Initial Environmental Examination

Project Number: 46166-001
May 2017

IND: Supporting Human Capital Development in Meghalaya

Subproject: Smit Higher Secondary School, Mawryngkneng, East Khasi Hills, Meghalaya

Submitted by:
Finance Department, Government of Meghalaya

This report has been submitted to ADB by the Finance Department, Government of Meghalaya and is made publicly available in accordance with ADB’s Public Communications Policy (2011). It does not necessarily reflect the views of ADB.

This Initial Environment Examination report 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. In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

Asian Development Bank
GOVERNMENT OF MEGHALAYA  
FINANCE (ECONOMIC AFFAIRS) DEPARTMENT

No.FEA(ADB)/PMU/ESG/1/2015/680,          Dated: Shillong, 20th April 2017

From:        Shri E.Y. Chen  
Director Institutional Finance & Ex-Officio  
Joint Secretary to the Govt. of Meghalaya  
Finance (Economic Affairs) Department

To:           Mr. Kenichi Yokoyama,  
Country Director, Asian Development Bank (ADB)  
India Resident Mission (INRM),  
4 San Martin Marg, Chanakyapuri,  
New Delhi 110 021, India

Subject:  Loan No. 3033-IND for ADB assisted project “Supporting Human Capital Development in Meghalaya” – Submission of signed Initial Examination Environment (IEE) reg.

Reference: Email, dt. 11-4-2017

Sir,

In inviting a reference to the email and subject cited above, I am directed to submit herewith the revised Initial Environment Examinations (IEEs) duly signed after incorporating ADB comments and views. The summary are as follow:-

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>IEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Phase – I Package -1</td>
</tr>
<tr>
<td>1.</td>
<td>IEE Garo Union Secondary School</td>
</tr>
<tr>
<td>2.</td>
<td>IEE Good Shepherd Secondary School</td>
</tr>
<tr>
<td>3.</td>
<td>IEE Holy Cross Higher Secondary School (Umkiang Secondary School)</td>
</tr>
<tr>
<td>4.</td>
<td>IEE Jowai Presbyterian Higher Secondary School</td>
</tr>
<tr>
<td>5.</td>
<td>IEE Khasi Jaintia Presbyterian Girls Higher Secondary School</td>
</tr>
<tr>
<td>6.</td>
<td>IEE Khliehriat Presbyterian Higher Secondary School</td>
</tr>
<tr>
<td>7.</td>
<td>IEE Kyrdem Presbyterian Secondary School</td>
</tr>
<tr>
<td>8.</td>
<td>IEE Laitumkhrah Assamese Secondary School</td>
</tr>
<tr>
<td>9.</td>
<td>IEE Mawryngkneng Higher Secondary School</td>
</tr>
<tr>
<td>10.</td>
<td>IEE Mukhla Raji Secondary School</td>
</tr>
<tr>
<td>11.</td>
<td>IEE Nongkrem Higher Secondary School</td>
</tr>
<tr>
<td>12.</td>
<td>IEE Ramakrishna Mission Secondary School</td>
</tr>
<tr>
<td>13.</td>
<td>IEE Seng Khasi Higher Secondary School</td>
</tr>
<tr>
<td>14.</td>
<td>IEE Shangpung Presbyterian Higher Secondary School</td>
</tr>
<tr>
<td>15.</td>
<td>IEE Smit Higher Secondary School</td>
</tr>
<tr>
<td>16.</td>
<td>IEE_Alpha English Higher Secondary School</td>
</tr>
<tr>
<td>17.</td>
<td>IEE_Cherra Presbyterian Secondary School</td>
</tr>
<tr>
<td>18.</td>
<td>IEE_District Pyndemsohsaw Presbyterian Higher Secondary School</td>
</tr>
<tr>
<td>19.</td>
<td>IEE_Khararblang Secondary School</td>
</tr>
<tr>
<td>Sl. No</td>
<td>IEE</td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>20.</td>
<td>IEE_Laishnong Higher Secondary School</td>
</tr>
<tr>
<td>21.</td>
<td>IEE_Malai Sohat Secondary School</td>
</tr>
<tr>
<td>22.</td>
<td>IEE_Mawsynram Higher Secondary School</td>
</tr>
<tr>
<td>23.</td>
<td>IEE_Pilangkatta Secondary School</td>
</tr>
<tr>
<td>24.</td>
<td>IEE_Raid Lyngkhat Presbyterian Secondary School</td>
</tr>
<tr>
<td>25.</td>
<td>IEE_Seng Khasi Secondary School, Langkyrdem</td>
</tr>
<tr>
<td>26.</td>
<td>IEE_St. John Bosco Boys Higher Secondary School</td>
</tr>
<tr>
<td>27.</td>
<td>IEE_Tirot Singh Memorial Secondary School</td>
</tr>
<tr>
<td>28.</td>
<td>IEE_Umroi Presbyterian Higher Secondary School</td>
</tr>
<tr>
<td>29.</td>
<td>IEE_Village Durbah Higher Secondary School</td>
</tr>
</tbody>
</table>

**Phase – 2 Package -2/3/4**

1) IEE_Adokgiri Secondary School
2) IEE_Bhitthari Higher Secondary School
3) IEE_Bikkongre Secondary School
4) IEE_Bynther Secondary School
5) IEE_Damas Secondary School
6) IEE_Green Yard Secondary School
7) IEE_Hynriew Shnong Higher Secondary
8) IEE_Mahatma Gandhi Memorial Secondary School
9) IEE_Mangsang Secondary School
10) IEE_Manikganj Secondary School
11) IEE_Omed Memorial Secondary School
12) IEE_Resubepara Girls' Higher Secondary School
13) IEE_Tikrikilla Higher Secondary School
14) IEE_United Rongjeng Higher Secondary School
15) IEE_United Songsak Secondary School
16) IEE_Williampur Secondary School

This is for your kind information and necessary action.

Yours faithfully,

(E. Y. Chen)

Director Institutional Finance & Ex-Officio Joint Secretary to the Govt. of Meghalaya,
Finance (Economic Affairs) Department
Initial Environmental Examination (IEE)
Project Number: IND: 46166-001: Supporting Human Capital Development in Meghalaya
April, 2017

IND: Supporting Human Capital Development in Meghalaya - Smit Higher Secondary School, Mawryngkneng, East Khasi Hills, Meghalaya

(Phase 1, Package No 1, Lot No 4)

Prepared by the Department of Finance, Government of Meghalaya

This IEE 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
Table of Contents

EXECUTIVE SUMMARY .................................................................................................................... 1

I. INTRODUCTION .......................................................................................................................... 2
   A. Project Background ..................................................................................................................... 2
   B. Sub Project Background .......................................................................................................... 2
   C. Purpose of IEE: ........................................................................................................................ 3
   D. Legal Frame Work: .................................................................................................................. 4
       a) ADB Policy ........................................................................................................................... 4
       b) National and State Laws ..................................................................................................... 4

II. DESCRIPTION OF EXISTING ENVIRONMENT ........................................................................... 6
   A. Physical Environment .............................................................................................................. 6
   B. Biological Environment .......................................................................................................... 9
   C. Social Environment ................................................................................................................ 10

III. PROJECT FACILITIES, IMPACTS AND MITIGATION MEASURES ........................................... 11
   A. Project Facilities ..................................................................................................................... 11
   B. Description of the School Buildings, existing condition and proposed Interventions ... 13
   C. Environmental Management Plan (EMP) .............................................................................. 14

IV. INSTITUTIONAL ARRANGEMENT ............................................................................................. 28

V. ENVIRONMENT MONITORING PLAN ....................................................................................... 29

VI. PUBLIC CONSULTATION AND DISCLOSURE MECHANISM.................................................. 32

VII. GRIEVANCE REDRESS MECHANISM .................................................................................... 32

VIII. ENVIRONMENTAL BUDGET .................................................................................................. 33

IX. CONCLUSION AND RECOMMENDATION ................................................................................ 35

List of Figures

Figure 1: Project Area (Smit Higher Secondary School) location Map ........................................ 3
Figure 2: Seismic Map of Meghalaya ........................................................................................... 7
Figure 3: SHSS Layout-Building without proposed Interventions ............................................. 12
Figure 4: SHSS Layout - Building with proposed Interventions ................................................. 12

List of tables

Table 1: Environmental Regulatory Compliance .......................................................................... 5
Table 2: Summary Table for Physicochemical Water Analysis ..................................................... 8
Table 3: Ambient Air Quality – East Khasi Hills District ................................................................. 8
Table 4: Environmental Management Plan (EMP) ....................................................................... 16
Table 5: Site Specific EMP for the Sub-Project ......................................................................... 26
Table 6: Mechanism for Implementation of EMP ..................................................................... 28
Table 7: Site and Activity Specific Plans/Programs as per EMP .................................................. 29
Table 8: Environmental Monitoring Program .............................................................................. 30
Table 9: Indicative EMP Budget ................................................................................................. 33
ABBREVIATIONS

ADB : Asian Development Bank
CFE : Consent for Establishment
CGWB : Central Groundwater Board
DPCU : District Project Coordination Unit
DSC : Design Supervision Consultants
EARF : Environmental Assessment and Review Framework
EC : Environmental Clearances
EMP : Environmental Management Plan
GoI : Government of India
GoM : Government of Meghalaya
ham : Hectare meter
IEE : Initial Environmental Examination
MoEF : Ministry of Environment and Forest
MSL : Mean Sea Level
MSPCB : Meghalaya State Pollution Control Board
MSW : Municipal Solid Waste
mts : Meters
NoC : No Objection Certificate
NOx : Oxides of Nitrogen
PMC : Project Monitoring Consultant
PMU : Project Management Unit
PVC : Polyvinyl Chloride
RCC : Reinforced concrete
RSPM : Respirable Suspended Particulate Matter
SHSS : Smit Higher Secondary School
SMC : School Management Committee
SPM : Suspended Particulate Matter
SPS : Safeguard Policy Statement
SO2 : Sulfur Dioxide
Sq.m : Square meters
EXECUTIVE SUMMARY

1. Under the “Supporting Human Capital Development in Meghalaya” program, the State Government of Meghalaya (GoM) has initiated to improve the quality and delivery of secondary and higher secondary education (including teacher training) and skill development programs in Meghalaya, the program has been funded by the Asian Development Bank (ADB).

2. The proposed project interventions include construction of a new G+1 RCC building and retrofitting works for the existing school buildings at Smit Higher Secondary School (SHSS). The retrofitting works includes upgradation of the existing infrastructure (like building renovation works, repair works, provide wire mesh at column-wall and beam-wall joints to strengthen the buildings, provide GI sunshades over all the exterior windows wherever sunshades are missing.), The new building shall have provision for a girl’s activity room, toilet for girls and five classrooms.

3. As per the prevailing environmental rules and regulations of Government of India (GoI), this project on school upgradation is exempted from obtaining Environmental Clearances (EC). This is because the proposed interventions/ construction activities are not classified under either category ‘A’ or ‘B’ type projects. Hence preparation of the Environmental Impact Assessment (EIA) is not mandatory. However, if the contractor requires use of machineries like setting up of hot-mix plant, batching plant, stone crushers, diesel generators etc, then he should obtain/get NoC from the Meghalaya State Pollution Control Board, Shillong.

4. As per the safeguard policies of the ADB, this project on school upgradation is classified as category “B” project and mandates the preparation of IEE /EMP report. This project is essential in improving the education quality and thereby it can draw the attention of more students to Smit Higher Secondary School from the surrounding area of Mawryngkeng block of East Khasi Hills district. By implementing this project the prime objective of skill development among the students and the staffs shall be achieved.

5. The purpose of this IEE is to capture the environmental impacts that are likely to arise due to the proposed project. The IEE has been prepared based on the secondary information that is collected from the available literatures, reports, journals, on-line information, consultations etc. Necessary site visits have also been conducted for verification of the collected information.

6. With exemption to the general construction impacts arising during the repair, restoration retrofitting works of the existing school building, the proposed project is not likely to have any other environmental impacts; accordingly the EMP has been prepared for the proposed activities. The prepared EMP shall mitigate the anticipated environmental impacts; the contractor shall adopt the suggested mitigation measures and monitoring plan.

7. Based on this Initial Environmental Examination (IEE), it shall be concluded that the proposed project shall have temporary negative impacts during the project construction, which shall be reversed during the project operation. The completion of the project shall induce a positive impact on the quality of the education, infrastructure requirements, hygienic and safe environment for the students and staffs.
I. INTRODUCTION

A. Project Background

8. Meghalaya is a small, land-locked state in northeast India with population of 2.9 million. It is flanked by Bangladesh in the south and Assam on the other three sides. A predominantly tribal state\(^1\), it has rich mineral reserves such as coal and limestone, forest cover of more than 70%, and abundant rainfall. Meghalaya’s economy has lagged behind due to its remote location, hilly terrain, and poor infrastructure. The high transport cost affects the competitiveness of economic activities and discourages private investment. The industrial base is narrow with limited processing and value addition taking place within the state. The low employability of Meghalaya’s youth compounds the adverse effects of these structural constraints, thereby trapping the state in a vicious cycle of poverty and underdevelopment.

9. The project “Supporting Human Capital Development in Meghalaya” aims to enhance the employability of Meghalaya’s youth by
   a) Improving the quality and delivery of secondary and higher secondary school education, and
   b) Facilitating results-oriented technical and vocational skills training.

B. Sub Project Background

10. Smit Higher Secondary School is located in Smit village of Mawryngkneng block, East Khasi Hills District, Meghalaya. The school was established in 1968. Geographically the school is located at 25°29’57.21” N and 91°54’21.16” E and at an altitude of 1781m above Mean Sea Level (MSL). The school-campus is spread over an estimated area of about 5496.25 sqm / 1.35 Acres of land (as per the school authority). The land is donated by the villagers. The prime land-use of the campus is institutional. The school site is located near the settlement/habitat and it is surrounded by varied land use as it encompasses built-up area as well as area covered with pine vegetation. All the classrooms in the school have electric supply. The school have social & personal skill development sessions in curriculum (SUPW, NCC, NSS, etc).

11. The school has a playground, with not so adequate sports equipment and dedicated sports room. There is proper fence, but it does not have dedicated parking space or proper dumping pit / garbage disposal place. There are 16 toilets in the school, all in poor condition. The school has its own borehole water connection and 2 water storage tanks comprising a capacity of up to 2000 litres.

12. The School is well connected with road network which is on the northern side with average road-width of 6 meters. The school is approx 6 Km away from the District HQ. The school has a catchment area which is approximately 20 km covering Laitkseh, Laitkor, Umphup, Umtngew, Thangsning, Laitdiengsai, Thadan, Mawber, Umphynai, Nongkrem, Maw-U-Sam, Thynroit, Rapdeng, Laitum, Jongsha, Mawlat, Lynshing, Laityrhong, Urmasi-Joh etc.

\(^1\)The tribal groups listed in Constitution Scheduled Tribe (ST) Order, 1950 account for 86% of Meghalaya’s population. Khasis, Garos, and Jaintias are the three largest tribal groups of the state.
Smit Higher Secondary School has been chosen to be upgraded under the Asian Development Bank (ADB) funds for “Supporting Human Capital Development in Meghalaya”. An Initial Environment Examination (IEE) has therefore been undertaken to ensure that the environmental rules and regulations prescribed by the Government of India (GoI), Government of Meghalaya (GoM) and ADB are adhered to while undertaking the civil works to upgrade the school. The selection criteria for the school are as follows -

- The land is donated by the villagers to the school.
- The school campus does not house any non-functional or incongruous activities which would invoke resettlement compliances. The campus is used by school functionaries and not used by the village community for their livelihood purposes.
- The total number of student enrolment in the school is 403 which meet the benchmark criteria (BMC) of 50 students in secondary section.
- SHSS SMC (School Management Committee) has demonstrated High Willingness in signing the MoU with DoE under the ADB Project and the commitments made therein.
- The school has 1.35 acres campus area and has sufficient spaces or buildable areas for expansion and infrastructural development

C. Purpose of IEE:

The purpose of conducting an IEE is to provide information about the general environmental setting of the project area, identify impacts of the project activities (physical infrastructure development of the schools) on the bio-physical, socio-economic and cultural environment of the project, recommend site specific environmental mitigation measures and prepare an Environmental Management Plan (EMP) for the project area to ensure that the IEE addresses the requirements of the following:

- ADB’s Safeguard Policy Statement, July 2009
- Relevant laws, regulations, applicable treaties and agreements adopted by Government of India and State Government of Meghalaya
15. The assessment of the project has been carried out for both positive and negative impacts. It is expected that the project activities will not have any significant adverse impact on the environment.

**D. Legal Frame Work:**

**a) ADB Policy**

16. 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, and loans involving financial intermediaries, and private sector loans.

17. **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 and are assigned to one of the following four categories:

- **Category A.** Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.
- **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.
- **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.
- **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.

18. **Environmental Management Plan (EMP).** 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.

19. **Public Disclosure.** The IEE will be put in an accessible place (e.g., local government offices, libraries, community centres, etc.) and a summary translated into Hindi/ Khasi (or) Garo for the project affected people and other stakeholders shall also be disclosed. The following safeguard documents will be put up in ADB’s website so that the affected people, other stakeholders and the general public can provide meaningful inputs into the project design and implementation.

**b) National and State Laws**

20. Implementation of the proposed project will be governed by the National (MoEF, GoI) and State (SPCB, GoM) environmental acts, rules, regulations, and standards. These regulations impose restrictions on activities to minimize/mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure proposed projects are consistent with the legal framework, whether national, state or municipal/local. Compliance is required in all stages of the project including design, construction, and operation and maintenance.

21. The realm of environmental regulations and mandatory requirements for the proposed project is shown in **Table 1.** The Environmental Impact Assessment (EIA) notification, 2006 by the Ministry of Environment and Forests (MoEF, GoI) specifies the mandatory environmental clearance
requirements. Accordingly, projects and activities are broadly categorized in two categories\(^2\) - Category A and Category B, based on the spatial extent of potential impacts and potential impacts on human health and; natural and man-made resources.

**Table 1: Environmental Regulatory Compliance**

<table>
<thead>
<tr>
<th>Proposed Project</th>
<th>Applicability of Acts/Guidelines</th>
<th>Compliance Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting Human Capital Development in Meghalaya – Smit Higher Secondary School, Mawryngkneng block, East Khasi Hills District</td>
<td>The Environment Protection Act, 1986 - under EIA notification, 2006 (and its subsequent amendments in 2009) provides for categorization of projects into category A and B, based on extent of impacts.</td>
<td>The proposed project is not covered in the ambit of the EIA notification as they are not covered either under Category A or Category B of the notification. As a result, the categorization, and the subsequent environmental assessment and clearance requirements, either from the State Government or the GoI is not triggered.</td>
</tr>
<tr>
<td></td>
<td>ADB’s Safeguard Policy Statement 2009 (Refer Annexure -2)</td>
<td>Categorization of project components into A, B or C and developing required level of environmental assessment for each component. This project has been &quot;<strong>Categorized as B and accordingly this IEE has been prepared</strong>&quot;</td>
</tr>
<tr>
<td></td>
<td>The Wildlife Conservation Act, 1972, amended in 2003 and 2006, provides for protection and management of Protected Areas.</td>
<td>Not applicable. No wildlife protected area in the vicinity of the project site</td>
</tr>
<tr>
<td></td>
<td>The Forest Conservation Act, 1980 and its subsequent amendments necessitate obtaining clearance from the MoEF for diversion of forest land for non-forest purposes.</td>
<td>Project site is not located within forest area. No tree felling is required. Hence this act does not trigger. However, under unavoidable circumstances appropriate compensation for the loss of trees (planting of two trees with a maintenance for felling of a tree) shall be worked out</td>
</tr>
<tr>
<td></td>
<td>The Meghalaya Forest Regulation (Application and Amendment) Act, 1973</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water (Prevention and control of pollution) Act, 1974 and;</td>
<td>The proposed project does not involve major construction activities. It deals with minor repair, restoration and retrofitting of structural and conditional distresses in the existing built forms. Hence it does not require Water and Air consents such as Consent for Establishment (CFE) and Consent for Operation (CFO) from the MSPCB.</td>
</tr>
<tr>
<td></td>
<td>Air (prevention and control of pollution) Act, 1981</td>
<td></td>
</tr>
</tbody>
</table>

\(^2\)All projects or activities included as Category ‘A’ in the Schedule, including expansion and modernization of existing projects or activities and change in product mix, will require prior environmental clearance from the Central Government in the Ministry of Environment and Forests (MoEF) on the recommendations of an Expert Appraisal Committee (EAC) to be constituted by the Central Government for the purposes of this notification; All projects or activities included as Category ‘B’ in the Schedule, including expansion and modernization of existing projects or activities as specified in sub paragraph (ii) of paragraph 2, or change in product mix as specified in sub paragraph (iii) of paragraph 2, but excluding those which fulfill the General Conditions (GC) stipulated in the Schedule, will require prior environmental clearance from the State/Union territory Environment Impact Assessment Authority (SEIAA). The SEIAA shall base its decision on the recommendations of a State or Union territory level Expert Appraisal Committee (SEAC) as to be constituted for in this notification. In addition, General Condition (GC) of the notification specifies that any project or activity specified in Category ‘B’ will be treated as Category A, if located in whole or in part within 10 km from the boundary of: (i) Protected Areas notified under the Wild Life Protection Act, 1972, (ii) Critically Polluted areas as notified by the Central Pollution Control Board from time to time, (iii) Notified Eco-sensitive areas, (iv) inter-State boundaries and international boundaries.
### Proposed Project | Applicability of Acts/Guidelines | Compliance Criteria
--- | --- | ---
The Ancient Monuments and Archaeological Sites and Remains Act, 1958, and the rules, 1959 provide guidance for carrying out activities, including conservation, construction and reuse in and around the protected monuments. | The construction materials available locally shall be utilized. | Not applicable. The project site is not close to any of the archeological / protected monuments.

The Factories Act, 1948 and The Labor Act, 1951 and subsequent amendments (Refer Annexure - 3) | The proposed project shall comply to all the rules and regulations as stipulated in the factory and labor acts with respect to Health and safety of the labours | 

Meghalaya Tree (Preservation) Act, 1976 | The proposed project does not envisage tree cutting. Hence this act is not applicable for this project. However, under unavoidable circumstances for felling of trees, appropriate compensation as per the Meghalaya Tree Act, 1976 shall be adopted. | 

Municipal Solid Wastes (Management and Handling) Rules, 2000 | Disposal of construction and municipal solid waste generated during the project construction has to be disposed through the stipulated MSW & Hazardous waste rules and subsequent amendments acts. | 


The above table indicates that the proposed project need not go through a full-scale environmental assessment process; as the scale of impacts and categorization of the project components/ interventions will not require consent/ clearances from Competent Authorities. Therefore, any further approvals or clearances from the GoI or GoM are not envisaged. The ADB guidelines, stipulate addressing environmental concerns, if any, of a proposed activity in the initial stages of project preparation. For this, the ADB Guidelines categorizes the proposed components into categories (A, B or C) to determine the level of environmental assessment required to address the potential impacts. This project on Smit Higher Secondary School upgradation has been categorized as "B" and accordingly this IEE has been prepared to address the potential impacts, in line with the recommended EARF/ IEE content and structure for Category B projects.

### II. DESCRIPTION OF EXISTING ENVIRONMENT

22. The project area falls under the Mylliem Block, East Khasi Hills District in Meghalaya, which is located approximately between 25°07” and 25°41” N Latitude and 91°21” & 92°09” E Longitude and bounded in the North by Ri-Bhoi district, east by Jaintia Hills district, west by West Khasi Hills and south by Bangladesh. To describe the baseline environmental and social features, this section has been sub divided into (i) Physical Environment, (ii) Biological Environment and (iii) Social Environment.

#### A. Physical Environment

(i) **Topography**

23. The East Khasi hills are an undulatory one. It comprises of denudational high and low hills with deep gorges. The district represents a remnant of ancient plateau of Indian Peninsular Shield which is deeply dissected suggesting several geo-tectonic and structural deformities that the
plateau has undergone. In the southern border areas, there are fringes of alluvial plains that are localized in nature.

**(ii) Climate and Rainfall**

24. The district has the unique distinction of having the wettest place on earth i.e. Mawsynram with an average annual rainfall of about 12,270mm. This is followed by 2nd wettest place called Cherrapunjee with an average annual rainfall of 11,600 mm. Southwest monsoon originating from the Bay of Bengal and the Arabian Sea directly relates to the high rainfall received by the region. The high altitude areas of the district experience temperate humid climate and low altitude areas experience tropical to sub-tropical humid climate. The whole year can be divided into four seasons namely summer, rainy, autumn and winter. The temperature varies from 1.7°C to 24°C.

**(iii) Seismicity**

25. All districts, including East Khasi Hills in the state of Meghalaya lie in Zone V. Since the earthquake database in India is still incomplete, especially with regard to earthquake’s prior to the historical period (before 1800 A.D.), these zones offer a rough guide of the earthquake hazard in any particular region. According to GSHAP data, the state of Meghalaya falls in a region of high to very high seismic hazard. Historically, parts of this state have experienced seismic activity greater than M6.0 including an M8.1 in 1897. The seismic map of Meghalaya is depicted in the Figure 2. Seismic Vulnerability Assessment has been conducted and the outcome of the observation has been attached in the Annexure 9.

**(iv) Drainage**

26. The drainage pattern is structurally controlled and parallel to sub-parallel in nature. The drainage pattern shows annular, trellis, sub-dendritic types, which also indicate the structural control. The important river includes the Umtrew, Umiam, UmKhen, Myntang and Umgnot Rivers.

**(v) Water Resources**

a. **Surface Water**

27. Umtrew, Umiam, UmKhen, Myntang and Umgnot and a good number of other turbulent streams that drain out all over the district exhibits gentle gradients with sinuosity on the plain areas. The river drainage system generally exhibits eight patterns viz. (i) Radial (ii) Centrifugal (iii) Parallel (iv) Dendritic (v) Deranged (vi) Trellised (vii) Annual and (viii) Rectangular. Of these two patterns i.e. Parallel and Dendritic can be witnessed in the catchment areas of the rivers in this district.

b. **Groundwater**
28. As per the study conducted by Central Groundwater Board (CGWB), the net annual ground water availability of the district works out to be 15,276 ham (hectare meter) after deducting the natural discharge during non-monsoon season. The annual allocation for domestic and industrial uses has been estimated as 2,382 ham based on the population data which has been projected up to year 2025. Thus the net groundwater availability for future irrigation use works out to be 12894 ham. The over-all stage of ground water development of the East Khasi Hills District is a meagre 0.20% and is categorised as ‘SAFE’.

29. As part of the routine groundwater quality monitoring, CGWB has collected water samples from various dug wells, springs, bore and tube wells in the East Khasi Hills district. The outcome of the physicochemical analysis is given in the following Table 2

<table>
<thead>
<tr>
<th>Constituents</th>
<th>Springs</th>
<th>Shallow aquifer</th>
<th>Deeper aquifer</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>4.8-7.2</td>
<td>5.2-7.1</td>
<td>5.7-6.4</td>
</tr>
<tr>
<td>Specific conductance (mhos/cm at 25°C)</td>
<td>20-170</td>
<td>51-260</td>
<td>51-214</td>
</tr>
<tr>
<td>Carbonate (mg/l)</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Bi-carbonate (mg/l)</td>
<td>6.1-24</td>
<td>6.1-134</td>
<td>18-104</td>
</tr>
<tr>
<td>Chloride (mg/l)</td>
<td>3.5-35</td>
<td>7.1-35</td>
<td>7.1-11</td>
</tr>
<tr>
<td>Fluoride (mg/l)   *BDL-0.21</td>
<td>0.07-0.35</td>
<td>0.08-0.47</td>
<td></td>
</tr>
<tr>
<td>Calcium (mg/l)</td>
<td>2-30</td>
<td>4-40</td>
<td>2-22</td>
</tr>
<tr>
<td>Magnesium (mg/l)</td>
<td>1.2-4.9</td>
<td>2.4-4.7</td>
<td>1.2-8.5</td>
</tr>
<tr>
<td>Total Hardness (mg/l)</td>
<td>10-80</td>
<td>15-115</td>
<td>10-90</td>
</tr>
<tr>
<td>Iron (mg/l)</td>
<td>BDL-0.24</td>
<td>BDL-1.52</td>
<td>BDL-8.4</td>
</tr>
</tbody>
</table>

*BDL- below detectable limit

30. According to Bureau of Indian Standards (BIS: IS: 10500, 1991), the chemical constituents present in the ground water of the district is all within the desirable limit set for drinking and irrigation water standards except for Fe which exceeds the limits prescribed for drinking purpose. Thus the water of the district is generally good and is fit for drinking as well as irrigation point of view. In pockets where high concentration of Fe is detected, the water can be treated by adopting iron removal procedures for domestic use.

(vi) Air and Noise Quality

31. The Meghalaya State Pollution Control Board is monitoring the Ambient Air Quality in the state under the National Air Monitoring Programme (NAMP) sponsored by CPCB. The frequency of monitoring is twice a week. The monitoring has been performed for Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM), Sulfur Dioxide (SO$_2$) and Oxides of Nitrogen (NO$_x$). The outcome of the monitoring for East Khasi Hills District is presented in the Table 3. With exception to the RSPM all other key air quality parameters are well within the permissible limits. The increase in RSPM may be due to the wind, increased traffic and other anthropogenic activities.

<table>
<thead>
<tr>
<th>Month &amp; Year 2009 - 2010</th>
<th>Parameters Tested (Monthly Averages)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SPM (μg/m$^3$)</td>
</tr>
<tr>
<td>April’09</td>
<td>63.9</td>
</tr>
<tr>
<td>May’09</td>
<td>60.3</td>
</tr>
<tr>
<td>June’09</td>
<td>59.1</td>
</tr>
<tr>
<td>July’09</td>
<td>53.7</td>
</tr>
<tr>
<td>August’09</td>
<td>53.3</td>
</tr>
<tr>
<td>September’09</td>
<td>58.8</td>
</tr>
</tbody>
</table>
### Parameters Tested (Monthly Averages)

<table>
<thead>
<tr>
<th>Month</th>
<th>SPM (μg/m³)</th>
<th>RSPM (μg/m³)</th>
<th>SO₂ (μg/m³)</th>
<th>NOₓ (μg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>October’09</td>
<td>73.9</td>
<td>63.5</td>
<td>2.0</td>
<td>5.1</td>
</tr>
<tr>
<td>November’09</td>
<td>69.3</td>
<td>63.3</td>
<td>2.0</td>
<td>4.6</td>
</tr>
<tr>
<td>December’09</td>
<td>96.0</td>
<td>83.0</td>
<td>2.0</td>
<td>6.1</td>
</tr>
<tr>
<td>Annual Avg.</td>
<td>65.3</td>
<td>57.9</td>
<td>2.0</td>
<td>4.7</td>
</tr>
</tbody>
</table>

#### Permissible Limits (Annual avg.)

- SPM: 360
- RSPM: 120
- SO₂: 80
- NOₓ: 80

Source: Meghalaya State Pollution Control Board - Annual Report

32. During Diwali festival, Noise quality monitoring has been conducted by the state pollution control board. The noise levels have been monitored before Diwali and during Diwali. The recorded information reveals that, there is a drastic increase in the noise pollution on the Diwali day and it gradually decreases in a week’s time after Diwali festival. Apart from the Diwali festival time, increased noise levels are observed in the Highways and major road intersections. However, in general the noise quality of the East Khasi Hills District is well under control in the settlements. Hence the proposed school upgradation interventions will not have any impact on the existing air and noise quality of the District/ Project area.

### Geology & Soil

33. Geologically, the East Khasi hills are an undulatory one. It comprises of denudational high and low hills with deep gorges. The district represents a remnant of ancient plateau of Indian Peninsular Shield which is deeply dissected suggesting several geotectonic and structural deformities that the plateau has undergone. In the southern border areas, there are fringes of alluvial plains that are localized in nature.

34. Red Loamy soil is a product of weathering of rocks like granites, gneisses etc which are relatively rich in clay forming minerals. This soil type are rich in organic matter, nitrogen and acidic in nature. They are found exposed in the central part of the East Khasi Hills district. Laterite soil is a weathering product of rocks like quartzite, schist, conglomerate etc, which are found exposed in the northern area of East Khasi Hills. The soils are rich in iron and aluminium. Alluvial soils are found exposed in the southern part of the district that are rich in potash but poor in phosphate content. They are acidic in nature.

### Biological Environment

#### Flora

35. Trees such as *Terminalia arjuna*, *Terminalia bellerica*, *Terminalia myriocarps*, *Alstoniascholaris*, *Ficusglomerata*, *Gmelinaarborea*, *Bauhinia acuminata*, *Ailanthus grandis*, *Duabanga grandiflora* and *Sterculiavillosa* are very frequent in this area. The dominant shrubs of this area are *Eupatorium odonatum*, *Zizyphusmuritinum* and *Clerodendroninfortunatum*, *Saccharumspontaneum*, *Thysanolaenamaxima* are abundant in exposed places. There are quite a good number of herbs in exposed areas. The dominant forms are *Sidacordifolia*, *Sidaacuta*, *Urenalobata*, *Amaranthusviridis*, *Ageratum conyzoides* and *Bidenspillosa*. Climbers are fairly abundant. The most predominant forms are *Mikeniascandense* and *Combretumroxburghii*. Wild *Musa sapiantum* occurs in the lower elevation. However no endemic or endangered plant species were found in the project area according to the reconnaissance/ initial survey.

#### Fauna

36. As per the reconnaissance/ initial survey and secondary information from Zoological Survey of India (ZSI), the project area is having poor profile of higher vertebrates, especially mammalian fauna. Frugivorous bats and small rodents and legomorphs remain the major representatives in the project and its buffer areas. None of the mammalian species could be identified as Rare and
Endangered. The study area indicates the possible occurrence of Rusells Viper and King Cobra in the past (based on the ZSI study).


38. **Other key fauna**: No particularly significant species occurs, except for the occasional arrival of Flying foxes *Pteropusgiganteus*. Bamboo rats *Cannomysbadius* have been also reported.

(x) **Protected area**

39. As per the Forest & Environment Department, Government of Meghalaya, there are four protected forests (Upper Shillong P.F. (7.66 acres), Short Round P.F. (1.13 acres), Laitkor P.F. (3.25 acres), Green Block No. 2 (0.21 acres)) and three reserved forests ((Riatkhwan R.F., Shyrwat R.F and Riat Laban R.F)) in the East Khasi Hills. There are no national park and sanctuaries within the district. None of the protected and reserved forests falls under the project area.

C. Social Environment

(xi) **Demographic Profile**

40. As per census 2011, the East Khasi Hills district had a population of 825,922 of which male and female were 410,749 and 415,173 respectively and it constitutes about 27.84% of total Meghalaya population. In comparison with the 2001 census, the district achieved an increase of 24.96% of population growth. The population density of the district is 301 people per sq. Km. Average literacy rate is 84.15% (male and female literacy were 84.51 and 83.81 respectively) compared to 76.07% of 2001. With regards to Sex Ratio, it stood at 1011 per 1000 male compared to 2001 census figure of 981.

(xii) **Socio Economic Features**

41. Agriculture is the mainstay of the rural folks of the district. In urban areas less than 1.0 percent of the total workers are engaged as cultivators and less than 1.0 percent as agricultural labourers. The principal crops cultivated in the district are cereals (rice, maize, small millets etc), pulses, potato, tapioca, fruits (pineapples, citrus fruits, banana, papaya), areca nut, ginger, turmeric, chillies etc.

42. As per Census 2011, the district has 3,26,786 persons (2, 04,303 males and 1, 22,483 females) engaged in economic activities. Out of which, persons engaged in cultivation, agriculture, household industry and other categories are 23.49%, 12.51 %, 0.91 % and 63.09 % respectively. The highest percentage distribution of persons engaged in cultivation, agriculture, and household industry as well as the other categories are noticed to be in Mawphlang (71.64 %), Pynursla (39.53 %), Khatarshnong-Laitkroh (2.03 %) and Mylliem (88.16 %) sub-districts respectively.
III. PROJECT FACILITIES, IMPACTS AND MITIGATION MEASURES

A. Project Facilities

43. The school campus is spread over an estimated area of about 1.35 Acres of land (as per the school authority). SHSS campus has three functional blocks (B1, B2 & B3). The western side being the oldest one house building B1 which is used for both education and administration purposes. The building B2 is a SSA (Sarba Siksha Abhiyan) block which is located in the southern side of the school campus and mainly used for educational purpose. The eastern side house B3 used for both education and administration purposes.

44. There are 16 toilets in the school, all in poor condition. The school has its own borehole water connection and 2 water storage tanks comprising a capacity of up to 2000 litres. The layout of the SHSS is depicted in the Figure 3 & 4.
Figure 3: SHSS Layout - Building without proposed Interventions

Figure 4: SHSS Layout - Building with proposed Interventions
### B. Description of the School Buildings, existing condition and proposed Interventions

<table>
<thead>
<tr>
<th>School Infrastructure</th>
<th>Type of structure</th>
<th>Usage</th>
<th>Existing Condition</th>
<th>Proposed Improvements</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| Block- B1              | Single storied – Masonry structure | Number of rooms: 10, Class rooms – 3 | • Cracks in walls of principal room, vice principal room staff room and store rooms;  
• Seepage in walls of staff room, science lab and all the class rooms. | • Crack portion shall be hacked and chipped and re-plastered with polymer based mortar;  
• Seepage portion shall be hacked and chipped off and cleaned properly then re-plastering with water proofing compound;  
• **Global Solution:** Tie beam to be provided column-wall and beam-wall joints all around the block;  
• Seismic band shall be provided at tie level and lintel level all around the block. | |
|                       |                   | Principal room |                   |                        |         |
|                       |                   | Vice principal room |                   |                        |         |
|                       |                   | Store rooms 2 |                   |                        |         |
|                       |                   | Staff room |                   |                        |         |
|                       |                   | Auditorium |                   |                        |         |
|                       |                   | Science lab |                   |                        |         |
| Block – B2             | Single storied – Masonry structure | Number of rooms: 4, Class rooms – 3 | • Cracks in walls of all the rooms;  
• Seepage in walls of all the rooms. | • Crack portion shall be hacked and chipped and re-plastered with polymer based mortar;  
• Seepage portion shall be hacked and chipped off and cleaned properly then re-plastering with water proofing compound;  
• **Global Solution:**  
  • Provide stone packing followed by grouting only at the external side of the building;  
  • Wire mesh to be provided on column-wall and beam-wall joint on both internal and external sides of the building. | • As the block 2 is under SSA block therefore no proposed work is to be done for the existing block. |
|                       |                   | Office room |                   |                        |         |
| Block – B3             | Two storied – RCC structure | Ground Floor: Number of rooms: 5, Class rooms – 4 | • Cracks in walls of all the rooms;  
• Seepage in walls of all the rooms. | • Crack portion shall be hacked and chipped and re-plastered with polymer based mortar;  
• Seepage portion shall be hacked and chipped off and cleaned properly then re-plastering with water proofing compound;  
• **Global Solution:**  
  • Provide stone packing followed by grouting only at the external side of the building;  
  • Wire mesh to be provided on column-wall and beam-wall joint on both internal and external sides of the building. | |
<p>|                       |                   | Office room |                   |                        |         |
|                       |                   | Computer rooms 2 |                   |                        |         |</p>
<table>
<thead>
<tr>
<th>School Infrastructure</th>
<th>Type of structure</th>
<th>Usage</th>
<th>Existing Condition</th>
<th>Proposed Improvements</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toilet</td>
<td>Toilet block 1: For students</td>
<td>Number of unit: 4</td>
<td>Poor condition</td>
<td>• Water storage, flushing system, etc will be upgraded</td>
<td>• 2 new toilet blocks shall be provided in new building</td>
</tr>
<tr>
<td></td>
<td>Toilet block 2: For teachers</td>
<td>Number of unit: 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water supply</td>
<td>PHE supply</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity provisions</td>
<td>There is a 2 phase power connection</td>
<td></td>
<td>Poor condition</td>
<td>• Wiring shall be done in looping system with copper PVC cable 250/440 volt grade of size 1.5 sqmm of approved quality using PVC casing capping including 5 amperes switch Indian best quality ceiling rose etc capable to a highest point.</td>
<td></td>
</tr>
<tr>
<td>Play Area</td>
<td>School has a play ground inside the school campus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of approach road</td>
<td>Metalled road</td>
<td></td>
<td>• The school can be accessed by a 500m long metalled road branching out from main Road. The road width is 5 metre</td>
<td>• No proposed improvements for approach road</td>
<td></td>
</tr>
<tr>
<td>Trees within the school campus (if any)</td>
<td></td>
<td></td>
<td>• There are approx. 40 trees in the school campus</td>
<td>• No trees will be affected due to proposed improvements</td>
<td></td>
</tr>
</tbody>
</table>

C. Impacts and Mitigation Measures

44. Being a localised construction activity at a minimal scale (repair, restoration and retrofitting of the existing school building, provision of drainage, introducing water harvesting and improving the existing infrastructure facilities), the proposed project activities are not anticipated to have major environmental impacts during the project construction and operation stages. However, irrespective of the scale of the construction activity, the proposed interventions shall have minimal temporary environmental impacts. The following section will discuss the anticipated environmental impacts and management measures that need to be adopted. It also specifies the roles and responsibility of the contractor, DSC and PMC.

45. The negative environmental impacts associated with the proposed project interventions includes generation of dust and noise pollution during the building demolishing activities, excavation and earth works, land grubbing, transportation and storage of construction materials etc. If the construction safety is not adopted in the construction camp and labor camp, the proposed intervention shall have occupation health hazards to the labourer's and the public. The soil erosion
is a predominant environmental impact which arises during the construction of any infrastructure projects in the hilly area; the project site being a hilly area, appropriate mitigation measures has to be adopted in containing the soil erosion. The soil and water pollution due to the surface runoff is anticipated during the project construction stage; hence the construction activities have impact on the surface runoff which shall be temporarily retained during the monsoon period. The project area shall also has natural disaster and extreme climate events, however, these impacts are not anticipated to be project induced but rather, they are related to the geographical location of project site.

46. The proposed project intervention shall also has positive environmental and social impacts, this includes

- Upgrading classrooms/ buildings to have ample natural light and good ventilation to the students and staffs.
- Provision of safety to the students and staffs by upgrading the building strength to withstand against natural calamities (including climate variability such as severe storms and geophysical hazards such as earthquakes and landslides).
- Improve hygiene among children and provide clean drinking water.
- Capacity building of stakeholders in environmental safeguards, including improved methods of construction, retrofitting of old structures and preparation of resilient infrastructure which will enhance knowledge and awareness for sustainable school infrastructure development in the future.

D. Environmental Management Plan (EMP)

45. The following EMP Table 4 summarizes the impacts that are expected to arise from the project activities. The Site specific EMP has been prepared for the sub project and given in Table 5
## Table 4: Environmental Management Plan (EMP)

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Project Activity</th>
<th>Potential Impact</th>
<th>Mitigation Measures</th>
<th>Responsible for Implementation</th>
<th>Responsible for Supervision</th>
<th>Frequency of monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1.</strong></td>
<td>Approvals/NOC Licences and Permits/Insurance.</td>
<td>Illegal activity</td>
<td>• All necessary approvals, permits and licences required by the state and local legislation shall be obtained prior to commencing of the construction activity. • All approvals, permits and licences shall be maintained and updated before expiry, and complied with during the construction period. • Should there be any changes to the project which would require additional permits or licences, these shall be obtained • The contractor shall maintain Pollution Under Control (PUC’s) Certificates for the construction vehicles and machineries used for this project. • Contractors shall insure all workers covered under the group insurance or any other suitable insurance schemes against all forms of injuries sustained at the workplace. • All migrant labourers engaged by contractors, has to possess Work Permit issued by GoM/ADCs/Under Inter State Migrant (Regulation of employment and services Act 1979).</td>
<td>• Contractor shall obtain all necessary NOC licences and permits, clearances etc required; for undertaking the construction activities.</td>
<td>• DSC/ PMC • Labour/Work permit license, Group Insurance for labourers and PUC for Vehicles and Machineries</td>
<td>Prior to start of construction activity and at regular intervals mainly during license/permit expiry/renewal time.</td>
</tr>
<tr>
<td><strong>2.</strong></td>
<td>Access, utility relocation</td>
<td>Disruption to local amenities</td>
<td>Access to properties (private properties, schools, etc.) affected by the project shall be maintained throughout the construction period. • Should there be a need to close any access temporarily, then owners of the affected property shall be given notification of the</td>
<td>• DSC to prepare preliminary list and maps of utilities that needs to be shifted. • Contractor needs to prepare the list</td>
<td>• DSC/ PMC • Utility shifting is not required for this project.</td>
<td>Monthly monitoring</td>
</tr>
<tr>
<td>Sl. No</td>
<td>Project Activity</td>
<td>Potential Impact</td>
<td>Mitigation Measures</td>
<td>Responsible for Implementation</td>
<td>Responsible for Supervision</td>
<td>Frequency of monitoring</td>
</tr>
<tr>
<td>-------</td>
<td>------------------</td>
<td>------------------</td>
<td>---------------------</td>
<td>-------------------------------</td>
<td>-----------------------------</td>
<td>------------------------</td>
</tr>
</tbody>
</table>
|       |                  |                  | extent, timing and duration of closure, not less than 24 hours prior to such closure.  
• Any legal access/right of way affected by the works shall be reinstated to an original/ equivalent standard/level.  
• Normal access to public roads and properties shall be maintained throughout the full duration of the construction works. | of the operators of utilities who has to be shifted | DSC/PMU | Monthly monitoring |
| 3.    | Loss of land     | Land acquisition  
Socio economic Impacts | No additional land will be required, as all school upgradation activities including construction work related to expansion activities will be done within the school premises.  
• Resettlement and/or land acquisition problems are not anticipated in the school upgradation/ construction activities. | DSC/PMU | PMC/PMU | Monthly monitoring |
| 4.    | Clearing of trees/Removal of vegetation | Loss of trees and vegetation  
Soil erosion and surface runoff | All reasonable measures shall be undertaken to ensure that no native fauna is harmed or placed at risk during the course of the clearing activities  
As per the proposed design, felling of trees is not envisaged at any stage of the project. However under unavoidable conditions if any of the trees are required to be cut/ felled, then prior permission as per existing procedure from Forest/ADCs, ensuring appropriate compensation including compensatory plantation as stipulated by the forest department/ADC shall be undertaken.  
• Avoid earthworks/breaking of land during monsoon season. | Forest Department/ ADC PMU | PMU | Fortnightly/ Monthly monitoring |
<p>| 5.    | Drainage management | Drainage congestion due to | As per the topography of the project site, it is located on a flat land (1781m) and slopes towards southeast direction, accordingly | Contractor / DSC | DSC/ PMC | Weekly/ Monthly monitoring |</p>
<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Project Activity</th>
<th>Potential Impact</th>
<th>Mitigation Measures</th>
<th>Responsible for Implementation</th>
<th>Responsible for Supervision</th>
<th>Frequency of monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>garbage/waste dumping</td>
<td>• Water logging. • Vector proliferation</td>
<td>appropriate sediment control measures will be designed and implemented prior to commencing of construction. • Design adequate drainage passage by following natural path. • Ancillary structures and work compounds shall be located at least 20 meters away from any built or natural drainage lines, springs/rivulets/water bodies. • Fill ditches/water logging in school premises. • Discharge drainage flow with proper downstream protection. • Silt Trap (20m) shall be provided to prevent sediment runoff from the construction zone from entering and adversely affecting the natural drainages or areas of native vegetation downstream from the construction zone. • Regular cleaning of drains within the school premises and construction site including discharge points to storm water/main drains.</td>
<td>Contractor</td>
<td>DSC/ PMC</td>
<td>Weekly basis during the monsoon season and monthly monitoring during non monsoon season</td>
</tr>
</tbody>
</table>

**Construction Phase**

6. Slope stability  
- Landslide or gully erosion on slopes that may threaten school infrastructure.  
- Planning and designing the refurbishment/upgrading of schools.  
- Keeping in mind the fragile natural environment and site specific geological conditions.  
- Avoid or maintain adequate distance from erosion prone areas.  
- Adopt right angle of cut on slopes.  
- Stabilize slopes by engineering and bioengineering measures.  
- Measures taken to avoid undercutting of hill toes that may cause slides.  
- Contractor  
- DSC/ PMC  
- Weekly basis during the monsoon season and monthly monitoring during non monsoon season
<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Project Activity</th>
<th>Potential Impact</th>
<th>Mitigation Measures</th>
<th>Responsible for Implementation</th>
<th>Responsible for Supervision</th>
<th>Frequency of monitoring</th>
</tr>
</thead>
</table>
| 7.    | Erosion and sediment   | Loss of soil, water pollution             | • Do not exert excess load on slopes by disposing spoil.  
• Temporary erosion and sediment controls like having vegetation, surface covering etc., shall be installed prior to the commencement of any works with the potential to cause soil erosion, including stockpiling of construction materials.  
• Erosion and sediment controls shall be monitored on a weekly basis and immediately following rainfall, inspection results shall be recorded as part of site quality management system.  
• Wherever possible during the course of the works, exposed soil areas shall be progressively stabilized or protected by an appropriate method to minimize erosion potential.  
• A Minimum of 4 cubic feet of topsoil in the construction area shall be stripped and stockpiled later for re-spreading on all exposed areas when final shaping has been completed.  
• Fill material shall not be placed around or pushed up against the base of the trees and shrubs that needs to be retained within the construction site.  
• All fill shall be sufficiently compacted to minimize erosion potential.  
• All exposed soil areas shall be stabilized and re-vegetated as soon as possible on completion of works to prevent potential erosion.  
• Contractor | DSC/ PMC | Weekly basis during the monsoon season and monthly monitoring during non monsoon season |
<p>| 8.    | Spoil Management       | Drainage blockage                         | • Minimize spoil disposal by balancing cut and fill wherever possible                                                                                                                                            | Contractor | DSC/ PMC | Daily inspection by contractor |</p>
<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Project Activity</th>
<th>Potential Impact</th>
<th>Mitigation Measures</th>
<th>Responsible for Implementation</th>
<th>Responsible for Supervision</th>
<th>Frequency of monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>causing localized ponding and/or slush/muddy runoff. • Spoil tipped over slope may cause slide</td>
<td>• Manage spoil to reclaim land with proper landscaping and vegetation • Do not dispose spoil on drainage path • A Comprehensive Disposal Plan of construction waste/debris; solid waste etc. • Spoil management plan to be developed and implemented by the contractor. • Awareness session on handling and storage of materials and waste management to be conducted at site for the construction workers</td>
<td>Contractor</td>
<td>DSC/ PMC</td>
<td>Weekly visual inspection by DSC • Random inspection by PMC &amp; PMU</td>
</tr>
<tr>
<td>9.</td>
<td>Water Pollution</td>
<td>Impact on existing water resources • Contamination of ground water and other water bodies. • Impact on school drinking water sources.</td>
<td>• Domestic effluent/Sewage shall be discharged into septic tanks with soak pits/bio-toilets. • Total prohibition on direct discharge of sewage/sullage/solid waste into drains, open spaces, water bodies to ensure downstream/adjoining settlement are not affected at any through water borne diseases. • Assess capacity and structural integrity of existing septic tanks in all schools where the project provides new class rooms / toilets; take appropriate measures for augmentation of septic tank as per additional sewage generation.</td>
<td>Contractor</td>
<td>DSC/ PMC</td>
<td>Monthly Monitoring</td>
</tr>
<tr>
<td>10</td>
<td>Transportation and storage of construction materials • Nuisance to the general public • Fugitive emissions</td>
<td>• The vehicles carrying the materials should be covered and secured to prevent loss or re-suspension of materials during travel. • Construction materials should be stored in covered areas to ensure protection of surrounding areas from dust and emissions • Diesel and other lubricant oil shall be stored in a covered area with hard surface/paved surface provided with spill trays to prevent soil pollution.</td>
<td>Contractor</td>
<td>DSC/ PMC</td>
<td>Daily / weekly inspection during construction</td>
<td></td>
</tr>
<tr>
<td>Sl. No</td>
<td>Project Activity</td>
<td>Potential Impact</td>
<td>Mitigation Measures</td>
<td>Responsible for Implementation</td>
<td>Responsible for Supervision</td>
<td>Frequency of monitoring</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>-----------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 11     | Stone crushing              | Dust and noise pollution                                                         | • Any transportation of materials on local roads shall be done during day light hours.  
• All vehicle movements or other construction activities shall be restricted to the delineated construction zone, the existing road network or previously disturbed areas.  
• Construction vehicles, personnel and machinery shall not enter fenced off areas or areas beyond the delineated construction zone  
• Appropriate signage should be given to the designated areas (storage/restriction of entries/toilets/laboratory etc.,) in the construction area/workers camp. | Contractor                     | DSC/ PMC                      | During the procurement of construction materials                                      |
| 12     | Air and noise pollution and fugitive emissions | Dust nuisance to children from construction works  
• Dust and noise generated by vehicles passing by schools  
• Loud noise during construction | • Locate crusher plant, if any, away from settlement, school, and forest areas.  
• Enclose and use water sprinklers to arrest dust.  
• Buy required material from authorized operating plants/quarries.  
• Wherever feasible, dust generating type of work shall be done during off-school time  
• Construction work shall be limited to day light hours.  
• The contractor shall provide HDPE construction impermeable scaffold safety net (1716 m) at site to control dust pollution.  
• Labourers’ use of masks and safety gears.  
• Water sprinkling on dust prone work areas.  
• Vehicles transporting construction materials to site must be covered to prevent dust pollution.  
• Cover fine grain construction materials with tarpaulin or sheets. | Contractor                     | DSC/ PMC                      | Daily inspection by contractor  
• Weekly visual inspection by DSC  
• Random inspection by PMC & PMU |


<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Project Activity</th>
<th>Potential Impact</th>
<th>Mitigation Measures</th>
<th>Responsible for Implementation</th>
<th>Responsible for Supervision</th>
<th>Frequency of monitoring</th>
</tr>
</thead>
</table>
| 13     | Water Quality    | Construction waste water impact         | • The required water will be sourced from the PWD/ PHED. In absence of the water supply, the contractor shall obtain necessary clearance from the competent authority for utilising surface/groundwater.  
• Construction waste and debris under no circumstances be dumped/discharged/released into surrounding water bodies. | Contractor                    | DSC/ PMC                   | Biannual/02 season        |
| 14     | Wildlife/Fauna   | Threat to wild animals/ fauna            | • Construction workers will protect natural resources & wild animals (including avifauna).  
• Hunting will be prohibited                                                      | Contractor                    | DSC/ PMC                   | Quarterly                |
<p>| 15     | Employment opportunity | Local people employed in project activities | • Contractors are encouraged to use local labour, wherever possible.                                                                                                                                                    | Contractor                    | DSC/ PMC                   | Monthly                 |</p>
<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Project Activity</th>
<th>Potential Impact</th>
<th>Mitigation Measures</th>
<th>Responsible for Implementation</th>
<th>Responsible for Supervision</th>
<th>Frequency of monitoring</th>
</tr>
</thead>
</table>
| 16    | Waste management and minimization | • Impacts on land, water and visual impacts showing poor housekeeping practices.  | • Recycled materials shall be used to the limits of design.  
• Any construction waste generated from the construction site shall be contained within the boundary of the site and removed at regular intervals to an appropriate, authorized waste disposal or recycling facility.  
• The Municipal Solid Waste (MSW) generated in the construction and labour camp shall be separated as organic and inorganic wastes.  
• The worksite shall be left in a tidy and rubbish free state upon completion of the works  
• There should be no burning of waste.  
• Segregation of waste at source be adopted.  
• Composting shall be practised for organic waste. The compost shall be used to raise plants/ landscaping within the school premises. | Contractor                       | DSC/ PMC                       | Daily / weekly inspection                                           |
| 17    | Occupational Health and Safety    | • Lack of safety tools  
• Lack of safe construction practices.  
• Accidents occurring on site  
• Site and task specific hazards  
• Lack of minimum required facilities of space, ventilation, | • Highest priority to safe construction practices  
• Provide safety gears to workers working in hazardous areas and provide training in the use of these safety gears  
• Keep first aid box ready at work areas and camps  
• Provide adequate space with ventilation, clean toilet/ bio toilet (1 no), solid waste management, light and safe drinking water in camps.  
• Provide mosquito nets at labour camps  
• Separate covered / walled toilet rooms (including bathing platforms) shall be provided for male and female labourers  
• Keep camp and work area clean and without water logging | Contractor                       | DSC/ PMC                       | Monthly/At random inspection                                       |
<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Project Activity</th>
<th>Potential Impact</th>
<th>Mitigation Measures</th>
<th>Responsible for Implementation</th>
<th>Responsible for Supervision</th>
<th>Frequency of monitoring</th>
</tr>
</thead>
</table>
| 18    | Community, health and safety. | • Security and safety of the school children, teachers and staff and community members.  
• Vector disease | • Wire Mesh Barricading / Fencing (210 m) will be provided for the construction and labour camps sites to fully separate construction activities from school yards and buildings to prevent injuries and health hazards particularly to school children  
• Fire fighting equipment like fire extinguishers will be provided in the construction site as per fire safety standards. | Contractor | DSC/ PMC | Monthly/At random inspection |
| 19    | Use of wood as construction materials | • Deforestation | • Minimize use of wood for construction  
• Use local materials as much as possible  
• Innovations shall be integrated within the design to make schools more environment-friendly for students. | Contractor | DSC/ PMC | Weekly inspection |
| 20    | Cooking and heating with firewood by construction workers. | • Deforestation | • Contractor shall supply kerosene or LPG at camps and restrict cooking and heating using firewood. | Contractor | DSC/ PMC | Daily / weekly inspection |
| 21    | Influx of migrant workers | • Health and safety risks  
• Chances of spread of sexually transmittable | • Local labourer’s to be given preference for job opportunities and each contractor should be bound by this commitment  
• Ensure labour-related regulations are met  
• In case of hiring outside labour, ensure that their working conditions as well as camps | Contractor | DSC/ PMC | Weekly inspection |
<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Project Activity</th>
<th>Potential Impact</th>
<th>Mitigation Measures</th>
<th>Responsible for Implementation</th>
<th>Responsible for Supervision</th>
<th>Frequency of monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>diseases like AIDS • Water pollution</td>
<td>meet local regulations and the best practices of the industry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Maintenance of the school infrastructure facilities</td>
<td>• Damages to school property due to inadequate maintenance.</td>
<td>• Maintenance activities that needs to be carried out by SMC as and when required.</td>
<td>• Contractor (during DLP). • PMU (SMC) (after contractor DLP)</td>
<td>• DSC/ PMC (during contractor DLP) • PMU (after DLP)</td>
<td>Monthly Inspection</td>
</tr>
<tr>
<td>23</td>
<td>Health and hygiene</td>
<td>• Un-hygienic drinking water leading to health issues • Lack of sufficient quantity of water for drinking and sanitation</td>
<td>• Drinking water quality to be tested at least twice a year. • The students to be made aware on the importance of conservation of water. • The sanitary facilities to be cleaned on a regular basis. Sufficient water storage facilities from both piped and rain water sources.</td>
<td>• Contractor (during DLP). • PMU (SMC) (after contractor DLP)</td>
<td>• DSC/ PMC (during contractor DLP) • PMU (after DLP)</td>
<td>Monthly Inspection</td>
</tr>
</tbody>
</table>
Table 5: Site Specific EMP for the Sub-Project

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Project Activity</th>
<th>Mitigation Measures</th>
<th>Responsible for Implementation</th>
<th>Responsible for Supervision</th>
<th>Frequency of monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A. Pre Construction Stage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Environmental Monitoring</td>
<td>• <strong>Water Quality Monitoring</strong> - Near site, one each for ground water and surface water (Minimum two samples at each sub-project/ site).</td>
<td>PMC</td>
<td>PMC</td>
<td>Once</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>Air Quality Monitoring</strong> - Twice a week @ 2 locations (upwind and downwind) at each sub-project/ site</td>
<td>PMC</td>
<td>PMC</td>
<td>Once</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>Noise Monitoring</strong> - Once before construction stage at sub-project/ site.</td>
<td>PMC</td>
<td>PMC</td>
<td>Once</td>
</tr>
<tr>
<td>2.</td>
<td>Drainage Management</td>
<td>• <strong>Silt Trap (20m)</strong> shall be provided to prevent sediment runoff from the construction zone from entering and adversely affecting the natural drainages or areas of native vegetation downstream from the construction zone.</td>
<td>Contractor / DSC</td>
<td>DSC/ PMC</td>
<td>Weekly/ Monthly monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Construction Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Dust Control Measures</td>
<td>• The contractor shall provide HDPE construction impermeable scaffold safety net (1716 m) at site to control dust pollution.</td>
<td>Contractor</td>
<td>DSC/ PMC</td>
<td>Daily inspection by contractor Weekly visual inspection by DSC Random inspection by PMC &amp; PMU</td>
</tr>
<tr>
<td>4.</td>
<td>Labour Camp</td>
<td>• Provide anaerobic bio toilet (one) in labour camp</td>
<td>Contractor</td>
<td>DSC/ PMC</td>
<td>Monthly/At random inspection</td>
</tr>
<tr>
<td>5.</td>
<td>Safety Measures</td>
<td>• <strong>Wire Mesh Barricading / Fencing (210 m)</strong> will be provided for the construction and labour camps sites to fully separate construction activities from school yards and buildings to prevent injuries and health hazards particularly to school children</td>
<td>Contractor</td>
<td>DSC/ PMC</td>
<td>Monthly/At random inspection</td>
</tr>
<tr>
<td>Sl. No</td>
<td>Project Activity</td>
<td>Mitigation Measures</td>
<td>Responsible for Implementation</td>
<td>Responsible for Supervision</td>
<td>Frequency of monitoring</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>----------------------------</td>
<td>------------------------</td>
</tr>
</tbody>
</table>
| 6.     | Environmental Monitoring  | **Water Quality Monitoring** - Near site, one each for ground water and surface water (Minimum two samples at each sub-project/ site).  
**Air Quality Monitoring** - Twice a week @ 2 locations (upwind and downwind) at sub-project/ site  
**Noise Monitoring** - Once after construction stage at sub-project/ site. | PMC                           | PMC                        | Once in a year            |
|        |                           | **PM C**                                                                            |                               |                            |                        |
| C.     | **Operational Phase**    |                                                                                     |                               |                            |                        |
| 7.     | Tree Plantation           | Supplying of **10 numbers** of locally available saplings of ornamental/fruit/broad leaf/conifer species according to site as per understanding with School Management Committee (SMC) and necessary planting and maintenance by SMC. | SMC                           | DSC/PMC/PMU               | Monthly                |
| 8.     | Environmental Monitoring  | **Water Quality Monitoring** - Near site, one each for ground water and surface water (Minimum two samples at each sub-project/ site).  
**Air Quality Monitoring** - Twice a week @ 2 locations (upwind and downwind) at sub-project/ site  
**Noise Monitoring** - Once after construction stage at sub-project/ site. | PMC                           | PMC                        | Once                   |
|        |                           | **PM C**                                                                            |                               |                            |                        |
IV. INSTITUTIONAL ARRANGEMENT

46. As per Environmental Assessment and Review Framework (EARF), Table 6 provides details about the implementation arrangements focusing on the environmental safeguards.

47. Based on consultations with the RMSA project directorate in Shillong, Meghalaya, it was found that there is no existing institutional setup, position, or assigned personnel in DOE for monitoring environmental safeguards issues. The Public Works Department (PWD), Government of Meghalaya (GOM), is mainly responsible for planning, designing, and implementing civil works projects in the state. The PWD engineers are generally assigned additional environmental tasks in addition to their technical responsibilities. In view of this situation, the following measures will be taken:

(i) The project director to be nominated by GOM will be designated as the focal point for all environment and social safeguard issues.
(ii) The project director will be assisted in his/her work by the two environment specialists who will be engaged under the loan as part of the project management consultants (PMCs) and the design and supervision consultants (DSCs).
(iii) The environmental specialists will undertake initial environmental examination (IEE) of selected schools and TTCs in line with the EARF. They will prepare an environmental management plan (EMP) for each site and ensure that the principles and processes laid down in the EARF are followed.
(iv) The environment specialists will work with DOE and PWD staff that is designated to project implementation unit 1 (PIU1) to ensure that all refurbishment works comply with the environmental legislation and policies of the government and ADB.
(v) They will also facilitate capacity development activities for DOE and PWD staff in Shillong (capital of Meghalaya) as well as in each district headquarter. They will prepare the required manuals and procedures, and guide DOE and PWD on how best to institutionalize the function of environmental safeguards.
(vi) The environmental specialists will prepare semi-annual monitoring reports and submit these to GOM and ADB. They will guide the project director and PIU1 in terms of handling grievances pertaining to environmental safeguards.

<table>
<thead>
<tr>
<th>Table 6: Mechanism for Implementation of EMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sl. No</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>1.1</td>
</tr>
<tr>
<td>1.2</td>
</tr>
<tr>
<td>1.3</td>
</tr>
<tr>
<td>1.4</td>
</tr>
<tr>
<td>1.5</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Sl. No</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

3. **Monitoring and Auditing**

| Compliance Audit during annually implementation | PMC/DSC/SMC | Visits to random sites. Verify overall compliance. |

4. **Annual Reporting & Feedback**

| Interactions/workshops reports | PIU1 | PMC will conduct an annual interaction with various DPCUs to encourage replication of best practices. |

**V. ENVIRONMENT MONITORING PLAN**

48. Through integration of mitigation measures in project design, impacts are mostly insignificant, temporary in nature and can be properly avoided or mitigated by following proposed mitigation measures given in the EMP (Table 4) of this IEE report.

A. **Summary of Site and Activity-Specific Plans**

49. The following Table 7 summarizes site and activity-specific plans with responsibilities to be adopted

**Table 7: Site and Activity Specific Plans/Programs as per EMP**
<table>
<thead>
<tr>
<th>To be Prepared During</th>
<th>Specific Plan/Program</th>
<th>Purpose</th>
<th>Responsible for Preparation</th>
<th>Responsible for Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed Design Phase</td>
<td>Erosion control and re-vegetation plan</td>
<td>Mitigate impacts due to erosion</td>
<td>DSC/PMC</td>
<td>Contractor</td>
</tr>
<tr>
<td>Detailed Design Phase</td>
<td>List of utilities and corresponding maps showing utilities to be shifted</td>
<td>Utilities shifting</td>
<td>DSC/PMU (SMC) during preliminary stage Contractor as per detailed design</td>
<td>Contractor</td>
</tr>
<tr>
<td>Detailed Design Phase</td>
<td>Contingency plan</td>
<td>Mitigate impacts due to interruption of services during utilities shifting</td>
<td>Contractor</td>
<td>Contractor</td>
</tr>
<tr>
<td>Detailed Design Phase</td>
<td>Chance find protocol</td>
<td>Address archaeological or historical finds</td>
<td>DSC/PMC</td>
<td>Contractor</td>
</tr>
<tr>
<td>Detailed Design Phase</td>
<td>List of pre-approved sites</td>
<td>Location’s for work camps, areas for stockpile, storage and disposal</td>
<td>DSC/PMC</td>
<td>Contractor</td>
</tr>
<tr>
<td>Detailed Design Phase</td>
<td>Waste Management Plan</td>
<td>Mitigate impacts due to waste generation</td>
<td>Contractor</td>
<td>Contractor</td>
</tr>
<tr>
<td>Detailed Design Phase</td>
<td>Health and Safety plan</td>
<td>Occupational health and safety</td>
<td>Contractor</td>
<td>Contractor</td>
</tr>
<tr>
<td>Detailed Design Phase</td>
<td>Traffic Management Plan</td>
<td>Mitigate impacts due to transport of materials and pipe laying works</td>
<td>Contractor</td>
<td>Contractor</td>
</tr>
</tbody>
</table>

B. Environmental Monitoring Program

50. The environmental monitoring plan forms the basis for verifying the extent of compliance during the implementation stages of the project. Implementation of mitigation measures will be ensured through both routine and periodic monitoring (refer Annexure – 4 for environmental monitoring format). Monitoring activities for project during the construction and operation phases are given in the following Table 8.

Table 8: Environmental Monitoring Program

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Indicators of Monitoring</th>
<th>Types of Monitoring/Method of Monitoring</th>
<th>Monitoring Frequency</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Construction Stage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Drinking Water Quality-Ground and Surface</td>
<td>Grab sampling method shall be adopted and analysis shall be done as per Standard Methods for Examination of Water and Wastewater</td>
<td>Once</td>
<td>PMC</td>
</tr>
<tr>
<td>2.</td>
<td>Air Quality Monitoring</td>
<td>High volume air sampler to be located 50m from the project site in the downwind direction. Use method specified by CPCB for analysis</td>
<td>Once</td>
<td>PMC</td>
</tr>
<tr>
<td>Sl. No</td>
<td>Indicators of Monitoring</td>
<td>Types of Monitoring/ Method of Monitoring</td>
<td>Monitoring Frequency</td>
<td>Responsibility</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------</td>
<td>----------------------------------------</td>
<td>---------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>3.</td>
<td>Noise Monitoring</td>
<td>The equivalent noise levels shall be measured using an integrated noise level meter kept at a distance of 15m from edge of project site.</td>
<td>Once</td>
<td>PMC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Construction Stage**

| 1.     | Drinking Water Quality- Ground and Surface | Grab sampling method shall be adopted and analysis shall be done as per Standard Methods for Examination of Water and Wastewater | Once in a year | PMC |
|        |                                              |                                        |                     |               |
| 2.     | Air Quality Monitoring | High volume air sampler to be located 50m from the project site in the downwind direction. Use method specified by CPCB for analysis | Once in a year | PMC |
| 3.     | Noise Monitoring          | The equivalent noise levels shall be measured using an integrated noise level meter kept at a distance of 15m from edge of project site. | Once in a year | PMC |
|        |                          |                                        |                     |               |
| 4.     | Transportation of construction material in covered condition, and safe loading & unloading of construction materials | Visual observation | Daily/ weekly during construction | Contractor/ DSC |
| 5.     | Stockpiling of excavated materials | Visual observation | Daily/ weekly | Contractor/ DSC |
| 6.     | Reuse of excavated materials | Visual observation | Daily/ weekly | Contractor/ DSC |
| 7.     | Solid waste segregation disposal | Visual observation | Daily/ weekly | Contractor/ DSC |
| 8.     | Clearing of trees | Visual observation | Regular during construction | Contractor/ DSC |
| 9.     | Occupational health and safety, use of safety gears | Visual observation | Once a month | Contractor/ DSC |
| 10.    | Safety to students | Record of injury | Once a week | Contractor/ DSC |
| 11.    | Water logging and vector proliferation | Direct observation | Once a week | Contractor/ DSC |

**Operation Stage**

| 12.    | Preparation of monitoring reports | Preparation of monitoring reports | Monthly | PMU (SMC) |
| 13.    | Drinking water quality Ground and Surface | Grab sampling method shall be adopted and analysis shall be done as per Standard Methods for Examination of Water and Wastewater | Once | PMC |
### Sl. No | Indicators of Monitoring | Types of Monitoring/ Method of Monitoring | Monitoring Frequency | Responsibility
--- | --- | --- | --- | ---
14. | Air Quality Monitoring | High volume air sampler to be located 50m from the project site in the downwind direction. Use method specified by CPCB for analysis | Once | PMC
15. | Noise Monitoring | The equivalent noise levels shall be measured using an integrated noise level meter kept at a distance of 15m from edge of project site. | Once | PMC
16. | Solid waste management system | Records of waste collected and managed | Bi-annual | PMU (SMC)
17. | Number of orientation and training | Number of orientation and trainings conducted | Regular | PMU (SMC)
18. | Impact Audit | Compliance with EARF | Annual | PMU (SMC) through third party audit

**EARF = Environmental Assessment and Review framework, DSC= Design Supervision Consultant, PMC = Project Management Consultant, SMC = School Management Committee**

51. The Department of Education (DOE) will carry out annual review to assess how effectively the environmental safeguard requirements have been followed

### VI. PUBLIC CONSULTATION AND DISCLOSURE MECHANISM

52. Consultation and information disclosure will be a continuous process during the preparation of the environmental assessment document and implementation of the environmental monitoring plan. The environment assessment will ensure to conduct meaningful consultation with affected people and concerned stakeholders (refer Annexure - 6), including civil society and facilitate their informed participation. The meaningful consultation shall begin early in the project component preparation stage and carried out in an ongoing basis throughout the project cycle, timely disclosure of IEE reports in understandable format and language by the local stakeholders. Consultation is organized in congenial environment without intimidation, and is gender sensitive.

### VII. GRIEVANCE REDRESS MECHANISM

53. The main objective of the Grievance Redressal Mechanism is to provide a time bound and transparent mechanism to voice and resolve complaints of the people in the project area. The environment consultants engaged through the Project Management Consultant (PMC) and Design and Supervision Consultant (DSC) will be responsible for handling grievances. They will

- Record the complaints, categorize and prioritize them (refer Annexure – 7 for grievance form);
- Consult with all relevant stakeholders (including contractors), visit the project site, and do the required examination;
- Settle the grievances in consultation with the complainant and the project staff;
- Report to the aggrieved parties about the decision/solution; and
- Forward the unresolved cases to higher authorities for resolution.

54. In case of complex complaints, the environmental consultants will inform the Project Director (PD) and guide him about practical options for resolving the grievances.

55. Grievances will be redressed within two to four weeks from the date of lodging the complaints. If resolution attempted at the SMC level fails, the SMC will refer the complaints to the District
Project Coordination Unit (DPCU) along with the minutes of the hearing. If a decision made at this level is found unacceptable by the aggrieved person(s), DPCU can refer the case to Department of Education (DoE) with the minutes of the hearings at both school and district levels. The SMC/DPCU will keep records of all resolved and unresolved complaints and grievances and make them available for review as and when asked for by DoE and ADB Resident Mission in Delhi. Information about GRC will be made public through non-governmental organizations.

VIII. ENVIRONMENTAL BUDGET

56. As part of good engineering practices in the project, there have been several measures as safety, signage, dust suppression, procurement of personal protective equipment, provision of drains, etc. and the costs for which will be included in the design costs of specific subprojects. Therefore, these items of costs have not been included in the IEE budget. Only those items that are not covered under budget for construction are considered in the IEE budget.

57. This is a small construction project and it is not expected to cause much significant air, water and noise pollution. However, as per the environmental monitoring plan routine environmental quality monitoring shall be conducted by the PMC/Contractor. The costs of water sprinkling for dust suppression and providing personal protective equipment’s to construction workers shall be borne by contractor as part of conditions of contract. The indicative EMP cost is given in the Table 9

<table>
<thead>
<tr>
<th>Table 9: Indicative EMP Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S.NO</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>S.NO</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>(i)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>(ii)</td>
</tr>
<tr>
<td>S.NO</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>(iii)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Add</td>
</tr>
</tbody>
</table>

### IX. CONCLUSION AND RECOMMENDATION

The IEE carried out for the Smit Higher Secondary School up gradation project shows that the proposed interventions will result in net environmental benefits to the school and that any moderate environmental impact (drainage congestion/water logging, dust and noise pollution, occupational health hazards, risk from poor sanitation system, improper lighting and ventilation system in school, and management of labour at the site) anticipated during the project construction and operation shall be addressed through proper location, planning and design; control of construction activity and mitigation measures as suggested in the EMP. Appropriate barricading measures has been suggested for all the schools to prevent the students and staff entering the construction site.

58. The EMP provides mitigation for all identified impacts and the Contract clauses (annexure -8) for the environmental provisions will be part of the civil works contract. Further, the proposed designs have been consulted with the stakeholders and no significant issues requiring redress in terms of environmental safeguards are known to exist at present.

59. Based on the findings of the IEE, it is evident that there are no significant impacts associated with the project activity. As per the ADB safeguard requirement, this project shall be categorised as Category “B”. No further special study or detailed Environmental Impact Assessment (EIA) needs to be undertaken to comply with ADB SPS (2009).
**Annexure – 1**

**Rapid Environmental Assessment (REA) Checklist**

Instructions:
(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.
(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.
(iii) 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.

<table>
<thead>
<tr>
<th>Country/Project Title:</th>
<th>IND: 46166-001: Supporting Human Capital Development in Meghalaya – Smit Higher Secondary School, Mawryngkneng block, East Khasi Hills District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector Division:</td>
<td>Human and Social Development Division, SARD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Screening Questions</th>
<th>Yes</th>
<th>No</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Project Siting</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the project area adjacent to or within any of the following areas:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Underground utilities</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Cultural heritage site</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Protected Area</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Wetland</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Mangrove</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Estuarine</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Buffer zone of protected area</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Special area for protecting biodiversity</td>
<td>✓</td>
<td></td>
<td>Smit Higher Secondary School is located in Mawryngkneng block of East Khasi Hills District. The school in its vicinity does not have any protected/ ecological resources</td>
</tr>
<tr>
<td>▪ Bay</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B. Potential Environmental Impacts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will the Project cause...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Encroachment on historical/cultural areas?</td>
<td>✓</td>
<td></td>
<td>The proposed project interventions include construction of a new G+1 RCC building and retrofitting works that is proposed to be carried out for the existing Smit Higher Secondary School which undergoes up gradation.</td>
</tr>
<tr>
<td>▪ Encroachment on precious ecology (e.g. sensitive or protected areas)?</td>
<td>✓</td>
<td></td>
<td>There are no protected area in the vicinity of the project area</td>
</tr>
<tr>
<td>▪ Impacts on the sustainability of associated sanitation and solid waste disposal systems?</td>
<td>✓</td>
<td></td>
<td>Does not arise</td>
</tr>
<tr>
<td>▪ Dislocation or involuntary resettlement of people?</td>
<td>✓</td>
<td></td>
<td>Land belongs to the school authority, hence involuntary resettlement are not envisaged</td>
</tr>
<tr>
<td>▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?</td>
<td>✓</td>
<td></td>
<td>Does not arise</td>
</tr>
<tr>
<td>▪ Accident risks associated with increased vehicular traffic, leading to loss of life?</td>
<td>✓</td>
<td></td>
<td>Does not arise</td>
</tr>
<tr>
<td>Screening Questions</td>
<td>Yes</td>
<td>No</td>
<td>Remarks</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>▪ Increased noise and air pollution resulting from increased traffic volume?</td>
<td>✓</td>
<td></td>
<td>Does not arise</td>
</tr>
<tr>
<td>▪ Occupational and community health and safety risks?</td>
<td>✓</td>
<td></td>
<td>During the project construction safety risk may arise. However, by adopting the proposed EMP, it shall be mitigated</td>
</tr>
<tr>
<td>▪ Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?</td>
<td>✓</td>
<td></td>
<td>Does not arise</td>
</tr>
<tr>
<td>▪ Generation of dust in sensitive areas during construction?</td>
<td>✓</td>
<td></td>
<td>There are no sensitive areas in the vicinity of the sub project area.</td>
</tr>
<tr>
<td>▪ Requirements for disposal of fill, excavation, and/or spoil materials?</td>
<td>✓</td>
<td>✓</td>
<td>The proposed project interventions include construction of a new G+1 RCC building and retrofitting works for the existing school. Hence minimal disposal of spoil materials are anticipated.</td>
</tr>
<tr>
<td>▪ Noise and vibration due to blasting and other civil works?</td>
<td>✓</td>
<td></td>
<td>Does not arise</td>
</tr>
<tr>
<td>▪ Long-term impacts on groundwater flows as result of needing to drain the project site prior to construction?</td>
<td>✓</td>
<td></td>
<td>Does not arise</td>
</tr>
<tr>
<td>▪ Long-term impacts on local hydrology as a result of building hard surfaces in or near the building?</td>
<td>✓</td>
<td></td>
<td>Does not arise</td>
</tr>
<tr>
<td>▪ Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?</td>
<td>✓</td>
<td>✓</td>
<td>The proposed project interventions include construction of a new G+1 RCC building and retrofitting works; hence very minimal labourers will be employed during the project construction and it won’t have any impact on the existing social infrastructure and services</td>
</tr>
<tr>
<td>▪ Social conflicts if workers from other regions or countries are hired?</td>
<td>✓</td>
<td></td>
<td>The proposed construction of a new G+1 RCC building and retrofitting works will require very minimal labourers and hence local labourers shall be employed to the extent.</td>
</tr>
<tr>
<td>▪ Risks to community safety caused by fire, electric shock, or failure of the buildings safety features during operation?</td>
<td>✓</td>
<td></td>
<td>Does not arise</td>
</tr>
<tr>
<td>▪ Risks to community health and safety caused by management and disposal of waste?</td>
<td>✓</td>
<td></td>
<td>Does not arise</td>
</tr>
<tr>
<td>▪ Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?</td>
<td>✓</td>
<td></td>
<td>Does not arise</td>
</tr>
</tbody>
</table>
A Checklist for Preliminary Climate Risk Screening

**Country/Project Title:** IND: Supporting Human Capital Development in Meghalaya – Smit Higher Secondary School, Mawryngkhen block, East Khasi Hills District

**Sector:** Education

**Sub sector:** Technical and Vocational Education and Training

**Division/Department:** Human and Social Development Division, SARD

<table>
<thead>
<tr>
<th>Screening Questions</th>
<th>Score</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location and Design of project</strong> Is sitting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?</td>
<td>0</td>
<td>The proposed project interventions include construction of a new G+1 RCC building and retrofitting works for the existing Smit Higher Secondary School. Hence there are no climatic impacts anticipated</td>
</tr>
<tr>
<td>Would the project design (e.g., the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?</td>
<td>0</td>
<td>Does not arise</td>
</tr>
<tr>
<td><strong>Materials and Maintenance</strong> Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity) hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?</td>
<td>0</td>
<td>The construction materials used for this project shall not have any impact on the climate change</td>
</tr>
<tr>
<td>Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?</td>
<td>0</td>
<td>Does not arise</td>
</tr>
<tr>
<td><strong>Performance of project outputs</strong> Would weather/climate conditions and related extreme events likely affect the performance (e.g., annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?</td>
<td>0</td>
<td>Does not arise</td>
</tr>
</tbody>
</table>

Options for answers and corresponding score are provided below:

<table>
<thead>
<tr>
<th>Response</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Likely</td>
<td>0</td>
</tr>
<tr>
<td>Likely</td>
<td>1</td>
</tr>
<tr>
<td>Very Likely</td>
<td>2</td>
</tr>
</tbody>
</table>

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high risk project.

**Result of Initial Screening:** (Low, Medium, High): **Low**

**Other Comments:** The proposed project interventions include construction of a new G+1 RCC building and retrofitting works for the existing school buildings at Smit Higher Secondary School (SHSS). The retrofitting works includes up gradation of the existing infrastructure (like building renovation works, repair works, provide wire mesh at column-wall and beam-wall joints to strengthen the buildings, provide GI sunshades over all the exterior windows wherever sunshades are missing.). The new building shall have provision for a girl’s activity room, toilet for girls and five classrooms. Hence the proposed construction activities do not have any impact on the climatic conditions.

**Prepared by:** The Department of Finance (DoF), Government of Meghalaya

---

3If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the sitting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.
## Annexure 1A: Environment Categorization

### Project Data

<table>
<thead>
<tr>
<th>Country/Project No./Project Title</th>
<th>IND: 46166-001: Supporting Human Capital Development in Meghalaya</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subproject title</strong></td>
<td>Smit Higher Secondary School, Mawryngkneng block, East Khasi Hills District</td>
</tr>
<tr>
<td><strong>Project Executing Agency</strong></td>
<td>Department of Finance (DoF), Government of Meghalaya</td>
</tr>
<tr>
<td><strong>Project Implementing Agency</strong></td>
<td>Public Works Department (Buildings), Government of Meghalaya</td>
</tr>
<tr>
<td><strong>Modality</strong></td>
<td>[ ] Project Loan [ ] Program Loan [ ] Sector Loan [ ] MFF [ ] Other financing modalities:</td>
</tr>
<tr>
<td><strong>ENV Impact categorization</strong></td>
<td>[ ] New [ ] Recategorization — Previous Category [ ]</td>
</tr>
</tbody>
</table>

### ENV Impact Categorization

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Significant ENV impact</td>
</tr>
<tr>
<td>B</td>
<td>Non-significant ENV impact</td>
</tr>
<tr>
<td>C</td>
<td>No ENV impact</td>
</tr>
</tbody>
</table>

Prepared by: the Department of Finance (DoF), Government of Meghalaya

**DSC Environment Specialist (Name, title, signature)**

Date: 27/06/17

**PWD Environment Specialist (Name, title, signature)**

Date:

**For Project Implementing Agency (Name, title, signature)**

Date:

**For Project Executing Agency (Name, title, signature)**

Date:
I. Environmental Safeguards

1. Objectives: To ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process.

2. Scope and Triggers: Environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts.

3. Policy Principles:
   - Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.
   - Conduct an environmental assessment for each proposed project to identify potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project’s area of influence. Assess potential trans-boundary and global impacts, including climate change. Use strategic environmental assessment where appropriate.
   - Examine alternatives to the project’s location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative.
   - Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an environmental management plan (EMP) that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators. Key considerations for EMP preparation include mitigation of potential adverse impacts to the level of no significant harm to third parties, and the polluter pays principle.
   - Carry out meaningful consultation with affected people and facilitate their informed participation. Ensure women’s participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment. Establish a grievance redress mechanism to receive and facilitate resolution of the affected people’s concerns and grievances regarding the project’s environmental performance.
   - Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders.
   - Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.
   - Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the
conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.

- Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group’s Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase outs. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.

- Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.

- Conserve physical cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of “chance find” procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.

II. Involuntary Resettlement Safeguards

4. **Objectives:** To avoid involuntary resettlement wherever possible; to minimize involuntary resettlement by exploring project and design alternatives; to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-project levels; and to improve the standards of living of the displaced poor and other vulnerable groups.

5. **Scope and Triggers:** The involuntary resettlement safeguards covers physical displacement (relocation, loss of residential land, or loss of shelter) and economic displacement (loss of land, assets, access to assets, income sources, or means of livelihoods) as a result of (i) involuntary acquisition of land, or (ii) involuntary restrictions on land use or on access to legally designated parks and protected areas. It covers them whether such losses and involuntary restrictions are full or partial, permanent or temporary.

6. **Policy Principles:**

- Screen the project early on to identify past, present, and future involuntary resettlement impacts and risks. Determine the scope of resettlement planning through a survey and/or census of displaced persons, including a gender analysis, specifically related to resettlement impacts and risks.

- Carry out meaningful consultations with affected persons, host communities, and concerned nongovernment organizations. Inform all displaced persons of their entitlements and resettlement options. Ensure their participation in planning, implementation, and monitoring and evaluation of resettlement programs. Pay particular attention to the needs of vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children, and Indigenous Peoples, and those without legal title to land, and ensure their participation in consultations. Establish a grievance redress mechanism to receive and facilitate resolution of the affected persons’ concerns. Support the social and cultural institutions of displaced persons and their host population. Where involuntary resettlement impacts and risks are highly complex and sensitive, compensation and resettlement decisions should be preceded by a social preparation phase.
• Improve, or at least restore, the livelihoods of all displaced persons through (i) land-based resettlement strategies when affected livelihoods are land based where possible or cash compensation at replacement value for land when the loss of land does not undermine livelihoods, (ii) prompt replacement of assets with access to assets of equal or higher value, (iii) prompt compensation at full replacement cost for assets that cannot be restored, and (iv) additional revenues and services through benefit sharing schemes where possible.

• Provide physically and economically displaced persons with needed assistance, including the following: (i) if there is relocation, secured tenure to relocation land, better housing at resettlement sites with comparable access to employment and production opportunities, integration of resettled persons economically and socially into their host communities, and extension of project benefits to host communities; (ii) transitional support and development assistance, such as land development, credit facilities, training, or employment opportunities; and (iii) civic infrastructure and community services, as required.

• Improve the standards of living of the displaced poor and other vulnerable groups, including women, to at least national minimum standards. In rural areas provide them with legal and affordable access to land and resources, and in urban areas provide them with appropriate income sources and legal and affordable access to adequate housing.

• Develop procedures in a transparent, consistent, and equitable manner if land acquisition is through negotiated settlement to ensure that those people who enter into negotiated settlements will maintain the same or better income and livelihood status.

• Ensure that displaced persons without titles to land or any recognizable legal rights to land are eligible for resettlement assistance and compensation for loss of nonland assets.

• Prepare a resettlement plan elaborating on displaced persons’ entitlements, the income and livelihood restoration strategy, institutional arrangements, monitoring and reporting framework, budget, and time-bound implementation schedule.

• Disclose a draft resettlement plan, including documentation of the consultation process in a timely manner, before project appraisal, in an accessible place and a form and language(s) understandable to affected persons and other stakeholders. Disclose the final resettlement plan and its updates to affected persons and other stakeholders.

• Conceive and execute involuntary resettlement as part of a development project or program. Include the full costs of resettlement in the presentation of project’s costs and benefits. For a project with significant involuntary resettlement impacts, consider implementing the involuntary resettlement component of the project as a stand-alone operation.

• Pay compensation and provide other resettlement entitlements before physical or economic displacement. Implement the resettlement plan under close supervision throughout project implementation.

• Monitor and assess resettlement outcomes, their impacts on the standards of living of displaced persons, and whether the objectives of the resettlement plan have been achieved by taking into account the baseline conditions and the results of resettlement monitoring. Disclose monitoring reports

III. Indigenous Peoples Safeguards

7. Objectives: To design and implement projects in a way that fosters full respect for Indigenous Peoples’ identity, dignity, human rights, livelihood systems, and cultural uniqueness as defined by the Indigenous Peoples themselves so that they (i) receive culturally appropriate social and economic benefits, (ii) do not suffer adverse impacts as a result of projects, and (iii) can participate actively in projects that affect them.

8. Scope and Triggers: The Indigenous Peoples safeguards are triggered if a project directly or indirectly affects the dignity, human rights, livelihood systems, or culture of Indigenous Peoples or affects the territories or natural or cultural resources that Indigenous Peoples own, use, occupy,
or claim as an ancestral domain or asset. The term Indigenous Peoples is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees: (i) self-identification as members of a distinct indigenous cultural group and recognition of this identity by others; (ii) collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories; (iii) customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and (iv) a distinct language, often different from the official language of the country or region. In considering these characteristics, national legislation, customary law, and any international conventions to which the country is a party will be taken into account. A group that has lost collective attachment to geographically distinct habitats.

9. Policy Principles:

- Screen early on to determine (i) whether Indigenous Peoples are present in, or have collective attachment to, the project area; and (ii) whether project impacts on Indigenous Peoples are likely.
- Undertake a culturally appropriate and gender-sensitive social impact assessment or use similar methods to assess potential project impacts, both positive and adverse, on Indigenous Peoples. Give full consideration to options the affected Indigenous Peoples prefer in relation to the provision of project benefits and the design of mitigation measures. Identify social and economic benefits for affected Indigenous Peoples that are culturally appropriate and gender and intergenerationally inclusive and develop measures to avoid, minimize, and/or mitigate adverse impacts on Indigenous Peoples.
- Undertake meaningful consultations with affected Indigenous Peoples communities and concerned Indigenous Peoples organizations to solicit their participation (i) in designing, implementing, and monitoring measures to avoid adverse impacts or, when avoidance is not possible, to minimize, mitigate, or compensate for such effects; and (ii) in tailoring project benefits for affected Indigenous Peoples communities in a culturally appropriate manner. To enhance Indigenous Peoples’ active participation, projects affecting them will provide for culturally appropriate and gender inclusive capacity development. Establish a culturally appropriate and gender inclusive grievance mechanism to receive and facilitate resolution of the Indigenous Peoples’ concerns.
- Ascertained the consent of affected Indigenous Peoples communities to the following project activities: (i) commercial development of the cultural resources and knowledge of Indigenous Peoples; (ii) physical displacement from traditional or customary lands; and (iii) commercial development of natural resources within customary lands under use that would impact the livelihoods or the cultural, ceremonial, or spiritual uses that define the identity and community of Indigenous Peoples. For the purposes of policy application, the consent of affected Indigenous Peoples communities refers to a collective expression by the affected Indigenous Peoples communities, through individuals and/or their recognized representatives, of broad community support for such project activities. Broad community support may exist even if some individuals or groups object to the project activities.
- Avoid, to the maximum extent possible, any restricted access to and physical displacement from protected areas and natural resources. Where avoidance is not possible, ensure that the affected Indigenous Peoples communities participate in the design, implementation, and monitoring and evaluation of management arrangements for such areas and natural resources and that their benefits are equitably shared.
- Prepare an Indigenous Peoples plan (IPP) that is based on the social impact assessment with the assistance of qualified and experienced experts and that draw on indigenous knowledge and participation by the affected Indigenous Peoples communities. The IPP includes a framework for continued consultation with the affected Indigenous Peoples communities during project implementation; specifies measures to ensure that Indigenous Peoples receive culturally appropriate benefits; identifies measures to avoid, minimize, mitigate, or compensate for any adverse project impacts; and includes culturally appropriate grievance procedures, monitoring and evaluation arrangements, and a budget and time-bound actions for implementing the planned measures.
- Disclose a draft IPP, including documentation of the consultation process and the results of the social impact assessment in a timely manner, before project appraisal, in an
accessible place and in a form and language(s) understandable to affected Indigenous Peoples communities and other stakeholders. The final IPP and its updates will also be disclosed to the affected Indigenous Peoples communities and other stakeholders.

- Prepare an action plan for legal recognition of customary rights to lands and territories or ancestral domains when the project involves (i) activities that are contingent on establishing legally recognized rights to lands and territories that Indigenous Peoples have traditionally owned or customarily used or occupied, or (ii) involuntary acquisition of such lands.

- Monitor implementation of the IPP using qualified and experienced experts; adopt a participatory monitoring approach, wherever possible; and assess whether the IPP’s objective and desired outcome have been achieved, taking into account the baseline conditions and the results of IPP monitoring. Disclose monitoring reports.
Indian Labour Law

1. Labour Law is the body of law that governs the employer-employee relationship, including individual employment contracts, the application of tort and contract doctrines, and a large group of statutory regulation on issues such as the right to organize and negotiate collective bargaining agreements, protection from discrimination, wages and hours, and health and safety.

2. The law relating to labour and employment in India is primarily known under the broad category of "Labour and Industrial Law". The relevance of the dignity of human labour and the need for protecting and safeguarding the interest of labour as human beings has been enshrined in Chapter-III (Articles 16, 19, 23 & 24) and Chapter IV (Articles 39, 41, 42, 43, 43A & 54) of the Constitution of India keeping in line with Fundamental Rights and Directive Principles of State Policy.

3. Factors responsible for shaping the Indian Labour legislation include:
   a. The prevailing social and economic conditions
   b. The views expressed by important nationalist leaders during the days of national freedom struggle
   c. The provisions of the Constitution
   d. The International Conventions and Recommendations.
   e. Important human rights and the conventions and standards that have emerged from the United Nations.
   h. Judicial pronouncements on labour related matters specifically pertaining to minimum wages bonded labour, child labour, contract labour etc.
Semi-Annual Environmental Monitoring Report Template

1.0 Introduction
- Overall project description and objectives
- Description of projects
- Environmental category of the projects
- Details of site personnel and/or consultants responsible for environmental monitoring
- Overall project progress and status

<table>
<thead>
<tr>
<th>Sl.</th>
<th>Project Name</th>
<th>Status of Project</th>
<th>List of Works</th>
<th>Progress of Works</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Design</td>
<td>Pre-Construction</td>
<td>Construction</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.0 Compliance Status with National/State/Local Statutory Environmental Requirements

<table>
<thead>
<tr>
<th>No.</th>
<th>Project Name</th>
<th>Statutory Environmental Requirements</th>
<th>Status of Compliance</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.0 Compliance Status with Environmental Loan Covenants

<table>
<thead>
<tr>
<th>No. (List schedule and paragraph number of Loan Agreement)</th>
<th>Covenant</th>
<th>Status of Compliance</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.0 Compliance Status with the Environmental Management and Monitoring Plan
- Provide the monitoring outcomes/ analysis as mentioned in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.
- There should be reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual Report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:
  - What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries;
  - If muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads;
  - Adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;
  - Are their designated areas for concrete works, and refuelling;
  - Are their spill kits on site and if there are site procedure for handling emergencies;
  - Is there any chemical stored on site and what is the storage condition?
  - Is there any dewatering activities if yes, where is the water being discharged;
  - How are the stockpiles being managed;
o How is solid and liquid waste being handled on site;
 o Review of the complaint management system;
 o Checking if there are any activities being undertaken out of working hours and how that is being managed.
## Monitoring Table Format

<table>
<thead>
<tr>
<th>Name of Subproject :</th>
<th>Location :</th>
<th>Date :</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name of Person Monitoring :</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Impacts (List from IEE)</strong></td>
<td><strong>Mitigation Measures (List from IEE)</strong></td>
<td><strong>Parameters Monitored (As a minimum those identified in the IEE should be monitored)</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Design Phase</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pre-Construction Phase</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Construction Phase</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operational Phase</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Public Consultations at Smit Higher Secondary School

1. During the project preparation, consultations have been held by the DSC safeguards team with the School Management Committee, Teachers and Public on suggestions and issues pertaining to the implementation of the proposed subprojects. The key issues highlighted during the discussion include the project detail.

2. The main outcomes of the Public Consultations are as under:
   a) They were aware about the project but detail information was not available with them.
   b) They were happy to know about proposed infrastructure and informed that it will help the students and teachers with improved infrastructure.
   c) They also envisaged increase in the enrolment and reduce dropout of students after the project.
   d) The following are the main outcome of the discussions:
      • The public was informed that the school infrastructure is proposed for improvement as per RMSA guidelines and proposed infrastructure improvement includes civil works, electrical and PHE.
      • It was also informed that condition assessment of the existing buildings will be carried out and decision on renovation, retrofitting and necessary rearrangement of rooms will be taken after structural and economical analysis.
      • The public was informed that the proposed project interventions include construction of a new G+1 RCC building and retrofitting works for the existing school buildings. The retrofitting works includes up gradation of the existing infrastructure (like building renovation works, repair works, provide wire mesh at column-wall and beam-wall joints to strengthen the buildings, provide GI sunshades over all the exterior windows wherever sunshades are missing) and the new building shall have provision for a girl’s activity room, toilet for girls and five classrooms.

The below table reflects the consultations done and issues discussed.

**Table 1: Consultations during Preliminary and Detail Design at Smit Higher Secondary School**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Date of Site Visit</th>
<th>Place of Site</th>
<th>Participants</th>
<th>Issues Discussed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11th September 2014</td>
<td>Smit Higher Secondary School</td>
<td>DSC experts &amp; Principal</td>
<td>Consultation on the proposed project</td>
</tr>
<tr>
<td>2</td>
<td>14th October 2014</td>
<td>Smit Higher Secondary School</td>
<td>DSC experts &amp; Principal</td>
<td>Consultation on the proposed project</td>
</tr>
<tr>
<td>3</td>
<td>14th January 2015</td>
<td>Smit Higher Secondary School</td>
<td>DSC experts, Staff, SMC &amp; Public</td>
<td>Consultation on the proposed project</td>
</tr>
<tr>
<td>4</td>
<td>23rd June 2015</td>
<td>Smit Higher Secondary School</td>
<td>DSC experts &amp; SMC</td>
<td>Consultation on the proposed new building</td>
</tr>
</tbody>
</table>
PHOTOGRAPHS OF PUBLIC CONSULTATIONS

Consultation with Principal

Consultation with Public

Consultation with Principal

Consultation with SMC

Consultation with Principal

Consultation with Principal
# ATTENDANCE SHEET

Name of the School: Smit Higher Secondary, SMIT  
Address: SMIT, Meghalaya, GKH Dist.

<table>
<thead>
<tr>
<th>Date</th>
<th>Name and Designation</th>
<th>Phone Number</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.01.2015</td>
<td>Shri Parvathi Kanji, Principal, SMIT</td>
<td>9774819691</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shri Gostin Rhythm, Secretary, SMIT</td>
<td>9862422477</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shri Robert Thangdina, Admin Officer, SMIT</td>
<td>9856089135</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shri Phringshel Syngope, Nominated Secretary, SMIT</td>
<td>8131930121</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shri Plabang, Nominated Secretary, SMIT</td>
<td>9615040409</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shri Gurgon S. Rang, Teacher Representative, Vice Principal, SHSS</td>
<td>9615309575</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shri Prasada Nagawon, Teacher Representative, Principal, SHSS</td>
<td>9615500042</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shri Khilamang, Warden, Principal, SMIT, Administration</td>
<td>9612005220</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shri Wanda, Parent Representative</td>
<td>9615468404</td>
<td></td>
</tr>
</tbody>
</table>
**ATTENDANCE SHEET**

**PARTICIPANTS LIST:**

Date: 23/6/15  
Village/Locality:  
Block: Maungmyaung  
Venue: East Khan School

<table>
<thead>
<tr>
<th>S. N</th>
<th>Name</th>
<th>M/F</th>
<th>SC</th>
<th>ST</th>
<th>OBC</th>
<th>Other</th>
<th>Phone</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Smt. Drisela</td>
<td>F</td>
<td></td>
<td>ST</td>
<td></td>
<td></td>
<td>9615500042</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maung</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Mr. Khinayng</td>
<td>M</td>
<td></td>
<td>ST</td>
<td></td>
<td></td>
<td>9612005222</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nyang</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mr. Evansion</td>
<td>M</td>
<td></td>
<td>ST</td>
<td></td>
<td></td>
<td>9774819691</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Khinyut</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Smt. Giangie</td>
<td>F</td>
<td></td>
<td>ST</td>
<td></td>
<td></td>
<td>9615304575</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wayi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ms. Thaw K.</td>
<td>M</td>
<td></td>
<td>ST</td>
<td></td>
<td></td>
<td>9862822477</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nein</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sample Grievance Redress Form

(To be available in Local Language and English)

The ________________ Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback. Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

<table>
<thead>
<tr>
<th>Date</th>
<th>Place of registration</th>
</tr>
</thead>
</table>

**Contact Information/Personal Details**

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>*Male</th>
<th>*Female</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Address</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phone no.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Complaint/Suggestion/Comment/Question** Please provide the details (who, what, where and how) of your grievance below:

If included as attachment/note/letter, please tick here:

How do you want us to reach you for feedback or update on your comment/grievance?

**FOR OFFICIAL USE ONLY**

Registered by: (Name of Official registering grievance)

Mode of communication:
Note/Letter
E-mail
Verbal/Telephonic

Reviewed by: (Names/Positions of Official(s) reviewing grievance)

Action Taken:

Whether Action Taken Disclosed: Yes No

Means of Disclosure:
EMP Contract Clauses

1.0 GENERAL

1.1 The Contractor shall be responsible for implementation of environmental provisions outlined in the EMP, in addition to adhering to all environmental provisions in the applicable specifications for the works will be adhered to as part of good engineering practices.

1.2 All works undertaken towards protection of environmental resources as part of the EMP and as part of good engineering practices while adhering to relevant specifications will be deemed to be incidental to works being carried out and no separate payment will be made unless otherwise specified explicitly. The costs towards environmental management as per EMP unless otherwise provided as a separate head, will be deemed to be part of the BoQ of the project. The scope of works of the contractor towards the implementation of the environmental provisions shall be as follows:

- Abide by all existing environmental regulations and requirements of the Government of India and State Government of Meghalaya, during implementation,
- Compliance with all mitigation measures and monitoring requirements set out in the Environmental Management Plan (EMP)
- Submission of a method statement detailing how the EMP will be complied with. This shall include methods and schedule of monitoring.
- Monitoring of project environmental performance and periodic submission of monitoring reports.
- Compliance with all measures required for construction activities in sensitive areas (if any), including protected areas, in line with the regulatory requirements adopted by MoEF, GoI.
- Compliance of all safety rules at work, and provision of adequate health and safety measures such as water, food, sanitation, personal protective equipment, workers insurance, and medical facilities.

1.3 The detailed provisions for specific environmental issues are outlined in the EMP table. Key clauses are outlined in the following sections.

2.0 QUARRY AND BORROWING

2.1 The Contractor will identify and seek prior approval of the Engineer for quarrying and borrowing operations. Quarry and borrowing will be carried only from locations approved by the Engineer. Quarrying, if required in the project will be only from approved quarries and no new quarries will be opened for the purpose of the project. Any deviation from the provisions will be immediately notified and approval of the Engineer is to be sought.

2.2 The Contractor shall maintain all borrow sites, stockpiles, and spoil disposal areas so as to assure the stability and safety of the works and that any adjacent feature is not endangered, and to assure free and efficient natural and artificial drainage, and to prevent erosion. Stockpiling of materials (topsoil, fill material, gravel, aggregates, and other construction materials) shall not be allowed during rainy season unless covered by a suitable material. Storage on private property will be allowed if written permission is obtained from the owner or authorized lessee.

2.3 Borrow areas and quarries shall be sited, worked, and restored in accordance with the specifications. Spoils shall be disposed of at approved disposal sites prepared, filled, and restored in accordance with the related specification requirements.

2.4 Following excavation for the works, the Contractor shall take all steps necessary to complete drainage and slope protection works in advance of each mining season. Erosion or instability or sediment deposition arising from operations not in accordance with specifications shall be made good immediately by the Contractor at the Contractor’s expense. The Contractor shall take all steps necessary to complete drainage in advance of each rainy season in the areas excavated for borrow materials.

3.0 PRECAUTIONS FOR PROTECTION OF ENVIRONMENTAL RESOURCES

3.1 The Contractor shall ensure that construction activities do not result in any contamination of land or water by polluting substances.

3.2 Unless otherwise provided in the specifications, the Contractor shall ensure that no trees or shrubs or waterside vegetation are felled or harmed except those required to be cleared for
execution of the works. The Contractor shall protect trees and vegetation from damage to the satisfaction of the Engineer.

3.3 The Contractor shall not use or permit the use of wood as a fuel for the execution of any part of the works and to the extent practicable, shall ensure that fuels other than wood are used for cooking and heating in all camps and living accommodations. Any wood so used must be harvested legally, and the Contractor shall provide the Engineer with copies of the relevant permits, if required.

3.4 The Contractor shall take all precautions necessary to ensure that vegetation existing adjacent to the project site is not affected by fires arising from the execution of the contract. Should a fire occur in the natural vegetation or plantation adjacent to the project site for any reason, the Contractor shall immediately suppress it. Areas of forest, shrub, or plantation damaged by fire considered by the Engineer to have been initiated by the Contractor’s staff or labourers shall be replanted or otherwise restored.

3.5 The Contractor shall confine operations to the dry season, use silt traps and dispose spoils in locations approved by the Engineer that will not promote instability and result in destruction of property, vegetation, irrigation and water supply. Disposal near wetlands, protected areas, and other areas that will cause inconvenience or deprive local residents of their livelihood shall not be allowed. Acidic and saline spoils shall not be spread into agricultural land.

3.6 The Contractor shall consult with local residents and local government before locating project offices, sheds, and construction plant. The work camps shall not be located near settlements, near drinking water supply intakes, protected areas, or wildlife habitats.

3.7 The Contractor shall maintain ecological balance by preventing felling of trees, water pollution and defacing of natural landscape. The Contractor shall, so conduct his cleaning operations, as to prevent any avoidable destruction, scarring or defacing of natural surroundings in the vicinity of the archaeological site. In respect of ecological balance, the Contractor shall observe the following instructions.

3.8 In the conduct of cleaning activities and operation of equipment, the Contractor shall utilize such practicable methods and devices as reasonably available to control, prevent and otherwise minimize water, air and noise pollution.

4.0 WATER POLLUTION

4.1 The Contractor shall take all precautionary measures to prevent the wastewater generated during construction from entering into streams, water bodies or the irrigation system. Contractor shall avoid construction works close to the streams or water bodies during monsoon.

4.2 The Contractor shall monitor the water quality parameters periodically as specified in the monitoring plan and report to the Engineer.

4.3 All waste arising from the project are to be disposed off in the manner that is acceptable to the State Pollution Control Board. The Engineer shall certify that all liquid wastes disposed off from the sites meet the discharge standards.

5.0 NOISE AND AIR POLLUTION

5.1 All works shall be carried out without unreasonable noise and air pollution. Subject and without prejudice to any other provision of the Contract and the law of the land and its obligation as applicable, the Contractor shall take all precautions outlined in the EMP to avoid the air and noise pollution.

5.2 The Contractor shall monitor the noise and air quality parameters periodically as specified in the monitoring plan and report to the Engineer.

5.3 The Contractor shall indemnify and keep indemnified the Employer from and against any liability for damages on account of noise or other disturbance created while carrying out the work, and from and against all claims, demands, proceedings, damages, costs, charges, and expenses, whatsoever, in regard or in relation to such liability.

6.0 OCCUPATIONAL HEALTH AND SAFETY DURING CONSTRUCTION

6.1 The Contractor shall, in accordance with the safety and health provisions specified in the EMP, provide workers with a safe and healthy working environment, in the work areas, through application of preventive and protective measures consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group’s Environment,
Health and Safety Guidelines. The borrower/client will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by

(i) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances;
(ii) providing appropriate equipment to minimize risks and requiring and enforcing its use;
(iii) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment;
(iv) documenting and reporting occupational accidents, diseases, and incidents; and
(v) having emergency prevention, preparedness, and response arrangements in place.

7.0 POST CONSTRUCTION CLEARANCE

7.1 On completion of work, wherever applicable, the Contractor shall clear away and remove from the sites all constructional plant, surplus materials, rubbish, scaffoldings and temporary works of every kind and leave the whole of the site and works in a clean condition to the satisfaction of the Engineer.

7.2 Construction camp sites post construction shall be cleared as specified in the EMP and handed over to the Owner. It will be ensured by the contractor that the site handed over is in line with the conditions of temporary acquisition signed by both parties.
SEISMIC VULNERABILITY ASSESSMENT OF SCHOOLS BASED ON QUESTIONNAIRE SURVEY

Structural characteristics:

<table>
<thead>
<tr>
<th>Block no</th>
<th>Confined Masonry Building</th>
<th>Reinforced Concrete Building</th>
<th>Assam Type</th>
<th>Unconfined Masonry Building</th>
<th>PARTIALLY RCC ONLY SCIENCE LAB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Interstory height:
- No. of cores:
- Plan shape: Rectangular [ ] L Shape [ ] U Shape [ ] T Shape [ ]
- Max length L: m
- Max width W: m
- Slab thickness: mm
- No. of staircase:
- Width of Staircase: m
- No. of doors
- width of doors:
  - Size of Column: 300 x 300 mm
  - Size of Beam: mm
  - Projected reinforcement Detail

Differential settlement

Topography:
- Hill top [ ] Hill side [ ] Steep slope [ ]
- Mild slope [ ] Plain [ ] Low Land [ ]
- Close to river [ ] Other (specify) [ ]

Actual state:
- Good (new) [ ] Recently renovated [ ]
- Need of renovation [ ] Bad (decayed) [ ]

Age:
- < 10 years [ ]
- 10-20 years [ ]
- 20-40 years [ ]
- > 40 years [ ]

General Comment
<table>
<thead>
<tr>
<th>Comments</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structural Vulnerability</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the building irregular in plan?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the columns regularly distributed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are both building directions adequately braced (RC frames/shear walls, masonry walls)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the ratio between the building’s length and width is &gt; 2.5?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building possess eccentric cores (staircases or elevators)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have a soft storey?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the building irregular in elevation caused by setbacks of upper stories?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have cantilevering upper stories?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have gable wall?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building possess a heavy mass at the top or at roof level?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are pounding effects possible?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have short columns?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are strong beams–weak columns available?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building possess shear walls?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did the building suffer any significant structural damage in the past?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building possess seismic retrofitting or strengthening measures?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in walls?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in columns?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in beams?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in slab?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in joints?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the building periodically painted?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in beams?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in column?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in slab?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in wall?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in other location?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the reinforcement bars suffer severe corrosion?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth of algae/vegetation observed in and around the structure?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have any fire safety device installed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have flat roof?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have two way sloped roof?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have four way sloped roof?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>I. Fire Fighting</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there smoke detectors and alarms available?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there enough fire extinguishers and hose-reel cabinets available?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are they easily accessible? (if Q2 = NO → NA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>II. Non-structural Infill Walls and Partitions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are (infill) brick walls protected against out-of-plane failure by e.g. internal reinforcement or surface meshes?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do movement joints between brick infill walls and RC frames exist to allow damage-free movement? (for masonry → NA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IV. Ceilings</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are suspended ceilings available?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the suspended ceilings adequately secured against failure? (if Q9 = NO → NA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>V. Emergency Exits and Escape Routes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If exit fire doors jam in an earthquake, is there a crowbar or sledge hammer readily available to facilitate emergency opening?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do all exit doors open outwards?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI. Appendages</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can nonstructural elements (e.g. parapets, facade cladding, roof tiles, chimneys) fall from the building and harm children or teachers running outside?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VII. Movable Equipment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Are wardrobes/lockers/bookshelves/blackboards adequately anchored to the walls?</td>
<td></td>
</tr>
<tr>
<td>Are tables stable enough to protect children from falling objects (e.g. suspended ceilings)?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VIII. Appurtenant structures</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Are enough open spaces around the building to be used as escape routes and where people are safe from falling objects?</td>
<td></td>
</tr>
<tr>
<td>Can neighboring structures (also walls, electricity lines) block escape routes or harm people running/gathering outside?</td>
<td></td>
</tr>
<tr>
<td>Can road access to and from the school be blocked due to collapse of buildings or geotechnical effects (landslides etc.)?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IX. Flood Vulnerability Assessment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the school situated near a river, pond, lake or any other water bodies?</td>
<td></td>
</tr>
<tr>
<td>Has the school affected by past flood event?</td>
<td></td>
</tr>
<tr>
<td>Are heavy debris flow and sediment deposits expected?</td>
<td></td>
</tr>
<tr>
<td>How quickly the flood water enters and leaves the site?</td>
<td></td>
</tr>
<tr>
<td>Is the school protected by any flood retention structures like embankments, flood walls etc.?</td>
<td></td>
</tr>
</tbody>
</table>
Structural characteristics:

Block no 2
- Confined Masonry Building
- Reinforced Concrete Building
- Assam Type
- Unconfined Masonry Building

Interstory height:
- No. of stories:
- Plan shape: Rectangular
- L Shape
- U Shape
- T Shape
- Max length L: m
- Max width W: m
- Slab thickness: mm
- No. of staircase:
- Width of Staircase: m
- No. of doors:
- Width of doors:
  - Size of Column: 300 x 300 mm
  - Size of Beam: 300 x 400 mm

Projected reinforcement Detail

Differential settlement

Topography:
- Hill top
- Hill side
- Steep slope
- Mild slope
- Plan
- Low Land
- Close to river
- Other (specify)

Actual state:
- Good (new)
- Recently renovated
- Need of renovation
- Bad (decayed)

Age:
- < 10 years
- 10-20 years
- 20-40 years
- > 40 years

General Comment
<table>
<thead>
<tr>
<th>Structural Vulnerability</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the building irregular in plan?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the columns regularly distributed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are both building directions adequately braced (RC frames/shear walls, masonry walls)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the ratio between the building’s length and width is &gt; 2.5 ?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building possess eccentric cores (staircases or elevators)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have a soft storey?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the building irregular in elevation caused by setbacks of upper stories?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have cantilevering upper stories?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have gable wall?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building possess a heavy mass at the top or at roof level?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are pounding effects possible?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have short columns?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are strong beams–weak columns available?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building possess shear walls ?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did the building suffer any significant structural damage in the past?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building possess seismic retrofitting or strengthening measures?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in walls?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in columns?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in beams?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in slab?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in joints?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the building periodically painted?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in beams?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in column?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in slab?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in wall?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in other location?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the reinforcement bars suffer severe corrosion?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth of algae/vegetation observed in and around the structure?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have any fire safety device installed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have flat roof?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have two way sloped roof?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have four way sloped roof?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Structural Vulnerability Index</th>
</tr>
</thead>
</table>

I. Fire Fighting

Are there smoke detectors and alarms available? |   |    |    |
Are there enough fire extinguishers and hose-reel cabinets available? |   |    |    |
Are they easily accessible? (if Q2 = NO → NA) |   |    |    |

II. Non-structural Infill Walls and Partitions

Are (infill) brick walls protected against out-of-plane failure by e.g. internal reinforcement or surface treatment? |   |    |    |
Do movement joints between brick infill walls and RC frames exist to allow damage-free movement? |   |    |    |

IV. Ceilings

Are suspended ceilings available? |   |    |    |
Are the suspended ceilings adequately secured against failure? (if Q9 = NO → NA) |   |    |    |

V. Emergency Exits and Escape Routes

If exit fire doors jam in an earthquake, is there a crowbar or sledge hammer readily available to facilitate opening? |   |    |    |
Do all exit doors open outwards? |   |    |    |
Are all doors unlocked from the inside and also unblocked? |   |    |    |
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are heavy debris flow and sediment deposits expected?</td>
<td></td>
</tr>
<tr>
<td>How quickly the flood water enters and leaves the site?</td>
<td></td>
</tr>
<tr>
<td>Is the school protected by any flood retention structures like embankments, flood walls etc.?</td>
<td></td>
</tr>
<tr>
<td>Are enough open spaces around the building to be used as escape routes and where people are safe?</td>
<td></td>
</tr>
<tr>
<td>Can neighboring structures (also walls, electricity lines) block escape routes or harm people running?</td>
<td></td>
</tr>
<tr>
<td>Is the school situated near a river, pond, lake or any other water bodies?</td>
<td></td>
</tr>
<tr>
<td>Has the school affected by past flood event?</td>
<td></td>
</tr>
<tr>
<td>Are heavy debris flow and sediment deposits expected?</td>
<td></td>
</tr>
<tr>
<td>How quickly the flood water enters and leaves the site?</td>
<td></td>
</tr>
</tbody>
</table>

**VI. Appendages**

- Can nonstructural elements (e.g. parapets, facade cladding, roof tiles, chimneys) fall from the building?

**VII. Movable Equipment**

- Are wardrobes/lockers/bookshelves/blackboards adequately anchored to the walls?
- Are tables stable enough to protect children from falling objects (e.g. suspended ceilings)?

**VIII. Appurtenant structures**

- Are the windows of ground floor barred/trellised?
- Are glazed windows available?
- Has the glazing of windows been designed to accommodate lateral movement? (if Q15 = NO → NA)
- Do large windows, door transoms and skylights have safety glass? (if Q15 = NO → NA)
- Are emergency exits and escape routes adequately designated, e.g. by fluorescent signs?
- Are emergency exits and escape routes adequately illuminated?

**IX. FLOOD VULNERABILITY ASSESSMENT:**

- Is the school situated near a river, pond, lake or any other water bodies?
- Has the school affected by past flood event?
- Are heavy debris flow and sediment deposits expected?
- How quickly the flood water enters and leaves the site?
Structural characteristics:

Block no: 3

Confined Masonry Building
Reinforced Concrete Building
Aram Type
Unconfined Masonry Building

Interstory height: G+1
No. of cores:
Plan shape: Rectangular
L Shape
U Shape
T Shape
Max length L: m
Max width W: m
Slab thickness: mm
No. of staircase:
Width of Staircase: m
No. of doors:

width of doors:

Size of Column: 300 x 300 mm
Size of Beam: 200 x 400 mm

Projected reinforcement Detail

Differential settlement

Topography:
Hill top
Mild slope
Close to river

Hill side
Plain
Other (specify)

Steep slope
Low Land

Actual state:
Good (new)
Recently renovated

need of renovation
Bad (decayed)

Age:
< 10 years
10-20 years
20-40 years
> 40 years

year of construction:

General Comment
## Structural Vulnerability

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the building irregular in plan?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the columns regularly distributed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are both building directions adequately braced (RC frames/shear walls, masonry walls)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the ratio between the building’s length and width is &gt; 2.5?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building possess eccentric cores (staircases or elevators)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have a soft storey?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the building irregular in elevation caused by setbacks of upper stories?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have cantilevering upper stories?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have gable wall?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building possess a heavy mass at the top or at roof level?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are pounding effects possible?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have short columns?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are strong beams–weak columns available?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building possess shear walls?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did the building suffer any significant structural damage in the past?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building possess seismic retrofitting or strengthening measures?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in walls?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in columns?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in beams?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in slab?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there any significant amount of cracks/deformation in joints?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the building periodically painted?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in beams?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in column?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in slab?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in wall?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spalling of concrete observed in other location?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the reinforcement bars suffer severe corrosion?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth of algae/vegetation observed in and around the structure?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have any fire safety device installed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have flat roof?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have two way sloped roof?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the building have four way sloped roof?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Non-Structural Vulnerability Index

### I. Fire Fighting

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there smoke detectors and alarms available?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there enough fire extinguishers and hose-reel cabinets available?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are they easily accessible? (if Q2 = NO → NA)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### II. Non-structural Infill Walls and Partitions

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are (infill) brick walls protected against out-of-plane failure by e.g., internal reinforcement or surfa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do movement joints between brick infill walls and RC frames exist to allow damage-free movement?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### IV. Ceilings

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are suspended ceilings available?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the suspended ceilings adequately secured against failure? (if Q9 = NO → NA)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### V. Emergency Exits and Escape Routes

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>If exit fire doors jam in an earthquake, is there a crowbar or sledge hammer readily available to fa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do all exit doors open outwards?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are all doors unlocked from the inside and also unblocked?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>--------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the windows of ground floor barred/trellised?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are glazed windows available?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has the glazing of windows been designed to accommodate lateral movement?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do large windows, door transoms and skylights have safety glass?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are emergency exits and escape routes adequately designated, e.g. by fluorescent signs?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are emergency exits and escape routes adequately illuminated?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI. Appurtenant structures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can nonstructural elements (e.g. parapets, facade cladding, roof tiles, chimneys) fall from the building?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VII. Movable Equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are wardrobes/lockers/bookshelves/blackboards adequately anchored to the walls?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are tables stable enough to protect children from falling objects (e.g. suspended ceilings)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIII. Appurtenant structures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are enough open spaces around the building to be used as escape routes and where people are safe?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can neighboring structures (also walls, electricity lines) block escape routes or harm people running?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can road access to and from the school be blocked due to collapse of buildings or geotechnical effects?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IX. FLOOD VULNERABILITY ASSESSMENT:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the school situated near a river, pond, lake or any other water bodies?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has the school affected by past flood event?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are heavy debris flow and sediment deposits expected?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How quickly the flood water enters and leaves the site?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the school protected by any flood retention structures like embankments, flood walls etc.?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>