

Table 3-5- Drain London Tier 2 Pluvial Modelling Property Count for the 1% AEP rainfall event

Property Type	Sub Category*	No. of properties flooded >0.03m**	No. of properties flooded >0.5m***
Infrastructure	Essential Infrastructure	45	2
	Highly Vulnerable	3	0
	More Vulnerable	74	0
	Other Infrastructure	43	1
Households	Deprived (All)	112	0
	Deprived (Basements)	0	0
	Non-Deprived (All)	21983	83
	Non-Deprived (Basements)	546	7
Commercial / Industrial	Commercial/Industrial (All)	1173	1
	Commercial/Industrial Basements	273	0
Other		20	0
	TOTAL	23453	94

* A full description of the sub-categories is included in Table 3-6 at the end of this Section.

** Building thresholds have been represented in the modelling as 'stubs' raised 100mm above the average ground level within the building footprint. A depth of >0.03m will result in a water level 0.03m above the property threshold, which is therefore considered to flood.

*** Buildings where the average depth of flooding across the building footprint is greater than 0.5m.

3.8.4 In addition, to provide an indication of the spatial flood risk across the Borough, a property count has been undertaken for each of the CDAs in the Royal Borough of Kingston upon Thames for the 1% AEP (1 in 100 annual probability event). These values are included in the following sections for each CDA and a full summary is included in Table 3-6 at the end of this Section.

3.8.5 It is important to note that the counts have been undertaken on a CDA basis, and therefore, for those cross boundary CDAs, not all flooded properties will lie within the Royal Borough of Kingston upon Thames administrative area.

Mapping

Figures 3.8.1 – 3.8.14 show the modelling results for each CDA; two maps for each CDA have been included which show the surface water depth and surface water flood hazard rating during the rainfall event with a 1% AEP (1 in 100 annual probability)

CDA_008 ACRE ROAD/NORTH KINGSTON

- 3.8.6 This CDA is located in the north west of the Borough on the boundary with London Borough of Richmond upon Thames and includes the northern part of Kingston Town Centre. Pluvial mapping has identified flow paths (overland flow) from parkland in the east (Richmond Park) leading to pooling of surface water in the vicinity of Acre Road. Ground levels in this CDA fall from 40mAOD in the north eastern corner to 10mAOD in the vicinity of Acre Road.
- 3.8.7 The Royal Borough of Kingston upon Thames holds historic records of flooding on London Road, Elm Road, Acre Road, York Road, Richmond Park Road and Canbury Avenue which have been attributed to surcharging of the local sewer network.
- 3.8.8 The Thames Water Network is combined (containing both surface water and foul water) at this location which may contribute to capacity problems. Thames Water DG5 records indicate 11-20 sewer flood records in the north of the CDA and 21-50 records of sewer flooding in the south of the CDA (some of the highest records across the Borough).
- 3.8.9 The majority of the CDA is not located within an area considered to be at increased risk of potential groundwater flooding (a small section of rail embankment is identified to have an increased risk), however there is one record of groundwater flooding within the CDA held on Environment Agency records (see Figure 3).

Figure 3-3 Acre Road Flooding July 2007

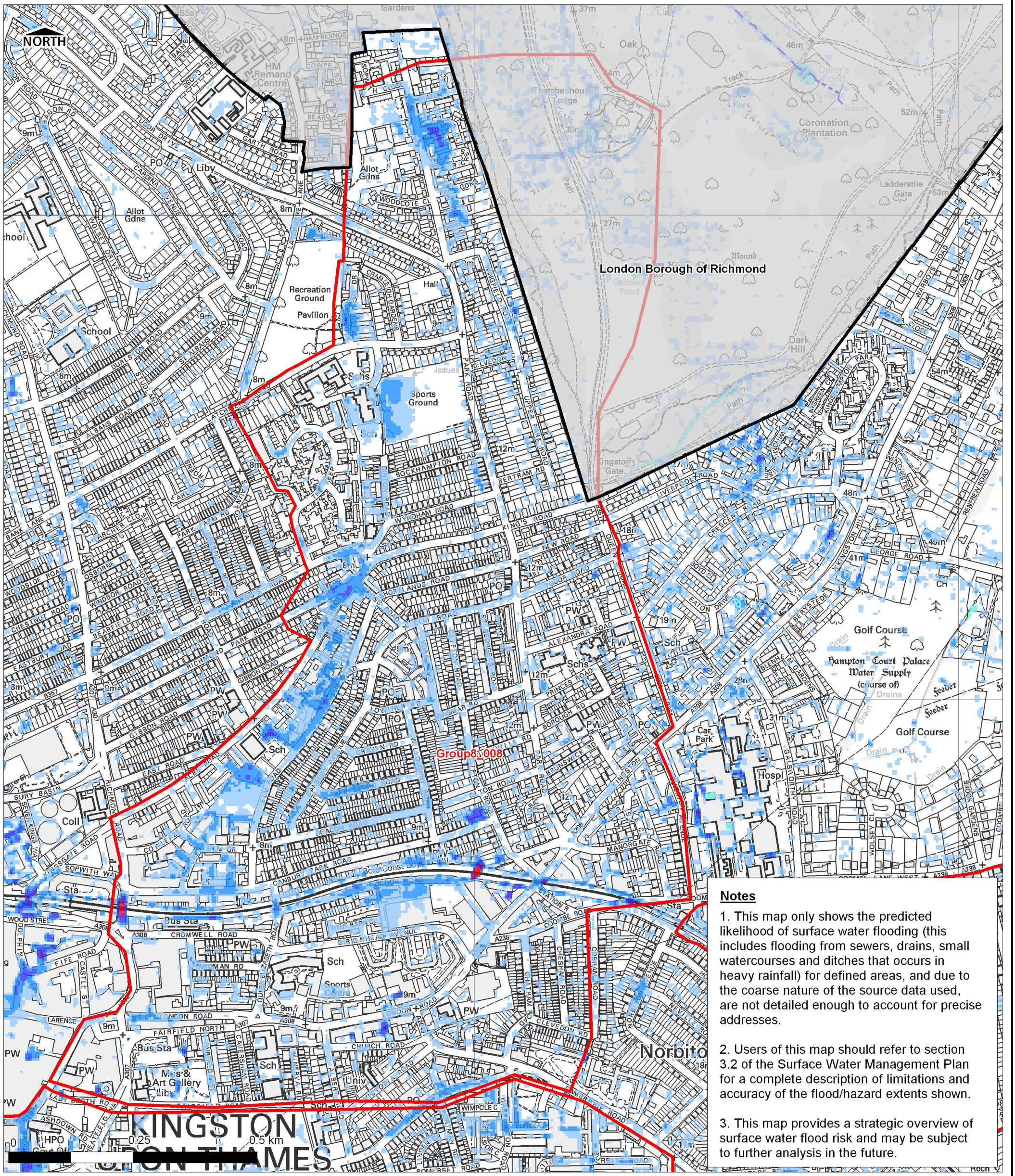


Source: by NRSLARK www.Flickr.co.uk

Figure 3-4 Flooding on London Road to the south of the CDA July 2007



Summary Table – CDA 008 Acre Road/North Kingston	
LLFA	Royal Borough of Kingston upon Thames (Lead) London Borough of Richmond Upon Thames
Flood Risk Categorisation:	Surface water, Sewer Flooding, Groundwater Flooding (1 record)
Property Count 1% AEP	<ul style="list-style-type: none"> Approximately 2071 non deprived households are identified to be at risk of flooding to a depth > 0.03m Approximately 58 non deprived households with basements are identified to be at risk of flooding to a depth > 0.03m
	<ul style="list-style-type: none"> Approximately 6 non deprived households are identified to be at risk of flooding to a depth >0.5m Approximately 1 non deprived households with basements are identified to be at risk of flooding to a depth >0.5m <p>There are no deprived households identified as being at risk within the CDA</p>
Critical Infrastructure	Electricity substation at sports ground adjacent to Park Road, at the corner of Richmond Park on Kings Road, on Alexandra Road, on the school site on Elm Road and within the Town Centre at Birkenhead Avenue (5 in total within CDA). London Waterloo mainline rail network in the south of the CDA approaching Kingston Town Centre.
Validation	Historic records of flooding on London Road, Elm Road, Acre Road, York Road, Richmond Park Road and Canbury Avenue
Figures	Figure 3.8.1a – Surface Water Depth (1% AEP) Figure 3.8.1b – Surface Water Flood Hazard (1% AEP)



Notes

1. This map only shows the predicted likelihood of surface water flooding (this includes flooding from sewers, drains, small watercourses and ditches that occurs in heavy rainfall) for defined areas, and due to the coarse nature of the source data used, are not detailed enough to account for precise addresses.
2. Users of this map should refer to section 3.2 of the Surface Water Management Plan for a complete description of limitations and accuracy of the flood/hazard extents shown.
3. This map provides a strategic overview of surface water flood risk and may be subject to further analysis in the future.

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED

Legend	
	Borough Administrative Boundary
	Critical Drainage Area
	Permanent Water Bodies
	Main River
	Ordinary Watercourse
	Culverted Watercourse
Flood Depth	
	<0.1m
	0.1m to 0.25m
	0.25m to 0.5m
	0.5m to 1.0m
	1.0m to 1.5m
	>1.5m

Royal Borough of Kingston upon Thames

Surface Water Management Plan

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Group8_008 (Acre Road) Surface Water Depth (m)
1 in 100 Chance of rainfall event occurring in any given year (1% AEP)

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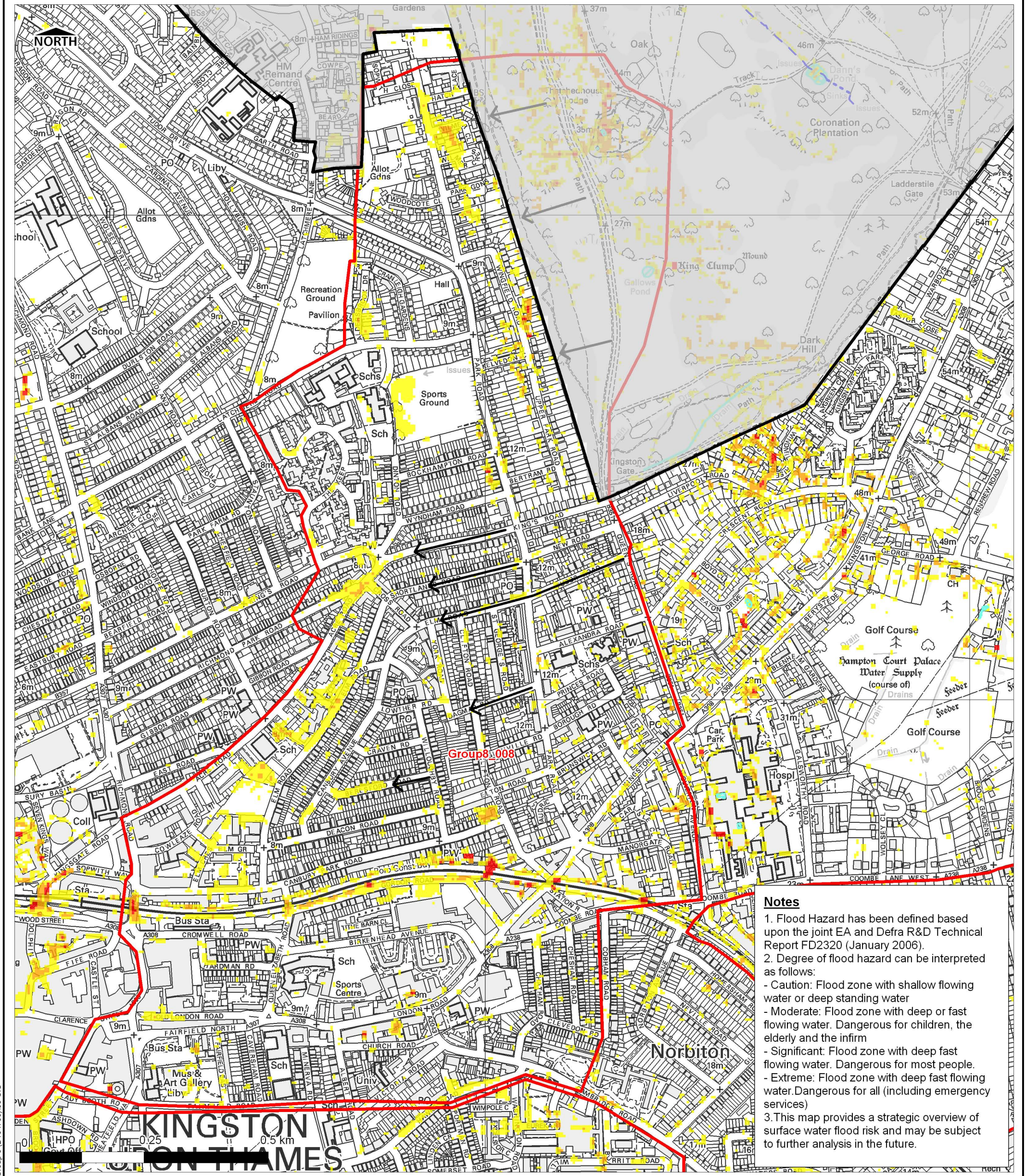
Drain London Programme Board Members

GREATER LONDON AUTHORITY

Scale at A3 1:7,500	Date 20/07/2011	Drawn by D.SKILTON	Approved by E.CRAVEN
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FIGURE 3.8.1a

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Notes

1. Flood Hazard has been defined based upon the joint EA and Defra R&D Technical Report FD2320 (January 2006).
2. Degree of flood hazard can be interpreted as follows:
 - Caution: Flood zone with shallow flowing water or deep standing water
 - Moderate: Flood zone with deep or fast flowing water. Dangerous for children, the elderly and the infirm
 - Significant: Flood zone with deep fast flowing water. Dangerous for most people.
 - Extreme: Flood zone with deep fast flowing water. Dangerous for all (including emergency services)
3. This map provides a strategic overview of surface water flood risk and may be subject to further analysis in the future.

Filepath: N:\Water\Current Projects\134785 DRAIN LONDON Tier 202 Group 8 (D134786)05 GIS

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED

Legend	
	Borough Administrative Boundary
	Critical Drainage Area
	Permanent Water Bodies
	Main River
	Ordinary Watercourse
	Culverted Watercourse
	Flow Direction Arrows
Flood Hazard	
	<0.75 Caution (Very low hazard)
	0.75 - 1.25 Moderate (Danger for some)
	1.25 - 2.0 Significant (Danger for most)
	<2.0 Extreme (Danger for all)

Royal Borough of Kingston upon Thames

Surface Water Management Plan

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Group8_008 (Acre Road)
Surface Water Flood Hazard Rating
1 in 100 Chance of rainfall event occurring in any given year (1% AEP)

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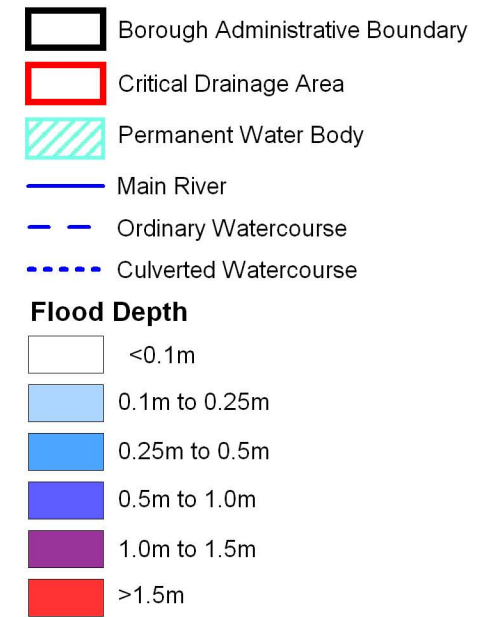
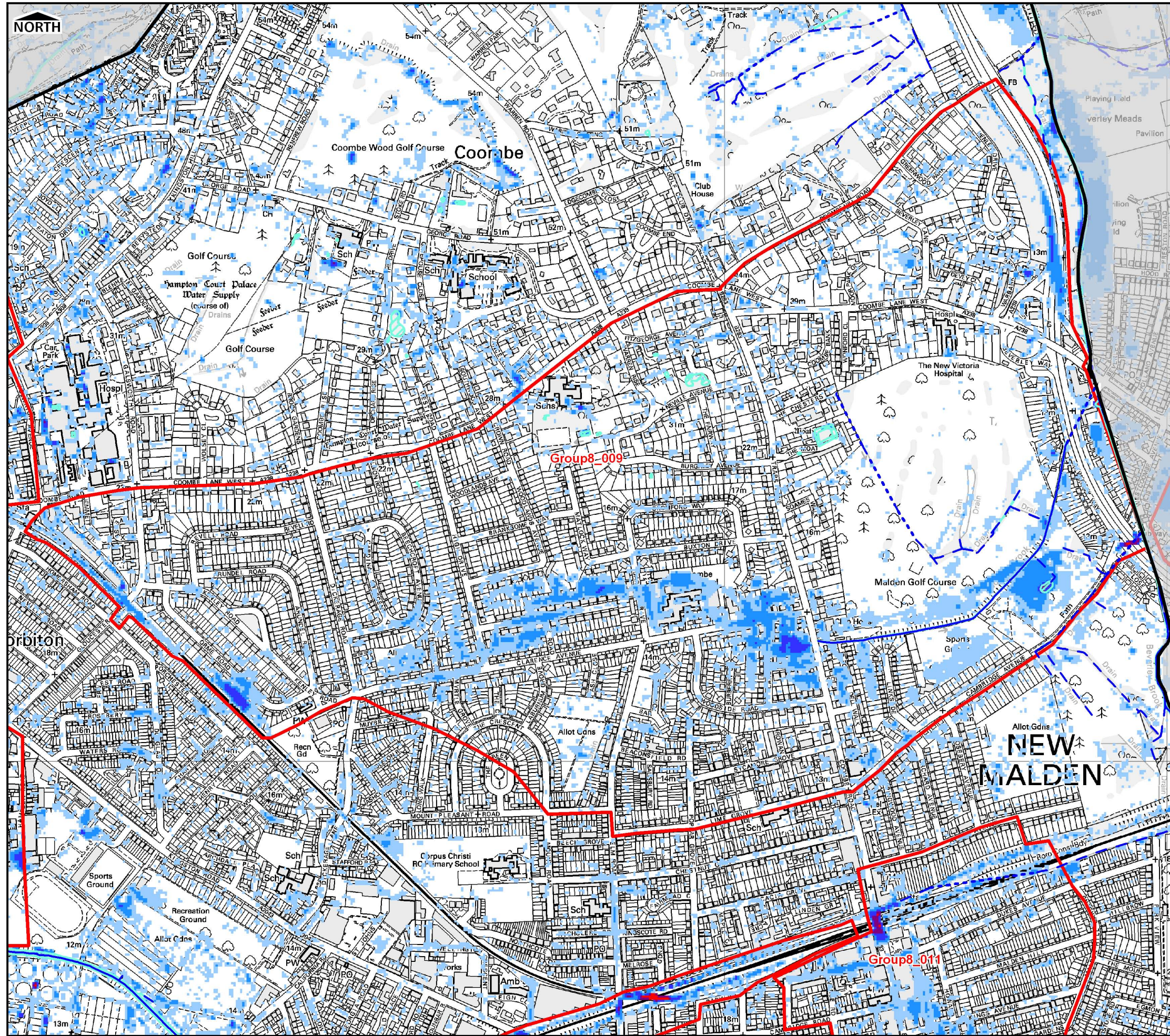
Scale at A3 1:7,500	Date 20/07/2011	Drawn by D.SKILTON	Approved by E.CRAVEN
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FIGURE 3.8.1b

CDA 009 NEW MALDEN NORTH

- 3.8.10 This CDA is located in the north east of the Borough. Pluvial modelling identifies multiple overland flow routes moving in a southerly direction in the extreme flood event leading to pooling of water at Langley Grove and behind the rail embankments at Orme Road. The Royal Borough of Kingston upon Thames has no reported incidents of flooding within this CDA.
- 3.8.11 The central part of this CDA is identified as being at increased potential of groundwater flooding, including the area to the north of the rail embankment where surface water is shown to pool. However there is only one record of groundwater flooding within the CDA held on Environment Agency records (see Figure 3).
- 3.8.12 Thames Water DG5 records show that the east of the CDA is located in an area identified to have 11-20 recorded instances of sewer flooding while the west of the CDA has 1-5 recorded instances of sewer flooding (See Figure D-5).
- 3.8.13 It should be noted that the River Hogsmill flows through the eastern half of this CDA and the south eastern corner is located within Flood Zone 2. Any mitigation measures within this CDA should be carried out in collaboration with the Environment Agency.

Summary Table – CDA 009 New Malden	
LLFA	Royal Borough of Kingston upon Thames
Flood Risk Categorisation:	Surface water, sewer flooding, groundwater flooding (1 record)
Property Count 1% AEP	<ul style="list-style-type: none"> • Approximately 1128 non deprived households are identified to be at risk of flooding to a depth > 0.03m • Approximately 4 non deprived households with basements are identified to be at risk of flooding to a depth > 0.03m
	<ul style="list-style-type: none"> • 0 non deprived households or basements are identified to be at risk of flooding to a depth > 0.5m.
	There are no deprived households identified as being at risk within the CDA
Critical Infrastructure	6 electricity substations across the CDA located at the rear of property on Cromford Way, rear of property (within LFRZ) on Oak Road, to the west of the CDA at Revell Road, near to a SW drain within allotments at Elm Road, the corner of Sycamore Grove and adjacent to a surface water drain at Malden Golf Course. Eastern boundary of the CDA includes the A3 red route, the west of the CDA contains London Waterloo rail link
Validation	Kingston Council has no reported incidents of flooding within this critical drainage area.
Figures	Figure 3.8.2 a – Surface Water Depth (1% AEP) Figure 3.8.2b – Surface Water Flood Hazard (1% AEP)



Notes

1. This map only shows the predicted likelihood of surface water flooding (this includes flooding from sewers, drains, small watercourses and ditches that occurs in heavy rainfall) for defined areas, and due to the coarse nature of the source data used, are not detailed enough to account for precise addresses.
2. Users of this map should refer to section 3.2 of the Surface Water Management Plan for a complete description of limitations and accuracy of the flood/hazard extents shown.
3. This map provides a strategic overview of surface water flood risk and may be subject to further analysis in the future.

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Group8_009 (New Malden North)
Surface Water Depth (m)
1 in 100 Chance of rainfall event occurring in any given year (1% AEP)

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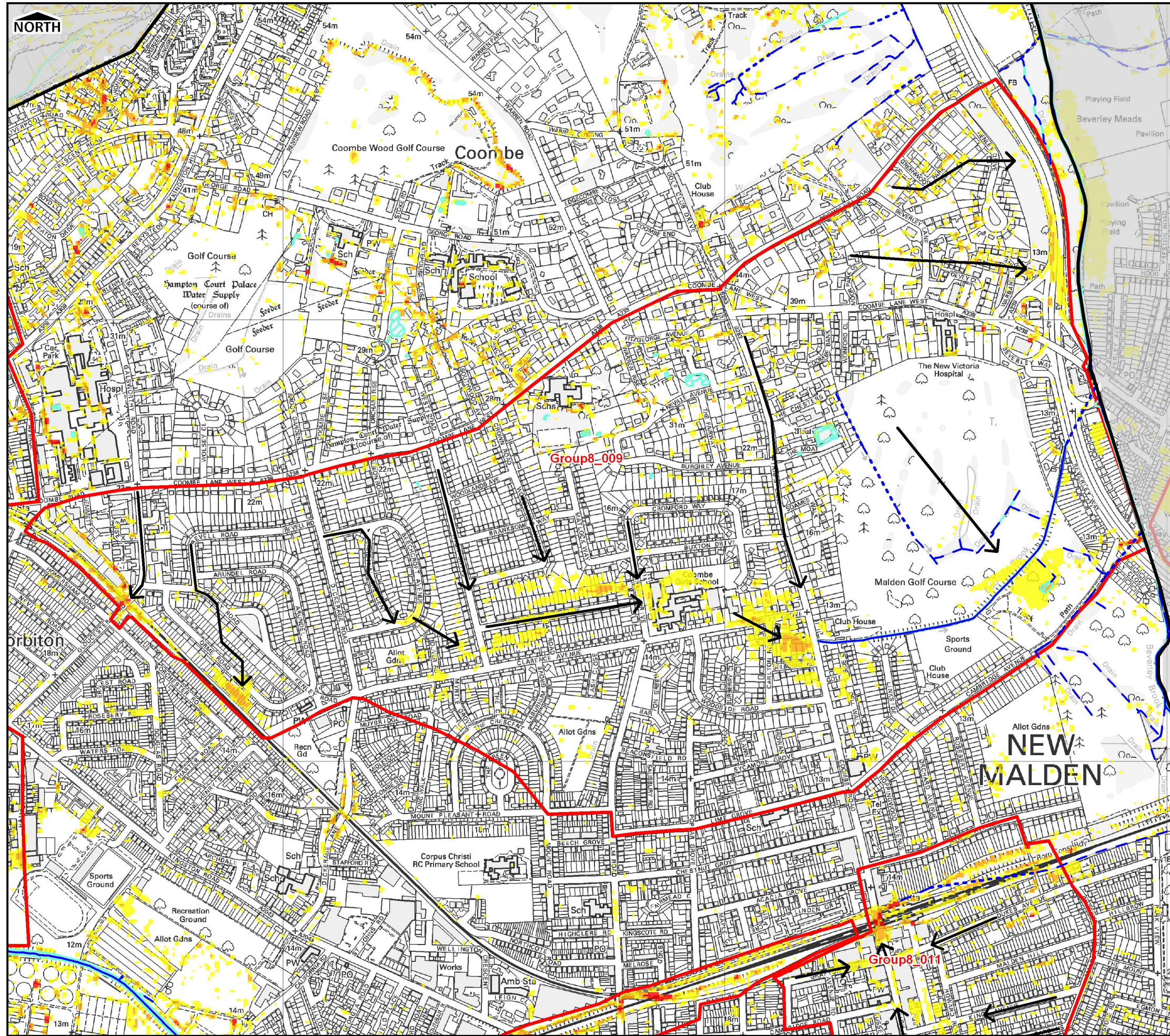
Flood Risk Management



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FIGURE 3.8.2a

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Legend

- Borough Administrative Boundary
- Critical Drainage Area
- Permanent Water Body
- Main River
- Ordinary Watercourse
- Culverted Watercourse

Flood Hazard

- <math><0.75</math> Caution (Very low hazard)
- 0.75 - 1.25 Moderate (Danger for some)
- 1.25 - 2.0 Significant (Danger for most)
- <math><2.0</math> Extreme (Danger for all)

→ Flow Direction Arrows

Notes

- Flood Hazard has been defined based upon the joint EA and Defra R&D Technical Report FD2320 (January 2006).
- Degree of flood hazard can be interpreted as follows:
 - Caution: Flood zone with shallow flowing water or deep standing water
 - Moderate: Flood zone with deep or fast flowing water. Dangerous for children, the elderly and the infirm
 - Significant: Flood zone with deep fast flowing water. Dangerous for most people.
 - Extreme: Flood zone with deep fast flowing water. Dangerous for all (including emergency services)
- This map provides a strategic overview of surface water flood risk and may be subject to further analysis in the future.

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**Group8_009 (New Malden North)
 Surface Water Flood Hazard
 1 in 100 Chance of rainfall event occurring
 in any given year (1% AEP)**

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Flood Risk Management

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FIGURE 3.8.2b