JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	TRDC1

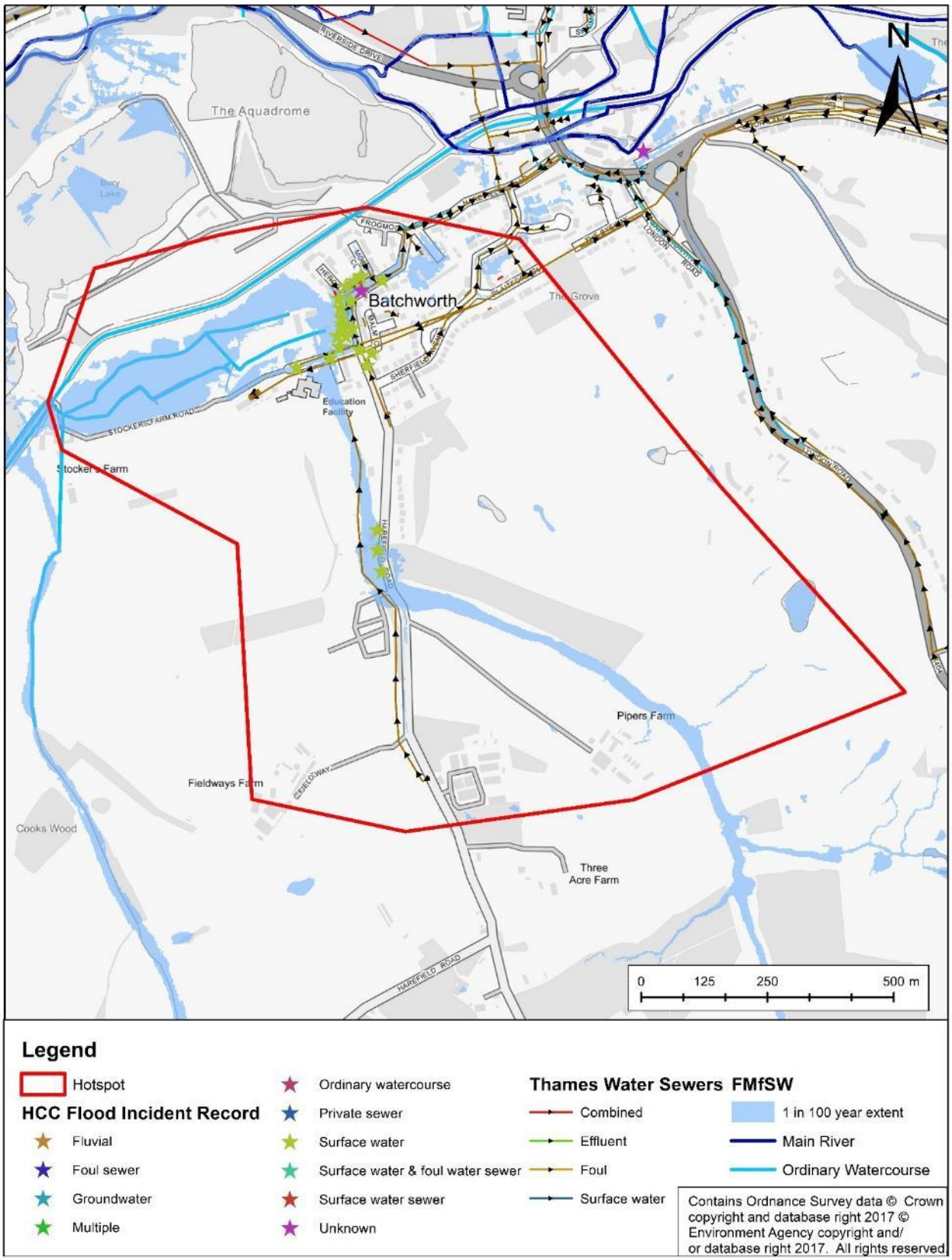
Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	TRDC1	
Hotspot Name	Batchworth	
Postcode	WD3 1NP	
Hotspot Area	**OS Grid Reference**	TL 05799 93635
	X coordinate	505799
	Y coordinate	193635
Local Authority	Three Rivers District	

Hotspot summary

Risk of Flooding from Surface Water (RoFfSW) mapping	A surface water flow path follows the natural topography from south to north alongside Harefield Road until it meets another major area of surface water flood risk between Stocker's Farm Road and the ordinary watercourse to the north. The flow path is linked to Stocker's Lake in the north west.
Sewerage	This hotspot has a foul sewer network only. It drains from the south of the hotspot up to the north and out to the north east.
Other Drainage	HCC records show that there are gulley's draining the highways across this hotspot such as along Harfield Road. The pipes leading from gullies are not recorded. It is assumed that they connect to the nearest surface water sewers, although along Harefield Road gullies probably connect directly to the ordinary watercourse.
Watercourses	An ordinary watercourse runs east to west in the north of the area. Two small tributaries join in the west above Stocker's Farm. Stocker's Lake exists to the north west of the boundary.
Flood incidents recorded	19 Properties flooded externally in Feb 2014 with water flowing down Harefield Road, failed culverts was a contributing cause to this flood event. Flooding also occurred on Harefield Road in September 2016, however the cause is not known. There have been a total of 24 flood incidents in the hotspot.
Topography and ground conditions	The elevation along the road varies between 91 and 46m along Harefield Road. The northern third of the hotspot is predominantly urban, with the remaining area rural with woodland to the east of Harefield Road.


N
The Aquadrome
Batchworth
The Grove
Education Facility
Stocker's Farm
Pipers Farm
Fieldways Farm
Cooks Wood
Three Acre Farm
RIVERSIDE DRIVE
STOCKERS FARM ROAD
SHERFIELD WAY
HAREFIELD ROAD
EDGELOW WAY
0 125 250 500 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	In February 2014 surface water from hard standing and overland flows collected by the valley bottom flowed down Harefield Road flooding two properties by Woodcock Hill Cemetery. Discussions about Stocker's Farm Road from the site visit on 30/11/2017 with the local authority representative confirmed that there is a culvert going under the road and some open channel in this hotspot area. The pathway of previous surface water flooding has been along Stocker's Farm Road to where it flattens out and accumulated at 118 on Hereford Road. This discharge onto the canal downstream has been reported to be limited.		
Properties at risk from surface water (high, medium, low) (count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	5	5	34
Sewer flooding incidents	15 sewer flooding incidents have been recorded for the postcode sector that is covered by this hotspot, WD3 1. TW reported the last blockage was in 20/02/2017 which was found on the S24 line. No other issues in this area postcode have been reported since. The hotspot selection workshop on 16/01/2018 revealed that TW had recorded a sewer flood event on 30/06/2016.		
Local authority incidents	24		

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. HCC have a TUFLOW model prepared by BMT - coverage to be confirmed.
Previous studies (including other SWMPs)	A flood study was undertaken for the flood event in February 2014 in Harefield Road. Hydraulic modelling was undertaken to understand the flood risk in the Harefield Road area. The SFRA reported that the road is a low spot in topography and hence is subject to regular surface water flooding which is thought to be exacerbated by a high water table in the surrounding area and under capacity highway drainage systems and culverts.
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	The ordinary watercourse in the north of the hotspot area has an overall status of "Moderate" under the WFD water quality classifications (2016)
Development	There is a proposed development area in the north of the hotspot along Stocker's Farm Road. There is a hotel and car park planned for this area.
Green spaces and designations	Large areas of green space exist along Harefield Road, including Nine of Herts Golf Course and Woodcock Hill Cemetery. There are no areas with environmental designations in this hotspot.
Working with natural processes	In the far south of the hotspot boundary the WWNP mapping has presented opportunity for the implementation of wider catchment woodland.
Ongoing and proposed schemes	HCC have been looking at natural flood management potential in this area but it is limited. Town Ditch has been studied in collaboration with the EA in this hotspot area.

Recommendations and options

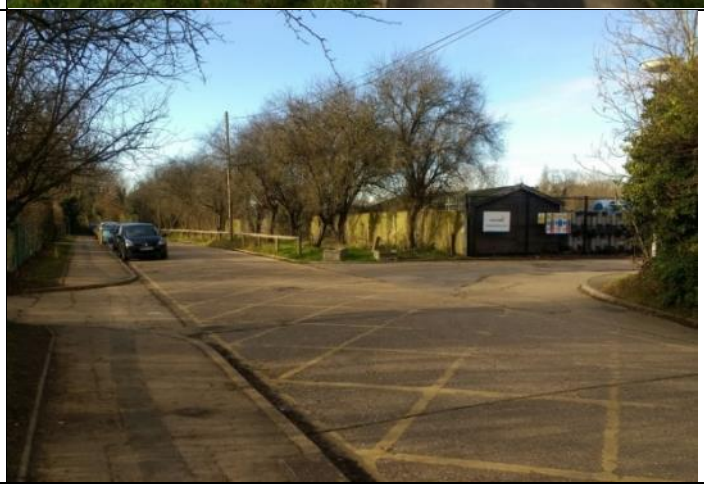
Recommendations

Recommended way forward	It is recommended that this hotspot is taken forward as a modelling hotspot. There is potential opportunity to hold the surface water flow upstream or to the west.	
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 area of Harefield Road that has been known to flood
Site Photo 2		Stocker's Farm Road houses that have reported flood events
Site Photo 3		Several flood incidents reported here by primary school on Stocker's Farm Road

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	TRDC2

Surface Water Management Plan – Hotspot Selection

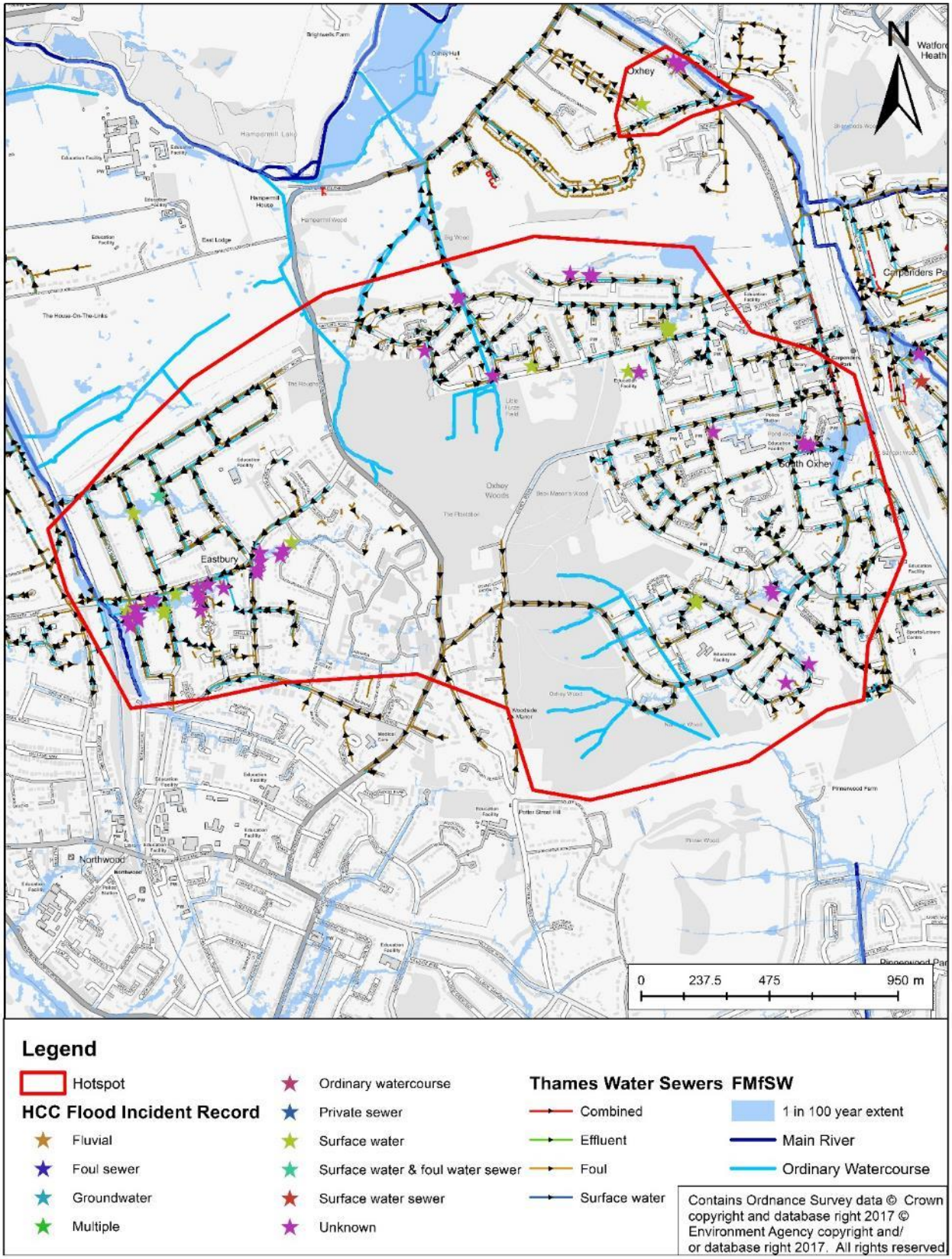
Overview

Hotspot Code	TRDC2	
Hotspot Name	Oxhey Drive, Eastbury, Nanscot and Oxhey Wood, South Oxhey, Gosforth Lane and Little Furze Field	
Postcode	WD19 7HT	
Hotspot Area	**OS Grid Reference**	TQ 10671 92839
	X coordinate	510671
	Y coordinate	192839
Local Authority	Three Rivers District	

Hotspot summary

Risk of Flooding from Surface Water (RoFfSW) mapping	Within this hotspot area there are several different flow paths that have been identified. In the area of Eastbury there are two surface water flow paths that join at the junction between Ardcross Avenue and Batchworth Avenue, following the natural topography. This then flows from east to west by Moor Park Stream. In Nanscot, there are also two separate surface water flow paths associated with the tributaries to the two ordinary watercourses that flow west to east and in normal conditions and would enter the culverts and flow to the south, but in high flow conditions may be present following the topography across the housing estate via Prestwick Road. In the area around Gosforth Lane, surface water flows from southwest to north east along by the school, following the road network to where it ponds near the junction between Fulford Grove and Hayling Road. The site visit confirmed the flow path of surface water along Harrowgate Road and its path along from Lincoln Drive. Around the area of Little Furze Field, surface water associated with the ordinary watercourse rising from the north to south. In normal flow conditions the ordinary watercourse would enter a culvert to pass under the housing estate, but under high flows, surface water may be present following the course of Embleton Road. Significant ponding may occur at the junction between Ebleton and Hayling Road.
Sewerage	This hotspot area consists of an array of sewer systems. The sewer system around Eastbury has surface water and foul sewers that drain out of the catchment towards the west. The surface water sewer drains into the main river, Moor Park Stream. In the area around Nanscot and Oxhey Wood, there is only a small amount of sewer network, whilst there is a larger sewer network that runs in South Oxhey that runs through the area and exists in the north. Discussions with HCC have confirmed that after the floods of 1993 the roads in the hotspot area were ripped up and replaced, however the piping network was not put back together correctly which leaves inconsistencies with the modelled data, particularly around Eastbury Road.
Other Drainage	HCC records show that there are gulleys draining the highways across this hotspot. The pipes leading from gullies are not recorded. It is assumed that they connect to the nearest surface water sewers by Oxhey Wood and the defined ordinary watercourses.
Watercourses	Moor Park Stream is a main river that runs from south to north around the area of Eastbury. The site visit observations revealed that there is a siphon beneath the railway that crosses the road and is connected to the open channel, joined by another sew
Flood incidents recorded	In the area around Eastbury there had been 6 incidents of surface water flooding, including internal property damage are recorded. 19 other incidents are recorded with the origin

	unknown. In the area around Nanscot and Oxhey Wood there have been 2 recorded incidents of surface water flooding on Hindhead Green, and 4 of unknown origin on Blackford Road and Gleneagles Close. A few of these events caused internal flooding. In June 2016 heavy and intense rainfall led to external and internal property flooding on Oakdale Road, Seacroft Gardens and Northwick Road. The flooding in June 2016 caused damage to the primary school, and to 3 properties along Fulford Grove. This flood event also caused flooding to Blairhead Drive, Gosforth Lane, and Bramshot Way. One property was designated as flooding from surface water, the remaining 4 are unknown.
Topography and ground conditions	The elevation along Batchworth Lane varies from 105m to 68m. The area around Nanscot Wood is sloped from west to east and drops in elevation from 127m to 75m. The land consist of a housing estate in the eastern part of the area, and a large wooded area (Oxhey Wood) to the west and south (Nascot Wood). In comparison, the land around Little Furze Field slopes southwards to northwards and from 115m in Little Furze Field to 64m on Bramshot Way. The land around this area is suburban with a large wooded area to the south.


N
Oxhey
South Oxhey
Eastbury
Northwood
0
237.5
475
950 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 recorded history of flooding in Eastbury includes the torrential rain that caused flash flooding on 23rd June 2016 in the Northwood area with local surface water drainage overwhelmed. A significant number of properties were affected along St Mary's Avenue, Batchworth Lane, Eastbury Road, Ardcross Avenue, Davenham Avenue and Altair Way. the flood events have caused a mix of internal and external flooding to properties. The flooding that has been reported on St Mary's Avenue in June 2016 was reported to be up to 0.75m deep outside of properties and 0.25m deep inside some properties. Sewerage was also reported to enter a number of properties. Observations from the site visit on 30/11/2017 along St Mary's Avenue confirmed that the area lies within a natural low point. In June 2016 in the area around Oxhey Wood, there were reports that the existing drainage system could not cope, causing drains to overflow in Hindhead Close, Ashridge Drive and Gleneagles Close. Both internal and external flooding of properties occurred. The site visit to this hotspot area on 30/11/2017 and conversation with HCC revealed that there has previously been reported flooding in residents gardens along the road, however their concern is over the new development that is proposed and how this will impact the flood risk in the future. Elsewhere, surface water flooding caused internal property flooding to 5 properties along Oxhey Drive, Oakdale Road, Seacroft Gardens and Northwick Road. Observations from the site visit on 30/11/2017 confirmed the flood risk in the area of South Oxley, particularly with planned development in this hotspot area around the main centre. Discussions with HCC confirmed flood risk along Pond Wood, particularly in the area adjacent to the woodland area. The history of flooding that has been recorded along Seacroft Gardens and its future potential risk was observed and could be linked to the low threshold of property entrances and the vulnerability of residents in the area (suggested by ramps into houses). Conversation with HCC confirmed the flood risk along Prestwick Road, in addition to the risk at Warren Dell Pre School. There have also been reports of surcharging of manholes which have resulted in internal property flooding at St Josephs school and on Harrogate Road. Other surface water flood events that have been reported in the area of South Oxhey are on Blairhead Drive, and Watford, along Gosforth Lane, Embleon Road and Bramshot Way. These flood incidents were recorded for June 2016. The pathway of the flooding was mostly along the roads in line with the natural topography.		
Properties at risk from surface water (high, medium, low) (count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	67	169	615
Sewer flooding incidents	30 sewer incidents have been recorded for the postcode sector WD19 6 in this hotspot and 20 sewer flooding incidents have been recorded in the postcode sector of WD19 7. The last blockage in lateral of property (WD19 6TW) was 08/02/2016. No issues in this postcode since. At the postcode WD19 7AX the last reported issue for this postcode was 01/03/2014 which was found to be a private blockage.		
Local authority incidents	52		

Modelling and existing studies

Existing river models	Modelled extents exist for Moor Park Stream

Existing sewer models	Maple Lodge catchment. Macro (coarse) modelling of foul sewerage only.
Previous studies (including other SWMPs)	A detailed a S19 Investigation has been carried out but is not yet published for Ardcross Avenue, St Mary's Avenue, Eastbury Road and Davenham Avenue, all in Northwood. The site visit revealed that the sewer network has been previously investigated by HCC. A Section 19 Report has been carrried out on the culvert in Eastbury.
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	Moor Park Stream has not been classified with a water quality status under the WFD classifications, however it is a tributary of the River Colne which has a moderate WFD class. The other watercourses in this hotspot area are also tributaries of the River Colne and therefore also have a WFD class of moderate.
Development	This hotspot area has several areas of proposed development. Development areas include along Grovesnor Road and Batchworth Lane, along Prestwick Road and in the fields behind Heysham Drive. Other areas of proposed development that will create opportunity
Green spaces and designations	The area of Eastbury has a small amount of green space by Batchworth Lane. Named areas of green space include Ashridge Play Area, Pond Wood and the area that surrounds South Oxhey Baptist Church. There is also an area of green space that exists to the south west of St Josephs school that includes a wooded area. South Oxhey Playing fields makes up a large part of the green space in this hotspot area. No environmental designations have been identified in this hotspot area.
Working with natural processes	Under the WWNP mapping a small amount of floodplain reconnection has been identified as an opportunity to work with natural processes in this hotspot, particularly around the line of the watercourses.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	The recommended way forward for this hotspot is to model it as one big hotspot alongside TRDC3 TRDC5, TRDC6 and TRDC7 as a result of the flood mechanisms being interrelated. This hotspot boundary has now been redrawn to include TRDC3 TRDC5, TRDC6 and TRDC7. The size of this hotspot is considerable larger than others that have been selected to be modelled, however it captures the main flow paths in the catchment which will be represented accurately despite being given the more dispersed nature of the them. There is potential to split this hotspot around Northwood/Eastbury at Batchworth Lane if required, with the road being the rough boundary of the divide.	
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
Scheme with either Thames Water of TFL to upsize the culvert by the railway in Eastbury.			

Photographs

Site Photo 1		Image of St Mary's Avenue
Site Photo 2		Slope down St Mary's Avenue

Site Photo 3		Railway and culvert exit alongside track
Site Photo 4		Reported flood events have occurred along St Mary's Avenue

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	TRDC4

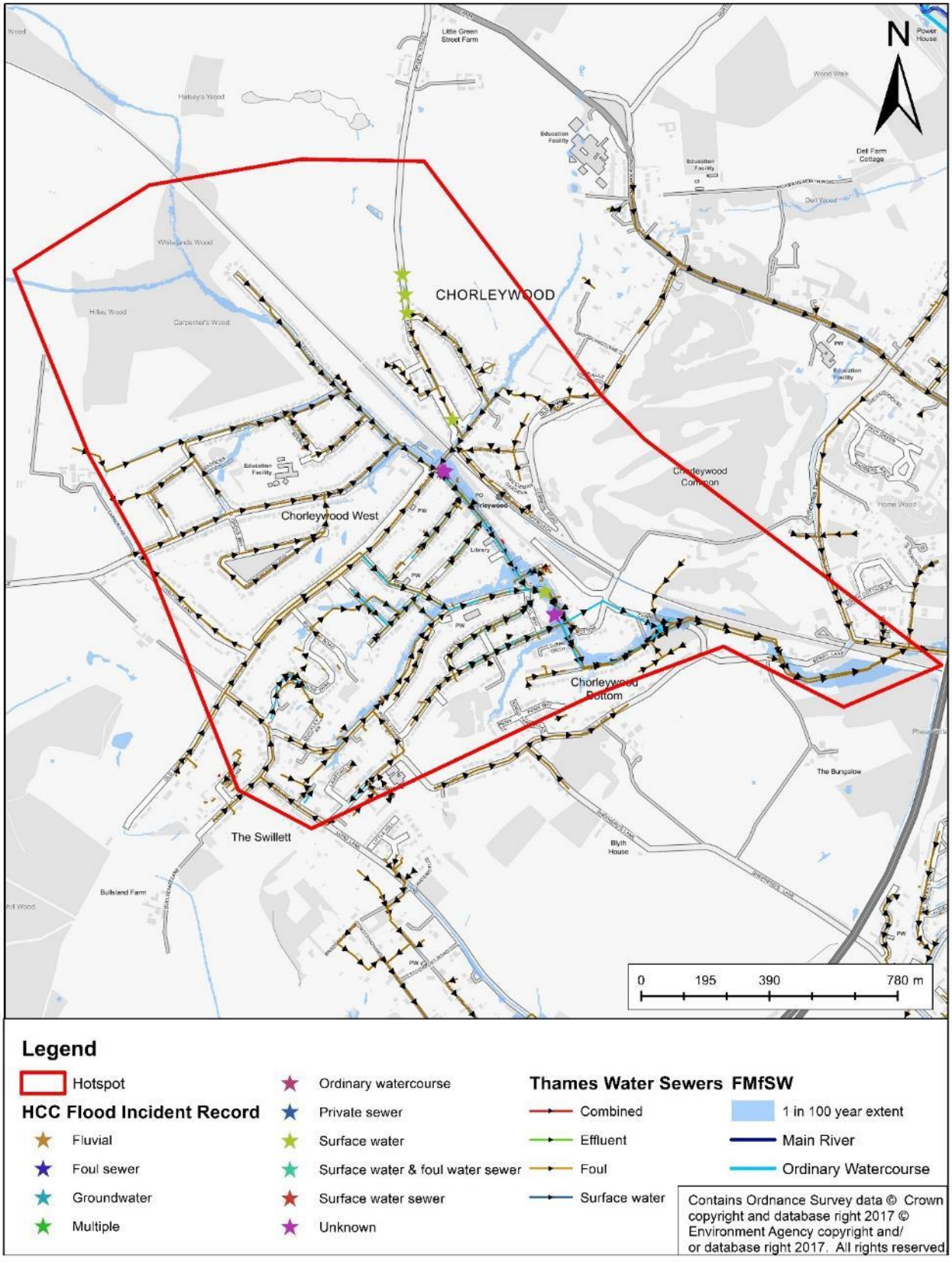
Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	TRDC4	
Hotspot Name	Chorleywood	
Postcode	WD3 5NP	
Hotspot Area	**OS Grid Reference**	TL 02427 96208
	X coordinate	502427
	Y coordinate	196208
Local Authority	Three Rivers District	

Hotspot summary

Risk of Flooding from Surface Water (RoFfSW) mapping	The main surface water flow path follows Lower road through from north west to south east. Two other flow paths also join from Chorley Wood to the north and the Swillett to the south west.
Sewerage	There is a surface water and foul sewer network that runs through the hotspot area and out to the south east.
Other Drainage	HCC records show that there are gulley's draining the highways across this hotspot such as along Shire Lane and Lower Road. The pipes leading from gullies are not recorded. It is assumed that they connect to the nearest surface water sewers. The site visit confirmed that there are gullies located along both sides of Green Street, as well as a ditch at either side of the road to collect surface water from the highway. Discussion with HCC on the site visit confirmed that the west side gullies drain through a pipe underneath the road into a deep bore soakaway, which the east side gullies also flows into.
Watercourses	There no watercourses present within this hotspot
Flood incidents recorded	Overland flows onto Green Street have led to frequent and prolonged flooding of the road in 2013 and 2014, with reports of other events between 2002 and 2012. External property flooding due to blocked drains was reported near the junction between Shire Lane and Lower Road in September 2016. Three recorded incidents of flooding on Chorleywood Bottom have been reported due to blocked drains.
Topography and ground conditions	The land slopes steeply from Chorleywood Common to the east of the area from a height of 110m to 78m along Lower Road. The majority of the area is suburban with Chorleywood Common an area of open grassland with scattered woodland. The site visit on 30/11/2017 confirmed that there is a defined valley to the west of Green Street which creates a route for overland flow routes.


N
CHORLEYWOOD
Chorleywood West
Chorleywood Common
Chorleywood Bottom
The Swillett
0
195
390
780 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 golf course on high ground to the north of Green Street is thought to be a significant source of surface runoff. This overwhelms the highway drainage system causing surface water to flow overland along Green Street, Lower Road, and Chorley Wood Bottom causing external property flooding along these streets. Note that this hotspot currently covers a small area that was part of a previous SWMP area by North Herts and Dacorum, in order to capture the natural topography of the catchment area (3 flood incidents exist within this area). The site visit to this hotspot area on 30/11/2017 confirmed the extent of the risk along Green Street, and how previous flood events in the area (such as in 2013 and 2014) have caused the public bus to take a diverted route around the flooding. Discussions from the site visit confirmed that there is a surface water flow path along Orchard Drive and that the flow path accumulates under the bridge by Shire Lane and Whitelands Avenue.		
Properties at risk from surface water (high, medium, low) (count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	61	111	295
Sewer flooding incidents	18 sewer flooding incidents have been recorded for the postcode sector WD3 5. TW have not reported issues at this postcode since 28/04/2014 which was for a MH cover replacement on the driveway of a property.		
Local authority incidents	7		

Modelling and existing studies

Existing river models	The area is not covered by any modelled extents.
Existing sewer models	Maple Lodge catchment. Macro (coarse) modelling of foul sewerage only.
Previous studies (including other SWMPs)	This area has been subject to a section 19 flood investigation on Green Street, Chorleywood. This S19 report investigated the flooding on the highway in 2013 and 2014. The flood investigation found there to be a primary overland flow route which flows from the north-west to the south-east. The primary overland route starts with runoff from the rural catchments north, north-east and north-west of a golf course and includes a new housing development on Stubbs Farm to the north-east. The S19 Flood Investigation Report has linked the previous flood events to several possible causes - due to the geology of the land, the current land use to the west of Green Street, the previous land use, the topography, the highway infrastructure and the rainfall/hydrology.
LiDAR coverage	The north eastern half of the hotspot area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	No watercourses are present in the area.
Development	There are 3 areas of proposed development in this hotspot boundary; along Quickly Lane, Old Common Road and Homefield Road.
Green spaces and designations	A large area of green space (Chorleywood Common exists on the high ground in the north east of the hotspot area. The northern part of the area is within the Chiltern AONB.
Working with natural processes	No potential for WWNP has been identified in this hotspot area under the mapping.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	After the site visit, it was agreed that the boundary of the hotspot was to be extended. There is sufficient modelled and reported flooding to warrant modelling and survey. It is likely that interventions will be placed at upstream rural areas.	
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 Green Street showing valley shaped road that dips from both sides
Site Photo 2		Image showing Green Street and the ditch at the side of the road
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	TRDC8

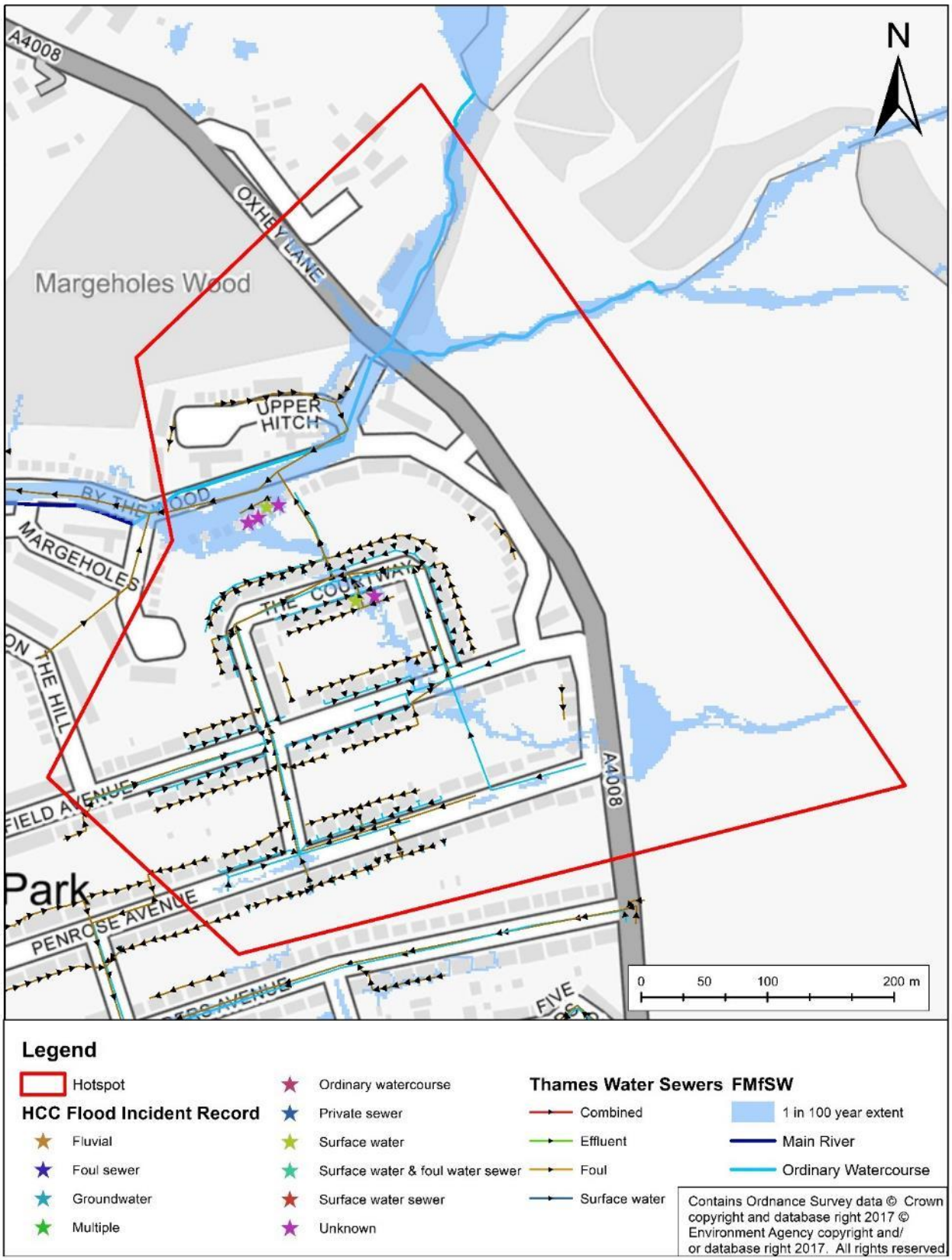
Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	TRDC8	
Hotspot Name	Oxhey Brook	
Postcode	WD19 5AF	
Hotspot Area	**OS Grid Reference**	TL 12400 93863
	X coordinate	512400
	Y coordinate	193863
Local Authority	Three Rivers District	

Hotspot summary

Risk of Flooding from Surface Water (RoFfSW) mapping	Surface water associated with Oxhey Brook flows from the north east corner of the hotspot and is joined by another flow path following the natural topography from the south east. Significant ponding of surface water may occur where they meet at the junction between Margeholes and By the Wood.
Sewerage	This hotspot area has surface water and foul sewer systems running through the area. The sewer systems enter the hotspot area from the south west along Penrose Avenue and exit in the north along By The Wood. The surface water pipes in this hotspot area represent an old river line.
Other Drainage	HCC records show that there are gulley's draining the highways across this hotspot such as along Greenfield Avenue and Penrose Avenue. The pipes leading from gullies are not recorded. It is assumed that they connect to the nearest surface water sewers. Although the gullies on By The Wood probably connect to the main river, Oxhey Stream that runs through the central band of the hotspot boundary.
Watercourses	Oxhey Brook, an ordinary watercourse, runs east to west in the north of the area
Flood incidents recorded	Flooding was reported in June 2016 at 2 properties on The Courtway, and 4 properties along By the Wood. Both internal and external property was flooded.
Topography and ground conditions	The land slopes gently from east to west from 93m to 68 m. Largely suburban with open space to the east. The area of Carpenders Park is bounded to the west by a railway line which separates it from South Oxhey by the B4543 and an area of greenbelt land.


N
A4008
OXHEY LANE
Margeholes Wood
UPPER HITCH
BY THE WOOD
MARGEHOLES
THE COURTWAY
THE HILL
A4008
PENROSE AVENUE
Park
0
50
100
200 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	Surface water flow caused flooding in June 2016 to properties on The Courtway and By the Wood. The flood incidents recorded have been from surface water flood events and also from unknown sources. They have caused both internal and external flooding to properties, with flooding to internal properties particularly on By the Wood and The Courtway. The cause of the flooding was due to short duration, high intensity rainfall. The site visit on 30/11/2017 revealed that there is a spring line coming through By The Wood which could be a contributing factor the this previous flood events that have occurred in the hotspot. There has been previous reports of groundwater flooding in this hotspot area as a result of the spring line that comes through By the Wood. Discussions with HCC revealed that water has tended to seep out through gaps in the paving slabs.		
Properties at risk from surface water (high, medium, low) (count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	7	9	40
Sewer flooding incidents	2 incidents of sewer flooding has been recorded for the postcode sector WD19 5. The last reported issue under this postcode (WD19 5AF) was 20/07/2016 which was to investigate a seepage issue. Lanes crew found water was coming from the ground and did not find an issue with any TW asset and referred back to Affinity Water.		
Local authority incidents	6		

Modelling and existing studies

Existing river models	The area is just upstream of the Upper Colne Mapping study.
Existing sewer models	Maple Lodge catchment. Macro (coarse) modelling of foul sewerage only.
Previous studies (including other SWMPs)	S19 Investigations have been requested for the flood incidents that occurred in June 2016. HCC have reported that By the Wood has very little options that could be undertaken to combat the flood risk, as the surroundings are highly urbanised.
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 Oxhey Brook under the WFD classifications. It is a tributary of the Colne which has a moderate WFD class.
Development	No development is proposed in this hotspot area.
Green spaces and designations	A large area of green space exists in the eastern area of the hotspot which presents opportunity for SuDS. There are no sites with environmental designations within the hotspot.
Working with natural processes	A small amount of floodplain reconnection has been identified as an opportunity under the WWNP mapping.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	It is recommended that this hotspot is taken forward to the modelling phase and assesses both the detention and attenuation capacity in the surrounding rural area. Groundwater flood risk needs to be taken into consideration when modelling this hotspot and making an assessment of the options.	
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
There is a detention area in the far east of the hotspot area which could be controlled to reduce the flood risk.			

Photographs

Site Photo 1	No photos were taken at this site visit.
Site Photo 2	
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	TRDC9

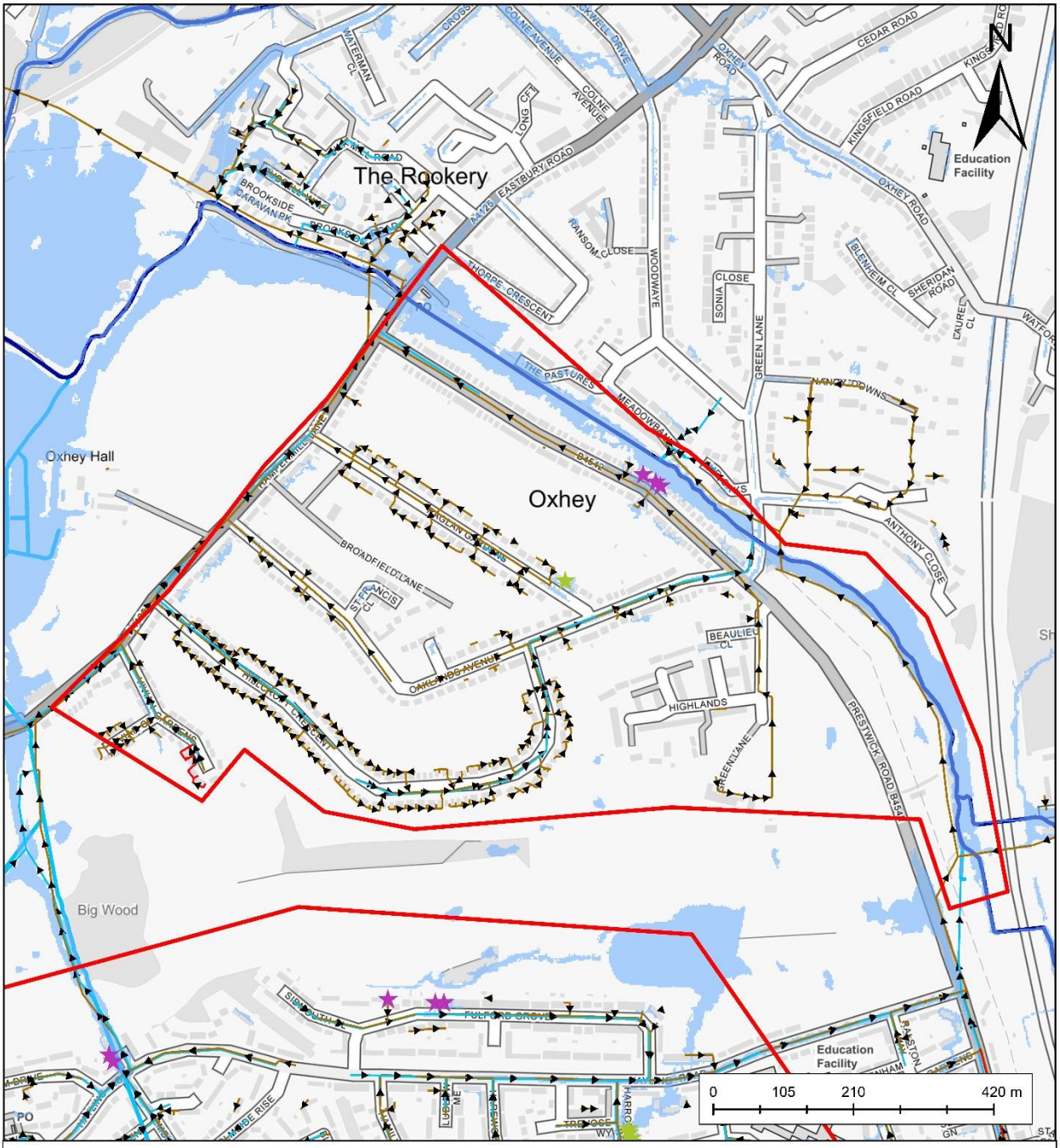
Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	TRDC9	
Hotspot Name	Prestwick Road, Brookdene Avenue and Raglan Gardens	
Postcode	WD19 4LR	
Hotspot Area	**OS Grid Reference**	TL 11193 94389
	X coordinate	511193
	Y coordinate	194389
Local Authority	Three Rivers District	

Hotspot summary

Risk of Flooding from Surface Water (RoFfSW) mapping	A significant surface water flow paths exists between Raglan Gardens and Brookdene Avenue, through back gardens. It then joins the floodplain of the Hearts Bourne. Elsewhere surface water follows the road network. There is high predicted flood risk at the junction with Hampermill Lane (A4125). From the site visit walk over, it is likely that the flood risk has been over estimated at the downstream extent of the hotspot boundary, at the junction with Hampermill Lane. This was reinstated at the hotspot selection workshop on 16/01/2018, suggesting that it is overstated along the line of the watercourse.
Sewerage	This hotspot area has a surface water and foul sewer network running through it. The surface water network runs along The Oaks and Oaklands Avenue and into the ordinary watercourse which runs adjacent to the B4542. The foul sewer network exits the catchment area along B4542.
Other Drainage	HCC records show that there are gulley's draining the highways across this hotspot such as along Oaklands Avenue, Raglan Gardens and the B4542. The pipes leading from gullies are not recorded. It is assumed that they connect to the nearest surface water sewers. Although the gullies on Oaklands Avenue probably connect to the main river, Hearts Bourne that runs through the central band of the hotspot boundary.
Watercourses	Hearts Bourne runs south east to north west across the area.
Flood incidents recorded	Flooding was reported in June 2016 in three properties along Brookdene Avenue. No cause was recorded, however they lie within a surface water flow path. One property on Raglan Gardens reported surface water flooding in September 2016, and has recorded incidents back to 1982.
Topography and ground conditions	The hotspot area is a valley 57m AOL by the river and 71m to the north east and south west. The area is suburban but houses have larger than average gardens contributing a large area of green space.


The Rookery
Oxhey
Oxhey Hall
Big Wood
Education Facility
Education Facility
N
0
105
210
420 m
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
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Flood Risk

History of flooding	Surface water flow caused properties to flood on Brookdene Avenue in June 2016 and on Raglan Gardens in September 2016. The flood events caused both internal and external flooding to properties. The site visit on 30/11/2017 confirmed flow paths and potential flood risk along Raglan Gardens. Green Lane slopes down from Raglan Gardens and it was observed that there is a low threshold along all the houses.		
Properties at risk from surface water (high, medium, low) (count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	0	2	19
Sewer flooding incidents	There have been 4 sewer flooding incidents that have been recorded in the postcode sector WD19 4. TW reported there to have been a private blockage under WD19 4LL 05/01/2018 and wet wipe blockage in I/C at WD19 4LG on 18/11/2017.		
Local authority incidents	4		

Modelling and existing studies

Existing river models	The area is covered by the Upper Colne Mapping study
Existing sewer models	Maple Lodge catchment. Macro (coarse) 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	The Colne (from confluence with Ver to Gade) has an overall status of "Moderate" under the WFD water quality classifications (2016)
Development	No development is proposed in this hotspot area.
Green spaces and designations	Although there is no designated green space, the larger than average gardens provide significant green space.
Working with natural processes	No potential for WWNP has been identified in this hotspot area under the mapping.
Ongoing and proposed schemes	The site visit revealed that HCC, as the Highway Authority are planning to implement a scheme to contain the water and keep the flow of water away from Raglan Gardens.

Recommendations and options

Recommendations

Recommended way forward	It is recommended that this hotspot is taken forward as a small targeted modelling area. There is potential for SuDS e.g. tree pits along Oaklands Avenue by Raglan Gardens.	
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
It is possible that tree pits and rain gardens could be implemented in this hotspot area.			
Consider merging with TRDC2.			

Photographs

Site Photo 1		Watercourse in this hotspot area that flows under the bridge on Oxhey Lane
Site Photo 2		Image showing main river in this area of Oxhey

Site Photo 3		Topographic level along Rylans Gardens
Site Photo 4		

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	TRDC10

Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	TRDC10	
Hotspot Name	Moor Wood	
Postcode	WD4 8NZ	
Hotspot Area	**OS Grid Reference**	TL 09127 03532
	X coordinate	509127
	Y coordinate	203532
Local Authority	Three Rivers District	

Hotspot summary

Risk of Flooding from Surface Water (RoFfSW) mapping	A significant RoFfSW flow path runs north to south in the western part of the hotspot area following the course of a private road south of Tom's Lane.
Sewerage	This hotspot area has a foul sewer network only that runs along Tom's Lane from the east to the west.
Other Drainage	HCC records show that there are gulley's draining the highways across this hotspot such as along Toms Lane. The pipes leading from gullies are not recorded. It is assumed that they connect to the nearest surface water sewers.
Watercourses	No watercourses exist in this area
Flood incidents recorded	Three properties north of Tom's Lane reported property flooding from surface water in February 2014 attributed to runoff from the fields north of the properties. Blocked road drains were also reported. In July 2016 (exact date not known), south of Tom's Lane property flooding was reported. Cause was reported as unknown, however the report described manholes lifting, and sewer waste overflowing.
Topography and ground conditions	The landscape slopes north to south across the hotspot area. 2m EA LiDAR is not covered by this hotspot.


N
Moor Wood
0
45
90
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	Surface water from fields to the north of Tom's Lane have resulted in flooding to properties at the junction between Tom's Lane and a private road. Discussions from the site visit on 30/11/2017 confirmed the flow path of surface water along Toms Lane.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	0	0	4
Sewer flooding incidents	This hotspot is covered by the postcode sector WD4 8, and 1 previous sewer flooding incident have been recorded. TW reported the last blockage under this post code to be on 23/07/2016 which was cleared from the manhole at the front of the property at WD4 8NZ.		
Local authority incidents	6		

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)	No detailed studies have been carried out for this hotspot area.
LiDAR coverage	This area is not covered by LiDAR

Other catchment needs and opportunities	
Water quality	No watercourses are present in the area.
Development	No development is proposed in this hotspot area.
Green spaces and designations	Large areas of green space exist to the south of Tom's Lane, including Longspring Wood Nature Reserve and Moor Wood.
Working with natural processes	No potential for WWNP has been identified in this hotspot area under the mapping.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	This hotspot has been identified as one that is of lower priority. However the hotspot has potential for some natural flood management due to the amount of available green space which could help control the flow upstream. Thus a small-scale hydrology and site investigation study would identify what measures could be put in place. Potential future modelling of this hotspot could be justified as it would improve the RoFfSW map as the current surface water flow path doesn't seem to follow the topography of the road. The flood incident record of the hotspot area is low which is why this hotspot has been recommended as being taken forward as a non-modelled hotspot.	
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
PLR is an option for this hotspot area.			

Photographs

Site Photo 1	No images were taken from this hotspot area
Site Photo 2	
Site Photo 3	
Site Photo 4	