

CONDITION ASSESSMENT AND GIS-BASED MAPPING OF STORM WATER DRAINAGE SYSTEM IN MYSURU CITY USING SWMM

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Introduction:

Urban stormwater drainage systems play a critical role in managing surface runoff and preventing flooding in rapidly growing cities. In recent years, Mysuru has experienced frequent waterlogging during monsoon seasons due to increased urbanization, improper maintenance of drains, and lack of updated spatial documentation. The expansion of impervious surfaces such as roads and buildings has further intensified surface runoff, placing additional pressure on the existing drainage infrastructure.

Despite the presence of an extensive drainage network, many sections suffer from siltation, blockages, structural damage, and poor connectivity, leading to localized flooding and environmental concerns. In this context, the integration of Geographic Information Systems (GIS) and hydrological modelling tools such as Storm Water Management Model (SWMM) provides an effective approach for systematic assessment and analysis of urban drainage systems. This project focuses on the condition assessment and GIS-based mapping of stormwater drains in Mysuru to identify critical problem areas and support data-driven decision-making for improved urban flood management.

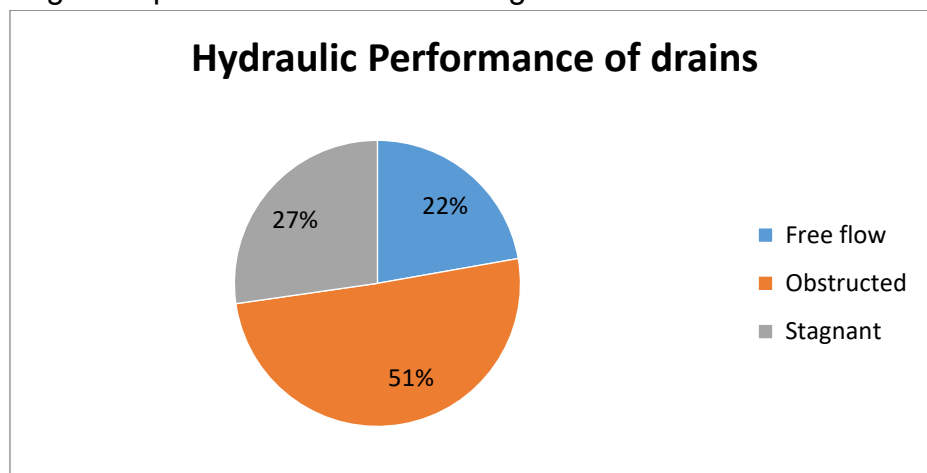


Figure 1: Hydraulic performance of drains

Objectives:

1. To assess the physical and functional condition of existing stormwater drains in selected areas of Mysuru.
2. To collect field data including drain dimensions, blockages, damages, and flow characteristics using GPS-enabled tools.
3. To develop a GIS-based map showing the spatial distribution and condition status of drains using color-coded classification.
4. To identify critical hotspot zones prone to flooding, overflow, or poor maintenance.

Methodology:

1. Study Area Identification
2. Preliminary Data Collection
3. Field Survey and Data Collection
4. Data Compilation and Verification
5. GIS Mapping and Spatial Analysis
6. Hydrological and Hydraulic Analysis (SWMM)
7. Result Interpretation
8. Recommendations

Result and Conclusion:

The GIS-based mapping of the drainage network was successfully completed, and the drains were classified into good, moderate, and poor categories based on their condition. The analysis helped in identifying critical and flood-prone areas within the study region. Major issues such as siltation, blockages, and solid waste dumping were observed in several drain sections. The SWMM analysis further provided insights into flow behavior and helped identify potential flooding points in the drainage system.

The study concludes that the existing stormwater drainage system has several deficiencies affecting its performance. The use of GIS proved to be effective in assessing and visualizing the condition of drains, while SWMM analysis helped evaluate their hydraulic performance. The integrated approach adopted in this study can support better planning and maintenance of drainage systems. Overall, the study provides a useful framework for improving urban flood management and drainage infrastructure.

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11. QGIS (Open Source Geographic Information System).
12. SWMM (Storm Water Management Model – USEPA).
13. Google Earth (Satellite imagery).
14. OpenStreetMap (Base maps).
15. Indian Meteorological Department (IMD) – Rainfall data.

Future Scope:

The future scope of this project includes:

1. Extension of study to entire city drainage network
2. Integration of IoT-based real-time monitoring systems
3. Development of mobile application for field data updates
4. Enhancement of GIS database for continuous maintenance planning
5. Application of methodology to other urban areas
6. Inclusion of advanced modelling techniques for better accuracy
7. Implementation of sustainable urban drainage systems (SUDS)