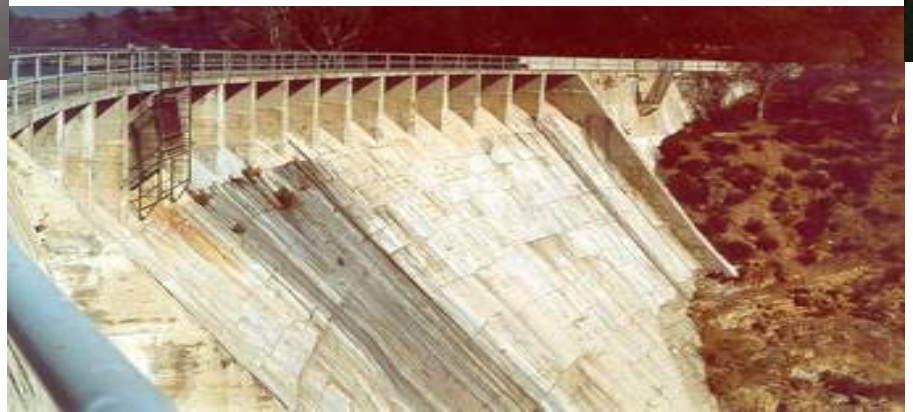
FLOOD CONTROL



FLOOD CONTROL methods are used to reduce or prevent the detrimental effects of flood waters. FLOOD RELIEF methods are used to reduce the effect of flood waters or high water levels.

CAUSES OF FLOOD

1. **Heavy Rains**

The simplest explanation for flooding is heavy rains. No matter where you live, you are surrounded by infrastructure and systems designed to move rainwater into appropriate basins and reservoirs. In most cases, the infrastructure does its job, and you never have to think about where the rain goes when it runs off.

When it rains heavily, however, those systems are overwhelmed, and that water doesn't drain nearly as quickly as it needs to. In short, the drainage systems back up, and the water rises — sometimes into homes. This typically happens only in cases of sustained heavy rains over a long period.

2. Overflowing Rivers

You do not necessarily need to have heavy rains to experience flooding in your area. For example, if you live along a river and areas upstream from you experience heavy rains, it could lead to a serious overflow where you live. Most larger rivers include a series of dams to help manage large amounts of rainfall, and most river systems are managed by government authorities.

Sometimes, however, those authorities have to make tough decisions about how to operate dams. They often can manage the water and prevent flooding altogether — but not always.

3. Broken Dams

When heavy rains come, and water levels rise, aging dams can fail and unleash torrents of water on unsuspecting households. there is always a possibility that a structure will fail.

4. Urban Drainage Basins

Many of our cities are made of mostly concrete and other impermeable material. When you have an urban drainage basin that is made of concrete, there is no ground for water to sink into. So, when those drainage basins fill up, it is going to mean flooding for low-lying areas.

5. Storm Surges and Tsunamis

Rain is not always the culprit when it comes to flooding. Storm surges related to hurricanes and other storms can lead to significant flooding, as can tsunamis that are sometimes caused by underwater earthquakes.

Given modern technology, we often know about storm surges and tsunamis before they arrive, but this is not always the case. For example, in 2004, an earthquake off the coast of Indonesia created a tsunami that gave little warning before coming ashore.

6. Channels with Steep Sides

Flooding often occurs when there is fast runoff into lakes, rivers and other reservoirs. This is often the case with rivers and other channels that feature steep sides. It is a similar issue to having a lack of vegetation, which is explained in more detail below.

7. A Lack of Vegetation

Vegetation can help slow runoff and prevent flooding. When there is a lack of vegetation, however, there is little to stop water from running off. This can be a bit of a conundrum after a drought. While area residents likely welcome the rain, the lack of vegetation after the drought can cause flash flooding. This does not always happen given that basins and reservoirs are close to empty, but it can occur in cases of extreme rains following long periods of drought.

8. Melting Snow and Ice

A winter of heavy snow and other precipitation can lead to a spring of flooding. After all, that snow and ice have to go somewhere when they melt. Most mountainous areas experience relatively consistent snowfall totals from year to year, but an unusually heavy winter of precipitation can spell bad news for low-lying areas around the mountains when spring hits.

The good news is that sustained winter precipitation provides a long lead time to prepare for potential flooding. That is a silver lining at the very least.

Methods of flood management

Some methods of flood control have been practiced since ancient times. These methods include planting vegetation to retain extra water, terracing hillsides to slow flow downhill, and the construction of flood ways (man-made channels to divert floodwater). Other techniques include the construction of levees, lakes, dams, reservoirs, retention ponds to hold extra water during times of flooding.

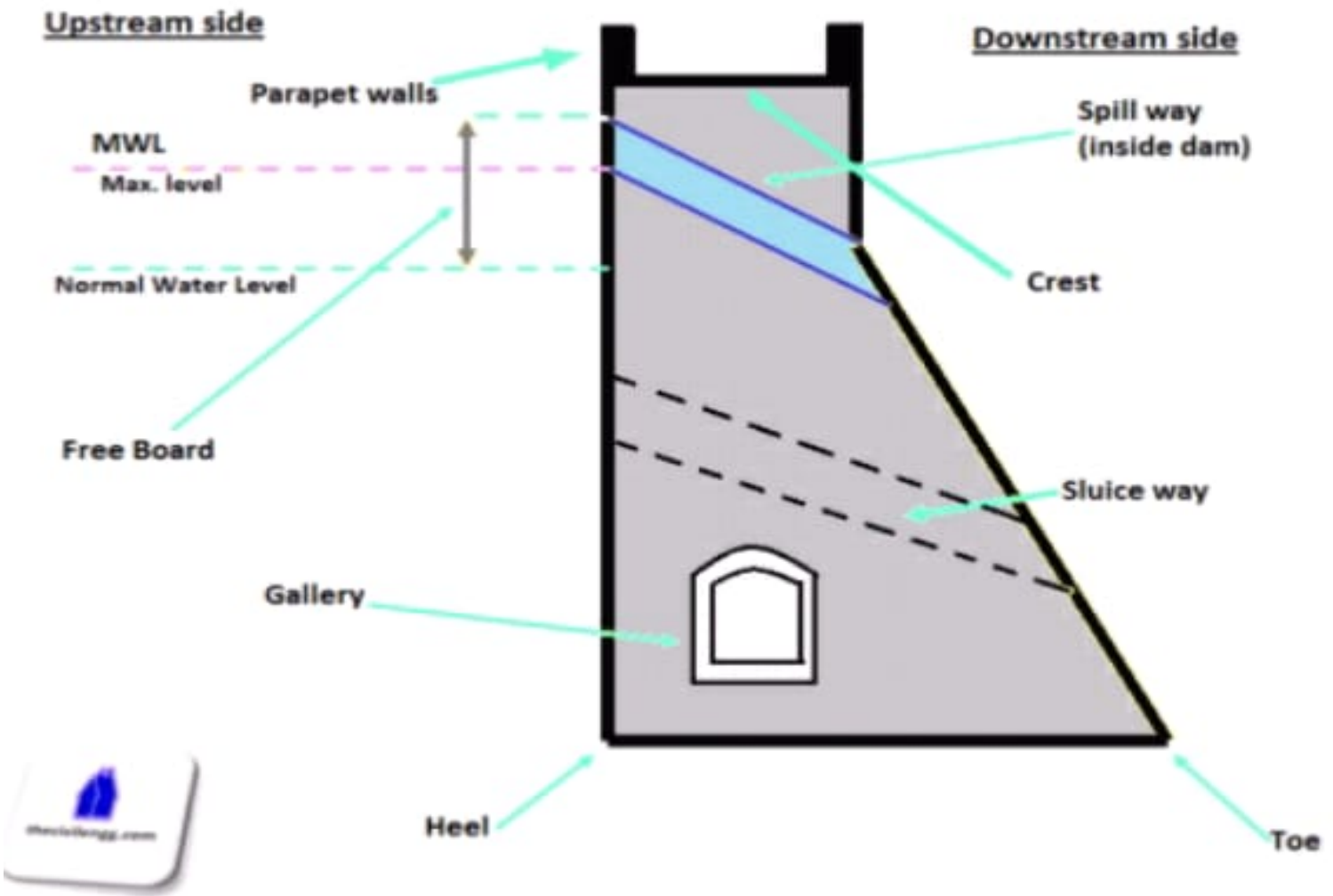
- DAMS
- LEVEE BASED FLOOD PROTECTION
- SPILLWAYS
- DIVERSION CANALS
- FLOODPLAINS AND GROUNDWATER REPLENISHMENT
- RIVER DEFENCES
- COSTAL DEFENCE
- SELF CLOSING BARRIER
- TEMPORARY PERIMETER BARRIERS

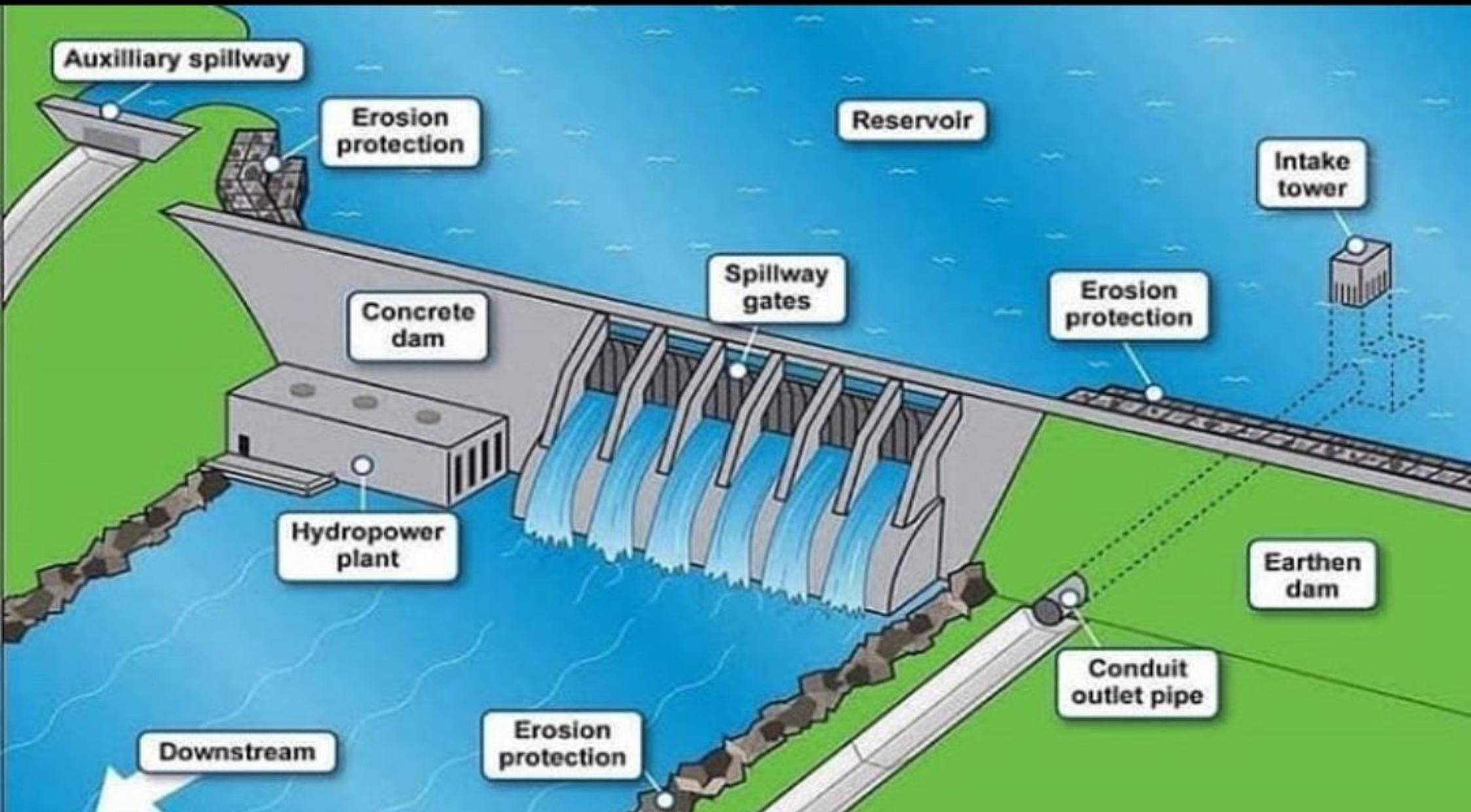
DAMS

- Dams are one of the most direct method of flood control through storing surface runoff thus, attenuation flood waves and storing flood water to be redistributed without exceed in downstream flood conditions.

- For flood control it is ideal to maintain the reservoir at the lowest level possible for storage. On the other hand, keeping reservoir at a high level provides the ability to maintain low flows and hydropower Production in droughts

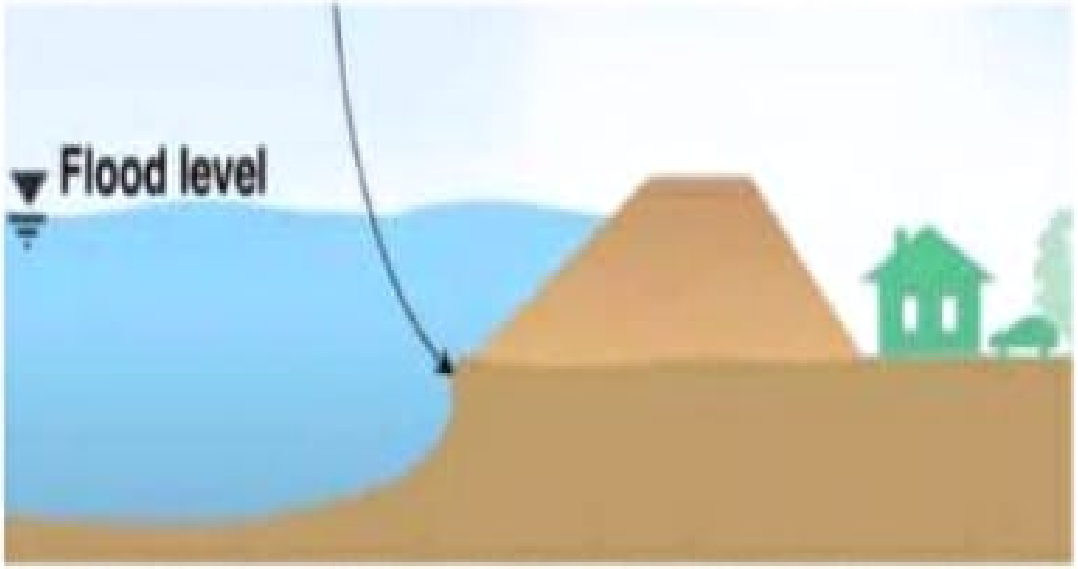
PARTS OF A DAM




Auxilliary spillway
Erosion protection
Reservoir
Intake tower
Spillway gates
Concrete dam
Erosion protection
Hydropower plant
Earthen dam
Conduit outlet pipe
Erosion protection
Downstream

LEVEE

- Levees are one of the oldest forms of river flood control used to protect people and their property from damaging flood water
- They consist of earthen embankment built between the river and the area to be protected
- Levees restrict the flood water’s flow to the river side of the levee. This will increase the stage in the river
- Levees should be built well outside the mean width of river’s prone to lateral migration.

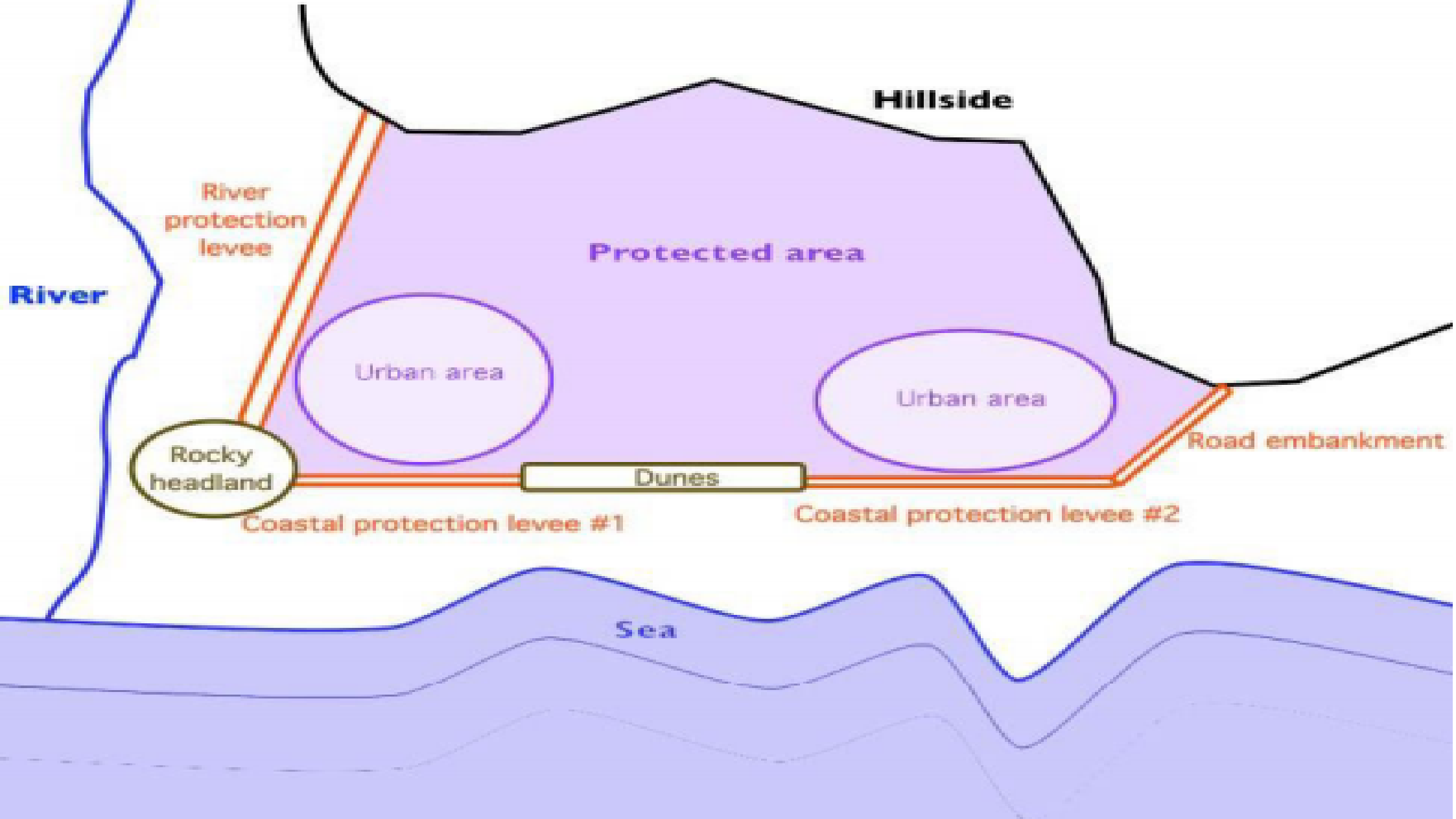


Freeboard should be taken into account when sizing a levee:

2 ft. for agricultural levees

3 ft. for urban levees


FLOOD
CONTROL
ASIA
Dikes and Levees

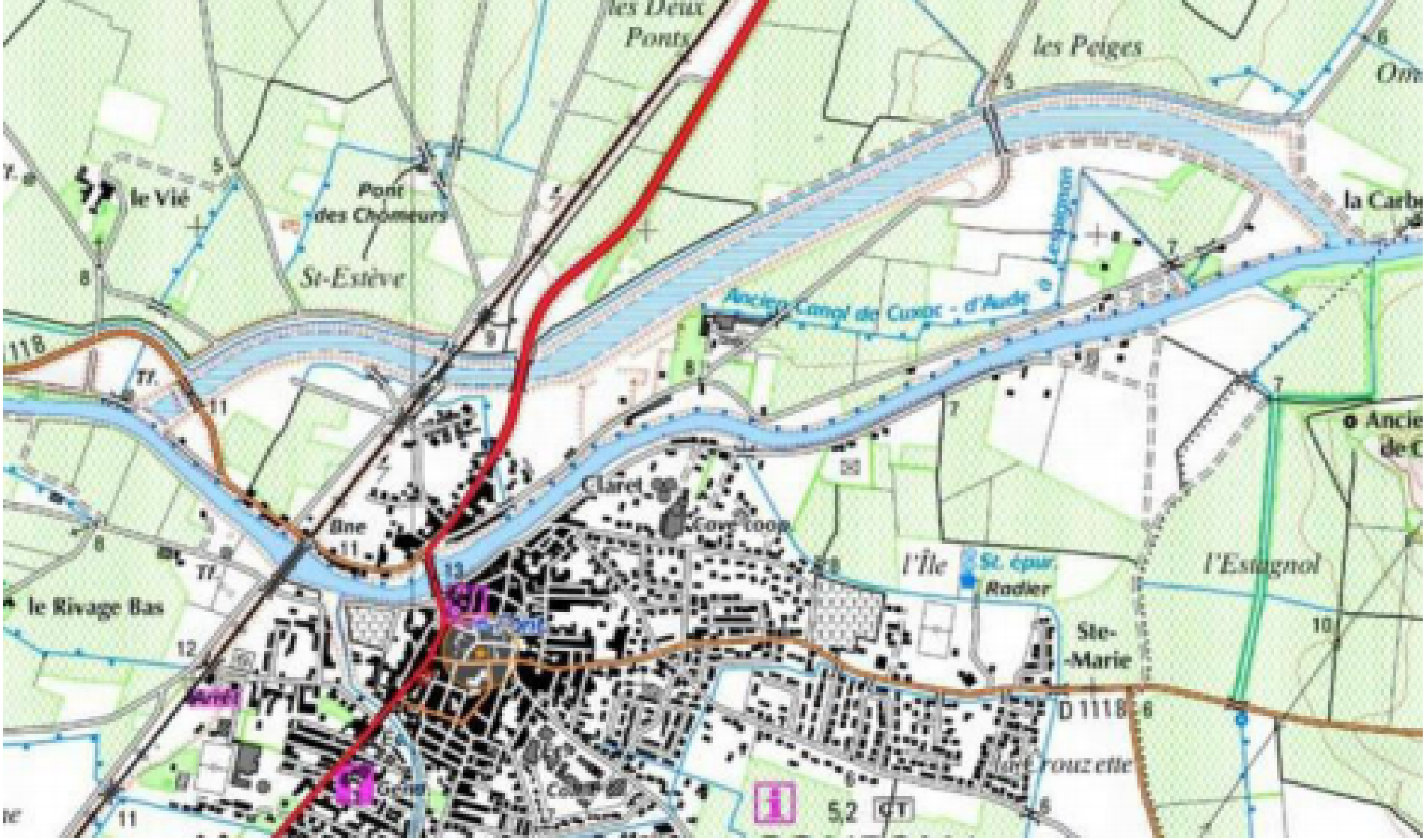

Hillside
River protection levee
Protected area
River
Urban area
Urban area
Road embankment
Rocky headland
Dunes
Coastal protection levee #1
Coastal protection levee #2
Sea

SPILLWAYS

Spillways are found of almost any dam, but also on levee systems. A spillway built on a levee is, like any levee section, another component of a hydraulic structure. The roles of a spillway are: to support the passage of water from one side to the other without causing damage, to hydraulically control this passage in terms of relation between water level and discharge, and to avoid damage on the rest of the levee system, which does not resist to overflowing.

DIVERSION CANALS

- The purpose of a diversion canal is to lower a watercourse's downstream water level.
- Such a canal is most often water supplied by a spillway on levees located along a main watercourse.
- Generally, these canals must make up for a watercourse's insufficient local conveyance, and join together further downstream
- It divert the water to temporary holding ponds or other bodies of water where there is a lower risk or impact to flooding


les Deux Ponts
les Peiges
le Vié
Pont des Chômeurs
St-Estève
Ancien Canal de Cuxac - d'Aude
la Carb
Bne
Claret
l'Ile
St. épur.
Radier
l'Estagnol
le Rivage Bas
Ste-Marie
D 1118
5,2

FLOODPLAINS AND GROUNDWATER REPLENISHMENT

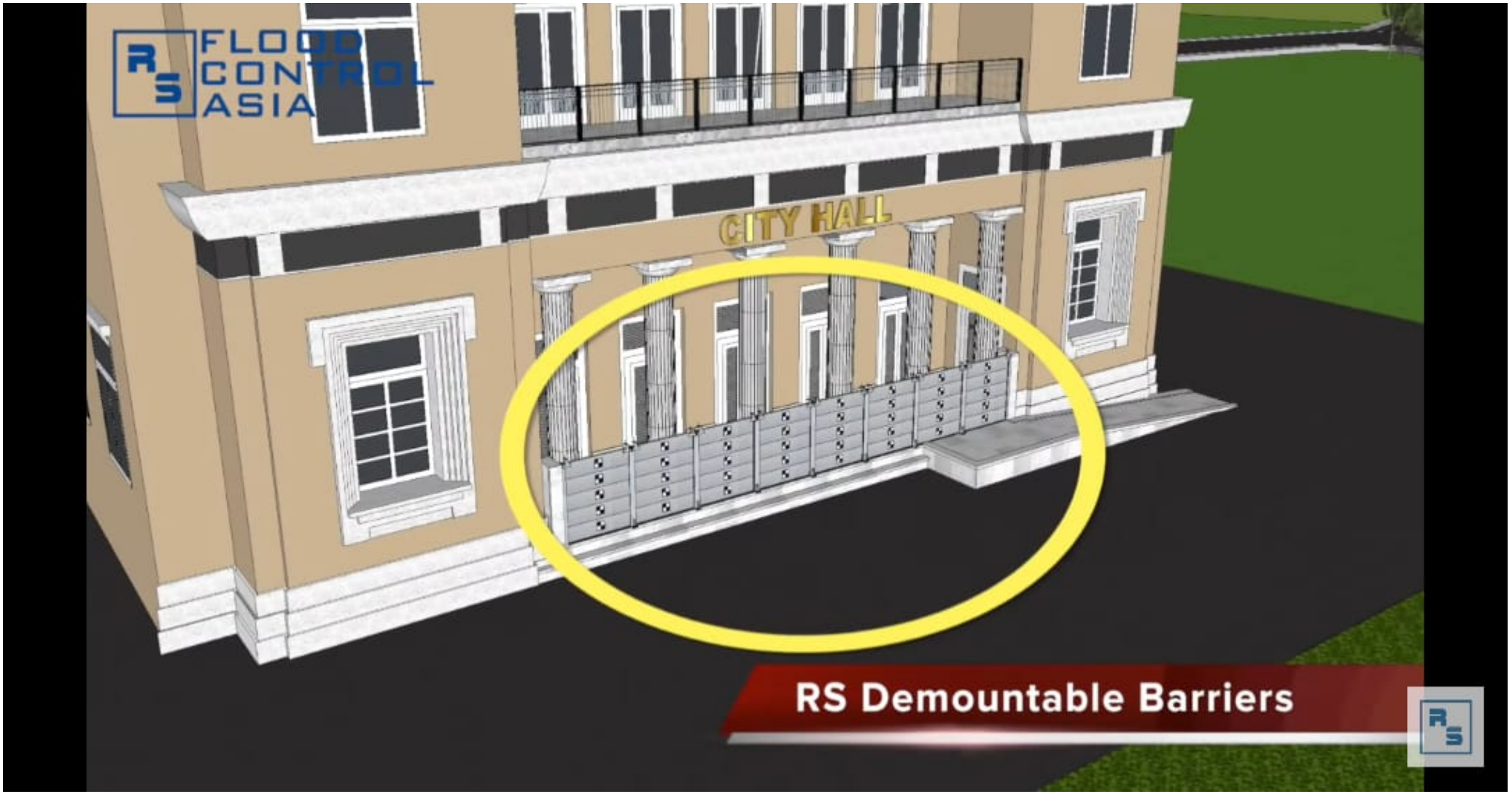
- Excess water can be used for groundwater replenishment by diversion onto land that can absorb the water. This technique can reduce the impact of later droughts by using the ground as a natural reservoir.
- It is being used in California, where orchards and vineyards can be flooded without damaging crops

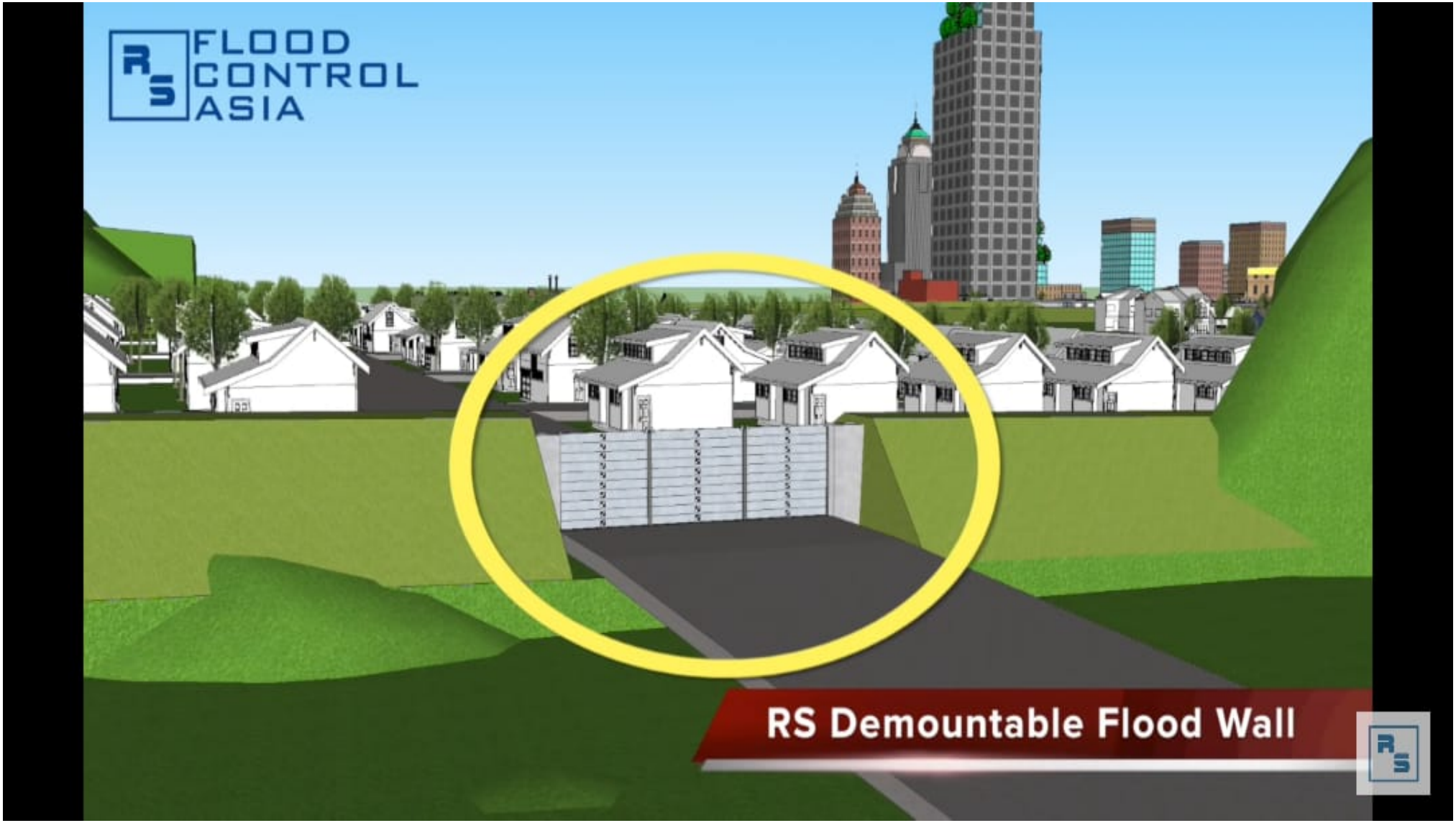
Coastal defences

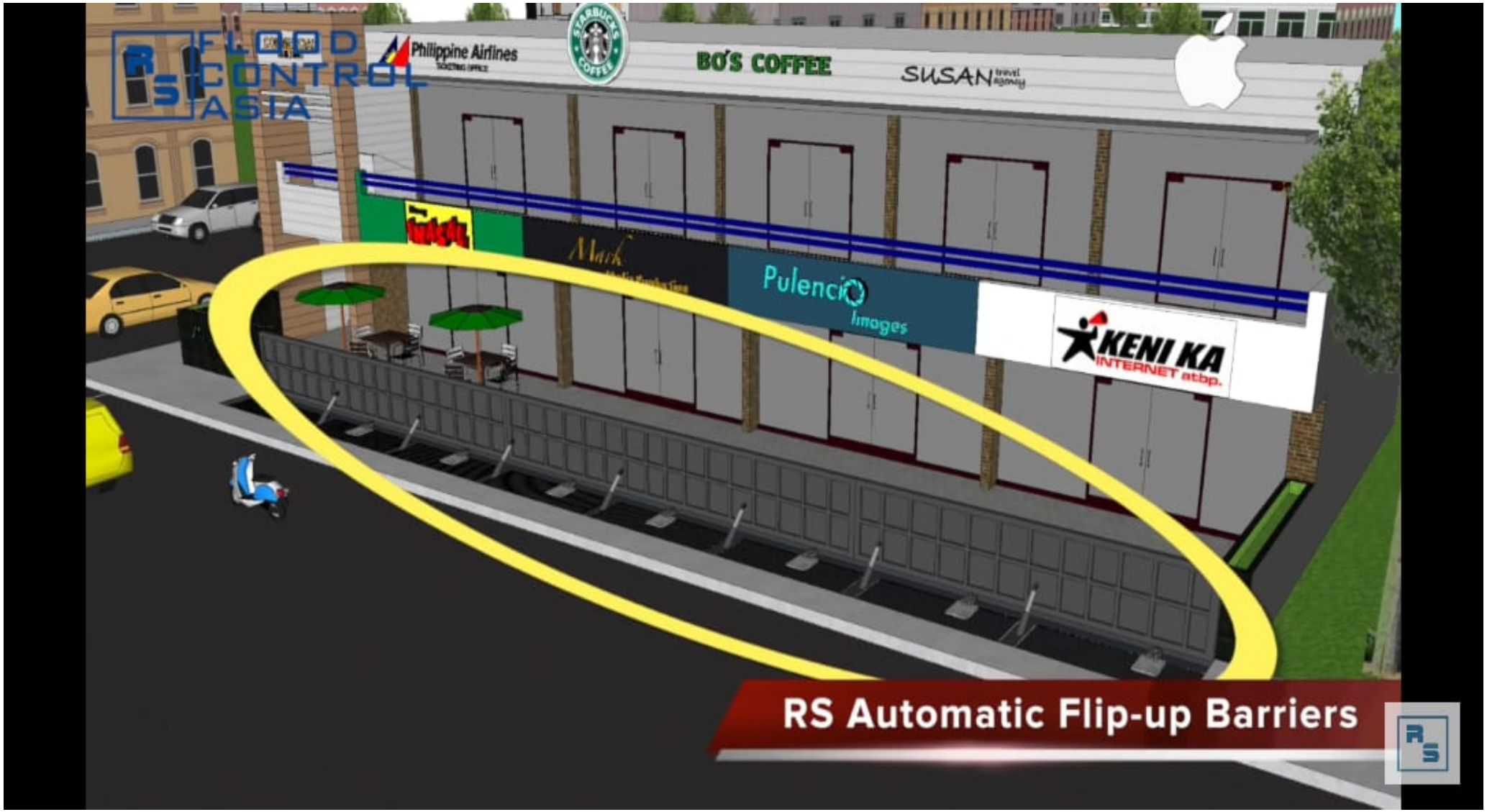
- Coastal flooding has been addressed with coastal defences, such as sea walls, beach nourishment, and barrier islands

Self-closing flood barrier

- The self-closing flood barrier (SCFB) is a flood defence system designed to protect people and property from inland waterway floods caused by heavy rainfall, gales or rapid melting snow.
- The SCFB can be built to protect residential properties and whole communities, as well as industrial or other strategic areas. The barrier system is constantly ready to deploy in a flood situation, it can be installed in any length and uses the rising flood water to deploy.

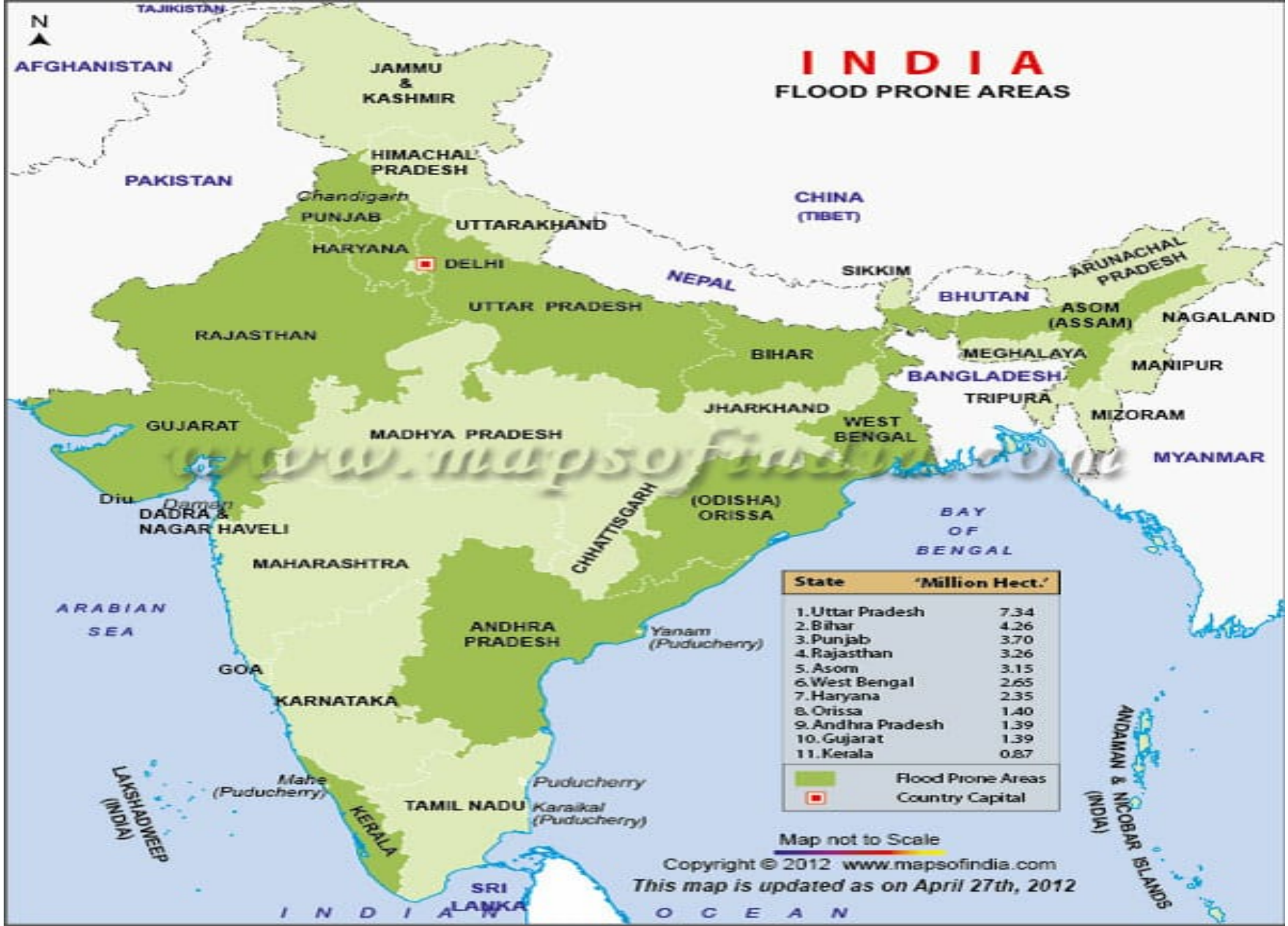

FLOOD CONTROL ASIA
CITY HALL
RS Demountable Barriers


FLOOD
CONTROL
ASIA
RS Demountable Flood Wall


FLOOD CONTROL ASIA
Philippine Airlines
BO'S COFFEE
SUSAN
Pulencio Images
KENI KA
INTERNET atbp.
RS Automatic Flip-up Barriers


FLOOD CONTROL ASIA
Deutsche Bank
-up Barriers


FLOOD CONTROL ASIA
Deutsche Bank
-up Barriers



State	'Million Hect.'
1. Uttar Pradesh	7.34
2. Bihar	4.26
3. Punjab	3.70
4. Rajasthan	3.26
5. Asom	3.15
6. West Bengal	2.65
7. Haryana	2.35
8. Orissa	1.40
9. Andhra Pradesh	1.39
10. Gujarat	1.39
11. Kerala	0.87