Appendix B – Viability of Sites Review

Appendix B – Viability of Sites Review

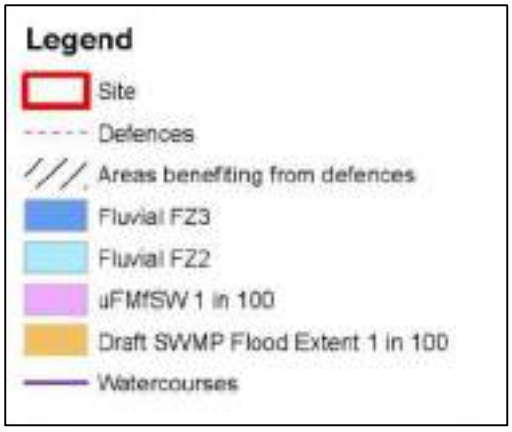
A total of 27 sites for Watford and 19 for St Albans were considered in detail in terms of flooding and the estimated EAD as part of the original Watford and St Albans SWMPs. As part of the SWMP update for Watford and St Albans, the scheme solutions for the selected sites have been reviewed.

In addition a high level overview was undertaken to determine if there are any other potential sites that should be considered as a priority, these are labelled as "P". The combining and extension of the original SWMP sites have also been undertaken, where feasible, as part of the review process. This allows for proposed mitigation measures to benefit a wider area and also gives a greater understanding on the actual properties predicted to be at potential risk of flooding. It also means that they are likely to be more viable in economic terms. The locations of the sites within each of the district are illustrated in Appendix A of this SWMP. 5 priority sites were selected from the high level overview and original SWMP review process. The potential mitigation proposals recommended for the 5 priority sites are listed in this appendix.

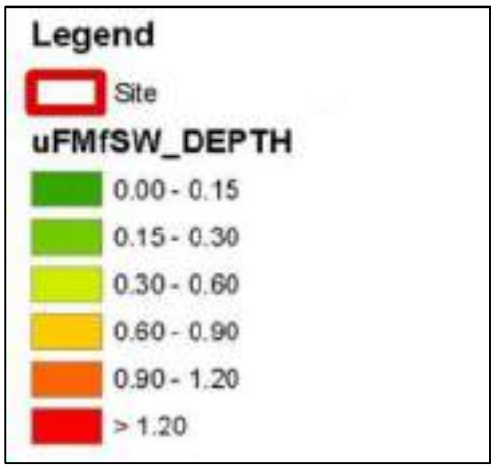
Information collected for this SWMP and consultation with Stakeholders has been used to allow for assessment for each priority and individual SWMP site. The tables produced show the flood risk associated with the sites, comments from a review of the mitigation proposals and subsequent mitigation recommendations.

Below is the key legend for the site specific mapping.

Key – Flood Mapping



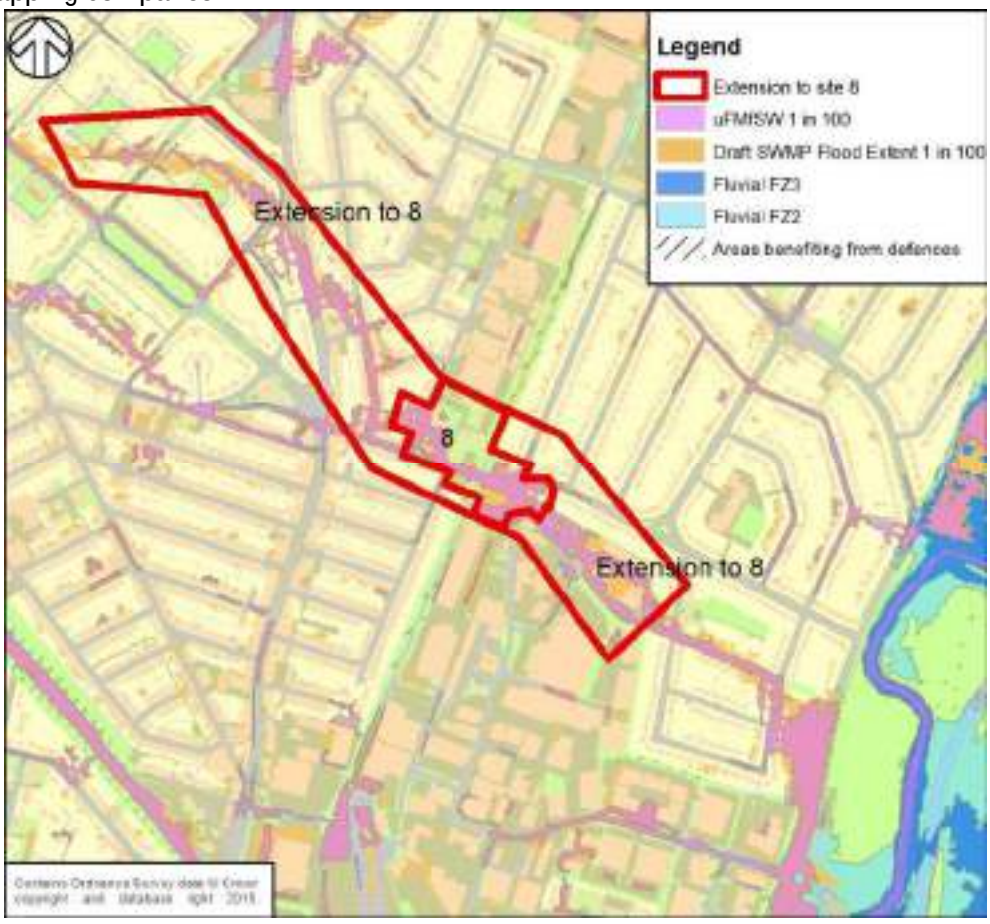
Key – Depth Mapping (1 in 30 and 1 in 100 yr)



Priority Sites

SWMP	Watford District
Site number	Extension to site 8
Site name	Balmoral Road

Flood Mapping Comparison



	Total	30 year updated	100 year updated
All properties	22	62	121
Critical Infrastructure	0	0	0
Comments			

- Draft SWMP detailed a Highway flooding problem that occurs on an annual basis with surcharging and flooding from the TW surface water sewers. Resulting in the road being closed.
- "Low spot" under the railway.
- Problems in Sandown Road predicted but not backed up by flooding reports.
- The draft SWMP proposed a detailed study for the area.

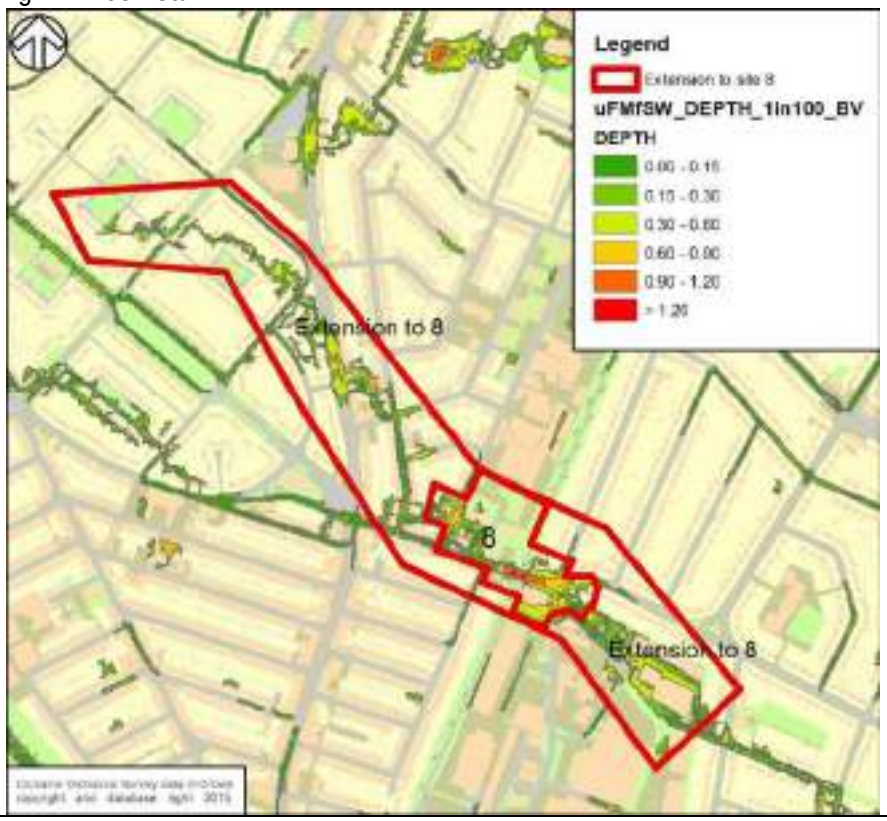
Comment Continued	
SWMP	Watford District
Site number	Extension to site 8
Site name	Balmoral Road

Flood Mapping Comparison

Proposed action	■ To ascertain the full extent of the potential flood risk to properties and the likely effects the extension of Site 8 was proposed to incorporate surface water flood routes upstream and downstream of the site. ■ The potential flood risk to Sandown Road could be resolved by better positioned gullies. However, the downstream surface water capacity will need to be checked. ■ An additional study, as recommended with the draft SWMP, is proposed. This approach has been agreed with Stakeholders. ■ Retrospective SuDS such as water butts, rainwater gardens located within public open space could be a potential solution for the proposed scheme.

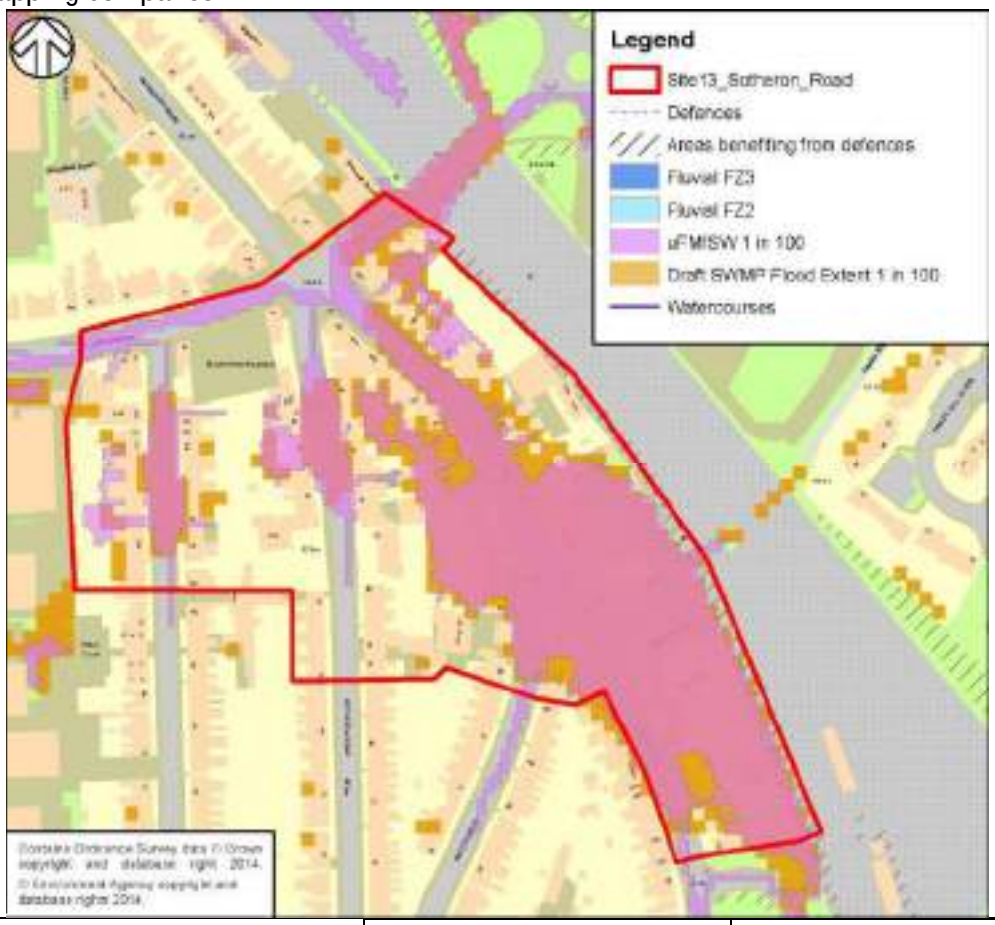
Depth Mapping 1 in 30 Year

Depth Mapping 1 in 100 Year



SWMP	Watford District
Site number	13
Site name	Sotheron Road

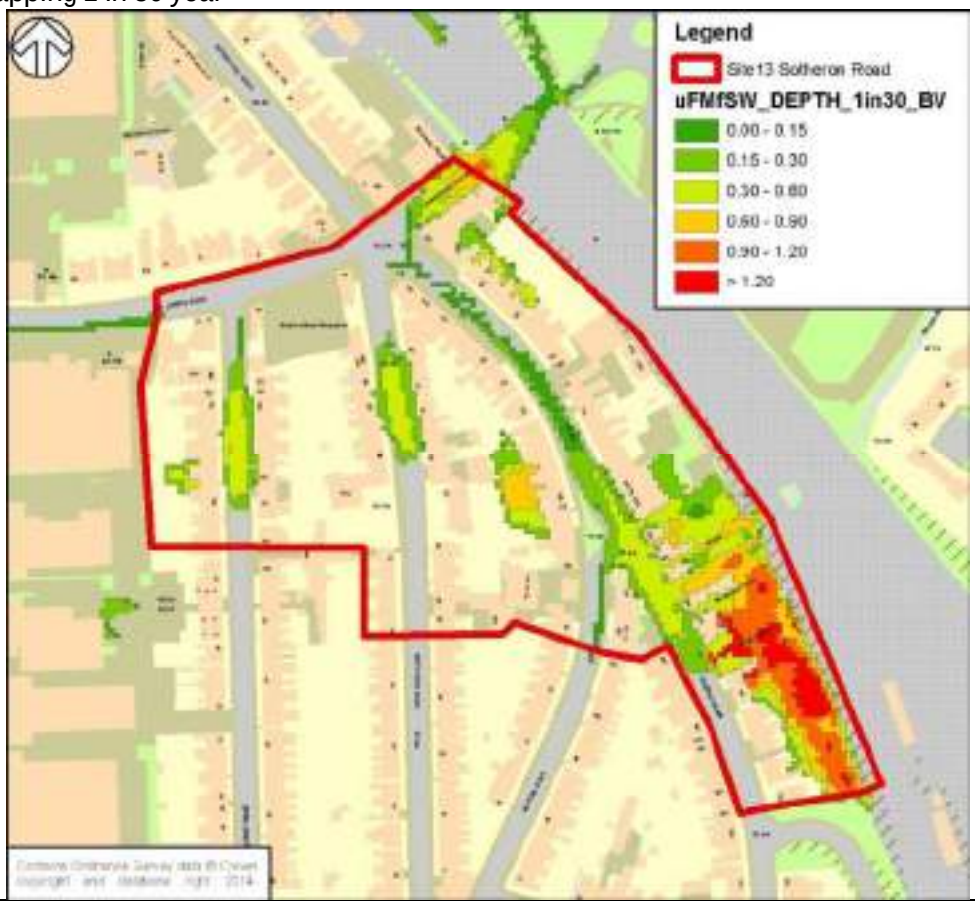
Flood Mapping Comparison



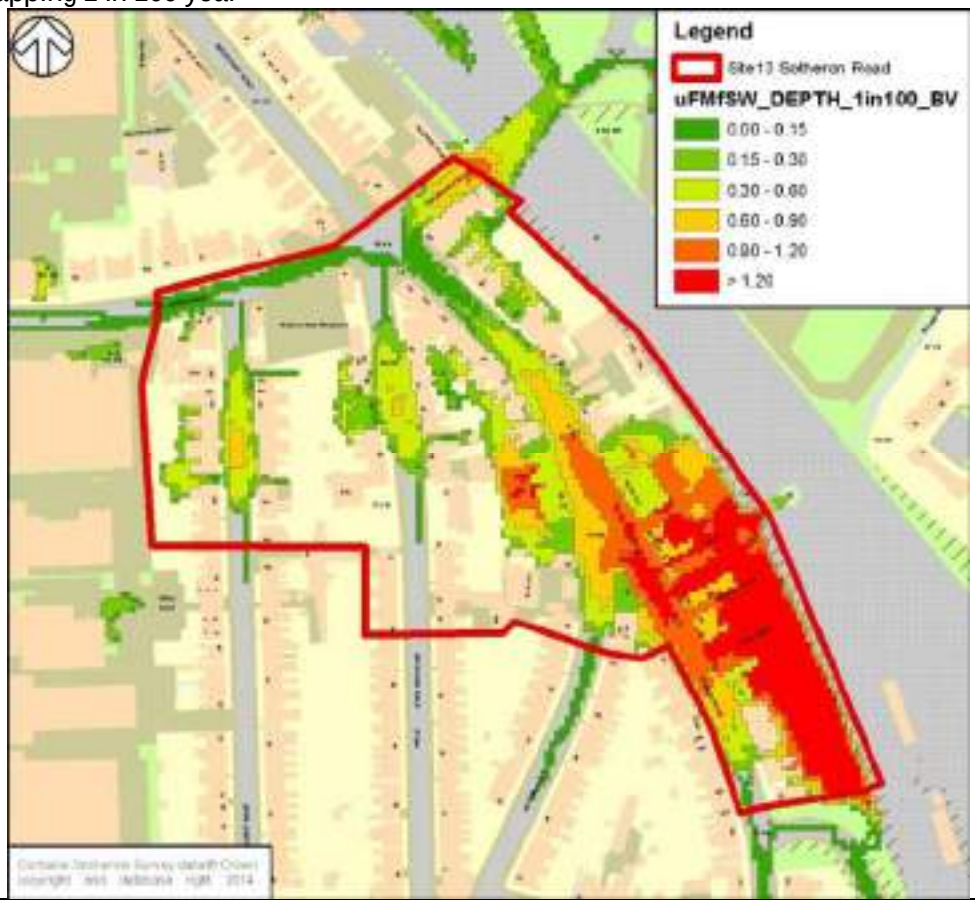
		30 year		100 year	
	Total	old	updated	old	updated
All properties	154	93	57	104	104
Critical infrastructure	0	0	0	0	0

Comments	■ The SWMP flood maps show the site to be affected by flooding and the flood waters at high depths in the Queens Road area. Stakeholders confirmed flooding has occurred within the area and specifically under the existing bridge. ■ Gullies are located within the area, site observations for the production of the draft SWMP stated flood waters were not dissipating quickly into the existing gullies.
Proposed action	■ The draft SWMP recommended a Thames Water study be undertaken to determine the capacity of the existing surface water sewer and whether there are any issues with the existing drainage. ■ Stakeholders agreed to this approach.

Depth Mapping 1 in 30 year

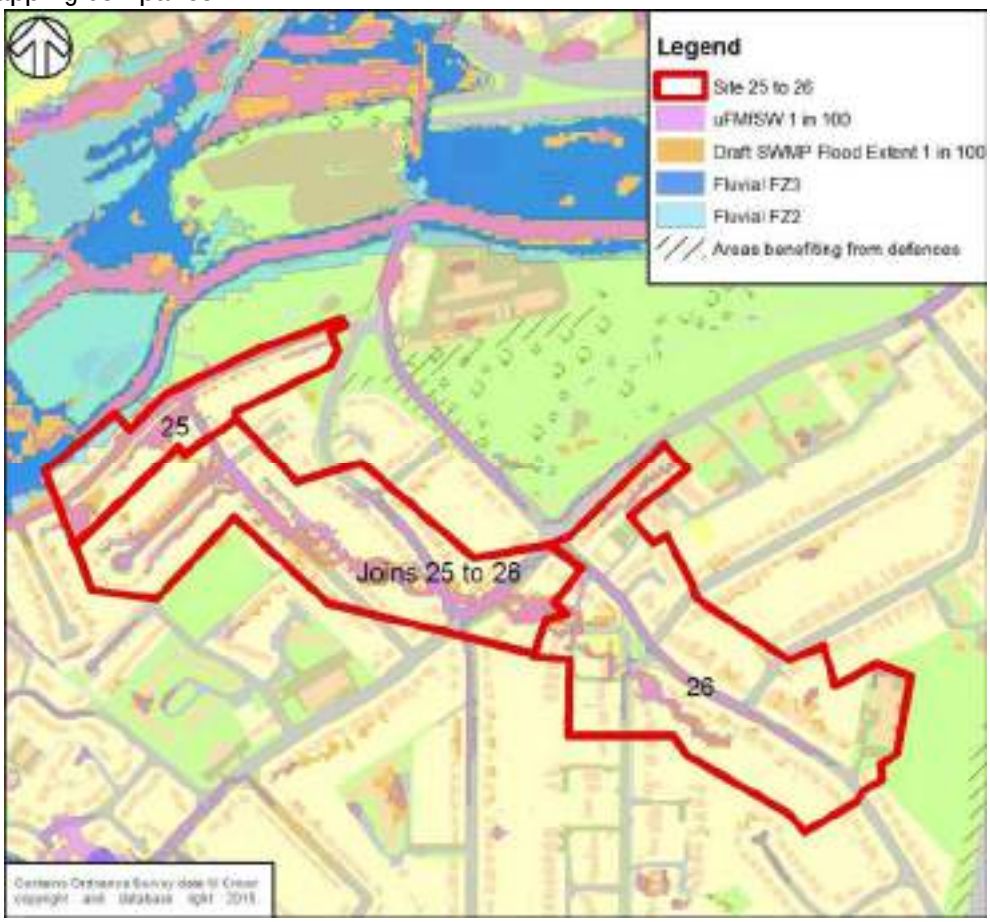


Depth Mapping 1 in 100 year



SWMP	Watford District Council
Site number	Combined Site 25 - 26
Site name	Riverside and Oxhey Road

Flood Mapping Comparison



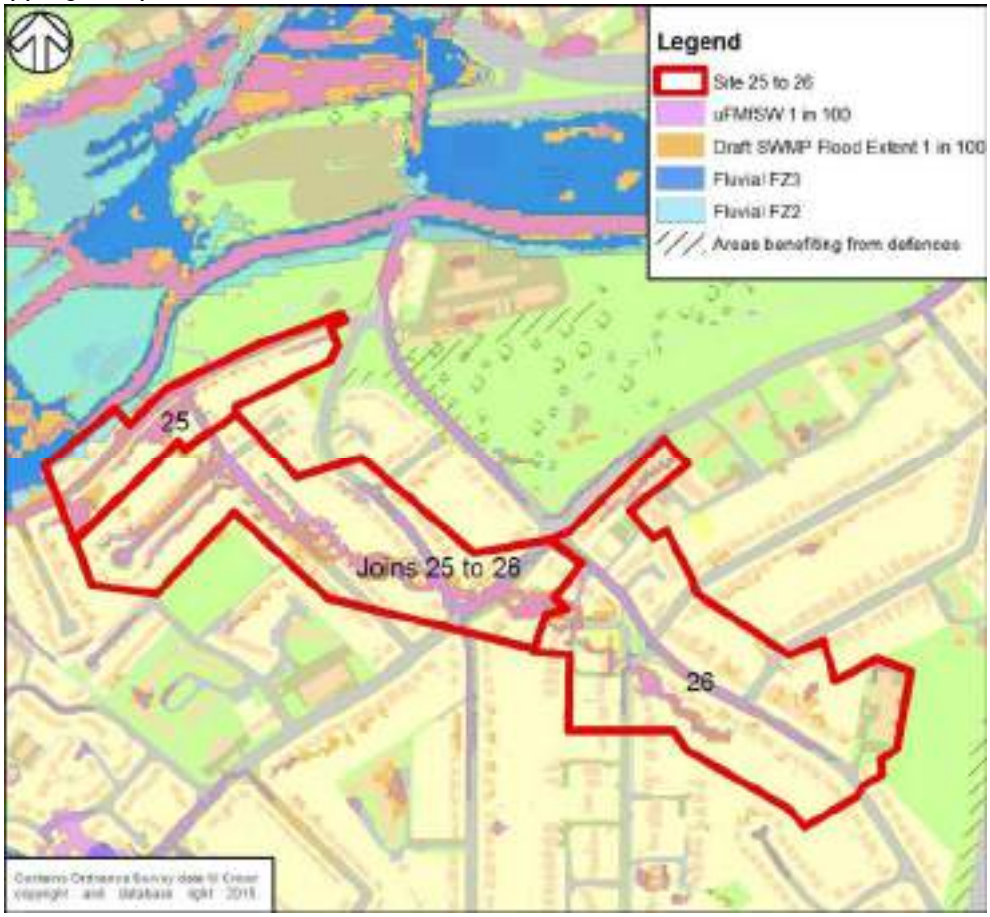
	Total	30 year updated	100 year updated
All properties	147	55	113
Critical Infrastructure	0	0	0

Comments

- Riverside is a relatively flat road lying adjacent to the river. Stakeholders have confirmed there have been reported flooding and the floods is likely as a result of its interaction with the floodplain and greater depths concentrated at a low spot on the corner of Green Lane and Hollybush Close.
- There are two sluices on the river, upstream of the flooding location, which are both controlled by Watford BC. The purpose of the sluices is to control the level of the river and prevent flooding within the local area.
- The sluices are operated manually and the operating regime is based on the experience of the operator.

Comment Continued	
SWMP	Watford District Council
Site number	Combined Site 25 - 26
Site name	Riverside and Oxhey Road

Flood Mapping Comparison



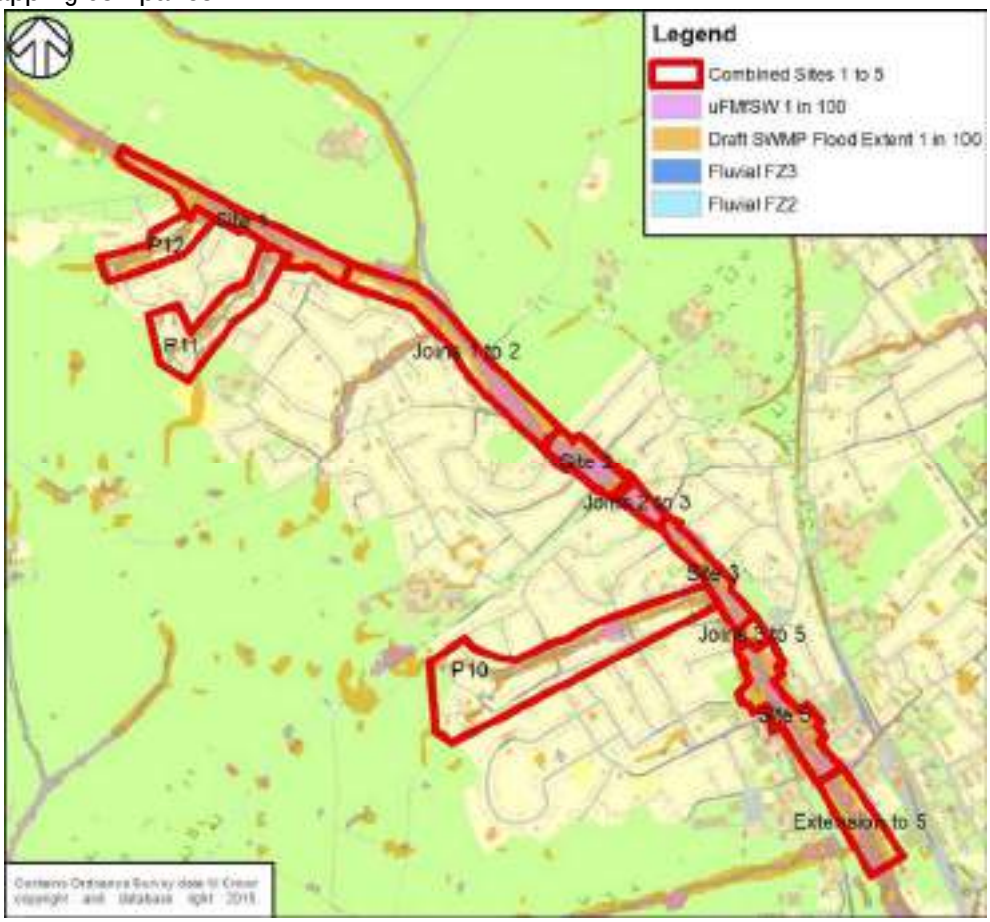
Proposed action	■ The recommendation of the draft SWMP was for installation of an automated system to control the sluices or the construction of a 2 stage weir. In either case detailed modelling will be required to determine the control settings. ■ The study is recommended to be for the combined Sites of 25 and 26 due to the proximity of this site and the catchments associated with it.

Depth Mapping 1 in 30 Year

Depth Mapping 1 in 100 Year

SWMP	St Albans District - Harpenden
Site number	Priority Site - Combined Site 1 to 5
Site name	Luton road, Towsend Road and High Street.

Flood Mapping Comparison



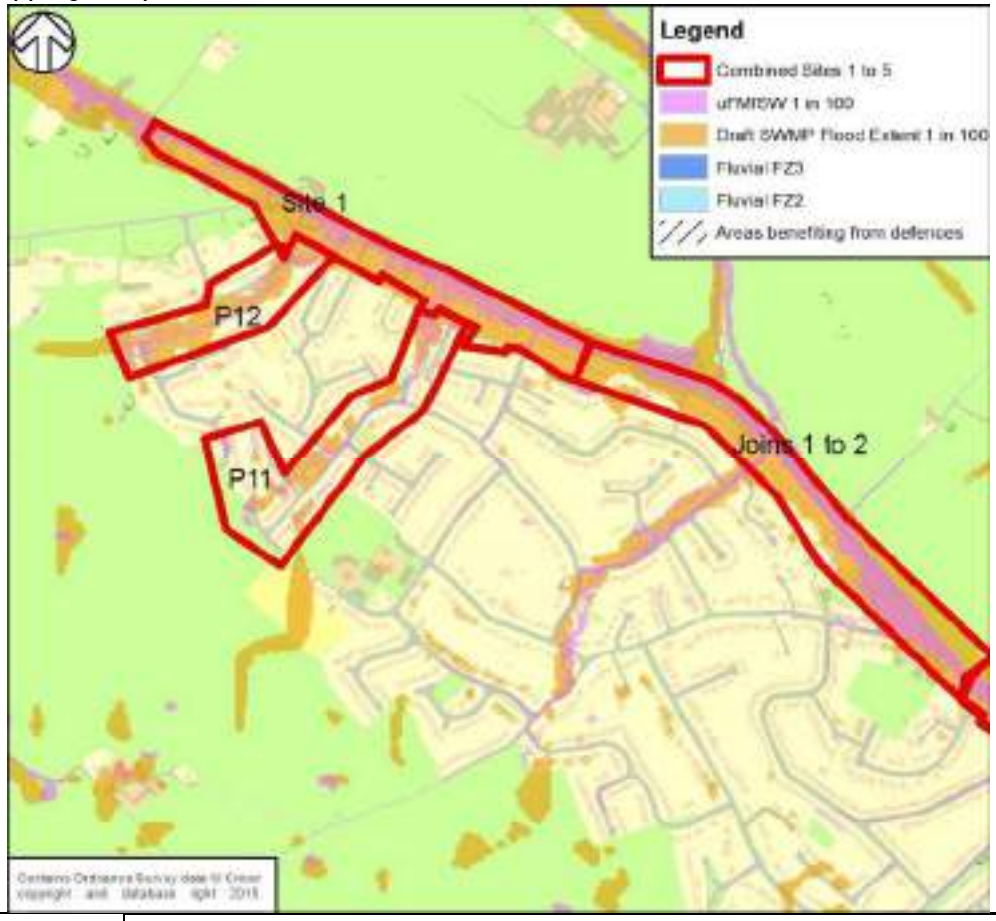
	Total	30 year updated	100 year updated
All properties	239	77	115
Critical Infrastructure	0	0	0

Comments

- Refer to the individual site Pro-forma's for specific information relating to the sites and the draft SWMP solutions.
- Incoporates specific areas which were subject to historical flood reports.
- The proposed solution within the draft SWMP was for attenuation provided within thrid party land and further studies.
- The sites were indivdiually assessed within the previous SWMP.
- Culvert mentioned within draft SWMP for sites located downstream.

Comment Continued	
SWMP	St Albans District - Harpenden
Site number	Priority Site - Combined Site 1 to 5
Site name	Luton road, Towsend Road and High Street.

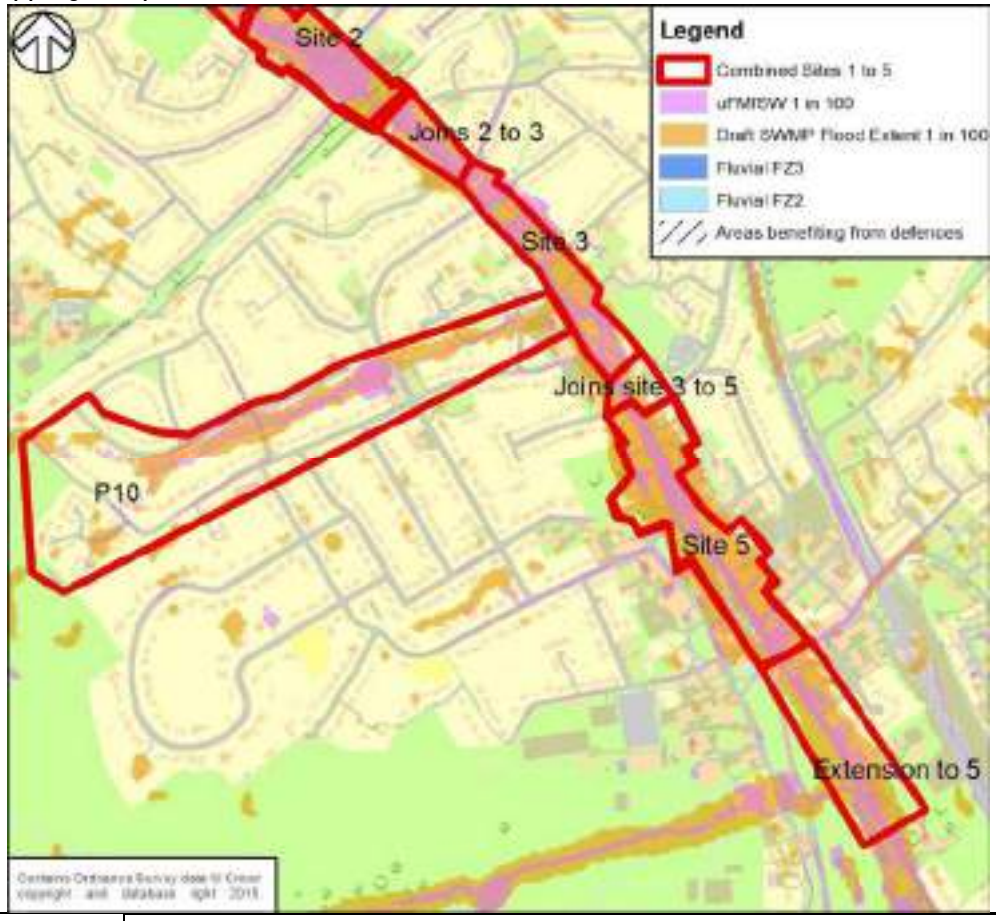
Flood Mapping Comparison



Comments	■ Proposals within the draft SWMP was for improved gully maintenance and additional gullies. ■ Sites are referred to within the SWMP as a relatively steep site with many of the road gullies observed as being blocked. The road is located within a valley with a contributing urban and rural catchment. ■ The draft SWMP references a culvert which runs through the area of Site 5; these are listed within the Thames Water (TW) records as a surface water sewer which eventually outfalls to the Southdown Ponds system located within Harpenden.

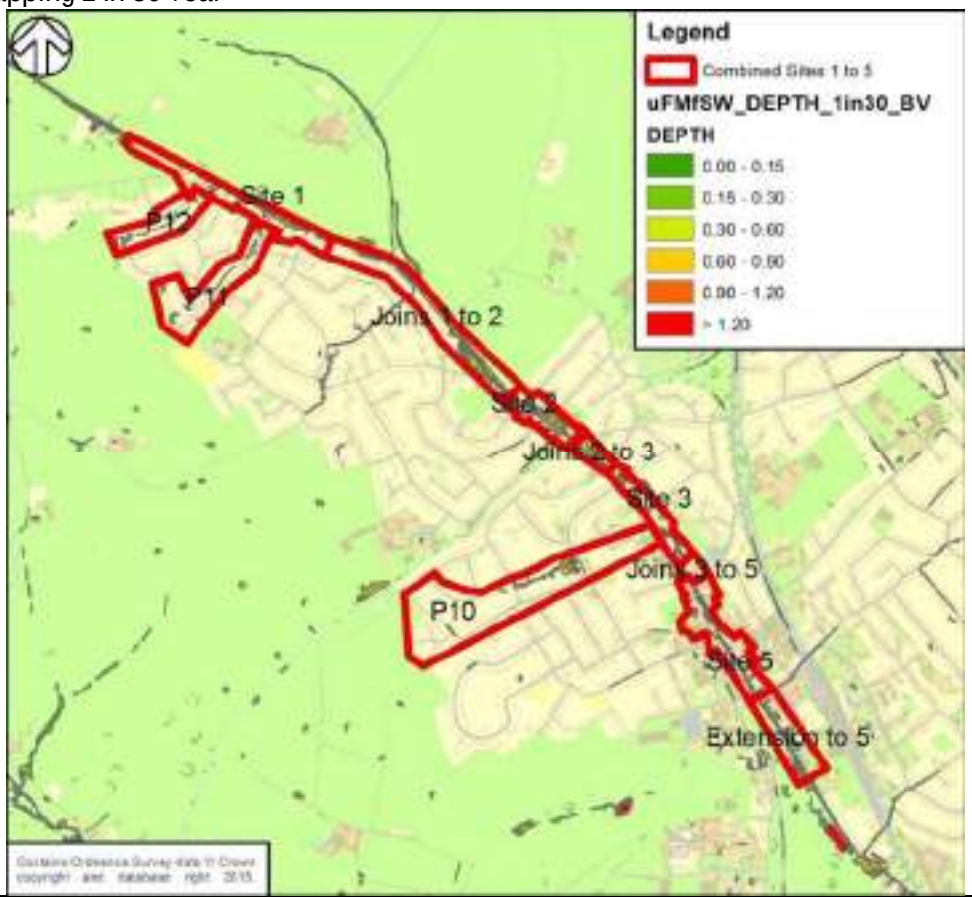
Comment Continued	
SWMP	St Albans District - Harpenden
Site number	Priority Site - Combined Site 1 to 5
Site name	Luton road, Towsend Road and High Street.

Flood Mapping Comparison

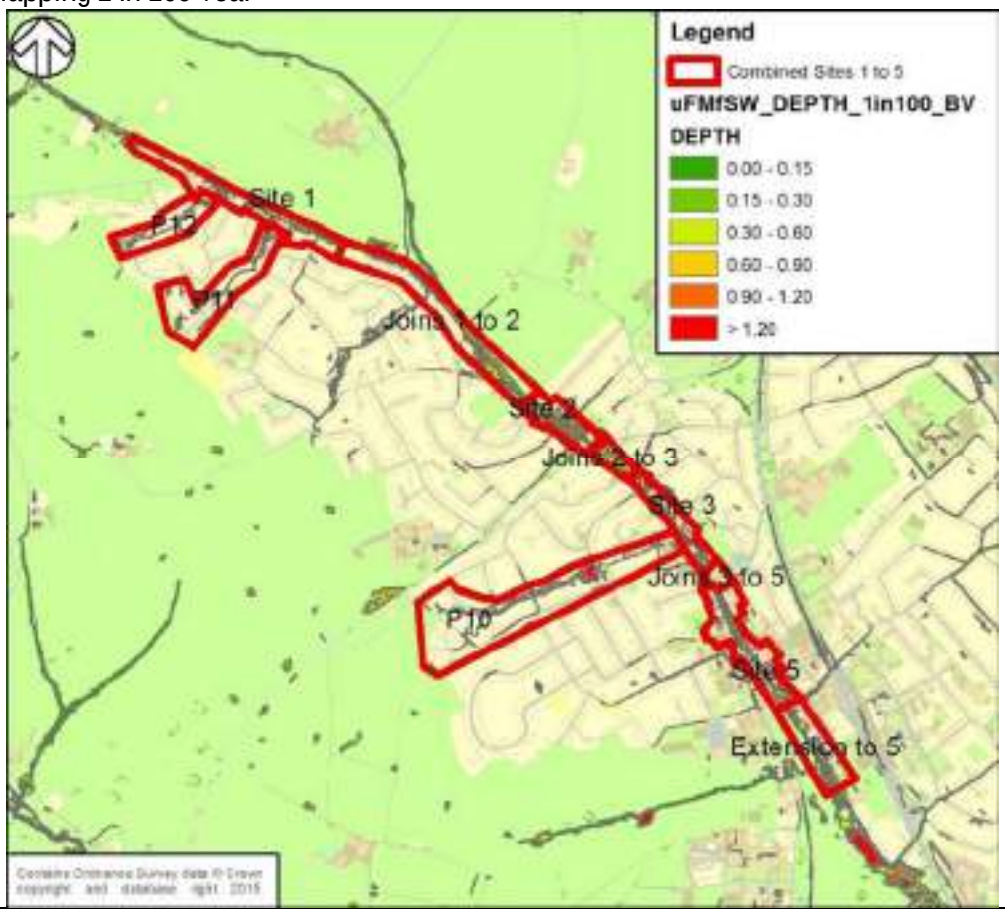


Proposed action	■ It is recommended with the SWMP update that the site be extended and linked with Sites 1, 3 and 5 to ensure a combined mitigation solution is investigated. ■ Further detailed studies will be required to determine the most viable drainage solutions for the area. ■ Recommend a survey of possible culvert and local drainage network as part of further studies.

Depth Mapping 1 in 30 Year



Depth Mapping 1 in 100 Year



SWMP	St Albans District – St Albans
Site number	Priority Sites - Combined site 38 to 40
Site name	Ladies Grove, Oysterfields, Camlet Way

Flood Mapping Comparison

	Total	30 year updated	100 year updated
All properties	126	61	94
Critical Infrastructure	0	0	0

Comments

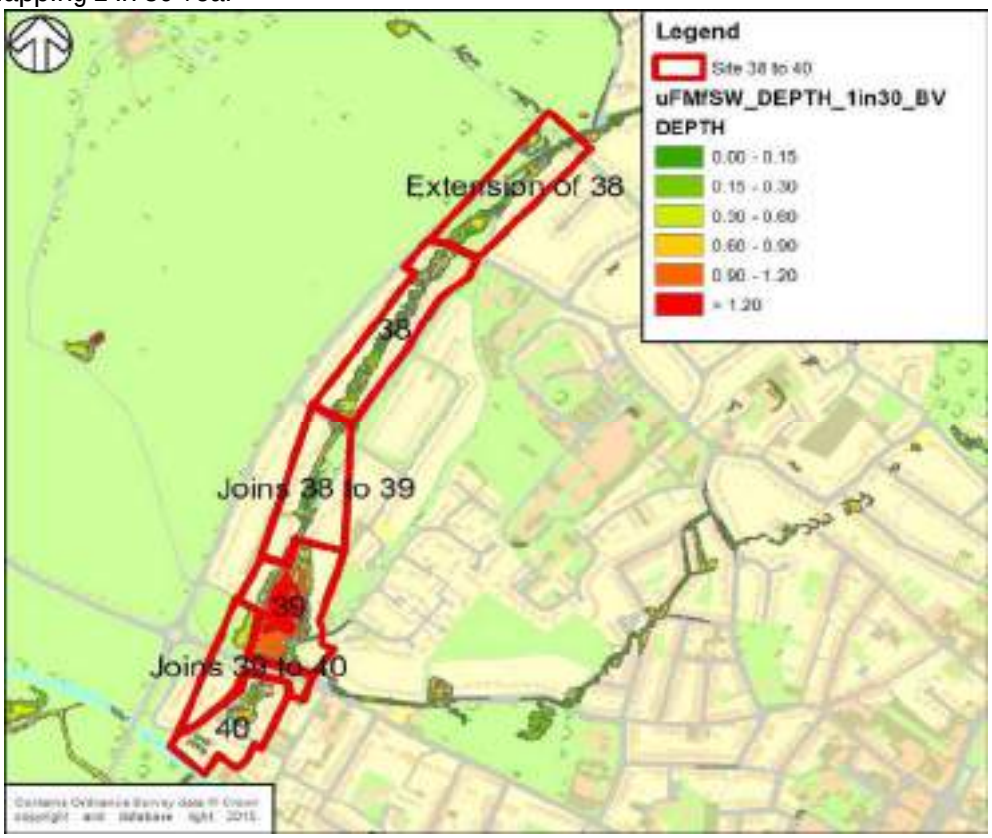
- Refer to the individual site Pro-forma's for specific information relating to the sites and the draft SWMP solutions.
- The draft SWMP predicted flooding to originate at a number of locations along the length of the site. Two properties along Camlet Way have flooding reports according to the draft SWMP.
- The site observation concluded both properties are located within low lying areas. One of the properties has a relatively steep drive from the road leading to an integral garage. There was evidence during the site visit of natural 'ponding' along Camlet Way where gullies are blocked by leaves. There is also a low spot behind the Camlet Way properties where significant flooding is predicted.

Comment Continued	
SWMP	St Albans District – St Albans
Site number	Priority Site – Combined Site 38 to 40
Site name	Ladies Grove, Oysterfields, Camlet Way

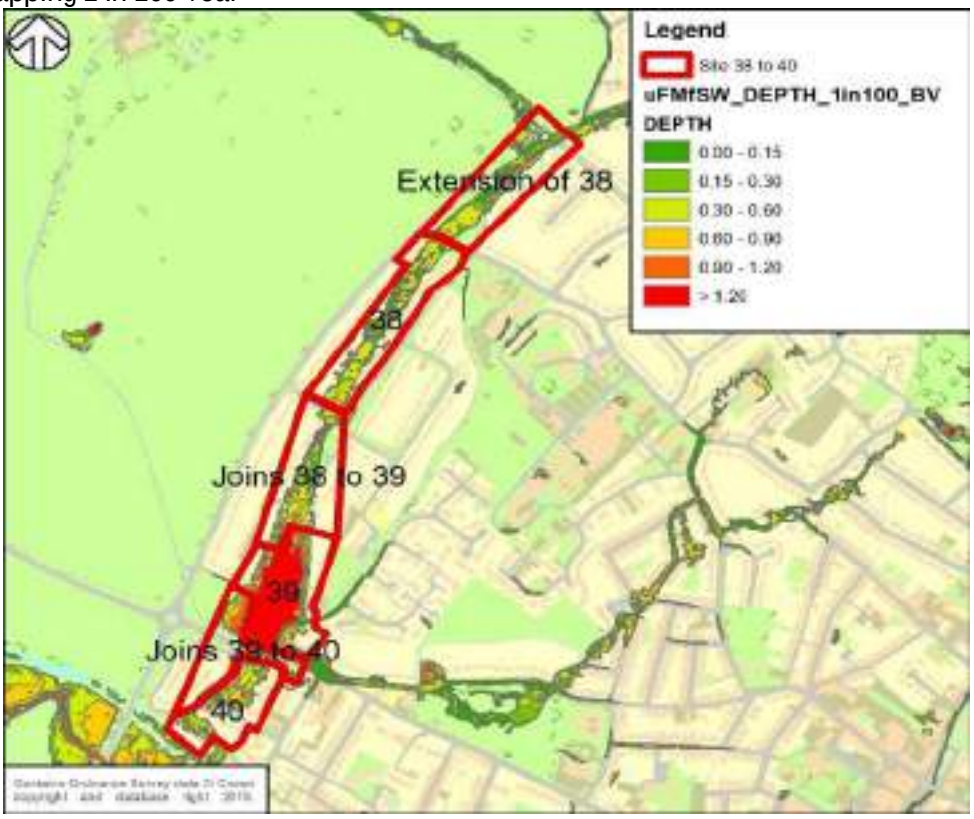
Flood Mapping Comparison

Comments	■ Gully mapping confirms the draft SWMP findings of there being a limited provision of gullies in the roads. ■ There is golf course (owned by the district council) and agricultural fields along the north western extent and a recreation ground located at the junction of Batchwood Drive and Everlasting Lane to the North of the site.
Proposed action	■ Bunding along the southern edge of the recreation area would be the preferred option within the updated SWMP. If local topography allows, an intercepting filter drain could be located at the base of the bund to infiltrate surface water (subject to infiltration tests in accordance to BRE 365). ■ Site 38 forms the upper catchment to Sites 39 to 40 and therefore it is proposed to extended Site 38 and combine it with Sites 39 and 40. ■ Bunding is also recommended within the adjacent golf course to prevent overland flow routes from the west discharging to the sites. ■ A hydrological assessment is recommended to help determine the associated site catchment.

Depth Mapping 1 in 30 Year



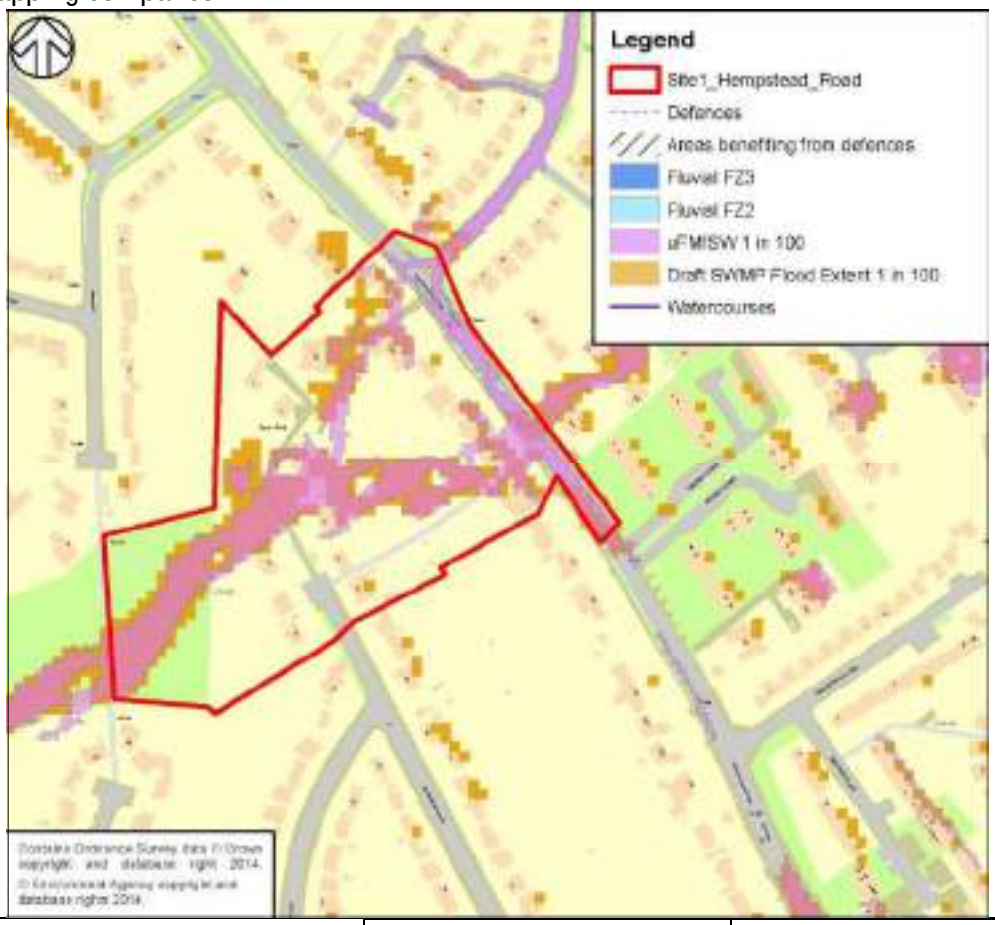
Depth Mapping 1 in 100 Year



Watford Sites

SWMP	Watford District
Site number	1
Site name	Hempstead Road

Flood Mapping Comparison



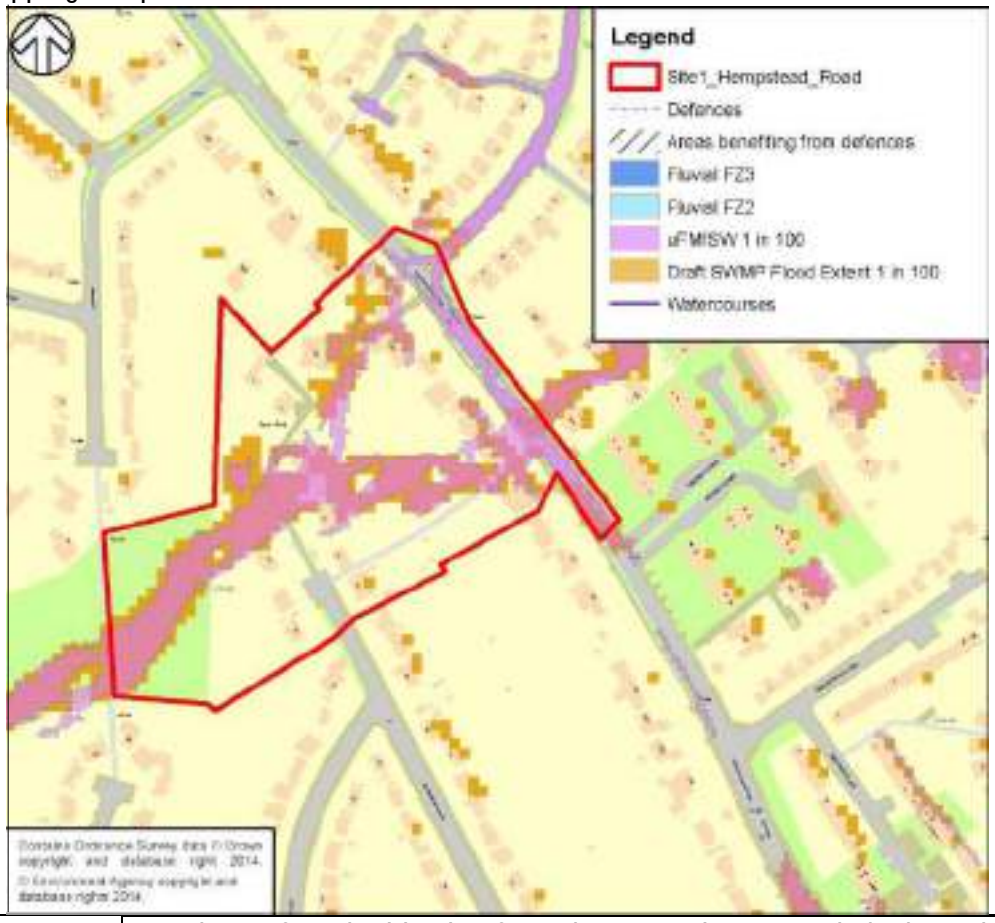
		30 year		100 year	
	Total	old	updated	old	updated
All properties	21	10	7	11	9
Critical Infrastructure	0	0	0	0	0

Comments

- Topography directs flow from the upstream catchment of Tunnel Wood Road and Ridge Lane. Properties are shown as being affected within the Tunnel Wood road extent. To understand the nature of the flooding which occurs, study area 1 is recommended to include this upper catchment.
- The upper catchment falls towards the canals and is intercepted by properties that have been built within this area.
- Property 221 Hempstead Road, according to the draft SWMP is located opposite a low spot. When flood waters reach a certain level it is likely to overtop the highway kerb and flood waters are directed to the property via the driveway.
- The draft SWMP notes descaling has occurred within the local Thames Water infrastructure and that this would suggest operational issues with the local sewerage infrastructure.

Comment Continued	
SWMP	Watford District
Site number	1
Site name	Hempstead Road

Flood Mapping Comparison



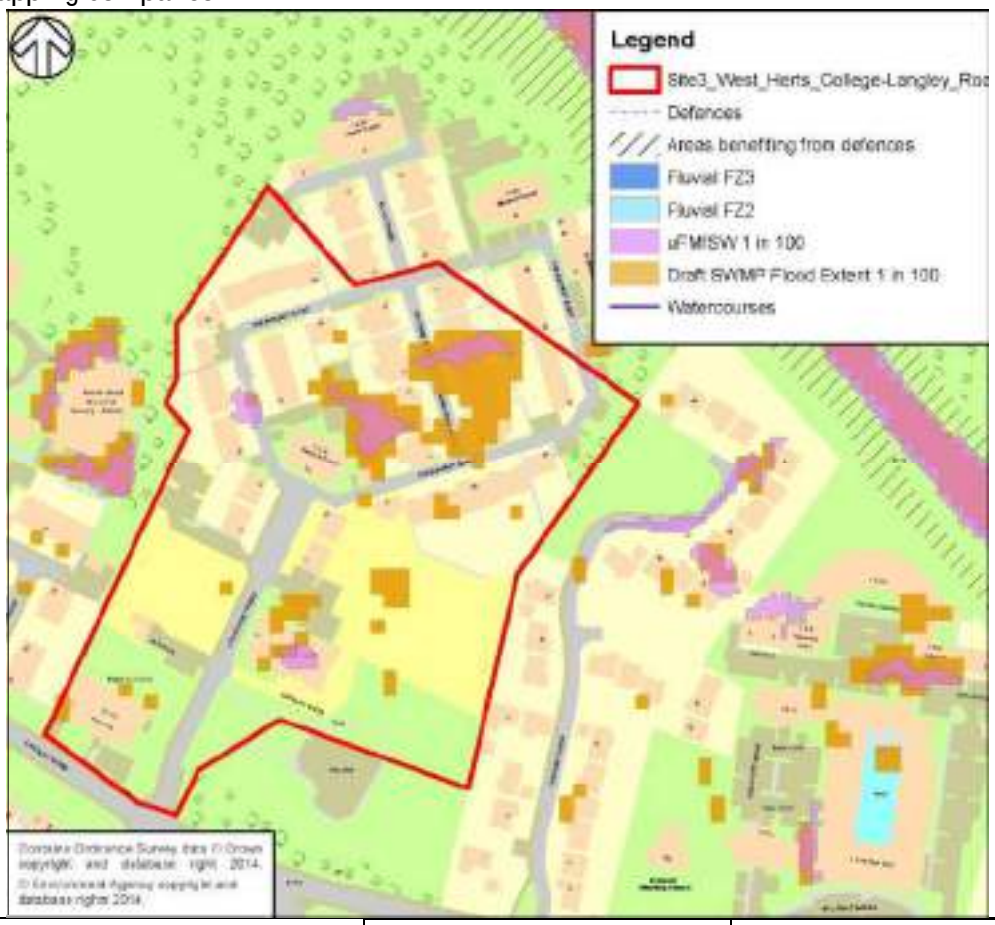
Comments continued	■ The preferred mitigation from the SWMP is to regrade kerbs and include additional gullies at strategic locations and divert overland flow to the alleyway, adjacent to property 221 (subject to safety review from the potential hazards caused by depth and velocities of flood waters). An alternative solution is a proposed investigation to determine upgrades to the Thames Water Sewer.
Proposed action	■ Stakeholders at the SWMP meeting confirmed they had no concerns with the kerb realignment and additional gulley proposals. ■ The proposed solution of kerb realignment and diverting flows through the alleyway could transfer the flood waters to other properties currently not directly affected within Deveraux Drive. The properties along Deveraux Drive would intercept flood waters which would naturally fall towards the Canal. ■ A flood risk study within the area is recommended and alternative solution sought to mitigate existing flooding upon completion of the study.

Depth Mapping 1 in 30 Year

Depth Mapping 1 in 100 Year

SWMP	Watford District
Site number	3
Site name	West Certs College – Langley Road

Flood Mapping Comparison



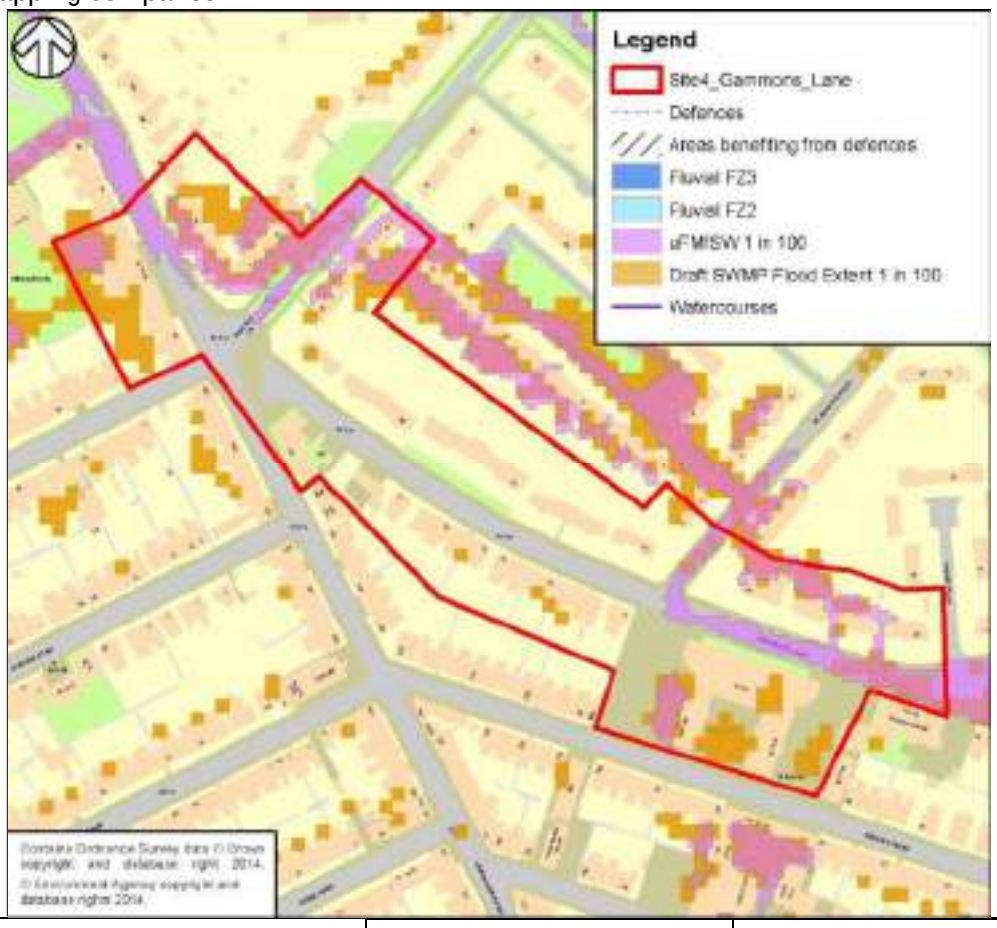
		30 year		100 year	
	Total	old	updated	old	updated
All properties	74	15	1	20	8
Critical infrastructure	0	0	0	0	0
Comments	■ The updated maps show this site is no longer affected. The recommendations within the SWMP remain valid for this site.				
Proposed action	■ Any future development will require a detailed FRA to be carried out. Runoff rates and volumes from the proposed development are to be controlled to prevent flood risk downstream.				

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	Watford District
Site number	4
Site name	Gammons Lane

Flood Mapping Comparison



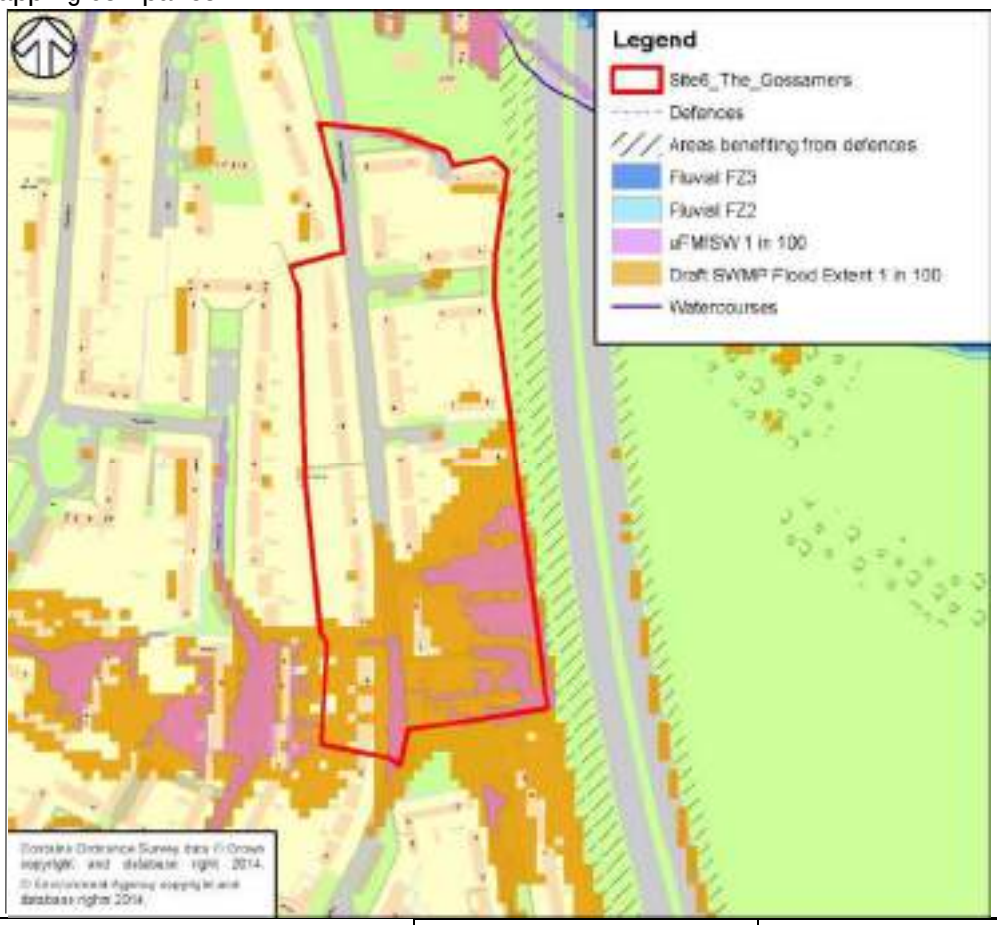
		30 year		100 year	
	Total	old	updated	old	updated
All properties	77	28	13	36	23
Critical infrastructure	0	0	0	0	0
Comments	■ Combination of property and road flooding. ■ Large difference observed between old and new modelling, and the number of affected properties. ■ Flooding observed just to the north of the site. ■ The Stakeholder meeting has confirmed that properties within this area had flooded in Jan / Feb 2014. They agreed with the proposals of the draft SWMP, which is for a Thames Water Study to be undertaken. ■ It was stated within the draft SWMP that flooding is due to capacity issues with the TW Sewers. Hertfordshire Highways (HH) was under the impression that it was both a surface and foul water flooding issue.				
Proposed action	■ As agreed at Stakeholder meeting, future studies to be undertaken to understand the reason for surface water flooding and potential mitigation solutions.				

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	Watford District
Site number	6
Site name	The Gossamers

Flood Mapping Comparison



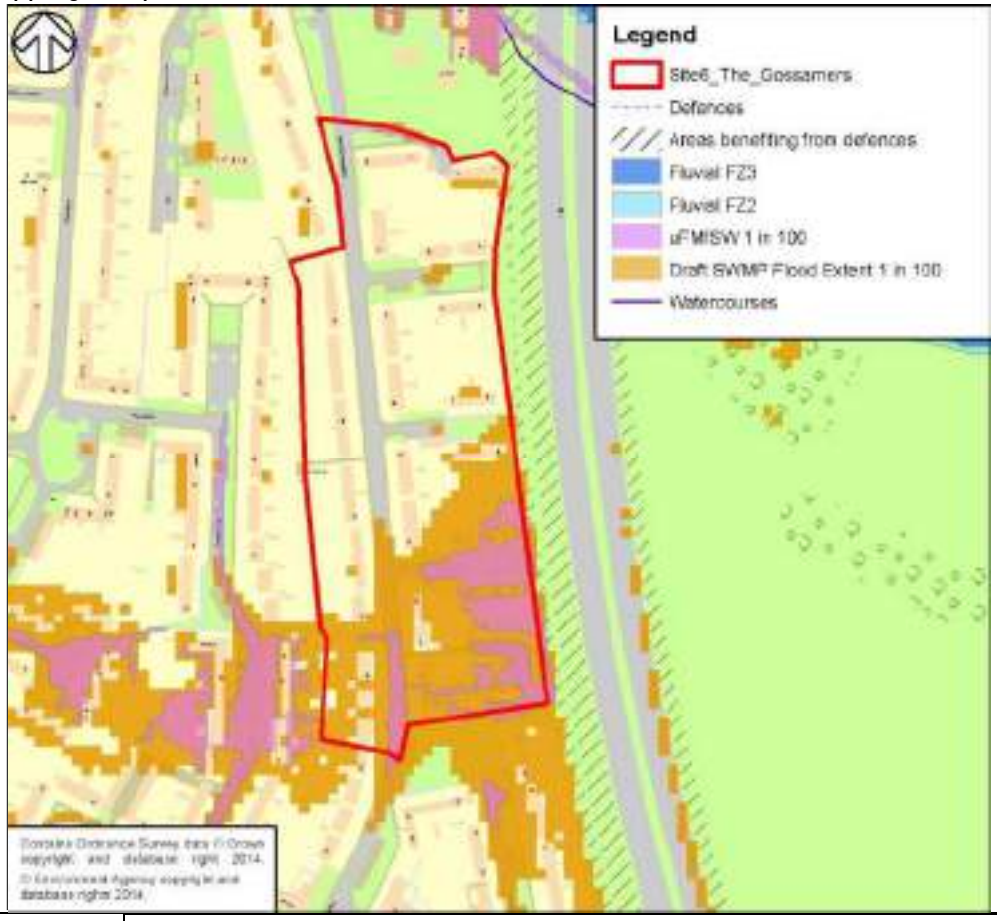
		30 year		100 year	
	Total	old	updated	old	updated
All properties	89	26	4	35	11
Critical infrastructure	0	0	0	0	0

Comments

- This site had a high EAD when reviewed as part of the draft SWMP, this is due to the number of properties predicted to be affected in the higher return period storms.
- The Draft SWMP recommends two solutions, as follows:
  1. Include positive drainage from the Grossmers into a 900 dia culvert and potentially upsize some existing sewers, subject to TW approval; or
  2. Construct a swale at the rear of the properties to attenuate runoff. The proposal is for 500m^3 of storage.

Comment Continued	
SWMP	Watford District
Site number	6
Site name	The Gossamers

Flood Mapping Comparison



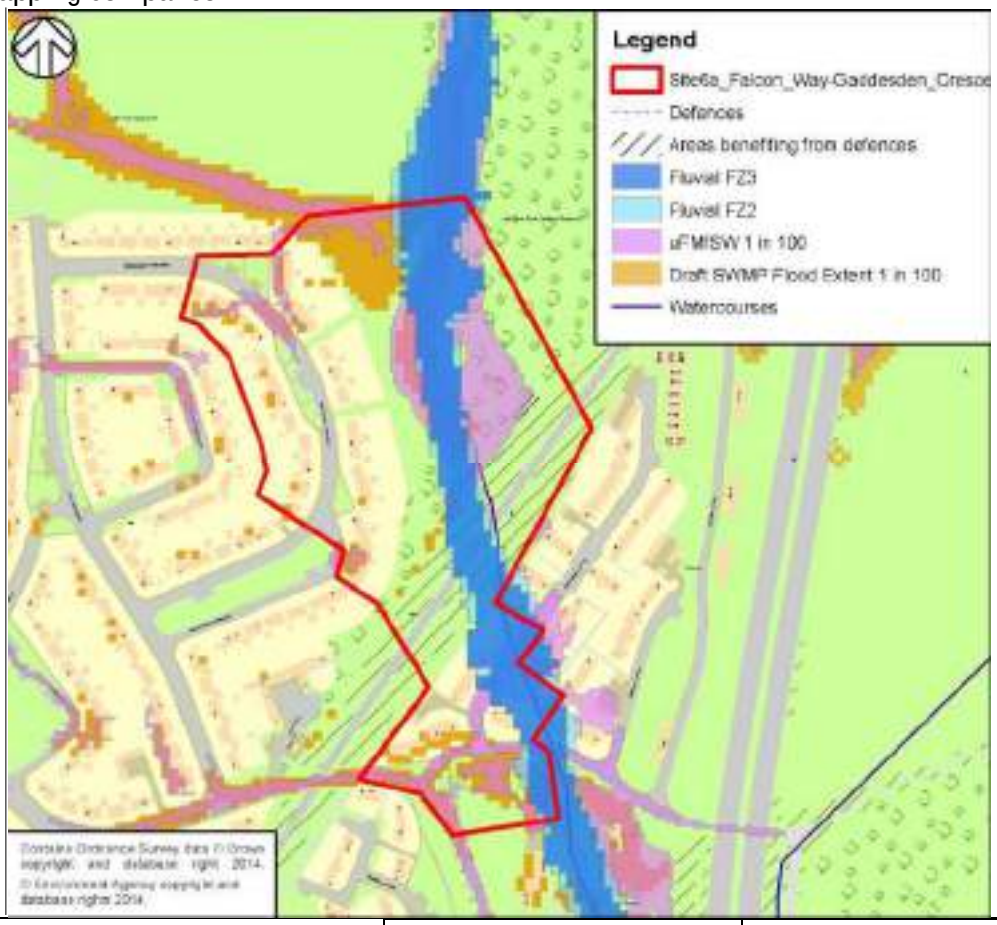
Proposed action	■ The land identified to be used as storage at the rear of the properties should be discounted as it is a dense wooded area, located at higher ground to the Grossmers properties. This wooded area is likely to function as a noise barrier for local residents from the neighbouring M1. Removing the trees is also likely to increase the amount of water runoff from the motorway embankments. ■ Throughout the Grossamers are communal grassed / vegetated areas that are located adjacent to the low points identified within the previous SWMP. A retrospective SuDS solution is proposed with the existing green areas re-profiled and designed as bio-retention areas to store flood waters. ■ Further detailed study is to be undertaken to determine overland flow routes to help determine the effectiveness of the mitigation measures proposed.

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	Watford District
Site number	6a
Site name	Falcon Way – Gaddesden Crescent

Flood Mapping Comparison



		30 year		100 year	
	Total	old	updated	old	updated
All properties	79	19	12	30	18
Critical infrastructure	0	0	0	0	0

Comments

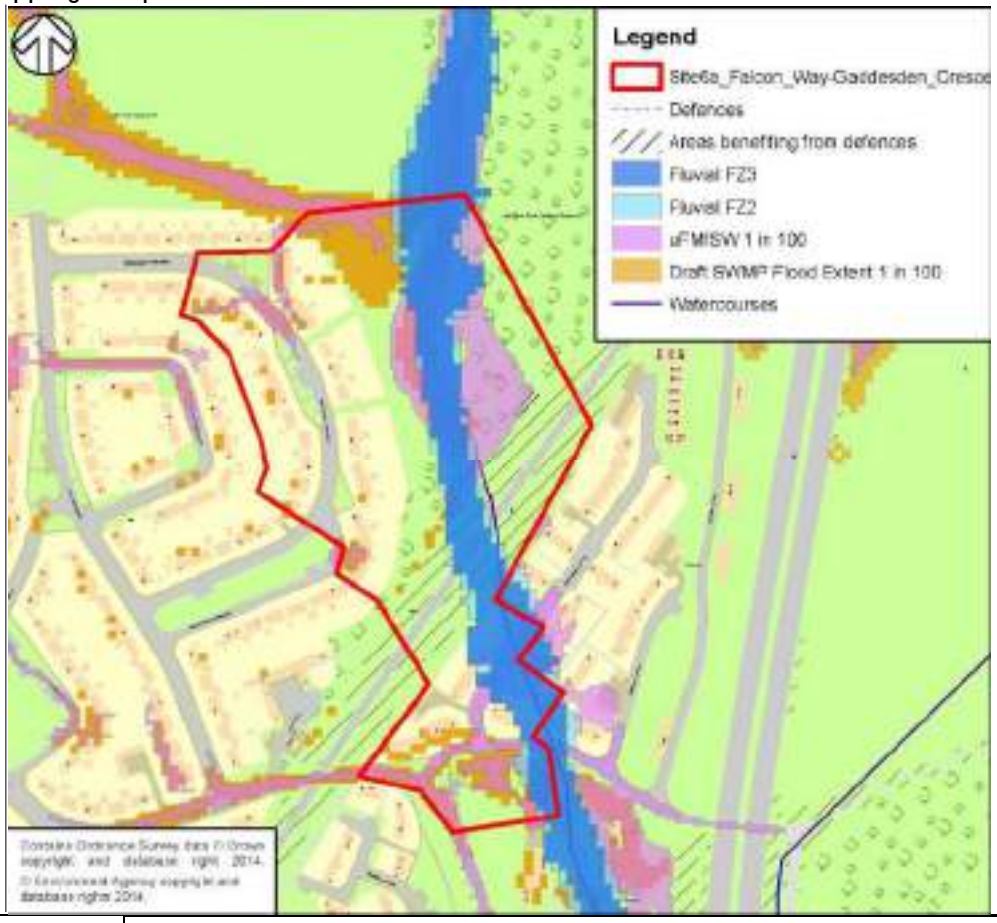
- Falcon Way / Gaddesden Crescent is located to the north of Site 5, adjacent to the M1. Flooding was reported within the draft SWMP as affecting the rear gardens of properties in Gaddesden Crescent, which backs onto a recreation ground. It states flooding was due to capacity of a downstream culverted watercourse which accepts flow from the recreation area. This culverted watercourse within the SWMP background data is listed as a culverted main river.
- Options listed within the draft SWMP for this site are as follows:

Falcon Way

1. Re-profiling open land and improved drainage provision of the motorway embankments; or / and
2. Increase kerb lines and channel water to local highway of Eastern Avenue where an existing grassed area is located which can be used for storage and an element of infiltration, or / and
3. Increase the number of Thames Water soakaways.

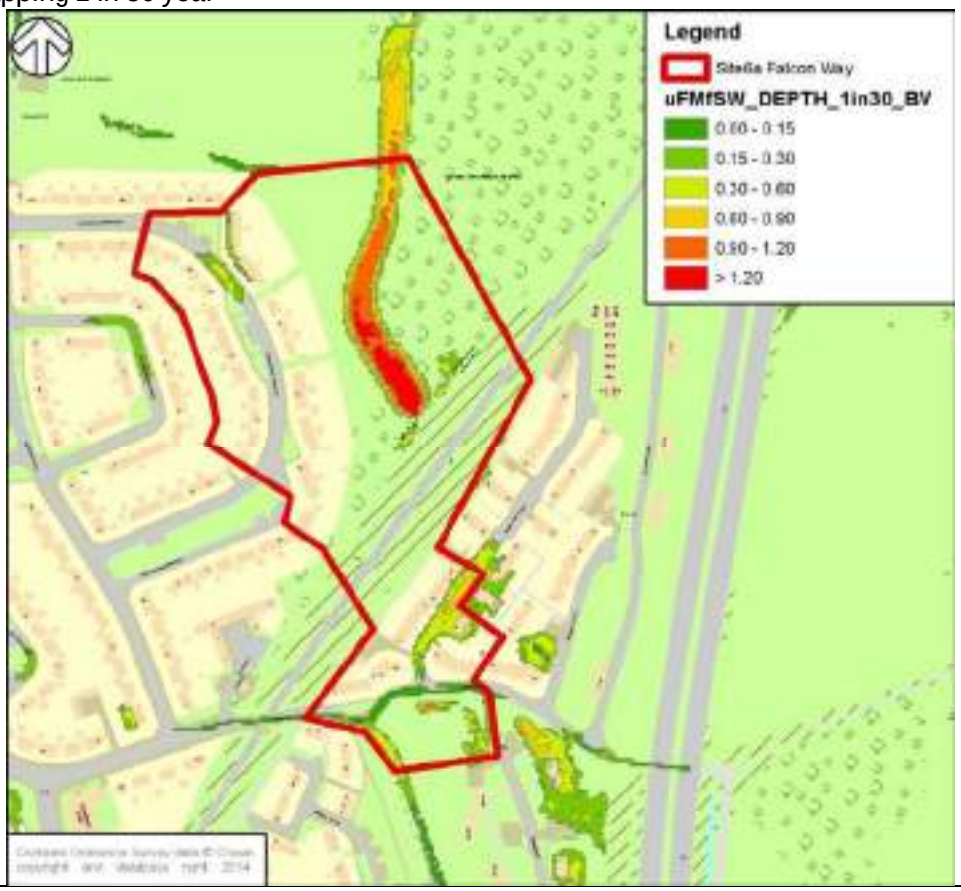
Comment Continued	
SWMP	Watford District
Site number	6a
Site name	Falcon Way – Gaddesden Crescent

Flood Mapping Comparison

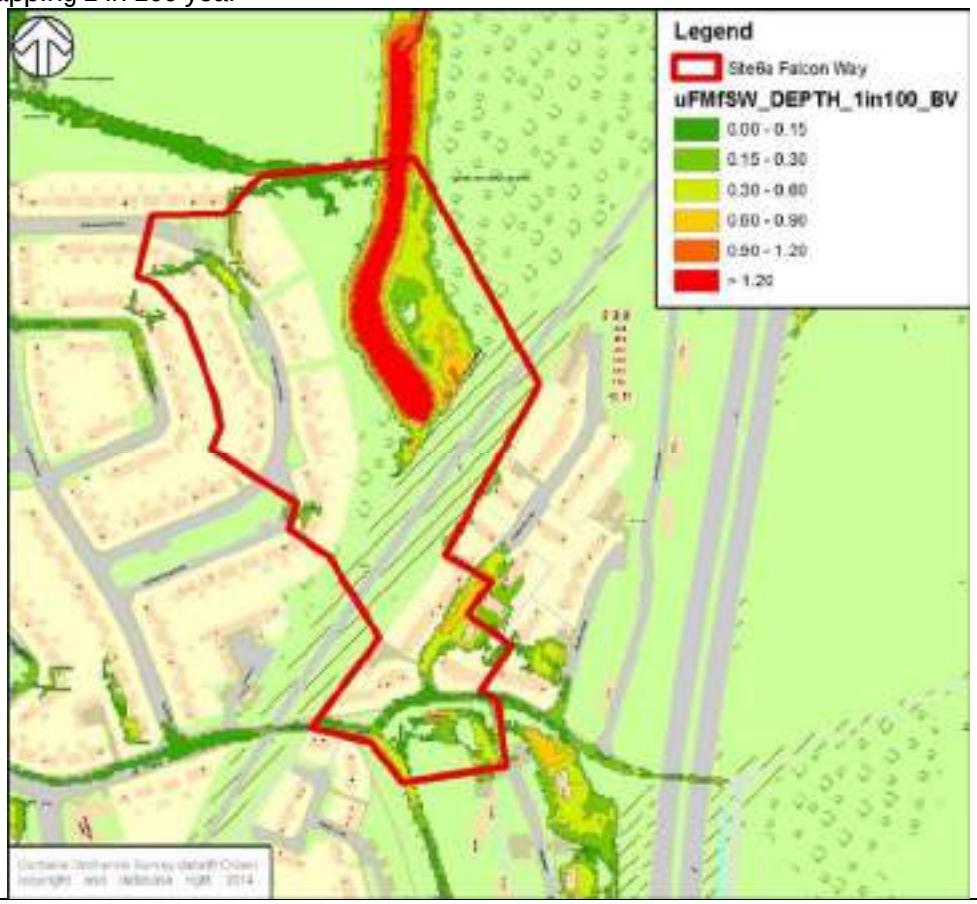


Comments continued	*Gaddesden Crescent* ■ No remediation measures were proposed as the gardens are located at higher levels than those of the low lying area within the recreational space.
Proposed action	Based on the SWMP initial review the following mitigation is proposed: *Falcon Way* ■ Highway land is available along Falcon Way at the junction of Ravencroft Road; this and the verges along this stretch of road could be re-profiled as a bio retention areas to intercept over land flow before being discharged back into the highway drainage. Additional gullies along the highway and within any low spots could also potentially help alleviate flooding (subject to Thames Water approval). *Gaddesden Crescent* ■ Bunding within the recreation ground adjacent to the rear gardens would help to mitigate against any further flooding of the rear gardens of Gaddesden Crescent.

Depth Mapping 1 in 30 year

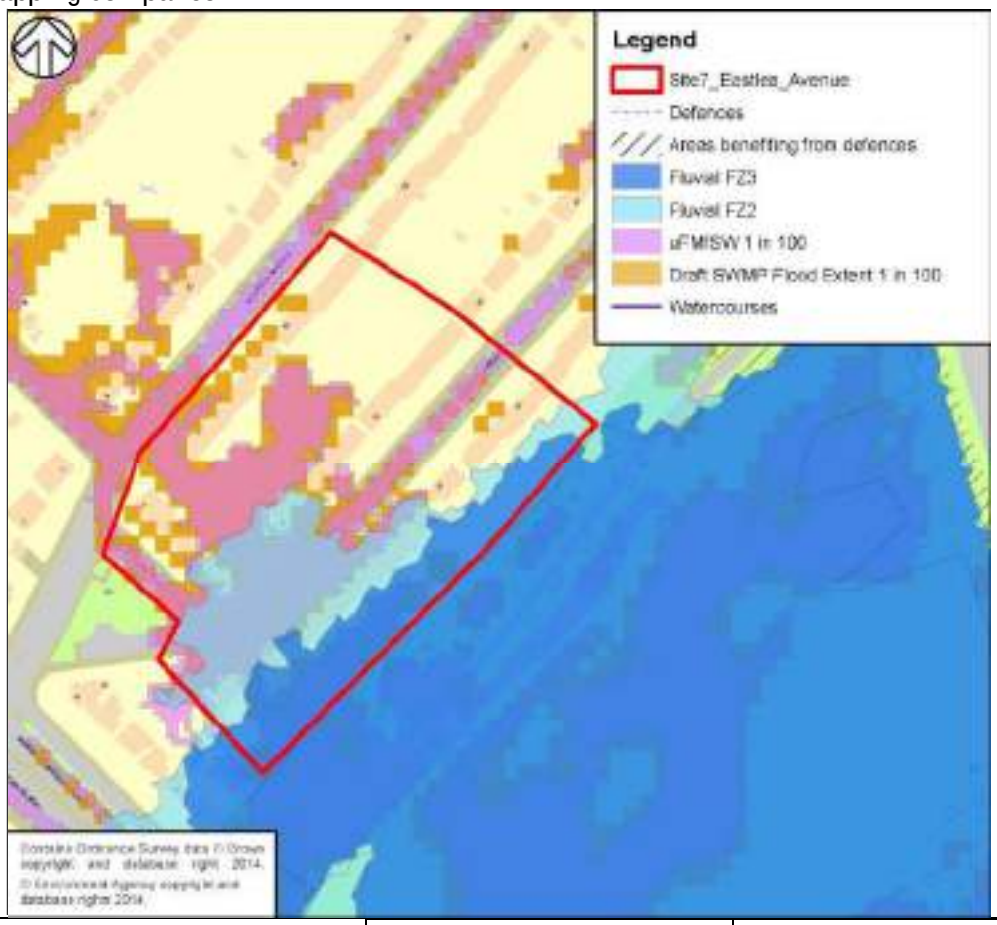


Depth Mapping 1 in 100 year



SWMP	Watford District
Site number	7
Site name	Eastlea Avenue

Flood Mapping Comparison



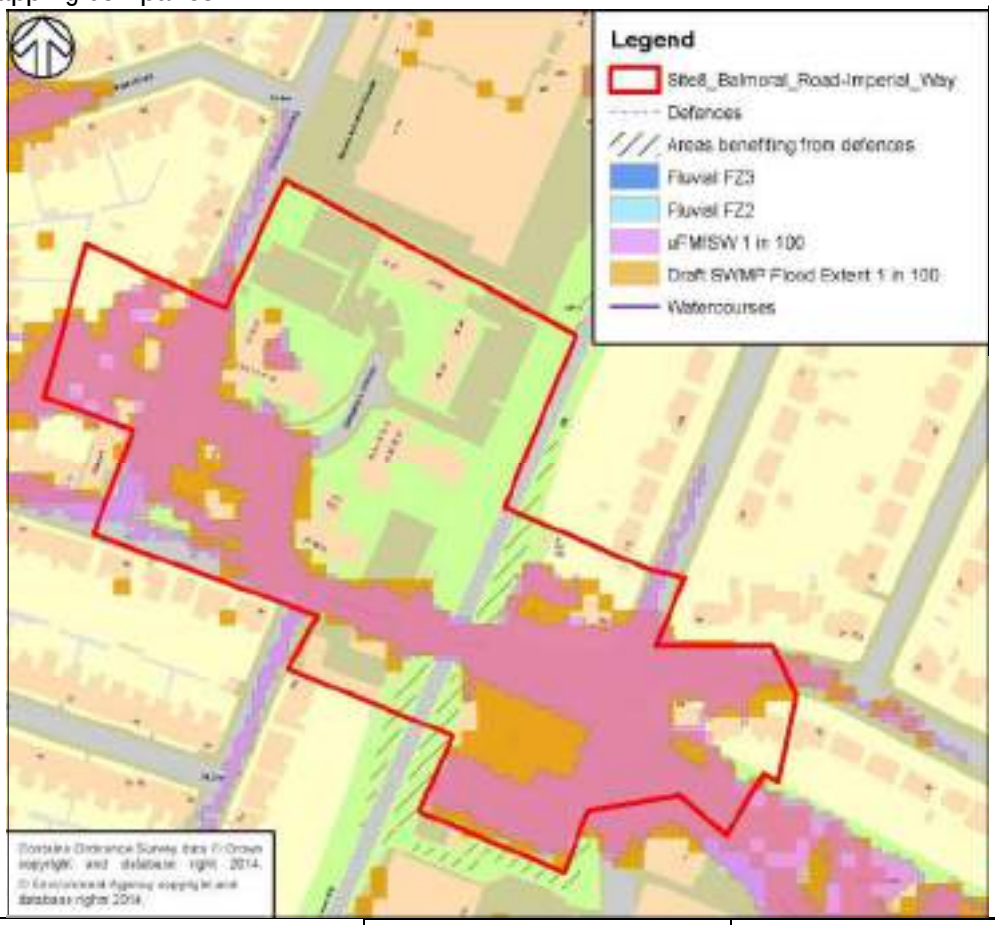
		30 year		100 year	
	Total	old	updated	old	updated
All properties	49	23	17	31	21
Critical infrastructure	0	0	0	0	0
Comments	■ Reported flooding is predicted to have occurred towards the south western end of Eastlea Avenue. ■ The draft SWMP recommends a grassed area used as a retention facility / soakaway and water directed to the area by channelling water to the bottom of Eastlea Avenue.				
Proposed action	■ The draft SWMP recommendations would work in principle if levels allow for this. Gullies are located at the low point of the road but fewer are located upstream. Additional gullies in the road could also help alleviate some of the flooding (subject to Thames Water approval).				

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

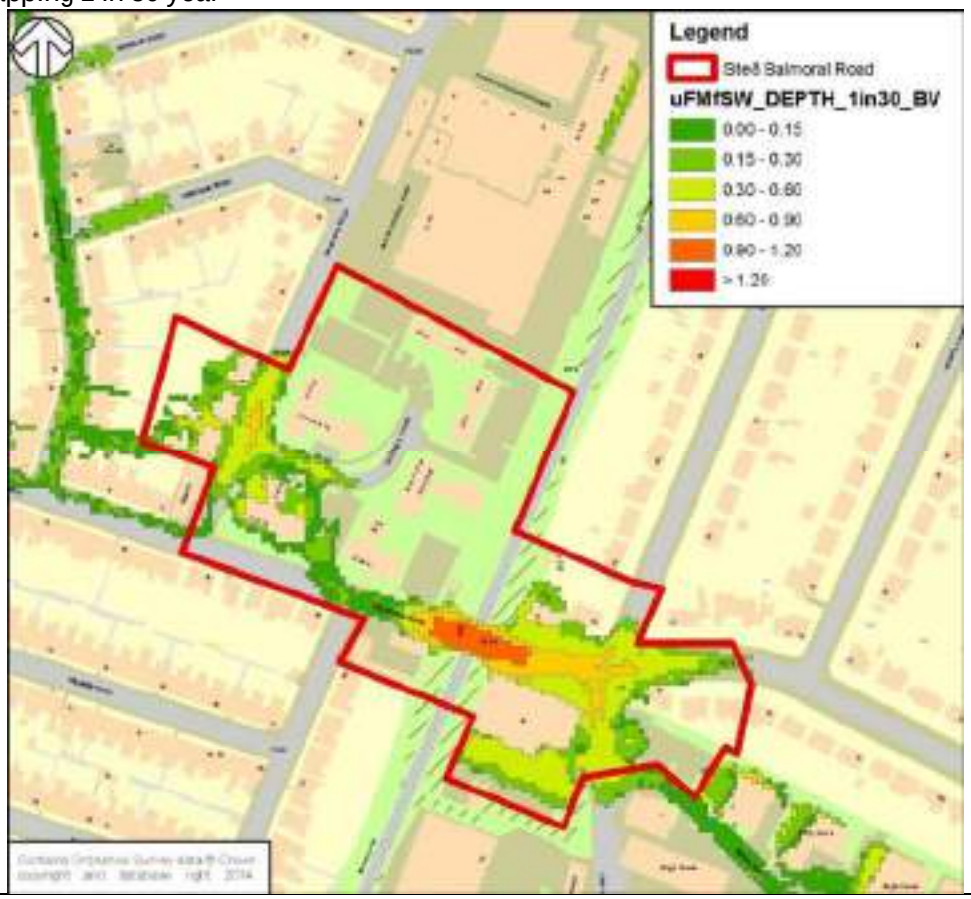
SWMP	Watford District
Site number	8
Site name	Balmoral Road

Flood Mapping Comparison

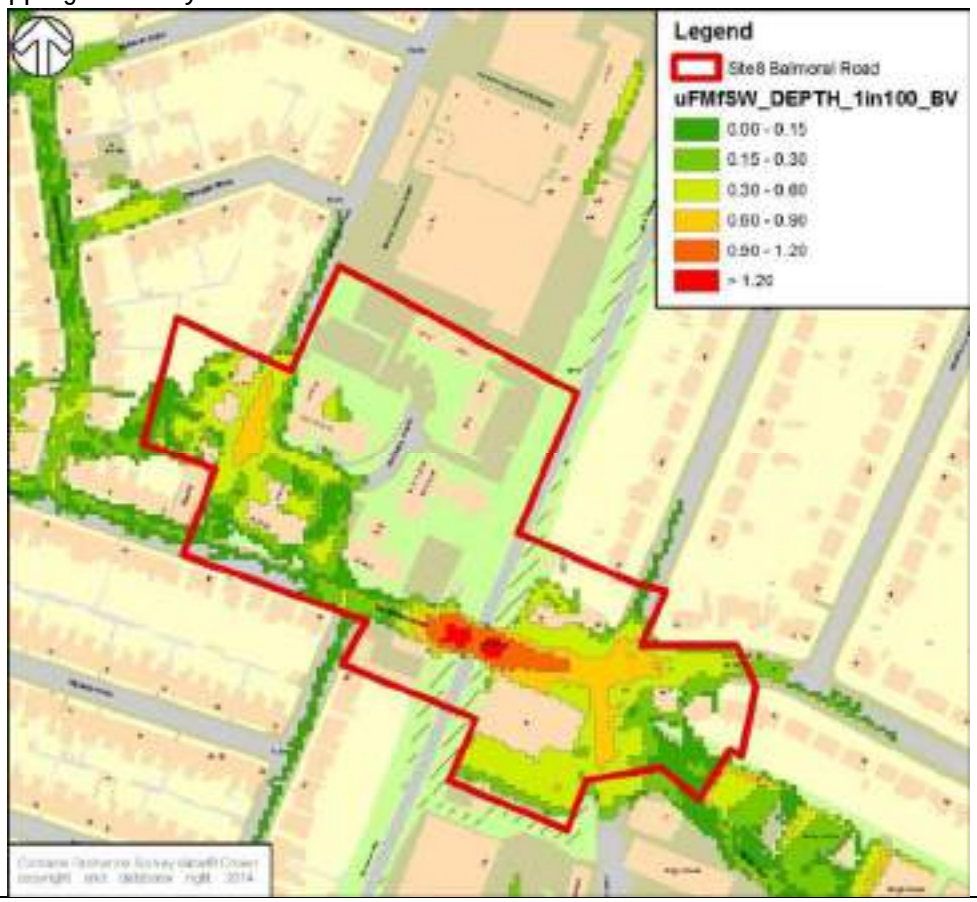


		30 year		100 year	
	Total	old	updated	old	updated
All properties	22	13	11	17	16
Critical infrastructure	0	0	0	0	0
Comments	■ Draft SWMP detailed a Highway flooding problem that occurs on an annual basis with surcharging and flooding from the Thames Water surface water sewers. Resulting in the road being closed. ■ "Low spot" under the railway. ■ Problems in Sandown Road predicted but not backed up by flooding reports. ■ The updated FMfSW shows a reduction in the number of properties affected. The draft SWMP proposed a detailed study for the area.				
Proposed action	■ The potential flood risk to Sandown Road could be resolved by better positioned gullies. However, the downstream surface water capacity will need to be checked. ■ Additional study as recommended with the draft SWMP. This approach has been agreed with Stakeholders.				

Depth Mapping 1 in 30 year

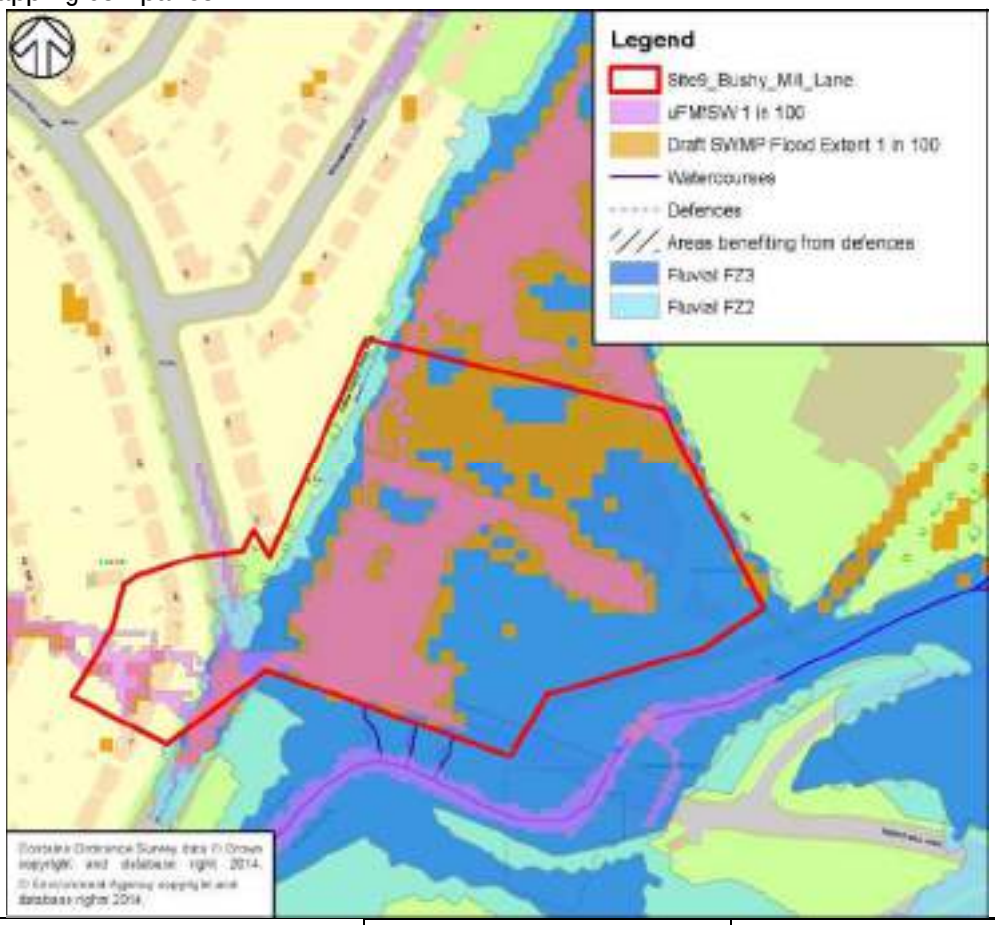


Depth Mapping 1 in 100 year



SWMP	Watford District
Site number	9
Site name	Bushy Mill Lane

Flood Mapping Comparison



	Total	30 year old	30 year updated	100 year old	100 year updated
All properties	10	2	3	6	6
Critical infrastructure	1	0	0	1	1

Comments

- The draft SWMP specifies the Bushey Mill Grid Sub Station being at risk of surface water and fluvial flood risk associated with the River Colne. It is likely that surface water sewers could become surcharged from the River which results in upstream flooding from the sewers.
- The stakeholder meeting confirmed a study by the EA is currently being undertaken looking at flood defences to be improved locally.
- Mitigation measures proposed in the draft SWMP for the scheme were for permanent road signs with the words 'Roads Liable to Flooding' erected in the area, to warn the public of potential hazards during periods of high rainfall.

Proposed action

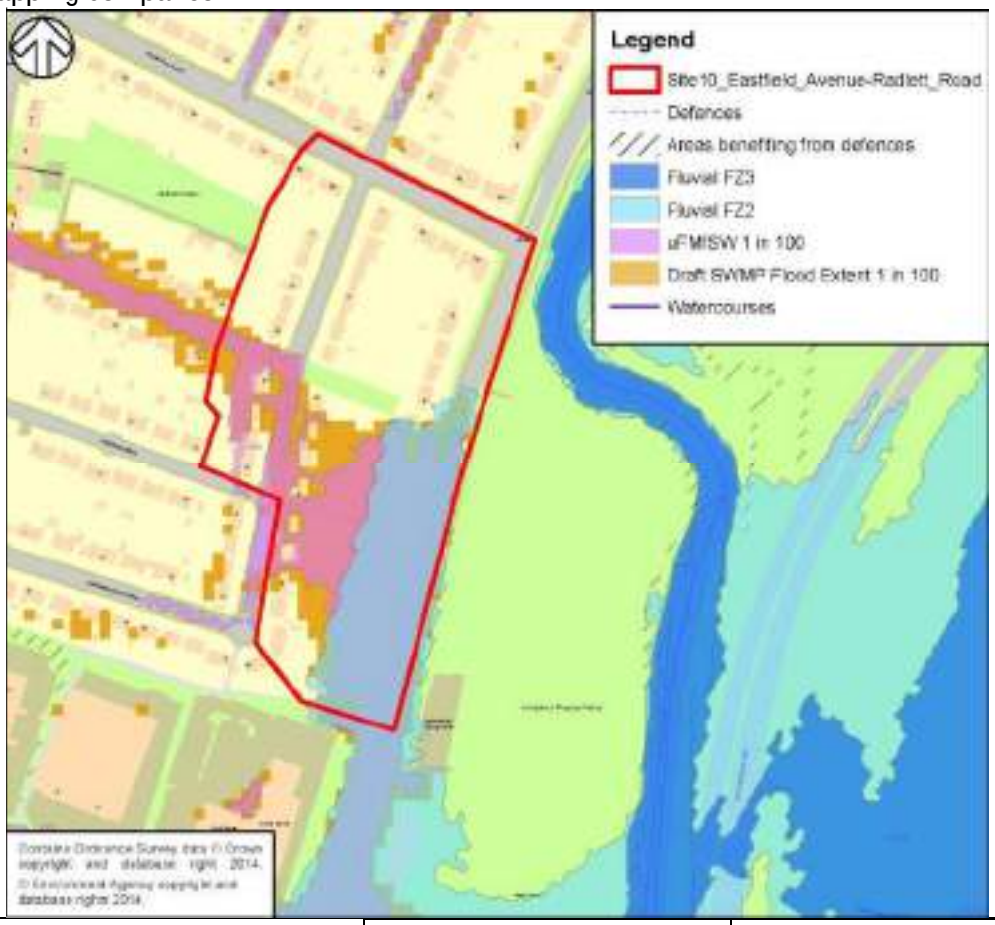
- The mitigation measures proposed are recommended as part of the SWMP update.

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	Watford District
Site number	10
Site name	Eastfield Avenue

Flood Mapping Comparison



		30 year		100 year	
	Total	old	updated	old	updated
All properties	84	33	24	35	36
Critical infrastructure	0	0	0	0	0

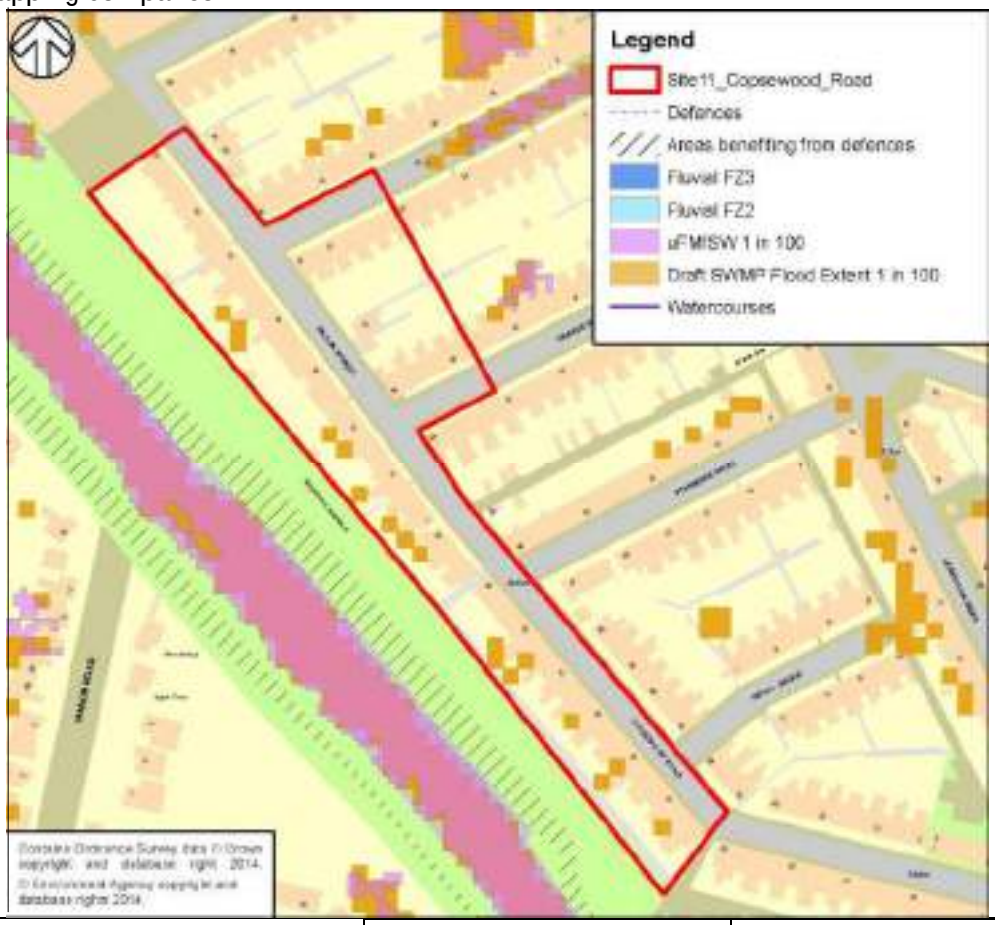
Comments	■ There are three flooding mechanisms at the site, surface water, fluvial (river) and foul water. The foul water flooding has reported to have occurred within local back gardens.
Proposed action	■ Thames Water has a fully designed solution for Eastfield Road and Radlett Road, but it has not yet been delivered due to funding. ■ Contributions from proposed local development should be assessed to allow for progress of this works.

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	Watford District
Site number	11
Site name	Copsewood Road

Flood Mapping Comparison



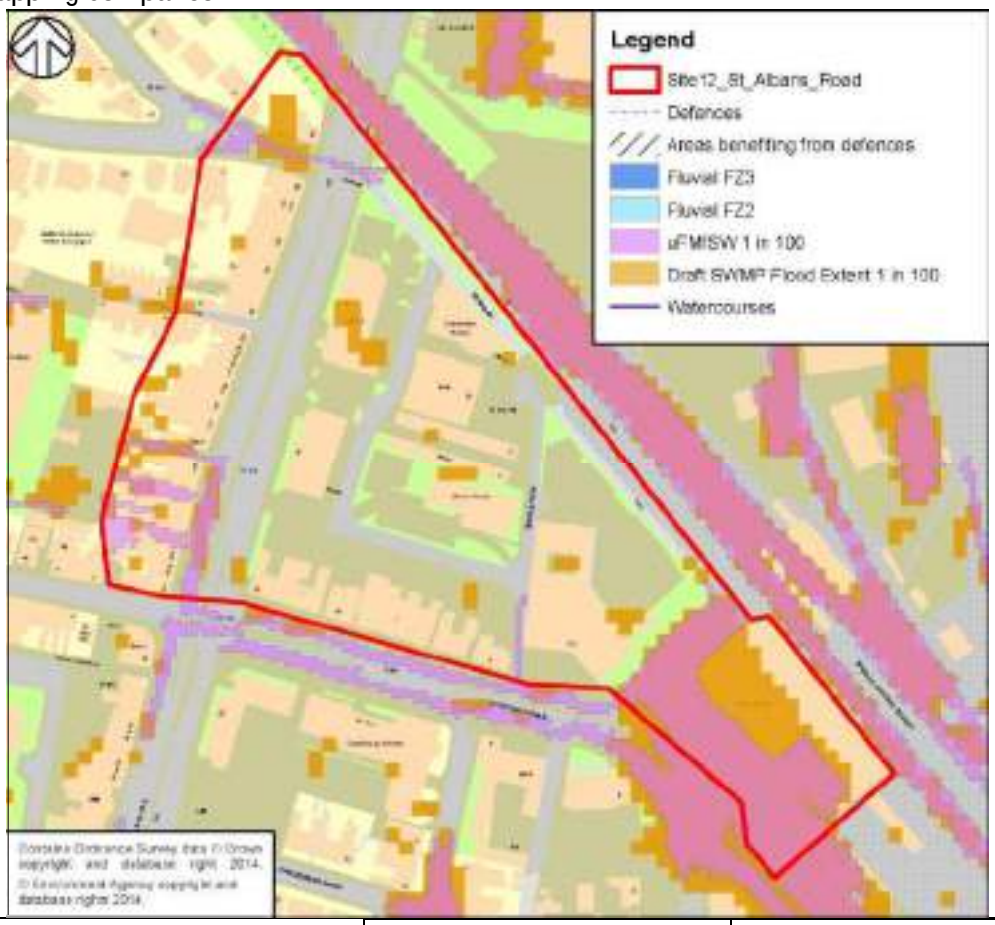
	Total	30 year		100 year	
		old	updated	old	updated
All properties	79	14	0	22	0
Critical infrastructure	0	0	0	0	0
Comments	■ Predicted low flooding depths at this site for a 10 year return period storm. ■ The updated FMfSW illustrates there are no properties at risk from surface water flooding. However some flooding had been reported previously within the local highway. ■ The topography of the site is at lower levels to the surrounding area. The draft SWMP confirmed there are a low number of gullies within the area and this has been confirmed from a review of the gully mapping.				
Proposed action	■ The draft SWMP recommended the inclusion of additional gullies and improved maintenance regime for the road. This approach was agreed at the Stakeholder meeting and is recommended as part of this SWMP update.				

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	Watford District
Site number	12
Site name	St Albans Road

Flood Mapping Comparison



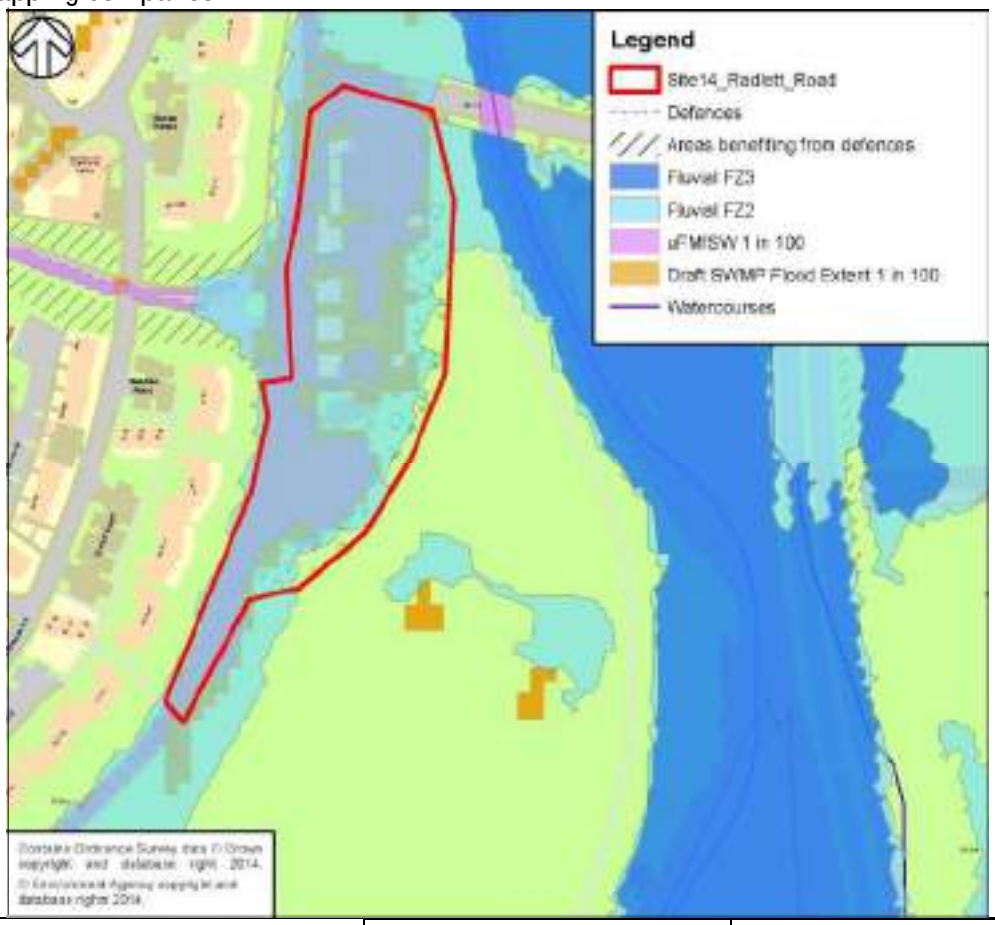
	Total	30 year		100 year	
		old	updated	old	updated
All properties	52	14	1	17	8
Critical infrastructure	0	0	0	0	0
Comments	■ No significant flooding predicted on St Alban's Road. ■ Significant flooding was predicted within the draft SWMP. The updated FMfSW shows this also is still the case, although residential properties appear unaffected by the flooding. ■ Infrastructure such as the local highway network and rail station is shown as potential areas affected.				
Proposed action	■ The draft SWMP did not have any solutions for this area and Stakeholders agreed not a site of concern.				

Depth Mapping 1 in 30 Year

Depth Mapping 1 in 100 Year

SWMP	Watford District
Site number	14
Site name	Radlett Road

Flood Mapping Comparison



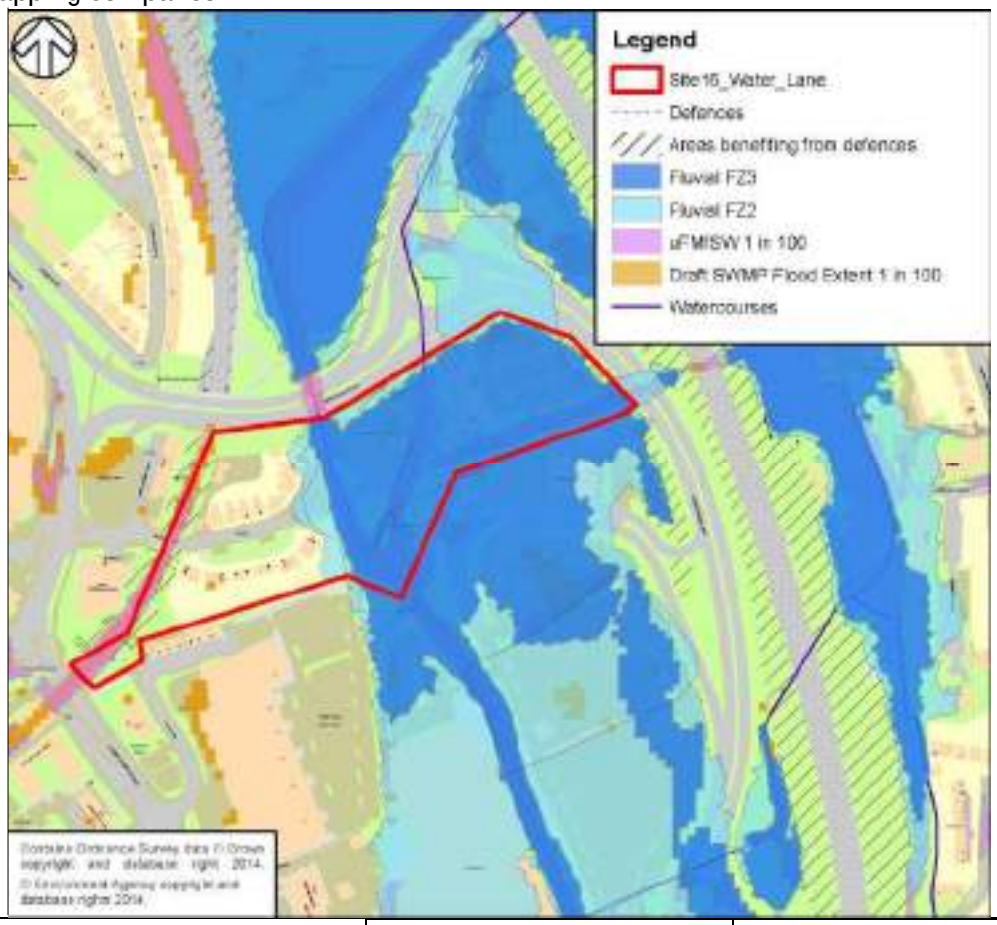
		30 year		100 year	
	Total	old	updated	old	updated
All properties	13	10	1	13	8
Critical infrastructure	0	0	0	0	0
Comments	■ This is a confirmed flood location. ■ The reports from historic flooding show considerable volumes of flood water relative to the size of the catchment area. ■ The site has been subject to a recent highway improvements scheme and a tank installed to help alleviate any flooding.				
Proposed action	■ No mitigation measures are proposed for the scheme following the recent improvements.				

Depth Mapping 1 in 30 Year

Depth Mapping 1 in 100 Year

SWMP	Watford District
Site number	16
Site name	Water Lane

Flood Mapping Comparison



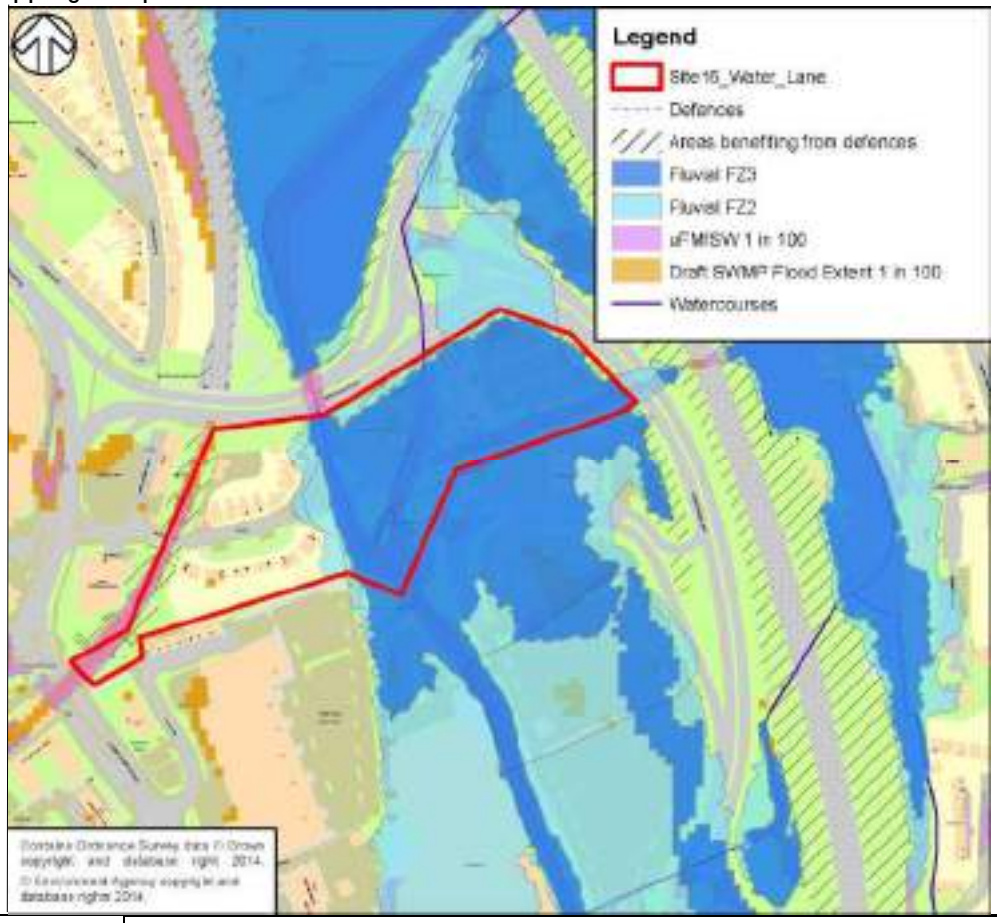
		30 year		100 year	
	Total	old	updated	old	updated
All properties	31	0	0	3	0
Critical infrastructure	0	0	0	0	0

Comments

- This is a known area with significant flooding issues, located in Water Lane situated between Tesco and the Premier Inn.
- The draft SWMP confirmed the floods result in restricted access and egress to the Premier Inn and a restriction of vehicular and pedestrian access between Watford and Hertsmere.
- Hertfordshire Highways have implemented a scheme in Water Lane consisting of a storage tank in the verge which is emptied by a pump. The pump is controlled by a float switch, which stops the pumps when the river reaches a certain level. In times when the river is high the storage tank will back up and flooding of the carriageway will still occur. At the stakeholder meeting HH confirmed the tank operating system has not always effectively worked. This could be in part due to high levels of the local watercourse or due to a fault with the tank and pump.

Comment Continued	
SWMP	Watford District
Site number	16
Site name	Water Lane

Flood Mapping Comparison



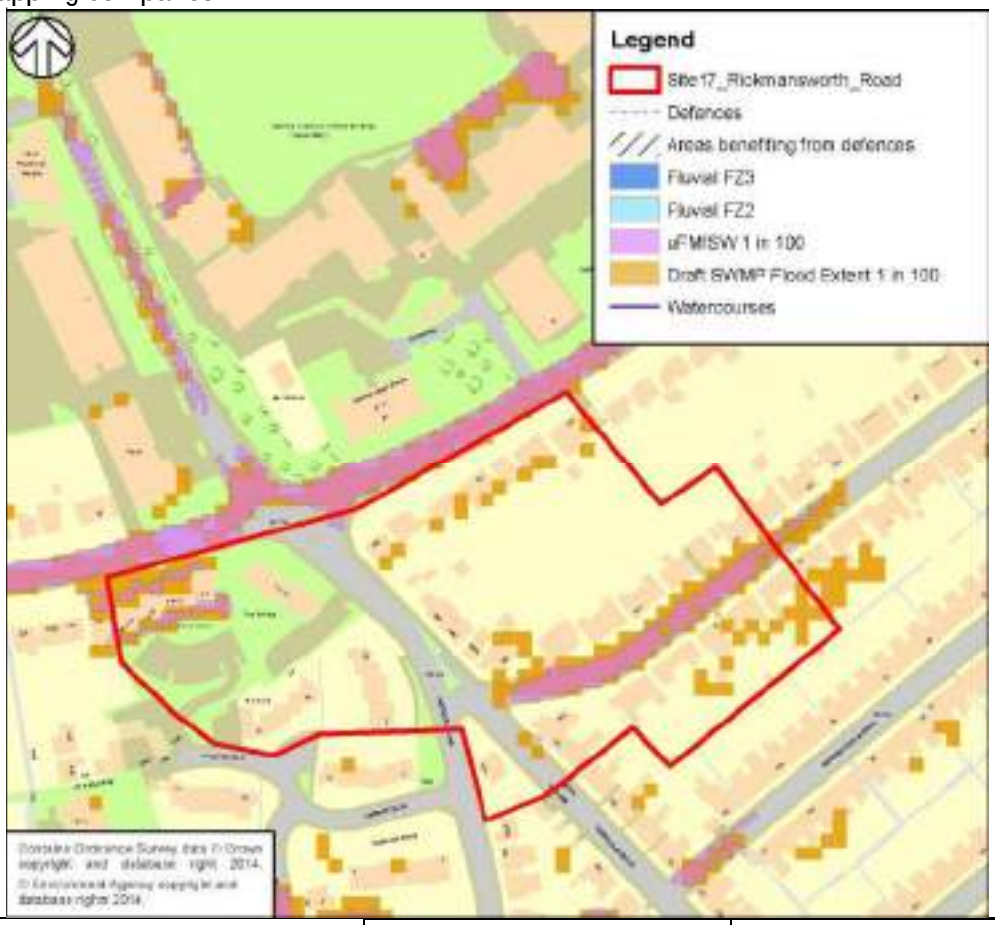
Proposed action	■ The draft SWMP recommendation is for a permanent 'Roads Liable to Flooding' signs to be erected. This approach has since been agreed with Stakeholders. ■ An investigation into the pump and tank operation should also be undertaken and if faulty repairs undertaken.

Depth Mapping 1 in 30

Depth Mapping 1 in 100

SWMP	Watford District
Site number	17
Site name	Rickmansworth Road

Flood Mapping Comparison



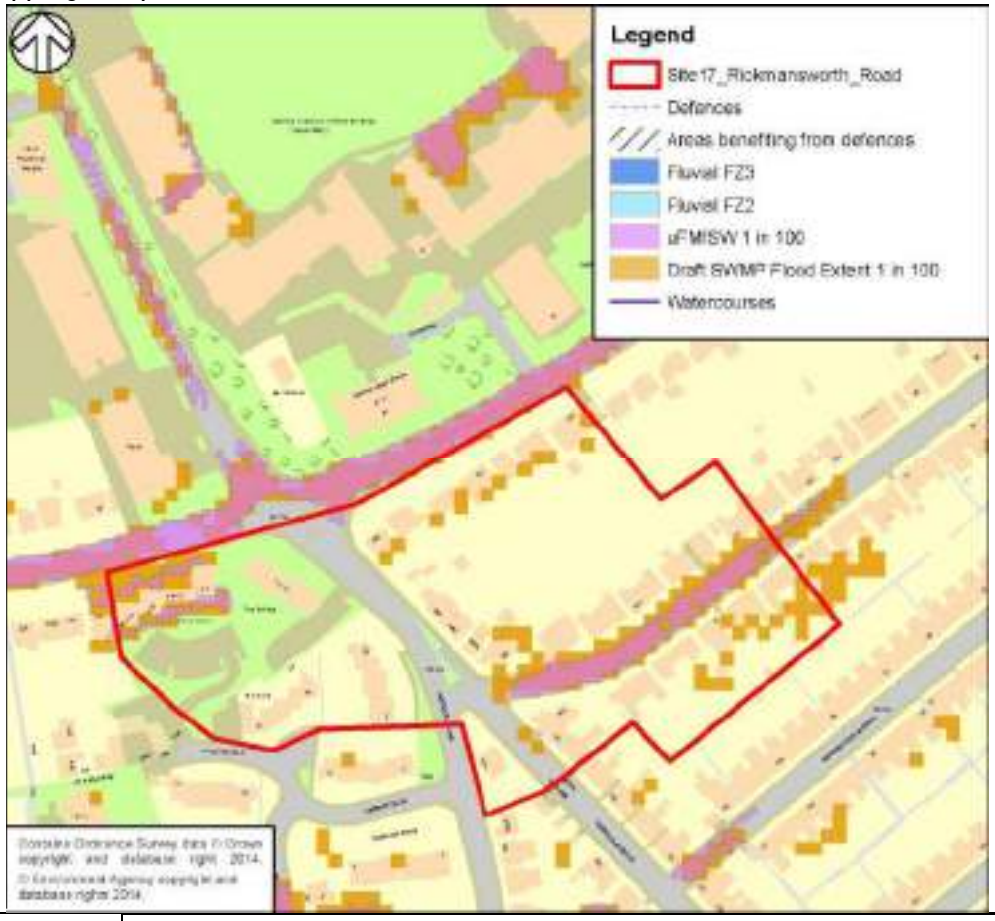
		30 year		100 year	
	Total	old	updated	old	updated
All properties	57	17	3	28	5
Critical infrastructure	0	0	0	0	0

Comments

- This site is at the junction of Rickmansworth Road and Hagden Lane. The draft SWMP stated there is no obvious reason why the flooding would occur at the bottom of Hagden Lane as the road has a reasonable gradient. The flats in Rickmansworth Road, adjacent Hagden Lane, are located at lower levels than the road.
- A comparison of the FMfSW shows a reduction in the number of properties affected and flood waters contained predominately within the highway.
- A review of the gully mapping shows a small number within the junction of Rickmansworth road. Site visits undertaken during the production of the draft SWMP showed there was evidence of blocked gullies within the road.
- Stakeholders have confirmed there is no history of this site area having flooded.

Comment Continued	
SWMP	Watford District
Site number	17
Site name	Rickmansworth Road

Flood Mapping Comparison



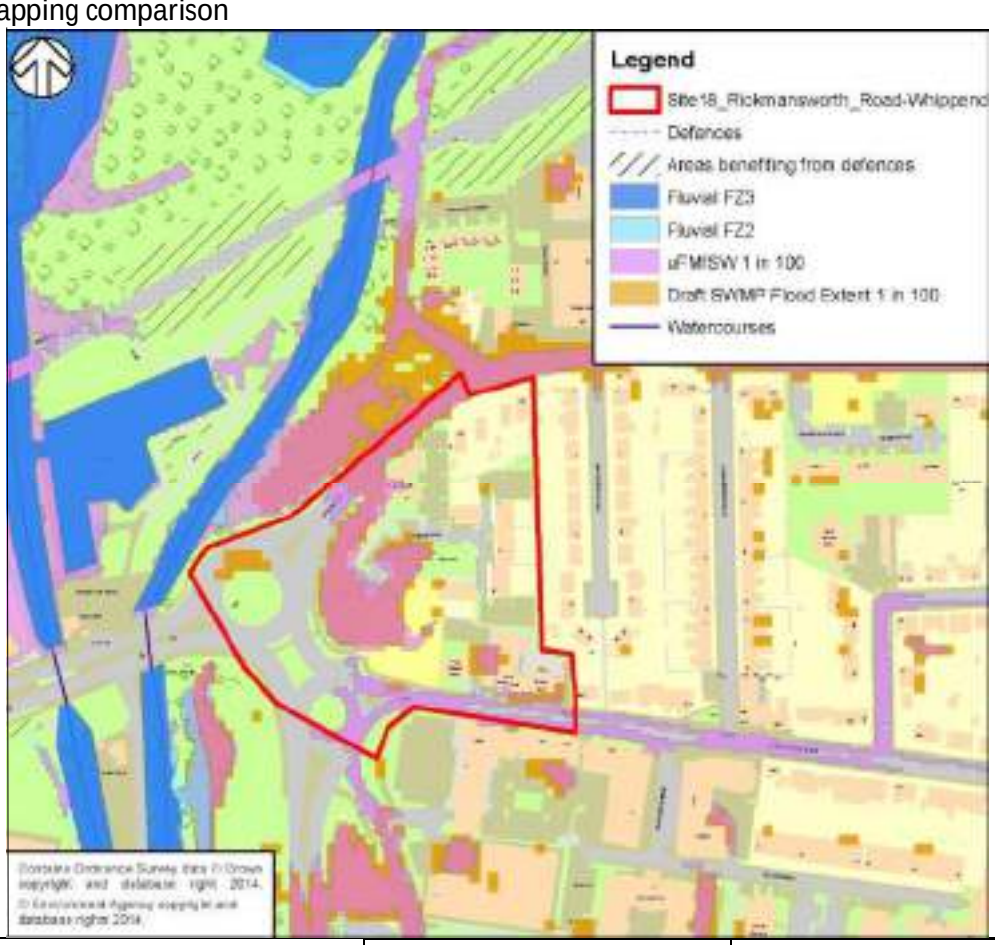
Proposed action	■ The draft SWMP proposed enhancing the number of gullies within this area and increased highway maintenance regime. ■ The proposals within the draft SWMP was agreed with Stakeholders at the meeting.

Depth Maping 1 in 30 year

Depth Maping 1 in 100 year

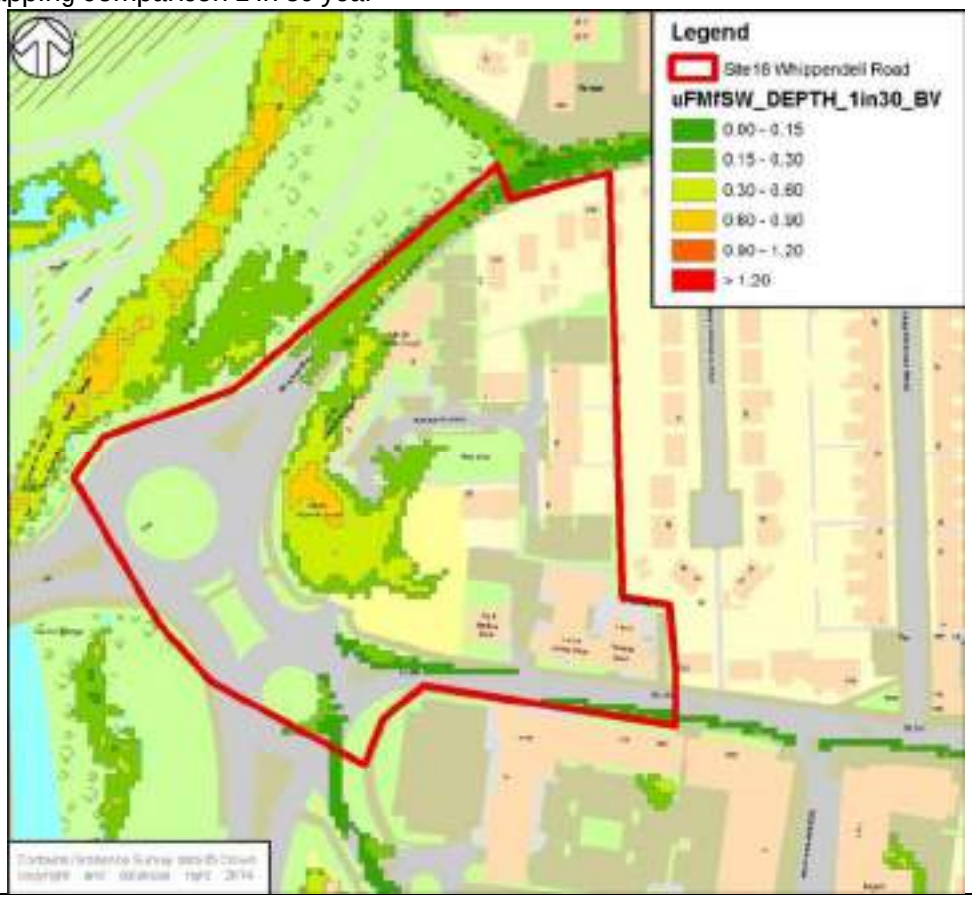
SWMP	Watford District
Site number	18
Site name	Rickmansworth Road – Whippendell Road

Flood Mapping comparison

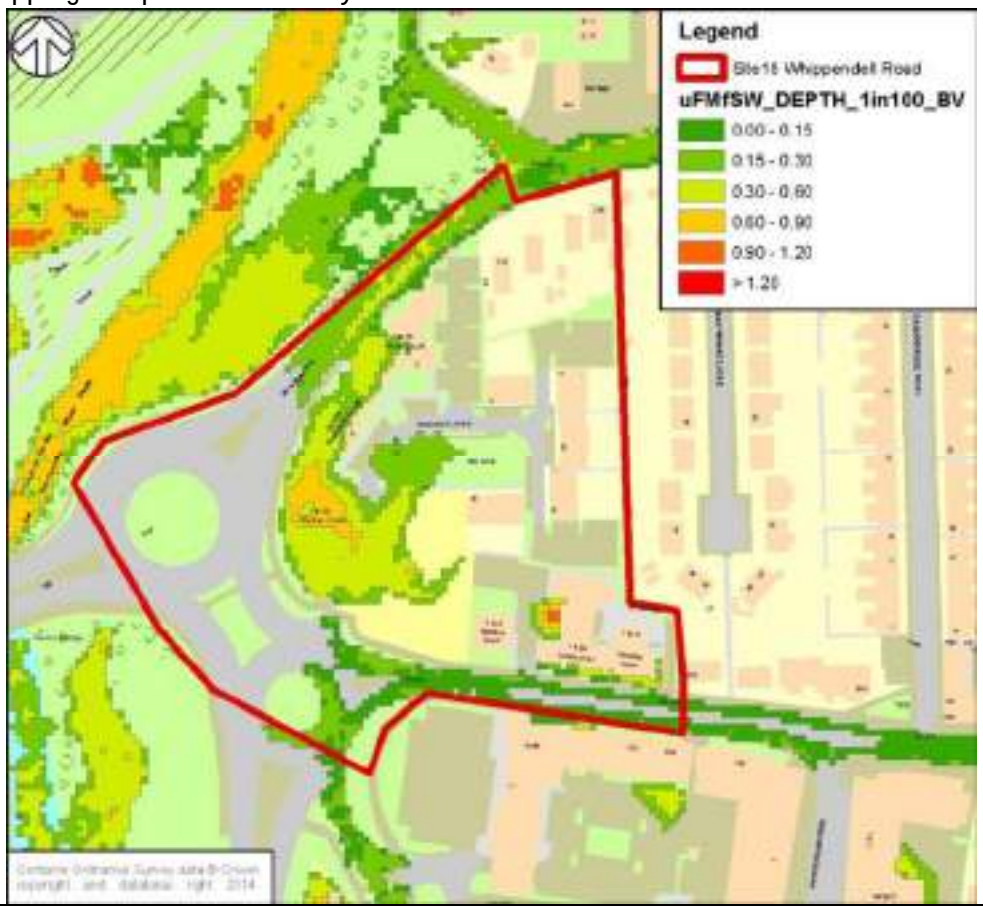


		30 year		100 year	
	Total	old	updated	old	updated
All properties	8	1	2	2	2
Critical infrastructure	0	0	0	0	0
Comments	■ The site is located within a low lying area which is in close proximity to the River Gade. ■ There is thought to be high ground water levels in the area. ■ The site was a previous fire station that has since been relocated. It is understood from the Stakeholder meeting that the site has previously flooded.				
Proposed action	■ The draft SWMP states the site is now proposed for housing and the EA flood maps show this site to not be located within an area at fluvial flood risk. ■ It was recommended, in accordance with the draft SWMP, a flood risk assessment will be required for the future development of the site. The FRA needs to specifically address the impacts of the proposed development to surface water flooding, ensure future residents are protected and the development does not cause a detriment to offsite areas.				

Depth Mapping Comparison 1 in 30 year

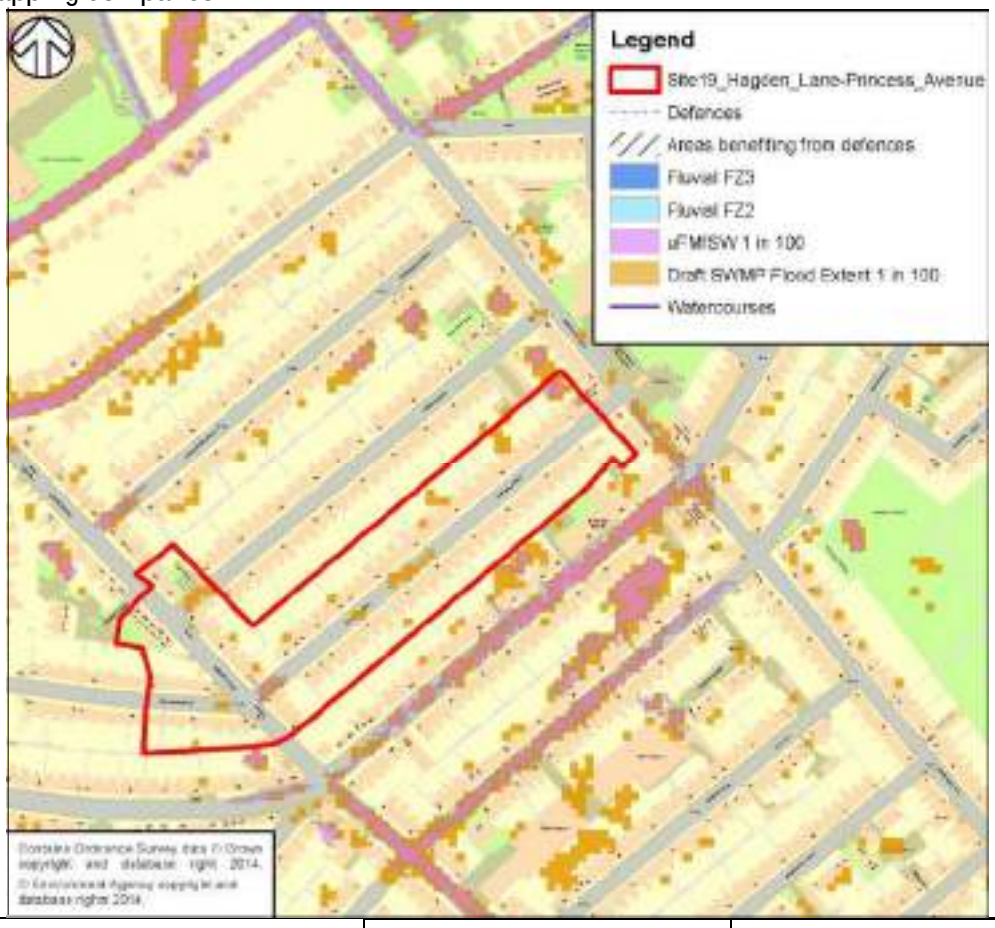


Depth Mapping Comparison 1 in 100 year



SWMP	Watford District
Site number	19
Site name	Harpenden Lane – Princess Avenue

Flood Mapping Comparison



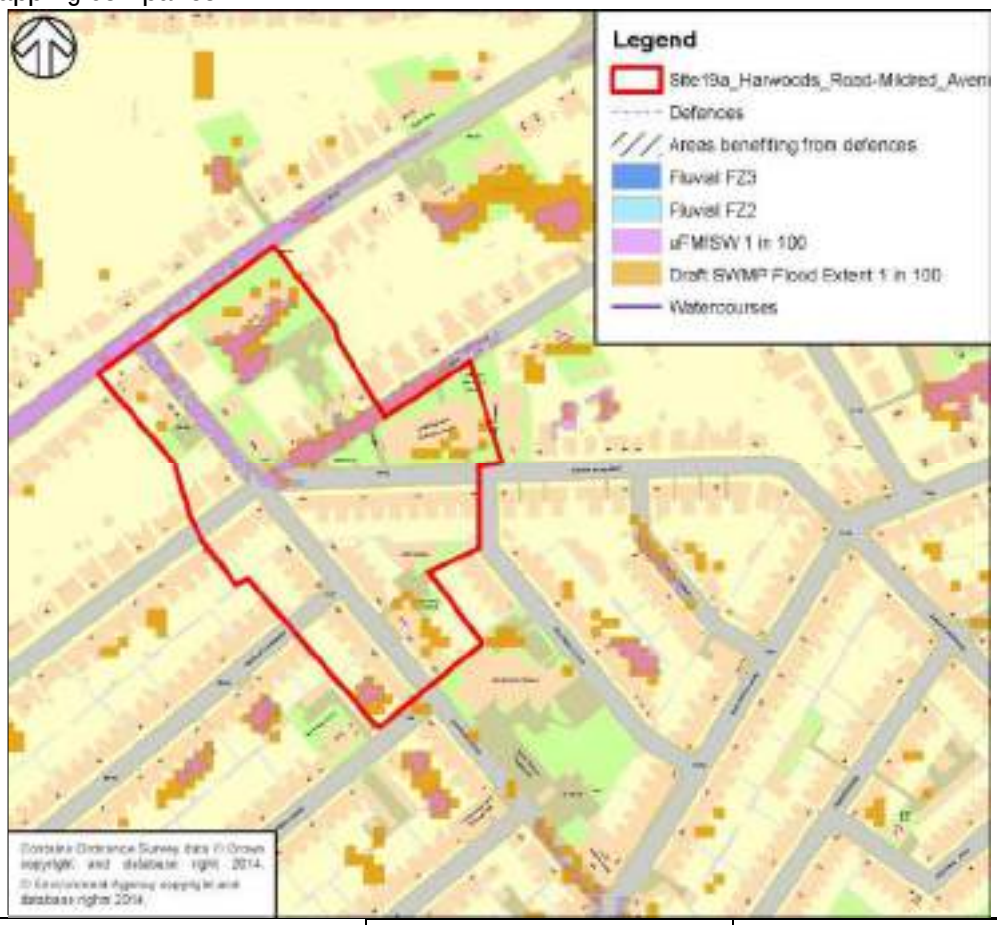
		30 year		100 year	
	Total	old	updated	old	updated
All properties	159	11	0	19	0
Critical infrastructure	0	0	0	0	0
Comments	■ A comparison of the updated FMfSW shows there are no properties affected from surface water flooding. However, there have been reports as part of the draft SWMP process, of localised flooding within the highways. This has been confirmed by stakeholders.				
Proposed action	■ The draft SWMP recommended increasing the number of gullies and improved maintenance regime. Stakeholders have agreed with this approach. ■ A review of the gully mapping shows there are a low number within the site area. The solutions within the draft SWMP are suitable for the flood risk associated with the area.				

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	Watford District
Site number	19a
Site name	Harwoods Road – Mildred Avenue

Flood Mapping Comparison



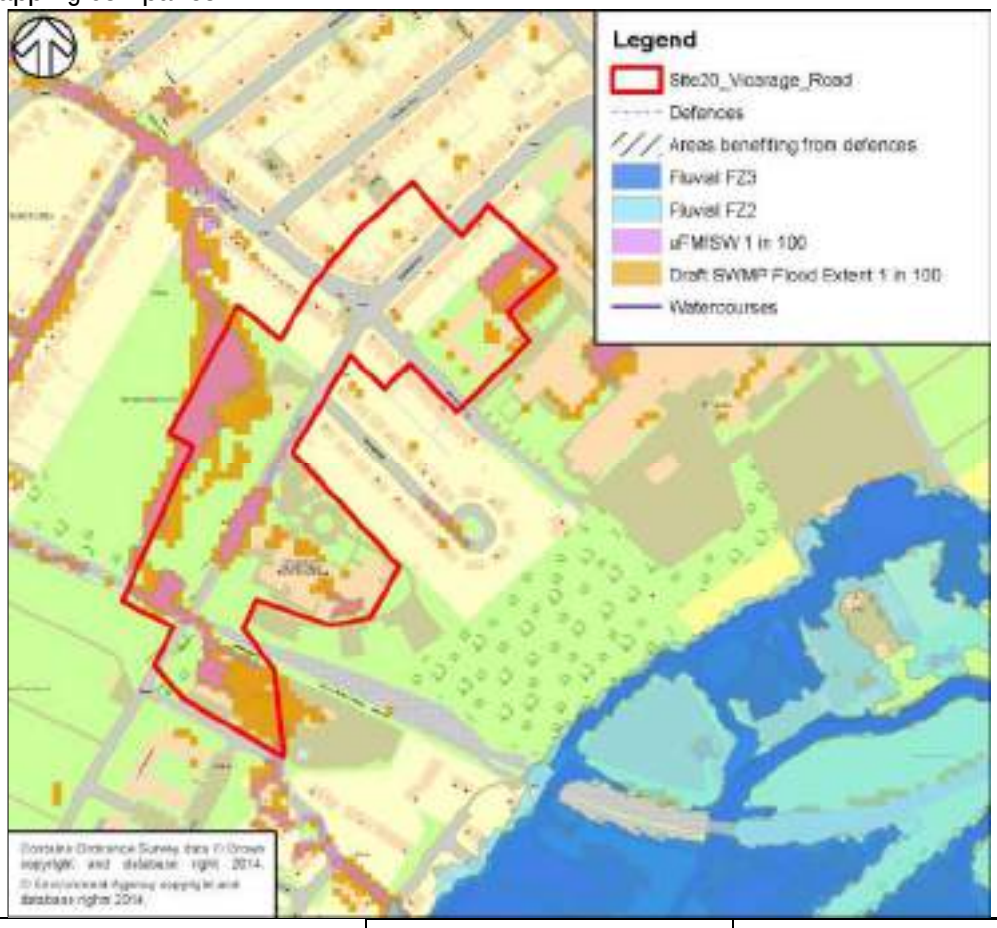
		30 year		100 year	
	Total	old	updated	old	updated
All properties	93	11	0	17	6
Critical infrastructure	0	0	0	0	0
Comments	■ A comparison of the updated FMfSW shows there are no properties affected from surface water flood. However there have been reports, as part of the draft SWMP review, of localised flooding within the highways. This has been confirmed by Stakeholders.				
Proposed action	■ The draft SWMP recommended increasing the number of gullies and improved maintenance regime. Stakeholders have agreed with this approach. ■ A review of the gully mapping shows there are a low number within the site. ■ Increasing gully provision and adding additional flows into the surface water system could have a 'knock on' effect to Site 17. ■ This area would require a detailed study in conjunction with Thames Water, with a verified hydraulic model, to determine the adequacy of the existing pipe sizes and implications of an increase in gully provision & additional flows.				

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	Watford
Site number	20
Site name	Vicarage Road

Flood Mapping Comparison



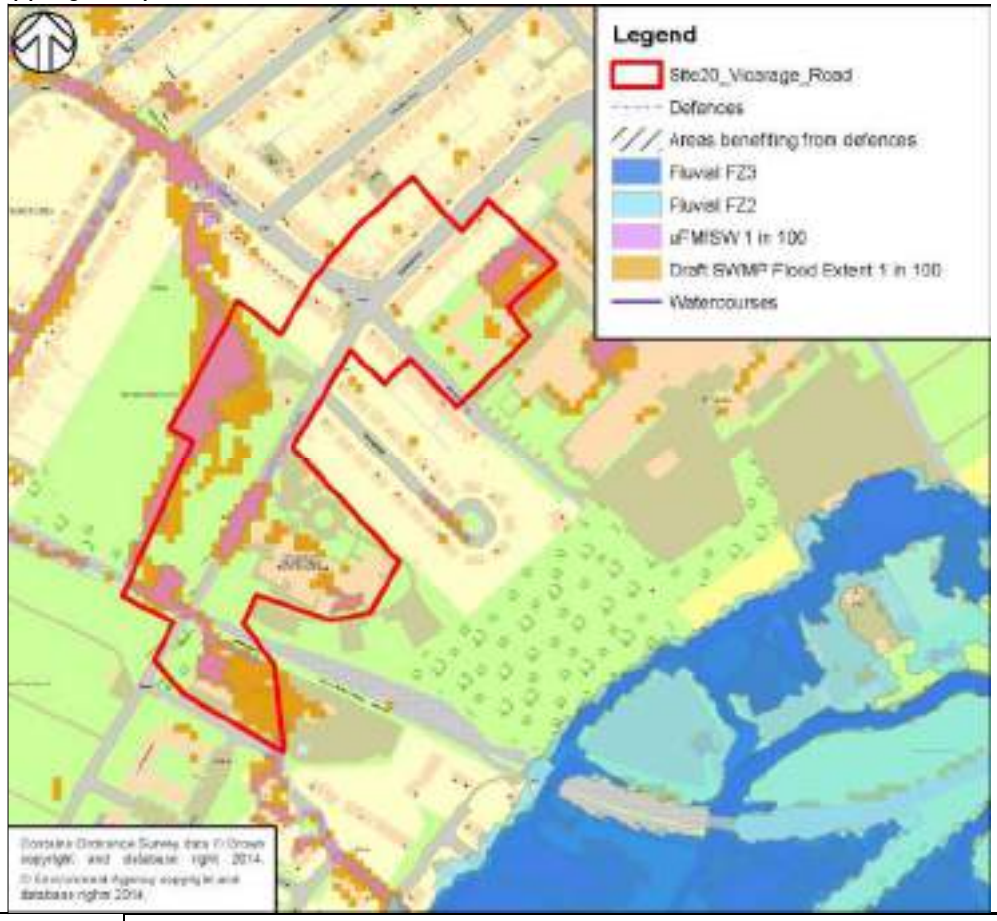
		30 year		100 year	
	Total	old	updated	old	updated
All properties	52	4	1	6	2
Critical infrastructure	0	0	0	0	0

Comments

- The draft SWMP reports of flooding along Vicarage Road, mainly between Queens Road and the railway bridge to the south. The predicted flooding illustrated on the latest FMfSW is shown along Vicarage Road, outside Laurence Hains School and within the recreation ground located behind the nursery school.
- According to Hertfordshire Highways the main issue is the flooding in the road. Gullies in the 'low spot' were previously connected to the grassed area adjacent to the road. The outfalls to these were damaged during the construction of the play area. The draft SWMP confirmed this has been partially repaired which has eased the situation.
- A review of the latest FMfSW and the Lidar data for the site would suggest flood waters would cut across Queens Road, through either resident's gardens or a local footpath, before falling towards the recreational area.

Comment Continued	
SWMP	Watford
Site number	20
Site name	Vicarage Road

Flood Mapping Comparison



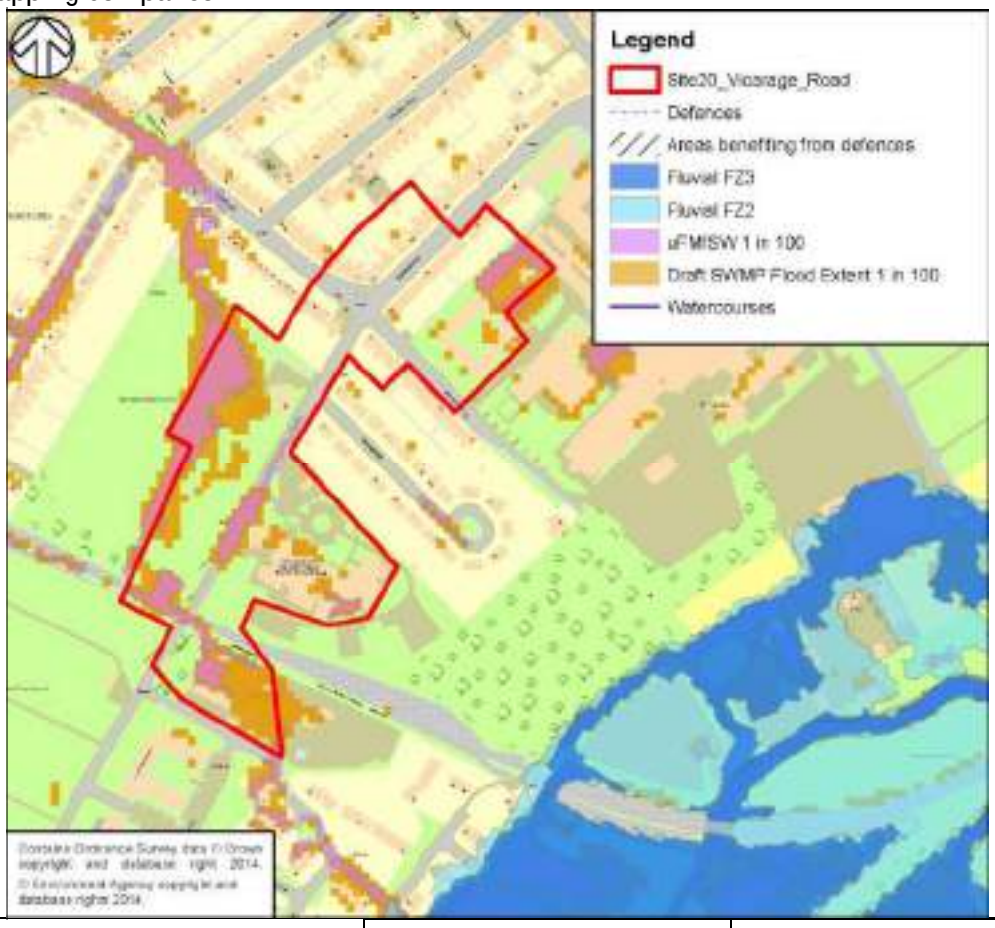
Comments continued	■ The properties fronting Queens Road are terraced with driveways located at higher than the road. Flood waters are therefore more likely to be directed either along the highway or through a local alleyway which leads to the recreational ground.
Proposed action	■ Bunding of the recreational ground could help reduce the flood waters discharging further south and towards the railway track which abuts the recreational area. ■ Gully maps for the area suggest additional gullies could be of benefit to intercept runoff from the roads. ■ A capacity study will need to be undertaken to ensure the increase in the number of gullies will not have an effect on capacity issues of the existing sewers.

Depth Mapping Comparison 1 in 30 year

Depth Mapping Comparison 1 in 100 year

SWMP	Watford
Site number	20
Site name	Vicarage Road

Flood Mapping Comparison



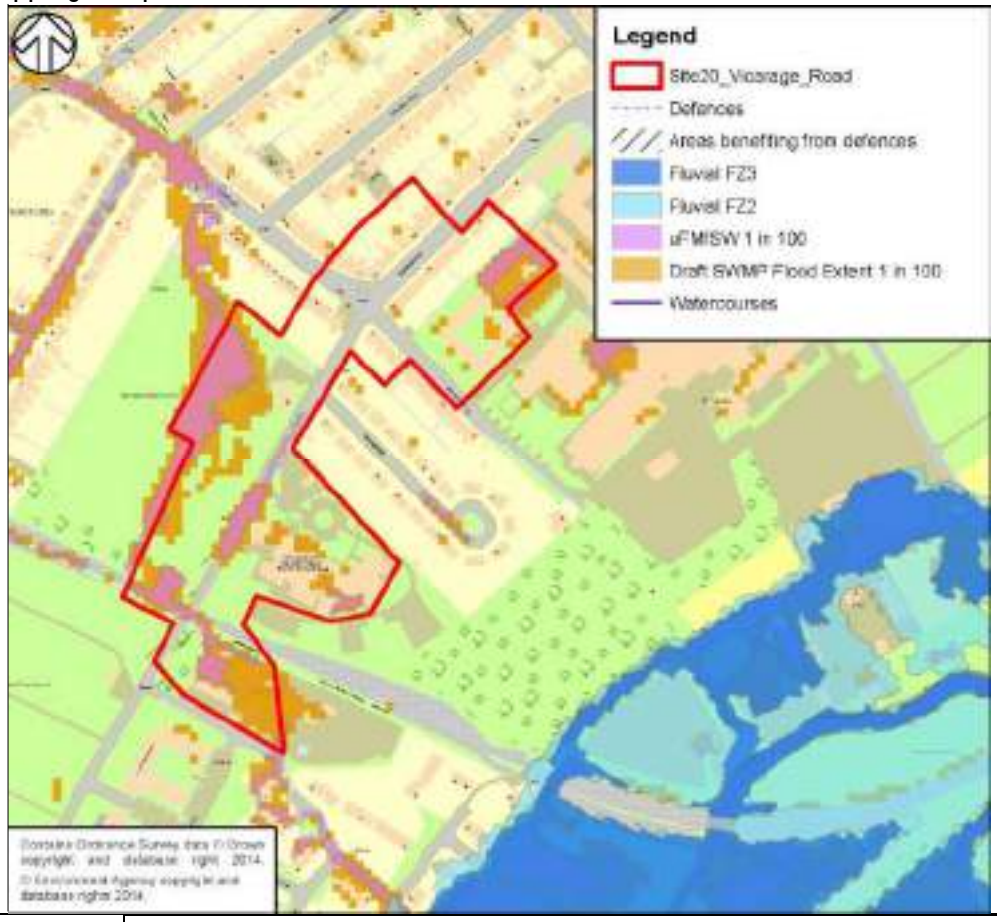
		30 year		100 year	
	Total	old	updated	old	updated
All properties	52	4	1	6	2
Critical infrastructure	0	0	0	0	0

Comments

- The draft SWMP reports of flooding along Vicarage Road, mainly between Queens Road and the railway bridge to the south. The predicted flooding illustrated on the latest FMfSW is shown along Vicarage Road, outside Laurence Hains School and within the recreation ground located behind the nursery school.
- According to Hertfordshire Highways the main issue is the flooding in the road. Gullies in the 'low spot' were previously connected to the grassed area adjacent to the road. The outfalls to these were damaged during the construction of the play area. The draft SWMP confirmed this has been repaired which has eased the situation.
- A review of the latest FMfSW and the Lidar data for the site would suggest flood waters would cut across Queens Road, through either resident's gardens or a local footpath, before falling towards the recreational area.

Comment Continued	
SWMP	Watford
Site number	20
Site name	Vicarage Road

Flood Mapping Comparison



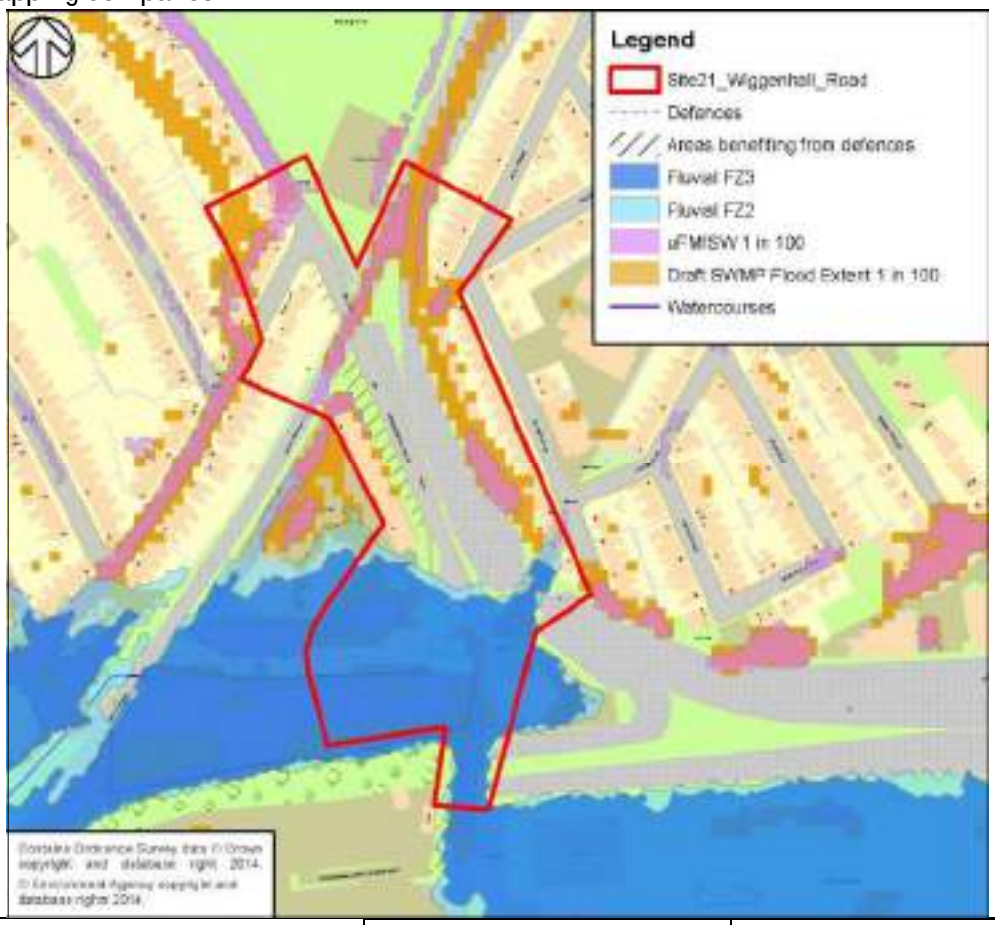
Comments continued	■ The properties fronting Queens Road are terraced with driveways located at higher than the road. Flood waters are therefore more likely to be directed either along the highway or through a local alleyway which leads to the recreational ground.
Proposed action	■ Bunding of the recreational ground could help reduce the flood waters discharging further south and towards the railway track which abuts the recreational area. ■ Gully maps for the area suggest additional gullies could be of benefit to intercept runoff from the roads. ■ A capacity study will need to be undertaken to ensure the increase in the number of gullies will not have an effect on capacity issues of the existing sewers.

Depth Mapping Comparison 1 in 30 year

Depth Mapping Comparison 1 in 100 year

SWMP	Watford District
Site number	21
Site name	Wiggenhall Road

Flood Mapping Comparison



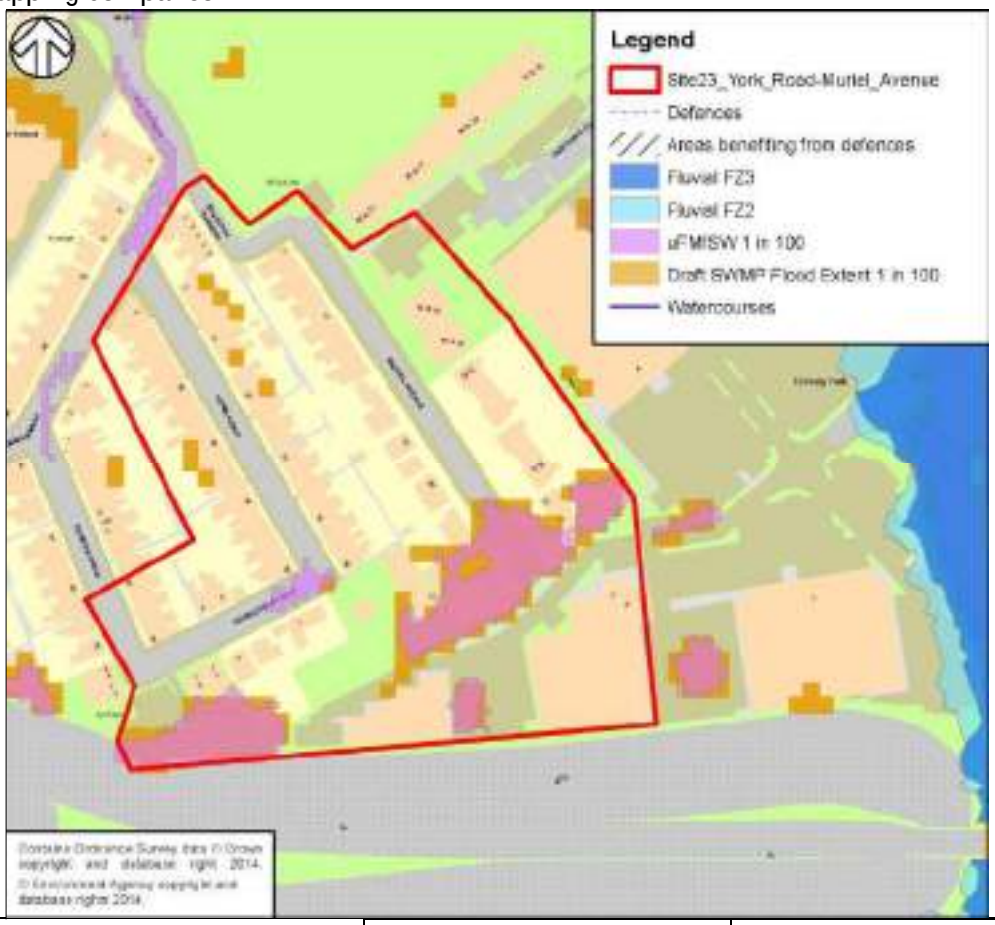
		30 year		100 year	
	Total	old	updated	old	updated
All properties	81	20	12	33	18
Critical infrastructure	0	0	0	0	0
Comments	■ As stated within the draft SWMP, the main predicted flooding in this area, is located at the rear of the properties which back onto Wiggenhall Road, by the railway embankment. ■ There are reports of flooding for Wiggenhall Road. ■ It is likely that any potential flooding could be caused by the railway embankment impeding the natural flow of water. ■ A review of the latest FMfSW show the southern part of the site also lays within a Flood Zone 3 extent and therefore this will have an impact on surface water flooding. ■ Further areas to the north and west of the site are shown within the Updated FMfSW as suffering from surface water flooding. ■ Flooding is likely to be as a result of surface water flow being surcharged due to the downstream outfall and its interaction with the watercourse.				
Proposed action	■ It is recommended that further studies be undertaken to determine a viable solution due to the interaction of the site with fluvial flooding.				

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	Watford District
Site number	23
Site name	York Road – Muriel Avenue

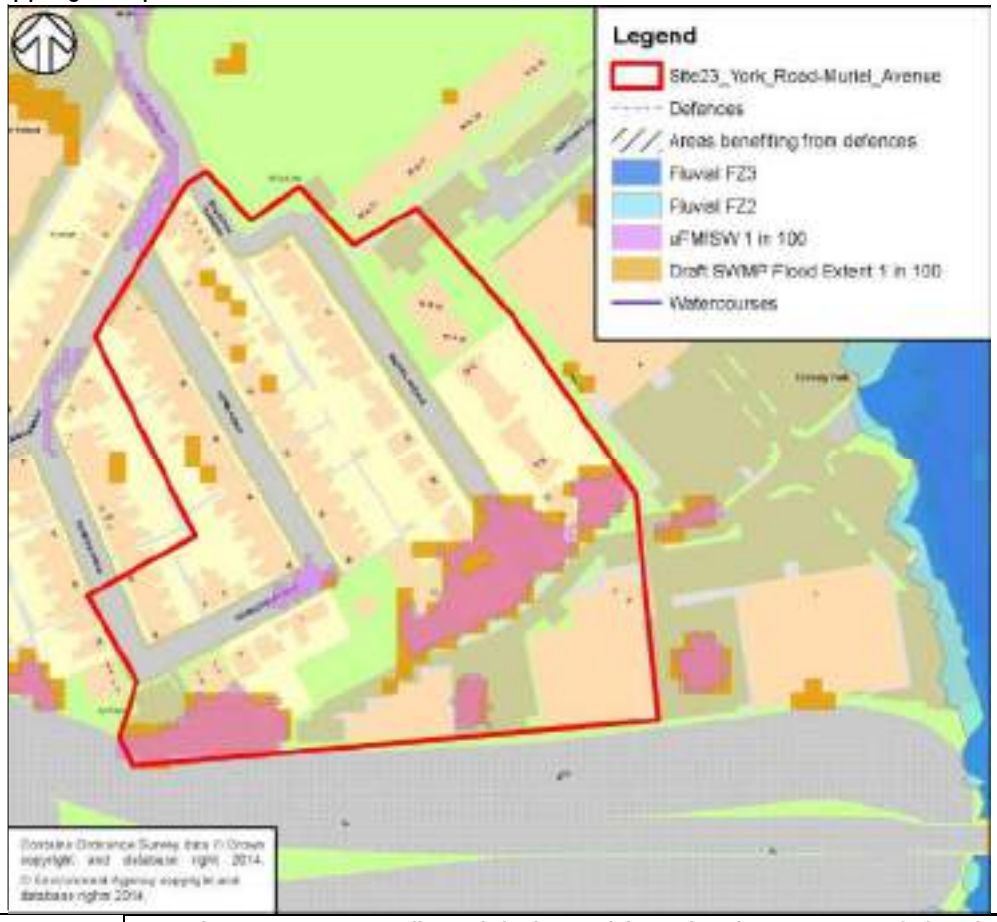
Flood Mapping Comparison



		30 year		100 year	
	Total	old	updated	old	updated
All properties	109	13	3	22	6
Critical infrastructure	0	0	0	0	0
Comments	■ The uFMfSW show flooding at a low spot within Muriel Avenue and York Road, which are bounded by commercial development. According to the draft SWMP there has been combined surface water and foul water flooding in this area and photographic evidence supplied by local residence were illustrated within the draft SWMP. ■ Lidar data confirm, levels fall from the north west to the south east of the site. A number of gullies are shown within the latest mapping to be located at the low point with little to no gullies located along the upstream catchment of Murial Avenue and York Road. ■ Sewer records for the area show Muriel Avenue with a 225mm dia foul sewer and a 225mm dia surface water sewer, these sewers discharge to a 1650mm dia foul sewer and a 750mm dia surface water sewer respectively. Thames Water confirmed, as part of the draft SWMP, flooding is likely to be as a result of an existing downstream 900mm outfall pipe which throttles to 375mm for the last 40m.				

Comment Continued	
SWMP	Watford District
Site number	23
Site name	York Road – Muriel Avenue

Flood Mapping Comparison



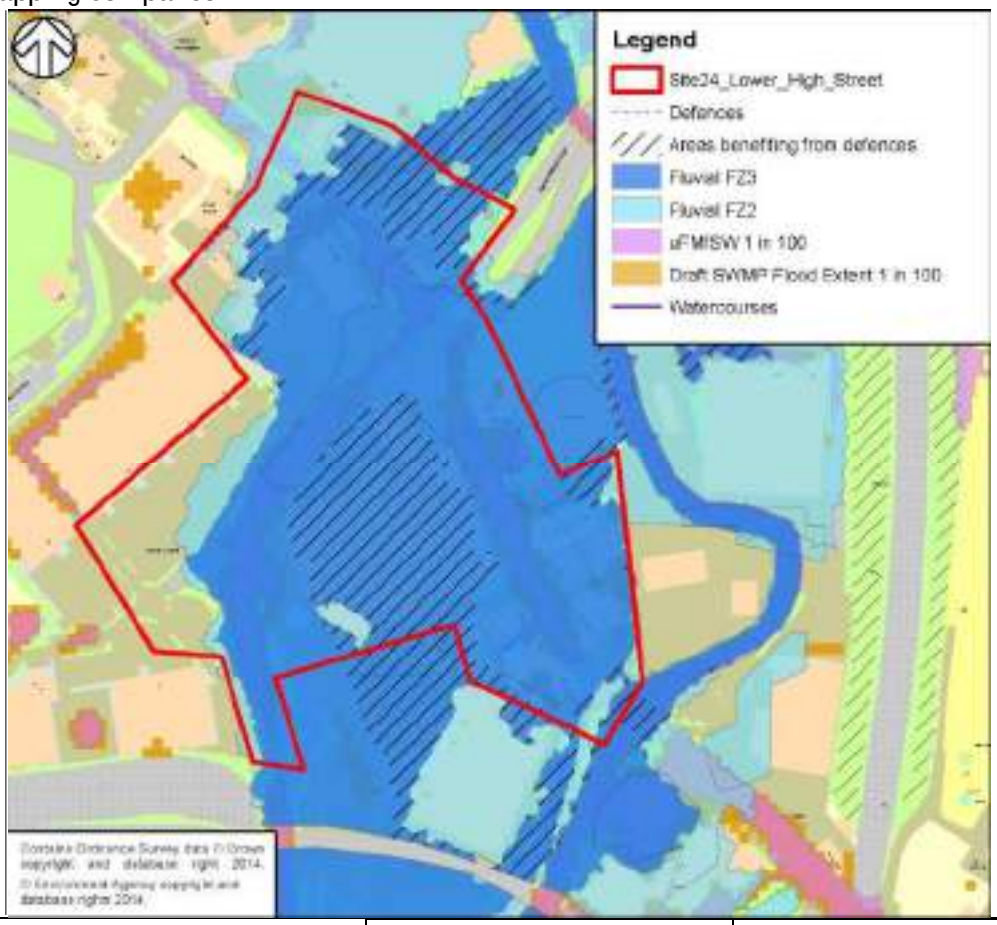
Comments continued	■ Thames Water confirmed during a visit to the site, as part of the draft SWMP review, that with properties not having been flooded the area is not a priority.
Proposed action	■ A review of the British Geological Survey mapping shows the road lies in an area underlain with Alluvium, consisting of gravels, sands, silts and clay. It is therefore possible that with the presence of silt and clay that infiltration will not be effective within the area. ■ Other potential mitigation measures such as installing additional upstream gullies to intercept runoff at source and viable downstream attenuation could provide an element of flood elevation to the area. This is subject to financing from Thames Water and a study to understand the storage necessary to alleviate the current flooding issues. ■ Recommend additional studies undertaken for this site to determine the most suitable mitigation.

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	Watford District
Site number	24
Site name	Lower High Street

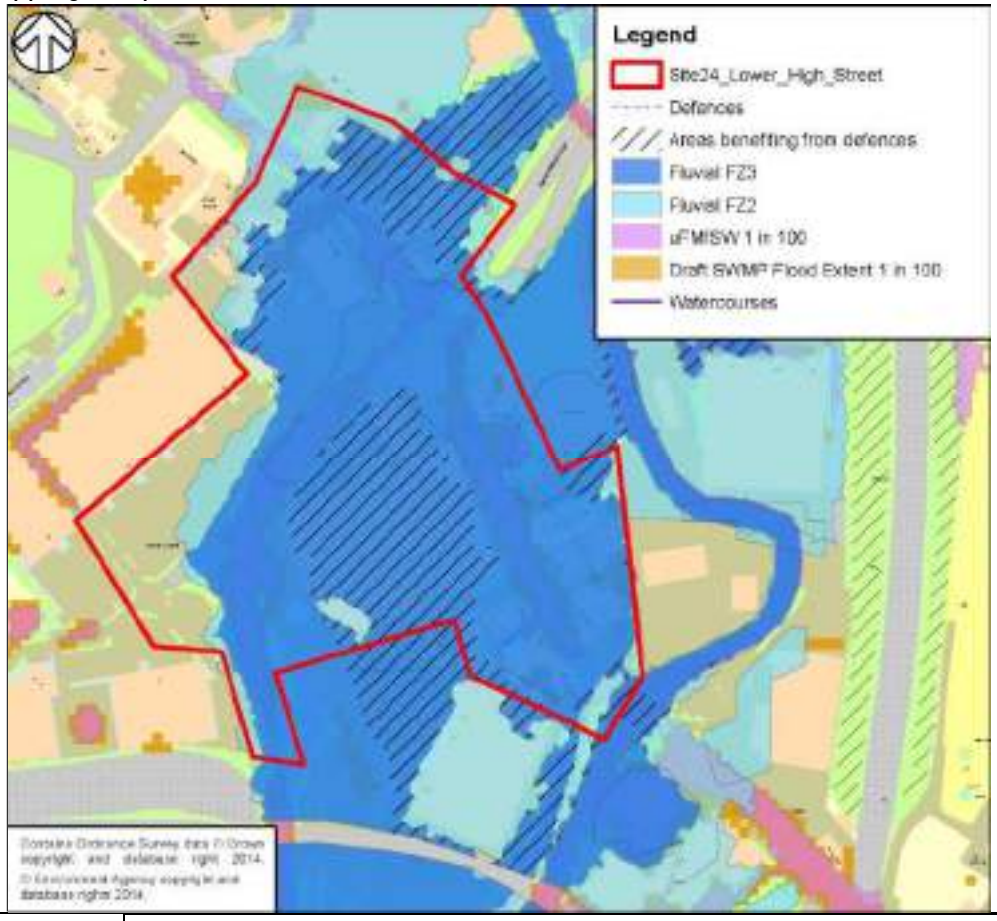
Flood Mapping Comparison



		30 year		100 year	
	Total	old	updated	old	updated
All properties	40	11	0	19	7
Critical infrastructure	0	0	0	0	0
Comments	■ This site is subject to surface water flooding due to surcharging of the River Colne. Stakeholders confirmed the disruption the flooding causes to local traffic and emergency services. Retailers within the area also suffer from regular flooding. ■ Lidar data shows the site is located in a low lying area and updated mapping illustrates the site is located within Flood Zones 2 and 3. ■ Capacity of the highway drainage system was improved in Lower High Street through the installation of a pump. However, this device is ineffective when the river levels are high. ■ A level 2 SFRA is currently being produced for the key development sites within Watford. One of the sites addressed within the SFRA is Lower High Street.				

Comment Continued	
SWMP	Watford District
Site number	24
Site name	Lower High Street

Flood Mapping Comparison



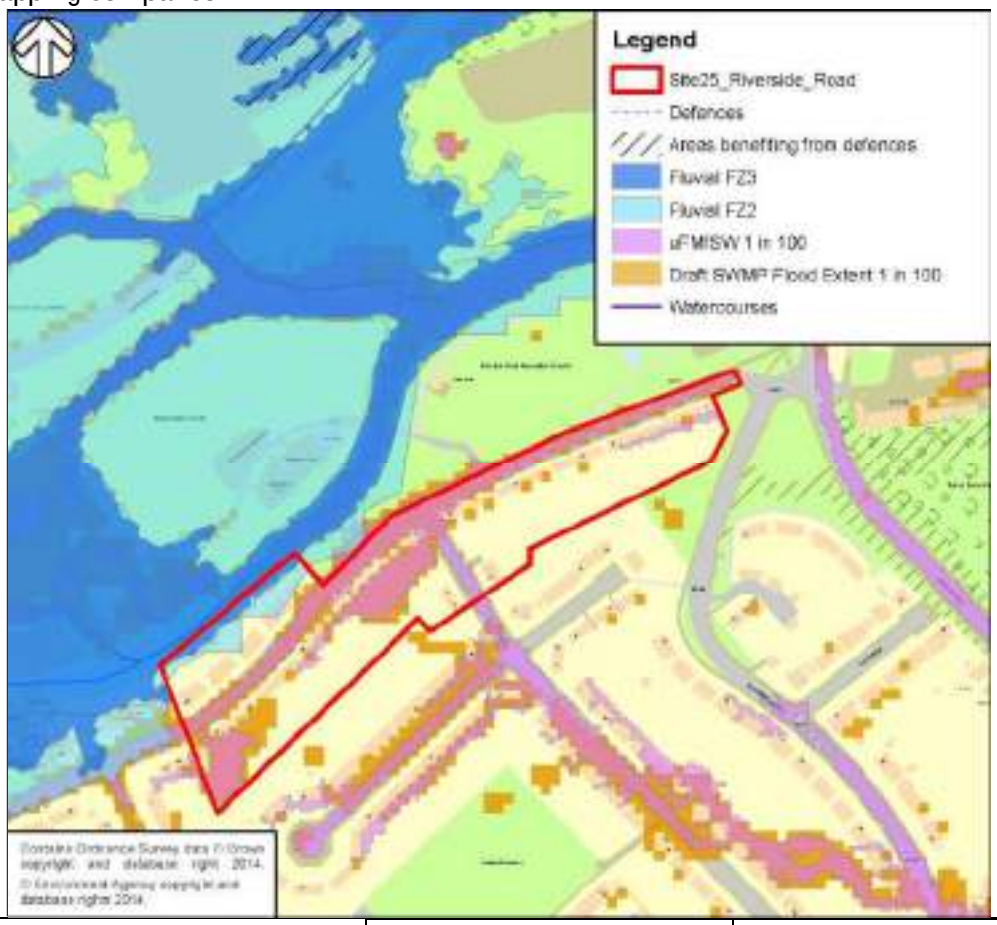
Proposed action	■ Due to the significant surface water flood risk associated with this area and its link to the River Colne it is therefore recommended that a feasibility study be undertaken to develop an integrated solution for the area.

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

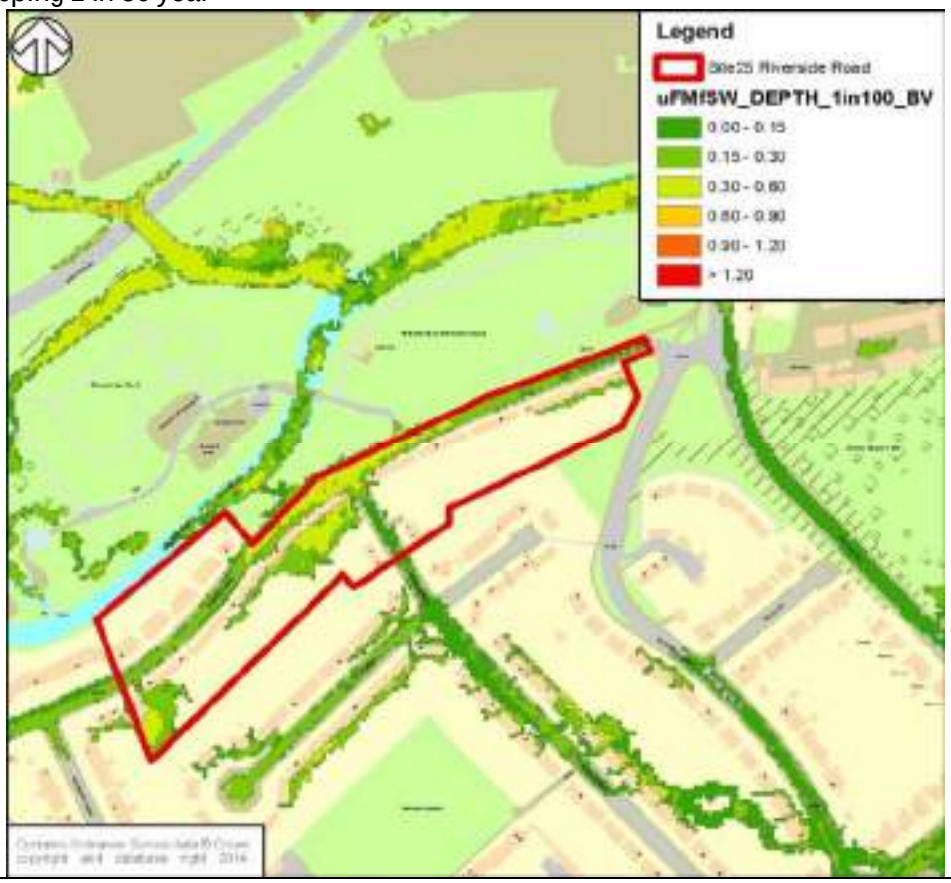
SWMP	Watford District
Site number	25
Site name	Riverside Road

Flood Mapping Comparison

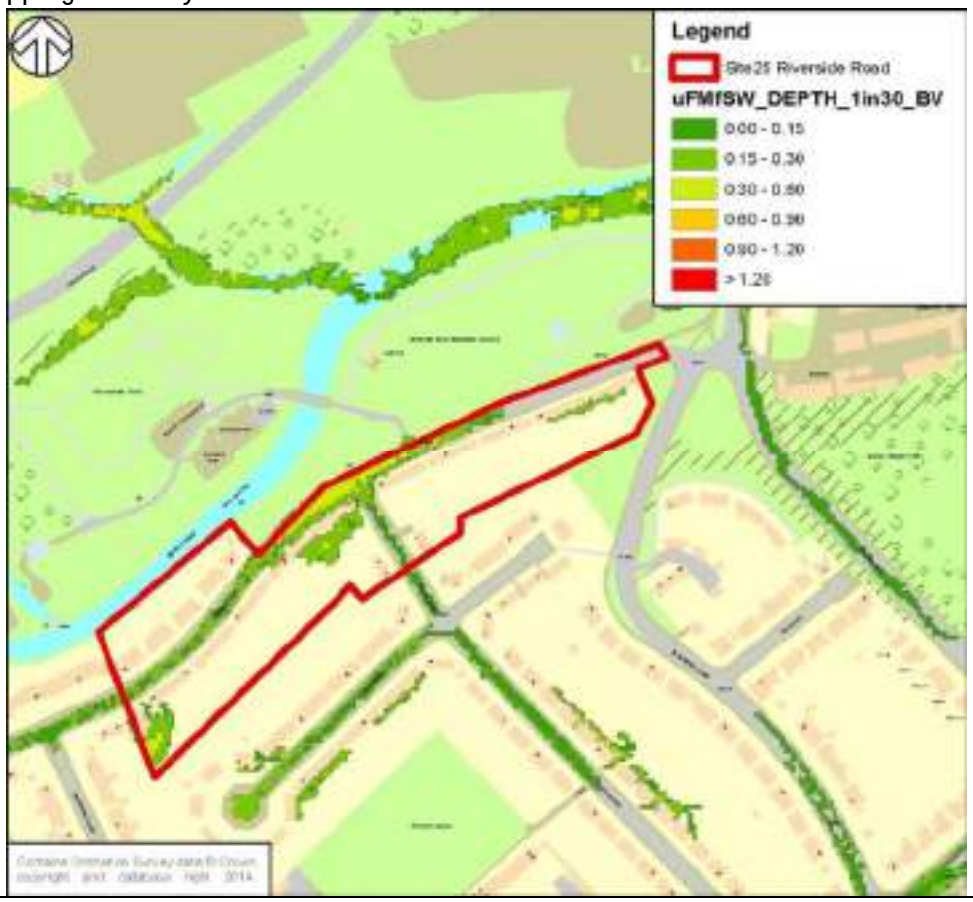


		30 year		100 year	
	Total	old	updated	old	updated
All properties	54	20	18	32	26
Critical infrastructure	0	0	0	0	0
Comments	■ Riverside is a relatively flat road lying adjacent to the river. Stakeholders have confirmed there have been reported flooding and the floods is likely as a result of its interaction with the floodplain. ■ There are two sluices on the river, upstream of the flooding location, which are both controlled by Watford BC. The purpose of the sluices is to control the level of the river and prevent flooding within the local area. The sluices are operated manually and the operating regime is based on the experience of the operator.				
Proposed action	■ The recommendation of the draft SWMP was for installation of an automated system to control the sluices or the construction of a 2 stage weir. In either case detailed modelling will be required to determine the control settings. ■ Any study is recommended to be combined with Study area 26 due to the proximity of this site and it forming part of the upper catchment to Site 25.				

Depth Mapping 1 in 30 year

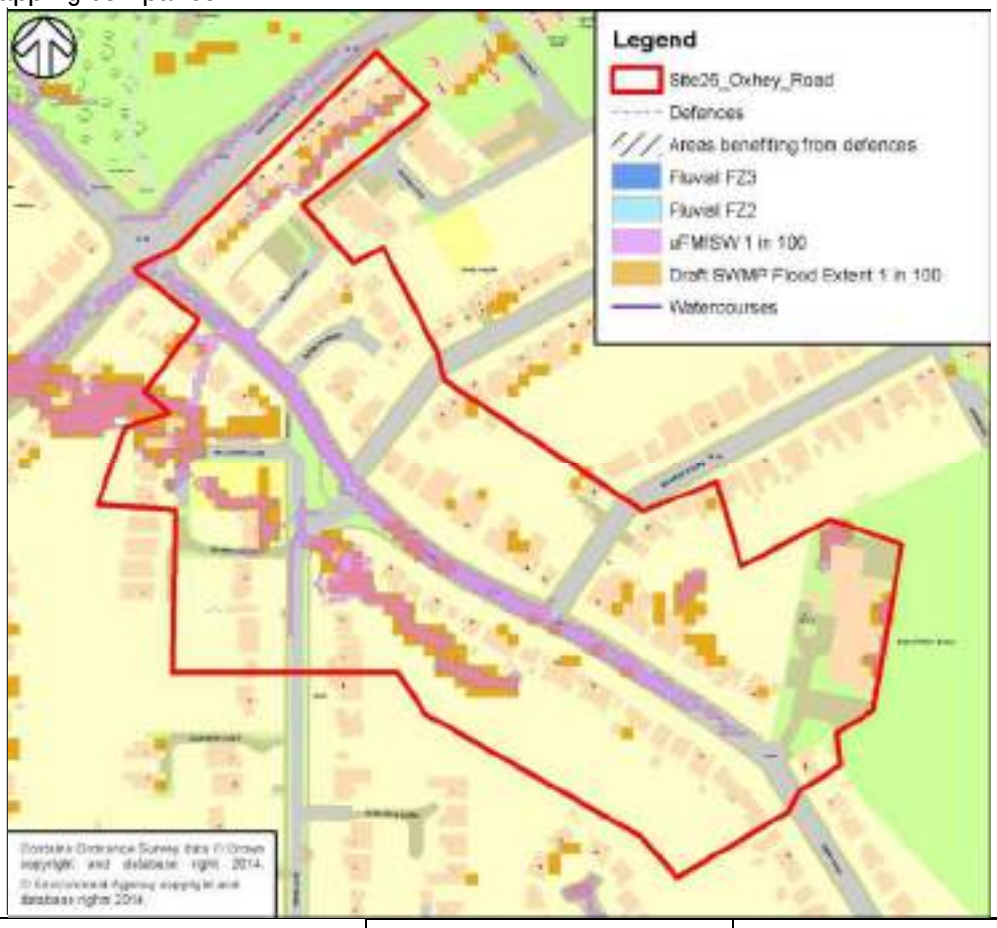


Depth Mapping 1 in 100 year



SWMP	Watford District
Site number	26
Site name	Oxhey Road

Flood Mapping Comparison



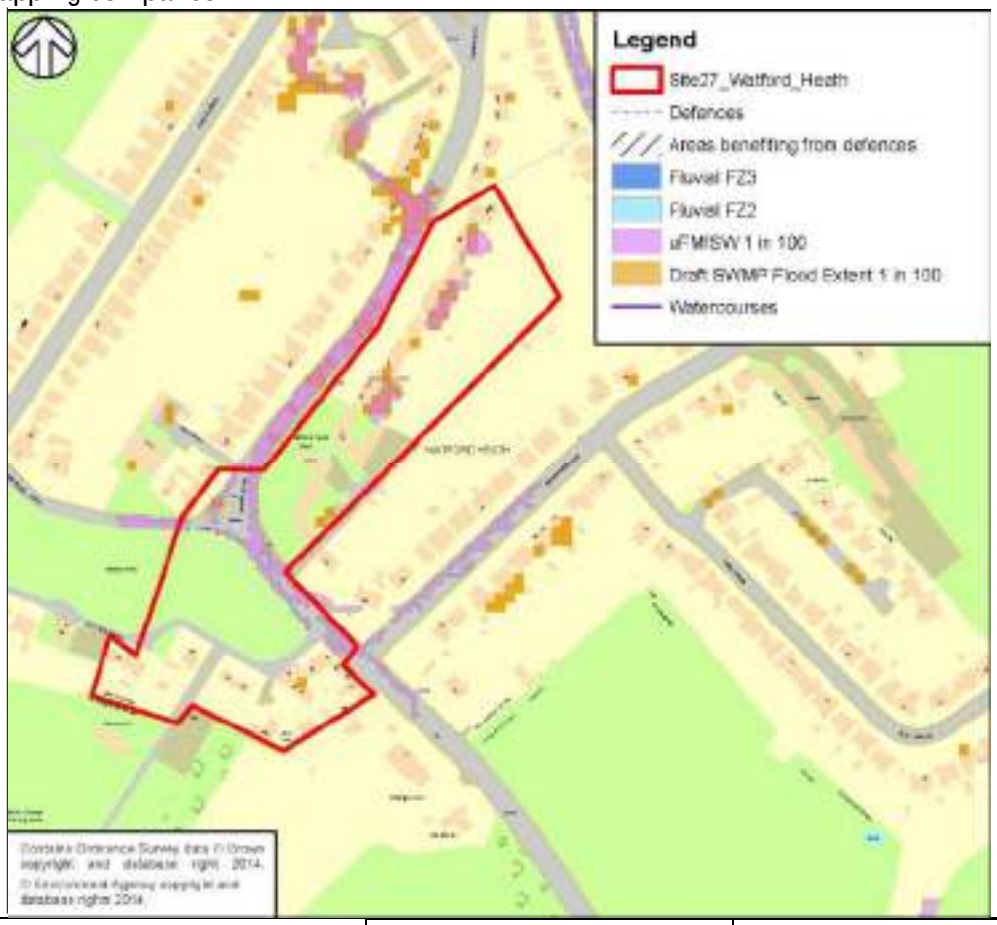
	Total	30 year		100 year	
		old	updated	old	updated
All properties	93	41	12	48	23
Critical infrastructure	0	0	0	0	0
Comments	■ According to the draft SWMP flooding has been reported within this area although no properties were reported to have flooded. Greater depths were concentrated at a low spot on the corner of Green Lane and Hollybush Close. ■ Surface water and foul water drainage within the Oxhey Road and Green Lane are illustrated within the Thames Water asset plans as being 225mm diameter. The sewers merge at the corner of Oxhey Road and Green Lane to a single sewer which is listed as 225mm in diameter.				
Proposed action	■ The site forms part of the upper catchment discharging to Study area 25 and therefore it is recommended for the study proposed for Site 25 to be extended to incorporate Site 26.				

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	Watford District
Site number	27
Site name	Watford Heath

Flood Mapping Comparison



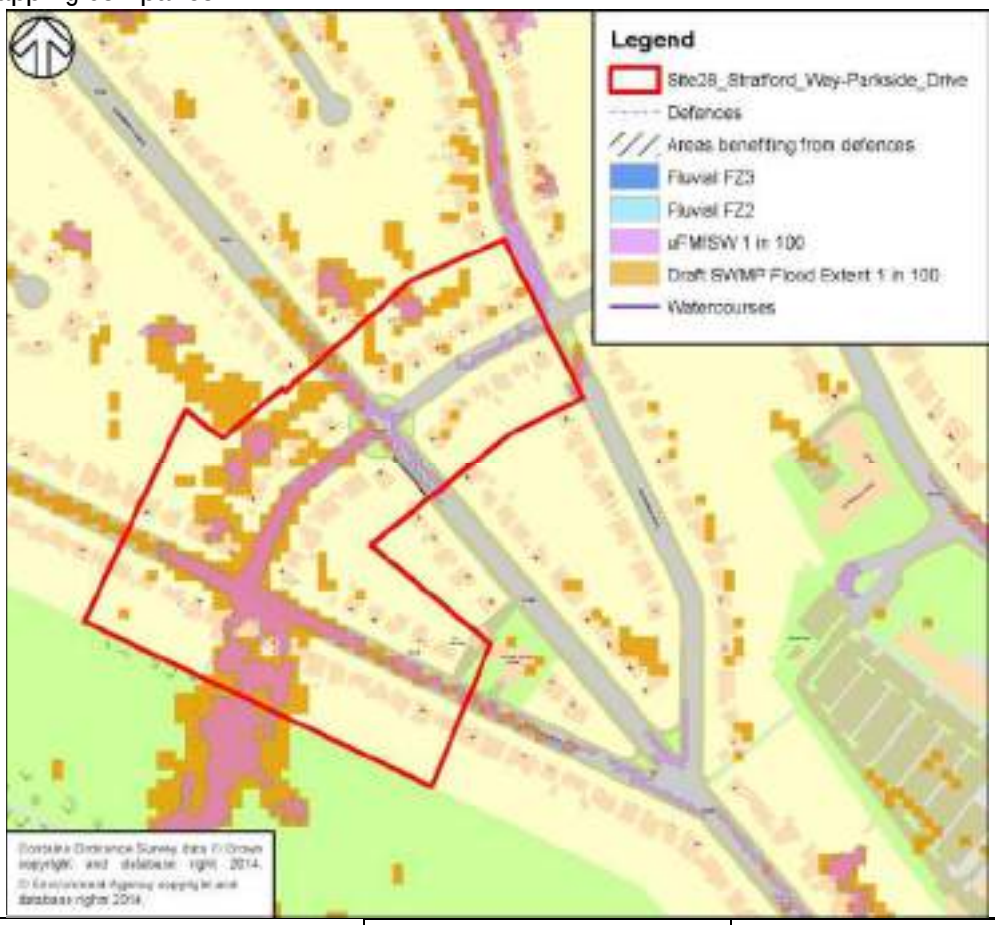
		30 year		100 year	
	Total	old	updated	old	updated
All properties	31	9	6	12	6
Critical infrastructure	0	0	0	0	0
Comments	■ Reported flood incidents were listed within the draft SWMP. This was confirmed at the stakeholder meeting where it was also confirmed as localised flooding. ■ The draft SWMP highlighted poor gully provision within the areas reported to have flooded and tree root ingress of the highway which would have caused undulations within the surface and contributed to the flooding issues.				
Proposed action	■ Stakeholders agreed to the conclusion of the draft SWMP, for additional gully provision to help alleviate current flooding issues. ■ Any additional gully provision needs to ensure there is sufficient capacity within the sewer network to accommodate additional flows.				

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	Watford District
Site number	28
Site name	Stratford Way – Parkside Drive

Flood Mapping Comparison



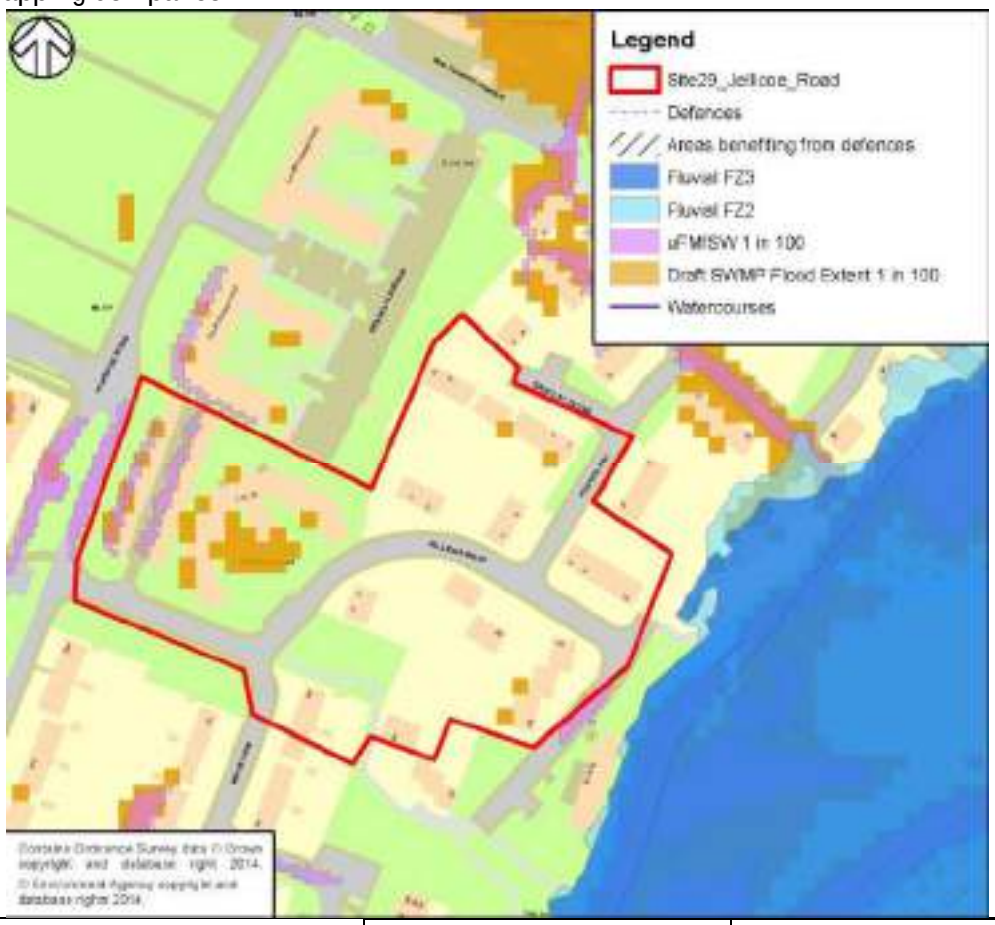
		30 year		100 year	
	Total	old	updated	old	updated
All properties	54	13	2	21	6
Critical infrastructure	0	0	0	0	0
Comments	■ Flooding has been reported within the draft SWMP and was deemed as a result of overland flow routes, with capacity issues of the local sewers. Thames Water responded they are not aware of there being any serious drainage issues within the area.				
Proposed action	■ The conclusion of the draft SWMP was to regrade the road junction to channel any flood water away from properties and direct flood waters along the alley way to the recreational ground to the south. ■ Stakeholders agreed to the recommendations listed within the draft SWMP. ■ Lidar data for the area confirms the findings of the draft SWMP. However, the reprofiling of the junction will be subject to Safe Road safety audit and cannot cause a detriment to road users.				

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	Watford District
Site number	29
Site name	Jelicoe Road

Depth Mapping Comparison



		30 year		100 year	
	Total	old	updated	old	updated
All properties	35	7	0	7	0
Critical infrastructure	0	0	0	0	0
Comments	■ Jellicoe Road slopes steeply from the east to west, towards properties located adjacent to a ditch, which the draft SWMP believes is a bypass for the river. ■ This area is in hydraulic connectivity with the upstream sluice detailed for Site 25. ■ Evidence compiled as part of the draft SWMP was of inadequate drainage located with private parking areas which could contribute to the flooding within the area. ■ Some localised flood resilience measures were recommended for the 'low lying' properties.				
Proposed action	■ Mitigation proposals within the draft SWMP were for works within third party land and flood resilience measures for low lying properties. Stakeholders agreed to the proposals subject to approval from third parties.				

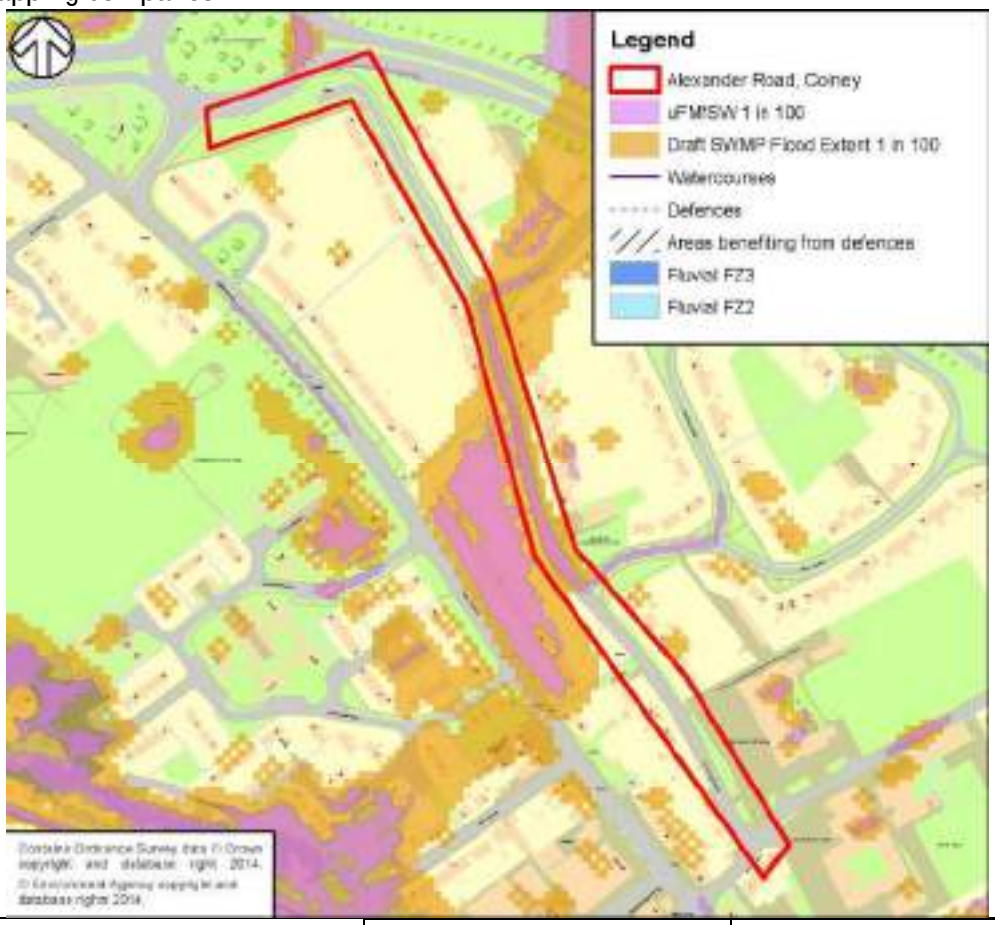
Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

St Albans Sites

SWMP	St Albans District – London Colney
Site number	Stakeholder Promoted Site
Site name	Alexander Road

Flood Mapping Comparison



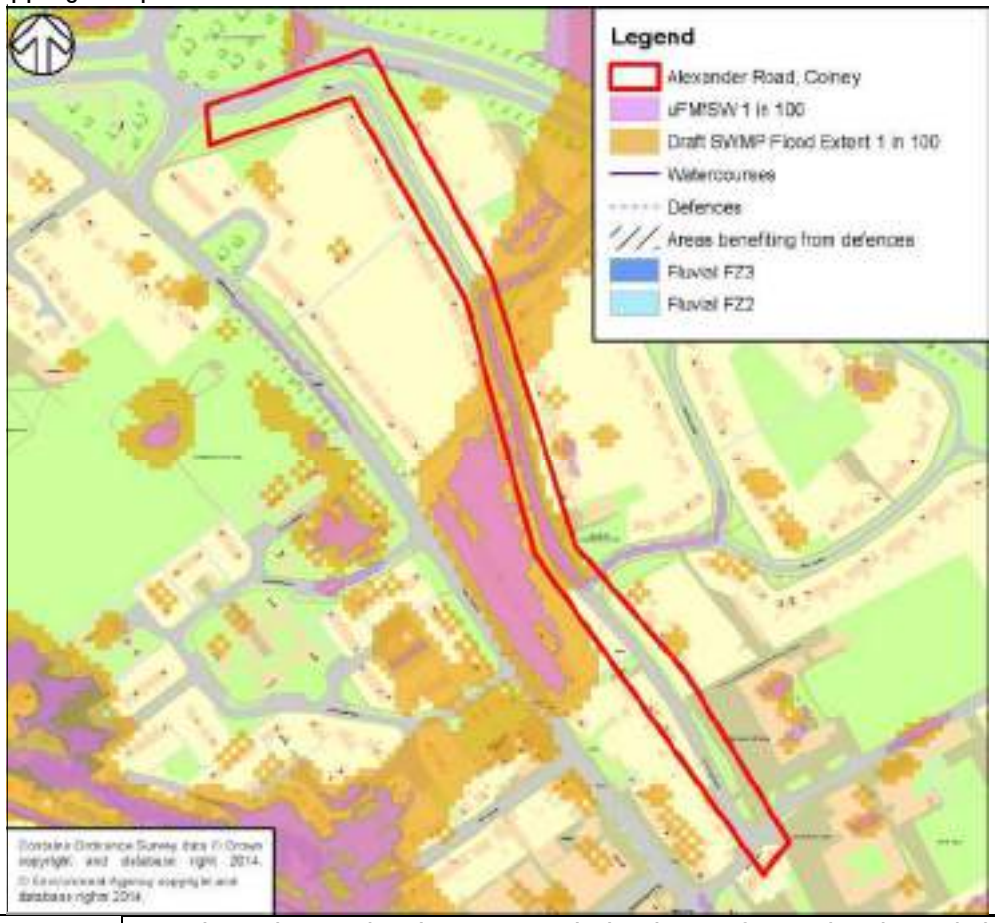
	Total	30 year old	30 year updated	100 year old	100 year updated
All properties	26	4	3	6	4
Critical infrastructure	0	0	0	0	0

Comments

- The site is located within a low lying area with a surrounding rural and part urban catchment. The A1081 is located in cutting to the north and east of the site, this road is therefore likely to intercept any overland flow routes from the eastern rural catchment.
- SADC requested the site be linked to Site 27 review and as a priority site for the SWMP due to the emergency services not be able to access the local High Street when the highway floods.
- Thames Water Sewer records show a 225mm diameter foul sewer only located within the High Street and surface water sewers located within Alexander Road. It was confirmed in the Stakeholder meeting a combined sewer is located within the vicinity of the site which may account for the lack of information on the surface water drainage arrangements.

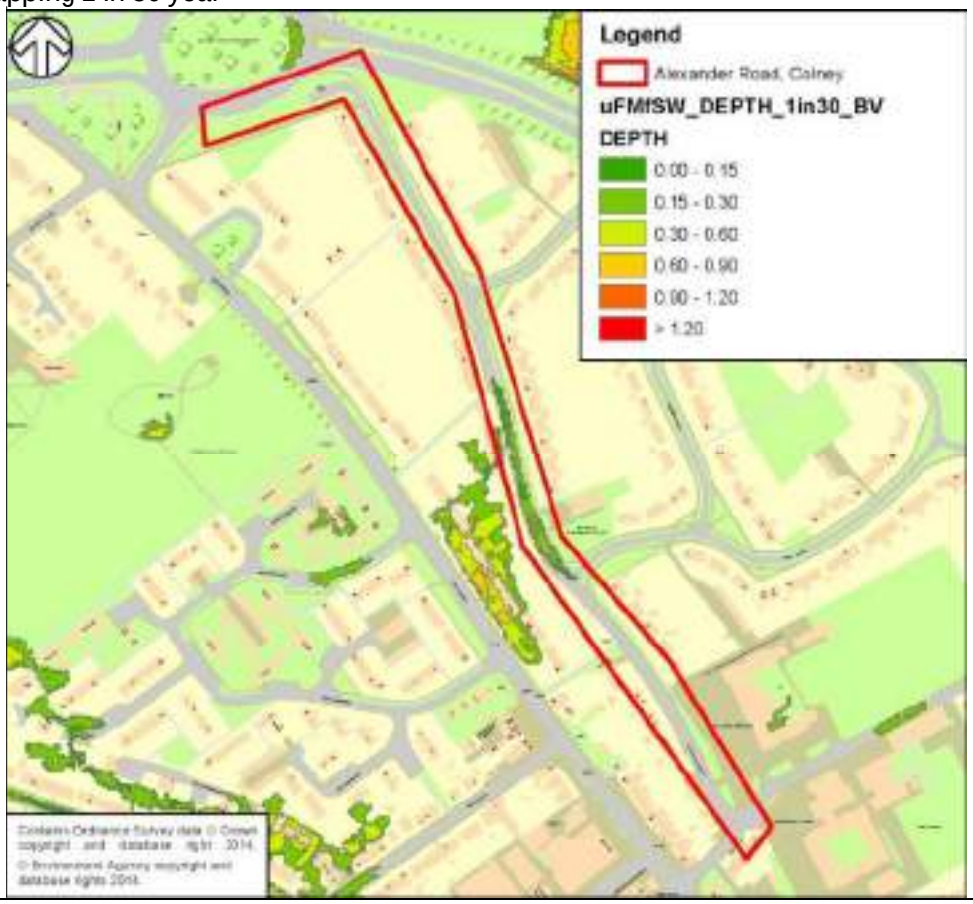
Comment Continued	
SWMP	St Albans District – London Colney
Site number	Stakeholder Promoted Site
Site name	Alexander Road

Flood Mapping Comparison

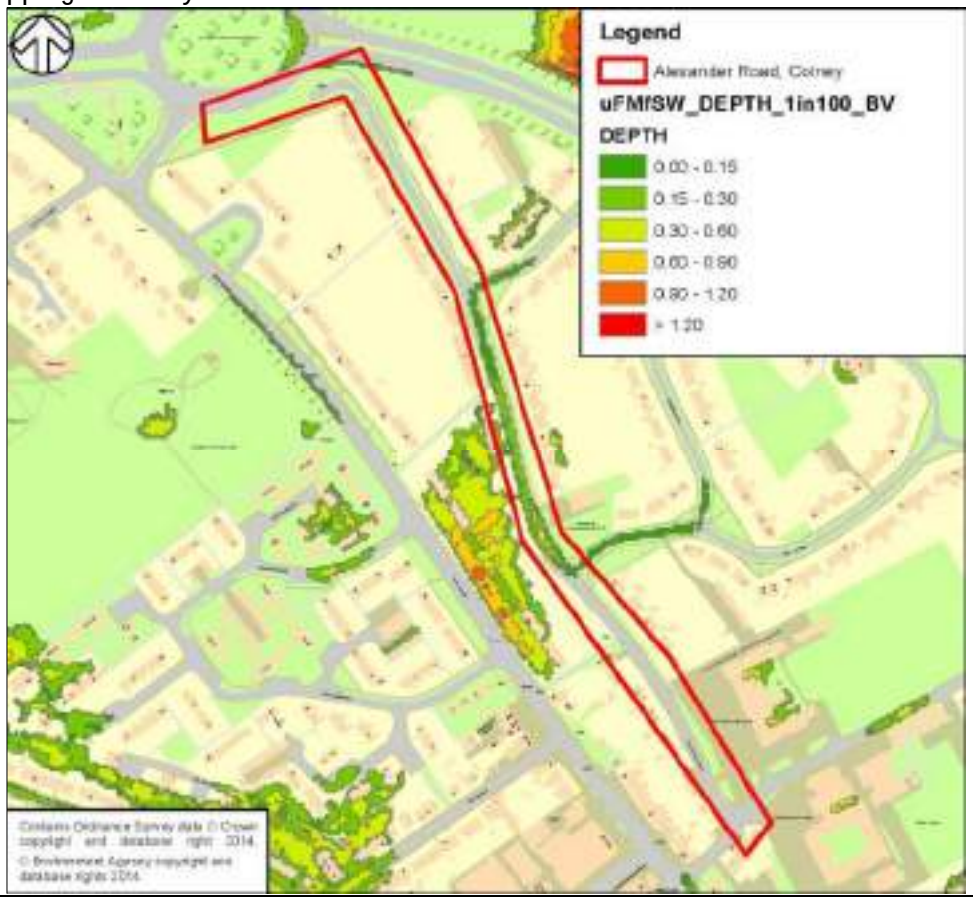


Proposed action	■ Alexander Road, Colney was a priority site put forward at the Stakeholder meeting for the SWMP. ■ The most feasible solution would be for a Thames Water study to be undertaken to determine any capacity issues within the local network. It is unlikely flooding of the highway is directly affected by any upper rural catchment due the interception of overland flows from the A1081 which is in cutting. ■ The study should combine the Site of 27 High Street, London Colney.

Depth Mapping 1 in 30 year

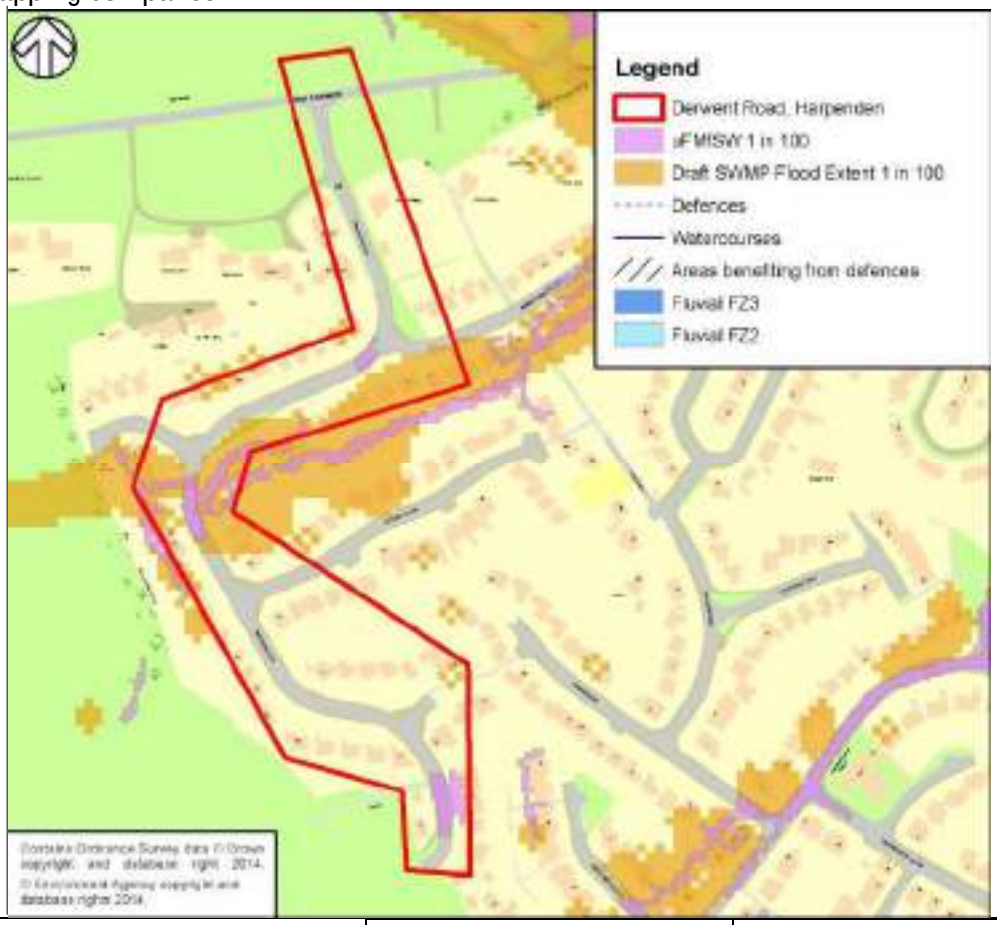


Depth Mapping 1 in 100 year



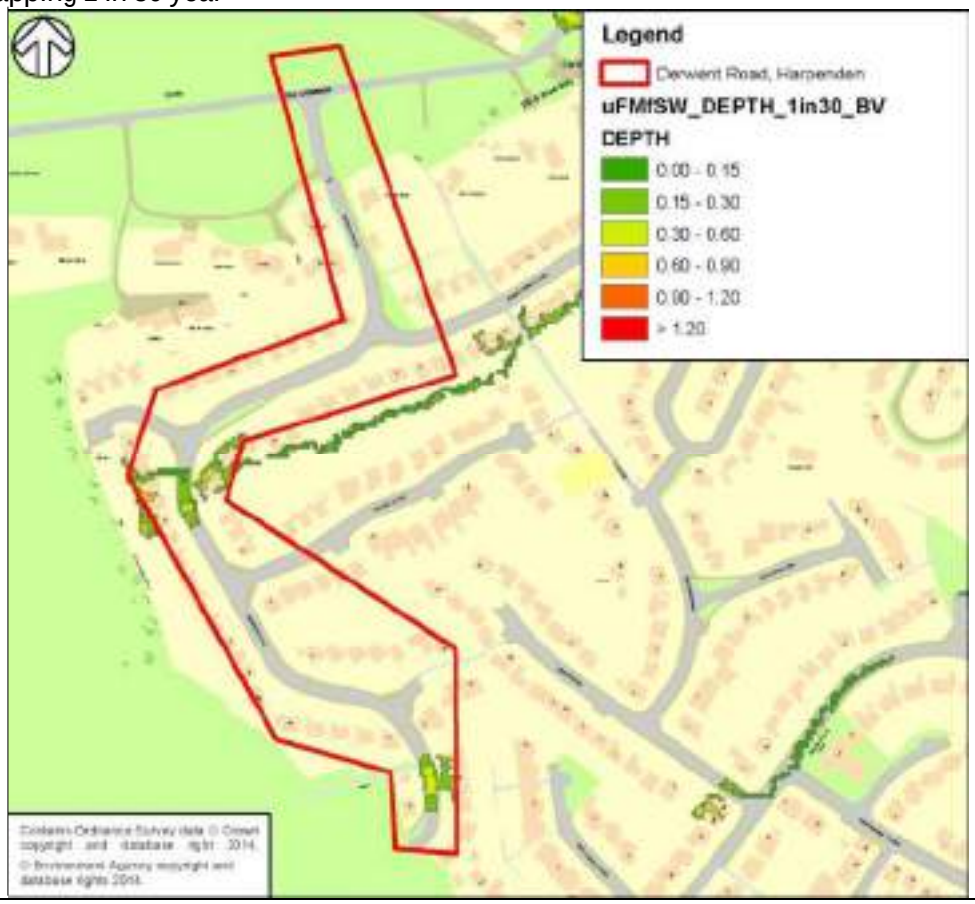
SWMP	St Albans District - Harpenden
Site number	Stakeholder promoted site
Site name	Derwent Road

Flood Mapping Comparison

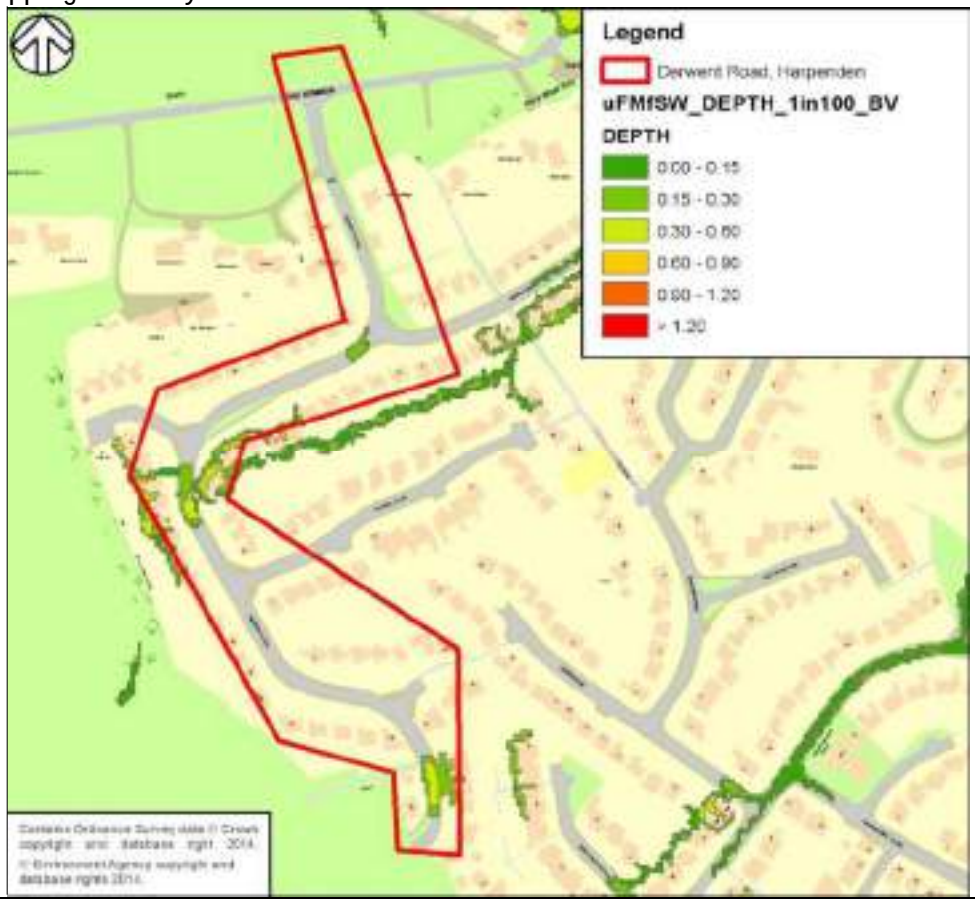


	Total	30 year		100 year	
		old	updated	old	updated
All properties	66	30	12	32	16
Critical infrastructure	0	0	0	0	0
Comments	■ Site promoted through the Stakeholder meeting as potential priority site and to be included within the emerging SWMP update. ■ The site also forms part of upstream areas for Sites 1 to 5 of the priority sites. ■ Rural runoff from local fields directed to this road.				
Proposed action	■ Sites 1 to 5 of the draft SWMP are one of the priority sites selected. These are located down stream of Derwent Road. ■ Mitigation solutions for Derwent Road are to be included within the solutions for the priority sites of 1 to 5, Harpenden ■ Mitigation solutions such as bunding along the fields and infiltration SuDS features should be investigated as part of the mitigation solutions.				

Depth Mapping 1 in 30 year

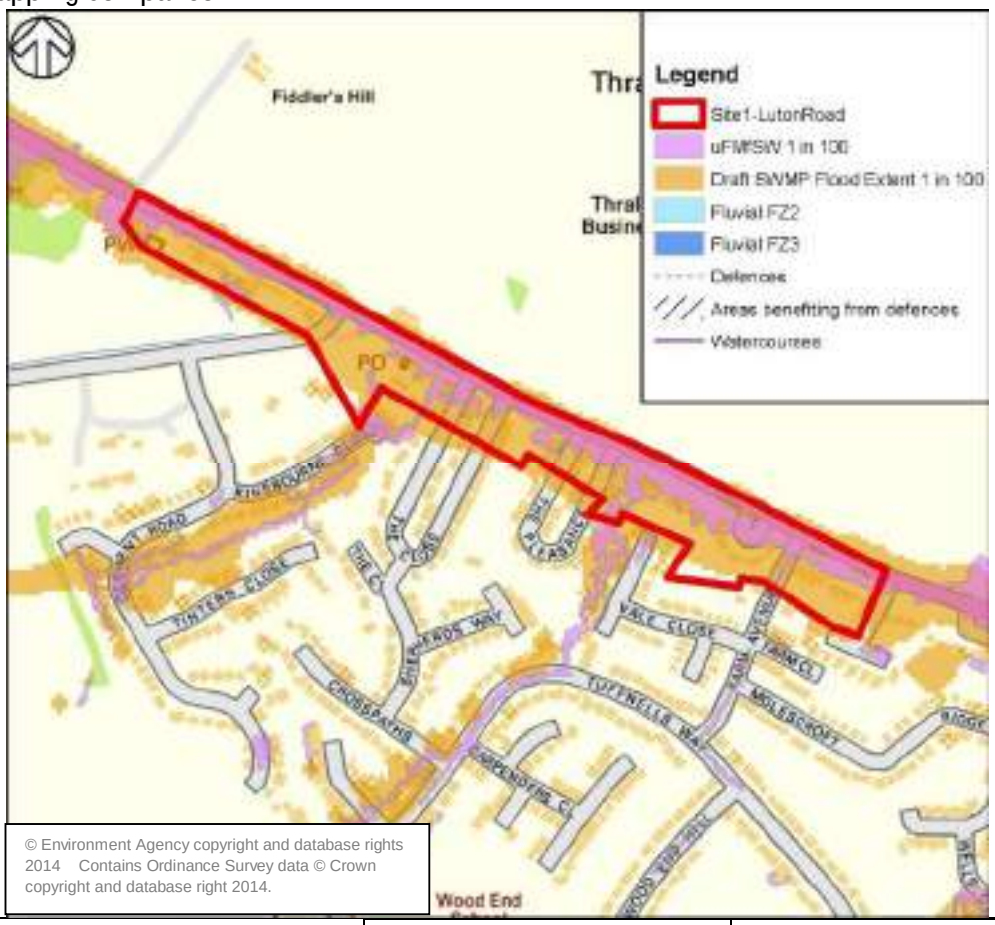


Depth Mapping 1 in 100 year



SWMP	St Albans
Site number	1
Site name	Luton Road

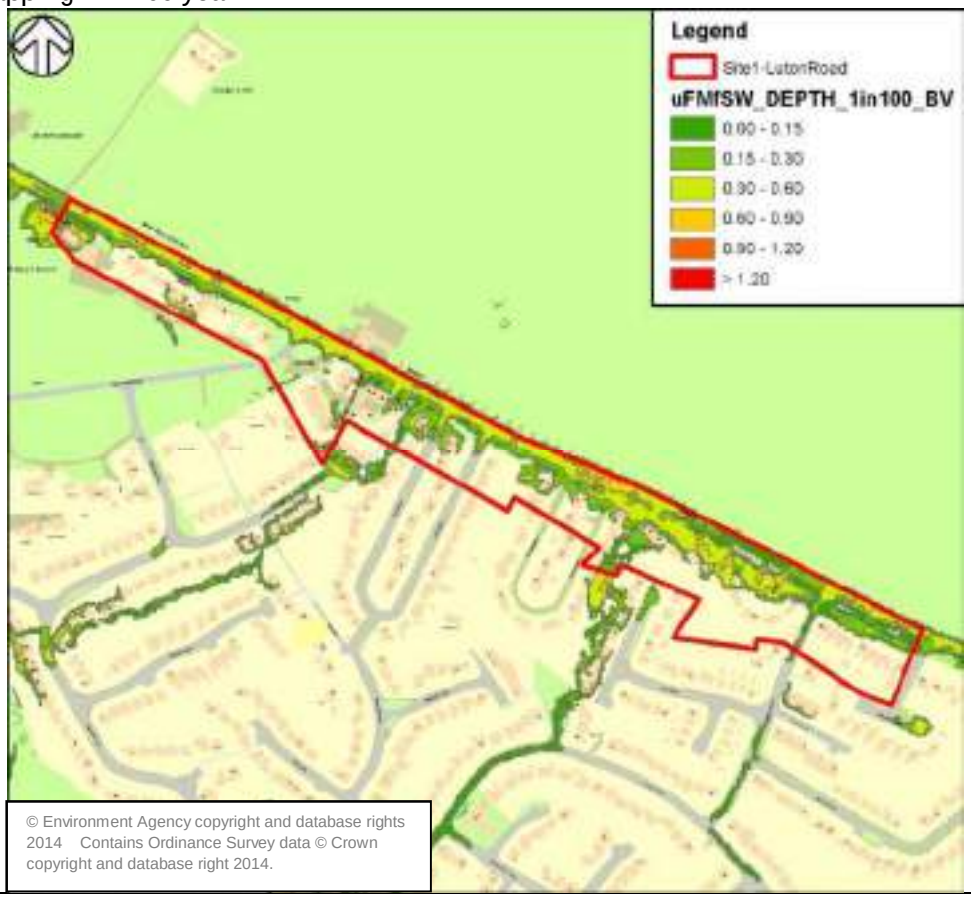
Flood Mapping Comparison



		30 year		100 year	
	Total	old	updated	old	updated
All properties	67	64	15	67	28
Critical infrastructure					
Comments	■ Incorporates two specific areas, subject to historical flood reports. ■ The proposed solution for this site is to collect field runoff to the north of the area in a swale running along the bottom of the field to a new detention pond, located in the field just upstream of the problem area. It may also be possible to use the swale as an overflow structure if the highway drainage becomes overloaded. The detention pond would have a restricted outlet back into the highway drainage downstream but have capacity to retain a 30 year design storm, which based on the modeling would require a volume of approximately 26,000m^3.				
Proposed action	■ Incorporate filter drains within the verges either side of Luton Road. ■ Locate depressions in the large verged areas situated within the highway land, situated on the southern edge of Luton Road. Control the land drainage rates into local highway drainage or via infiltration. OS maps show river terrace deposits (gravels and sands) possible within this locality (subject to infiltration tests to BRE 365, groundwater levels and aquifer protection).				

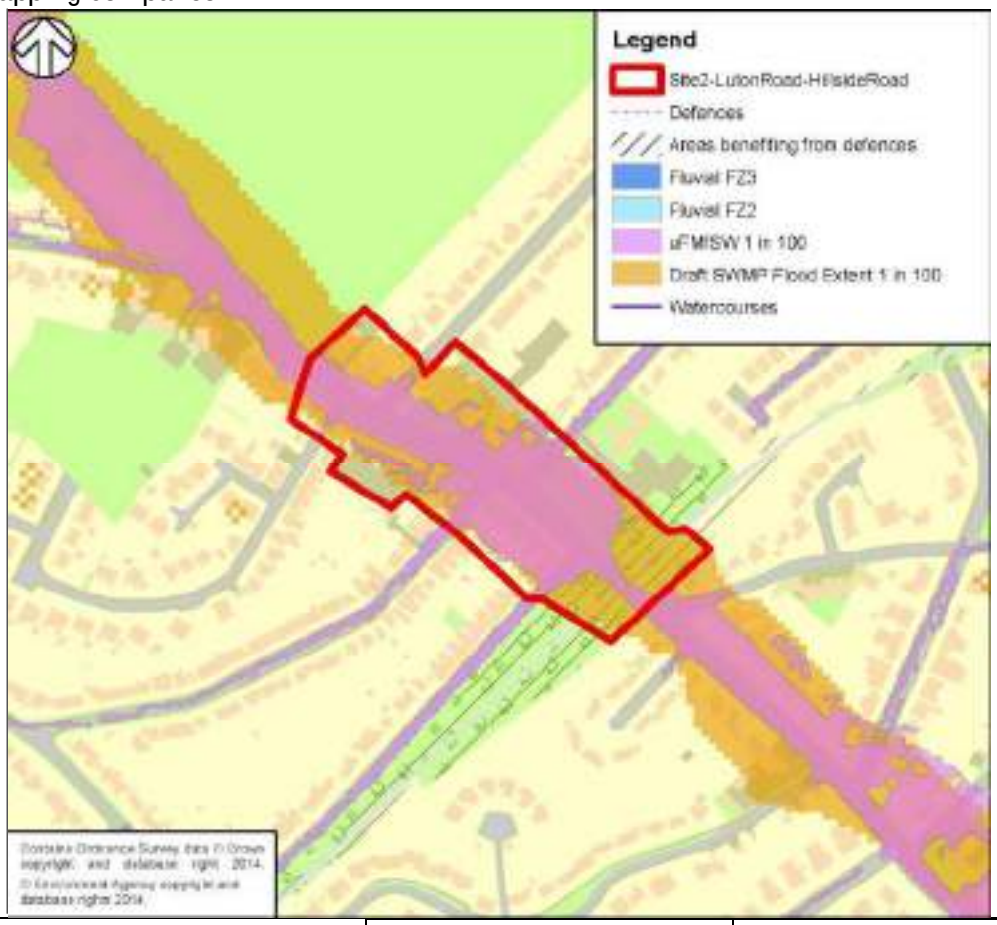
Depth Mapping 1 in 30 Year

Depth Mapping 1 in 100 year



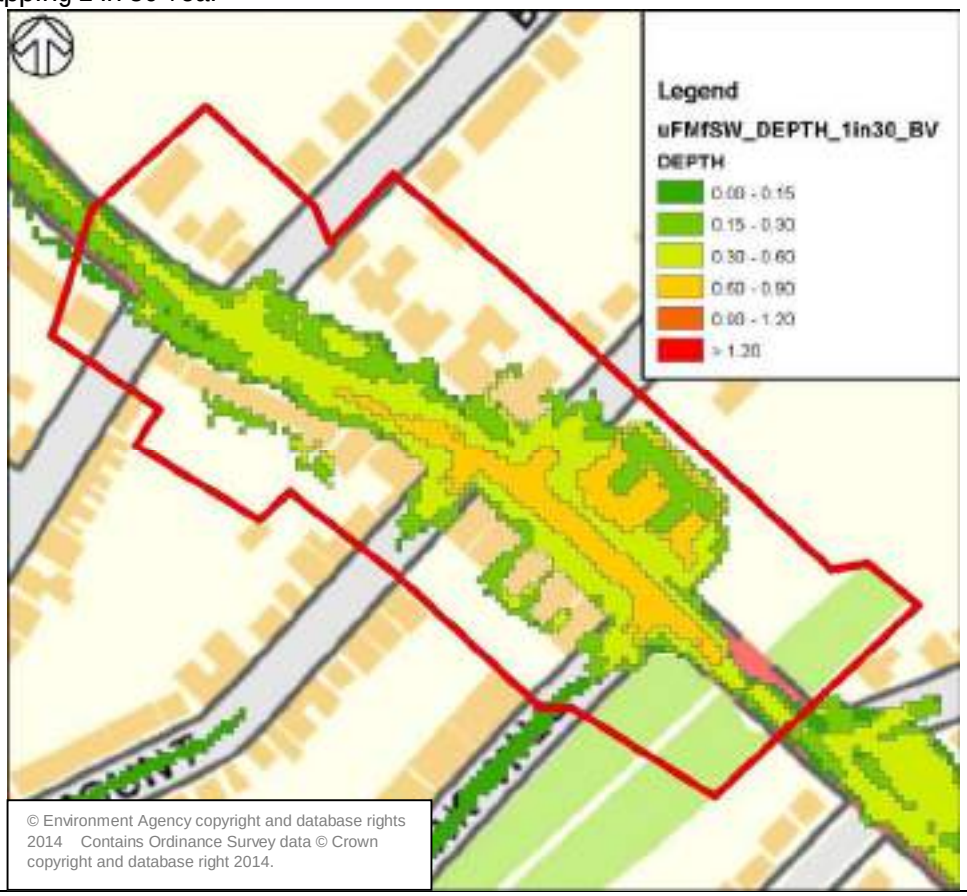
SWMP	St Albans District - Harpenden
Site number	2
Site name	Luton Road – Hillside Road

Flood Mapping Comparison

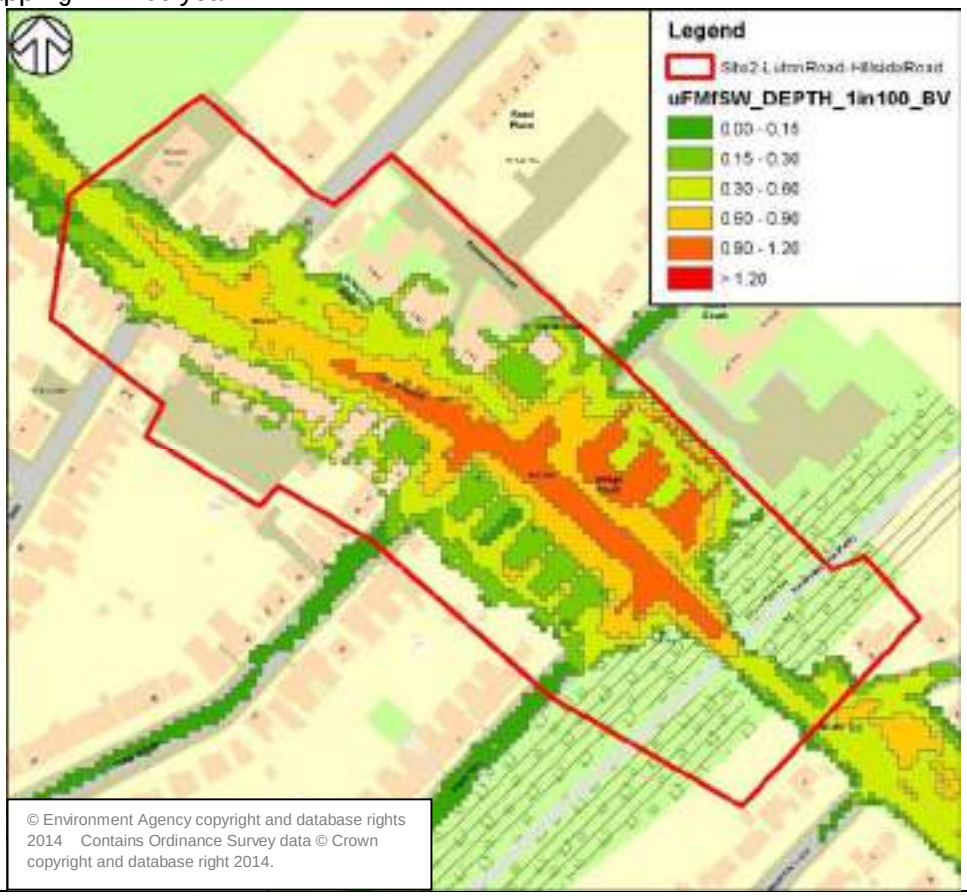


		30 year		100 year	
	Total	old	updated	old	updated
All properties	50	49	28	49	44
Critical infrastructure	0	0	0	0	0
Comments	■ As with Site 1, the road is located within a valley with a contributing urban and rural catchment. ■ The proposed solution for this site along the southern edge of the field to collect rural runoff, draining to a pond (1.4 ha in size) in the corner of a field located upstream of the predicted flooding area (similar to Site 1). ■ Culvert mentioned within draft SWMP for sites located downstream.				
Proposed action	■ It is recommended with the SWMP update that the site be extended and linked with Sites 1, 3 and 5 to ensure a combined mitigation solution is investigated. ■ Further detailed studies will be required to determine the most viable drainage solutions for the area. ■ Recommend a survey of possible culvert and local drainage network as part of further studies.				

Depth Mapping 1 in 30 Year

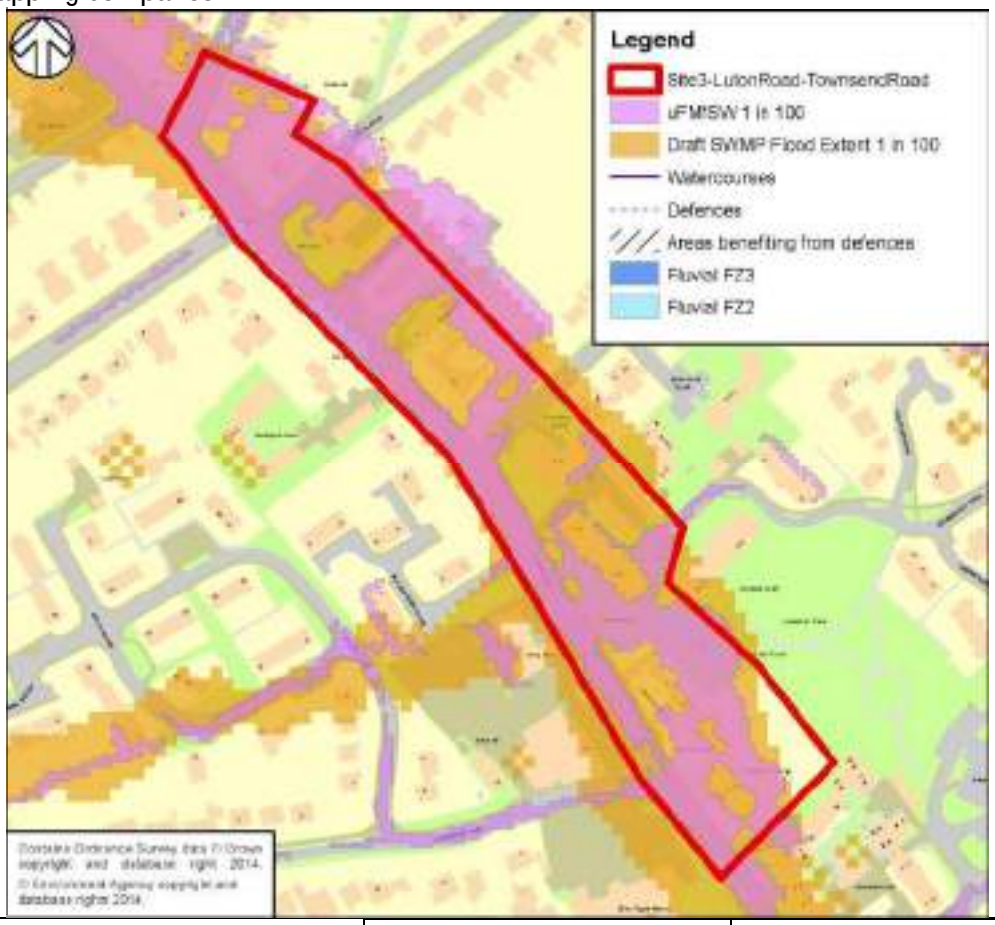


Depth Mapping 1 in 100 year



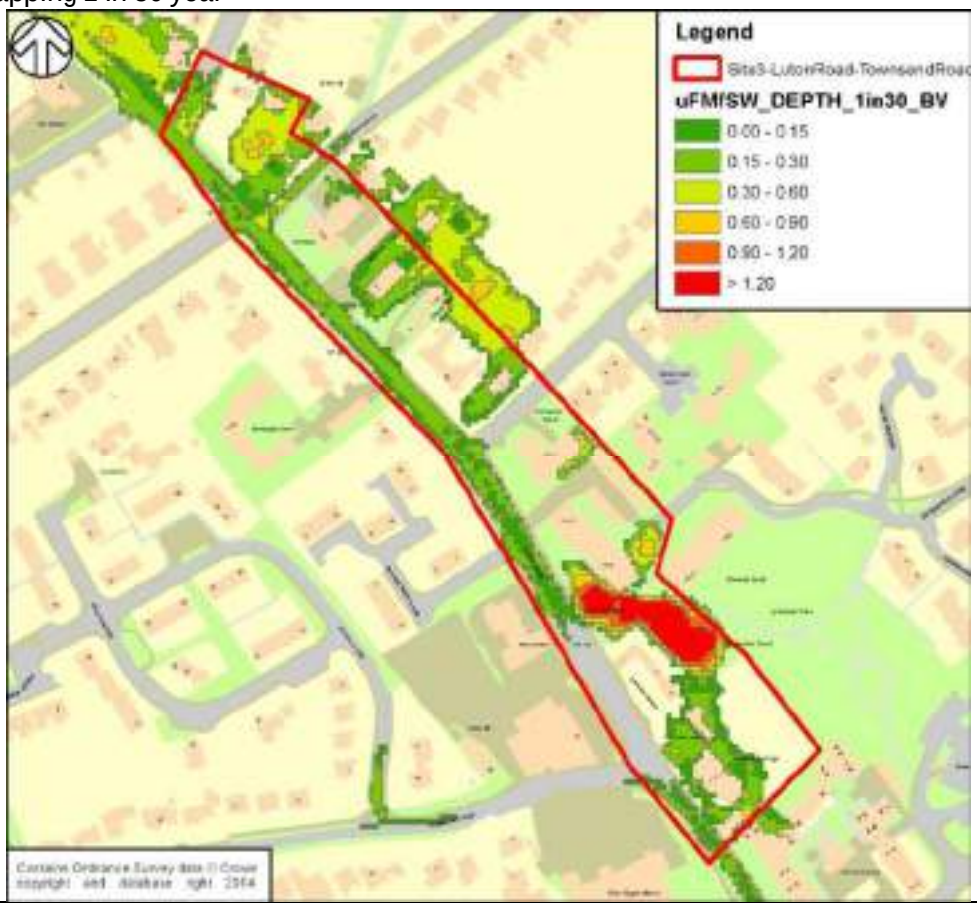
SWMP	St Albans District - Harpenden
Site number	3
Site name	Luton Road – Townsend Road

Flood Mapping Comparison



		30 year		100 year	
	Total	old	updated	old	updated
All properties	20	18	12	18	16
Critical Infrastructure	0	0	0	0	0
Comments	■ As with Site 2, Site 3 is referred to within the SWMP as a relatively steep site with many of the road gullies observed as being blocked. The road is located within a valley with a contributing urban and rural catchment. ■ Proposals within the draft SWMP was for improved gully maintenance and additional gullies.				
Proposed action	■ It is recommended the site be extended and linked with Sites 1, 3, and 5 to ensure a combined mitigation solution is investigated. ■ Further detailed studies will be required to determine the most viable drainage solutions for the area. ■ CCTV survey as part of further studies is recommended.				

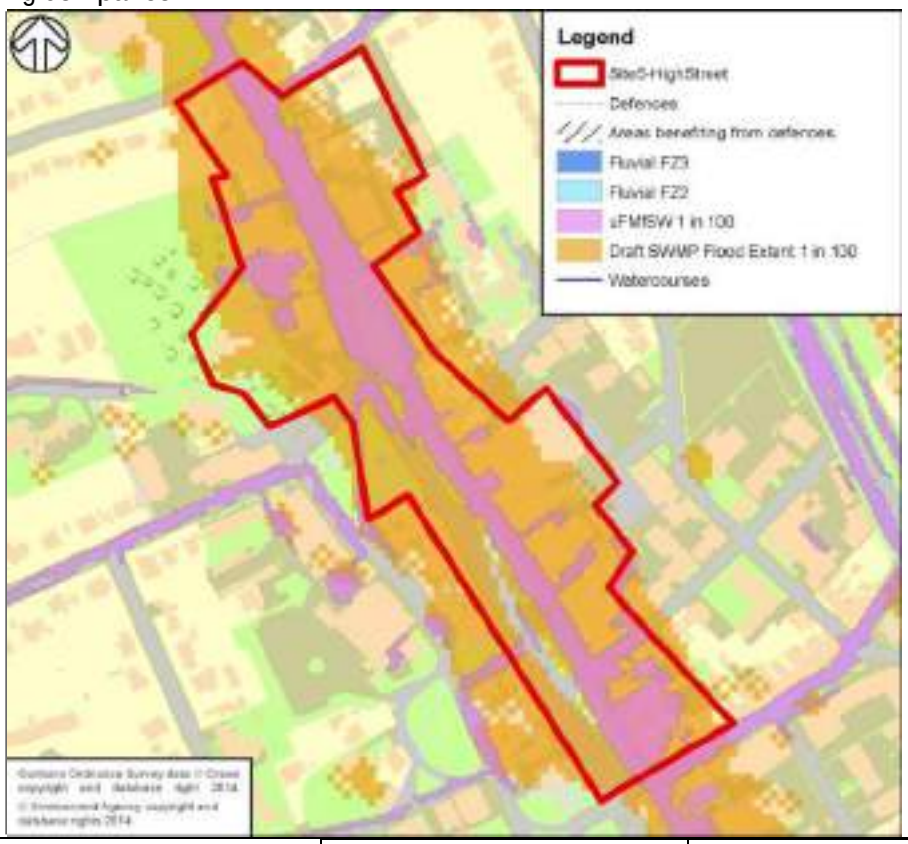
Depth Mapping 1 in 30 year



Depth Mapping 1 in 100 year

SWMP	St Albans District - Harpenden
Site number	5
Site name	High Street

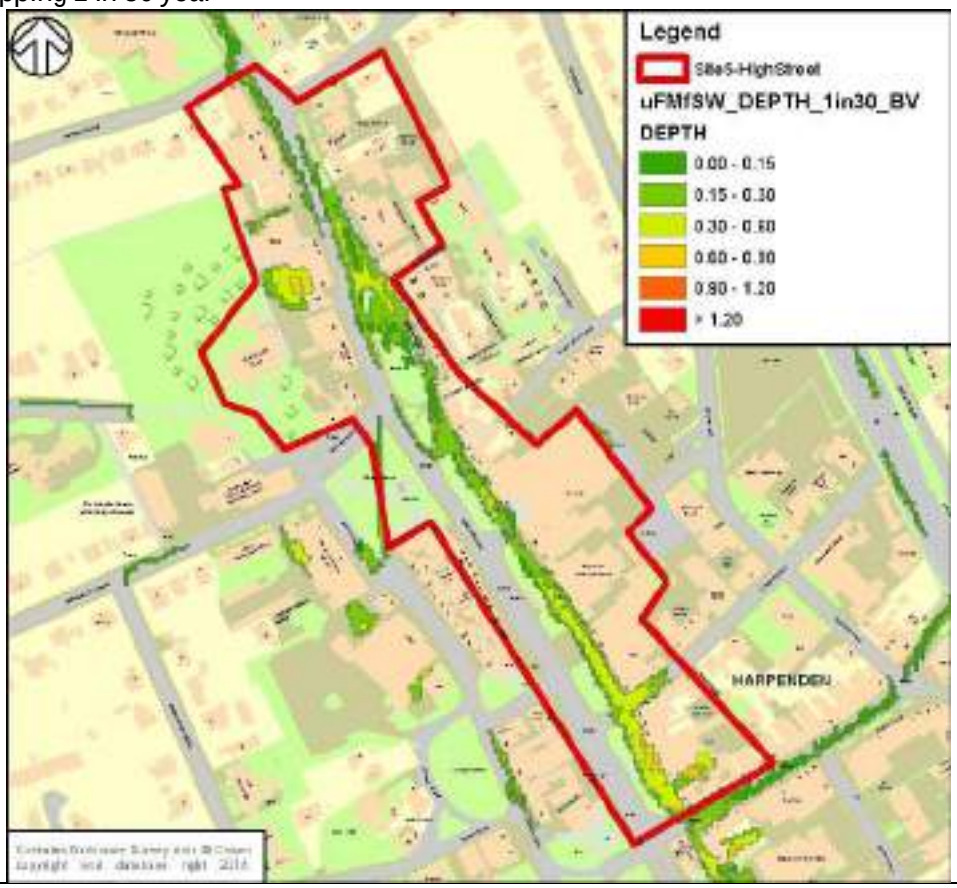
Flood Mapping Comparison



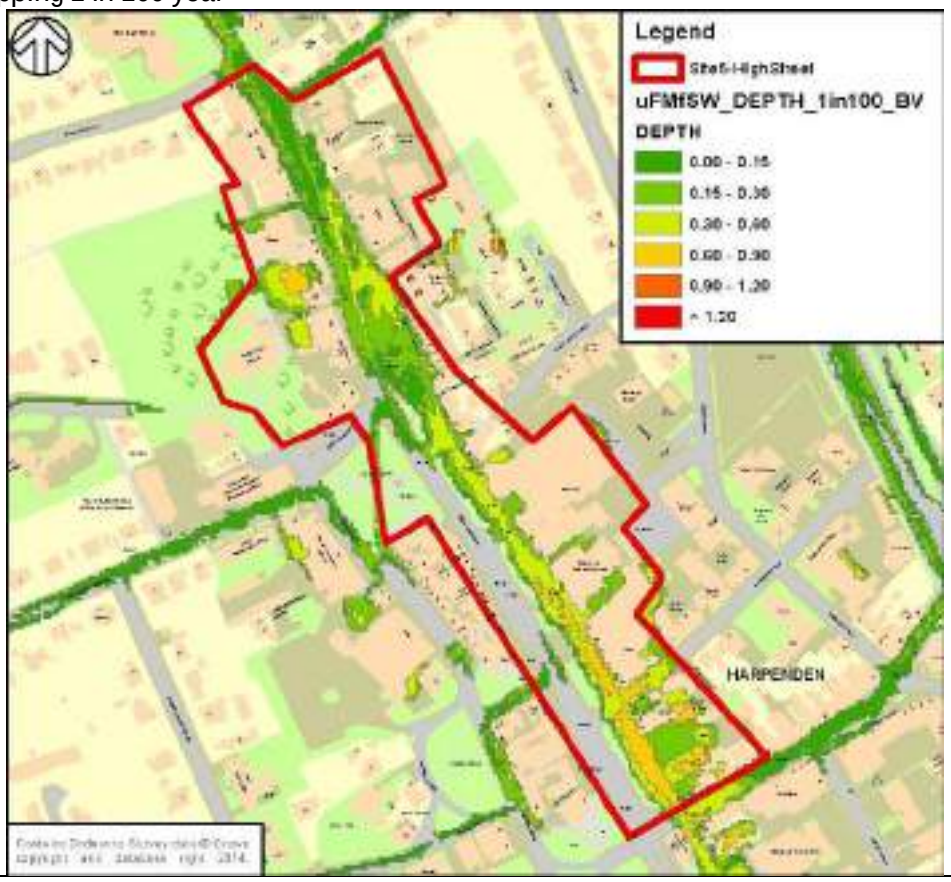
		30 year		100 year	
	Total	old	updated	old	updated
All properties	102	98	26	101	46
Critical Infrastructure	0	0	0	0	0

Comments	■ As with Site 2, Site 5 is a low lying area located within a valley, with a contributing urban and rural catchment. ■ The draft SWMP references a culvert which runs through the area; these are listed within the Thames Water records as a surface water sewer. There are two sewers at 900mm and 600mm in diameter located either side of the central island area of the High Street. The sewer discharges into a ditch, which according to Thames Water sewer records outfalls to the Southdown Ponds system located within Harpenden. The pond where the site discharges to is not shown as having an outfall and therefore it could operate as an infiltration feature. ■ Proposals within the draft SWMP was for improved gully maintenance and additional gullies within the area.
Proposed action	■ It is recommended the site be extended and linked with Sites 1, 3, and 5 to ensure a combined mitigation solution is investigated. ■ Further detailed studies will be required to determine the most viable drainage solutions for the area. Stakeholders confirmed traffic calming measures had been introduced which could help towards future mitigation.

Depth Mapping 1 in 30 year

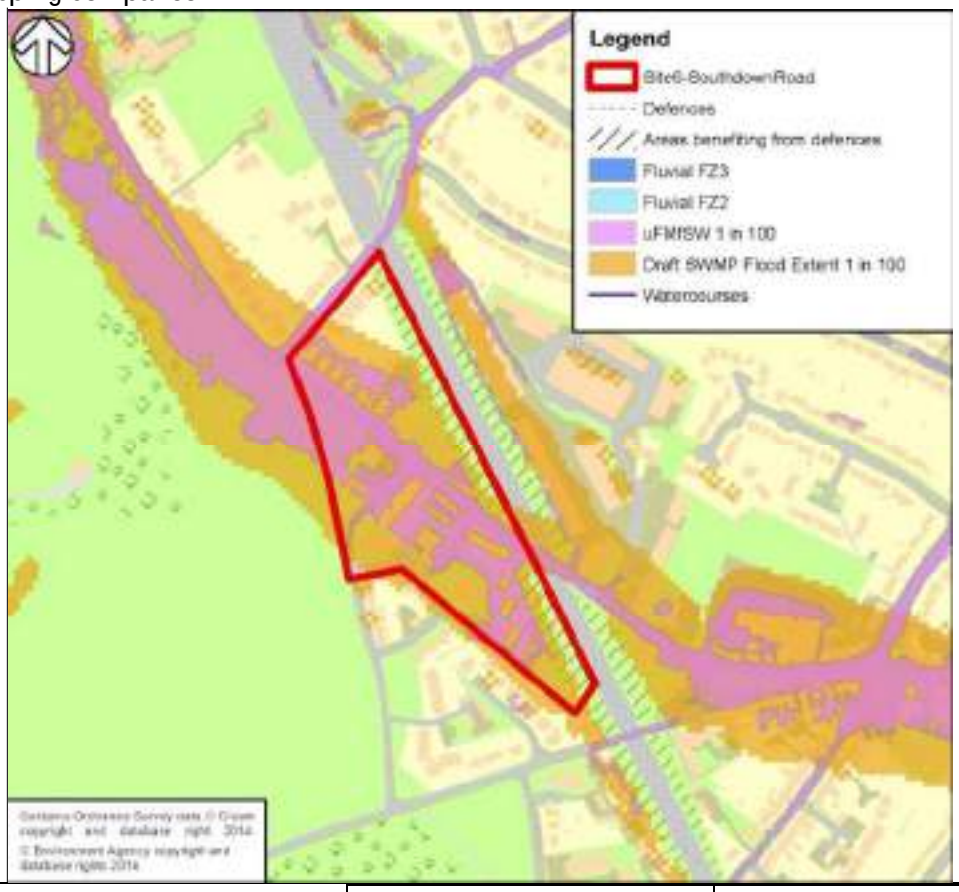


Depth Mapping 1 in 100 year



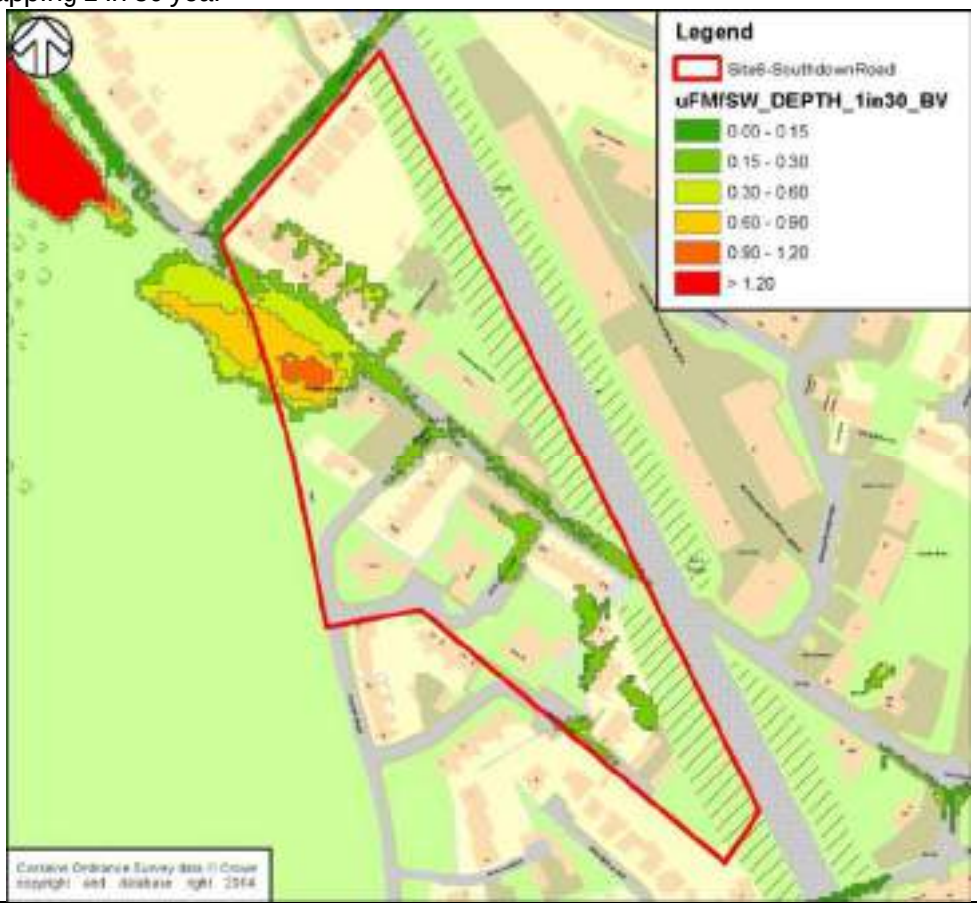
SWMP	St Albans District - Harpenden
Site number	6
Site name	Southdown Road

Flood Mapping Comparison

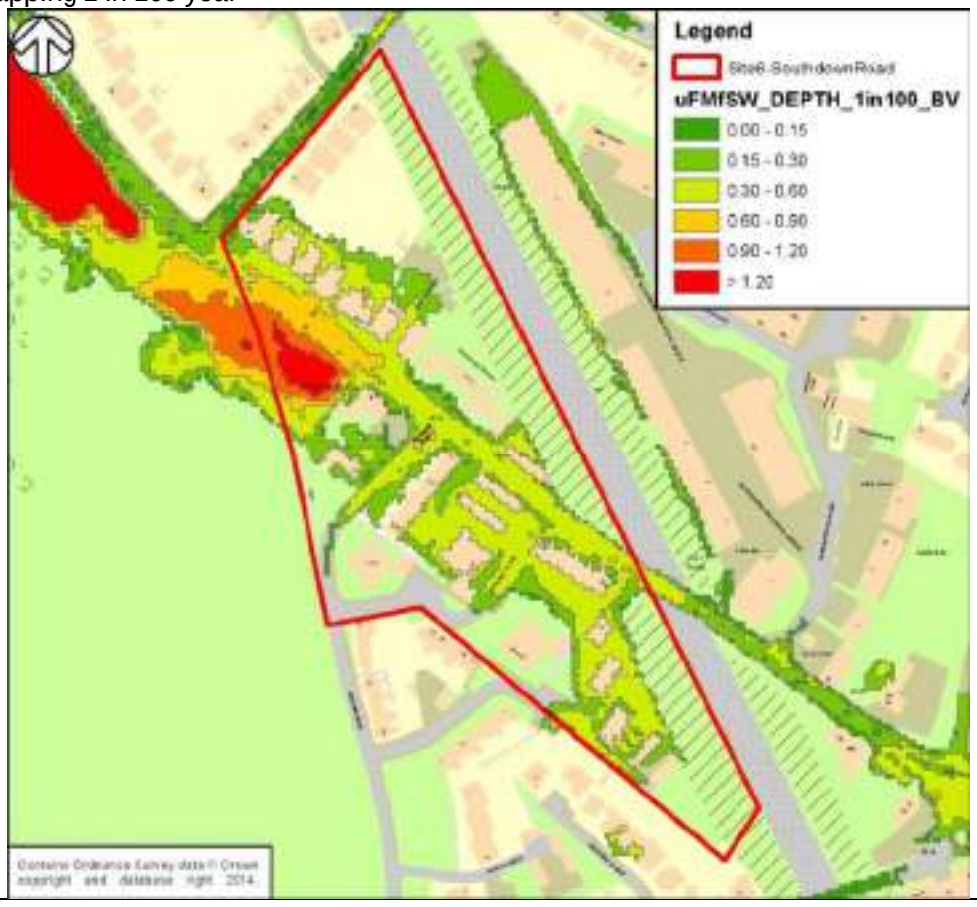


		30 year		100 year	
	Total	old	updated	old	updated
All properties	46	41	17	41	35
Comments	■ The site is located downstream of Southdown Ponds and naturally sits within a valley, downstream of Sites 1, 3, 5 and 6. The railway track is located to the east of the site and therefore impounds any surface water flooding from leaving the site. ■ Thames Water sewer records show only foul water sewers are located within the immediate area. ■ The Southdown Ponds, situated upstream of the site accepts runoff from a large catchment. Overland flow from this feature would fall towards the site. ■ The draft SWMP recommends increasing the upstream Ponds, however, little is known on the function and total catchment of this feature.				
Proposed action	■ Recommend site be reviewed upon completion of the mitigation works for Sites 1 to 5. ■ Further detailed studies will be required to determine the most viable drainage solutions for the area. Stakeholders confirmed traffic calming measures had been introduced within the area which could help mitigate some localised flooding.				

Depth Mapping 1 in 30 year

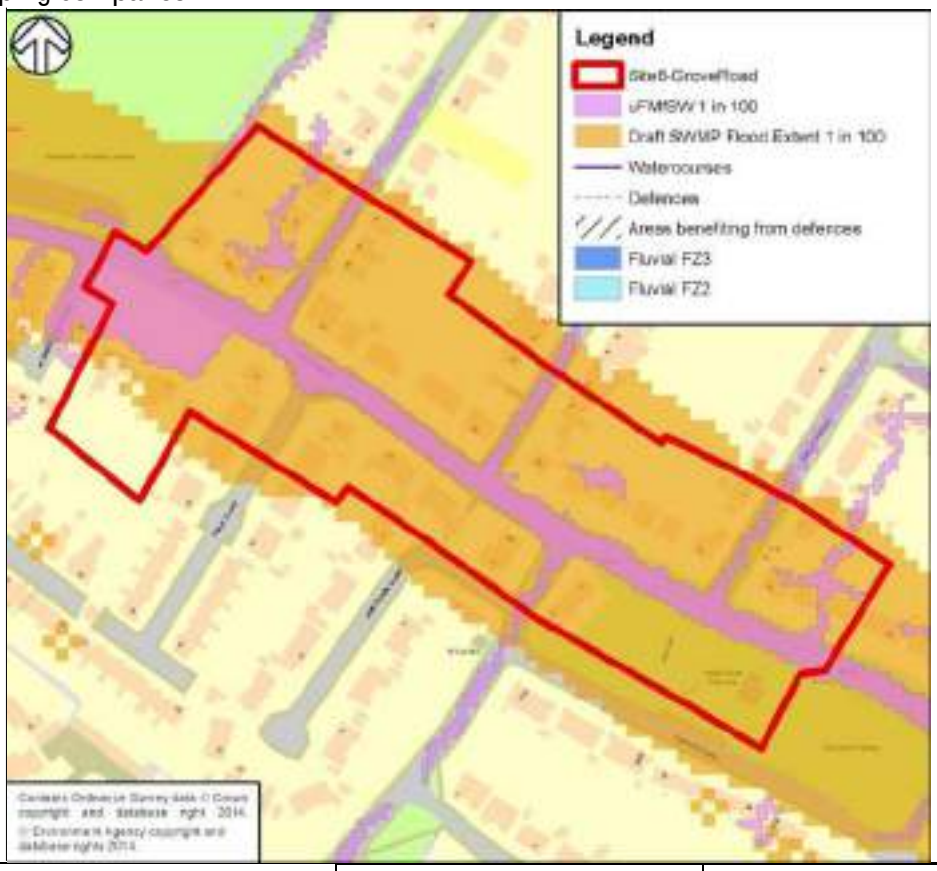


Depth Mapping 1 in 100 year



SWMP	St Albans District - Harpenden
Site number	8
Site name	Grove Road

Flood Mapping Comparison



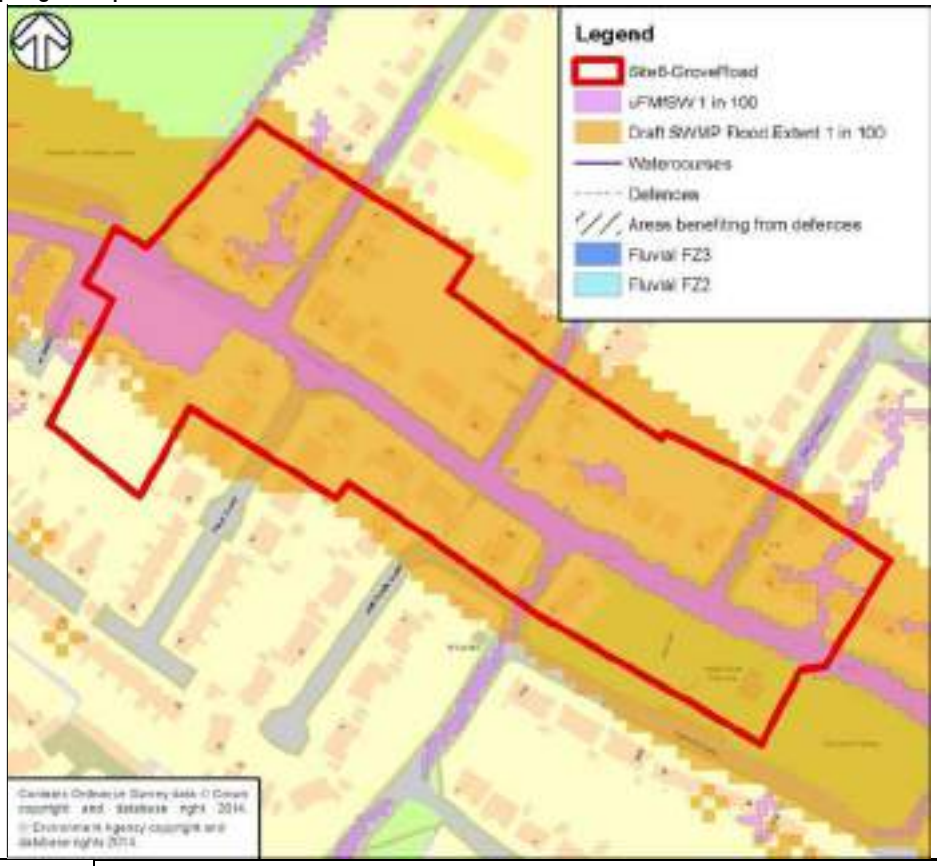
		30 year		100 year	
	Total	old	updated	old	updated
All properties	47	46	1	47	8

Comments

- This is a confirmed “low spot” with properties located just above road level and side road slopping towards Grove Road itself.
- The uFMfSW shows a significant reduction in area affected by surface water flooding. Most of the flooding is contained within the highway and shown not to affect properties.
- During the site visit for the draft SWMP observations were made of blocked gullies and there was an attempt by Hertfordshire Highways prior to the production of the draft SWMP to install additional gullies to help alleviate the current issues within the area.
- Existing Thames Water sewer records show foul and high pressure water main within the area but no records of surface water drainage.
- Recommendations within the draft SWMP were to increase the size of an existing pond, if feasible, or locate another pond within local third party land. The existing pond located upstream of the site is owned by Thames Water and is located within a parcel of land adjacent to an existing industrial area. There is little scope to increase the size of this feature without encroaching into the local industrial park.

Comment Continued	
SWMP	St Albans District - Harpenden
Site number	8
Site name	Grove Road

Flood Mapping Comparison



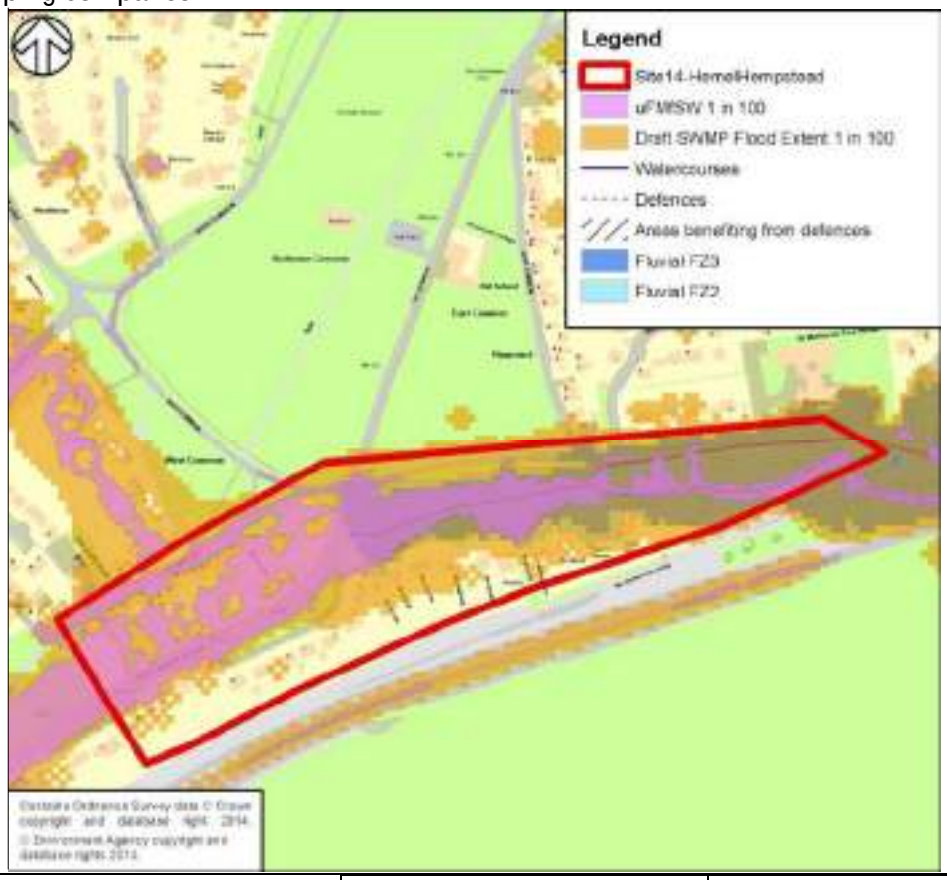
Proposed action	■ Open space within third party land is limited due to an existing school and its playing fields, allotments and small local greens. All of these areas provide important local amenity value and therefore would be affected by the scale of proposed drainage features listed within the draft SWMP. ■ Improvements made to the upstream Sites of 1 through to 6 are likely to have a positive effect to the site and therefore any improvements to the area should be reviewed upon completion of any upstream mitigation measures for other sites.

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

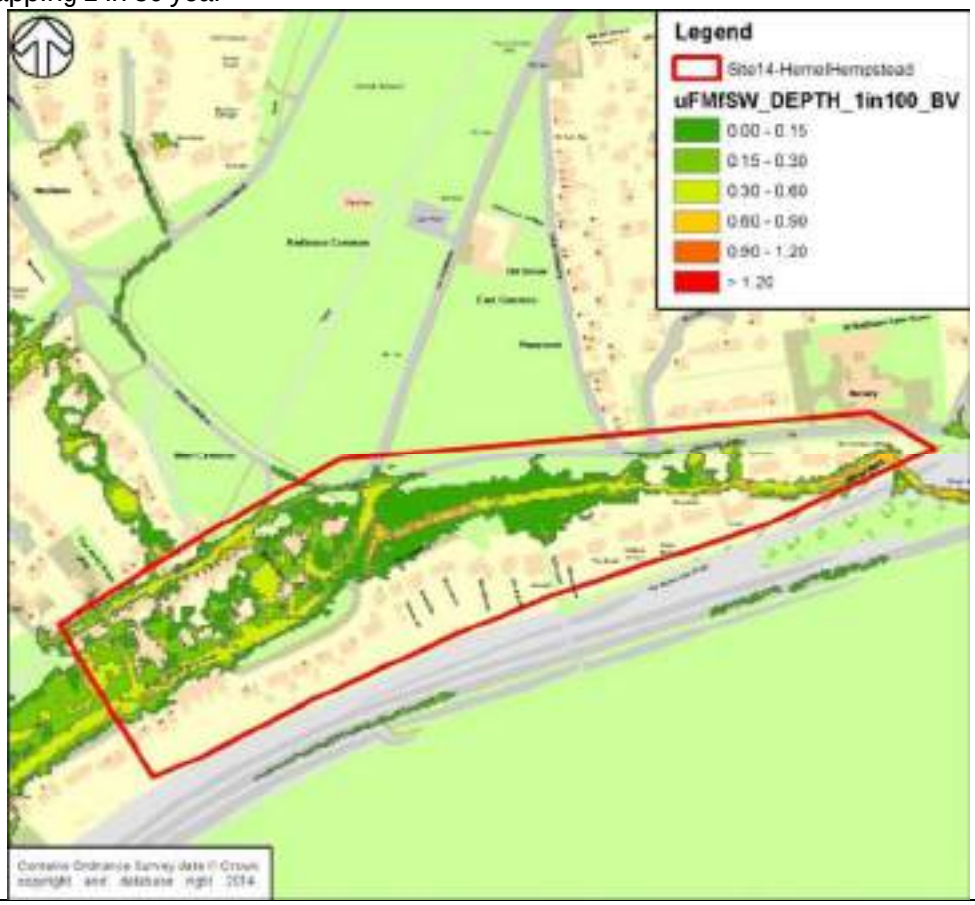
SWMP	St Albans - Redbourn
Site number	14
Site name	Hemel Hempstead Road

Flood Mapping Comparison

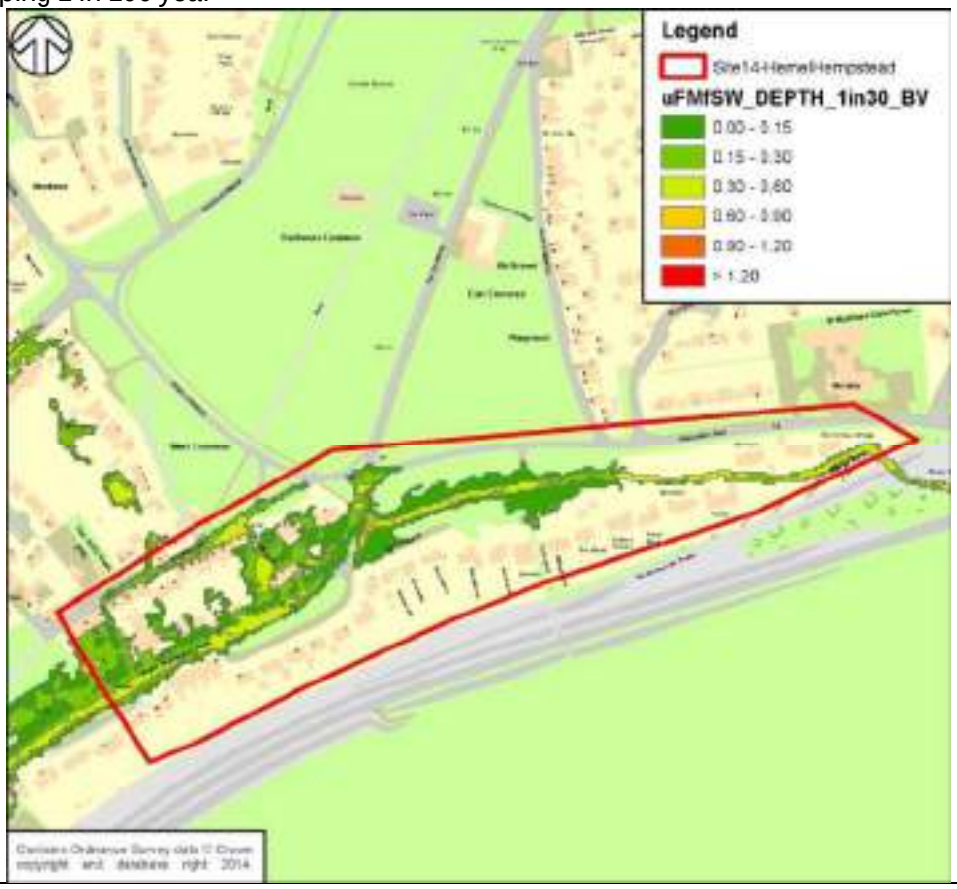


		30 year		100 year	
	Total	old	updated	old	updated
All properties	73	63	25	66	45
Comments	■ The main predicted flooding identified within the draft SWMP is a ditch / watercourse which runs along the existing common. This is confirmed within the uFMfSW. ■ Gullies were identified during site observations for the production of the draft SWMP and a concrete channel within Church End Road. ■ Mitigation proposals listed within the draft SWMP was for increased capacity of the ditch under the property access points and attenuation of upstream flows located within the vicinity of Site 16. ■ Both Sites 14 and 16 are located within low lying areas with upper rural catchments. ■ Stakeholders confirmed there are capacity issues within this area.				
Proposed action	■ A combined mitigation strategy for Sites 14 and 16 should be investigated, with attenuation included as part of a future study. ■ Given the implication of works within third party land it is recommended bunding and ditches are located along the edges of the contributing rural catchment. These should ideally extend from the North West to the south of the site. A hydrological model and study will need to be undertaken to determine the full catchment extent.				

Depth Mapping 1 in 30 year

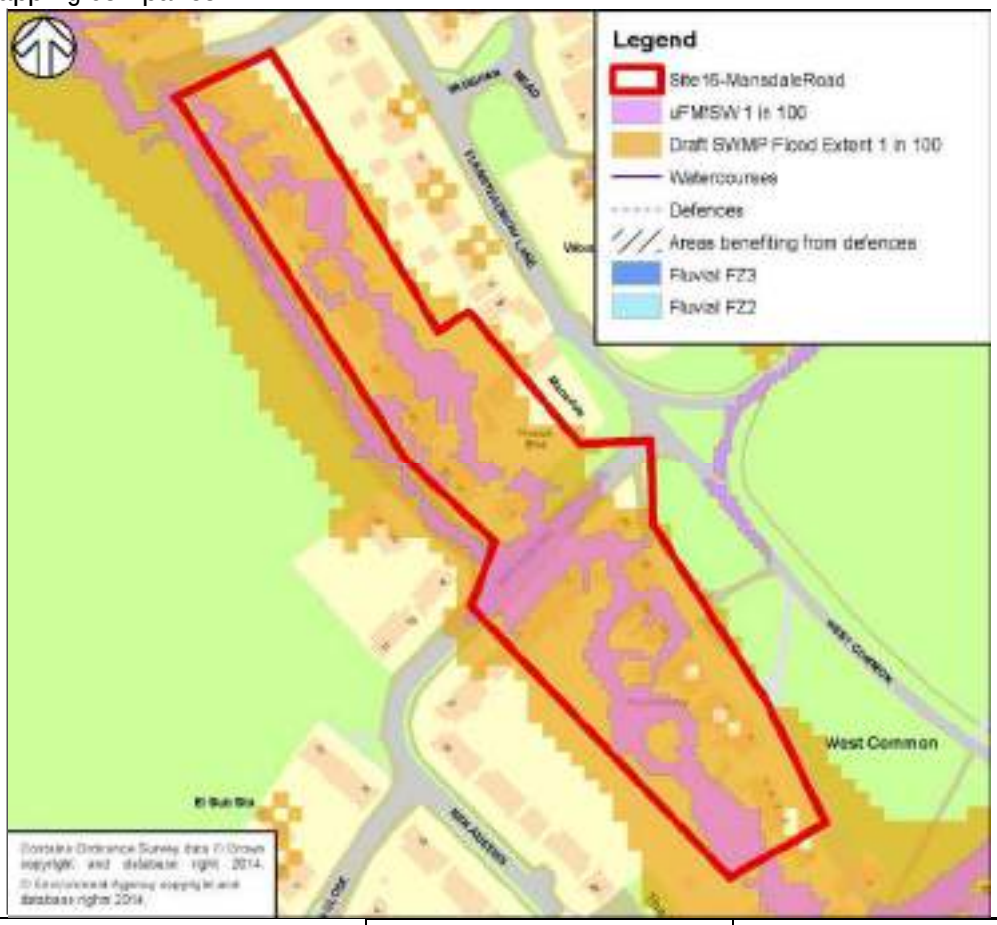


Depth Maping 1 in 100 year



SWMP	St Albans - Redbourn
Site number	16
Site name	Mansdale Road

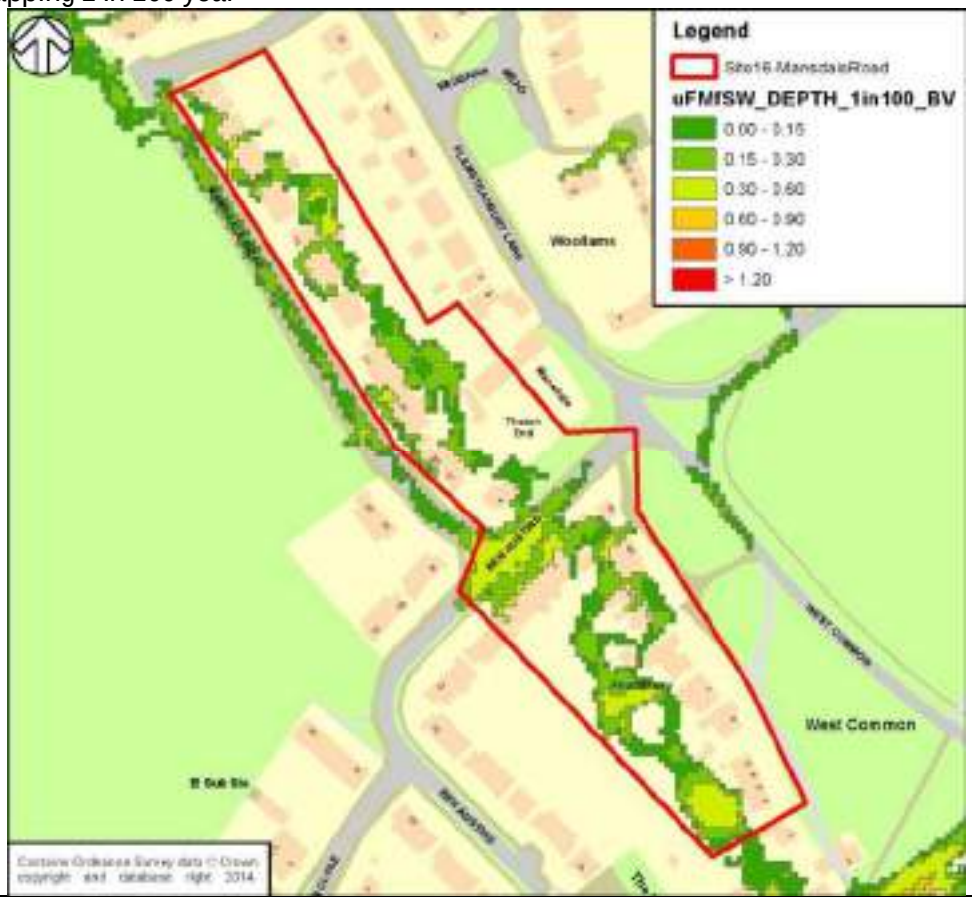
Flood Mapping Comparison



	Total	30 year		100 year	
		old	updated	old	updated
All properties	33	33	7	33	28
Comments	■ The uFMfSW show a reduction in flood area. As detailed for Site 14 the site lies in a low lying area surrounded by higher ground levels with a rural catchment to the north and south.				
Proposed action	■ A combined mitigation strategy for Sites 14 and 16 should be investigated, which attenuation investigated as part of a future study. ■ A hydrological model and study will need to be undertaken to determine the full catchment extent.				

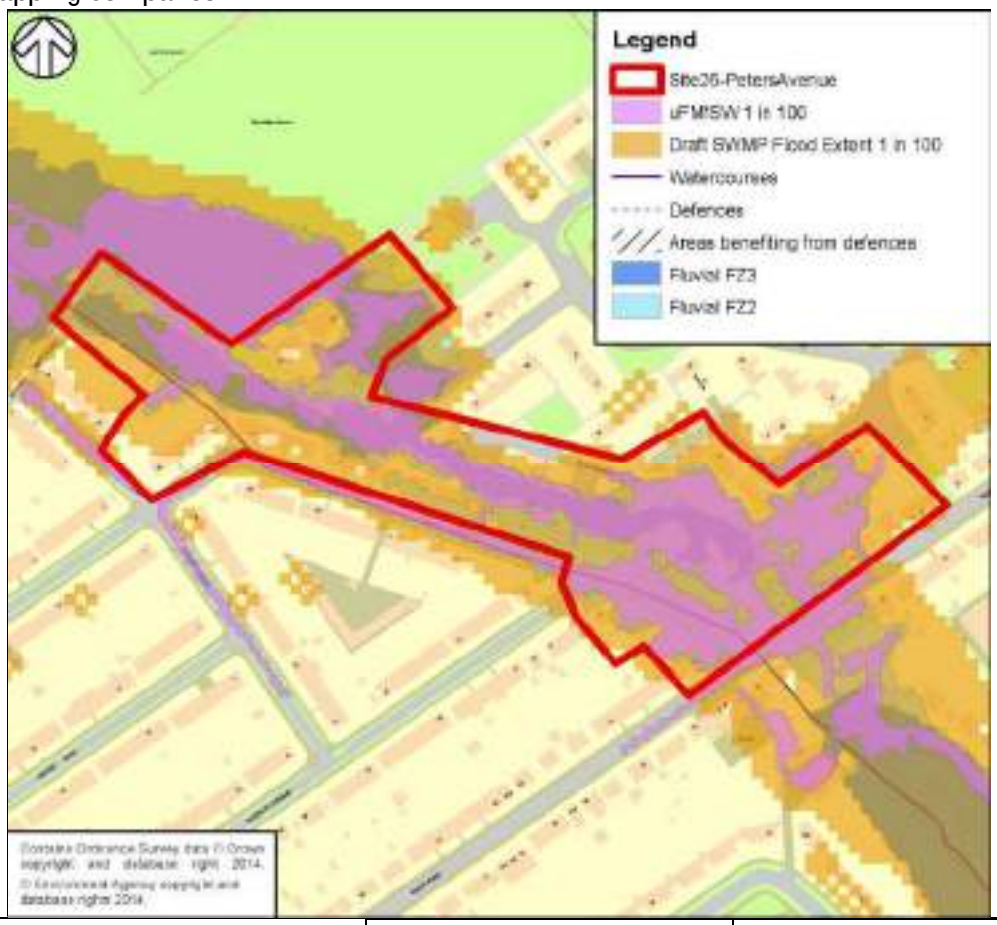
Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year



SWMP	St Albans District – London Colney
Site number	26
Site name	Peters Avenue

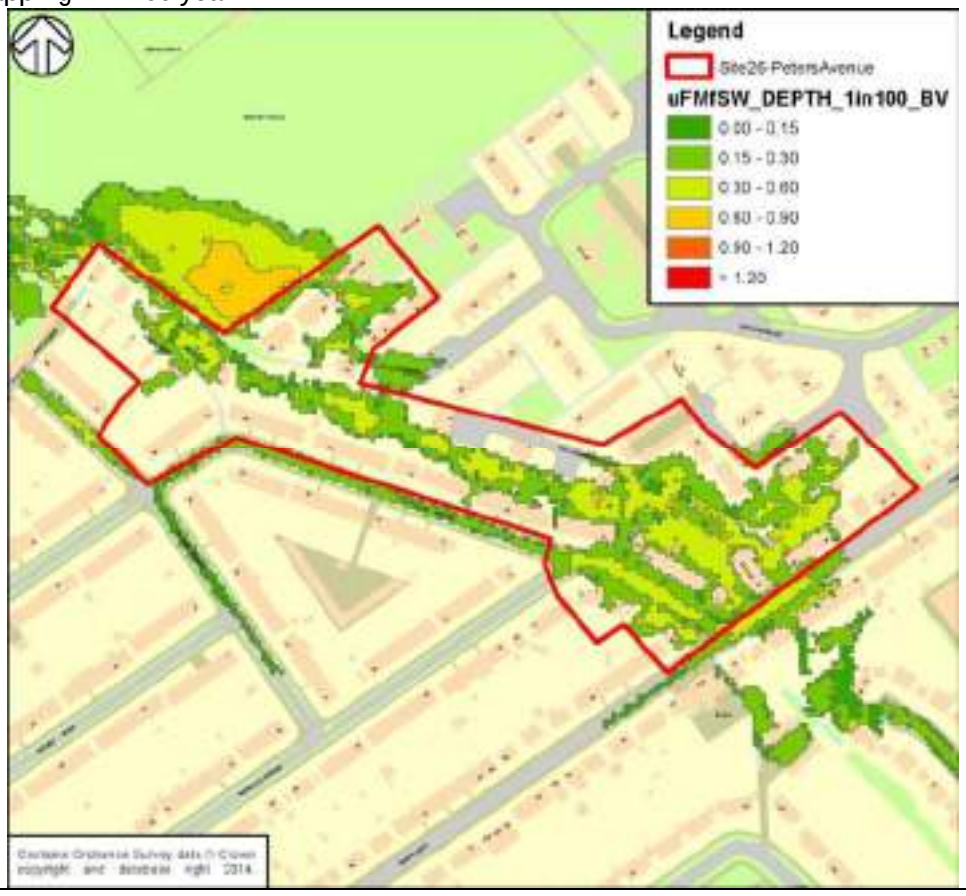
Flood Mapping Comparison



		30 year		100 year	
	Total	old	updated	old	updated
All properties	97	94	15	96	48
Comments	■ Peters Avenue is a relatively flat road with a low lying area within Bellchambers Road. ■ The overland flow path is enters the site from the recreational area and allotments to the north west. ■ The recommendation within the draft SWMP is for an attenuation pond, sized to store the 30 year storm runoff, approximately 5400m^3 in size to be located within the local open space.				
Proposed action	■ The EA are currently undertaking a study assessing the fluvial interaction with the local Surface water drainage. Future solutions to prevent flooding will need to be readdressed upon completion of this study.				

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year



SWMP	St Albans District – London Colney
Site number	27
Site name	High Street

Flood Mapping Comparison

		30 year		100 year	
	Total	old	updated	old	updated
All properties	28	28	20	28	27

Comments

- This site was listed within the draft SWMP as an area with significant predicted flooding, affecting one side of the High Street.
- The uFMfSW show a reduction in area affected by flooding. Lidar data confirms the site is located within a low lying area with the A1081 located in cutting to the north and east of the site. Therefore, this road is likely to intercept any overland flow routes from the eastern rural catchment.
- Mitigation proposals within the draft SWMP listed an attenuation pond of 0.7ha within third party land located between the North Orbital Road and the A1081. This was proposed to retain overland flow from the eastern and northern catchment which it predicted to affect the High Street Properties.
- SADC requested the site been linked to Alexander Road review and as a priority site for the SWMP due to the emergency services not be able to access the local High Street when the highway floods.
- Thames Water Sewer records show a 225mm diameter foul sewer only located within the High Street and surface water sewers located within Alexander Road. It was confirmed in the Stakeholder meeting a combined sewer is located within the vicinity of the site which may account for the lack of information on the surface water drainage arrangements.

Comment Continued	
SWMP	St Albans District – London Colney
Site number	27
Site name	High Street

Flood Mapping Comparison

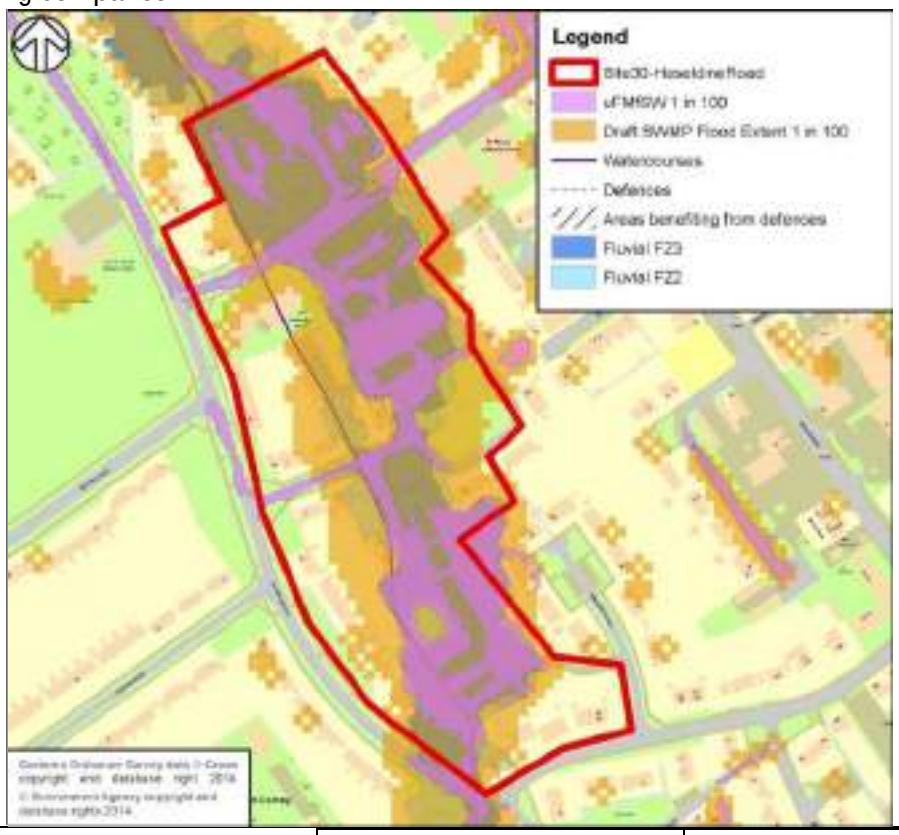
Proposed action	■ Alexander Road, Colney was a priority site put forward at the Stakeholder meeting for the SWMP. ■ The most feasible solution would be for a Thames Water study to be undertaken to determine any capacity issues within the local network. It is unlikely flooding of the highway is directly affected by any upper rural catchment due the interception of overland flows from the A1081 which is in cutting. ■ The study should combine the site of Alexander Road.

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	St Albans District – London Colney
Site number	30
Site name	Haseldine Road

Flood Mapping Comparison



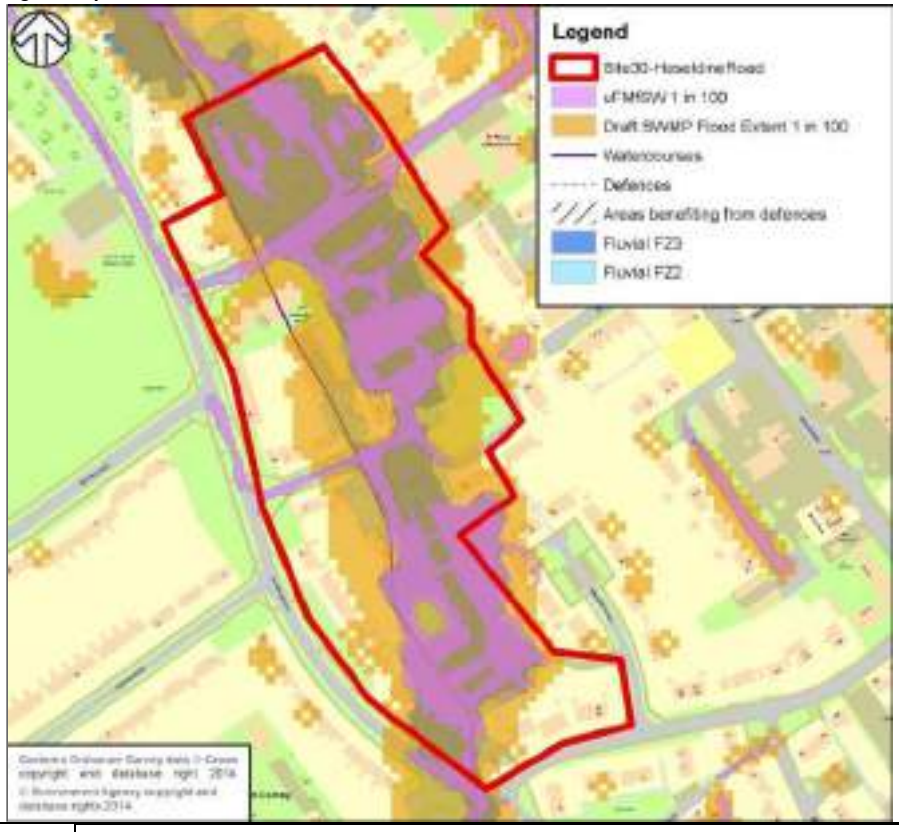
		30 year		100 year	
	Total	old	updated	old	updated
All properties	92	72	28	75	46

Comments

- The draft SWMP predicted flooding at the site from Haseldine Avenue, heading south, parallel to Caledon Road, with reported flooding confined to Haseldine Road.
- An open watercourse runs beside No 46/48 Haseldine Road. This is culverted under the road and presumably for some distance downstream as the outlet could not be found during the site visit undertaken to inform the draft SWMP. SADC has confirmed discharge of the existing watercourse is to Broad Water ponds and then into the river.
- There is a low spot in the car park behind the shops and further south in Bluett Road, where the uFMfSW also predicts flooding.
- The culvert is in riparian ownership. Given the large number of households backing onto the watercourse and the difficulties of serving notice, the District Council undertook regular maintenance of the culvert up to 2009. After 2009, the EA withdrew their agency agreement for the maintenance of non-critical water courses and the funding. They now undertake the maintenance works directly.

Comments Continued	
SWMP	St Albans District – London Colney
Site number	30
Site name	Haseldine Road

Flood Mapping Comparison



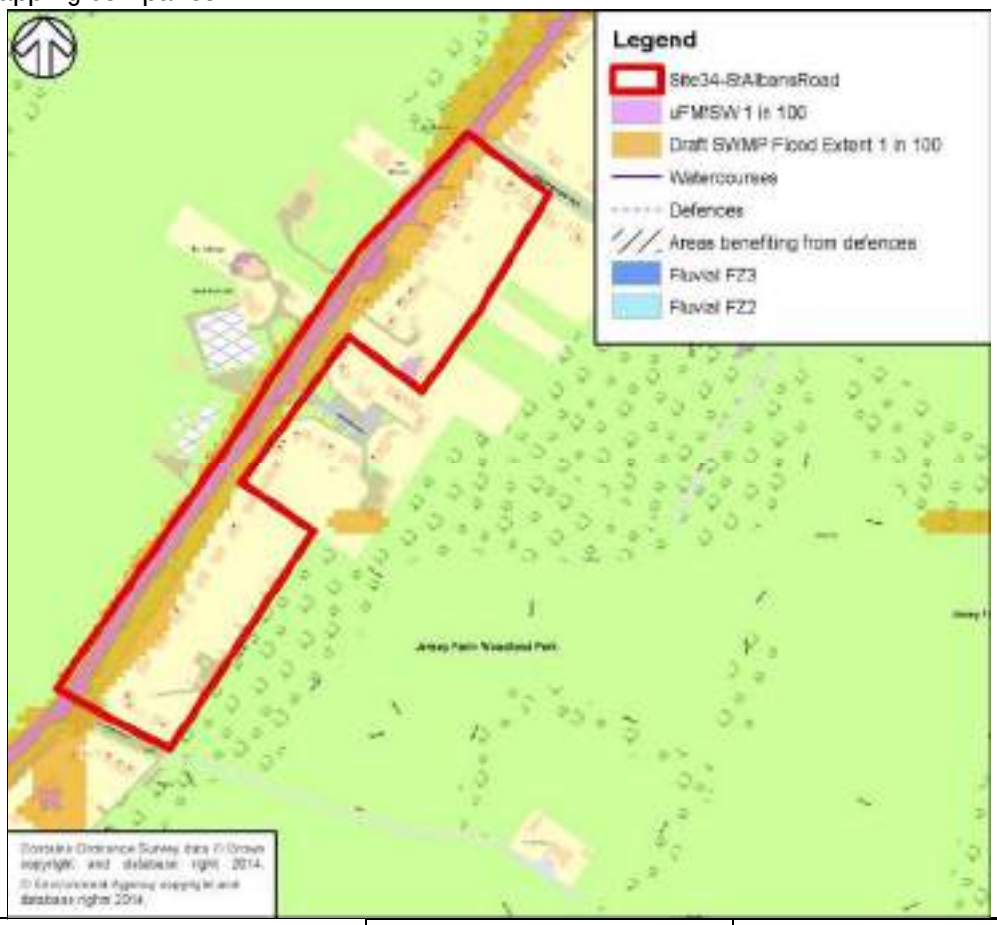
Proposed action	■ Stakeholders agreed there is a maintenance issue with this water course. The main contributing factor of the flooding is when the existing gratings become blocked. It was recommended that further investigations be undertaken in accordance with the draft SWMP.

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

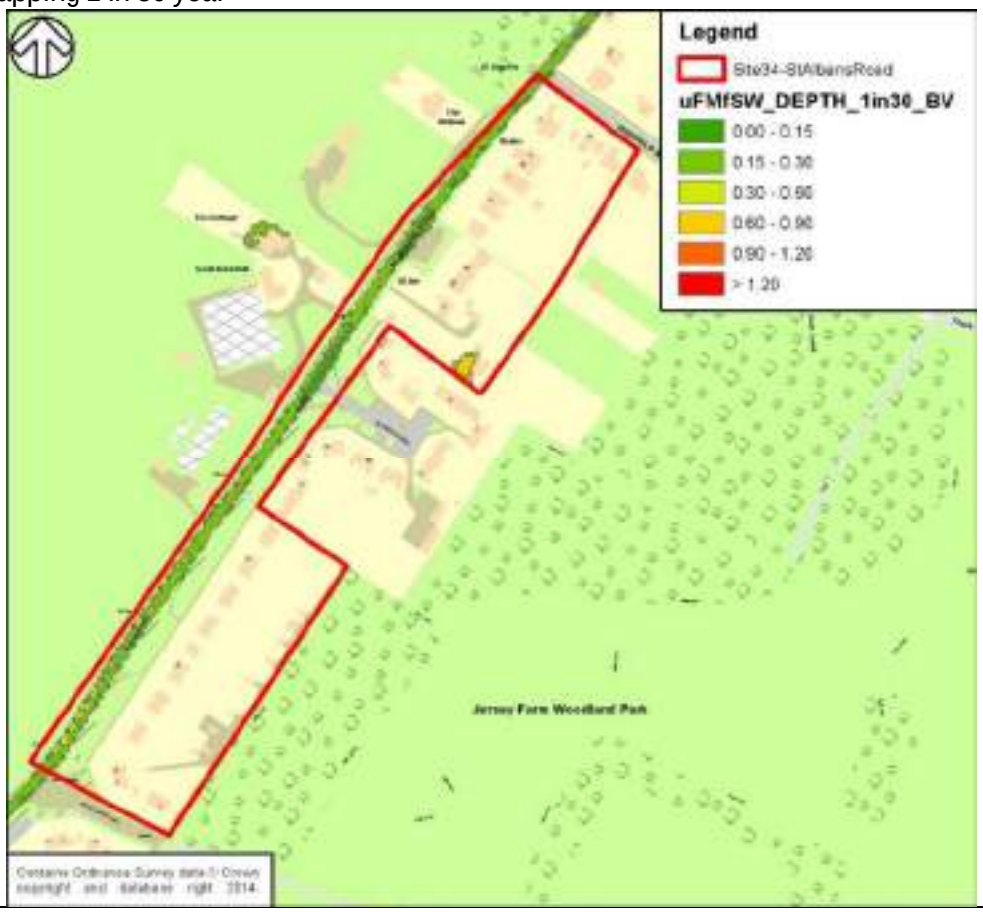
SWMP	St Albans District – St Albans
Site number	34
Site name	St Albans Road

Flood Mapping Comparison



	Total	30 year		100 year	
		old	updated	old	updated
All properties	32	8	1	12	2
Comments	■ The site is located in St Albans Road between the junction of Highfield Road and St Heliers Road. ■ The properties either side of the road are well above road level but the carriageway sits in a hollow with banks either side. The draft SWMP confirmed one side of the road has a kerb but there is no kerb line on the opposite side. ■ The highway drains were replaced prior to the production of the draft SWMP, however, site observation noted most of the gullies were blocked. ■ Mitigation proposals within the draft SWMP was for additional gully provision / maintenance and the installation of some terrain (or other lining) to the embankments which are located along St Albans Road. ■ The uFMfSW show a reduction in the predicted flood extent with flooding constrained to the highway.				
Proposed action	■ Stakeholders agreed to improved maintenance regime at the site.				

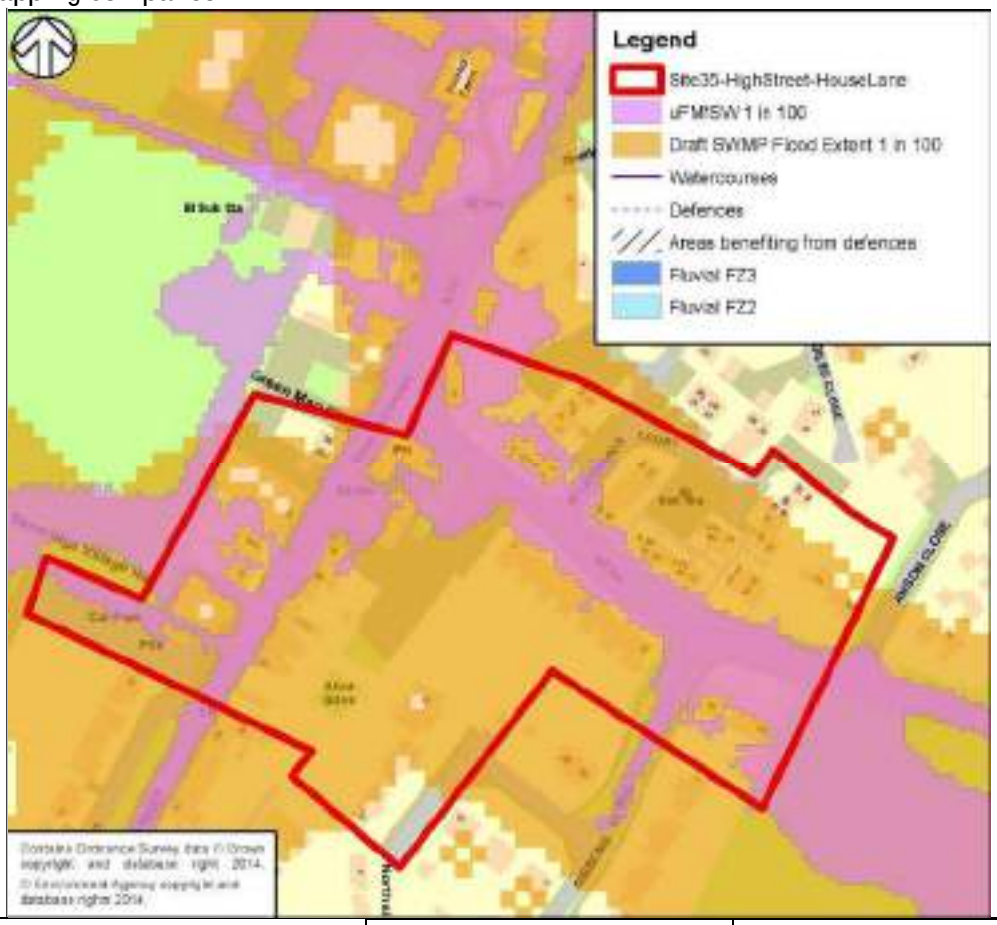
Depth Mapping 1 in 30 year



Depth Mapping 1 in 100 year

SWMP	St Albans – St Albans
Site number	35
Site name	High Street – House Lane

Flood Mapping Comparison



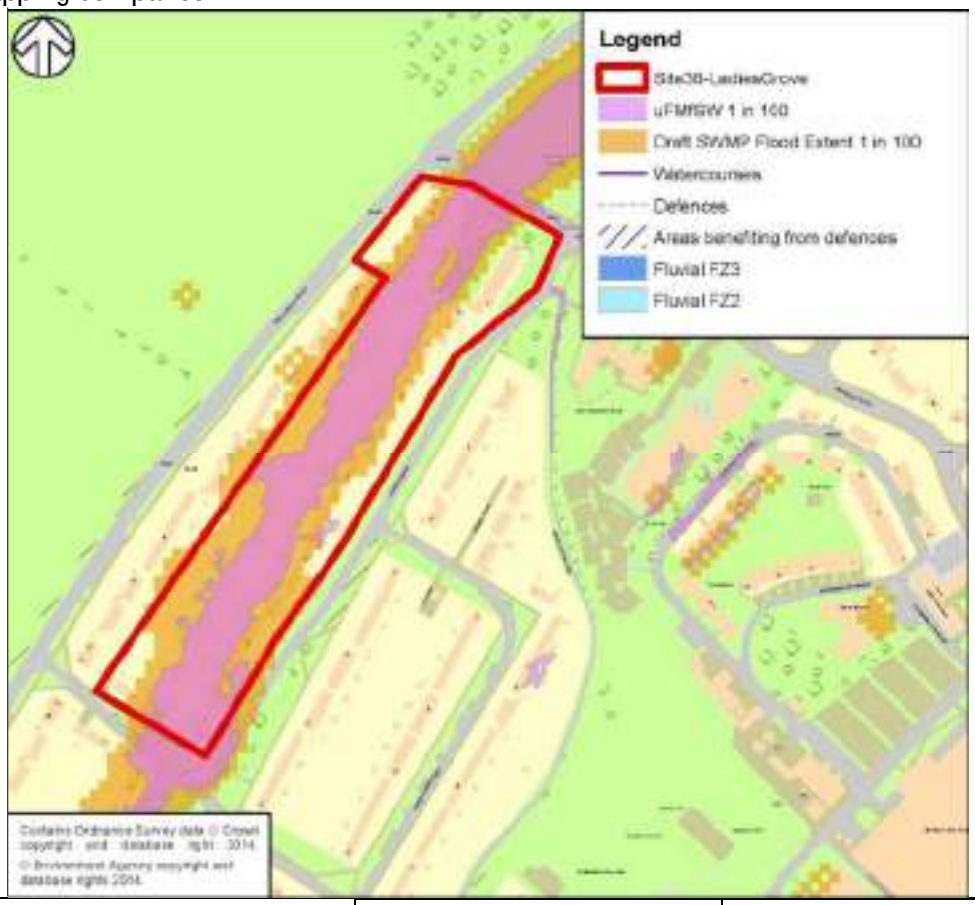
		30 year		100 year	
	Total	old	updated	old	updated
All properties	65	57	11	64	36
Comments	■ This site includes the top end of House Lane, close to the junction with High Street as well as part of the High Street itself. ■ Site observations as part of the draft SWMP noted a low spot at the junction of House Lane / Gibbons Close, with the House Lane properties at risk from flooding from the carriageway. A gully at this low spot was noted as being blocked. ■ A reported flooding incident was recorded for a single dwelling at this location. ■ Lidar data for the site shows it be located within a natural valley with local agricultural land and part of the local urban catchment falling towards it. ■ The draft SWMP recommended re-profiling of the existing field to limit the amount of overland flow entering the site.				
Proposed action	■ Bunding and field drains are recommended along the outer edges of the contributing fields / recreational land to intercept and contain overland flood waters, to help mitigate potential effects of overland flow routes.				

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	St Albans District – St Albans
Site number	38
Site name	Ladies Grove

Flood Mapping Comparison



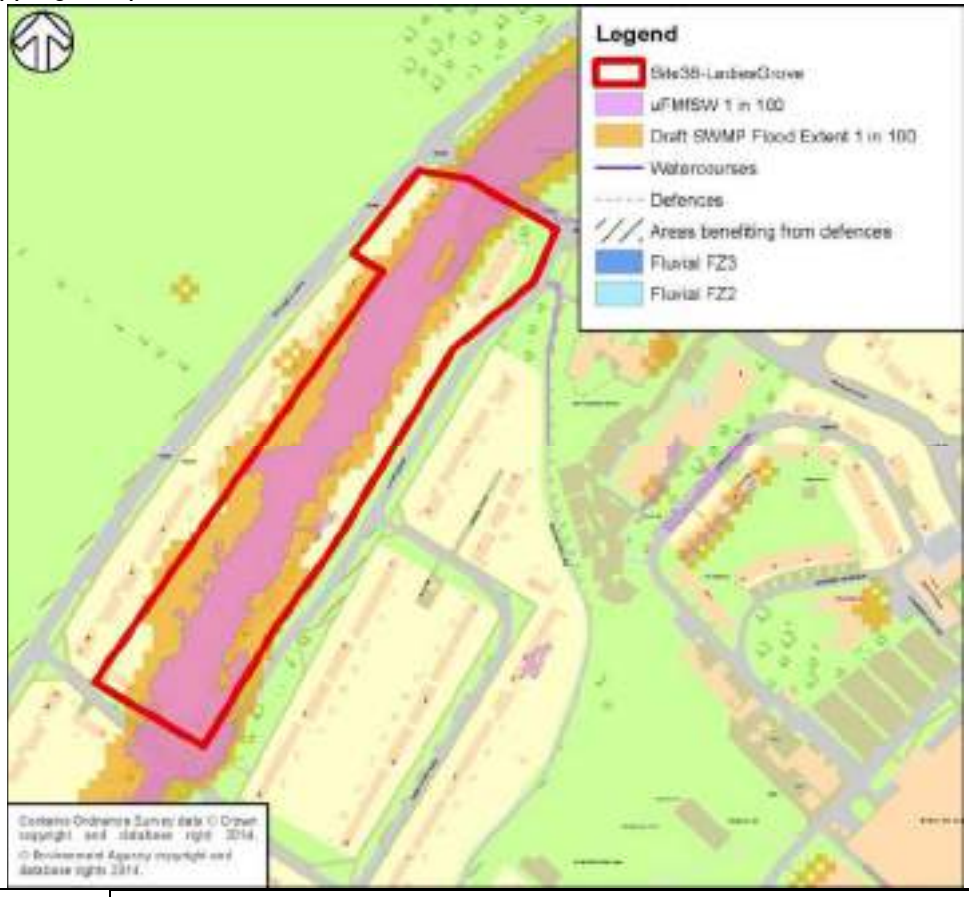
		30 year		100 year	
	Total	old	updated	old	updated
All properties	52	41	11	44	26

Comments

- The draft SWMP predicted flooding to originate at rear of the properties on the north western side of Ladies Grove. This correlates well with the uFMfSW and Lidar data for the site, which shows it to be part a natural catchment associated with the River Ver to the south west.
- There is a significant fall from the main road to the 'low spot' at the rear of the properties, where the flooding is predicted. The properties are lower than the road with drop kerbs and drives sloping down towards the properties. On the opposite side of Ladies Grove the properties are much higher with a bank sloping towards the road. This may contribute to the runoff directed towards the low lying properties.
- Gully mapping confirms the draft SWMP findings of there being a limited provision of gullies in the road, with one located at the junction with Links View.
- There is golf course (owned by the District Council) and agricultural fields along the north western extent and a recreation ground located at the junction of Batchwood Drive and Everlasting Lane to the North of the site.
- The draft SWMP proposed to construct an attenuation pond in the northern recreation area of Batchwood Drive and Everlasting Lane.

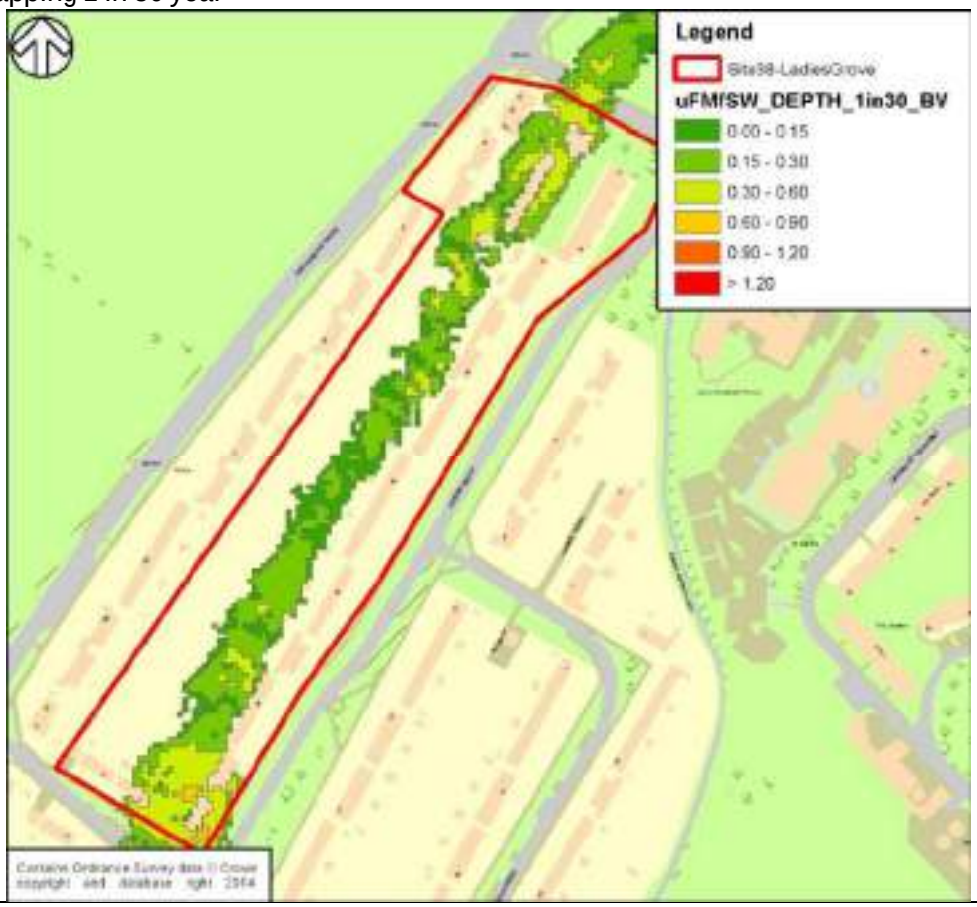
Comment Continued	
SWMP	St Albans District – St Albans
Site number	38
Site name	Ladies Grove

Flood Mapping Comparison

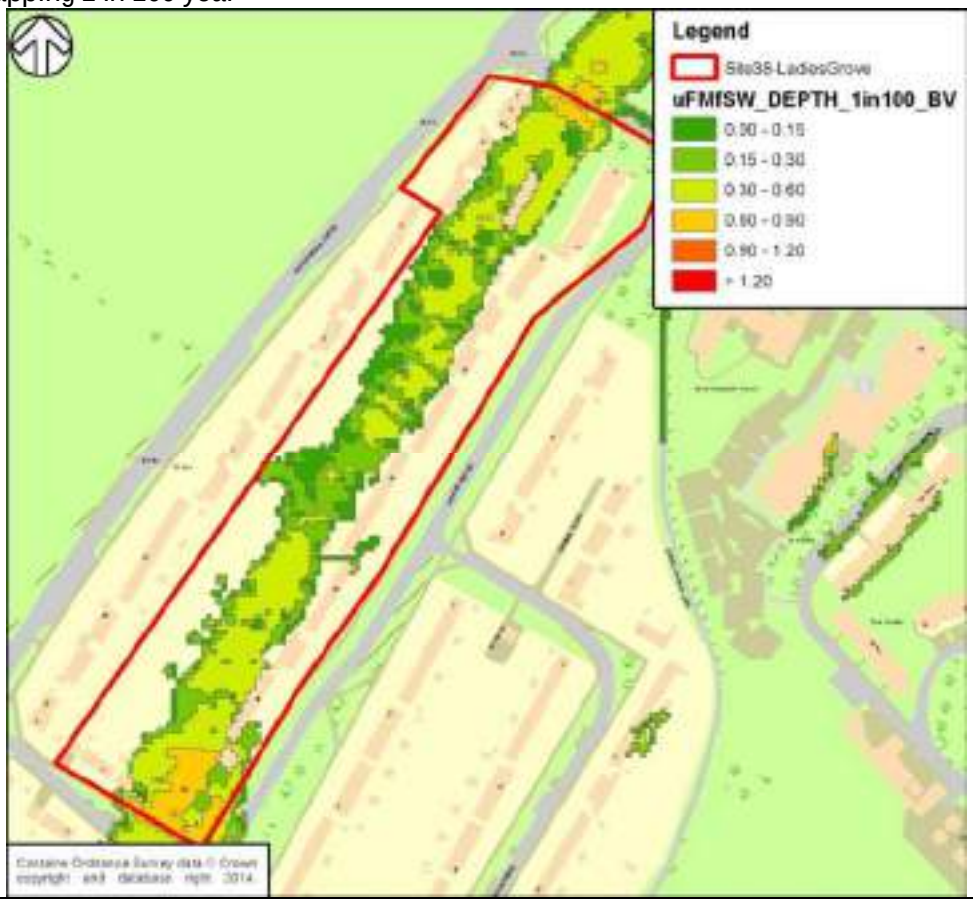


Proposed action	■ Bunding along the southern edge of the recreation area would be the preferred option within the updated SWMP. If local topography allows, an intercepting filter drain could be located at the base of the bund to infiltrate surface water (subject to infiltration tests in accordance to BRE 365). ■ Site 38 forms the upper catchment to Sites 39 to 40 and therefore it is proposed to extended Site 38 and combine it with Sites 39 and 40. ■ Bunding is also recommended within the adjacent golf course to prevent overland flow routes from the west discharging to the sites. ■ A hydrological assessment is recommended to help determine the associated site catchment.

Depth Mapping 1 in 30 year

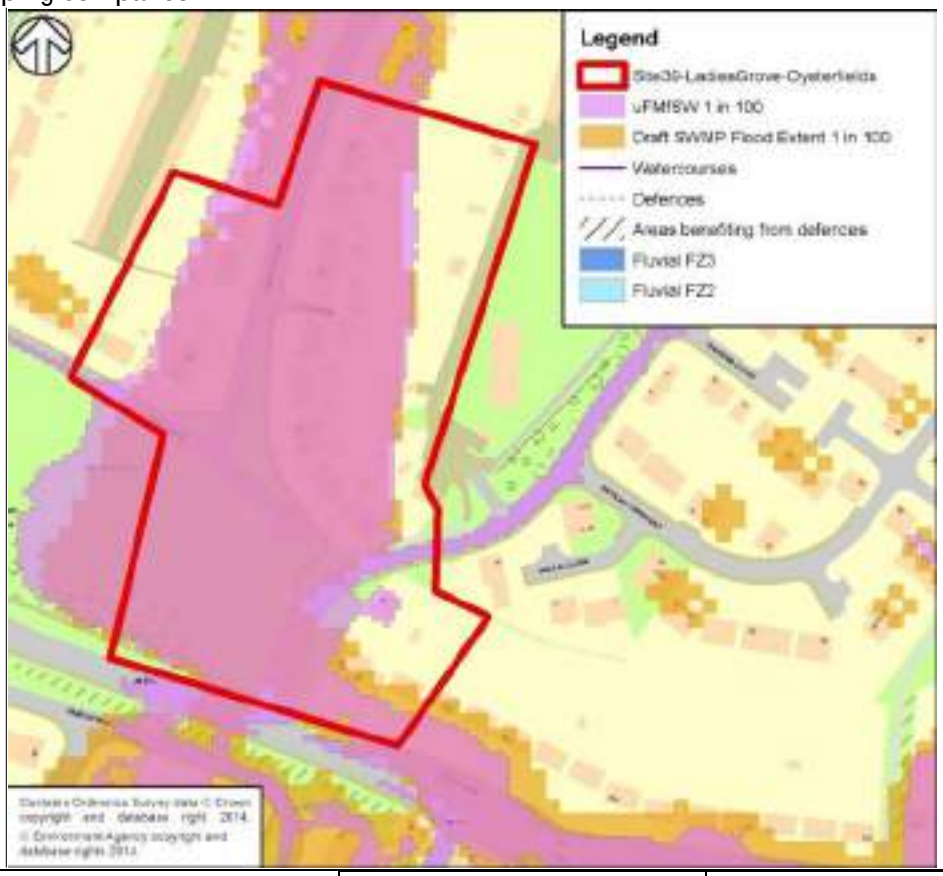


Depth Mapping 1 in 100 year



SWMP	St Albans District – St Albans
Site number	39
Site name	Ladies Grove – Oysterfields

Flood Mapping Comparison



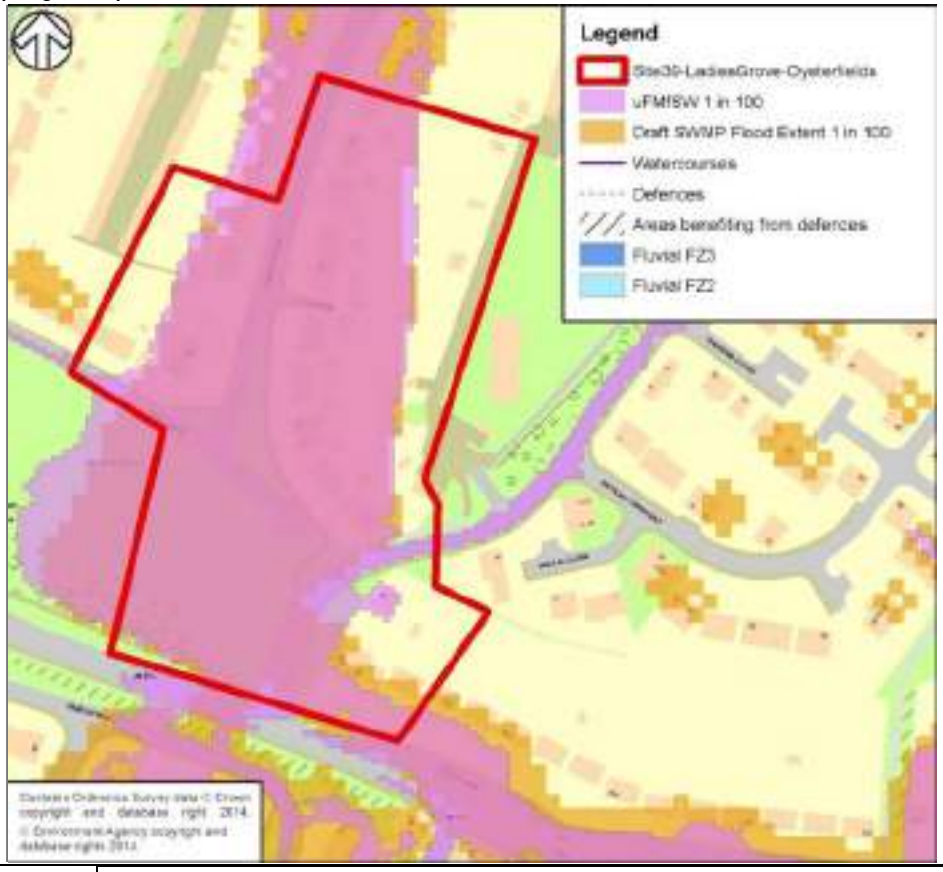
		30 year		100 year	
	Total	old	updated	old	updated
All properties	34	32	26	32	29

Comments

- The uFMfSW predicts flooding in Ladies Grove at the junction with Downedge, which is downstream from Site 38.
- There is a recreation ground adjacent to Downedge. Low lying properties are located adjacent to the junction of Ladies Grove and Downedge.
- The Thames Water records show a 2.7 x 1.0m storage tank, which may have a pumped return as during the site visit for the draft SWMP there was a kiosk in the recreation ground, alternatively this could be housing telemetry controls for the tank.
- The uFMfSW predicts the surface water overland flows originate from the north, upstream of Site 38. The solution proposed at Site 38 should assist with problems here.
- The draft SWMP proposed further attenuation upstream of this site in the relatively thin strip on land surrounded by Ladies Grove. Some bunding and or re-profiling of this area were proposed to attenuate any flows from the north.

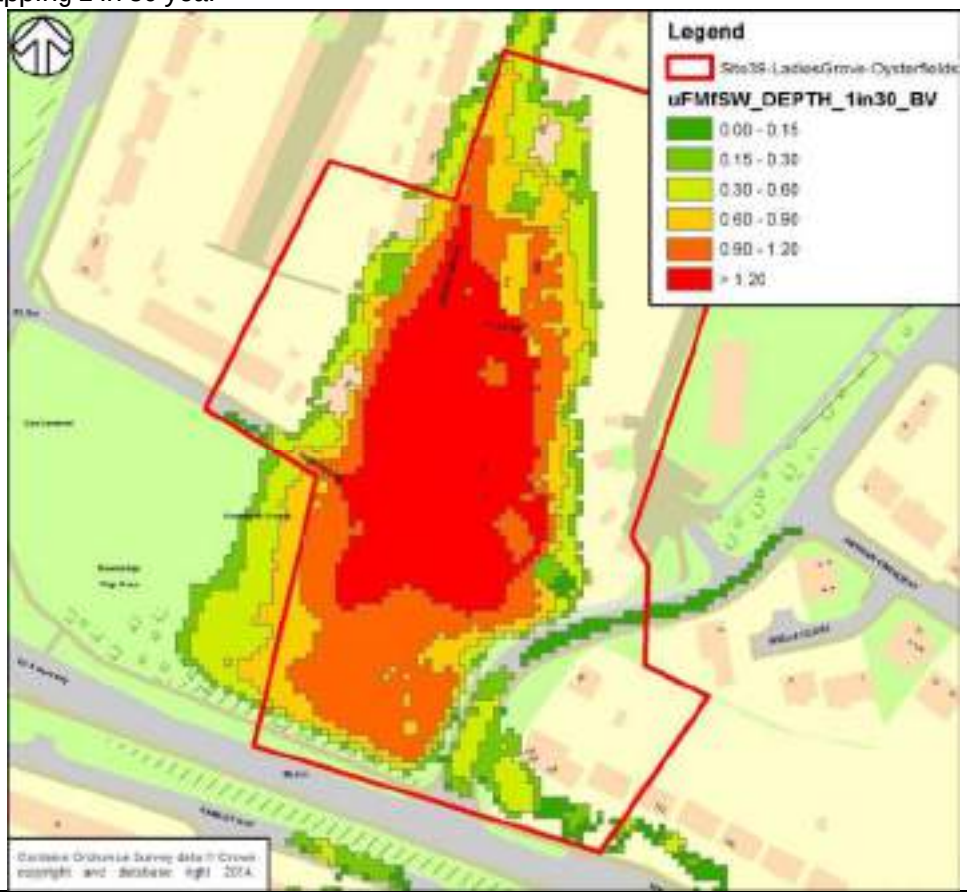
Comments Continued	
SWMP	St Albans District – St Albans
Site number	39
Site name	Ladies Grove – Oysterfields

Flood Mapping Comparison

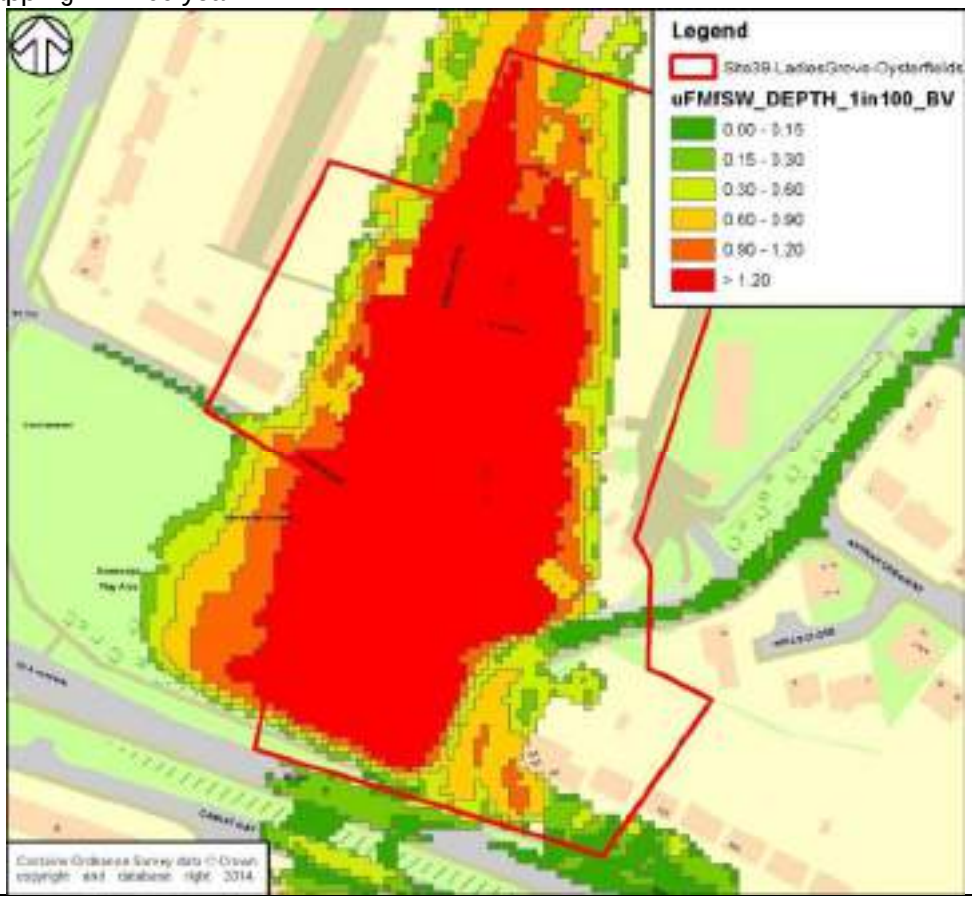


Proposed action	■ Given the relatively small strip of land available and the presence of mature trees in this area, the reprofiling of this strip of land would provide little storage. The redirecting of flow as part of the Site 38 works and filter drain / swales located along Batchwood Drive could be the best solution for the site. ■ It is recommended that Site 39 be linked and drainage solutions proposed for Site 38 and drainage located along Batchwood Drive investigated as part of the further studies.

Depth Mapping 1 in 30 year



Depth Mapping 1 in 100 year



SWMP	St Albans District – St Albans
Site number	40
Site name	Camlet Way

Flood Mapping Comparison

		30 year		100 year	
	Total	old	updated	old	updated
All properties	34	32	26	32	29

Comments

- The updated flood maps shows a reduction in the flood extent compared to the draft SWMP. Flooding is predicted to be concentrated in Fryth Mead and Camlet Way.
- Two properties along Camlet Way have flooding reports according to the draft SWMP. The site observation concluded both properties are located within low lying areas. One of the properties has a relatively steep drive from the road leading to an integral garage. There was evidence during the site visit of natural 'ponding' along Camlet Way where gullies are blocked by leaves. There is also a low spot behind the Camlet Way properties where significant flooding is predicted.
- The Thames Water sewer records show relatively small diameter surface water sewer pipes draining the area but these connect into a large 900 diameter pipe draining to the River Var, adjacent to Fryth Mead.

Comments Continued	
SWMP	St Albans District – St Albans
Site number	40
Site name	Camlet Way

Flood Mapping Comparison

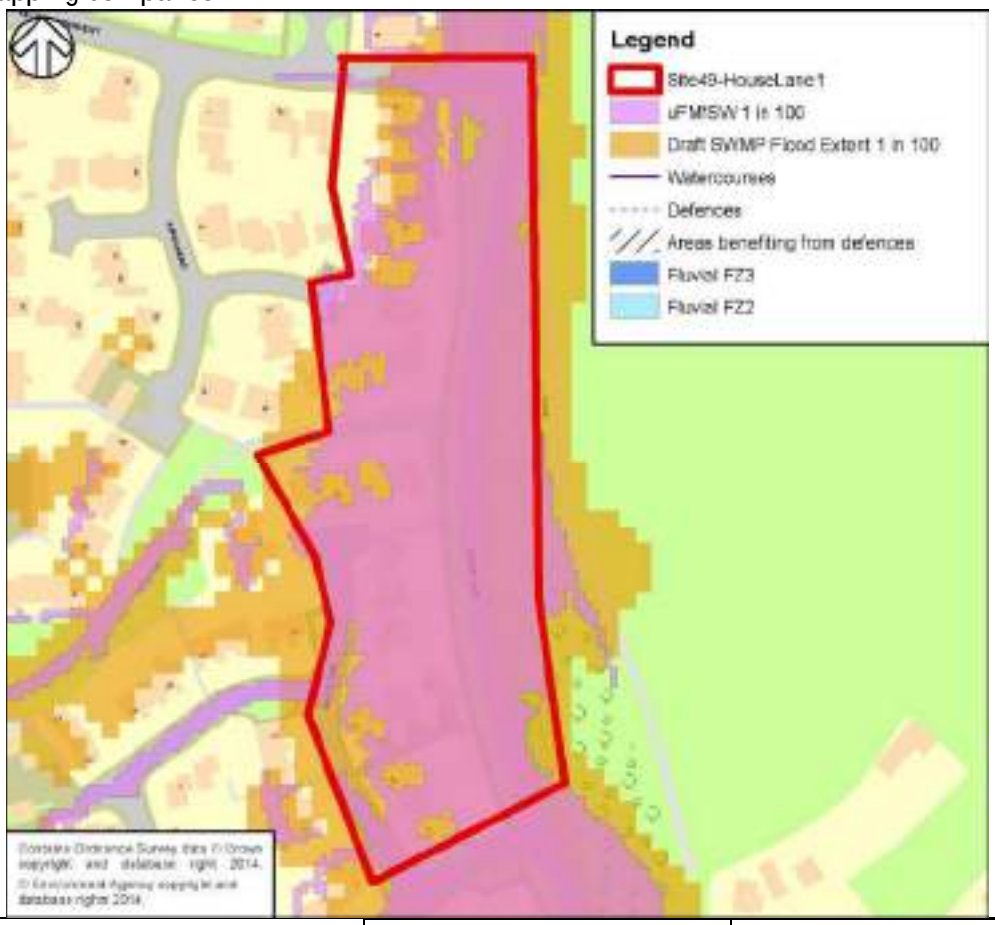
Comments Continued	■ Within the draft SWMP Herfordshire Highways confirmed that one of the main causes of problems in this area is a highway drain from Verulum Road / Redbourn Road which discharges part way down the road embankment. Water is understood to flow down the embankment picking up debris and flooding Camlet Way as well as blocking the drains. To resolve this issue it was proposed within the draft SWMP to construct a swale along the bottom of the road embankment to connect to the River Var downstream, a length of approximately 225m. ■ Stakeholders believe fluvial flooding of the River Ver may contribute to the predicted flood outline of the uFMfSW.
Proposed action	■ The proposed attenuation works at Sites 38 and 39, could help resolve any overland flow issues from the north, combined with gully maintenance to ensure localised runoff can enter the surface water system. ■ It is recommended that Site 40 be linked to the further studies and drainage solutions proposed for Sites 38 and 39.

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year

SWMP	St Albans District – St Albans
Site number	49
Site name	House Lane

Flood Mapping Comparison



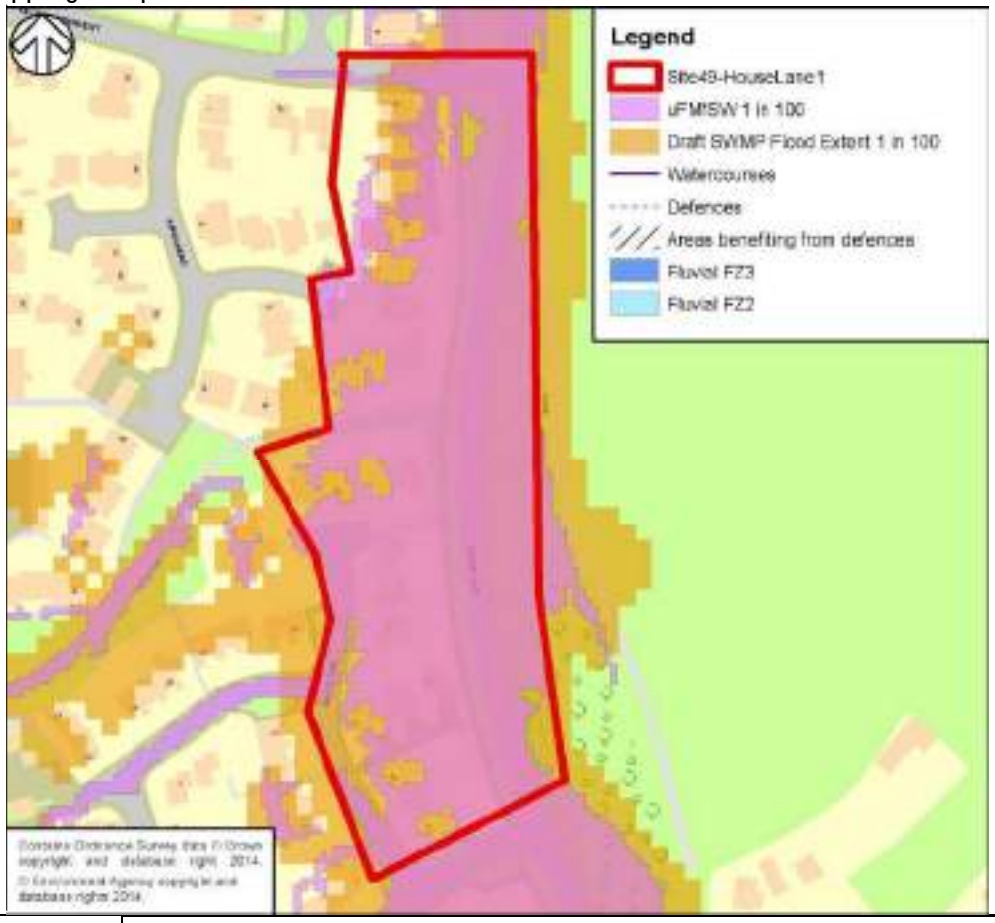
		30 year		100 year	
	Total	old	updated	old	updated
All properties	25	23	19	25	25

Comments

- The site is located in a natural low lying valley with both a rural and urban catchment contributing to it.
- The uFMfSW predicts flooding of both the carriageway and the footpath extending to properties within Gladeside.
- There is no surface water drainage shown on Thames Water sewer records along House Lane, the residential roads which lead onto House Lane are shown as having surface water sewers but these terminate before reaching House Lane. It is therefore assumed drainage along House Lane uses a highway drainage system or the roads drain to soakaways.
- Flow paths from the fields to the north affect this site and Site 51.
- It was recommended within the draft SWMP to construct a swale in the field, adjacent to the road in order to retain the water runoff.

Comment Continued	
SWMP	St Albans District – St Albans
Site number	49
Site name	House Lane

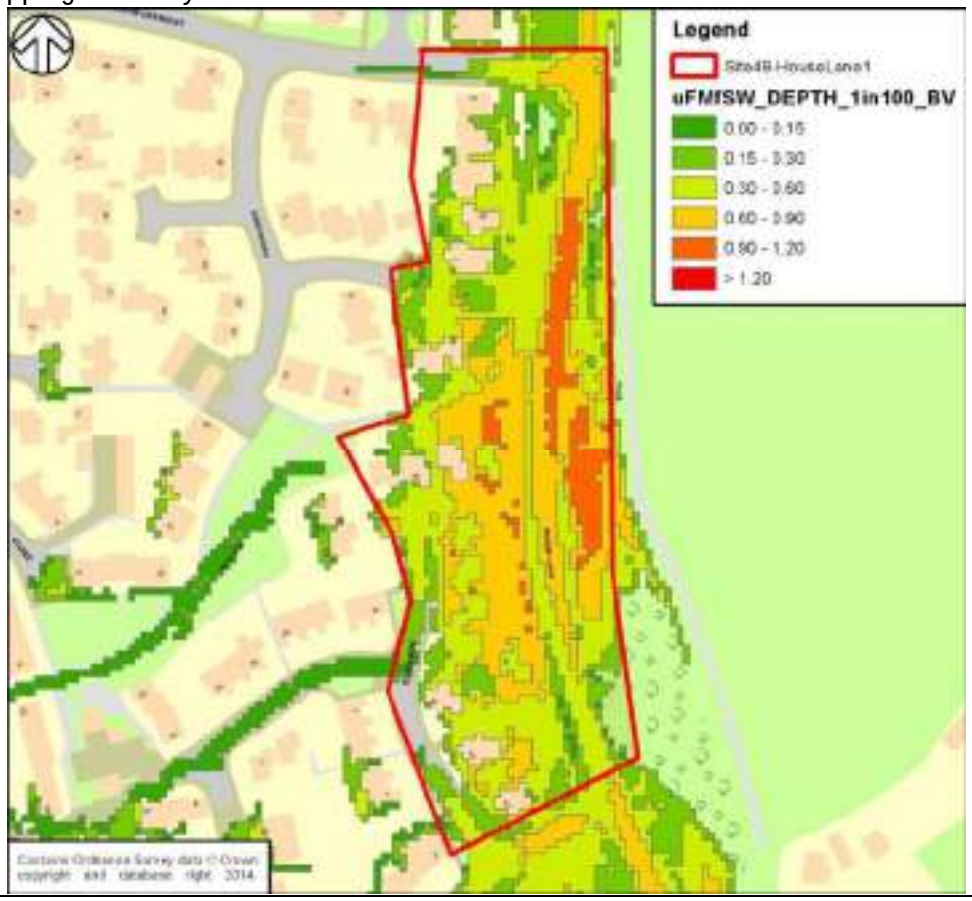
Flood Mapping Comparison



Comments continued	■ It was also assumed within the draft document that a retention pond would be required upstream of the properties adjacent to the Nursery to prevent diverting flood water toward these properties. ■ Stakeholders at the meeting agreed to the approach subject to third party land.
Proposed action	■ Parts of the highway along House Lane have wide verges which could accommodate suitable sized swales and bio-retention detention areas as a potential alternative to the proposed retention pond. The long term maintenance of the features make this a more attractive option that of a swale or pond located within third party land, as proposed within the draft SWMP. ■ It is proposed within the overview maps this site be connected to Site 51 and extended further north of House Lane and to include the neighbouring residential areas of Kingsmead. ■ Further detailed studies to understand the catchment and current drainage capacity within the area are likely to be required for the site. This should include Site 51.

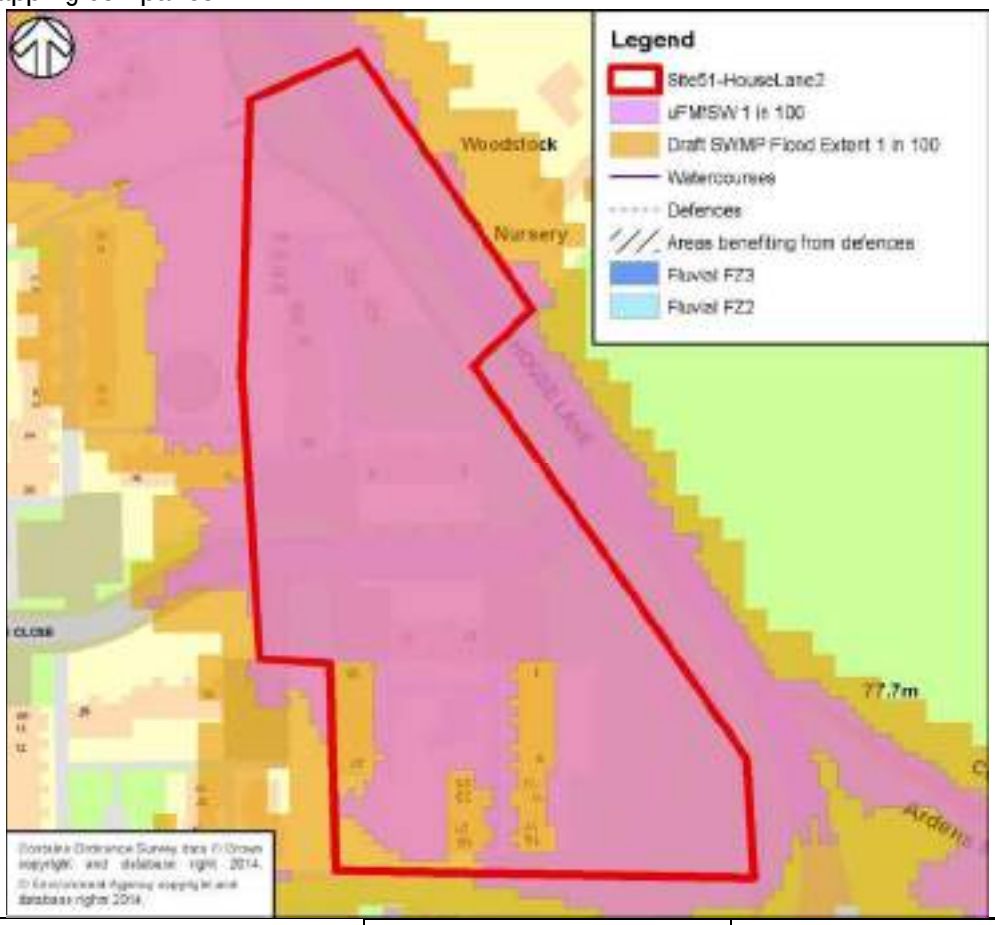
Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year



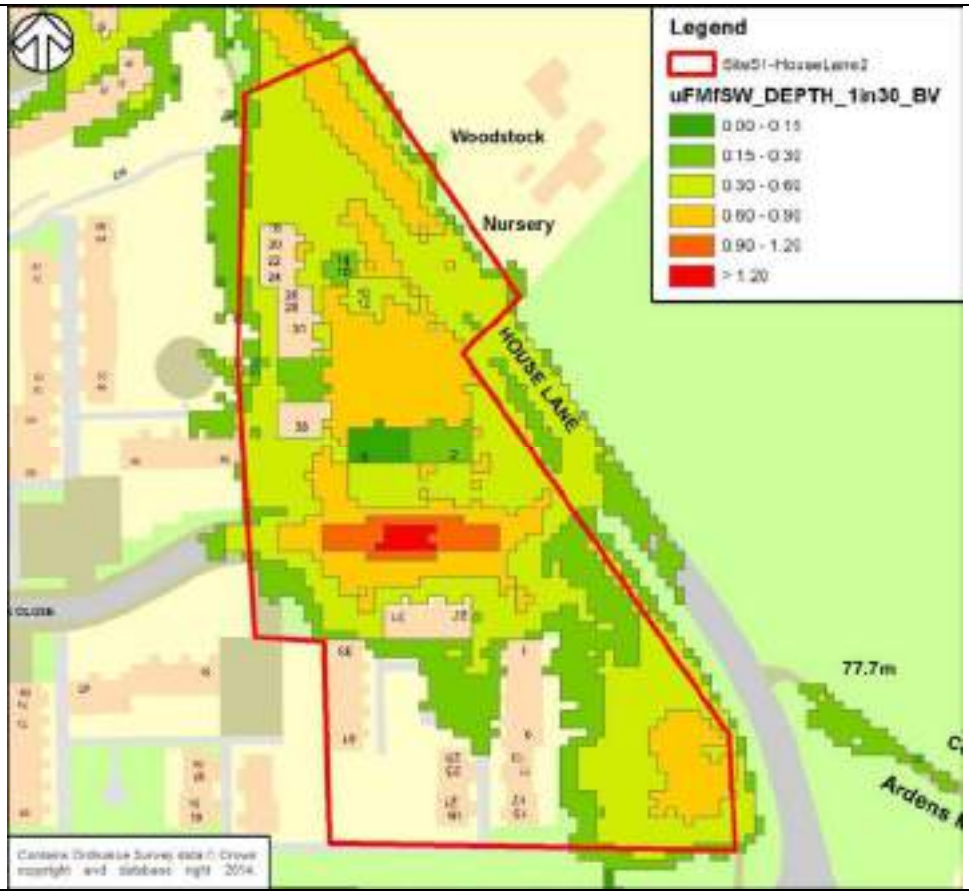
SWMP	St Albans District – St Albans
Site number	51
Site name	House Lane 2

Flood Mapping Comparison

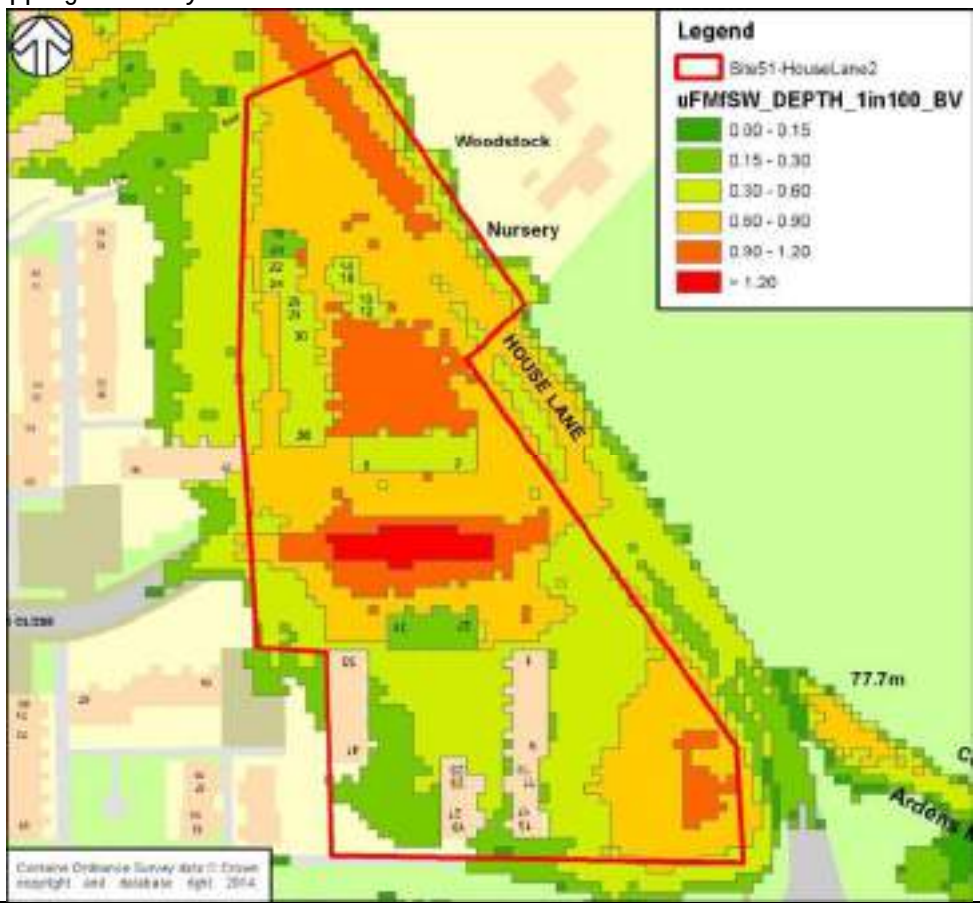


		30 year		100 year	
	Total	old	updated	old	updated
All properties	31	31	21	31	31

Comments	■ The site is further along House Lane from Site 49, at the junction of Newgate Close. ■ There is a 'low spot' observed during a site visit for the draft SWMP within Newgate Close, close to the junction with House Lane. Gully provision appears to be adequate here with twin gullies either side of the road. ■ The uFMfSW predicts overland flow from upstream as per Site 49.
Proposed action	■ Any future studies for Site 49 should combine with Site 51. ■ Upstream attenuation storage within the highway proposed for Site 49, should reduce overland flows to this area and help resolve the flooding experienced here.

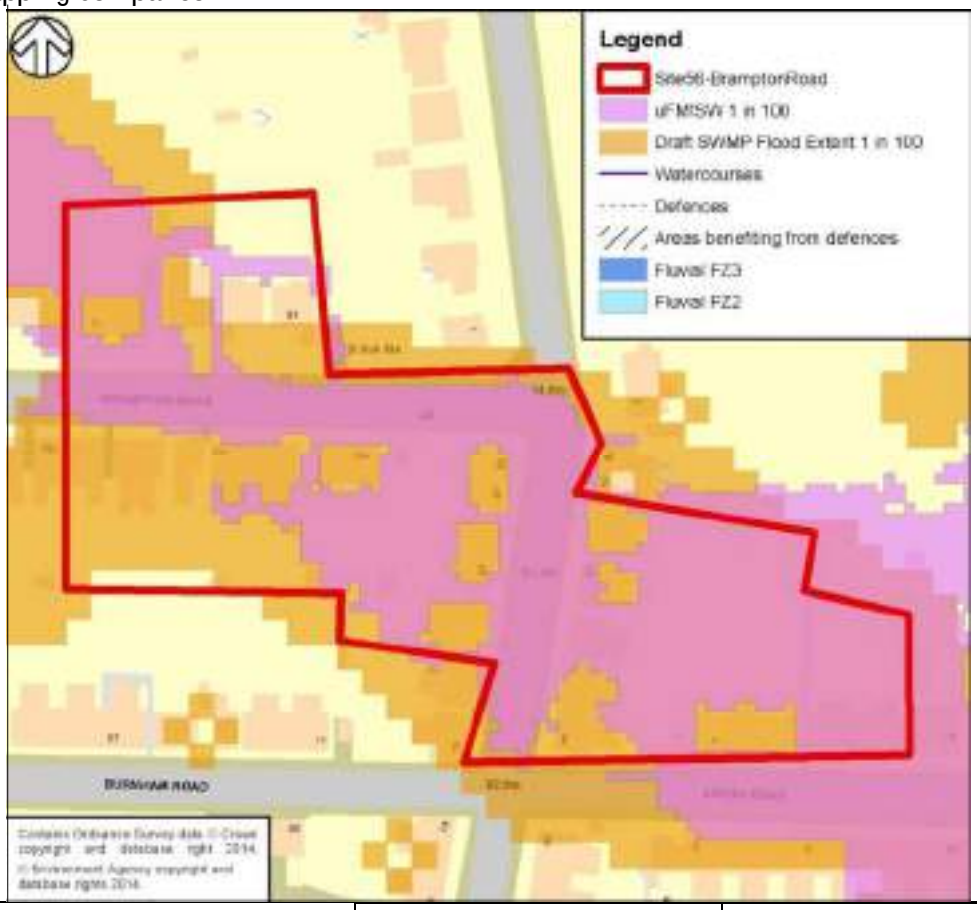


Depth Mapping 1 in 100 year



SWMP	St Albans – St Albans
Site number	56
Site name	Brampton Road

Flood Mapping Comparison



		30 year		100 year	
	Total	old	updated	old	updated
All properties	43	40	25	43	39
Critical infrastructure					
Comments	■ The main predicted flooding in this area is in Brampton Road although the flow path extends across Woodstock Road South, affecting properties in Eaton Road. ■ The draft SWMP confirmed there is a natural low spot with No 33 Woodstock Road South. ■ Mitigation proposals within the draft SWMP recommended an additional gully located in Woodstock Road South, opposite Brampton Road as it appears to be the lowest spot in the area. The draft SWMP predicted the overland flow path to be from Verulam School to the north. The uFMfSW would suggest this originates further north. ■ The proposal within the draft SWMP was for a pond within the school playing field. This is unlikely to be a viable solution with schools tending to avoid bodies of open water for health and safety reasons and land lost for the school recreational facility.				
Proposed action	■ It is recommended Site 56 to be extended to incorporate catchments further north and south of the site so that mitigation can benefit a wider area.				

Depth Mapping 1 in 30 year

Depth Mapping 1 in 100 year