Walters Land (Rogerstone) Ltd

Jubilee Park - Plots LC1 and LC2

Flood Note

Issue 1 | 10 May 2021

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 229671

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1 Introduction

Walters Land (Rogerstone) Ltd have developed the Jubilee Park site at Rogerstone under an outline planning permission in 2013. The majority of development was for residential end use, but also incorporated a new primary school and some commercial development. The residential plots and school have now been built out, however the two commercial plots at the entrance of the site, called LC1 and LC2 have not been developed, as explained in more detail in the Planning Statement. An alternative site, along Tregwilym Road, outside the original planning boundary, has subsequently been developed for commercial end use, this was subject to its own planning application. It is now proposed to develop plots LC1 and LC2 for housing, Newport Council have advised that since the proposed end use is different, a new planning application will need to be submitted.

As part of the original development, flood modelling was carried out and a Flood Consequences Assessment was produced and agreed with NRW. A number of flood mitigation measures were identified, and these were installed between 2014 and 2016.

As part of this planning application, liaison took place with NRW to determine what they required in this instance, since the previous FCA remains applicable, see record in Appendix A. NRW indicated the current flood situation should be reviewed using the updated information from NRW, but assuming flood risk no worse, a note recording the findings of the review and attaching the old FCA would suffice.

This report presents the check undertaken and demonstrates that the flood risk is no worse than previously assessed. It includes the previous FCA in Appendix B, which remains applicable for the sites in question.

2 The Site

2.1 Site Location and Description

The LC1 and LC2 sites are located near to the northern entrance of the Jubilee Park development in Rogerstone, Newport, South Wales, see Figure 1 below.

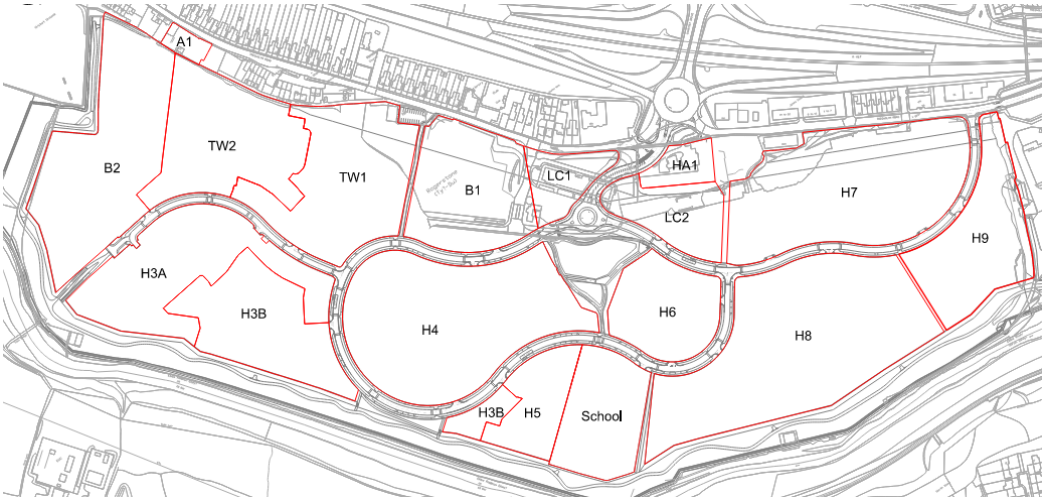

Figure 1 – Jubilee Park Development Plot Boundaries

The LC1 site is 0.5 hectares in size, the centre is approximately at Grid Reference 326942, 187892. The site is bounded to the south and east by Jubilee Way, to the north by Tregwilym Road and to the west by new housing development. The site is currently unused plot of land, it was remediated and prepared during the Jubilee Park site preparation works between 2014 and 2016. An access junction has been formed in the south-west, linking the plot to Jubilee Way. The site generally slopes from north to south; the current level is some 0.6m below the proposed ground level, which was previously defined for the whole Jubilee Park site as part of the flood mitigation works and shown in Drawing CG1005 in Appendix C.

The LC2 site is 0.86 hectares in size, the centre is approximately at Grid Reference 327011, 187782. The site is bounded to the west by Jubilee Way, to the south by Castle Way, to the north by a slope fronting Mandrake House to the north, to the east by new housing development to the north by Tregwilym Road and to the west by a recently built housing development. The site is currently unused plot of land, it was remediated and prepared during the Jubilee Park site preparation works between 2014 and 2016. An access junction has been formed in the south-east, linking the plot to Jubilee Way. The site generally slopes from north to south; the current level is some 0.6m below the proposed ground level, which was previously defined for the whole Jubilee Park site as part of the flood mitigation works and shown in Drawing CG1005 in Appendix C.

2.2 Proposed Development

The concept development proposals are illustrated in Figure 2, and consist of a mix of houses and apartments. The existing access roads onto the two plots will be utilised, a new drive access is also proposed for LC2 in the south-west.

Figure 2 – Concept Development Layout

The previous proposals for the site included setting the finished floor levels across the while development, including this site. The finished levels drawing is presented in Appendix B. Currently, the site is some 0.6m below this level, this was part of the remediation strategy, where the final 0.6m was formed using clean imported topsoil and subsoil in gardens and landscaped areas, or construction material related to building slabs, roads, footways and car parks.

3 Previous FCA and Construction Works

The previous Flood Consequences Assessment (FCA) was produced in 2013 following detailed flood modelling and submitted with the outline planning application. The FCA showed that once flood mitigation measures were implemented, the Jubilee Park site would be protected from flooding during a 1 in 100 year fluvial flood event, including an allowance for climate change. During a 1 n 1000 year extreme flood event, the majority of the Jubilee Park site would flood, however the depth and velocity of flooding would be below the limits described in TAN15 and the consequences of flooding would be acceptable. The modelling and FCA highlighted a range of mitigation measures to allow development to proceed and avoid detriment to adjacent properties.

The mitigation measures included:

- Re-profiling of ground levels to ensure that site levels are within 600mm of the Q1000 level
- Lowering of ground levels in an existing woodland area to the north to provide additional flood storage
- Raising flood defences and replacing a flood bund with a new wall in the north
- Provision of a lower level flood relief channel, 20m wide and within the site, along the northern and western boundaries. This will convey the majority of flow during a Q1000 event from north to south, discharging back into the River Ebbw at the southern end of the site

The measures rely on maintaining the flood defences and ensuring that they remain in place to protect the site during extreme floods during the design life of the development, taken to be 100 years.

The flood model was used to determine the defence levels along the river, these were either the Q100CC +300mm, the Q1000 level, or levels greater than the Q1000 level.

The flood mitigation works were constructed in 2014-2016, this included a 1.6km long concrete flood wall, a lower level 20m wide linear park, lowering the old woodland to the north and earthworks to enable the finished levels to meet the TAN15 criteria. The plot levels were deliberately left low so that each plot developer could bring up the level to the final level using clean topsoil and sub-soil in garden and landscaped areas, and construction thicknesses beneath builds, roads, car parks and hardstandings.

4 Updated Flood Information

4.1 Introduction

As part of this change of use proposal, liaison took place with Gary Purnell of NRW to determine what NRW would require in this instance, since the previous FCA should remain applicable, see Appendix A. NRW indicated the current flood situation should be reviewed using the updated flood information from NRW. Initially, Product 5 report was obtained, however Product 6 site specific mapping information was subsequently gathered.

4.2 Flood Report Review – Product 5

A flood report produced by Wallingford HydroSolutions dated 14th June 2019 described up to date flood modelling carried out on the Ebbw River. There is little site specific information in this report, however it does describe updated extreme event flows at Rhiwderin gauging station, which is located just south of the Jubilee Park site. The flows quoted are described in the below table, these can be compared to the flows obtained from Environment Agency Wales in 2011 which were used in the 2013 flood modelling work undertaken by Arup, and quoted in the flood modelling report.

Reference	**Peak Flows (m3/s)**	
	1% AEP	**0.1% AEP**
2013 Arup Report	241	423
2019 Wallingford Report	236.3/222.7	383.6/388.5/406.7

It can be seen that the peak flows used in Arup's 2013 study and subsequent FCA are higher than all the updated flows in the updated 2019 report. This shows that the flood levels assessed in the 2013 flood model and FCA are conservative and actual extreme flood levels will be less

4.3 Flood Mapping Review – Product 6

Product 6 flood mapping data has been obtained from NRW for the site and the River Ebbw catchment. The mapping received includes flood extent, depth, elevations and velocities for the site and surrounds.

The updated information confirms that the Jubilee Park site, including plots LC1 and LC2 site do not flood during a 1% AEP plus climate change event, see extract in Figure 3.

Fig 3 – 1%+CC (100 year plus climate change) flood extent map for Jubilee Park

Parts of the overall site and Plots LC1 and LC2 sites do flood during a 0.1% extreme flood event, see Figure 4 and 5. However, the flood depths on LC1 and LC2 are low, less than 50mm in depth. The maximum velocities are also low, consistently below 0.01m/s and complies with the requirements of TAN15. This level is lower than that assessed in the previous flood modelling and FCA, a reflection of the lower peak flows discussed in Section 4.2.

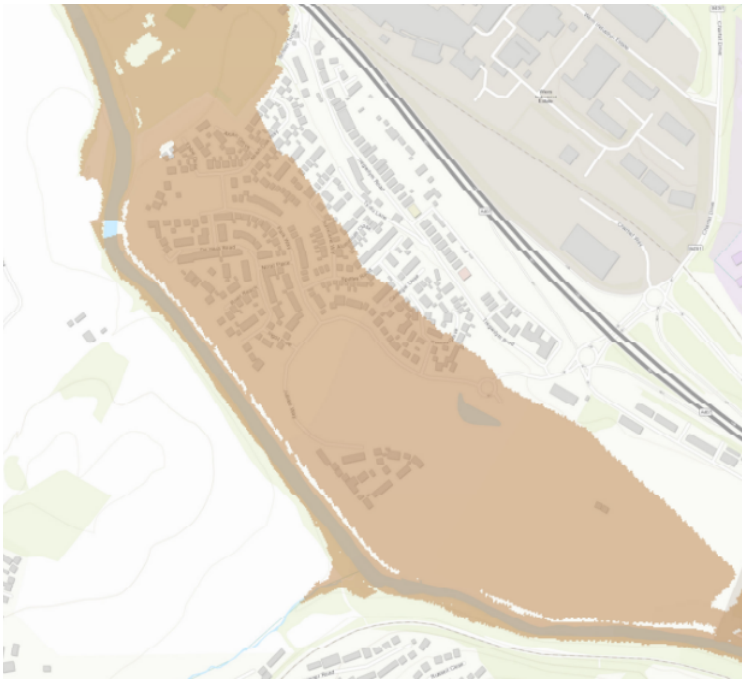

Fig 4 - 0.1% (1000 year) flood extent map extract for Jubilee Park

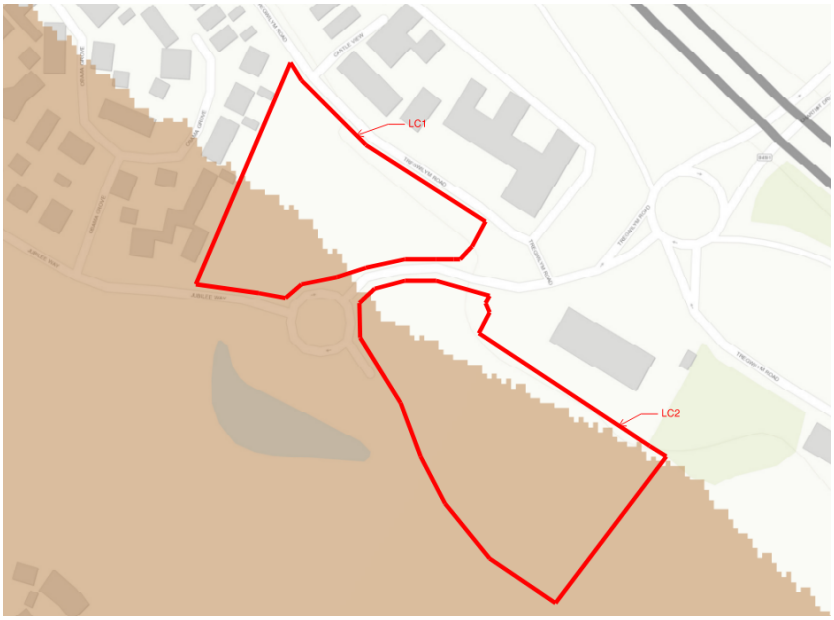

Fig 5 – 0.1% (1000 year) flood map extract for Plots LC1 and LC2

In summary, the updated mapping demonstrates that Plots LC1 and LC2 do not flood during a 1%+CC (100 year plus climate change) flood event, and will flood by less than 50mm during an extreme 0.1% (1000 year) flood event, and less than the 600mm stipulated in TAN15. This is no different to what was covered in the original FCA, therefore the previous assessment remains applicable.

5 Conclusion

As part of the previous Jubilee Park planning application in 2013, detailed flood modelling and an FCA was produced, demonstrating that forming residential development on the site was acceptable in accordance with the requirements of TAN15, providing flood mitigation measures were installed. These were constructed in 2014 and 2016 and the majority of the development has been built out.

Plots LC1 and LC2 are not yet developed and are subject to a standalone application for outline permission for residential development. NRW have advised that the previous FCA would still stand provided that it can be demonstrated that the flood risk is no worse than previously assessed, taking into account updated flood data.

Updated flood information has been obtained from NRW and described in the preceding sections. This data demonstrates that the extreme event flows and flood levels are less than those previously assessed. The development plots remain flood free during a 1%+CC (1 in 100 year plus climate change) event; parts of the two sites flood during an extreme 0.1% (1 in 1000year event), but the flood depth is less than 600mm. Therefore, the assessment and conclusion of the previous FCA remains applicable and residential development on the two plots adheres to the requirements of TAN15.

Appendix A

NRW Correspondence

A1

John Smith

From: Purnell, Gary <Gary.Purnell@cyfoethnaturiolcymru.gov.uk>
Sent: 23 February 2021 16:28
To: John Smith
Subject: [External] RE: Jubilee Park - Change of use

Good Afternoon John
I'm very well thank you (after being on leave last week) and hope you are too.

With regards the FCA approved for the above development, I'd recommend that you check as to whether the modelling is still valid in terms of the hydrology etc. If this is the case then I agree it would be better to submit a FCA addendum/covering statement/technical note in support of the development changes within the area of the site in question.

We've recently updated our Ebbw Model so you may wish to obtain the most up to date information via this LINK

Kind Regards
Gary

From: John Smith <john.smith@arup.com>
Sent: 23 February 2021 11:32
To: Purnell, Gary <Gary.Purnell@cyfoethnaturiolcymru.gov.uk>
Subject: Jubilee Park - Change of use

Hi Gary,

Hope you are well.

Wanted to speak to you about Jubilee Park. As you will recall, we produced an FCA for planning back in 2013. The majority of the site was residential and FCA was produced for the residential end use. However, a couple of plots were near the entrance were earmarked for small scale commercial (pub and small local store). The client has not received any interest for this end use so now wants to develop some houses on the plots. The planner (Savills) has been liaising with Newport CC and they have stated it can't be done as a Section 73 change of use and new application is needed. NCC have given a list of items that want covered for the application, including an FCA. Since nothing has really changed, our client is asking whether we can simply provide a covering statement and append the old FCA, or do we need to produce a new, stand alone FCA for these two plots. Can you let me know your thoughts on this.

Many thanks,

John

John Smith
Associate Director | Civil Engineer

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Appendix B

Previous Flood Consequences Assessment

B1

JUBILEE PARK, ROGERSTONE

Flood Consequences Assessment

128581 Issue 1

Revision B
January 2013

ARUP

WALTERS GROUP

Walters Land (Rogerstone) Ltd
Jubilee Park, Rogerstone
Flood Consequences Assessment

12-8581

Rev B | 9 January 2013

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 218996

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1 Introduction

Walters Land (Rogerstone) Ltd is preparing an outline planning application for the redevelopment of the former aluminium factory at Rogerstone.

The redevelopment works include remediating the contamination on site and providing suitable infrastructure, including access roads, services and drainage to serve the proposed development.

This initial phase of work will also include work to the existing flood defences, the construction of a flood relief channel along the riverside length of the site and balanced earthworks to produce a revised ground profile. These three pieces of work being necessary to ensure that any part of the development is not placed at an unacceptable risk of flooding.

Walters Land (Rogerstone) Ltd has commissioned Ove Arup & Partners to undertake a Flood Consequences Assessment in support of their planning application for consent for the development.

The Flood Consequences Assessment (FCA) has been undertaken using the principles set out in the Planning Policy Wales (June 2010) and Technical Advice Note 15 (TAN 15) – Development and flood Risk (July 2004).

The report recognises that it will take some time before the re profiling of the site and the construction of the flood defences will be completed. Consequently it has considered and demonstrated how a temporary bund can be used to protect part of the development before the completion of the flood mitigation works.

TAN 15 provides technical guidance which supplements the policy set out in PPW in relation to development and flooding and provides a framework within which risks arising from fluvial and tidal flooding, and from additional run-off from the development can be assessed.

This report presents the Flood Consequences Assessment in accordance with TAN 15 (July 2004).

2 The Site

The application site comprises the former Novelis/Alcan factory works site within Rogerstone, located to the west of Newport. The site was previously an aluminium factory that was operational for 70 years before closing in April 2009. All buildings occupying the site have now been demolished and some work to remediate the site has been completed.

The site is bounded by Tregwilym Road to the north east and by the residential properties that sit alongside it. The River Ebbw runs along the western and southern boundaries, beyond which are open fields and Garth Woods. An area of woodland, a cricket ground and recreation space (the Welfare Ground) bound the site to the north west with Tregwilym Industrial Estate located to the south east of the site. See Figure 1.

The site is protected from fluvial flooding from the River Ebbw by flood defences in the form of reinforced concrete walls and bunds constructed on the western and southern boundaries of the site.

A topographical survey of the site has been undertaken, see Figure 2. The survey has been complimented by Lidar survey obtained from Geomatics Group, dated August 2011.

Almost the whole of the site generally falls some 3m in a south easterly direction from a level of 28.50m AOD to 25.50m AOD. There is a narrow strip of higher ground along the northern boundary of the site.

3 Proposed Development

This outline planning application proposes the extensive regeneration of the site. It is anticipated the development will take place over a programme of works lasting 10 to 12 years to be undertaken across four distinctive phases. When complete the development will provide:

Up to 1200 new homes, 90% of which are detached/semi detached and the remainder link housing of up to 4 units.

A green grid of new and improved open space;

A new primary school;

Revised access from the roundabout and a network of internal roads and paths;

A neighbourhood centre to include a small scale convenience store and other small scale uses and activities; and

The re-use of the existing ‘Drill Hall’ for community use.

A masterplan of the proposed development is enclosed in Figure 3.

4 Flooding policy

TAN 15 Development Advice Map indicates that the site is partially located in Zone C1 and partially in Zone C2 flood plains. The narrow strip of high ground along the north eastern boundary is above the Zone C1 flood plain.

TAN 15 describes Zone C2 as areas of the flood plain without significant flood defence infrastructure and Zone C1 as areas of flood plain which are developed and served by significant infrastructure, including flood defences. The Development Advice Map is shown in Figure 4.

Section 7.5 of TAN 15 states that whether a development should proceed or not will depend on whether the consequences of flooding of that development can be managed down to a level which is acceptable for the nature/type of development being proposed, including effects on existing development.

Section 5 of TAN 15 places residential developments in “highly vulnerable development” category and Section 9 of TAN 15 confirms that where such developments are placed in Zone C2 flood plain, flooding consequences are not considered to be acceptable. Plan allocations should not be made for such

developments and planning applications not proposed. For developments proposed in Zone C1, Section 5 of TAN 15 confirms that application of justification tests as defined in Section 6 of TAN 15, and acceptability of consequences as defined in Section 7 and Appendix 1 of TAN 15 should be applied.

The whole of the site is developed and served by significant infrastructure, including flood defences in the form of reinforced concrete walls and flood bunds and as such, should be considered to be wholly in Zone C1 flood plain, with the exception of the narrow strip of higher ground along the northern boundary which is above this flood plain.

5 Flood Modelling

The Environment Agency was consulted at an early stage of the commission to discuss the modelling options and obtain available information.

Product 4 flood data was obtained from the EA which is based on the Risca hazard mapping study undertaken in August 2009 and updated in October 2010. It provides flood levels for the 100 year, 100 year + climate change (CC) and 1000 year flood events.

In addition a 1D model of River Ebbw was obtained from the EA and has been run to verify its stability.

An ISIS –Tuflow linked 1D-2D model was constructed extending from the A467 river bridge upstream to Park View River Bridge downstream. The model was run for the 100 year, 100 year+CC and the 1000 year flood events for the pre and post development scenarios.

A Flood Modelling Report Ref 4.50, dated 3 January 2013 (Rev A) has been submitted to the EA together with the 2D model for verification.

6 Existing Flood Extent

The 2D model provides the following results for the existing conditions:

1. The 1 in 100 year flood is contained in the River Ebbw channel, as shown in Figure 5.
2. In the 100 year +CC event, the playing fields upstream of the site will flood. The flood water will overtop the flood defences at this location and also over a short length of defences adjacent to River Ebbw and flow across the site, causing flooding to Tregwilym Industrial Estate. The flood extent is shown in Figure 6.
3. In a 1000 year event the flood water will overtop the defences at several locations along its length, flooding the site. The industrial estate and the residential developments downstream will also be flooded. The flood extent is shown in Figure 7.

7 Mitigation measures

In order to reduce the flood risk to the proposed development site and adjacent properties several options were modelled. The mitigation measures proposed include:

1. Lowering of the ground levels in the wooded area adjacent to the playing fields by some 3m and to the same level as the playing fields to provide additional flood storage and retaining a section of the existing ground up to a level of 31.70m AOD to maintain protection to the site against a 100 year+CC event with a minimum of 300mm freeboard.
2. Raising of the flood defence wall bounding the playing fields (some 50m length) by up to 600mm to a level of 31.70 m AOD and constructing a flood defence wall to replace existing bund adjacent to River Ebbw, some 100m in length to a level of 30.00m AOD, in order to provide protection to the site against a 100 year+CC event with a minimum of 300mm freeboard.
3. Provision of a flood relief channel on site as part of the site's flood defences against river flooding. The channel will convey the majority of the flows overtopping the defences in a 1000 year event discharging to the River Ebbw downstream of the site to ensure that the flood water from the River Ebbw does not back up onto the site.
4. The re profiling of the ground levels with balanced earthworks to produce a preliminary earthwork surface with a gradient along the site.
5. To complete each phase of the development, the ground surface will be raised by 600mm above the preliminary earthwork surface to produce the development surface.
6. Road surfaces will be kept up to 150mm below and the ground floor of buildings up to 150mm above the development surface.
7. As the areas of roads and buildings are of similar extent they will largely compensate for each other and so for flood modelling purposes it can be assumed that the site can be represented by the development surface and the characteristics of the development being mainly detached and semi detached properties are consistent with the modelling assumptions.
8. The contours of the modelled surface are shown in Figure 12.
9. To provide some flexibility during construction, the modelling has tested various options. This has demonstrated that the actual elevation of the development surface that is eventually built can vary by ± 100mm of the surface shown on Figure 12, without changing the modelling conclusions, provided that this is done without changing the profile of the development surface.
10. Steps 4, 5 and 6 above will not apply to the narrow strip of higher ground along the northern boundary

    The model also demonstrates that a temporary bund, 800mm high will protect and enable part of the development to proceed to occupation before the completion of the flood mitigation works.

8 Proposed Flood Extent

The hydraulic model was run to include the mitigation measures described in Section 7. The Manning's roughness used in the modelling was adjusted across the site in the 2D model to represent an average for a typical housing development.

The 100 year event was not considered further as the flows are retained within the River Ebbw channel and there will be no flooding of the site nor of any adjacent land upstream and downstream.

For the 100 year+CC event the model confirms that the site is flood free. Figure 8 shows the flood extent for this event.

Figure 9 shows the comparison of the pre and post development flood levels for the 100 year+CC event.

The following table shows the flood depth and change in flood levels on adjacent sites in a 100 year+CC event.

	Cricket Pitch	Community Hall	Caretaker's House	Myrtle Drive	Viaduct Way	Industrial Estate
Existing Depth (m)	1.32	0.95	0.73	0	0	0.07/0.25
Proposed Depth (m)	1.12	0.74	0.53	0	0	0.08/0
Difference (mm)	-200	-210	-200	0	0	+10/-250

The creation of additional storage volume in the playing fields and the raising of the flood defences will reduce the flood depth in the playing fields by 200mm.

The raising of the flood defences will stop flood water flowing through the site and causing flooding of parts of the industrial estate, thereby reducing flood depths by 250mm.

The model indicates that the flood water level within the River Ebbw channel will increase by some 10mm, but this is considered to be insignificant and affects a small area of the Industrial Estate. However, the depth of flooding in this area is only 70mm and there is an overall benefit as shown in the tables above.

Figure 10 shows the flood extent for the 1000 year event. At the peak of this event, much of the flood water overtopping the defences will be conveyed in the river flood relief channel, and the site will be flooded. Animation screenshots of the flooding, showing direction and timing of the flooding are shown in Appendix A.

At the peak the flows from the channel into the site will be along the contours and therefore have low velocities of some 0.02 m/s,the maximum depth of water over more than half the site will be less than 300mm with the remainder being between

300mm and 450mm , except for 2 small stips adjacent to the channel where the depth of flow is 450mm to 600mm.

Figure 11 shows the comparison of the pre and post development flood levels in the 1000 year event.

The following table shows the flood depth and change in flood levels on adjacent sites in a 1000 year event.

	Cricket Pitch	Community Hall	Caretaker's House	Mytle Drive	Viaduct Way	Industrial Estate
Existing Depth (m)	1.85	1.50	1.27	1.92	0.69	2.47
Proposed Depth (m)	1.82	1.48	1.25	1.89	0.64	2.39
Difference (mm)	-30	-20	-20	-30	-50	-80

The model indicates that controlling the flood water flow through the site onto adjacent land will reduce the depth of flooding in the downstream residential properties by up to 50mm and the downstream industrial site by some 80mm.

In addition there is a reduction in flood levels in the playing fields and properties upstream of the site.

9 Justification of the Location of Development

TAN 15 states that development within Zone C will only be justified if it can be demonstrated that:

(i) Its location in Zone C is necessary to assist, or be part of a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement; or

(ii) Its location in Zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region.

And,

(iii) It concurs with the aims of PPW and meets the definition of previously developed land;

(iv) The potential consequences of a flooding event for the particular type of development have been considered, and in terms of the criteria contained in Sections 5, 7 and Appendix 1 of TAN 15 are found to be acceptable.

Criterion (i)

The application proposes the redevelopment of a highly accessible, brownfield regeneration site located within the settlement of Rogerstone. The redevelopment of the site accords with policies contained within the adopted Unitary Development Plan (UDP). Furthermore, the deposit Local Development Plan (LDP), which sets out the Council's future development strategy for Newport to 2026, allocates the site for development under policies H1 and EM2 of the plan.

Criterion (ii)

TAN 15 states that a development will be justified if it complies with either criteria (i) **OR** (ii). As the proposal accords with criterion (i), it is not necessary to refer to criterion (ii).

Criterion (iii)

Previously developed land is defined in PPW as,

"...that which is or was occupied by a permanent structure (excluding agricultural or forestry buildings) and associated fixed surface infrastructure."

PPW also includes a preference for the re-use of previously development land. It states, in paragraph 4.8.1, that,

"Previously developed (or brownfield) land should, wherever possible, be used in preference to greenfield sites…"

Paragraph 4.8.2 further states,

"Many previously developed sites in built-up areas may be considered suitable for development because their re-use will promote sustainability objectives. This includes sites:

in and around existing settlements where there is vacant or under-used land, commercial property or housing;

which facilitate the regeneration of existing communities."

Paragraph 9.2.8 of PPW also states that,

"...local planning authorities should follow a search sequence, starting with the re-use of previously developed land and buildings within settlements, then settlement extensions and then new development around settlements with good public transport links."

The site falls within PPW's definition of "brownfield site" as historical OS maps indicate that since the 1880's a factory has occupied the site and in the last 50 years the entire site was covered by factory buildings which have now been demolished.

Criterion (iv)

The potential consequences of a flooding event for the development have been considered in **Section 10** of this report.

10 Assessing Flood Consequences

Appendix 1 of TAN 15 explains how the potential consequences of a flooding event should be assessed within the context of TAN 15 and provides guidance on the technical requirements for undertaking such an assessment. That guidance has been followed in the following assessments using TAN 15 Appendix 1 clause numbers.

A1.3 The mechanism of flooding is the overtopping of the River Ebbw flood defences.

Sections 6, 7 and 8 of this report explain the mechanism of flooding and mitigation measures proposed in detail.

All flood defences proposed will be raised at least 300mm above the 100 year+CC flood levels to provide sufficient freeboard. The defences consist of reinforced concrete walls or mass earth bunds and will be checked and upgraded to current standards.

The risk of a breach is negligible subject to regular inspection and repair as necessary.

A1.4 The hydraulic performance of the flood defences have been assessed using the latest flood data provided by the Environment Agency and modelling techniques, including allowance for climate change.

A1.5 The proposed development will provide a safe and secure living and working environment throughout its life, since the risk of flooding is negligible and can be adequately managed. Access/egress routes will be via the northern boundary of the development which rises to higher ground.

A1.6 Two footbridges are located on the River Ebbw adjacent to the site. These are of relatively slim construction with sufficient headroom not to cause a backup of water in the event of blockage. The bridges downstream of the site are at a lower level than the site and any blockage of these bridges would not cause flooding of the site.

A1.7 The flood defence wall/embankment and channel forms part of an integral protection system and will be part of the Public Open Space created for the development.

A1.8 In the event of an extreme flood event the flooding of the development can be adequately managed.

A1.9 The Developer will assess the structural integrity of the existing flood defences and undertake any raising and strengthening necessary including adjustment of site levels. The raising of the defences will not result in an increase in flood risk to adjacent land.

A1.10 The Flood Consequences Assessment is undertaken by a suitably qualified Engineer employed by Arup who has undertaken numerous similar assessments in the past.

A1.11 The risk of flooding can be adequately managed.

A1.12 At the planning Stage it has been assumed that generally the existing defences, including the old railway embankment along the south west boundary, have been well built and founded, and that the infiltration into the Flood Defence Channel through the ground beneath the new defences during river floods will be minimal in comparison with the design capacity of the channel.

At the detailed design stage there will be a detailed investigation and assessment of the existing walls and embankments and an assessment made of how these measures will be reused in the proposed flood defence.

This investigation and assessment will include the structural integrity and stability of the existing embankments and walls.

If this investigation finds a potential for a strong flow from a river flood through the ground beneath or through the wall and or embankment itself, then specific measures such as a grout barrier will be provided as needed

This investigation will also check for existing ducts, culverts and drains through and or beneath the existing flood defences .Where such features are found, specific measures will be provided as needed to prevent flows into the site during river floods.

The future ownership and maintenance arrangements for the flood defence wall and flood defence channel are the subject of ongoing Section 106 discussions between Walters Land(Rogerstone) Ltd and Newport City Council . One option which is receiving detailed consideration would provide for the ownership passing to Newport City Council and a private company taking on the maintenance responsibility.

At the detailed design stage it may be found beneficial to make small adjustments to the dimensions or location of the channel. If this situation arises then the consequences of such adjustments will be checked by modelling and the adjustments will not be made unless the model demonstrates that the maximum flood depths as shown in Figure 10 are not increased by more than 50 mm and the maximum flow velocities as shown in Figure 13 are not increased by more than 0.01m/s.

A1.13 Discussions have been held with the EA and the hydraulic model and Flood Modelling Report have been submitted to the EA for verification. This Flood Consequences Assessment will be submitted to the Environment Agency as part of the Pre Planning Submission.

A1.14 The TAN 15 criteria for highly vulnerable developments state that the development should be free from flooding under a 1 in 100 year fluvial event. The defences provide adequate protection and the development will be flood free in the event of a 100 year+CC flood.

A1.15 The TAN 15 criteria for highly vulnerable developments state that beyond the threshold frequency, the development would be expected to flood which should not exceed 600mm in depth at properties and their access routes. Also that the velocity of flood water should not exceed 0.3 m/s.

Figure 10 shows that the depth of flood water in a 1000 year event generally does not exceed 450mm.

Figure 13 shows the velocity vectors across the proposed development. These generally do not exceed 0.02 m/s.

Animation screenshots of the flooding, showing direction and timing of the flooding are shown in Appendix A.

The mitigation measures proposed in 7.5 therefore ensure that the development meets the criteria set out in Cl A.1.15

A1.16 Figure 14 shows the hazard map of the development based on the" Supplementary note on flood hazard ratings and thresholds for development planning and control purpose – Clarification of Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TRl" – 2008.

The hazard map demonstrates that a large part and particularly the egress/evacuation routes from the site will be in the lowest hazard zone (very low hazard). The majority of the remainder of the site will be located in the next hazard category (damage for some). There is a small area of the development adjacent to the flood channel which is located in the "danger for most" category. This area is furthest away from the egress routes from the site.

In summary, the hazard map shows that at all times during a 1 in 1000 year event there will be safe escape routes for the public and safe access routes for emergency services.

A1.17 The following technical assessments have been undertaken in meeting the criteria for the flooding consequences and the paragraph numbering below relates to the clauses of section A1.17 of TAN 15.

1. A location plan has been provided in Figure 1. TAN15 DAM in Figures 4 shows the proximity of the site to the flood defences.
2. A topographical survey of the site is included in Figure 2.
3. The existing defences consist of embankments and concrete walls. At the planning stage it is assumed that defences have been adequately constructed. However, all of the existing defences will be subject to a detailed investigation during the detailed design stage.
4. Access/egress route will be via the entrance roundabout and onto Tregwilym Road which leads onto higher ground and Zone A flood plain.
5. Other sources of flooding will not have a detrimental effect on the development.
6. The site does not have a history of flooding.
7. The bridges upstream and downstream of the site have been included in the flood modelling undertaken. They are assessed further in Section A1.6 above.
8. The effect of climate change has been considered in the assessment of the flooding.

9. The proposed development surface is shown in Figure 12. It is proposed that road surfaces will be placed up to 150mm below the proposed contours and the ground floor of buildings up to 150mm above the proposed contours. Consequently, the areas of roads and buildings will largely compensate for each other.

   For the narrow strip of higher ground along the north eastern boundary, the criterion in 9 above will not be needed and will not be applied.

10. The hydraulic model of the River Ebbw catchment has assessed the depth and velocity of flow across the site in a 0.1% probability event, including the hazard map of the site. Animation screenshots of the flooding, showing direction and timing of the flooding are shown in Appendix A.

11. Western Valleys Trunk Sewer is located along the southern boundary of the site. The ground above this sewer is liable to flooding and the covers on the manholes should be replaced to stop ingress of flood water into the trunk sewer.

12. An assessment of the mitigation measures indicates that the proposed development will not displace flood water. The existing site is almost entirely impermeable and covered by concrete slabs, roads and car parks. The proposed development will include areas of public open space as well as private gardens. The impermeable area will therefore be substantially reduced, resulting in a reduced rate of surface water runoff. It is therefore proposed to discharge surface water runoff into River Ebbw without attenuation.

13. The flood model indicates that the proposed mitigation measures will reduce the extent of flooding both upstream and downstream. The benefit will be more pronounced on the residential developments at Myrtle Drive and Viaduct Way.

14. The development will have no effect on coastal morphology and the long term stability and sustainability.

15. The expected climate change impacts have been considered in the assessment. Any uncertainties in flow estimation resulting in the overtopping of the defences have been considered in the flood model and a 300mm freeboard above the 100 year+CC flood event will be provided.

16. There are no residual risks of flooding to the development.

11 Conclusions

The proposed residential led redevelopment of the former Novelis aluminium factory at Rogerstone, lies within Zone C2 and Zone C1 flood plains as defined in TAN 15 Development Advice Maps.

The site is served by significant flood defences in the form of reinforced concrete walls and flood bunds and as such, should be considered to be wholly in Zone C1 flood plain, with the exception of the narrow strip of higher ground along the north eastern boundary which is above this flood plain.

A 2D flood model of the River Ebbw catchment has been undertaken to assess the flood risk to the proposed development and test the effect of the proposed mitigation measures on flood risk to adjacent areas.

The mitigation measures proposed include the creation of additional flood storage adjacent to the playing fields to the north west of the site, provision of flood defences to provide 300mm freeboard above the 100 year+CC flood levels, a flood relief channel , and a commitment to a particular development surface and to a development with particular characteristics

The 2D model indicates that the mitigation measures would provide a development platform in which flooding can be effectively managed, at the same time reducing the extent of flooding to existing developments upstream and downstream of the site.

The modelling has demonstrated that at the peak of the 1000 year flood event there will be safe evacuation routes for the residents and safe access for the emergency services.

The assessment has taken into account the effects of climate change and the proposed development will be adequately protected for the duration of its design life.

The existing site is almost entirely impermeable and covered by concrete slabs, roads and car parks. The proposed development will include areas of public open space as well as private gardens. The impermeable area will therefore be substantially reduced, resulting in a reduced rate of surface water runoff. It is therefore proposed to discharge surface water runoff into the River Ebbw without attenuation.

A flood consequences assessment has been undertaken in accordance with the guidelines of TAN 15.

The proposed development complies with criteria (i), (iii) and (iv) of the justification test for the location of development as set out in Section 6 of TAN 15.

The proposed development also complies with criteria for assessing flooding consequences as set out in Section 7 and Appendix 1 of TAN 15.

The Flood Consequences Assessment concludes that the measures proposed meet the requirements of TAN 15.

Figures

Figure 1 Site Location
Figure 2 Topographical Survey
Figure 3 Masterplan
Figure 4 TAN 15 DAM
Figure 5 Existing 100 Year Flood Extent
Figure 6 Existing 100 Year & CC Flood Extent
Figure 7 Existing 1000 Year Flood Extent
Figure 8 Proposed 100 Year and CC Flood Extent
Figure 9 1 in 100 Year and CC Comparison of the Pre and Post Development Flood Depths
Figure 10 Proposed 1000 Year Flood Extent
Figure 11 1 in 1000 Year Comparison of the Pre and Post Development Flood Depths
Figure 12 The Development Surface
Figure 13 Flood Velocity – Proposed Conditions
Figure 14 Flood Hazard Map – Proposed Conditions

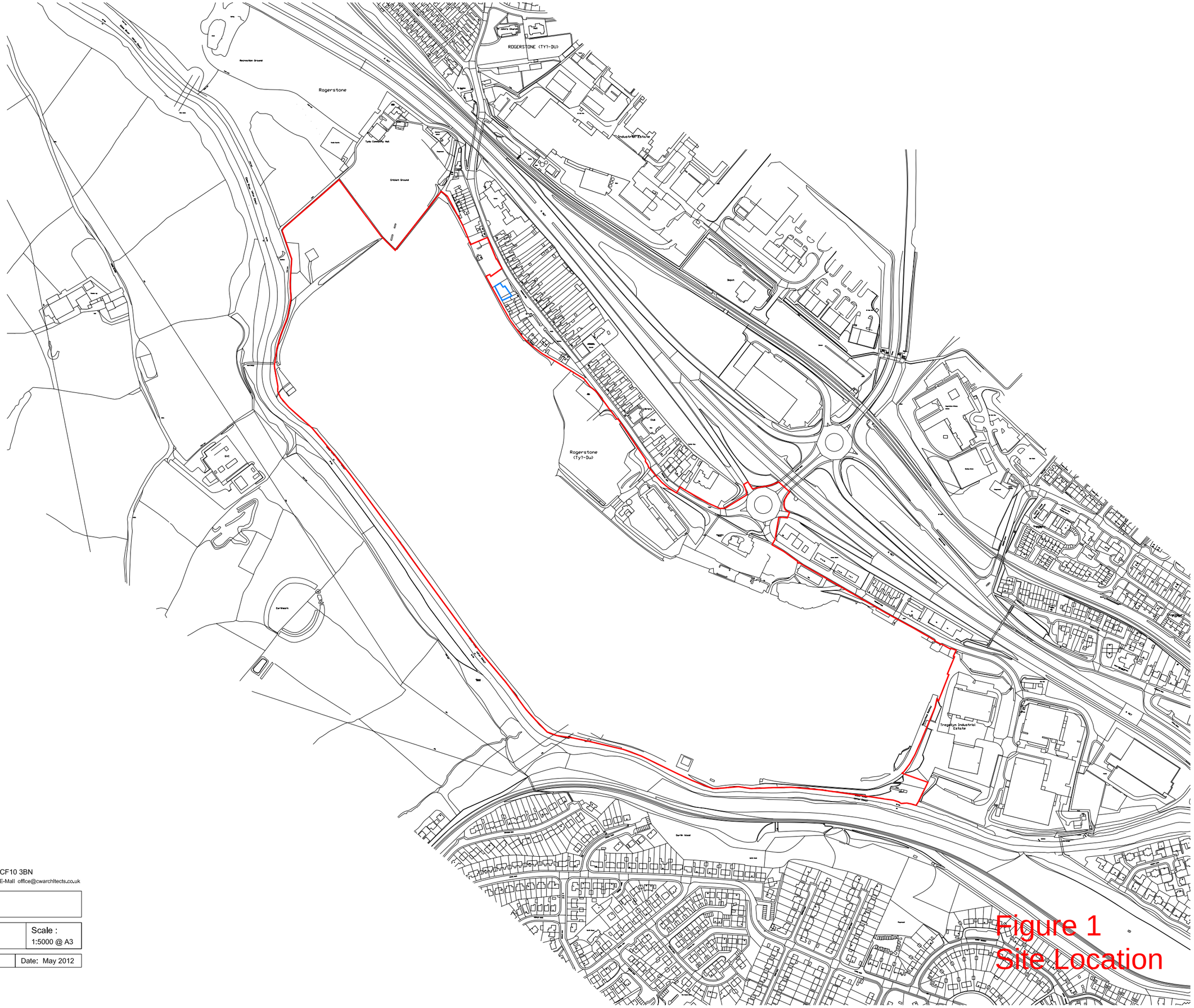


Figure 1
Site Location

C. W. ARCHITECTS Ltd
Grosvenor House, 8 Park Grove, Cardiff CF10 3BN
Tel : +44 (0)2920 223123 Fax : +44 (0)2920 388367 E-Mail office@cwarchitects.co.uk

Project Name :	Rogerstone, Novelis Site
Project Ref :	G1280

Drawing Title :	Location Plan (Red Line Boundary)	Scale :
Drawing Number :	G1275 - CP05	1:5000 @ A3

Revision:	A	Drawn by: oa	Date: May 2012

Figure 2
Topo Survey

* All areas quoted are approximate and subject to change

Figure 4.1 - Masterplan

C. W. ARCHITECTS Ltd
Grosvenor House, 8 Park Grove, Cardiff CF10 3BN
Tel : +44 (0)2920 223123 Fax : +44 (0)2920 388367 E-Mail office@cwarchitects.co.uk

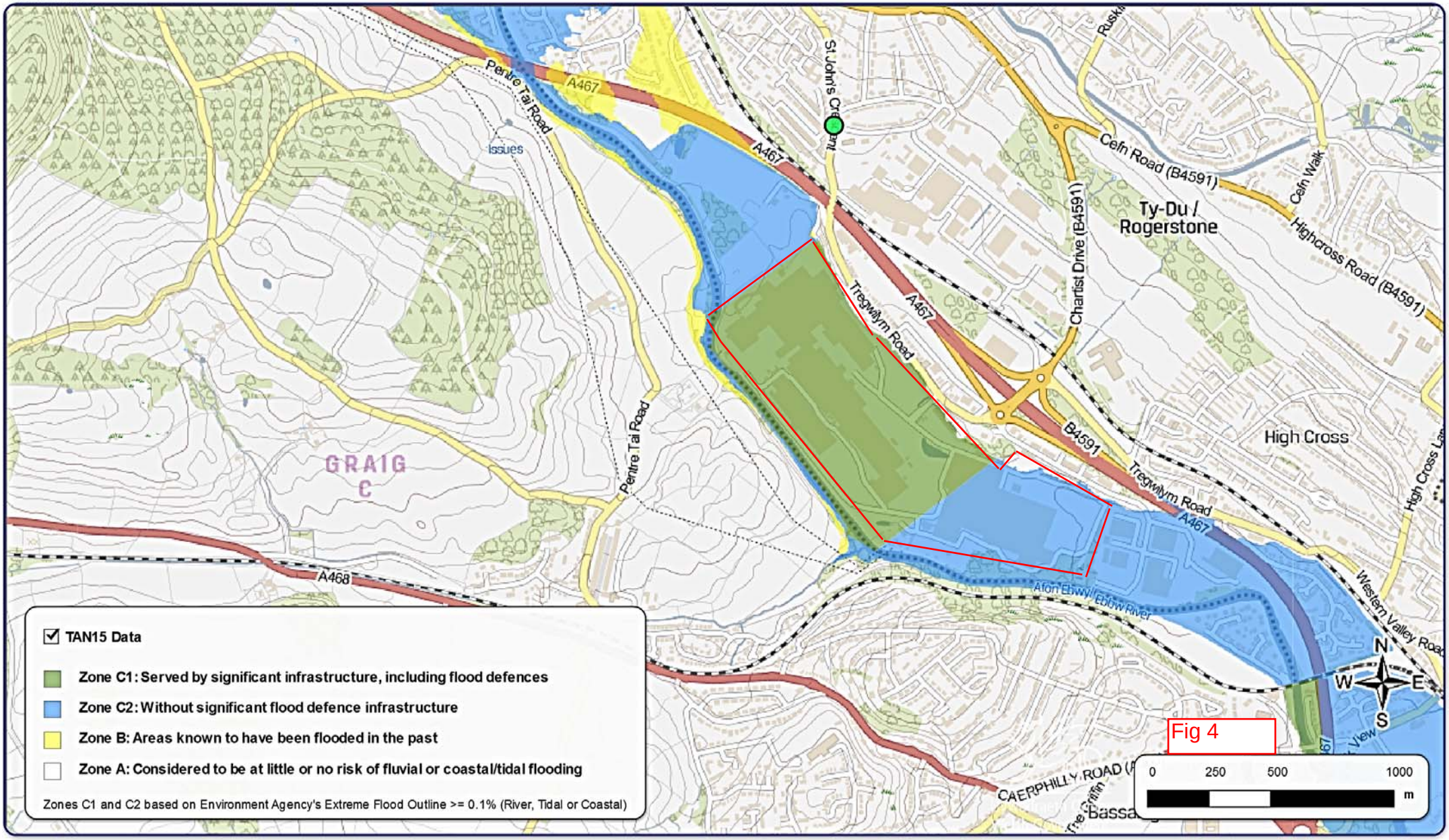
Project Name :	Jubilee Park, Rogerstone		
Project Ref :	G1280		
Drawing Title :	Proposed Masterplan	Scale :	
Drawing Number :	G1280 - #001	1:1250 @ A0	
Revision:	B	Drawn by:	Date: July 2012

Figure 3

Llywodraeth Cymru
Welsh Government

TAN 15 Development and Flood Risk

Development Advice Map



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Developed by Cartographics, Welsh Government

A3

Legend

Flood Depth (m)

- 0 - 0.15
- 0.15 - 0.3
- 0.3 - 0.4
- 0.4 - 0.6
- 0.6 - 1
- > 1

Issue	Date	By	Chkd	Appd
P1	2012-07-31	LC	LY	KA

Metres: 0 95 190 380

ARUP

13 Fitzroy Street
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Client

Walters Land (Rogerstone) Ltd

Job Title

Rogerstone

Q100 Flood Map, Existing Condition

Scale at A3

1:7,000

Job No	Drawing Status
218996	Preliminary

Drawing No	Issue
Fig 5	P1

31/07/2012 14:57:41

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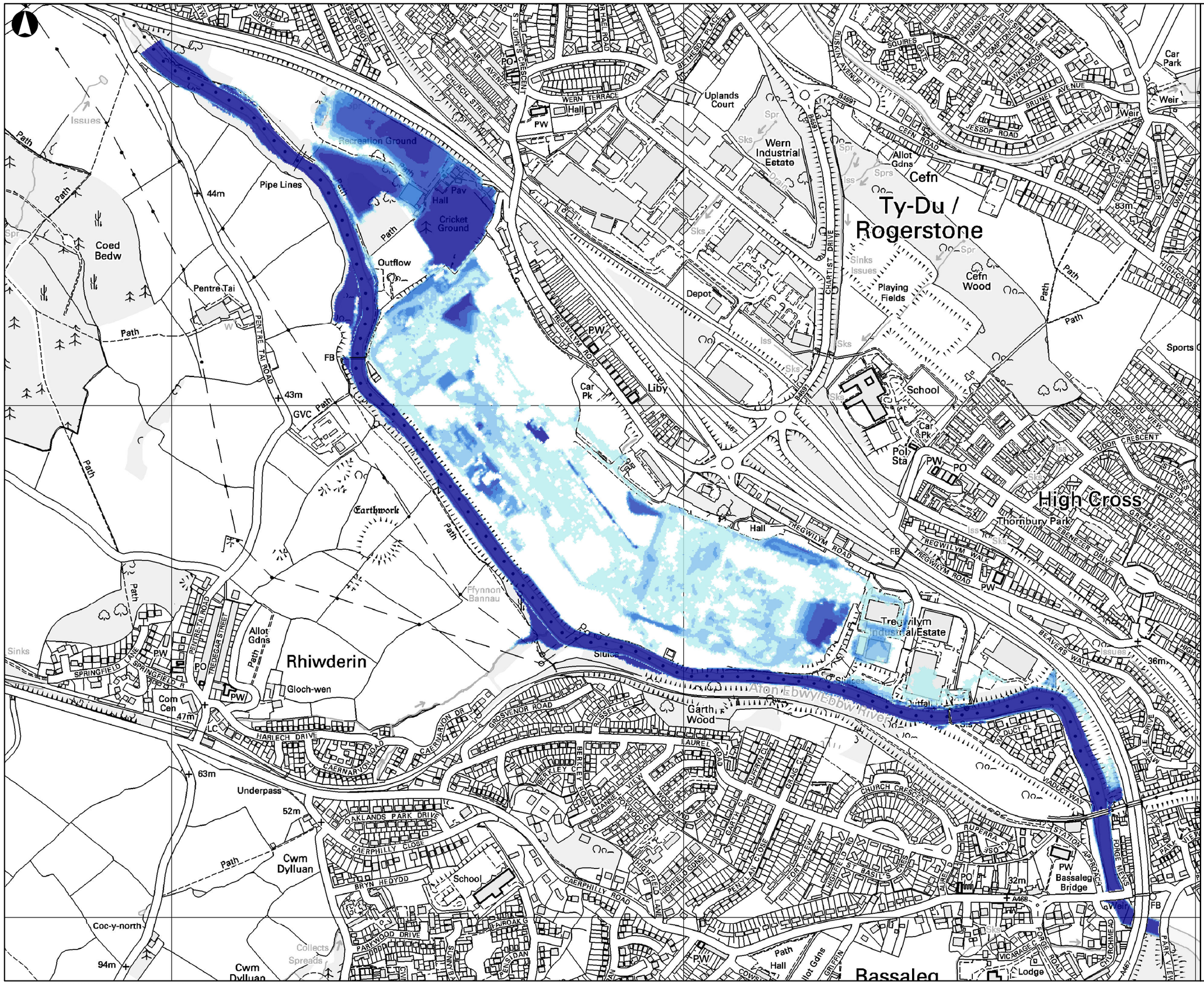
A3



Legend

Flood Depth (m)

- 0 - 0.15
- 0.15 - 0.3
- 0.3 - 0.4
- 0.4 - 0.6
- 0.6 - 1
- > 1

Issue	Date	By	Chkd	Appd
P1	2012-07-31	LC	LY	KA

Metres: 0 95 190 380

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Job Title

Rogerstone

Q100 plus Climate Change Flood Map, Existing Conditon

Scale at A3

1:7,000

Job No	Drawing Status
218996	Preliminary

Drawing No	Issue
Fig 6	P1

31/07/2012 14:58:37

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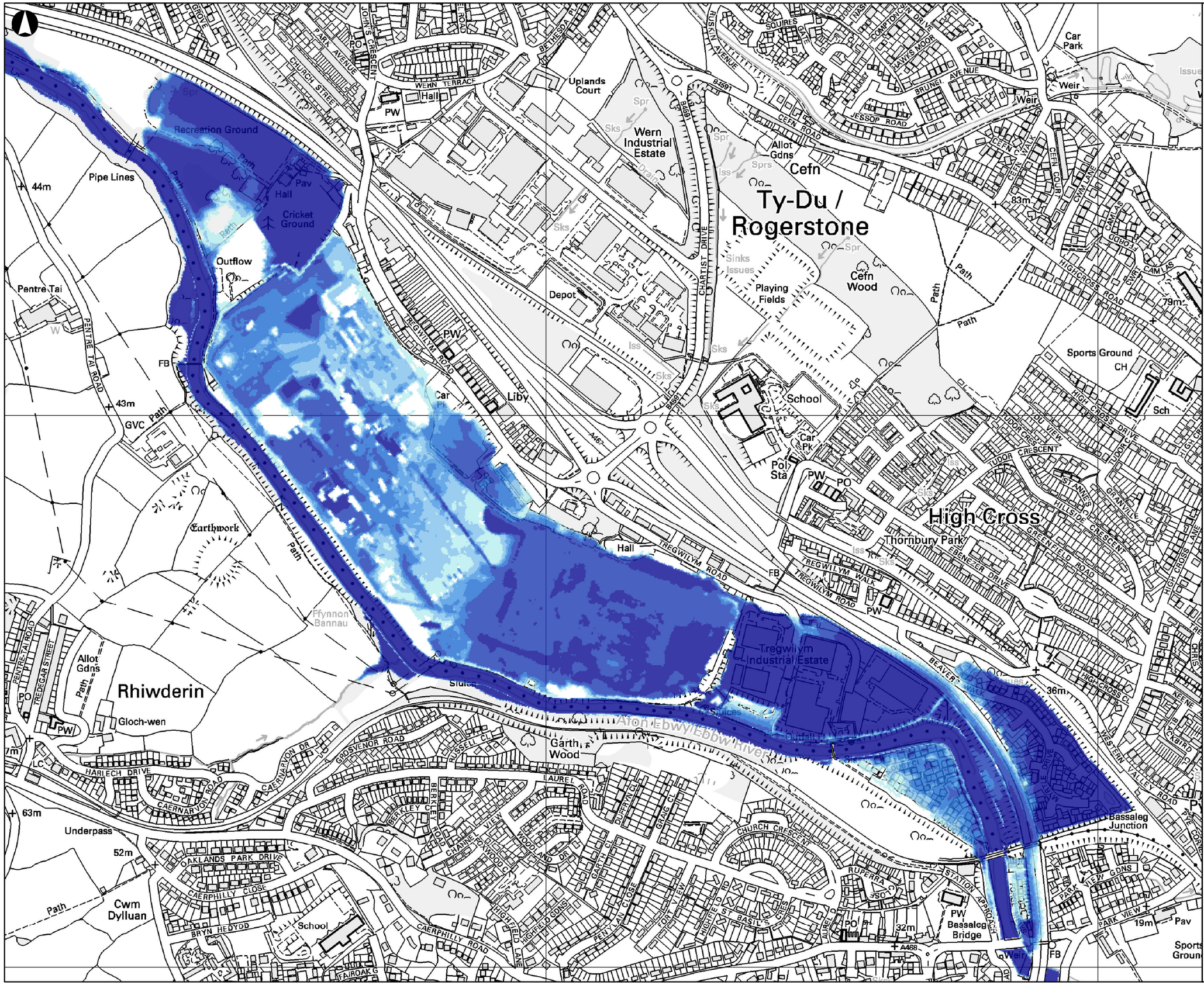

Legend

Flood Depth (m)

- 0 - 0.15
- 0.15 - 0.3
- 0.3 - 0.4
- 0.4 - 0.6
- 0.6 - 1
- > 1

31/07/2012 15:08:05

Issue	Date	By	Chkd	Appd
P1	2012-07-31	LC	LY	KA

Metres: 0 — 87.5 — 175 — 350

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Job Title

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Q1000 Flood Map, Existing Condition

Scale at A3

1:6,500

Job No	Drawing Status
218996	Preliminary

Drawing No	Issue
Fig 7	P1

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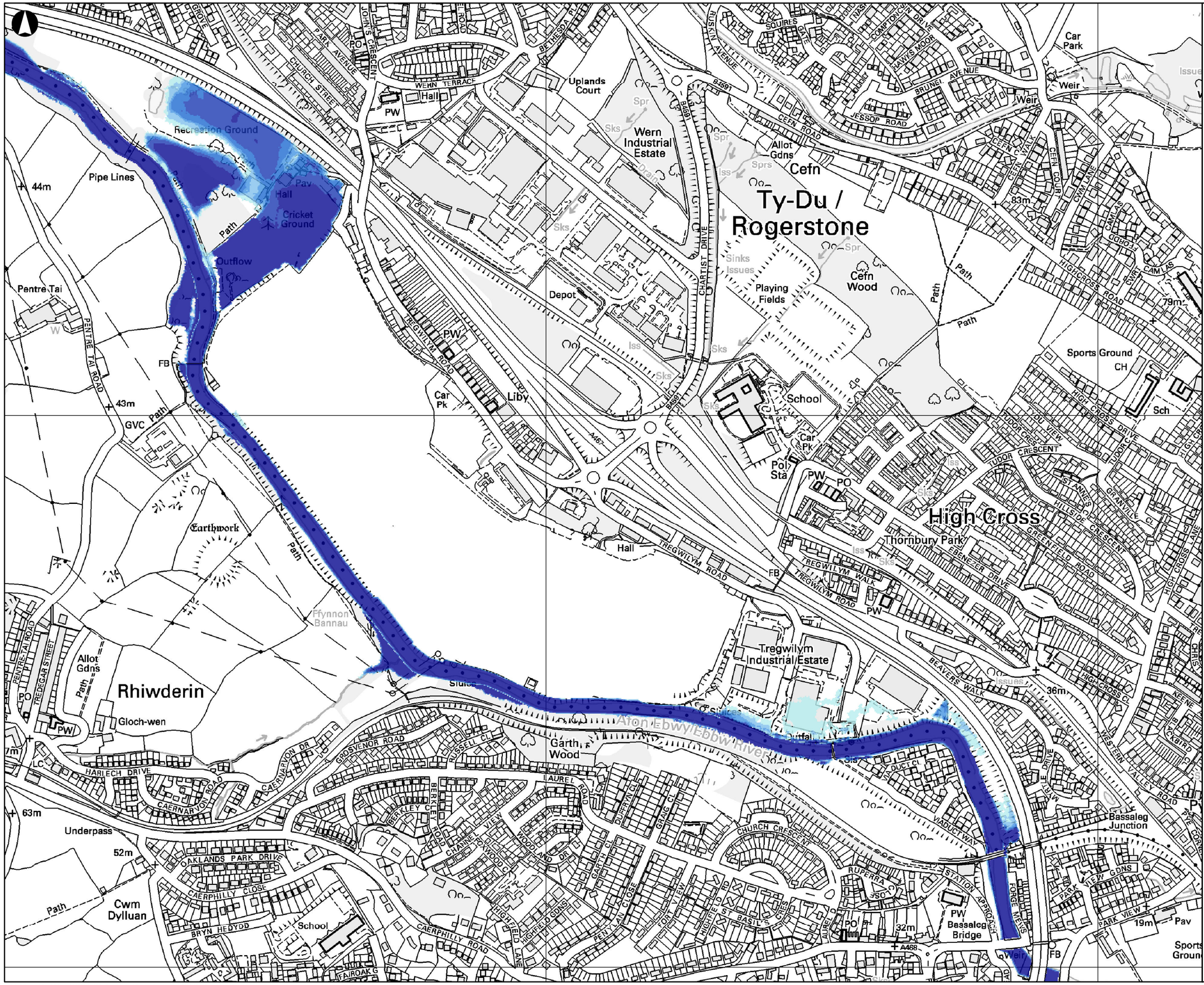

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Flood Depth (m)

- 0 - 0.15
- 0.15 - 0.3
- 0.3 - 0.4
- 0.4 - 0.6
- 0.6 - 1
- > 1

31/07/2012 15:09:07

Issue	Date	By	Chkd	Appd
P1	2012-07-31	LC	LY	KA

Metres: 0 — 87.5 — 175 — 350

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Job Title

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Q100 plus Climate Change Flood Map, Proposed Condition

Scale at A3

1:6,500

Job No	Drawing Status	Issue
218996	Preliminary	P1

Drawing No

Fig 8

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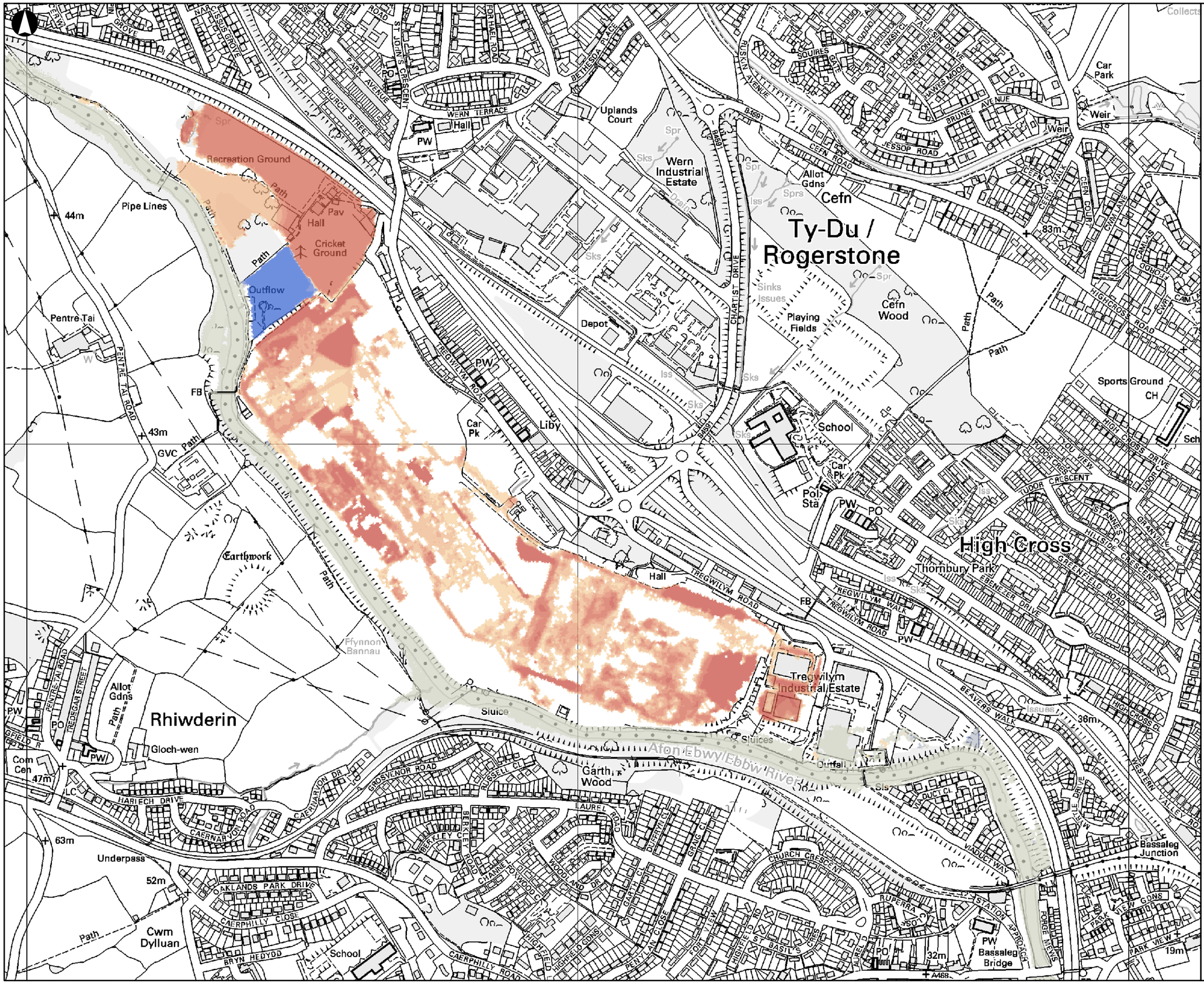

Legend

Water Depth Differnce

Design - Baseline (mm)

- < -300
- -300 - -200
- -200 - -150
- -150 - -100
- -100 - -50
- -50 - 0
- 0 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- 200 - 300
- > 300

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Issue	Date	By	Chkd	Appd
P1	2012-07-31	LC	LY	KA

Metres: 0 — 87.5 — 175 — 350

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Job Title

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Comparison between proposed and existing conditions under Q100CC

Scale at A3

1:6,500

Job No	Drawing Status
218996	Preliminary

Drawing No	Issue
Fig 9	P1

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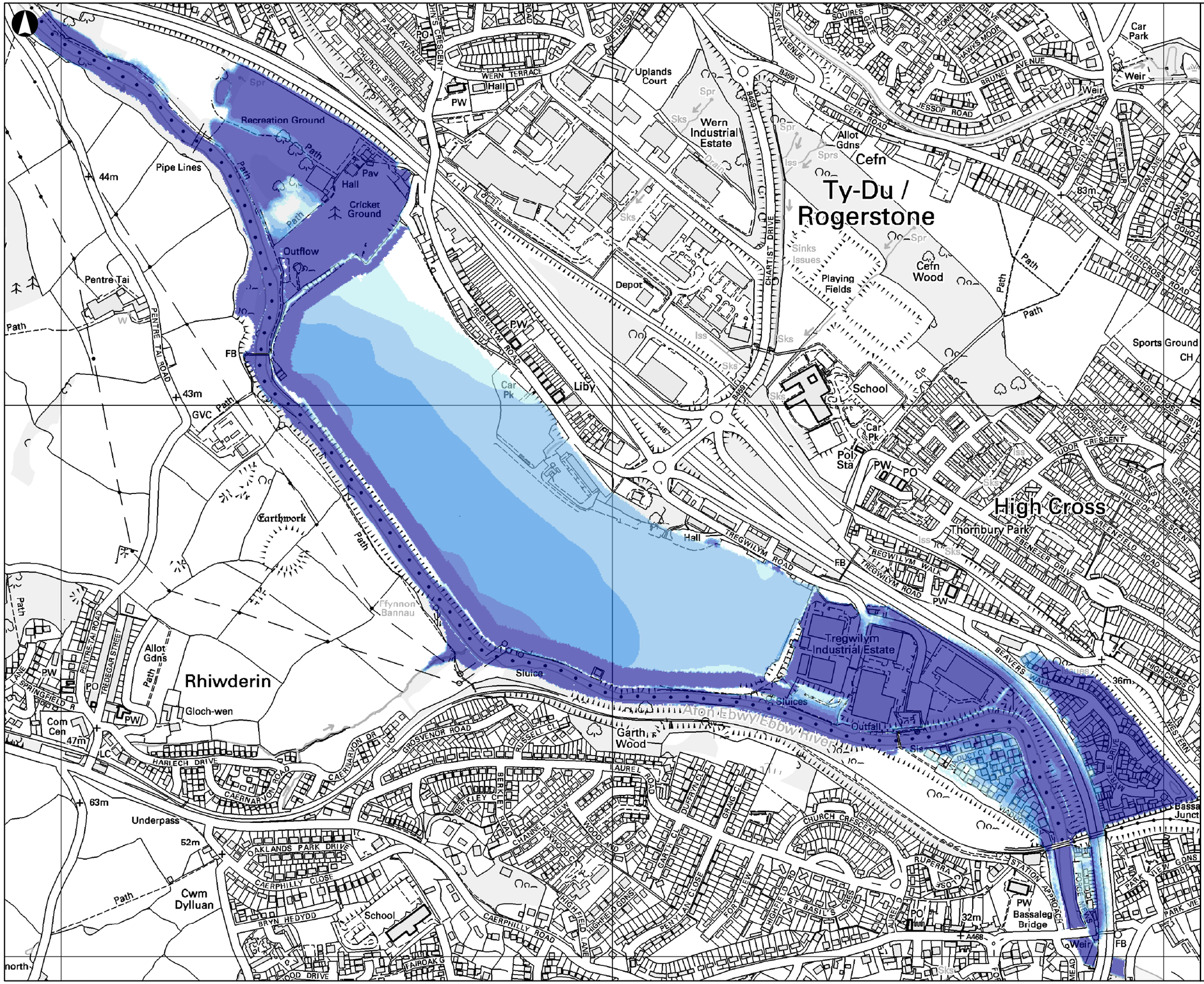

Legend

Flood Depth (m)

- 0 - 0.15
- 0.15 - 0.30
- 0.301 - 0.45
- 0.451 - 0.60
- >0.60

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Issue	Date	By	Chkd	Appd
P0	2013-01-07	KM	LY	KA

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Walters Land (Rogerstone) Ltd

Job Title

Rogerstone

Q1000 Flood Map
Flood Depth
Proposed Condition

Scale at A3

1:6,500

Job No	Drawing Status
218996	Preliminary

Drawing No	Issue
001	P0

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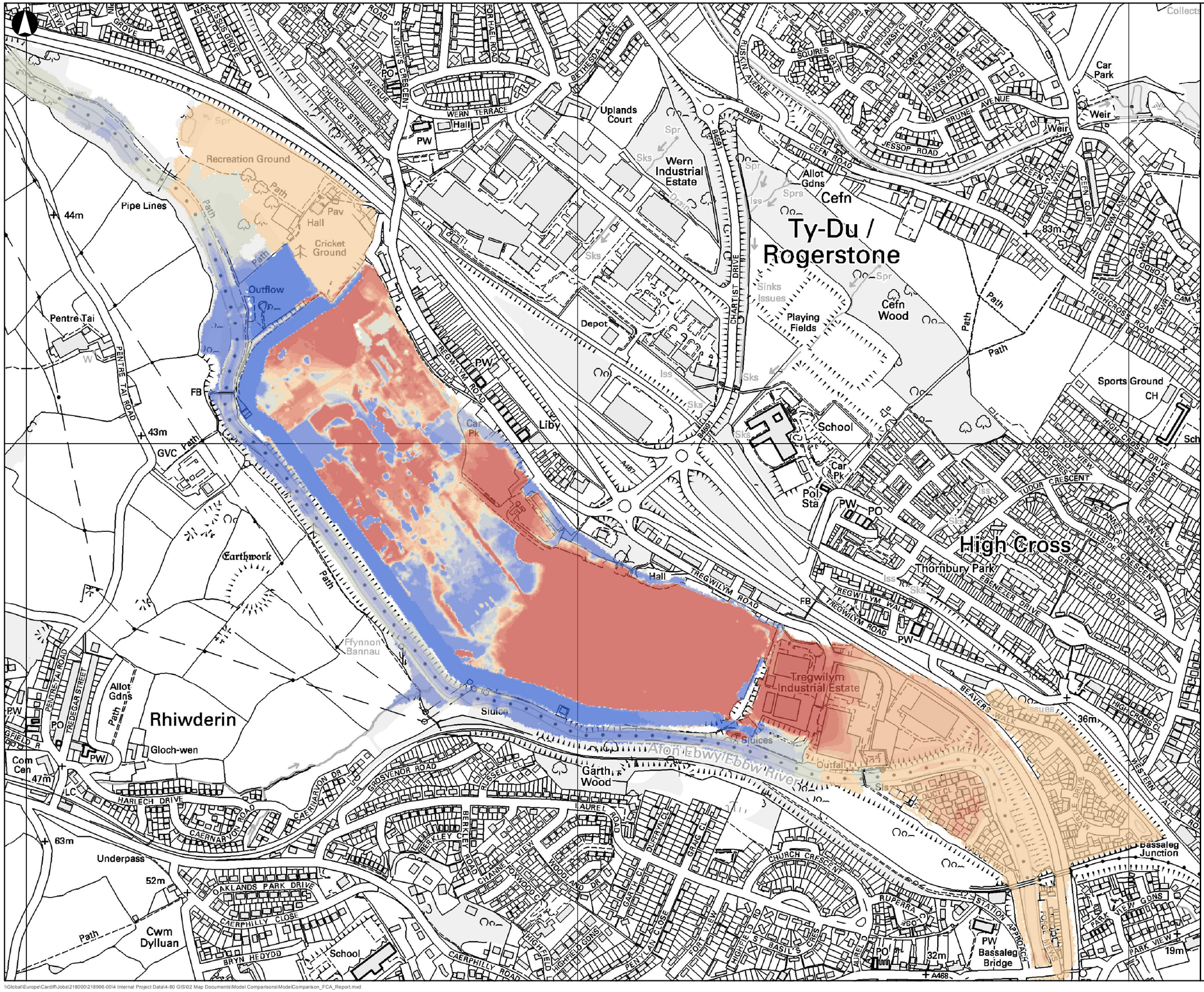

Legend

Water Depth Differnce

Design - Baseline (mm)

- < -300
- -300 - -200
- -200 - -150
- -150 - -100
- -100 - -50
- -50 - 0
- 0 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- 200 - 300
- > 300

14/11/2012 12:36:46

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Issue	Date	By	Chkd	Appd
P1	2012-11-14	LC	LY	KA
P0	2012-07-31	LC	LY	KA

Metres: 0 — 87.5 — 175 — 350

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Client

Walters Land (Rogerstone) Ltd

Job Title

Rogerstone

Comparison between proposed and existing conditions under Q1000

Scale at A3

1:6,500

Job No	Drawing Status
218996	Preliminary

Drawing No	Issue
Fig 11	P1

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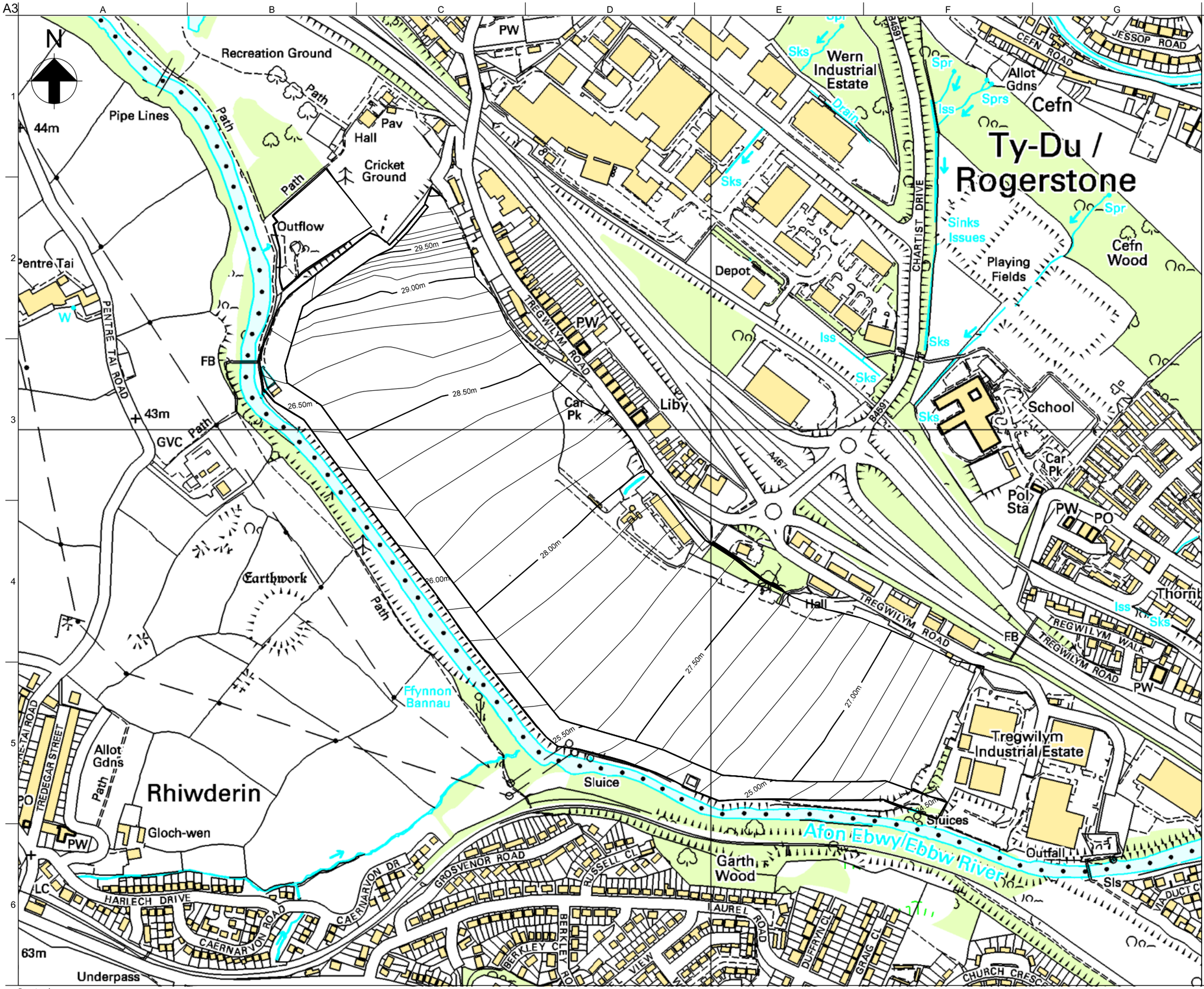

Notes:-

1. Proposed road surfaces will be up to 150mm below and the ground floor of buildings up to 150mm above the indicated contours.

2. The finished levels can vary by ±100mm from the indicated contours, provided that the profile of the development surface is unchanged.

Issue	Date	By	Chkd	Appd

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Client
Walters Land (Rogerstone) Ltd.

Job Title
Jubilee Park

Drawing Title
The Development Surface

Scale at A3 1:5000

Discipline Earthworks

Drawing Status
For Information

Job No	Drawing No	Issue
218996	Figure 12	

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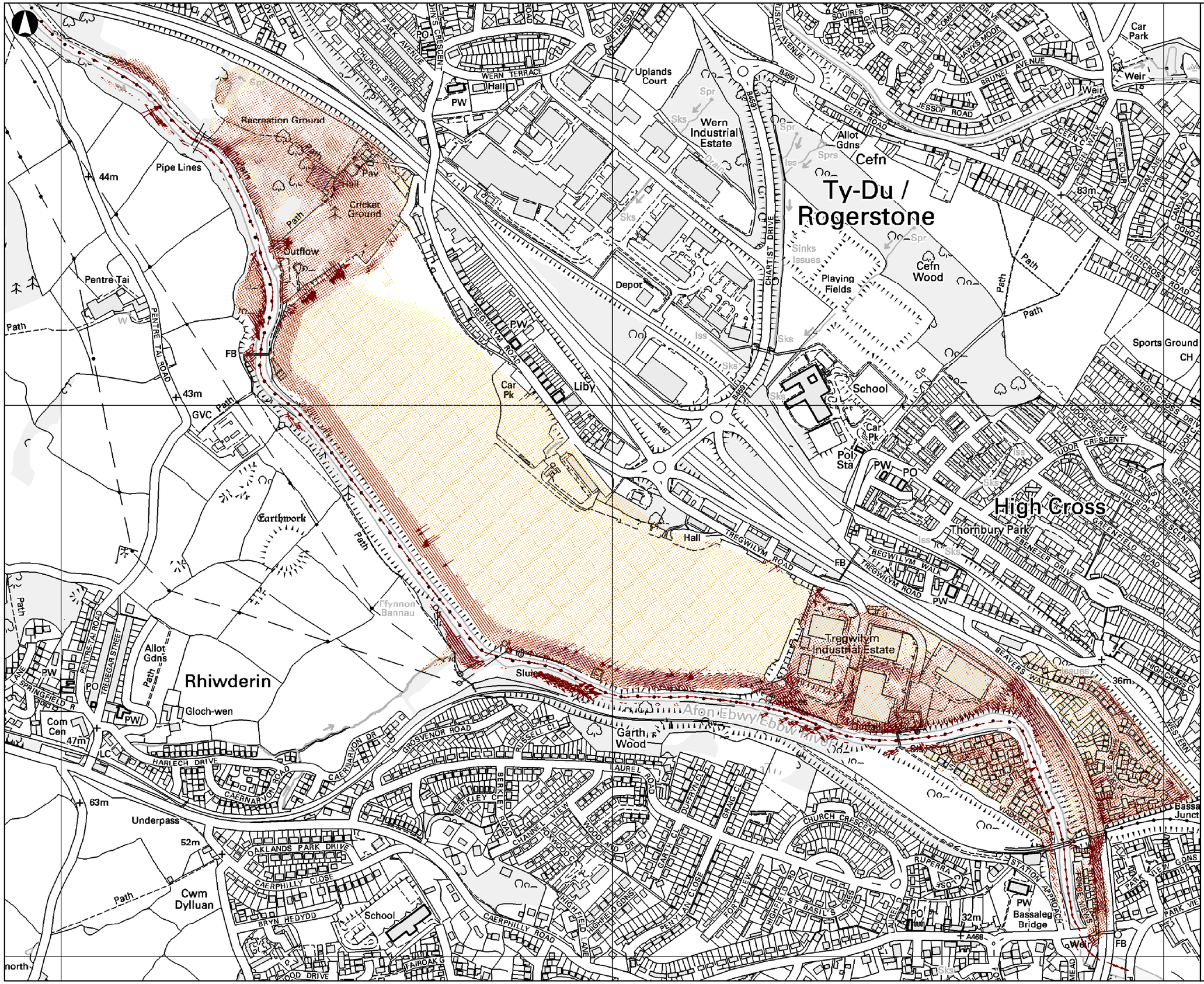
A3



Legend

Flood Velocity (m/s)

- 0 - 0.010
- 0.011 - 0.019
- 0.020 - 0.049
- 0.050 - 0.099
- 0.100 - 0.999
- > 1.0

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Issue	Date	By	Chkd	Appd
P0	2013-01-07	KM	LY	KA

Metres: 0 – 87.5 – 175 – 350

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Walters Land (Rogerstone) Ltd

Job Title

Rogerstone

Q1000 Flood Map
Flood Velocity
Proposed Condition

Scale at A3

1:6,500

Job No	Drawing Status
218996	Preliminary

Drawing No	Issue
Figure 13	P0

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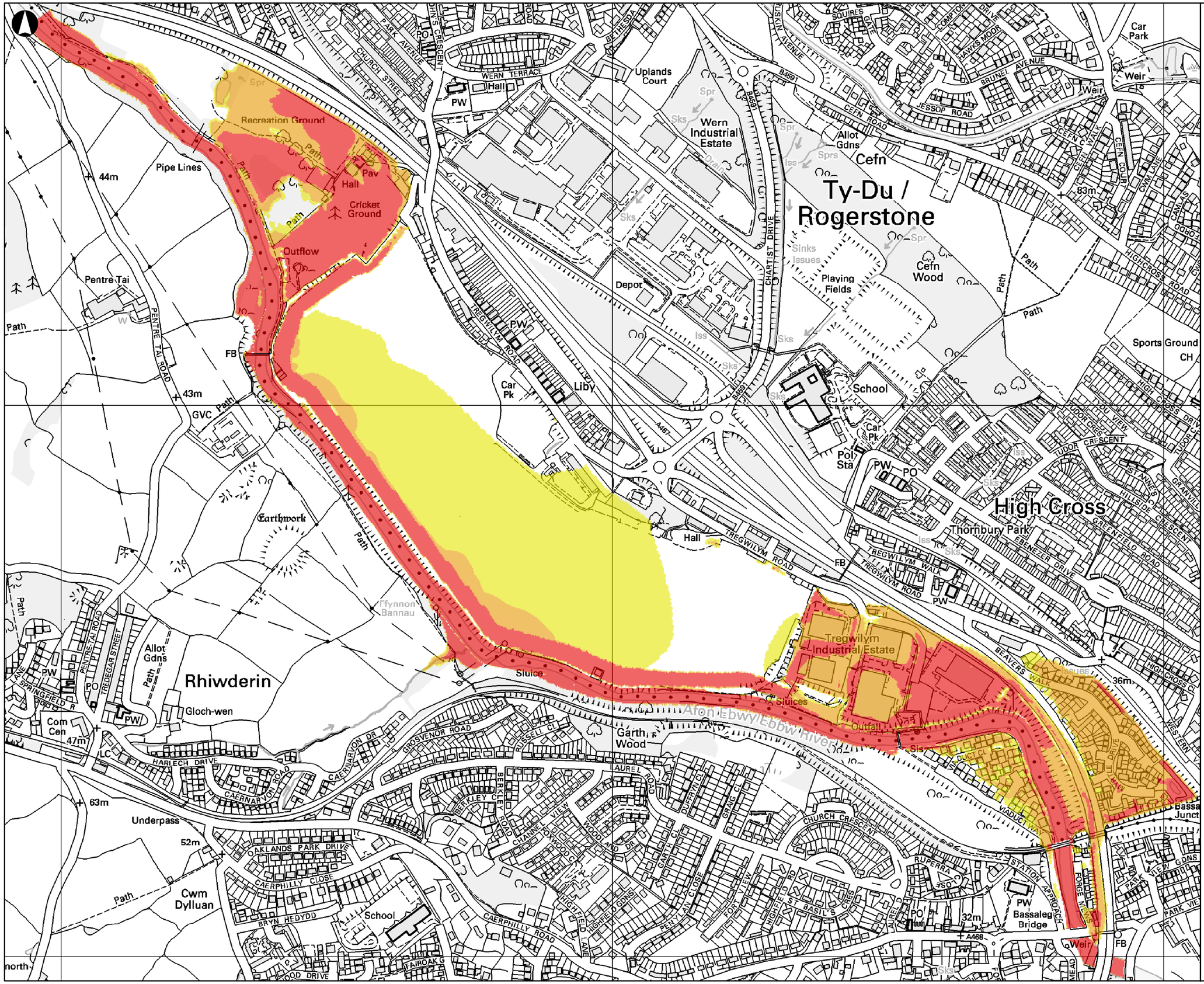

Legend

Flood Hazard

- 0.5 - 0.75
- 0.75 - 1.25
- 1.251 - 2.0
- > 2

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P0	2013-01-07	KM	LY	KA

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Job Title

Rogerstone

Q1000 Flood Map
Flood Hazard
Proposed Condition

Scale at A3

1:6,500

Job No	Drawing Status
218996	Preliminary

Drawing No	Issue
Figure 14	P0

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Appendix A

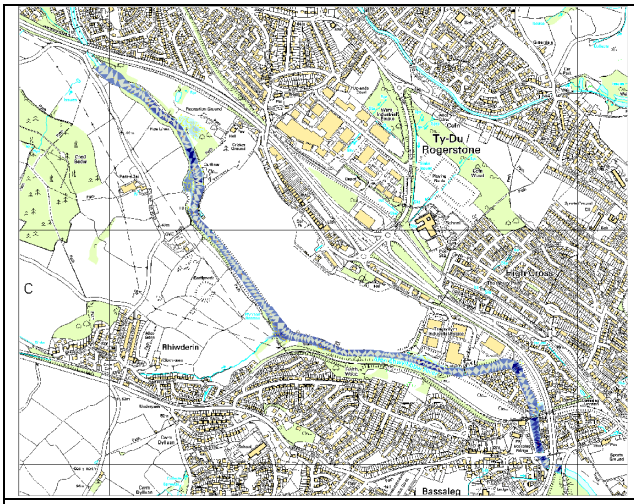
Animation Screenshots

A1

ARUP

Subject Solution Model FMT08 - Q1000 Flood Depths and Velocities

Date 3 January 2013 Job No/Ref Rogerstone



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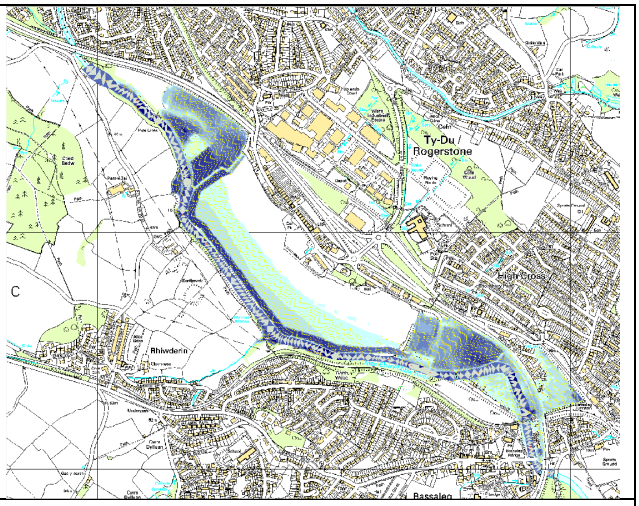

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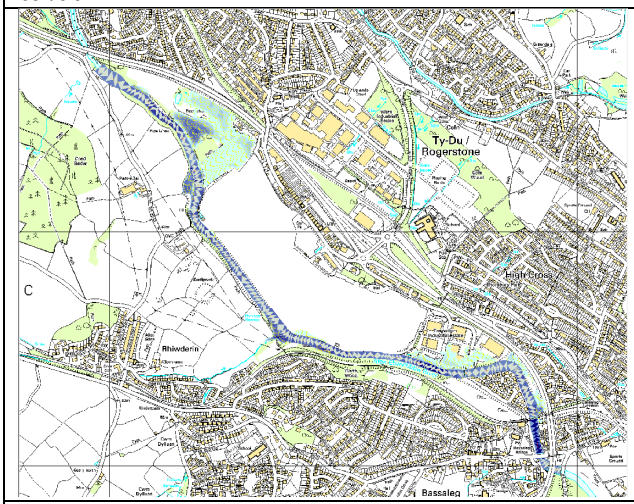

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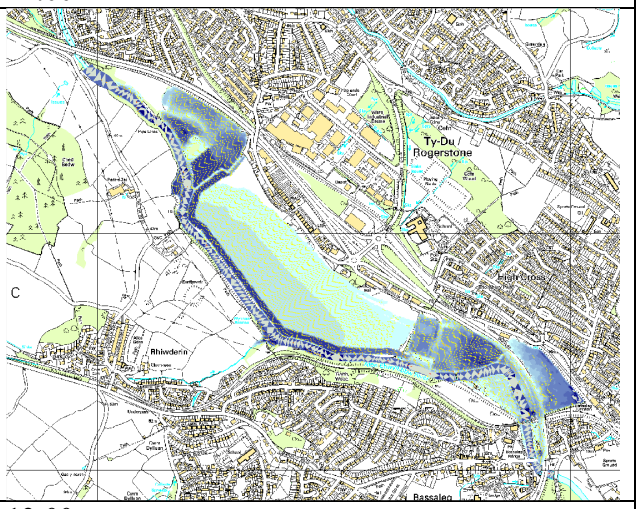

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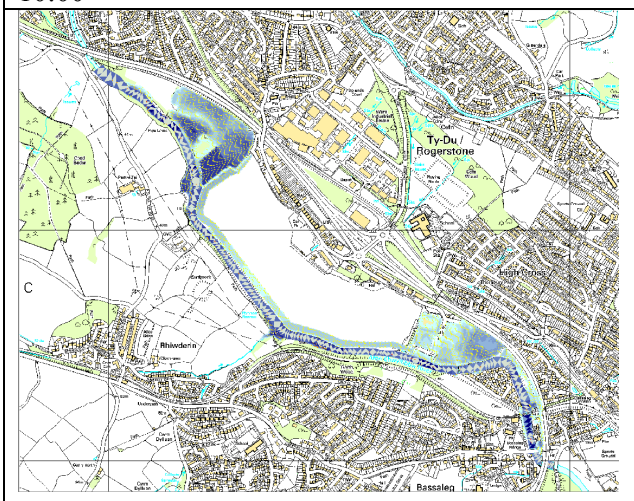

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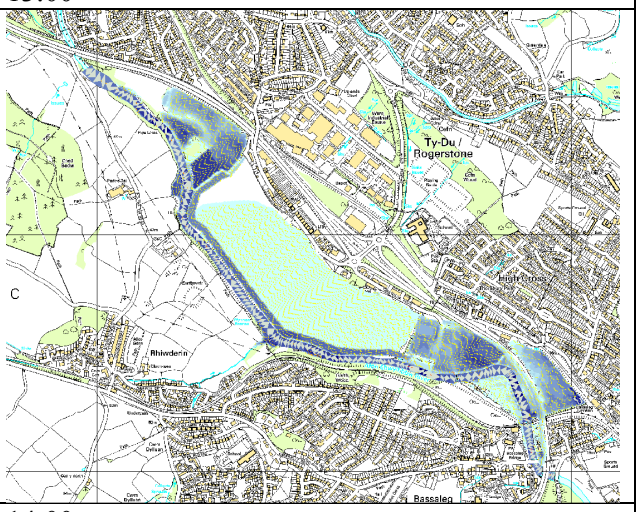

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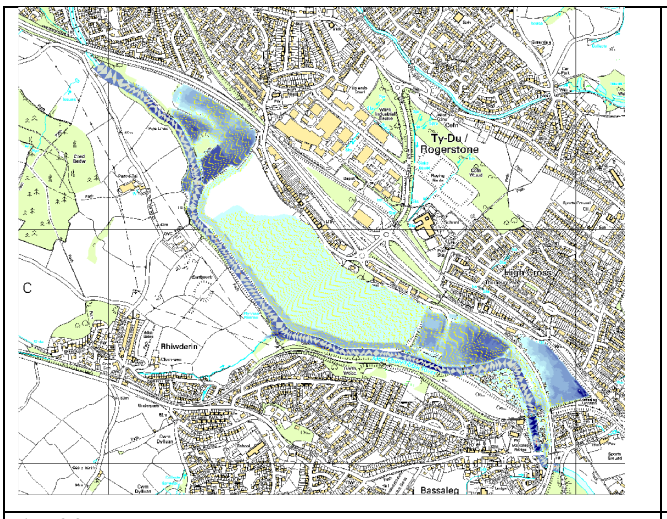
Subject Solution Model FMT08 - Q1000 Flood Depths and Velocities

Date 3 January 2013 Job No/Ref Rogerstone



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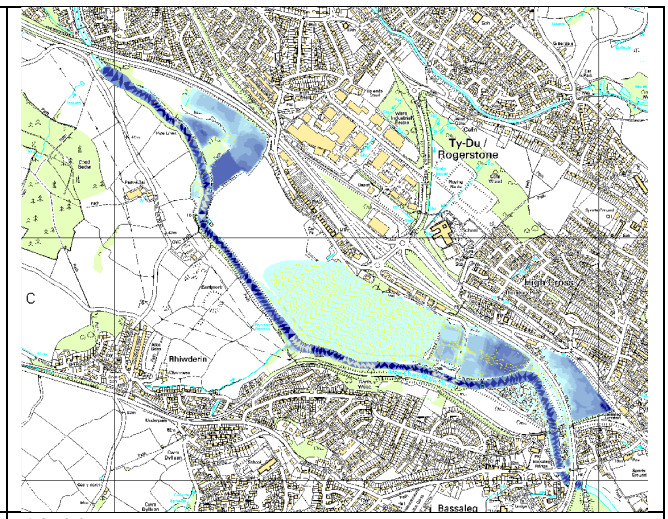

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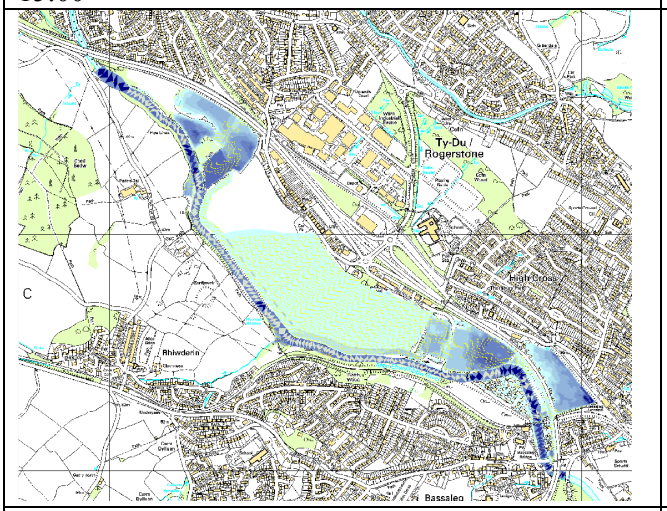

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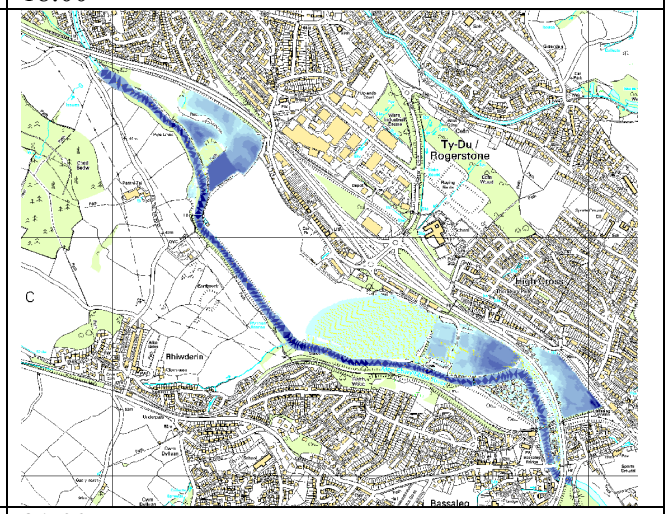

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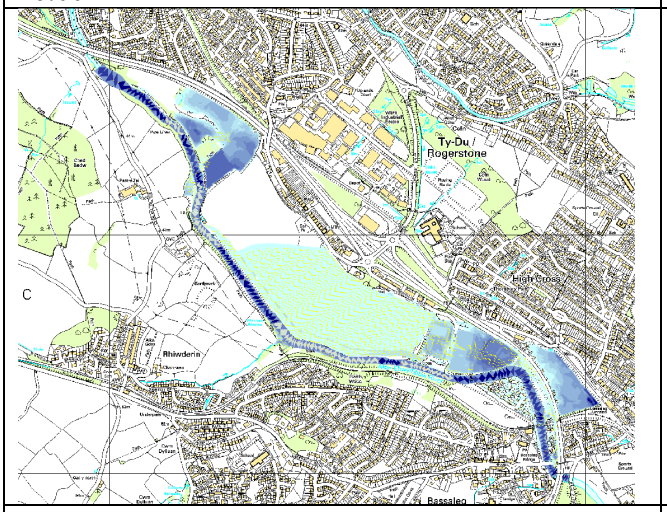

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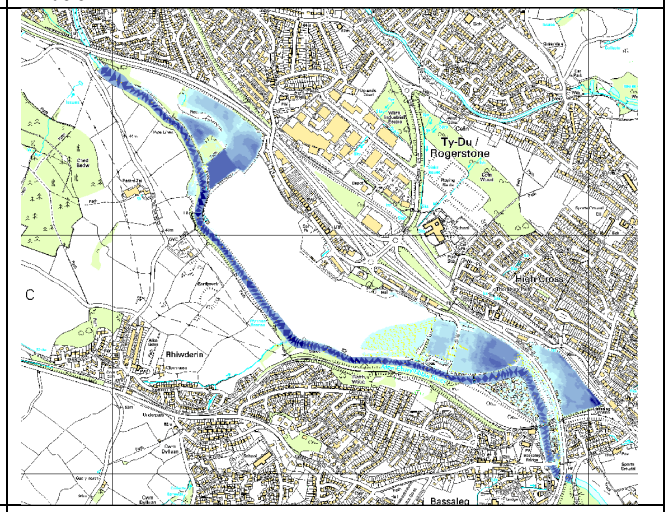


23:00

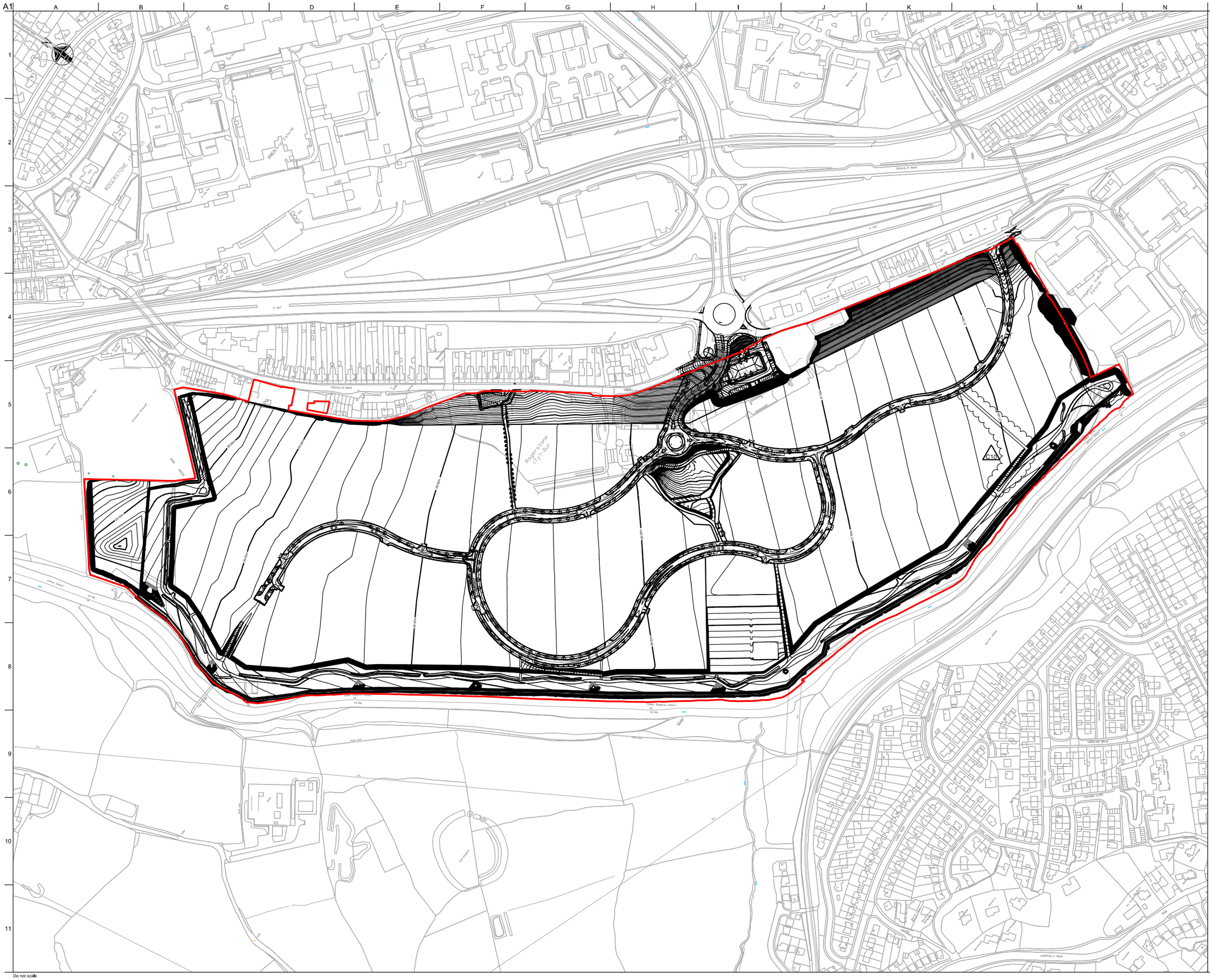
0 - 0.3 0.3 - 0.6 0.6 - 0.9 0.9 - 1.2 1.2 - 1.5 1.5 - 1.8 1.8 - 2.1 2.1 - 2.4 2.4 - 2.7 2.7 - 3 Outside Colour NoData Colour	0 - 1 1 - 2 2 - 3 3 - 4 4 - 5 5 - 6 Outside Colour NoData Colour
Depth Colour Ramp	Velocity Colour Ramp

Appendix C

Finished Levels Drawing

C1

A1



Legend

Site Boundary

Notes

1. Roads should be constructed to within 0 to -150mm, building slab levels to within 0 to +150mm of contours shown.

Issue	Date	By	Chkd	Appd
C10	14/10/16	DS	JS	JS
Footpath and ramp added				
C9	20/06/16	DS	JS	JS
Footway and Swales added to Linear Park				
C8	07/08/15	DS	JS	JS
Levels revised				
C7	10/07/15	DS	JS	JS
Levels amended as shown				
C6	20/05/15	DS	JS	JS
Levels revised				
C5	20/04/15	DS	JS	JS
Levels revised				
C4	24/09/14	DS	JS	JS
Levels revised				
C3	03/09/14	DS	JS	JS
Levels revised				
C2	04/06/14	DS	JS	JS
Channel levels amended				
C1	01/05/14	DS	JS	JS
Levels updated - As clouded				
C0	24/04/14	DS	JS	JS
Issued for Construction				

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Client
Walters Land (Rogerstone) Ltd.

Job Title
Jubilee Park - Infrastructure

Drawing Title
Final Development Surface

Scale at A1 1:2000

Discipline Civils

Drawing Status
Construction

Job No	Drawing No	Issue
229671	CG1005	C10

Do not scale

© Arup

J:\229000\229671-00\04 Internal Project Data\04-30 Drawings\Infrastructure Drawings\CG1005\??????