



# B478 Playhatch Road





# Introduction

- Background / History
- What has been done
- What is proposed
  - Options
  - Funding Opportunities
- Summary





# Background / History

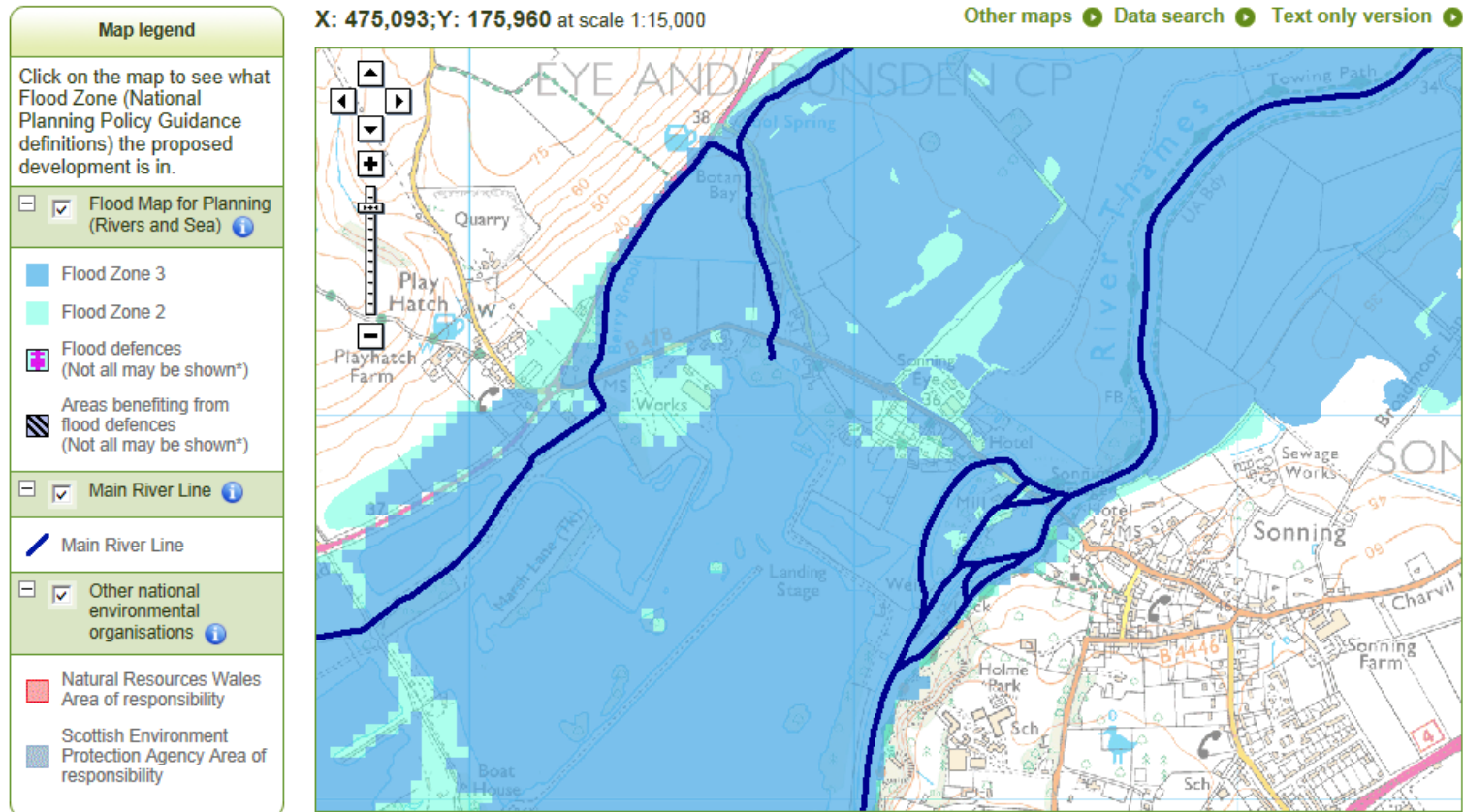
- The road is frequently closed due to flooding and in 2013/14 was closed as a result of severe erosion and scouring to the embankment (single lane 10 months)
- Road is closed due to flooding at 5yr flood events
- Vulnerable to flooding, scour damage and erosion





# Background / History

## Environment Agency Flood Map: 1 in 100 year flood event





# Background / History

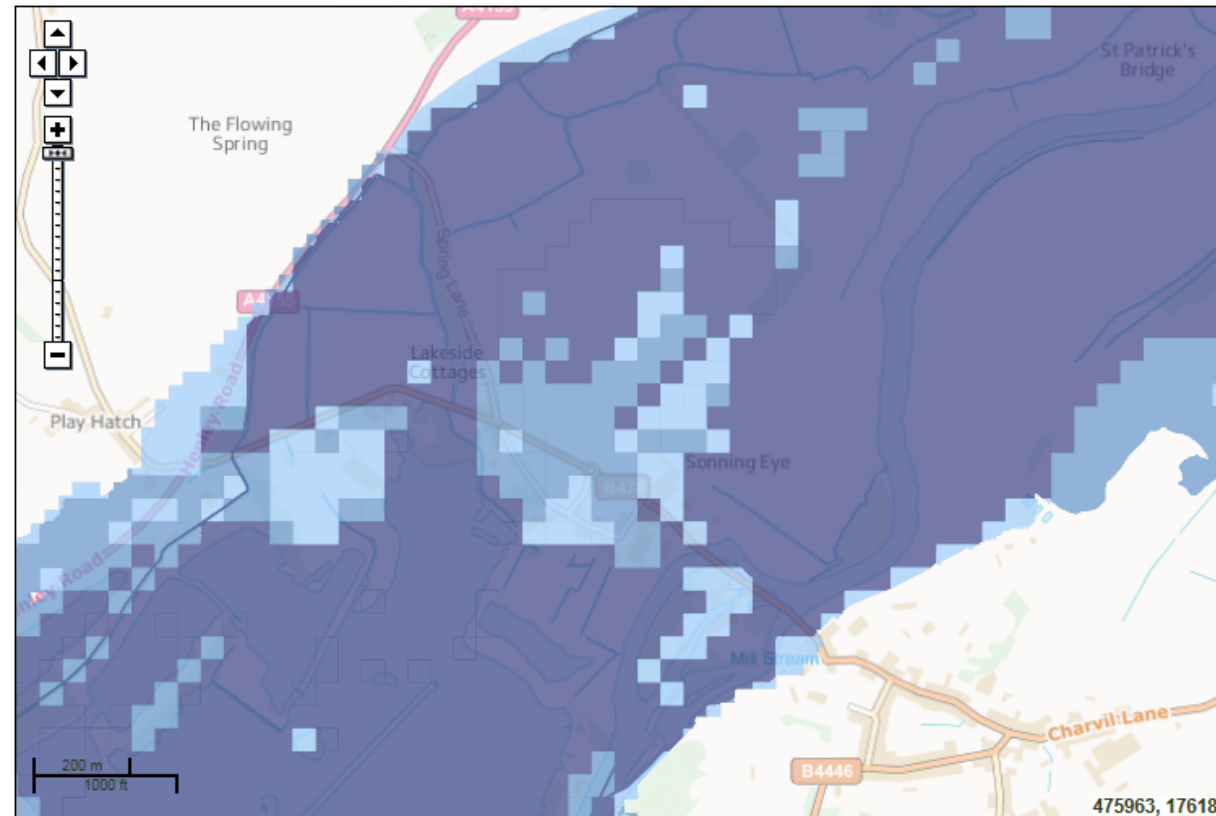
## Environment Agency Flood Map: Risk of Flooding

**Map legend**

- Risk of Flooding from Rivers and Sea
  - High
  - Medium
  - Low
  - Very Low
- Other national environmental organisations
  - Natural Resources Wales Area of responsibility
  - Scottish Environment Protection Agency Area of responsibility

Map of X: 475,168; Y: 176,189 at scale 1:10,000

Data search





# Background / History

## Environment Agency Flood, Risk of Flooding Definition

- **High** - greater than to equal to 1 in 30 (3.3%) chance in any given year
- **Medium** - less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance in any given year
- **Low** - less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year
- **Very Low** - less than 1 in 1,000 (0.1%) chance in any given year





# Playhatch Project Objectives

- Decrease probability of flooding from 20% (1 in 5) to 5% (1 in 20)
- Improve durability of the road
- No increase in flood risk to properties or businesses
- Provide a desirable economic benefit
- Limit construction impact/duration



# What has been done

- Project developed to inform a Business Case suitable to support a funding bid to DfT
  - Economic analysis to determine value and constraints **BCR 3.2**
  - Establish target flood level and undertake modelling
  - Determine detailed options, develop and identify viable solutions





# Economic Analysis

## Method

- Traffic volume and growth established
  - AADT of 13,600 vehicles
- Cost to the economy of the road being unavailable determined
  - Based on previous events
- Current and future employment benefiting identified
- Road safety benefits costed
- Benefits from reduced long-term maintenance
  - Based on costs from recent repairs



# Economic Analysis

## Outcome

- Cost benefit derived over a 40 year period
- Benefit cost ratio (BCR) determined
  - Scheme Benefit Cost / Scheme Capital Cost
  - BCR determined as 3.2, therefore the economic benefits of the scheme outweigh the cost above the DfT limit at 2.5
- Economic constraints determined
  - Maximum Scheme Cost £7.5M
  - Maximum timescale approximately 12 weeks



# Flood Modelling

## Method

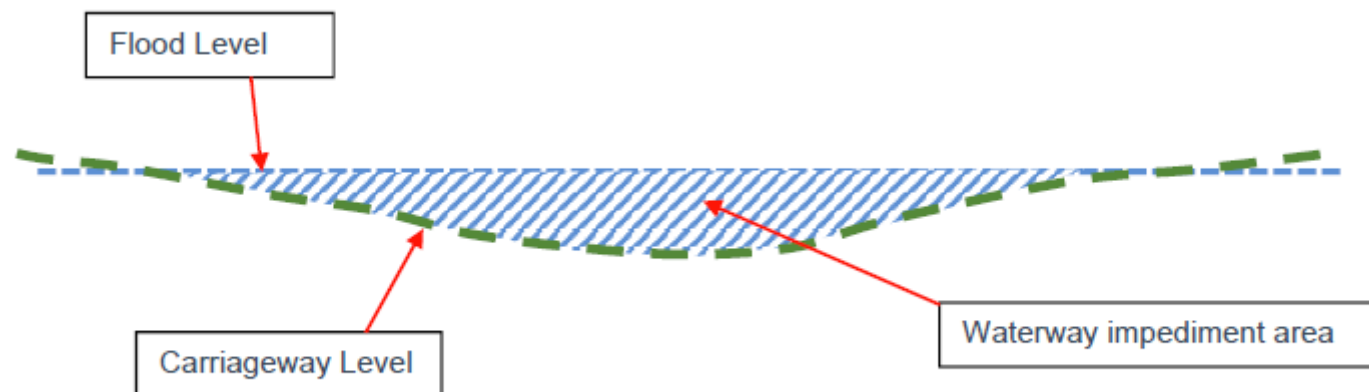
- Flood model (Jacobs 2011 ISIS-TUFLOW) base-line re-run to establish flood levels for 1:5 and 1:20 year scenarios.
  - The target flood level based on the 1:20 year return period plus a 25% climate change allowance
  - Making the target level 36.22m AOD.
- 36.22m AOD has been used to determine the minimum carriageway level for Playhatch road.
  - At its lowest point the carriageway level needs to be raised by some 800mm.



# Flood Modelling

## Impediment to Waterway

- 3D model developed of existing topography
- The longitudinal profile of the existing road has been compared to the target flood level 36.22AOD
- Theoretical waterway impediment area calculated as 202m<sup>2</sup>
- Used to calculate the number of pipes/culverts under the road





# Options

## Development of Options

Determination of target flood level above Ordnance Datum for 1:20 year return period



Calculation of impediment to waterway area if carriageway raised to target level



Calculation of pipe/culvert sizes to replace impeded water way area



Develop preferred option to facilitate hydraulic modelling





# Options

## Options Considered

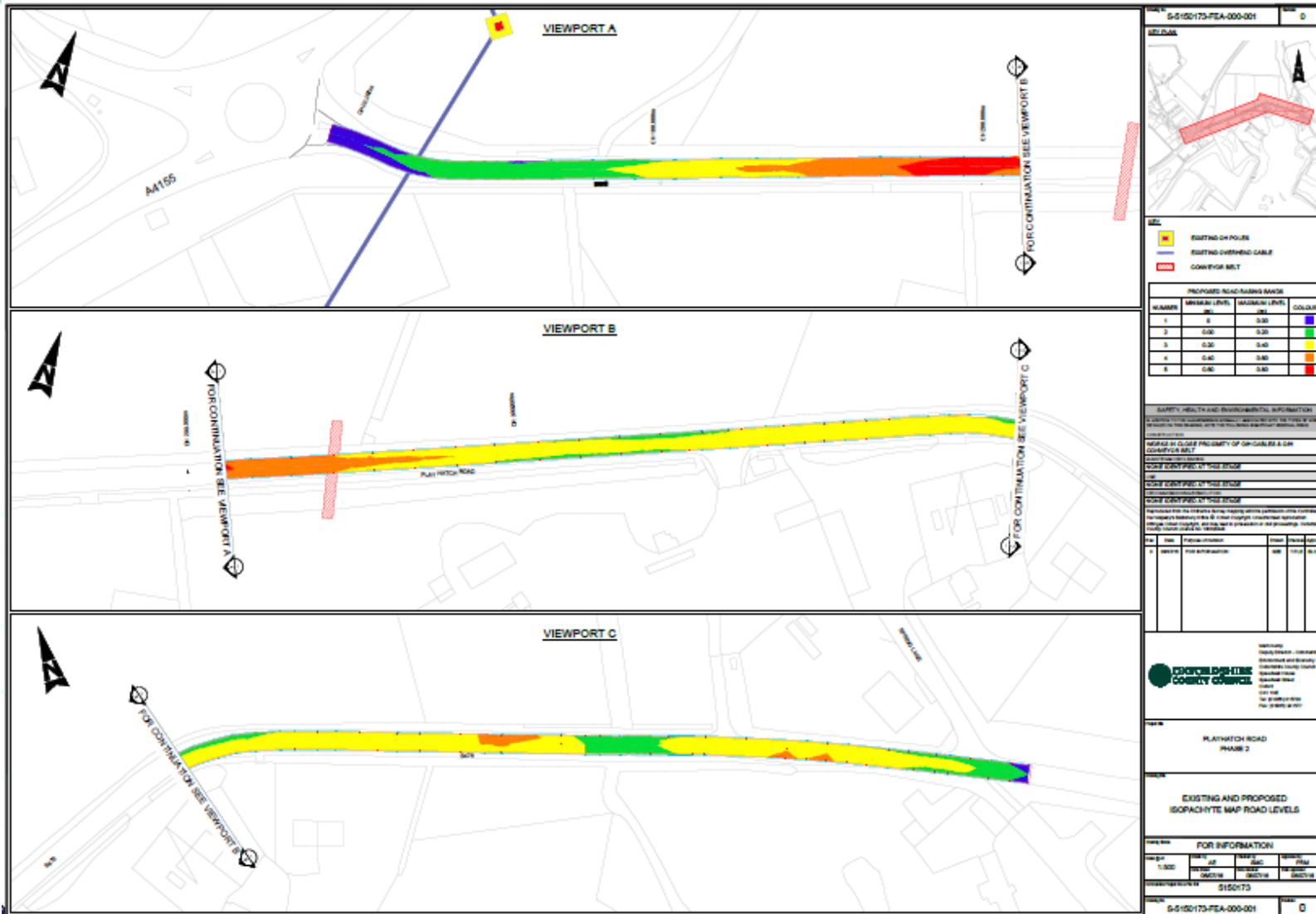
- **Option 1** - Series of 900mm diameter pipes with an upstream chamber
- **Option 2** - Upstream weir and series of dropped culvert
- **Option 3** - Series of box culverts at low points

With respect to Option 2 and 3

At the low point 14 no box culverts with a clear waterway of 3300mm X 1500mm are proposed and 54 box culverts with a clear waterway of 3300mm X 750mm are proposed .

The final option selection from the preferred options listed above would be made on the basis of the flood modelling.

# Options – comparison of road levels







# Options

## Construction Issues

- Construction would require full or partial road closures over approximately 3 months.
- It is envisaged that each precast concrete box culvert could be installed and resurfaced in 3 days.
- There is a potential to install 2 culverts simultaneously by using both ends of Playhatch road for works access.
- Water main and underground electric cable may require diversion to implement the works.



# Funding

## Business Case

- To be completed Autumn 2016 then subject to approval by OCC Cabinet member.
- Department for Transport (DfT) 'Challenge Funding' is a potential source.
- Challenge Fund is a competitive bidding process and the business case is evaluated on its merits
- Challenge Fund must be spent in three years and would be available from April 2017 to 2020.
- There are no guarantees that OCC's submission to the DfT would be successful

If unsuccessful other funding options would need to be sought.





# Summary

## Objectives

- Climate change effects included in modelling work.
- Flood modelling to have no impact on upstream flood levels.
- No increase in flood risk to the surrounding area.

## Actions

- Business case to be completed Autumn 2016
- Economic case completed
- Options identified
- Flood modelling of options in progress
- Coordination with Environment Agency
- Business Case to be submitted for DfT Challenge Funding



# Any Questions

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