JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	WHBC1

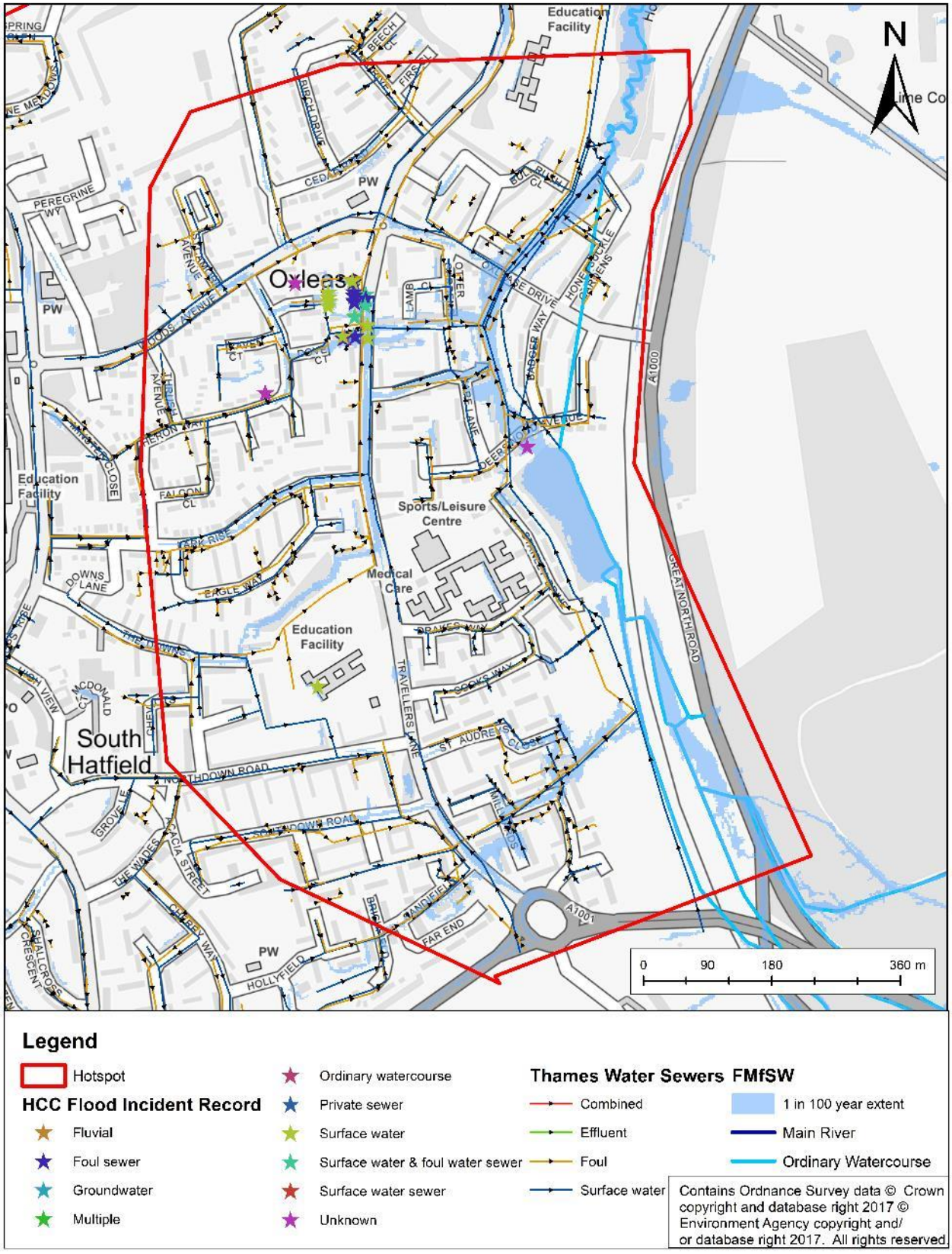
Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	WHBC1	
Hotspot Name	Travellers Lane, Hatfield	
Postcode	AL10 8SE	
Hotspot Area	**OS Grid Reference**	TL 22466 07563
	X coordinate	522466
	Y coordinate	207563
Local Authority	Welwyn-Hatfield	

Hotspot summary

Risk of Flooding from Surface Water (RoFfSW) mapping	Surface water flow path is fed by the ordinary watercourse that runs alongside the railway adjacent to Great North Road. The flow path follows the natural topography of the land and road, along Travellers Lane and along to the Oxlease roundabout. Secondary flow pathways also join from the urbanised areas to the west of Travellers Lane.
Sewerage	This hotspot area has a surface water and foul sewer network. Both networks drain out towards the north of the hotspot area.
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknow, but it is assumed that they drain to the surface water sewers where present.
Watercourses	There is an ordinary watercourse that runs along the eastern area of the hotspot boundary. This watercourse flows into the River Lea at Hertford Road.
Flood incidents recorded	Travellers Lane has been affected by multiple flood events since December 2013. These have been due to multiple flooding mechanisms such as overland flow from surface water and from water surcharging from the foul sewer network. Over the flood events that have occurred, properties have been flooded internally (7) and externally (13). The site visit indicated that the local authority have not had any reports of flooding since 2014.
Topography and ground conditions	The elevation along the road varies between 87.17 - 91.71 AOD(m) The road is situated along an industrial area and the surrounding and is relatively flat. The road predominately runs through an urbanised area. Adjacent to travellers lane there is a railway track that runs alongside the road. To the east of this road there is a wooded area.


N
Education Facility
Orleans
South Hatfield
Sports/Leisure Centre
Medical Care
Education Facility
Education Facility
A1000
A1001
GREAT NORTH ROAD
0 90 180 360 m
Legend
Hotspot
HCC Flood Incident Record
Fluvial
Foul sewer
Groundwater
Multiple
Ordinary watercourse
Private sewer
Surface water
Surface water & foul water sewer
Surface water sewer
Unknown
Thames Water Sewers
Combined
Effluent
Foul
Surface water
FMfSW
1 in 100 year extent
Main River
Ordinary Watercourse
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Flood Risk

History of flooding	Flooding has been caused by two very different flooding mechanisms; one from overland surface water flow and one from water surcharging from the foul water sewer network which collapsed. Sewers have known to fail in the area due to blockages. Discussions from the site visit suggested that flooding has previously been due to overland flow that has surcharging onto the sewers. There have also been incidents of flooding in the absence of rainfall, caused solely by obstructions to flow in the foul water sewer network. This occurred on several occasions in 2016, where internal flooding to properties was caused by foul water surcharging from two private foul water manhole chambers located at the front of properties. Flooding also occurs due to natural exceedance and infrastructure failure. It was observed on the site visit that the houses don't have a threshold. There is a significant dip in slope between the path entrances to the houses. The hotspot selection workshop on 16/01/2018 highlighted that there is a connectivity issue with the surface water network in the west of the hotspot.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	20	41	139
Sewer flooding incidents	No sewer flooding events have been recorded in the postcode sectors which cover this hotspot.		
Local authority incidents	0		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Maple Lodge catchment. Macro (coarse) modelling of foul sewerage only.
Previous studies (including other SWMPs)	A section 19 report was carried out on Travellers Lane for flood events that occurred in December 2013, February 2014, September 2014, July 2015, August 2015, June 2016. Flood events over these dates caused internal and external flooding to properties and affected road access. Travellers Lane was included in the Preliminary Flood Risk Assessment (2017).
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	The watercourse that runs through the boundary has not been classified with a water quality status, but the main river which it feeds into slightly downstream has been classified as moderate.
Development	No development is proposed in this hotspot area.
Green spaces and designations	There is a small area of green space to the eastern edge of the hotspot next to Stanley Drive. Other areas of green space include along by Great North Road, along Cherry Way, outside the eastern boundary of the hotspot there is a large area of green space beyond Great North Road and adjacent to the railway. There is also green space in proximity to Southdown Road. There are two local nature reserves in the boundary of the hotspot, Oxleys to the south east and part of Howe Dell to the north east.
Working with natural processes	In this hotspot there is opportunity for a small amount of wider catchment woodland under WWNP mapping that has been identified. There is also a small amount of potential for the implementation of riparian woodland.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	A reactive study has been carried out by HCC. It has been decided that recommendations from the HCC study that is being carried out at this hotspot will be taken forward for this hotspot. A follow up meeting regarding this site should be arranged, which will include review of the model that has been developed for this area ans whether any changes need to be made to it. Discussions on the site visit noted that funding for further work in the future could potentially come from a flood defence grant. There is potential for the area to include an environmental enhancement scheme (e.g. landscape a swale).	
Agreed decision	Significant risk identified and further modelling required	
	Non-modelled hotspot (see next section for proposed action	✓
	No further actions	

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs

Photographs

Site Photo 1		Image of Travellers Lane – houses both sides of the road have reported flood incidents in the past
Site Photo 2		Land slopes down towards mobile homes on Travellers Lane and have experienced surface water ponding in the past
Site Photo 3		
Site Photo 4		

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	WHBC2

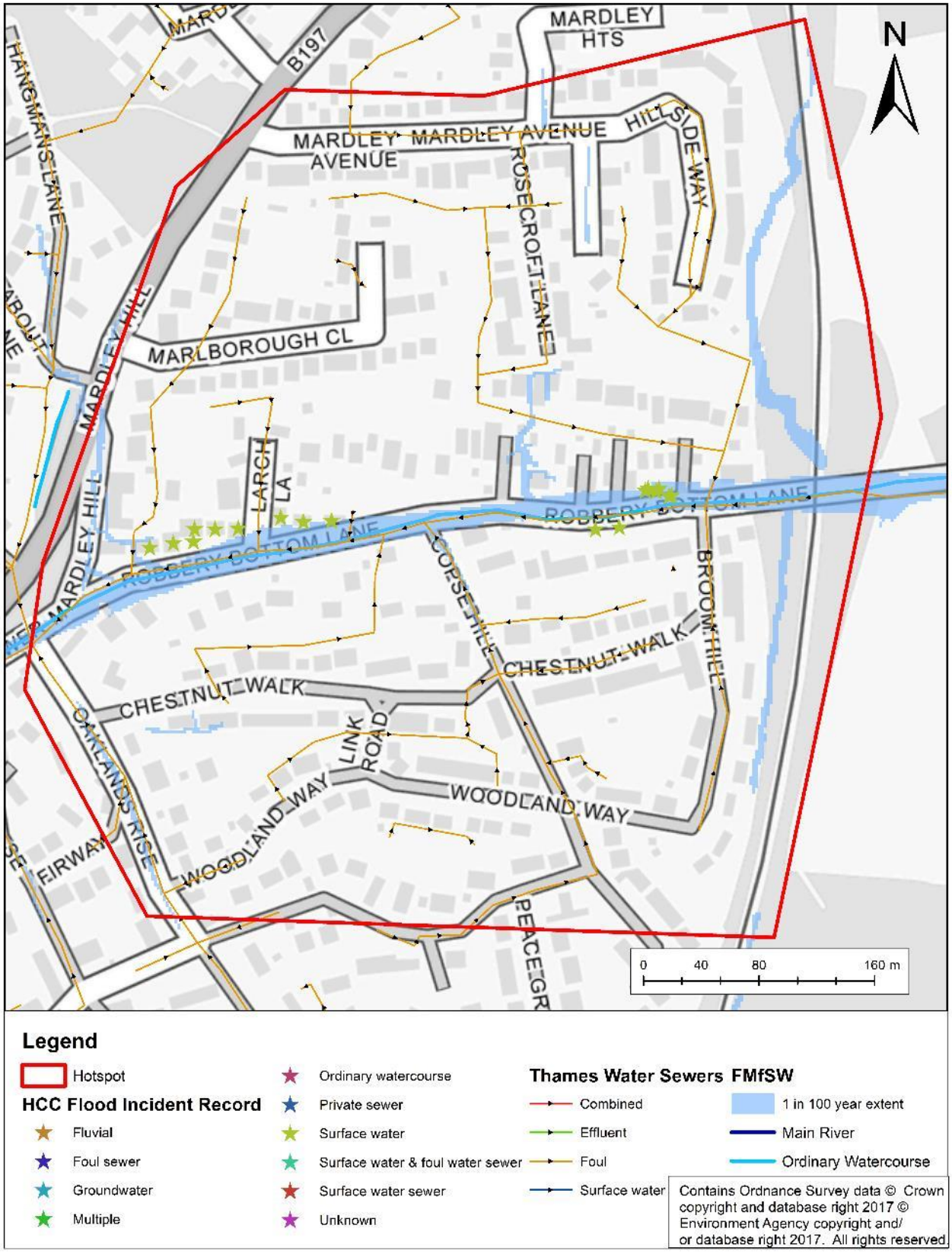
Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	WHBC2	
Hotspot Name	Robbery Bottom Lane	
Postcode	AL6 0UL	
Hotspot Area	**OS Grid Reference**	TL 24867 17625
	X coordinate	524867
	Y coordinate	217625
Local Authority	Welwyn-Hatfield	

Hotspot summary

Risk of Flooding from Surface Water (RoFfSW) mapping	There is a path of surface water flood risk along the stretch of Robbery Bottom Lane, with risk across all events up to the 1 in 1000 each year. The path flows from the east to the west with the catchment inflows from the village north of the area, at Woolmer Green village.
Sewerage	This hotspot area only has a foul sewer network system that drains out towards the west of the hotspot area.
Other Drainage	HCC records show a network of highway drainage gullies along Robbery Bottom Lane and roads to the north, but none in the roads to the south. The connectivity of these is unknow, but it is assumed that they drain to the surface water sewers where present.
Watercourses	There is an ordinary watercourse that flows along the stretch of Robbery Bottom Lane, flowing from Great North Road in an east to west direction. When the open watercourse is in low flow, the water naturally flows from where it first appears just south of the junction of White Horse Lane and Robbery Bottom Lane. It then heads west through one field, through a culvert under a bridleway and into another field.
Flood incidents recorded	Robbery Bottom Lane experienced flooding on 14th Feb 2014 following several days of rainfall causing saturation to the catchment area. The flood incidents that have been recorded in this area are all sourced from surface water.
Topography and ground conditions	The hotspot Is located in a residential area of Oaklands and the eastern perimeter of the hotspot covers part of a railway track. There is no EA 2m LiDAR coverage in this area.


MARDLEY HTS
B197
MARDLEY AVENUE
HILLSIDE WAY
ROSECROFT LANE
HANGMANS LANE
MARLBOROUGH CL
MARDLEY HILL
LARCH LA
ROBBERY BOTTOM LANE
COPSE HILL
CHESTNUT WALK
BROOM HILL
LINK ROAD
WOODLAND WAY
OAKLANDS RISE
PEACE GR
N
0 40 80 160 m
Legend
Hotspot
HCC Flood Incident Record
Fluvial
Foul sewer
Groundwater
Multiple
Ordinary watercourse
Private sewer
Surface water
Surface water & foul water sewer
Surface water sewer
Unknown
Thames Water Sewers
Combined
Effluent
Foul
Surface water
FMfSW
1 in 100 year extent
Main River
Ordinary Watercourse
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Flood Risk

History of flooding	Robbery Bottom Lane has experienced a number of flood incidents that have been recorded for 2014 and 2015. The source of the recorded flood events have been attributed to surface water flooding following several days of persistent rainfall. Once the area became saturated the surface water runoff made its way to an open watercourse that runs east to west along fields.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	1	4	9
Sewer flooding incidents	4 sewer flooding events have been recorded in this hotspot postcode sector (AL6 0)		
Local authority incidents	17		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Rye Meads catchment. Detailed modelling of foul sewerage only.
Previous studies (including other SWMPs)	Section 19 report was carried out for the flood event that occurred in February 2014. The surface water flooding entered the space beneath the floor of a further four residential properties, and caused internal damage to two garages. During this event the road was impassable for more than 10 hours. External property flooding affecting roads, including between the junctions of Broom Hill and Lower Mardley Hill. Other factors identified as contributing to the flooding in February 2014; the lane's highway drain between the inlet and Lower Mardley Hill was blocked with tree and shrub root mass which reduced the drain's capacity to convey water; gullies along the lane had become blocked with tree and shrub debris which reduced their efficiency. Flooding previously affected the lane on Christmas Eve 2013, as well as during 2009 and 1993. An options and feasibility study has been carried out bt HCC for this area, however no cost beneficial options were identified to go forward with.
LiDAR coverage	No, the area is not covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	There is no water quality status for this watercourse, which is a tributary of the Mimram (Codicote Bottom to Lee), WFD class moderate.
Development	Development is proposed in the south of this hotspot area.
Green spaces and designations	There is a small amount of green space to the eastern boundary of the hotspot area. There are no designations in the boundary.
Working with natural processes	No potential for WWNP has been identified in this hotspot area under the mapping.
Ongoing and proposed schemes	Some of the flood events that have been recorded along Robbery Bottom Lane are part of an Options and Feasibility Study which commenced in Summer 2015. Robbery Bottom Lane has also been part of the most recent Preliminary Flood Risk Assessment (2017).

Recommendations and options

Recommendations

Recommended way forward	Two studies have recently been commissioned by HCC for this area so it is recommended that this hotspot is not taken forward to the next phase of the SWMP project as highlighted flood risk will be considered in due course. As part of the HCC study, the upstream options were assessed but nothing was implemented and the workshop on 16/01/2018 concluded that modelling this hotspot further would not lead to any cost beneficial direction. HCC will continue to identify and explore whether there are any recommendations that can be implemented here.	
Agreed decision	Significant risk identified and further modelling required	
	Non-modelled hotspot (see next section for proposed action	
	No further actions	✓

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs

Photographs

Site Photo 1		Land behind Robbery Bottom Lane
Site Photo 2		Track along Robbery Bottom Lane

Site Photo 3		Image of winterbourne ditch at the edge of the land boundary on Robbery Bottom Lane
Site Photo 4		

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	WHBC3

Surface Water Management Plan – Hotspot Selection

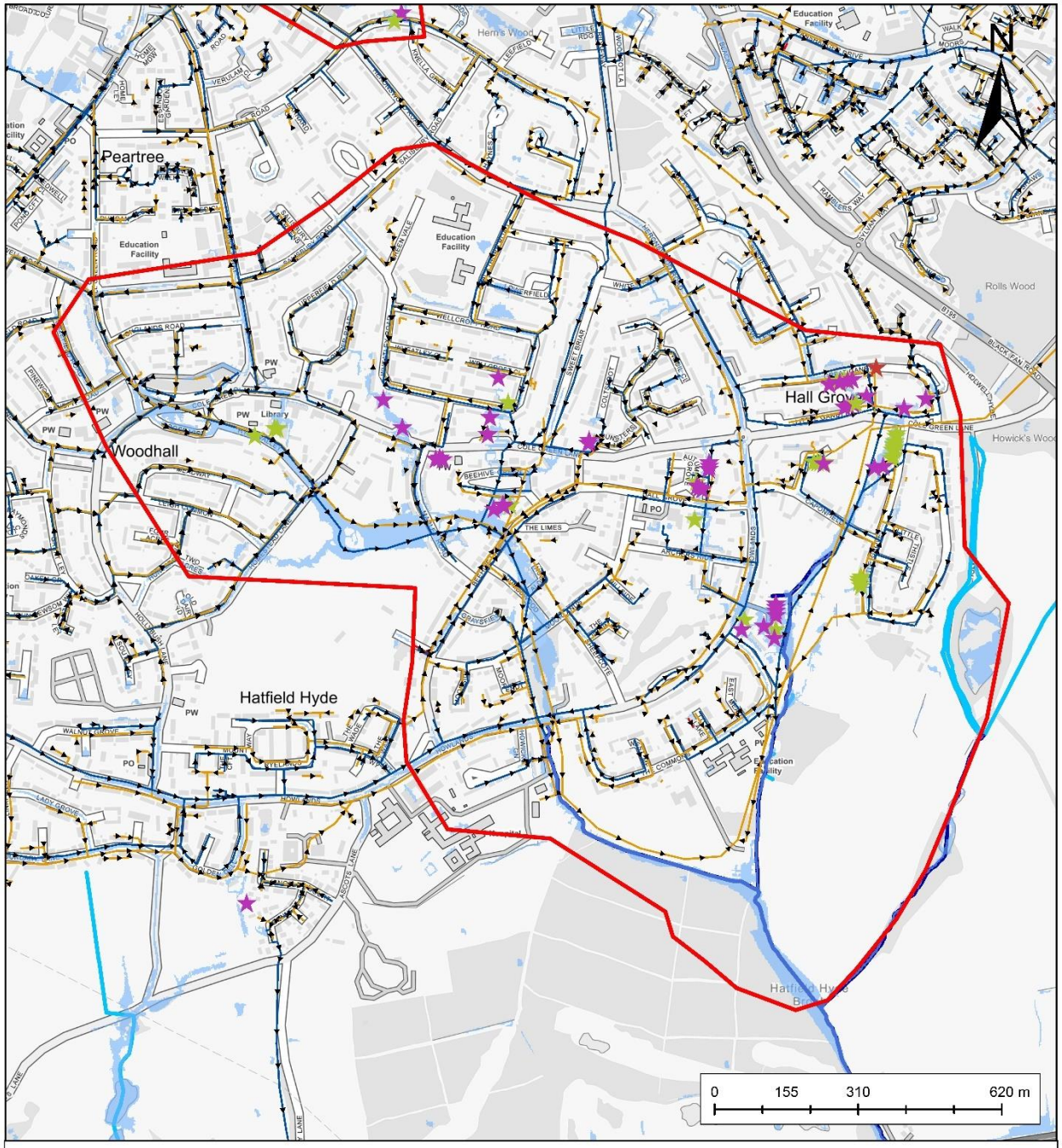
Overview

Hotspot Code	WHBC3	
Hotspot Name	Hyde Valley, Cole Green Lane and Beehive Green (in Woodhall) in the east and Great Ganet, Little Gannet, Thistle Grove, Desborough Close, and Autumn Grove in the west	
Postcode	AL7 4ND	
Hotspot Area	**OS Grid Reference**	TL 24775 11770
	X coordinate	524775
	Y coordinate	211770
Local Authority	Welwyn-Hatfield	

Hotspot summary

Risk of Flooding from Surface Water (RoFfSW) mapping	The RoFfSW mapping follows the natural topography of the basin. The pathway flows from south to north in the hotspot area. There is one main pathway which spreads into a further four routes, predominately passing along roads. The hotpot is at risk from across all three return periods, 30 year, 100 year and 1000 year extents.
Sewerage	This hotspot has surface water and foul sewers draining out of the catchment towards Hatfield Hyde Brook which is in the south of the hotspot area.
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknow, but it is assumed that they drain to the surface water sewers where present.
Watercourses	Hatfield Hyde Brook is a main river that has been classified by the EA, that runs through part of the southern band of this hotspot area. The course of the brook ends just before the road Caponfield. There are no ordinary watercourses that have been identified.
Flood incidents recorded	There have been 80 previous recorded flood incidents that have been mostly surface water flooding events, and two events related to surface water flooding and sewers exceeding their capacity. The majority of the surface water flood events have been from high intensity rainfall.
Topography and ground conditions	The topography of the land in this hotspot follows the river basin. The centre of the catchment as a lower elevation and it gradually gets steeper towards the perimeter of the boundary. The lowest elevation is approximately 65.65mAOD to 86.43mAOD. The centre of the catchment as a lower elevation and it gradually gets steeper towards the perimeter of the boundary.

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	WHBC3



Legend

HCC Flood Incident Record

- Fluvial
- Foul sewer
- Groundwater
- Multiple
- Ordinary watercourse
- Private sewer
- Surface water
- Surface water & foul water sewer
- Surface water sewer
- Unknown

Thames Water Sewers FMfSW

- Combined
- Effluent
- Foul
- Surface water

- 1 in 100 year extent
- Main River
- Ordinary Watercourse

Flood Risk

History of flooding	The history of flooding in this hotspot area has been reported to either be from surface water from heavy rainfall events which also caused drains to block, from sewers exceeding their capacity, or they have been reported to be from an unknown source. The flooding has affected properties both internally and externally in the hotspot area, particularly on Cole Green Lane. The EA historic flood map does not show any previous flooding in this area. Discussion with the LLFA during the site visits revealed that the care home along Hyde Valley has flooded from behind. The source of any future flood events are unlikely to be from the front of the building due to the slope up to the entrance to the care home. It was reported that the basement of the care home has had to be pumped out twice due to flood water. The land at this site has now been sold for flat conversions, however there is not an acceptable surface water management plan for the site to date (27/11/2017). Along Marley Road, there have been 3 flood incidents at the corner of the road, including the event on June 20th 2016, where approximately 20mm of rainfall fell over 15 minutes. Flooding along Cole Green Lane has been observed at the back of properties. Site visit discussion with HCC revealed that along Hall Grove, areas of depressions have filled with water in the past. A negative threshold sloping to the entrance of houses was noted.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	6	34	133
Sewer flooding incidents	28 sewer flooding events have been recorded in this postcode sector (AL7 4). The hotspot selection workshop on 16/01/2018 revealed that there were several incidents of sewer flooding in 1992 (35 properties), 1993 ans 1996. TW also confirmed that there was a scheme implemented in 2005 as a result of foul water flooding. The reported foul sewer flooding in 1996 has not known to reoccur until 2016.		
Local authority incidents	80		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Rye Meads catchment. Detailed modelling of foul sewerage only.
Previous studies (including other SWMPs)	A detailed S19 report has been requested but not carried out to date, for Cole Green Lane for the flood incident on 23rd June 2016. "Detailed S19 reports were requested for the flood event on 23/06/2017 and was completed on 11/10/2017. The S19 report showed that there is one surface water sewer issue along Cole Green Lane. The S19 Investigation reported that water flowed west at the roundabout by Cole Green Lane and overtopped the kerb at the lowest point on Cole Green Lane, running into Autumn Grove. Recommendations from this investigation for reducing risk of flooding from surface water included the LLFA to conduct a feasibility study to identify if a property level resilience scheme for properties at risk of flooding in Welwyn Garden City would provide necessary flood reduction measures, to explore surface water attenuation features as a means to channel surface water runoff, the LLFA to investigate surface water drainage at Autumn Grove to clarify that it is functioning to its design capacity. An S19 report has been carried out on Desborough Close where 6

	properties were flooded internally. A Section 19 Investigation was also published on 10 October 2017 for the flood event on 23 June 2016 which investigated three area. A section of Halls Grove, associated with the River Lee tributary. HCC sent 150 questionnaires to the area, of which 51 respondents reported internal flooding to have occurred. The report confirmed the strong correlation between the location of reported flood incidents and areas identified at risk from surface water flooding. Topographic depressions associated with historic flow of water were seen to be strongly associated with the areas that experienced flooding, concentrating surface water flow and overland flow routes. The majority of properties that experienced internal property flooding had dropped driveways and some areas were as a result of bow waves from vehicles travelling through flood water.
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	There is no water quality status for this watercourse, which is a tributary of the Lee (from Luton Hood Lakes to Hertford), which has a moderate WFD class.
Development	There are four areas of proposed development in this hotspot, including in the south east and by Woodhall Library. There is also a large strategic development proposed in the south eastern corner of the hotspot (and beyond), referred to as SDS2 in the Local Plan. These development areas represent opportunities to include SuDS into the proposed development plans.
Green spaces and designations	There is a reasonable amount of green space on the road verges and around the residential area of Hyde Valley and there are a lot of small areas of green space around the south eastern part of the hotspot. The Commons Nature reserve is a special designation and exists in this hotspot, providing an area of green space and an area of wetland.
Working with natural processes	In this hotspot opportunity is presented for wider catchment woodland under WWNP. There is also a small amount of potential for floodplain reconnection.
Ongoing and proposed schemes	This hotspot has previously been subject to a detailed S19 Investigation. This report investigated the flooding on 23rd June 2016. The flooding was caused by torrential rain and thunderstorms which caused flash flooding. The rainfall swept across the country starting in Northwood and heading north-east, affecting Bushey, Carpenders park, South Oxhey, Radlett, London Colney, Hatfield and Welwyn Garden City. Over 60mm of rainfall was recorded to have fallen at Mill Green during an 18 hour window. Overland flow was reported to follow the natural depression in the area which went along the west of Thistle Grove, through to Hall Grove and Desborough Close. Properties on the west side of Thistle Grove and east side of Howlands and Desborough Close flooded internally and externally. The depth and speed of flow overwhelmed the local drainage network in the Cole Green Lane area. Flooding to the properties at Desborough Close has additional significance and risk as they are designated for older residents, some of which whom have mobility restrictions.

Recommendations and options

Recommendations

Recommended way forward	This hotpot has been combined with a smaller hotspot (WHBC4) which was considered in the earlier versions of this report. It has been recommended to take this hotspot forward to phase 2 of the SWMP process and model this hotspot. There is potential for floodwater storage and so it is worthwhile to investigate feasibility options. Along Thistle Grove the clusters of previous surface water flooding demonstrated that distributed schemes would need to be implemented. The area of the Commons Nature Reserve is alongside where the main river runs. This area would require a cross section survey to be carried out. Potential to model the channel (high roughness).	
Agreed decision	Significant risk identified and further modelling required	✓
	Non-modelled hotspot (see next section for proposed action	
	No further actions	

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs
SuDS potential on verges of roads along Hyde Valley. There is also potential for SuDS opportunities along Cole Green lane and Hall Grove. Recommendations from the S19 report that was carried out for the flood event 23 June 2015 included the LLFA to conduct a feasibility study to identify if a property level resilience scheme for those properties at risk in WHBC to provide the necessary flood reduction measures; to explore surface water attenuation features as a means to channel surface water runoff; to investigate the surface water drainage at Autumn Grove to clarify that it is functioning to its design capacity; and lastly, that the LLFA should work with key stakeholders to investigate if any actions could be taken in Desborough Close to help residents become more resilient to the risks of surface water flooding.			

Photographs

Site Photo 1

Care home on Hyde Valley that is now in the process of getting permission for being converted to flats. Slopes down from behind towards care home. Flood risk is only presented from behind.

Site Photo 2

Road along Hyde Valley next to ex care home

Site Photo 3		Image of Marley Road
Site Photo 4		Image of property on Marley Road that has experienced flooding in the past on a number of occasions. Low thresholds towards entrance to property.

Site Photo 5		Sloping land along from Thistle Grove
Site Photo 6		The Commons Nature Reserve and main river (which appeared to be dry on visit (27/11/2107)

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	WHBC5

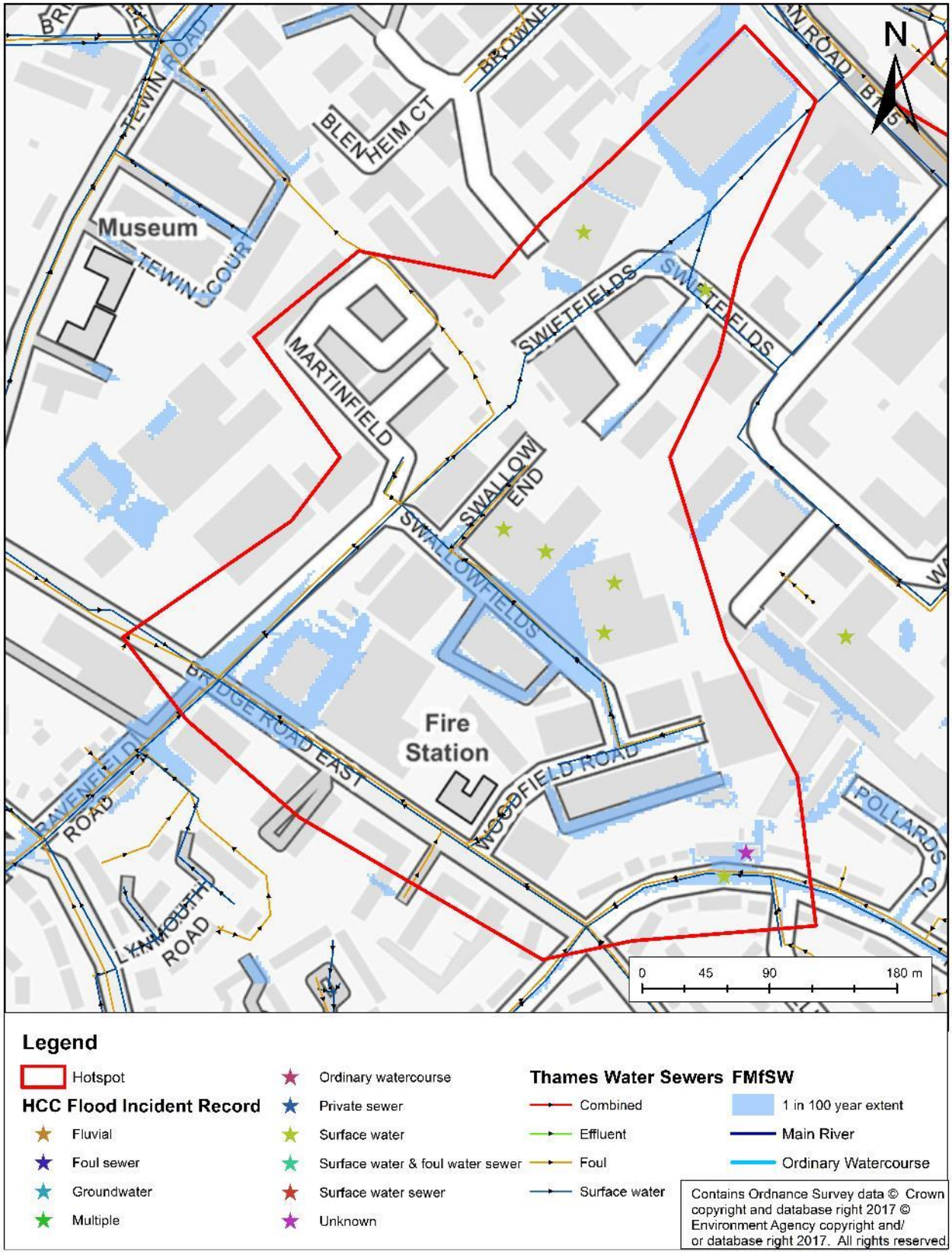
Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	WHBC5	
Hotspot Name	Swallowfields, Swiftfields, Knella Road	
Postcode	AL7 1UT	
Hotspot Area	**OS Grid Reference**	TL 24752 12867
	X coordinate	524752
	Y coordinate	212867
Local Authority	Welwyn-Hatfield	

Hotspot summary

Risk of Flooding from Surface Water (RoFfSW) mapping	The RoFfSW mapping is along the roads within the hotspot. The majority of road network in this area is affected by surface water flood risk under the 1 in 1000 each year extent, risk under the 1 in 100 and 1 in 30 year event is largely around Swiftfields and Swallowfields.
Sewerage	Surface water and foul networks drain out of this small hotspot boundary.
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknow, but it is assumed that they drain to the surface water sewers where present.
Watercourses	There are no watercourses that pass through this hotspot.
Flood incidents recorded	Surface water flood incidents have occurred in this hotspot and have been recorded over the period between 2015 to 2017. The events have been due to heavy rainfall and the catchment exceeding its capacity.
Topography and ground conditions	The elevation of the land slopes from the south to the north. The lower elevated area is around Swiftfields, with a small dip in elevation around Swallowfields as well (the elevation here is 78.9). Higher elevations exist around Woodfield Road and Martinfield. The range of elevation in this hotspot area is approximately between 73.54 and 81.6.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TEWIN ROAD
BLENHEIM CT
BROWNE
Museum
TEWIN COURT
MARTINFIELD
SWIFTFIELDS
SWALLOW END
SWALLOWFIELDS
Fire Station
BRIDGE ROAD EAST
WOODFIELD ROAD
RAVENFIELD ROAD
LYNMOUTH ROAD
POLLARDS
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180 m
Legend
Hotspot
HCC Flood Incident Record
Fluvial
Foul sewer
Groundwater
Multiple
Ordinary watercourse
Private sewer
Surface water
Surface water & foul water sewer
Surface water sewer
Unknown
Thames Water Sewers
Combined
Effluent
Foul
Surface water
FMfSW
1 in 100 year extent
Main River
Ordinary Watercourse
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Flood Risk

History of flooding	The source of the flood events that have occurred have been due to heavy rainfall, causing the catchment area to saturate and surface water flooding to occur. The pathway of the flooding has predominately been along roads, and the receptor of the floods have been roads and houses. Internal and external flooding have been caused over the flood events. Observations from the site visit on 27/11/2017 shows that along Woodfield Road, there is a large area of the land that is impermeable (industrial estate) and does not have very good drainage. Along Knella Road it was observed that there have been flooding of the flats along the left hand side of the road due to surface water.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	0	0	3
Sewer flooding incidents	The postcode sector (AL7 1) which covers Swallowfields and Swiftfields has experienced 7 flood incidents in this postcode sector, whilst Knella Road covered by the postcode sector Al7 3 has experienced 51 sewer flood events in this sector.		
Local authority incidents	8		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Rye Meads catchment. Detailed modelling of foul sewerage only.
Previous studies (including other SWMPs)	No detailed studies have been carried out for this hotspot area.
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	There is no water quality status for this hotspot as there are no watercourses that drain through the catchment area.
Development	Development is proposed along Bridge Road East and Woodfield Road.
Green spaces and designations	There is an area of green space (a wildlife site) that runs partly across the east of the site. No other desigations have been identified in this hotspot.
Working with natural processes	Under the WWNP mapping, no opportunities have been presented for this hotspot as a result of its urbanised nature.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	The hotspot has been identified as one that is of lower priority, however it is recommended to survey this hotspot and carry out PLR work. There would be very limited funding to implement any SuDS opportunities that would be identified through a model due to the industrial nature of the area. Area is limited to PL or minor works, particularly along Swiftfields.	
Agreed decision	Significant risk identified and further modelling required	
	Non-modelled hotspot (see next section for proposed action	✓
	No further actions	

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs

Photographs

Site Photo 1		Image of Swallowfields, road on industrial estate that is heavily urbanised
Site Photo 2		Industrial estate buildings on Swallowfields road

Site Photo 3		Little opportunity at this site due to land use and lack of green space
Site Photo 4		

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	WHBC6

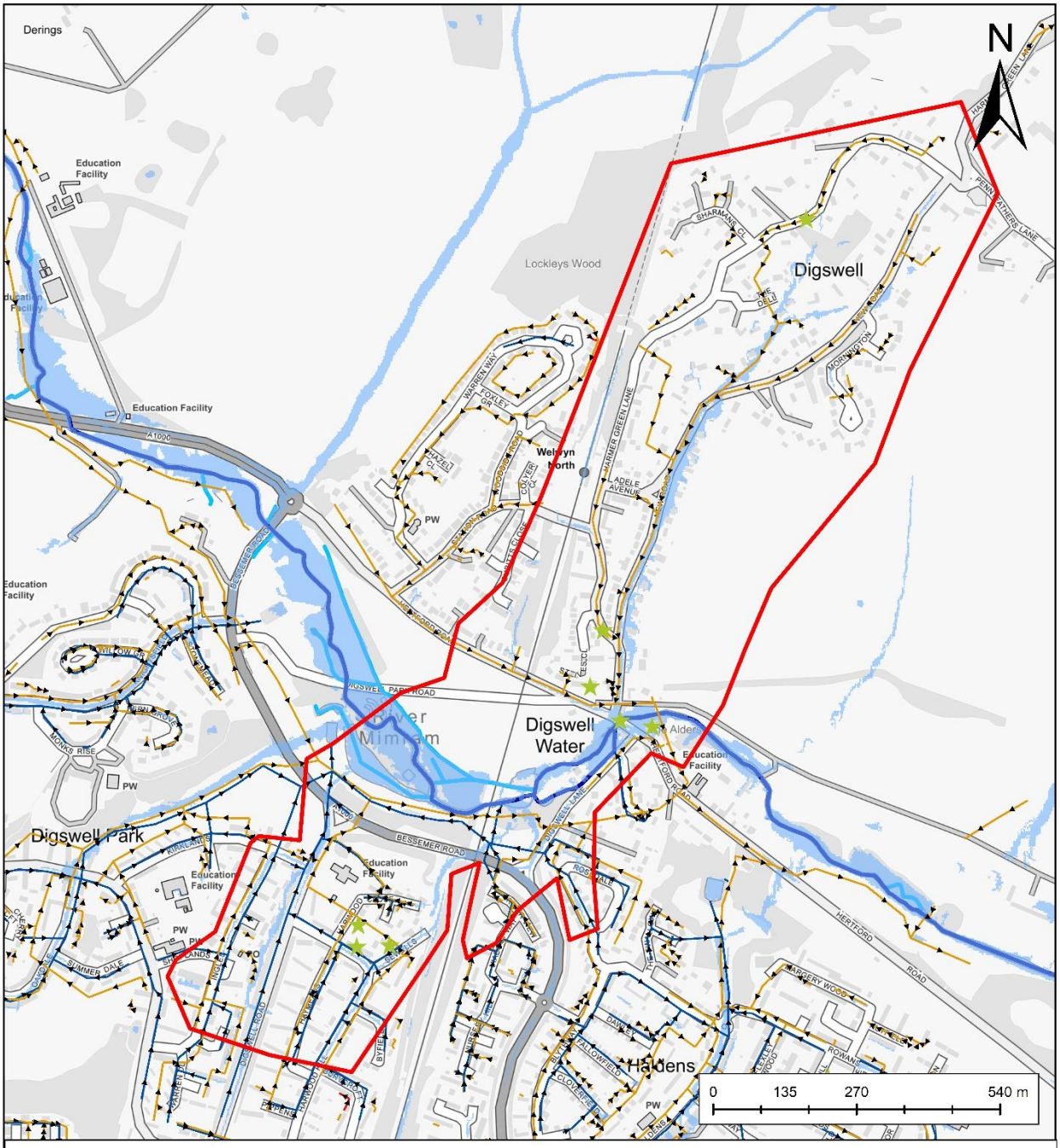
Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	WHBC6	
Hotspot Name	Rosedale, Digswell Water, Harwood Close, Sewells, Hertford Road	
Postcode	AL7 1DP	
Hotspot Area	**OS Grid Reference**	TL 24738 14594
	X coordinate	524738
	Y coordinate	214594
Local Authority	Welwyn-Hatfield	

Hotspot summary

Risk of Flooding from Surface Water (RoFfSW) mapping	The majority of the surface water flood risk in this hotspot is around the area of the watercourse, with the flow path of surface water flowing from the north to the south west along the road network, particularly along the roads of Bessemer Road, Haymeads and Digswell Road.
Sewerage	This hotspot area has surface water and foul water sewer networks. Both networks drain out of the catchment area. The surface water network drains towards the River Mimram.
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknow, but it is assumed that they drain to the surface water sewers where present.
Watercourses	The River Mimram exists within this boundary and has been considered to be a main river classified by the EA.
Flood incidents recorded	There have been surface water flood events within this hotspot area and the area around the River Mimram is on the EA historic flood map. The flood incidents have affected Harmer Green Lane, Hertford Road, Digswell Bridge, Sewells, Harwood Hill and Harwood Close. The flood incidents have been due to heavy rainfall/near to the River Mimram.
Topography and ground conditions	Digswell Water and the River Mimram run through approximately 30% of this hotspot area. Adjacent to the Bessemer Road is an education facility and a residential area, such as around Haymeads. The topography of the land slopes towards the river basin, with the lower elevations around Digswell Park Road. The elevation of the area ranges between 64.43 to 95.07mAOD.



Legend

HCC Flood Incident Record
- Fluvial
- Foul sewer
- Groundwater
- Multiple
- Ordinary watercourse
- Private sewer
- Surface water
- Surface water & foul water sewer
- Surface water sewer
- Unknown

Thames Water Sewers
- Combined
- Effluent
- Foul
- Surface water

FMfSW
- 1 in 100 year extent
- Main River
- Ordinary Watercourse

Flood Risk

History of flooding	The source of the flood incidents have been due to heavy rain saturating the ground causing surface water flooding. The pathway of surface water flow has been predominately along roads, and the receptor has been houses, causing both internal and external damage. Observations from the site visits in Digswell Water showed that exceedance of surface water would flow down under the bridge on Hertford Road. There is an open field behind Hertford Road that slopes down towards the houses - this contributes to the runoff from the east of the hotspot boundary. Observations along Hertford Road illustrated surface water flow paths would mainly be along the road. It was observed from the site visit on 27/11/2017 that under flood conditions surface water would flow under the bridge at Digswell Water (on Hertford Road). There is an open field behind Hertford Road that slopes downwards towards the houses and presents flood risk to houses from behind, contributing to runoff from the east. Flooding on Hertford Road has been a previously reported problem, including along Harmer Green Lane. Observations from the site visit showed that Digswell Lane dips at the bottom of the Road and there is a gully by a house that has potential to back up from the river across the road if water levels are high.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	0	1	24
Sewer flooding incidents	This hotspot area covers three postcode sectors picked up by the sewer flooding register. Digswell Road and Hertford Road is covered by AL6 0 postcode sector which has experienced 4 sewer flooding events, Rosedale Road in sector AL7 1 has experienced 7, and Harwood Close and Sewell's in Al8 7 has experienced 17 sewer flooding incident events.		
Local authority incidents	7		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Rye Meads catchment. Detailed modelling of foul sewerage only.
Previous studies (including other SWMPs)	HCC carried out a Flood Investigation report for the flood incident that occurred on 16th and 17th July 2015 at Digswell Bridge. Three internal properties were reported to flood along with 6 external properties. The report observed the rural nature of the area, having a very steep hill which enables fast flows in a southerly direction. It was also reported that water eventually ponds at the bottom of New Road at the roundabout with Hertford Road.
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	The River Mimram has been considered to have a "moderate" status under the WFD water quality classifications (2016).
Development	There is a small amount of development proposed in this hotspot area, along Hertford Road in the north.
Green spaces and designations	There are several areas of green space within this hotspot boundary, with a large portion of it in the north east of the boundary above the River Mimram.
Working with natural processes	Under the WWNP mapping, there is a potential for opportunities for floodplain reconnection and floodplain woodland around the area of the River Mimram which is the watercourse that runs through this hotspot boundary.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	This hotspot would not benefit from detailed modelling, however it is recommended to be taken forward as a small modelled hotspot. It is recommended that a levelling survey is carried out. The modelling would look at how the surface water can be kept on the road rather than affect the nearby properties, particularly along Sewells Road. Sending out a questionnaire to Sewells Road is also recommended to improve the reporting and better understand the flood risk. The site visit and later discussion around this hotspot revealed the extended risk around harmer Green and St Ives Close. These areas have now been included and the modelled boundary has been extended. It was reported that runoff collets by the roundabout and flows through the properties.	
Agreed decision	Significant risk identified and further modelling required	✓
	Non-modelled hotspot (see next section for proposed action	
	No further actions	

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs
A possible option that will be co considered is diverting or holding the water back in the fields behind Hertford Road (on New Road/Hertford Road).			

Photographs

Site Photo 1		Image of Sewells – watercourse is located down the end of this road. The houses at the bottom are at particular risk
Site Photo 2		Green space along Sewells that could implement possible SuDS opportunities

Site Photo 3		Slope down from Harmer Green Lane, Digswell Water
Site Photo 4		Watercourse behind Tewin Water Estate, Digswell Water

Site Photo 5		Image of Harwood Close, properties 1-7
Site Photo 6		Image of sloping road towards Sewells

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	WHBC7

Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	WHBC7	
Hotspot Name	Heayfields, Wren Wood, Westly Wood	
Postcode	AL7 2EH	
Hotspot Area	**OS Grid Reference**	TL 26149 13208
	X coordinate	526149
	Y coordinate	213208
Local Authority	Welwyn-Hatfield	

Hotspot summary

Risk of Flooding from Surface Water (RoFfSW) mapping	The RoFfSW is quite disperse and spread around the hotspot area. The flow path is primarily along the roads such as Herns Way and Brooksfield. The 1 in 30 each year flood risk is relatively small, with a main area of concern around Heay Fields where previous flood incidents have been recorded, in comparison to the risk under the 1 in 1000 year event for the area.
Sewerage	This hotspot area has surface water and foul water sewer networks. Both networks drain out of the catchment area. The surface water network drains towards the River Mimram.
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknow, but it is assumed that they drain to the surface water sewers where present.
Watercourses	The River Mimran is 0.8km away which has been classified as a main river by the Environment Agency. No ordinary watercourses are nearby the hotspot.
Flood incidents recorded	Flood incidents have occurred in this hotspot area have been: Heay Fields - 5 events by surface water and unknown sources occurred, causing both internal and external flooding to properties. Moors Walk - 1 flood event has been recorded here, due to surface water flooding that affected both internal and external properties Wren Wood - 1 flood event occurred here by an unknown source New Wood - 2 flood events have been reported here, to have caused internal and external flooding, by an unknown source
Topography and ground conditions	The lower elevations in the hotspot area are in the far east, which is where most of the previous flood incidents have been recorded. The low elevations range between approximately and 74AOD(m) and 76 AOD(m). The elevation of the land slopes from the west to the east, which follows the same path of the surface water along the roads. There is an education facility to the south of the hotspot site which has an elevation of 80.1AOD(m).

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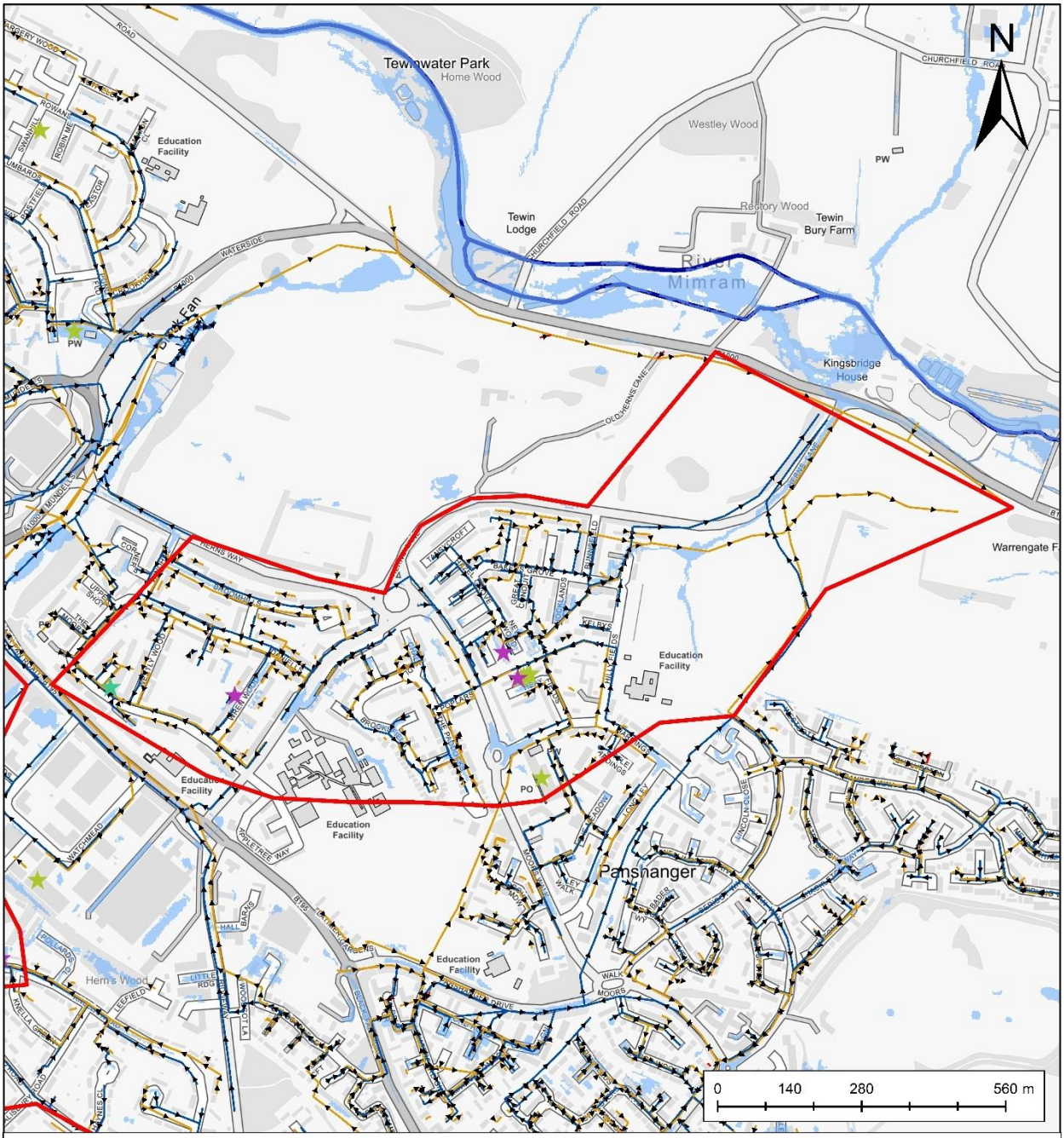


Legend

- Hotspot
- HCC Flood Incident Record
  - Fluvial
  - Foul sewer
  - Groundwater
  - Multiple
  - Ordinary watercourse
  - Private sewer
  - Surface water
  - Surface water & foul water sewer
  - Surface water sewer
  - Unknown
- Thames Water Sewers FMfSW
  - Combined
  - Effluent
  - Foul
  - Surface water
- 1 in 100 year extent
- Main River
- Ordinary Watercourse

Flood Risk

History of flooding	There is a history of flooding that has occurred in the area, that has caused internal and external flooding to properties. The source and cause of the flooding was attributed to surface water runoff from heavy and intense rainfall. Two of the events that have been recorded have also been sourced from poor drainage (incident on Wren Wood and new Wood). Observations from the site visits illustrated that in the area of Heayfields, the land slopes towards the bottom of the road where there is potential for surface water ponding. The houses in the area have no threshold and are lower than the highway. The road along Wren Wood was shown to be higher than the level of the houses, and there are steps down to house entrances, showing their vulnerability to surface water ponding/flooding. This was also evident along Stoney Croft.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	0	14	69
Sewer flooding incidents	Wren Wood and Westly Wood are covered by AL7 1 postcode sector and have 7 previous sewer flood incidents recorded. Heayfields is in AL7 2 postcode sector and has no previous sewer flooding history.		
Local authority incidents	10		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Rye Meads catchment. Detailed modelling of foul sewerage only.
Previous studies (including other SWMPs)	No previous studies have been carried out for this area that has experienced flooding in the past.
LiDAR coverage	Area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	The River Mimran is considered to be of "Moderate" status under the WFD water quality classifications (2016).
Development	Hilly Fields in this hotspot is an area where there is proposed development. The proposed development in this hotspot is on the RoFfSW flow path to the east of the hotspot, and a surface water sewer network runs along the road by the proposed development site. The hotspot selection workshop suggested that the development could potentially make the surface water risk worse to the site, so SuDS should be picked up by the developer at the planning phase.
Green spaces and designations	There are no designation areas in this hotspot. However there is a large area of green space in the north west of the hotspot boundary along Old Herns Lane.
Working with natural processes	Under the WWNP mapping, no opportunities have been presented in the majority of the area that this hotspot covers, however there is a band of potential opportunity in the north of the hotspot for floodplain reconnection, floodplain woodland and a small amount of riparian woodland, following the line of the main river.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	The flood events that have been recorded in this hotspot area are dispersed and therefore additional modelling would be unlikely to increase the understanding on flood risk. The level of predicted modelled flood risk is relatively low and the flood events recorded are in a largely flat area, which suggests the flooding is localised.	
Agreed decision	Significant risk identified and further modelling required	
	Non-modelled hotspot (see next section for proposed action	✓
	No further actions	

Options (section to be completed for non-modelled hotspots only)

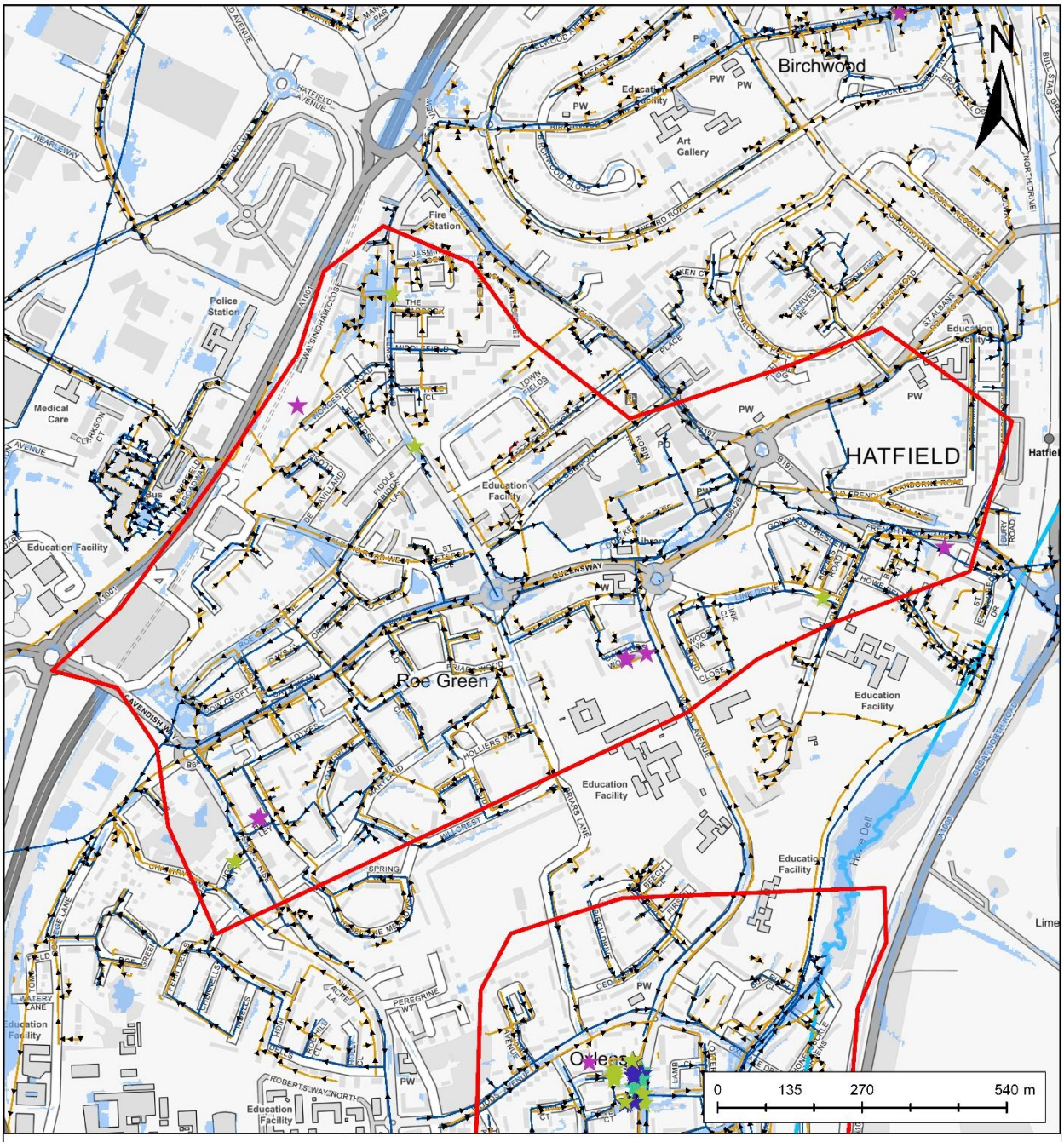
Proposed action	Lead organisation	Partners	Costs

Photographs

Site Photo 1		Sloping road along Heay Fields
Site Photo 2		Low threshold along properties driveways along Heay Fields

Site Photo 3		Steps down towards entrance to properties on Wren Wood.
Site Photo 4		

Surface Water Management Plan – Hotspot Selection		
Overview		
Hotspot Code	WHBC8	
Hotspot Name	Hatfield and Roe Green (French Horn Lane, Link Drive, Oaklands Wood, Vigors Croft, Hill Ley, Worcester Road and Lemsford Road)	
Postcode	AL10 0LR	
Hotspot Area	**OS Grid Reference**	TL 22502 08495
	X coordinate	522502
	Y coordinate	208495
Local Authority	Welwyn-Hatfield	
Hotspot summary		
Risk of Flooding from Surface Water (RoFfSW) mapping	The RoFfSW mapping shows flow paths from the west to the east. The flow path is mainly along the roads. The western and north western area of this hotspot is most at risk from surface water flooding across all three return periods (30, 100 and 1000 year extents), particularly along St Albans Road West and Lemsford Road, where there have been recorded flood incidents.	
Sewerage	This hotspot area has surface water and foul water sewer networks. Both networks drain out of the catchment area. There is also a small amount of combined sewer network located on Stockbreach Road.	
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknow, but it is assumed that they drain to the surface water sewers where present.	
Watercourses	There are no rivers or ordinary watercourses that run through the hotspot area boundary, however there is an ordinary water course that runs adjacent to the eastern boundary of the hotspot. The River Lee is a main river classified by the EA, located 1.3km away from the hotspot and is a low flow catchment.	
Flood incidents recorded	Flood incidents have occurred in this hotspot area have been: Hill Ley - 2 events by unknown sources that caused internal and external flooding to properties Oaklands Wood - 3 events from unknown sources, that caused external flooding to properties Link Drive - surface water flood event Glebe Court - 2 events here caused internal flooding to properties Lemsford Road - 2 events caused by surface water led to external flooding to properties Worcester Road - Flood event caused by an unknown source caused external flooding to a property on this road	
Topography and ground conditions	Topography of the hotspot area ranges between 92.16AODm in the far south eastern corner, to 75.5AODm in the far north western corner. There is a gentle gradient from west to east. The majority of the area is residential with an area of commercial development to the far south west.	



Legend

Hotspot

HCC Flood Incident Record

- Fluvial
- Foul sewer
- Groundwater
- Multiple
- Ordinary watercourse
- Private sewer
- Surface water
- Surface water & foul water sewer
- Surface water sewer
- Unknown

Thames Water Sewers FMfSW

- Combined
- Effluent
- Foul
- Surface water

- 1 in 100 year extent
- Main River
- Ordinary Watercourse

Flood Risk

History of flooding	There is a history of flooding that has occurred in this area. The source of flooding in this hotspot area has been due to surface water from heavy rainfall events, with a number of incidents having an unknown source. The events recorded on Hill Ley are thought to be due to a lack of drainage in the area. One event was reported a being due to raised neighbouring ground following on from a school development. The pathway of the flooding has mainly been along roads, following the natural topography of the land. The receptor of the events has been roads, houses and gardens. Observations and discussions from the site visit showed that the negative threshold along Oaklands Wood contributed to the flood risk in this area. Flooding along Oaklands Wood has been observed as being sourced from behind the houses along the left side of the road. The urban density of the area causes reduced impervious surface which has increased the flood risk in the area and the potential for surface water ponding. Observations along Lemsford Road showed there to be a threshold of approximately 20cm to houses. There is a potential area of accumulation in the area. Jasmine gardens is approximately 300mm lower than Lemsford Road. Not all houses have thresholds in this area and thus the distribution of flood risk is uneven.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	2	11	241
Sewer flooding incidents	No sewer flood events have been recorded in the postcode sector covering this hotspot.		
Local authority incidents	0		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Eastern half of hotspot is in Maple Lodge catchment. Macro (coarse) modelling of foul sewerage only. Western half of hotspot is in Hatfield (Mill Green) catchment. Detailed modelling of foul sewerage only.
Previous studies (including other SWMPs)	No S19 reports have been carried out for the flood incidents that have been reported.
LiDAR coverage	Area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	The Upper Lee is 1.3km away from the hotspot boundary and is considered to have a "moderate" status under the WFD 2016 Classifications.
Development	6 areas of proposed development exist in this hotspot area. The majority of development is proposed around Dog Kennel Lane and Robin Hood Lane.
Green spaces and designations	There are no designation areas in this hotspot. However there are several areas of green space including around St Lukes Church, Coronation Gardens and a few other areas of green space in residential squares.
Working with natural processes	In this hotspot, opportunity is presented for wider catchment woodland under WWNP. There is also opportunity for the potential of riparian woodland.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	The flood risk that has been identified in this area has been shown to be dispersed and there is no defined flow path evident by the site visit or from the RoFfSW mapping. The flood history that has been evident is dispersed in the area is relatively flat, which suggests the flooding is localised which means it is unlikely this hotspot would benefit from being modelled. The area is already undergoing development in the town centre, which has the potential to reduce the flood risk to the area. As a result this hotspot is not being carried forward to the next phase.	
Agreed decision	Significant risk identified and further modelling required	
	Non-modelled hotspot (see next section for proposed action	
	No further actions	✓

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs

Photographs

Site Photo 1		Oaklands Wood
Site Photo 2		Main road with turning to Oaklands Wood to the left of this image. Slight slope in land down road towards roundabout

Site Photo 3		Oaklands Wood – previous flooding reported in this area
Site Photo 4		