



FLOOD RISK ASSESSMENT

PRINCE CONSORT ROAD, HEBBURN

for

Mr. T. Smith

AUGUST 2015

Flood Risk Assessment
Prince Consort Road, Hebburn,
Tyne and Wear, NE31 1EH.
for
Mr. Terry Smith

N15150	Flood Risk Assessment, Prince Consort Road, Hebburn
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1.0 Introduction

- 1.1 The purpose of this study is to assess the flood risk in respect of the proposed residential development on the site at Prince Consort Road, Hebburn, Tyne and Wear, NE31 1EH, approximately 11km east of Newcastle upon Tyne city centre, in accordance with the Communities and Local Government Technical Guidance to the National Planning Framework (March 2012) which replaces Planning Policy Statement 25 (PPS25): Development and Flood Risk (Community and Local Government 2006), however retaining key elements of the aforementioned document. The Flood Risk Assessment will be provided as supporting documentation as part of a planning application.
- 1.2 The proposed residential development, for the purposes of this assessment is stated to be “More Vulnerable” as defined in Table 2: Flood Risk Vulnerability Classification within the document Communities and Local Government Technical Guidance to the National Planning Framework (March 2012). See Appendix A.

2.0 Site Location

2.1 The proposed residential development site is an existing storage yard, located directly off the public highway, Prince Consort Road, Hebburn, Tyne and Wear. The footway associated with Prince Consort Road forms the southern boundary, with a metal palisade fence separating the proposed residential development site from the public highway. The northern boundary is formed by metal palisade fence, abuts a public cycleway / walkway. The western boundary is formed by a wharf located onto the River Tyne. The subject site is located on the west outskirts of Hebburn, approximately 11km east of Newcastle upon Tyne city centre.

Please refer to the Site Location Plan in Appendix B.

2.2 The proposed development will accommodate 8No. residential dwellings consisting of terraced units with associated private garden areas, associated off street parking, and a private access estate road.

Please refer to the Proposed Development Layout in Appendix C.

3.0 Existing Site Conditions

- 3.1 The site, to the north of Prince Consort Road Road, is a triangular shaped piece of land of an approximate area of 2.91Ha. with the area centred on National Grid Reference 430097mE 564906mN.
- 3.2 The site is occupied by a number of different sized storage containers, which are sited on a base of either tarmacadam, concrete or gravel. The site boundary on the east and south is provided by a steel palisade fence. The western boundary is the wharf associated with the River Tyne. The area is bound by Prince Consort Road to the south, with a gated access to the development site. Prince Consort Road public highway to the south, serves both a small industrial estate and existing residential properties to the east. The area slopes from east to west from an elevation of approximately 6.0m to an elevation of approximately 3.5m. The majority of this area is gently sloping, with an average gradient in the region of 1 in 25. Please refer to the Topographic Survey Drawing in Appendix D.
- 3.3 An existing electric supply enters the site from the cycleway/footpath located in the south eastern corner of the development site, adjacent to the gated entrance. The electricity cabinet is indicated on the Topographical Survey, located in Appendix D and a photograph located in Appendix E.
- 3.4 Patrick Parsons has been made aware of a storm water overflow system from the Prince Consort Road public foul water pumping station, which passes through the proposed residential development site, prior to discharging into the River Tyne. The Prince Consort Road Pumping Station is located approximately 20m to the east of the development site, at the intersection of the cycleway/footpath with Prince Consort Road. A copy of the Northumbrian Water Sewer Records is included in Appendix P.
- 3.5 It is considered that the site should be treated as a Brownfield site.
- 3.6 Patrick Parsons has been made aware of a storm water overflow system from the Prince Consort Road public foul water pumping station, which passes through the proposed residential development site, prior to discharging into the River Tyne. The storm water overflow system has been subjected to a CCTV survey, the plan and results are included in Appendix Q.

4.0 Flood Alleviation Measures

- 4.1 Based on information provided by the Environment Agency there appears to be no flood alleviation measures in place and we are not aware of any plans to construct any measures in the near future.

Please refer to the Environment Agency Flood Plan in Appendix H.

5.0 Sources of Potential Tidal and Fluvial Flooding

- 5.1 The Flood Map enclosed in Appendix H shows the Environment Agency's most appropriate information on the extent of the extreme flood from rivers or the sea that would occur without the presence of flood defences.
- 5.2 From a consideration of the Environment Agency's flood map it suggests that approximately 65% of the proposed development site falls within a Category Flood Zone 1 Annual Probability of Flooding, i.e. less than a 1 in 1000 annual probability of river or sea flooding (less than 0.1%).
- 5.3 However approximately 12% of the development falls within a Category Flood Zone 2 Annual Probability of Flooding between a 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of river flooding or having between a 1 in 200 (0.5%) and 1 in 1000 (0.1%) annual probability of sea flooding in any year.
- 5.4 However approximately 23% of the development falls within a Category Flood Zone 3a Annual Probability of Flooding i.e. greater than a 1 in 100 (>1%) annual probability of river flooding or greater than a 1 in 200 (>0.5%) annual probability of sea flooding in any year.
- 5.5 The Flood Maps in Appendix H are based upon the approximate extent of floods with a Flood Zone 3 having a 0.5% annual probability boundary for flooding from the sea and tidal waters, and 1% annual probability boundary for flooding from rivers under present expectations, or where this is greater, the extent of the highest known flood. It should be noted that the flood map area assumes no defences and does not take into account the likelihood that flood risk will be increased by climatic change. It is important to recognize that a 1% flood has a 26% probability of being equalled or exceeded at least once in 30 years (the duration of a typical mortgage) and a 49% probability of being equalled or exceeded at least once in 70 years (a typical human lifetime). The attached plan represents the best available current information on the extent of flood risk. However, it should be noted, that these maps are indicative only, and are to be used as a basis of consultation and not as the sole basis for decisions on where planning policies apply. Therefore due to such local variability and uncertainties, it is difficult to be prescriptive about the levels of risk. It is to be recognised that there is a continuum from virtually no to high risk. The DEFRA Paper 'Flood and Coastal Defence Project Appraisal Guidance (1999)' gives indicative standards of protection for existing development against river flooding of 1.0 – 4.0% annual probability of failure for typically less intensively developed urban areas (i.e. they defend against a flood with that probability of occurring). It is, therefore, reasonable on present evidence to regard areas with an annual probability of river flooding of 1% or above to be zoned as at significant risk of flooding.
- 5.6 Classification of Zones does not include for climate change, as clarified by the Environment Agency.
- 5.7 From Environment Agency data modelling of the River Tyne, undertaken in July/August 2015, the Hebburn Node Point TM01049, denoted the critical water level as 4.124m. This level is based upon current data from all modelled up to, and including the critical 1 in 200 Year Return Period critical seasonal storm events. See Appendix F and G.

- 5.8 The proposed residential buildings, indicated on the Architect’s development site plan, fall within the extent of the Zone 3a of the extreme flood, at the time of the Environment Agency assessment of the likelihood of flooding. Therefore the development site can be categorised as being in a flood Zone 3a Classification, within the Environment Agency Flood Risk Area. See Appendix I and J
- 5.9 A Flood Zone 3a Fluvial indicates the extent of flood from rivers with a 1.0% (1 in 100) chance of happening in a given year. Please note that as part of the proposed residential development the area of land within the Flood Zone 2 and 3a areas will form part of the constructed development. Due to the Flood Risk Zone 3 Vulnerability Classification, the “More Vulnerable” residential development will be subjected to an Exceptional Test.
- 5.10 The remainder of the development to the east, above the 5.038m level datum, does not suffer from tidal or fluvial flooding, and can be classified as being within a Flood Zone 1.

Flood Risk Vulnerability Classification

The Flood Risk Vulnerability Classification for this development site, is “More Vulnerable – Buildings used for dwelling houses”.

Flood Risk Vulnerability and Flood Zone “Compatibility”

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exceptional Test required	✓	✓
Zone 3a	Exceptional Test required	✓	X	Exceptional Test required	✓
Zone 3b “Functional Floodplain”	Exceptional Test required	✓	X	X	X

Key

- ✓ Development is appropriate
- X Development should not be permitted

It can be clearly seen from the above tables that the proposed residential development portion of the site falls in Category Zone 1 incorporating the “More Vulnerable” column, that development is appropriate without the need for an Exceptional Test.

5.11 Other Sources of Flood Risk

The table below identifies the potential sources of flood risk to the development. Where necessary, the significance of these sources is investigated further.

Flood Source	Potential Risk				Description
	High	Medium	Low	None	
Fluvial				X	
Tidal			X		River Tyne is tidal
Canals				X	No canals
Groundwater				X	No history
Reservoirs and waterbodies				X	
Sewers			X		No historical flooding of site
Pluvial			X		No historical flooding of site
Development Drainage			X		Design process will minimise risks

6.0 Previous Flood Events

- 6.1 The River Tyne was the subject of a major tidal surge on 5th and 6th of December, 2013 when the River Tyne burst its banks in several locations. The Environment Agency are quoted as saying the water levels were the highest in 30 years. The records found on the internet state that the highest levels were reached at South Shields. The recorded levels from the North Shields Tidal Gauge record the maximum level as no greater than 6.70m. See Appendix T.
- 6.2 The North Shields Tidal Gauge record showing the maximum level as no greater than 6.70m has to be converted from Chart Datum to Ordnance Datum. To convert from Chart to Ordnance Datum, a factor of -2.60m is required for North Shields. See Appendix U.
- 6.3 The River Tyne Tidal surge of 5th and 6th December 2013, is therefore recorded as being at a level of 4.10m. (6.70 – 2.60). This is recorded in Drawing No. N15150-296-P1. See Appendix V.
- 6.4 PPL consulted with the Environment Agency regarding the known Tidal Surge of 5th and 6th December, 2013 and received a response on 27th. August, 2015. They stated that “Apparantly the tidal surge gave levels there or thereabouts to the 1 in 200 Year event which correlates with the new Tyne model”. See Appendix X. This is given as being 4.124m in the Hebburn Node Point Attributes Table. See Appendix G. This statement confirms the information in Paragraph 6.2
- 6.5 The response from South Tyneside to our request for flooding information, stated that the footpath/cycleway to the north of the development site was flooded. We are aware that this path falls towards the river the further north it travels, and from the information in Paragraphs 6.2,6.3 and 6.4 we assume the information that the site did flood but to a level of 4.10metres A.O.D. See Appendix Y.
- 6.6 The River Tyne Maximum and Minimum Tide Levels for the North Shields indicate a maximum Tide Chart Datum Level of 5.73m which has to be adjusted by -2.60m to return to a Ordnance Datum Level of 3.13, which would indicate that none of the site will be flooded during normal tide conditions. The existing wharf has a finished surface of 3.75 approximately. See Appendix W.
- 6.7 Patrick Parsons Ltd has approached Michelle Hogg of South Tyneside Council, to request information, regarding previous recorded flood events on the site and the immediate vicinity. At the time of writing this Flood Risk Assessment, we await a response.

7.0 Existing Structures Affecting Flooding

- 7.1 There are no existing structures located within the immediate vicinity to the site that affect flooding.

8.0 Observed Trends

- 8.1 Patrick Parsons Limited conducted an exercise in placing a copy of the interactive flood map onto the Proposed Development Plan which is enclosed in Appendix E.
- 8.2 Detailed flood level information for the River Tyne was obtained from the Environment Agency, giving modelled flood levels for a range of storm return periods in the vicinity of the site. Please refer to the Environment Agency Flood Level Information in Appendix G. The flood level associated with point reference 'EA 1211286 model point TM01049' for a 1 in 100 year critical seasonal return period storm event is 4.020m A.O.D. No level was provided for a 1 in 100 year return period with an additional allowance for climate change, however it should be noted that the 1 in 200 year critical seasonal return period flood level was only slightly higher at 4.124m A.O.D. The 1 in 200 Year Return Period critical seasonal storm event plus a agreed national percentage increase for climate change, returns a flood level of 5.038m A.O.D. which is designated as 201 for the return period.
- 8.3 From examination of the Topographical Survey drawing in Appendix D it can be seen that Prince Consort Road initially rises from south to north, forming the eastern boundary, from the site's southern boundary at a level of 5.27m to a high point of 6.04m at the northern extent of the eastern boundary. The northern boundary rises from the River Tyne in the west, at a level of 3.11m to a high point on Prince Consort Road of 6.04m. The western boundary, formed by the banks of the River Tyne rises from a level of 3.11m in the north to a high point in the south with a level of 3.21mm. The southern boundary, formed by the adjacent yard rises from the banks of the River Tyne in the west from a level of 3.21m to a high point on Prince Consort Road to the east with a level of 5.27m. It should be noted that, with the Node Point Attributes that areas of this proposed residential site fall within all three Flood Risk Vulnerability Classification Zones, Zone 1, Zone 2 and Zone 3A.
- 8.4 From examination of the existing topographical survey drawing, as discussed in 8.3, we would suggest there is a very small chance of inundation from overland floodwaters from a flood route down Prince Consort Road towards the development site. There is an obvious rise in level from the channel line of 125mm of Prince Consort Road and the entrance into the site. Patrick Parsons has produced drawing N15150-295-P1 showing the Existing Flood Route in the vicinity of the site. Please refer to Appendix K.

9.0 Consequences of Possible Flooding

- 9.1 The Environment Agency has advised within an Email of 18th. August that their preference would be for a 600mm free board over and above the 1 in 200 Year critical seasonal Return Period storm event + Climate Change Flood Level. The flood level is stated as 5.038m A.O.D. See Appendix G. The proposed Finished Floor Levels have been set at 5.650m A.O.D., allowing for a free board of 612mm. Due to the floor levels having to meet the technical requirements, the surrounding garden areas have to be raised from existing, to permit access to the properties. This necessitates the requirement for a retaining wall structure to be placed on the site boundary adjacent to the River Tyne. The top of the wall has been calculated as being 5.100m A.O.D.. Please refer to Appendix O.
- 9.2 Drawing No. N15150-296-P1 'Preliminary Proposed Levels Plan' demonstrates the impact of proposed levels on existing levels along the adjacent boundaries.
- 9.3 Drawing No. N15150-296-P1 'Preliminary Proposed Levels Plan' specifies finished floor levels within the development site. These proposed finished floor levels are stated as 5.650m A.O.D. , having been set 612mm above the 1 in 200 Year critical seasonal Return Period storm event + Climate Change Flood Level. The Environment Agency Flood Node Point Attributes Table, See Appendix G, shows an element of the site is subjected to the effects of a Category Zone 2 and 3a Flooding, Patrick Parsons has identified elsewhere in this report that this has been eliminated from the site, with no risk of flooding from rivers or sea to new residential dwellings.
- 9.4 The proposed residential buildings on the site all mainly falls within a Category Flood Zone 1, however there is also a small portion of the residential building which is the subjected to the influence of Zone 3A Flood Risk Vulnerability Classification from rivers and seas.
- 9.5 As this is a Zone 3A created by a tidal situation, the developer will not be therefore required to provide compensatory storage of the displaced waters.
- 9.6 As this is a Zone 3A created by a tidal situation, the developer will however have to set a minimum floor level as a minimum of 5.650m A.O.D.

10.0 Existing Sewer Infrastructure

- 10.1 The Northumbrian Water Ltd (NWL) existing sewer record plan details an existing adopted combined sewer system adjacent to the site. A copy of the NWL existing sewer record plan is included in Appendix P.
- 10.2 The NWL existing sewer record plan details an existing adopted gravity 150mm-diameter foul sewer located in the north east corner of the proposed development site and flows into an adopted foul gravity system located within Prince Consort Road.
- 10.3 There is an existing 375mm-diameter overflow system from the adjacent Prince Consort Road Pumping Station, located approximately 25m to the north east of the development site. The overflow system flows through the development site to an outfall on the River Tyne.
- 10.4 The overflow system will require diverting around the proposed development site, with necessary Legal Easements granted to Northumbrian Water. These Easements will be a minimum 3.0m either side of the diverted pipe. The Legal Easements will preclude any building within.
- 10.5 The diversion of the NWL overflow system through the development site, will be the subject of a Section 185 of the Water Industry Act 1991.
- 10.6 A CCTV survey of the existing drainage within and around the site has been undertaken. This survey has confirmed that the adopted overflow pipe is in existence, but not as indicated on the attached NWL Sewer Records – See Appendix P.
- 10.7 A pre-development enquiry associated with the proposed development was submitted to NWL.

11.0 Displaced Waters

- 11.1 Infrastructure protocol states that a designer should consider the following in order of preference before finalising a surface water design statement for the development.
1. Discharge to an adequate soakaway or some other adequate infiltration system or where this is not reasonably practicable.
 2. Discharge to a watercourse or where this is not reasonably practicable.
 3. Discharge to a public surface water sewer network.
- 11.2 Method 1 – Discharge to a SUDS device. PPL have examined the British Geological Society Maps on-line, and found all adjacent borehole location logs to indicate made ground to a significant depth. For this reason alone, it is considered that a SUDS scheme using soakaways will not be suitable at this site.
- 11.3 Method 2 – Discharge to a watercourse. The adjacent River Tyne, on the western boundary, offers a tidal discharge point. This will have to be applied for and agreed with the Environment Agency, to construct a new outfall into the River Tyne, for which there will be a one off administration fee of £50 + VAT.
- 11.4 Method 2 – Discharge to a watercourse. South Tyneside Council, as the Lead Local Flood Authority, now responsible for this section of the River Tyne, when contacted, stated that their standard statement to a request for a Discharge Rate to a watercourse, is to state all discharge must equate to agricultural run-off. The site, however, has been used as a yard, with 100% impermeability, and has to be treated as a brownfield development site.
- 11.5 The existing area equates to 0.271Ha, applying a rainfall figure of 50mm of rain, this equates to a current discharge of 37.6 litres/second to the River Tyne.
- 11.6 The developer, will provide surface water attenuation, for the generated surface waters, with a controlled discharge of 18 litres/second, an improvement of 52%.
- 11.7 The design will have to pass the criteria of no flooding from the critical, seasonal 1 in 100 Year critical seasonal Return Period Storm event with an additional allowance of 30% included for the effects of climatic change.
- 11.8 The controlled discharge of a maximum discharge of 18 litres/second will require 35 cubic metres of storage, which will be provided by either oversized pipes, or a crated system. This system, will have to be designed, and then approved by South Tyneside Council, the Lead Local Flood Authority. See Appendix W.
- 11.9 With the River Tyne being tidal adjacent to the site, the designer should take into account the effect of a submerged outfall, taking account of the the critical 1 in 200 year return period critical seasonal storm with an allowance for climate change.
- 11.10 A new outfall structure will be required into the River Tyne, which will require the permission of the Environment Agency, for which there will be a £50 + VAT administration fee.

11.11 Method 3 – Discharge to a public surface water sewer network.

There are no surface water sewers within the immediate vicinity of the proposed development site. The developer is **NOT** permitted to discharge to the surface water overflow from the Prince Consort Road Pumping Station.

11.12 A Preliminary Drainage Strategy Plan has been produced by Patrick Parsons showing indicative drainage requirements for the development that incorporates the requirements stated above. Please refer to drawing No. N15150-240-P1 'Preliminary Drainage Strategy Plan' in Appendix V.

12.0 Impact of Displaced Water

- 12.1 The displaced waters created by the development of this site, in the form shown on the submitted plans, will have only minimal effect on the risk to raise flooding. As this increase is created by the effects of tidal waters, according to the Environment Agency, it is not to be considered as part of this assessment, and will not require any mitigation works, other than the setting of a minimum floor level, above the 1 in 200 Year Return Period critical seasonal storm event with an allowance for Climate Change (5.038m). See Appendix G.

13.0 Sequential Test

- 13.1 The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. Development should not be permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. The Strategic Flood Risk Assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk from any form of flooding.
- 13.2 Communities and Local Government Technical Guidance to the National Planning Policy Framework therefore states that a Sequential Test should be applied to this development site as well as an Exception Test due to the flood risk vulnerability classification for residential development identified as more vulnerable in accordance with Table 2 and 3 within the Communities and Local Government Technical Guidance to the National Planning Policy Framework document.
- 13.3 Three of the eight residential buildings, the private parking and drives for all eight dwellings within the site fall into a Category Zone 1 classification and therefore no Sequential Test is required.
- 13.4 Three of the eight residential buildings within the site fall into a Category Zone 2 classification. A sequential test is therefore required. The Strategic Flood Risk Assessment, instigated by the Local Planning Authority, will provide the basis for this Sequential Test
- 13.5 Two of the eight residential buildings within the site fall into a Category Zone 3A classification. A sequential test is therefore required. The Strategic Flood Risk Assessment, instigated by the Local Planning Authority, will provide the basis for this Sequential Test.
- 13.6 The existing uses of the site, and adjacent sites are in decline, and the proposed development provides wider sustainability benefits to the community that outweigh the flood risk.
- 13.7 This flood risk demonstrates that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere. The properties will be safe from flooding by raising the floor level, a minimum 612mm above the 1 in 200 Year Return period critical, seasonal storm with an allowance for climate change.
- 13.8 The proposed development, due to its location, would normally be expected to be appropriately flood resilient and resistant, including safe access and escape routes, and that any risk can be safely managed, including by emergency planning, and it gives priority to the use of sustainable drainage system. However, due to the adjacent finished surface levels requiring to be built up to provide access to the calculated finished floor level of 5.650m A.O.D., there is not a requirement for the properties to be flood resilient and flood resistant. The finished surface levels also ensure that there are safe access and a safe escape route. For preliminary proposed finished surface levels, see Appendix O.

14.0 Exception Test

- 14.1 In accordance with the recommendations provided by the Environment Agency, as detailed in Appendix C, the Flood Zone 2 and 3a portion of the planning application site lies within the proposed construction of 8No. residential units therefore the requirement for a Exception Test is applicable in this instance.
- 14.2 The floor levels for the properties will be set a minimum 612mm above the 1 in 200 Year Return Period critical seasonal storm event with a agreed national percentage increase allowed for climate change, at 5.650m.
- 14.3 TThe proposed development, due to its location, would normally be expected to be appropriately flood resilient and resistant, including safe access and escape routes, and that any risk can be safely managed, including by emergency planning, and it gives priority to the use of sustainable drainage system. However, due to the adjacent finished surface levels requiring to be built up to provide access to the calculated finished floor level of 5.650m A.O.D., there is not a requirement for the properties to be flood resilient and flood resistant. The finished surface levels also ensure that there are safe access and a safe escape route, and that any risk can be safely managed, including by emergency planning. For preliminary proposed finished surface levels, see Appendix O.
- 14.4 The proposed surface water drainage infrastructure associated with the development will incorporate a controlled restricted discharge, to be agreed with Northumbrian Water Ltd. and the local authority, as well as on-site attenuation in which to reduce discharge rates from the site resulting in a reduction in risk of flooding to that of existing.

15.0 Conclusions

- 15.1 The construction of the 8No residential units which is subject to a planning application falls within three different Flood Risk Vulnerability Classification zones
- 15.2 Three of the eight residential buildings, the private parking and drives for all eight dwellings within the site fall into a Category Zone 1 classification and therefore no Sequential Test is required.
- 15.3 Three of the eight residential buildings within the site fall into a Category Zone 2 classification
- 15.4 Two of the eight residential buildings within the site fall into a Category Zone 3A classification.
- 15.5 In Zones 2 and 3A there will be no raising of levels, out-with the footprint of the proposed buildings
- 15.6 The proposed minimum finished floor level is set at 5.650m A.O.D. which equates to 612mm above the level of the 1 in 200 Return period critical seasonal storm with an allowance for climate change.
- 15.7 The flooded areas are from tidal waters, and the potential displaced volume of flood water will have little effect on other property.
- 15.8 The existing levels, to the rear of the proposed properties to the River Tyne, as well as the front, will be raised to provide safe access.
- 15.9 The front door entrance of each property will be reached by a path/parking bay at a maximum gradient of 1 in 20, from higher land, at the site entrance on Prince Consort Road. This will provide a safe escape route at times of extreme flood.
- 15.10 The finding of this assessment identifies that the proposed development will not increase the intensity of surface water run-off from the development. The proposed surface water drainage infrastructure will incorporate a controlled restricted discharge and on-site attenuation which will reduce the discharge rate from the site in all storm conditions and will result in the risk of flooding compared to that of existing.
- 15.11 The Exception Test process for the proposed development site demonstrates that the proposed residential development of the site is appropriate. The development provides wider sustainability benefits to the community that outweigh flood risk.
- 15.12 The site specific Exception Test flood risk assessment, demonstrates that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and where possible through design will reduce flood risk overall.
- 15.13 As both elements in Clauses 15.11 and 15.12 of the Exception Test have passed the development should be permitted.

- 15.14 The finding of this assessment is that the proposed dwellings do lie within an area that is subject to flooding and existing flood routes around the development site will be maintained. Furthermore through good drainage design in which the assessment has identified that the most appropriate method associated with proposed surface water management is to discharge surface water flows into a new surface water system, with a new outfall constructed on the banks of the River Tyne. The design of the surface water system, will be based upon a 50% improvement to the existing brownfield site, which in this case equates to 18 litres/second (37.6 litres/second). Furthermore the proposed surface water drainage scheme will incorporate on-site attenuation to cater for a 1 in 30 year storm event in accordance with current Sewers for Adoption, The design will also assess the effect of flood waters from rainfall events above the 1 in 30 year storm event up to the 1 in 100 year event, including an allowance for climate change, in accordance with the Local Authority requirements. Please note that the proposed surface water drainage scheme will be subject to approval by both Northumbrian Water Ltd and the Local Authority.
- 15.15 The assessment has identified that the subject site can be developed with no risk of flooding to the proposed properties within the development and with minor change in impact on third party land. Therefore development of the subject site is considered appropriate
- 15.16 The Flood Risk Assessment supports a planning application for residential development of 8 No. dwellings, associated vehicle parking spaces, and vehicular access to the site.

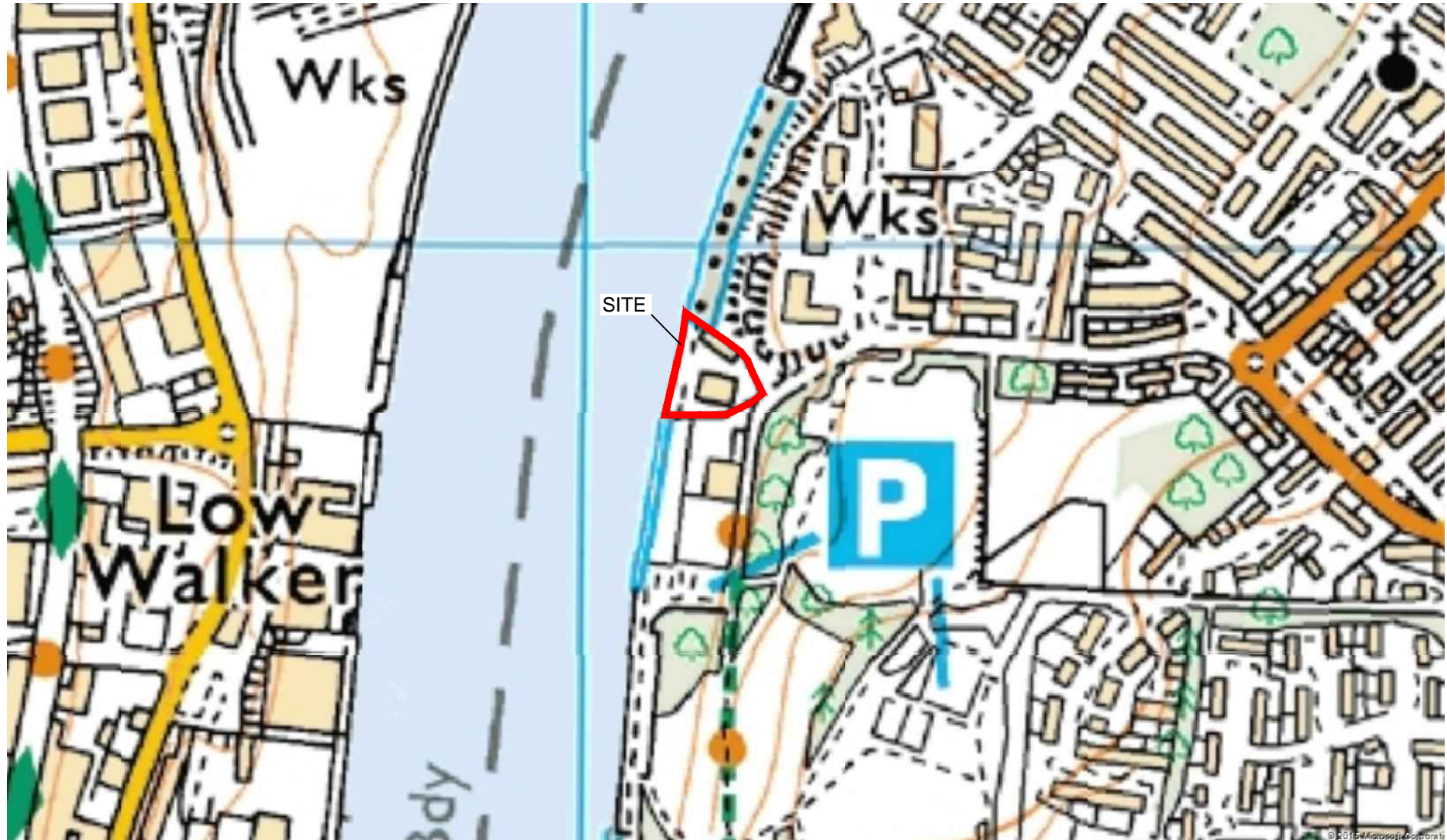
16.0 Report Conditions


- 16.1 The report is based on the information that has been acquired and / or made available to us via the various searches and consultations undertaken as part of the Flood Risk Assessment. In some cases anecdotal information has been relied upon, where documented evidence has been lacking.
- 16.2 The conclusions drawn in the above report are considered correct although any subsequent additional information may allow refinement of the conclusions.
- 16.3 All work carried out in preparing this report has utilised and is based upon Patrick Parsons Limited current professional knowledge and understanding of current UK standards and codes, technology and legislation. Changes in this legislation and guidance may occur at any time in the future and cause any conclusions to become inappropriate or incorrect.
- 16.4 This report has been prepared using factual information contained in maps and documents prepared by others. Patrick Parsons Limited can accept no responsibility for the accuracy of such information.

17.0 References Not Included

- 17.1 Communities and Local Government Technical Guidance to the National Planning Framework (March 2012) which replaces Planning Policy Statement 25 (PPS25) Development and Flood Risk – published December 2006, however retaining key elements of the aforementioned document.

Appendix A
Site Location Plan



 PATRICK PARSONS T. +44 (0)191 261 9000 E. info@patrickparsons.co.uk W. www.patrickparsons.co.uk	Client	Drawing	Scale	N.T.S.	Drawn	Checked
	Project	SITE LOCATION PLAN	Drawing No.	Rev.	P1	

Appendix B
Flood Risk Vulnerability Classifications

Table 2: Flood risk vulnerability classification

<p>Essential infrastructure</p> <ul style="list-style-type: none"> • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
<p>Highly vulnerable</p> <ul style="list-style-type: none"> • Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use³. • Installations requiring hazardous substances consent⁴. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as “essential infrastructure”)⁵.
<p>More vulnerable</p> <ul style="list-style-type: none"> • Hospitals. • Residential institutions such as residential care homes, children’s homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste⁶. • Sites used for holiday or short-let caravans and camping, <i>subject to a specific warning and evacuation plan</i>.⁷
<p>Less vulnerable</p> <ul style="list-style-type: none"> • Police, ambulance and fire stations which are <i>not</i> required to be operational during flooding. • Buildings used for shops, financial, professional and other services,

³ For any proposal involving a change of use of land to a caravan, camping or chalet site, or to a mobile home site or park home site, the Sequential and Exception Tests should be applied.

⁴ See Circular 04/00: *Planning controls for hazardous substances* (paragraph 18) at: www.communities.gov.uk/publications/planningandbuilding/circularplanningcontrols

⁵ In considering any development proposal for such an installation, local planning authorities should have regard to planning policy on pollution in the National Planning Policy Framework.

⁶ For definition, see *Planning for Sustainable Waste Management: Companion Guide to Planning Policy Statement 10* at

www.communities.gov.uk/publications/planningandbuilding/planningsustainable

⁷ See footnote 3.

Appendix C
Proposed Development Layout

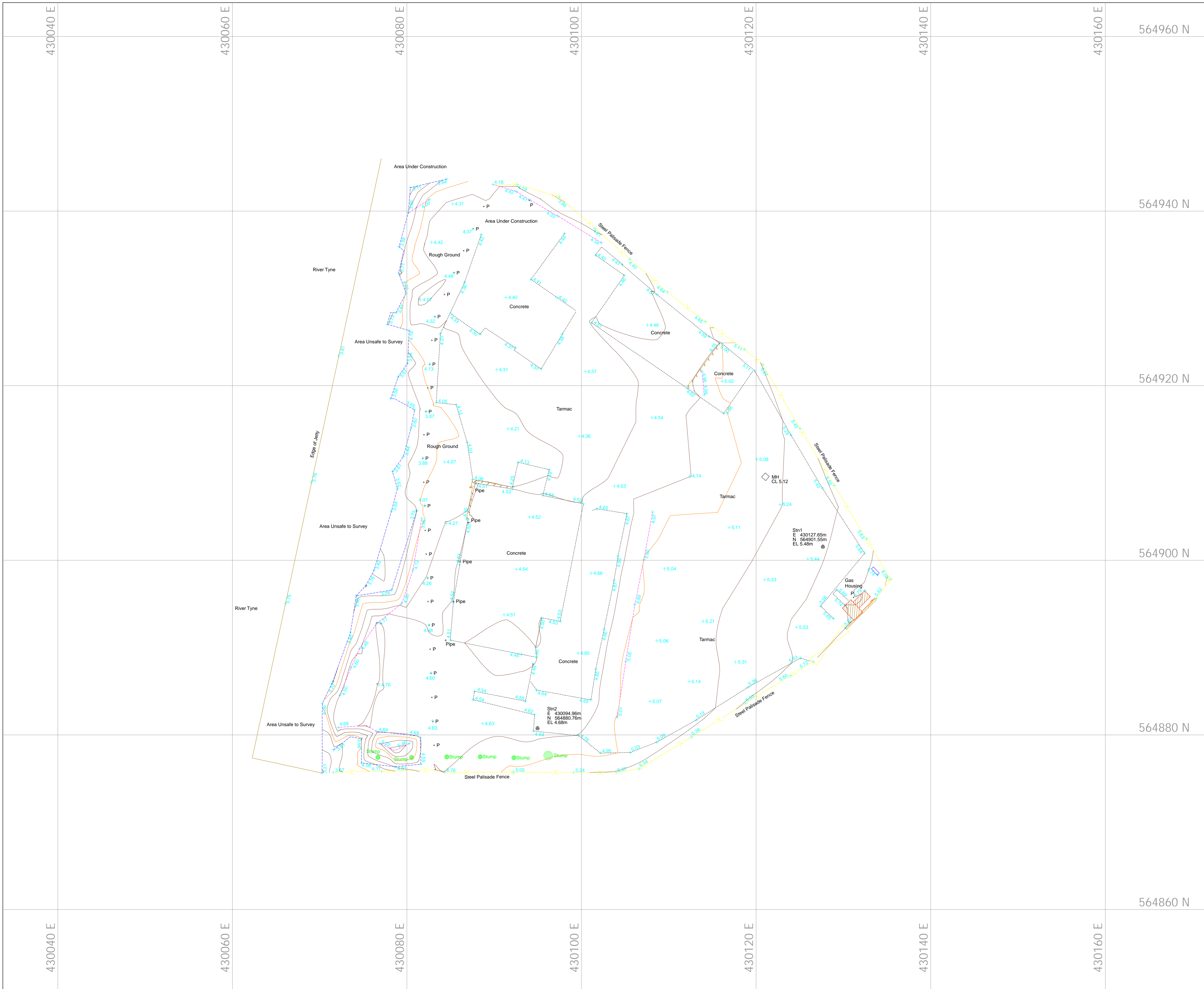


Client:	Mr. Terry Smith
Address:	2 Prince Consort Road Hebburn Tyne and Wear NE31 1EH
Project:	New Development
Drawing Title:	Proposed Site Plan
Scale:	1:200 @ A1
Date:	04/03/2015
Drawn:	G.Z.
Checked:	B.W.
Dwg No.:	1425_03

BWA
ARCHITECTURE
RIBA Chartered Practice

104 Great Lime Road
Newcastle Upon Tyne
NE12 7DQ
T: 0191 289 4312
M: 0794 4573 433
twarchitecture@gmail.com
www.bw-architecture.co.uk

Appendix D
Topographic Survey Drawing



430040 E	430060 E	430080 E	430100 E	430120 E	430140 E	430160 E	564960 N
							564940 N
							564920 N
							564900 N
							564880 N
							564860 N
430040 E	430060 E	430080 E	430100 E	430120 E	430140 E	430160 E	

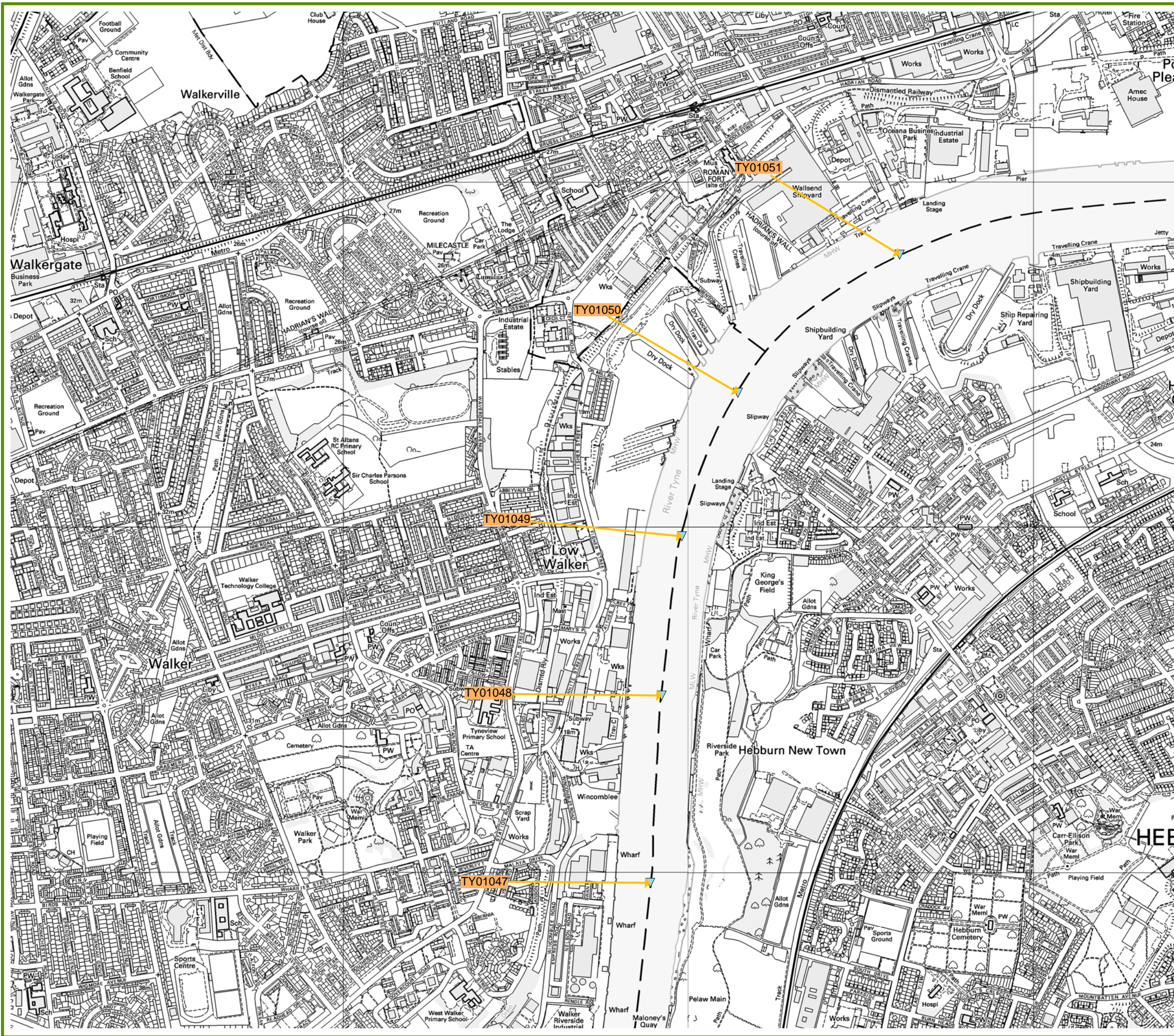
Client:	Mr. Terry Smith
Address:	2 Prince Consort Road Hebburn Tyne and Wear NE31 1EH
Project:	New Development
Drawing Title:	Topographical Survey
Scale:	1:200@A1
Date:	29/05/2015
Drawn:	G.Z
Checked:	B.W
Dwg No.:	1425_10

RIBA Chartered Practice
 104 Great Lime Road
 Newcastle Upon Tyne
 NE12 7DQ
 T: 0191 289 4312
 M: 0794 4573 433
 bwarchitecture@gmail.com
 www.bw-architecture.co.uk

Appendix E
Electricity Cabinet Photograph



Appendix F
Environment Agency River Tyne Modelling Node Plan Extract



Legend

Node Points with Modelled Flood Levels



Node Locations Hebburn

Date: Aug 2015 Scale: 1:10,000 Status: Final

NFCDD data quality flag: Adequate

Data Source: NFCDD - data downloaded on 13-08-2015

Approved by: Phil Marshall 13-08-2015

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Appendix G
Environment Agency River Tyne Node Point Attributes Table

Hebburn Node Point Attributes Table

Aug 2015 JC

Modelled Flood Group = EA1211286

Node Point Name	Return Period (1:x years)	Level Value (mAOD)
TM01047	2	3.535
	5	3.633
	10	3.716
	20	3.799
	30	3.854
	50	3.925
	75	3.978
	100	4.022
	150	4.074
	200	4.126
	201	5.038
	1000	4.383
	1001	5.332
TM01048	2	3.533
	5	3.632
	10	3.716
	20	3.798
	30	3.852
	50	3.923
	75	3.976
	100	4.021
	150	4.073
	200	4.124
	201	5.038
	1000	4.381
	1001	5.33
TM01049	2	3.533
	5	3.632
	10	3.717
	20	3.798
	30	3.851
	50	3.921
	75	3.975
	100	4.02
	150	4.072
	200	4.124
	201	5.038
	1000	4.378
	1001	5.33

Node Point Name	Return Period (1:x years)	Level Value (mAOD)
TM01050	2	3.533
	5	3.633
	10	3.718
	20	3.8
	30	3.85
	50	3.922
	75	3.976
	100	4.021
	150	4.072
	200	4.124
	201	5.038
	1000	4.379
	1001	5.33
TM01051	2	3.533
	5	3.634
	10	3.719
	20	3.801
	30	3.85
	50	3.923
	75	3.976
	100	4.021
	150	4.073
	200	4.125
	201	5.039
	1000	4.381
	1001	5.329

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Appendix H
Environment Agency Flood Plan from Seas and Rivers

Enter a postcode or place name:

NE31 1DL

Go

Other topics for this area...

Flood Map for Planning (Rivers and Sea)

Flood Map for Planning (Rivers and Sea)


Map legend


Click on the map to see what Flood Zone (National Planning Policy Guidance definitions) the proposed development is in.

Flood Map for Planning (Rivers and Sea) [i](#)

 Flood Zone 3

 Flood Zone 2

 Flood defences (Not all may be shown*)

 Areas benefiting from flood defences (Not all may be shown*)

Main River Line [i](#)

 Main River Line

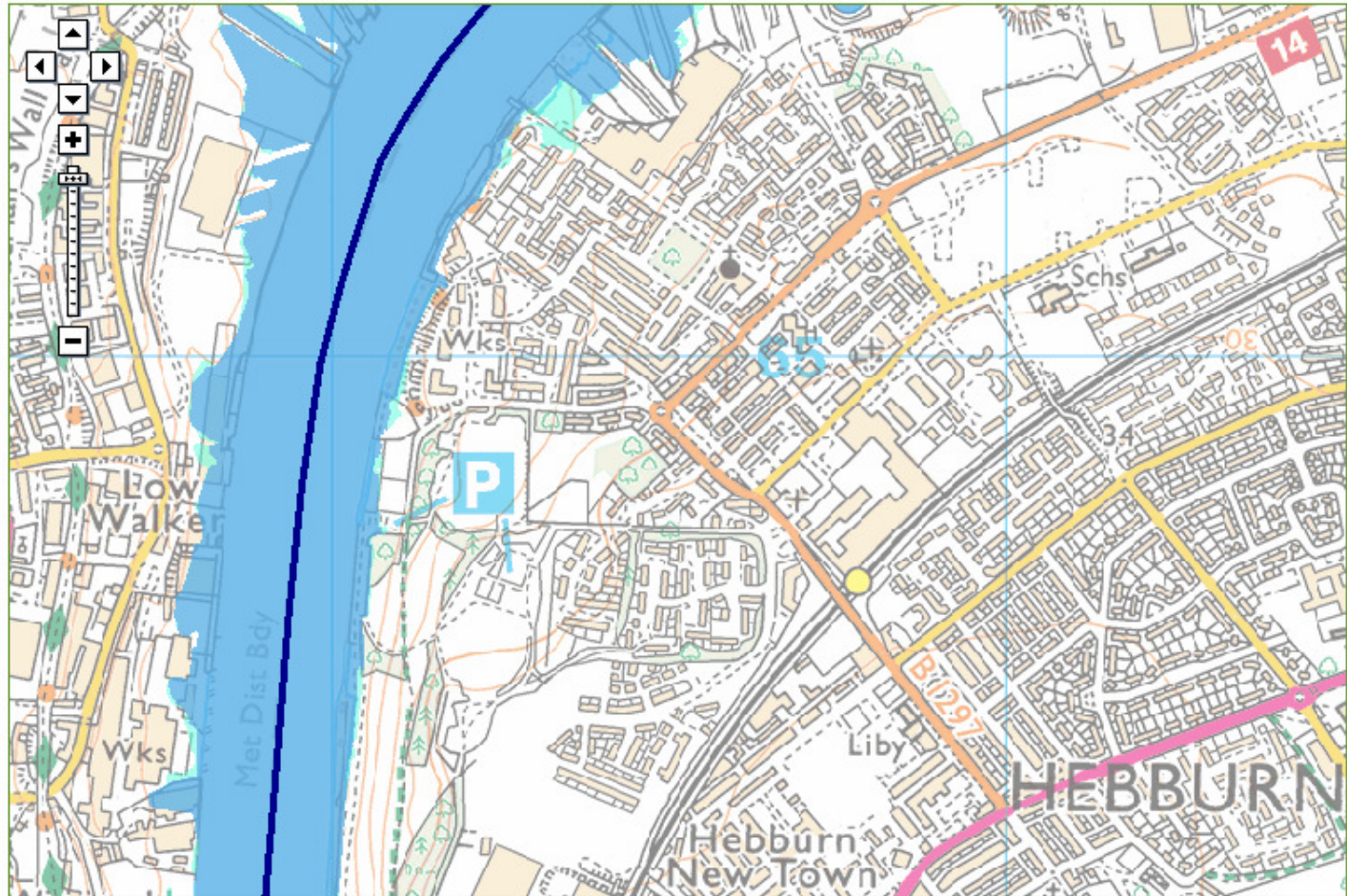
Other national environmental organisations [i](#)

 Natural Resources Wales Area of responsibility

 Scottish Environment Protection Agency Area of responsibility

NE31 1DL at scale 1:10,000

Other maps [Data search](#) [Text only version](#)



Appendix I
Environment Agency Flood Plan from Reservoirs

Risk of Flooding from Reservoirs

Reservoir flooding is extremely unlikely to happen.

The shading on the map shows the area that could be flooded if a large reservoir were to fail and release the water it holds. A large reservoir is one that holds over 25,000 cubic metres of water, equivalent to approximately 10 Olympic sized swimming pools. Since this is a worst case scenario, it's unlikely that any actual flood would be this large.

Click on the shading to see details of reservoirs that could cause flooding in this area.

Map legend

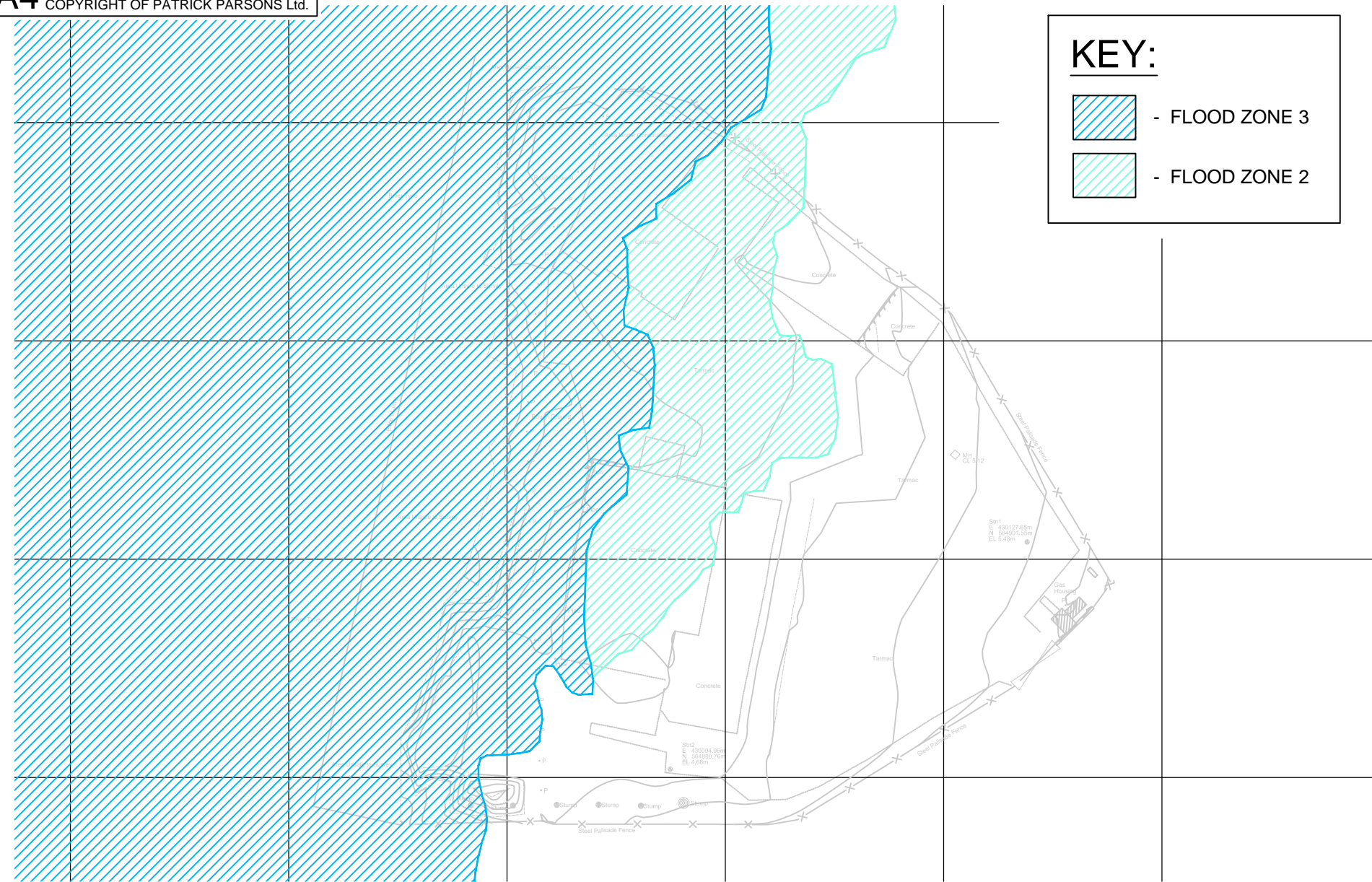
- Risk of Flooding from Reservoirs
- Maximum extent of flooding
- Other national environmental organisations
- Natural Resources Wales Area of responsibility
- Scottish Environment Protection Agency Area of responsibility

Map of X: 430,515; Y: 564,859 at scale 1:10,000


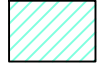
Data search 



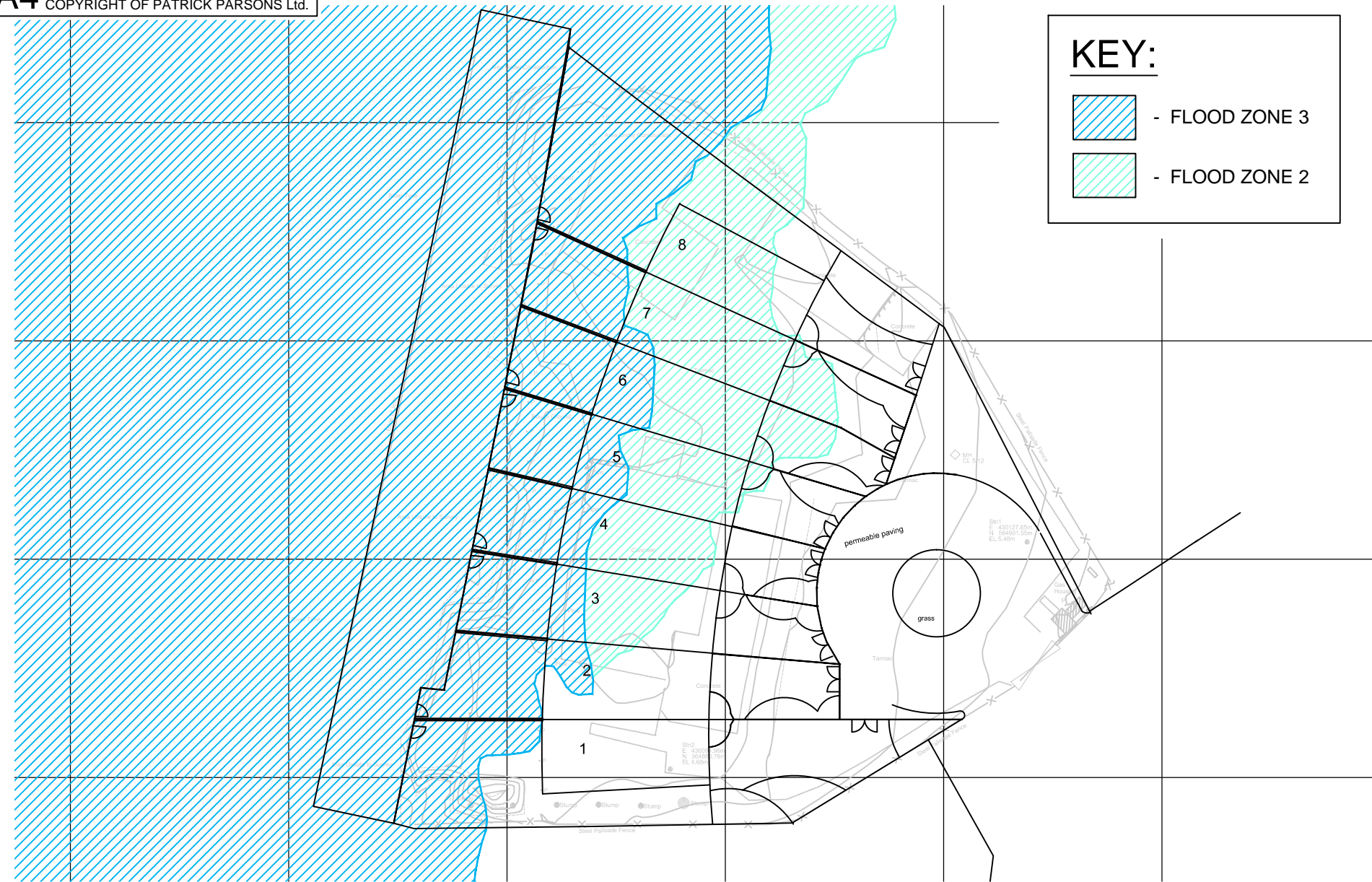
Appendix J
Environment Agency Flood Plan Overlaid on Topographical Survey



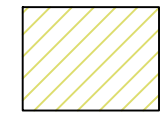
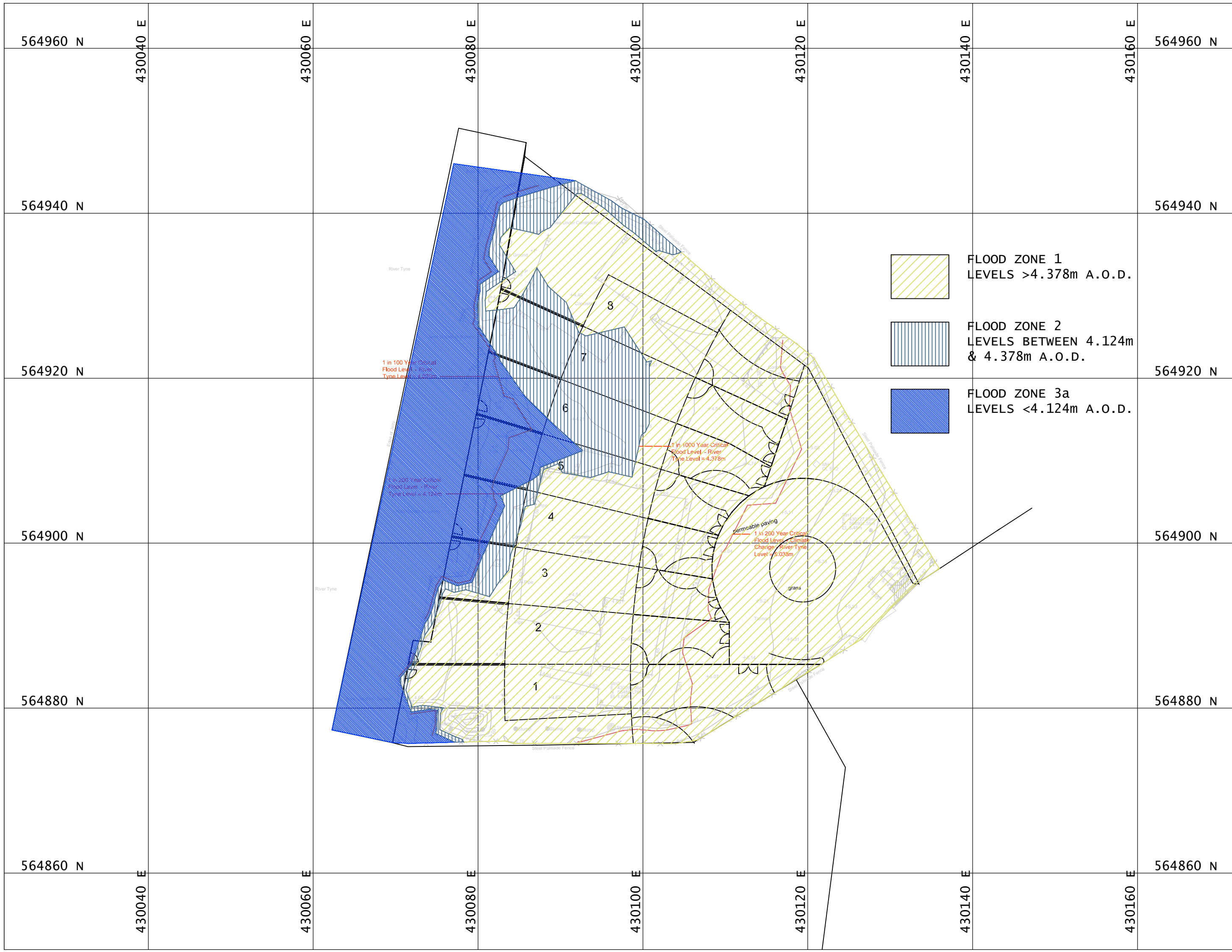
KEY:

-  - FLOOD ZONE 3
-  - FLOOD ZONE 2

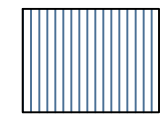
Appendix K
Environment Agency Flood Plan Overlaid on Proposed Layout



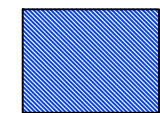
Appendix L
Environment Agency Flood Zone Information from Node Point
TM01049



FLOOD ZONE 1
LEVELS >4.378m A.O.D.

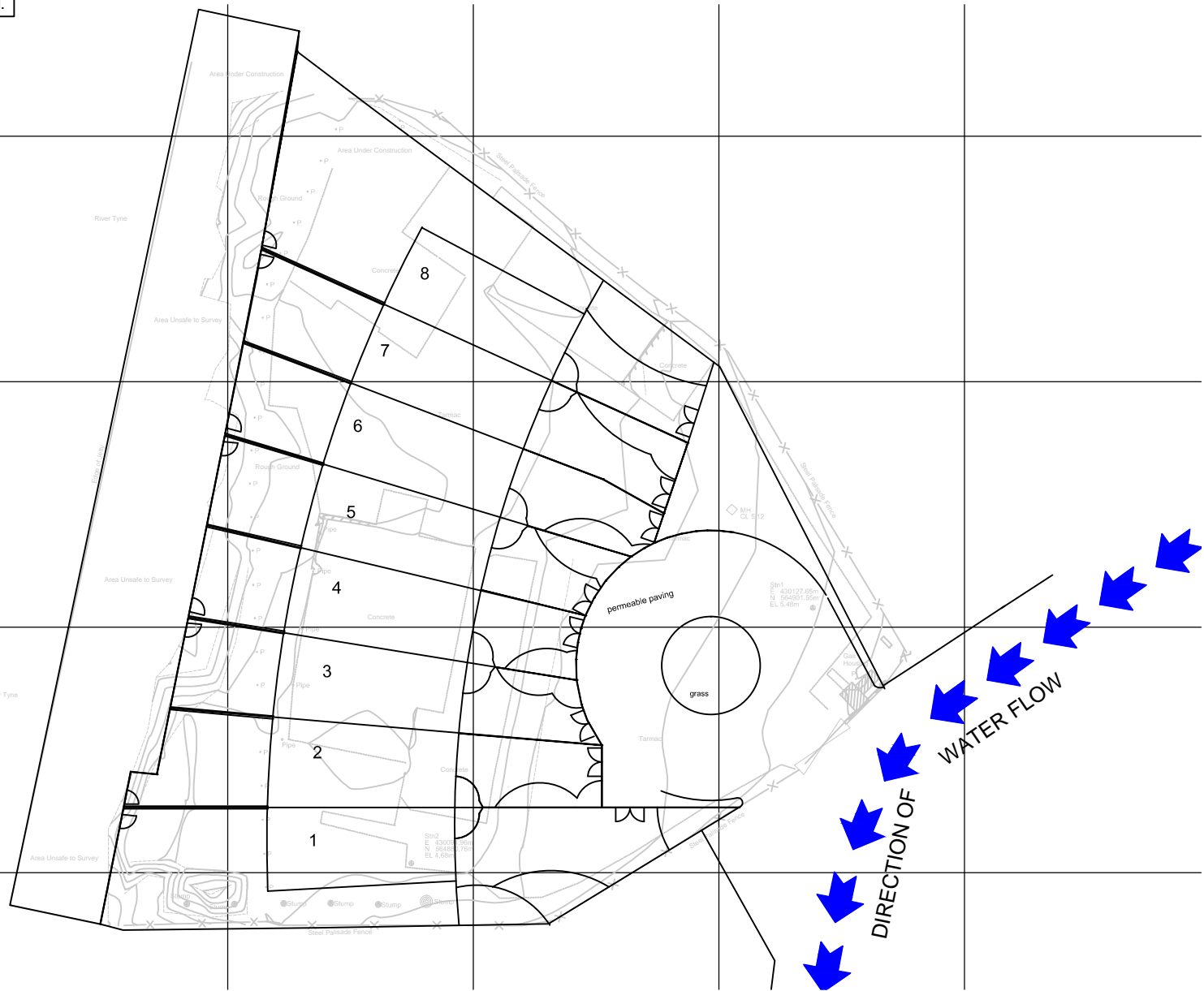


FLOOD ZONE 2
LEVELS BETWEEN 4.124m
& 4.378m A.O.D.



FLOOD ZONE 3a
LEVELS <4.124m A.O.D.

Appendix M
Existing Flood Route



Appendix N
Environment Agency Correspondence 13th August 2015.

Gordon Scott

From: Pearce, Sarah [sarah.pearce@environment-agency.gov.uk]
Sent: 13 August 2015 11:24
To: Gordon Scott
Subject: Flood levels for River Tyne at Prince Consort Road Hebburn
Attachments: Hebburn Node Table.pdf; Hebburn Node Plan.pdf; Standard_Notice[1].pdf

Our Ref: RFI/NDT/1254

Dear Gordon

Enquiry regarding Flood levels for River Tyne at Prince Consort Road Hebburn

Thank you for your enquiry, and subsequent payment which was received today 13 August 2015

I enclose a copy of the levels as requested.

We hope we have answered your query. Please see the attached Standard Notice or licence for details of permitted use.

We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.

We now have over 100 datasets available as Open Data. Open Data allows access to our data free of charge and free of restriction, even for commercial use under an Open Government Licence. You can find out about the data we have available our new page on Gov.uk <https://www.gov.uk/environmental-data>

Please don't hesitate to contact me if you have any further queries.

We are committed to providing a professional customer service. Please help us understand more about what is important to you by completing our [two-minute survey](#)

Kind regards

Sarah Pearce

Customers and Engagement

Sarah Pearce | Customers and Engagement Officer

Customers and Engagement Team | Northumberland Durham and Tees

Environment Agency | Tyneside House, Skinnerburn Road, Newcastle Business Park, Newcastle upon Tyne NE4 7AR

External | 0191 203 4383 / 0191 203 4105

Internal | 278 4383

Email | northeast-newcastle@environment-agency.gov.uk

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Appendix O
Preliminary Proposed Levels Plan



- FLOOD ZONE 1
LEVELS >4.378m A.O.D.
- FLOOD ZONE 2
LEVELS BETWEEN 4.124m
& 4.378m A.O.D.
- FLOOD ZONE 3a
LEVELS <4.124m A.O.D.

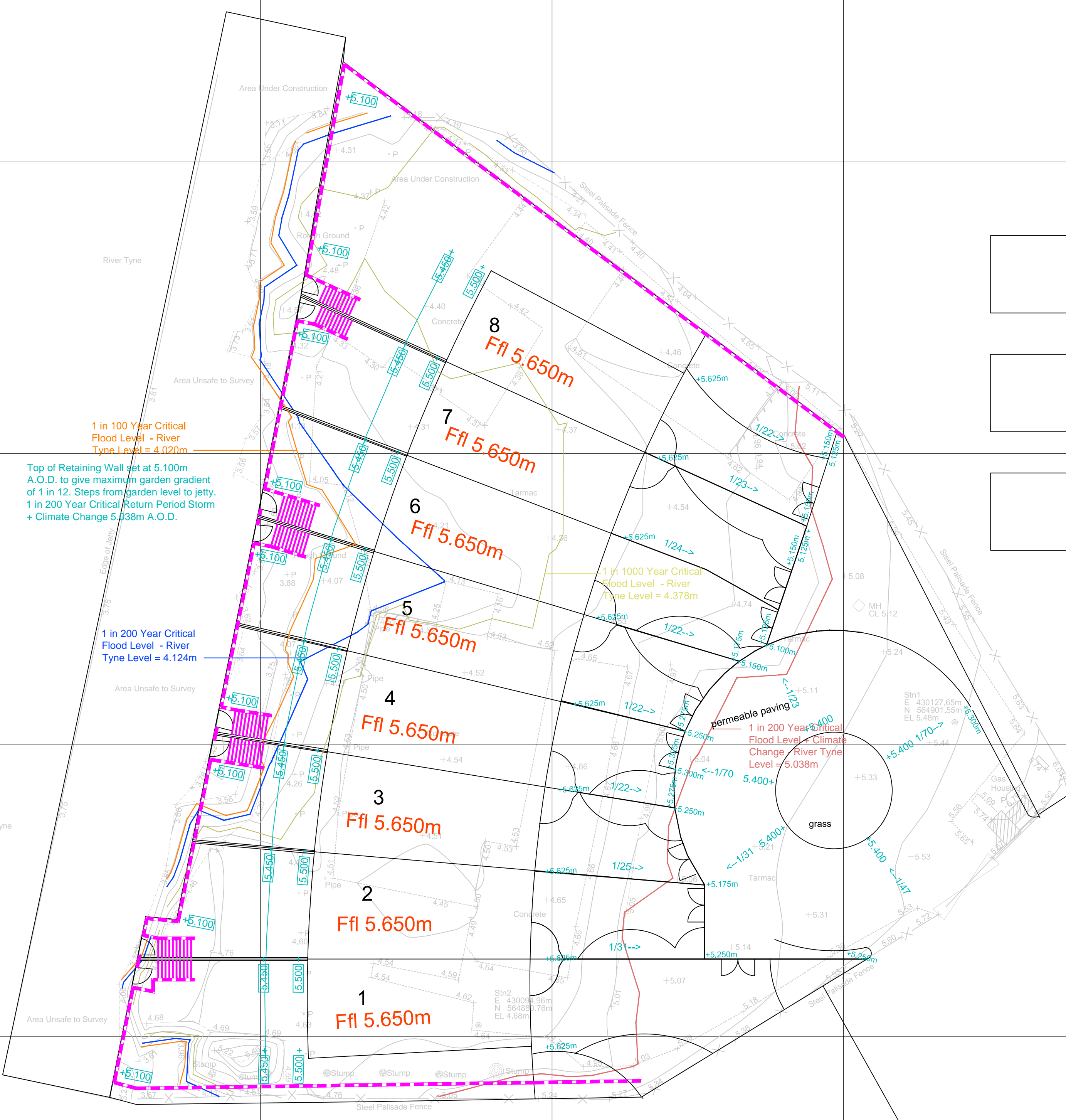
1 in 100 Year Critical
Flood Level - River
Tyne Level = 4.020m

Top of Retaining Wall set at 5.100m
A.O.D. to give maximum garden gradient
of 1 in 12. Steps from garden level to jetty.
1 in 200 Year Critical Return Period Storm
+ Climate Change 5.038m A.O.D.

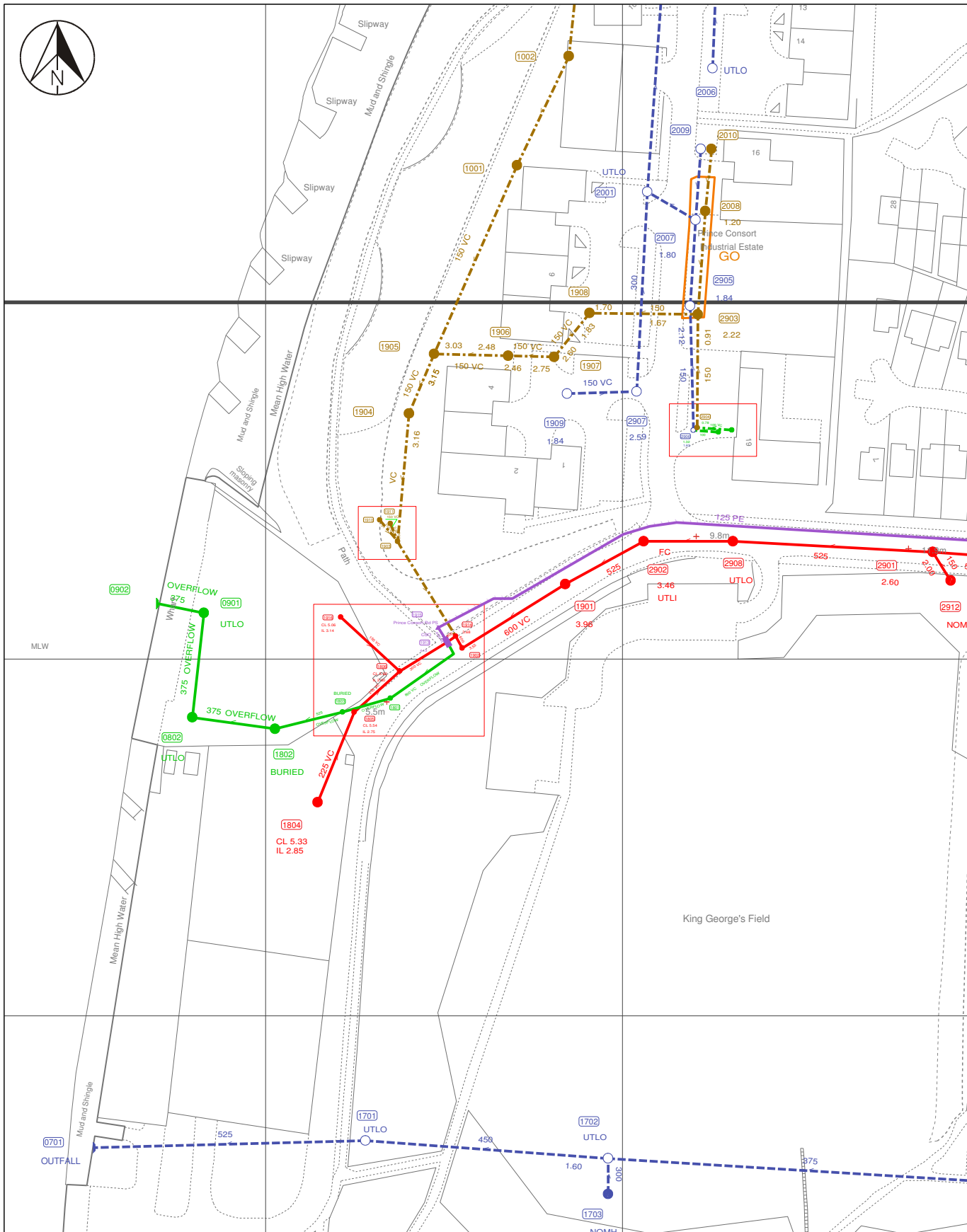
1 in 200 Year Critical
Flood Level - River
Tyne Level = 4.124m

1 in 1000 Year Critical
Flood Level - River
Tyne Level = 4.378m

1 in 200 Year Critical
Flood Level - Climate
Change - River Tyne
Level = 5.038m



Appendix P
Northumbrian Water Limited Sewer Records



User : PERKR

Date : 02/06/2015 12:03:40

Title :

Map Sheet : NZ3064NW

Centre Point : 430162,564911

Paper / Scale : A4@1:1500

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WARNING...Where indicated on the plan there could be abandoned asbestos cement materials or shards of pipe. If excavating in the vicinity of these abandoned asbestos cement materials, the appropriate Health & Safety precautions should be taken. Northumbrian Water accepts no liability in respect of claims, costs, losses or other liabilities which arise as the result of the presence of the pipes or any failure to take adequate precautions. Emergency Telephone Number: 0845 717 1100



Appendix Q
CCTV Survey of Storm Water Overflow system from Prince Consort
Road Pump Station







kwik flow
71 kingsway north
gateshead
Tel: 0191 4874444
Fax:
Email:

Project-information

Project name :
riverside view

Project Number :

Contact :

Date :
21/05/2015

Client:
Contact Name:
Department:
Road:
Town:
County:
Telephone:
Fax:
Mobile:
E-mail:

Site: **riverside view**
Contact Name: **terry**
Department:
Road: **riverside view**
Town: **hebburn**
County: **tyne & wear**
Telephone:
Fax:
Mobile:
E-mail:

Contractor **kwik flow**
Contact Name:
Department: **cctv**
Road: **71 kingsway north**
Town: **gateshead**
County: **tyne & wear**
Telephone: **0191 4874444**
Fax:
Mobile:
E-mail:



kwik flow
 71 kingsway north
 Street : gateshead
 Tel: 0191 4874444
 Fax:
 Email:

Inspection report

Date : 21/05/2015	Job number :	Weather : no rain or snow	Operator : stack	Section number : 1	PLR SUFFIX: X
Weather no rain or snow	Vehicle : cctv1	Camera : tractor	Preset :	Cleaned : no	Operator : stack

Place : heburn	Location details:	U/S MH : nz30641801
Road : riverside vew	Catchment: z	U/S Depth : 3.57
Location Road	Tape number :	D/S MH : nz30641803
Inspection nz30641801 (D/S) nz30641803	Pipe Length 2.50 m	D/S Depth : 0

Use: Combined	Pipe shape : Circular
Year laid : z	Pipe size : 525 mm
Purpose : Investment planning	Pipe material : Concrete
Total length : 13.79 m	Lining :

Comment :

1:120 Depth: 3.57	Position	Code	Observation	Grade
nz30641801	0.00	MH	Start node type, manhole, reference number : nz30641801	(Constr) 0
	0.00	WL	Water level, 5% of the vertical dimension	(Serv) 0
	0.60	DER	Settled deposits, coarse, 20% cross-sectional area loss	(Serv) 4
	0.92	CN	Connection other than junction, at 12 o'clock, diameter 150mm	(Constr) 0
	4.48	CN	Connection other than junction, at 9 o'clock, diameter 300mm Remarks: poss culvert	(Constr) 0
	13.79	MHF	Finish node type, manhole reference number: nz30641803	(Constr) 0
nz30641803				
Depth: 0				

Structural Defects					Constructional Features				
Service Defects					Miscellaneous Features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	1	5	0.36	5	4

riverside view



kwik flow
 71 kingsway north
 Street : gateshead
 Tel: 0191 4874444
 Fax:
 Email:

Inspection report

Date : 21/05/2015	Job number :	Weather : no rain or snow	Operator : stack	Section number : 2	PLR SUFFIX: X
Weather no rain or snow	Vehicle : cctv1	Camera : tractor	Preset :	Cleaned : no	Operator : stack

Place : Road : Location Inspection	heburn riverside view Road nz30641803 (D/S) nz30641802	Location details: Catchment: z Tape number : Pipe Length 2.50 m	U/S MH : U/S Depth : D/S MH : D/S Depth :	nz30641803 0 nz30641802 0
---	---	--	--	--

Use: Combined Year laid : z Purpose : Investment planning Total length : 37.77 m	Pipe shape : Circular Pipe size : 525 mm Pipe material : Concrete Lining :
---	--

Comment :

1:300 Depth: 0	Position	Code	Observation	Grade
	nz30641803			
	0.00	MH	Start node type, manhole, reference number : nz30641803	(Constr) 0
	0.00	WL	Water level, 5% of the vertical dimension	(Serv) 0
	3.90	H	Hole in drain/sewer, at 12 o'clock	(Struct) 4
	7.63	CL	Crack, longitudinal, at 2 o'clock	(Struct) 2
	32.36	WL	Water level, 30% of the vertical dimension	(Serv) 0
	34.95	WL	Water level, 50% of the vertical dimension	(Serv) 0
	37.77	DER	Settled deposits, coarse, 50% cross-sectional area loss	(Serv) 4
	37.77	SA	Survey abandoned Remarks: due to debris	(Misc) 0

Structural Defects					Constructional Features				
Service Defects					Miscellaneous Features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
2	80	2.38	90	4	1	8	0.21	8	4

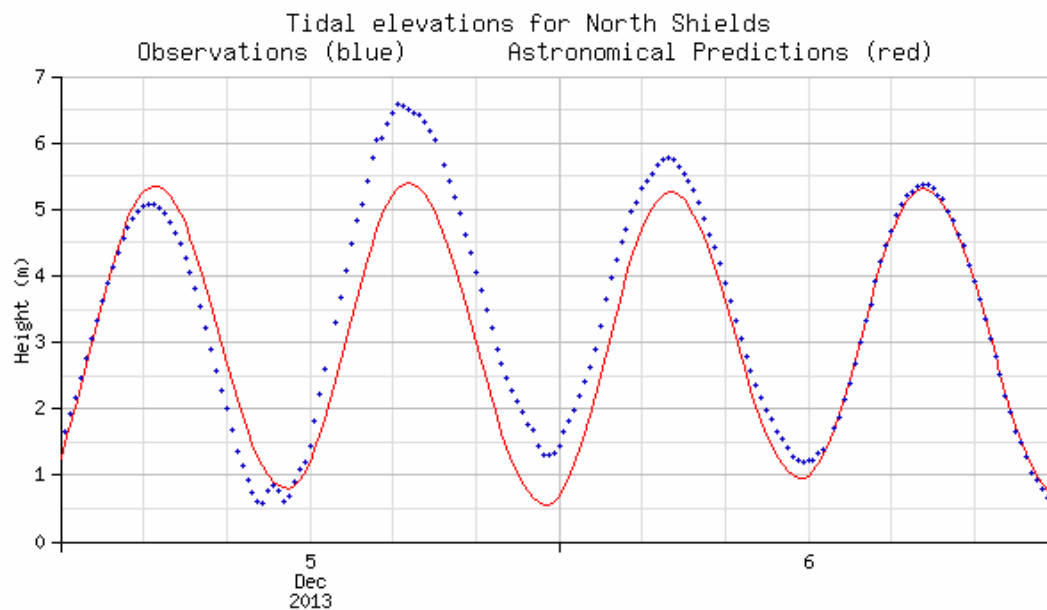
riverside view

Appendix R
River Tyne Tidal Surge Levels 5th / 6th December 2013

Real-time/near real-time data display for North Shields

[Real-time data](#) | [Tidal predictions](#) | [Check tide gauge operational status](#)

[Today & yesterday](#) | [Last week](#) | [Last month](#) | [Custom dates](#)



Warning: Plots based on real-time unchecked data [Disclaimer applies]

Dates are centred on midday

Times marked by vertical grid lines at 00:00, 04:00, 08:00, 12:00, 16:00, 20:00 GMT

Heights are in metres above chart datum – [Read more](#) →

Appendix S
Chart Datum to Ordnance Datum Conversion Chart

Chart datum & ordnance datum

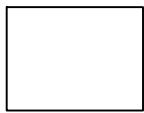
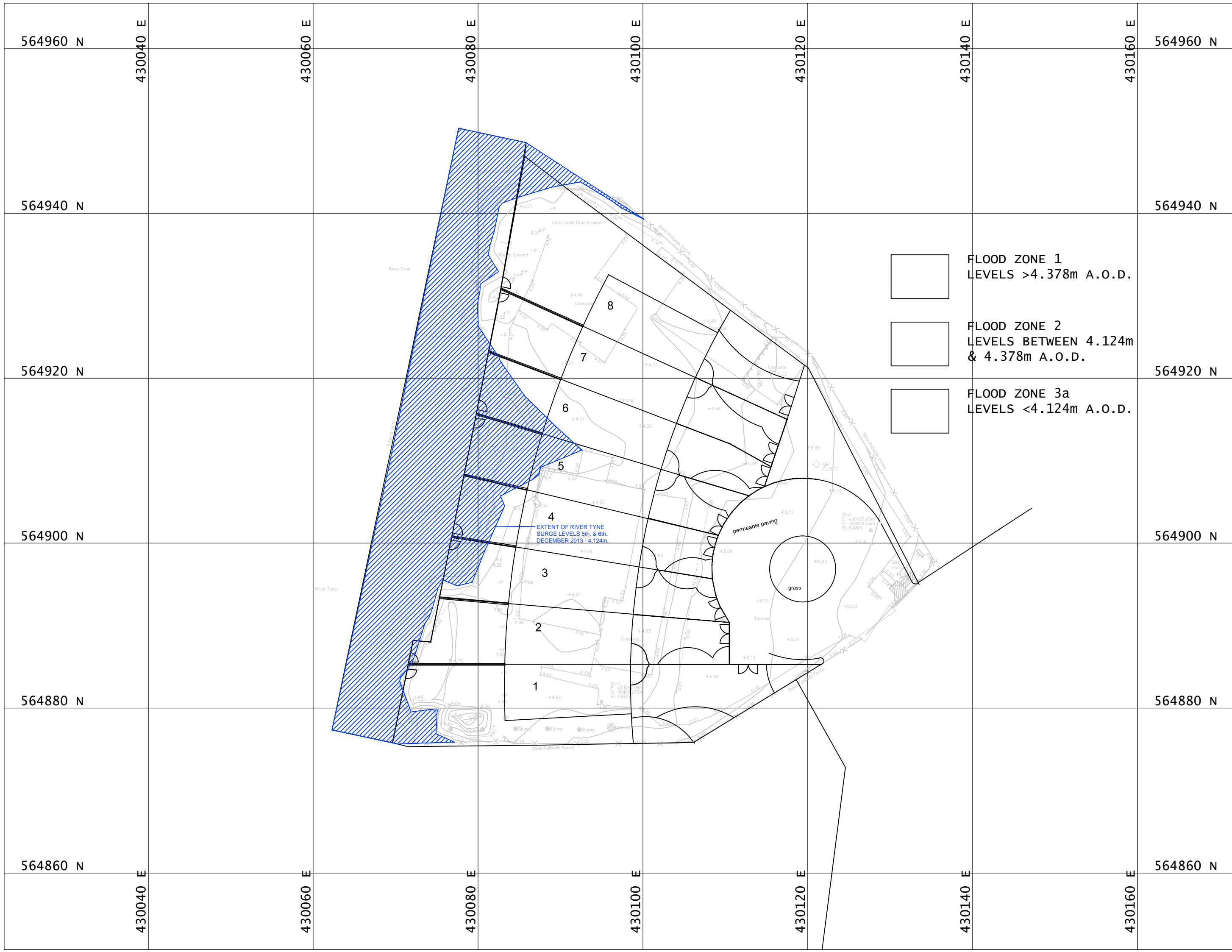
Differences at selected UK and Irish ports

Tidal levels are quoted relative to chart datum (approximately the lowest level due to astronomical effects and excluding meteorological effects). The heights of chart datum (CD) relative to ordnance datum (OD, at Newlyn) in the UK are listed below.

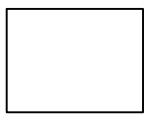
If for example, you have a data value for Liverpool of 10m relative to CD and want to convert it to be relative to OD, then this would be 5.07m, that is 10m plus -4.93m .

England – South		England – East		England – West		Isle of Man	
Avonmouth	–6.50m	Cromer	–2.75m	Blackpool	–4.90m	Port Erin (local OD)	–2.75m
Bournemouth	–1.40m	Felixstowe	–1.95m	Formby	–4.93m		
Devonport	–3.22m	Immingham	–3.90m	Heysham	–4.90m	Channel Islands	
Dover	–3.67m	Lowestoft	–1.50m	Hilbre Island	–4.93m	St. Helier (local OD)	–5.88m
Hinkley	–5.90m	North Shields	–2.60m	Liverpool	–4.93m		
Ilfracombe	–4.80m	Sheerness	–2.90m	Southport	–4.90m		
Newhaven	–3.52m	Whitby	–3.00m	Workington	–4.20m		
Newlyn	–3.05m						
Portsmouth	–2.73m						
St. Mary's (local OD)	–2.91m						
Southampton	–2.74m						
Weymouth	–0.93m						
Wales		Scotland		Northern Ireland		Éire / Ireland	
Barmouth	–2.44m	Aberdeen	–2.25m	(OD Belfast		(OD Dublin)	
Fishguard	–2.44m	Kinlochbervie	–2.50m	= OD Dublin +2.71m)		Cobh	+0.13m
Holyhead	–3.05m	Leith	–2.90m	Bangor	–2.01m	Dublin	+0.20m
Llandudno	–3.85m	Lerwick (local OD)	–1.22m	Belfast	–2.01m	Limerick	–0.46m
Milford Haven	–3.71m	Millport	–1.62m	Donaghadee	–2.26m	Rosslare	+1.02m

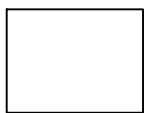
Appendix T
River Tyne Tidal Surge Levels 5th / 6th December 2013 on
Topographical Survey



FLOOD ZONE 1
LEVELS >4.378m A.O.D.



FLOOD ZONE 2
LEVELS BETWEEN 4.124m
& 4.378m A.O.D.



FLOOD ZONE 3a
LEVELS <4.124m A.O.D.

EXTENT OF RIVER TYNE
SURGE LEVELS 5th. & 6th.
DECEMBER 2013 - 4.124m.

564960 N

430040 E

430060 E

430080 E

430100 E

430120 E

430140 E

430160 E

564960 N

564940 N

564940 N

564920 N

564920 N

564900 N

564900 N

564880 N

564880 N

564860 N

430040 E

430060 E

430080 E

430100 E

430120 E

430140 E

430160 E

564860 N

Appendix U
River Tyne Tide Level Information up to Year 2026

North Shields, years 2008 to 2026

Highest astronomical tide	5.73m
Mean high water springs	5.12m
Mean high water neaps	4.08m
Mean low water neaps	1.90m
Mean low water springs	0.73m
Lowest astronomical tide	0.00m

Highest equinoctial spring tides

5.42m	7 Apr 2008	5.45m	17 Oct 2008
5.47m	11 Feb 2009	5.57m	22 Aug 2009
5.61m	2 Mar 2010	5.71m	10 Sep 2010
5.61m	20 Feb 2011	5.70m	29 Sep 2011
5.50m	10 Mar 2012	5.55m	17 Oct 2012
5.45m	13 Jan 2013	5.54m	23 Aug 2013
5.58m	2 Feb 2014	5.68m	11 Sep 2014
5.63m	21 Feb 2015	5.73m	30 Sep 2015
5.57m	11 Mar 2016	5.68m	18 Oct 2016
5.42m	30 Mar 2017	5.52m	6 Nov 2017
5.46m	2 Feb 2018	5.56m	11 Sep 2018
5.54m	21 Feb 2019	5.68m	30 Sep 2019
5.56m	11 Mar 2020	5.69m	18 Oct 2020
5.49m	30 Mar 2021	5.55m	6 Nov 2021
5.32m	3 Feb 2022	5.48m	12 Sep 2022
5.51m	22 Feb 2023	5.66m	1 Oct 2023
5.61m	12 Mar 2024	5.72m	20 Sep 2024
5.55m	31 Mar 2025	5.63m	9 Oct 2025
5.37m	21 Mar 2026	5.41m	13 Sep 2026

10 highest tides

5.73 m	30 Sep 2015
5.72 m	20 Sep 2024
5.71 m	10 Sep 2010
5.70 m	29 Sep 2011
5.69 m	29 Sep 2015
5.69 m	18 Oct 2020
5.68 m	11 Sep 2014
5.68 m	30 Sep 2019
5.68 m	19 Oct 2024
5.68 m	11 Sep 2010

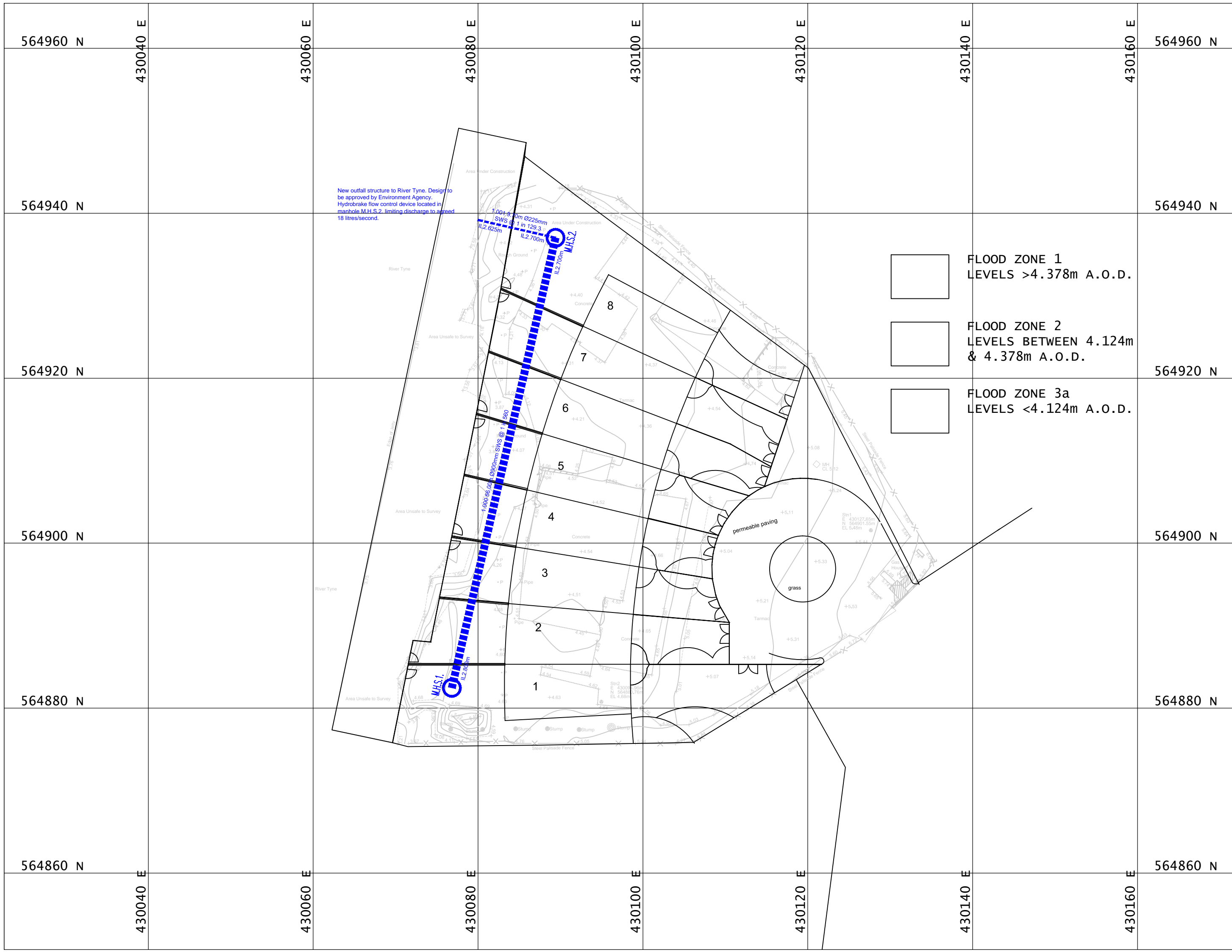
Lowest equinoctial spring tides

0.28m	6 Apr 2008	0.26m	3 Aug 2008
0.20m	11 Feb 2009	0.06m	22 Aug 2009
0.03m	1 Mar 2010	0.02m	12 Aug 2010
0.04m	20 Mar 2011	0.12m	31 Aug 2011
0.20m	7 Apr 2012	0.34m	18 Sep 2012
0.24m	26 Jun 2013	0.16m	25 Jul 2013
0.13m	2 Mar 2014	0.08m	13 Aug 2014
0.06m	21 Mar 2015	0.11m	31 Aug 2015
0.10m	8 Apr 2016	0.23m	18 Sep 2016
0.25m	29 Mar 2017	0.26m	25 Jul 2017
0.21m	3 Mar 2018	0.10m	13 Aug 2018
0.05m	21 Mar 2019	0.03m	1 Sep 2019
0.01m	8 Apr 2020	0.08m	19 Sep 2020
0.12m	29 Mar 2021	0.29m	8 Oct 2021
0.32m	3 Mar 2022	0.19m	14 Aug 2022
0.11m	22 Mar 2023	0.05m	2 Sep 2023
0.00m	11 Mar 2024	0.07m	19 Sep 2024
0.09m	30 Mar 2025	0.27m	9 Sep 2025
0.34m	20 Mar 2026	0.20m	14 Aug 2026

10 lowest tides

0.00 m	11 Mar 2024
0.01 m	8 Apr 2020
0.01 m	11 Mar 2020
0.02 m	12 Aug 2010
0.03 m	1 Sep 2019
0.03 m	1 Mar 2010
0.04 m	10 Sep 2010
0.04 m	20 Mar 2011
0.05 m	2 Sep 2023
0.05 m	21 Mar 2019

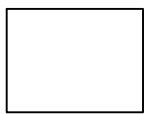
Appendix V
Preliminary Drainage Strategy Plan



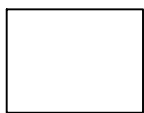
New outfall structure to River Tyne. Design to be approved by Environment Agency. Hydrobrake flow control device located in manhole M.H.S.2 limiting discharge to a peak of 18 litres/second.



FLOOD ZONE 1
LEVELS >4.378m A.O.D.



FLOOD ZONE 2
LEVELS BETWEEN 4.124m
& 4.378m A.O.D.



FLOOD ZONE 3a
LEVELS <4.124m A.O.D.

Appendix W
Micro-Drainage Quick Storage Calculation

Quick Storage Estimate

Micro Drainage

Variables

FSR Rainfall

Return Period (years) 100

Region England and Wales

Map M5-60 (mm) 17.200

Ratio R 0.344

Cv (Summer) 0.750

Cv (Winter) 0.840

Impemeable Area (ha) 0.175

Maximum Allowable Discharge (l/s) 18.0

Infiltration Coefficient (m/hr) 0.00000

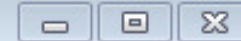
Safety Factor 2.0

Climate Change (%) 30

Analyse OK Cancel Help

Select required Rainfall Model from the list

Quick Storage Estimate



Results

Global Variables require approximate storage of between 22 m³ and 47 m³.

These values are estimates only and should not be used for design purposes.

Variables

Results

Design

Overview 2D

Overview 3D

Vt

Analyse

OK

Cancel

Help

Select required Rainfall Model from the list

Appendix X
Email Response from EA to Tidal Surge 5th and 6th December 2013
information

Gordon Scott

From: Hall, Suzanne [suzanne.hall@environment-agency.gov.uk]
Sent: 27 August 2015 15:42
To: Gordon Scott
Subject: River Tyne
Attachments: image001.png

Hi Gordon

I have spoken to colleagues about the Tidal Surge and the levels shown in the Tyne Model.

It may be worthwhile – as you have already mentioned – getting data from North Shields – which we can give you and historic flood information on the Tyne – from us as well.

Apparently the tidal surge gave levels there or thereabouts to the 1 in 200 year event which correlates with the new Tyne Model.

I am on leave until Tuesday if you need to discuss further – in the meantime you can get the details above from our usual source

Have a great weekend

Suzanne

Suzanne Hall
*Flood and Coastal Risk Management Officer
Partnerships & Strategic Overview
Durham & Tees Valley*

Tel: 0191 203 4094
Fax: 0191 203 4199

Environment Agency
Tyneside House
Skinnerburn Road
Newcastle Business Park
Newcastle
Tyne & Wear
NE4 7AR

<http://www.environment-agency.gov.uk>

If you are trying to make a request under the Freedom of Information Act or the Environmental Information Regulations, please contact our National Customer Contact Centre on 03708 506 506 or email them at enquiries@environment-agency.gov.uk

HOME, SWEET HOME?



**FLOODS
DESTROY
BE PREPARED**

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Appendix Y

Email Response from South Tyneside Council to Tidal Surge 5th and
6th December 2013 information

Gordon Scott

From: Michelle Hogg [Michelle.Hogg@southtyneside.gov.uk]
Sent: 28 August 2015 11:53
To: Gordon Scott
Cc: Rachel Jackson
Subject: RE: N15150 [NOT PROTECTIVELY MARKED]
Attachments: image001.jpg; image002.png

This email has been classified as: **NOT PROTECTIVELY MARKED**

Gordon,

We have checked our records in relation to historic flooding. I am aware that north of the proposed development there is a path called "the riverside" adjacent to a housing development off Ellison street, Hebburn that was affected by a tidal surge on the 5th/6th December 2013. I understand that this path was submerged but that the housing is higher and was not affected. I have no information as to whether the area detailed as the proposed development was affected but I understand that the impacts of the tidal surge extended as far as Newcastle/Gateshead quayside. The Environment Agency may have more information regarding this particular storm and relevant return periods.

As I understand it the site may fall into some of flood zone 2/3 but that you have had some discussions regarding this with the Environment Agency. I understand that the EA has also advised that we would comment of discharge rates into the river. As discussed we would normally advise greenfield run off rates for any new connection. If a connection is proposed you will need to consider the submerged outfall scenario when designing the drainage. I understand that the development is currently proposed to be 8 houses however please note that if the development is to have more than 10 houses there have been changes to the planning system. Since April 2015 it is a requirement that major new developments(i.e. over 10 houses) use sustainable drainage systems within the drainage system.

Should you have any further questions please feel free to contact me

Regards

Michelle

From: Gordon Scott [mailto:G.Scott@patrickparsons.co.uk]
Sent: 25 August 2015 13:51
To: Michelle Hogg
Subject: RE: N15150 [NOT PROTECTIVELY MARKED]

Good afternoon Michelle

The total development site is shaded yellow. I do not understand why the number of properties proposed is applicable, but we are told it is 8No. terraced units fronting the River Tyne.

I am after any historical flooding recorded by the local authority, as the Lead Local Flood Authority, either on the site, or in the immediate area, which may have an effect on the development infrastructure.

I look forward to receiving your response.

From: Michelle Hogg [mailto:Michelle.Hogg@southtyneside.gov.uk]
Sent: 25 August 2015 13:18
To: Gordon Scott

Cc: Rachel Jackson
Subject: RE: N15150 [NOT PROTECTIVELY MARKED]

This email has been classified as: **NOT PROTECTIVELY MARKED**

Hello Gordon,

You are correct. To clarify where is the boundary of the application site is this shaded yellow on the plan. Also when you say small how many properties are you talking?

Regards

Michelle

From: Gordon Scott [<mailto:G.Scott@patrickparsons.co.uk>]
Sent: 25 August 2015 12:34
To: Michelle Hogg
Subject: N15150

Sorry Michelle

Please find enclosed Location Plan

Gordon Scott
Senior Civil Engineer

Patrick Parsons Ltd.

T: +44 191 2619000
M: +44 7976 575921
E: g.scott@patrickparsons.co.uk
W: www.patrickparsons.co.uk



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