SOFTWARE REQUIREMENTS SPECIFICATION

FOR

GRAM E&S MONITORING SYSTEM

VERSION 1.0

JANUARY 01, 2023

Prepared by Jafar khan & Akash Nagi

Bhugol GIS Pvt. Ltd.

Table of Contents

1. INTRODUCTION

1.1 Purpose

Identification and Monitoring of Social and Environmental aspects for metro line 4 & 4A. The system Will enable us to monitor and report about the social and environmental details to MMRDA & KFW.

1.2 Objectives and Scope

ESMS is for people who works on the metro line 4 & 4A and its purpose to monitor the activity Related to construction site , labore camp , Rehabilitation etc. this portal reduce the time and paper work and its goal to create a platform to record and monitor all the aspect of metro line between Wadala to Kasarvadavali.

1.3 Intended Audience

This document is for project Manager (Deepak Choksi), Client (MMRDA), consultant , contractor and for developer who is working on this project. Please read full document for better understanding.

References

https://mmrda.maharashtra.gov.in/home - for MMDRA logo and themes

http://www.eqmsindia.com/ - (logo)

1.5 Overview

The system will Monitor the Social & environmental aspect such as Air quality noise level water quality which is affected by construction site etc. and for social side it will help them to identify the project affected person and rehabilitate them and if needed, they will be compensated. And it will generate quarterly report for comparison for MMRDA & KFW.

2. SYSTEM OVERVIEW

2.1 Product Perspective

GRAM E&S Monitoring System is a self-contained product. it will be part of the official MMRDA website for monitoring the social and environmental monitoring aspects. There are several types of users who can user this portal such as consultant, contractor, MMRDA, KFW.

It will also provide the GIS system graphs, comparison view for better user interface and data viewing and monitoring.

2.2 Product Functions

- Dashboard
- Report
- Social Monitoring
- Environmental Monitoring
- GIS portal
- Training
- Occupational Health & Safety
- Photograph

2.3 User Classes and Characteristics

The system will be used by mainly four type of users and according to their user type they have specific permission. KFW and MMRDA will be the main users.

User types:

- Consultant
- Contractor
- MMRDA
- KFW

2.3 Operating Environment

The system is also designed to be user-friendly. The software will operate, including the hardware platform, operating system and versions, and any other software components or application with which it must peacefully coexist.

2.4 Design and Implementation Constraint

- Anticipate difficulties and limitations regarding system upgrades and improvements.

- Always log all data posted by user, understanding bugs and ensuring the integrity of information.
- Always ensure the integrity of the information.
- Always make information accessible.
- Guarantee a speed of data display, no matter how much information to look for in several different databases.

2.6 User Documentation

List the user documentation components (such as user manuals, on-line help, and tutorials) that will be delivered along with the software. Identify any known user documentation delivery formats or standards.

2.7 Assumptions and Dependencies

The website intends to use GIS linking and geo location tagging of the camps and sites and other things which are going to be monitored and managed. These are some of the external links that the user must be aware of. Apart from that the user can use the software easily.

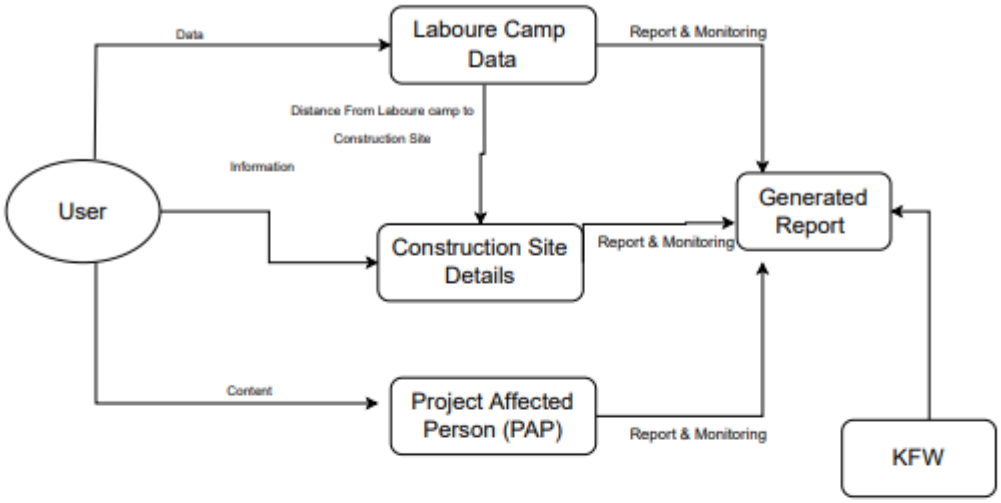
3 DESIGN AND IMPLEMENTATION

3.1 User Interfaces

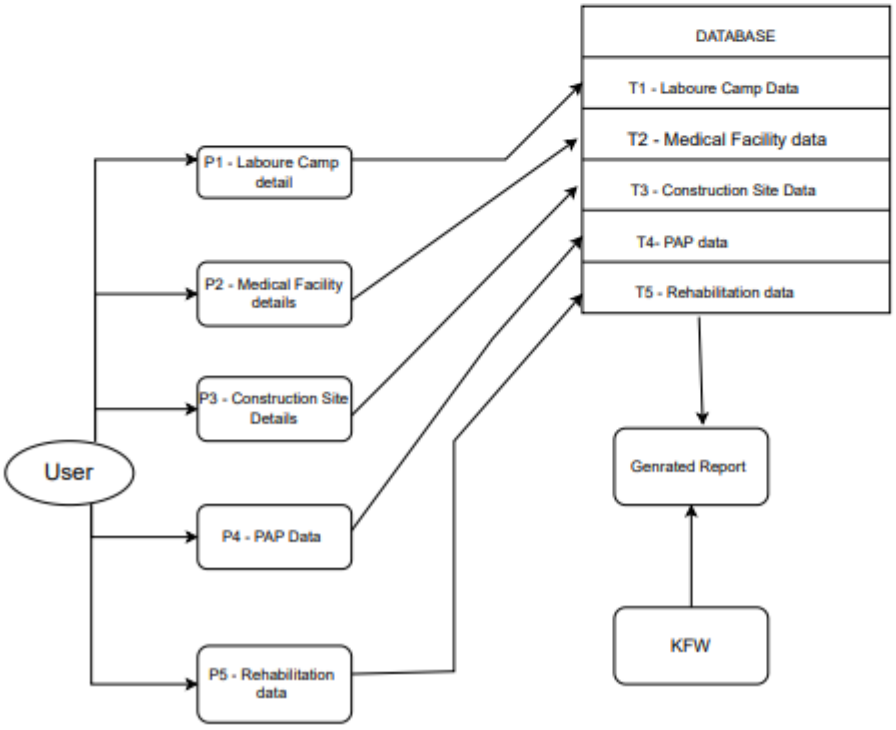
3.2 Data Flow Diagrams

1. Social Monitoring DFD:

Social Monitoring DFD Level 0

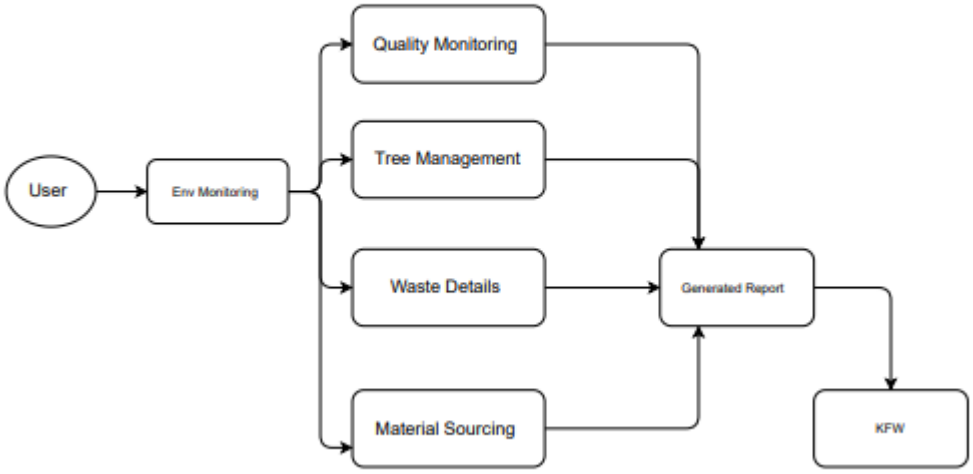


Social Monitoring DFD Level 1

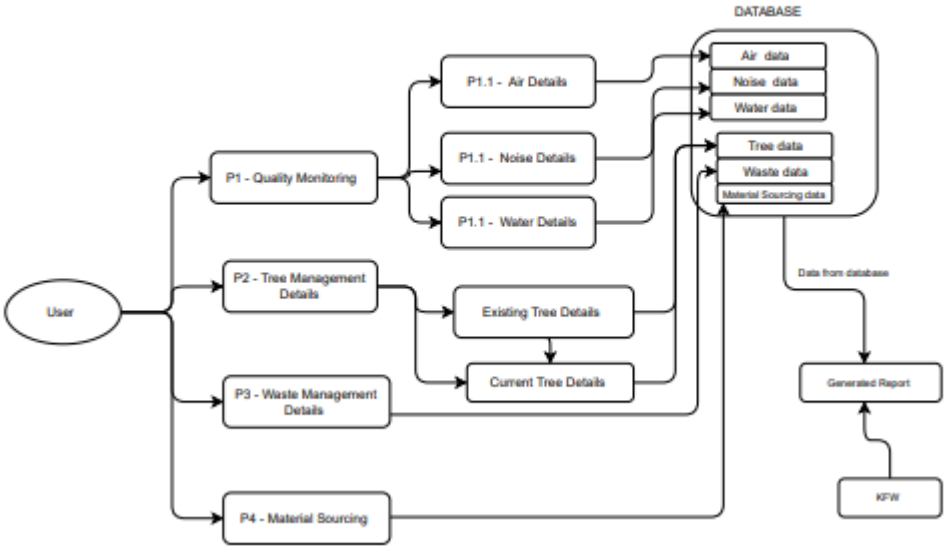


2. Environmental Monitoring DFD:

Level 0 Env Monitoring



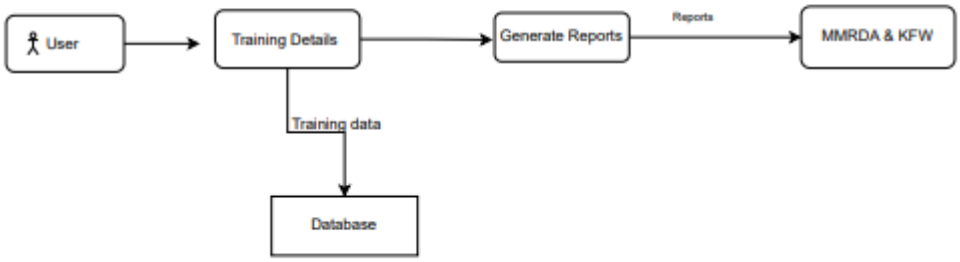
Level 1 Env Monitoring DFD



3. Training Module DFD:

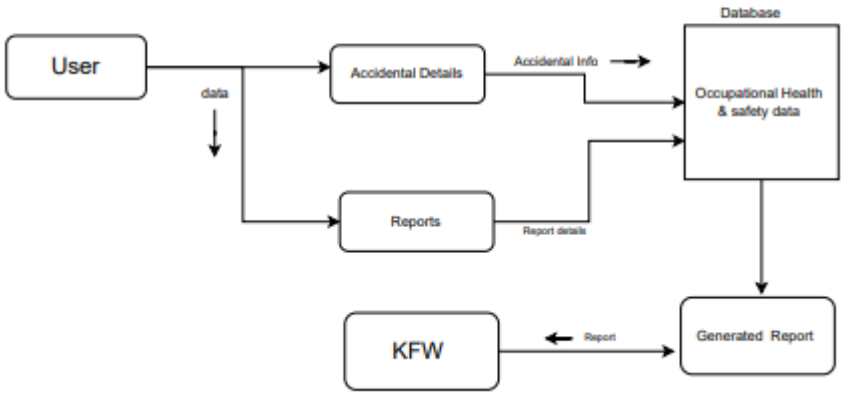
Level 0 Training DFD

Level 1 training DFD



4. Occupational Health & Safety DFD:

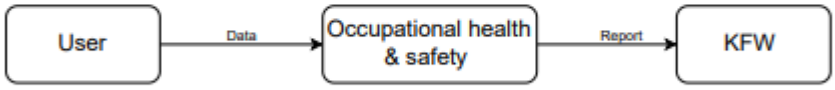
Level 0 Occupational health & safety DFD



5. Occupational Health & Safety DFD

Software used	Description
Operating system	We have chosen Windows operating system for its best support and user-friendliness.
Database	To save the data record we have chosen SQL+ Postgres database.
Python & React	To implement the project, we have chosen Python for backend and for frontend react language for its more interactive support.

Level 0 Occupational health & safety DFD



3.3 Hardware Interfaces

- Windows, Mac
- A browser which supports CGI, HTML & JavaScript

3.4 Software Interfaces

4 FUNCTIONAL REQUIREMENTS

4.1 Authentication

User Story: As a KFW member, consultant, contractor I must be able to login and enter the website.

- Logging In with email, password, and captcha verification
- For resetting password, it sends link to email and resets password.
- “Forgot my password” section that sends link to the verified email

4.2.1 Labor Camps

- Quarter
- Package
- Date of Monitoring
- Labourcamp Name , and ID
- Latitude
- Longitude
- Toilets. If selected display condition as good, average, poor with photographs and remarks
- Drinking Water. If selected display condition as good, average, poor with photographs and remarks
- Demarking pathways. If selected display condition as good, average, poor with photographs and remarks
- Signages or Labeling. If selected display condition as good, average, poor with photographs and remarks
- Kitchen Area. If selected display condition as good, average, poor with photographs and remarks
- Fire Extinguisher. If selected display condition as good, average, poor with photographs and remarks
- Rooms or Dom’s. If selected display condition as good, average, poor with photographs and remarks
- Segregation of Waste. If selected display condition as good, average, poor with photographs and remarks
- Regular health checkup. If selected display condition as yes, no with photographs and remarks
- Availability of Doctor. If selected display condition as yes, no with photographs and remarks
- Availability of first aid kit. If selected display condition as yes, no with photographs and remarks
- Transportation Facility. If selected yes display transportation mode as either public or private. If selected no enter distance from site.
- Photographs
- Documents
- Remarks

4.2.2 Construction Site Camp

- Quarter
- Package
- Date of Monitoring
- Latitude
- Longitude
- Toilets. If selected display condition as good, average, poor with photographs and remarks
- Drinking Water. If selected display condition as good, average, poor with photographs and remarks
- Demarking pathways. If selected display condition as good, average, poor with photographs and remarks
- Signages or Labeling. If selected display condition as good, average, poor with photographs and remarks
- Regular health checkup. If selected display condition as yes, no with photographs and remarks
- Availability of Doctor. If selected display condition as yes, no with photographs and remarks
- Availability of first aid kit. If selected display condition as yes, no with photographs and remarks
- Photographs
- Documents
- Remarks

4.2.3 Project Affected Person

- Quarter
- Package
- Date of Monitoring
- Latitude
- Longitude
- Pap Id
- Pap Name
- Address – Address Line 1, Street Address and Pin code
- Date of Identification
- Eligibility Status – Eligible, Not Eligible and Pending
- Category – Individual/Joint Holding, Commercial, Private Land, Government Land, Institutional and Other
- Type of Structure – if Individual/Joint Holding selected user can select House, Land, Independent House/Hutment, Others
- Legal Status
- Legal Documents
- Action Taken – Rehabilitation, Compensation and Not Agreed
- Not Agreed Reason if Not Agreed Selected

Rehabilitation (Display If Agreed for Rehabilitation is Selected)

- Pap Id

- Name of Pap
- Date of Rehabilitation
- Compensation Status- Cash Compensation, Land Provide Area, Alternate accommodation, Commercial Unit
- Cash Compensation Amount If Cash Compensation Selected in Compensation Status
- Land Area in Sqm if Land Provided Area Selected in Compensation Status
- Other Compensation
- Shifting Allowance. If selected display condition as Yes or No with photographs and remarks.
- Livelihood Support. If selected display condition as Yes or No with photographs and remarks.
- Training. If selected display condition as Yes or No with photographs and remarks
- Tenements/House/Flat. If selected display condition as Yes or No with photographs and remarks and area
- Transportation allowance. If selected display condition as Yes or No with photographs and remarks, amount.
- Financial Support. If selected display condition as Yes or No with photographs and remarks, amount.
- Community Engagement. If selected display condition as Yes or No with photographs and remarks.
- Photographs
- Documents
- Remarks

4.3 Dashboard:

- Dashboard page with list of summarized data.
- A feature that enables to view the summarized details related to environment monitoring and explore them by using different filters.

4.4.1 Quality Monitoring

For Air

- Quarter
- Package
- Date of Monitoring
- Latitude
- Longitude
- PM10
- Standard PM10
- SO2
- Standard SO2
- O3
- Standard O3
- NOx

- Standard NOx
- AQI

For Water

- Quarter
- Package
- Date of Monitoring
- Latitude
- Longitude
- Quality of water
- Water Disposal
- Source of Water

For Noise

- Quarter
- Package
- Date of Conduct
- Latitude
- Longitude
- Noise level
- Monitoring Period

4.4.2 Tree Management

- Quarter
- Month
- Package
- Date of Monitoring
- Latitude
- Longitude
- Existing Tree Id
- Existing No of Tress Cut
- Existing Management
- Existing Common Name
- Existing Botanical Name
- Existing Condition
- Existing Tree cut Details
- Action Taken
- Existing Photographs
- Existing Remarks
- Present Tree Id
- Present No of Tress Cut
- Present Management
- Present Common Name
- Present Botanical Name

- Present Condition
- Present Tree cut Details
- Present Photographs
- Present Remarks

4.4.3 Waste Handling

- Quarter
- Month
- Package
- Date of Monitoring
- Latitude
- Longitude
- Waste Type - Hazardous, Bio, Electrical, Non - Bio
- Quantity in kg
- Waste Handling - Disposal, Dump, Transportation, Recycling
- Waste Latitude
- Waste Longitude
- Photographs
- Documents
- Remarks

4.4.4 Material Sourcing

- Quarter
- Month
- Package
- Date of Monitoring
- Latitude
- Longitude
- Type of Material
- Approvals
- Source - Quarry, Factory, Casting Yard, Local Vendor, Others
- Source of Quarry - Mines or Blast based on Source Selected
- Storage Type
- Storage Latitude
- Storage Longitude
- Material Storage Condition – Safe, Unsafe, Need Improvement Material
- Material Storage Photograph
- Documents
- Photographs
- Remarks

4.5 Occupational Health and Safety

- Quarter
- Month
- Package
- Date of Monitoring
- Latitude
- Longitude
- Remarks
- Photographs
- Joining Medical Checkup
- PPE kit
- Training To Workers
- House Keeping
- Power Supply System
- Assembly Area
- Ambulance Arrangement
- Toilet Facility
- Safe Moment Passage
- Material Keeping Practice - Safe, unsafe, Need Improvements
- Accidental check
- Safety Gear Status
- Barricading
- Nature Of Accident
- Type Of Incident- Reportable Accident, Reportable Non-Fatal Accident, First Aid Cases, Dangerous Occurrences, Man Days Lost,
- Major (Road Accident), Road Accident, Tree Broken, Natural death, Third Party Incident
- Incident Details – Title, Response Time, Cause based on Incident Selected
- Identified Cause of Incident
- Outcome
- Compensation Paid

4.6 Training

- Quarter
- Month
- Package
- Date of Monitoring
- Latitude
- Longitude
- Category
- Training Title
- Location
- No of times Training conducted
- Male
- Female
- In charge Person
- Training Initiated By
- Description
- Photographs
- Training id

5 NON-FUNCTIONAL REQUIREMENTS

5.1 Performance Requirements

The page should load within 2 seconds. The software is developed in such a way that it can be scaled within higher workloads as well. It's a robust system to return the results as soon as possible.

5.2 Security Requirements

If there is extensive damage to a wide portion of the database due to catastrophic failure, such as a disk crash, the recovery method restores a past copy of the database that was backed up to archival storage (typically tape) and reconstructs a more current state by reapplying or redoing the operations of committed transactions from the backed-up log, up to the time of failure. The system is protected with JWT session authentication.

5.3 Business Rules

KFW and MMRDA are only allowed to view the website and post remarks on the same. Contractors are allowed to enter the data for air quality once a month, also for Labor camp and construction site they will update the data once every 3 months. Consultant

5.4 Software Quality Attributes

The following factors are used to measure Software Development Quality. These attributes can be used for Quality assurance as well as Quality control.

Reliability – The website will give correct results consistently and it can work in different platforms as it is platform and operating system independent.

Maintainability - The website has source code so that is easy to add code to existing system and its easy to upgrade for new features and technologies from time to time. Maintenance is cost-effective and easy.

Usability – The website is user friendly and navigation is simple as well .

Testability – The system is easy to test and find defects. If required , its easy to divide into different modules for testing.

6 PROJECT / RELEASE ISSUES

6.1 Project Development Effort

The GRAM ESMS will help us to monitor and manage social and environmental sections. The estimate required to complete the following phases are as follows

Design Phase took 1 week for preparation. Build phase estimation was 3 months with 2 weeks for testing and 1 week for deployment.

6.2 Proposed Project Schedule

Proposed Schedule for the project was as discussed in the above point.