Proposed System Design

Introduction

The proposed system design is expected to improve the current system efficiency and better manage the geospatial aspect of Disaster Management in the Western Cape. We have chosen to look at Disaster Risk Assessment specifically and model how a mapping system will improve this process. We have also chosen to combine some processes to increase efficiency. These changes are further discussed below.

User Needs Analysis

The existing system is already very concise and well planned to work efficiently. However, we think that the addition of a mapping department will make the control of information and interactions between processes run more efficiently. Including a mapping subsystem will facilitate a more effective use of spatial data. The addition of the 'Mapping' department will manage spatial data and produce a better visualization of hazardous areas, handle the transport network mapping and the approximated extent of disasters, amongst many other things.

There also exist an overlap of data between Vulnerability Monitoring and Disaster Risk Monitoring, and between Disaster Event Tracking and Hazard Tracking. To reduce the redundancy in the data we have decided to merge these processes to create 'Vulnerability and Disaster Risk Monitoring' and 'Disaster Event and Hazard Tracking'. These combinations of processes is also expected to minimize the amount of data transmission between processes thereby increasing the processing speed.

Context Diagram

Figure 2.1 shows the design Context Diagram of the proposed system. We are now able to output useful information directly to external entities and other subsystems. This new data is output from the added mapping department. The design context diagram illustrates how the addition of the mapping system improves the information output by the subsystem.

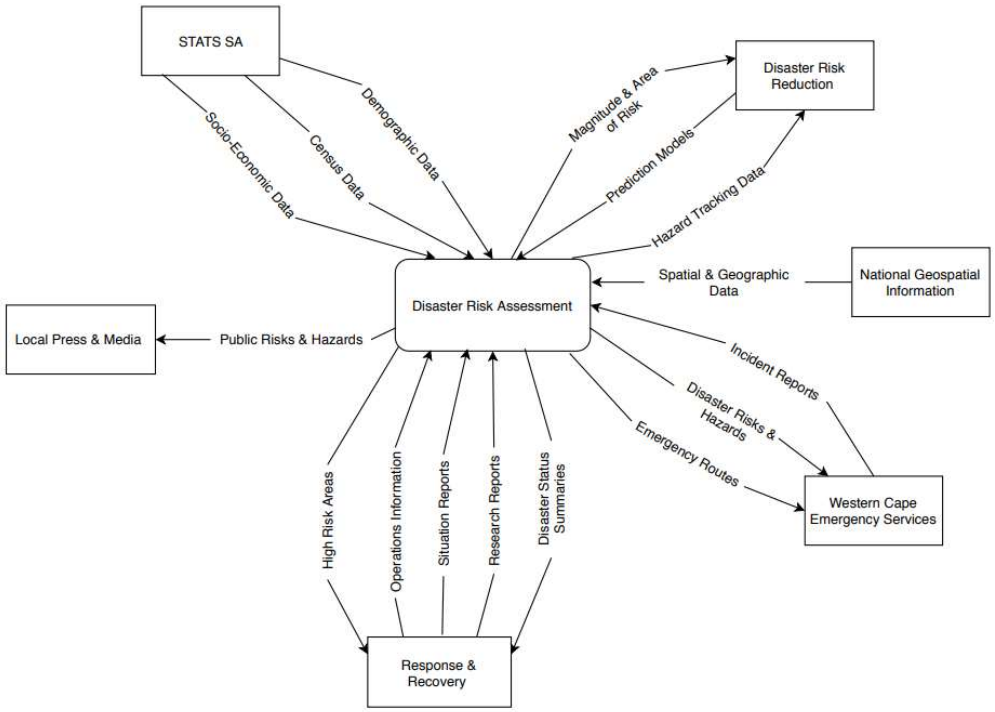

Figure 2.1: Design Context Diagram

Data Flow Diagrams

The Top Level Diagram in figure 2.2 and the First Level Diagram in figure 2.3 below show the new data flows and how the processes have been divided to increase efficiency. We have decided to make Information Dissemination a separate process in order to facilitate efficiency, information improvements and additional georeferenced data transmission; and to introduce a mapping process.

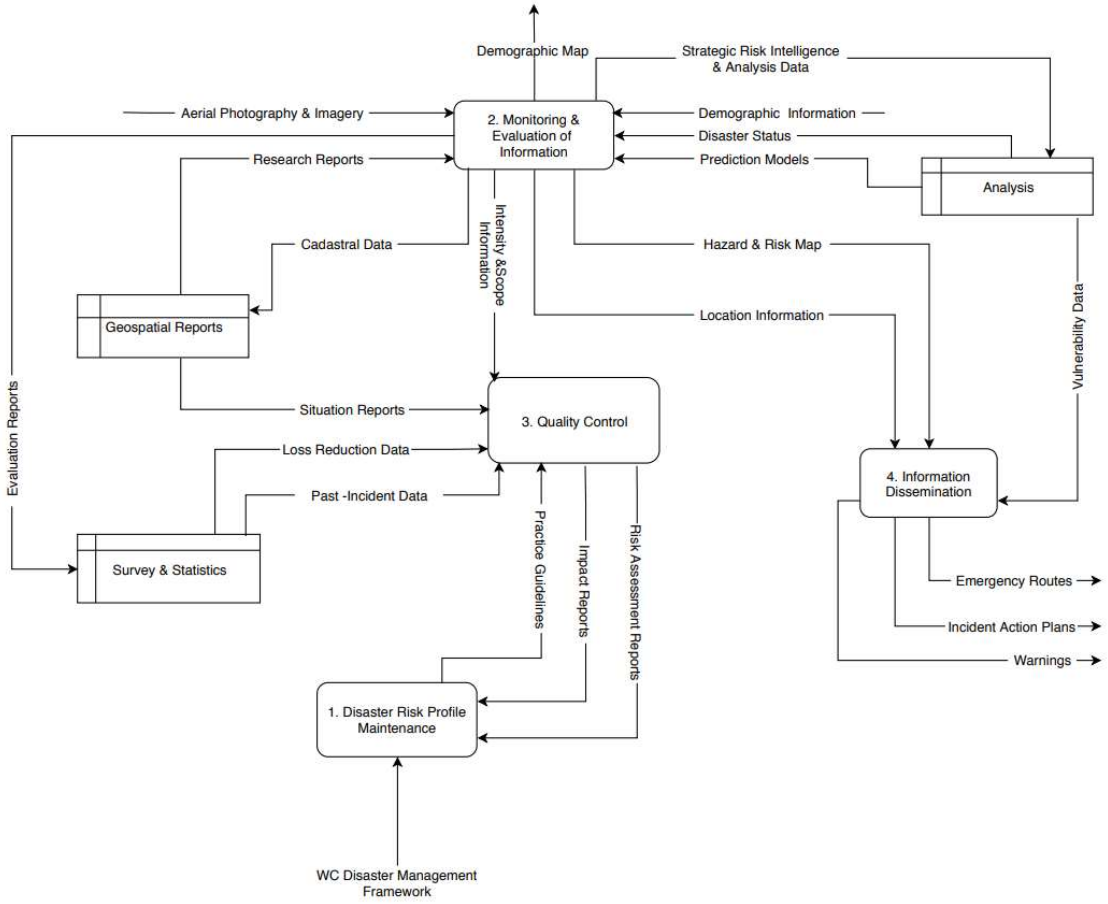

Figure 2.2: Design Top Level Diagram

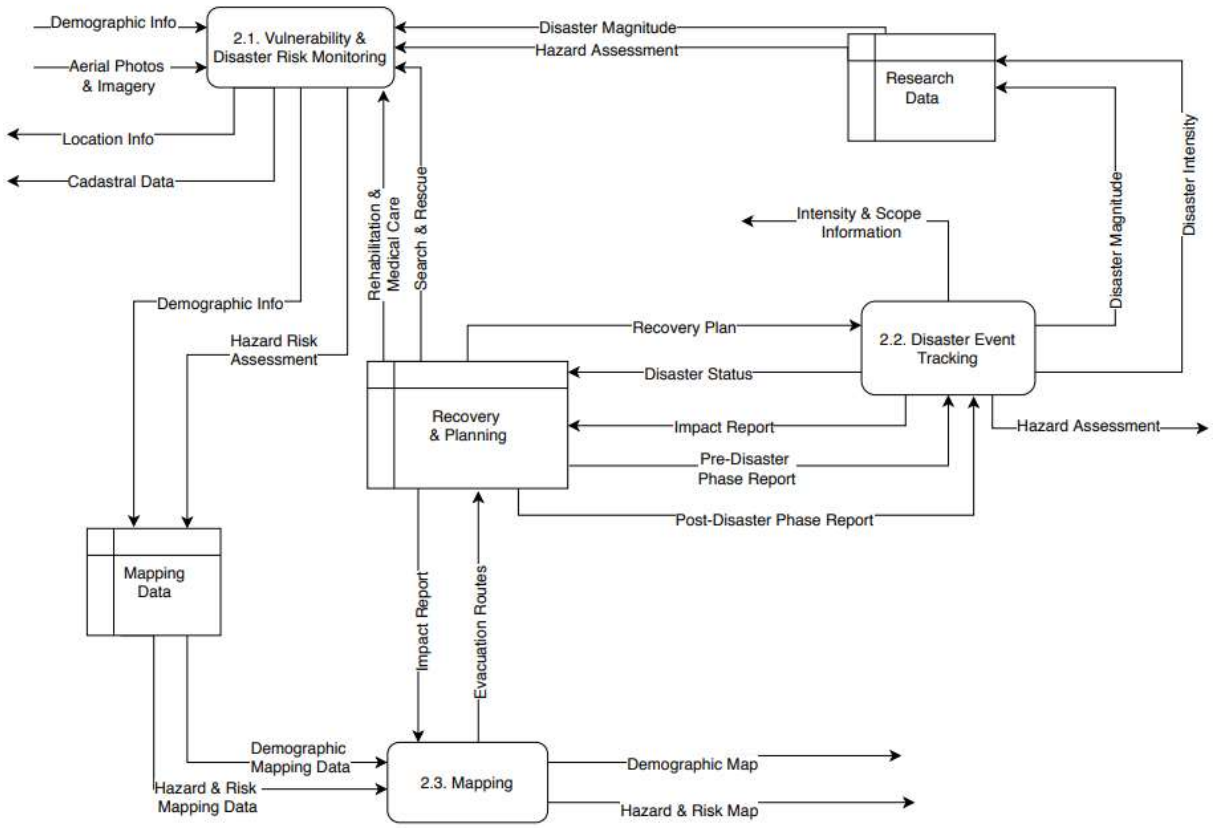

Figure 2.3: Design First Level Diagram

Entity-Relationship Diagram

The data entity relationship diagram below illustrates how the information between different databases interact. Location information is shared across databases and is used in route planning, site vulnerability and risk analysis, emergency response and recovery.

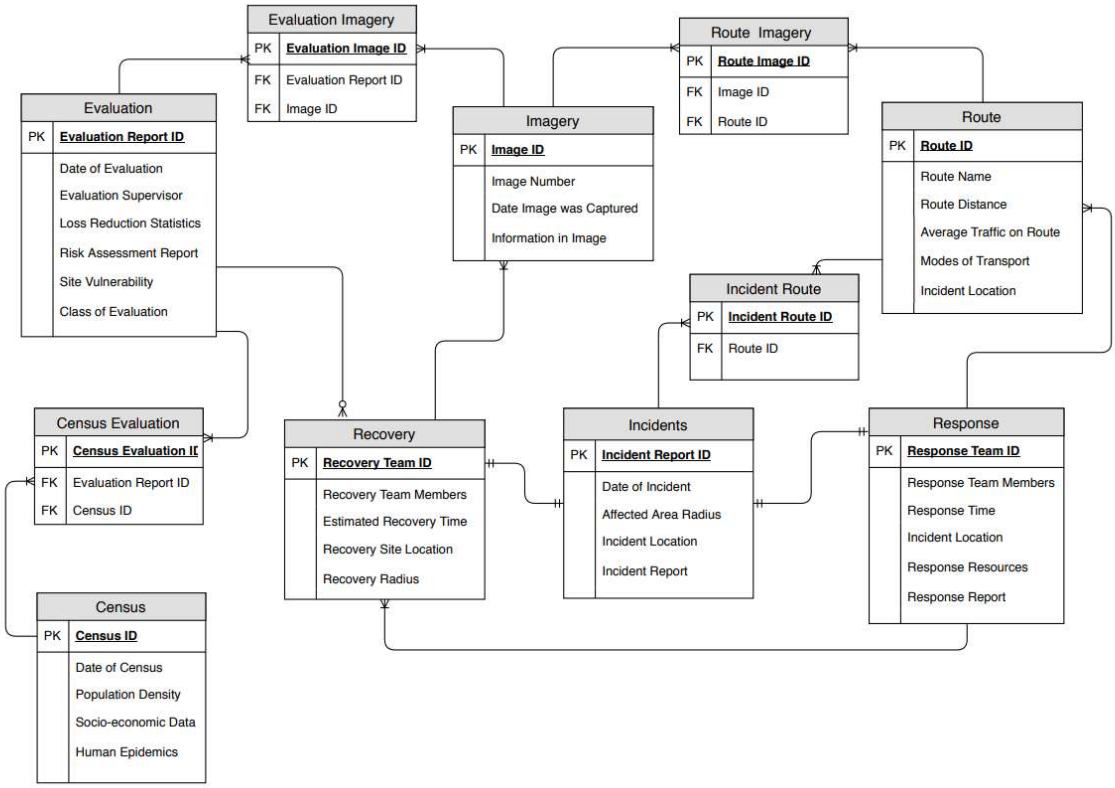

Figure 2.4: Design Entity-Relationship Diagram

Data Dictionary

Disaster Relief	Process of responding to a catastrophic situation, providing humanitarian aid to people who have suffered from a disaster
Activation & Mobilization	Enabling the dissemination of recovery teams and facilitation the movement of people out of disaster sites
Declaration of Disasters	The process of determining the intensity of a disaster, its extent and the necessary action plan required.
Disaster Event Tracking	Use of a systematic process to monitor and identify disasters and draw conclusions based on the locations of these disasters and their affected areas.
Disaster Status Summary	Information collected on past disasters in the province which has been assessed and classified according to its level of intensity for future comparison purposes.
Emergency Routes	A network of pre-identified Municipal and Provincial roads in the Western Cape Province that can best move emergency services and supplies to where they are needed in the event of a major disaster.
Evaluate	To give an assessment based on monitoring data coupled with other resources
Hazard Tracking	Locating possible disaster zones based on evaluations and monitoring data
Incident Action Plan	An organized course of events that addresses all phases of incident control within a specified time.
Information Dissemination	The distribution of information in various formats to the respective entities for their different uses
Mapping	The creation of a graphic symbolic representation of the significant features of a part of the surface of the Earth
Mobilisation	The preparation and organising of specialised response and recovery teams
Monitor	To observe changes over time; to keep under systematic review
Operations Information	Information on the activities and operations carried out in responding to disasters and the recovery process of disaster sites

Prediction Models	Technology models that predict disaster occurrences by detecting and monitoring the disasters and disseminate warnings. Data is gathered from the augmentation of research programs on basic physical and biological processes of natural hazards.
Public Risks & Hazards	Possible disasters that threaten civilians
Rehabilitation & Reconstruction	To rebuild and assist in the redevelopment and restoration of a site and its services
Relief	To provide assistance like medical care and resources to disaster sites
Reports	Scientific reporting from site analysis, response and recovery; notification of disaster incidences
Research Reports	A document focusing on the tools for response and recovery, prepared by an analyst or strategist part of the Disaster Management Research Team.
Situation Reports	Reports that provide an update on relief operations at regular intervals. Situation Reports are crucial for planning response actions.
Socio-Economic Data	Data that shows how economic activity affects and is shaped by social processes
Spatial Data	Spatial Data is the information that identifies the geographic location of features and boundaries on Earth. Spatial data will provide information on areas susceptible to floods and locations that people and livestock can be evacuated to in the event of a disaster.
Standardization of Information	The process of ensuring information is stored and transmitted in the formats that enable sharing and reuse.
STATS SA	Statistics South Africa - The body that provide national statistical data sets based on passed analysis.
Technical Checks	Testing of the technicalities around the functionality of a system
Vulnerability & Disaster Risk Monitoring	The combined process of identifying possible disaster risks and the vulnerability of areas based on site analysis and evaluation data. Includes assessing the magnitude of the impact of a possible disaster.
Western Cape Disaster Management Framework	A plan of action for the fulfilment of the Institutional strategies consisting of a hierarchy of objectives to be pursued through ongoing projects and processes.

Decomposition Diagram

Figure 2.5 below illustrates the decomposition diagram with the proposed changes implemented.

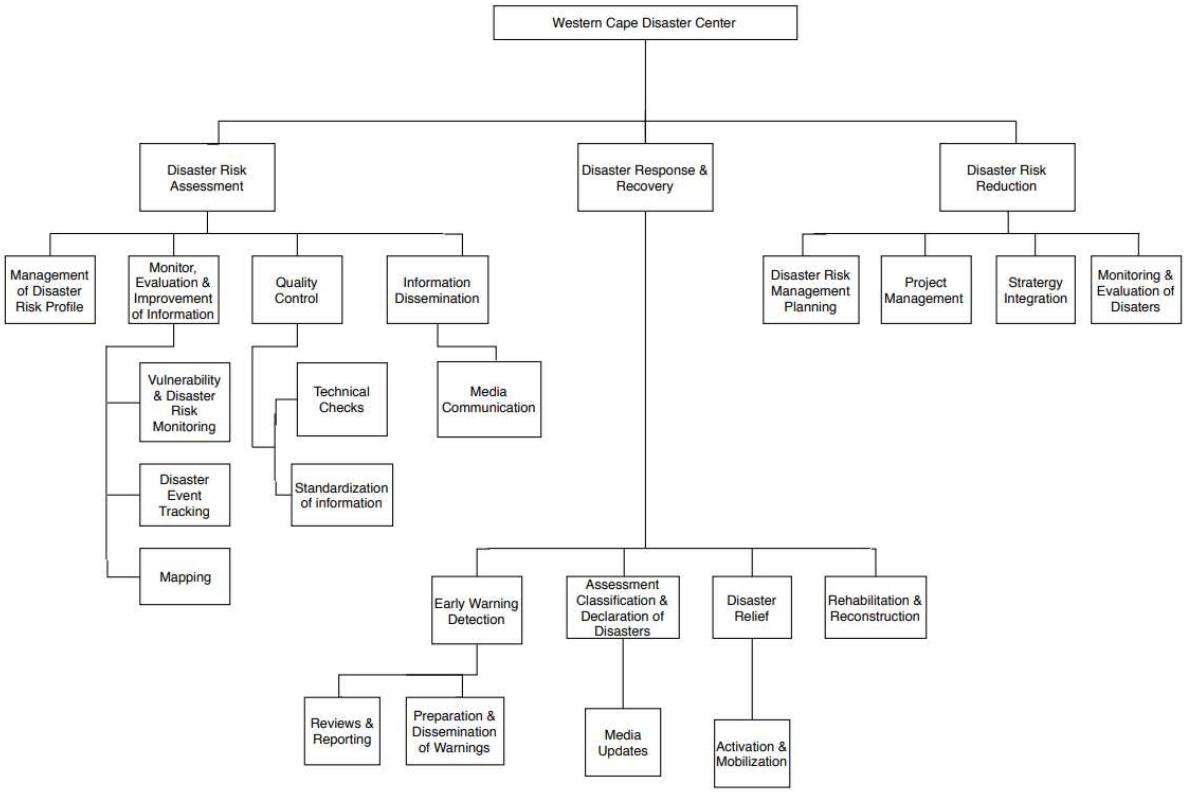

Figure 2.5: Design Decomposition Diagram