

St. Asaph November 2012 Floods

Data Report – KS4/5

Introduction

The data contained within this document is the raw data which was used by NRW to identify and evaluate the risk of flooding during the November 2012 floods in St. Asaph. The data is displayed:

- In its original format so that learners can plot the data themselves. Numbers can be rounded to the nearest whole number to help students interpret the data if required.
- As graphs for students to interrogate and interpret. Data from 2013 is included so that pupils can compare and contrast the data.

For further information and data please visit [NRW's River Levels Online webpage](#), where data on Welsh river levels can be obtained along with live flood risk levels around Wales.

Data collection background

River Levels

Telling people that a flood may happen or that a flood is about to happen is vital as it gives those concerned time to prepare. To be able to monitor river levels and forecast floods, Natural Resources Wales has two river measuring stations along the Afon Elwy in the River Clwyd catchment.

Pont y Gwyddel gauging station

Where? Pont y Gwyddel near Llanfair Talhaiarn. Gauging station 66006 on the National River Flow Archive if you want to search for the gauging station's location on their searchable maps: <http://nrfa.ceh.ac.uk/data/search>

Purpose? Data is collected every 15 minutes and the information is sent down the phone line to a computer server so that NRW Officers that are on duty can analyse the data. The information gathered is also available to the public as it is displayed on NRW's 'River Levels Online' [webpage](#).

Notes: The Afon Aled, which is managed for water abstractions by Dwr Cymru, joins the Afon Elwy 750 metres upstream of the measuring station. At Pont y Gwyddel the River Elwy has a width of 15 metres.

St.Asaph gauging station

Where? In the river below the A55 dual carriageway in St. Asaph. A kiosk is situated nearby to control the measuring station.

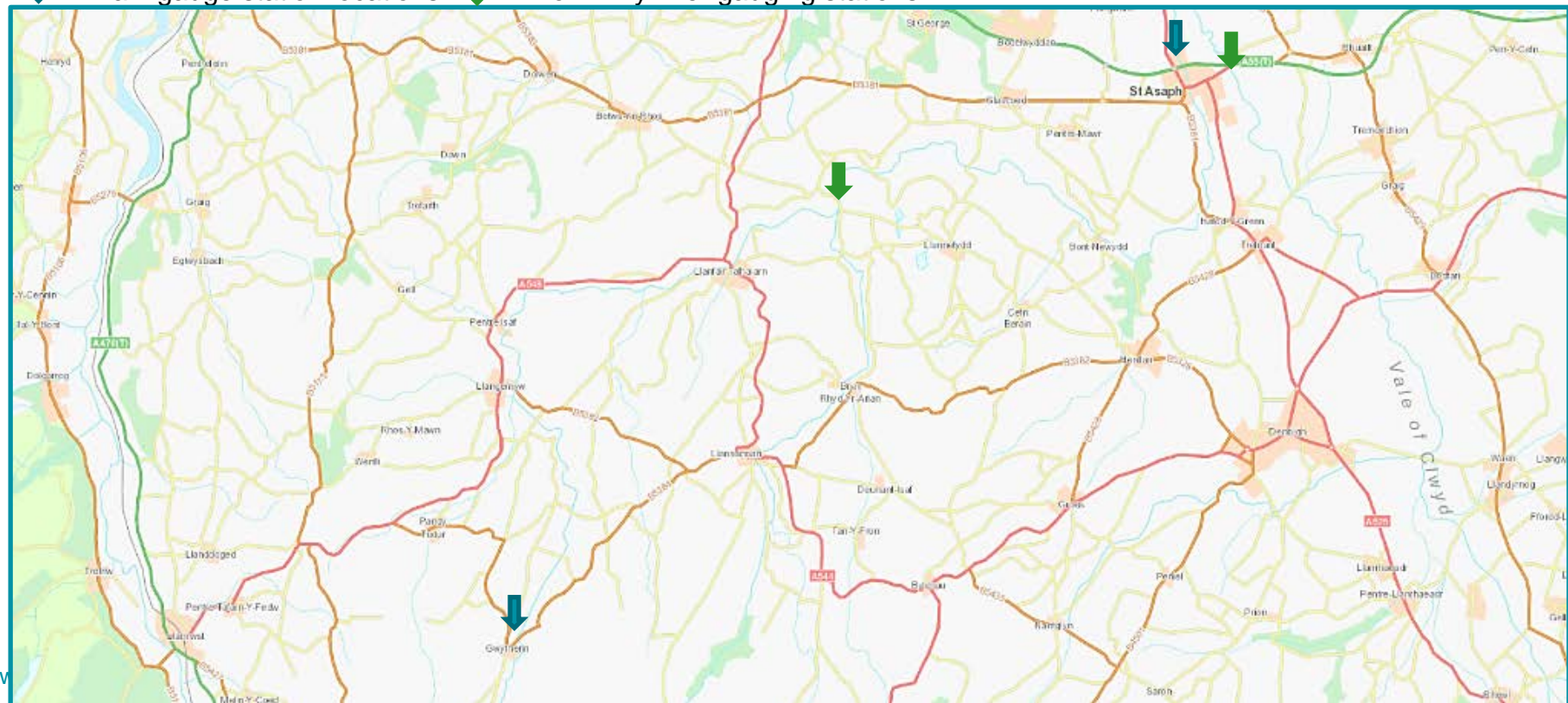
Purpose? To monitor river levels at the city in case of flooding in the area. Data is collected every 15 minutes and the information is sent down the phone line to a computer server so that NRW Officers that are on duty can analyse the data. The information gathered is also available to the public as it is displayed on [NRW's River Levels Online webpage](#).

Rain Gauges

Natural Resources Wales has two rain gauges within the Afon Elwy catchment. The first is in the uplands of the river's catchment at Gwytherin with the second based in St.Asaph. The rain gauges are automated and the data recorded is analysed and recorded to help forecast when flooding is likely to occur.

Figure 1 – Overview map of rain gauge sites

↓ = Rain gauge station locations ↓ = Afon Elwy river gauging stations



Suggested questions/tasks for learners

Figure 2 – OS map of Gwytherin

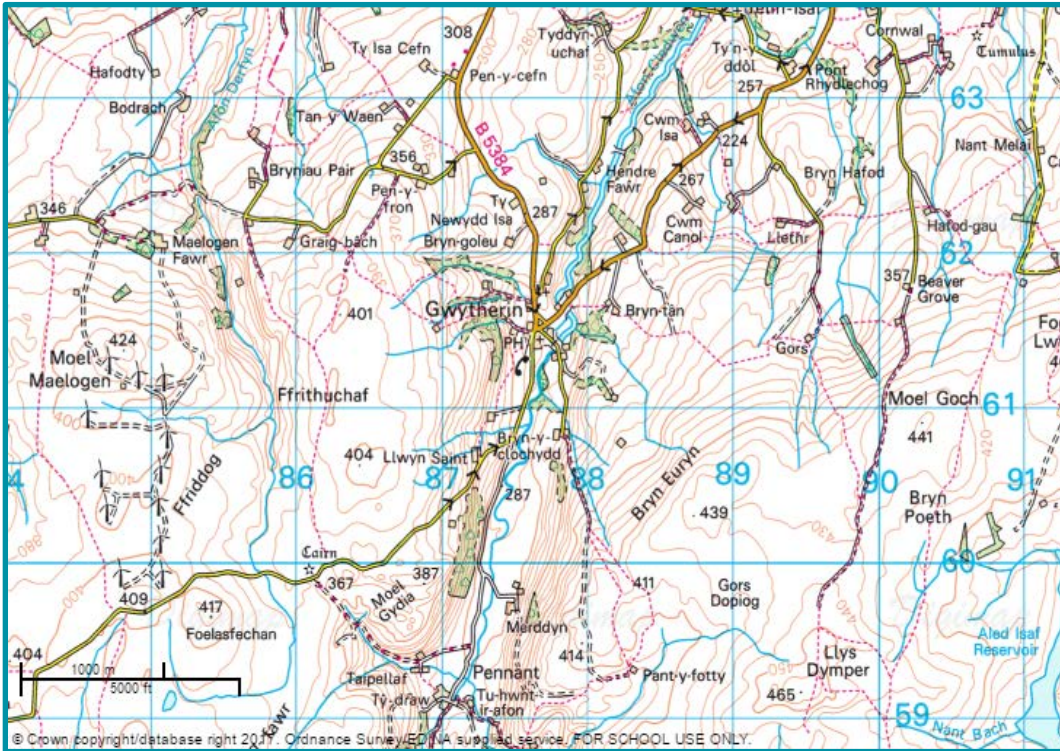
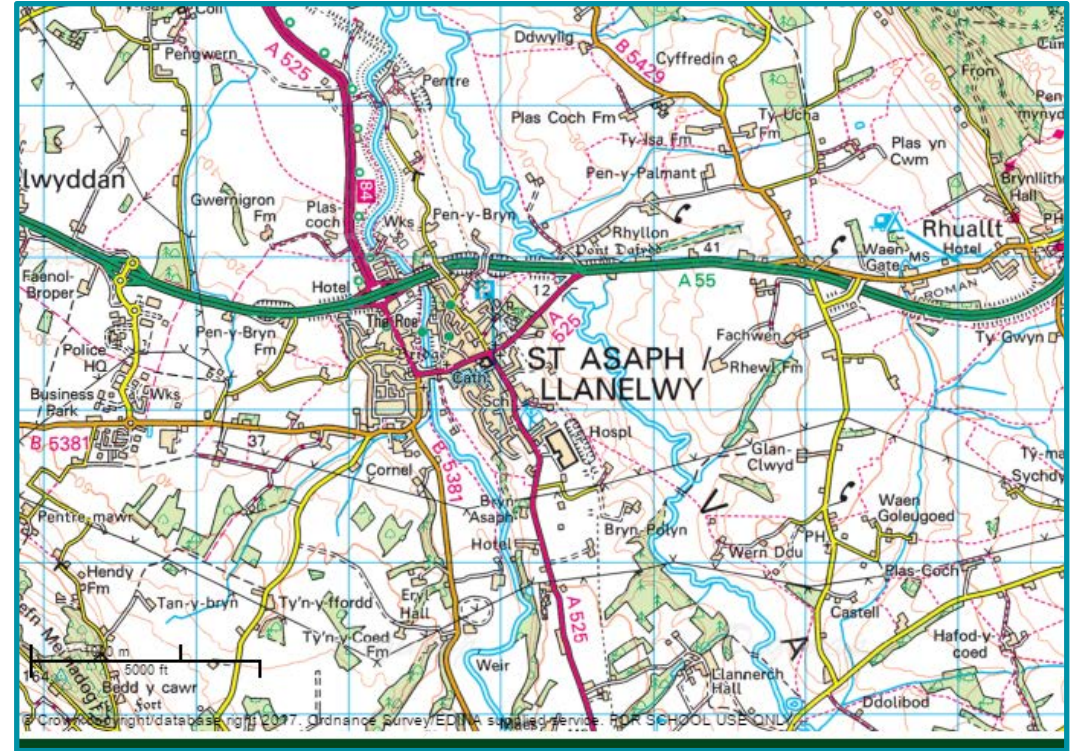


Figure 3 – OS map of St. Asaph



Task 1

- Describe the relief shown in Figure 1 and Figure 2.

Compare the two areas.

- Suggest how one physical factor can increase the risk of flooding at Gwytherin. Use evidence from the map to support your answer.
- Suggest how one human factor increases the risk of flooding at St. Asaph. Use evidence from the map to support your answer.

Daily rainfall level data for November 2012 in the Afon Elwy Catchment

Date	Total precipitation (mm)	
	Gwytherin	St.Asaph
01/11/2012	2.8	1.2
02/11/2012	5	0.6
03/11/2012	11.8	2.4
04/11/2012	0.2	0.2
05/11/2012	1	3.6
06/11/2012	0.6	0.6
07/11/2012	0.2	0.4
08/11/2012	0.2	0
09/11/2012	4.8	0.8
10/11/2012	3.4	1.6
11/11/2012	3.4	1.2
12/11/2012	0.4	1.2
13/11/2012	0	0
14/11/2012	0	0
15/11/2012	0	0
16/11/2012	9.4	9
17/11/2012	0.4	0
18/11/2012	1.4	0.2
19/11/2012	10.4	1.2
20/11/2012	4.8	2.8
21/11/2012	0.2	0
22/11/2012	23.2	13.4
23/11/2012	2.2	0.4
24/11/2012	13.6	15
25/11/2012	14.6	13.2
26/11/2012	71	25.8
27/11/2012	0.6	0
28/11/2012	0	0
29/11/2012	1	1
30/11/2012	1	2.4

Suggested questions/tasks for learners

Task 2

Using the rainfall provided calculate:

- The total rainfall (mm) received in Gwytherin and St. Asaph.
- The mean rainfall (mm) for the month of November 2012 for Gwytherin and St. Asaph.
- The difference in rainfall totals between Gwytherin and St. Asaph on the 26th November 2012. Outline the reasons for any similarities or differences.

Task 3

Using graph paper, plot the rainfall graph for Gwytherin/St.Asaph during November 2012.

- Describe the pattern of rainfall.
- Add onto your graph the hydrometric flow of the Afon Elwy recorded at Pont y Gwyddel during November 2012.
- Describe the river flow at Pont y Gwyddel during November 2012. Think HOLT – highest, odd things, lowest and trends.

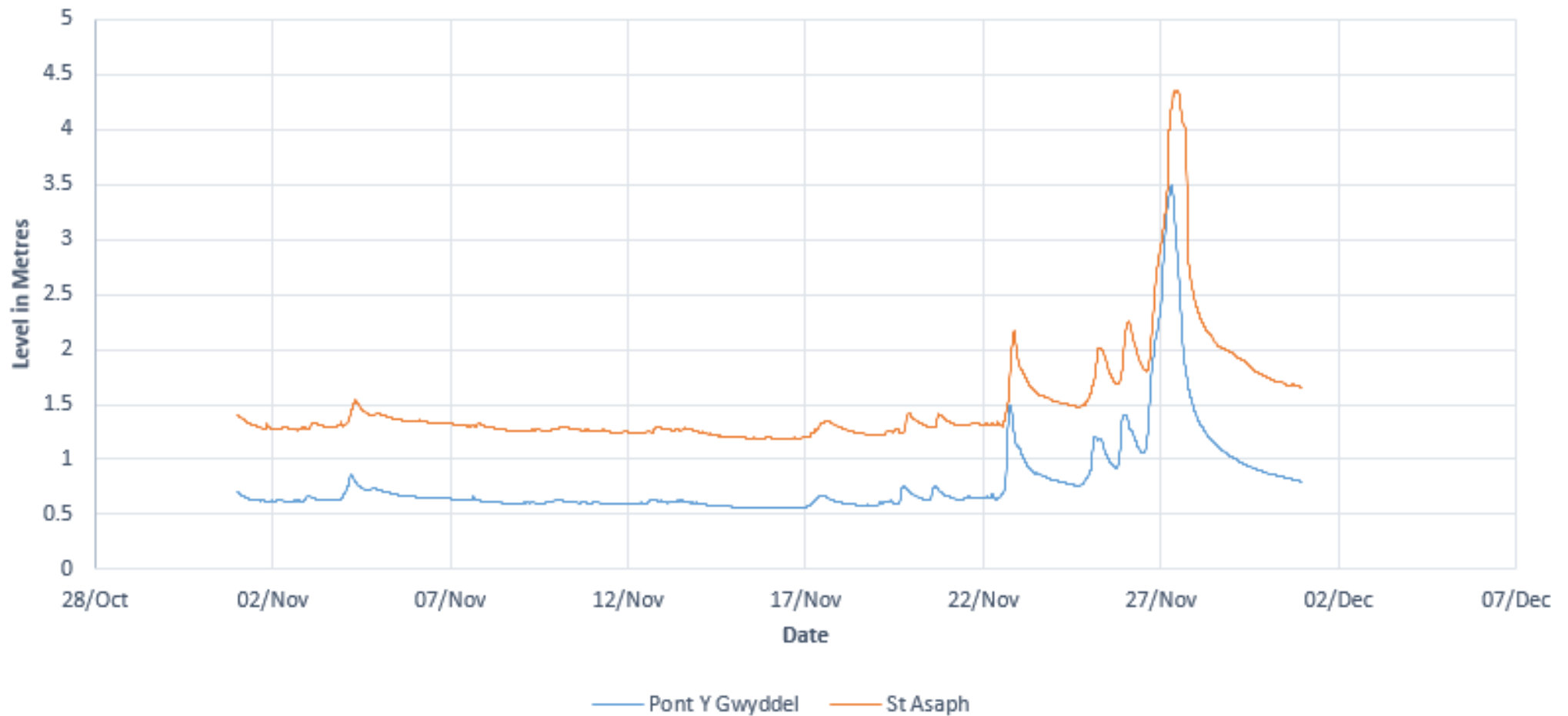
Task 4

Afon Elwy mean flow recorded at Pont y Gwyddel hydrometric site November 2012.

- Use metre ruler sticks, bamboo sticks or anything you can find to make a metre cubed. Can you fit a person inside?

94.4 m³ of water passed Pont y Gwyddel every second on the 26.11.2012. That's 94.4 of your meters cubed passing a single point every second!

Afon Elwy Level for Pont Y Gwyddel and St. Asaph Sites in November 2012



Suggested questions/tasks for learners

Task 5

- Study the graph, describe the river hydrograph for Pont y Gwyddel/St. Asaph.
- Give reasons why the river reached it's peak level in Gwytherin before St.Asaph.
- Flood alerts and warnings are given when the river reaches a certain level. When would you have sent the first flood alert? What would your emergency plan be if the situation arose again?

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For a full explanation of what happened during the St.Asaph floods of 2012 and what NRW has done to establish a Flood Risk Management scheme, you may wish to look at:

- The St. Asaph November 2012 floods ‘Task and Problem’ and ‘Solution’ documents
- The St. Asaph November 2012 floods powerpoint presentation detailing what happened and the remedial work that has been undertaken
- The St. Asaph November 2012 floods KS2/3 data report
- The St. Asaph November 2012 floods KS4/5 data report
- The St Asaph November 2012 floods in the news document

which can be found on the Education, Learning and Skills pages of NRW’s website.

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