

Storm Water Management a Case Study of Latur City

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Abstract - Storm water management means controlling rainwater and melted snow so that it does not cause flooding, soil erosion, or water pollution. When it rains, water flows over the ground. In natural areas, this water soaks into the soil. But in cities, there are many hard surfaces like roads, buildings, and pavements. These surfaces do not allow water to enter the ground, so more water runs off quickly. This Strategy used in our Latur city (Nanded Road) to prevent the impacts of Storm water. Urbanization means building more houses, roads, buildings, and pavements in an area. These surfaces are hard and do not allow rainwater to soak into the ground. Because of this, the **infiltration rate** (the amount of water that enters the soil) becomes very low. Most of the rainwater flows quickly over the surface instead of going into the soil.

Key Words: Storm water, Runoff, Infiltration, Impervious surfaces, Urbanization

1. INTRODUCTION

Urbanization reduces the natural ability of land to absorb rainwater. When cities develop, open soil areas are replaced with hard surfaces such as roads, footpaths, parking areas, and rooftops. These surfaces do not allow water to soak into the ground, so the infiltration of rainwater decreases.

As a result, rainwater flows over these impervious surfaces as storm water runoff. The volume of runoff increases and can lead to flooding in urban areas. This runoff is usually carried through drainage systems and discharged into nearby lakes and rivers.

While flowing over city surfaces, storm water collects pollutants such as sediment, nitrogen, phosphorus, bacteria, oil, grease, trash, pesticides, and heavy metals. In many places, storm water mixes with sewage in sewer lines, which further increases pollution. Additionally, when it finally enters lakes or rivers, industrial wastewater may also contaminate it.

Storm water management is the scientific approach used to control runoff, reduce pollution, and safely store or treat excess water. Its main purpose is to manage both the quantity and quality of storm water, study the problems caused by runoff, and provide suitable solutions to reduce harmful environmental impacts

2. Objective

1. To identify and analyze the major issues present in the study area, Nanded Road, Latur.
2. To examine the existing drainage system in the study area and suggest effective improvements to overcome the identified problems.
3. To find suitable measures to reduce traffic congestion that occurs during the rainy season.
4. To stop the discharge of sewage from its source and prevent it from entering the storm water drainage system.

3.1 Problem Statement:

1. Based on the field survey conducted in the study area (Nanded Road, Latur), it was observed that stormwater drain lines are provided on both sides of the road to convey runoff into the Manjara River. However, the system is not functioning efficiently.
2. The existing stormwater drainage network is inadequate to handle peak runoff during heavy rainfall. Due to the low-lying topographical condition near the signal junction, runoff from surrounding areas converges toward this depression, resulting in water accumulation and localized flooding.
3. The Manjara River receives discharge from industrial effluents and domestic sewer systems. Storm water runoff flowing over urban surfaces becomes contaminated with pollutants such as oil and grease from vehicles, heavy metals, sediments, nitrogen, phosphorus, pesticides, solid waste, and bacteria. The presence of extensive impervious surfaces further reduces infiltration, increasing surface runoff during the rainy season. Although rainwater is initially clean, it becomes polluted as it flows over contaminated surfaces before entering drains and eventually discharging into nearby water bodies.
4. Repeated flooding in the area leads to pavement deterioration and soil erosion. Storm water represents a potential freshwater resource; however, instead of being conserved, it is directly discharged into the river. Proper storage and reuse systems could enable its utilization for domestic and non-potable purposes.
5. The storm drainage lines are partially blocked due to sediment deposition and accumulation of debris, reducing their hydraulic efficiency and leading to overflow during heavy rainfall events.

3.2 Study Area:

The present study focuses on a selected stretch along **Nanded Road in Latur city**. The study location is situated approximately 10 km from the Manjara River and lies at a latitude of 18.400529° N and longitude of 76.592524° E.

This area is one of the busiest and highly congested zones of the city, where waterlogging is frequently observed during the monsoon season. Recurring flooding in this region results in damage to public and private property, deterioration of road pavement, disruption of traffic movement, and overall economic loss to the city.

The existing stormwater drainage infrastructure in the study area was constructed several years ago. The drains are undersized and not designed to accommodate the current runoff generated due to rapid urbanization and increased impervious surfaces. As a result, the drainage capacity is insufficient to handle peak discharge during intense rainfall events, leading to overflow and surface water accumulation.



Fig -1: Site Location



Fig -2: Storm water



Fig -3: Manhole



Fig -4: Heavy Flood



Fig -5: Rainfall Pattern of Latur

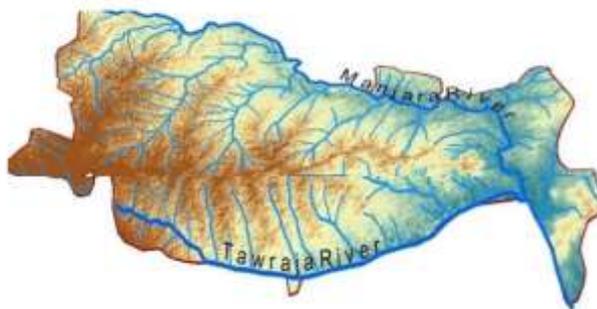


Fig -6: Drainage Pattern of Manjara River

4. Proposed Solutions Based on Field Survey

Based on the detailed survey of the study area, several storm water-related issues were identified. It was observed that the Manjara River is significantly polluted due to the continuous discharge of untreated sewage and industrial effluents. The direct disposal of wastewater into the river has reduced its carrying and self-purification capacity, adversely affecting water quality and the surrounding ecosystem.

To address this issue, it is recommended that every industry discharging wastewater must be equipped with a properly designed and functional Effluent Treatment Plant (ETP). The installation and strict monitoring of ETPs will ensure that treated effluent meets

environmental discharge standards before being released into natural water bodies.

Further site observations revealed that an adequate stormwater drainage network is not available in certain portions of the study area. Due to the low-lying topography along Nanded Road, surface runoff accumulates and leads to waterlogging during heavy rainfall. Therefore, it is proposed to design and install a dedicated storm water drainage system starting from the low-elevation zones of Nanded Road. The system should be hydraulically designed to safely convey runoff and discharge it into the Manjara River after ensuring proper sediment control and pollution prevention measures.

These measures will improve storm water management, reduce flooding, and minimize environmental degradation in the study area.

5. Conclusions

1. The review of existing literature indicates significant scope for detailed investigation and analysis of stormwater-related issues in the selected study area. It highlights the need to identify site-specific problems and implement appropriate Best Management Practices (BMPs) to minimize the adverse impacts of stormwater runoff.
2. Field observations and analysis revealed that a proper storm water drainage network is not available in the study area. Due to the low-lying topographical conditions, runoff accumulates during rainfall events. Therefore, it is proposed to design and install a dedicated storm water drainage line along the low-elevation zone to ensure efficient conveyance of runoff and prevent waterlogging.
3. It is also necessary to eliminate the discharge of untreated sewage from various sources into open drains and natural water bodies. Proper segregation of stormwater and sewage networks, along with adequate wastewater treatment facilities, should be implemented to prevent contamination and protect environmental quality.

6. REFERENCES

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