

APPENDIX XX

Initiatives by IIT Delhi and some observations from field visits

Figure 0-1 broadly indicates the mechanism of capturing some of the relevant details of the storm drains by making use of the geo-tagged cell phone pictures so that these can sit at the respective locations on the GIS map. All the captured geo-tagged images showing the health of drainages in NCT of Delhi are uploaded on following webpage <http://gisserver.civil.iitd.ac.in/delhidrainagemasterplan/>

Figure 0-1: Data collection by IIT Delhi



Key Observations

Based on the field visits and primary analysis, following are the key observations:

Household scale observations

- At many locations, it was found that individual households were draining storm water into the sewer lines. In some up-scale colonies where basement construction is allowed, overflow from storm drain is directed into sewer line instead of making arrangement for storm water to be pumped out.



Storm Drain & Sewer Line Adjacent to each other



Overflow from Storm drain is directed to Sewer line – in a systematic manner

- Most of the storm drains in front of the individual houses are permanently covered / encroached upon by the owners/residents.

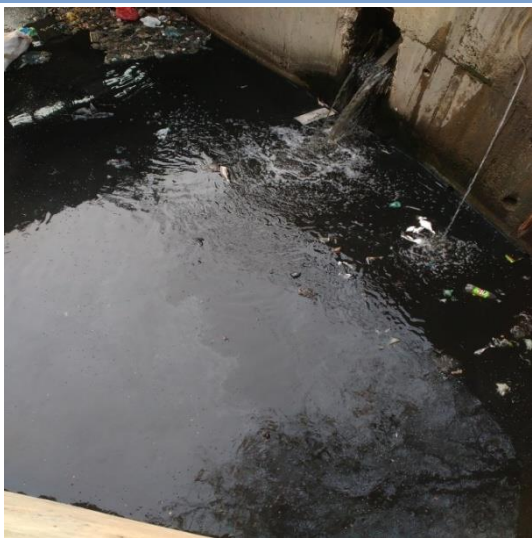




- No cleaning of locality storm drains is carried out. General upkeep of storm drains of the localities is really in bad shape. Solid waste from households finds way into the open drains.



- In localities that are not sewered, households drain their sewage into storm drains



Roadside drains observations

Roadside drains are also in real bad shape. In dry seasons, these drains are given little care, which makes them inadequate to receive storm water during monsoon season.

- Bell mouths are covered by road dust/waste.



- Roadside construction material finds way into the storm drains. There is either lack of effective guidelines for rehabilitation of roads or even if available, there is a lack of effective supervision to ensure a strict compliance with prescribed guidelines during road construction and routine road repairs.



- Utilities are installed on storm drains/inside storm drains



- Road side vendors encroach the local drains



- There is no regular upkeep of storm drains (Growth of shrubs and dumping of solid waste)



Multiple agencies are responsible for storm drains in a specific area

Multiplicity of agencies responsible for management of the storm water drainage system presents major challenges. Observations include:

- a. Cases of single storm drains managed by either multiple departments or multiple sub-divisions within same department.
- b. Cases of parts of drain falling in no-man's land i.e., no agency is responsible for the operational jurisdiction of parts of drain.
- c. The annual, largely perfunctory, campaign of de-silting of drains is neither synchronized nor supervised for efficacy. Payments to contractors are assured disregarding the quality of work and, as a consequence, rehabilitation works never attain the desired levels of effectiveness and thus are rendered futile.

Storm Drains are fully or partially covered

Till the time NGT banned the practice of covering the natural drains, programmes were initiated to cover, fully or partially, several natural drains across Delhi. These initiatives were not backed by any feasibility study to assess their future impacts on the overall integrity of the drainage system itself. Also, these initiatives did not go through a formal process of evaluation of alternative design concepts to assess their efficacy and suitability and, as a result, the drains that were covered were conspicuously lacking a sufficient number of inlets and approaches that are so critical for regular cleaning and/or their routine maintenance. So often, as a consequence, critical sections of storm drains ended up with accumulated silt which, over time, has solidified into a hard and obdurate mass and not amenable to conventional de-silting methods. Thus all such de-silting programmes undertaken in the past - both upstream as well as downstream – have been of little practical value besides being sub-optimal.

Irrational practices and a disdainful storm water management approach

Knee jerk measures such as connecting the storm water system to the waste sewer system and vice versa is frequently been adopted as a normal institutional response to reported cases of drainage congestion. Usually such interim and ad hoc measures become a permanent feature of the drainage infrastructure.

Poor Municipal Solid Waste Management

Municipal solid waste management system has remained rooted in practices that are at best archaic. Regrettably, the solid waste management practice is also characterized by its implied sanction of a practice that only engenders an excessive reliance on rag pickers as is evidenced by an ineffective waste collection, waste segregation and waste transportation systems. Further, it is a common observation that even upmarket district centres and other commercial complexes witness routine dumping of office and restaurant wastes, as well as wastes emanating from temporary and makeshift eateries into any proximally available storm drain with impunity.

Building material waste generated from constructions and demolitions presents a greater challenge. Absence of intent to enforce or, at best, an ineffective enforcement of construction by-laws by municipal authorities leads to construction material and construction waste often finding its way into the drainage system through deliberate acts of omission and/or commission. This seriously compromises the transport capacity of the drainage system and in some cases has been responsible for its permanent damage.

Encroachment through temporary/permanent settlements

Encroachment by squatters and widespread mushrooming of slum clusters in green areas such as parks and river flood plain zones have been happening and often with political patronage. A direct consequence is reduced infiltration potential leading to an increased incidences of overland runoff.

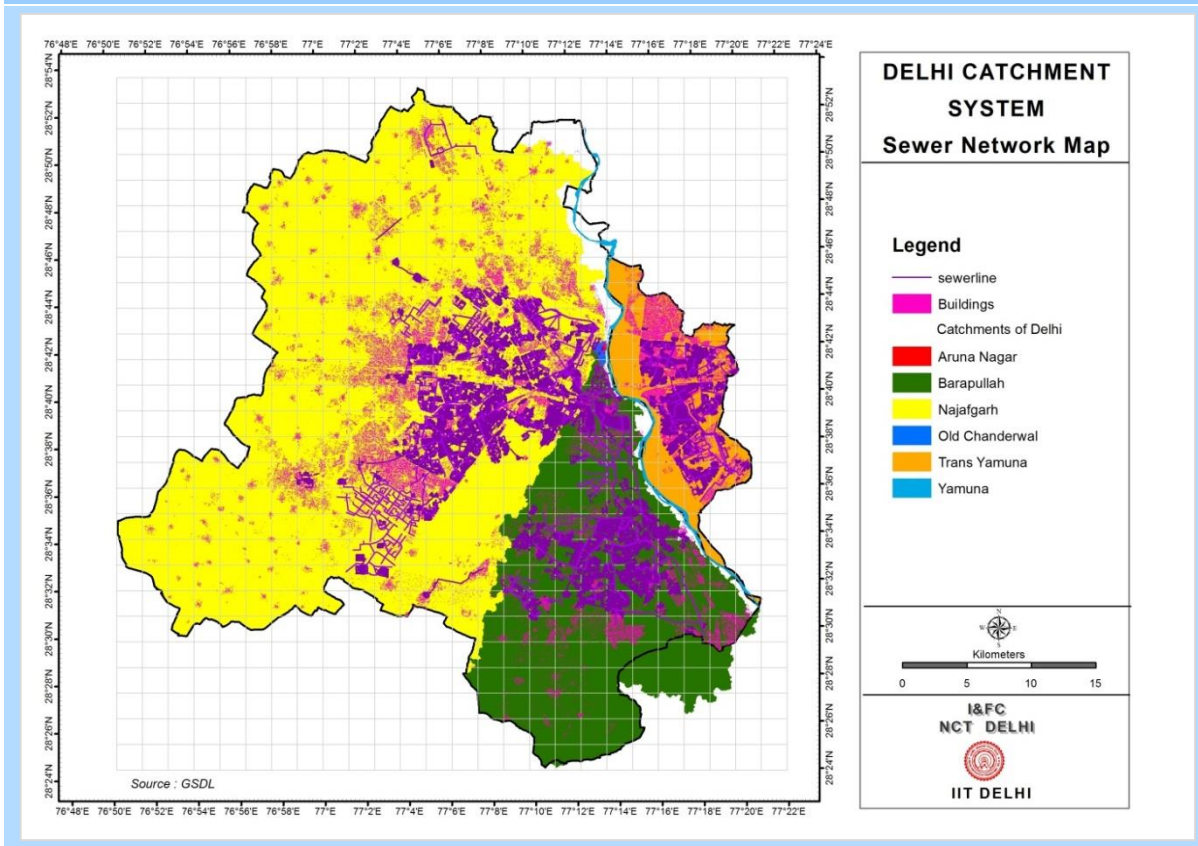
Neglect of natural water bodies as detention basins and/or retention ponds

Many of the natural water bodies have either disappeared or are under the risk of encroachment.

Absence of sewerage network/Unauthorized discharge of sewage into storm drains

Large tracts of the capital region, conservatively estimated to be 50% of the capital territory, do not have access to the engineered sewer systems Figure 0-2 shows the seweraged area of NCT Delhi. Sewage generated from these areas is inevitably discharged into the storm water system, often leading to overflows and sluggish movement of the storm water within the drainage network.

Figure 0-2: Sewered area of NCT of Delhi



Local drain design do not consider overall catchment flow (big picture missing)

It has come to the notice that designing of new drains is carried out locally. Overall catchment response is not taken into consideration while designing local drains, which leads to a compromised performance. Further, the choice of design parameters is also arbitrary and, therefore, often are inappropriate and incompatible, as these lead to under estimation of the required conveyance capacity.

Further, as a mitigation strategy, pumping is the last and the only measure that can be resorted to and its failure, which is often the case, results in local flooding.