STUDY OF SPONGE CITYN FOR WATER MANAGEMENT

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ABSTRACT

Manay problems such as urban flood inundation and water shortage occurred in many countries during the rapid urbanization in the last several decades. An urban water management program called Sponge City (SPC) is put forward in China in 2014 in order to relieve the flood inundation and water shortage situation. The SPC program implements not only the concept and practices of low impact development but also various comprehensive urban water management strategies. The SPC development promotes water security, water environmental protection, and water ecological restoration. The background information and general principles of the SPC program are introduced in this paper as well as the experience and achievement obtained in developing SPC so far. Sixteen cities have been selected by Chinese government as SPC's pilot cities in March, 2015. The Chinese government will provide special subsidy and financial support for the development of SPC in the next three years.

Keyword : - *WATER MANAGEMENT , SPNGE CITY*

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1. INTRODUCTION

The Ministry of Water Reves (MWR) of China stated that there are more th 400 cities having the shortage of water supply and 110 cries furring severe water shortage situation in China. For the 32 megs cities in China: 10 mag cities have various water shortage problems and challenges. Urban sprawl over the last several decades has increased impervious areas and converted occupied many forests, grasslands, lakes, and wetlands that can store water resources. This breaks the natural water cycle that allows storm water infiltrate and replenish the groundwater rags. When it rains, MONT of storm water runoff is discharged out of the city This is accompanied by more frequent occurrences of urban storm water management obstacles such as om water nunoff pollution, water resource shortage, higher possibility of flooding and so on According to a survey conductedby the Ministry of Housing and Urban Rural Development (MOHURD) of the PeopleThe Ministry of Water Reves (MWR) of China stated that there are more th 400 cities having the shortage of water supply and 110 cries furring severe water shortage situation in China. For the 32 megs cities in China: 10 mag cities have various water shortage problems and challenges.

2. METHODOLOGY

2.1 Green buildings and green roofs

Green roofs are new technology of green building represented by the vegetative Layer of the roof They consist of several layers the protective felt layerdrainage-storag fod, filtration felt layer, a substrate for green roofs and a final layer of vegetation. The ban division of green roofs is the extensive and intensive green tools The types of vegetation substrate and other layers may vary depending on the type of green roof. The vegetation on a green roof cools the surface and reduces heat from the air through evapotranspiration These two mechanisms reduce the temperature of the roof surface and the surrounding at Area under covered with green roof can be cooler than the surtounding ar, while conventional roof can increase the air temperature over 50 C.

2.2 DRAINAGE SYSTEM

The flow of water through well-defined channels is known as drainage and the network of such channels is called a "drainage system" The drainage system of an area - the outcome of the geological time period, nature and structure rocka, stope topography, amount of water and the periodicity flow. The area drained by a single river system (river and its tributaries) is called its drainage basin. An elevated area (mountain or an upland) that separates two drainage basins is calleda "water divide" The world's largest drainage basin is of the Amazon river and in India, the river Ganga has the largest river basin.

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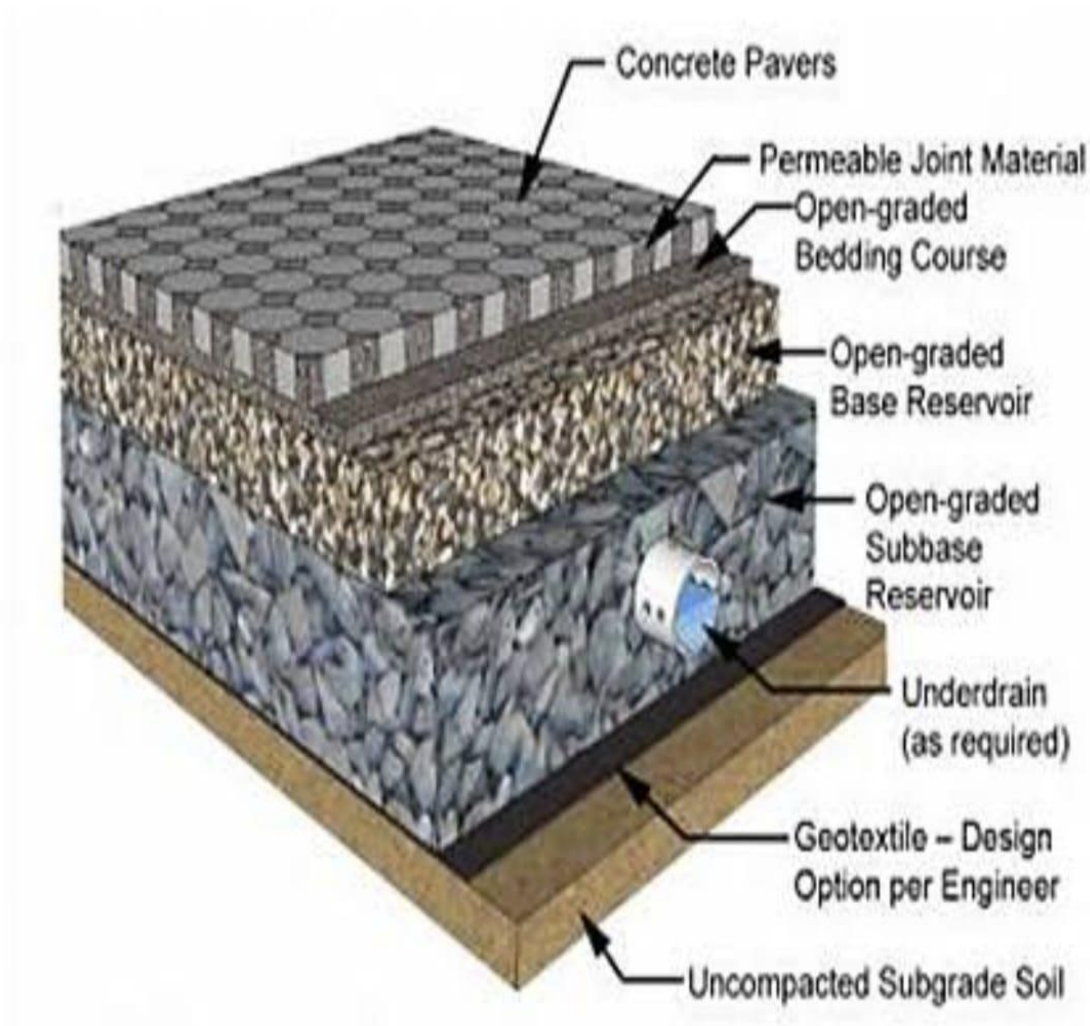
2.3 Wetlands

Wetlands are areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season. Water saturation (hydrology) largely determines how the soil develops and the types of plant and animal communitiesliving in and on the soil Wetlands may support both aquatic and terrestrial species.The prolonged presence of water creates conditions that favour the growth of specially adapted plants (hydrophytes) and promote the development of characteristic wetland (hydric) soils Wetlands are among the most productive ecosystems in the world, comparable to rain forests and coral reefs. An immense variety of species of microbes, plants, insects, amphibians, reptiles, birds, fish andmammals can be part of a wetland ecosystem. Climate, landscape shape (topology), geology and the movement and abundance of water help to determinethe plants and animals that inhabit cach wetland. The complex, dynamic relationships among the organisms inhabiting the wetland environment are called food webs. This is why wetlands in Texas, North Carolina and Alaska differ from one another.

2.4 **Porous Concrete**



2.5 **Site selection**

Our target area is Marine drive (150000 cumes) which India's one of the most visiting place for tourism where flooding one The biggest problem during the monsoon. stormwater get mix with sea water & then during high tides it comes out on road which stops touring, as well as traffic & Sometimes it cause loss of human life's also.

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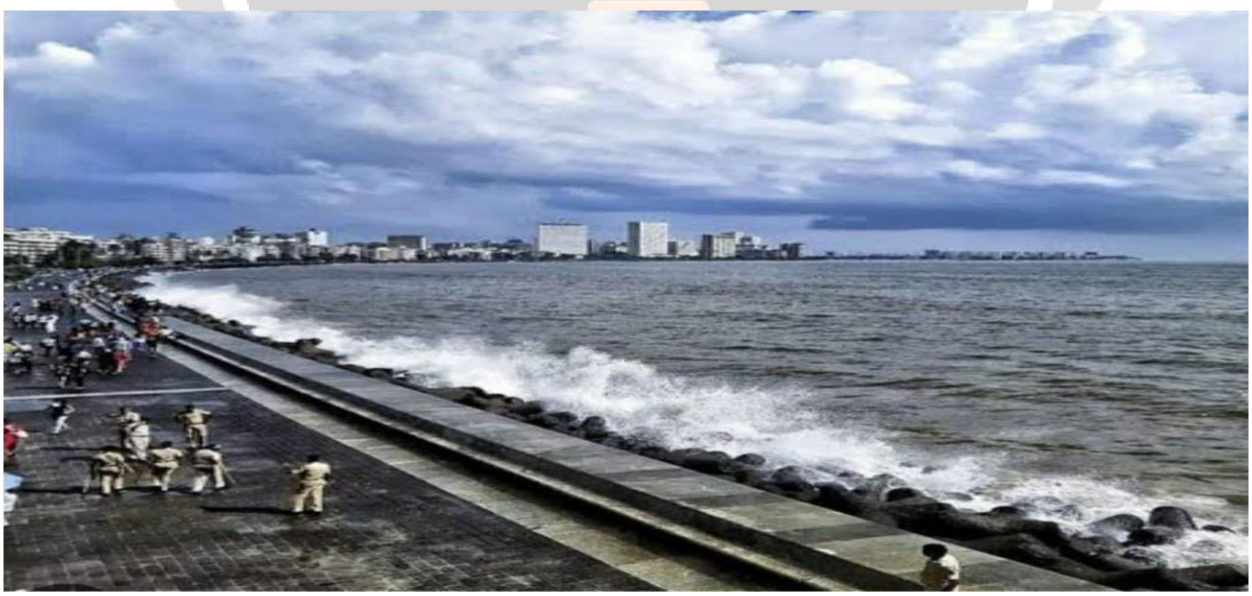
2.6 Marine drive during monsoon



3. CALCULATIONS

RAINFALL AT SITE SELECTION

Mumbai Observations recorded at 08:30 Hrs. IST of November 20,2022

Station	Temperatures (in °C)					Relative Humidity (%)					Rainfall (in mm)		Rainfall (in cm)	
	Max.	Dep. from normal	Min.	Dep. from normal	DryBulb At 8:30 Hrs.	At 08:30Hrs	Dep. from normal	At 17:30 Hrs 19/11/2022	Dep. from normal	Last 24 hours	Since 01/10/2022	Departure	Annual Total	Annual Normal
Mumbai (SCZ)	33.3	-0.4	19.8	-1	23.0	47	-15	45	-09	0	226	153	288.96	232
Mumbai (CLB)	32.2	-1.2	22.2	-1	24.0	60	-19	60	-07	0	186	100	228.70	212

Calculation of rainfall in our area

Rainfall at marine drive-2320 mm/annumQ = ciA

C = Runoff coefficient i = Intensity of

rainfallA =Selected Area

c = 0.8-(for our area)i= 2032 cumes

A = 150000m ^ 2

O =0.82 X 320 X 150000

=2784 X 10^ 6 1/AnnumQ=278.4ml/Annum

Discharge in our selected area is 278.4 ml/annum

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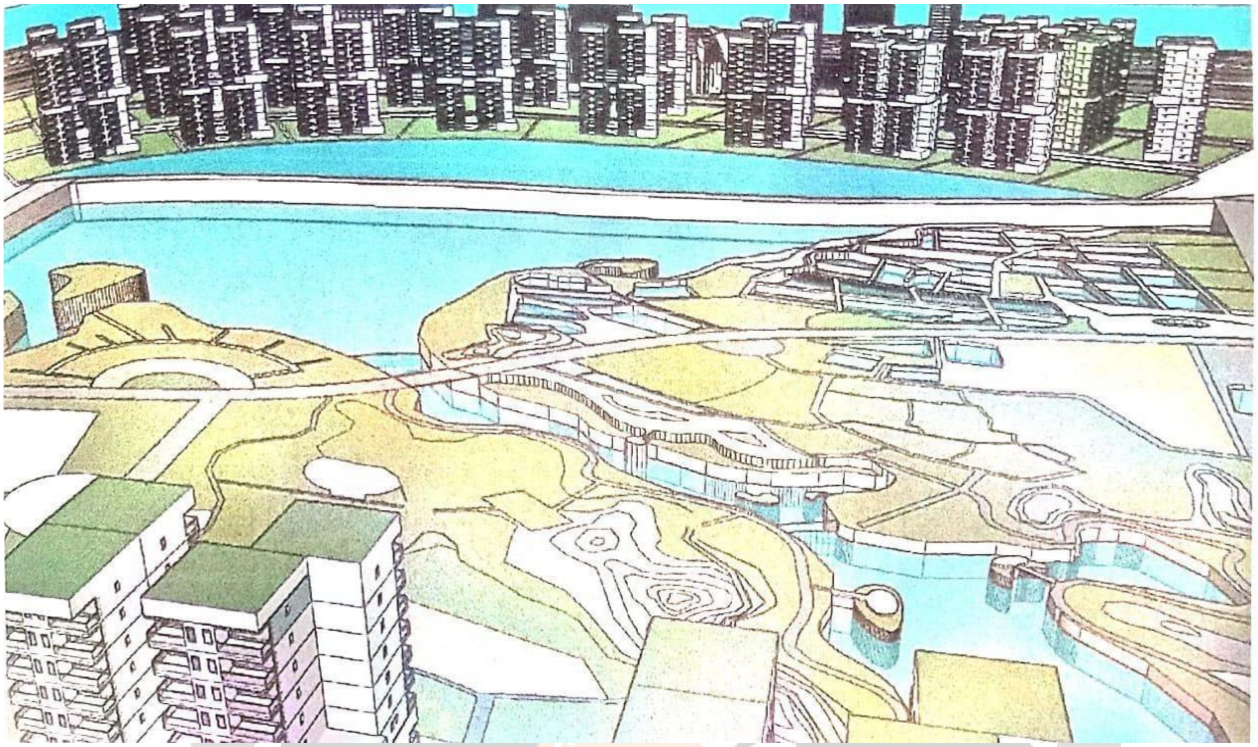

Image during design of model video

Image during design of model video

4 Conclusions

Discharge in our selected area is around 278 million litre cumes. With the application of all the methodologies (Green buildings and Green roofs, Porous concrete and pervious pavement. Drainage system, Wetlands) We can save up to 50% minimum. After rainfall more than 70% of water will go into pervious pavement which is made up of pervious concrete whose efficiency can be achieve up to 80%. After that some part will drain out through drains, drain can leads the storm water to the river nearby or may be to the treatment plant if there any. Then remaining will be absorb by plants and the green roofs and green buildings Lastly if there possibility of making wet lands then reaming water can be save there for any purpose

Goal of the „Sponge-City" is to buffer rainwater at its place of origin. "Green elements" just as swales, tree-drains, green roofs and facades help to evaporate, store and infiltrate the rainwater, which strongly reduces the outflow.

Climate change will further aggravate the problem of heat stress in major cities. In addition to increasing heavy rainfalls, long periods of heat will also be a challenge for urban water management. The "Sponge-City" imitates the natural water cycle, increases local evaporation and therefore forwards an increased evaporation cooling in densely populated areas.

Our goal is to raise awareness that dealing with rainwater should be less a "rainwater disposal" and more an "urban rainwater management". To achieve this goal, the idea of decentralized rainwater management has to be clarified and the message must be spread

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