

# *THE OUSEBURN* **CATCHMENT** *WEEK 2*

## **Team 11:**

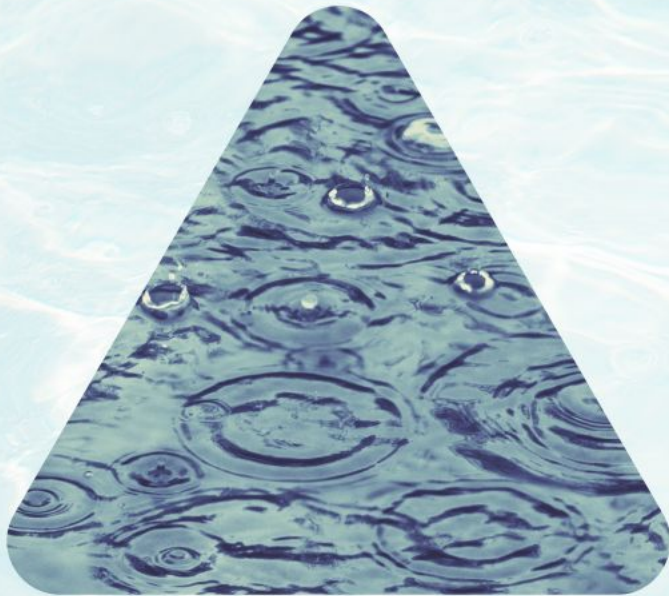
Jessica Canchig, Tarannum Tabassum Islam,  
Benjamin LELEU, Jenna Lotfi, Ousseynou NDIAYE,  
Amélie Sibuet, Ka Kin TANG, Guillaume VAN  
MECHELEN, Lawrence Whittaker, Tarrin Wilson, Yi WU



# THE PROBLEM AND STEPS SO FAR

2

**ONLINE**



**RAINFALL  
GENERATION**

**WEEK 1**



**SHETRAN FLOW  
ANALYSIS**

**WEEK 2**



**FLOOD HAZARD  
MAP**

# TELEMAC

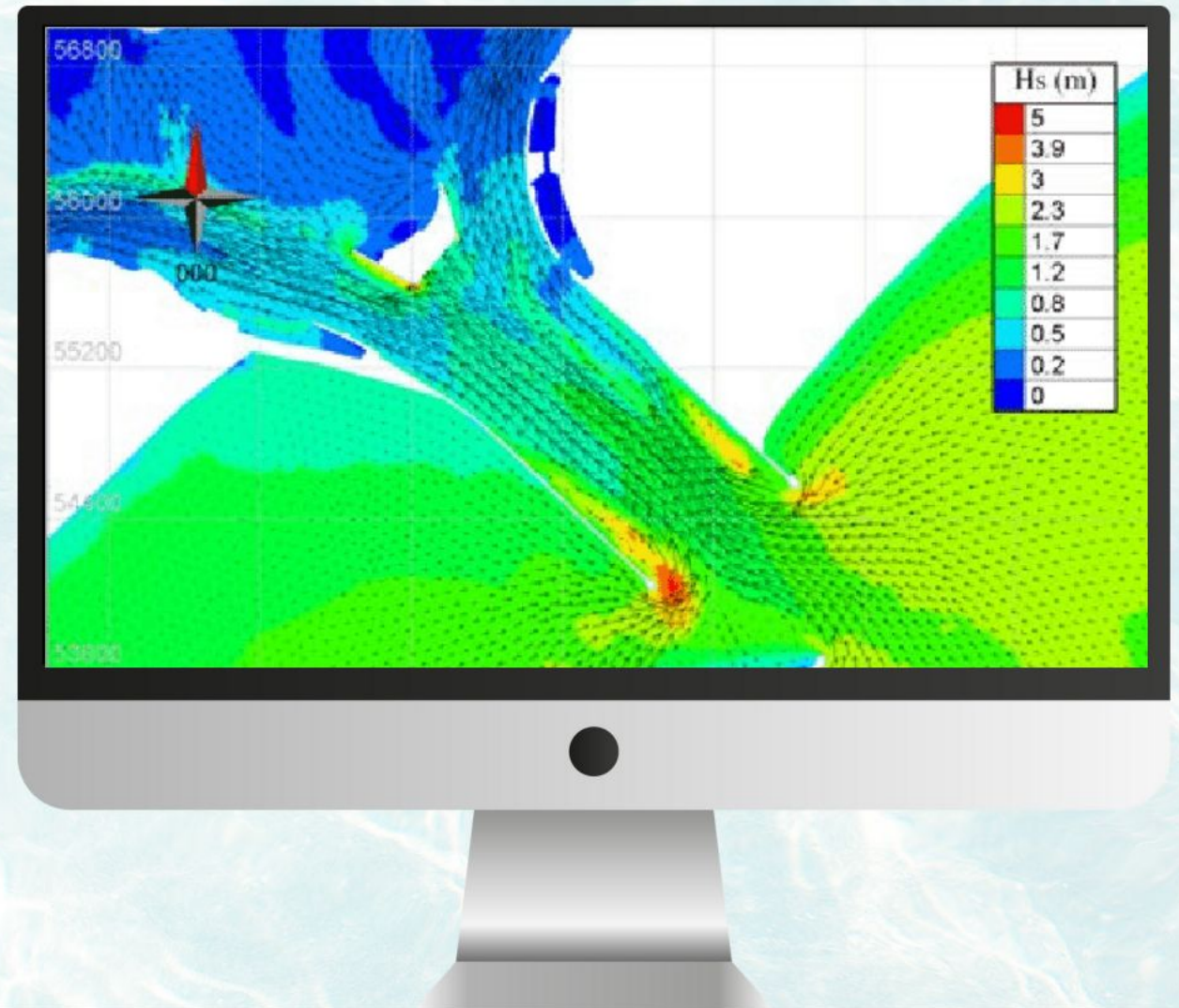
## Hydrodynamic + 2D

### SIMULATES:

- FLOOD INUNDATION DEPTH
- INUNDATION EXTENT
- FLOOD HAZARD MAP

FOR

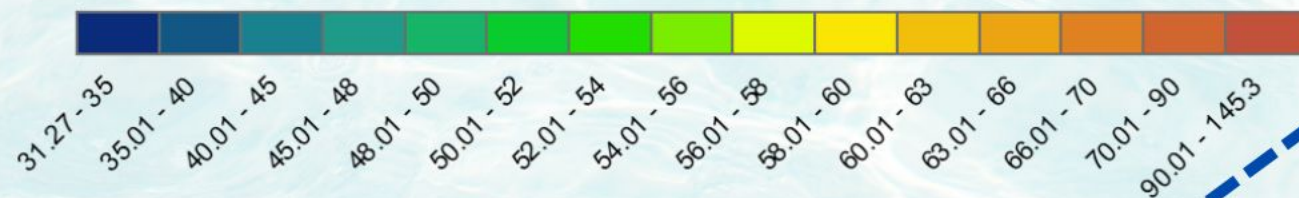
4 HR DURATION RAINFALL – 100 YR RP



# MODEL DOMAIN PRE-PROCESSING

4

Legend



55 KM<sup>2</sup>

**DIGITAL TERRAIN MODEL**

**(M.A.S.L)**

50 cm resolution DTM

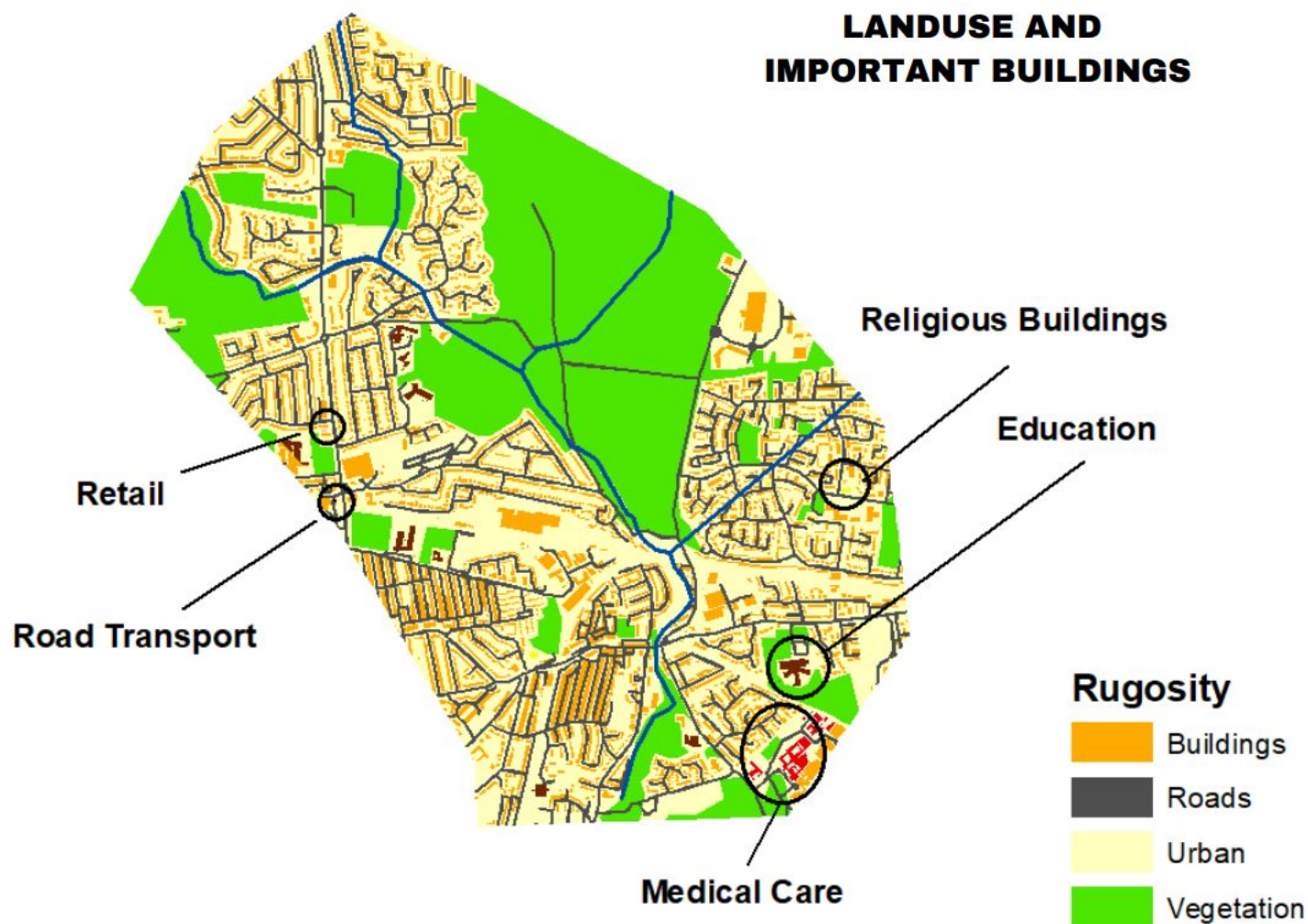
**SATELLITE IMAGERY**  
**HIGH RESOLUTION**  
**(8K UHD)**

5.8 KM<sup>2</sup>

**\*GOOGLE EARTH PRO**

# MODEL DOMAIN PRE-PROCESSING

5



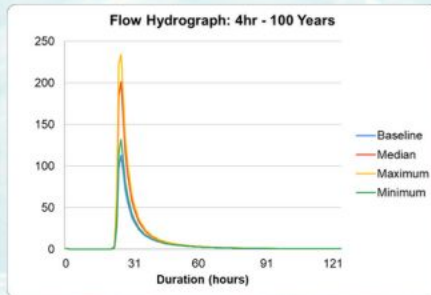
| Landuse    | Rugosity (Strickler's) |
|------------|------------------------|
| Buildings  | 5                      |
| Urban      | 62.5                   |
| Vegetation | 25                     |
| Roads      | 70                     |
| River      | 25                     |

\*Roads and buildings shapefile from Ordnance Survey, UK

# MODEL DOMAIN PRE-PROCESSING

6

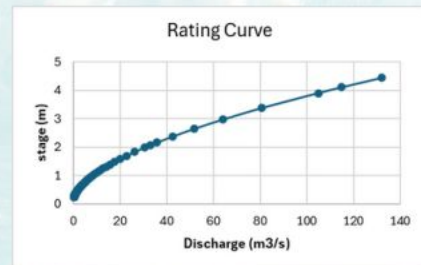
## UPSTREAM: DISCHARGE



Discharge obtained from SHETRAN using 4 hr duration synthetic rainfall data for 100 yr return period (week 2)

15M MESH

RIVER  
2M MESH



## DOWNSTREAM: RATING CURVE

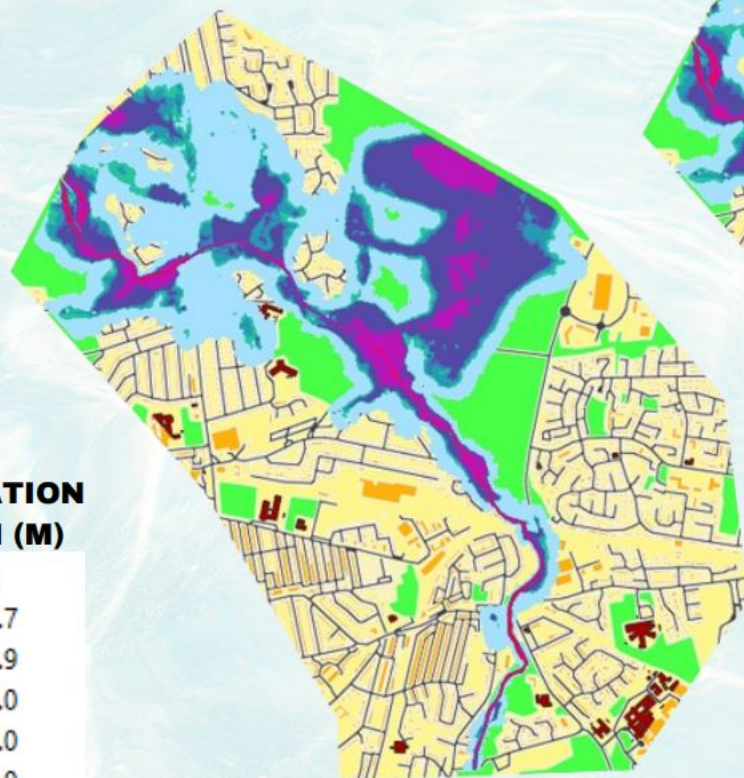
DTM IN TELEMAC

RUGOSITY IN TELEMAC

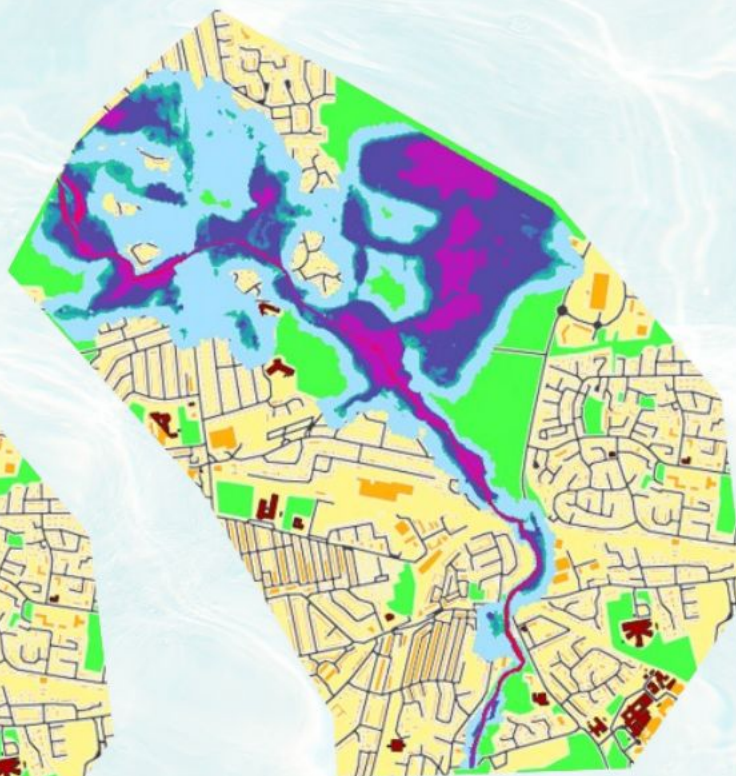
# RESULTS - INUNDATED AREAS

7

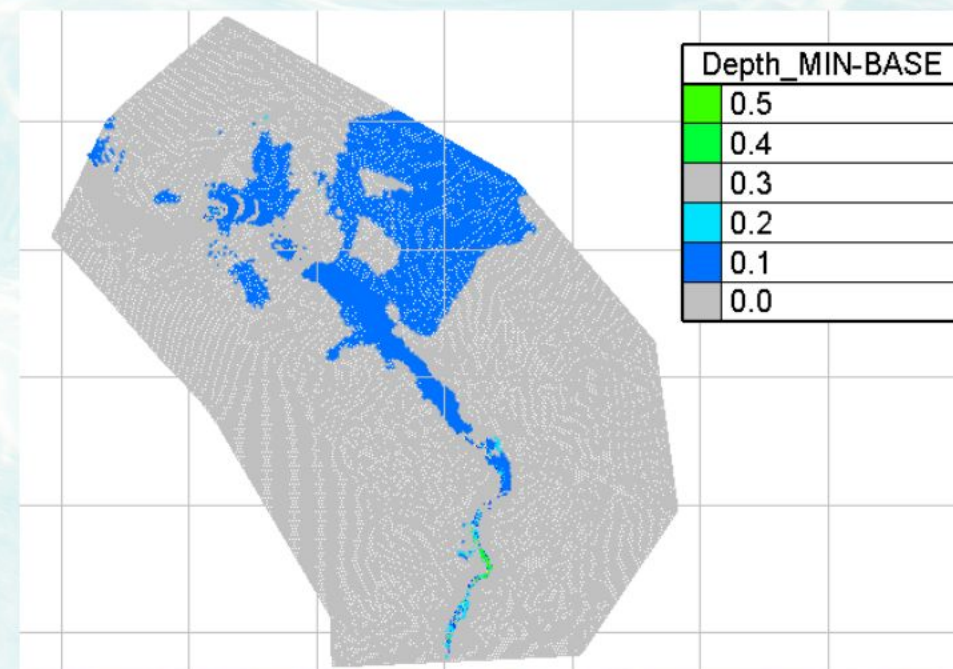
**BASELINE SCENARIO**



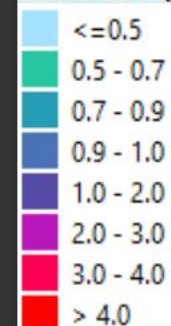
**CLIMATE CHANGE  
MINIMUM INCREASE**



**MINIMUM - BASELINE  
CLIMATE CHANGE SCENARIO**



**INUNDATION  
DEPTH (M)**

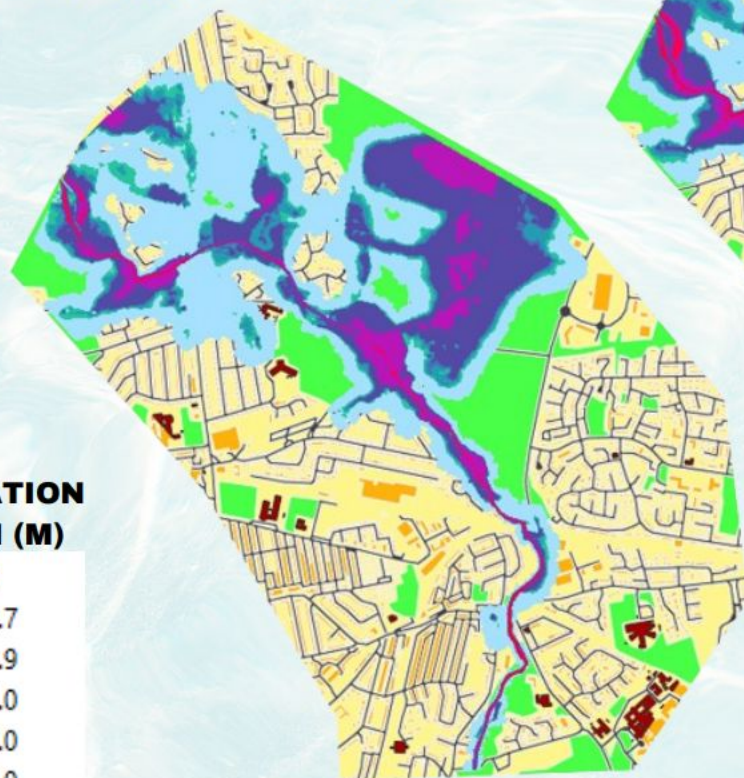


**DIFFERENCE UPTO 0.5M  
SOME PLACES**

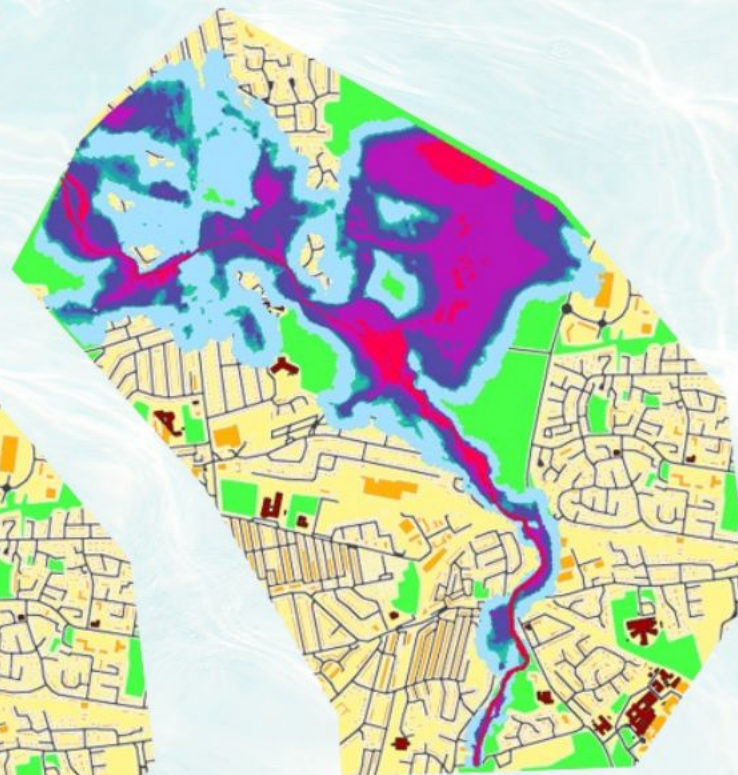
# RESULTS - INUNDATED AREAS

8

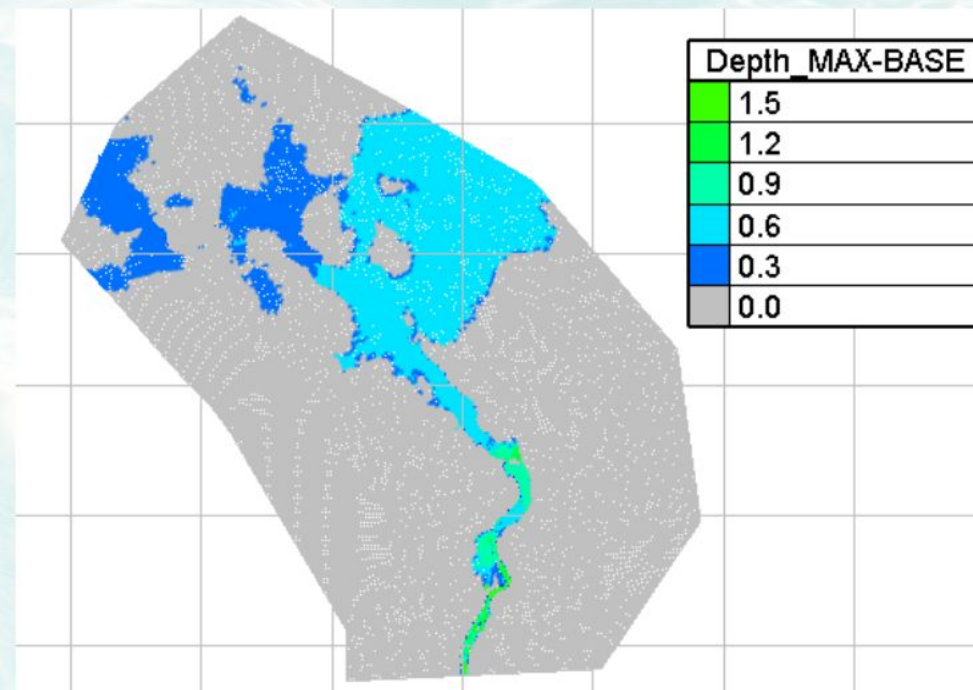
**BASELINE SCENARIO**



**CLIMATE CHANGE  
MAXIMUM INCREASE**



**MAXIMUM - BASELINE  
CLIMATE CHANGE SCENARIO**

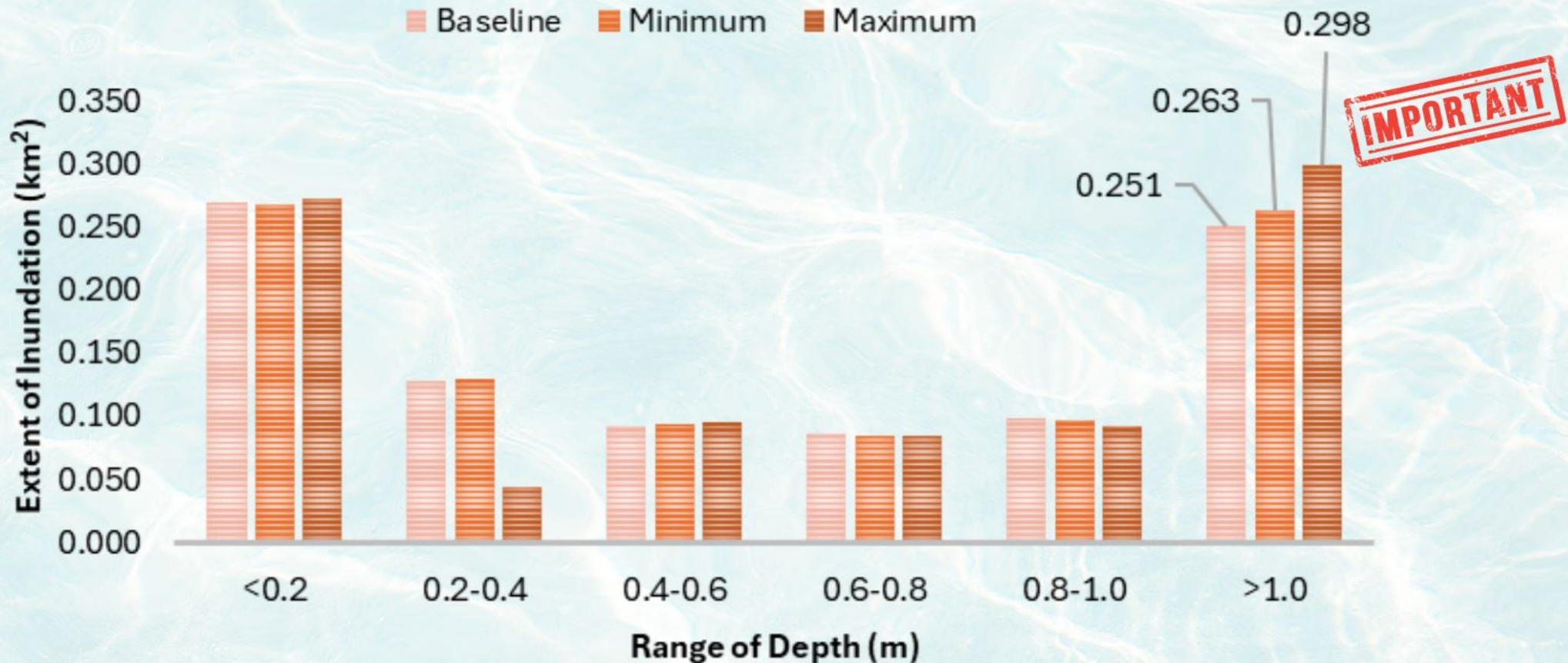


**DIFFERENCE UPTO 1.5M  
MANY PLACES**

# RESULTS – COMPARISON

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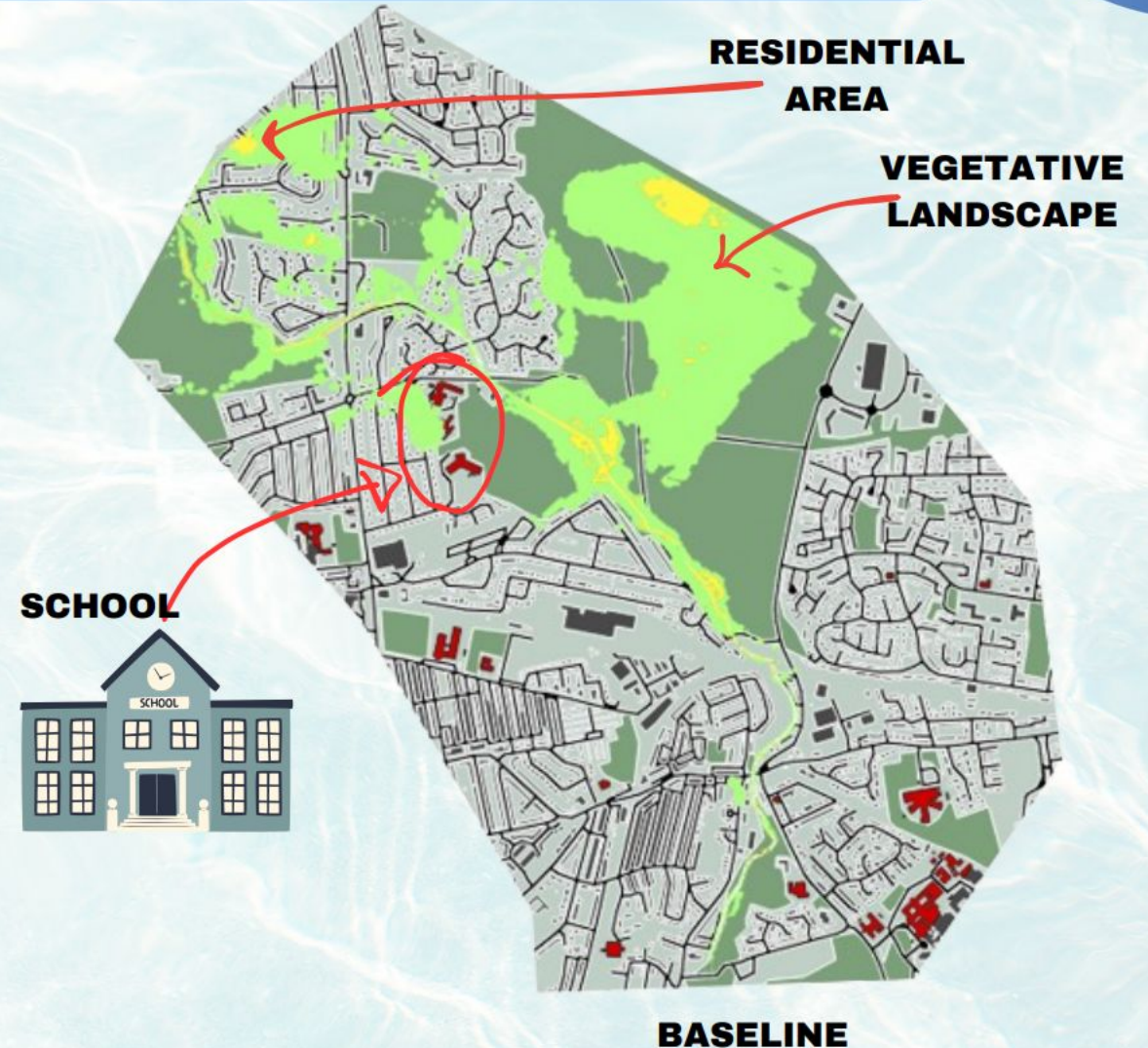
## INUNDATION DEPTHS



# FLOOD HAZARD MAPPING - UK

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| d*<br>(v+0.5) | Degree of<br>Flood<br>Hazard | Description                                                                            |
|---------------|------------------------------|----------------------------------------------------------------------------------------|
| <0.75         | Low                          | Caution - Flood zone with shallow flowing water or deep standing water                 |
| 0.75 - 1.25   | Moderate                     | Dangerous for some (i.e Children) - Danger: Flood zone with deep or fast flowing water |
| 1.25 - 2.5    | Significant                  | Dangerous for most people - Danger: Flood zone with deep fast flowing water            |
| >2.5          | Extreme                      | Dangerous for all - Extreme Danger: flood zone with deep fast flowing water            |



# COMPARISON – FLOOD HAZARD MAPS

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**BASELINE SCENARIO**



**MINIMUM HAZARD UNDER  
CLIMATE CHANGE SCENARIO**



**MAXIMUM HAZARD UNDER  
CLIMATE CHANGE SCENARIO**

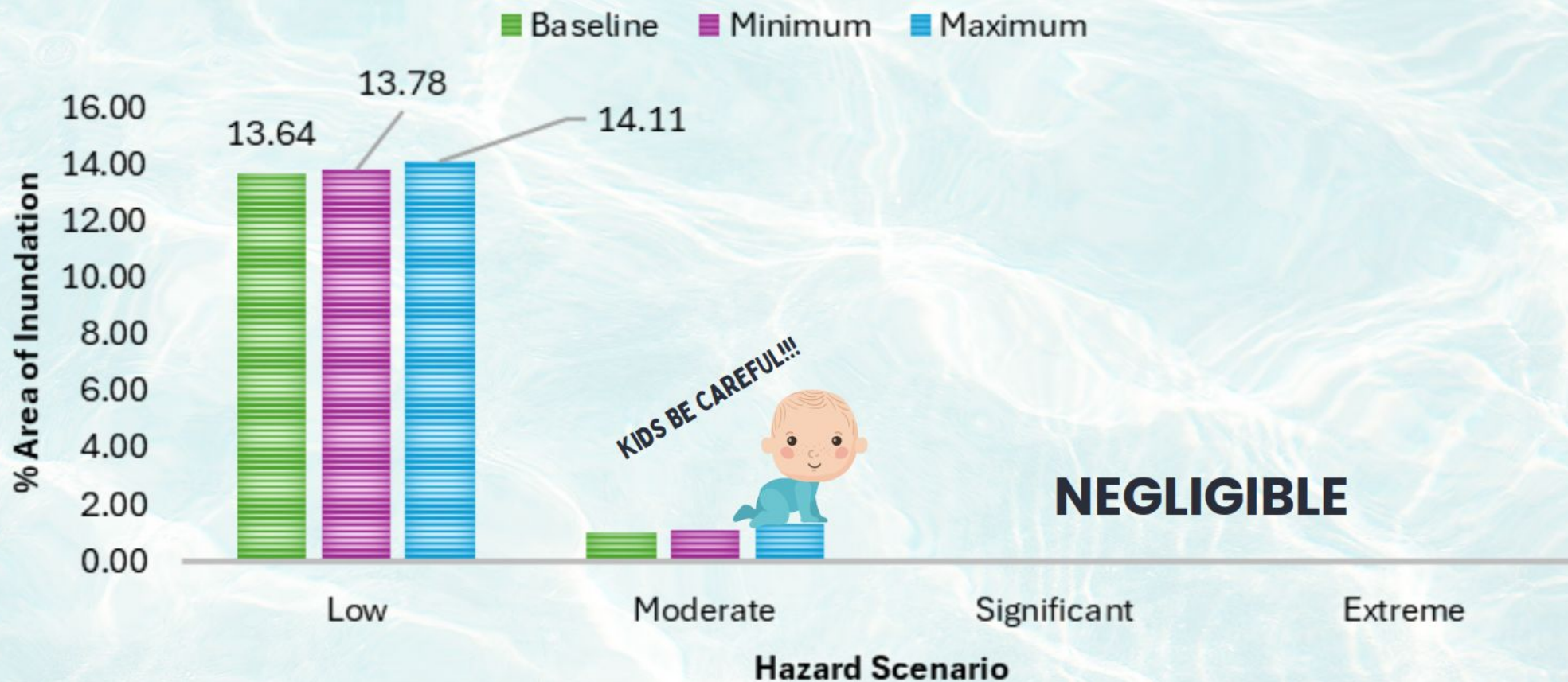
Low  
Moderate  
Significant  
Extreme

**CAN'T SEE THE DIFFERENCE? WE GOT YOU!**

# RESULTS – FLOOD HAZARD MAPS

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## FLOOD HAZARD



• % AREA INUNDATION BASED ON MODEL DOMAIN (5.8 KM<sup>2</sup>)



**EVEN THE SMALLEST  
CHANGE MATTERS**

The background is a map of Newcastle upon Tyne. A pink line highlights a route starting from the west, passing through Fawdon, Gosforth, Benton, High Heaton, Jesmond, and ending near the city center. Other labeled areas include Kingston Park, Fawdon, Gosforth, Benton, High Heaton, Jesmond, Brandling Village, Heaton, Fenham, Spital Tongues, Newcastle upon Tyne, Battle Field, Walker, Walkerville, and Wallington. Road numbers like B1305, B1312, B1313, and A187 are also visible.