Proposed Terms of Reference for EIA of Lunghar Chromite Mines

Village: Shirohi-Lunghar, Ukhrul District, Manipur

Mining Lease Area: 132.781 ha.

Production Capacity: 10531 tons per annum

Prepared for:

M/s Sarvesh Refractory Private Ltd. (SRL)

Prepared by:

ERM India Pvt. Ltd.

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The mining lease area over 132.781 ha has granted mining lease in favour of M/s Sarvesh Refractory Pvt. Ltd., is situated in villages Sirohi and Lunghar under Ukhrul district of Manipur. The ML area is featured in the toposheet No. 83 K/8. The granted lease is bounded between:

ML Boundary	Latitudes	Longitudes
A	25° 09′ 35.98′′ N	94°28′ 12.04′′ E
B	25° 09′ 37.07′′ N	94°28′ 40.13′′ E
C	25° 08′ 44.54′′ N	94°28′ 45.48′′ E
D	25° 08′ 43.62′′ N	94°28′ 16.42′′ E

The ML area is devoid of any forest land or agricultural land; entire land is categorised as unclassed Govt. land.

The Geological Proved reserve of exposed ore bodies is estimated to be 1134. The geological probable reserve of float ore zone is estimated to be 91674 tones. Therefore total demonstrated reserve (Proved and Probable reserve) is 92,808 tones. The production capacity of the mine is 10531 tons per annum. Based on current exploration data, the life of the mine is 9 years.

The proposed project activity falls under the category of mining of minerals having ML area ≥ 50 ha (categorized as 1a vide Notification dated 14th September, 2006) which have to take environment clearance from the Central level based on appraisal of EIA as per the new EIA Notification promulgated by the Ministry of Environment and Forests and Climate Change (MoEFCC) in September, 2006. To initiate the environmental clearance (EC) process, M/s Sarvesh Refractory Private Limited (SRL) has to submit Form-1 of the EIA Notification along with a Terms of Reference (ToR) for the EIA for approval by the MoEFCC before undertaking the EIA study.

ERM India Pvt. Ltd. will undertake an environmental assessment of the proposed expansion and document the same as an Environment Impact Assessment report. This draft Term of Reference (ToR) intends to set the scope of the EIA study for the proposed expansion activities. The intention of the proposed EIA is to support the project for obtaining the necessary environmental clearance from the MoEFCC. In this perspective, ERM would strive to fulfil the project objectives delineated in the section below.

1.1 OBJECTIVES OF THE STUDY

The overall objectives of the EIA study will be as follows:

- Establish the prevailing baseline environmental and socioeconomic condition of the project site and its surroundings;
- Assess environmental, socioeconomic and occupational health impacts arising out of the development and operation of mines;

- Identify residual impacts that may arise from the project and suggest suitable measures to minimize them;
- Recommend appropriate preventive and mitigation measures to minimize pollution, environmental and social disturbances during the life-cycle of the project;
- Formulate EMP that integrate mitigation measures with existing program of project proponent so that they can be implemented, monitored and suitable corrective action can be taken in case of deviations;
- Assess the risk and suitably prepare a Disaster Management Plan

1.2 STRUCTURE OF DRAFT TOR

This draft ToR has been prepared in purview of the EIA study to be undertaken for the proposed facility. It has been based on Standard ToR for EIA/EMP report for projects/Activities requiring Environmental Clearance under EIA Notification, 2006, published on April, 2015. The draft ToR submitted to EAC will assist in finalization of the ToR by MoEFCC. The other key purpose of the draft ToR is to identify and convey the issues pertaining to Environmental Baseline Monitoring, Impact Assessment Methodologies and draw Environmental Management Plan at a later stage.

The draft ToR for the EIA study is framed within the following structure:

1.2.1 Introduction

This section will include the purpose of the project, profile of the project proponent, the provisions of the General Conditions of EIA Notification, 2006 that the project attracts, etc. Further the need for conducting the study and its scope will be given here.

1.2.2 Project Description

This section of the EIA report will provide an overview of the project in terms of:

- Location of the ML area and environmental setting
- Mining lease
- Existing & proposed land use of the mine
- Geological reserve, mineable reserve & life of mine
- Mining waste and waste management

The EIA would provide an overview of the various project components proposed for approval, including:

- Mine Development;
- Mining & Transportation of Ore;
- Conceptual Mining Plan;
- Mine Closure & Reclamation Plan.

Details and/or drawings will be provided for the project components and activities including:

- Original land schedule, Proposed land use (plan period), Conceptual period land use and after mine land use;
- Exploration plan
- Quarry development plan & map during plan period and conceptual period;
- Amount of mining waste generated during plan period, conceptual period and its management;
- Mining operation and associate activity;
- Explosive used, storage, drilling & blasting activity;
- Water requirement & sourcing;
- Transportation and haulage routes;
- Utilities and Resource requirements.

Any litigation pending against the proposed project and or any direction/ order passed by any court of law against the projects and the details thereof.

- Use of existing infrastructure
- Utilities and Resource requirements
- Water requirement & sourcing.
- Source of Power Supply
- Manpower
- Pollution Sources and Characterization
- Estimated Project Cost

1.2.3 Baseline Studies

Understanding of Project area

To provide an understanding of the project area the EIA study will involve reconnaissance visits and compilation of secondary information present as following.

- Location of the proposed project
- Location of industries/settlements in the vicinity
- Location of sensitive environmental receptors in the project area
- A list of major industries with name and type within study area (10km radius) Land use break-up of total land of the project site (identified and acquired), government/ private - agricultural, forest, wasteland, water bodies, settlements, etc shall be included. (not required for industrial area)
- Location of National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, within 10 kms.
- Details of Drainage of the project up to 10km radius of study area.

Study Area

Intensive data collection will be conducted within the study area i.e. area falling within the boundary of about 10 km around the site which may be impacted by the proposed mining activity (***Figure 1.1*** The project area would

be regarded as core area and rest of the area of about 10 km boundary around the project site would be considered as buffer area. The following features will be considered within the study area:

- Present Land use of site and in the study area
- Topography in the study area
- Sensitive Environmental Resources: Sensitive Natural Habitats
- Surface water resources and drainage network in the project site and study area
- Ground water resources in the project site and study area
- Details of the physical and socio-economic features along with manmade structures
- Road Network
- Proneness to Natural Disasters
- Sensitive Social Resources: Human habitats, Public Utilities, Valuable Common Property Resources.

The sites and the surrounding study area would be depicted on GIS maps through satellite imagery and topographical map to understand the status of environment and their impacts. The following section details out the Sampling Plan for the study.

Primary Monitoring

The sampling plan for primary monitoring will be drawn up based on the findings of the reconnaissance survey and after obtaining an understanding of the proposed project activities. The sampling plan will also take into consideration the receptor locations that could potentially be affected by the proposed activities. The tentative monitoring stations and sampling locations for each environmental component along with the parameters to be monitored, frequency and number of samples to be taken are presented in the environmental matrix given in ***Table 1.1***.

Table 1.1 Details of monitoring program for environmental components

Component	**Meteorology**
No. of Stations	1 Station
Frequency & Duration	One season
Parameters	Wind speed, Wind Direction, Rainfall, Temperature, Relative Humidity & Cloud Cover
Locations	Any central location of the study area
Component	**Air Quality**
No. of Stations	5 Stations
Frequency & Duration	24hrs / 8 hrs, 2 times a week for one season (excluding monsoon)
Parameters	PM_{10}, $PM_{2.5}$, SO_2, NOx, CO

Locations	Sensitive receptors around the proposed site, residential, commercial and industrial zones considering micro-meteorological condition
Component	**Surface Water Quality**
No. of Stations	3 Stations
Frequency & Duration	Grab sample – once in the season
Parameters	Color, pH, Total Dissolve Solids, Total Suspended Solids, Oil and Grease, DO, BOD, COD, Chlorides, Sulphates, Total Hardness, Salinity (Na), Free Ammonia, Electrical Conductivity, Sodium Absorption Ratio (SAR), Lead, Iron, Arsenic, Boron, Cadmium, Chromium, Total Coliforms, Faecal Coliforms
Locations	Local streams in the study area
Component	**Potable Water Quality**
No. of Stations	5 stations potable water sources in the villages
Frequency & Duration	Grab sample – once in the season
Parameters	Colour, Odour, pH, Taste, Turbidity, TDS, Aluminum, Ammonia, Anionic detergents, Barium, Boron, Calcium, Chloramines, Chlorides, Copper, Fluoride, Free Residual Chlorine, Iron, Magnesium, Manganese, Mineral Oil, Nitrate, Phenolic Compounds, Sulphate, Sulphide, Total Alkalinity, Total Hardness, Zinc, Cadmium, Cyanide, Lead, Mercury, Polychlorinated biphenyls, Polynuclear Aromatic Hydrocarbons, Total chromium, Total Coliform, Faecal Coliform
Locations	From neighboring villages
Component	**Soil Quality**
No. of Stations	5 stations
Frequency & Duration	Grab sample – once in the season
Parameters	Texture, pH, Electrical Conductivity, Cation Exchange Capacity Porosity, Water Holding Capacity, Organic Carbon, Sodium Absorption Ratio (SAR), Nitrogen, Phosphorous, Potassium (NPK) Values, Copper, Zinc.
Locations	One from site and four from neighboring agricultural fields
Component	**Ambient Noise**
No. of Stations	5 location
Frequency & Duration	Once in the season over 24 Hours (daytime / night time)
Parameters	Equivalent sound level in dB (A) – Leq
Locations	Sensitive receptors around the ML area
Component	**Traffic**
No. of Stations	2 location

Frequency & Duration	Once during study period
Parameters	Heavy, medium and light vehicles
Locations	Access and approach road

Proposed Monitoring Location Map of air, noise and met is enclosed in ***Figure. 1.2*** and soil, water and estuarine monitoring locations are shown in ***Figure 1.3***

Secondary Studies

Desktop study will be conducted for understanding the topography, geological settings like rock type, seismicity and associated hazards mainly in the area will be studied as part of baseline study. Soil data including type, classification, characteristics, soil properties, etc., will be important for engineering design considerations like loading cargo capacity, etc.

Ecological Survey

The ecological profile of the area would be drawn up based on the review of secondary data and primary field surveys. Secondary data will be obtained from Forest Department, and local people. Preliminary investigation and studies show that there is no ecologically sensitive area within 10km of the project site boundary. However this will be further studied during the primary ecological surveys to be undertaken at the project area and surroundings as part of the EIA study.

The primary and secondary data relating to flora, fauna and agricultural diversity of the area will be generated by visiting the site area and its surroundings. The baseline surveys will be carried out to determine the existing environmental conditions in order to facilitate an adequate assessment of the Project's impacts upon ecology and aids in further identification and development of appropriate mitigation measures. Efforts will also be made to find protected species in the area which can be of conservation importance.

Socioeconomic Analysis

Assessment of the socioeconomic profile forms an integral part of any EIA Study. The baseline socioeconomic scenario will focus on demographic structure, economic activity, education, literacy profile, infrastructure facilities of the villages located within the study area. Secondary data for this purpose will be utilized from Census of India, 2011. Socioeconomic profiling will involve diagnosis of baseline status of the villages of the study area in relation to human environment with respect to:

- Socio-Cultural resources - which refers to demographic structure, total population, density, housing, sex ratio, literacy, employment level and cultural facilities

- Infrastructure resources - refers to educational facilities, health services, transportation, water supply, communication, other service etc.

As the proposed project is located in an existing industrial land hence, issues pertaining to R&R are not envisaged.

1.2.4 Impact Assessment

The EIA study will aim to identify, characterize and evaluate potential impacts arising out of the project and prioritize them so that they can be effectively addressed through Environment Management Plans and by adopting appropriate Project designing and planning.

Impact Identification

The preliminary identification of the potential impacts will be carried out based on the understanding of the project gained during the scoping exercise and also from the field visit, consultation with representatives of the project proponent and professional judgment of the ERM team. A preliminary understanding of the mine development and operation of mines is provided below:

1. Air environment: Assessment of ground level concentration of pollutants from the operation of mine. Air Quality modelling will be undertaken to understand the additional emissions due to the proposed expansion. The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any.
2. Water Environment: Impact on surface water quality and ground water quality will assessed due to surface runoff from mining site and waste dump site. Proposed mitigation and control measures will be provided.
3. Mine Waste: The waste (mine overburden and inter-burden) generated due to mining and other waste (hazardous and non-hazardous) will be generated during operation of mine that will impact upon the environment adversely if not handled as per best practices and applicable rules and regulations.
4. Occupational Health: The imminent health hazards associated with mining operation. This will be dealt in the risk section.
5. Socio-cultural impact: The proposed project is new projects; socio-cultural impacts are envisaged.

The environmental and health aspects will be studied in detail in EIA study and relevant mitigation measures will be suggested.

Impact Evaluation

An environmental matrix will be developed to formally present an overview of the predicted impacts. The matrix structure will take into account the environmental issues as well as the concerns of the community.

The first step in the elaboration of the matrix will consist of defining the main activities or aspects of the project that possibly can generate negative or positive impacts through extensive consultations with representatives of the project proponent. The second step will aim at establishing a list of environmental elements (biophysical and human) found in the project area. Potential interrelations between the impact sources and these elements will be established to evaluate the impacts.

Environment Safeguards

The EIA study would prepare guidelines for mitigating any adverse impacts identified due to the proposed project. The site specific mitigation plan will specifically address impacts that would be generated as a result of the proposed project**.**

1.2.5 Project Benefits

The benefits arising out of proposed expansion on local population and the country will be studied and provided in this section

1.2.6 Additional Studies - Risk Assessment and Disaster Management Plan

In normal scenarios, the level of risk is low however fire from fuels, inflammable chemicals can occur in abnormal conditions. Risk analysis will be carried out for the facilities proposed in the development plan in EIA studies. Potential hazards will be identified and consequence analysis will be conducted as part of EIA study. The Disaster Management Plan will be integrated with the existing Disaster Management Plan in the existing plant.

1.2.7 Environmental Management Plan (EMP)

The Environmental Management Plan (EMP) will recommend specific, structured and targeted management plans to mitigate the significant impacts and bring them to a level that would be acceptable to both the regulatory authorities and the community. The EMP would be laid down in a manner that these plans can be integrated with the proponent's existing environmental management measures. The EMP would also include recommendations those necessary for pollution prevention, control as well as conservation and compensatory measures. In addition, a systematic environmental monitoring plan for assessing the adequacy of the mitigation measures and for understanding changes in environmental quality due to the proposed project would also be part of the EMP.

1.2.8 Environmental Monitoring Strategy

To measure the effectiveness of the implementation of the EMP a monitoring strategy (Plan) for activities during construction phase and also during the post construction phase will be prepared. The Plan will include the monitoring activities and corresponding schedules.

1.2.9 EIA Reporting

Reporting on all activities conducted during the project will be prepared, collated and submitted in the form of an EIA Report. The report will include supporting documents as necessary, a list of findings, impacts and proposed mitigation measures. Following would be the structure of the report as per the guideline set by the EIA 2006 Notification:

- Executive Summary
- Introduction
- Description of Project
- Alternative Analysis
- Description of Environment
- Impact Assessment
- Additional Studies - Risk Assessment and Disaster Management Plan
- Project Benefits
- Environmental Management Plan & Framework
- Environmental Monitoring Program
- Disclosure of Consultants

The draft EIA report would be further finalized by incorporating comments and views obtained from different stakeholders during the public hearing and through letters/ representations before submitting it to the appraisal committee. Apart from annexures to the report, there would also be notes and proceedings of the public hearing, list of references and other relevant documents, photographs etc.

Figure 1.1 Study Area of the proposed project

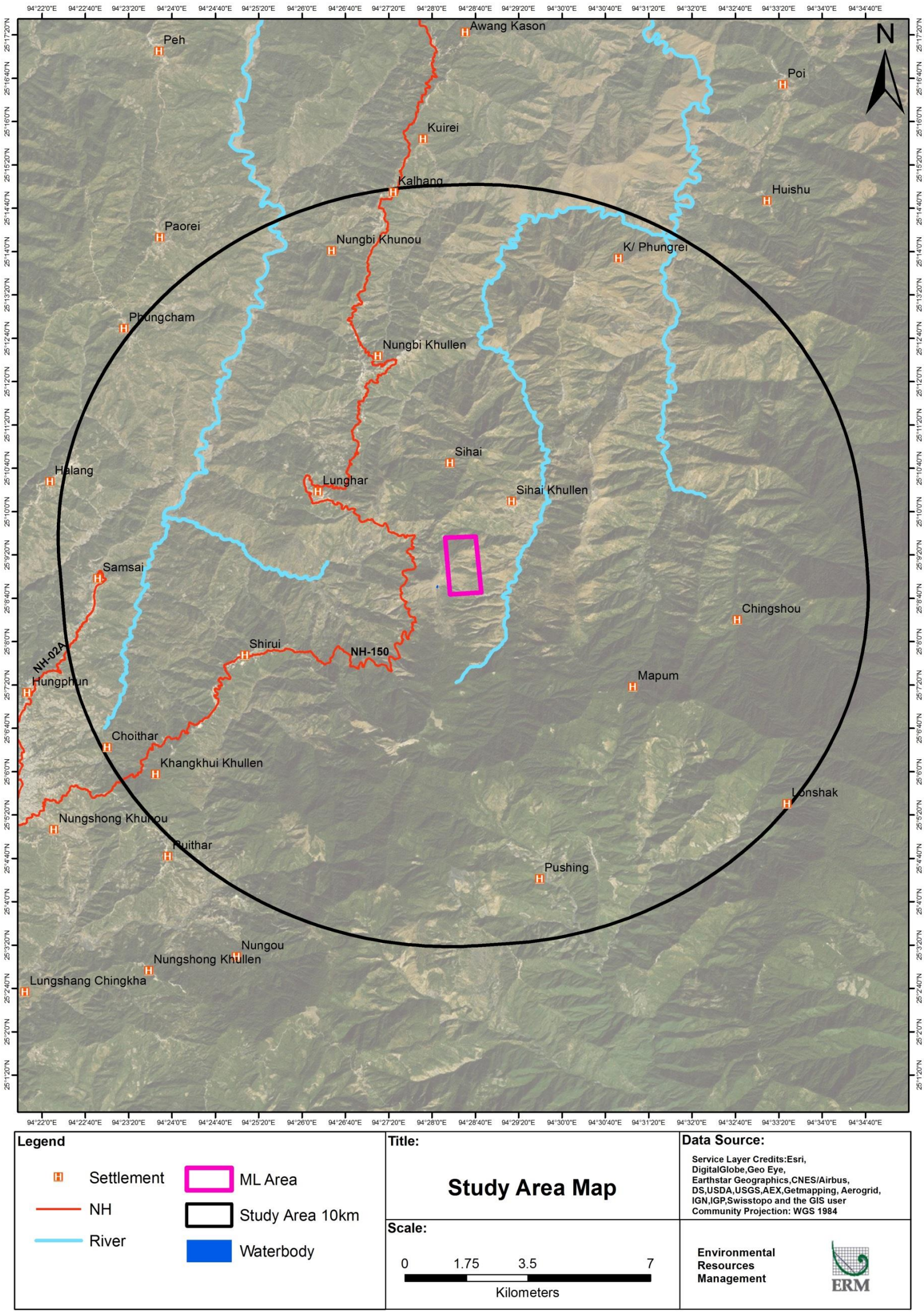

Figure 1.2 Proposed monitoring locations of Meteorology, Air and Noise

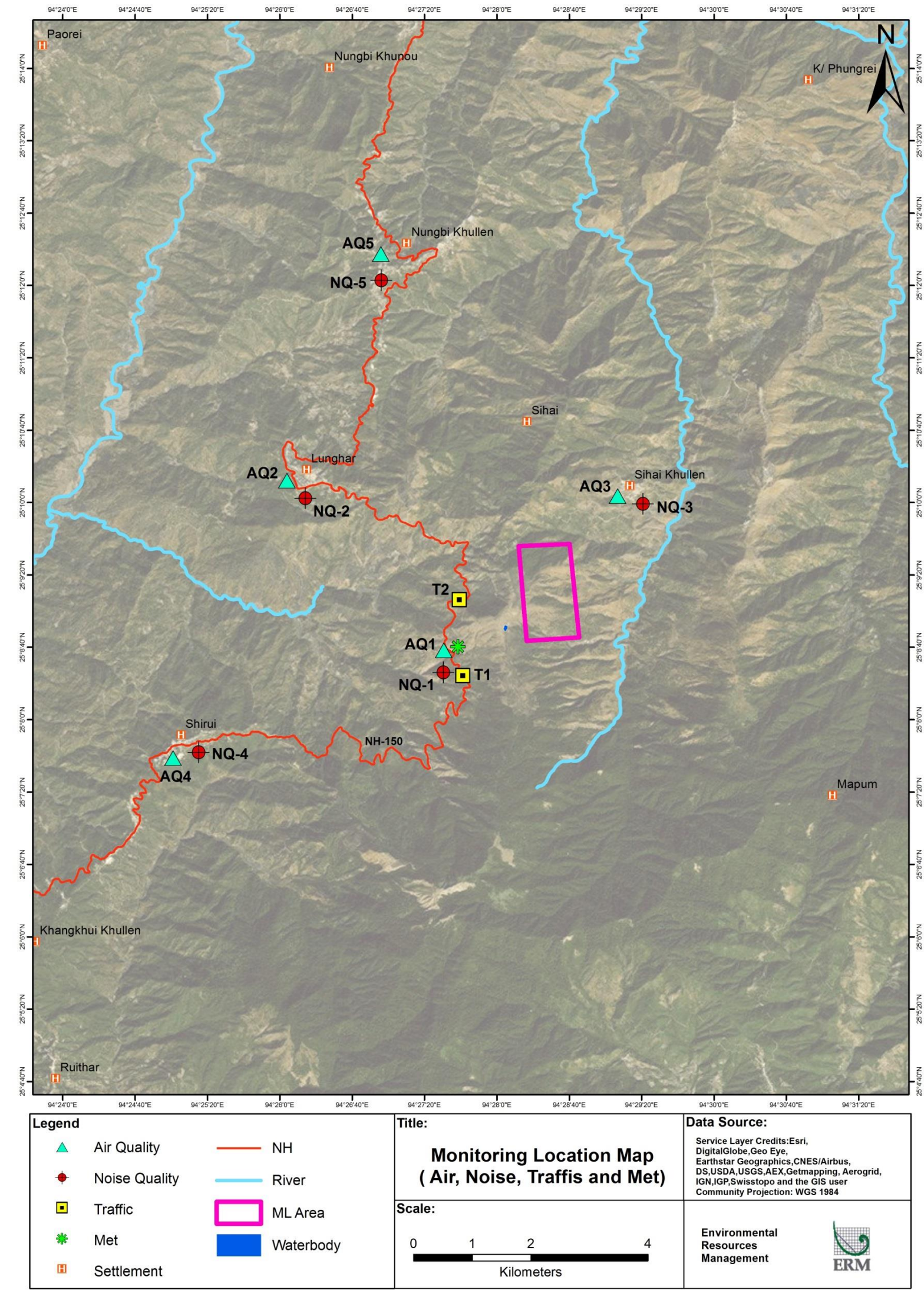

Figure 1.3 Proposed monitoring locations of groundwater, surface water and soil