



## Ben Fox

---

**From:** South Wales Information <swinformation@cyfoethnaturiolcymru.gov.uk>  
**Sent:** 30 July 2014 12:35  
**To:** bfox@pfaplc.com  
**Subject:** CONFIDENTIAL - ATI 05040A - A251 - Barry Dock - Flood Consequence Assessment  
**Attachments:** ATI-05040a.pdf; ATI 05040A.pdf; Standard\_Notice NRW.pdf  
**Flag Status:** Flagged

Hello Ben

Please find attached the requested flood level information for this site, together with information on the current Flood Map, defences and flood history. Also attached is a receipt for your recent payment and our Standard Notice which outlines the permitted use of this information/data.

I am still making enquiries as to any information we may hold regarding previous use of the site. Should any relevant information come to light I will provide this by our 20 working day deadline of 11 August 2014.

Regards

Kathy

Eich Enw/Your name: Kathleen Banner  
Teitl Swydd/Job Title: Swyddog Cysylltiadau Allanol/ External Relations Officer  
Teitl eich tim/Title of your team: Cysylltiadau Allanol/External Relations  
Cyfoeth Naturiol Cymru/Natural Resources Wales  
Ffon/Tel: 01437 783024/ **VOIP: 03000653568** or Ganolfan Gwasanaethau Cwsmeriad/Customer Services Centre - 03000 65 3000  
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E-bost/E-mail: [accesstoinformationteam@naturalresourceswales.gov.uk](mailto:accesstoinformationteam@naturalresourceswales.gov.uk)  
Gwefan/Website: [www.cyfoethnaturiolcymru.gov.uk/www.naturalresourceswales.gov.uk](http://www.cyfoethnaturiolcymru.gov.uk/www.naturalresourceswales.gov.uk)

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Please note I work on a Tuesday, Wednesday and Thursday

Ein diben yw sicrhau bod adnoddau naturiol Cymru yn cael eu cynnal, eu gwella a'u defnyddio yn gynaliadwy, yn awr ac yn y dyfodol.

**Our purpose is to ensure that the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future.**

----- Original Message -----

**From:** [bfox@pfaplc.com](mailto:bfox@pfaplc.com)  
**Received:** 14/07/2014 14:09  
**To:** Enquiries Queue  
**Subject:** A251 - Barry Dock - Flood Consequence Assessment - CONFIDENTIAL

To Whom It May Concern:

**A251 – Barry Dock – Flood Consequence Assessment – CONFIDENTIAL**

PFA Consulting have been commissioned to look at the feasibility of developing a site at Barry Docks with respect to flood risk and drainage. The site is located at: NGR 313073, 313073 and the nearest postcode is CF63 3RG.

The Development Advice Map is attached. This mapping shows that proposed development site lies on the edge of the Tidal floodplain.

Please can you provide:

- Any information you hold on historic flood incidences which may have affected the application site;
- Detailed extents of A,B, C1 and C2;
- Presence and standard of protection provided by sea and river flood defences in the vicinity of the site;
- Any modelled flood levels, depths and extents in the vicinity of the application site (tidal and fluvial); and
- Any information regarding previous use of the site;

Please treat this data request as confidential as the proposed development site is commercially sensitive.

Do not hesitate to contact me should you require any further information to allow yourselves to proceed with this information request.

Regards,

**Ben Fox**

Graduate Engineer

PFA Consulting Ltd  
Stratton Park House  
Wanborough Road  
Swindon  
SN3 4HG

T: 01793 828000 F: 01793 835500 E: [bfox@pfapl.com](mailto:bfox@pfapl.com) W: [www.pfapl.com](http://www.pfapl.com)

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# ATI-05040a – FCA: Barry Dock

E: 312998 N: 167285

## 1.0 Current Flood Map

**Figure 1** shows the current Flood Map (version 201404) at this location. The Flood Map represents the undefended fluvial and tidal flood extents derived from a combination of detailed and generalised modelled data.

The current tidal flood data in this area was updated by NRW in 2013. This study uses sea level nodes within the Severn Estuary, based on a set of extreme sea levels generated by the EA in 2011 (*ref 2*) for current day (2008). The levels were projected in-land over a digital terrain model to produce depth and elevation grids as well as tidal mapped outlines for both the 0.5% (1 in 200) AEP (annual exceedance probability) and the 0.1% (1 in 1000) AEP; including climate change and upper confidence intervals (+/-95%).

More information on the Flood Map can be obtained from the Environment Agency website <https://www.gov.uk/government/organisations/environment-agency>

## 2.0 Extreme Sea Levels & Climate Change Guidance

In February 2011, extreme sea levels used in this model were superseded by a nationally consistent set of extreme sea levels (*ref 2*). These levels were derived using a tidal model calibrated to UK tidal gauge data. The model output is provided for node locations spaced at approximately 2km. 95% confidence bounds for these values were also derived using the confidence intervals for each node location. The extreme sea levels comprise still water level including storm surge, however they do not account for local wave action. The baseline estimations are for the year 2008, so climate change is calculated relative to this year, for example add 17.5mm for the year 2013.

**Table 1: 2008 Baseline Extreme Sea Levels for adjacent nodes**

Node	Easting	Northing	Extreme Event Sea Level (mAOD)					
			T25	T50	T75	T100	T200	T1000
424	313663	167054	7.22	7.33	7.39	7.44	7.55	7.87
426	312039	166117	7.19	7.30	7.36	7.41	7.51	7.82

To provide the estimate of extreme sea levels for the site (**Table 2**), levels were interpolated from the adjacent nodes.

**Table 2: 2008 Baseline Extreme Sea Levels interpolated between adjacent nodes**

Node	Easting	Northing	Extreme Event Sea Level (mAOD)					
			T25	T50	T75	T100	T200	T1000
Site	313663	167054	7.22	7.33	7.39	7.44	7.55	7.86
<b>95% Confidence Bound (+/- m):</b>			<i>0.20</i>	<i>0.20</i>	<i>0.30</i>	<i>0.30</i>	<i>0.40</i>	<i>0.70</i>

The current guidance on climate change from DEFRA is as follows:

**Table 3: Sea level rise, mm per year**

Assumed vertical land movement	1990-2025	2025-2055	2055-2085	2085-2115
-0.5	3.5	8.0	11.5	14.5

The calculated future extreme sea levels are shown in **Table 4**. Adopting a precautionary approach as advised by Agency guidance (*ref 4*), these levels include the upper level 95% confidence bound.

**Table 4: Extreme sea levels for the site (including 95% Confidence Bound)**

Year	Sea level rise(m)	Extreme Event Sea Level (mAOD)					
		T25	T50	T75	T100	T200	T1000
2014	0.021	7.4	7.5	7.7	7.8	8.0	8.6
2064	0.403	7.8	7.9	8.1	8.1	8.3	9.0
2089	0.703	8.1	8.2	8.4	8.4	8.6	9.3
2114	1.065	8.5	8.6	8.8	8.8	9.0	9.6

### 3.0 Additional Information

The NRW holds no historic flood information for the site or nearby vicinity.

The coastal flood defence embankment in the Wentlooge Levels area generally has a 1 in 200 year design standard of protection. There is a 750m section with a potentially lower standard of protection to the west of Tabb's Gout, with a crest height of approximately 8.60m AOD. The Agency is currently investigating raising this section of the embankment.

The local authority may be able to provide information on issues such as localised flooding from sewers, drains and culverts.

### 4.0 References

1. Tidal Flood Mapping Study (Penarth and Chepstow), Study report Issue 1, Atkins July 2008
2. Department for Environment, Food and Rural Affairs, 2011. *Technical Report Design sea levels*. R&D Report SC060064. Defra/Environment Agency
3. Flood and Coastal Defence Appraisal Guidance: FCDPAG3 Economic Appraisal. Supplementary Note to Operating Authorities – Climate Change Impacts; October 2006; Department for Environment, Food and Rural Affairs.
4. Using the national coastal flood boundary data for England and Wales, Environment Agency Operational Instruction 490\_11, Issued 4/2/2011

### 5.0 Notes

Undefended scenarios are provided as being a possible worst case scenario in the event of defence failure. They are used as the basis of the Flood Map.

Extreme sea levels provided as part of this project are accurate to one decimal place (**Table 4**). Two decimal places have been provided to show the gradual change between nodes seen in the model, however, this does not imply greater accuracy.

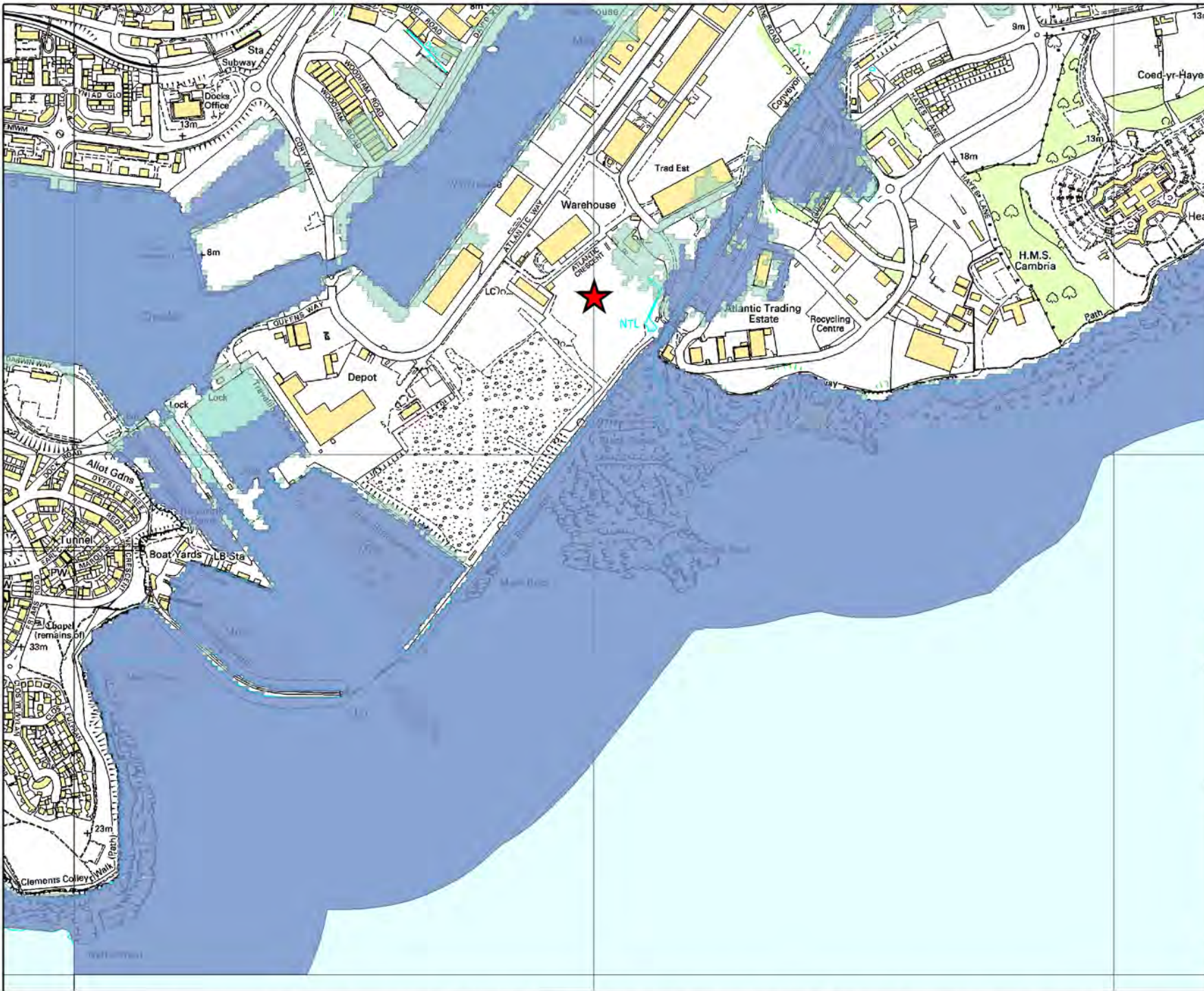
**The scope of the model is the mapping of flood risk, it is not intended for detailed design.**

**The model should be considered as the starting point for more detailed modelling, commensurate with the consequences of flooding at the site of interest.**

**NRW models are available under licence agreement for the purpose of further development. Contact Natural Resources Wales Access to Information team for details of terms, conditions and pricing.**

**If the data is used in support of an FCA, please include the reference number. Please refer to NRW standard terms and conditions.**





**Legend**

- ★ Site Location
- Flood Zone 3 (1 in 100 year undefended fluvial and 1 in 200 year undefended tidal extents)
- Flood Zone 2 (1 in 1000 year undefended fluvial and tidal extents)
- ▣ Areas benefiting from defences
- Defences

 **Cyfoeth Naturiol Cymru**  
**Natural Resources Wales**

**Project**  
FCA: Barry Dock  
[Ref: ATI-05040a]

**Drawing**  
Figure 1:  
Current Floodmap  
[v201404]

**Date**  
29th July 2014





**Legend**

-  Site Location
-  Statutory Main River
-  Bank Top E-Planning Tool (comprising: 20m buffer around the Main River network, River Bank features & around the mean high water level for estuaries wider than 40m)

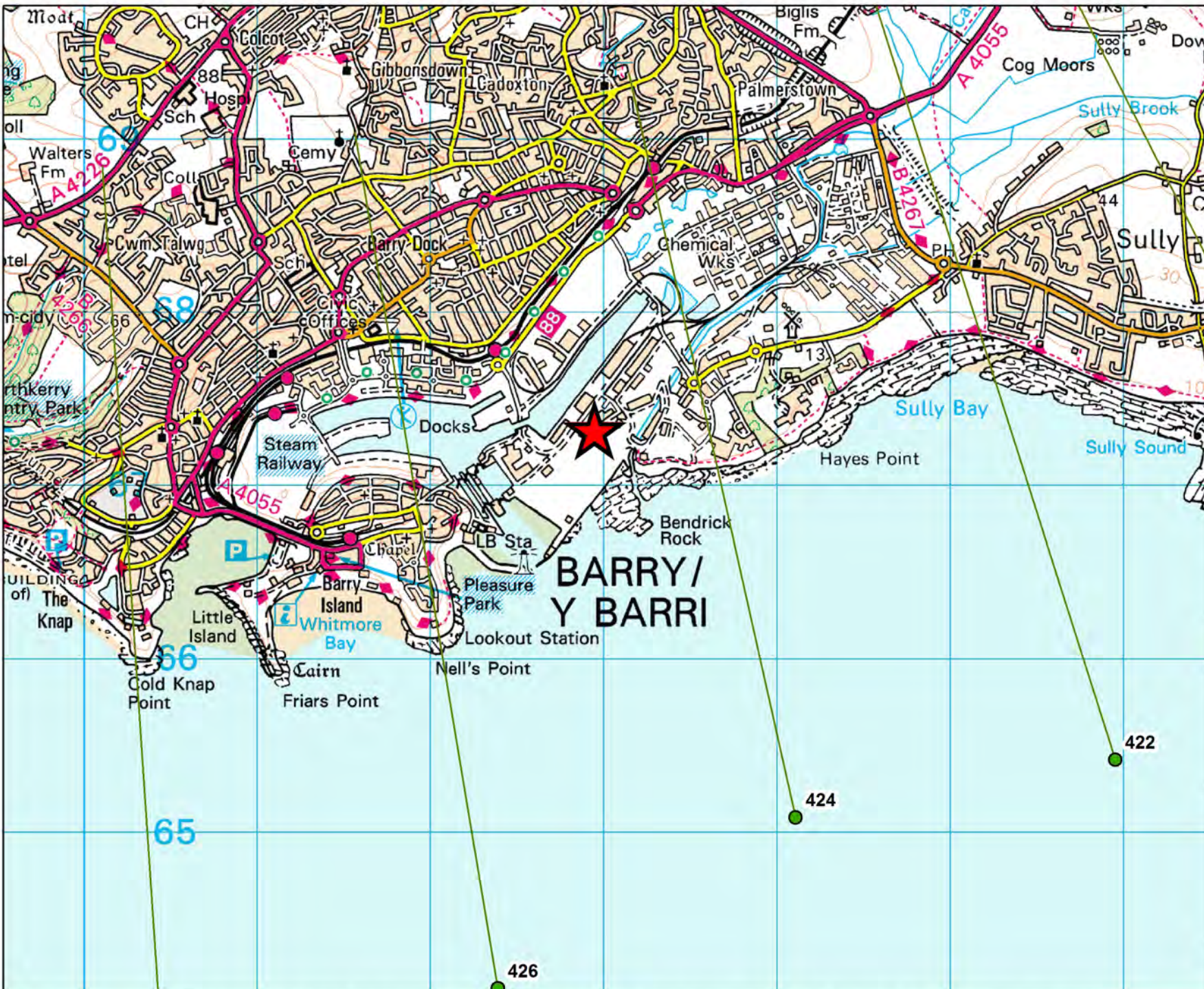
 **Cyfoeth Naturiol Cymru**  
**Natural Resources Wales**

**Project**  
Barry Dock  
[Ref: ATI-05040a]

**Drawing**  
Figure 2:  
Statutory Main Rivers

**Date**  
29th July 2014





- Legend**
- ★ Site Location
  - Projection Lines
  - Node Point

 **Cyfoeth Naturiol Cymru**  
**Natural Resources Wales**

**Project**  
 Barry Dock  
 [Ref: ATI-05040a]

**Drawing**  
 Figure 3:  
 Extreme Sea Level  
 Node Locations

**Date**  
 29th July 2014



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-  internal use for any purpose, or offering a product or service based on the Information for indirect commercial advantage, by an organisation that is primarily engaged in trade, commerce or a profession.

## Ben Fox

---

**From:** South Wales Information <swinformation@cyfoethnaturiolcymru.gov.uk>  
**Sent:** 12 August 2014 12:25  
**To:** Ben Fox  
**Subject:** CONFIDENTIAL - ATI 05040A - A251 - Barry Dock - Flood Consequence Assessment

Hello Ben

Just to let you know that I'm awaiting feedback on your queries regarding the tidal flap (your email below) and wave action (your email of 5 August) and will be in touch as soon as I receive a response.

There is no such thing as a "defended" flood map - the "flood map" is a combination of tidal and fluvial undefended outlines. Unfortunately the model in this area has no depth grids, so there are no defended outlines for any return period.

Regards

Kathy

Eich Enw/Your name: Kathleen Banner  
Teitl Swydd/Job Title: Swyddog Cysylltiadau Allanol/ External Relations Officer  
Teitl eich tim/Title of your team: Cysylltiadau Allanol/External Relations  
Cyfoeth Naturiol Cymru/Natural Resources Wales  
Ffon/Tel:01437 783024/ **VOIP: 03000653568** or Ganolfan Gwasanaethau Cwsmeriad/Customer Services Centre - 03000 65 3000  
Ffacs/Fax: 01437 783091  
E-bost/E-mail: [accesstoinformationteam@naturalresourceswales.gov.uk](mailto:accesstoinformationteam@naturalresourceswales.gov.uk)  
Gwefan/Website: [www.cyfoethnaturiolcymru.gov.uk/www.naturalresourceswales.gov.uk](http://www.cyfoethnaturiolcymru.gov.uk/www.naturalresourceswales.gov.uk)

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---

**From:** Ben Fox [<mailto:bfox@pfaplc.com>]  
**Sent:** 07 August 2014 16:36  
**To:** South Wales Information  
**Subject:** RE: CONFIDENTIAL - ATI 05040A - A251 - Barry Dock - Flood Consequence Assessment

To Whom It May Concern:

**ATI 05040A - A251 - Barry Dock - Flood Consequence Assessment**

Further to my email on the 5<sup>th</sup> August 2014 regarding allowance for wave action on tidal flood levels another issue has come to light.



Associated British Ports (ABP) have highlighted the presence of a tidal flap / sea door at the mouth of the River Cadoxton (Grid Reference: ST 13151 67246). This provides an outfall and protects land upstream of the structure. ABP have stated that this flood defence is operated and maintained by Natural Resources Wales.

Please can you confirm the standard of protection provided by this flood defence and if a 'defended' Flood Map is available?

If you require any further information to deal with both my queries or wish to discuss my requests do not hesitate to contact me.

Best regards,

**Ben Fox**  
Graduate Engineer

PFA Consulting Ltd  
Stratton Park House  
Wanborough Road  
Swindon  
SN3 4HG

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---

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---

**From:** Ben Fox [<mailto:bfox@pfaplc.com>]  
**Sent:** 05 August 2014 12:08  
**To:** 'South Wales Information'  
**Subject:** RE: CONFIDENTIAL - ATI 05040A - A251 - Barry Dock - Flood Consequence Assessment

Kathy,

Thank you for your email providing flood risk information for Barry Docks.

I note that the Extreme Sea Levels provided do not account for local wave action. Can you please advise on what you would consider a precautionary estimate for wave action and if there is any general guidance available on this matter? Alternatively would including the 95% confidence band be a precautionary estimate for this hazard?

Regards,

**Ben Fox**  
Graduate Engineer

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Wanborough Road  
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## Ben Fox

---

**From:** South Wales Information <swinformation@cyfoethnaturiolcymru.gov.uk>  
**Sent:** 21 August 2014 15:23  
**To:** Ben Fox  
**Subject:** CONFIDENTIAL - ATI 05040A - A251 - Barry Dock - Flood Consequence Assessment  
**Attachments:** Standard\_Notice NRW.pdf  
**Flag Status:** Flagged

Hello Ben

Please find below our response to the questions you raised about flood defences and wave action.

Existing information (October 2009) suggests that the area around the Cadoxton Sea Outfall has a standard of service in the order of 2% (1 in 50) from tidal inundation. This appears to be as a result of a 20m low spot within the embankment that surrounds the former coal yard in the general area of grid reference ST13118 67241.

We understand that some work has been carried out by the previous owner of the yard that has raised the low spot but we have no information on the type of material used and there is low confidence in the ability of the embankment at this location to cope with the hydrostatic load from a tide in excess of the 2% (1 in 50 year) event.

The Cadoxton model is currently being reviewed and will be available by the end of the calendar year. This model takes into account astronomical and surge tide and fluvial (including the sea outfall) but does not take wave action into account.

We have just received a Swan wave model from which it may be possible to extract information about local waves in the future.

Unfortunately we currently have no detailed modelling in the area, we would suggest that you contact us again in the near future to obtain more detailed data.

There is also a Shoreline Management Plan (Lavernock Point to St Ann's Head Shoreline Management Plan SMP2) which can be found via the following link:

<https://www.gov.uk/government/publications/shoreline-management-plans-smps>

Regards

Kathy

Eich Enw/Your name: Kathleen Banner

Teitl Swydd/Job Title: Swyddog Cysylltiadau Allanol/ External Relations Officer

Teitl eich tim/Title of your team: Cysylltiadau Allanol/External Relations

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**Sent:** 07 August 2014 16:36

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Further to my email on the 5<sup>th</sup> August 2014 regarding allowance for wave action on tidal flood levels another issue has come to light.

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Best regards,

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Graduate Engineer

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## Ben Fox

---

**From:** South Wales Information <swinformation@cyfoethnaturiolcymru.gov.uk>  
**Sent:** 26 August 2014 15:05  
**To:** Ben Fox  
**Subject:** CONFIDENTIAL - ATI 05040A - A251 - Barry Dock - Flood Consequence Assessment  
**Attachments:** Standard\_Notice NRW.pdf  
**Flag Status:** Flagged

Hello Ben

Apologies for the delay in providing the following information:

In response to your original request we can advise that within the site boundary, outlined red on the map provided, there are two existing waste permits:

WML 30362 – Levic Vehicle Dismantlers  
WML 30354 – Atlantic Salvage Company

There are also three historic landfill sites:

Barry Dock, No. 1 Atlantic Trading Estate  
Licence issued 2/11/77

Licence surrendered – 31/12/78

Waste last input 31/7/81 – packaging material, glass , timber waste, office rubbish, soil, rubble, hardcore and concrete

Barry Docks Area A

Licence issued 26/10/77

Licence surrendered – 31/12/78

Waste last input – 31/12/94 – absbestos, pvc and resins

Barry Docks Area B

Licence issued – 72/2/78

Licence surrendered – 31/12/78

Waste last input – 31/12/94 – general industrial waste

Prior to the Control of Pollution Act 1974 brought in a licensing system for Waste Management sites in 1976, they were regulated by the Local Authority Planning system. Any sites closed up to that time were then classed as contaminated land and subsequently became the regulatory responsibility of the Local Authority usually via their Environmental Health Department.

Waste sites that closed prior to the revised licensing system, introduced by the Environmental Protection Act 1990, technically are in a similar position. The date for these sites was pre April 1994. Up till then all the site operator had to do to surrender the licence was to give it back to the Waste Regulation Authority.

Since that date sites have to go through a formal closure and surrender process for their permit/licence. Until the establishment of the Environment Agency (EA) in 1996 that was the responsibility of the Local Authority (LA) Waste Regulation Authority.

Since then the responsibility for regulating surrender has been with the Environment Agency/Natural Resources Wales. However any site that has successfully passed through the surrender procedure would be considered as low risk as there are significant requirements to be met before surrender would be accepted and in particular, the production of a Site Condition Report that has to demonstrate that there has been no deterioration in the site condition as a result of permitted activities.

Regards

Kathy

Eich Enw/Your name: Kathleen Banner

Teitl Swydd/Job Title: Swyddog Cysylltiadau Allanol/ External Relations Officer

Teitl eich tim/Title of your team: Cysylltiadau Allanol/External Relations

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----- Original Message -----

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**Received:** 14/07/2014 14:09

**To:** Enquiries Queue

**Subject:** A251 - Barry Dock - Flood Consequence Assessment - CONFIDENTIAL

To Whom It May Concern:

**A251 – Barry Dock – Flood Consequence Assessment – CONFIDENTIAL**

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The Development Advice Map is attached. This mapping shows that proposed development site lies on the edge of the Tidal floodplain.

Please can you provide:

- Any information you hold on historic flood incidences which may have affected the application site;
- Detailed extents of A,B, C1 and C2;
- Presence and standard of protection provided by sea and river flood defences in the vicinity of the site;
- Any modelled flood levels, depths and extents in the vicinity of the application site (tidal and fluvial); and
- Any information regarding previous use of the site;

Please treat this data request as confidential as the proposed development site is commercially sensitive.

Do not hesitate to contact me should you require any further information to allow yourselves to proceed with this information request.



Regards,

**Ben Fox**

Graduate Engineer

PFA Consulting Ltd  
Stratton Park House  
Wanborough Road  
Swindon  
SN3 4HG

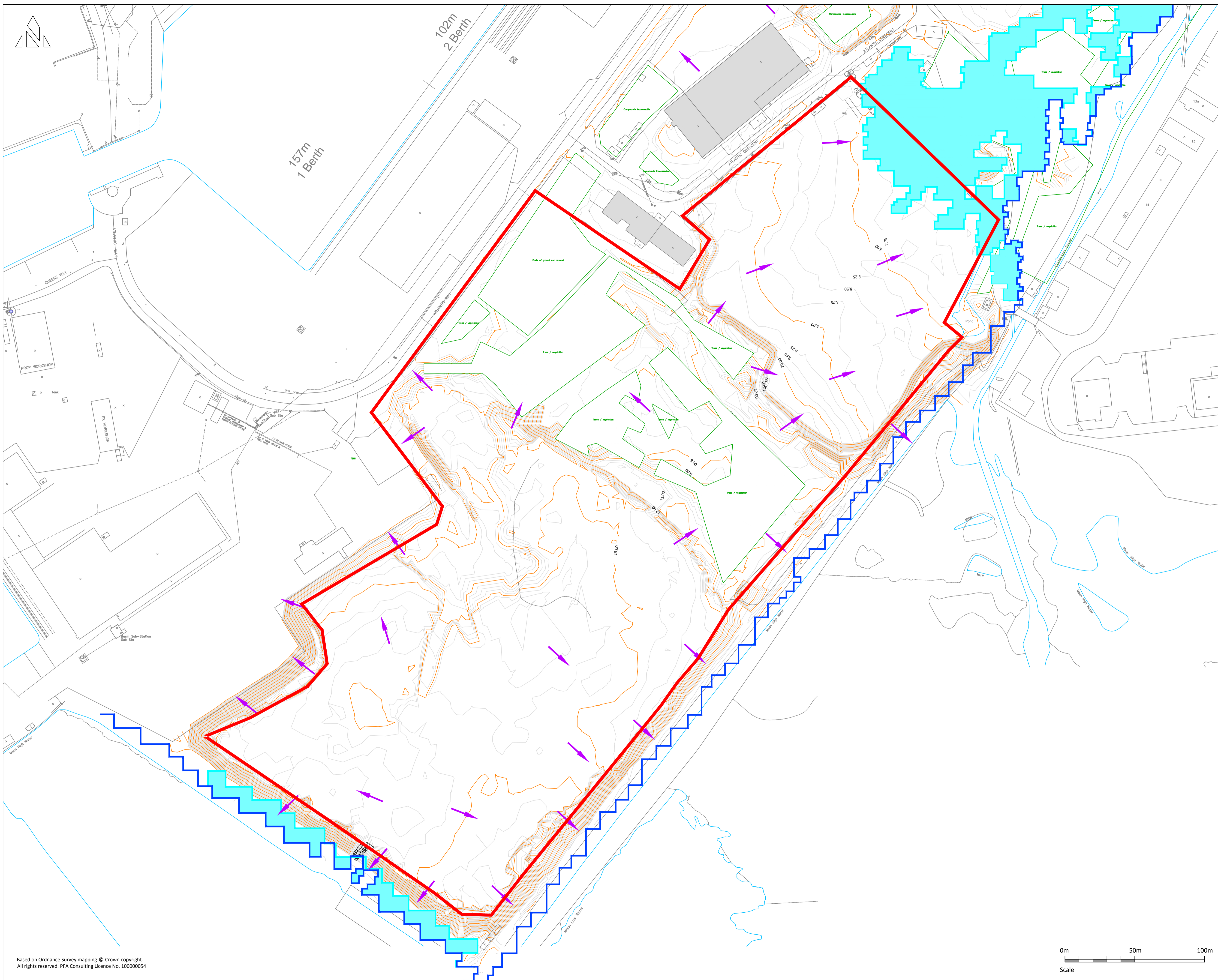
T: 01793 828000 F: 01793 835500 E: [bfox@pfapl.com](mailto:bfox@pfapl.com) W: [www.pfapl.com](http://www.pfapl.com)

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- Key**
- Site Boundary (Indicative Only)
  - Flood Zone 3 (Traced from Natural Resources Wales 'Current Flood Map')
  - Flood Zone 2 (Traced from Natural Resources Wales 'Current Flood Map')
  - Areas of Vegetation (No Topographical Survey)
- Notes**
- a. Site Survey provided by ABPmer.

Rev	Date	Description	Initials
A	27/08/14	NRW Flood Zones added.	BF

Client

**ABPmer**

Project

**Proposed Solar Park,  
Barry Docks**

Drawing Title

**Existing Flood Hazards**

Drawing No. **A251/03** Rev A

Date	August 2014
Scale	1:1250 @ A1
Drawn By	BF
Checked By	GE
E-Mail	geves@pfapl.com
File Ref.	F:A251\Drawings\A251 03.dwg

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## Ben Fox

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**From:** Morgans, Huw <hmorgans@valeofglamorgan.gov.uk>  
**Sent:** 24 July 2014 07:38  
**To:** Ben Fox  
**Subject:** RE: A251 - Barry Dock - Flood Consequence Assessment - CONFIDENTIAL

**Flag Status:** Flagged

Mr Fox

Your enquiry has passed to me for investigation. I will formally reply in August as I am on leave for the next two weeks. As an interim holding comment from memory we have had no flooding incidents at this location. The river is heavily modified at this point and Natural Resources Wales are the consenting body for main rivers and as this is a main river they may have more information. The coastal defence forms part of the ABP Barry Harbour entrance works and it would be their responsibility for maintenance and repair of the same. The site has been heavily modified over the years and part of it is currently operated as a waste processing operation again licensing would be from NRW. I will investigate further and reply in due course.

Regards Huw

Huw Morgans  
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Visible Services  
Vale of Glamorgan Council / Cyngor Bro Morgannwg  
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Ewch i'n gwefan yn [www.bromorgannwg.gov.uk](http://www.bromorgannwg.gov.uk)

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Ystyriwch yr amgylchedd. Peidiwch ag argraffu'r neges hon oni bai fod gwir angen.*

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**From:** Ben Fox [<mailto:bfox@pfaplc.com>]  
**Sent:** 14 July 2014 15:18  
**To:** Contact OneVale  
**Subject:** A251 - Barry Dock - Flood Consequence Assessment - CONFIDENTIAL

To Whom It May Concern:

### **A251 – Barry Dock – Flood Consequence Assessment – CONFIDENTIAL**

PFA Consulting have been commissioned to look at the feasibility of developing a site at Barry Docks with respect to flood risk and drainage matters. The site is located at: NGR 313073, 313073 and the nearest postcode is CF63 3RG.

The Development Advice Map is attached. This mapping shows that proposed development site lies on the edge of the tidal floodplain.

Please can you provide:

- Any information you hold on historic flood incidences which may have affected the application site;
- Presence and standard of protection provided by sea and river flood defences in the vicinity of the site;

- Any modelled flood levels, depths and extents in the vicinity of the application site (tidal and fluvial); and
- Any information regarding previous use of the site;

Please treat this data request as confidential as the proposed development site is commercially sensitive.

Do not hesitate to contact me should you require any further information to allow yourselves to proceed with this information request. Please note I have contacted Natural Resources Wales separately to ascertain any data they hold on the proposed development site.

Regards,

**Ben Fox**

Graduate Engineer

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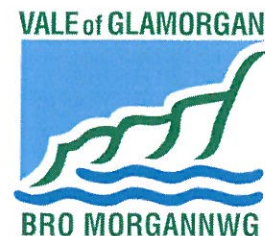
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Company Registered in England 03871018. Registered address as above.

Date/Dyddiad 1<sup>st</sup> September 2014  
Ask for/Gofynwch am Huw Morgans  
Telephone/Rhif ffôn 029 20673026  
Fax/Ffacs 029 20673114  
e-mail/e-bost Visibleservices@valeofglamorgan.gov.uk

The Vale of Glamorgan Council  
The Alps, Wenvoe CF5 6AA

Cyngor Bro Morgannwg  
Yr Alpau, Gwenfô CF5 6AA

www.valeofglamorgan.gov.uk  
www.bromorgannwg.gov.uk



Your Ref/Eich Cyf

My Ref/Cyf V VH/HE/SP/HM

PFA Consulting Ltd  
Stratton Park House  
Wanborough Road  
Swindon  
SN3 4HG



Dear Mr Fox

**Re: A251 - Barry Dock - Flood Consequence Assessment**

As mentioned in my EMail Dated 24<sup>th</sup> July 2014 your enquiry has passed to me for investigation. Having checked our records I have found no formal or informal flooding incidents at this location.

As I also stated the river is heavily modified at this point its outfall being controlled by a sluice arrangement that effectively controls its level and restricts tidal inundation upstream.

The coastal defence at this location forms part of the ABP Barry Harbour entrance works and it would be their responsibility for maintenance and repair of the same. Again ABP as landowners and operators may have more information about flooding at this location.

The site has been heavily modified over the years and part of it is currently operated as a waste processing operation and licensing of such is regulated by NRW.

NRW have produced flood maps that are readily available for viewing on their Website under the 'Whats in my backyard category' which shows that the site is in the low to very low risk of flooding category.

Hoping that this information is of use to you.

Yours sincerely,

Huw Morgans

**for Operational Manager Highways and Engineering  
ar ran Rheolwr Gweithredol Priffyrdd a Pheirianeg**