FLOOD CONSEQUENCE ASSESSMENT

ALDI & STARBUCKS - AFAN WAY, PORT TALBOT

CLIENT



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Revision	Date	Notes	Author	Checked	Approved
DRAFT	26.06.23	First issue	WAH	-	-

1. INTRODUCTION

- 1.1. This Flood Consequence Assessment (FCA) has been prepared to support a planning application for the proposed development of a retail food store and a drive thru coffee shop at the request of Aldi Stores Ltd. This FCA has been prepared in line with the relevant legislation and guidance, as detailed below.
- 1.2. The Welsh Assembly Government's policy with respect to development in flood risk areas is set out in Planning Policy Wales, Technical Advice Note 15: Development and Flood Risk published in July 2004 (TAN15). TAN15 supplements Planning Policy Wales (PPW).
- 1.3. The objective of this report is to assess the flood risk to the site and evaluate whether the proposed development meets the requirements of TAN15.
- 1.4. It was intended that the 2004 version of TAN15 would be superseded by a revised version, published in October 2021, with panning applications determined after 1st December 2021 subject to assessment under the revised 2021 version. However, it was announced in November 2021 in a Written Statement by the Minister for Climate Change that implementation of the new version would be suspended until June 2023 and that the 2004 TAN15 would continue as the applicable framework for assessing flood risk in the planning system. In May 2023 it was further announced that following re-consultation it is unlikely that the new TAN will come into force before the end of 2023. The 2004 guidance therefore remains applicable.
- 1.5. This report has been developed using information from Natural Resources Wales (NRW) including online mapping and Product 5 & 6 information in the form of a report commissioned from JBA Consulting Ltd, reference **2016s4827 Port Talbot Harbourside PAR Project Report**; tide level data from the Environment Agency (EA); Dŵr Cymru / Welsh Water asset mapping; and other site-specific information.

2. PROPOSED DEVELOPMENT SITE

2.1. Site Location

The site is located to the south west of Port Talbot town centre and close to the north bank of the river Afan at post code SA12 6LL or national grid reference SS 759900 89830. A location plan is included as appendix A.

The total site area is approximately 1.21 hectares. The site is bounded to the north by Water Street and Ysguthan Road, to the south west by Isaac's Place, and to the south west by the A4241 Afan Way.

2.2. Topographical Survey Data

A topographic survey of the site has been carried out by Berry Geomatics, drawing ref. 103/18. A copy of this survey is included in appendix B.

The topographic data shows that the site is relatively flat with levels typically in the range of 6.00 to 6.50m AOD, dropping as low as 5.30m at the two existing access points from Water Street. The site is generally 0.5-1.0m higher than Water Street and Isaac's Place and up to 1.3m lower than Afan Way.

The site has been occupied in the past by commercial/industrial buildings which have since been demolished. The topographic survey shows two steel frames within the site which were erected in or around 2008 as part of an aborted redevelopment. It has been established that these were removed in mid 2021.

3. DEVELOPMENT PROPOSALS

It is proposed to develop this site with an ALDI food store and a Starbucks drive thru coffee shop with associated parking, access and landscaping as shown in the proposed site plan, included in appendix C. The ALDI will be set along the Isaac's Place boundary, whilst the Starbucks will be close to the junction of Afan Way and Water Street. The public vehicle access to the site will be from Afan Way, with pedestrian access from Water Street as well as access for HGV delivery vehicles.

4. FLOOD RISK FEATURES

Approximately 60m to the south east of the site at its closest point is the River Afan, which is classified by NRW as a Main River. It is evident that the river is tidal at this location since it is downstream of the nearby Green Park Weir which impounds water to feed Port Talbot dock. NRW data indicates that any risk of flooding is primarily from fluvial rather than tidal events.

5. ASSESSMENT OF RISK

5.1. Data Sources

- (a) Relevant extracts from NRW online mapping are included in appendix D.
- (b) Extracts from the NRW-commissioned report by JBA Consulting (ref. **2016s4827 Port Talbot Harbourside PAR Project Report**) are include in appendix E.

5.2. TAN15 (2004) Development Advice Map

A relevant extract from the Natural Resouces Wales online Development Advice Map (DAM) is shown in appendix D. This map shows that the entire site is classified as DAM Zone C1, which describes areas of the floodplain which are developed and served by significant flood infrastructure.

5.3. TAN15 (2004) Flood Map for Planning Wales

A selection of extracts from the NRW Flood Risk Assessment Wales Map with various data sets highlighted is also included in appendix D. The Flood Defence map shows that the entire site is classified as a TAN15 Defended Zone benefiting from river defences, whilst the immediately surrounding areas also benefit from sea defences.

On the detailed flood mapping, the entire site is shown to be at 'Low' risk with respect to river flooding and 'Very Low' risk with respect to sea flooding, corresponding to the areas indicated on the Flood Defences Map.

5.4. Tidal and Fluvial Flood Risk

Environment Agency data retrieved from the website data.gov.uk has been used to determine the base level 0.5% tidal event in 2017. A plan showing the relevant node and levels is included in appendix E. The nearest node is at chainage 480, node 2 on the Afan Estuary limb. The 1 in 200-year (0.5%) tidal level based on 2017 data is 6.37mAOD and the 1 in 1000-year (0.1%) level is 6.69mAOD. These levels are above the existing ground levels across much of the site, however due to the presence of higher ground between the site and the river, the corresponding tidal events do not present an immediate risk of flooding. As stated in Section 5.3 above, the surrounding area is considered to be at low risk from flooding from the sea, indicating an annual probability of flooding of between 0.1% and 0.5%, taking into account the effect of flood defences. From further inspection of the Flood Risk Map it is apparent that in a extreme event water would first overtop the river bank adjacent to Green Park Street upstream of Green Park weir before proliferating to low lying areas; this is also identified as a spilling location in the JBA report. It can be inferred that the top of the bank at this location is at a level just above the 0.5% tidal level of 6.37m. The fact that the site is outside of the 'Low' flood risk zone indicates that it is above the level that inundating water would be expected to reach in a 0.1% probability event based on 2017 data.

Detailed fluvial flood mapping included with the JBA report has also been reviewed and is included in appendix F. By cross-referencing this with the topographical data, it is apparent that fluvial flooding may be expected to reach a level of approximately 5.50mAOD in the 1.0% AEP event, and 6.20mAOD in the 0.1% event.

5.5. Surface Water Flooding

The surface water flood risk to the site has been assessed using the NRW online mapping as shown in appendix D. This shows that the site is not currently at risk of surface water flooding, but that parts of the adjacent Water Street and Isaac's Place are considered to be at low to medium risk.

The surface water drainage strategy is covered in Section 6 of this report.

5.6. Sewer Water Flooding

There are no known records of sewer flooding within the area. Surveying has identified two separate DCWW combined sewers which cross through the site in orthogonal directions. These are at considerable depth and do not present any risk of flooding to the site.

5.7. Ground Water Flooding

A series of trial pits and window samples recorded across the site typically indicate approximately 1.0 to 3.0m of made ground overlying alluvial deposits. Perched groundwater was encountered at two locations at a depth of approximately 1.0m within the made ground. Elsewhere on site groundwater strikes were identified in the natural ground at depths between 4.2m and 5.3m. The groundwater may be tidally influenced due to the proximity of the river Afan, however based on the depth at which it was encountered, emergence at the surface is considered to be unlikely.

5.8. Reservoir Flooding

It is important to consider the potential failure of reservoirs as if these bodies of water are breached or fail then rapid inundation could occur downstream. The NRW website provides mapping to show the flood risk from reservoirs. This is included in appendix D and shows that the site is not considered to be at risk from this form of flooding.

5.9. Historic Flood Data

Despite the identified fluvial flood risk, there has been no recorded flooding in the immediate vicinity of the site in recent times. The site falls within the 'River Afan at Port Talbot' Flood Warning Area; the website 'floodassist.co.uk' reports that no Flood Warnings have been issued for this area since at least June 2017.

5.10. Displaced Flood Storage

Site levels are generally to be raised across the majority of the site, in particular to form the platform for the ALDI. With respect to fluvial flooding, the areas where the greatest level build-ups are proposed are generally already higher than the threshold 0.5% probability flood level of 6.20mAOD therefore will not have any impact on flood storage in this scenario. In one area levels will be lowered significantly to form the service yard entrance from Water Street. Extensive use of permeable paving is proposed across the site, along with other below ground attenuation. Taken together, these features will provide compensation for the parts of the site that will be raised in at-risk areas.

In a tidal flooding scenario, flood volume compensation on site would have an immeasurably small effect on the flood level in the surrounding area during such an event where the flood defences were breached or overtopped to a significant degree.

5.11. Additional Issues Considered in the Assessment of Flood Risk

- (a) Obstruction to the flow of water during a flood event the flow of water during a flood event will not be significantly obstructed by the proposed buildings.
- (b) Obstruction to watercourses or access to them the proposed development is not directly adjacent to the watercourse therefore will not present any obstruction to it or to any access routes.

6. IMPACT OF CLIMATE CHANGE

6.1. Tidal and Fluvial Flood Risk

Guidance is provided on the gov.wales website with regards to climate change allowances to be included within flood consequence assessments for proposed developments.

For fluvial flood risk, the current guidance gives recommended allowances to be made for peak river flow increases from a 1961-1990 baseline. For the West Wales river basin district which includes the site, the guidance indicates that the appropriate change factor/central estimate to inform design levels is 30%. The detailed flood mapping for the 1.0% AEP + Climate Change event, extracted from the NRW Product 6 data and included in appendix F shows that food levels would be expected to reach a level of 5.50m AOD in this scenario and would not encroach on the site beyond the service yard entrance. In more extreme events flooding would occur within the site boundary, however mapping for these scenarios is not included in the Product 6 data.

In terms of tidal flooding and sea levels, the guidance makes allowances for the higher central (70th percentile) and upper end (95th percentile) expected increases, based on UKCP18 projections. Development proposals should be assessed against the higher central allowance to inform design levels, while the upper end should be used to inform mitigation measures, access and egress routes and emergency evacuation plans. Table 1 below shows the anticipated sea level rises for the appropriate Local Authority Area.

Local Authority Area	Mean sea level rise (metres)		
	Percentile	By 2100	netres) By 2120 1.01 1.32
Neath Port Talbot	70 th	0.84	1.01
Neath Port Taibot	95 th	1.11	1.32

Table 1: gov.wales Sea Level Rise Estimates

Being a commercial development, the site has a maximum lifespan of 75-years, although in reality this will likely be lower. Assuming the development begins operating in 2024, climate change should therefore be assessed until 2099. The "by 2100" allowances are therefore appropriate. These allowances are added to the extreme sea levels identified in section 5.4, as shown below.

Year & Extreme Sea Level (mAOD)			
Return Period (%AEP)	2023	2099 (higher central)	2099 (upper end)
0.5	6.37	7.21	7.48
0.1	6.69	7.53	7.80

Table 2: Extreme sea level estimates for site.

Table 2 shows that the maximum tidal flood level for the 2099 0.5% AEP flood event at 7.21mAOD, which is considerably above the proposed ALDI FFL and the highest level of the site at 6.975m. If flood defences commensurate with the anticipated sea level rise due to climate change are not installed in the intervening years, the site would be inundated with water in such a scenario, reaching at least 230mm above its highest point.

During the 0.1% AEP scenario in 2099, the maximum water elevation is estimated as 7.53mAOD, as such the site would be at risk of flooding to a depth of more than 550mm above its highest point.

Climate change will also increase the risk of surface water flooding, as rainfall intensity is predicted to increase. The management of surface water is dealt with in section 13.

7. FLOOD CONSEQUENCES AND ACCEPTIBILITY CRITERIA

The information included with this FCA demonstrate that the site is not considered to be at risk of flooding events up to and beyond the present day 0.5% tidal flood and the present day 1.0% fluvial flood and therefore meets the requirements of the threshold frequency criterion in Welsh Government advice on flood risk TAN15 (2004) A1.14.

TAN15 accepts that areas will flood during extreme events, and it is considered that overtopping of the flood defences would classify as an extreme event. TAN15 A1.15 contains indicative acceptability criteria for flood depths and velocities to assess the consequences of such flooding.

Based on the proposed floor levels of 6.975m AOD (ALDI) and 6.40m (Starbucks), and a maximum flood level of 7.80m in the 0.1% plus climate change (upper end) event, it can be expected that a significant level of flooding of both units would occur in this event, if new flood defences are not constructed to protect against sea level rise due to climate change. Fluvial flooding could reach similar levels in corresponding events.

The anticipated depth of flooding, up to 1.40m above FFL, is not within the recommended limits for commercial buildings of 600mm from TAN15. Similarly, the rate of rise of flood water, speed (time) of inundation and maximum velocity of flood waters do not meet the recommended limits due to the proximity of the river.

It should be noted that the criteria given in A1.15 are not prescriptive, and "provide indicative guidance".

As above, although the site is not explicitly shown on NRW mapping to benefit from flood defences, surrounding land levels result in the site being effectively defended against the present day 0.1% event. Additionally, tidal flooding is a wholly predictable event, based on normal tidal progression and medium range weather forecasting. Any extreme tidal flood should therefore be preceded by a flood warning, allowing an evacuation (or non-opening) of the store.

It is therefore considered that the consequences of flooding are acceptable, given the current standard of protection of the defences and the ability to reduce risk through evacuation / closure in the event of a flood warning being issued.

8. MITIGATION MEASURES

In situations where development is proposed in areas prone to, but defended from, flooding, it is typical practice to raise the floor level of proposed buildings above the existing ground levels. The proposed ALDI FFL of 6.975m AOD is approximately 600-700mm above the current levels within the proposed building footprint. Similarly, the floor level is higher than the proposed ground levels in the car park. The proposed Starbucks FFL of 6.400 is 200-300mm above current levels but will be at a low point with respect to its associated car park.

In order to raise the floor level to meet the A1.15 extreme event threshold criteria of a maximum of 600mm of flooding, would mean an increase in FFL to higher than 7.53mAOD. This is not considered practical due to the excessive gradients that would arise on access routes to meet the existing road network, the levels differences at the boundaries, and the need to import a significant amount of soil to raise ground levels to such an extent.

Where buildings can be anticipated to be flooded during an event, there may be a benefit in utilising flood resilient construction methods to reduce damage to the interior and decrease the amount of time taken for usage of the building to return to normal. Based on the recommendations of the Communities and Local Government publication "Improving the Flood Performance of New Buildings", the normal construction of both an ALDI store and Starbucks drive thru, which will be similar, are considered to be relatively resilient to internal flooding. A cast in-situ reinforced concrete slab will be incorporated, without a sub-floor void or insulation (although a ventilating layer may be required for ground gas dispersion). A full proprietary gas protection barrier is required, which beneath the slab will exceed the performance of a normal damp-proof membrane. Floor finishes comprise concrete terrazzo tiles and polished concrete. Walls comprise closed cell composite insulated panels externally, with concrete blockwork masonry internally, with limited areas of wall-boarding and plaster to internal faces. External doors are steel and internal doors are solid timber with laminated facings, windows are aluminium framed. Services are generally distributed above ceiling level, and are generally raised well above the floor level.

It is therefore considered that the proposed construction of each of the buildings is inherently relatively resilient to flooding, and no specific measures are proposed.

It is recommended that the management of each of the two properties subscribe to NRW's flood warning service in order to provide early warning should a flood event be expected, to allow evacuation of both customers and staff, as well as deployment of temporary flood protection measures (flood barriers for instance) that may increase resilience in the event of a minor overtopping scenario.

9. THE SUITABILITY OF SITE FOR DEVELOPMENT

9.1. Compatibility of Proposed Development

As shown in section 5.1, the site is classified as being within TAN15 (2004)'s Development Advice zone. The proposed development being a "commercial and retail development" is classified by TAN15 as "less vulnerable development". Less vulnerable development located in flood zone C1 is considered compatible provided that the development can be justified in this location, including an acceptability of potential consequences.

9.2. Justifying the Development Location

Section 6 of TAN15 (2004), sets out a number of factors that must be complied with for a development to be justified:

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 (PPW fig 2.1).

AND;

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 and 7 and appendix 1 found to be acceptable.

The proposed site has previously been an employment site (prior to 2006) and its development will make use of otherwise derelict land and increase the employment opportunities for the area. More details are contained within the Planning and Retail Statement, prepared as part of the planning application. It is therefore considered that this complies with the above point ii, as well as contributing towards Objectives 3, 12 and 17 of the Neath Port Talbot Local Development Plan 2011-2026.

Previously Developed Land is defined in PPW as:

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

The proposed site was previously occupied by permanent structures and associated fixed surface infrastructure and is therefore considered to be previously developed. This therefore complies with point iii.

This FCA has considered the potential consequences of a flood event, based on the site being defended from flooding and advance evacuation/closure being possible, and has been found to be acceptable and thereby in compliance with point iv.

Therefore, it is considered that the development can be justified in this location.

10. MANAGING SURFACE WATER

10.1. Existing Site Drainage

There is no apparent existing private drainage infrastructure within the site, and it is understood that rainfall is currently allowed to infiltrate naturally to the ground or exit via overland flows to the surrounding roads.

As noted in section 5.6 above, two separate DCWW combined sewers cross the site, each of which will be protected by a suitably sized easement.

10.2. Proposed Surface Water Drainage Strategy

Following the implementation of Schedule 3 of the Flood Water Management Act 2010 in Wales, developments with a construction area greater than 100m² are required to incorporate Sustainable Drainage Systems (SuDS). All such systems are required to be approved by the SuDS Approval Body (SAB) under an approval application, and required to be adopted by the SAB where they serve more than a single property. As such, surface water drainage for the proposed site will be developed and approved under application separate to the planning process.

Infiltration of surface water generated by the development will not be viable due to near-surface contamination and cohesive soils beneath the site. Disposal of surface water is therefore proposed to be to the River Afan via two new outfalls. Since the river is tidal at this location, any additional flow from the site will have a negligible impact on the flood risk elsewhere and the discharge from the site will not be restricted on this basis.

Surface water will discharge by gravity for as much of the site as possible, however levels dictate that pumping will be required from some areas. It is anticipated that some attenuation storage may be

required to prevent flooding on the site during the event of the outfalls being tidally locked, and the outfall pipes may also have a throttling effect on the rate. The systems will be designed to have enough storage capacity to prevent flooding for all storm durations up to and including the 1 in 30-year return period event, plus a 40% increase in rainfall intensity as allowance for climate change. MicroDrainage System 1 software will be used to size the pipes and MicroDrainage Simulation and Source Control software will be used to model the integrated below ground drainage system.

The drainage system will also be checked for the 1 in 100-year return period events plus 40%. Any surface water flooding will be retained on the site during these storm events, via ponding in low points in car park areas. Any ponding will not affect the proposed building or access/egress routes.

In the event of drainage system failure or exceedance (beyond 1 in 100-year events), flow routes will be away from the proposed and existing buildings which will not be affected.

The surface water drainage systems for the ALDI and Starbucks units will remain separate and will each serve only an individual property, therefore will not be offered for adoption to the SAB.

The design of the private drainage will be developed in accordance with the requisite standards, including current Building Regulations Approved Document Part H.

10.3. Proposed Foul Water Drainage Strategy

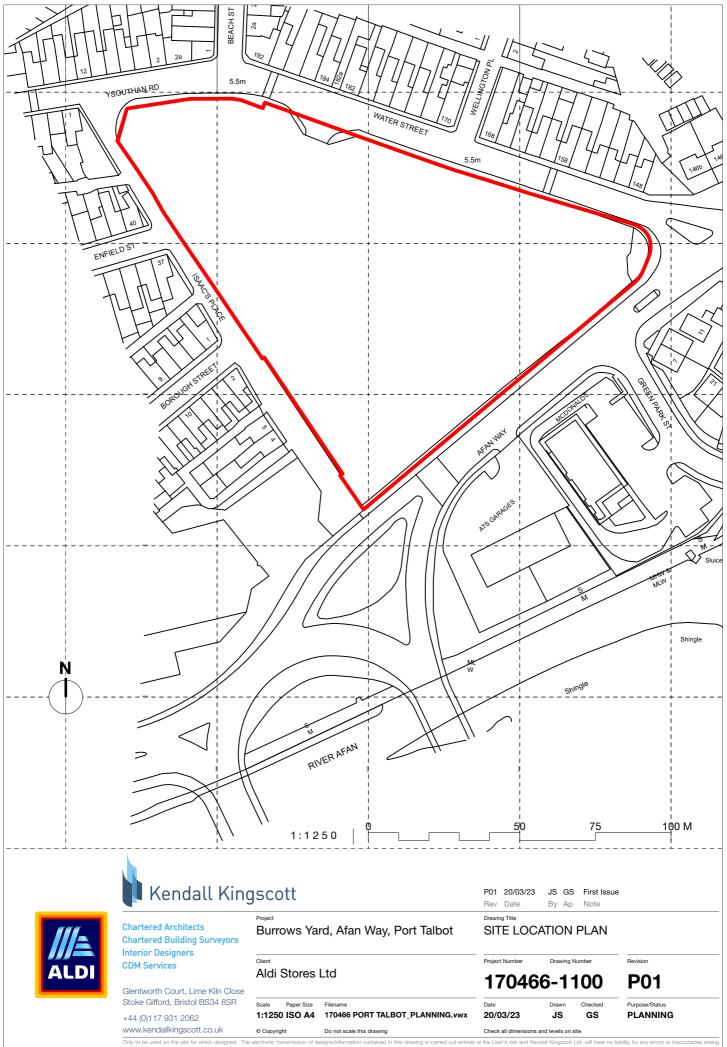
Foul drainage from each of the two properties will discharge to one of the existing public sewers which cross the site. The sewers are both at considerable depth and a gravity discharge will be achievable.

A Section 106 direct sewer connection application for each of the properties will need to be completed and agreed with Welsh Water prior to construction.

11. SUMMARY & CONCLUSIONS

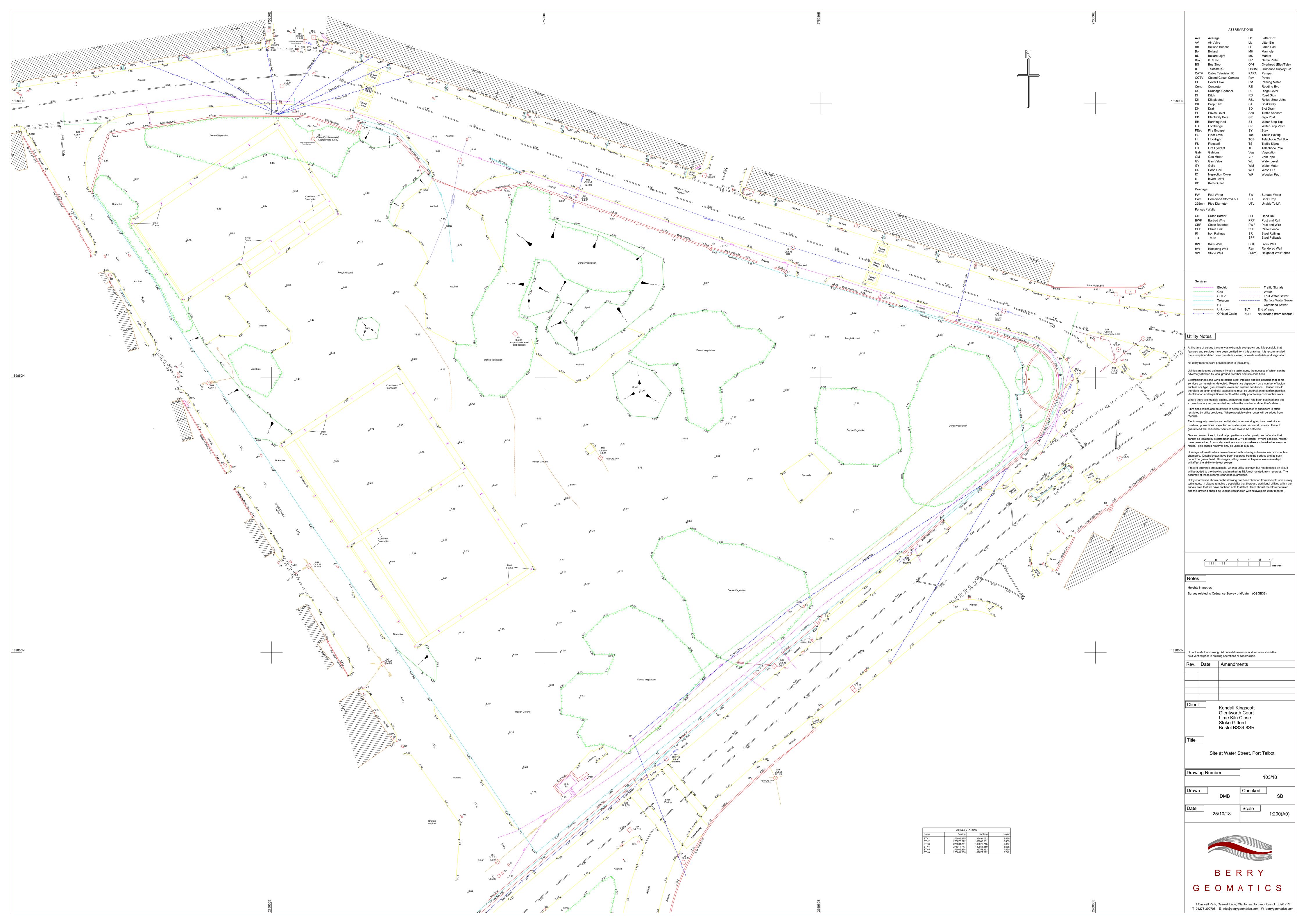
- (a) The site is not at significant risk of tidal flooding compared to fluvial flooding, which is dominant, however the site benefits from defences against both forms of flooding.
- (b) Based on current modelling, the site is not at risk from fluvial flooding or tidal flooding up to and including the 0.5% AEP & 0.1% AEP events respectively.
- (c) The Development Advice Map currently classifies the site as TAN15 (2004) flood zone C1.
- (d) Neither the site nor its access routes are risk of surface water flooding.
- (e) The site is not at elevated risk from other forms of flooding.
- (f) The site is not at risk from tidal or fluvial flooding within the commercial thresholds set out by TAN15 over the majority of a 75-year commercial design life.
- (g) Without the construction of new defences, the site (along with much of the surrounding area of Aberavon) is likely to become at elevated risk from both fluvial and tidal flooding near the end of its design life, with the maximum tidal flood water level for the 0.5% AEP event overtopping the flood defence by approximately 800mm, and the 0.1% AEP event overtopping by approximately 1100mm, when using the higher central climate change allowances.
- (h) It is considered likely that flood risk to the site and surrounding areas will continue to be managed by defences throughout the lifespan of the buildings, which will protect against both tidal and fluvial flooding.
- (i) The finished floor level of the building will be no lower than other site levels, to mitigate the impact of floodwater on site, and minimise ingress of water to the building.
- (j) It is recommended that a flood emergency plan be developed to help manage the residual risk and as part of this, a subscription to the Flood Warning Service should be maintained.
- (k) Surface water generated by the proposed development will be discharged to River Afan, with attenuation to prevent flooding during periods of high tidal levels that temporarily restrict or prevent discharge.
- (I) Foul water generated by the proposed development will discharge via gravity to either of the two existing combined public sewers which cross the site.

APPENDIX A Site Location



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APPENDIX B Topographic Survey



APPENDIX C Proposed Site Plan



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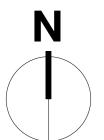
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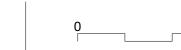
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ENFIELD ST

- New service yard entrance in approximate location of existing site entrance Proposed site access with right hand filter lane off Afan Way and two lane egress Pedestrian crossing (4) Pedestrian access Existing electric sub station with area of hardstanding for access Exsting facing brick masonry boundary / retaining walls retained Vehicle crash barrier and retaining wall to Afan Way Existing masonry wall along Water Street to be rebuilt as facing brickwork retaining 8 wall Low noise external plant area enclosed by acoustic grade timber fence and 2.5m high BOROUGHSTREET (9) palisade fencing. Galvanised finish Retaining wall with guard railing above 1.8m high close boarded fence to site boundary (12) Vehicle restraint barrier New facing brick boundary retaining wall with 1.1m high railings above along Issac's (13) Place Bicycle stands Proposed Aldi double pole sign. Location subject to separate advertisement consent (15) and agreement with the statutory authority to build within the sewer easement. Proposed Starbucks totem sign position. Location subject to separate advertisement consent and agreement with the statutory authority to build within the sewer easement. (17) Future gigabit broadband provision brought into site. Location indicative (18) Surface water attenuation pond for highway drainage, subject to separate sab and highway application (19) Covered trolley bay (20) Parent & Child spaces Disabled spaces Active EVCP spaces (22) (23) Loading bay ramp and bin store
- Starbucks bin and plant area (24)
- Approximate location of existing telegraph poles. Service to be diverted (25)
- 2.4m x 43m visibility splay shaded blue
- (27) Route of 525mm Concrete combined sewer
- Route of 900mm h x 600mm w brick combined sewer (28)

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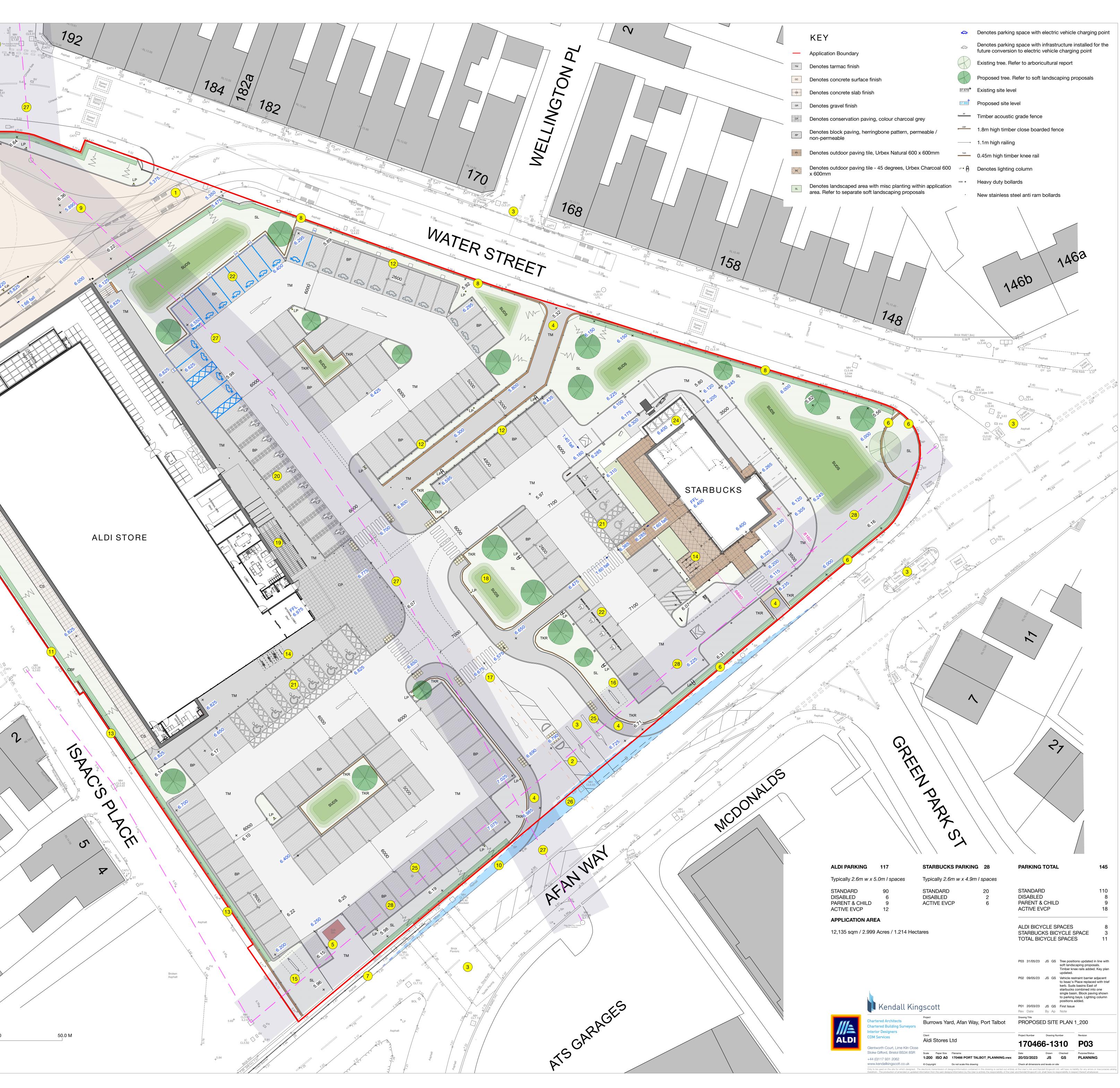


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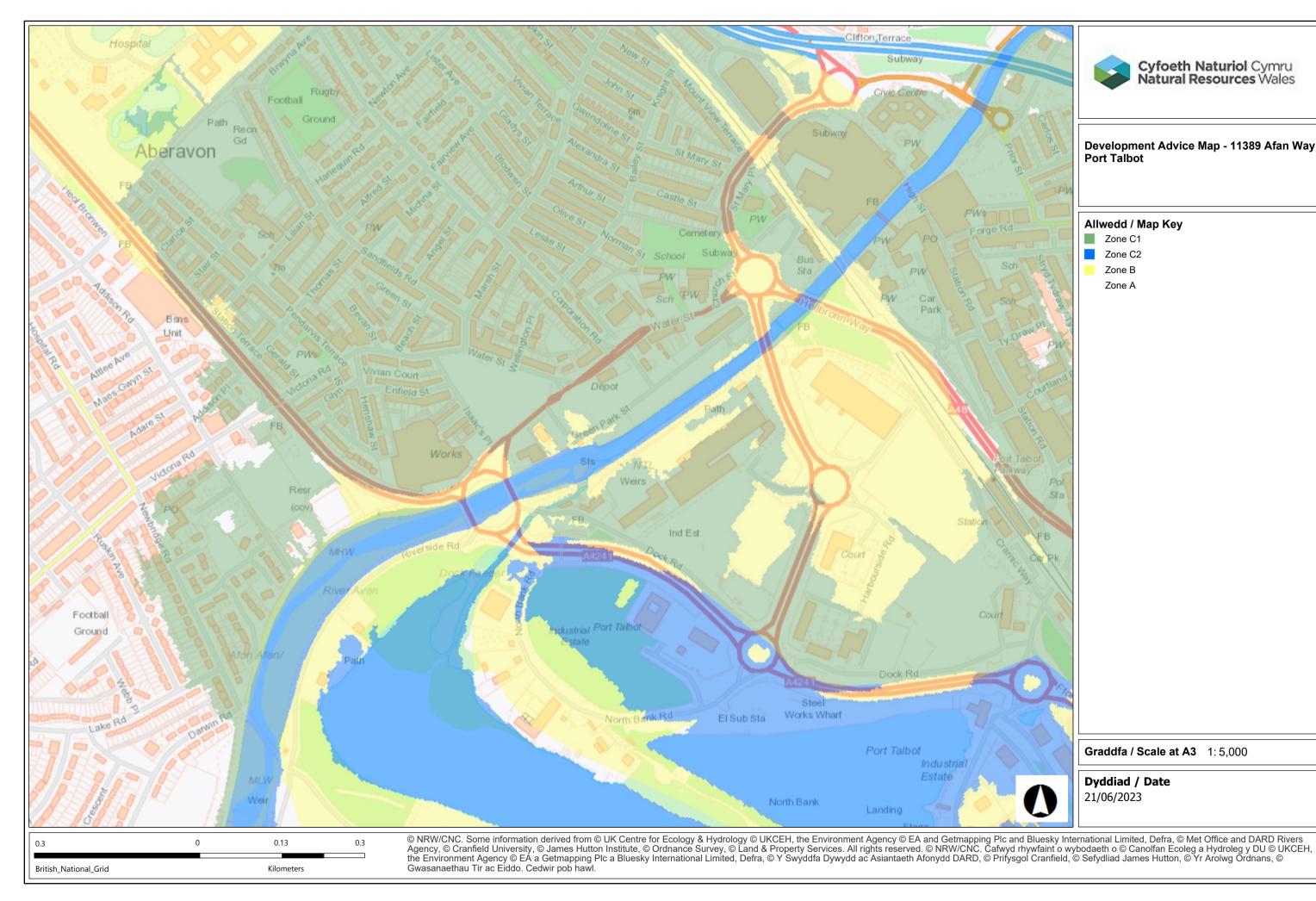
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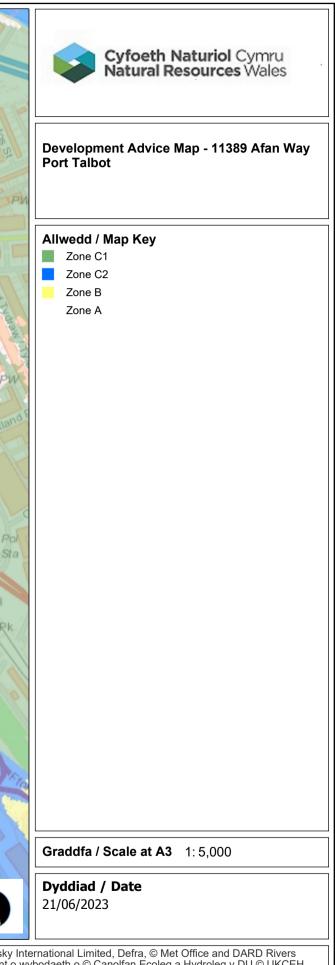
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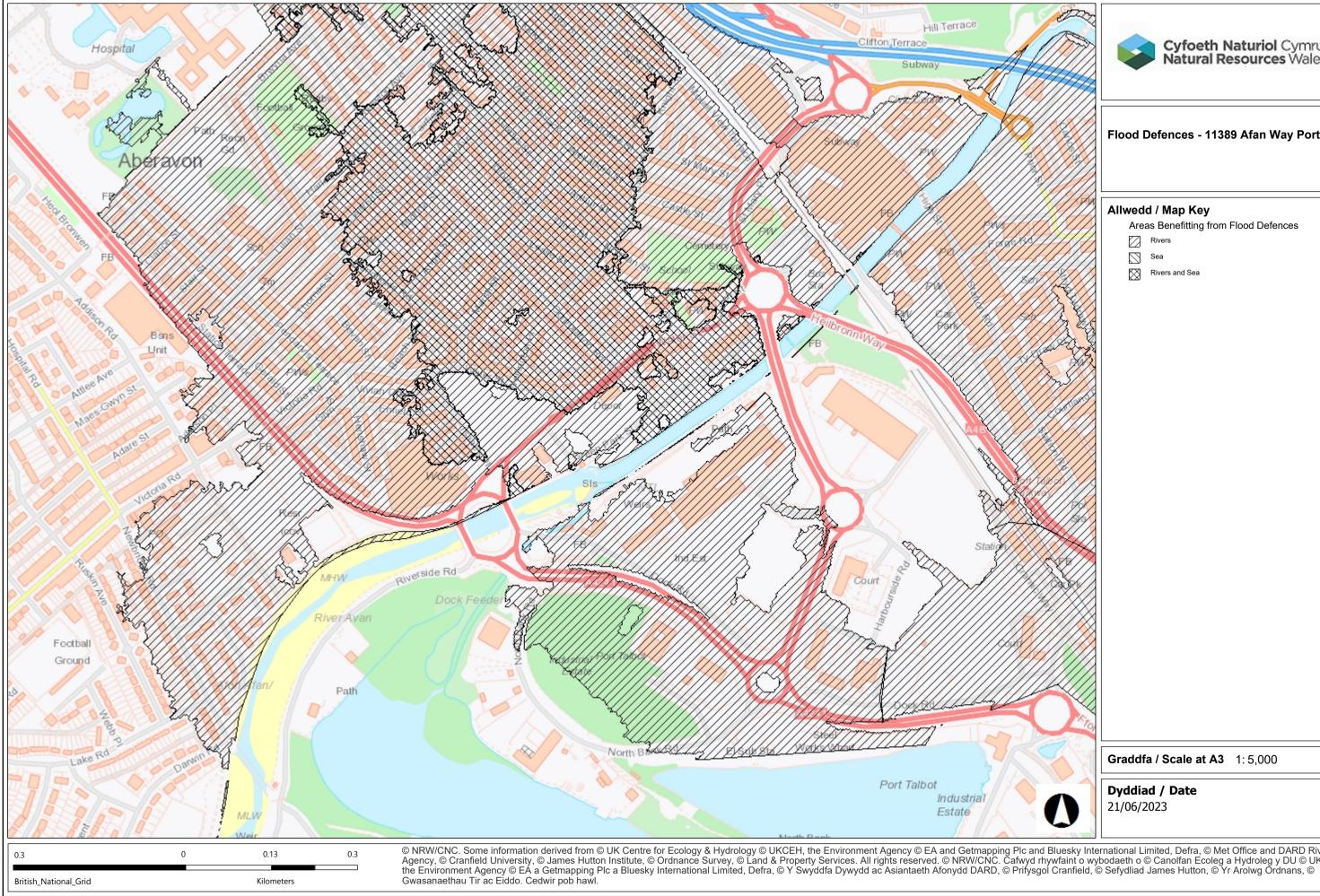
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APPENDIX D NRW Online Plans

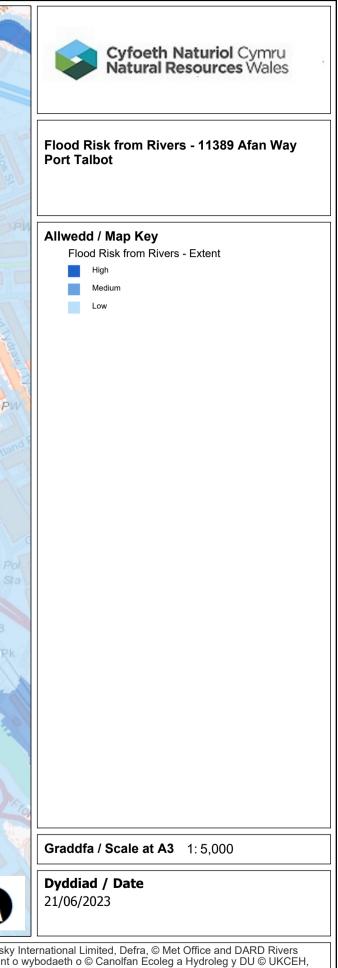


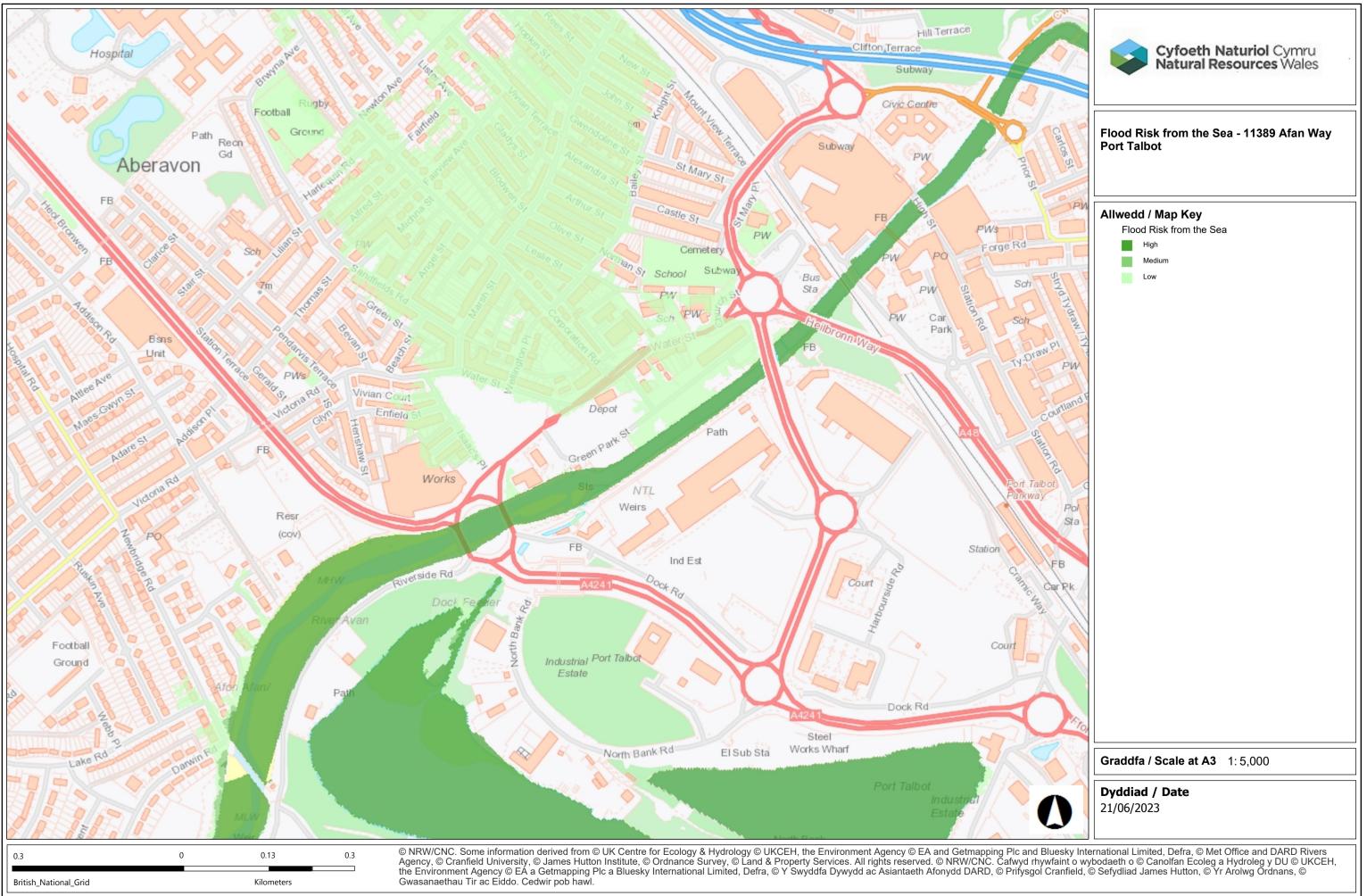


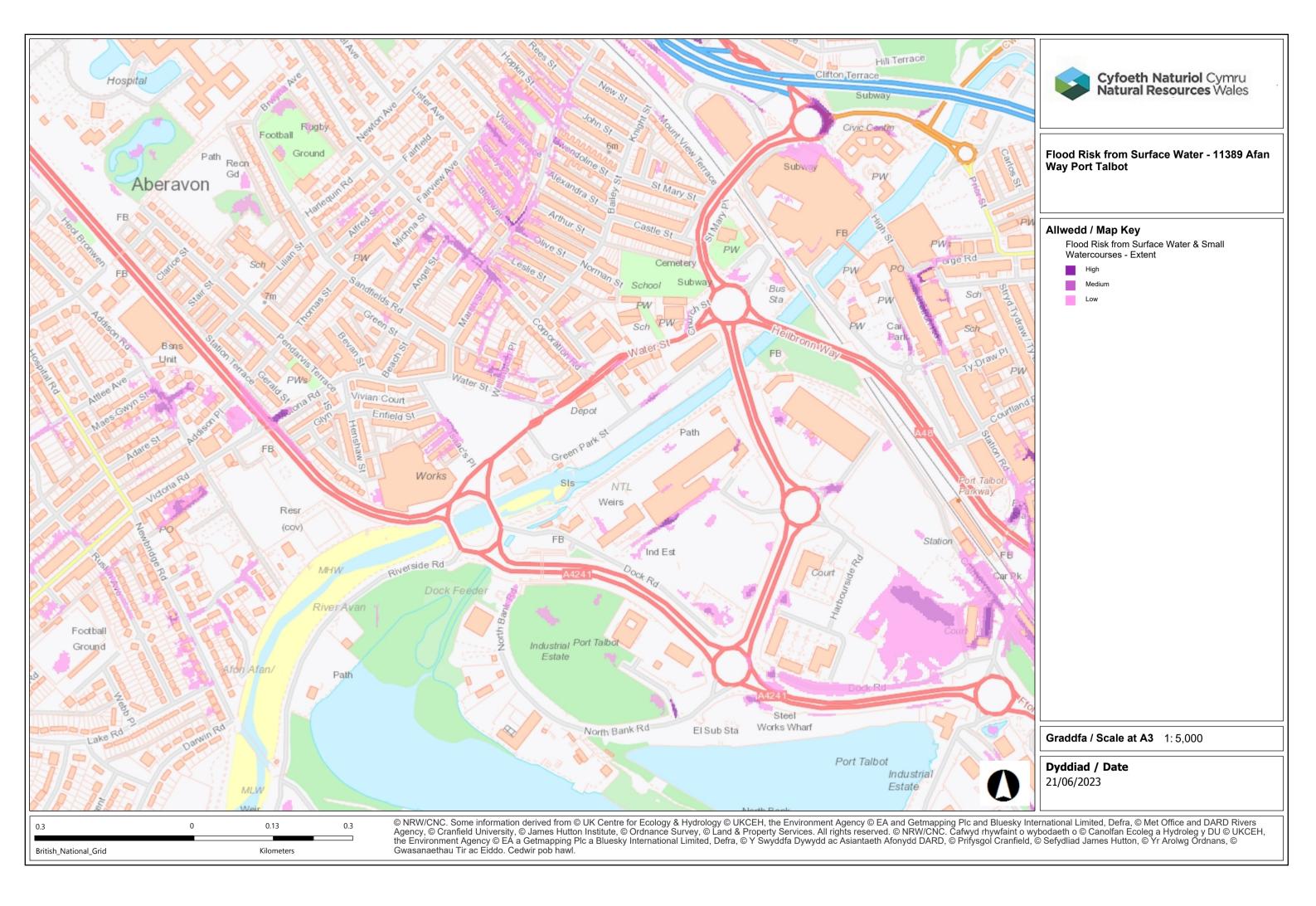


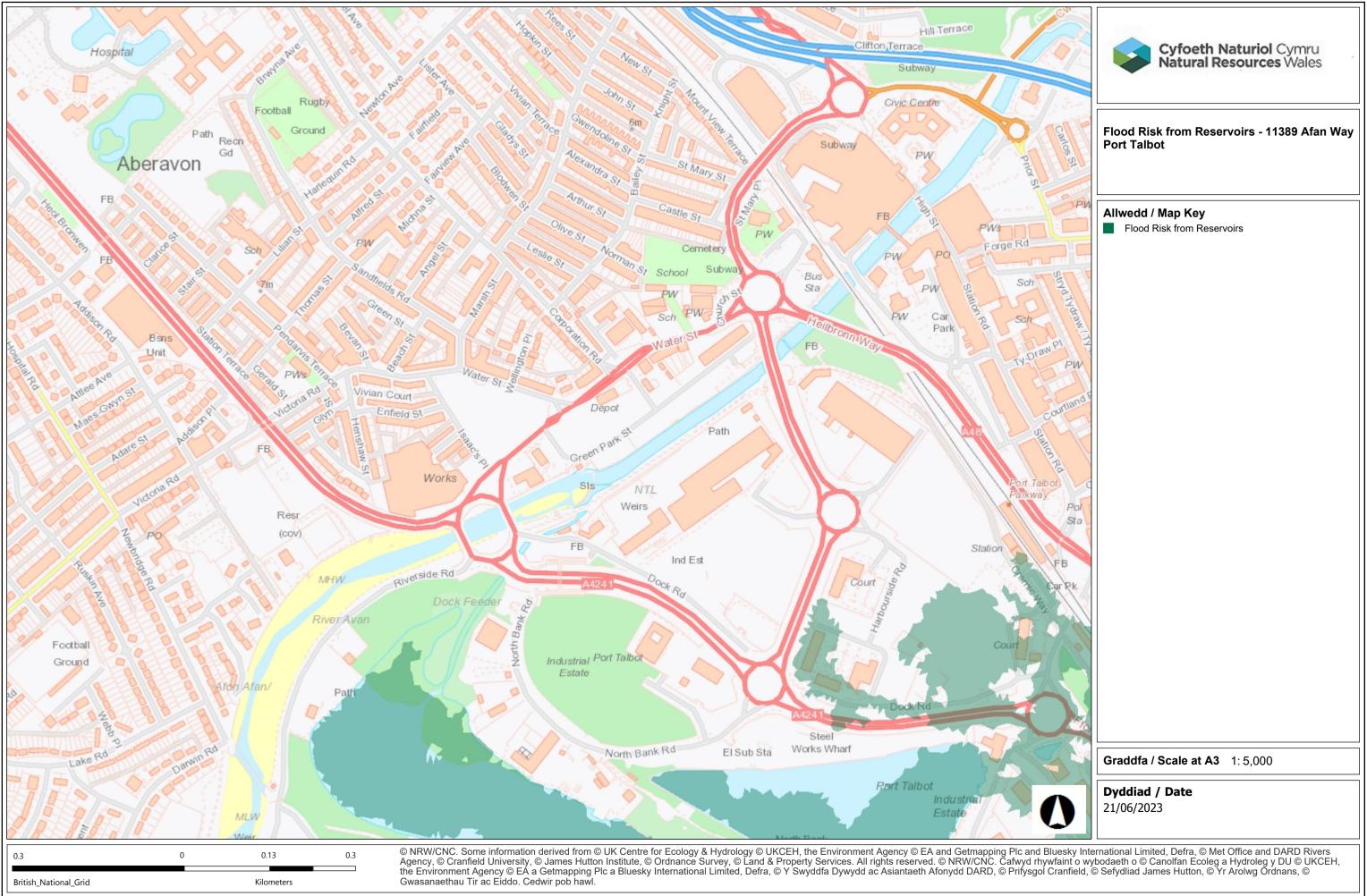
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	Flood Defences - 11389 Afan Way Port Talbot
	Allwedd / Map Key Areas Benefitting from Flood Defences □ Rivers □ Sea □ Rivers and Sea
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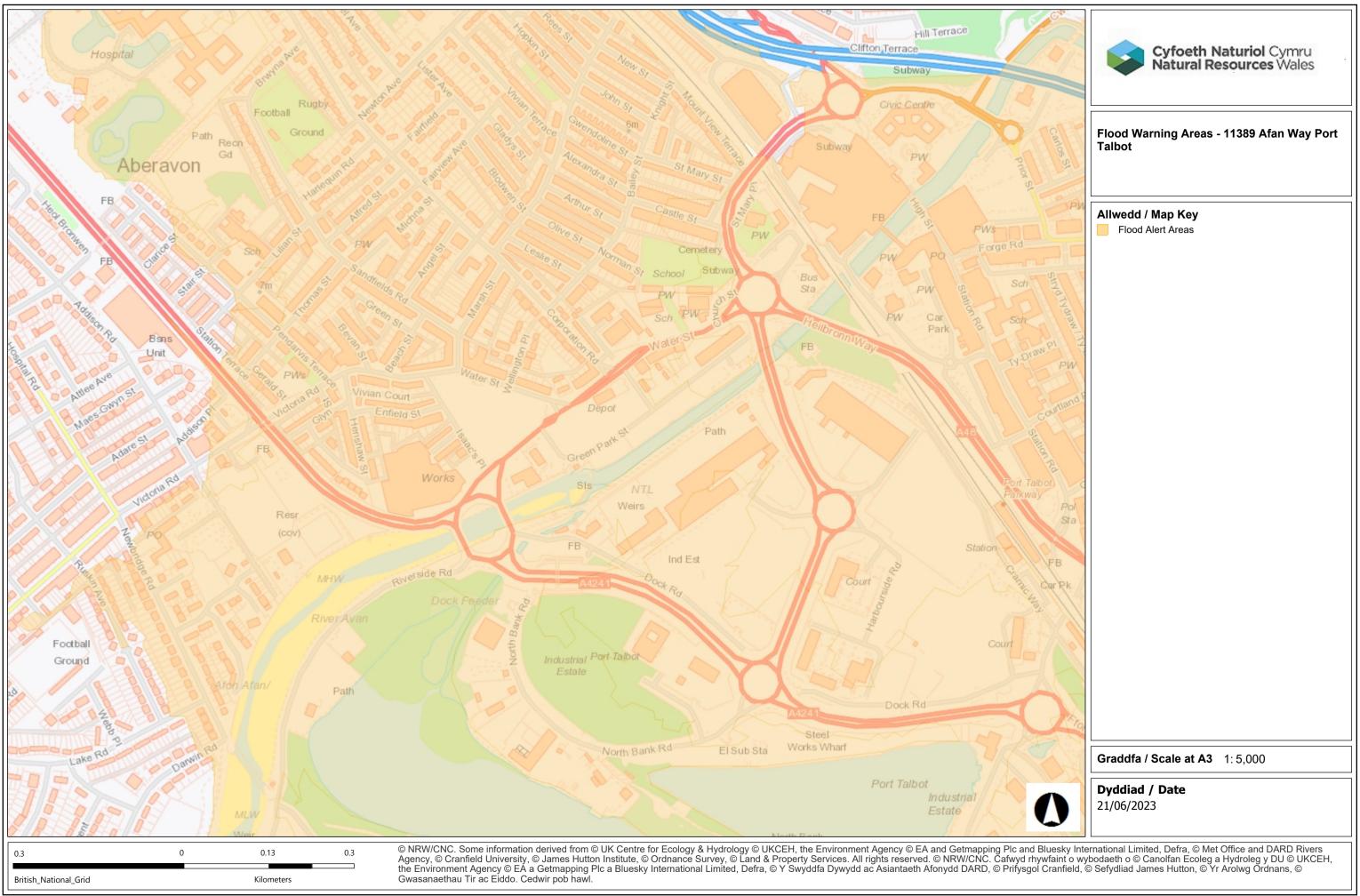






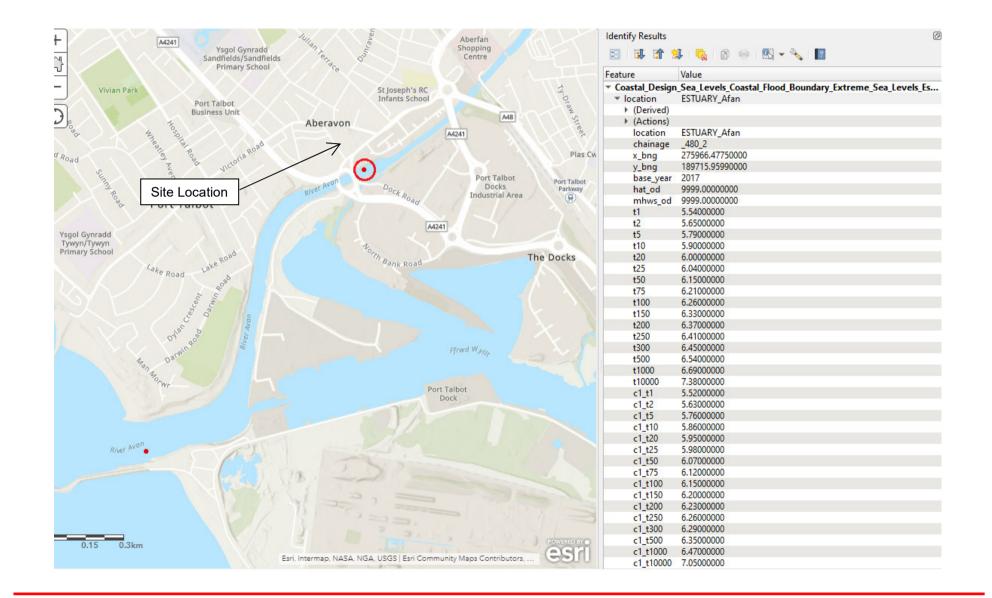




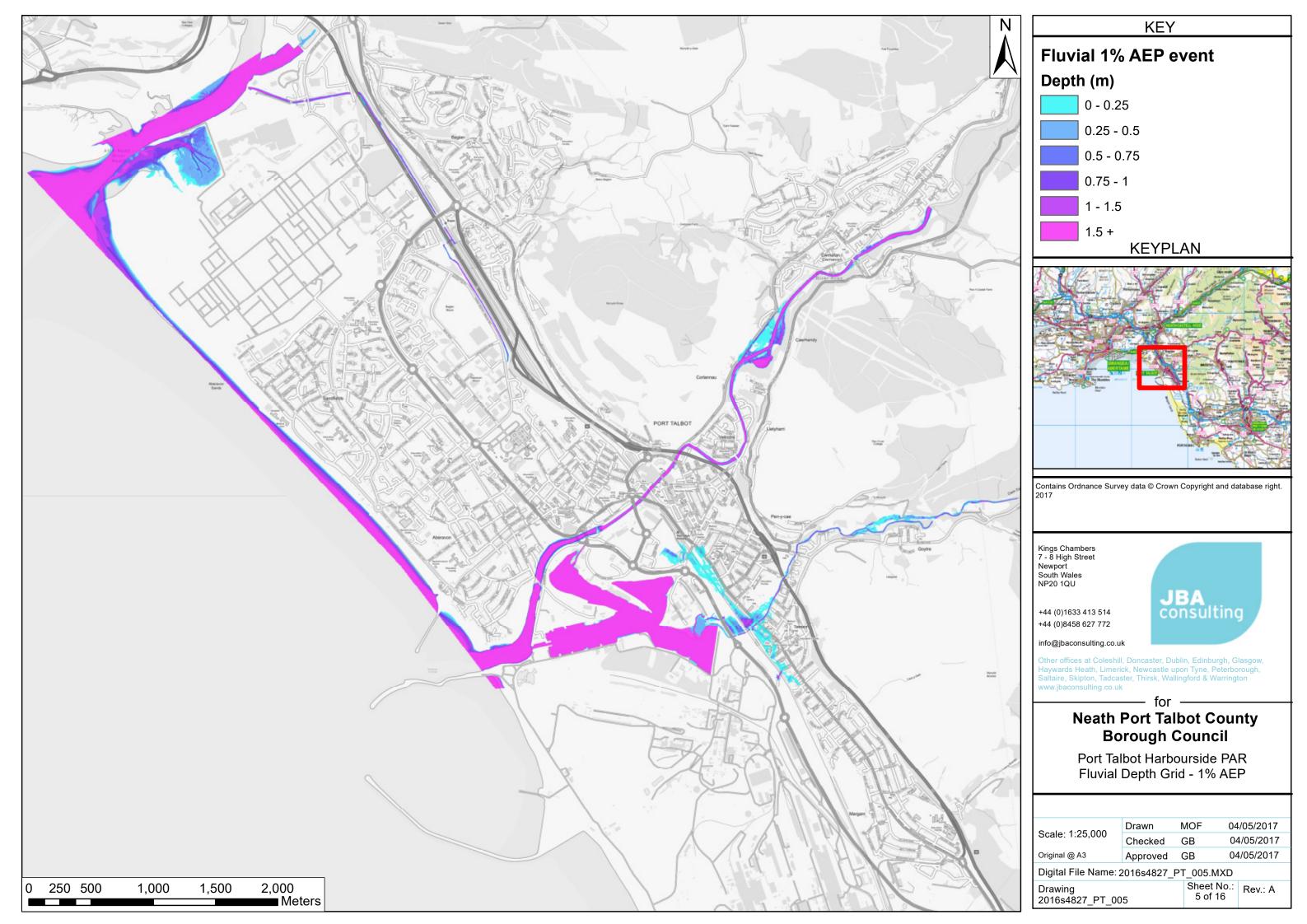


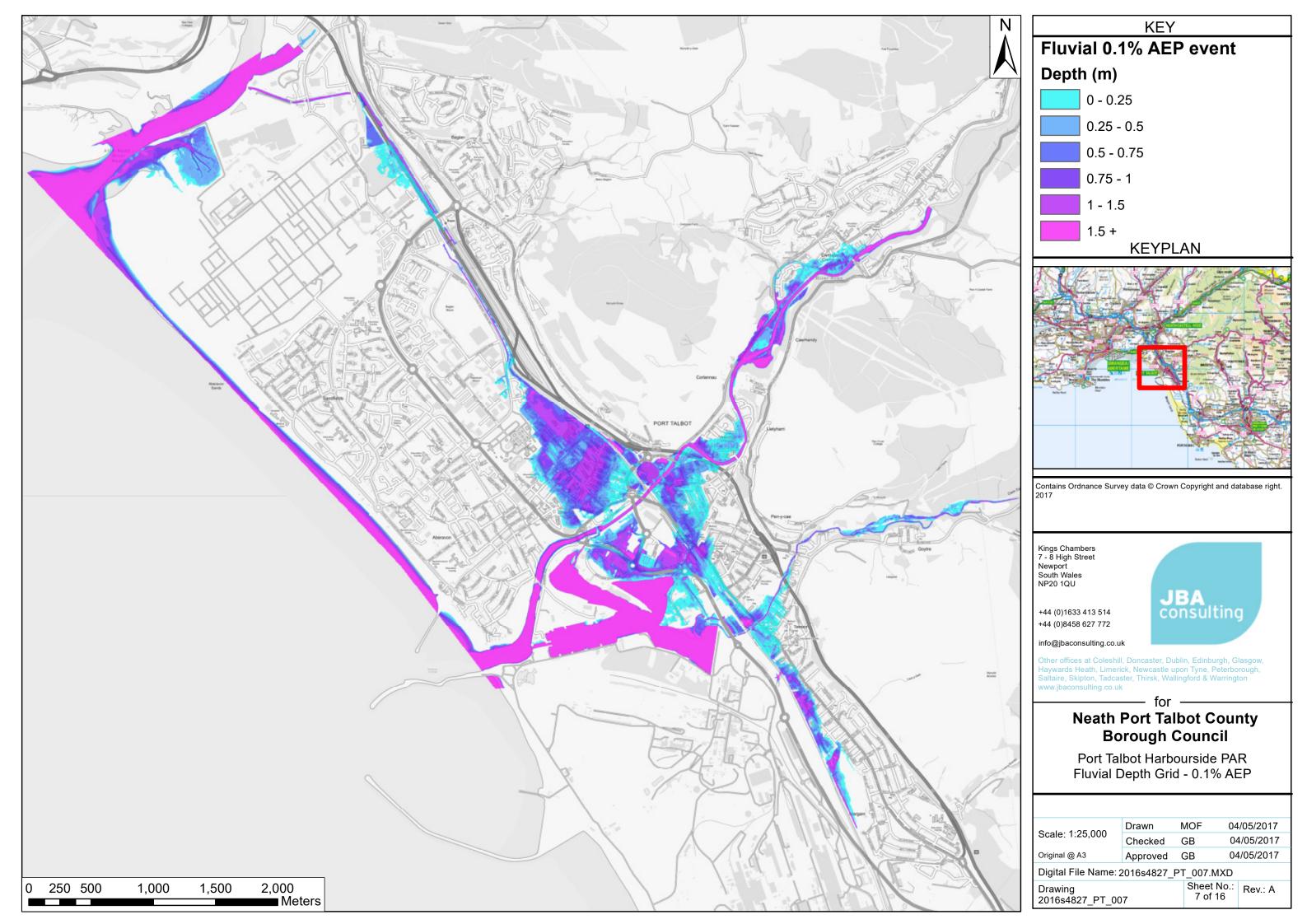
APPENDIX E Tidal Level Data

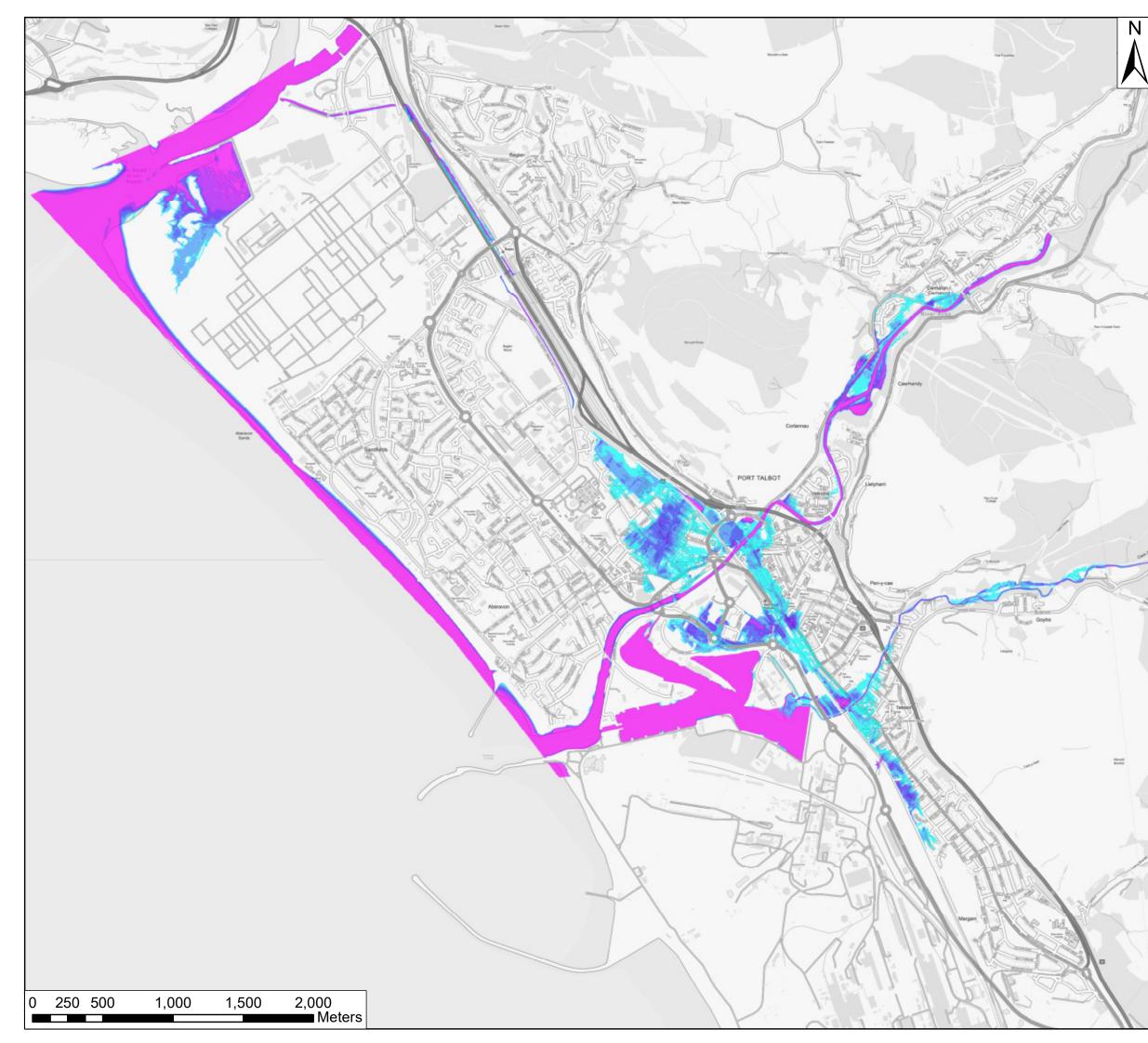
CRADDYS

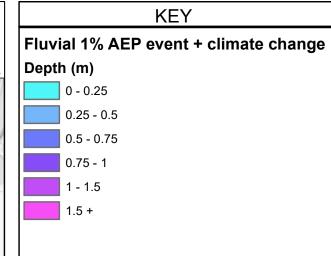


APPENDIX F NRW Product 6 Extracts









KEYPLAN



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JBA consulting

for Neath Port Talbot County Borough Council Port Talbot Harbourside PAR Fluvial Depth Grid - 1% AEP plus Climate Change

0 1 1 05 000	Drawn	MOF 0	4/05/2017
Scale: 1:25,000	Checked	GB 0	4/05/2017
Original @ A3	Approved	GB 0	4/05/2017
Digital File Name: 2016s4827_PT_006.MXD			
Drawing 2016s4827_PT_006		Sheet No.: 6 of 16	Rev.: A

APPENDIX G Proposed Drainage Layout

