SITE ASSESSMENT - Seven Kings Car Park

Address: Skerne Road, Kingston, KT2 5AD

Area: 0.49 **Ha**

Site Reference: SA 002

Current Use	Proposed Use
Multi-Storey Car Park	Mixed Use (Residential Led) - 108 residential units

Current Vulnerability Classification	Proposed Vulnerability Classification
Less Vulnerable	More Vulnerable

Current Risk Summary					
Fluvial / Tidal			**Groundwater**		
FZ2	100	% of Site	<25	40.7	% of Site
FZ3a	7.3	% of Site	25-50	0	% of Site
FZ3b	0	% of Site	50-75	59.3	% of Site
Surface Water			>75	0	% of Site
1 in 30	0	% of Site	**Artificial**		
1 in 100	1.1	% of Site	Reservoir	Y	At risk?
1 in 1000	2.4	% of Site	Canal	N	At risk?
Sewer Flooding			**Town Centre**		
No. Incidents		80	Y/N	Y	

Flood Defences

This site is not in an area benefitting from flood defences.

Flood Warning Area

The EA Flood Warning Service is available at this site.

FLUVIAL / TIDAL

Risk Assessment (Defended)

Parameter	FZ3b	FZ3a	*FZ3a+CC	Units
Speed of inundation	N/A	N/D	N/D	Hrs
Min. Depth	N/A	0.02	0.39	m
Max. Depth	N/A	0.18	1.49	m
Max. Velocity	N/A	0.08	0.62	m/s
Max Flood Level	N/A	6.82	8.19	m AOD
Max Ground Level	8.46	8.46	8.46	m AOD
Min Ground Level	6.41	6.41	6.41	m AOD
Max Flood Hazard	N/A	0.75	2.21	N/A
Duration of Flood	N/A	N/D	N/D	Hrs

* The +35% Climate Change Allowance event (central allowance) is reviewed

Risk Assessment (Undefended)

Parameter	FZ3a	*FZ3a+CC	Units
Speed of inundation	N/D	N/D	Hrs
Min. Depth	0.00	N/D	m
Max. Depth	0.42	N/D	m
Max. Velocity	0.51	N/D	m/s
Max. Hazard	1.23	N/D	N/A
Duration of Flood	N/D	N/D	Hrs

Description of Flood Mechanism

- The site is at risk from fluvial flooding from the River Thames, which flows to the west of the site in a northerly direction.
- A small extent of the site along the western border is at risk of flooding in the 1 in 100 year flood event.
- Climate change is predicted to increase the flood extent, as well as the flood depth, hazard and velocity.
- In the undefended scenario, flood extent, depth, velocity and hazard is increased in the 1 in 100 year flood event.

Note: the EA are due to update River Thames model

Figure 1 - Fluvial Flood Depth Map

Site Access / Egress

- Safe access / egress routes should be directed towards Seven Kings Way to the east of the site where the risk of flooding is lower.
- Safe refuge areas must be provided on site to account for the predicted impact of climate change on the site.

Figure 2 - Fluvial Flood Hazard Map

Mitigation / FRA Requirements

- Self-contained basement dwellings and bedrooms are not permitted in FZ2 (the entire site). See SFRA Level 2 Report mitigation requirement number 4.10 for additional basement stipulations.
- A FRA must be submitted as part of a planning application.
- Include appropriate flood resistance or resilience measures to address predicted flood depths.
- See SFRA Level 2 Report mitigation requirement numbers 4.2, 4.3, 4.4, 4.5 and 4.6 for further development stipulations.
- Develop a Flood Emergency and Evacuation Plan for the site.
- Site users should be signed up to the EA's Flood Warning Service.

SURFACE WATER

Risk Assessment

Parameter	1 in 30	1 in 100	1 in 1000	Units
Min. Depth	0	0	0.00-0.15	m
Max. Depth	0	0.60-0.90	0.60-0.90	m
Max. Velocity	0	0.25-0.50	0.50-1.00	m/s
Max. Hazard	0	1.25-2.00	1.25-2.00	N/A

*The 1 in 1000 annual probability extent represents the potential climate change adjusted impact of current risk

Description of Flood Mechanism

- The site is currently at low risk of surface water flooding.
- Skerne Road to the west of the site, and Seven Kings Way to the east of the site are predicted to be at risk from surface water flooding.
- Climate change is predicted to increase the flood extent and velocity, but not depth or hazard.

Site Access / Egress

Safe access and egress routes should be directed to the north east of the site towards Sury Basin where there is a lower risk of flooding.

Figure 3 - RoFSW Flood Depth Map

Mitigation - Flood Risk Requirements

- Development should be directed away from the southern edge of the site where there is risk of surface water flooding.
- See SFRA - Level 2 Report mitigation requirement numbers 4.2, 4.3, 4.4, 4.5 and 4.6 for further development stipulations.

Figure 4 - RoFSW Flood Hazard Map

Mitigation - Surface Water Drainage

- A Kingston SuDS Proforma must be submitted with the planning application.
- Developments should apply the Sustainable Drainage Hierarchy set out in Policy SI13 of the London Plan.
- Ground investigations are required to confirm whether infiltration based SuDS are suitable.

SITE ASSESSMENT - Seven Kings Car Park

SEWER

Risk Assessment

• The site falls within a postcode area where there are 80 reported flood incidents from sewer flooding.
• The site is served by separate surface water and foul sewer networks.

Figure 5 - Thames Water Sewer Flood Map

Mitigation Requirements

• Applicant must consult with TWUL to confirm if the development site has historically flooded. TWUL must agree to any proposed sewer connections.
• Where historic flooding has occurred, the applicant must show how this risk will be managed for the lifetime of the development.

GROUNDWATER

Risk Assessment

• The eastern section of the site is classified as having <25% susceptibility to groundwater flooding.
• The western section of the site is classified as having >=50%<75% susceptibility to groundwater flooding.
• The site is underlain by London Clay bedrock geology.

Figure 6 - Areas Susceptible to Groundwater Flooding Map

Mitigation Requirements

• Applicant should carry out a screening study (as a minimum) to establish if there are any subterranean flood risk issues that may require further investigation.
• If there is a potential level of impact, mitigation actions must be proposed.
• Must be prepared by a chartered professional or specialist.

ARTIFICIAL

Risk Assessment

• This site is at risk of flooding from a number of reservoirs including the Barwell Court Lake, Bourne Ditch, Chertsey Settling, Hampton (Distributing, Grand Junction, Stain Hill and Sunnyside), Island Barn, King George VI, Queen Elizabeth II, Queen Mother, Staines (North and South), Walton (Bessborough and Knight), and Wraysbury.
• The reservoir extent map predicts that if any of these reservoirs breach on a wet day, the site will be at risk of flooding.

Figure 7 - Outline Reservoir Flood Map

Mitigation Requirements

• Propose appropriate and proportionate risk management measures.
• A suitable emergency response plan should be put in place, including an emergency warning system in the event of a reservoir flooding incident.
• Local Authority Emergency Planning Officers must be consulted to create a reservoir failure emergency and evacuation plan.

PLANNING CONSIDERATIONS

Safety of Development

A. Can the development be future proofed for climate change considerations?
• Yes. See SFRA - Level 2 Report mitigation requirement numbers 4.2 and 4.4 for the required finished floor levels and flood resistant / resilient building stipulations.

B. Can the development be designed safe throughout its lifetime without increasing flood risk elsewhere?
• Yes - The development must use surface water drainage techniques to manage surface water runoff onsite through above ground SuDS and / or below ground attenuation. Green drainage infrastructure should be prioritised to provide wider ecological / biodiversity benefits as per London Plan Policy SI 13.
• See SFRA - Level 2 Report mitigation requirement number 4.5 for compensatory flood storage stipulations.
• See SFRA - Level 2 Report mitigation requirement number 4.6 for voids mitigation specification. This may be required for the section of the site that is in FZ3a.

C. What is the cumulative impact of the development land use change and will flood risk increase?
• The development land use is changing from the 'Less Vulnerable' to the 'More Vulnerable' classification, as residential uses have been proposed.
• The site is already covered by impermeable surfaces, therefore flood risk is likely to be similar.
• An increase in impermeable area coverage on site will increase surface water runoff and flood risk if not managed properly.

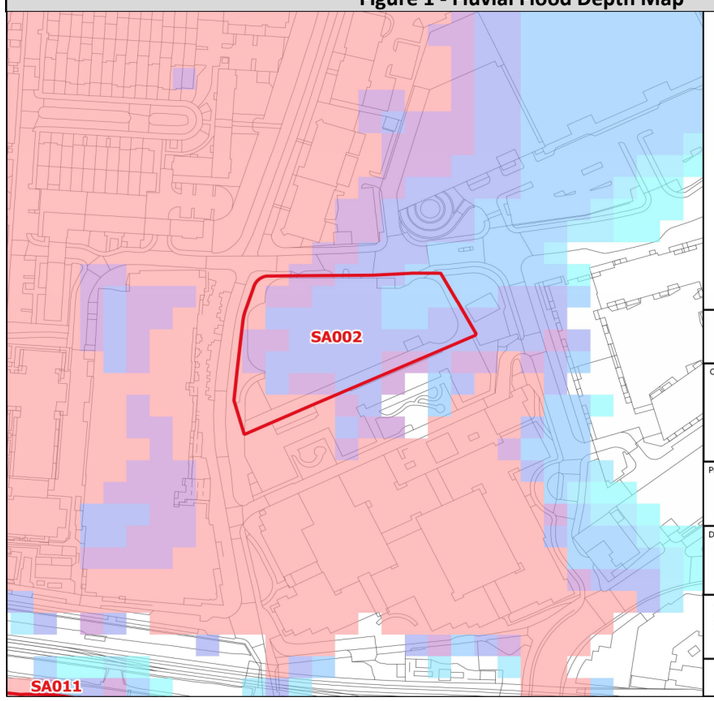
D. How can the development reduce risk overall?
• Direct development away from the southern section of the site.
• Include SuDS to manage surface water runoff and reduce run-off rates to comply with Policy DM 4 in Kingston's Core Strategy.
• Safe egress routes should be directed towards the north east of the site where there is lower risk of flooding, and safe refuge area should be provided on site to account for the predicted impact of climate change on flooding at this site.
• By complying with SFRA - Level 2 Report mitigation requirement numbers 4.2, 4.3, 4.4, 4.5 and 4.6.

E. Will development require a flood risk permit/watercourse consent?
• No. The site is not within 8m of a Main River or 5m of an Ordinary Watercourse.

F. Is the Exception Test required?
• The Exception Test is required for 'More Vulnerable' development that falls within Flood Zone 3a (the northwest and western edges of the site).
• This can be passed by making the site safe throughout its lifetime without increasing flood risk elsewhere (see questions A, B, and C). The site could also reduce flood risk overall with appropriate SuDS and flood storage compensation measures implemented (see Mitigation - Surface Water Drainage and Mitigation - Flood Risk Requirements boxes).

G. What are the delivery challenges in developing at this site in terms of passing the the Exception Test?
• Given the high flood level expected on the site, significant floodplain compensation and voids will be required.
• Due to the high flood levels predicted for the 1 in 100 year + CC event, achieving the required finished floor levels may not be feasible (see SFRA requirement 4.3).

Figure 1 - Fluvial Flood Depth Map



Legend

Kingston borough boundary
Site Allocations

Detailed River Network
Main River
Main River - Culverted
Ordinary Watercourse
Ordinary Watercourse - Culverted

Fluvial maximum flood depth (m) -
1 in 100 year+35% event
0.00 - 0.15
0.15 - 0.30
0.30 - 0.60
0.60 - 0.90
0.90 - 1.20
>1.20

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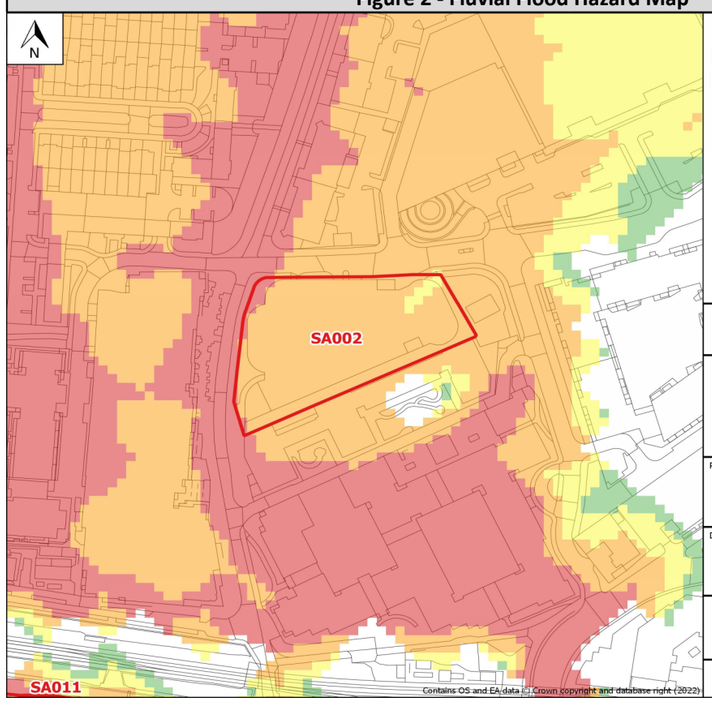
Client
THE ROYAL BOROUGH OF KINGSTON UPON THAMES

Project Title
Level 2 Strategic Flood Risk Assessment

Drawing Title
Fluvial flood depth
(1 in 100-year+35% Climate Change Allowance Event)

1:1,500	Drawing Size A3	Drawing Number Figure No.1

Figure 2 - Fluvial Flood Hazard Map



Legend

Kingston borough boundary
Site Allocations
Fluvial maximum flood hazard rating
(1 in 100 year + 35% event)
Low Hazard
Danger for Some
Danger for Most
Danger for All

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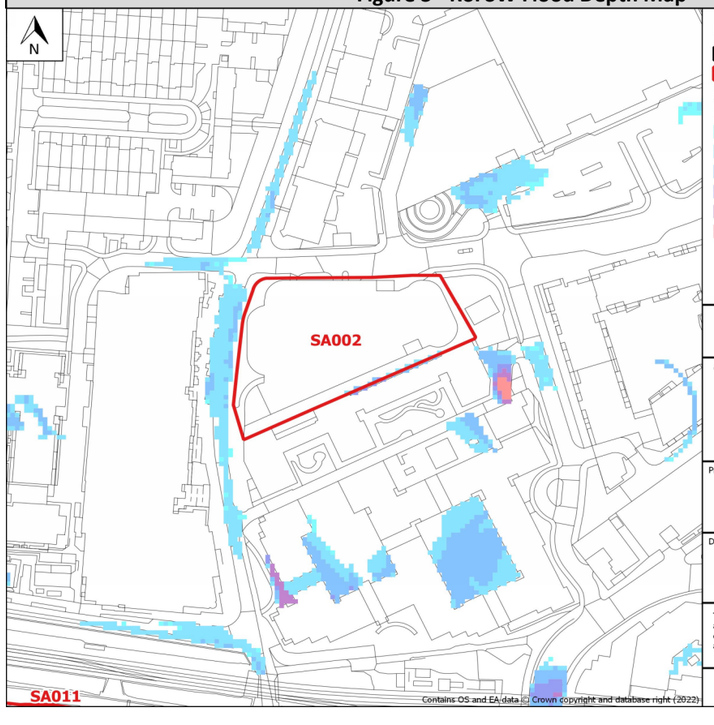
Project Title
Level 2 Strategic Flood Risk Assessment

Drawing Title
Fluvial flood hazard
(1 in 100-year + 35% Climate Change Allowance Event)

1:1,500	Drawing Size A3	Drawing Number Figure No.2

Figure 3 - RoFSW Flood Depth Map



Legend

Kingston borough boundary
Site Allocations
Surface Water flood depth (m)
1 in 100-year flood
0.00 - 0.15
0.15 - 0.30
0.30 - 0.60
0.60 - 0.90
0.90 - 1.20
> 1.20

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Project Title
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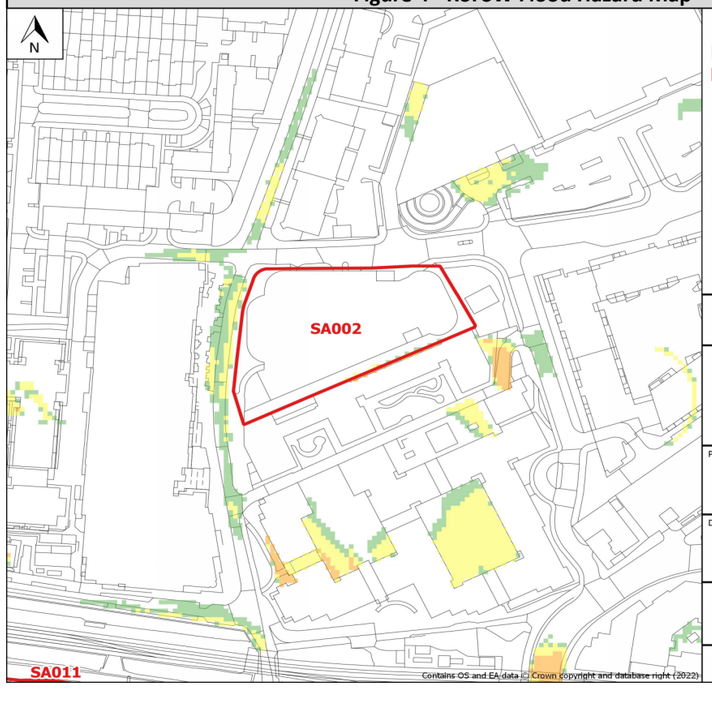
Drawing Title
Surface Water flood depth

1:1,500	Drawing Size A3	Drawing Number Figure No.3

Figure 4 - RoFSW Flood Hazard Map



Legend

Kingston borough boundary
Site Allocations
Surface Water Hazard
1 in 100-year flood
Low Hazard
Danger for Some
Danger for Most
Danger for All

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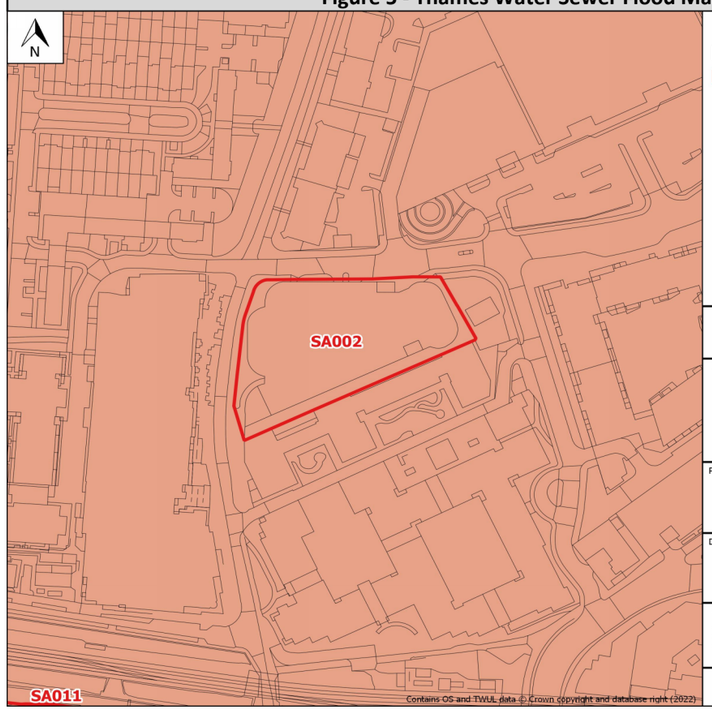
Project Title
Level 2 Strategic Flood Risk Assessment

Drawing Title
Surface Water flood hazard

1:1,500	Drawing Size A3	Drawing Number Figure No.4

Figure 5 - Thames Water Sewer Flood Map



Legend

- Kingston borough boundary
- Site Allocations

Sewer flooding

- 0 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200

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Project Title

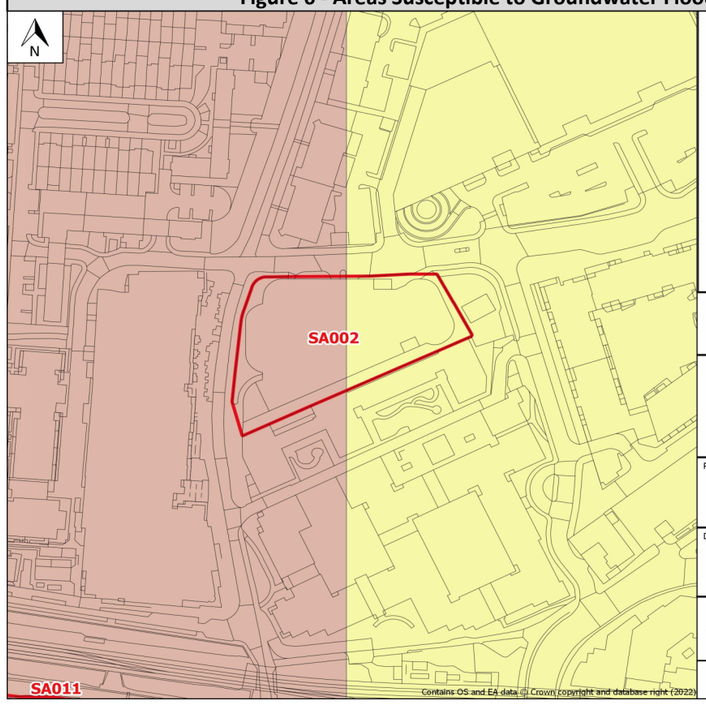
Level 2 Strategic Flood Risk Assessment

Drawing Title

Thames Water 2022 Sewer Flooding Records

1:1,500	Drawing Size A3	Drawing Number Figure No.5

Figure 6 - Areas Susceptible to Groundwater Flooding Map



Legend

- Kingston borough boundary
- Site Allocations

Areas Susceptible to Groundwater Flooding

- < 25%
- >= 25% <50%
- >= 50% <75%
- >= 75%

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Project Title

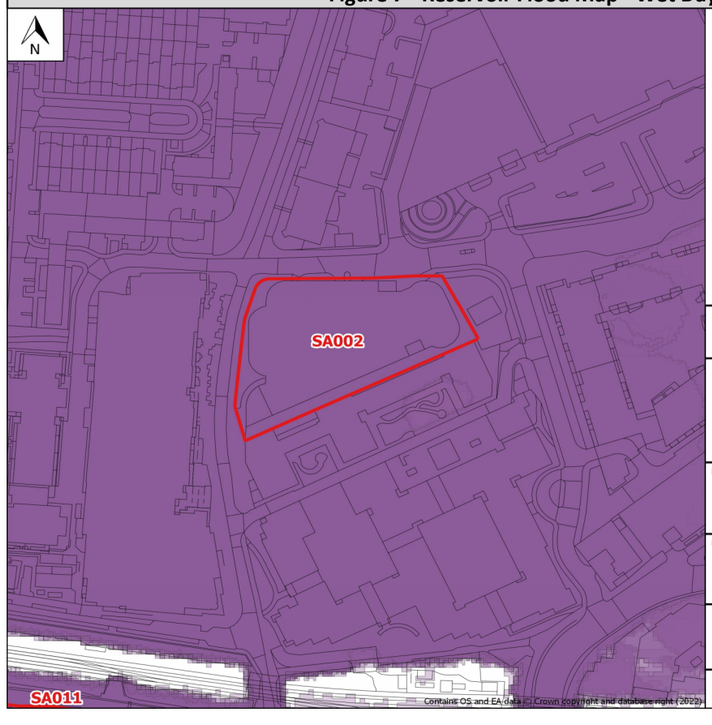
Level 2 Strategic Flood Risk Assessment

Drawing Title

Areas Susceptible to Groundwater Flooding

1:1,500	Drawing Size A4	Drawing Number Figure No.6

Figure 7 - Reservoir Flood Map - Wet Day



Legend

- Kingston borough boundary
- Site Allocations
- Reservoir Flood Extents (Wet Day)

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Project Title

Level 2 Strategic Flood Risk Assessment

Drawing Title

Reservoir Flood Extents (Wet Day)

1:1,500	Drawing Size A3	Drawing Number Figure No.7