7.0 IMPACT ASSESSMENT AND MITIGATION MEASURES

This section presents the environmental impacts and issues which have been identified during the ESIA Study. Where necessary mitigation measures with which to minimise or negate potential negative impacts; and maximise or enhance potential positive impacts will be recommended. Environmental impacts can be classified as environmental impacts of mining operation and environmental impacts of mineral processing.

7.1. Impact Assessment Methodology

The methodology and approach to be followed during this EIA is described below. Each specialist will undertake an impact assessment, and prepare an impact assessment report as supporting documentation to the EIA. These will include:

- Executive Summary;
- Introduction;
- Brief project description;
- Methodology including guidelines and standards used in the study;
- Baseline description of the Environment;
- Assessment of the potential significance of impacts of the project; and
- Recommendations for mitigation/management of impacts.

Impacts will be assessed using information gathered during the baseline assessment in combination with previously collected data and the detailed project plan. The significance of the identified impacts will be determined using the approach outlined in Table 7.1. This incorporates two aspects for assessing the potential significance i.e. occurrence and severity, which are further sub-divided as indicated. The impact ranking will be described for both pre and post implementation of mitigation/management measures conditions.

An impact can be defined as any change in the physical-chemical, biological, cultural and/or socio-economic Environmental system that can be attributed to human activities. The significance of the aspects/impacts of the process was rated by using a Matrix Method modified by Green Tech ESIA Team. The significances of the impacts were determined through a synthesis of the criteria below:

1. Scale

No.	Description	Rating	Score
1.	Impact will be affected (Distance = 100 m or Area =1000 m^2)	Site	1
2.	Impact will be affected (Distance = 1000 m or Area = 10 km^2)	Limited	2
3.	Impact will be affected (Distance = 1000 m to 10 km or Area = 10 km^2 to 100 km^2)	Local	3
4.	Impact will be affected (Distance = 10 km to 100 km or Area = 100 km^2 to 1000 km^2)	District	4
5.	Impact will be affected (to the distance exceeding 100 km or Area = 1000 km^2)	Regional	5

Note: For linear objects areal gradations are used. If the area cannot be evaluated, the linear distance is used.

2. Duration

No.	Description	Rating	Score
1.	One day to one month	Very short term	1
2.	One month to two years	Short term	2
3.	Two years to ten years	Medium term	3
4.	Ten years to the whole life of operation	Long term	4
5.	Permanent and irreversible impact on nature	Permanent	5

3. Severity for the Environment

No.	Description	Rating	Score
1.	Isolated parts will be damaged and easy to mitigate/restore	Very low	1
2.	Isolated parts will be damaged and hard to mitigate/restore	Low	2
3.	Large parts will be damaged and easy to mitigate/restore	Low to Medium	3
4.	Large parts will be damaged and hard to mitigate/restore	Medium	4
5.	Large parts will be permanently destroyed	High	5

4. Frequency

No.	Description	Rating	Score
1.	Less than twice a year	Rare	1
2.	3 to 4 times per year	Intermittent	2
3.	Once a month	Regular	3
4.	1-3 times per week	Very Often	4
5.	More than 3 times per week	Continuous	5

5. Probability

No.	Description	Rating	Score
1.	Impact is very unlikely to occur under normal conditions but may occur in exceptional circumstances	Very Seldom	1
2.	Impact is unlikely to but may occur at some time under normal operating conditions	Seldom	2
3.	Impact is likely to occur at some time under normal conditions	Probable	3
4.	Impact is very likely to occur at some time under normal conditions	Highly probable	4
5.	Impact will occur under normal operating conditions	Certain	5

Table- Impact Rating Table

Consequence

Likelihood														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
6	12	18	24	30	36	42	48	64	60	66	72	78	84	90
7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

- Very Low (0- 25)
- Low (26- 50)
- Low to Moderate (51-75)
- Moderate (76-100)
- Moderate to High (101-125)
- High (126 to 150)

Mitigation Requirement for Impact Significance

No.	Impact Significance	Mitigation Requirement
1	Very Low (Negligible)	No mitigation required
2	Low	Required a small number of additional mitigations
3	Low to Moderate	Require more or less additional mitigations
4	Moderate	Require a number of additional mitigations
5	Moderate to High	Require a number of additional mitigation or modification of the project design
6	High	Require additional mitigations plus modification of the project design or alternative action may be required

Prediction Confidence

Although not explicitly included in the criteria tables, there is uncertainty associated with the information and methods used in an ESIA because of its predictive nature. The certainty with which an impact analysis can be completed depends on a number of factors including:

- Understanding of natural/ecological and socio-economic processes at work now and in the future; and
- Understanding of present and future properties of the affected resource.

The level of prediction confidence for an impact analysis will be discussed when there are questions about the factors reviewed above. Where the level of prediction confidence makes a prediction of the impact problematic, a subjective assessment is made based on the available information, the applicability of information on surrogates and on professional opinion.

The level of prediction confidence is sufficiently low in some cases that an estimate of Environmental consequence cannot be made with a sufficient degree of confidence. Undetermined ratings are accompanied by recommendations for research or monitoring to provide more data in the future.

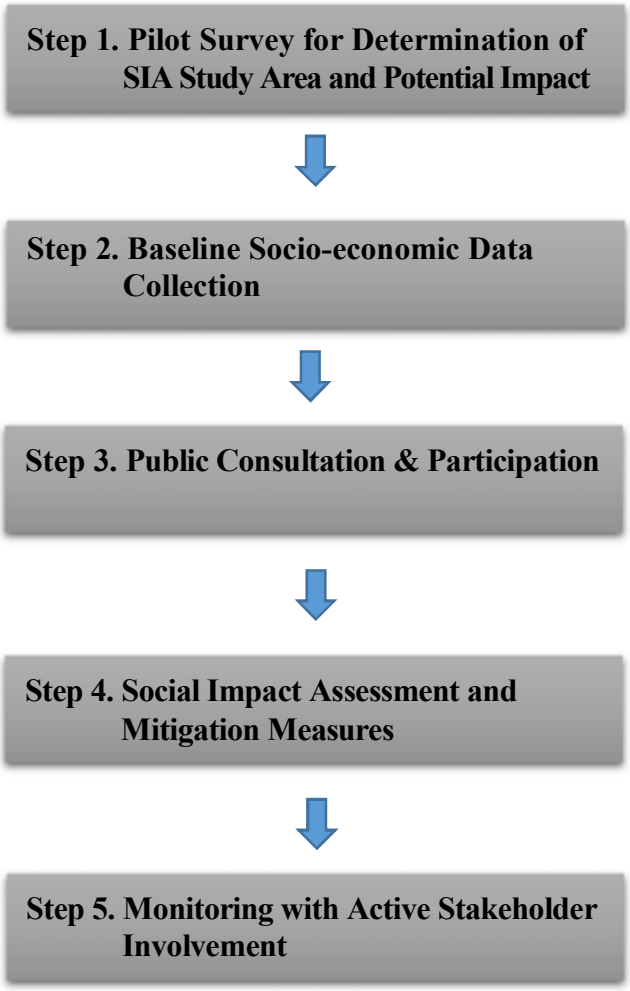
Development of Mitigation Measures

A common approach to describing mitigation measures for critical impacts is to specify a range of targets a predetermined acceptable range and an associated monitoring and evaluation plan. To ensure successful implementation, mitigation measures should be unambiguous statements of actions and requirements that are practical to execute. The following summarize the different approaches that may be used in prescribing and designing mitigation measures:

- Avoidance: e.g. mitigation by not carrying out the proposed action on the specific site, but rather on a more suitable site;
- Minimization: mitigation by scaling down the magnitude of a development, reorienting the layout of the project or employing technology to limit the undesirable Environmental impact;
- Rectification: mitigation through the restoration of Environments affected by the action;
- Reduction: mitigation by taking maintenance steps during the course of the action; and Compensation: mitigation through the creation, enhancement or acquisition of similar Environments to those affected by the action.

7.1.1. Social Impact Assessment (SIA) Methodology

The first phase of the Social Impact Assessment (SIA) will provide a baseline description of the study area, specifically focusing on the communities living and working in close proximity to the proposed development. The potential impacts of the proposed development on the social environment will be identified and assessed in terms of an agreed assessment methodology in the EIA phase. Mitigation measures will be proposed to enhance the positive impacts and reduce the significance of the negative impacts. Socioeconomic impact assessment for proposed project was conducted by the following procedures.



Main Steps in SIA Study

Step I: Pilot Social Survey for Determination of SIA Study Area and Potential Socio-economic Impacts

Pilot survey was done for determination of SIA study area and study area was considered after the discussions with key informers project managers from MPC and the heads of Village General Administrative Offices of nearest villages. Google Map and census are also used for the determination of SIA study area during pilot survey.

Step 2: Baseline Socio-economic Data Collection

To assess the baseline socio-economic conditions that may result from the development of the proposed project, the SIA team employed both quantitative and qualitative approaches as follow:

Primary Data Collection by Household Survey

The collection of primary data consisted of focus group discussions and household surveys in the target study areas. Household sample survey was conducted to evaluate primary socio-economic conditions of the project area and to understand the mood, perceptions and extent of preparedness of the people towards the proposed project. The household survey was carried out to tap the baseline socio-economic conditions of project area and to assess project perceptions and attitudes of the local people over a period of five days. The accuracy of primary data collection was based on the accuracy, number of surveyed household and experiences of surveyors. To get the accurate data, primary data collection was conducted by social specialist, social consultants, local authorities and local people.

(a) Survey Team

The team was formed with researchers from social, medical, and engineering sciences having research experiences in the field of social impact assessment and social management planning.

(b) Development of Survey Questionnaire

Socioeconomic aspects to be included in questionnaire were based on site visits and issues identified by interviews with local people and village heads during pilot survey. Items were formulated by the consultants and reviewed by social assessment team members as to clarity of item wordings and relevance to the socioeconomic domains measured. The survey questionnaire was designed to collect information as to the following household characteristics:

- household composition (age, gender, educational status, religion, ethnicity, language used and marital status);
- occupations;
- ownership of agricultural fields and livestock;
- energy sources and facilities;
- agricultural and other economic activities;
- daily movement patterns;
- income and expenditure patterns;
- access to and use of community services/facilities and natural resources;
- health and nutrition; and
- views/concerns/suggestions on the proposed project.

(c) Recruitment and Training

The enumerators were received a training program prior to commencing with the fieldwork. The training program included a briefing on the objectives of the survey, socioeconomic aspects to be measured, interview techniques as well as a detailed explanation of each question and its relevance to the survey objectives, how to pose the question and how to code the answer. Discussions were also held among participants about the socioeconomic conditions and initial questionnaire items were revised based on the discussion results. A set of guidelines were given to each enumerator for administration of survey questionnaire. In the field data collection activities, the enumerators were supervised by experienced supervisors with household survey.

(d) Data Collections

The project related data, factory layout plans and design parameter are provided by Myanmar Pongpipat Co., Ltd. and No. (2) Mining Enterprise (Tanintharyi). Secondary data on demographic distribution in the area are sourced from Head of Local Administration Office (Dawei) and data on public health are sourced from Public Health Department (Dawei). Primary data for public concerns, socio-economic and health profiles are conducted by household survey.

(e) Data Analysis

In household survey data collection period, field supervisors checked and ensured the control of data quality. During field surveys, information obtained through household survey and interviews was corroborated through direct observation by the study team aiming at assessing social and cultural infrastructure existed in the project area, physical assets of people, and living conditions. Observations were backed up by photographic records. Quantitative data were coded and processed using SPSS statistical package. Qualitative data were coded using standard methods.

7.1.2. Health Impact Assessment Methodology

There is no universally agreed formula for assessing public health significance, although assessments are mostly based on a subjective judgment about the magnitude of the potential health impacts (size of the affected population and scale of the positive or negative health impact); its likelihood of occurrence; and the degree of confidence in the impact actually occurring (based on scientific and other evidence of the health impact occurring in similar

circumstances elsewhere). The following table shows a Health Impact Significance Rating Methodology of Green Tech EIA Team.

	Likelihood of Occurrence of Health Impact			Health Impact Rating
	Low	Medium	High	
Magnitude of Health Impact	Unlikely to occur	Likely to occur sometimes	Likely to occur often	
None	No significance	No significance	No significance	0
Low	Very Low	Low	Medium	1
Medium	Low	Medium	High	2
High	Medium	High	Very High	3

When analyzing health impacts, it is important to consider the magnitude, likelihood and public health significance of the potential impacts. This analysis will involve expert judgment based on a consideration of the evidence gathered and its applicability to the local context and the specific project.

Distributional, health equity and inequality impacts will be analyzed by examining how particular sub-groups within a population, particularly vulnerable groups, are likely to be affected by the project. The scoping and community profiling steps are likely to have already identified potentially vulnerable groups through existing local information on these individuals/groups or through community surveys and meetings with key informants e.g. community leader, community health worker or local NGO.

Health equity/inequality impacts occur when the projects benefits and harms are unevenly distributed. This includes where the risk is equally distributed, such as air pollution, but the impact is disproportionate – affecting particularly children, older people and those with existing ill health.

Analysis of health impacts will involve systematically determining the range of potential impacts, their relative importance and where, when and how likely they are to occur. The

information for the HIA will be obtained from the primary data collection (household survey), literature review, community profile and Health Data from Pubic Health Department as well as knowledge and expertise of the HIA Consultant.

7.2. Detailed Studies to be undertaken in the EIA Phase – Specialist Studies

The assessment of the impacts of the proposed activity will be conducted within the context provided by these principles and objectives. The impact assessment will be comprised of a number of specialist studies. Once completed, the findings of the specialist studies will be integrated with the Draft EIA Report and the impacts will be ranked using a scoring system that compares the significance of each impact. The following specialist studies have been commissioned and will play a crucial role in the EIA process:

- Biodiversity Impact Assessment
- Air Quality Impact Assessment;
- Noise Impact Assessment;
- Soils and Land Use Impact Assessment;
- Surface Water (Hydrology) Impact Assessment;
- Socio-economic Impact Assessment;
- Health Impact Assessment;
- Visual Impact Assessment; and
- Wastes and Utilities; and
- Disaster Risk Assessment.

The specialist reports will be included as part of the Draft EIA Report and ESMP, and will be made available for public review before submission to the decision-making authorities.

7.2.1. Biodiversity Impact Assessment

The objectives of the Ecology Impact Assessment include:

- Undertaking the collection of baseline Environmental data;
- Characterisation of the baseline Environment;
- Identification, and assessment of key adverse impacts that may result from the activities of the project;
- Identification, assessment and recommendations of appropriate and practical mitigation measures to remove or minimize the adverse impacts identified; and

- Providing specialist ecological input into the Environmental and Social Management Plan (ESMP).

Scope of Work

Flora

- Conduct initial desktop review of vegetation likely to occur within the study area;
- Develop a species list of red data and protected plants;
- Conduct a detailed survey (using standard scientific methodology) in order to:
- Identify general vegetation types and communities on site;
- Identify dominant plant species;
- Record red data and protected species;
- Identify invader or exotic species;
- Identify floral species with any medicinal, cultural or commercial importance;
- Identify sensitive landscapes and habitats including wetland and riparian habitats;
- Identify possible impacts of the proposed project on flora species and communities; and
- Recommend mitigation measures for these identified impacts.

Fauna

- Conduct initial desktop review of faunal species likely to occur within the study area;
- Develop a species list of red data and protected animals;
- Conduct a detailed survey (using standard scientific methodology) in order to identify terrestrial fauna linked to veldt types and vegetation communities on site, including:
- Visual observations;
- Live capture and release, including small mammal trapping;
- Identify the dominant faunal species on site;
- Record observed red data and protected faunal species;
- Identify observed exotic species;
- Identify possible impacts of the proposed project;
- Identify possible impacts of the proposed project on flora species, habitats and communities; and
- Recommend mitigation measures for these identified impacts.

Current Biological Environment

Vegetation and terrestrial animals are very low abundant in the project area. Small population of flora and fauna in surrounding area of land are found. Aquatic fauna including fish and birds are fairly abundant. Small fisheries practiced by local fishermen are observed during in the survey period. No red list species of flora and fauna in both terrestrial and aquatic environments are recognized during the scoping survey. There is also no any wildlife protected area, wetland and reserved forests nearby the project area.

Methodology

(a) Field Survey and Data Collection

Data collection will be taken by field observation. List of the terrestrial plant and habitats will be classified. Terrestrial and aquatic fauna survey will be carried out one time in cold season. The collected data will be analysis to investigate the plant and animal population and distribution by using the appropriate methods: Relative Frequency (R.F), Relative Abundance (RA) and Importance Value Index (I.V.I) for plants and habitat utilization for fauna species will be identified. The threatened species on both flora and fauna described in IUCN Red List will be included if possible found for the concern of conservation. Benthos and zooplankton will be collected and analysis for their abundance and distribution.

(b) Impact Analysis

Impact analysis will be done based on available survey data and information. Analysis method will be used in accordance with the standard of biodiversity and wildlife international.

(c) Anticipate the Potential Impacts

Impact analysis will be carried out to investigate the specific impacts on biodiversity during the constructional and operational.

- Impact on terrestrial and aquatic animals
- Impact on plant community

(d) Survey Work

Detail study for fauna and flora to be included are as follow:

- Baseline data of flora and fauna on both terrestrial and aquatic environment

- General type and dominant species of plants and animals
- Species richness, abundance and distribution of plants and animals
- Benthos and zooplankton species and their abundance
- Rare and Endangered species if possible found
- Further investigation on the potential impacts

7.2.2. Air Quality Impact Assessment

Air quality impact assessment will be conducted as follow:

Scope of Work

The following scope of work is proposed for the air quality study:

- To describe baseline ambient air quality and meteorological conditions based on current information, and to identify where knowledge gaps exist in this regard;
- If necessary, to conduct a preliminary baseline air quality monitoring programme to address identified baseline information gaps;
- To develop an emissions inventory identifying potential project sources of air emissions and quantifying emission rates from each source, based on actual measurements or literature emission factors;
- To assess the likely Environmental significance of project-related and cumulative air quality impacts (i.e. combined impacts from project and existing sources), by comparison against air quality standards /guidelines and human health effects reported in the literature; and
- To recommend project design and operational management measures to minimise/abate air quality emissions to the atmosphere.

Approach

The following approach is proposed to undertake the air quality study:

Ambient Air Quality Monitoring

At this stage then, monitoring should only be for baseline establishment purposes. In this regard a three-month sampling campaign is recommended. Ideally this campaign should be

done during winter to represent the worst case scenario. Haz-Scanner EPAS will be used for ambient air quality.

Haz-Scanner EPAS for Ambient Air Quality Monitoring

The detailed about the Haz Scanner EPAS that will be used by EIA Team are as follow:

(a) Monitoring Parameters

The parameters for ambient air quality monitoring will be SO_2, NO_2, CO_2, CO, H_2S, O_3, $PM_{2.5}$ and PM_{10}.

(b) Sampling Rate and Sensors

Determination and analysis of ambient air qualities were conducted by using Haz-Scanner Environmental Perimeter Air Station (EPAS).

Sampling rate of air quality will be recorded automatically every one minute for important gases (Sulfur dioxide, Nitrogen dioxide, Carbon dioxide, Carbon monoxide, Hydrogen sulfide, Particulate matter, Hydrogen sulfide and Ozone) to describe ambient air quality. Sampling pump was adjusted to 2 liter/min. Different analysis methods will be integrated in the instrument, such as particulates 90° Infrared Light Scattering for particulate matters (PM_{10}, $PM_{2.5}$), electrochemical sensors for toxic gases (SO_2, NO_2, CO, H_2S), NDIR (optional sensor) for (CO_2) and Gas Sensing Semiconductor- GSS technology (optional sensor) for O_3.

Important Gases for Ambient Air Quality

No.	Parameters	Analysis Methods
1.	Sulfur dioxide (SO_2)	Electrochemical sensors
2.	Nitrogen dioxide (NO_2)	Electrochemical sensors
3.	Carbon Dioxide (CO_2)	NDIR (optional sensor)
4.	Carbon monoxide (CO)	Electrochemical sensors
5.	Hydrogen Sulfide (H_2S)	Electrochemical sensors
6.	Particulate matter 2.5 ($PM_{2.5}$)	Infrared Light Scattering
7.	Particulate matter 10 (PM_{10})	Infrared Light Scattering
8.	Ozone (O_3)	Gas Sensing Semiconductor- GSS technology (optional sensor)

Location of Monitoring Points

The air quality monitoring will be conducted inside the project site.

Monitoring Period

Air quality will be monitored by 12 hours for day time and 12 hours for night time as follow:

Duration of Air Quality Monitoring

Monitoring Points	Duration
Night Time	(07:00 pm to 07:00 am)
Day Time	(07:00 am to 07:00 pm)

Air Quality Monitoring Results

The air quality monitoring results obtained by every minute will be combined to make average values for day time (12 hours) and nigh time (12 hours) for evaluation and comparison with standard values.

The monitoring results will be compared with the following guidelines.

MEG = Myanmar Emission Guideline 2015)

WHO Guideline = World Health Organization Guideline Value, Global Update 2005

NAAQS = National Ambient Air Quality Standard, 2003 (Central Pollution Control Board, Ministry of Environment and Forests)

For carbon dioxide, no guideline values were provided for the ambient air quality.

Risk Assessment

The significance of project-related and cumulative sources of air pollution will be assessed using Green Techs impact rating protocol. This method considers the likelihood and significance of individual impacts in relation to human health, Myanmar emission guidelines and relevant air quality standards / guidelines (which may include those of the WHO, IFC and EU).

Mitigation Measures

Management and mitigation measures will be identified for significant air quality impacts identified in this study to adequately control the release of air emissions from various project sources. Where these measures can be incorporated into the design phase of the proposed project to avoid possible significant impacts, this will be highlighted.

7.2.3. Noise Impact Assessment

The approach will be based on SANS 10328:2008, 'Methods for Environmental noise impact assessments' as well as the IFC PS and Equator Principles. The technical guidelines will be based on good engineering practice, SANS 10103:2008, 'The measurement and rating of Environmental noise with respect to annoyance and to speech communication' and the IFC EHS Guidelines for noise.

Scope of Work

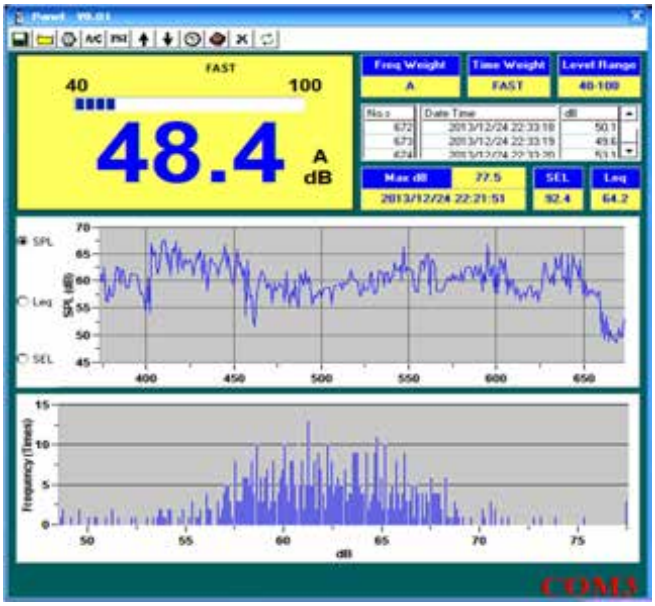
Given the generally rural and agricultural nature of the existing Environment, noise levels can be predicted to be low. So, measure the present ambient noise levels at 1 measurement points that have been identified for the project.

To monitor the existing noise level, the team will use TES-1353H Integrating Sound Level Meter which is applicable with IEC61672-1: 2003, IEC60651: 1979, ANSI S1.4: 1983 and IEC60804: 1985 standards. Existing noise level will be monitored in both day time (07:00 to 22:00) and night time (22:00 to 07:00).

TES 1353H Integrating Sound Level Meter

Noise Quality Monitoring Results

The results for noise level monitoring will be calculated by using Panel V8.01 Software as follow:



Integrating Sound Level Software (Panel V8.01)

Noise Level Monitoring Standard

Noise level monitoring results will be compared with Myanmar Emission Guidelines, 2015 for residential, institutional and educational areas as follow:

Receptor	One Hour LAeq (dBA)[a]	
	Day time (07:00-22:00) (10:00-22:00 for Public holidays)	Night time (22:00-07:00) (2200-10:00 for Public holidays)
Residential, Institutional, Educational	55	45

Source: Myanmar Emission Guidelines (2015)

Operation Noise Level Prediction

Given the rural and agricultural nature of the of the project area, a substantial increase in noise levels can be anticipated during operation. For the proposed project, the major noise generating sources during the operation phase will be movement of trucks, operation of trommels, jigs and shaking tables. Noise level at nearest residents will be predicted and presented.

7.2.4. Soils and Land Use Impact Assessment

The objectives of the soil assessment will be as follow:

- To assess the current physical and chemical status of the greenfield area targeted for the development;
- To determine the pre-development land capability of the soil cover to be affected by the proposed project; and
- To assess the expected impacts posed on the soil resource by the proposed development.

Scope of Work

The entire area comprises greenfields. In terms of the legislation it is proposed to conduct a soil investigation based on the Soil Classification System for SA, 1991. Such an assessment

will include a physical investigation of the soil cover to be disturbed by the proposed mining infrastructure. The scope of work entails the following:

- Conduct a desktop study as a prerequisite prior to a field visit;
- Conduct a field visit during which a physical assessment of the soil covering the areas to be disturbed will take place;
- Compile soil, land use and land capability maps for the assessed area; and
- Compile a report on the findings and results of the assessed area.

Desktop Study

A desktop study will be conducted to gain a general understanding of the soil resource covering the area in question. Existing broad scale maps will be obtained and reviewed to address the input requirements for the ESIA report.

In-field Soil Assessment

In preparation for a field visit soil survey locations will be generated to optimise coverage of the expected soil types. Actual field mapping and classification will be supported by soil profiling to serve as a platform for detail level mapping. During soil mapping, the extent of ecologically sensitive areas, such as wetlands, will be identified and delineated on the basis of soil types.

The following attributes listed recorded at each location point

- Soil form and depth;
- Estimated soil texture and Structure;
- Content of coarse fragments;
- Underlying material;
- Current land use; and
- Land capability.

Sampling of Representative Areas

Chemical balance in the soil profile may be subjected to disturbance during the planned development and post-activity restoration. In order to obtain fertility status of the soil

resource prior to commencement of any development activities, a sampling program is recommended in conjunction with the soil mapping exercise.

The sampling of major delineated units is good practice. A maximum of 4 sample locations are deemed sufficient to exhibit the required soil properties and chemical status. The following analysis package is proposed and will be submitted to the laboratory of the Department of Agricultural:

- Particle size distribution on selected samples (3-fraction testing);
- pH (water);
- Exchangeable cations Na, K, Ca, Mg (Saturated paste method);
- Phosphorus (Bray1 method);
- Organic carbon content on selected topsoil samples (Walkley Black method); and
- Electrical conductivity (indication of salt presence).

Soil Samples

Soil samples are collected inside the mine site was conducted prior to the actual sampling so that selection of sampling unit represents the whole area. Then surface soil samples were taken with hand auger at about 3 inches depth and collected in the bulk soil sample bag.

Testing of Soil Quality

All of the soil samples will be tested in National Laboratory under the Myanma Research and Innovation Department.

7.2.5. Surface Water (Hydrology) Impact Assessment

The surface water study will focus on the characterisation of the baseline hydrology at the project site and assess the potential impacts on surface water due to project development. The following tasks are proposed:

- Compilation of a baseline report to characterise the existing hydrology and water quality of the area;
- Development of floodlines for the area;
- Development of a stormwater management plan for the mine site; and
- Development of management plan for erosion of tailing ponds.

There are important interactions between groundwater and surface water in this type of Environment. There will therefore be strong collaboration between the groundwater and surface water specialist teams.

Scope of Work

The scope of work for the surface water assessment is provided below.

Site Visits

Two site visits are proposed. The first visit will be a reconnaissance visit to understand the situation in proposed site. The further two visits are to set up the baseline monitoring program and take field measurements.

Hydrology Study

This report is the environmental impact of the proposed mine development on the hydrological regime at the proposed project site in Heinda area of Dawei region. It aims at assessing sensitivity of the baseline hydrological environment and the potential impacts of the proposed development upon it and proposes mitigation measures in order to ensure that the potential adverse impacts of the proposed mine project on the hydrological environment will be slight and neutral.

The proposed Heinda mine will consist of opencast mining, mineral processing plant, central treatment plant, settling ponds and access tracks. The area is mainly covered by grass and shrubs with occasional rocky outcrops projecting onto the surface cover. The soils cover is thin and comprises of rocky surfaces in some places.

The potential impacts on the surface water environment from the proposed mine development, in the absence of suitable mitigation measures, are considered to be as follows:

- Direct impacts of the mine operation on the hydrological environment for example of surface water (if encountered in excavations) from the spillage/leakage of fuels from vehicles and fuel/ waste storage areas.
- Direct impacts from excavated areas (overburden and surface mining) where vegetation has been removed through release of silt laden surface water runoff into local watercourses due to soil erosion and increased volumes of surface water runoff.

- Indirect impacts from tailing ponds (overburden and surface mining) where pond failure has been removed through release of sediment surface water runoff.

Baseline Hydrological Environment

The description of the baseline hydrological environment at the subject site and in the surrounding area was by means of a desktop study. This was supplemented by a site walkover by the hydrologist to site.

Relevant desktop studies were undertaken to aid in understanding the underlying hydrology of project area. Supporting information relating to the proposed development was collected for purposes of understanding the suface mine project and to relate development to hydrological characteristics inherent in the area in order to:-

- Assess the sensitivity of the baseline hydrological environment at the subject site and in the surrounding area with respect to the proposed mine project development.
- Identify any potential impacts on the hydrological environment associated with the proposed development.
- Identify any constraints posed by the existing hydrological environment to the proposed development and to;
- Recommend appropriate mitigation measures in order to ensure that the potential impact of the proposed project is slight and neutral.

Field Survey Methodology

In order to inform the hydrological impact assessment, a site walkover was carried out by the hydrologist to record observations and features of significance in the project area.

Significance Criteria

Relevant documentation gathered from diverse sources categorize impact into five (5) categories to aid in assessing the potential impacts of the proposed development on the hydrological environment in terms of how significant an impact may be on the overall environment as follows:-

***Imperceptible Impact*:** An impact capable of measurement but without noticeable consequences.

Slight Impact: An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.

***Moderate*:** An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends.

Significant Impact: An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.

***Profound Impact*:** An impact which obliterates sensitive characteristics.

Existing Water Quality Monitoring

Existing water quality will be monitored for both surface and ground water qualities as follow:

Monitoring of Surface Water Quality: The locations that take the surface water samples will be in the Myaung Pyo creek, Kin Mon Chone creek and project site.

Monitoring of Ground Water Quality: The locations that take the ground water samples will be in project site and at nearest villages.

Water Quality Testing

All of the surface and ground water quality will be tested in Water Quality Testing Laboratory under the Department of Occupational Health.

7.2.6. Visual Impact Assessment

Objectives of the Visual Impact Assessment (VIA)

The objectives of the Visual Impact Assessment (VIA) will be to:

- Assess the baseline conditions of the visual context within which the proposed project will take place;
- Determine what visual receptor groups may potentially be affected by the project;
- Establish what visual impacts may potentially arise as a result of the project and determine their social significance; and
- Investigate possible methods with which the potential impacts may be mitigated.

Scope of Work

The specific scope of works is briefly described below:

- The VIA will assess the value of the study area as a visual resource, as a function of its perceived aesthetic value, and will assess the magnitude and significance of the potential visual impact of the proposed activities;
- A Visual Resources Analysis will be carried out, which will identify elements that are considered to be of visual significance. Conversely elements that detract from the visual quality of the landscape will also be identified;
- A Visual Receptor Analysis will be done which will identify receptors that may be negatively impacted upon by the proposed activity. This will include adjacent landowners as well as significant commuting routes and areas where large groups of people may congregate;
- The VIA will also explore potential visual mitigation strategies and implementation measures that need to be considered during construction and implementation, operations and possible closure of the project site.
- The VIA will be carried out for the project site itself and the greater surrounding context, which has been determined as a 3 km kilometre radius around the project site boundary.

7.2.7. Waste and Utilities Assessment

Objectives of the Waste and Utilities Assessment

The objectives of the Waste and Utilities Assessment will be to:

- Identification, and assessment of key adverse impacts that may result from the consumption of waste and utilities;
- Determine what natural resources may potentially be affected by the project;
- Investigate possible methods with which the potential impacts may be mitigated.
- Identification, assessment and recommendations of appropriate and practical mitigation measures to remove or minimize the adverse impacts identified; and
- Providing specialist waste and utilities management to input into the Environmental and Social Management Plan (ESMP).

Scope of Work

The specific scope of works is briefly described below:

- Identification of site specific water use, electricity use and waste management activities including monitoring and control activities relating to the development in operational mode;
- Formulation of a set of strategies and actionable objectives for the sustainable water use or waste management approach for the current development. This will lead to a range of management measures to meet the set goals and objectives.

7.2.8. Social Impact Assessment (SIA)

SIA is a formal process used to predict how the proposed project will affect existing socio-economic conditions of nearest local communities. It is desirable to ensure that the development options under consideration are sustainable. It also aims to make recommendations for the mitigation of the potential negative impacts and enhancement of the positive ones.

SIA will also contain Social Managemnt and Monitoring Plan (SMMP). SMMP is a site specific plan developed to ensure that the project is implemented in a socially sustainable manner where all contractors and subcontractors, including consultants, understand the potential socio-economic impacts arising from the proposed project and take appropriate actions to properly manage that risk.

Objectives of the SIA Report

The objectives of the SIA report are to:

(i) describe the process undertaken during project design to engage stakeholders, and the planned information disclosure measures and the process for carrying out consultation with affected people and facilitating their participation during project implementation;
(ii) assess the project's likely positive and negative, direct and indirect impacts to existing socio-economic conditions in the project's area of influence;
(iii) identify and evaluate the potential positive and negative socio-economic impacts resulting from the development of the proposed project;

(iv) present a set of mitigation measures to avoid, reduce, mitigate, or compensate for adverse socio-economic impacts;

(v) describe the monitoring measures and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures; and

(vi) identify who is responsible for carrying out the mitigation and monitoring measures.

Scope of the SIA Study

SIA will report will also cover the following:

(a) the present status of socio-economic components of the environment;

(b) The primary data collection of socio-economic conditions of the villages around the 4 km radius of the proposed project,

(c) The secondary data collection for the whole Amayapura Township,

(d) Identification and evaluation of socio-economic impacts for construction, operation and decommissioning phases of proposed project,

(e) Mitigation and enhancement measures for anticipated social impacts in all phases,

(f) Social management plan (SMP) to manage the necessary mitigation and enhancement measures, and

(g) Social monitoring program to measure the improvement of the community around the area.

In making impact assessment, the SIA team will mostly referred to the Guidelines and Methodologies from Asia Development Bank (ADB), International Finance Organization (IFC) and Work Bank.

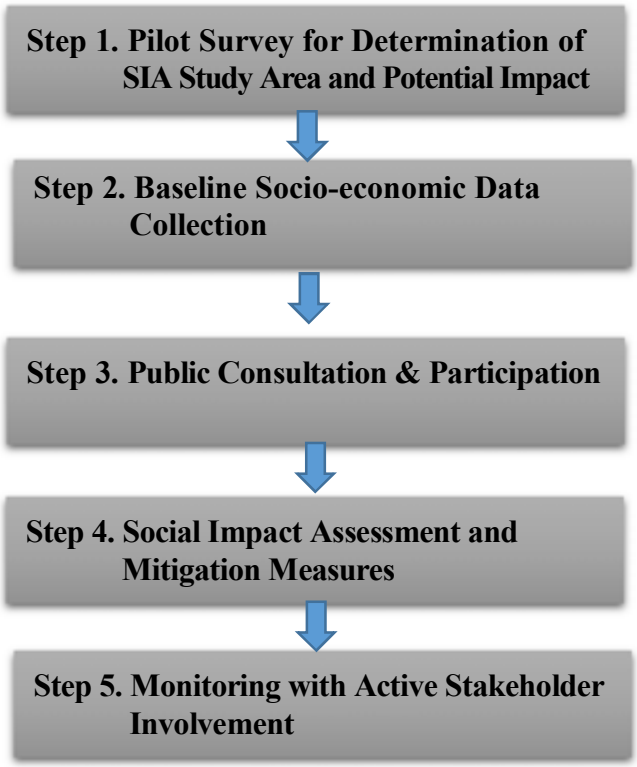
Details of the Social Assessment Practitioner

SIA will be conduct by Socially Responsible Partner (SPR) SIA Team. Below is the background information of SIA Team.

Socially Responsible Partner, SPR		
Specialists including written the SIA report	Dr. Kyaw Swar Tint	Ph.D. (Mining)
	Dr. Thein Tun	Ph.D. (Metallurgy)
	Dr. Myo Min Tun	Ph.D. (Metallurgy)
	Dr. Win Swe	Ph.D. (Geography)
	Ma Nandar Nwe	Dip. and M.S. in EIA/EMS
	Ma Thazin Htwe	Dip. and M.S. in EIA/EMS
	Mg Thant Zin	B.Sc.(Forestry); Dip. in EIA/EMS

Methodology for SIA Study

Socioeconomic impact assessment for proposed project was conducted by the following procedures.



Main Steps in SIA Study used by SRP Group

Socio-economic Impact Study

The EIA team will make the impact assessment for socio-economic both positive and negative impacts such as job opportunities, impacts associated with population influx, impacts on social services etc.

7.2.9. Health Impact Assessment

HIA provides a systematic analysis of the potential community health impacts as well as developing options for maximizing the positive health impacts, minimizing the negative impacts and enhancing health equity/reducing health inequalities. This HIA report was conducted by Socially Responsible Partner (SRP) Social and Health Impact Assessment Group, and the potential health impact of the proposed project on local communities and the wider society were assessed.

Procedures for HIA Study

HIA for proposed project will conduct by the following procedures.

(a) Scoping process;

(b) Identification and evaluation of potential health impacts;

(c) Mitigation measures for potential health impacts; and

(d) Management and monitoring process HIA as follow:

No.	Stage of Health Impact Assessment	Purposes	Outcomes
1.	Scoping Process	To determine the scope of the HIA to be undertaken.	Outlines of how the HIA will be conducted including the time, resources and activities required.
2.	Identification and assessment of potential health impacts	To identify and assess the potential health outcomes.	Document that describes the potential health outcomes of the proposed sugar mill.
3.	Mitigation	To minimize and remedy for potential health impacts.	Set of mitigation measures to prevent, reduce and minimize for potential impacts of proposed project.
4.	Management and Monitoring	To manage the effectiveness of the HIA and monitor health outcomes.	Document that manage and monitor the HIA process and other outcomes.

Scope of the Study

Initially, a detailed understanding of the project, its aims and objectives is developed. This is followed by a desk-based community health and wellbeing profile using existing local health information from Public Health Department (Dawei). Based on secondary data collection, HIA for local people in nearest villages follows by a more detailed community health impact based on the ground fieldwork, social surveys, focus groups and discussions with key informants such as community health and development workers and local health/public health officials. This study also involves developing a baseline assessment and community profile with a particular focus on existing health and wellbeing problems and assets.

Methods of Data Collection

The typical methods of data collection of existing health conditions consist of the following:

(a) ***Interaction with Government Departments***: Interaction with key government departments such as general administrative office, department of health etc. are conducted to identify constraints and additional information specific to the individual departments and ministries;

(b) **Household Surveys**: Questionnaires and surveys about health are employed to obtain public needs and concerns from a representative sample household.

Data Sources

Primary and secondary data for obtainable health conditions of local communities were collected from the following data sources.

(a) Regional health data from department of health;
(b) Group discussions with key informers,
(c) Community feedback from household surveys,
(d) Feedback from government and non-government stakeholders, and
(e) Public meetings.

Law and Legislations Related to HIA

The relevant laws and legislations that safeguard about the health and wellbeing of public in Myanmar are shown in the following table.

Relevant Laws and Regulations for Human Environment in Myanmar

Laws and Regulations	Year	Purpose
Town Act and Village Act	1907, 1908	To protect the people and animals of Myanmar from infection diseases.
Essential Supplies and Services Act	1947	To maintain supplies and services essential to the life of the community providing or regulating water supply and environmental sanitation in rural areas.

Public Health Law	1972	To promote and safeguard public health and to take necessary measures in respect of environmental health.
Animal Health and Development Law	1993	To prevent of dangers to animal feeds, prevention of infectious diseases, and prevention of cruelty to animals.

Methodology Used in HIA

HIA for proposed project will be conducted by the following methodology.

(a) Scoping process for determination of HIA study area and project affected persons (PAPs);
(b) Data collection for anticipated health impacts;

(a) Scoping Process for HIA Study

Scoping for HIA study will be done to determine SIA study area and PAPs.

Determination of HIA Study Area

To similar as SIA study, the HIA study area will conduct within 3 km radius around the proposed project.

HIA Survey Team

The HIA team will organize 6 people (1 health consultant, 1 social consultant, 2 local people and 2 health surveyors). Two local people are members of quarter administrative offices and 2 surveyors are from qualified survey team. Roles and responsibilities of key consultants are as follow:

No.	Consultants	Role	Responsibility
1.	Dr. Khon Aung M.B.B.S (Ygn)	Health Consultant	Health Impact Assessment and Health Management Plan
2.	U Aung Naing Tun LLB, MBA, MPA, M.Dev.S, M.A (BL)	Health Law Consultant	Health Law Consultant

(b) Data Collection

To assess potential health impacts, HIA team will make sure of both primary and secondary data collections as follow:

Primary Health Data Collection

Primary health and wellbeing data for nearest villages will be collected by household within the 3 km radius of the project area.

Secondary Health Data Collection

Secondary data for health and wellbeing profile of nearest village will be sourced from Department of Health, Station Hospital and some data are sourced from Local Administrative Office.

7.2.10. Risk Assessment

There are various factors, which can cause disaster in the mines. These hazards are as follows:

(1) Natural Hazards and Disaster Risk

(2) Mining Industrial Hazards.

(1) *Natural Hazards and Disaster Risk*

Typical natural hazards in Myanmar include floods, storms and cyclones, droughts, landslides, and earthquakes.

Although there was no natural disaster in the project area according to the secondary data collection, flood and storms hazards can be considered as the most possible natural disaster.

(2) *Mining Industrial Hazards*

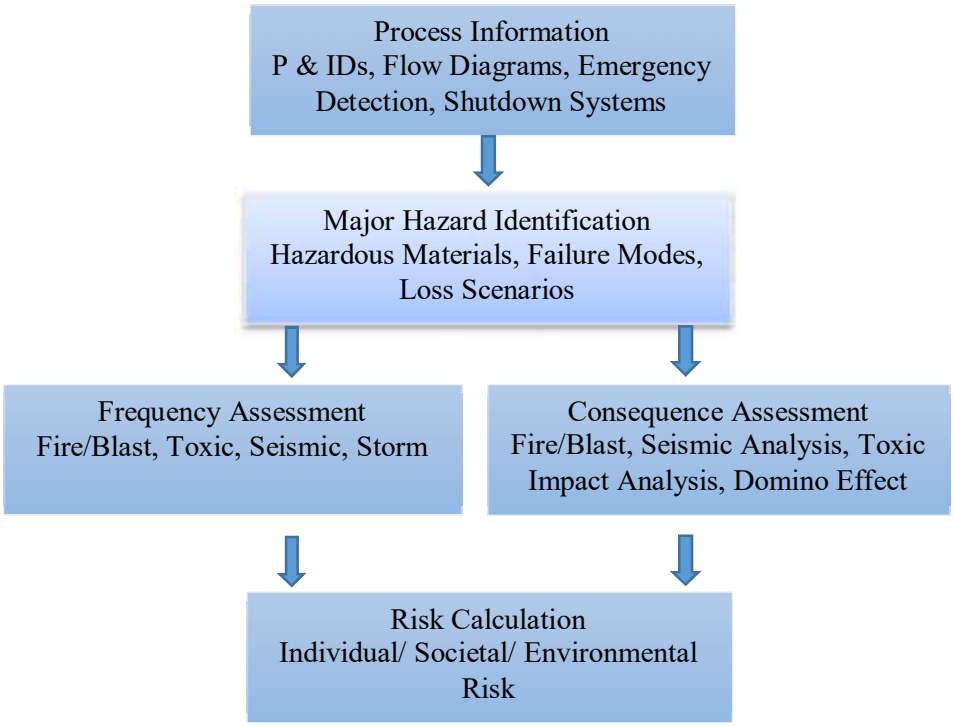
There are various factors, which can cause disaster in the mines. These hazards are as follows:

- Waste rock dumps;
- Equipment & Heavy machinery;
- Settling pond failures; and
- Fire, etc.

There is no a comprehensive approach, or a set of industry guidelines, or technical publications available that address the risks from hazards such as fire, lightening, earthquake, and forest fires etc.

Risk Assessment Flow Diagram

The following is the flow chart for risk assessment procedure.



Risk Calculation

Risk due to hazards at a proposed mine site and its surroundings is composed of summation of all risks given no escalation (i.e. no domino effects) of undesired events and all risks given an escalation (i.e. domino effects) of undesired events:

□ = Σ □ |□ □ +Σ□ |□

Tolerability of Environmental Risk (Category Definitions) – Loss of Containment

Category	Definitions	
6	Catastrophic	- Major airborne release with serious off-site effects - Site shutdown

		- Serious contamination of ground water or water course with extensive loss of aquatic life
5	Major	- Serious toxic effect on beneficial or protected species - Widespread but not persistent damage to land - Evacuation of local populace - Temporary disabling and hospitalization - Serious toxic effect on beneficial or protected species - Widespread but not persistent damage to land - Significant fish kill over 5-mile range
4	Serve	- Hospital treatment required - Public warning and off-site emergency plan invoked - Hazardous substance releases into water course with 1/2-mile effect
3	Significant	- Severe and sustained nuisance, e.g. strong offensive odors or noise disturbance - Major breach of permitted emissions limits with possibility of prosecution - Numerous public complaint
2	Noticeable	- Noticeable nuisance off-site, e.g. discernible odors - Minor breach of permitted emission limits, but no environmental harm - One or two complaints from the public
1	Minor	- Nuisance on site only (no off-site effects) - No outside complaint.

UK HSE, "Safety and environmental standards for fuel storage sites", Process Safety Leadership Group, 2009. Environment Agency for England and Wales, "Integrated Pollution Prevention and Control (IPPC) Environmental Assessment and Appraisal of BAT", July 2003

Tolerability Criteria of Environmental Risk

Category	Definition	Acceptable if frequency less than	Acceptable if reduced as low as is reasonably practical and frequency between	Unacceptable if frequency above
6	Catastrophic	1.0E-06 per year	1.0E-04 to 1.0E-06 per year	1.0E-04 per year
5	Major	1.0E-06 per year	1.0E-04 to 1.0E-06 per year	1.0E-04 per year
4	Serve	1.0E-06 per year	1.0E-04 to 1.0E-06 per year	1.0E-02 per year
3	Significant	1.0E-04 per year	1.0E-04 to 1.0E-06 per year	1.0E-01 per year
2	Noticeable	1.0E-02 per year	~1.0E+01 to 1.0E-02 per year	~1.0E+01 per year
1	Minor	All shown as acceptable	-	-

7.3. Key Potential Impacts and Mitigation Measures

Although the mining operation will include pre-construction, construction, operation and decommissioning phases, there will no necessary to conduct impact assessment for pre-construction and construction phases because the mining operation was started since 1999. So, the impact assessment will take place only for operation and decommissioning phases.

7.3.1. Environmental Impacts of Mining Operation due to Operation Phase

Environmental impacts of mining operation due to operation phase will be as follow:

(i) Impacts on Air Environment;

(ii) Impacts of Noise

(iii) Impacts on Surface Water Environment;

(iv) Impacts on Soil and Ground Water Environment;

(v) Impacts on Biodiversity Environment

7.3.1.1. Impacts on Air Environment

Increase in airborne particulates due to increased dust and exhaust emissions during mine operation. Dust generation could potentially impact on community and worker health due to elevated concentrations of dust (PM_{10}), especially along both roads and mining areas. In addition, dust could be generated once the tailings have dried out, since they are susceptible to wind-blown dispersal.

Given the rural nature of the area and ambient air quality monitoring, the air quality is relatively high. So, the proposed operations are not likely to result in exceedances of the selected criteria for PM_{10}, NO_2, SO_2, DPM, VOCs and dust fall at surrounding sensitive receptors. Moreover, the proposed long-distance haulage is likely to result in exceedances of the selected criteria for PM_{10}, and NO_2 for more than 400 m from the centre of the road.

Mitigation Measures

A reduction in the amount of dust generated through vehicles and during mining operation can be effectively mitigated by simply reducing the speed of vehicles and by wetting road surfaces. Covering the dried tailings with topsoil and re- vegetating the area can successfully mitigate against wind-blown tailings.

Greenhouse Gas (GHG) and Climate Change

Clearing vegetation from the project site will lower the carbon absorption potential of the area. Similarly, project activities and processes including transportation, use of generators and waste management activities have the potential to emit GHGs. Ability of the project infrastructure to withstand the effects of climate change (such as more severe weather, droughts and storms).

Mitigation Measures

Replanting the bare area within the mine site.

7.3.1.2. Impacts of Noise

Given the rural and agricultural nature of the of the project area, a substantial increase in noise levels can be anticipated during operation. For the proposed project, the major noise

generating sources during the operation phase will be movement of trucks, operation of trommels, jigs and shaking tables. If most of the operation machineries are running at the same time, this cumulative noise level can increase to 82 dB(A) at 15 m (about 50 feet) distance as follow:

$$L_{site} = 10 \log \left(\frac{10^{8.5} + 10^{8.4} + 10^{8.2} + 10^{7.5}}{4} \right)$$

$$= 82.7 \text{ dB(A)}$$

Table Typical Construction Equipment Noise Emission Levels

Equipment Type	Noise Level (dBA at 50 Feet)
Trommel	85
Truck (Medium and Heavy)	84
Jig	82
Shaking Table	75

The predicted noise level at nearest villages during operation phase can be predicted as follow:

Receptors and distances from project	Existing noise levels monitored by integrated noise level meter (dBA)		Calculated noise level at site (dBA)		Reduced noise level at receptors due to Distance (dBA)	Predicted cumulative noise level at receptors (dBA)		Allowable noised level (existing noised level + 3dBA) (dBA)	
	Day Time	Night Time	Day Time	Night Time		Day Time	Night Time	Day Time	Night Time
Local residents in Heinda (0.9km)	50.1	44.5	82.7	-	27.1	50.3	44.5	53.1	47.5
Myaungpyo Village (1.1km)	49.1	43.4			25.4	49.2	43.4	52.1	46.4

According to the above calculation and monitoring of noise level inside the nearest villages, there will no impact of noise according to the operation of mine and so no mitigation is required for the impact of noise. Noise level monitoring result can be higher than the actual result due to the travelling of motorbike and some cars inside the village road near the monitoring station.

7.3.1.3. Impacts on Surface Water Environment

As Heinda Mine is situated in an area of high topographic relief coupled with high average rainfall levels. In the event of less likely, there might have the potential to contaminate surface water unless properly managed mining activities during operation phase. Site clearance, mine waste facilities, open pit developments, effluent discharge also have the potential to impact on surface water. Surface water impacts which have the potential to occur as a result of the proposed project include:

- Sediment loading of water courses and water bodies;
- Erosion;
- Alternation of stream courses due to the sedimentation into the river bed; and
- Alteration and impediment of perennial and non-perennial water courses and natural drainage patterns.

Surface water might be contaminated by the following factors:

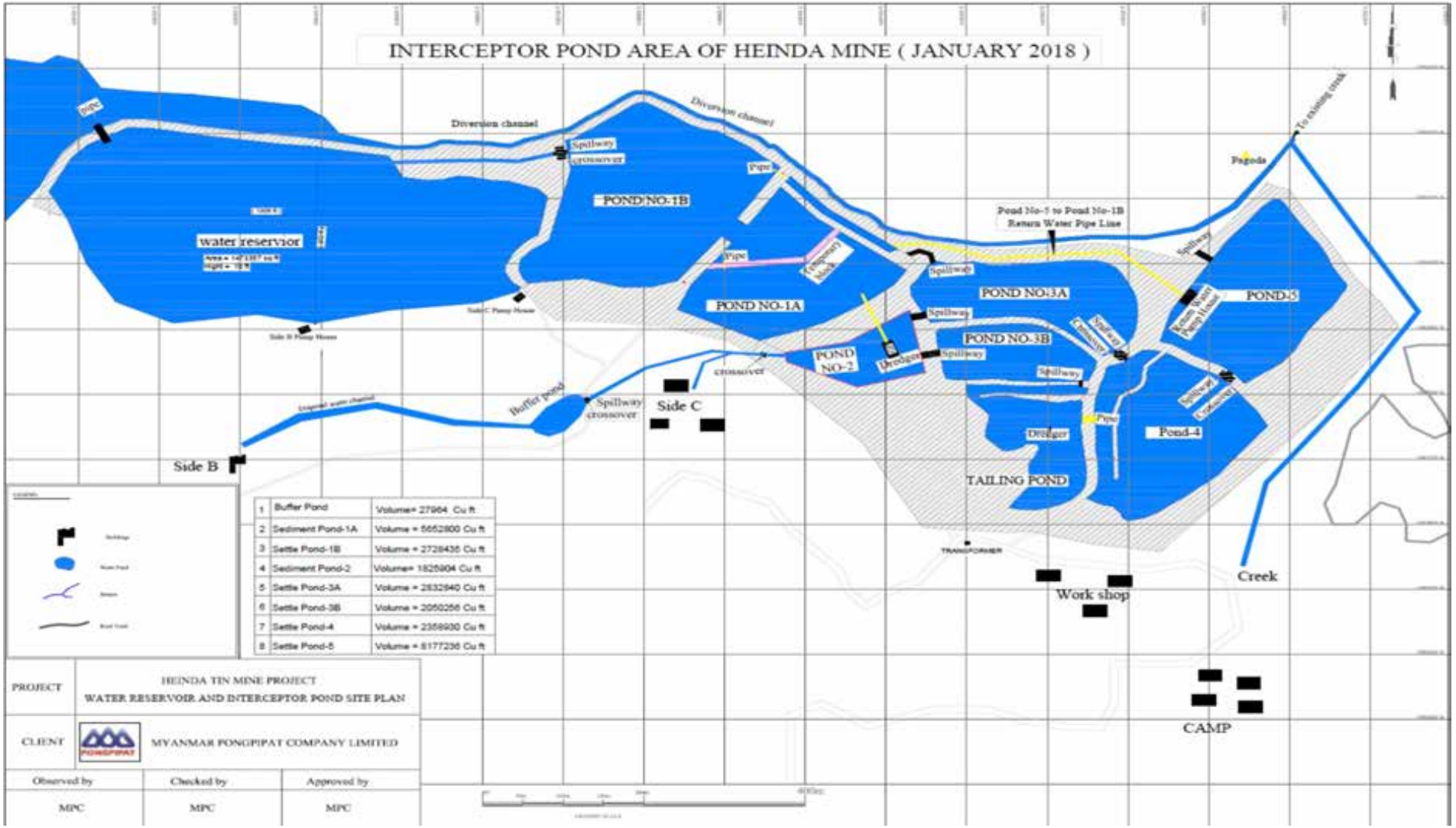
Discharge from Processing Plant

Although wastewater will not release and reuse as process water during summer (February to May) and Winter (October to January), large volume of effluent water (rain water from sediment pond 7) might release during heavy rainy seasons (June to September) into the Myaungpyo Creek. The discharge water with high content of sediments in wastewater might effect aquatic lives, domestic and drinking water quality along the Myaungpyo Creek to the Tanintharyi River. Moreover, there will be impact on agricultural lands along the downstream of wastewater if wastewater enter into the agricultural land during the flood in rainy seasons. In this case, it would be highly unlikely that discharge water might effect to ecology under the systematic detention recycling system.

Mitigation Measure

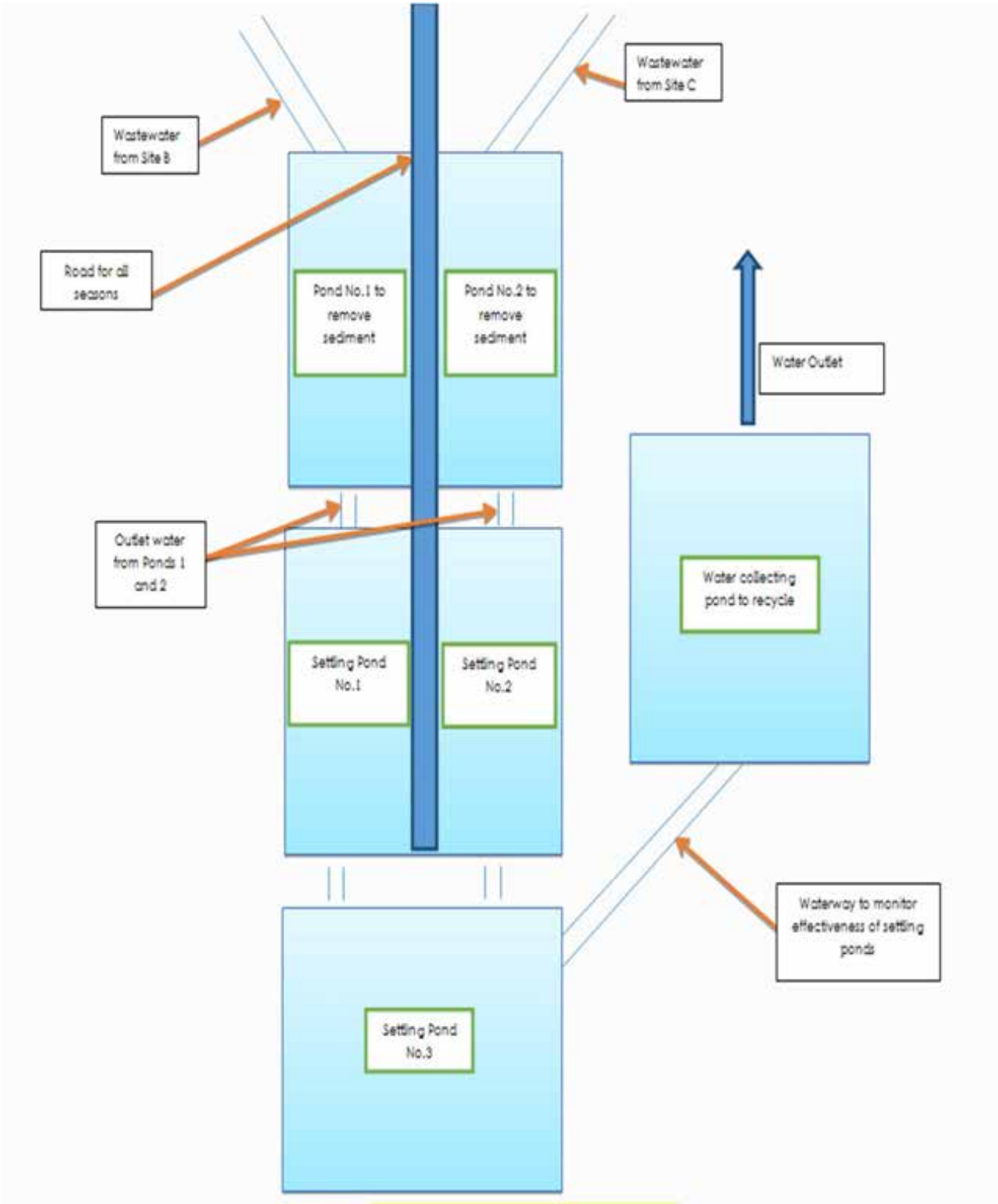
Effective sediment ponds according to the following conceptual design will be constructed for wastewater from processing plant.

Current Condition of Settling Ponds in Aerial Photo

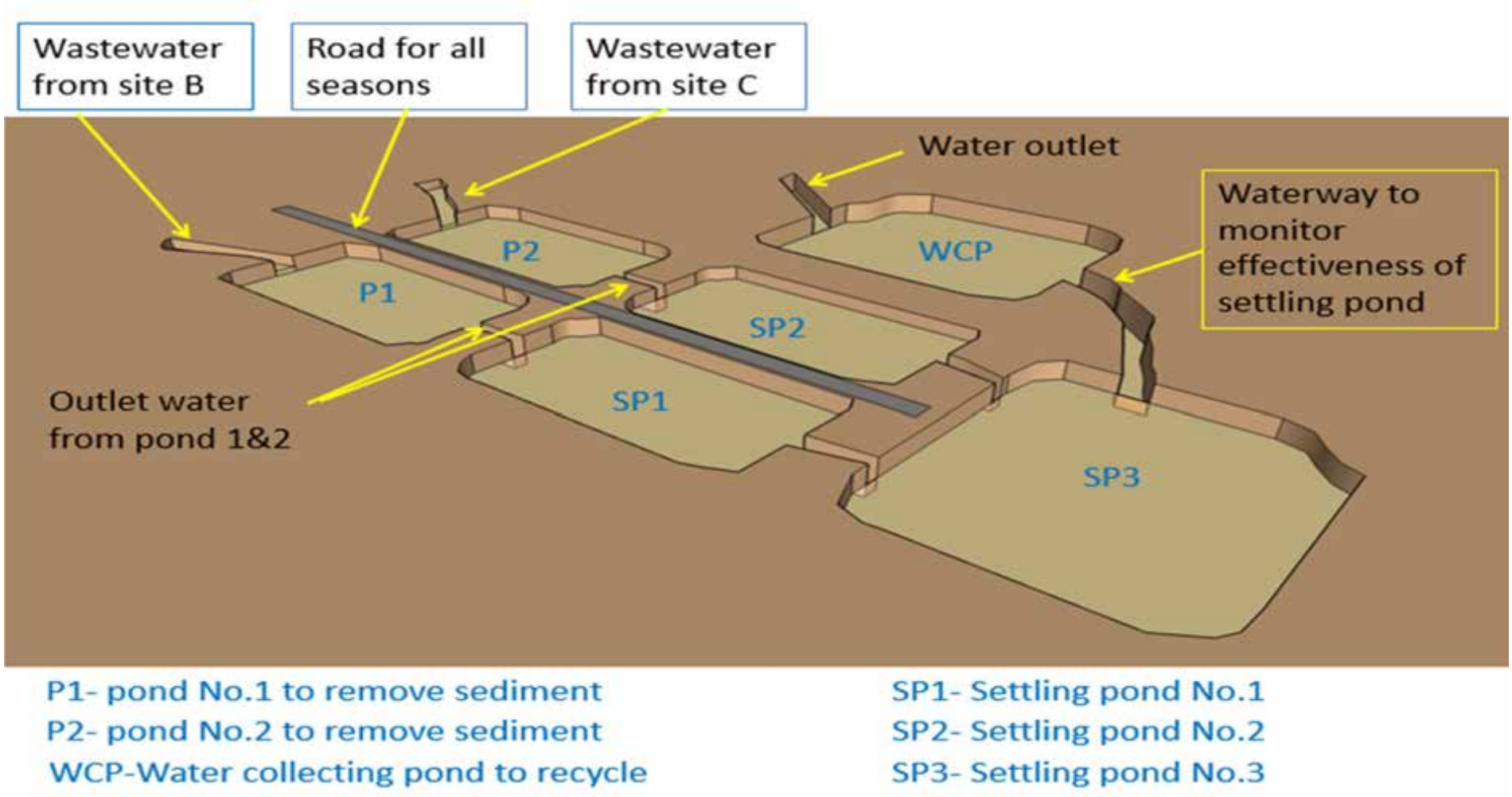


Current Condition of Settling Ponds in Map

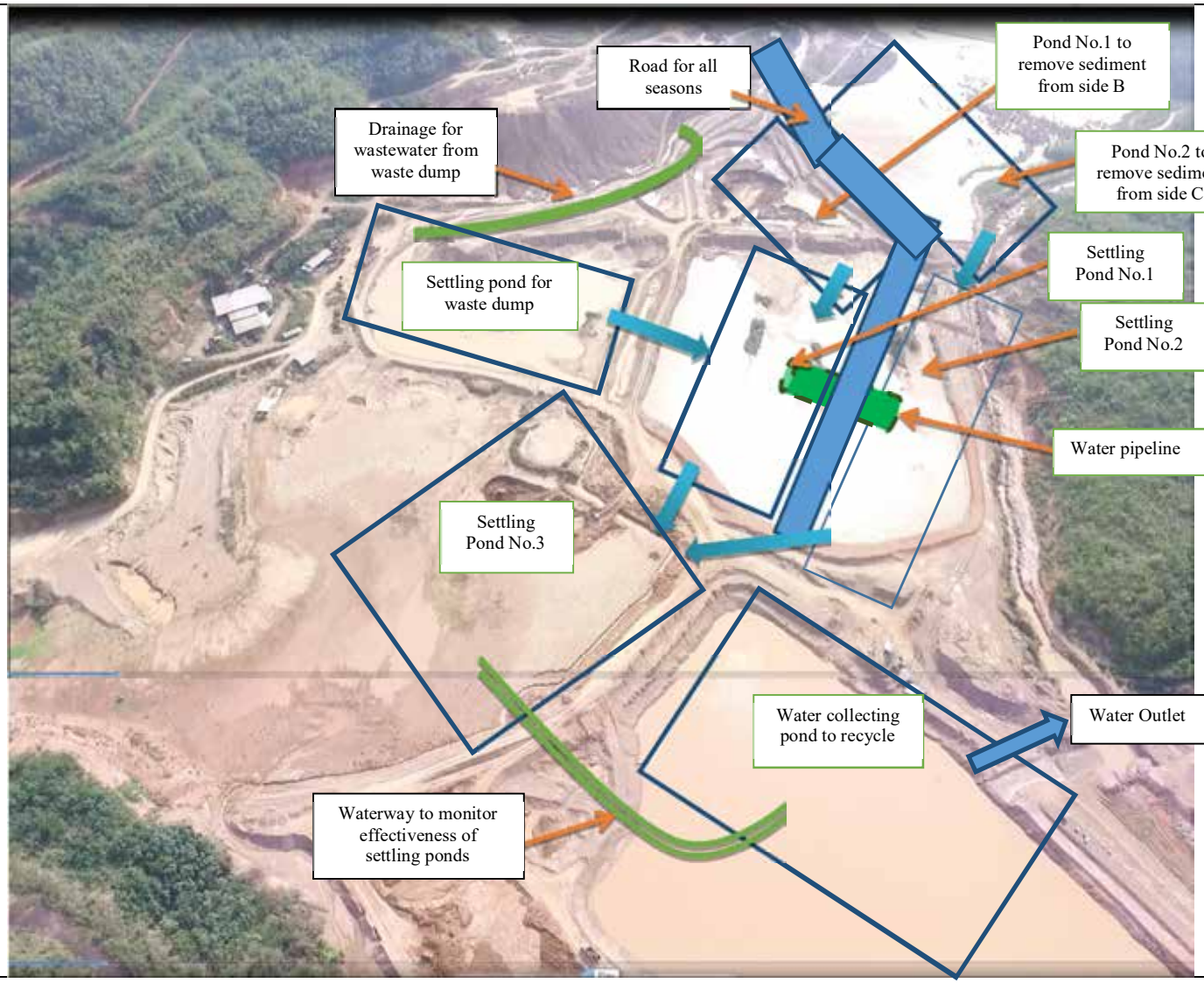
According to the current condition of the settling ponds, sediment (fine soil particles) removal system not contain and all of the settling ponds will be full within a few years. So, the developer is proposed by the following conceptual design for settling ponds (wastewater treatment) with sediments removal system.



Conceptual Plan Design for Proposed Settling Ponds



Conceptual 3D Design for Proposed Settling Ponds



Propose Conceptual Design of Settling Ponds in Google Earth

7.3.1.4. Impacts on Soil and Ground Water Environment

Mining activities may affect local groundwater quality due to contaminated effluent or contamination through contact with wastes. Pollution could result from the infiltration of contaminated surface water into the groundwater table. The principal sources of contamination from the surface are hazardous materials such as chemicals and hydrocarbons. Heinda mining activity only use gravity separation and no chemical in the process therefore it would be less likely for contamination impact from chemicals in this case Poorly managed domestic sanitation (e.g. badly sited pit latrines) and leachate from solid waste disposal sites can also pollute ground water sources. Once an aquifer is contaminated it is impossible to rehabilitate. Although plumes of pollution will migrate very slowly, major pollution incidents may eventually contaminate ground water sources in and around the village. The period over which the impacts occur will be relatively short, but the impacts will be very long lasting.

(a) Soil Erosion

Soils in the project area have high potential, but are also highly prone to erosion. The mining operations are also proposed in an area of high topographic relief coupled with high average rainfall levels. The project has the potential to result in soil transfer and sediment loading due to erosion. Soil erosion will also cause surface water pollution.

Mitigation Measures

Replantation of the old mining area as soon as possible. Movement, stockpiling and rehabilitation of soils during mine operation, and closure will require careful planning and management.

(b) Contamination from Non-ore Pollutants:

Hazardous materials and chemical pollutants (e.g. hydrocarbons from machinery and vehicles, floatation reagents, uncured cement, paints, shutter fluids, etc.) associated mining activities, as well as washing detergents and soap etc., might pollute both groundwater and surface water. These pollutants could be harmful to aquatic biota and impact on drinking water quality for communities and domestic stock downstream. The risk of wastewater arising from the waste rock dump and top soil storage facility.

Mitigation Measures (Sedimentation and Contamination)

- Store and treat all contaminants so as to eliminate any water pollution risk. No stream or river can be used for partial or total wastewater treatment purposes. No wastewater dilution is allowed.
- Detain mine water and surface run-off from the mining areas in sedimentation ponds before the clear surface water (if uncontaminated) is allowed to flow into the adjacent drainage lines or streams.
- Drain and treat runoff waters coming from hazardous areas such as concentrator plant, mineral stock-piling, concentrates, mine tailings accumulation areas before disposing them at the discharge point.
- Contaminated water from the process plant should be treated in settling ponds and should be stored in a dedicated storage reservoir and fed back to the process water reticulation together with the supernatant or decant water from the TSF.
- Any effluent discharged into the environment must be treated to relevant national standards.
- Ensure that temperature of effluent prior to discharge does not result in an increase greater than 3°C of ambient water temperature.
- Do not discharge effluent with Total Suspended Solids (TSS) of more than 10% of the receiving stream.
- Do not discharge effluent with a pH that fluctuates more than 10% of the receiving stream.

(c) Potential Groundwater Contamination from the TSF

Although it is unlikely that current existing human users of groundwater in the area will be affected, the resource will be permanently degraded. It is unlikely that acidification will occur during the operational phase, even though waste rock does not have a high acidification potential. Due to the geochemical properties of footwall materials, water quality descriptions for mine water quality during the operational phase, also apply to the TSF waste rock. It is expected that Al, Fe and Mn will mostly be present at concentrations of <10mg/L. As (Arsenic) concentrations may exceed drinking water guidelines, it is expected to be below guidelines. Cd (Cadmium) concentrations may marginally exceed drinking water guidelines. Cu (Copper), Ni (Nickel), Pb (Lead) and Zn

(Zinc) concentrations are expected to exceed drinking water guidelines, and may potentially exceeding DRC Mining regulation guidelines. Water draining through tailings material will have much lower concentrations. Although As, Cd, Ni and Pb concentrations may exceed drinking water guidelines, these are expected to be below guidelines of the effluent level of mining in Myanmar Emission Guidelines. Zn concentrations are expected to exceed drinking water guidelines but below Myanmar Emission Guidelines.

Mitigation and Management

- Major fissure water features should be measured and mapped.
- Excess water must be pumped to the surface water storage facilities for re-use or discharge into the environment.
- If the flows exceed 0.3Ml/day, volumes of excess water must be measured and reported daily, together with a record of the percentage of surface storage capacity available at the end of the day.
- Water discharged to the surface water environment must conform to site-specific water quality objectives.
- All pollution control dams and the TSF must have impervious base layers or be lined, according to design standards.
- Solid waste disposal sites must be lined with impervious material.
- Strict management of all hazardous materials, such as hydrocarbons and chemicals, must be implemented.
- Prevention of hydrocarbon spills from machinery and vehicles by the use of drip-trays and permanent bunded areas for overnight parking. This should include any workshops envisaged for the project. In addition, workshops should be fitted with oil traps and sumps to ensure that no contaminated water/hydrocarbons are allowed to escape.
- Spills must be cleaned up and remediated immediately after occurrence.
- All contaminated surface water run-off from mine sites must be contained and treated appropriately to relevant national or international standards prior to discharge.
- Any effluent discharged into the environment must be appropriately treated to relevant national or international standards.

(d) Contamination from Non-ore Surface Sources

As for surface water resources, groundwater sources might be contaminated by infiltration of contaminated surface water into the groundwater table. The principal sources of contamination from the surface are hazardous materials such as chemicals and hydrocarbons, together with unlined reservoirs of water awaiting treatment and recycling. Poorly managed domestic sanitation (badly sited pit latrines, for instance) and leachate from solid waste disposal sites can also pollute ground water sources. Due to groundwater flow being toward the mine during the operational phase, the groundwater quality of surrounding aquifers are unlikely to be impacted.

Groundwater flow directions will be towards the mine workings in the vicinity of the mine, and water may accumulate in the lowest mining levels. While the mining level is above the valley floor short-term outflows of water may influence small areas bordering the workings; most-likely vertically downward, and probably not extending laterally more than 30m from then mine.

Mitigation Measures

Line the basin with appropriate material.

- All groundwater monitoring recommendations mentioned for the mining area are applicable, including groundwater level monitoring and sampling locations/frequency/analyses.
- Ensure that the TSF is regularly and frequently inspected by appropriately qualified and experienced experts, and that all defects are remedied without delay.
- Engineered capping design should have specific objectives to reduce toe seepages as well as infiltration rates to the groundwater system (e.g. through shaping without creating erosion, installing a capillary break, cover thickness, choice of vegetation, or an artificial cover)
- If practical, and found to be a workable solution, the base of the rock discard can be prepared with tailings material, thus preventing direct contact of groundwater from below, with waste rock. It will also reduce the contact time of rainfall recharge with waste rock; thus improving the leachate quality of the toe seepages.
- The most important water quality management measure to consider during the operational phase, is to ensure that mine water from upper levels are allowed to flow to pumping stations as quickly as possible from where it will be pumped into holding dams on various mining levels, and eventually out to the surface pollution control dam.

7.3.1.5. Impacts on Biodiversity Environment

Fragmentation of habitats can lead to the loss of viable populations, especially in animals requiring large home ranges. Mining operations may well have an impact on terrestrial flora and faunal habitats, as well as potentially impacting breeding or foraging habitats of numerous species (birds, amphibians, reptiles, juvenile fish nursery areas etc.). Much of the forests and vegetation found close to the project area have been impacted by humans living and mining in the area since the discovery of tin deposits.

However, extensive areas of pristine primary forest still surround the project area. The impact on these areas is likely to increase in the near future as more land is cleared for tin mining on a commercial scale. This will put added pressure on the ecosystem and the few remaining faunal populations.

As mentioned the area has not seen a dramatic reduction in the numbers and diversity of resident faunal species, and this is not likely to improve with the introduction of the mining project. Although the number of people living in the area has increased little by little, the mining project and its associated noise and transport impacts may limit or prevent some wildlife from returning to the area.

Mitigation Measures

Being a mining project, no mitigation measures are required for biodiversity environment expect from replanting (rehabilitation and revegetation program).

7.3.1.6. Impacts on River Flow Regimes

The water requirements for the operational purposes of the mine, including mineral processing, are currently estimated to be a continuous abstraction rate of about 6 litres / second.

The average wet season flow rate of 300 litres /sec measured the Myaung Phyo Creek in June 2017 indicates that these requirements are likely to exceed the capacity of the creek to supply it, especially during the dry season, without adversely affecting the ecological functioning of the river.

However, it will effect on the capacity of water resources in Myaung Phyo Creek during dry season. It will therefore be necessary to provide off-channel balancing storage on the mine site and will not have a significant impact on the quantitative flow regime of the Myaung Phyo Creek.

Estimated maximum inflows for SLC ranged from around 500 cubic metres to about 5000 m^3/d at the anticipated maximum mine depth. These volumes of water will need to be pumped from the mine to keep the workings dry, and are equivalent to pumping rates rising from 6 to 60 litres per second over the operating life of the mine. These estimates are based on incomplete knowledge of the geohydrological conditions in the mining area, and must be regarded as first-order estimates.

Mitigation Measures

- Minimise abstractions by recycling as much previously-used water as possible.
- Avoid working (especially mineral processing) during dry seasons.

7.3.1.7. Failure of Tailing Storage Facility

In the event of most unlikely, a partial or total failure of the containment wall might lead to large volumes of sediment and tailings being released into the Myaungpy Creek. If the failure occurs as a result of a major rainfall / flooding event, water levels in the Myaungpyo may rise sufficiently high to damage or threaten the integrity of infrastructure near to the creek, such as the agricultural lands, betal plantation, infrastructures and road.

A catastrophic failure towards the end of the life of the mine during a very high flood will almost certainly result in sediment being washed downstream into the Myaungpyo Creek, which is also a tributary to the Pauk Tai River and Dawei River. It is important to note that the failure of the TSF will have water quality implications for the Myaungpyo Creek, and probably also for the Pauk Tai River.

Mitigation Measures

- Ensure that the TSF is designed and constructed to the highest possible safety standards, to withstand an appropriately extreme flooding event.
- Ensure that the TSF is regularly and frequently inspected by appropriately qualified and experienced experts, and that all defects are remedied without delay.

7.3.1.8. Hazardous Wastes

Inappropriate storage of wastes, particularly those exhibiting harmful properties (i.e. hazardous wastes), can result in the contamination of land and water resources. Leachate

may be formed as water percolates through the solid waste, and this leachate may contain a variety of toxic compounds, including metals. As such, it could result in the contamination of water and land. The presence of certain toxic compounds in water as a result of pollution may render the water unsuitable for certain applications, including human consumption.

Mitigation Measures

- All wastes will be managed according to the requirements of No. (2) Mining Enterprise legislation and, preferably, the requirements of the IFC General EHS Guidelines (2007);
- All general wastes that cannot be reused or recycled will be stored temporarily in a dedicated area and then transported regularly to the proposed landfill for disposal;
- The proposed general landfill site will be sited, designed and operated to international standards to isolate the wastes and prevent environmental contamination, particularly groundwater contamination (EHS Guidelines for Waste Management Facilities, IFC 2007).
- The landfill site will be located and designed in such a way so as to minimise the risk of contamination of this water resource;
- A comprehensive Integrated Waste Management Plan (including the management of hazardous wastes) should be developed for the site
- All employees, contractors and visitors to the site must be informed of correct waste management procedures, including separation of general and hazardous waste at source;
- Waste storage and disposal areas must be located at least 100m from surface water resources or important drainage lines.
- The landfill sites must be secured at all times to prevent unauthorised access.

7.3.1.9. Impacts on Transportation and Traffic

The project is located in a rural area with limited vehicular traffic, substantial pedestrian and livestock traffic, and high topographical relief. Anticipated mine traffic volumes and loads will be a substantial increase to current levels, as well as a change in the speeds and types of vehicles travelling through the area. Potential traffic impacts and mitigation measures may

require greater financial and/or technical inputs due to the terrain and minimal existing infrastructure.

Developing and upgrading the roads to service the mine, as well as a significant increase in heavy vehicle traffic, will increase risks to local residents' health and safety. Roads in the area are currently used by large numbers of pedestrians, bicycles and motorbikes. There will be an increase in the amount of vehicle movements in proximity to the mining operation. Although local communities are not unfamiliar with vehicles, the risk of traffic accidents is still very important. Villages situated along existing roads will be especially at risk. Vehicle related dust pollution (PM_{10}) may also be a significant issue if not intentionally mitigated.

Mitigation Measures

Reduce speed within the Heinda Village internal roads and use traffic safety sign at every crossing within the village roads. To minimise the risk of accidents occurring the following is recommended:

- A speed limit appropriate to the design and construction factors and characteristics of the roads be implemented (such as width, horizontal and vertical alignment, grade, sightlines and surfacing material) for all delivery vehicles, and strictly enforced.
- Heavy delivery vehicles should not travel between 10pm and 6am unless it is absolutely unavoidable.
- Delivery vehicles must not be overloaded and loads should be securely fastened.
- Consistent random spot checks on drivers must be conducted to ensure they are not under the influence of drugs or alcohol.
- In the event that accidents do occur, within each vehicle, an emergency response plan should be provided. This should specify the actions required of the driver in the event of an accident. This should contain the following information at least:
    - Contact numbers for local police, local ambulance and supervisor.
    - Instructions on basic first aid that can be administered to stabilise the injured.
    - The supervisor, in turn, should have a rehearsed emergency response plan toprovide assistance to the driver and victims.

7.3.1.10. Visual Impacts

Visual impact from the project refers to receptors and locations from which the change in landscape or topography would be visible during operation, closure, and post-closure of the project.

Mitigation Measures

Replantation have to make during the mining operation and before and after the mine closure within the mining area.

7.3.2. Impacts Resulting from the Decommissioning Phase

7.3.2.1. Surface Hydrology and Hydrogeology

(a) Impacts on Surface Water Resources

The extent of the post-closure impacts on surface water resources will depend on the extent to which the mine site is rehabilitated. Unless the site is properly cleared and reinstated, surface runoff might carry sediments and residual pollutants into the Myaung Pyo Creek, and then into the Dawei River. Contamination will progressively decrease as the site returns naturally to a vegetated state.

(b) Impacts on Groundwater Resources

Removal of all infrastructure means:

- Removing all surface infrastructure, including the mineral processing plant, machinery, plant, workshops, stores and offices.
- Closing and capping the TSF.
- Closing and capping the pollution control dams.
- Closing the run-of-mine pad.

It is anticipated that the removal of all infrastructure will result in short-term impacts on ground water yields, most of which will be of negative significance, but will be an improvement compared to if everything were simply to be abandoned in situ. It is, however, anticipated that contamination plumes from the TSF will potentially reach the nearby the Myaung Pyo Creek – within 10 years to 35 years after mine closure.

7.3.2.2. Impacts Associated with the Decommissioned and Rehabilitated TSF

The TSF water balance will depend on the final cap design. Important considerations include cap permeability, cap thickness, vegetation, and run-off potential. Due to the saturated groundwater conditions along the natural drainage lines inside the TSF footprint area (a limiting factor for the volume of tailings water that can infiltrate to the groundwater system), most water entering the cap will continue to drain as toe seepages.

Due to the capping of the TSF, and the prediction that rainfall infiltration through the TSF footprint will not exceed natural rainfall recharge prior to the construction of the TSF, groundwater levels should not be impacted after closure, and the post-closure groundwater levels should approximate the pre-mining situation.

The contamination plume that develops over the long-term after the mine closes, will depend on water quality trends inside the TSF, the rate at which water seeps from the TSF to the groundwater system and aquifer hydraulic/hydro-chemical parameters. The contamination plume will be different at shallower and deeper aquifers.

If a means of mitigation can be identified to reduce the TSF impact by 50% (e.g. reduce infiltration by 50% through an effective capping system, or reduce the sulphate concentrations by 50% through choice of material) the impact on the surface water environment should improve accordingly, possibly to acceptable concentrations.

Mitigation and Management

- Remove all above-ground structures, including all hazardous materials storage facilities.
- Remove any areas of contaminated soils - empty and clean out water storage dams.
- Revegetate the entire site: maintain stormwater management system until the site is sufficiently vegetated to prevent further erosion.
- Cap and re-vegetate the ROM pad and TSF.
- All demolition and rehabilitation work must be in accordance with the requirements of closure specifications and objectives.
- Liners will be removed from all pollution control dams and the TSF, and surface areas capped and re-vegetated.
- The post closure land use objectives for unaffected forest areas will be re-instated.

- Groundwater monitoring is to be continued for a period of at least 2 years after closure.
- Water levels and water quality must be recorded using a system of groundwater monitoring boreholes.
- Water levels and water quality in the mine portal system must be monitored for at least five years after closure to confirm predictions of post closure stratification.
- Quarterly groundwater monitoring during post closure must continue until a steady state water level is reached and ground water quality has returned to pre-mining state.
- The mine access portal should be sealed.
- The mine must be allowed to flood as quickly as possible.
- All mining-related changes to the surface topography during mining which may potentially increase rainfall recharge to the mine, such as ponding of water on surface, should be shaped to increase surface water run-off.
- Excess contaminated water on the surface should be pumped into the mine.
- Water levels and water quality measurements in the portal system must continue at least 5 years after flooding to confirm predictions.
- Shaft quality measurements probably at an initial monthly frequency, and later six-monthly.
- As a further safety precaution, the shaft systems will be sealed.
- Operational phase management measures included re-evaluations of the potential impact of the TSF on the local groundwater system. Studies were also recommended to verify the chemicals of concern if compared to applicable water quality guidelines, as well as alternative TSF design criteria. It is assumed that these studies will focus on measures to reduce the long-term impact on the groundwater system; primarily relating to the engineering capping design
- General groundwater monitoring recommendations are important. Surface water monitoring should continue as specified by the surface water expert.
- If an engineered solution cannot be found to prevent toe seepages, a solution should be found to manage contaminated toe seepages water from the TSF; i.e. to prevent contaminated water run-off.
- Groundwater monitoring should continue for a recommended period, as indicated by a qualified hydrogeologist, most likely initially on a six-monthly basis, for the same localities and water quality parameters as specified for the operational

phase. Groundwater monitoring will depend on the nature and extent of impacts after mine closure.

- Surface water monitoring should continue as specified by the surface water expert.
- All mining-related changes to the surface topography during mining which may potentially increase rainfall recharge to the mine (e.g. ponding of water on surface), should be shaped to increase surface water run-off.

8. RISK ASSESSMENT

Risk assessment is the analysis and mitigation of risks of natural disasters and major industrial mining accidents with respect to consequences for the Project and resulting environmental and social impacts.

8.1. General Aspects

The Risk Assessment (RA) for safety in a mine project enables the identification and assessment of Hazard Scenarios that could threaten the safety of individuals, the physical integrity of the environment or the pursuit of economic activities.

Safety has now been the priority of every mining company and there are harsh penalties issued upon companies that do not prioritise the health and safety of their employees and the environment in which they operate. Zero harm is the recent target for mining companies to achieve and this can only be achieved through collaboration with the government, mining companies and mining employees.

The legislation requires mining companies to have code of practices, standards and procedures in place so that workers can know how to keep their working places safe and free from hazards or risks. Workers must at all times be kept on the alert about hazards that are prone to their respective working places so as to combat the issues regarding injuries related to uncontrolled hazards. It should be noted that although mining is still a risky environment, owners and contractors are working very hard to eliminate, minimize and control the hazards associated with mining operations.

This chapter will discuss safety in surface tin mining. It will identify main hazards or hazardous areas in surface mines. Furthermore, it will outline systems and procedures, together with innovative technologies that are employed in surface mining to ensure a safe mining operation. This report was compiled by making use of the internet, literature reading from the library and online books on safety.

8.2. Identification of Hazards and Risk Assessment

There are various factors, which can cause disaster in the mines. These hazards are as follows:

(1) Natural Hazards and Disaster Risk

(2) Mining Industrial Hazards.

(1) Natural Hazards and Disaster Risk

Typical natural hazards in Myanmar include floods, storms and cyclones, droughts, landslides, and earthquakes.

Although there was no natural disaster in the project area according to the secondary data collection, flood and storms hazards can be considered as the most possible natural disaster.

Natural Disaster Management Plan proposed in the following section– 4 in detail.

(2) Mining Industrial Hazards

There are various factors, which can cause disaster in the mines. These hazards are as follows:

- Waste rock dumps;
- Equipment & Heavy machinery;
- Settling pond failures; and
- Fire

Waste Rock Dumps

The waste rock dumps may cause landslides. High rock dumps created at the quarry edge may cause sliding of the dump or may cause failure of the pit slope due to excessive loading, thereby causing loss of life and property. Siltation of surface water may also cause run-off from waste rock dumps.

Equipment & Heavy Machinery

One of the biggest contributors to surface mining accidents is equipment and machinery. This is the case because for most if not all surface mines are mechanised operations meaning that machines and equipment are responsible for the daily operations of the mine. Most of the accidents during transport of dumpers, trucks, proclaims, ripper dozers and other heavy vehicles are often attributable to mechanical failures and human errors.

For proper control and minimisation of hazards associated with equipment and machinery especially mobile equipment hazards, it is paramount that emphasis be placed on training. Operators of mobile equipment are to be trained on how to properly operate these equipment and be found competent.

Once they are deemed competent as haulage truck operators they will be trained on how to identify, minimise, control and eliminate hazards or risks associated with the operation of haul trucks as required by section 10 of Mine Health and Safety Act.

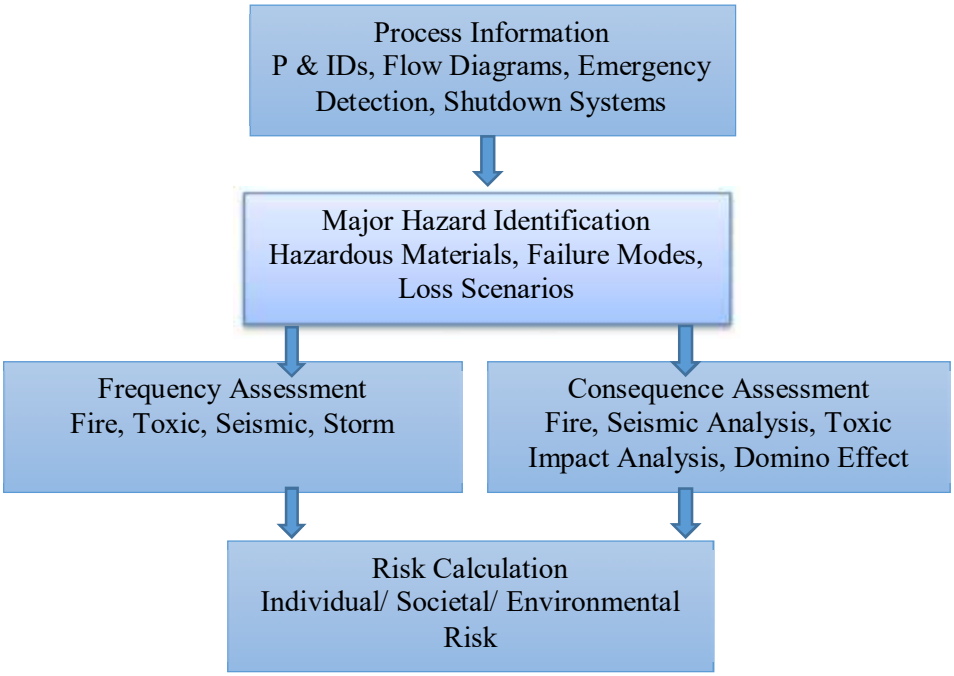
Another factor that contributes to haulage accidents is the construction of unsafe haul roads. It is of utmost importance that haul roads are designed and constructed according to laid down procedures and standards. In order to have a safe haul road that will be free from defects and result in excellent traffic, it is advisable to follow guidelines issued by (Tannant & Regensburg, 2001) when designing or constructing haul roads. The main aspect of traffic management of haul roads will be to focus on the geometric design of the road. By adhering to vertical alignment and horizontal alignment issues such as the stopping distances, sight distances, grade, width, super-elevation, curves and safety berms then most of the accidents can be eliminated.

Failure of Tailing/Settling Ponds

In the event of highly unlikely, the failure of tailing/settling ponds may cause instability of the pond side walls. The failure holds as much weight of water volume in the pond and erosion of soil at the walls. If it occurs it can cause undesirable events such as permanent disability, serious injuries, loss of life and damage to equipment and infrastructure.There is no a comprehensive approach, or a set of industry guidelines, or technical publications available that address the risks from hazards such as fire, blast, toxic smoke, lightening, earthquake, loss of containment (dike failure, etc.), forest fires and etc.

8.3. Risk Assessment Flow Diagram

The following is the flow chart for risk assessment procedure.



Risk Calculation

Risk due to hazards at a storage tank terminal and its surroundings is composed of summation of all risks given no escalation (i.e. no domino effects) of undesired events and all risks given an escalation (i.e. domino effects) of undesired events:

□ =Σ □ |□ □ +Σ□ |□

Tolerability of Environmental Risk (Category Definitions) – Loss of Containment

Category	Definitions	
6	Catastrophic	- Major airborne release with serious off-site effects - Site shutdown - Serious contamination of ground water or water course with extensive loss of aquatic life
5	Major	- Serious toxic effect on beneficial or protected species - Widespread but not persistent damage to land - Evacuation of local populace - Temporary disabling and hospitalization - Serious toxic effect on beneficial or protected species - Widespread but not persistent damage to land - Significant fish kill over 5-mile range
4	Serve	- Hospital treatment required - Public warning and off-site emergency plan invoked - Hazardous substance releases into water course with 1/2-mile effect
3	Significant	- Severe and sustained nuisance, e.g. strong offensive odors or noise disturbance - Major breach of permitted emissions limits with possibility of prosecution - Numerous public complaint

2	Noticeable	- Noticeable nuisance off-site, e.g. discernible odors - Minor breach of permitted emission limits, but no environmental harm - One or two complaints from the public
1	Minor	- Nuisance on site only (no off-site effects) - No outside complaint.

UK HSE, "Safety and environmental standards for fuel storage sites", Process Safety Leadership Group, 2009. Environment Agency for England and Wales, "Integrated Pollution Prevention and Control (IPPC) Environmental Assessment and Appraisal of BAT", July 2003

Tolerability Criteria of Environmental Risk

Category	Definition	Acceptable if frequency less than	Acceptable if reduced as low as is reasonably practical and frequency between	Unacceptable if frequency above
6	Catastrophic	1.0E-06 per year	1.0E-04 to 1.0E-06 per year	1.0E-04 per year
5	Major	1.0E-06 per year	1.0E-04 to 1.0E-06 per year	1.0E-04 per year
4	Serve	1.0E-06 per year	1.0E-04 to 1.0E-06 per year	1.0E-02 per year
3	Significant	1.0E-04 per year	1.0E-04 to 1.0E-06 per year	1.0E-01 per year
2	Noticeable	1.0E-02 per year	~1.0E+01 to 1.0E-02 per year	~1.0E+01 per year
1	Minor	All shown as acceptable	-	-

A comprehensive, holistic approach will be done for determining risk in and around the hydrocarbon storage tank terminal accounting for domino effects.

8.4. Emergency Response Plan (ERP)

An emergency is an unplanned event when a project operation loses control, or could lose control, of a situation that may result in risks to human health, property, or the environment, either within the facility or in the local community. Emergency incident response plan for proposed mine site is proposed to mitigate harms on humans and environment in the project area and its vicinity in case of incident. This plan provides the management structure, key responsibilities, emergency assignments and general procedures to follow during and immediately after an emergency. Moreover, it is necessary to establish ERP to address the immediate requirements for a major disaster or emergency in which normal operations are interrupted and special measures must be taken to:

- Save and protect the lives of employees;
- Manage immediate communications and information regarding emergency operations and work site safety;
- Provide essential services and operations;
- Provide and analyze information to support decision-making and action plans; and
- Manage resources effectively in an emergency operation.

8.4.1 Elements of ERP

Emergency Preparedness and Response Plan that is commensurate with the risks of the facility and that includes the following basic elements:

(a) Communication systems
(b) Emergency resources
(c) Training and updating
(d) Business Continuity and Contingency

Additional information is provided for key components of the emergency plan, as follows:

(a) Communication systems

(i) Worker Notification and Communication

Alarm bells, visual alarms, or other forms of communication should be used to reliably alert workers to an emergency. Related measures according to IFC Guidelines include:

- Testing warning systems at least annually (fire alarms monthly), and more frequently if required by local regulations, equipment, or other considerations; and
- Installing a back-up system for communications on-site with off-site resources, such as fire departments, in the event that normal communication methods may be inoperable during an emergency.

(ii) Community Notification

If a local community may be at risk from a potential emergency arising at the facility, the company should implement communication measures to alert the community, such as:

- Audible alarms, such as fire bells or sirens;
- Fan out telephone call lists;
- Vehicle mounted speakers;
- Communicating details of the nature of the emergency;
- Communicating protection options (evacuation, quarantine); and
- Providing advises on selecting an appropriate protection option.

(iii) Media and Agency Relations

Emergency information should be communicated to the media through:

- A trained, local spokesperson able to interact with relevant stakeholders, and offer guidance to the company for speaking to the media, government, and other agencies.
- Written press releases with accurate information, appropriate level of detail for the emergency, and for which accuracy can be guaranteed.

(b) Emergency Resources

(i) Fire Services

Myanmar Pongpipat should consider the level of local fire fighting capacity in the event of a major emergency or natural disaster. If insufficient capacity is available, fire fighting capacity should be acquired that may include personal fire engine, pumps, water supplies, trucks, and training for personnel.

(ii) Medical Services

Myanmar Pongpipat should provide first aid attendants for the facility as well as medical equipment suitable for the personnel, type of operation, and the degree of treatment likely to be required prior to transportation to hospital during emergency case.

(iii) Availability of Resources

Appropriate measures for managing the availability of resources in case of an emergency in Dawei region include:

- Maintaining a list of external equipment, personnel, facilities, funding, expert knowledge, and materials that may be required to respond to emergencies. The list should include personnel with specialized expertise for spill clean-up, flood control, engineering, water treatment, safety, environmental science, etc., or any of the functions required to adequately respond to the identified emergency.
- Providing personnel who can readily call up resources, as required.
- Tracking and managing the costs associated with emergency resources.
- Considering the quantity, response time, capability, limitations, and cost of these resources, for both site-specific emergencies, and community or regional emergencies.
- Considering if external resources are unable to provide sufficient capacity during a regional emergency and whether additional resources may need to be maintained on-site.

Note: All of these resources should have alternate facilities.

(iv) Mutual Aid

Mutual aid agreements decrease administrative confusion and provide a clear basis for response by mutual aid providers. Where appropriate, mutual aid agreements should be maintained with other organizations to allow for sharing of personnel and specialized equipment.

(v) Contact List

The company should develop a list of contact information for all internal and external resources and personnel in Dawei region. The list should include the name, description,

location, and contact details (telephone, email) for each of the resources, and be maintained quarterly. The contact list should include General Administrative Department (Dawei), General Administrative Department (Myitta), Myanmar Police Force (Myitta), Myanmar Police Force (KyoughtMaeTaung), Public Health and Medical Services (Myitta), Public Health and Medical Services (Heinda), Fire Services Department (Myitta), Fire Services Department (KyoughtMaeTaung), and Department of Relief & Resettlement (Dawei) etc.

(c) Training and Updating

The emergency preparedness facilities and emergency response plans require maintenance, review, and updating to account for changes in equipment, personnel, and facilities. Training programs and practice exercises provide for testing systems to ensure an adequate level of emergency preparedness. Programs should:

(i) Identify training needs based on the roles and responsibilities, capabilities and requirements of personnel in an emergency

(ii) Develop a training plan to address needs, particularly for flood control, fire fighting, spill response, and evacuation. Conduct annual training, at least, and perhaps more frequent training when the response includes specialized equipment, procedures, or hazards, or when otherwise mandated

(iii) Provide training exercises to allow personnel the opportunity to test emergency preparedness, including:

- Desktop exercises with only a few personnel, where the contact lists are tested and the facilities and communication assessed.
- Response exercises, typically involving drills that allow for testing of equipment and logistics.
- What aspects require improvement,
- Update the plan, as required, after each exercise. Elements of the plan subject to significant change (such as contact lists) should be replaced and
- Record training activities and the outcomes of the training.

(d) Business Continuity and Contingency

Measures to address business continuity and contingency include:

(i) Identifying replacement supplies or facilities to allow business continuity following an emergency. For example, alternate sources of water, electricity, and fuel are commonly sought.

(ii) Using redundant or duplicate supply systems as part of facility operations to increase the likelihood of business continuity.

(iii) Maintaining back-ups of critical information in a secure location to expedite the return to normal operations following an emergency.

8.4.2. Proposed Organization for ERP Team

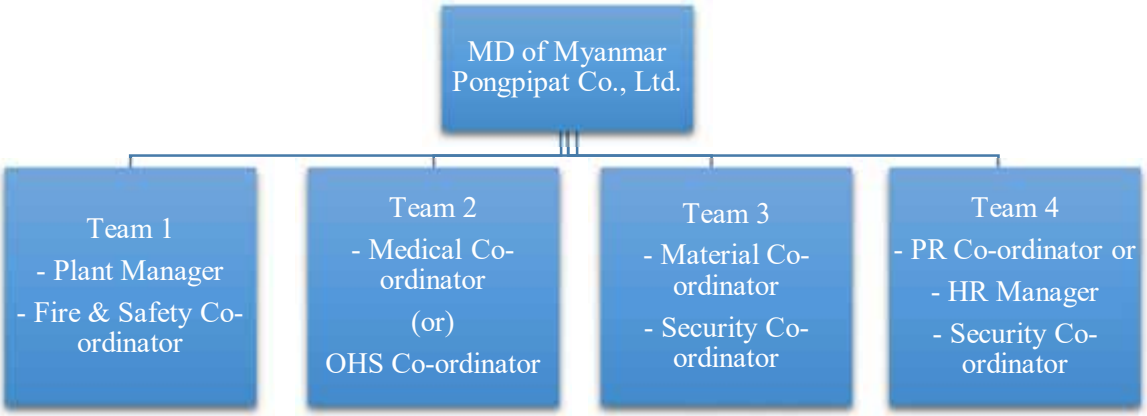


Figure - Organization for ERP Team

8.4.3. Duty Allocation for EPR Team

The followings are the proposed duty allocation for EPR team.

(a) Chief Emergency Controller (General Manager)

- Take control and declare emergency.
- Focal person for all team.
- Contact Authorities.

(b) Plant Manager

- Take steps. Make Emergency shut-down of activities. Put everything in Safe condition.
- Evacuate.
- Commence initial emergency case, till Fire Department or other agencies comes to take up.
- Identify materials requirements and call Material Manager.

(c) Medical Coordinator

- Establish Emergency Center, Treat affected persons,
- Transfer/Remove Patients.
- Assign and Deploy staff.
- Contact Authorities.

(d) Material Coordinator

- Dispatch necessary Supplies.
- Arrange Purchases.
- Providing equipment perform shutdown procedures, damage assessments, emergency repairs and equipment protection.

(e) Fire & Safety Coordinator

- Be Overall in-charge for Fire and Safety.
- Coordinate with Area Coordinator and Direct the Operations.
- Coordinate with City and Other Fire-tenderers.

(f) Public Relationship Coordinator & Security Coordinator

- Remove Crowd
- Arrange Gate security
- Contact Police
- Arrange evacuation
- Contact outside Agencies if asked.
- Handle news media
- Mobilise vehicles
- Arrange Food, clothings to Officers inside.

(g) Emergency Control Center

- Adequate Internal phones
- Adequate external phones
- Workers Tally

Map showing hazardous storages, Fire horns, Safety equipments, Gates and side gates, Assembly points, List of persons.

9.0 CUMULATIVE IMPACT ASSESSMENT

9.1. Methodology and Approach

Cumulative Impact Assessment is the process of assessing potential effects on receptors from environmental and social impacts caused by the combined influence of more than one project. Impacts directly associated with the Project are discussed in the preceding sections. In this section the impacts associated with cumulative effects of the Project and other development are described. Evaluation of potential cumulative impacts is an integral element of an impact assessment. In reference to the scope for an impact assessment, IFC's Performance Standards specify that:

*"Risks and impacts will be analyzed in the context of the project's area of influence. This area of influence encompasses…**areas potentially impacted by cumulative impacts** from further planned development of the project, any existing project or condition, and other project-related developments that are realistically defined at the time the Social and Environmental Assessment is undertaken; and (iv) areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location".* (IFC 2006).

Cumulative impacts in relation to an activity are defined in the EIA Regulations (Government Notice R543) as meaning "*the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area*"

Cumulative Impact Defined. Cumulative impacts result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concerns and/or concerns of affected communities.

9.2. Anticipated Cumulative Impacts

The predicted possible cumulative impacts and their causes are shown in the following table.

No.	Impacts	Causes
1.	Water pollution in the downstream area of mine site	Turbidity, dissolved matters and suspended matters may be rise to downstream area due to the operations of the mine site
2.	Sediment discharged from tin mining activities causes siltation of waterways	waterways had narrowed and creeks had been redirected by siltation in several locations

Mitigation Measures for Cumulative Impacts

A reduction in the amount of Turbidity, dissolved matters and suspended matters during mining operation can be effectively mitigated by effective design of tailing pound treatment system.

In downstream areas the first line of defense is to maintain land cover and prevent soil erosion in the first place. The second line of defense is to trap the material before it reaches the stream network (known as sediment control). In downstream areas the defense is to keep land uncovered for as short a time as possible during construction, and to use silt screens to prevent the sediment from getting released in water bodies. During dredging the spill can be minimized but not eliminated completely through the way the dredger is designed and operated. If the material is deposited on land, efficient sedimentation basins can be constructed. If it is dumped in relatively deep water there will be a significant spill during dumping, but not thereafter, and the spill that does arise will have minimal impact if there are only fine-sediment bottoms nearby.

10. COMMUNITY ENGAGEMENT AND COMMUNITY DEVELOPMENT

In this study, effective public consultation and participation approaches in the form of stakeholder identification, focus group discussions, public meetings and public disclosure were conducted. Public participation empowers local people so that they regard the development projects as their own. Public participation (community involvement) also reduces the impact of uncertainties and stress caused by the proposed project.

10.1. Stakeholders Identification

The following local communities, authorities and NGOs can be considered as key stakeholders who are directly or indirectly related to the proposed project.

(a) Local People (Heinda Village, Myaung Pyo Village, Wa Kone Village, Kim Boom Chone Village, Shwe Chaung Village, Myauk Mae Taung Village, Taung Thone Lone Village);
(b) Village Administrative Offices (Heinda Village, Myaung Pyo Village, Wa Kone Village, Kim Boom Chone Village, Shwe Chaung Village, Myauk Mae Taung Village, Taung Thone Lone Village);
(c) No. (2) Mining Enterprise (Tanintharyi);
(d) Environmental Conservation Department (Tanintharyi);
(e) Head of Local Administration Office (Dawei);
(f) City Development Committee (Dawei);
(g) Department of Public Health (Dawei);
(h) Department of Forestry (Dawei);
(i) Planning and Statistics Department (Dawei);
(j) Department of Settlement and Land Record (Dawei);
(k) Department of Water Resources Utilization Department (Dawei);
(l) Department of Labour (Dawei); and
(m) Local Media, NGOs and CBOs (Dawei Watch, D.R.A, TKP etc.).

10.2. Focus Group Discussions

Focus group discussions were carried out with heads of village administration office and elders from almost all of the nearest villages. Through these discussions, information was collected for consideration of PAPs (Project Affected Persons) and potential socio-economic impacts.

10.3. Household Surveys

Household sample survey was conducted to evaluate primary socio-economic conditions of the project area and to understand the mood, perceptions and extent of preparedness of the people towards the proposed project. The household survey was carried out to tap the baseline socio-economic conditions of project area and to assess project perceptions and attitudes of the local people over a period of five days. The accuracy of primary data collection was based on the accuracy, number of surveyed household and experiences of surveyors. To get the accurate data, primary data collection was conducted by social specialist, social consultants, local authorities and local people.

10.4. Public Meeting for Scoping Report

Public meeting for scoping report was held in Heinda Village in (9.1.2017). There were about 40 people from local people attended in this meeting.

Recorded Photo for Public Meeting for Scoping Report

Most Public Needs and Concerns during Household Survey and Public Meeting

During social survey, immediate community needs and concerns about the project were assessed. The most important positive outcomes from the project expected by the local people and their concerns about proposed project are as follow:

Village Name	Most Public Needs	Most Pubic Concerns
Heinda	- Upgrade earth based road to bituminous road or concrete road - Upgrade health care facilities - Electricity	- Blockage and damage of village roads due to the travelling of mine cars
Wa Gone	- Upgrade earth based road to bituminous road or concrete road - Drinking water Facilities	- Blockage and damage of village roads due to the travelling of mine cars
Myaung Phyo	- Compensation for damage to agricultural lands in the past - Electricity - Drinking water Facilities	- Entering of waste water into domestic well - Damage to domestic water resources due to waste water
Yae Bu Wa	- Help to improve in bridge & roads - Electricity	- Impacts of waste water
Taung Thone Lone	- Compensation for damage to agricultural lands in the past - Help to improve in agricultural sector - Upgrade of Village Roads	- Entering of waste water into agricultural lands
Kyaut Mae Taung	- Compensation for damage to agricultural lands in the past - Electricity - Upgrade of Village Roads	- Damage to local water resources - Entering of waste water into agricultural lands
Shwe Chaung, Shwe Hla, Heindu Chaung	- Compensation for damage to agricultural lands in the past - Electricity - Help to improve in bridge & roads - Need school teachers	- Damage to local water resources - Entering of waste water into agricultural lands

10.5. Key Stakeholders Meeting

Key Stakeholders meeting was held in Zay Yar Htet San Hotel in (6.3.2017). There were about 50 people from local authorities, communities, NGOs, INGOs and local media, and those who are directly or indirectly affected by the proposed project are attended in this meeting.

Recorded Photo for Key Stakeholders Meeting

10.6. Public Meetings

Public meetings are accomplished two times as follow:

10.6.1. First Public Meeting

First public meeting was held in (1.4.2017) Heinda . The aim of first public meeting is -

(i) To discuss about the possible socio-economic impacts; and

(ii) To discuss about the alternative ways to avoid the possible socio-economic impacts.

There were about 110 people from local authorities, communities, NGOs and INGOs, and those who are directly or indirectly affected by the proposed project are attended in this meeting. Number of people from different stakeholders are shown in the following table and detailed attendance list are shown in Appendix I. Suggestion letters and key discussion during the meeting are shown in Appendix II and III.




Recorded Photos during First Public Meeting

10.6.2. Second Public Meeting

Second public meeting was hold in (9.6.2017) and about (120) people are attended in this meeting. The aim of second public meeting is -

(i) To discuss the alternative ways to avoid socio-economic impacts;
(ii) To announce-the anticipated socio-economic impacts of proposed projects;
(iii) To discuss about mitigation measures for these impacts; and
(iv) To discuss about the social management and monitoring plan.

Recorded Photos during Second Public Meeting

10.6.3. Public Disclosure Process

Summary of SIA report as Myanmar Language are distributed to all key stakeholders as public disclosure process. Softcopies for meeting minutes and summary are also distributed to all participants during second public meeting. Key discussion during the second public meeting is shown in Appendix IV.

11. MINE CLOSURE PLAN

11.1. Determination of closure objectives

The aim of this closure plan is to ensure that the area transformed by mining, processing and other operational activities is either returned to as natural a state as possible or facilities remaining at the end of the life of mine are utilised for other economically viable and sustainable activities. The closure objectives will achieve as cost effective a manner as possible, and the closure solution will sustainable in the long term. So, the Heinda mine closure objectives are:

- To ensure that the biodiversity and environment on the site is protected.
- To make sure that the following commitments will be achieved as a minimum:
  - The site will be made safe for both humans and animals,
  - The site will be rehabilitated to be physically, chemically and biologically stable
  - The residual impacts will be managed to acceptable levels and will not deteriorate over time, and
  - Closure will be achieved with minimal socio-economic upheaval.

Cross-cutting to the above, MPC will commit to provide sufficient funds at the end of life of mine, to properly implement the closure plan, and also to make provision for possible premature closure, and post closure monitoring requirements.

11.2. Reclamation and Rehabilitation

Land degradation is one of the major adverse impact of Heinda Mine and any efforts to control adverse impact would be incomplete without land appropriates reclamation strategy. Though the lease area granted for mine ,whether for actual mine excavation or construction of infrastructure facilities , is in the possession of the mine management , necessary steps to keep the area under disturbance at any stage of mining operation to the minimum have been planned . This has been planned by ensuring rehabilitation of the completely excavated area at the earliest by reducing the gap, between the first damage (due to mining activities) and the first repair (reclamation) to the minimum.

It is not possible for current reclamation at any stage of active mine life. There will be no reclamation or backfilling work proposed during the first five years of mining operation. Therefore biological reclamation of the mined out area is envisaged only after the abandoning stage.

Biological Reclamation

Soil binding species like Agave Sisal (Sisal). Dendrocalmus Strictus (Kanta Bamboo) etc. will be planted to stabilize slope or dump. Sirus, Babul, Khair, Acacia. are also the other species which can be used for the biological reclamation purpose. Along the road side fruit bearing tree (e,g, mango) plantation will be proposed.

Reclamation of Waste Dump

The reclamation of will be taken up once individual dumps become inactive. Suitable species will be chosen after consultation with the Forest Department (Dawei). Grass turf will be developing over the inactive dump till reclamation. Reclamation operation will be taken up from the 11th years of mining operation after attaining the maximum thickness of tin ore bearing gravels.

Shape and Size of Waste Dump

There will be two waste dumps for the mining operation.

Sr. No.	Location of Dump	Size of Dump in M^3
1	Along the northern lease Mine site(98º 26'52.75"E 14º 08'39.76"N)	237x130 x 7.5

Backfilling will be started after the as soon as the mining operation.

Stabilization and Vegetation of Waste Dump

To avoid erosion, silting and flow of top soil the following measures will be used, based on the past experience:

- Proper soil binding species will be planted over the dump.
- The height of waste dump will not more than 5 meter.
- Suitable garland channel to be prepared for proper flow of precipitation run-off at toe of dump and also all around the lease boundary.
- Contour bunding at 100 meters intervals.

Soil Conservation

The properly stacked soil will be spread over the fully reclaimed area for biological growth in plantation scheme and filling the sapling pits.

Plantation

The plantation will be done in the area of mining lease year wise plantation is shown in table below for the first five years of mining operation:

Year	No. of Tree	Area in Sq.Meters	Survival rate %
1	170	1150	70 %
2	170	1150	70 %
3	170	1150	70 %
4	170	1150	70 %
5	170	1150	70 %

Table - Proposed Stage Wise Cumulative Plantation around Heinda Mining Project

Year	Un-worked area - Dumps		Peripheral		Worked out pit		Village Road in Buffer zone		Total	
	Area	Trees	Area	Trees	Area	Trees	Area	Trees	Area	Trees
1	0.05	5	0.04	4	-	-	0.01	2	0.102	110
1	0.05	5	0.04	4	-	-	0.01	2	0.102	110
1	0.05	5	0.04	4	-	-	0.01	2	0.102	110
1	0.05	5	0.04	4	-	-	0.01	2	0.102	110
1	0.05	5	0.04	4	-	-	0.01	2	0.102	110
1 to- end of mine	0.78	780	0.20	200	1.00	1000	0.30	300	2.280	2280
Post Mining Afforestation	1.00	1000	0.60	600	6.00	6000	1.00	1000	8.600	8600
Total	2.04	2030	1.00	1000	7.00	7000	1.350	1400	11.390	1430

It is intended to plant 50 trees every year along the village roads and other nearby areas outside the lease in consultation with local authorities.

11.3. Rehabilitation Strategy

Rehabilitation will be addressed separately and concurrently according to the phases set out below:

- during operational phase,
- during closure phase, and
- post closure phase.

(1) Operational Phase Rehabilitation

The proposed rehabilitation strategy is to conduct rehabilitation concurrently while construction of the decline will take place.

Table - Phase 1 Rehabilitation Activities [Construction and Operation]

Physical Rehabilitation	Biophysical Rehabilitation	Water resource restoration
Infrastructure Maintenance	-Soil analysis -Baseline criteria determination -Local seed harvesting -Topsoil management -Concurrent pollution remediation	-Concurrent pollution remediation -Baseline Monitoring -Impact Monitoring

(2) Closure phase rehabilitation

Decline use and related activities will be temporarily terminated and the associated infrastructure 'moth-balled' pending a final decision as to the future mining potential for this area.

The drainage system constructed to isolate the decline and drain the shaft area has to be evaluated upon closure in terms of metal and salinity composition. The results of this analysis will guide final disposal of the drainage material. Where the material remain inert, as proposed by the waste characterization study, the material can be retained or used for final closure backfilling.

The excavated drainage system will then be filled with a top soil mix consisting of sand dune material and gravel from the plains (50:50 ratio). Biophysical rehabilitation will then commence where soil amelioration and vegetation establishment takes place. Thereafter vegetation, ecological and soil monitoring to indicate degree of restoration and ecological sustainability.

Table - Phase 2 Rehabilitation Activities [Closure]

Biophysical Rehabilitation	**Physical Rehabilitation**	**Water resource restoration**
-Soil amelioration -Vegetation of temporary areas -Topsoil replacement -Monitoring -Maintenance	-Demolish temporary infrastructure -Maintain permanent infrastructure	-Concurrent pollution remediation -Baseline Monitoring -Impact Monitoring

11.4. Criteria for Mine Closure Plan

Closure or completion criteria, are generally a set of indicators used to measure the successful completion of the closure process. They should reflect the area's individual set of environmental, heritage, social and economic circumstances.

Ideally, closure criteria should be identified and agreed upon with the relevant government agencies prior to detailed closure planning commencing. However, progressive rehabilitation and subsequent monitoring allows completion criteria to be tested and refined. As a result, the closure criteria identified the following Table is indicative only.

Table -Indicative Closure Criteria

Closure Criteria	**Indicator**	**Monitoring**
Safety/stability		
All structures left in a safe and stable state	-No significant erosion / movement of landforms during closure period. -No significant slumping/geotechnical failure of rehabilitated waste dumps - No significant erosion / subsidence around ventilation	-Quarterly photo monitoring at all rehabilitation / closure domains.

Sustainable Landform		
Rehabilitated landform is sustainable for its intended land use in the long term	-Rehabilitated landform is being utilised for its intended use. -No degradation of the landform as a result of its intended use.	-Annual photo monitoring after rehabilitation is established and the landform is being utilized for its intended use. -If rehabilitated landform is not being utilised for its intended use, document reasons on an annual basis.
Surface Water Contamination		
All contaminated water contained so as to not impact on downstream surface water quality (in Myaung Pyo Creek) including impacting aquatic ecosystems, limiting agricultural use and/or causing human health risk.	-All potentially contaminated water contained within the Mine Site. -All water containment structures are maintained and no settling ponds failures occur - Settling ponds drainage water quality improves and stabilises. -Surface water quality of closure domain area runoff improves and stabilises. -Rehabilitated surfaces are stable with minimal erosion.	-Annual visual inspections and photo monitoring. -Water quality monitoring. -Annual settling ponds failure/leakage assessments
Air Quality		
Dust leaving the site does not pose a potential pollution or health risk	-Rehabilitated surfaces are stable with minimal wind erosion.	-Annual visual inspections and photo monitoring. -No unreasonable levels of dust during windy
Vegetation establishment		
Vegetation in disturbed areas is self sustaining and requires no more maintenance than surrounding area of vegetation.	-Vegetation has become established on all applicable closure domain landforms. -Vegetation coverage has been stable or improving for at least 12 months. -Limited erosion is visible. - Insect activity is visible.	-Annual visual inspections and photo monitoring.

11.5. Closure Assumptions

The following assumptions have been made in relation to the proposed closure activities.

- The rehabilitation completion criteria are the criteria that would have applied at the time that mining activities at the Heinda Tin Mine.
- The closure activities assume that there is no possibility of subsequent mining operations. As such, this Preliminary Closure Plan assumes complete closure and relinquishment of the leases.
- Any area in the vicinity of fuel storage/use is considered hydrocarbon contaminated.
- Any area that is associated with processing activities, including tailings storage areas, has potential to be contaminated and is assumed to require remediation until proven otherwise.
- Concrete slabs and footings have been assumed to be removed to ground level and the remaining slab and/or footing covered over.
- Existing safety bunds around the open pit voids are adequate and that additional safety barriers are not required.
- Existing contaminated water management structures, namely the Water Reservoir Pond and over flow pipe are sound and additional remediation work is not required.
- Material, including pipework, broken concrete and other similar material, may be placed within one or more excavations within one of the tailings dams and covered.
- The Construction Area Domain includes waste rock material with a nil acid generation potential. This area would remain unrehabilitated for future use as a source of road construction material.

11.6. Closure Areas

The closure areas for Heinda Mine are follow:

- Mining area;
- Processing plant area;
- Settling/Tailing ponds area;
- Waste Rock/Dump emplacement area; and
- Workshop and Office area.

The following table is show closure actions and monitoring of each domains.

Table - Closure Actions and Monitoring

Task	Activity	Comment
Domain 1 - Processing Plant Closure		
Closure Objectives	• Safe, stable landform. • Non-polluting. • Development of sustainable vegetative cover	
Completion Criteria	• No significant erosion or geotechnical failure. • All potentially sediment-laden surface water is directed a suitable sedimentation pond. • Surface is not the subject of dust generation through wind erosion. • Suitable vegetation established.	
Decommissioning	• Remove remaining plant and infrastructure.	
Rehabilitation	• Extract fine material for use as growth medium elsewhere within the Mine Site.	
	• Retain former slime pond as water storage and sediment basin.	
	• Reprofile domain to form a free draining, stable landform.	
	• Deep rip and revegetate domain with appropriate tree species sourced from locally collected seed.	
Monitoring	• Visual inspection and photographic record annually for remainder of lease term.	• Photographic locations should be marked with a painted concrete block and photographs should be taken at the same time of day, same direction and using the same focal length or zoom.
Domain 2 – Mine Site Closure		

Closure Objectives	• Safe, stable landform. • Non-polluting.	
Completion Criteria	• No significant erosion or geotechnical failure. • Internally draining. • Surface is not the subject of dust generation through wind erosion. • Suitable fences and/or bunds exist to prevent unauthorised/ inadvertent access.	
Decommissioning	• Remove remaining equipment/ pipework.	
Rehabilitation	• Repair and upgrade perimeter bunding and fencing as appropriate.	
Monitoring	• Visual inspection and photographic record annually for remainder of lease term.	• Photographic locations should be marked with a painted concrete block and photographs should be taken at the same time of day, same direction and using the
	• Undertake annual water quality analysis (pH, electrical conductivity) and report results to ECD (Tanintharyi) and No.2 Mining Enterprise (Tanintharyi)	• It is likely that the pH will decrease and heavy metal like zinc, manganese will increase in the Myaung Pyo Creek.
Domain 3 - Waste Rock/Dump Emplacement Closure		
Closure Objectives	• Safe, stable landform. • Non-polluting. • Development of sustainable vegetative cover	
Completion Criteria	• No significant erosion or geotechnical failure. • All potentially sediment-laden surface water is directed a suitable sedimentation pond. • Surface is not the subject of dust generation through wind erosion. • Suitable vegetation established.	
Decommissioning	• Nil	

Rehabilitation	• Spread topsoil or other fine material as required on the outer toe of the waste rock emplacement and revegetate domain with appropriate tree species sourced from locally	
Monitoring	• Visual inspection and photographic record annually for remainder of lease term.	• Photographic locations should be marked with a painted concrete block and photographs should be taken at the same time of day, same direction and using the same focal length or zoom.

Task	Activity	Comment
Domains 4 - Tailings /Settling ponds Closure		
Closure Objectives	• Safe, stable landform. • Non-polluting. • Development of sustainable vegetative cover	
Completion Criteria	• No significant erosion or geotechnical failure. • Clean water diversions operating effectively and are non-eroding. • All potentially contaminated surface water is contained or directed to the Mill Reclaim Pond Domain. • Surface is not the subject of dust generation through wind erosion. • Suitable vegetation established in areas of placed soil material and becoming established in other areas.	
Decommissioning	• Remove all pipework and other materials and dispose of in an appropriate location.	
Rehabilitation	• Reprofile the tailings dam surface to form a free draining, stable landform.	• Small depressions in the area and will continue to be a leachate recharge location unless removed.

	• Place approximately 200mm of coarse material over all areas of open tailings.	• A capping of coarse material will prevent generation of wind blown dust and will assist with seed retention and germination Minor areas of erosion are present.
	• Repair all areas of erosion and construct / repair / modify surface water control structures as appropriate.	• Minor areas of erosion are present.
	• Place fine material / soil in 'islands' covering between 20% and 40% of the surface of the tailings dam and revegetate with appropriate species sourced from locally collected seed. It is noted that the middlings material, if not reprocessed or following	
Monitoring	• Visual inspection and photographic record annually for remainder of lease term.	• Photographic locations should be marked with a painted concrete block and photographs should be taken at the same time of day, same direction and using the same focal length or zoom.

Task	Activity	Comment
Domain 5 – Workshop and Office Area Domain		
Closure Objectives	• Safe, stable landform. • Non-polluting. • Development of sustainable vegetative cover	
Completion Criteria	• No significant erosion or geotechnical failure. • Surface is not the subject of dust generation through wind erosion.	
Decommissioning	• Remove / demolish all remaining buildings with the exception of the administration buildings and	

Rehabilitation	• Excavate a number of emplacement sites and push all	
	• Leave concrete footings in place.	
	• Excavate and treat onsite all hydrocarbon contaminated soil.	• It is assumed that some contamination will be associated with the former diesel storage tanks.
	• Reprofile and rip the domain area to form a stable, free draining	
	• Construct/repair surface water diversion structures to ensure that surface water flows to either the	
	• Spread appropriate soil material or other growth medium.	
	• Revegetate domain with appropriate species sourced from	
Monitoring	• Visual inspection and photographic record annually for remainder of lease term.	• Photographic locations should be marked with a painted concrete block and photographs should be taken at the same time of day, same direction and using the same focal length or zoom.

11.7. Closure Costs

Mine Closure plan for Heinda mine collaborate that has a remaining life of mine operation years. The closure estimate required for this mine is a Class 0 estimate (-Operation Years to +35%). The follow sections in this document list the closure criteria and list the assumptions that were made in estimating the closure cost. The final life of mine (LOM) closure cost was determined, taking into consideration ongoing rehabilitation throughout the operational phase of the mine.

Financial provisioning information for closure of the Heinda mine Project is provided in following Table. Closure cost estimates were calculated in an MS® Excel spreadsheet (Nevada Standard Reclamation Cost Estimate, version 1.41) as part of Heinda mine overall final estimates are provided in the following table.

Disturbance and Landforms at Completion

The expected maximum disturbance footprint of major and ancillary built infrastructure is summarised in Table 1, with reference to Mining Rehabilitation Fund (MRF) categories, and shown on Figure 3.

Table- Infrastructure Disturbance by MRF Category at Closure

Domain Category	Includes	Footprint (Acra)	Time (Year)
Alluvial processing plant	gravity concentrate plants (Site B and C)	6	1
Mine open cut	Landfill site	65.6	5
Waste Rock/ Dump emplacement	Waste Rock/Sediment Dump deposit area	9.7	1
Tailings /Settling ponds	Settling ponds 1 to 7	60	5
Transport or service infrastructure corridor	Access roads	23	1


Processing plants
(Site B & C)
Tailings /Settling
ponds
Waste Rock/Dump
Mine site
Workshop and
Office Area
Google Earth
©2018 Google
Image © 2018 DigitalGlobe
N
2000 ft

Criteria for Mine Closure Costing

The following risk based criteria were used to estimate the closure cost:

• Return of land to its pre-mining land capability where possible

• Facilities that remains – making the area safe for both humans and animals

• Facilities that remain will be made stable and sustainable. In other words, they should not move with time

• All structures and infrastructure (Workshop and Office Area) recharge to ME 2.

• Waste rock dumps will remain post-closure

• The waste rock dumps will be shaped during the operational phase to prevent storm water from flowing over the sides of the dumps. These dumps will not be vegetated

• The tailings dumps will remain post-closure

• The tailings dump top surface will be shaped during the operational phase to control storm water. As part of the operating costs, storm water control measures such as paddocking will be installed to retain and evaporate the storm water on the top, and to prevent post-closure erosion due to concentrated runoff

• The tailings dump side slopes will be flattened (cut to fill) during the operational phase to a slope of 1v:3h and 300 mm of waste rock cladding will be placed on the side slopes during the closure phase for erosion protection during the post-closure phase

• The open pit will remain post-closure with the necessary storm water control measures in place to ensure slope stability

• The slimes and slurry dams will be rehabilitated and vegetated on closure

• Remove all assets

• Removal and/or burying all rubble and waste in a designated waste site, excluding waste rock dump and tailings dump and slimes/slurry dam materials

• Engineering works (re-shaping, earthworks, drainage etc.)

• Rehabilitation of all disturbed land surfaces, i.e. rip, topsoil if sufficient topsoil is available and re-vegetate, including the slimes/slurry dams but excluding tailings dumps and waste rock dumps

• All vehicles, plant and workshop equipment will be removed for salvage or resale

• All fixed assets that can be profitably removed will be removed for salvage or resale

• Any item that has no salvage value to the mine, but could be of value to individuals, will be sold (zero salvage assumed in cost estimation) and the remaining treated as waste and dumped in the open pit

• The excavations will be filled in with soil, the top 150 mm being topsoil

• Unpaved roads will be ripped and shaped to restore the natural contours as far as possible

• Paved roads will be ripped up, the wearing course treated as waste and the sub-base ripped or ploughed and covered with 150 mm topsoil

• Inert ceramics, such as bricks, concrete, gravel etc., will be dumped in the pit, subject to approval by the Waste Management authority

• All disturbed and exposed surfaces will be covered with at least 150 mm of topsoil and re-vegetation must be allowed to take place naturally

• Air and water quality will be monitored until they reach a steady state after closure

• Demolish all concrete fence foundations to 500 mm below the original ground level

• Plough or rip fence lines and cover with topsoil where necessary

• The company contracted to supply fuel will be requested to remove all fuel storage and reticulation facilities

• The pit area will be fenced off and shaped to drain inwards

• Ensure the slopes of the open pit are safe in the long term

• Remove pumping equipment from disused boreholes and install a concrete cap/seal at the top of the collar

• Submission of closure report and application for closure to the authorities

• Environmental monitoring and maintenance for at least 5 years after closure

Mine Closure Assumptions for Estimation of Closure Costs

The following assumptions were made:

• The values for the resale of equipment and salvable material were not considered

• Average haul distance will be 2.5 km within the lease

• The waste rock dumps will be shaping to prevent erosion (the shaping will be done during the operational phase). A berm will be constructed at the toe of the waste rock dumps and some topsoil placed against the toe (10 m high) to facilitate potential natural vegetation

• The tailings dump sides will be shaped to 1v:3h during the operational phase and cladded with 300 mm of waste rock on the side slopes during the closure phase, to prevent erosion during the post-closure phase

• The tailings dump top surface will be shaped during the operational phase to control storm water. As part of the operating costs, storm water control measures, such as paddocking, will be installed to retain and evaporate the storm water on the top and to prevent post-closure erosion due to concentrated runoff

• Slimes dams will be rehabilitated and vegetated by means of flattening the slopes to 1v:3h using waste rock and covering this layer with 150 mm of topsoil and sub-dividing the top surface into paddocks (50 m x 50 m grid) to control storm water, and covering the top surfaces with a 150 mm layer of topsoil

• Slurry dams will be rehabilitated and vegetated by means of cladding the slopes with a 300 mm waste rock layer and covering it with 150 mm of topsoil and sub-dividing the top surface into paddocks (50 m x 50 m grid) to control storm water, and covering the top surfaces with a 150 mm layer of topsoil. Bulk earth works will not be required on the sides, as the slopes are already 1v:3h

• There will be no ring-main at the pit and the de-watering boreholes will be decommissioned

• It is assumed that the post-mining pit stability will be addressed as part of the operation and necessary remedial actions implemented prior to closure

• No rehabilitation will be done inside the pit, except for ripping of the haul road to facilitate the growth of natural vegetation

• The tailings and waste rock / slurry dams will not exceed the planned area footprint

• Borrow pits used for construction of slimes dam walls that are situated outside the slimes dam footprint will be rehabilitated during the operational phase (flatten slopes to 1v:3h or flatter and allow to vegetate naturally)

• The airfield (including all the structures) will be closed, and the runway ripped to facilitate vegetation

• There is sufficient topsoil for rehabilitation purposes

• Where topsoil is not available, the cost for in-situ remediation will be the same as the estimate for top soiling

• The closure costs for the various well fields and associated infrastructure have been included in this estimate.

TABLE - MINE CLOSURE ESTIMATE SPREADSHEET (Heinda Mine)

It	DESCRIPTION	COMMENTS ASSUMPTIONS	Qut	Length m	B m	Area m2	High m	Vol\ m3		KEY Qut	RATE	COST(U$$)	TOTAL COST (U$$)
	DAMS AND PONDS												
1a	Settling Pond	100m by 80m	5	500	400	200,000.00	5						
	tailinqs pond	120 m by 100m	2	240	200	48.000	5						
				7400	600								
	Rock fill of 300mm (sides only)	Sides only							m3	102,600.00	2.96	303696.00	
	Topsoil, growing medium	allow for 150mm of growing medium							m3	1.178.000.00	0.33	388740.00	
	50m x 50m paddock grid (1m2 retainer berms)	allow 2m base by 1m high berms for 0.25 ha grid formation							m2	800.000.00	0.19	160000.00	
	Veqetate sides & top								m2	267000.00	0.23	61410.00	
												Sub-total	**913846.00**
	ROADS												
	General gravel rds (14m wide) plus Haul Road (40m wide)	300mm ht. 7m wide, haul road 40m wide 500m lonq outside pit		8.645.00	14.00	121.030.00						4949.60	
	Rio in situ material/landscape								m2	137946.00	0.4	55178.40	
												Sub-total	**60128.00**
	WASTE DUMP												
11	Existing dump 250m x150m		1	250.00	150.00								
	Construct berm around pit (2m hiqh berm and 4m base)	4m2 of berm							m3	19,600.00	2.96	57982.00	

	4m2 soil wedge for revegetation -10m from foot of dump	Place soil for bottom 10m ht. from foot of dump.							m3	19,600.00	0.33	6468.00	
												Sub-total	**64450.00**
	PITS												
13	Alluvial Surface Pit-1	Open pit with an approximate diameter of 70m	1			3848.45							
14	Alluvial Surface Pit-2	Open pit with an approximate diameter of 110m	1			9503.31							
	cut pond sides to 1 in 3 fall	push over tailings material (cut to fill)							m3	13351.00	2.96	3952.00	
	rock fill	allow for rock cladding along sloping side - 3 00mm thick							m3	720,266	2.96	2056856.00	
	50m x 50m paddock grid (1m2 retainer berms)	allow 2m base by 1m high berms for 0.25ha grid formation (part of operational cost)							m2	600.000	0.00	0.00	
	revegetation	allow to revegetate naturally							m2	1200.00	0.23	12000	
												Sub-total	**2062008.00**
												Total	**3100432.00**

11.8. Ongoing Maintenance, Monitoring and Record Keeping

11.8.1 Ongoing Maintenance

Closure planning and design has been conducted to ensure minimal ongoing maintenance requirements. Ongoing maintenance within the mine site will be limited to the following.

(a) Targeted noxious weed control over the entire mine site on an annual basis if required.

(b) Remedial earthworks in areas where significant rill or gully erosion is evident.

(c) Supplementary seeding/revegetation in areas where monitoring indicates that revegetation has not been successful.

(d) Placement of additional soil / growth medium in the event that reseeding/revegetation operations identified in (c) above are not successful.

(e) Remediation where annual monitoring indicates that the existing surface water control structures, including diversion banks and channels, the pond overflow pipes and storage structures are leaking or are inadequate.

11.8.2 Monitoring

MPC will undertake the following monitoring annually, typically in spring. This monitoring will commence prior to the completion of the closure activities and will continue until relinquishment of all mineral authorities.

- Visual inspection for each area with emphasis placed on identifying:
  - areas where revegetation operations have not meet the required closure criteria;
  - areas where weeds have become established;
  - areas of erosion or sedimentation; and
  - evidence of potentially contaminated water leaking from the tailing ponds.
- Typically photographs would be taken from a fixed photo location marked by a painted concrete block or similar.
- A procedures manual will be developed describing how the photos are to be taken, the time of year and day that they are to be taken, the focal length or zoom to be used and the direction of each photo.
- Water sampling using calibrated field meters to determine the pH and electrical conductivity of surface water within the N0.7 tailing ponds and the Myaung Pyo creek.

11.8.3 Record Keeping

Within three months of the completion of the annual environmental monitoring program, MPC will prepare a brief report in accordance with the requirements of Guidelines to *Environmental Impact Assessment Guidelines for the Mining Sector* published by the Ministry of Natural Resources and Environmental Conservation. The report will:

- document the results of the current and previous monitoring, including graphs;
- provide copies of the photographs taken of each monitoring area;
- outline the results of the visual inspection;

describe activities undertaken during the previous 12 months and those proposed during the subsequent 12 months.

12. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

In order to manage the physical, biological and sociological impacts identified in the impact assessment, Myanmar Ponpipat Co., Ltd. has committed to implement an environmental management plan of the project (EMP). This management plan will form the basis for the development of an integrated management system for environmental and community issues. EMP is a site specific plan developed to ensure that the project is implemented in an environmental sustainable manner where all contractors and subcontractors, including consultants, understand the potential environmental impacts arising from the proposed project and take appropriate actions to properly manage that risk. EMP also ensures the project implementation is carried out in accordance with the design by taking appropriate mitigation actions to reduce adverse environmental impacts during its life cycle. EMP for proposed mine site will include the following essential parts.

(h) Environmental Management and Monitoring Plan,
(b) Occupational Safety and Health Management Plan, and
(c) Corporate Social Responsibility (CSR) Program.

12.1. Environmental Management and Monitoring Team

The purpose of environmental monitoring is to evaluate the effectiveness of implementation of Environmental Management Plan (EMP) by periodically monitoring the important environmental parameters within the impact area, so that any adverse affects are detected and timely action can be taken. Main objectives of environment monitoring plan include:

(g) Identify all environment changes which may cause adverse effects on environment by the project implementation;
(h) Monitor discharge sources (gas emission, waste water and solid waste) and operation of environmental protection equipment in order to ensure that these activities will comply with legislative requirements;
(i) Check monitoring process and inspect installation system and equipment in respect of pollution prevention and control;
(j) Prevent potential incidents;
(k) Propose appropriate environment protection measures based on results of environmental monitoring;

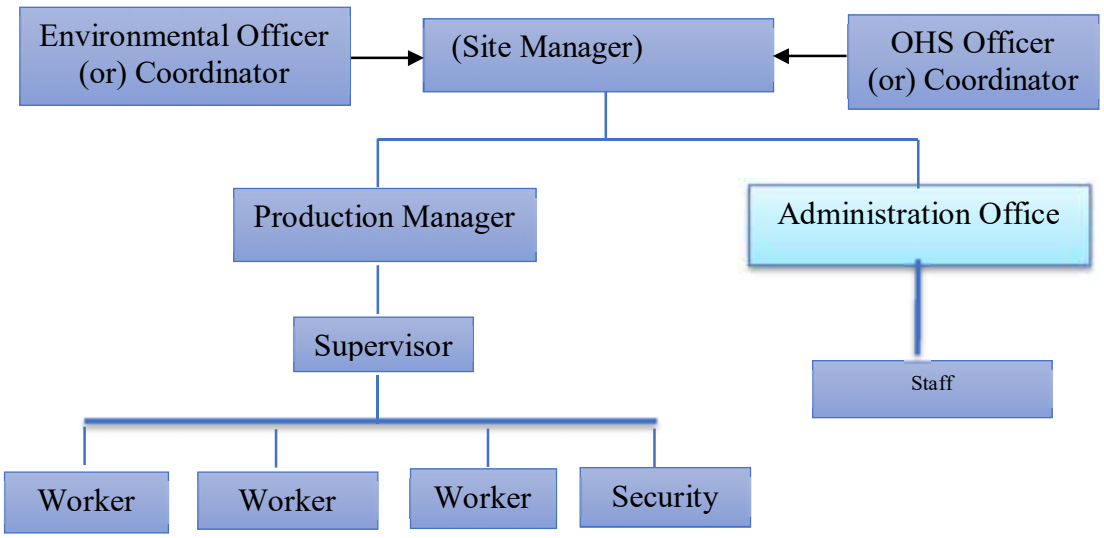
(l) Overcome and repair all weak-points based on results of environment monitoring program.

12.1.1. Environmental Monitoring Team for Regular Monitoring

The environmental monitoring team should accomplish regular environmental monitoring. The environmental officer or environmental coordinator should have to be fully responsibility for environmental affair and environmental monitoring. The following table shows proposed organization plan for the environmental monitoring group of the proposed project.

No.	Group Member	Quantity	Remark
1.	Environmental Officer (or) Coordinator	1	To be appointed
2.	Occupational Health and Safety Officer (or) Coordinator	1	To be appointed
3.	Plant Manager	1	Appointed
4.	Supervisor	1	Appointed
5.	Helpers	1	Appointed

According to the above proposed table, it is necessary to reorganized the organization structure of Myanmar Ponpipat as follow:



Organization Structure

Apart from having an Environmental Management Plan, it is necessary to have a permanent staff charged with the task of ensuring its effective implementation of mitigation measures

and to conduct environmental monitoring. So, it is necessary to assign environmental officer with necessary monitoring equipment. According to the above table, it is necessary to appoint environmental officer (or) coordinator and occupational health and safety officer (or) coordinator. It can be signed as dual duty if site manager is able to do workers' safety and health matters. Training program for safety issues should be completed if necessary. Environmental monitoring can also be done by registered third party monitoring agency. Detailed function of the environmental officer but not limited are as follow:

Environmental Officer

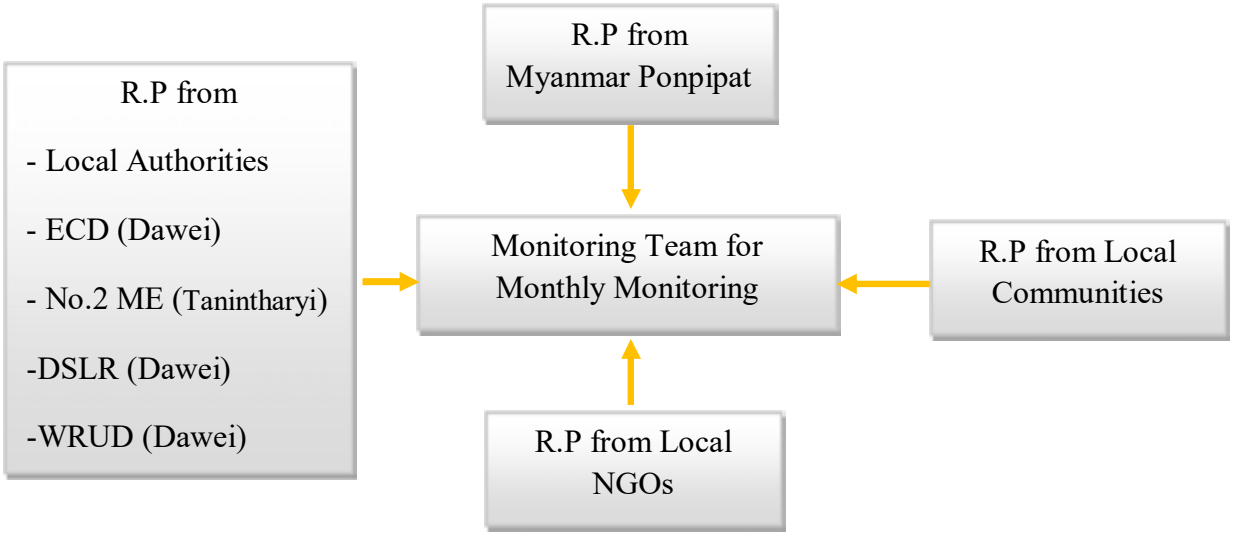
The major duties and responsibilities of the environmental officer or person-in-charge for environmental monitoring of proposed project should be as given below:

(a) To implement the environmental management plan,
(b) To assure regulatory compliance with all relevant rules and regulations,
(c) To ensure regular operation and maintenance of pollution control devices,
(d) To minimize environmental impacts of operations by strict adherence to the EMP.
(e) To initiate environmental monitoring as per approved schedule.
(f) Review and interpretation of monitored results and corrective measures in case monitored results are above the specified limit,
(g) Maintain documentation of good environmental practices and applicable environmental laws as ready reference,
(h) Maintain environmental related records,
(i) Coordination with regulatory agencies, external consultants, monitoring laboratories,
(j) Maintain of log of public inconvenience and the action taken,
(k) Ready to solve any complaints from local people about environmental and social issues especially in Waste water run out from mine sites.

12.1.2. Environmental Monitoring Team for Monthly Monitoring

Environmental monitoring team for monthly monitoring has to organize representatives from environmental monitoring team for regular monitoring, representative persons from General Administrative Office (GAO, Dawei), General Administrative Office (GAO, Heinda), (d) No. (2) Mining Enterprise (Tanintharyi), Environmental Conservation Department (ECD, Dawei),

Department of Settlement and Land Record (DSLR, Dawei), Department of Water Resources Utilization Department (WRUD, Dawei), local communities and local NGOs as proposed as follow:



Note: should participate , R.P = Representative Persons

Proposed Environmental Monitoring Team for Monthly Monitoring

12.1.3. Parameters, Responsibilities, and Estimated Cost for Mitigation and Monitoring

Monitoring should be conducted daily by the environmental monitoring group of proposed project and monthly by proposed monitoring team or by the registered monitoring agency. Monitoring frequency should be sufficient to provide representative data for the parameter being monitored. Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken. Monitoring should be carried out throughout all project implementation phases and the responsibilities for monitoring for operation phases. The parameters to be monitored; location of the monitoring sites; frequency and duration of monitoring, responsibilities and estimated cost for each of the monitoring parameters are presented in the following Table.

Estimated Cost for Environmental Monitoring

Discharge Source	Parameter	Monitoring Frequency	Proposed Monitoring Locations	Estimated Cost/Kyats	Responsibility	Laboratory testing
Monitoring at mine site						
Runoff water from mine sites (Effluent)	pH, Turbidity, TDS, Colour, TSS, Copper, Lead, Zinc, Arsenic, Mercury, Cadmium	Weekly Rainy season (4 months)	Settling ponds in mine sites	50,000	Environmental Officer of MPC	The Department of Research and Innovation (DRI)
Drainage system around the settling ponds at mine site	Check drainage systems of setteling ponds	Weekly Rainy season (4 months)	Near settling ponds	-	Environmental Officer of MPC	-
Sediment removal from settling ponds	Sedimentation rate in settling pond	Weekly during Rainy Seasons (4 months)	settling ponds in the mine sites	-	Environmental Officer of MPC	-
Landslides at mine site	Slope stability at mine site	Daily before commence of mining operations	In mine site	-	Environmental Officer of MPC	-
(Monitoring at Sedimentation Dump Site)						
Stability of sediment dump	Failure of waste dump	Weekly during Rainy Seasons (4 months)	Sediment dumping site	-	Environmental Officer of MPC	-
Runoff water from sediment dump	pH, Turbidity, TDS, Colour, TSS, Copper,	Weekly during Rainy Seasons	Drainage from sediment dump site	50,000	Environmental Officer	The Department of

	Lead, Zinc, Arsenic, Mercury, Cadmium	(4 months)			of MPC	Research and Innovation (DRI)
Blockage of drainage system around sediment dump site	Block in drainage system	Weekly during Rainy Seasons (4 months)	Drainage system from sediment dump site	-	Environmental Officer of MPC	-
Replantation on the sendiment site	Survival and growth rate of plantation	Weekly for 2 years after plantation	sendiment dump site	-	Environmental Officer of MPC	-
(Monitoring at Settling Ponds)						
Discharge water from final settling pond	pH, Turbidity, TDS, Colour, TSS, Copper, Lead, Zinc, Arsenic, Mercury, Cadmium	Monthly	runoff water from final Settling Ponds	5,0000	Environmental Officer of MPC	The Department of Research and Innovation (DRI)
Sediment removal from settling ponds	Sedimentation rate in settling pond	Daily	Settling Ponds	-	Environmental Officer of MPC	-
stability of settling ponds	Failure of settling ponds' retaining walls	Weekly for rainy season, Monthly for dry season	Settling ponds ponds' retaining walls	-	Environmental Officer of MPC	-

Others Monitoring Programs						
Soil pollution	Lead, Zinc, Copper, Arsenic, Mercury, Cadmium, Cromium, pH, Iron, Nickel, Manganese	Once 6 months	At near Waste dump	40,000	Environmental Officer of MPC	The Department of Research and Innovation (DRI)
Soil pollution	Oil & Grease	once 6 months	At Oil storage tank	10,000	Environmental Officer of MPC	The Department of Research and Innovation (DRI)
Noise	dB (A)	once 6 months	At Processing/central treatment Plant	40,000	Environmental Officer of MPC	Ever Green Tech Environmental Services Co., Ltd.
plantation condinatioin Replantation on the mine site and other places	Survival and growth rate of plantation	Weekly for 2 years after plantation	old mine site and sediment dump site	-	Environmental Officer of MPC	-

According to the above tables of estimated cost for environmental monitoring and mitigation measures, the periodic monitoring cost will be 240,000 MMK.

12.1.4. Important Factors for Environmental Monitoring

The following factors should be considered during the environmental monitoring.

(a) Monitoring have to be done by registered third party monitoring agency or proposed environmental monitoring team of the proposed team. and at least three representatives from proposed monitoring team have to be participated in every monitoring process.

(b) If monitoring results show constantly (3 consecutive years) and significantly (e.g. less than 75 percent) better than the required levels, frequency of monitoring can be reduced (IFC, World Bank, 2007).

(c) By studying the wind rose, the most dominant wind direction and wind speed for every season can be predicted and monitoring station for dust, noise and gas emissions should be carried out at that wind direction.

12.1.5. Environmental Management Training Program

Environmental management training program is an important part in EMP. Training and human resource development is an important link to achieve sustainable operation of the facility and environmental management.

Training Program for Operation Phase

In operation phase, all staff of proposed project must be trained on environment safety throughout training courses to be familiar with operation processes and guidelines, mine closure plans (replantation, rehabilitation), emergency responses plans on landslide risks, tailing pond failure, etc., Project Management Board should be established and maintain training programs that are regularly updated to help staff at all levels and related functional departments are aware of their responsibility on environment protection. For successful functioning of the project, relevant EMP's should be communicated to the following groups of people:

Office Staff

Employees must be made aware of the importance of occuopational safety, waste segregation and storage, and energy conservation. This awareness can be provided through, formal and informal training, leaflets and periodic in house meetings. They should be informed about

their responsibilities for successful operation of various environmental management schemes inside the premises.

Mine Worker

Mine workers must be trained the following topics by relevant personnel:

- Health and safety requirements
- Physical and health hazards of chemicals
- Transportation controls and communitcaiton systems
- Escape and emergency evacuation plans
- Highwalls
- Water, fire and electrical hazards
- Illumination and night work
- Fall prevention and protection
- First aid

12.1.6. Record Keeping

Record keeping and reporting of performance is an important management tool for ensuring sustainable operation. Records should be maintained for regulatory, monitoring and operational issues. Typical record keeping requirements for the site is summarized in following table.

Record Keeping Requirements

Parameter	Particulars	Record
Discharge of waste water	Discharge water from final settling pond	Daily
water pollution	Waste	Daily
Failure of settling ponds' retaining walls	Check stability of settling ponds' retaining walls	Weekly for rainy season, Monthly for dry season
Failure of waste dump	Stability of sediment dump	Weekly during Rainy Seasons (4 months)

Sediment removal from settling ponds	Sedimentation rate in settling pond	Weekly during Rainy Seasons (4 months)
Soil pollution	Lead, Zinc, Copper, Arsenic, Mercury, Cadmium, Chromium, pH, Iron, Nickel, Manganese, Oil & Grease	Once 6 months
Noise	Ambient noise level around the mine site	once 6 months
Replantation on the sediment site	Survival and growth rate of plantation	Weekly for 2 years after plantation

12.1.7. Environmental Audits and Corrective Action Plans

Environmental audit is an independent and objective oriented examination of whether the practice complies with expected standards. Broadly, environmental audit means a check on some aspects of environmental management, and implies some kind of testing and verification. To assess whether the implemented EMP is adequate, MPC will conduct periodic environmental audits.

There are two levels of Environmental Audits, i.e. Environmental Impact Audit and Environmental Management Audit. Environmental Impact Audit involves comparing the impacts predicted in an EIA with those that actually occur after implementation of the project while Environmental Management Audit involves checks against adherence to plans, mitigation measures and general compliance of terms and conditions. These audits will be followed by Corrective Action Plans (CAP) to correct various issues identified during the audits.

12.1.8. Reporting Monitoring Results

Monitoring will be carried out according to the Monotoring Program in this EIA Report and monitoring results will be reported to Minister of Environmental Conservation (Tanintharyi Regional Government), No. (2) Mining Enterprise (Tanintharyi), Environmental Conservation Department (ECD, Tanintharyi), General Administrative Office (GAO, Dawei), and Members of Supervisory body of Heinda Mine.

12.1.9. Compliance with Environmental Quality Standards

As specified in the EIA Procedure, projects shall be responsible for the monitoring of their compliance with the following standard parameters from Myanmar National Environmental Quality (Emission) Guidelines, December 2015.

(1) Effluent Standards for Mining Sites

(2) Ambient Air Quality Standards

(3) Ambient Noise Standards

Detail parameters values are showed in the previous section 3.5.

Projects shall engage in continuous, proactive and comprehensive self-monitoring of the project and comply with applicable guidelines and standards.

12.2. Occupational Safety and Health Management Plan

Occupational safety and health management plan for the proposed project will include the following:

(h) Potential Safety and Health Impacts on Workers

(i) Emergency and First-aid Procedures

(j) Medical Precautionary Measures

(k) Maintenance and Troubleshooting Precautions

(l) House Keeping

(m) Safety awareness

(n) Safety training

(A) Potential Safety and Health Impacts on Workers

Workers' in antimony refinery will impose health problems by the following:

(a) Fugitive Dust Emissions;

(b) Noise;

(c) Electrical Hazard;

(d) Manual Handling and Work Place; and

(e) Confined Spaces.

(i) Fugitive Dust Emission

Fugitive dust will emit from mining sites section vehicle movement and transportation activities.

Excavation and Preparatory Work in Ore & Waste

During run-of-mine or waste excavation and disposal of waste during dry months some dust is generated. However, since the ore and waste rock contain some natural moisture of the order 2.0 to 2.5% not much dust is generated during manual mining operations of blasted ore/waste even during dry season.

Transportation of Tin ore and dump

The tin ore form working face to the washing pond will be transported by 10 tonnes capacity trucks. The trucks shall be well maintained so that exhaust smoke dose not contain abnormal values of noxious gases and un-burnt fuel. The other source of air pollution is due to the dust generated during the movement of trucks in the mine.

Mitigation Measures for Fugitive Dust Emission

Emission of fugitive dust can be controlled by

Regular water sprinkling should be carried out on the roads leading to the active area of the mine workings during the shifts by water sprinklers to ensure effective dust suppression. In every day about 3 to 4 times and depending up on the road condition water shall be sprinkled by taking utmost care to ensure that less water is consumed for effective dust suppression keeping in view the water conservation aspects.

(ii) Nosie

Noise will produce from mineral processing section. Screening process (tormmels) and jigging process are generates noise of a higher frequency. Exposure to noise over a period of time can result in impairment or loss of hearing. Myanmar National Environmental Quality (Emission) Guidelines, permissible noise exposure limit for industrial workers, which is based on 70 dB (A) for a day and the Occupational Safety and Health Administration (OSHA) has recommended permissible noise exposure limit for industrial workers, which is based on 90 dB (A) for 8 hours exposure a day with 5 dB (A) trading rates. The limits are given in Table follow.

Table - Permissible Exposure Noise Limits

Total Time of Exposure Per Day in Hours	Noise Level dB(A)
8	90
6	92
4	95
3	97
2	100
1	105
½	110
¼	115

According to OSHA, the maximum allowable noise level for the workers is 90 dB (A) for 8 hours exposure a day.

Mitigation Measure for Noise

Adequate protective measures in the form of ear muffs/ear plugs to the workers working in high noise areas need to be provided because noise level near the concentration plant will exceed 90dB(A).

Mitigation Measures to Reduce Noise at Working Zone

To begin with, an examination should be made to see whether the process or production set-up can be modified to avoid the sources of noise.

(a) Screen off noisy work and take measures to reduce reverberation in working areas by putting up noise absorbers.

(b) Use ear protectors if the noise is disruptive or if there is a risk of hearing damage.

(c) Where noise levels exceed allowable levels laid down in health and safety legislation, warning notices will be required either at the machine/process or, if excessive generally throughout a workshop, at all entrances.

(d) Ear protection equipment (ear defenders, ear plugs, etc.) is the most prevalent risk control measure used to reduce personal exposure to noise. Ear protection devices must be in good condition and have sufficient noise attenuation properties. In addition, ear protection can prevent hot spatter from entering the ear.

(e) Segregation of noisy processes to one area of the workshop, away from the general work area as much as possible, can be used as a control measure to reduce exposure to noise for the majority of workers.

(iii) Electrical Hazard

The main electrical hazard is electric shock or electrocution. Live electrical parts can include the power supply, the power and work cables, and the work itself (if the work is not connected to earth ground).

Prevention of Electrical Hazard

(a) The current-carrying capacity of cables, interconnectors, terminals, etc., should be high enough to carry the maximum operating current.

(b) There should be a separate earthing conductor.

(c) Avoid working in wet, damp or humid conditions.

(d) Avoid working in a confined space.

(e) Wear dry leather gloves, insulated footwear and other appropriate protective clothing.

(f) Make sure all electrical connections are tight, clean, and dry.

(g) Keep cables and connectors in good condition.

(h) Avoid open-circuit voltage.

(iv) Hazards of Manual Handling and Work Place

Manual handling can present a hazard during lifting, lowering, carrying, pushing, pulling or moving of tin concentrate, tools, materials, equipment and consumables, etc. One of the most common injuries experienced by workers is back injury during manual handling. Other

general sources of hazard on industrial premises include moving machinery, site transport, and delivery vehicles.

Mitigation Manual Handling and Work Place Hazard

(a) Using specialized or dedicated lifting equipment and systems.
(b) Proper safety training should give all employees.
(c) Maintaining tidy work areas, removing obstructions and discarded items greatly reduces the risk of injury.

(v) Hazard of Confined Spaces

The proposed central treatment plant will include entering in confined spaces (tabling section and magnetic separation section) for collecting of tin concentrate. Confined spaces have the characteristics of limited space, entry, or exit and poor ventilation, which cause lack of safe breathing air and possible buildup of fine tin concentrate powder.

Mitigation of Confined Spaces Hazard

The worker should wear respiratory equipment when they enter into confined spaces.

(B) Emergency and First-aid Procedures

First aid is immediate, temporary treatment given in the event of accident or illness.

Inhalation: Workers with symptoms of exposure to fumes and gases from roasting furnace and antimony filter room should go to an uncontaminated area and inhale fresh air or oxygen and call a physician. Administer oxygen by mask if the person is breathing.

Eye: Contact lenses, if worn, should be removed. Irrigate the eyes immediately with large amounts of water for 15 minutes. Occasionally hold the eyelids apart to insure complete irrigation. Apply a dry protective dressing. Call for emergency medical assistance.

For “flash burns” cover the eye with cold (preferably iced) compresses for 5 to 10 minutes; then repeat. Apply a dry protective dressing. Call a physician. Don’t rub the eye. Don’t use ointments or drops unless prescribed by a physician.

Skin: For skin contact with irritants, flush the areas with large amounts of water, and then wash with soap and water. Remove contaminated clothing. If mucous membranes are irritated, flush with water. Wash cuts and scrapes with mild soap and water. Avoid contamination. Apply a dry sterile dressing.

For thermal bums, cold water is an effective first aid measure. If skin is not broken, immerse bum part in clean cold water or apply clean ice to relieve pain. Do not disturb or open blisters. Prevent contamination. Bandage loosely with a clean dry dressing. Call for emergency medical assistance.

Electrical Shock and Electrical Burns: Disconnect and turn off power. Remove victim from contact. Use no conducting materials if the rescuer must resort to pulling the victim from the live contact. The rescuer must first protect himself by use of insulated materials such as gloves. If not breathing, administer CPR as soon as electrical contact is broken. Call for emergency medical assistance. Continue CPR until spontaneous breathing has been restored or until a physician arrives. Administer oxygen. Keep comfortably warm. Keep horizontal until there is no further evidence of shock. Treat electrical bums as thermal bums. For electrical bums apply clean, cold (iced) compresses. Prevent contamination. Cover with a clean, dry dressing. Call for emergency medical assistance.

(C) Medical Precautionary Measures

The following medical precautionary measures are recommended for the proposed project.

(a) Periodic health examinations are recommended with the cooperation with Public Health Office (Dawei). The potential health effects of nonwork related factors, such as smoking, must be considered.

(b) An effective educational, training, and industrial hygiene program should be instituted. The program should cover the following: (a) the nature and potential hazards of welding, cutting and gouging; (b) proper and safe use of equipment; and (c) emergency and first aid procedures.

(c) Medical personnel should be available on-site or by phone for advice and consultation. Emergency phone numbers should be posted near the telephones. At leastone person on each shift should be trained in first aid, as well as qualified to administer oxygen and cardiopulmonary resuscitation (CPR).

(d) The following should be readily available: (a) first aid supplies approved by a physician; (b) stretchers and blankets for transportation; (c) oxygen inhalation equipment; and (d) approved instant acting eye washes and showers.

(e) Good personal hygiene practices are very important. Employees should wash their face and hands before eating, and it is recommended they not be permitted to eat, drink, or smoke in the work area. Food and beverages should not be stored in the work area. Contaminated clothing should be changed.

(f) Protection against skin conditions, such as chemical burns, rashes, and dermatitis can be provided by appropriate protective clothing and equipment, as well as the use of protective creams or lotions.

(D) Maintenance and Troubleshooting Precautions

Faulty or improperly maintained equipment can cause property damage, physical injury, or possibly death by fire or electrical shock. Here is a list of some important items to check when troubleshooting or maintaining equipment.

(a) Stop operating immediately if equipment is malfunctioning.

(b) Do not perform any maintenance unless you are qualified to perform such work.

(c) Make test readings carefully.

(d) Protect the equipment from heat, excessive wet conditions, oil or grease, corrosive atmospheres, and inclement weather.

(e) Replace parts only with manufacturer's recommended replacement parts.

(f) Keep all protective devices and covers in position.

(E) House Keeping

The following measures shall be practiced at the proposed project.

(a) Regular cleaning of the floors with service water.

(b) Keeping all de-dusting systems in perfect working conditions to avoid dust accumulation inside and outside the plant.

(c) Avoid dumping of wastes, damaged equipment and items anywhere inside the plant affecting aesthetics and increasing risk of fire and other hazards.

(d) Keeping ventilation systems of premises in perfect working condition to avoid ingress of dust inside the pressurized room.

(e) Maintaining hygienic conditions in areas like canteens, near drinking water sources and toilets.

(f) Maintaining green belt along the factory boundaries to suppress noise, fugitive dust and to improve the aesthetics.

(g) Developing a positive outlook in the employees for improving the working place, both in factory and office or laboratory clean and well maintained.

(F) Safety Awareness

Safety awareness must be promoted among project managers and employees by:

(a) Imparting regular training.

(b) Installing/displaying safety caution boards and safety posters mentioning Do's & Don'ts at different vulnerable locations.

(c) Arranging safety & housekeeping competition etc.

(d) To procure and maintain personal protective equipment in good working condition.

(G) Safety Training

Training programmes in safety and aedccident prevention will be organized at all levels of employees with a view to familiarize them with the general safety rules, safety procedures in various operational activities and to update their knowledge in safety and accident prevention, industrial hygiene and emergency equipment. These training programmes will be conducted periodically in a planned manner to refresh their knowledge. Training shall be imparted for:

(a) Safe working and maintenance practices.

(b) Use of proper tools and tackles.

(c) Use of personal protective equipment.

(d) Handling emergency situation.

12.3. Corporate Social Responsibility (CSR) Program

Contribution at random places with no records will have some social problem due to the lack of transparency. So, Myanmar Ponpipat should have CSR program to contribute and manage CSR fund effectively.

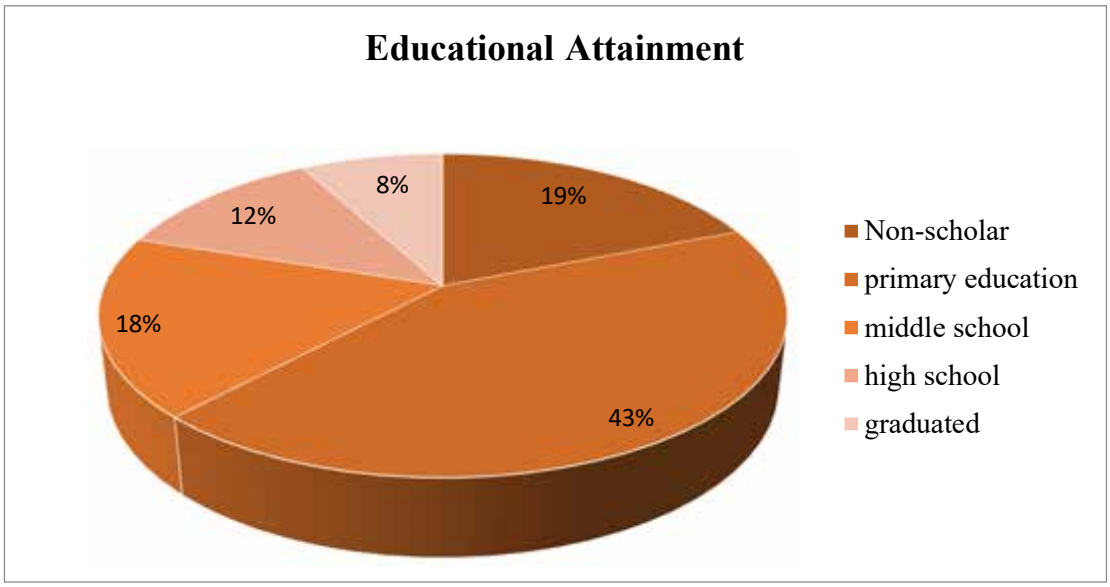
12.3.1. CSR Fund

Myanmar Ponpipat will set up CSR fund for local community development. It is important that CSR activities will be accomplished not only by financial assistance but also by technical aid and manpower in some assistances to retain good relation with local communities. Allocated percent of CSR fund is based on local community needs and local needs are considered according to the public consultation process
(social survey and public meetings). Proposed allocated percent of CSR budget are as follow:

No.	Activities	Proposed allocated per cent of CSR budget	Public Needs according to Primary Data Collection
1.	Donation to NGOs and CBOs	20%	Yes
2.	Construction of roads	30%	Yes
3.	Donation to schools	20%	Yes
4.	Donation to health care facilities	20%	Yes
5.	Donation to agricultural development	10%	Yes
Total		100%	

Education

The educational attainment of respondents enumerated in the household socioeconomic survey in the project area is reported in the following figure.



Overall, educational attainment of local residents in the project area was found to be relatively low. According to the social survey on educational attainment by primary data collection, most of the people are just fnished primary school due to difficult to go to school and household economy.

In Dawei, school enrollment rate of 5-year-olds was 62.86% in the overall Dawei Township. The teacher student ratio is greater than acceptable teacher student ratio (1:20) and so the developer should assist to upgrade the educational infrastructure.

As education is the fundamental requirement for rural area development, Myanmar Ponpipatshould have a plan to upgrade existing education system in nearest villages as CSR program.

12.3.2. Participating Government Schemes for Social Welfare

Myanmar Ponpipat should actively participate in implementation of government schemes for welfare of the society of the Dawei region.

12.3.3. Cooperation with Local NGOs

Myanmar Ponpipat should cooperate with local NGOs and CBOs in nearest villages in the activities to improve regional, religious, and all round developments in Dawei Region. Some percentage of CSR fund should provide regularly to NGOs and CBOs in nearest villages.

12.3.4. CSR Officer (or) Coordinator

MPC will assign CSR officer (or) coordinator to closely relate with local people in order to manage the contributions of CSR fund effectively. CSR officer should donate CSR fund after the discussion with representatives from nearest villages.

12.3.5. Declare the Contribution of CSR Fund

All of the CSR activities and contribution programs will be declared to public by means of local media, company annual report or company's website on a regular basis. Audit on contribution of CSR fund will be carried out together with environmental and social audits through independent external audit team for transparency.

13.0. PROPOSED CONTENT OF THE EIA REPORT

The proposed chapters for the ESIA report and the content of each chapter is described below.

Chapter Content of chapter

Non-technical executive summary

1.0 Executive Summary

Concise description to detail the significant findings and recommended actions in easy language.

2.0 Introduction

This chapter will provides the introduction and background of the project, presentation of the project proponent, presentation of the environmental and social experts, outlines the ESIA process required.

3.0 Policy, Legal and Institutional Framework

Review of the legal and administrative framework within which the Assessment was carried out. This chapter will contains corporate environmental and social policies, policy and legal framework, international conventions, treaties and agreements, and national and international standardsandguidelines, contractual and other commitments, institutional framework, project's environmental and social standards, and health standards for projects with health impacts.

4.0 Project Description

The project is described concisely and includes all related facilities required during the operation, decommissioning of the project. The geographical location of the project site is also provided. So, this chapter will contain project background, project location, overview map and site layout maps, project development and implementation time schedules, description of the project size, ore extraction, ore processing, transportation facilities, waste rock: stockpiles, dumps, and tailings, Amount and type of emissions to air, effluent discharges to water; amount of type solid waste disposal; and amount and type of hazardous waste, all together with overview maps and site layout maps and design drawings for each project phase.

5.0 Project Alternatives

This chapter will include: Method for analysis of alternatives, no project alternative alternative technologies and locations description of the selected Alternative(s) by project phase.

6.0 Environmental Baseline Descriptions

The physical, ecological and socio-economic context of the project area of influence is described. This chapter also includes the data collected during the ESIA process, the accuracy, reliability and sources of data, description of the surrounding environment, setting the study limits,methodology and objectives, legally protected national, regional or state areas, including without limitation: (i) mangrove swamps; (ii) wildlife sanctuaries; (iii) geophysically significant reserves; (iv) protected cultural heritage areas; and (v) protected archeological areas or areas of historical significance, physical components: description with data and maps of (i) topography; (ii) water resources; (iii) geology and soils, hydrology/hydrogeology; (iv) environmental quality; (v) climate; (vi) vegetation cover; and (vii) natural hazards including earthquakes, tsunamis, extreme weather events, flooding, drought, and others, biological components: descriptions and maps on fauna and flora including abundance, spatial distribution of rare, endangered and vulnerable species, and species of economic and health/nutritional values, and maps and description of valued or sensitive environmental areas and habitats, infrastructure and services: location and size or capacity of transport infrastructure, public utilities and services, socio-economic components: income and livelihoods, living conditions and access to public services and natural resources, land use maps, population distribution maps, maps and charts of other socio-economic indicators such as poverty, employment and education, public health components: mortality and morbidity, occurrence of diseases, accidents and injuries, and socialhealth determinants, cultural components: description and maps of cultural, historical, and religious sites, structures and objects, and objects with high aesthetic value; description of traditional knowledge and beliefs, and cultural practices, visual components including where applicable landscape, city scape and sea scape usingthree dimensional models

7.0 Impacts Identification and Evaluation (Impact Assessment and Mitigation Measures)

The project's likely positive and negative environmental, socio-economic and health impacts are identified and evaluated. The significance of each impact is provided, in terms of its magnitude, geographic extent, duration, reversibility, frequency and probability of occurrence. So, this chapter will include impact assessment methodology, impact identification, assessment and mitigation for each Project phase (pre-construction, construction, operation, decommissioning, closure, and post-closure), identification and assessment of potential environmental impacts including (i) physical, biological, social, socio-economic, health, cultural, and visual impacts; (ii) potential impacts on climate change such as greenhouse gas emissions and loss of carbon sinks or stocks; and (iii) identification of impacts of climate change on the project based on available climate change predictions from designated national authorities or international scientific research bodies, identification and assessment of the likelihood and severity of natural and industrial hazards relevant to the project, the design, layout, functioning, management and implementation of appropriate impact mitigation measures, characterization and assessment of any residual impacts and comparison with applicable regulations, standards and guidelines, comprehensive monitoring plan, relevant maps, aerial photos, satellite images in proper scale clearly indicating the location of sources of adverse Impacts, the spatial and temporal distribution of such impacts and with reference to the description of the surrounding environment, the components that are likely to be impacted and the nature of the impacts.

8.0 Risk Assessment

Risk Assessment associated with the project will be further investigated in detail during the EIA study. This is an aspect that will be assessed in the EIA phase. So, this chapter will include Methodology and Approach, Natural Hazards and Disaster Risk, Mining Industrial Hazards, analysis of likelihood of hazards and the consequences, identification of measures to reduce risks and Emergency Response Plans

9.0 Cumulative Impacts

Cumulative Impacts: Cumulative impacts associated with the project will be further investigated in detail during the EIA study. This is an aspect that will be assessed in the

EIA phase. So, this chapter will include Methodology and Approach, Cumulative Impact Assessment,Brief description and map of relevant existing and future private and public projects and developments, Identification and assessment of the potential cumulative impacts on the components in the surrounding environment and the Project's contribution to such impacts, Determination of the leverage and influence that the Project may have over the significant and project related cumulative impacts, Description of measures to mitigate the Project's contribution to the cumulative impacts.

10.0 Community Engagement and Community Development

This chapter will include: Methodology and Approach, Summary of consultations and activities undertaken, Results of Consultations, Further ongoing Consultations, Disclosure

11.0 Mine Closure Plan

The Plan is to include activities for progressive rehabilitation of the site over the life of the mine. This will minimize the effort and cost for the final rehabilitation. The Mine Closure Plan is to include requirements for updating. It is to be updated within two years of the start of operations. Thereafter, it should be updated every five years. Five years before mine closure, a Post Closure Plan is to be submitted with the Mine Closure Plan.
The Post-Closure Plan is to include activities for post-closure monitoring and maintenance of all mine facilities, including surface mine workings, tailings, and waste disposal facilities. It is to include a plan and financing for long-term monitoring and maintenance.

12.0 Environmental and Social Management Plan

Management plans will include the required management strategies for mitigation measures and monitoring. So, this chapter will include Project Description by Project phase (pre-construction, construction, operation, decommissioning, closure and post-closure),Project's Environmental, Socio-economic and, where relevant, Health Policies and Commitments, legal requirements and institutional arrangements, Summary of Impacts and Mitigation Measures, Overall budget for implementation of the EMP, Management and Monitoring Sub-Plans by Project phase (preconstruction, construction,

operation, decommissioning, closure and postclosure); the Management and Monitoring Sub-Plans shall address and satisfy all relevant environmental and social management and monitoring issues such as but not limited to noise, vibrations, waste, hazardous waste, wastewater and storm water, air quality, odor, chemicals, water quality, erosion and sedimentation, biodiversity, occupational and community health and safety, cultural heritage, employment and training, and emergency response, Content of each Sub-Plan: Objectives, Legal Requirements, Overview maps and site layout maps, images, aerial photos, satellite images, Implementation Schedule, Management Actions, Monitoring Plans, Projected Budgets andResponsibilities

13.0 Summary and conclusion

Summary and conclusions of the ESIA

References and ESIA Technical

Appendices

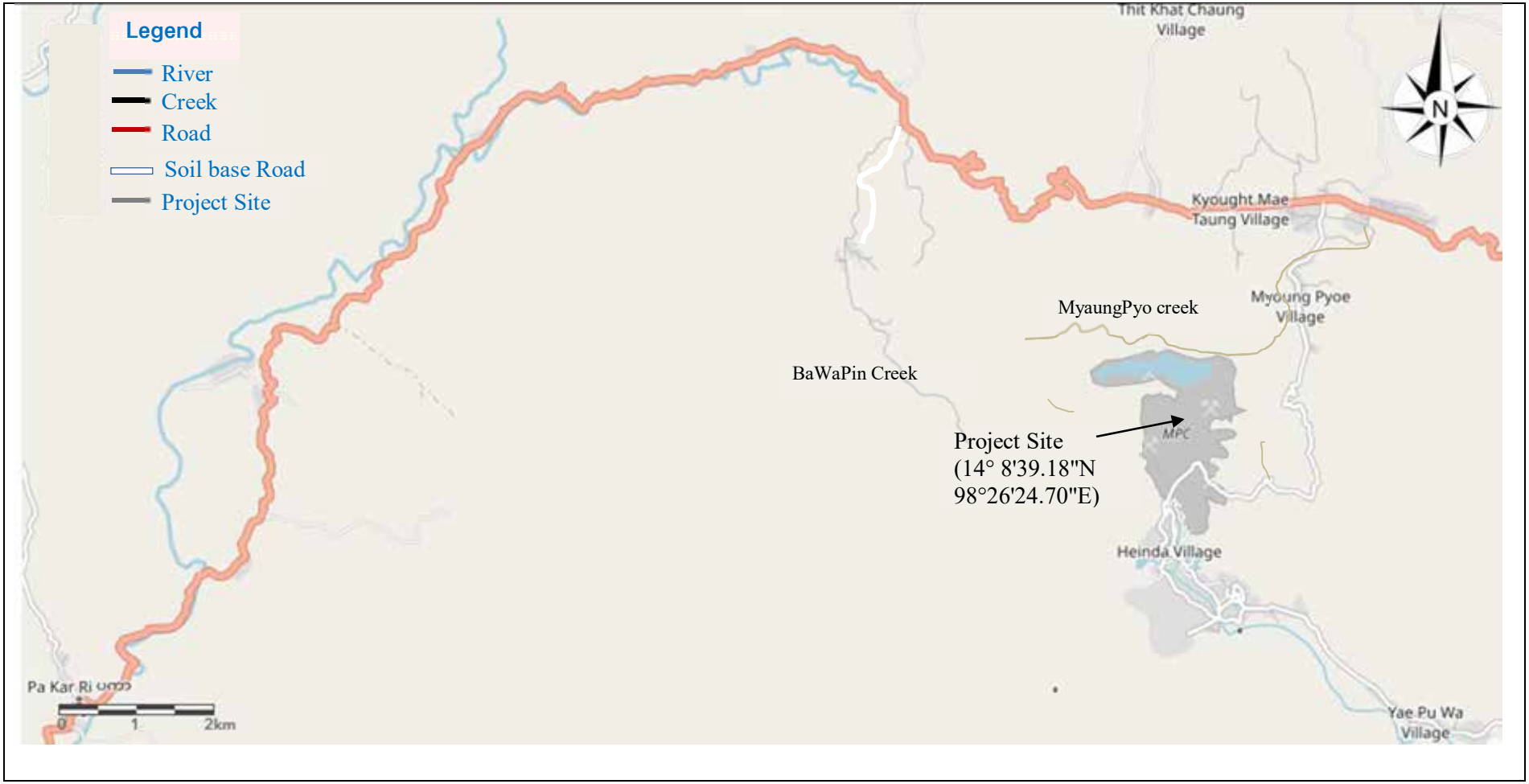
14. NEXT STEPS IN THE EIA PROCESS

Following the completion of the scoping process, the next step will be to finalise the specialist studies that will inform the impact assessment. During the impact assessment phase, the issues raised by stakeholders and the potential impacts of the project on the environmental and socio-economic status of the area will be examined in detail. Stakeholder issues will therefore assist to drive the EIA process. When complete, the findings of the specialist studies will be integrated into a single report, the Draft EIA Report and EMP. The report will then be made available for stakeholder comment, after which it will be finalised and submitted to the ECD for review process.

15. CONCLUSION

According to the study for the scoping processes, the ESIA team will make with participants from local communities and local NGOs for concerning about the surface water pollution and compensation for damage to agricultural lands in the past. So, the developer has been working with the local authorities to setup a committee to work with local community, although MPC has issued the compensation in accordance to the resolution.

APPENDICES



Location Map of Project Site

APPENDIX I

ATTENDANCE LIST OF PUBLIC MEETING FOR SCOPING REPORT

ဟိန္ဒားသတ္တုတွင်းပတ်ဝန်းကျင်ထိခိုက်မှုလေ့လာဆန်းစစ်ခြင်းအတွက်နယ်နမိတ်သတ်မှတ်ခြင်းလုပ်ငန်းစဉ်နှင့်ပက်သက်၍တွေ့ဆုံရှင်းလင်းပွဲတက်ရောက်သူများစာရင်း

နေ့စွဲ - ၉-၁-၂၀၁၇

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုသည့်အဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁.	ဒေါ်အေးမြင့်ဝေ	ဟိန္ဒား (ရပ်မိရပ်ဖ)	ဟိန္ဒား	[signature]
၂.	ဦးအောင်ကျော်	ဟိန္ဒား (ရပ်မိရပ်ဖ)	ဟိန္ဒား	[signature]
၃.	ဒေါ်မိုးကိုထွေး	သတ္တုတော်လှော် (ဟိန္ဒား)	၀၉-၈၇၄၆၆၁၉၇	[signature]
၄.	ဒေါ်အုန်းရီ	ရပ်မိရပ်ဖ	ဟိန္ဒား	[signature]
၅.	ဦးဝင်းဆင့်	ရပ်မိရပ်ဖ	ဟိန္ဒား ၊ အမှတ် (၁၀)	[signature]
၆.	ကိုဝင်းဝင်း	"	ဟိန္ဒား	[signature]
၇.	ကိုအောင်လင်းထွန်း	"	ဟိန္ဒား	[signature]
၈.	ကိုမြင့်မိုးဦး	"	"	[signature]
၉.	ဦးအောင်တင်ဆင့်	"	"	[signature]
၁၀.	ဒေါ်ရီရီဝင်း	"	"	[signature]

ဟိန္ဒားသတ္တုတွင်းပတ်ဝန်းကျင်ထိခိုက်မှုလေ့လာဆန်းစစ်ခြင်းအတွက်နယ်နမိတ်သတ်မှတ်ခြင်းလုပ်ငန်းစဉ်နှင့်ပက်သက်၍တွေ့ဆုံရှင်းလင်းပွဲတက်ရောက်သူများစာရင်း

နေ့စွဲ - ၉-၁-၂၀၁၇

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုသည့်အဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁၁.	ဦးအောင်	ရပ်မိရပ်ဖ	ဟိန္ဒား	[signature]
၁၂.	ဦးလှမောင်	"	"	[signature]
၁၃.	ဦးထွန်းအေး	"	"	[signature]
၁၄.	ဦးမြင့်ဦး	"	"	[signature]
၁၅.	ဦးသိန်းဝင်း	"	"	[signature]
၁၆.	ဒေါ်သန်းဟန်	"	"	[signature]
၁၇.	ဦးထွန်းဌေး	"	"	[signature]
၁၈.	ဦးမောင်အေး	"	"	[signature]
၁၉.	ဦးချမ်းဝင်း	"	"	[signature]
	ဦးဝေထွန်း	"	၀၉-၄၉၈၅၀၅၃၄	[signature]

ဟိန္ဒာသတ္တုတွင်းပတ်ဝန်းကျင်ထိခိုက်မှုလေ့လာဆန်းစစ်ခြင်းအတွက်နယ်နမိတ်သတ်မှတ်ခြင်းလုပ်ငန်းစဉ်နှင့်ပက်သက်၍တွေ့ဆုံရှင်းလင်းပွဲတက်ရောက်သူများစာရင်း

နေ့စွဲ - ၉-၁-၂၀၁၇

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၂၀	ဒေါ်စား ဘွာ ဂေဗ ဂျာနို	ရပ်မိရပ်ဖ	ဟိန္ဒာ	
၂၁	ဒေါ်ခင်ဝေ	〃	ဟိန္ဒာ	
၂၂	ဦးခမ်းစိန်	〃	၀၉-၄၉၉၄၅၂၇၆	
၂၃	ဒေါ်မြင့်မွေး	〃	ဟိန္ဒာ	
၂၄	ဦးကြည်ထွန်း	〃	၀၉-၄၅၁၀၆၀၉၇၇	
၂၅	ဦးဖေရှိန်ခိုင်	〃	ဟိန္ဒာ	
၂၆	ဦးကြာဒိုင်	〃	〃	
၂၇	ဦးဟန်ဖိုး	〃	〃	
၂၈	ဦးထွန်းဝေ	〃	〃	
၂၉	ဦးရွှေတွေး	〃	〃	

ဟိန္ဒာသတ္တုတွင်းပတ်ဝန်းကျင်ထိခိုက်မှုလေ့လာဆန်းစစ်ခြင်းအတွက်နယ်နမိတ်သတ်မှတ်ခြင်းလုပ်ငန်းစဉ်နှင့်ပက်သက်၍တွေ့ဆုံရှင်းလင်းပွဲတက်ရောက်သူများစာရင်း

နေ့စွဲ - ၉-၁-၂၀၁၇

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၃၀	ဦးအောင်ထင်း	ရပ်မိရပ်ဖ	ဟိန္ဒာ	
၃၁	ဒေါ်ထွန်းရီ	〃	〃	
၃၂	ဦးစန်းဒွေ	〃	ရေပူဝ	
၃၃	ကိုအောင်အောင်	〃	ဟိန္ဒာ အမှတ် (၈)	
၃၄	ဒေါ်ဇာခြည်ဝင်း	〃	ဟိန္ဒာ အမှတ် (၉)	
၃၅	ကိုဝင်းအောင်ချိုတွေး	〃	၀၉-၄၅၅၈၄၇၀၇၉ ဟိန္ဒာ	
၃၆	ဦးဖိုးလုံး	〃	ဟိန္ဒာ	
၃၇	ဒေါ်စန်းနွေး	〃	ဟိန္ဒာ	
၃၈	ဦးဝေဝင်းထိုက်		ဟိန္ဒာ	

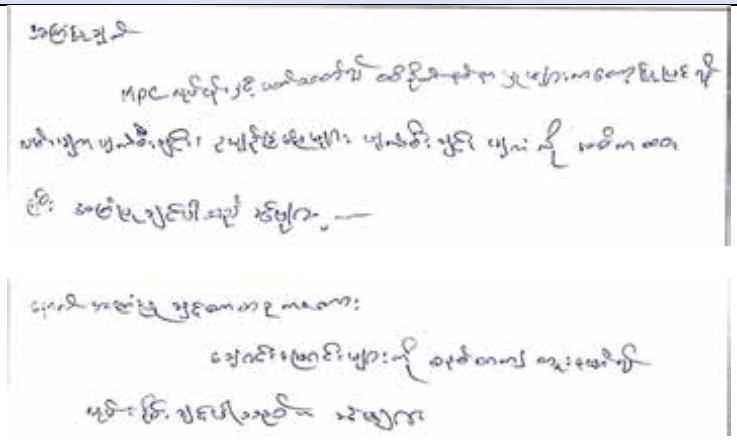
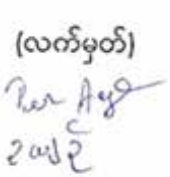
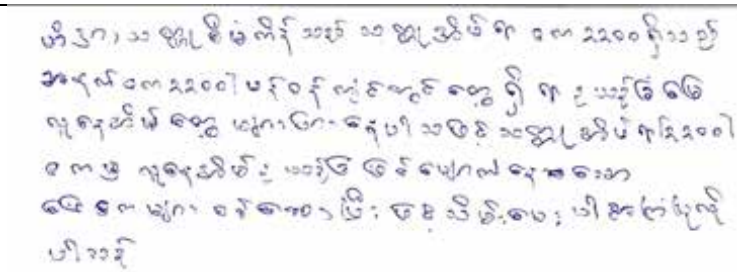
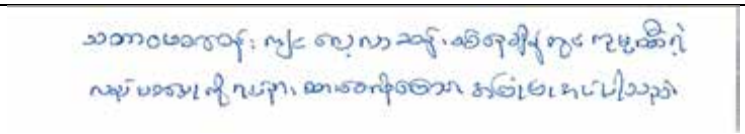
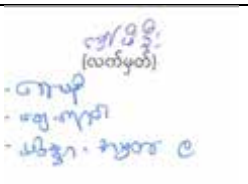
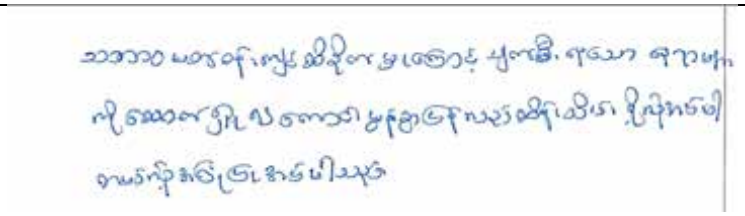
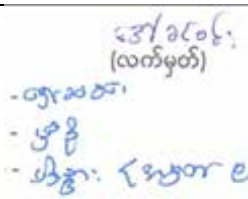
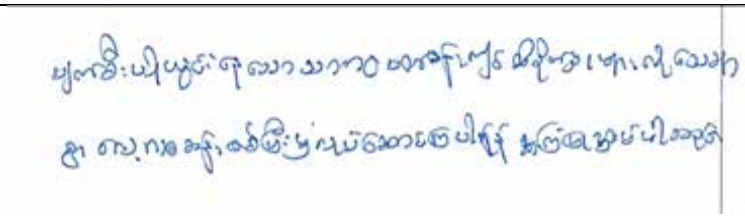
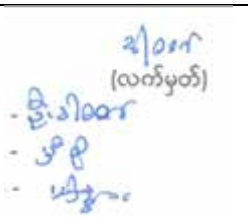
APPENDIX II

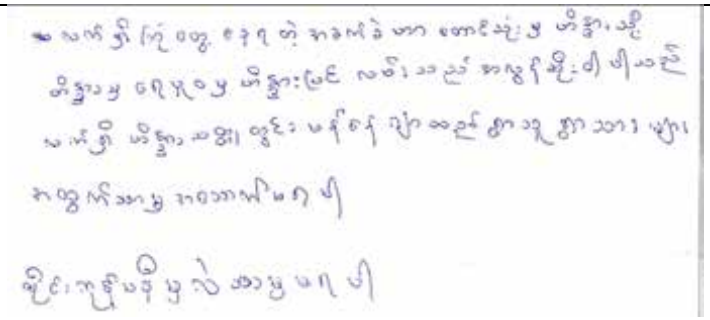
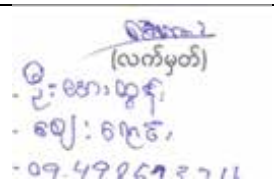
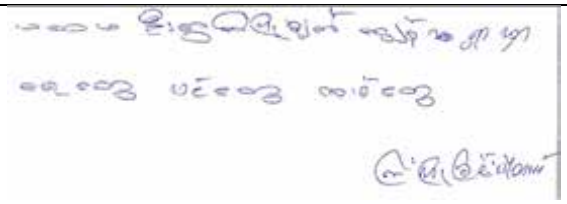
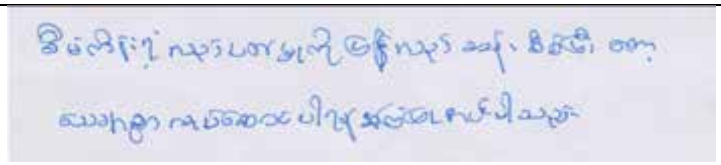
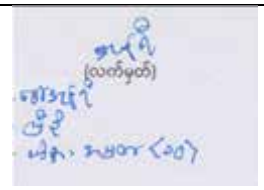
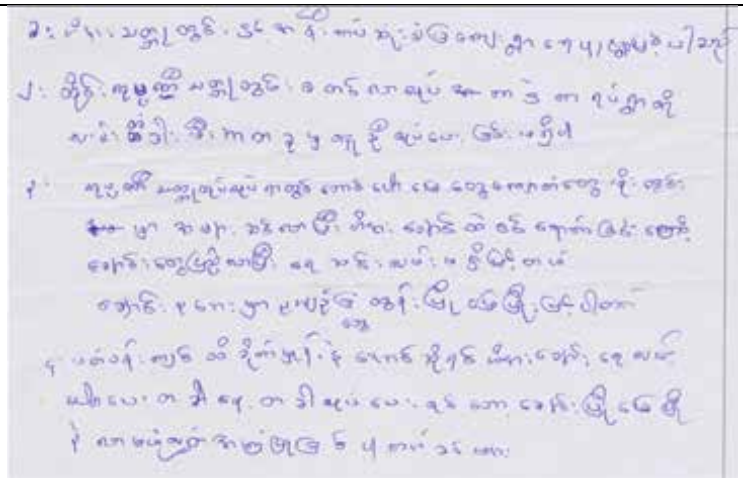
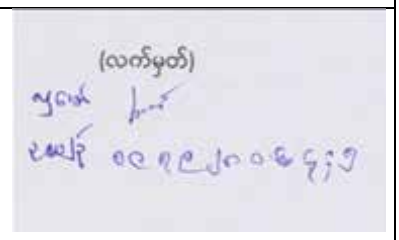
KEY DISCUSSIONS DURING PUBLIC MEETING FOR SCOPING PROPOSAL

စဉ်	တင်ပြဆွေးနွေးသူ / အဓိကဆွေးနွေးချက်များ
၁။	ဒေါက်တာကျော်စွာတင့် (Ever Green Tech) - ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းစဉ်များအကြောင်း၊ နယ်နမိတ်သတ်မှတ်မှုလုပ်ငန်းစဉ်နှင့် ဒေသခံလူထုပူးပေါင်းပါဝင်မှုအရေးကြီးပုံ၊ ထိခိုက်နိုင်မှုများနှင့်ကြိုတင်ကာကွယ်ထားရှိသင့်သည်များ၊ လူမှုဖွံ့ဖြိုးရေးရံပုံငွေ အသုံးပြုမှုများအားဆွေးနွေးတင်ပြသွားပါသည်။
၂။	ဦးသက်အေး (ဟိန္ဒာအုပ်ချုပ်ရေးမှူး) - လူမှုဖွံ့ဖြိုးရေးရံပုံငွေအား ကုမ္ပဏီမှ ပုံမှန်သုံးစွဲခြင်းရှိ/မရှိ မည်ကဲ့သို့သိရှိနိုင်ပါကြောင်း၊ - ရေပူဝန်ဆောင်မှုဆန်းစစ်ခြင်းလုပ်ငန်းများလုပ်ဆောင်ရာတွင်ထည့်သွင်းပေးစေလိုပါကြောင်း ဆွေးနွေးသွားပါသည်။
၃။	ဒေါက်တာကျော်စွာတင့် (Ever Green Tech) - လူမှုဖွံ့ဖြိုးရေးရံပုံငွေအား ကုမ္ပဏီမှ ပုံမှန်သုံးစွဲရမည်ဖြစ်ပါကြောင်း၊ မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုကော်မရှင်မှလည်းလမ်းညွှန်ပေးထားပါကြောင်း၊ ပုံမှန်သုံးစွဲရမည်ဖြစ်ကြောင်းသိရှိပြီးဖြစ်၍ သုံးစွဲခြင်းရှိ/မရှိစောင့်ကြည့်လေ့လာသွားနိုင်ပါကြောင်း၊ - ရေပူဝန်ဆောင်မှုဆန်းစစ်ခြင်းလုပ်ငန်းများလုပ်ဆောင်ရာတွင်ထည့်သွင်းကွင်းဆင်းသွားမည်ဖြစ်ကြောင်းဆွေးနွေးသွားပါသည်။
၄။	ဒေါ်နီနီထွေး (သတ္တုတွင်းစောင့်ကြည့်လေ့လာရေးအဖွဲ့) - သတ္တုတွင်းမှ စွန့်ပစ်ရေထုတ်လွှတ်မှုကြောင့် ထိခိုက်နစ်နာမှုများရှိခဲ့ပါကြောင်း၊ - ဆန်းစစ်မှုလုပ်ငန်းများအား တိကျသေချာစွာလုပ်ဆောင်ပေးရန်၊
၅။	ဒေသခံတစ်ဦး (အောက်ဟိန္ဒာကျေးရွာ) - လူမှုဖွံ့ဖြိုးရေးရံပုံငွေသုံးစွဲမှုအား တိကျသေချာစွာပုံမှန်သုံးစွဲရန်လိုအပ်ပါကြောင်း၊

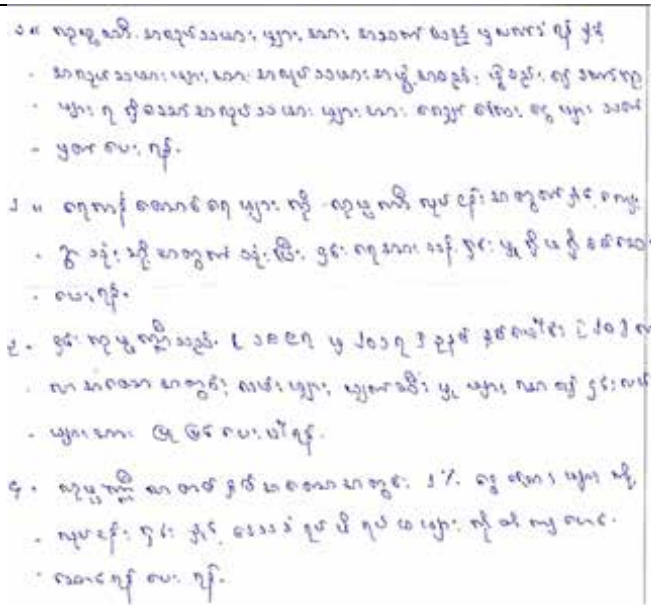
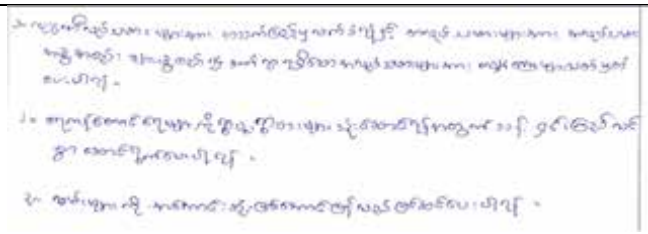
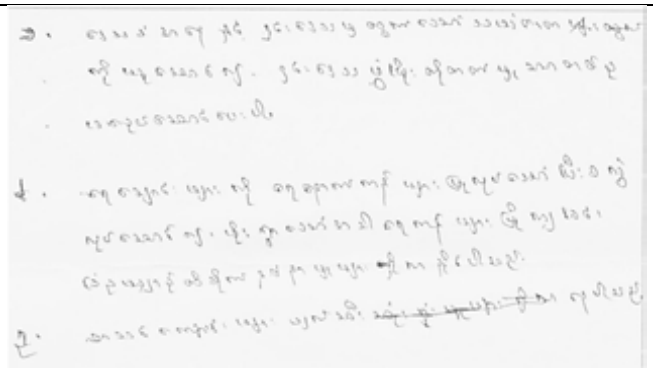
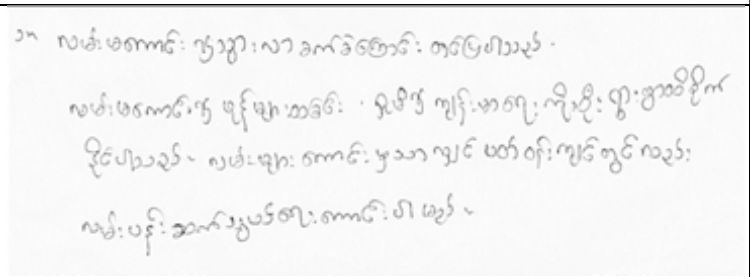
COMMENTS BY SUGGESTION LETTERS DURING FIRST PUBLIC MEETING

ပထမအကြိမ်တောင်ပြန်ပုံပဲခြံတင်မြေတက္ကရောက်လာသူများမှစာဖြင့်ရေးသားအကြံပြုချက်များ

စဉ်	အကြံပြုချက်	အကြံပြုဆွေးနွေးသူ
၁။		
၂။		
၃။		
၄။		
၅။		

၆။		
၇။		
၈။		
၉။		

၁၀။	- ရေလွှာင်ကန်ကို ဆုတ်ထားကြပါတယ် - ကုန်ပြဿနာတွေကို ပြန်ကျပြီး ယူရပြီ ဂုဏ်ယူပါတယ် - ကြေးစားများကို အခိုင်လုံမှု မရှိဘေးဒုက္ခ မဖြစ်သင့် ၊ ဆုတ်ထားကြဖို့ပါသင့် - ရေလွှာင်ကန် မနုံးတော်လျှင် ရေဆိုးသန့်ဘေး ကင်းပါသင့် - ဒွါတဲ့သို့ မသန့်ဂွင်းတဲ့ ရေများဝင်ရောက်လာခိုင် - လျှပ်စစ်မီး အခိုင်မှုန် ဆိုင်းများ ဆုတ်ထားကြ ယုံပါသင့် - ဘေးနီး ကြောင်းရေးဆွဲ ကို တိတိကျကျ မီးပေးသင့် - ဝန်ထမ်း ကင်းမှီ သူများကို ဒဏ်ပေးခွင့်မရှိဘူးသင့် (ရှိနိုင်ခြေ လျှင် အခိုင်မှုအတွက် • လျော်ကြေး ပေးသော ကြောင့်) - ကျွန်းတောရေ ဆေးရုံကျွန်း ရှိကသ - တိုက်တန်းယူငှဲ့ လေ့ကျင့်ပြီး ဒွန်း ရှုလို - တွေ့ဆုံခွေး ဒွန်းမှုမဲ့ များ ပြုလုပ်လျှင် campaign မှ သူများ ဆိုတဲ့တက်ရောက်ပေး ဆို (ကြေးရိုးရာတွင် ဒဏ်ကဲ့သို့ပေးသော ကြောင့်) - ဂန္ဒြာတ်ရွေ့ခဲ့တယ်း ကို သေချာစီစဉ်သင့် ၊ တိတ်ကျမှု လို	(လက်မှတ်) ဦးဇော်သန်း ၁၄၀၈။
၁၁။	MPC ကုမ္ပဏီ ဘက်က ဒုံ ရွေးချယ်မှု ကို စစ်ဆေးတဲ့ အခါ ဦးစီး ဦးဆောင်မှု ပေးနိုင်ရေးအတွက် အကြံပေးတောင်းခံ ခြင်းပါတယ် အကယ်၍ ဝန်ထမ်းများ ထိခိုက်မှုရှိခဲ့ပေါက် အကူအညီများကို လျင်မြန်စွာပေးနိုင်ရေး၊ ဝေဒနာခံစားရသူများကို ကုသပေးနိုင်ရေး အတွက် ကြိုတင်ပြင်ဆင်ထားရှိရန် လိုအပ်ပါသည်။	(လက်မှတ်) - ဒေါက်တာစိုးအောင် - ဒေါ်မြင့် - 09874011?
၁၂။	M.P.C ကုမ္ပဏီကို ဆိုခိုတက်ရောက်ခဲ့ကြတဲ့ အဖွဲ့အစည်းများ ကိုယ်စားပြုပါတယ်၊ ဒါအောင့် ဒီ တတိယ သယ်ယူပို့ဆောင်ရေး လုပ်ငန်းတယ်၊ ရွာကဆိုင်းမှာ စဉ်းစားစရာ၊ အားဆောင်ခန့်မှန်းသမျှ သယ်ယူမှုတစ်ကျွမ်းမှာ ကယ်ဆုံးရှုံးရခဲ့တဲ့ မတရားမှုများ အလေးထားဆိုင်းဆိုးရွာကိုစွန့်ခွာကြရတဲ့ ဒုက္ခသည်များ ရောက်ရှိလာမှုကြောင့် ကြီးမားသော ဆုံးရှုံးမှုများ ဖြစ်ပေါ်ခဲ့ရတဲ့ ဒေသခံများ ဖြစ်လာစေရေးနဲ့ ဒီလိုမျိုး ဖြစ်ရပ်မျိုး ထပ်မံမဖြစ်ပေါ်စေရေး ကြိုတင်ကာကွယ် ကုန်ဆောင်ရွက်ပေးရန်အတွက် / သယ်ယူပို့ဆောင်ရေးလုပ်ငန်းများ ဆောင်ရွက်ရာတွင် လုပ်ဆောင်ရမည့် ဝန်ထမ်းများ / သယ်ယူပို့ဆောင်ရေး အရောင်းလည်း မှုခင်ကြီးကြပ်ရေး တွေ့အပေါ်လေးထားရေး လုပ်ဆောင်ပေးစေလိုကြောင်း အစည်းအဖြေပြုပါသည်ကြောင့်	(လက်မှတ်) -
၁၃။	လာဘ်ခစားကောင်းကျိုး လာဘ်သား လုပ်ပေးပါ ဆိုတဲ့အကြောင်းဆိုရင် အကျိုးသင့်ပါ ၊	(လက်မှတ်) - ဖိုးညီယော - -

၁၄။		(လက်မှတ်)
၁၅။		(လက်မှတ်)
၁၆။		(လက်မှတ်)
၁၇။		(လက်မှတ်)

APPENDIX III

KEY DISCUSSIONS DURING FIRST PUBLIC MEETING

လူမှုဝန်းကျင်ထိခိုက်မှု ကွင်းဆင်းစစ်ဆေးမှု ရလာဒ်များ

ရွာအမည်	လိုလားချက်များ	စိုးရိမ်မှုများ
မြောင်းပြို	လမ်း၊တံတား၊ရေမီး၊ဆေးခန်း၊လျော်ကြေး၊ လစာ၊ချောင်းဖော်၊	မြေစာစွန့်ပစ်မှု၊ထိခိုက်မှုထပ် မဖြစ်စေရန်၊
အထက်ဟိန္ဒား	လမ်း၊တံတား၊ရေမီး၊ဆေးခန်း၊နှုန်းများဆ ယ်ရန်၊လစာ၊	
အောက်ဟိန္ဒား	လမ်း၊တံတား၊ရေမီး၊လစာ၊ ကျောင်းဆရာမ	မြေစာစွန့်ပစ်မှု
ရေပူဝ	လမ်း၊တံတား၊ရေမီး၊	
ကင်ပွန်းခြို	လမ်း၊တံတား၊ရေမီး၊နှုန်းများဆယ်ရန်၊လေ ာ်ကြေး၊ချောင်းဖော်၊	ထိခိုက်မှုထပ် မဖြစ်စေရန်၊
ကျောက်မဲတောင်	လမ်း၊တံတား၊ရေမီး၊ဆေးခန်း၊ ဘုန်းကြီးကျောင်း၊ချောင်းဖော်၊	မြေစာစွန့်ပစ်မှု၊
တောင်သုံးလုံး	လမ်း၊တံတား၊ရေမီး၊ဆေးခန်း၊ရေတွင်းများ ားရေအရည်အသွေး စမ်းရန်၊လျော်ကြေး၊ချောင်းဖော်	မြေစာစွန့်ပစ်မှု၊ထိခိုက်မှုထပ် မဖြစ်စေရန်၊
ရွှေချောင်း	လမ်း၊တံတား၊ရေမီး၊ဆေးခန်း၊ရွာဘောလုံး ကွင်း၊ခဲသင်္ဘော ပြန်စားရန်၊လျော်ကြေး၊ချောင်းဖော်၊ ကျောင်းဆရာမ	ထိခိုက်မှုထပ် မဖြစ်စေရန်၊

၂၇-၃-၂၀၁၇ တွင် မြောင်းပြိုချောင်း စောင့်ကြည့်ရေးအဖွဲ့ဝင်များနှင့် တွေ့ဆုံဆွေးနွေးမှု ရလာဒ်များ

၁။ အမှတ် ၂ ချောင်းတွင်း မြေစာမပုံရန်။
၂။ ချောင်း ၂ ချောင်းအား ရွာထိပ်မရောက်မီပေါင်းရန်။
၃။ အနည်ထိုင်ကန်များအား အောက်သို့သာ တူးချရန်။
၄။ မြောင်းပြိုချောင်းအား တူးရန်၊ ချဲ့ရန်၊ ကျောက်စီရန်။

၅။ မြေစာများရွာအနားတွင် စွန့်ပစ်ခြင်းမပြုရန်။
၆။ ကန်ဘောင်အတွင်း/အပြင်နံရံအား ကျောက်လုံးစီပေးရန်။
၇။ ကန်များအား ပုံမှန်ဆယ်ပေးရန်။
၈။ ကန်များအား ဖွင့်ချခြင်းမပြုရန်။
၉။ မြောင်းပြိုရွာအတွင်း ရေမဝင်စေရန်။
၁၀။ မြောင်းပြိုရွာ သုံးရေသွယ်ယူပေးရန်။

ပထမ အကြိမ် အဓိကသက်ဆိုင်သူများနှင့် တွေ့ဆုံပွဲ ထားဝယ်မြို့

စဉ်	တင်ပြဆွေးနွေးသူ / အဓိကဆွေးနွေးချက်များ
၁။	- လူမှုဖွံ့ဖြိုးရေးရံပုံငွေအား ကုမ္ပဏီမှ ပုံမှန်သုံးစွဲခြင်းရှိ/မရှိ - စွန့်ပစ်ရေထုတ်လွှတ်မှုကြောင့် ထိခိုက်နစ်နာမှုများရှိ - ဆန်းစစ်မှုလုပ်ငန်းများအား တိကျသေချာစွာလုပ်ဆောင်ပေးရန်၊
၁။	ဆွေးနွေးပွဲတွင် အင်္ဂလိပ်ဘာသာဖြင့် မပြောရန်
၂။	ရေစုကန်၊ ရေစစ်ကန်များ၏ ပုံများ ထည့်သွင်း ပြသပေးရန်၊
၃။	၁၉၉၉မှစ၍ MPC စတင်လည်ပတ်ခဲ့ပြီး စွန့်ပစ်မြေစာများ စနစ်တကျမရှိမှု၊ ရေဆိုး စွန့်ပစ်မှုတို့ကြောင့် မြောင်းပြို ချောင်းပျောက် ကွယ်သည်အထိ ဖြစ်ခဲ့ ဆုံးရှုံးမှုများအား မည်သည့် တာဝန် ယူမှုမှ မပြုလုပ်ခဲ့ပါကြောင်း၊ အစည်းအဝေးလုပ်မည်ဆိုပါက နှစ်ပတ် ကြိုတင် အကြောင်းကြားစေလိုကြောင်း၊ ထို့ပြင် ဆွေးနွေးမည့် အကြောင်းအရာ သုံးပတ်ခန့်ကြိုတင်ပို့ပေးစေလိုပါကြောင်း၊
၄။	- တောင်သုံးလုံး၊ ကျောက်မဲတောင်၊ ဆိုးကျိုးများ ခံစားနေရ - ချောင်းတူးခြင်းနှင့်ပတ်သက်၍ သိလိုကြောင်း၊ - ချောင်းဖော်ခြင်းလုပ်ငန်းအား ဟိန္ဒုချောင်းအထိတူးသင့်ကြောင်း၊အနက် ၁၅ပေ အကျယ် ပေ၅၀ ခန့် တူးသင့်ပါကြောင်း၊ - သဲမြေစာများအား ဘေးတွင် ပုံထားခြင်းဖြင့် ပြန်လည်မျော်ပါ ပြိုကျလာနိုင်သဖြင့် ချောင်း ပြန်ကောနိုင်ပါကြောင်
၅။	- MPC မှ ရေကာတာ ပိတ်ထားသဖြင့် မနှစ်ကရေကြီး၊
၆။	- ချောင်းဘေးနံရံများ အခိုင်အမာဖြစ်ရန် - အုန်းကြိမ်ချောင်းအားပြန်လည်ဖော်ပေးရန် - ခြံများပျက်စီးခဲ့ခြင်းအားတာဝန်ယူ ဖြေရှင်းပေးရန်
၇။	- ESIA လုပ်ငန်းအတွက် အချိန်မည်မျှယူထားသည် - သက်ရောက်မှု ဧရိယာမည်မျှသတ်မှတ်ထားသည်ကို သိလိုပါကြောင်း - အစီရင်ခံစာအား မည်သူအားတင်ပြမည်ကို သိလိုပါကြောင်း - ဒေသခံနှင့် လုပ်ငန်းရှင် မည်သူအားဦးစားပေးရွေးချယ်ပေးမည်

APPENDIX IV

KEY DISCUSSIONS FROM SECOND PUBLIC MEETING

ဒုတိယအကြိမ် လူထုတွေ့ဆုံပွဲ
အ.ထ.က (ဟိန္ဒား)

စဉ်	ဆွေးနွေးသူ / အဓိကဆွေးနွေးချက်များ
၁။	- Tailing Pond ၇ ခု တည်ဆောက် လည်ပတ် နေပါ ကြောင်း - Tailing Pondများ တူးဖော်ခြင်း ပြုလုပ်ခိုင်းထားကြောင်း၊ အမှတ် ၆၊ အမှတ် ၄ ကန်တွင် နှုန်းများစုပုံ သွားမည်
၂။	- ဒေသခံများအား ခဲလုပ်ငန်း လုပ်ကိုင် ခွင့်ပြုရန် - မီးလိုင်းများအား စနစ်တကျပြုလုပ်ပေးရန် - တောပြုန်းခြင်းဖြစ်နေသဖြင့် တားဆီးပေးစေလိုကြောင်း - ရပ်ရွာဖွံ့ဖြိုးရေးများ ဆောင်ရွက်ပေးစေလိုကြောင်း
၃။	ကျောက်မဲတောင်အုပ်ချုပ်ရေးမှူး ချောင်းရေကြီးမှုကြောင်း မြေယာဆုံးရှုံးမှုများရှိပါကြောင်း၊ ထိုက်သင့် သော နစ်နာကြေး ရရှိလိုပါကြောင်း၊
၄။	- ကုမ္ပဏီအနေဖြင့် အမြတ်ငွေ၏ ၂ % အား ဒေသဖွံ့ဖြိုးရေးတွင် သုံးစွဲသွားမည် - ဆရာ/မများအား ထောက်ပံ့မှုများ ပြုထားပါကြောင်း - လမ်း/တံတားများ ပြင်ပေးနေ - ဟိန္ဒားဆေးရုံအား ပြုပြင်ပေးပြီးဖြစ် - မီးသင်္ကြိုလ်စက်မတည်ကူညီ - ဖောင်းတောရေကန်အား သန့်ရှင်းရေးပြုလုပ်ပေးမည် - ရေပိုက်လိုင်းများအား ပြုပြင်ပေးထား - မြောင်းပြုရွာဖွံ့ဖြိုးရေး သိန်းငါးဆယ် လှူထား
၅။	- နုန်းများအား မိုးရေနှင့်အတူ ဖောက်ချခဲ့ကြောင်း၊ - ဒုတိယအကြိမ် ရေကန်ကျိုးပေါက်၍ ဖြစ်ပါကြောင်း၊ မြေစာများဖယ်ထုတ်ရန် တဧက ၅၀၀၀ကျပ်ပေး၊ လျော်ကြေးပေးခြင်းမဟုတ်၊ - မြေစာများအား ဥပဒေနှင့် အညီ စွန့်ပစ်ရန် - ဒေသတွင်းနစ်နာမှုများအားကူညီဖြည့်ဆည်း ပေးစေလို၊ - ကျောက်မဲတောင်၊ တောင်သုံးလုံး၊ ရွှေချောင်းရွာများမှာလည်း ထိခိုက် နစ်နာမှုများ ရှိခဲ့ပါကြောင်း၊
၆။	- ဒေသဖွံ့ဖြိုးရေး ရန်ပုံငွေအား ဒေသခံများ ပါဝင်သော အဖွဲ့၏စီမံခန့်ခွဲမှုဖြင့်သာ ဆောင်ရွက်စေလိုပါကြောင်း
၇။	- မိုးကျတော့မည်ဖြစ်သဖြင့် ရေကန်များ အလုံအလောက်/ အခိုင်အခန့် ရှိမရှိ - စွန့်ပစ်မြေစာများအား လုံခြုံစိတ်ချရသောနေရာသို့ စွန့်ပစ်မှုများ ရှိသင့်ပါကြောင်း - နစ်နာသူများအား ဖြေရှင်းပေးနိုင်သော အဖွဲ့အစည်းတစ်ခု ထူထောင်ပေးရန် - ရေအရည်အသွေးအား ပုံမှန်စစ်ဆေး၊သတင်းထုတ်ပြန် ပေးရန်

ဒုတိယအကြိမ် လူထုတွေ့ဆုံပွဲ

မြောင်းပြုရွာ ဘုန်းတော်ကြီးကျောင်း

စဉ်	ဆွေးနွေးသူ / အဓိကဆွေးနွေးချက်များ
၁။	- Power Point တွင် English စာလုံးများ ထည့်သွင်းရေးသားထားခြင်းအား လက်မခံပါကြောင်း
၂။	- မြေယာပျက်စီးမှု လျော်ကြေးများ ဆွေးနွေးပေးစေလို
၃။	- CSR Program အား ဆွေးနွေးခြင်းမပြုခင် ဒေသခံများ၏ လိုလားချက်များအား သိရှိရန် အရင် ဆွေးနွေးစေလို - မြစ်ချောင်းများ၏ ရေစီးဆင်းမှု ကောင်းမွန်လာစေရေး ဆောင်ရွက်ရာတွင် အစအဆုံး ဆောင်ရွက်ရန်၊
၄။	- မြေစာဖုံးလွှမ်းခြင်းခံခဲ့ရသော လယ်ယာမြေများ ပြန်လည်ဖော်ထုတ်နိုင်ရေး ကူညီပေးရန်။ (ဥပမာ - ရွာများအား ထွန်စက်များဝယ်ယူလှုဒါန်းပေးထားပြီး စက်အင်အားဖြင့် ဆောင်ရွက်ခြင်း)