DUST CONTROL AND MANAGEMENT PLAN

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Contractor: MCC17. Supervision Consultant: AARVEE Jv. NET Consult 
Client: Ethiopian Roads Authority. Financed by the World Bank
Mizan – Dimma-Boma Road Upgrading Project

Contract 1: Mizan - Dima
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1. Introduction

This report covers the plan and methodologies to be used by the joint party of the Contractor, MCC17, and the Supervision Consultant, AARVEE Jv. NET, and local community members to control and mitigate the nuisance caused by parts of the construction work including but not limited to dust pollution emanating from the main stone crushing facility, roadways under construction and blasting activities in stone quarry areas as well as the hot mix asphalt operations on the immediate local community and on the local staff employed therein.

This dust Control and Management Plan forms part of the site environmental management plan to ensure that the construction activities in the project meet the requirements of the ESIA and operate to the highest standard required.

The management of emission level concern pollutants of both from the crusher and the asphalt plant. Pollutant from the crusher plant are particulate matter, while those from the asphalt plant are gaseous by products of asphalt smelling from the bitumen, including NOx, COx, SOx gases.

Complaints have been voiced from the local community on the amount of dust pollutants produced by the crushing activity and reaching them constantly. The complaints range from dust and noise nuisance to health problems on themselves and their immediate family members.

This unpleasant fact has been a source of considerable concern on the part of the community, ERA and the Consultant that are the primary drivers of the concerns about the high levels of the emissions from the quarry operations, and the requirements of ERA’s ESIA and the contractor’s ESMP. These measures are necessary to comply with the project’s ESIA and Ethiopian legislations.

A lasting solution to the problem is highly sought by all concerned parties which gave rise to the current site visit by a team of experts from the WB, the ERA, the Supervision Consultant, the Contractor and representatives of the local community.

Consequently, the crushing activity has been interrupted until the Supervision Consultant and the Contractor come up with a safe methodology of running the main stone crusher and the asphalt plant without undue nuisance and health risks on the immediate community.

Therefore, the Supervision Consultant and the Contractor have devised this dust control and management plan to effectively and consistently solve the problem henceforth.

2. Objective

The primary objective of this Dust Management Plan is to prevent significant impacts on amenity, human health and significant environmental values. This objective will be achieved through establishing:

- Measurable environmental performance indicators and targets;
- Relevant dust control management actions and responsibilities; and
- A monitoring system that can be report performance against these targets
3. Site Layout

Inherent to road construction work the different production, construction, storage, habitation and other important activities are located across the length of the road project and at times most activates are carried out simultaneously too.

But, the major activities where nuisance to the community potentially emanates include:

1. Stone crushing yards
2. Hot mix asphalt plant yard
3. Priming bitumen fluxing yard
4. Blasting areas
5. Bitumen storage area

In the subject project most of the above operations are located at km 39+100 LHS such as stone crushing yard, hot mix asphalt plant, prime fluxing yard, bitumen storage yard and blasting yard. This is helpful in concentrating the nuisances caused by these activities in one single area, which in turn is helpful in minimization of environmental impact and management of the nuisances.

A detailed drawing showing the site plan and the locations of the different operations is attached in the appendix of this report.

4. Exposure, Vulnerability and Nuisance

The exposure and vulnerability measurement has been done on the surrounding location of the main crusher plant in order to identify and locate major risk groups due to this nuisance. Hence, a sketch of the crushing plant along with the surrounding area has been prepared and houses located within 500m radius of the crusher have been identified and indicated. Besides, consideration was given to the houses and facilities which are located toward the general wind direction in order to specify those especially vulnerable to the nuisance.

The evidence on airborne particulate matter (PM) and its public health impact is consistent in showing adverse health effects at exposures that are currently experienced by urban populations in both developed and developing countries. The range of health effects is broad, but are predominantly to the respiratory and cardiovascular systems.

Though it is a common phenomenon, that all people are affected by dust pollution and health risks on the respiratory and cardiovascular systems is experienced; on prolonged exposure to significant quantity of dust particulate matter, especially vulnerable groups, including young and the elderly as well as pregnant women, can be significantly affected.
5. Types of Dust Pollutants

Dust pollutants are generally categorized into PM, Particulate matter, PM\(_{10}\) and PM\(_{2.5}\).

This is a way of indicating the size of the airborne dust that emanates from most dust producing sources in micro meters. Hence PM\(_{2.5}\) indicates that part of the particle concentration which is less than or equal to 2.5 \(\mu\)m in size, whereas PM\(_{10}\) describes the concentration of particles that are less than or equal to 10\(\mu\)m in diameter. Both sizes cause nuisance.

The choice of indicator for particulate matter also requires consideration. At present, most routine air quality monitoring systems generate data based on the measurement of PM\(_{10}\) as opposed to other particulate matter sizes. Consequently, the majority of epidemiological studies use PM\(_{10}\) as the exposure indicator. The PM\(_{10}\) is primarily produced by mechanical processes such as construction activities, road dust re-suspension and wind, whereas the PM\(_{2.5}\) originates primarily from combustion sources.

6. Mitigation Measures

Stone crushing is necessary in order to build roads, bridges, buildings and almost everything we need in our modern life. Stone dust cannot be avoided in crushing activity. It is produced by the crushing itself, the sorting, the transport of gravel and also by vehicle movements over dusty roads. We can however reduce the amount of dust that reaches the lungs. By dust suppression mechanism, the places where dust is generated can be encapsulated so the dust is not easily carried off by the wind.

The best solution is therefore to REDUCE the amount of dust that is being released into the ambient air. This can be done by:

- Wet crushing
- Mist spraying at the sand crusher
- Spraying water at the source of dust dispersion
- Measuring of level of dust emission using PM (particle matter) measurement equipment as a control mechanism
- Showering the access and surrounding of every dust producing places
- Cleaning the crusher area periodically and prohibiting drivers from speedy driving.
- Enclosing the dust sources by sheds and processes with a canvas near the generating source
• Using Personal Protective Equipment (PPE) for those local staff working in or near the crusher plant
• Relocating of permanent inhabitants within 500m of the crusher plant.

6.1 Wet Crushing and Mist Spray

The best way to minimize and avoid dust pollution from crushing of stone is incorporating effective dust suppression measure shall be incorporated in the crushing processes such as wet crushing, mist spray, and inclusion of dust suppressant accessories.

Rock stockpiles should be watered to wash out fines before loading into the crusher

6.2 Showering

Showering the access road and all dust generating place will prevent the dust from invading the surrounding atmosphere. Moistening the ground two times per day (Morning at 8am and Afternoon at 4pm) will extremely reduce the dust that may find its way to the respiratory system by wind action and movement of vehicles within the crusher plant compound.

Action to be taken

➢ A minimum of two applications of water shower on the dusty grounds surrounding the crusher plant will be done. Special emphasis on the access road to the crusher site is envisaged by this dust control and management plan of action, and data will be recorded using the inspection sheet as attached in the appendix section of this report.

6.3 Provision of outlet covers/tubes

Outlet covers/tubes at out falls of conveyors will collect the dust and acts as a vent and away from population habitation areas.

6.4 Cleaning the Crusher area periodically and prohibit drivers from speedy driving

It is known that there is a fugitive dust which generally involve the re-entrainment or settled dust by wind or machine movement. This secondary source of pollution creates more fines particulate matters.

Hence, the crasher area will be cleaned every other day and the trucks or equipment will be controlled by reducing their speed. The speed limit for vehicles in Crusher area will be 10km/hr.
6.5 Spraying water

Dust control by water spraying measures is effective in reducing breathable crystalline silica. Studies have reported significant reductions by the use of wet methods to control silica in various applications, including stone crushing, construction, mining, and manufacturing industries.

Dust control by watering system introduces moisture into the material flow by spraying water at dust generating locations, so that fine particulates do not become airborne. This requires an arrangement to provide pressurized water to nozzles. Its installation includes a water tank, pump, filter, pressure gauges, flow meter and a network of pipeline, fitted along with regulating valves and spray nozzles.

This has already been installed on the crushing plant and its application will be daily monitored and recorded by the contractor environmentalist and periodically by the Supervision consultant.

If the water level in the storage tanks feeding the wet-crushing sprinklers falls below 15% maximum capacity, then crusher operations shall be stopped until the tanks are refilled.

Action to be taken

➢ At all times, water will be availed and applied to the rock material before it is introduced in to the crusher plant. This will be recorded and documented on a daily basis, using the inspection sheet prepared for this purpose; and as included under the appendix section of this report.

6.6 Enclosing dust sources

Dust producing points are especially located at crusher jaws, screens for sorting sizes, high heaps of crushed materials and stockpiles, including sand and finer particles piled up sites, Canvas covers have already been placed on such dust source points of the crusher with additional covers to be applied from time to time as the need arises. Besides, cover shade roofing has been constructed on sand crusher part (which creates more fines that the other types of crusher) of the plant, to reduce dust emission from this source in to the surrounding atmosphere.

The supervision consultant and the contractor’s site manager will daily supervise and inspect the condition of the covers and their adequacy.
6.7 Relocating of inhabitants

It is recommended to locate the crushing facility as far from human habitation as possible. Whenever, this is not practical the nearest inhabitants can be relocated.

As part of the risk management plan, all inhabitants within 500m of the crusher are to be relocated as part of this dust control and management action. This is found to be the best solution to the problem. Those inhabitants who are located beyond the 500m radius from the crusher plant are to be protected through a strict application of the underlying dust control mechanisms in the coming period.

7. Reporting

Dust control activities and monitoring results will be made available for the community leaders and reported in a weekly basis and aggregated for regular monthly reports. The success of any dust suppression methods tried and used during the operation will also be in consultation with the community and reported.

The supervision consultant will produce progress report on the dust control and management plan each month including all measurements made, daily inspection sheets attached and photos showing the crusher vicinity. Graphs and charts will be produced indicating the log of measurements and the rate of changes in daily dust emission. This is expected to help in identifying peak hours of dust emissions, so that additional protective measures may be taken as the need may be.

Incidents of high dust levels will be recorded in incident database system and reported to ERA management. The same system is used for the management of complaints. Management responses to prevent any further impacts and control or mitigate further dust emissions will be formulated, tracked, and implemented.

All inspection sheets will be signed by the technician recording the data, the contractor’s material engineer and the consultant’s material engineer daily.

The report will be made available to the Client and the Financer at the beginning of each month.

All complaints received by project employees, including night operations will be handled according to the project’s COMPLIANT PROCEDURE.
8. Consultation with Local Community

A number of consultations have been done with the members of the local community including local government officials, people living in the immediate vicinity of the crusher plant and hence directly being affected by the dust nuisance, and with the World Bank group and the Client ERA.

Accordingly, the community members stated that even though the dust emanating from the crushing activity poses health concerns, if managed properly it will be reduced and they can live with it. And, the Community members and their leaders agreed that this DMP with the consultation of the community will be good enough to mitigate the adverse impact of dust. In the meantime, ERA has also informed the local community that, considering the safety of the local inhabitants and properties around the crusher yard, within 500m radius from the center of the crusher yard will be demark as a buffer zone; moreover, ERA has mentioned its position to pay the relevant compensation for the properties which is found under the demark buffer zone in line with the actual procedure and regulations.

ERA has reached agreement with the Community to resume crushing activity provisionally as trial as of the Dust Management Plan is finalized.

The Community engagement and monitoring of the Crushing activity: the community members deliberated on schedule for monitoring the crushing activities and agreed that moving forward, the community members will monitor the agreed schedule, namely:

- 6.00AM to 11.00AM in the morning, and
- 4.00PM to 8.00PM in the evening
- Any failure on the part of the contractor in implementing this schedule, the community leaders will use the hotline/phone line to be provided by ERA to inform the WB and the ERA management.

It is further agreed that the contractor cannot do the crushing activity between 11AM and 4PM due to the high intensity of the sun and hence the related potential for dust production and transportation within this time frame. If there is a need of change of working hour, the community will be consulted.

It is also agreed that periodic checks would be made on the crushing activity by the local community to see whether the crushing is done according to the best practices mentioned above. If the community found it unacceptable, complaints shall be made to the Consultant, Client and Bank through
representatives of the community and further management measures would be made by the concerned parties.

Besides, during the discussion with the local community, ERA has reached on consensus with the local community to advise the Contractor to use alternative quarry area found at Km 37 until the Contractor be appropriate to apply control blasting mechanism at present quarry area.

9. Conclusion in condition for reopening the crusher activities:

Although the WB have insisted that the ongoing stoppage in crushing activity should be maintained, however, all community members agreed that the crusher activity should be opened based on the above agreed action and all the community members, including their leaders signed a minute of the consultation meeting indorsing the reopening. ERA and its resident consultant agreed to commence the implementation of the proposed action plan within the short period of time.

We recommend that a trial period be introduced, to allow an initial assessment of emissions levels to be made for when the crusher is and is not operating. This will provide information on background levels of air quality and indicate the extent of any further dust control measures that need to be introduced at the quarry site.

Appendices