness program on SWM was conducted on 26.05.2012 at GPS Hall, Seikhazou D'Khel, Kohima. Details of the awareness program are presented as **Appendix 1**. Ward-level seminars and discussions on improving SWM at household level were conducted at ward no. 4 on 28.05.2012, ward no. 9 on 02.06.2012, ward no. 6 on 04.06.12 and ward no. 2 on 16.06.2012. Solid Waste Management sub project was disclosed and discussed during the Gender Sensitization Seminar conducted on 06.10.12 at Zonal Council Hall, Kohima. The semi annual environmental monitoring report has been published on the SIPMIU website for disclosure.

32. A focus group discussion was conducted on 21st September, 2013 at SWM site with the Squatters occupied the SWM site, who will be affected by the proposed retaining walls. Mr. Suresh Kumar O G, (Resettlement Specialist, DSMC), Mrs. Ajolu Zango (Engineering Assistant, DSMC) Ms. Viserenuo Theunuo, (Sociologist, SIPMIU), Mr. Petenei-o Khezhie (Squatter), Ms. Neisanuo Kire (Tenant of the structures made by the Squatter) and Mr. Batat & Mrs. Meena (Tenant of the structures made by the Squatter) were participated in the discussion. It was explained to them that they have occupied the SWM site after the cut off date and hence not eligible for any type of assistance. The Squatter expressed his willingness to move from the land based on the project requirements. But he has requested that, at least one of his family members need to be employed in the upcoming project in permanent basis. Also they should be hired for executing small works coming up under this project. Records of consultation with owners of affected structures for the retaining walls have been presented as **Appendix 5**.

## **C. Future Consultation and Disclosure**

33. Following consultations will be conducted during the implementation of the sub project:

- (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;

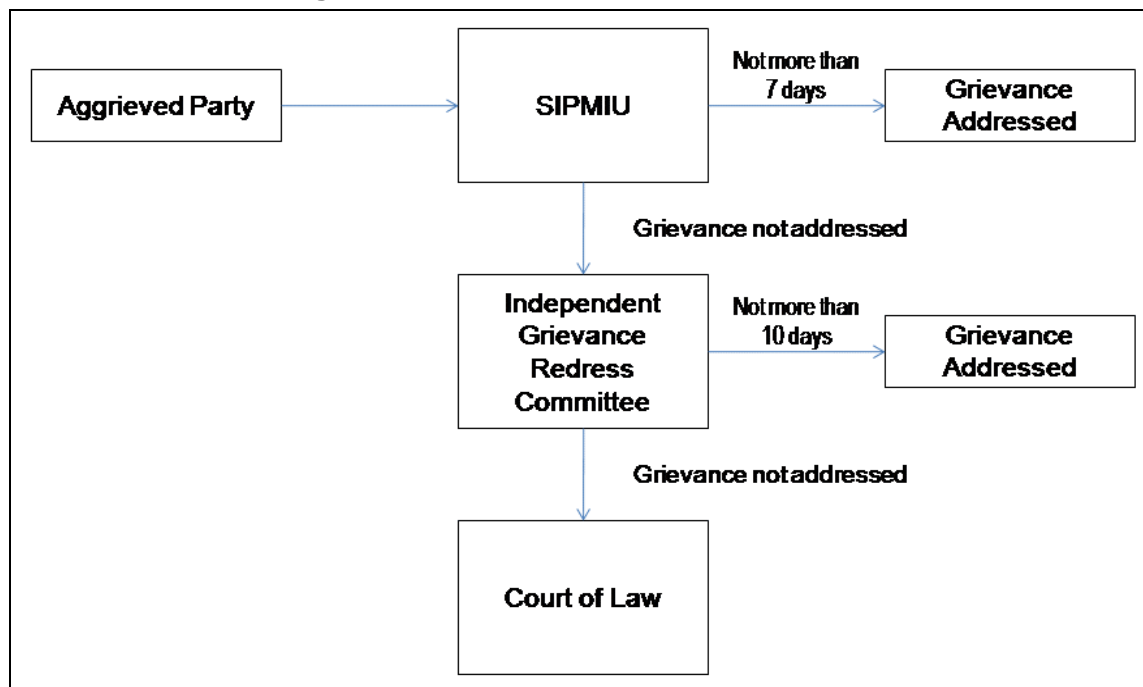
34. Formal disclosure of completed project reports such as updated IEE report, Social Impact Assessment and IR Screening Report will be done by making copies available at SIPMIU and related offices, informing the public of their availability, and providing a mechanism through which comments can be made.

35. Based on ADB requirements, the following will be posted on ADB website: (i) this updated IEE, upon receipt; (ii) corrective action plan prepared during Project implementation to address unanticipated environmental impacts and to rectify non-compliance to EMP provisions; and (iii) environmental monitoring reports, upon receipt.

## V. GRIEVANCE REDRESS MECHANISM

36. A grievance redress mechanism has been implemented for the project. 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 IGRC 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 1**. The IGRC was constituted vide SIPMIU notification dated 18.01.2013. Notification on constitution of the IGRC is presented as **Appendix 2**.

**Figure 1: Grievance Redressal Mechanism**



SIPMIU - State Investment Program Management and Implementation Unit

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

## VI. FINDINGS AND RECOMMENDATIONS

38. The process described in this document has assessed the environmental impacts of additional infrastructure proposed at the landfill site. 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. Some mitigation measures have already been included in the designs for the infrastructure. This means that the number of impacts and their significance has already been reduced by amending the design. Some additional impacts were identified due to construction and operation of the additional components. The Environmental Monitoring Plan included in the original IEE has been revised and included in this document for the mitigation of these impacts.

39. During the construction phase, impacts mainly arise due to excavation and disposal of soil. Impacts also arise due to requirement for additional raw materials such as stones, sand and cement. These are common impacts of construction, and there are well developed methods for their mitigation and have been included in the original EMP.

40. Certain measures were included in the original IEE for environmental enhancements. 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.

41. 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 minimal. The main impacts of the operating solid waste management system will be beneficial to the citizens of Kohima. They will be provided with a clean environment due to proper treatment of municipal solid waste. This will improve the quality of life through better hygiene thereby reducing the incidence of diseases associated with poor sanitation.

42. Mitigation will be assured by a program of environmental monitoring conducted during construction and operation to ensure that all measures are implemented and the environment is protected as intended. This will include observations on- and off-site, document checks, interviews with workers & beneficiaries, and any requirements for remedial action.

43. This updated IEE will be made available at public locations in the city and will be disclosed to a wider audience via the SIPMIU and ADB websites. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.

## VII. CONCLUSIONS

44. The subproject is unlikely to cause significant adverse impacts. Some additional impacts were identified due to construction and operation of the additional components, but no impacts were identified due to either the project design or location. Some mitigation measures have already been included in the designs for the infrastructure. This means that the number of impacts and their significance has already been reduced by amending the design. The Environmental Monitoring Plan included in the original IEE has been revised and included in this document for the mitigation of these impacts. The potential adverse impacts that are associated with 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.

45. 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 the ADB Environmental Policy (2002) or the Government of India's EIA Notification (2006). Filled up Rapid Environmental Assessment (REA) Checklist for Solid Waste Management has been provided as **Appendix 6**.

## **Appendix 1. Details of Awareness Program on Solid Waste Management Conducted at Kohima**

### **MINUTES OF MEETING HELD IN THE GPS HALL, SEIKHAZOU D'KHEL, KOHIMA.**

A meeting was held under the Chairmanship of Dr. K. Kuotsu, General Secretary DGOK on 26<sup>th</sup> May 2012 at 1 PM for Awareness Program on Solid Waste Management (SWM) project which is coming up in Kohima with assistance from ADB.

In his introductory speech, the Chairman welcomed everyone present and expressed his appreciation to SIPMIU and KMC for conducting the awareness program. President DGOK, while appreciating the steps being taken to improve the environment of the City explained that people of 'D' Khel were the original land owners of 'Dzukepougei', the site for the SWM project and he also explained that since future development of the community will occur in the downstream of the project, the community was concerned about the environmental impacts of the project and he hoped that the program will throw light on their concerns.

Program Director, SIPMIU, gave a brief introduction of the overall projects being undertaken by SIPMIU for improvement of urban services for citizens of Kohima. Power point presentations were given by Mr. Akshay Anand, Team Leader, Institutional Development Consultants (IDC) and Ms Viserenuo Theunuo, Sociologist, SIPMIU to give a clear picture about the project under implementation. Mr. Akshay Anand highlighted issues of concern for citizens of Kohima like the water supply, Solid waste management, cleanliness and environment. He further stressed that active participation of the community is main key to success of any project and therefore requested for support of the participants. Ms Viserenuo Theunuo, sociologist SIPMIU gave a technical overview of the project on different aspects of functioning of plant for SWM. In her power point presentation she gave a brief introduction on Solid Waste Management and the various components that come under a landfill.

During the question hour, DGOK members asked questions on leachate and odor which may come out of SWM plant and in turn can affect environment along with river flowing in the vicinity. Additional Program Director, SIPMIU assured that all technical and environmental protection was ensured from design and inception stage of the project. He mentioned that all necessary clearances have been taken from the environmental and pollution control authorities in the State. He added that apart from clearances, SIPMIU's Technical team is taking extra precaution for environmental safeguards for air and water pollution.

Chairman of 'D' Khel Council stressed that a proper system of accountability should be put in place when it comes to project deliverables as he feels that initiatives of this kind is very good to citizens of Kohima but there should be check and balance to ensure that the Contractors do not fail to deliver the goods.

Er. Khupi explained that the Contractors for the project were selected following stringent procedures of the ADB and likewise project execution is also guided by stringent norms. He also explained that untreated Leachate will not be released into the river but will be scientifically treated to limits permitted by the Nagaland Pollution Control Board (NPCB). Finally treated waste water will be used for gardening/landscaping and in the green belt plantation at the SWM site. He explained that the (NPCB) will be regularly monitoring the quality and standards of the treated Leachate and that the NPCB is the appropriate authority to raise any issue of environment concern.

DGOK members asked about printed brochure and guidelines for SWM so that a better understanding can be developed as it works as a knowledge disseminator for general citizens of Kohima. SIPMIU assured that these will be made available very soon.

The Program ended with a vote of thanks by General Secretary of DGOK.

### **Workshop At a Glance**



## Appendix 2. Notification on Constitution of Independent Grievance Redress Committee

**STATE INVESTMENT PROGRAMME MANAGEMENT AND IMPLEMENTATION UNIT  
ASIAN DEVELOPMENT BANK (ADB) – ASSISTED PROJECT  
KOHIMA : NAGALAND**

**NOTIFICATION**

Dated Kohima, the 18<sup>th</sup> January 2013

NO.SIPMIU/SCL/CP/2011:: In pursuance to Asian Development Bank (ADB) guidelines; the Independent Grievance Redress Committee (IGRC) is hereby constituted to address the grievances of persons affected due to the sub-projects implemented in Kohima under the ADB assisted North Eastern Region Capital Cities Development Investment Program.

- |  |   |                  |
|--|---|------------------|
| i. Program Director, SIPMIU                            | : | Chairman         |
| ii. Addl. Program Director, SIPMIU                     | : | Member Secretary |
| iii. Dy. Program Director/ Environment Officer, SIPMIU | : | Member           |
| iv. Sociologist, SIPMIU                                | : | Member           |
| v. Assistant Engineer, SIPMIU                          | : | Member           |
| vi. Team Leader, DSMC                                  | : | Member           |
2. The IGRC shall determine the merit of each grievance and resolve the grievance/s within 10 (ten) days of receiving the compliant.
3. Grievances not redressed by the IGRC will be referred to the appropriate court of law.
4. All costs involved in resolving the grievances shall be borne by SIPMIU.
5. The Design Supervision & Management Consultants shall keep records of all grievances received including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date of redressing the grievance and the final outcome.

Sd/-  
K. HARALU  
Program Director

NO.SIPMIU/SCL/CP/2011

Dated Kohima, the 18<sup>th</sup> January 2013

Copy to:

- i) The Commissioner & Secretary, Urban Development Department, Nagaland, Kohima for information.
- ii) The Director, Urban Development, Nagaland, Kohima for information.
- iii) The Chief Engineer, PHE, Nagaland, Kohima for information.
- iv) The CEO, Kohima Municipal Council, Kohima, Nagaland for information.
- v) All the members
- vi) Office copy



  
(NELL VASA)  
Dy. Program Director

**LEGEND**

- Original Works
- Additional Works
- Temporary sheds of Contractor
- Affected Farm land
- Retaining Wall
- New Culvert
- New Pipe Culvert
- Step Drain

**AREA OF THE SITE: 21.61 ACRE (87640 sqm)**

**Appendix 4. Photographs of sites where additional works are proposed**



Proposed Pipe Culvert on Approach Road



Proposed Retaining Wall below Compost Plant



Proposed Retaining Wall below Y-Junction



Proposed Retaining Wall near Weigh Bridge



Proposed Retaining Wall near Y-Junction



Proposed site for Box Culvert



Proposed site for Storm Water Drain

## **Appendix 5. Records of consultation with owners of affected structures for the retaining walls**

### **Minutes of Focus Group Discussion with the Occupants of Land near the Approach Road of the SWM Site at Lerie Conducted at 11:00 am on 21<sup>st</sup> September 2013.**

Present:

1. Ms. Viserenuo Theunuo (Sociologist of SIPMIU)
2. Mr. Suresh (Social Expert of DSMC)
3. Mrs. Ajolu Zango (Engineering Assistant of DSMC)
4. Mr. Rajesh Chetri (Representing the Contractor)
5. Mr. Petenei-o Khehie (Traditional land owner)
6. Ms. Neisanuo Kire (member tenant)
7. Mr. Bharat (member tenant)
8. Mrs Meena Bharat (member tenant)

The Sociologist of SIPMIU, Ms Viserenuo Theunuo, welcomed the participants attending the interaction and explained the policy of ADB in taking care of environment & social safeguards while a project funded by the Bank is under execution as well as operation. The history of occupation of the land was discussed with them.

The traditional land owner informed that the land had been surrendered to government in the year 1972 by him, but it has been remaining unutilized for a long period. After few subsequent years, he occupied a small piece (around 400 Sqm) of land and started cultivation and cattle rearing. Now two tenants are taking care of his small farm and cattle. There are two cattle sheds and two huts. These are temporary structures made of wooden logs and tinned roof.

Mrs Ajolu Zango (Engineering Assistant, DSMC) provided the technical details & locations of the newly proposed construction works on the two boundaries of the land occupied by them. Two rubble masonry retaining walls will be constructed to protect the portions near the Weigh Bridge and Y-Junction. The locations were shown to them in the map (and later on they were taken to the spots also). The retaining wall no.1 is at the northern boundary of the land where it is sloping down towards the weigh bridge which may be damaged in case of a land slide. Falling of small lumps of earth & stone has started slowly since last monsoon. So also pointed out that incase a major slide occurs; the land and the properties of the tenants also would be damaged. The location for retaining wall no.4 is on the upper boundary (southern side) of the land where the approach road is feared to slide into the land creating damage to it as well as the ongoing project. Cracks already developed in the road were shown to the people to convince them of the necessity of the retaining wall. The tenants as well as the traditional land owner agreed that both structures will be safeguarding the damages to the land occupied by them also.

The possible impacts of construction were then briefly explained by the Sociologist of DSMC, Mr. Suresh. The construction of retaining walls can be done without dismantling any of the sheds or cutting of any tree. The tenants will not be required to vacate the whole or the portion of the occupied land during construction. The project objectives and its importance in the city life and negative impacts in dwelling close to the site were explained by him to the participants. The anticipated negative impacts like odour, insects etc may not be very comfortable to human habitations very close to the landfill site.

Regarding moving off from the project boundary, their response was very positive. According to the traditional land owner the land was voluntarily surrendered to government in the year of 1972. It had remained unutilized for a long period. Some portion of the site was found to be ideal for cultivation & cattle rearing and moved in. However they are willing to move from the land based on the project requirements. But they have put forward a request for employing at least one of the family members and hiring for small works. The matter was discussed with the Contractor present during the interaction. The participants were informed that they would be engaged for the daily jobs at site whenever they come forward.

The discussions were concluded at 1:00 pm for visiting the locations of proposed retaining walls.



**(Ms. Viserenuo Theunuo)**  
Sociologist



Ms. Neisanuo Kire (Tenant of Structure made by Squatter) speaks to Sociologists of SIPMIU and DSMC



Mr. Batat & Mrs Meena (Tenants of Structure made by Squatter)



Consultation with Mr Petenei-o Khezhe (Squatter – Owner of the structures)



Mr Petenei-o Khezhe and others



Resettlement Specialist carrying out site inspection with civil contractor



Consultation with the Engineers of civil contractor



House of Mr. Batat & Mrs Meena (Tenants of Structure made by Squatter)



Cattle shed -1



House of Ms. Neisanuo Kire (Tenants of Structure made by Squatter)



Cattle shed -2

## Appendix 6. Rapid Environmental Assessment (REA) Checklist

### RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

SOLID WASTE  
MANAGEMENT

#### Instructions:

- ☐ This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department.
- ☐ This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- ☐ This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- ☐ Answer the questions assuming the “without mitigation” case. The purpose is to identify potential impacts. Use the “remarks” section to discuss any anticipated mitigation measures.

**Country/Project Title:** India / North Eastern Region Capital Cities Development Investment Program

**Sector Division:** Urban Development

SCREENING QUESTIONS	Yes	No	REMARKS
<b>A. Project Siting</b>			
Is the project area...			
▪ Densely populated?		√	N.A
▪ Heavy with development activities?		√	N.A
▪ Adjacent to or within any environmentally sensitive areas?			
▪ Cultural heritage site		√	N.A

SCREENING QUESTIONS	Yes	No	REMARKS
▪ Protected Area	√		The distance from the Puliebadze Wildlife Sanctuary to the proposed solid waste disposal site is approximately 3.5 kms. The Puliebadze Protected Forest and Sanctuary is notified under the Nagaland Jhum land Act, 1970. Since, the Protected Forest and Sanctuary is not notified under the Wildlife Protection Act, 1972, it does attract the EIA notification, 2006.
▪ Wetland		√	N.A
▪ Mangrove		√	N.A
▪ Estuarine		√	N.A
▪ Buffer zone of protected area		√	N.A
▪ Special area for protecting biodiversity		√	N.A
▪ Bay		√	N.A
<b>B. Potential Environmental Impacts</b>  Will the Project cause...			
▪ impacts associated with transport of wastes to the disposal site or treatment facility	√		All vehicles purchased for transportation of waste shall meet the standards prescribed by MoEF. Covered refuse collection vehicles have been proposed. Vehicles will be maintained periodically to prevent spillage of leachate en route.
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	N.A
▪ degradation of aesthetic and property value loss?	√		Design includes green belt of adequate width to form a physical separation and visual screen to the development.
▪ nuisance to neighboring areas due to foul odor and influx of insects, rodents, etc.?	√		Design includes aerobic composting with proper aeration to control the odor problem. Health risk due to breeding of flies in waste is proposed to be controlled by appropriate fly control measures such as use of electric fly catchers and spraying of herbal fly repellents. The compost plant shall be covered with net to prevent the entry of birds and animals that may spread the waste in the nearby areas.

SCREENING QUESTIONS	Yes	No	REMARKS
▪ dislocation or involuntary resettlement of people		√	N.A
▪ public health hazards from odor, smoke from fire, and diseases transmitted by flies, insects, birds and rats?	√		Flies, insects and rats will be controlled by the mitigation measures proposed above. Landfill gas monitoring shall be conducted as specified in the environmental monitoring plan. If concentration of methane is exceeding the prescribed limits, the gas shall be flared to avoid fire hazards.
▪ deterioration of water quality as a result of contamination of receiving waters by leachate from land disposal system?	√		Design includes leachate collection and treatment facility with adequate capacity. Monitoring of treated leachate quality shall be conducted as specified in the environmental monitoring plan. Appropriate mitigation measures shall be taken if treated leachate is not meeting the required standards.
▪ contamination of ground and/or surface water by leachate from land disposal system?	√		Same as above. Further, monitoring of ground water quality has been proposed in the EMP. Appropriate mitigation measures shall be taken if any contamination is detected.
▪ land use conflicts?		√	N.A
▪ pollution of surface and ground water from leachate coming from sanitary landfill sites or methane gas produced from decomposition of solid wastes in the absence of air, which could enter the aquifer or escape through soil fissures at places far from the landfill site?	√		Design includes leachate collection and treatment system and landfill gas collection and venting system.
▪ inadequate buffer zone around landfill site to alleviate nuisances?		√	N.A
▪ social conflicts between construction workers from other areas and community workers?		√	A condition has been included in the contract to engage local labour, where ever appropriate.
▪ road blocking and/or increased traffic during construction of facilities?		√	N.A

SCREENING QUESTIONS	Yes	No	REMARKS
▪ noise and dust from construction activities?	√		Construction shall be avoided during night-time to avoid noise impacts. Plant and equipment employed in the construction shall comply with environmental standards. Regular wetting of stock piles of sand and blue metal shall be carried out to control dust. Air quality and noise level monitoring shall be conducted as specified in the environmental monitoring plan
▪ temporary silt runoff due to construction?	√		Following mitigation measures are proposed in the EMP: Proper stock piling of silt/spoil at site; Examine the reuse opportunities for silt/ spoil; Identification of site for disposal of silt/ spoil; properly covering the disposal site on completion of work; Protection against pollution during transportation; and maintenance of the transportation vehicles
▪ hazards to public health due to inadequate management of landfill site caused by inadequate institutional and financial capabilities for the management of the landfill operation?	√		Adequate institutional arrangements have been proposed in the IEE report. Enough financial provisions for environmental management have been included in the operation and maintenance cost of the project.
▪ emission of potentially toxic volatile organics from land disposal site?	√		Landfill gas monitoring shall be conducted as specified in the environmental monitoring plan. If concentration of toxic gases exceeds the limits, adequate mitigation measures shall be taken.
▪ surface and ground water pollution from leachate and methane gas migration?	√		Design includes leachate collection and treatment system and landfill gas collection and venting system. Monitoring program has been proposed for regular surface and ground water quality monitoring.
▪ loss of deep-rooted vegetation (e.g. trees) from landfill gas?	√		Design includes landfill gas collection and venting system.
▪ explosion of toxic response from accumulated landfill gas in buildings?	√		Design includes landfill gas collection and venting system.
▪ contamination of air quality from incineration?		√	

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> <li>public health hazards from odor, smoke from fire, and diseases transmitted by flies, rodents, insects and birds, etc.?</li> </ul>	√		Design includes aerobic composting with proper aeration to control the odor problem. Health risk due to breeding of flies in waste is proposed to be controlled by appropriate fly control measures such as use of electric fly catchers and spraying of herbal fly repellents. The compost plant shall be covered with net to prevent the entry of birds and animals that may spread the waste in the nearby areas. Landfill gas monitoring shall be conducted as specified in the environmental monitoring plan. If concentration of methane is exceeding the prescribed limits, the gas shall be flared to avoid fire hazards.
<ul style="list-style-type: none"> <li>health and safety hazards to workers from toxic gases and hazardous materials in the site?</li> </ul>	√		Same as above. Further, the workers will be provided with personal protective equipments like masks, gloves, shoes etc.

### **SIPMIU's Assessment on Categorization of Environmental Impacts**

Based on the above checklist, what is the SIPMIU's assessment on the categorization and planning requirements for this subproject?

- ☐ Category A, Environmental Impact Assessment (EIA), Environmental Management Plan including a Budget, Public Consultation (at least twice) and Disclosure 120 days in advance of Board Consideration and required.
- ☐ Category B sensitive, Initial Environmental Examination (IEE), Environmental Management Plan including Budget, Disclosure 120 days in advance of Board Consideration and Public Consultation are required.
- ☒ Category B, Initial Environmental Examination (IEE) and Public Consultation are required.
- ☐ Category C, Review of Environmental Implications is required