

Flood Risk Assessment

Rickmansworth Waterways Trust,

Batchworth Lock Education Centre

Adjacent 99 Church Street, Rickmansworth

Rev D 21.04.17

1.0 Introduction

Background

Rickmansworth Waterways Trust (RWT) is a heritage education charity which invites school groups between 4 and 11 years old to learn about the history of the canal system locally and nationally. Due to the recent loss of access to their classroom facility, which has been used to deliver the programme for over twenty years, RWT currently use a first floor room at St Mary's Church Hall to greet groups of up to 30, plus up to 6 adult helpers. Children now have to be escorted alongside and across a busy main road to reach the lock and would benefit from all facilities being adjacent to the lock. RWT also travel to adult groups such as historical societies and U3A to give lectures on the canal history, but would like to have facilities to invite those people in groups of 20 to 30 to Batchworth Lock.

As well as their charitable educational programme, RWT organise water related leisure activities:

- *The Rickmansworth Festival is an annual leisure event organised by RWT based around Batchworth Lock, the Aquadrome and the adjacent stretch of the Grand Union Canal*
<http://www.rwt.org.uk/festival/festival-2015-sponsors/>
- *'Pride of Batchworth' is a leisure boat booked through RWT for canal cruises, starting from Batchworth Lock* <http://www.rwt.org.uk/canal-cruises/> *This boat is also used to provide a pleasure cruise as part of the fun educational visits for children and during the Rickmansworth Festival.*
- *'Roger' is a historic canal boat which is used for both educational and leisure trips*
<http://www.rwt.org.uk/historic-working-boat/>

RWT are proposing to erect a single storey cabin type structure at Batchworth Lock to facilitate the education programme *and the leisure activities*. The building would have occasional daytime use during the spring to autumn months when the majority of the educational visits are held. *It would also have the function of housing the necessary administration office, storage facilities and WC's that are required to support the running of the leisure boats and annual Rickmansworth Festival. It is also proposed to have a Welcome Centre run by Canal & Rivers Trust (CRT) volunteers to provide information to leisure boat users and the public using the canal, and will logically need to be located directly adjacent to the canal.*



Aerial photo of site location: adjacent to 99 Church Street, Rickmansworth, Hertfordshire, WD3 1JJ

Summary of key issues and discussions with EA:

RWT have received comments from the Environment Agency (EA) – their letter 30.03.17 and subsequent email 07.04.17. The main issue is the description of use in relation to the Zone 3b flood risk site.

The response made by RWT is that they operate a mix of water based leisure boat activities and a voluntary education programme in a similar manner to the Bury Lake Young Mariners (BLYM) charitable trust at the nearby Aquadrome in the same Zone 3b flood zone. BLYM made a very similar proposal to improve their facilities with a much larger scheme (993sqm gross floor area footprint as opposed to 184sqm for RWT) which was approved by the EA and TRDC in August 2015 (ref 15/1650/FUL). Therefore there is relevant precedent for a mix of water based leisure and educational work to be accepted in a Zone 3b flood risk site provided that the appropriate measures are taken.

The water based leisure boat activities require the RWT facility to be on the proposed site at Batchworth Lock in order to support the leisure boats. CRT own the towpath but RWT lease the land immediately behind the towpath and so this is the only logical site to provide the storage, administration and maintenance access required to run the boats at their moorings. During educational visits the boats are brought closer to the Batchworth Lock site and used for a mix of leisure and educational trips. Drawing 162031-D-11 shows the relationship of the site to the boats and other canal based facilities.

The key issues raised by the EA are addressed as follows:

- A. RWT operate a mix of water based leisure boat, festival and charitable educational work, therefore it is reasonable to say that their activities include the water based leisure boat activity that is permitted within the Zone 3b flood risk area. What is at question is whether the occasional additional charitable education work is also allowable.
- B. There is relevant precedent for such a mix of uses being accepted for BLYM at the nearby Aquadrome in the same flood zone.
- C. RWT would not be able to support their boats from another location because this is the only place where they can provide effective maintenance access and the necessary storage and admin support facilities to run them. The other base of operations for RWT is in 99 Church Street, adjacent to the site, and they also share the use of the CRT workshop as part of their agreed adoption of the canal between Batchworth and Stockers Locks. RWT volunteers maintain this area in conjunction with CRT for both land based and water based leisure use of the canal.
- D. The site is a brownfield site. Its previous use was residential, which is a far higher risk and not appropriate to a Zone 3b flood area (p4). RWT have been using this site for the described mix of water based leisure and education for over 20 years.
- E. Like BLYM, the programme of educational visits is arranged by invitation, though the frequency is much lower for RWT, being approximately 1 or 2 visits per week during spring/summer/autumn months, up to a maximum of 40 visits per year. RWT liaise with CRT and EA to get information on flood warnings and would cancel visits if a warning was issued for this location (section 7.0, p10). Note that CRT use the SCADA electronic system to give ample warning of floods.
- F. In the unlikely event that a flood occurred without warning then visitors would be evacuated up the ramp to the pedestrian path on the raised portion of Church Street, which is well above the worst predicted flood levels and outside all flood risk areas (section 7.0, p10).
- G. The site is too low for excavation to offset displacement by the new building so it is proposed to raise the floor structure above the predicted design flood level and allow water to path underneath, in a similar way to the agreed BLYM proposal (section 5.0, p9).
- H. Subject to grant of planning permission, RWT will seek a permit from the EA for the proposed works.



Site plan – existing



1. View of access ramp from Church St



2. View of access ramp from canal towpath



3. Existing CRT workshop & NE corner of site



4. View of site from canal towpath



5. View of 99 Church St on opposite side of canal

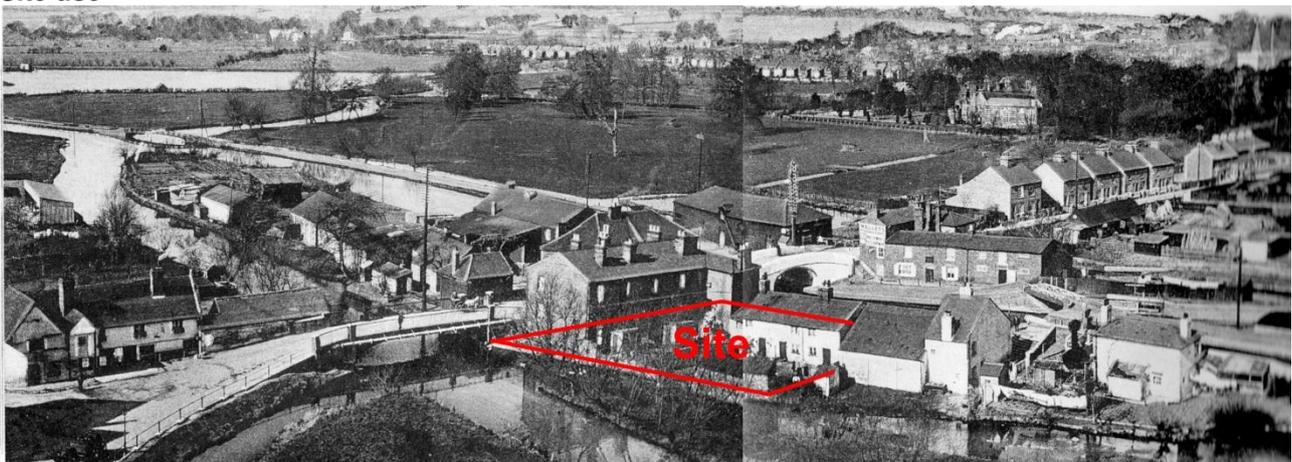


6. View of southern river side edge of site

Location

The site is located between the Grand Union Canal and the River Colne, next to Church Street and close to the centre of Rickmansworth. The site is near to the listed No. 99 Church Street and adjacent the Canal and Rivers Trust (CRT) workshop and the dwelling at No. 115 Church Street. There is an existing ramp access from Church Street onto the CRT owned towpath which gives access to the site.

Site use

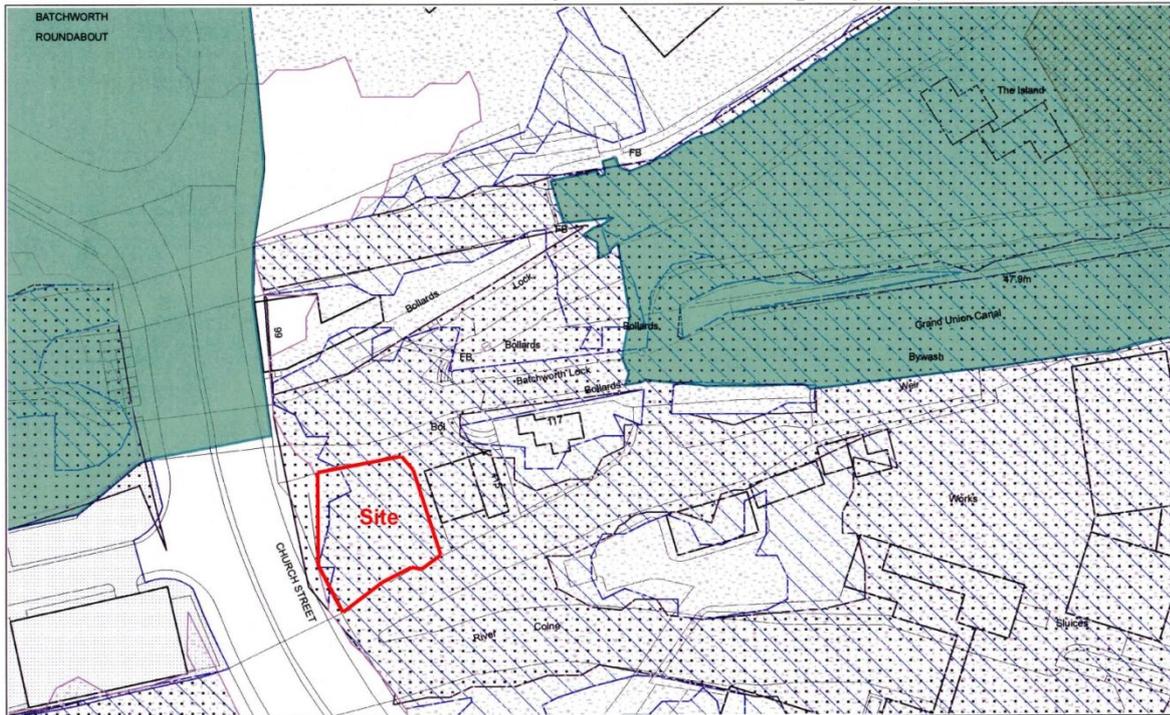


Panoramic photograph of site taken by TJ Price in 1910

Historically there were a mixture of single and two storey buildings on the site, which were used for retail, housing and storage. The site was cleared and made available for use by the Rickmansworth Waterways Trust (RWT) over twenty years ago. RWT are tenants and the land is now owned by Three Rivers District Council. The RWT currently have a small model canal system on the site a storage container for their equipment. The site has been used for educational and recreational visits for over twenty years.

Flood Zone

The site is located within a zone allocated 3b by the Environment Agency (EA).



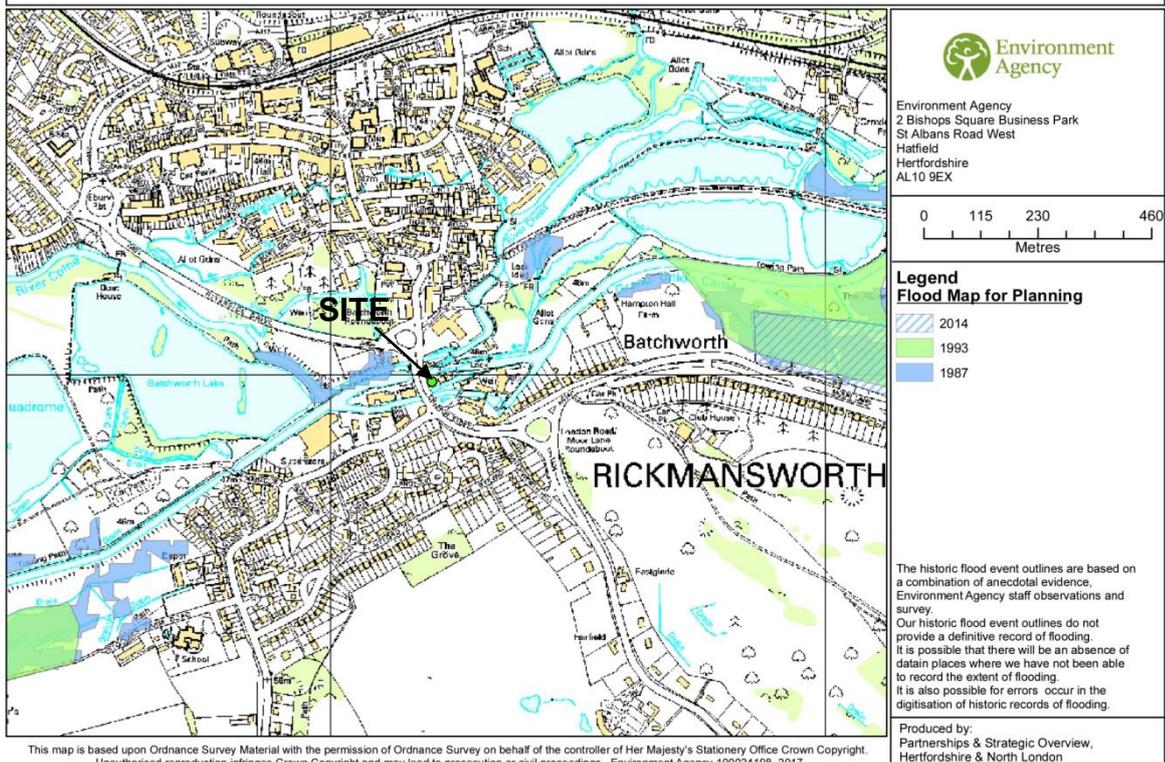
- Green Belt SA2014
- County Wildlife Site
- TPO
- SFRA Floodzone 2 2012
- SFRA Floodzone 3a 2012
- SFRA Floodzone 3b 2012

1:750
0 5 10 20 Metres

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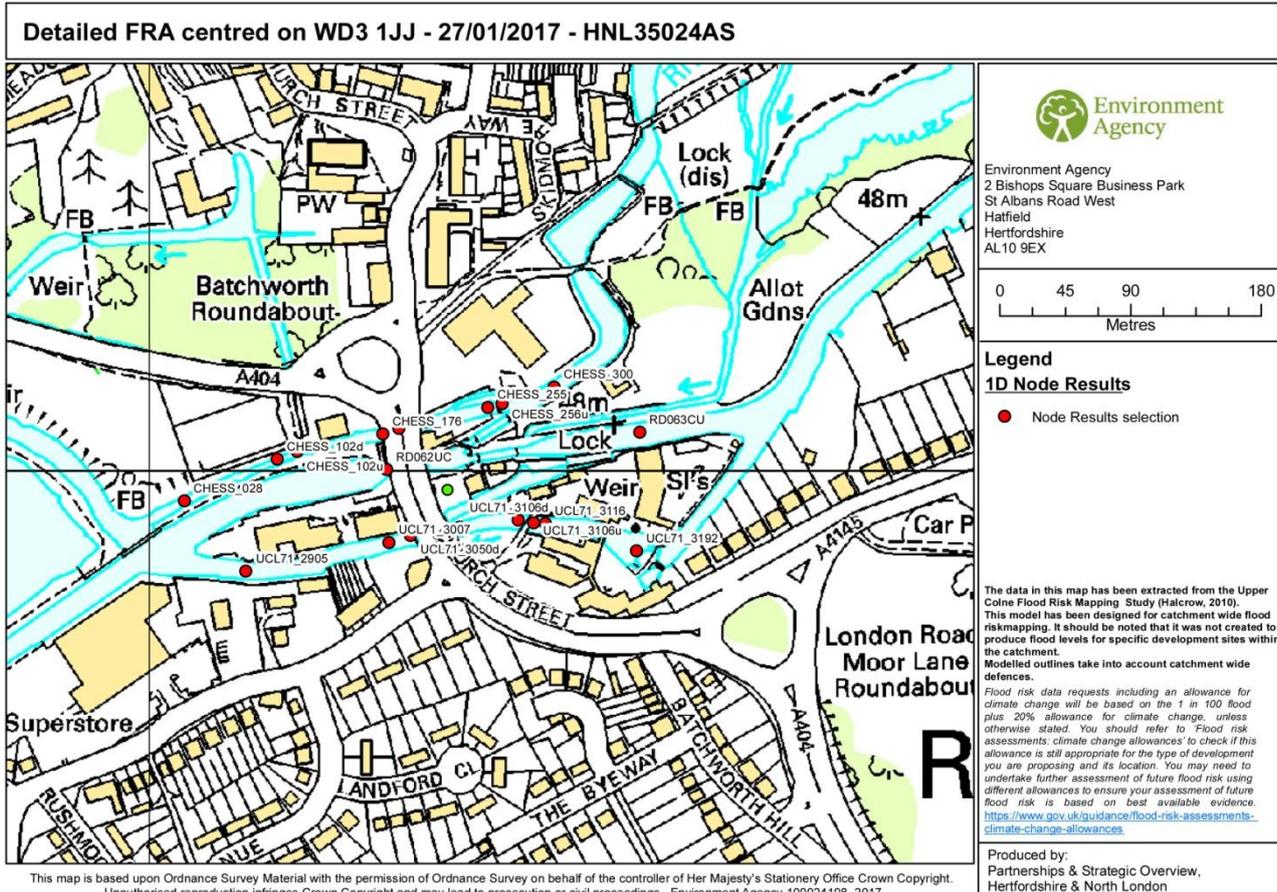
Historical EA records demonstrate that the site has not flooded:

Historic Flood Map centred on WD3 1JJ - 27/01/2017 - HNL35024AS



The RWT have occupied the site for over 20 years and during that time the water levels have never risen above the canal and river side embankment edges (approx **46.00m** above Ordnance Datum). When water levels have risen to this height then the water overflows the embankment edges about 230m further downstream, adjacent to the Aquadrome, and discharges into Bury Lake and Stockers Lake.

The applicant requested flood level information for the site, but the EA does not hold accurate data on flood water levels for this site, so information has had to be interpolated from nearby data points.



The nearest data points give the following information:

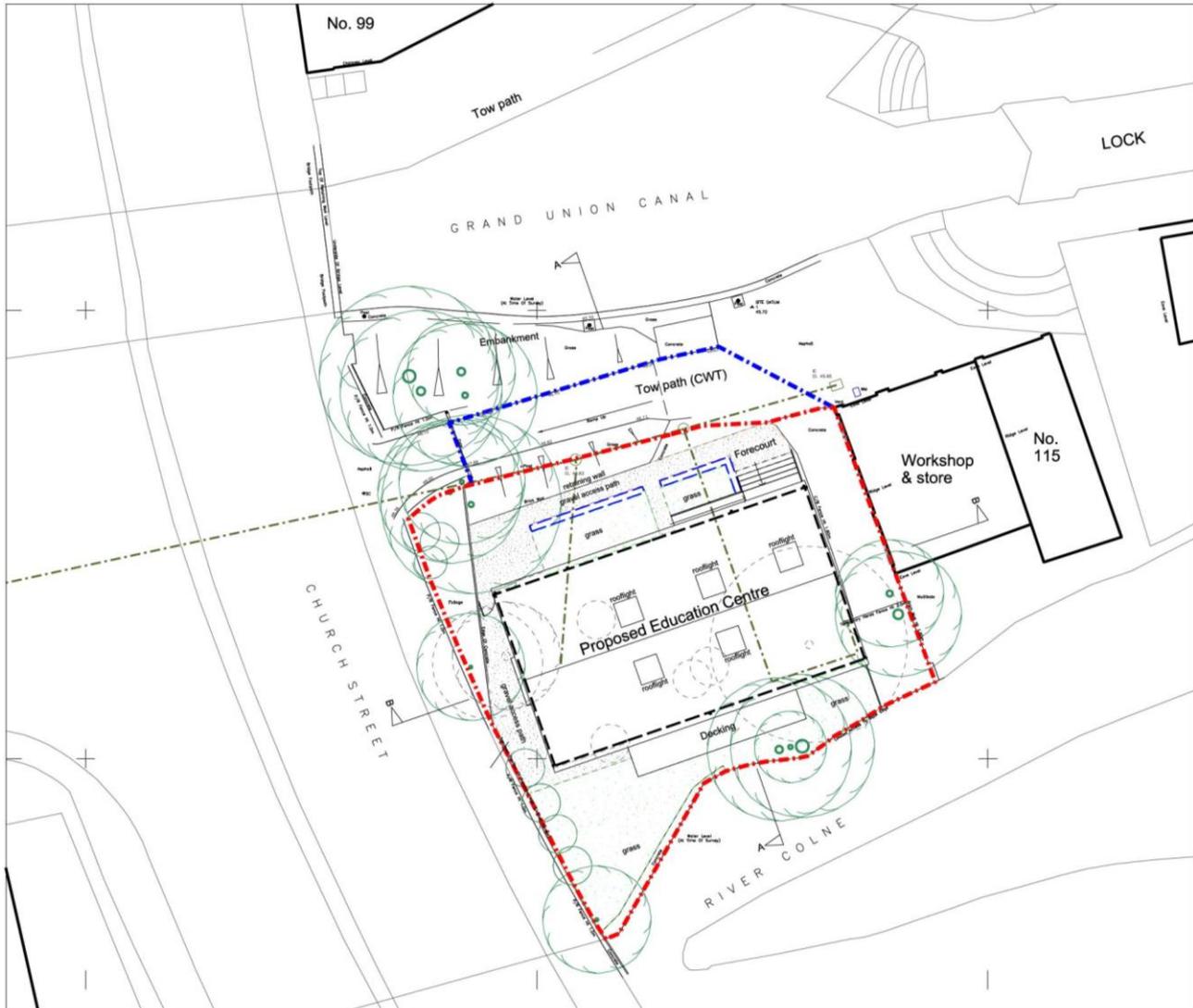
	Predicted flood level above Ordnance Datum for 1 in 100 year plus 20% allowance for Climate Change	Predicted flood level above Ordnance Datum for 1 in 1000 year condition
UCL 71.3106d (to South-east)	46.55	46.72
UCL 71.3107 (to South-west)	46.25	46.36
CHES_102u (to North-west)	46.10	46.19

The worst case would be the EA predicted flood levels for point UCL 71.3106d on the River Colne, adjacent to the Affinity Water facility to the south east of the site (approximately 45m from the site). The EA advises that designs should allow for a 1 in 100 year condition plus 20% allowance for climate change. Therefore the design level should be **46.55m** above Ordnance Datum (OD).

2.0 The development proposals

The proposal

The proposal is to remove the model canal, the existing metal storage container and some of the trees on the site, and erect a new single storey education centre building.



Proposed site plan

The proposed site layout will comprise the following:

- Single storey education centre building which includes a teaching hall, entrance foyer, toilets, a two person administration office with kitchenette (currently accommodated in No. 99 Church Street), and storage rooms.
- External partially covered decking area adjacent to the River Colne
- Open entrance forecourt area facing the canal towpath

Proposed gross external floor area of education building: 184.0sqm

Proposed finished floor level of building: **46.82m** above OD

There is no proposed change of use of the site. The site is already used for informal education and recreation activities by the RWT which are specifically related to the waterside. The proposal is to provide better built accommodation to allow those activities to continue.

Vulnerability to flooding

Given that the existing and proposed continued use of the site is for waterside related informal education and recreation then the EA vulnerability classification would be 'Water Compatible' and the scale of the development at less than 250sqm would be 'Minor'.

The EA table A indicates that a Detailed Flood Risk Assessment is required to support proposals for such a development in a Zone 3b flood risk area, which is provided in this report.

Expected lifetime of proposed development

The RWT Building Requirements document states a "planned life of twenty years". The proposal is to erect a timber cabin style structure in accordance with the planned life.

3.0 Sequential Test

Minor Development

It is a minor development (less than 250sqm), therefore the Sequential and Exception tests do not apply. Notwithstanding this RWT have considered other sites and concluded that this site represents the only logical solution.

Review of other locations and reasons for proposing this site

Another site would be inappropriate because it would mean moving the children along busy roads to see the canal, lock and narrow boats. This is an unsafe situation that RWT are seeking to avoid by erecting a built facility on the site.

4.0 Climate Change

RWT are taking EA advice and using flood level data that includes a 20% addition to the predicted 1 in 100 year levels.

5.0 Site Specific Flood Risk

Main source of flood risk on site

The known flood risk sources are from the adjacent River Chess, River Colne and the Grand Union Canal. These are the water courses that the EA monitor and have provided flood level data on.

Probability of flooding

As stated above, historical EA records demonstrate that the site has not flooded. RWT have been using the site for over 20 years and have not experienced flooding of the site because water overflows into the lakes further downstream and therefore the water has not risen above the existing bank edges which are at about 46.00m above OD. However RWT are taking advice on predicted future flood levels as explained above in section 1.0.

Other flood risk sources

RWT are not aware of any other flood risk sources.

Predicted flood levels

RWT are taking advice on predicted future flood levels and the design level being used is **46.55m** above OD for a 1 in 100 year condition plus 20% for climate change.

Will the development flood?

The proposal is to lift the internal building floor level up above the predicted design flood level so that it will not flood. The existing external ground levels will be kept and will be allowed to flood.

How will the development be made safe?

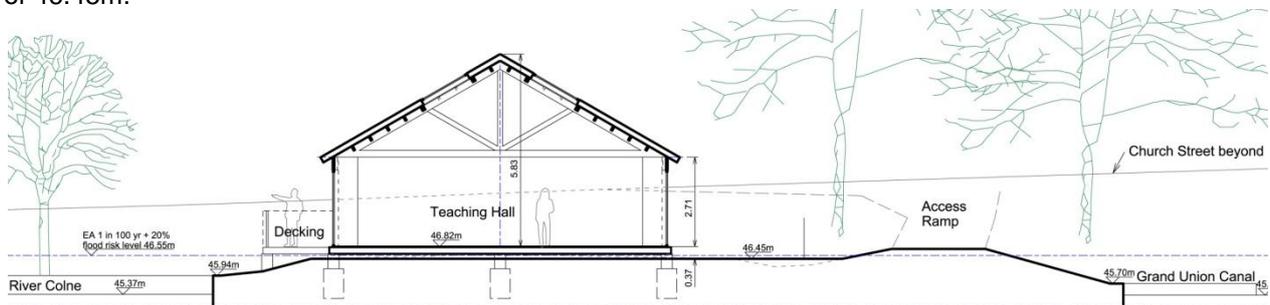
Use of flood warnings/Flood risk management/safety of site users:

The RWT educational programme is only operated during the Spring to Autumn months, during the school term times. It is not residential. School visitors pre-arrange day trips to the RWT facility. RWT is in touch with the EA to take advice on flood warnings. If there was a flood warning then the educational programme during the predicted flood period would be cancelled and re-arranged at a time that was safe.

There is no proposed vehicle parking on the site and therefore no risk to vehicle users. The only vehicle access is for maintenance and service access via the CRT owned ramp and towpath and this access will be managed jointly by CRT and RWT. In the event of a flood warning no vehicle access would be allowed.

Design of building to avoid flooding by raising the floor level:

The building has been designed to have its main internal floor level raised well above the predicted flood level - see site section drawing below. The design flood level at the Batchworth Lock site is **46.55m** (see above). The floor level has been raised **46.82m**, which is well above the design flood level (and above the 1 in 1000 year prediction of 46.72m), as well as being above the existing ground levels, which are an average of 46.45m.



Proposed site section

Structural safety of the building:

The proposal is to raise the floor structure up on brick piers to form a ventilated sub-floor void that is designed to be allowed to flood without causing any damage to the building.

How will the development avoid impact on other areas? **Flood plain compensation**

The proposal to raise the floor of the building on piers also avoids any significant impact on the flood zone and would not displace any significant volume of water. Therefore there would be no adverse impact on existing facilities.

Due to the low existing site levels it will not be possible to excavate a similar volume than that displaced by the proposed building. The proposal is similar to that agreed between the EA and BLYM (planning ref 15/1650/FUL). In the same way as the BLYM proposal, RWT will use a shallow 150mm deep void that cannot be used for storage or any other purpose other than to allow the forecast flood water level to pass beneath the floor structure. It is proposed to use a metal mesh at the perimeter of the void to prevent ingress of debris or vermin and to allow regular cleaning. This void will in any case be required by Building Control to ensure satisfactory ventilation of the suspended timber floor construction.

Are there opportunities to mitigate flooding?

The Canal & Rivers Trust (CRT) works closely with the EA to mitigate potential flooding in this location through the management of the existing lock system. RWT is in close contact with both the CRT and EA to take advice on flood warnings and alter or cancel their programme accordingly.

Flood risk activities: environmental permits

Under the terms of the Water Resources Act 1991, and the Thames Land Drainage Byelaws 1981, a permit from the Environment Agency would be required for any proposed works or structures, in, under, over or within 8 metres of the top of the bank of the River Colne, designated a 'main river'.

Subject to grant of planning permission, RWT will seek a permit from the EA for the proposed works.

6.0 Surface Water Management

Existing surface water arrangements

The existing site surfaces are either concrete (the CRT towpath and access ramp) or permeable grass and gravel on the RWT areas.

Proposed surface water arrangements and impact other areas

The proposed landscaping of the site will continue to use permeable finishes throughout: either soft landscaped areas adjacent to the river or gravel areas under the building and adjacent to the canal.

The proposed building roof would drain to a soak-away. There is no predicted impact on other adjacent areas.

7.0 Occupants and users

There are no permanent occupants or sleeping accommodation on the site and no proposals for any occupants or sleeping accommodation. There is existing seasonal use of the site by visiting parties of up to 30 children accompanied by adults. This arrangement would continue with the proposed new building.

RWT is in close contact with both the CRT and EA to take advice on flood warnings and alter or cancel their programme accordingly to ensure safety of visitors. *CRT use the SCADA electronic system to give ample warning of floods and share this information with RWT to enable them to carry out their delegated role in looking after the stretch of the Grand Union Canal that runs through Rickmansworth.*

In the unlikely event that a flood occurred without warning then visitors would be evacuated up the ramp to the pedestrian path on the raised portion of Church Street which is well above the worst predicted flood levels (a minimum of 48.3 above OD and therefore 1.75m above the design flood level) and outside all flood risk areas (see the flood zone plan on page 5). From this point the RWT supervisors would be able to take the visitors to safely away from the flood zone without having to pass through one.

8.0 Exception Test

It is a minor development (less than 250sqm), therefore the Sequential and Exception tests do not apply. Nevertheless, RWT have reviewed the implications.

There is a wider benefit to the community in having the RWT voluntary educational facility on the proposed site. Schools all over the London and South Eastern area travel to take advantage of the historical educational programme run by RWT.

Another site would be inappropriate because it would mean moving the children along busy roads to see the canal, lock and narrow boats. It is a unique waterside activity which relies upon its location next to the canal and lock to carry out its programme.

It has been demonstrated in section 5.0 that the proposed building is designed to avoid flooding and also to avoid any impact on the adjacent areas. If floods are predicted then RWT will cancel the planned visits and avoid risk to users.

There are already dwellings adjacent to and at the same ground level as the site at 115 and 117 Church Street. Historically the site was occupied by retail, storage buildings and housing. Therefore the part time use of the site for a non-residential voluntary educational programme represents a significantly lower risk in comparison to these other established uses.

9.0 Residual Risk

RWT have sought to address all flood risks posed to users and adjacent areas. RWT will continue to take responsibility for liaising with EA and CRT to avoid use of the site in time of flood risk.

10.0 Flood Risk Assessment Credentials

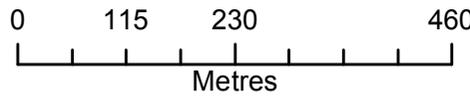
This assessment has been carried out by TEC Architecture Ltd on 07.02.17 and revised in line with design updates on 01.03.17, *and also in response to EA comments on 07.04.17 and RWT comments on 20.04.17.*

Appendix 1 - Environment Agency data

Flood Map for Planning centred on WD3 1JJ - 27/01/2017 - HNL35024AS

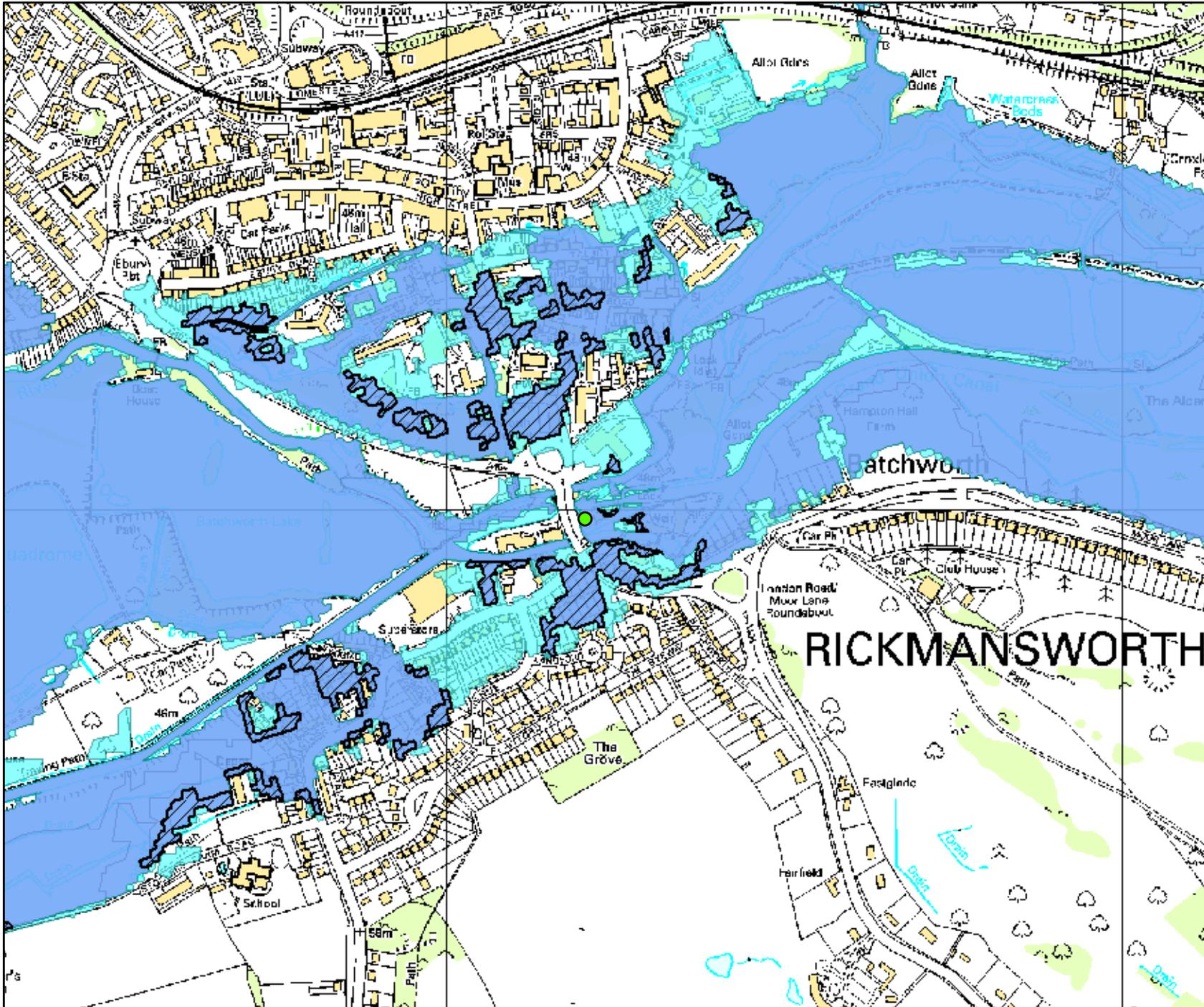


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 2 Bishops Square Business Park
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 Hatfield
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 AL10 9EX



Legend
Flood Map for Planning

-  Flood Storage Area
-  Areas Benefiting from Flood Defences
-  Flood Zone 3
-  Flood Zone 2



Flood Map for Planning (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:
 - from the sea with a 1 in 200 or greater chance of happening each year
 - or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

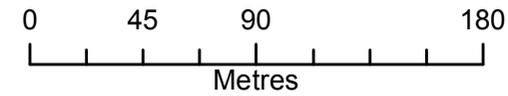
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Detailed FRA centred on WD3 1JJ - 27/01/2017 - HNL35024AS



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Legend Defended Flood Outlines

- 1 in 2 (50%) Defended
- 1 in 5 (20%) Defended
- 1 in 10 (10%) Defended
- 1 in 50 (2%) Defended

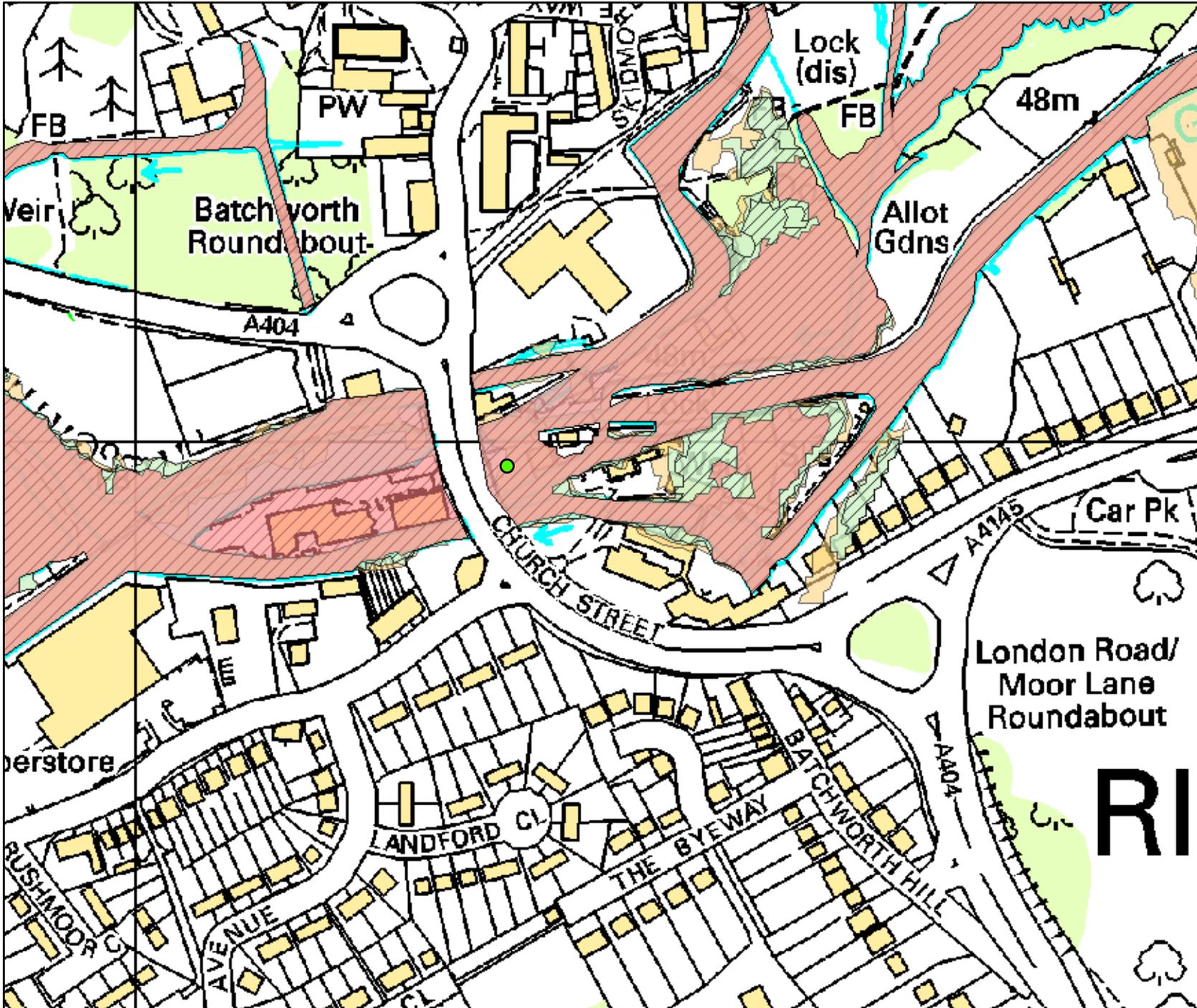
The data in this map has been extracted from the Upper Colne Flood Risk Mapping Study (Halcrow, 2010). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment.

Modelled outlines take into account catchment wide defences.

Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

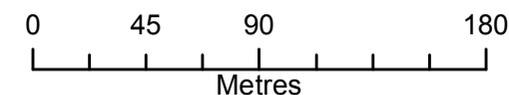
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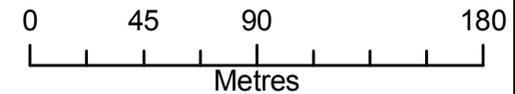
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Legend

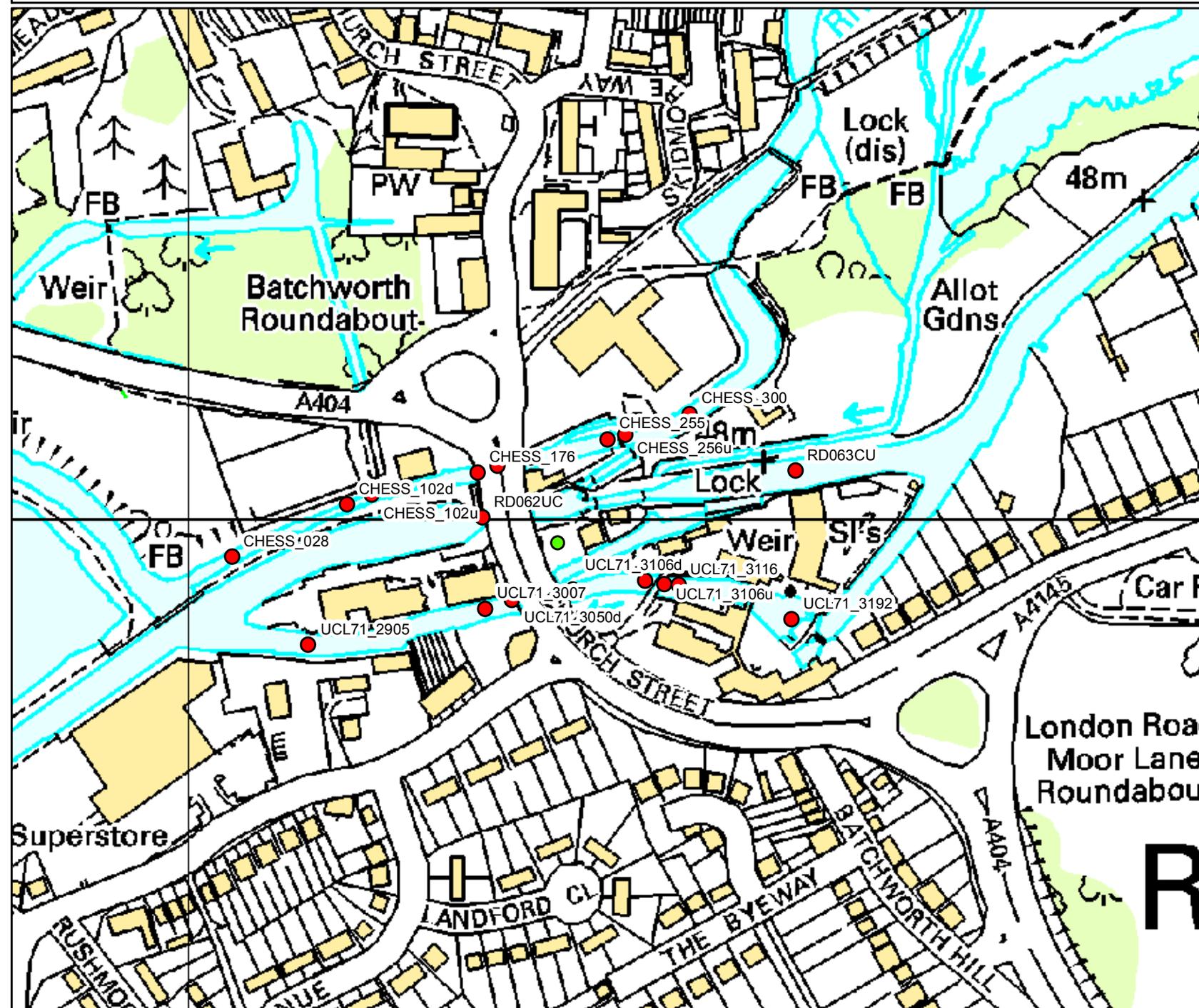
1D Node Results

- Node Results selection

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Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence. <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

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Environment Agency ref: NE35024AS

The following information has been extracted from the Upper & Middle Stort Flood Mapping Model (Halcrow, 2010)

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<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Caution:

Although this is a detailed model, please be aware that it was not originally created to assess flood levels at particular development sites.

All flood levels are given in metres Above Ordnance Datum (mAOD)

All flows are given in cubic metres per second (cumecs)

MODELLED FLOOD LEVEL

Node Label	Easting	Northing	Return Period							
			2yr	5yr	20yr	50yr	100yr	100yr +20%	200yr	1000yr
RD063CU	506339	194025	47.32	47.41	47.53	47.64	47.77	47.82	47.80	47.92
RD062UC	506164	193999	45.82	45.85	45.91	45.95	45.99	46.01	46.00	46.06
CHESS_300	506280	194057	46.64	46.67	46.76	46.83	46.94	47.07	47.02	47.32
CHESS_256u	506244	194045	46.64	46.66	46.75	46.80	46.89	46.98	46.95	47.13
CHESS_255	506234	194043	45.83	45.86	45.96	46.04	46.16	46.30	46.25	46.58
CHESS_202u	506191	194032	45.83	45.86	45.95	46.03	46.14	46.27	46.22	46.52
CHESS_202d	506173	194028	45.83	45.86	45.95	46.02	46.12	46.24	46.20	46.46
CHESS_176	506162	194024	45.83	45.86	45.94	46.01	46.10	46.21	46.17	46.42
CHESS_102u	506102	194012	45.82	45.85	45.93	45.98	46.04	46.10	46.08	46.19
CHESS_102d	506089	194007	45.82	45.85	45.93	45.98	46.04	46.10	46.08	46.19
CHESS_028	506024	193977	45.82	45.85	45.91	45.95	45.98	46.00	45.99	46.03
UCL71_3192	506337	193943	46.95	47.06	47.20	47.34	47.49	47.56	47.54	47.68
UCL71_3116	506273	193962	45.99	46.06	46.18	46.32	46.52	46.63	46.59	46.82
UCL71_3106u	506265	193962	45.98	46.05	46.17	46.31	46.51	46.63	46.59	46.82
UCL71_3106d	506255	193964	45.98	46.04	46.16	46.29	46.45	46.55	46.52	46.72
UCL71_3050u	506214	193959	45.95	46.01	46.14	46.28	46.46	46.56	46.53	46.73
UCL71_3050d	506181	193953	45.92	45.97	46.07	46.17	46.30	46.38	46.35	46.50
UCL71_3007	506166	193949	45.88	45.93	46.01	46.09	46.18	46.25	46.23	46.36
UCL71_2905	506067	193929	45.82	45.85	45.90	45.94	45.97	45.99	45.99	46.03

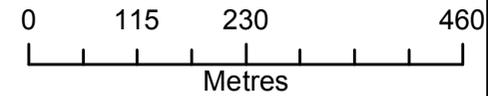
MODELLED FLOWS

Node Label	Easting	Northing	Return Period							
			2yr	5yr	20yr	50yr	100yr	100yr +20%	200yr	1000yr
RD063CU	506339	194025	No Data	0.40	1.90	3.95	6.91	8.28	7.72	10.94
RD062UC	506164	193999	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
CHESS_300	506280	194057	1.19	1.67	3.86	5.55	8.69	12.67	11.14	20.43
CHESS_256u	506244	194045	1.19	1.67	3.86	5.55	8.69	12.67	11.14	20.44
CHESS_255	506234	194043	1.19	1.67	3.86	5.55	8.69	12.67	11.14	20.44
CHESS_202u	506191	194032	1.22	1.67	3.86	5.56	8.69	12.68	11.17	20.42
CHESS_202d	506173	194028	1.22	1.67	3.86	5.56	8.69	12.68	11.17	20.42
CHESS_176	506162	194024	1.32	1.68	3.86	5.55	8.69	12.69	11.16	20.41
CHESS_102u	506102	194012	1.54	1.68	3.85	5.56	8.68	12.65	11.14	20.22
CHESS_102d	506089	194007	1.54	1.68	3.85	5.56	8.68	12.65	11.14	20.22
CHESS_028	506024	193977	1.70	1.70	3.87	5.56	8.06	11.04	9.94	16.38
UCL71_3192	506337	193943	14.33	16.32	18.76	21.08	23.63	24.75	24.37	26.36
UCL71_3116	506273	193962	14.33	16.33	18.76	21.07	23.63	24.75	24.38	26.36
UCL71_3106u	506265	193962	14.33	16.33	18.76	21.06	23.64	24.75	24.38	26.36
UCL71_3106d	506255	193964	14.33	16.33	18.76	21.06	23.64	24.75	24.38	26.36
UCL71_3050u	506214	193959	14.33	16.33	18.76	21.08	23.63	24.76	24.38	26.41
UCL71_3050d	506181	193953	14.33	16.72	20.66	25.03	30.54	33.03	32.10	37.34
UCL71_3007	506166	193949	14.33	16.72	20.66	25.02	30.54	33.04	32.11	37.35
UCL71_2905	506067	193929	14.34	16.72	20.67	25.02	30.54	33.66	32.62	38.47

Historic Flood Map centred on WD3 1JJ - 27/01/2017 - HNL35024AS



Environment Agency
 2 Bishops Square Business Park
 St Albans Road West
 Hatfield
 Hertfordshire
 AL10 9EX



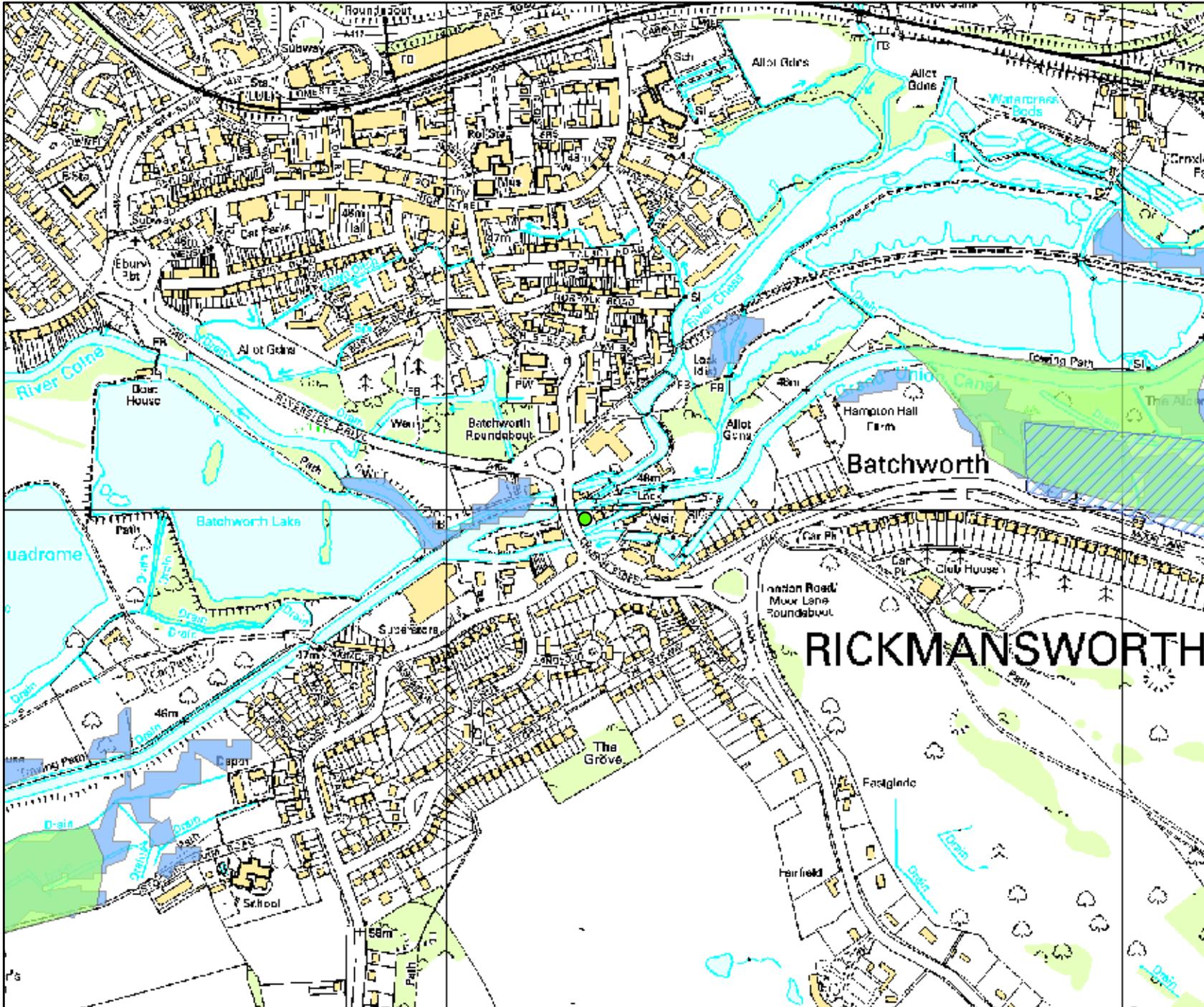
Legend Flood Map for Planning

-  2014
-  1993
-  1987

The historic flood event outlines are based on a combination of anecdotal evidence, Environment Agency staff observations and survey.

Our historic flood event outlines do not provide a definitive record of flooding. It is possible that there will be an absence of data in places where we have not been able to record the extent of flooding. It is also possible for errors to occur in the digitisation of historic records of flooding.

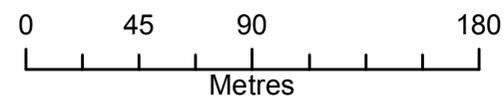
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Structures and Defences centred on WD3 1JJ - 27/01/2017 - HNL35024AS



Environment Agency
 2 Bishops Square Business Park
 St Albans Road West
 Hatfield
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 AL10 9EX

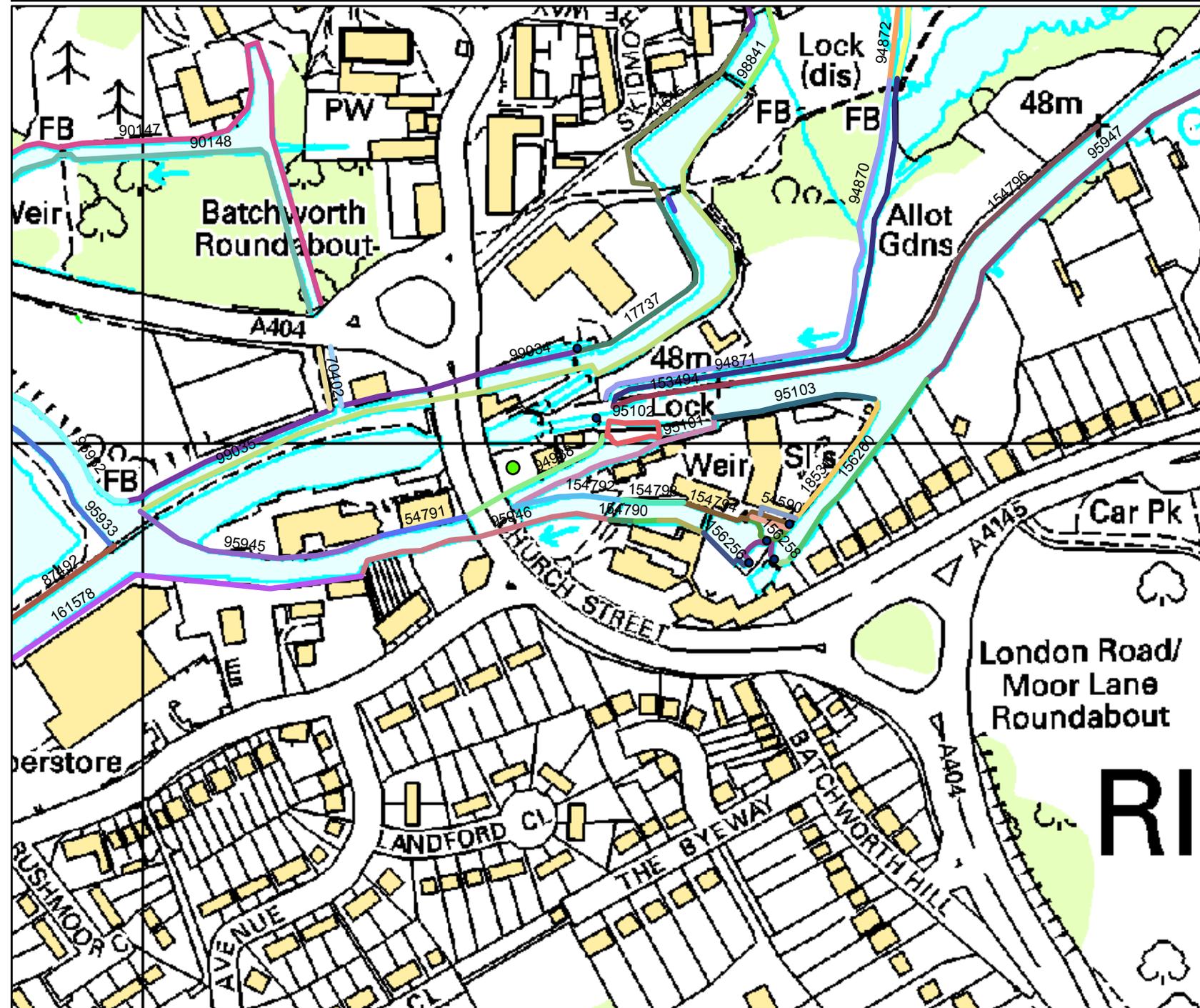


Legend

NAFRA_DEFENCE	ASSET_ID
95103	154792
95932	154793
95933	154794
95945	154795
95946	154796
95947	154798
95948	154799
95949	154800
95950	154801
95951	154802
95952	154803
95953	154804
95954	154805
95955	154806
95956	154807
95957	154808
95958	154809
95959	154810
95960	154811
95961	154812
95962	154813
95963	154814
95964	154815
95965	154816
95966	154817
95967	154818
95968	154819
95969	154820
95970	154821
95971	154822
95972	154823
95973	154824
95974	154825
95975	154826
95976	154827
95977	154828
95978	154829
95979	154830
95980	154831
95981	154832
95982	154833
95983	154834
95984	154835
95985	154836
95986	154837
95987	154838
95988	154839
95989	154840
95990	154841
95991	154842
95992	154843
95993	154844
95994	154845
95995	154846
95996	154847
95997	154848
95998	154849
95999	154850

The following information on defences has been extracted from the Asset Information Management System (AIMS)

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Environment Agency ref: [HNL35024AS](#)

The following information on defences has been extracted from the Asset Information Management System (AIMS)

Defences

Asset ID	Asset Type	Asset Protection	Asset Comment	Asset Description	Design Standard of protection (years)	Downstream Crest Level	Upstream Crest Level	Condition of Defences (1=Good, 5 = Poor)
11615	wall	fluvial	Part of Chess FD scheme (O&M28/11a Area 1) Raised concrete wall bank defence (R07 CS?) Chess path (R04) leads to carpark & follows Ebury Way footpath until it rises to footbridge. Defence continues beyond bridge as R12.	Chess Wall 3	100	47.28	46.85	3
17737	wall	fluvial	Part of Lower Colne Scheme(Area 1).O&M is 28/11. Footpath with flood kerbing wall running through bank either side of path. Labelled as "Flood Defence". Levels taken from a survey by Halcrow Geomatics in 2002. Ref: HG2746.	Chess Wall 4.	200	47.18	47.2	3
54590	high_ground	fluvial	Brickwork wall immediately DS of the 4 gate sluice forming the R/Bk of the R/Ch. Site mgr reports possible siphon draining to centre of main DS pool. (A cormorant had disappeared underwater only to surface in middle of the pool).	Bank Protection	80	No Data	No Data	2
70402	high_ground	fluvial	Natural earth bank	Natural bank	80	No Data	No Data	2
87492	high_ground	fluvial	Right bank is GUC towpath maintained by British Waterways. 24-02-2010 AP Changed to TC 3 in line with Maintained Channel	Towpath	1000	46.3	46.3	3
90147	high_ground	fluvial	Natural earth defence	Natural Bank	200	No Data	No Data	3
90148	high_ground	fluvial	Natural earth defence	Natural Bank	1000	45.38	No Data	3
94870	high_ground	fluvial	Natural earth defence	Natural Bank	80	No Data	No Data	3
94871	high_ground	fluvial	Natural earth defence	Natural Bank	50	No Data	No Data	3

94872	high_ground	fluvial	Natural earth defence. Channel section DS, which is fed from the fishery outflow, is wide and clear but the US section from the GUC (also draining S/R32) is a heavily vegetated input to the fishery outflow.	Natural Bank	80	No Data	No Data	3
94873	high_ground	fluvial	Natural earth defence. Channel section DS, which is fed from the fishery outflow, is wide and clear but the US section from the GUC (also draining S/R32) is a heavily vegetated input to the fishery outflow.	Natural Bank	80	No Data	No Data	3
94938	high_ground	fluvial	Natural earth defence	Natural Bank	80	45.94	No Data	3
95101	high_ground	fluvial	Natural earth defence	Natural Bank	80	45.94	47.91	3
95102	high_ground	fluvial	Natural bank (R/Bk edge of sidespill weir from Grand Union Canal)	Natural bank	80	No Data	No Data	2
95103	high_ground	fluvial	Bank of Grand Union Canal lined with steel sheet piling. 02/09/2010 AP Changed to TC 3	Grand Union Canal	200	47.91	47.9	3
95932	high_ground	fluvial	Natural earth defence	Natural Bank	2	45.27	45.96	3
95933	high_ground	fluvial	Natural earth defence	Natural Bank	2	44.88	46	3
95945	high_ground	fluvial	Natural earth defence	Natural Bank	5	45.96	46.12	3
95946	high_ground	fluvial	Natural earth defence	Natural Bank	100	46.52	47.37	3
95947	high_ground	fluvial	Channel lined with steel sheet piling. Access difficult-near impossible due to large number of small frontages of the permanent moorings. AP 25-8-2011 Changed to Maintained Channel - for CAMC	Lined Channel	5	47.8	47.93	2
98841	high_ground	fluvial	Natural earth defence	Natural Bank	20	47.34	46.83	3

99034	high_ground	fluvial	Natural earth defence with sections of bank protection including (D/S to U/S): Corrugated concrete piling; Concrete capped Sheet steel piling; Brickwall bank protection; Concrete protection wall..	Natural bank / bank protection.	2	45.96	47.63	3
99035	high_ground	fluvial	Natural earth defence with some bank protection: Concrete capped sheet steel piling D/S of A404 bridge; Brick wall bank protection with concrete capping U/S from A404 bridge; Concrete bank protection wall by draw bridge.	Natural bank/bank protection.	2	46.18	47.34	3
127237	high_ground	fluvial	CONCRETE BANK PROTECTION WALL. LARGE VERTICAL CRACKS. METAL SLUICE GATES APPEAR TO BE NO LONGER OPERATIONAL.	Bank protection.	5	No Data	No Data	3
127238	wall	fluvial	Part of Lower Colne Scheme - Area 1 . Low brick wall [0.5m high] with 3m section of concrete (1.5m TALL) - 13M U/S OF D/S starting point]. Acts as a FD for surrounding properties. O & M manual 28/11. Keys into Ebury Way footbridge	Chess Wall 2	20	49.44	47.35	2
153493	high_ground	fluvial	Corrugated concrete bank protection	Bank protection.	80	No Data	No Data	3
153494	high_ground	fluvial	SHEET STEEL PILING WITH CONCRETE CAPPING.	Bank protection.	50	47.9	47.9	3
153495	high_ground	fluvial	DISUSED RAILWAY EMBANKMENT. NOW A PUBLIC FOOTPATH - EBURY WAY. VARIES IN HEIGHT FROM 1-3M HIGH. Should be a Left Bank defence designation. 30-12-09 AP - Changed to NFDS, TC 9 - agreed ASC	Embankment.	80	49.44	49.44	2
154790	high_ground	fluvial	LARGE WALL BANK PROTECTION. CEMENTED BRICK/CONCRETE WITH CONCRETE CAP AND STEEL HANDRAIL.	Bank protection.	1000	47.37	47.34	2
154791	high_ground	fluvial	SHEET STEEL PILING TOPPED WITH TIMBER. TIMBER STARTING TO AGE BUT NO VISIBLE PROBLEMS. OVERGROWN.	Bank protection.	2	46.12	45.94	3
154792	high_ground	fluvial	Natural bank with bank protection made from rock and bricks.	Natural bank with protection	2	45.94	47.25	3
154793	high_ground	fluvial	BRICK WALL BANK PROTECTION. Main role is decorative and levelling footpath & car park behind. Wall reduces in height and merges with the natural bank DS near flapped outfalls.	Bank protection.	50	47.29	47.29	2

154794	high_ground	fluvial	Low engineering brickwork wall from DS of office FtBridge to become a channel separation wall US at the 4 gate sluice. Small culvert gap under US allows water from R/Ch to join the L/Ch just US of curved weir.	Bank protection.	1000	No Data	No Data	2
154795	high_ground	fluvial	Defence rationalised and re-used as a brickwork channel wall. 02/09/2010 AP Changed to TC 3	Bank protection (Was a Boom).	80	No Data	No Data	2
154796	high_ground	fluvial	SHEET STEEL PILING WITH STEEL TOE. NO CAPPING JUST VEGETATION AND TOW PATH. Waterways maintained	Bank protection.	100	47.95	No Data	3
156254	high_ground	fluvial	LOOSE CONCRETE AND ROCK BANK PROTECTION.	Bank protection.	80	47.34	No Data	3
156255	high_ground	fluvial	BRICK WALL BANK PROTECTION.	Bank protection.	80	No Data	No Data	3
156256	high_ground	fluvial	BRICK WALL BANK PROTECTION.	Bank protection.	80	No Data	No Data	3
156257	high_ground	fluvial	Brickwork wall of the Left 4-gate sluice channel	Bank protection.	200	No Data	No Data	3
156258	high_ground	fluvial	Brickwork wall between the older sluices and also forming the DS wingwall of the main 2 gate sluice. GIS amended to reflect actual position and reduce number if individual defences in the complex.	Bank protection.	80	No Data	No Data	3
156259	high_ground	fluvial	Brickwork wall with gaugeboard attached and telemetry. Stoplog slot	Bank protection.	80	No Data	47.8	3
156260	high_ground	fluvial	MIXTURE OF BANK PROTECTION TYPES. TIMBER PLANKS/BRICK WALLS/STEEL SHEETING/CONCRETE WALL.	Bank protection.	80	47.8	47.8	3
161578	wall	fluvial	Access from Tesco car park. DS end along garden in Frogmore Lane at canal bridge.	Sheet steel piled wall with timber board revetment to protect against damage from mooring barges, timber capping and drainage flap valves. O&M 28/11a. Actual Crest Level data calculated April 2010	100	46.33	46.34	3
185317	high_ground	fluvial	Channel lined with steel sheet piling.	Lined channel	1000	48.1	48.16	No Data

Structures

Asset ID	Asset Type	Asset Protection	Asset Comment	Asset Description	Condition of Structures (1=Good, 5 = Poor)
453166	control_gate	fluvial	No Data	Bypass Valve	3
265479	control_gate	fluvial	LOCK. Brick / Concrete channel sides. Large timber gates with steel handrails	SLUICE GATE Lock.	3
265862	control_gate	fluvial	BRICK SLUICE WEIR. CONCRETE BEAM SUPPORTING SIDEWALLS D/S.	SLUICE GATE River control structure.	3
265864	control_gate	fluvial	SLUICE WEIR. BRICK SIDEWALLS. METAL MECHANISM. TIMBER GATES.	SLUICE GATE River control structure.	3
265865	control_gate	fluvial	Penstock metal gate sluice to culvert. D/S end regarded as redundant by site management.	SLUICE GATE River control structure.	2
203082	control_gate	fluvial	4 Sluice gates (2 sets of 2) in steel frames. Brick sidewalls. Complex steel operating mechanisms. 2 Footbridges U/S: 1 with steel deck / 1 with concrete deck. Steel trash screen U/S. Regularly tested & maintained by 3VW.	SLUICE GATE River control structure.	2