KEEPING OUR RIVERS FLOWING

SUMMIT HOSTED BY

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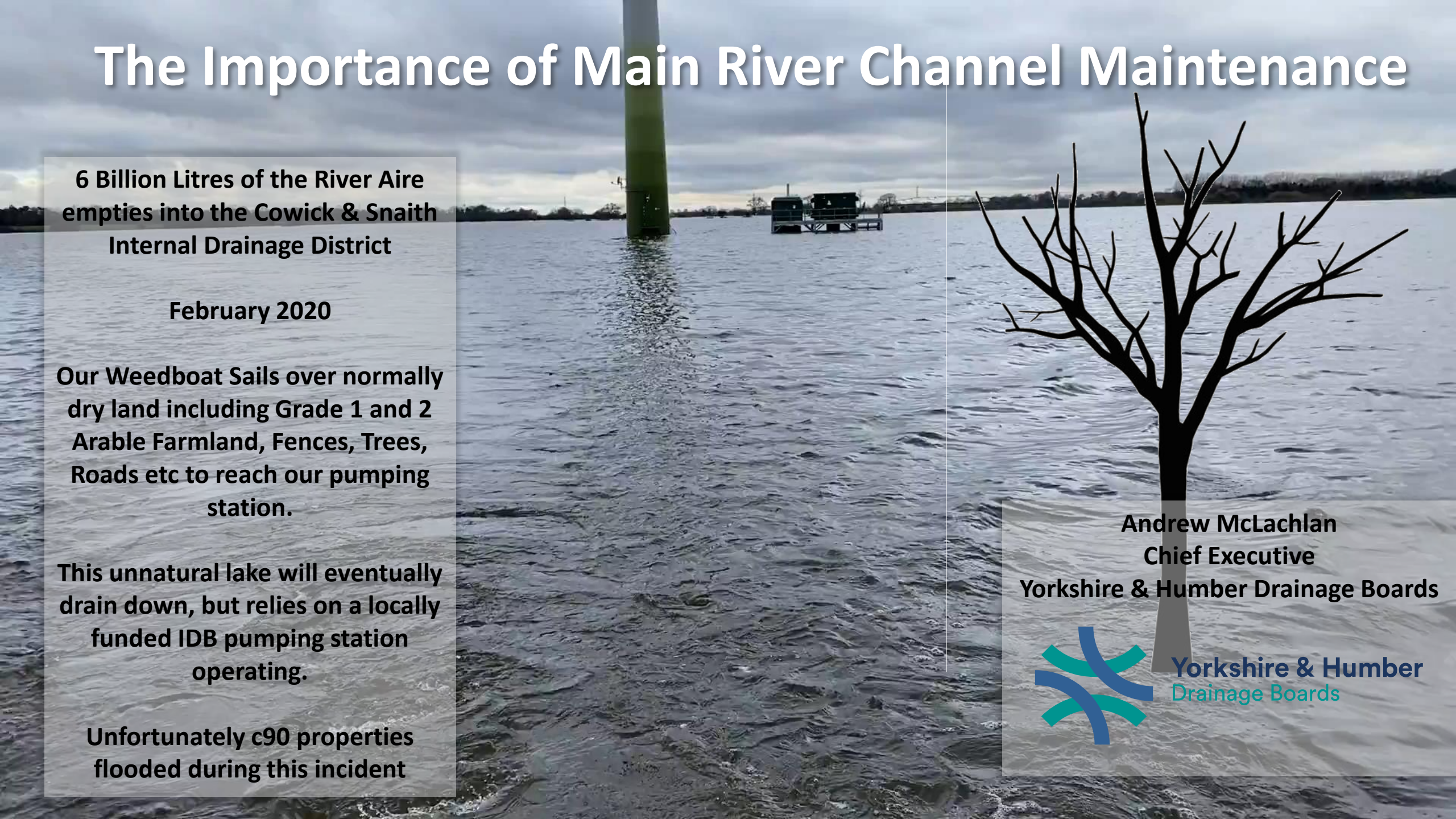
CLA

Yorkshire & Humber Drainage Boards

Sustainability Through Maintenance

The Importance of Main River Channel Maintenance



6 Billion Litres of the River Aire empties into the Cowick & Snaith Internal Drainage District

February 2020

Our Weedboat Sails over normally dry land including Grade 1 and 2 Arable Farmland, Fences, Trees, Roads etc to reach our pumping station.

This unnatural lake will eventually drain down, but relies on a locally funded IDB pumping station operating.

Unfortunately c90 properties flooded during this incident

Andrew McLachlan
Chief Executive
Yorkshire & Humber Drainage Boards

Yorkshire & Humber
Drainage Boards

Definitions

Catchment = The act of collecting water

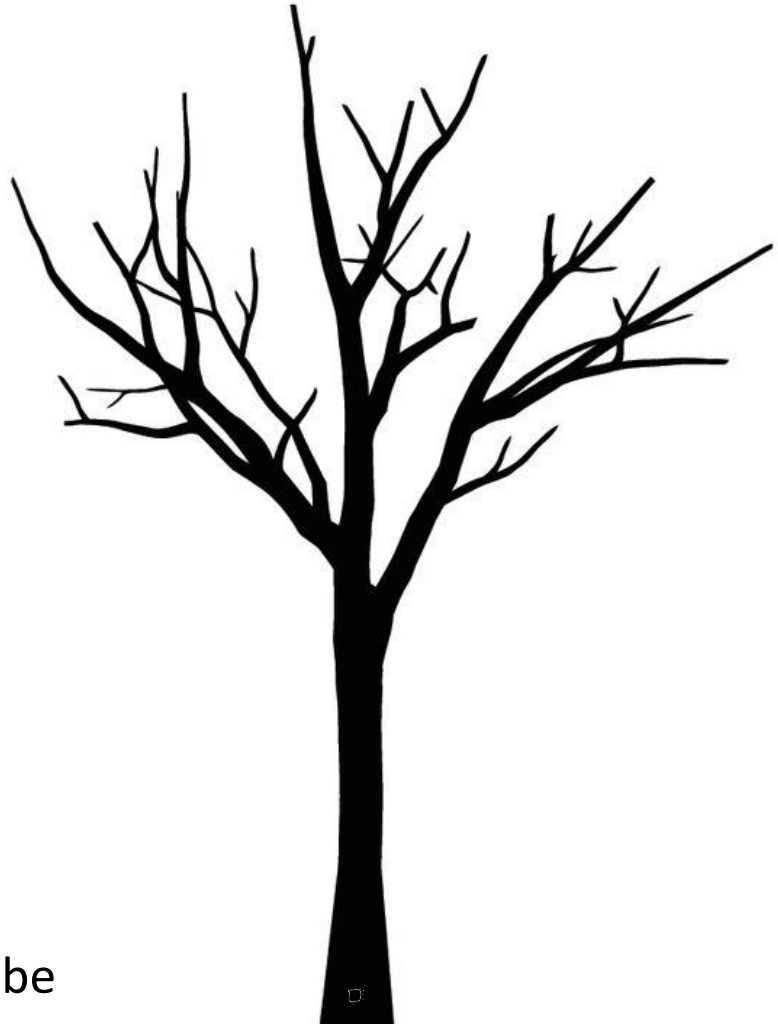
Dendritic = Branched form

Fluvial = Relating to river processes

System = A set of things that work together

Maintenance = The process of keeping something in good condition

Flooding = Water above ground level where it would not normally be



Perfect Catchment Management

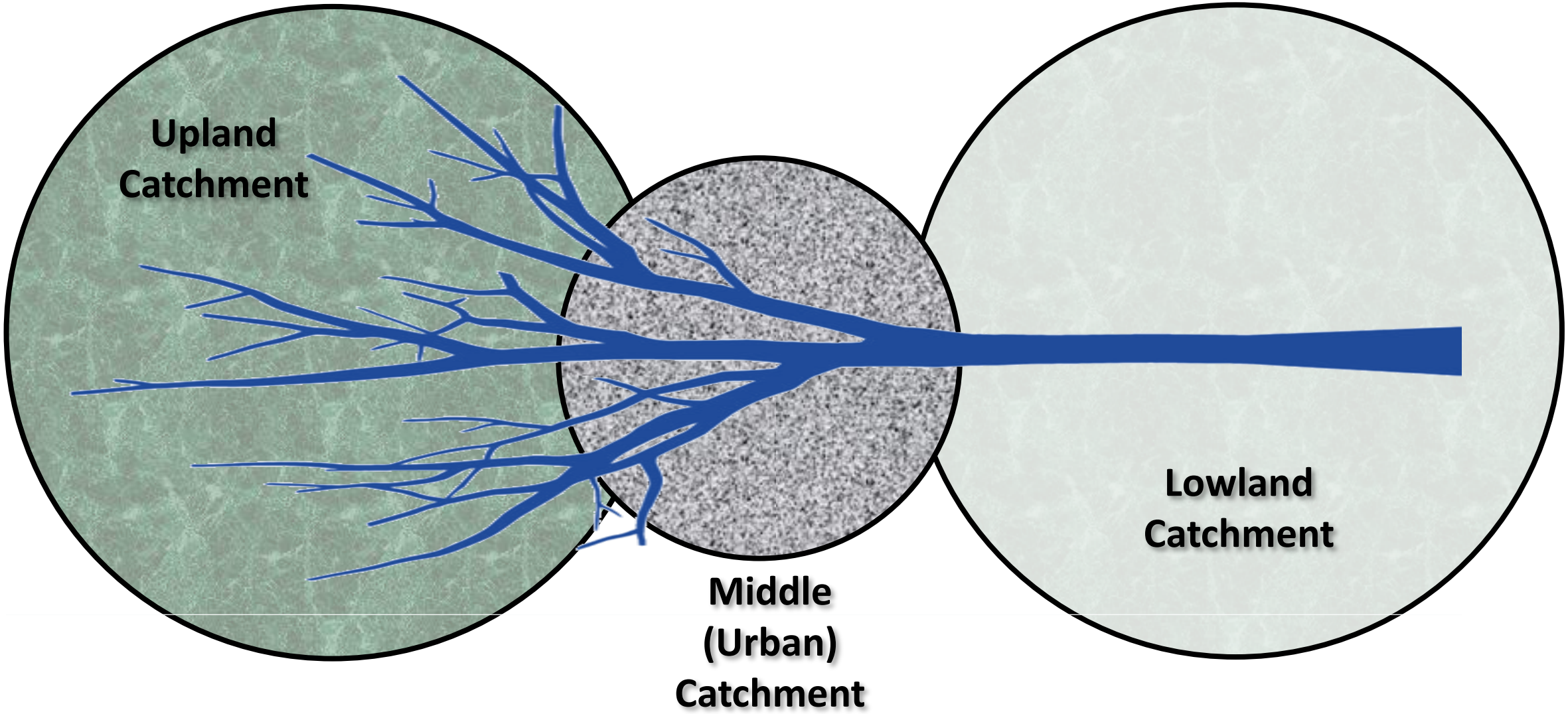
Maintaining a dendritic fluvial system so that it does not cause flooding

Achievable Catchment Management

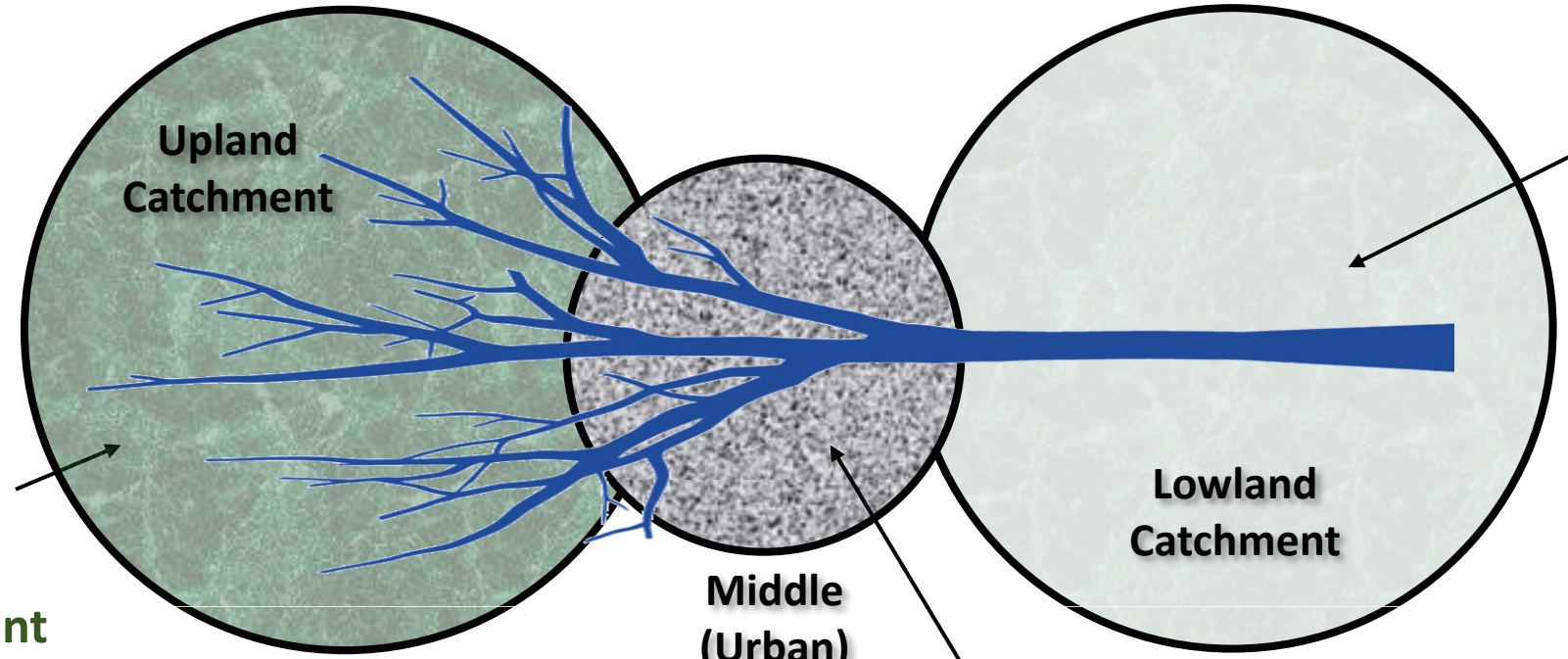
Maintaining a dendritic fluvial system using the resources we have to reduce the risk of flooding

Poor Catchment Management

Not maintaining a dendritic fluvial system using the resources we have to reduce the risk of flooding


Upland
Catchment
Middle
(Urban)
Catchment
Lowland
Catchment

3 Necessary and Achievable Measures



Natural Flood Management (NFM)

Poor historic performance, lots of positive recent interest and activity. Requires improvement.

Channel Maintenance and Conveyance (CMC)

Very good historic performance, very poor recent performance. Requires significant and very urgent improvement.

Sustainable Drainage Systems (SuDS)

Non existent historic practices, very good recent performance and standards. Requires robust and continuing spatial planning strategies and legislation to continue being effective.

Local Drainage and Flood Risk Assets Rely on Free Discharge to River

Low or No Gradient

Tidally Influenced

Communities Below River Water Level

Heavily Modified or Entirely Artificial Rivers

Pumping Stations

Higher Ground

High Level Carrier Systems (Raised Banks)

Infrastructure and Industry Below Water Level

Ground Levels often Below Maximum High Tide Level (5m or Less)

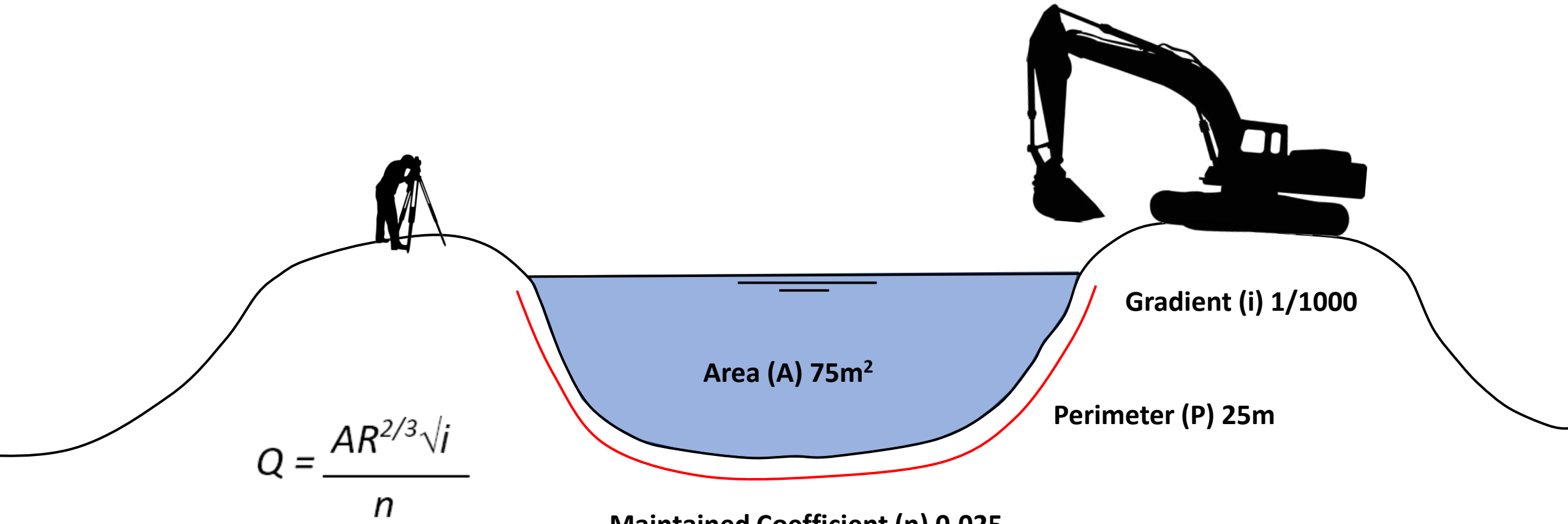
Lowland Catchment Characteristics

Channel Conveyance and Maintenance

Maintained Main River Channel (Simple Model using Manning's Equation)

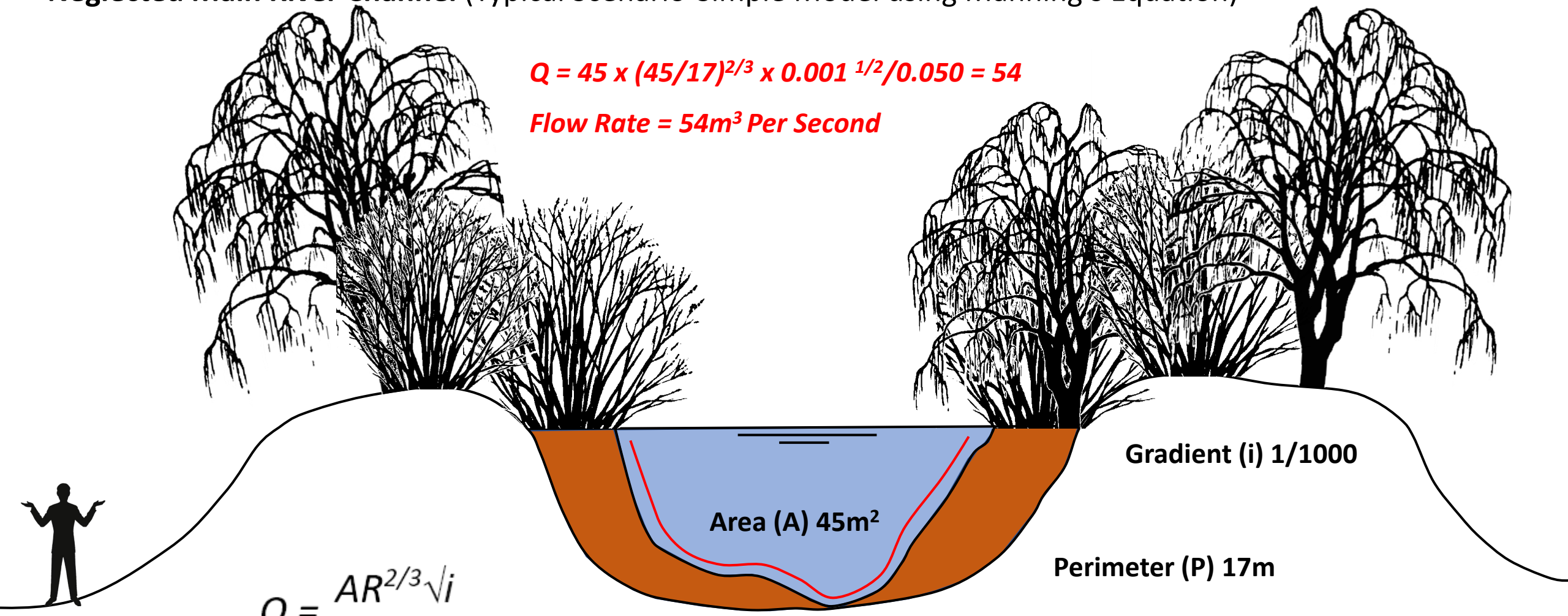
$$Q = 75 \times (75/25)^{2/3} \times 0.001^{1/2} / 0.025 = 197$$

Flow Rate = 197m³ Per Second



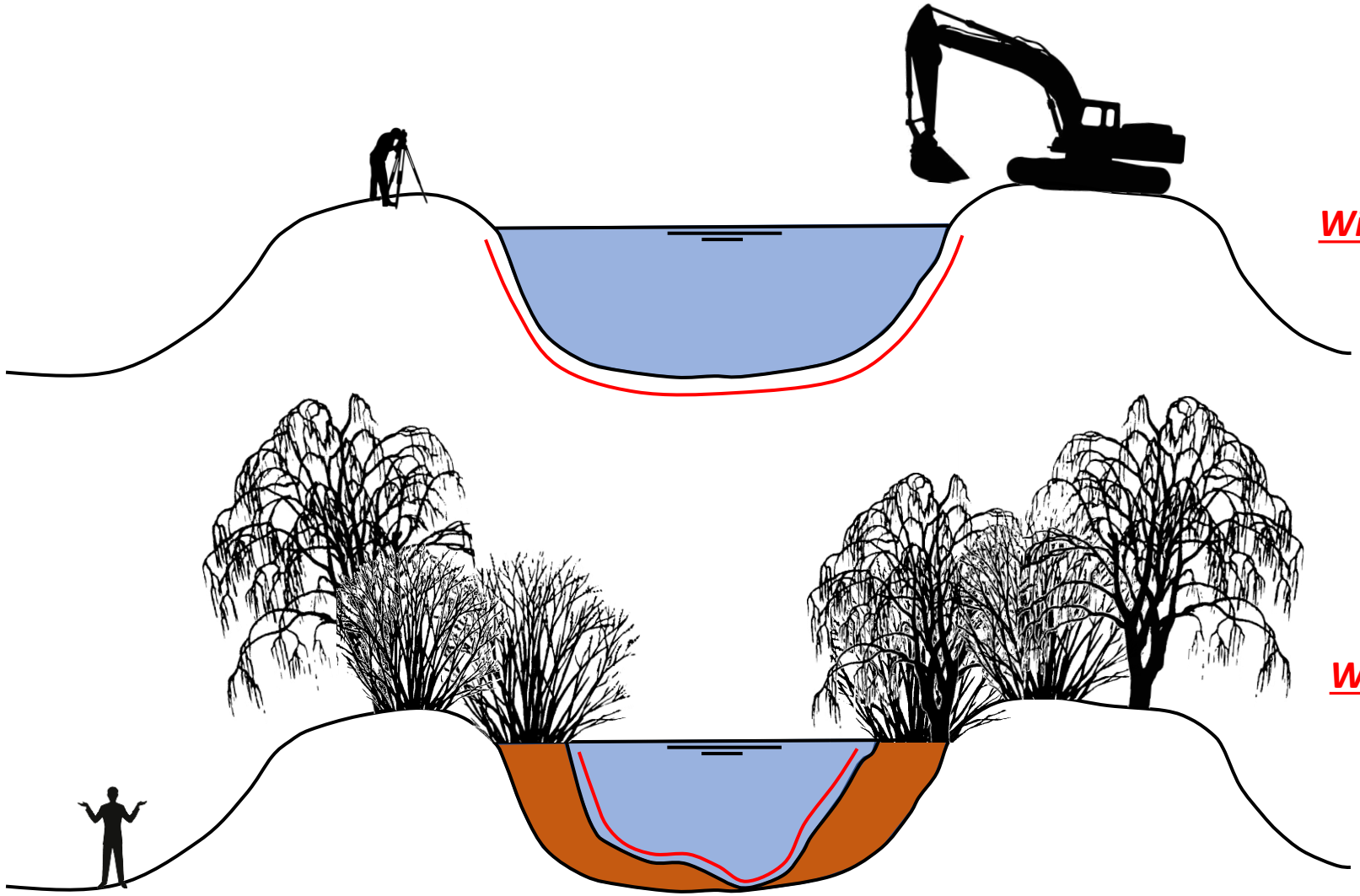
Channel Conveyance and Maintenance

Neglected Main River Channel (Typical Scenario-Simple Model using Manning's Equation)



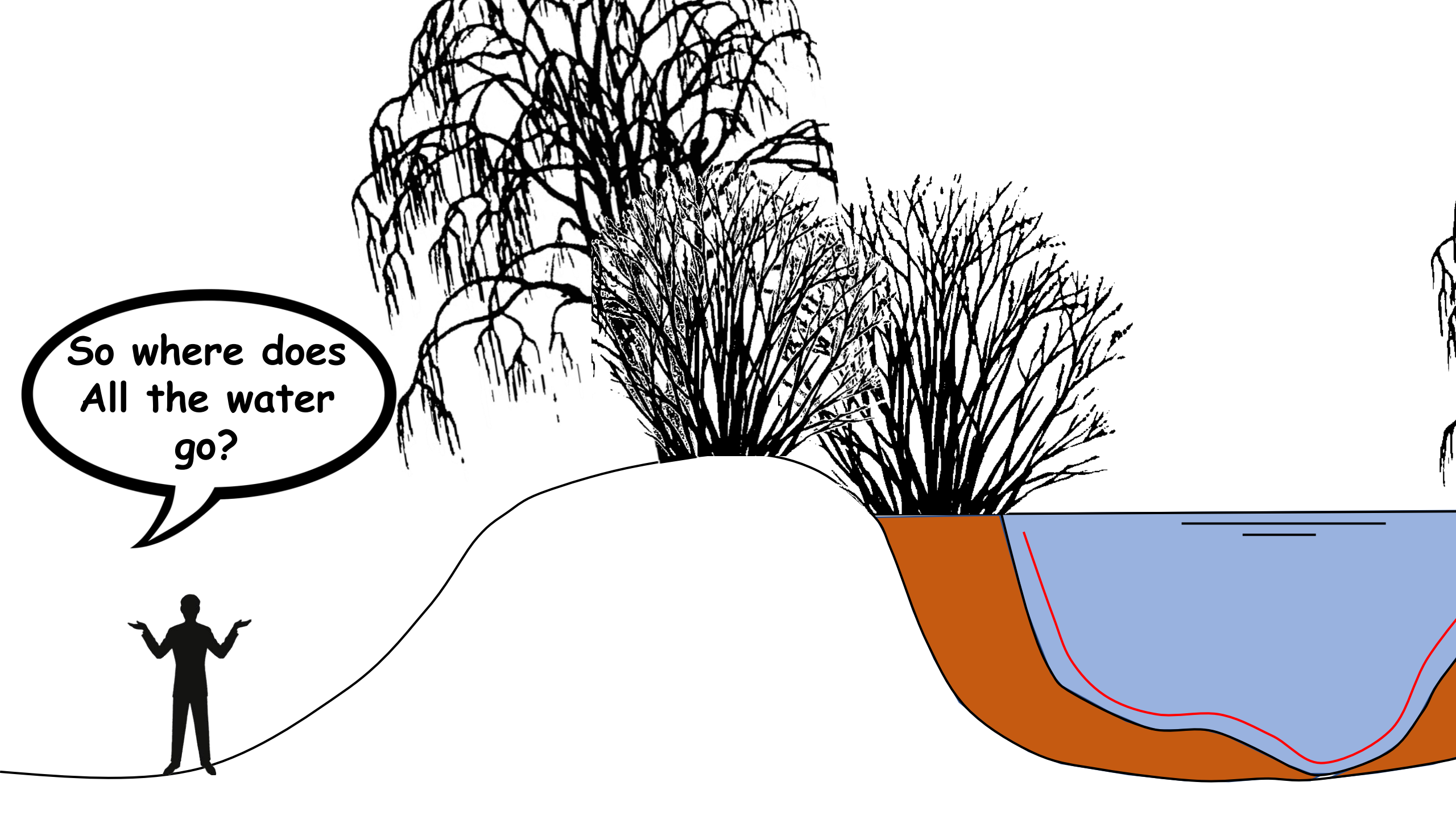
$$Q = \frac{AR^{2/3}\sqrt{i}}{n}$$

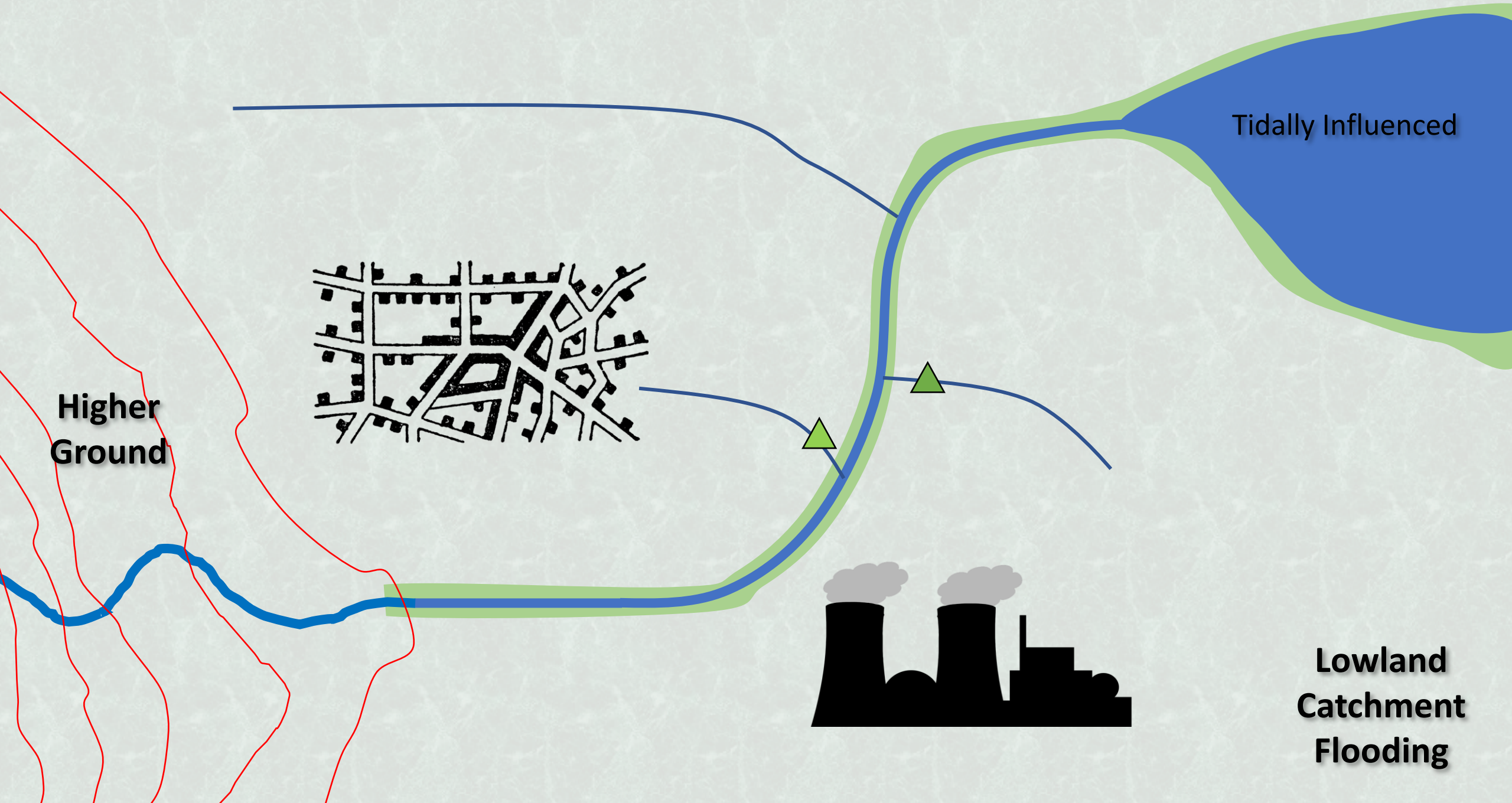
Volume Discharge in 24 Hour Period

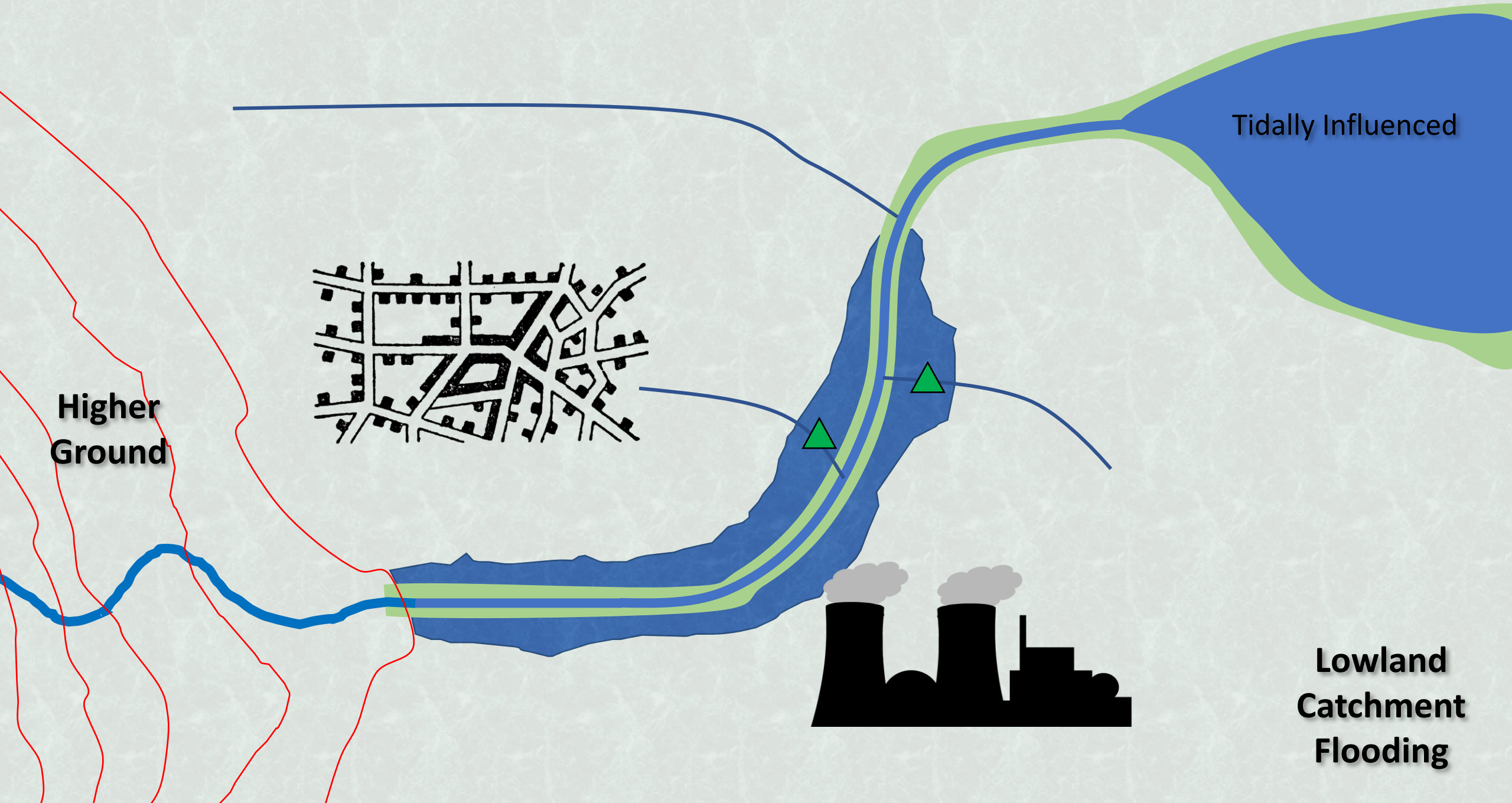


With Maintenance 17 million m^3

Without Maintenance 5 million m^3


So where does All the water go?


Tidally Influenced
Higher Ground
Lowland Catchment Flooding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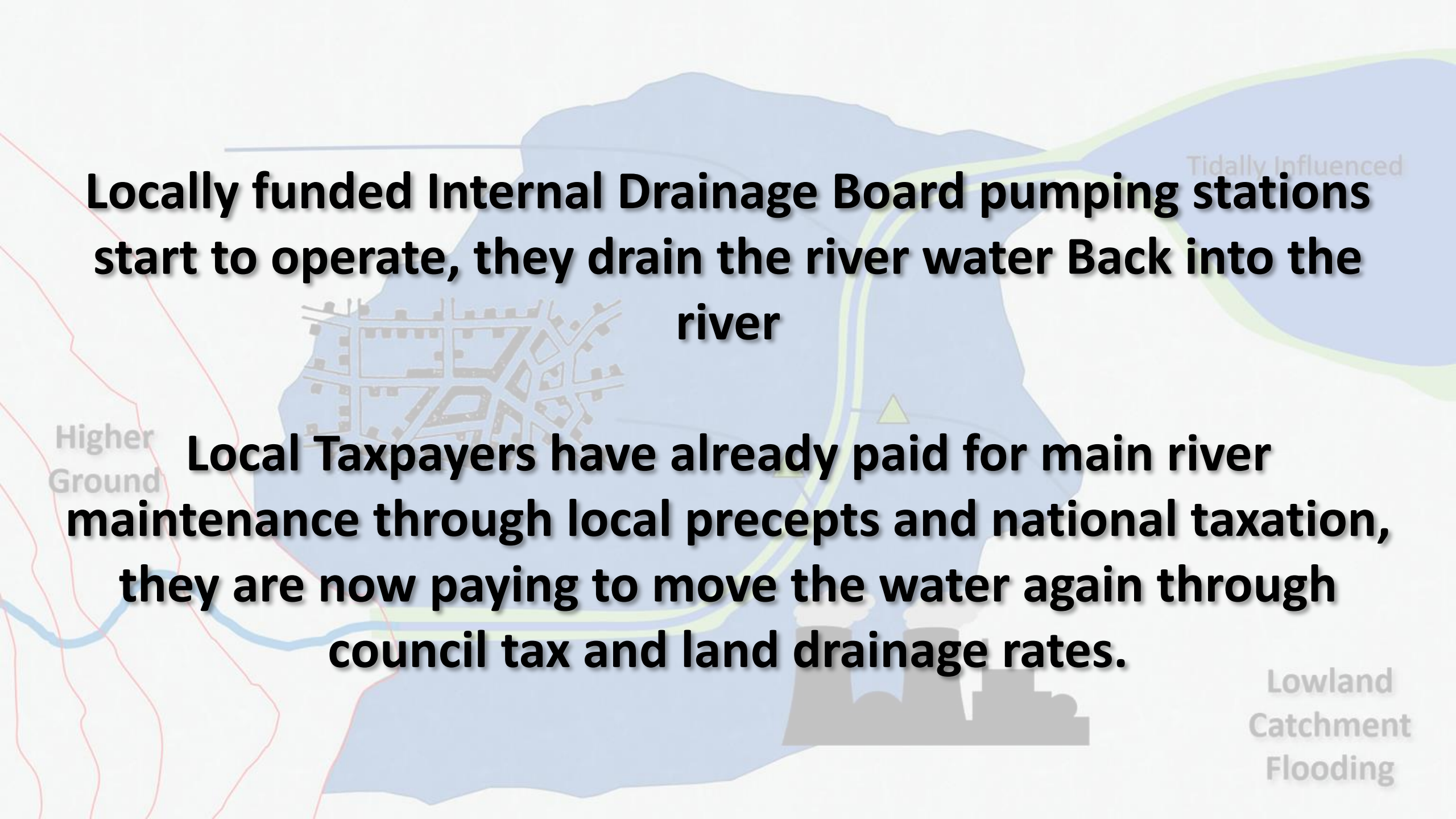
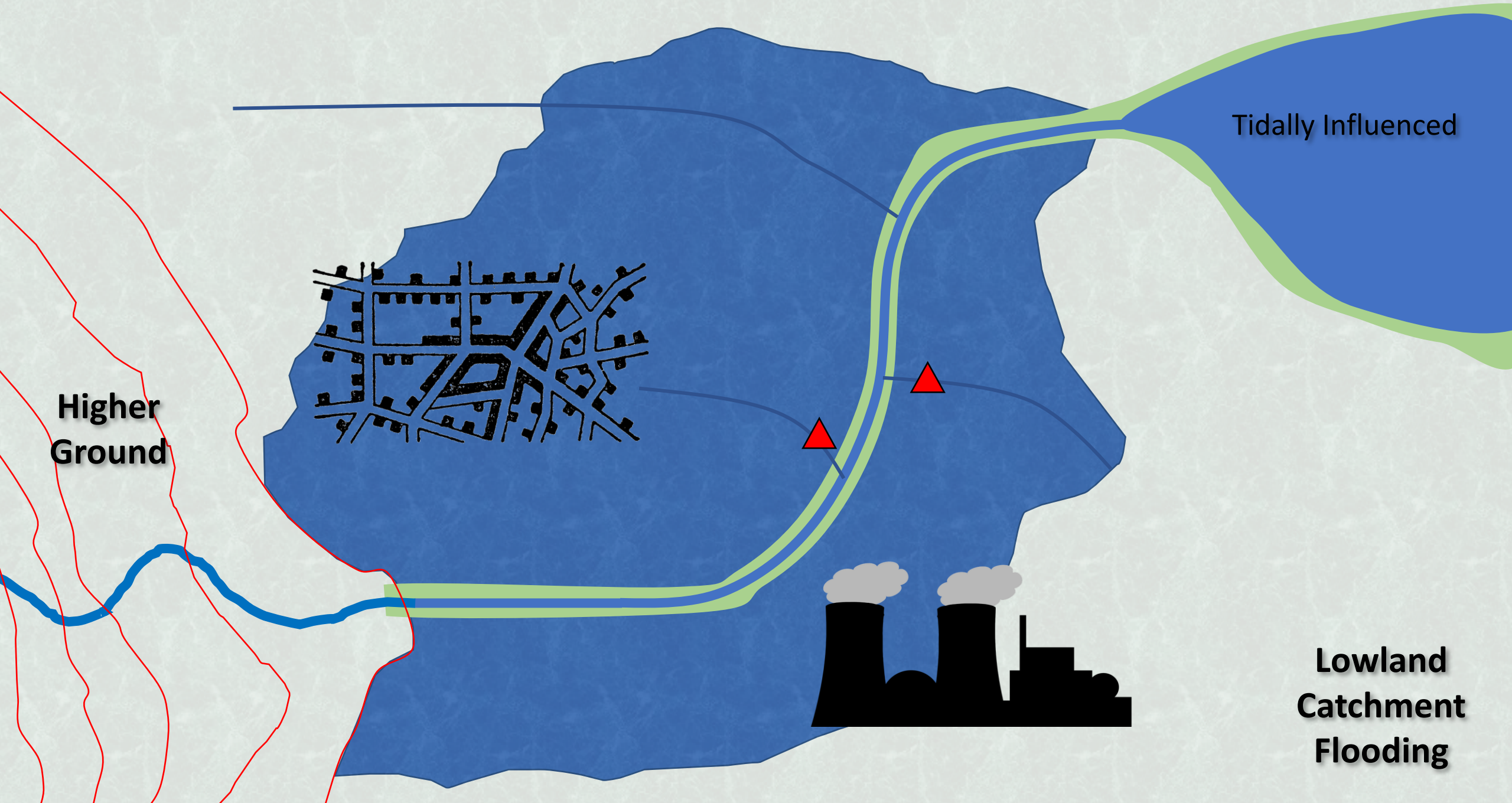


Locally funded Internal Drainage Board pumping stations start to operate, they drain the river water Back into the river

Local Taxpayers have already paid for main river maintenance through local precepts and national taxation, they are now paying to move the water again through council tax and land drainage rates.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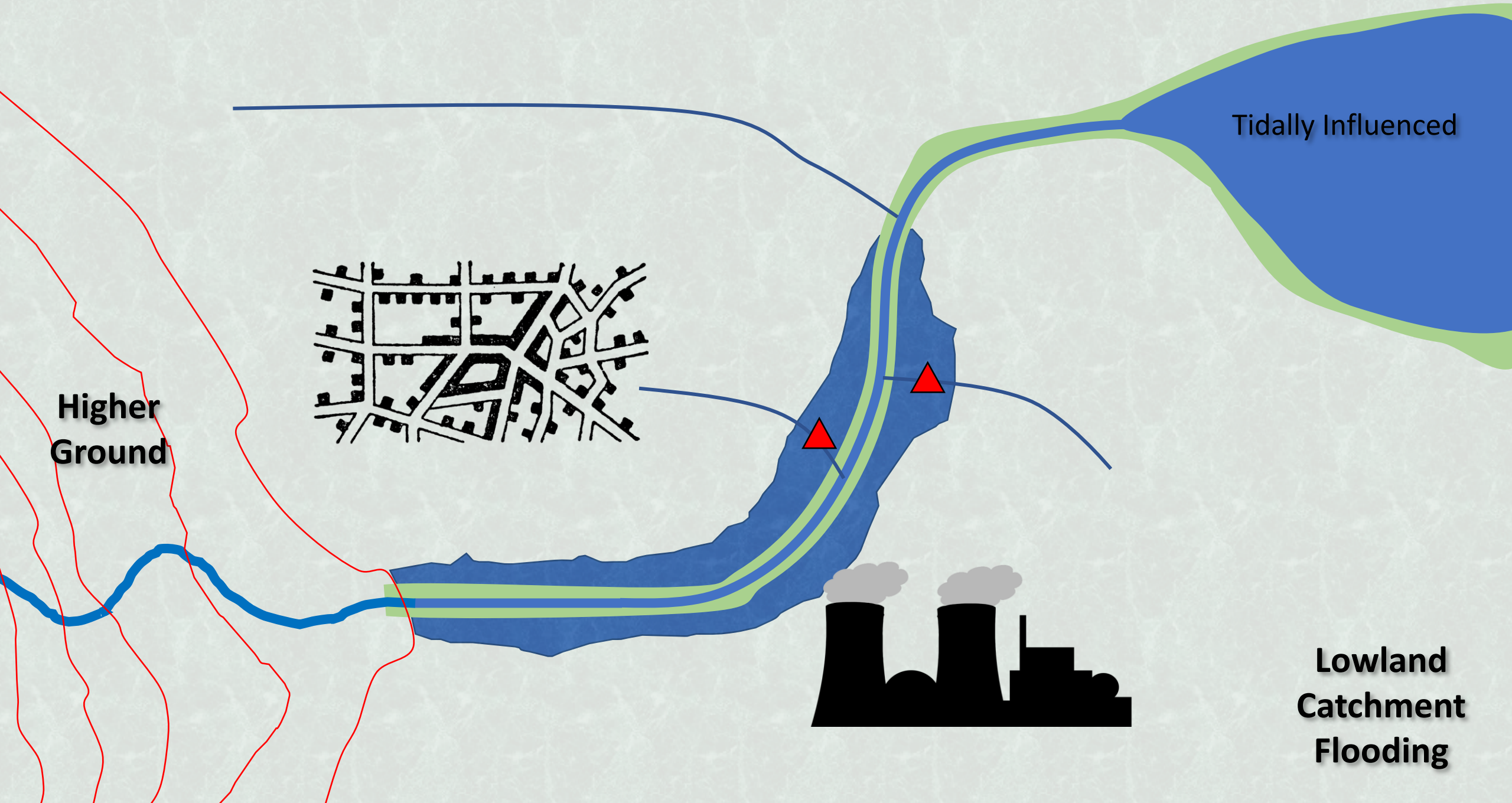
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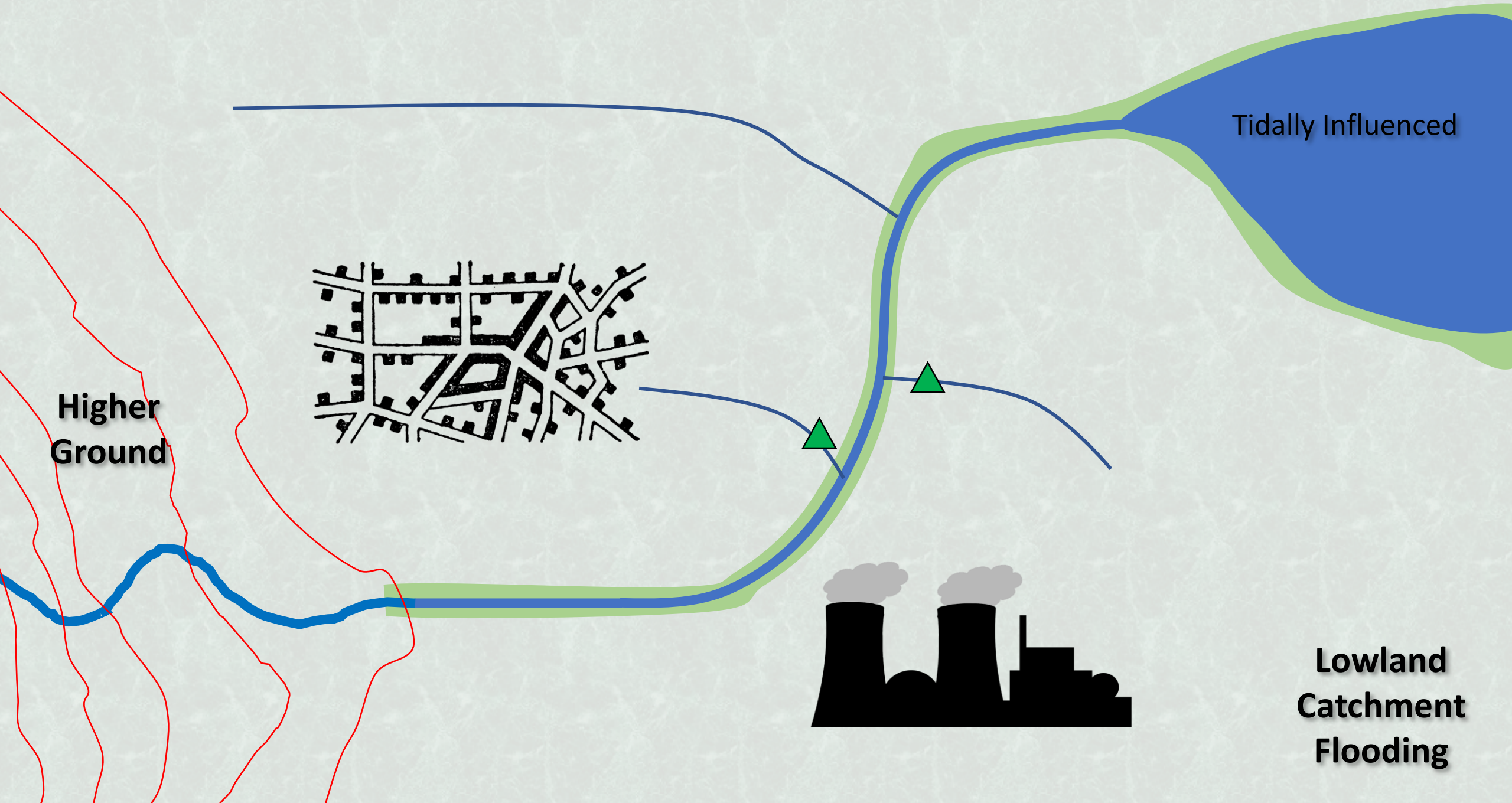
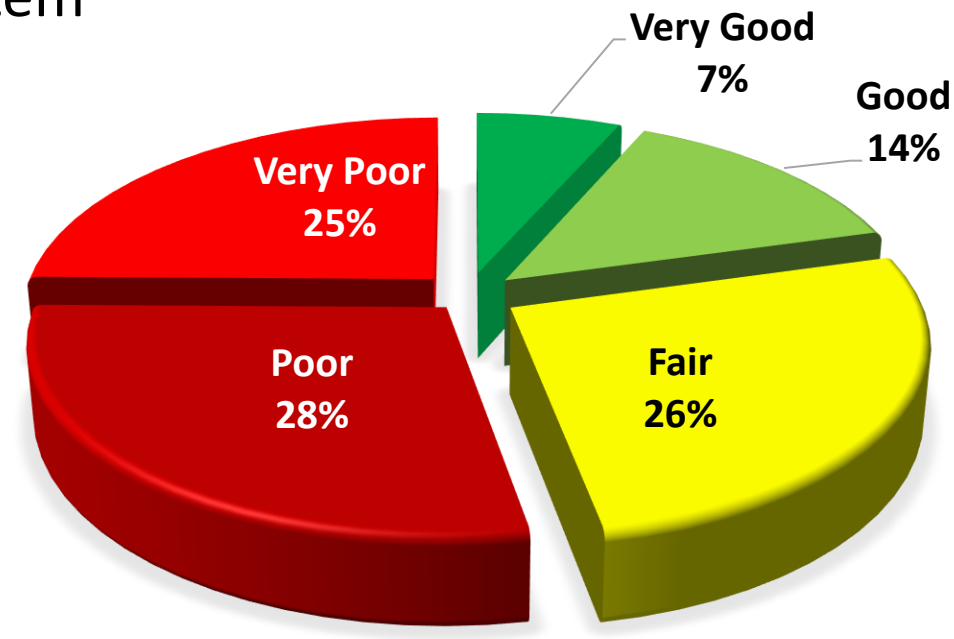

Tidally Influenced
Higher Ground
Lowland Catchment Flooding

Yorkshire & Humber
Drainage Boards
....an evidence based organisation

Case Study – River Went (Main River)

- Heavily Modified & Entirely Artificial System
- Highland Carrier
- Walkover Survey using EA Condition Classification System
- 122 Detailed Survey Points
- Half the River found in Poor or Very Poor Condition
- £22 per metre (average) paid in Last Decade (Precept)
- No apparent channel maintenance
- Regular flooding in low order events



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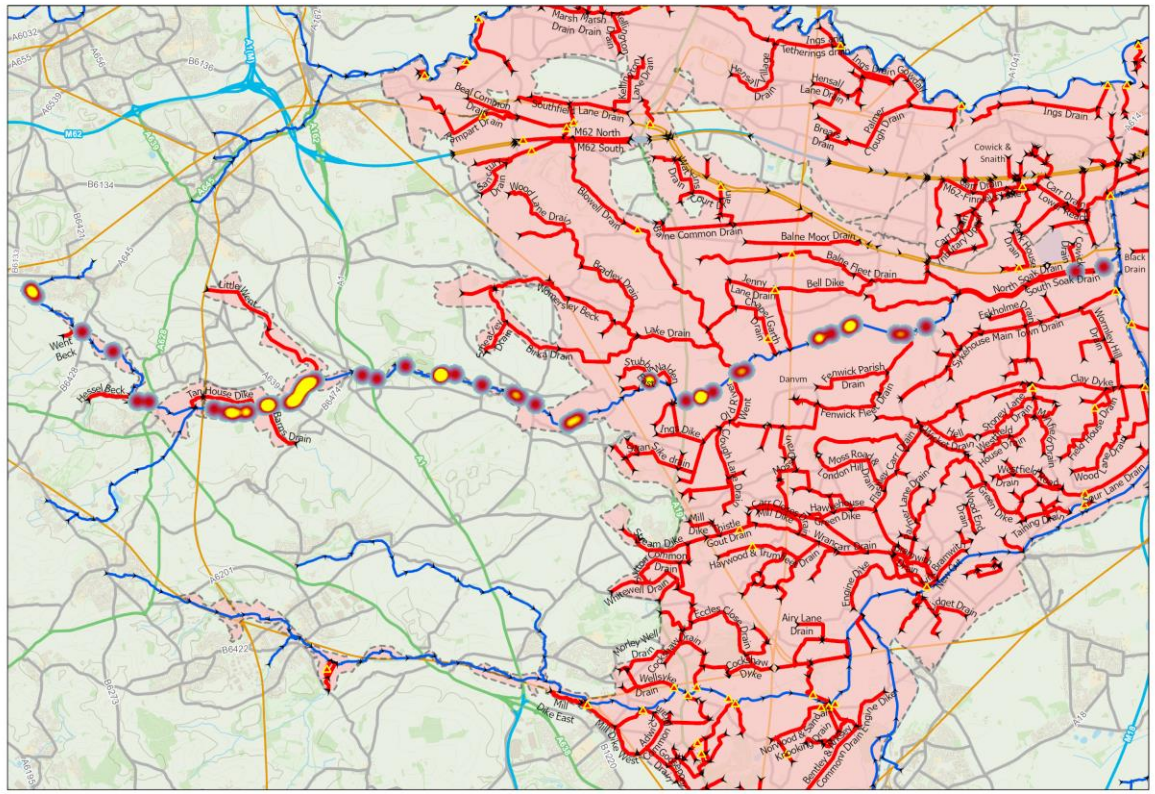
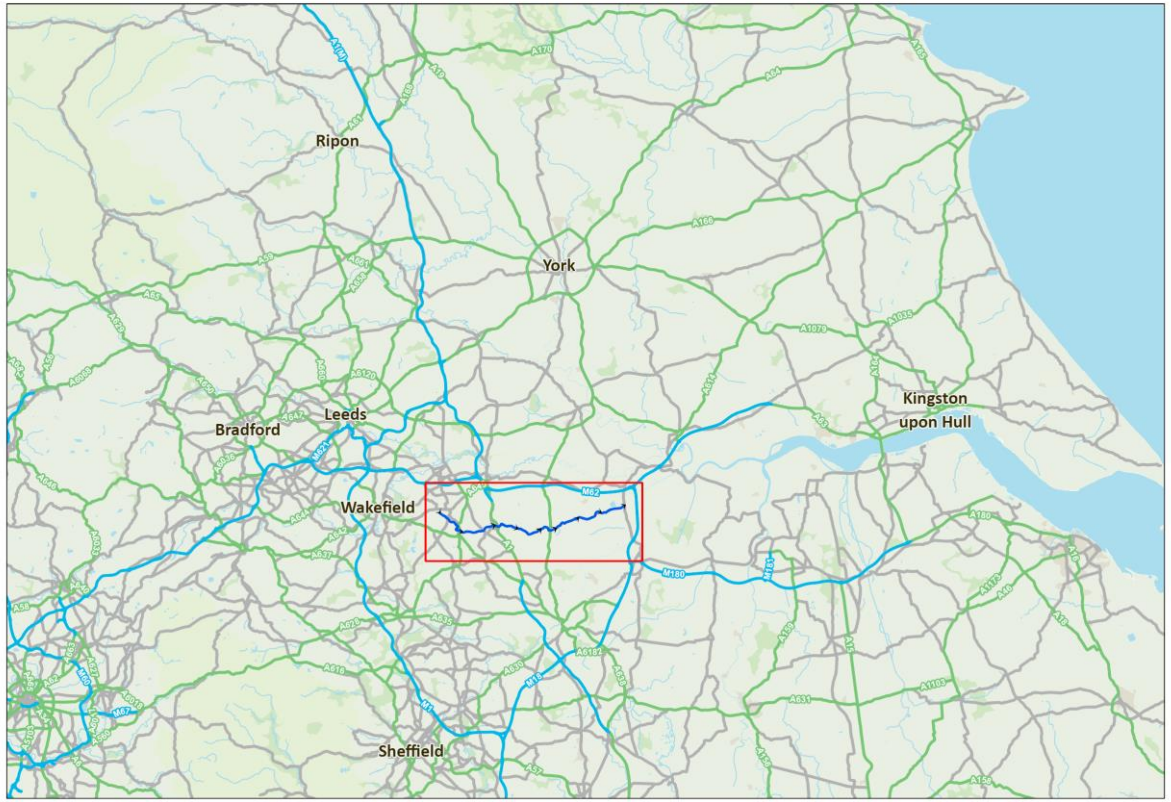
Case Study – River Went (Poor & Very Poor Heatmap)





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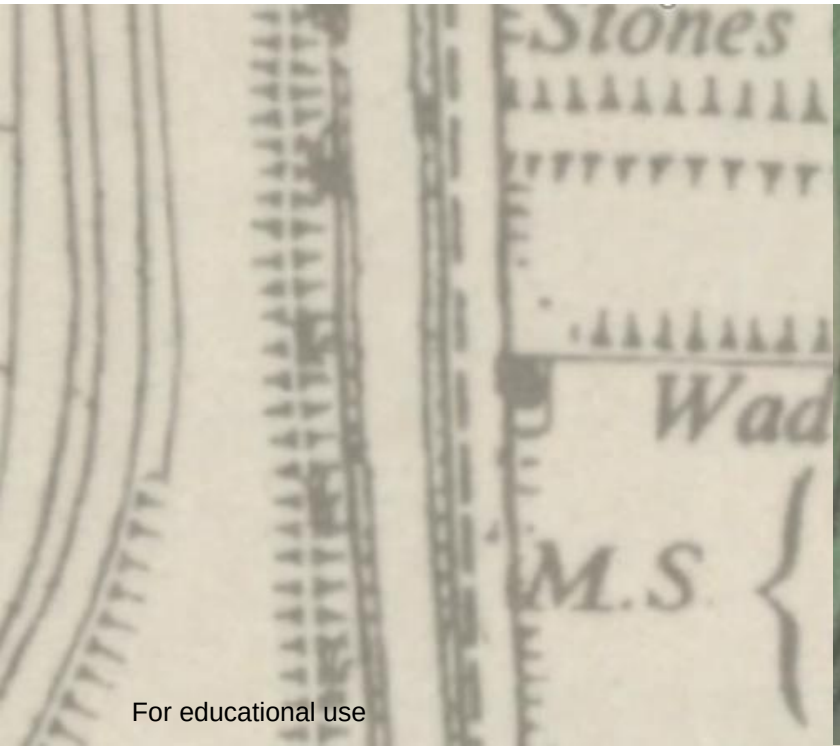
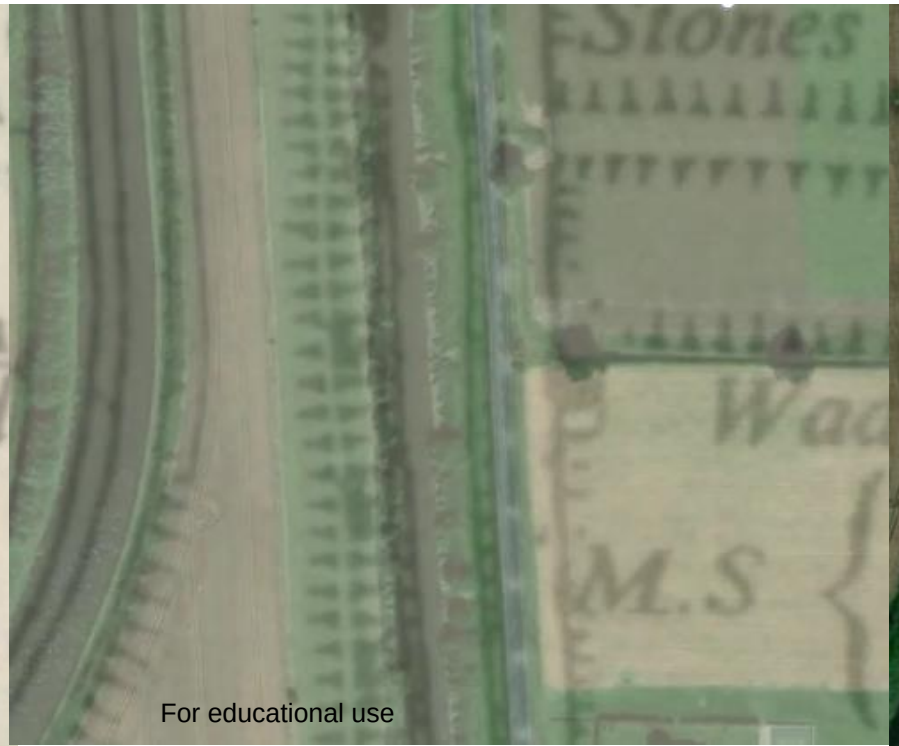
Case Study – River Don (Main River)





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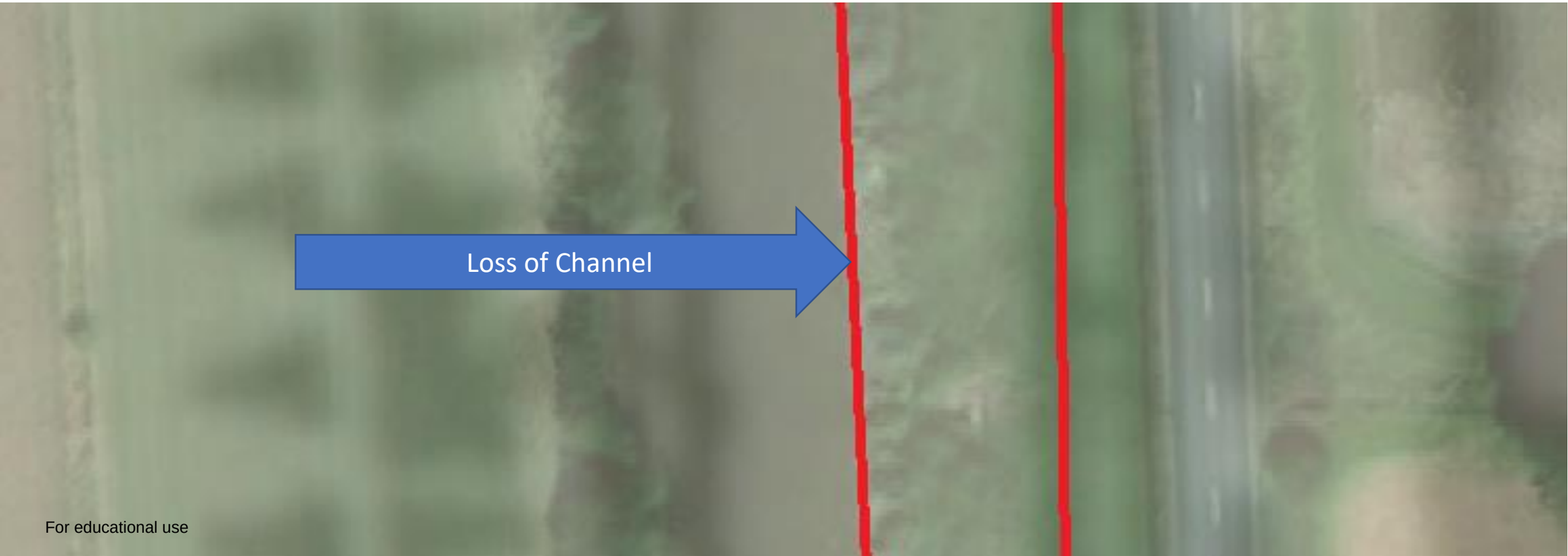
Case Study – River Don (Main River)



Actions Needed

Urgent Action Required to restore Main River channels to design profiles

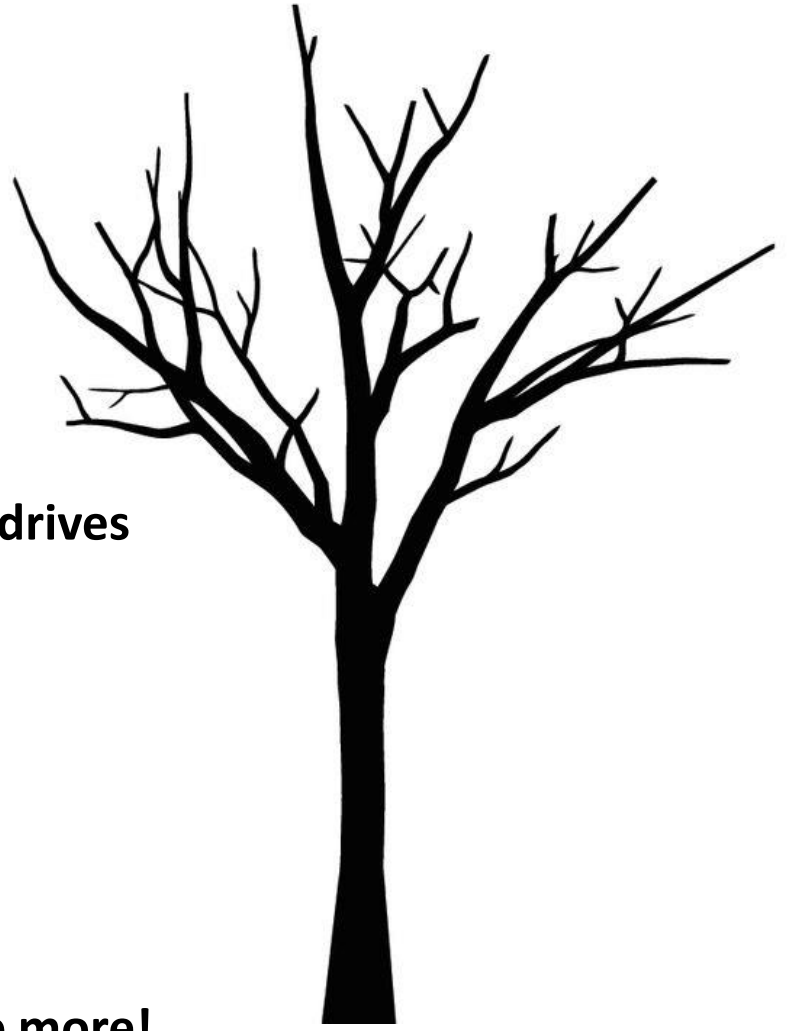
Enabling policies - Cut red tape & take a common sense approach

Please, please STOP counting houses when making spending decisions. This drives the wrong behaviours in Flood Risk Managers

Robust timebound targets for channel maintenance needed

Speed up demainment process for smaller systems, reduce precepts on IDBs

PSCA works well – Very cost effective and legal procurement route – Let's do more!



Conclusions

- **Effective catchment management can be achieved within existing budgets**
- **There a lot of catching up to do to bring systems back to a serviceable condition**
- **Need to recognise that the lower catchment is benefitting the whole catchment**
- **Three necessary and achievable measures are:**

NFM
Natural Flood Management
Upper Catchment

SuDS
Sustainable Drainage Systems
Middle (Urban) Catchment

CMC
Channel Maintenance & Conveyance
Lower Catchment