



St Albans City and District Council
Level 2 Strategic Flood Risk Assessment
Detailed Site Summary Table

Site details

Site Code	UC12
Address	Garage Block between Hughenden Road and The Ridgeway, St Albans
Area	0.22ha
Current land use	Garages – Brownfield
Proposed land use	Residential
Flood Risk Vulnerability	More Vulnerable

Sources of flood risk

Location of the site within the catchment	<p>The site is located within the residential area of Marshalswick in northern St Albans. The sites western boundary is comprised of Wycombe Way. To the south there are several commercial units making up part of The Quadrant. To the north and east of the site there are several residential units, in addition there is an additional access road, Orton Place.</p> <p>The site is within the Upper Colne and Ellen Brook catchment, which covers an area of 95.5km², with the River Colne located approximately 4.8 km to the south of the site. The site is in the lower part of the catchment, in a densely urbanised area. The site is within the Colne Management Catchment, which covers a much larger area of 1,040 km².</p>
Topography	<p>Environment Agency 1m resolution LIDAR shows that topography varies across the site. The site is in a densely developed urban area and LIDAR data is unlikely to be representative of the actual site topography, this may have an impact on some of the flood risk datasets used in the assessment. The LIDAR shows that the land in the northwestern half of the site is the highest, then slopes down in a southeastern direction. The highest elevation in the northeastern corner is 103.3mAOD and falls to the lowest elevation of 101.5mAOD in the southeastern corner by Orton Place.</p>
Existing drainage features	<p>There are no existing drainage features within the site that are visible on topographic mapping or aerial imagery. Given that the site is within the main St Albans urban area, it is likely to be drained by the surface water drainage network.</p>
Fluvial	<p>The proportion of site at risk FMFP: FZ3b – 0% FZ3a – 0% FZ2 – 0% FZ1 – 100%</p>

	<p>The Flood Zone values quoted show the percentage of the site at flood risk from that particular Flood Zone/event, including the percentage of the site at flood risk at a higher risk zone. This is because the values quoted are the area covered by each Flood Zone/extent within the site boundary. For example: Flood Zone 2 includes Flood Zone 3. Flood Zone 1 is the remaining area outside Flood Zone 2 (FZ2+ FZ1 = 100%).</p> <p>Available data:</p> <p>The Environment Agency's Flood Zone mapping has been used in this assessment. The site lies outside the 0.1% AEP flood extents from the Environment Agency's Upper Colne (2010) Model. No detailed hydraulic modelling was available for this site.</p> <p>Flood characteristics:</p> <p>The site is located within Flood Zone 1 and is therefore at negligible risk of fluvial flooding.</p>
<p>Surface Water</p>	<p>Proportion of site at risk (RoFSW):</p> <p>3.3% AEP – 0% Max depth – N/A Max velocity – N/A</p> <p>1% AEP – 0% Max depth – N/A Max velocity – N/A</p> <p>0.1% AEP – 0% Max depth – N/A Max velocity – N/A</p> <p>Available data:</p> <p>The Environment Agency's Risk of Flooding from Surface Water (RoFSW) map has been used within this assessment.</p> <p>Description of surface water flow paths:</p> <p>There is no surface water flooding within the site for either the 3.3%, 1% or 0.1% AEP events.</p>
<p>Reservoir</p>	<p>The Environment Agency's reservoir maps show the site is not at risk of flooding from reservoir.</p>
<p>Groundwater</p>	<p>JBA Groundwater mapping shows that the whole site is at moderate risk from groundwater flooding, groundwater levels are indicated to be between 0.025 to 0.5m below ground level.</p> <p>The risk from groundwater will need to be investigated further as part of a site-specific flood risk assessment and is likely to require ground investigations to confirm the risk.</p>
<p>Sewers</p>	<p>The site is located within a postcode area with 30 recorded incidences of sewer flooding, according to the Thames Water Hydraulic Sewer Flood Risk Register.</p>

Flood history	There are no reported flood incidents reported by the Environment Agency, St Albans City and District Council or Hertfordshire County Council within or in vicinity of the site.
Flood risk management infrastructure	
Defences	The Environment Agency AIMS dataset shows that the site is not protected by any formal flood defences.
Residual risk	The site is not residual risk of flooding.
Emergency planning	
Flood warning	The site is not located within either an Environment Agency Flood Warning or Flood Alert area.
Access and egress	<p>Access and egress to the site is from either from Wycombe Way or Orton Place which both connect to off The Ridgeway.</p> <p>There is safe access and egress during the 3.3%, 1% AEP and 0.1% AEP event. During the 0.1% AEP event there is a flow path present along part of Wycombe Way however the flood depth is mainly <0.15m with a few small areas of 0.15 to 0.30m. The associated velocities are between 0.50 to 1.00 m/s. The resulting flood hazard is classified as 'very low', therefore does not impede access</p>
Dry Islands	The site is not located on a dry island.
Climate change	
Implications for the site	<p>Management Catchment: Colne Management Catchment</p> <p>Increased storm intensities due to climate change may increase the extent, depth, velocity, hazard, and frequency of both fluvial and surface water flooding</p> <p>Fluvial:</p> <p>In the absence of suitable climate change modelling, the 0.1% AEP extent from Upper Colne (2010) model was used as a proxy for future fluvial flood risk. Mapping shows that the site is within Flood Zone 1 and future fluvial flood risk to the site remains negligible.</p> <p>Surface Water:</p> <p>The latest climate change allowances have been applied to the Risk of Flooding from Surface Water map to indicate the impact on pluvial flood risk. The 1% AEP plus 40% climate change corresponds to the 1% AEP upper end allowance for peak rainfall intensity for the 2070s epoch and is therefore the 'design event' scenario.</p> <p>In the 1% AEP plus 40% climate change event, the flood extent is similar to that in the 0.1% AEP event. The site remains unaffected by surface water. The surface flow route along the access and egress route, Wycombe Way reaches a maximum depth, velocity, and hazard of 0.23m,</p>

0.85m/s and 'Danger to some'. Therefore, vehicular access and egress is still possible, via Wycombe Way.

Development proposals at the site must address the potential changes associated with climate change and be designed to be safe for the intended lifetime. The provisions for safe access and egress must also address the potential increase in severity and frequency of flooding.

Requirements for surface water drainage and integrated flood risk management

Broad-scale assessment of potential SuDS

Geology & Soils

- Geology at the site consist of:
 - Bedrock – Lewes Nodular Calk Formation and Seaford Chalk Formation – Chalk.
 - Superficial – The superficial geology of the site is Lowestoft Formation – Diamicton. This is an extensive sheet of chalky till, with outwash sands, gravels, silts and clays.
- Soils at the site consist of:
 - Slightly acid loamy and clayey soils with impeded drainage.

Sustainable Drainage Systems (SuDS)

- Groundwater levels are indicated to be less than 0.5m below ground level. Detention and attenuation features should be designed to prevent groundwater ingress from impacting hydraulic capacity and structural integrity. Additional site investigation work may be required to support the detailed design of the drainage system. This may include groundwater monitoring to demonstrate that a sufficient unsaturated zone has been provided above the highest occurring groundwater level. Below ground development such as basements are not appropriate at this site.
- BGS data indicates that the underlying geology is chalk which is likely to be free draining. Although, groundwater mapping indicates that the site is at moderate risk of groundwater flooding, therefore infiltration techniques may not be suitable. This should be confirmed through infiltration testing, and groundwater monitoring throughout a winter period.
- The whole site is located within Groundwater Source Protection Zone 3. Proposed SuDS should be discussed with relevant stakeholders (St Albans City and District Council, Hertfordshire County Council and the Environment Agency) at an early stage to understand possible opportunities and constraints. The Groundwater Source Protection Zone guidance is currently undergoing a review. Therefore, developers should ensure they are using the latest guidance.
- The site is not located within a historic landfill site.
- Surface water discharge rates should not exceed pre-development discharge rates for the site and should be designed to be as close to greenfield runoff rates as reasonably practical in consultation with the LLFA. It may be possible to reduce site runoff by maximising the

	<p>permeable surfaces on site using a combination of permeable surfacing and soft landscaping techniques.</p> <ul style="list-style-type: none"> • If it is proposed to discharge runoff to a watercourse or sewer system, the condition and capacity of the receiving watercourse or asset should be confirmed through surveys and the discharge rate agreed with the asset owner.
<p>Opportunities for wider sustainability benefits and integrated flood risk management</p>	<ul style="list-style-type: none"> • Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the site and surrounding area. Proposals to use SuDS techniques should be discussed with relevant stakeholders (St Albans City and District Council, Hertfordshire County Council and the Environment Agency) at an early stage to understand possible constraints. • Development at this site should not increase flood risk either on or off site. The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development • Opportunities to incorporate filtration techniques such as bioretention areas must be considered. Consideration should be made to the existing condition of receiving waterbodies and their Water Framework Directive objectives for water quality. The use of multistage SuDS treatment will clean and improve water quality of surface water runoff discharged from the site and reduce the impact on receiving water bodies. • Opportunities to incorporate source control techniques such as green roofs, permeable surfaces and rainwater harvesting must be considered in the design of the site.
<p>NPPF and planning implications</p>	
<p>Exception Test requirements</p>	<p>The site is within Flood Zone 1 but at risk from groundwater flooding. The Sequential Test must be passed, the criteria for which is highlighted within the Level 1 Assessment. The Exception Test is not required under the NPPF. However, it must be shown that the development will be safe for its lifetime and the risk can be managed through a sequential approach to design.</p>
<p>Requirements and guidance for site-specific Flood Risk Assessment</p>	<p>Flood Risk Assessment:</p> <ul style="list-style-type: none"> • At the planning application stage, a site-specific FRA will be required as the site is: <ul style="list-style-type: none"> ○ At risk of groundwater flooding. • All sources of flooding should be considered as part of a site-specific FRA. Ground investigations are likely to be necessary to confirm the risk from groundwater flooding to the site. • Consultation with St Albans City and District Council, Hertfordshire County Council, Thames Water and the Environment Agency should be undertaken at an early stage. • Any FRA should be carried out in line with the National Planning Policy Framework (NPPF); Flood Risk and Coastal Change Planning

	<p>Practice Guidance (PPG); St Albans City and District Council's Local Plan Policies and Hertfordshire County Council's Guidance for Developers.</p> <ul style="list-style-type: none"> The development should be designed with mitigation measures in place where required. <p>Guidance for site design and making development safe:</p> <ul style="list-style-type: none"> The developer will need to show, through an FRA, that future users of the development will not be placed in danger from flood hazards throughout its lifetime. It is for the applicant to show that the development meets the objectives of the NPPF's policy on flood risk. For example, how the operation of any mitigation measures can be safeguarded and maintained effectively through the lifetime of the development. (Para 048 Flood Risk and Coastal Change PPG). Planning permission is required to surface more than 5 square metres of unpaved ground using a material that cannot absorb water. Mitigation for seasonal high groundwater levels must be considered (for example by raising finished floor levels to an appropriate height above ground level). Due to the high groundwater flood risk, basements are not advised. The design of SuDS schemes must consider the seasonally high groundwater table. Infiltration techniques may be ineffective and may pose a pollution risk. SuDS may need to be shallow and take up larger areas. Above ground conveyance and attenuation can be used but care must be taken that groundwater does not enter the SuDS feature and reduce the storage capacity and structural integrity of the design.
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Key messages

The site is in Flood Zone 1 however has some significant risk of groundwater flooding. Development is likely to be able to proceed if:

- A carefully considered and integrated flood resilient and sustainable drainage design is put forward, with development steered away from the areas identified to be at risk of surface water flooding across the site.
- A site-specific FRA demonstrates that the site is not at an increased risk of flooding in the future and that development of the site does not increase the risk of surface water flooding on the site and to neighbouring areas.
- If flood mitigation measures are implemented then they are tested to check that they will not displace water elsewhere (for example, if land is raised to permit development on one area, compensatory flood storage will be required in another).

Mapping Information

Flood Zones	Flood Zones 2 and 3a have been taken from the Environment Agency's Flood Map for Planning mapping. There is no detailed hydraulic modelling available at this location.
Climate change	The latest climate change allowances have been applied to the Environment Agency's RoFSW map to indicate the impact on surface water flood risk.

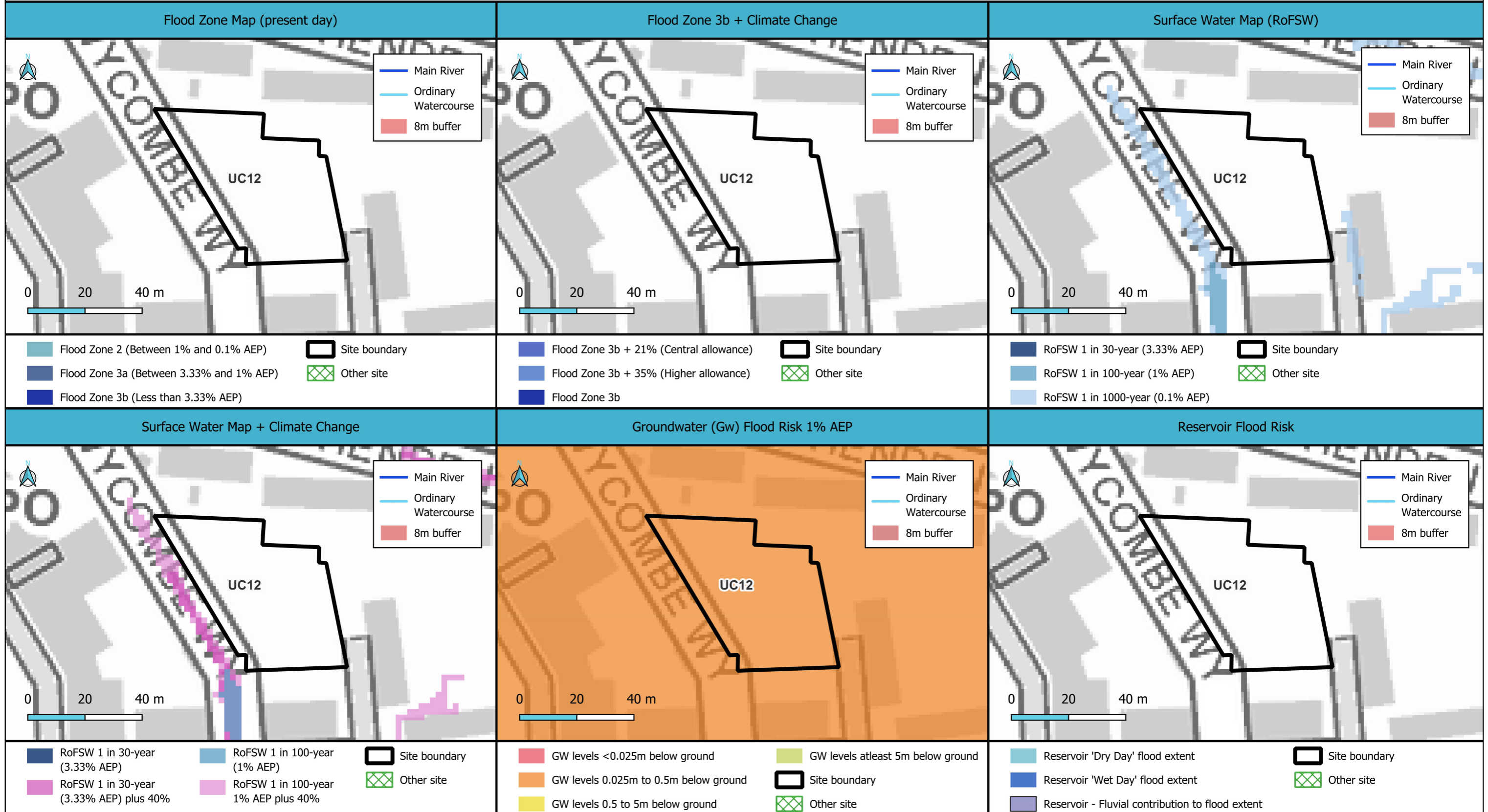
	In the absence of detailed hydraulic modelling, Flood Zone 2 has been used as an indicative assessment of future fluvial risk at 1% AEP.
Fluvial depth, velocity and hazard mapping	There is no detailed hydraulic modelling available at this location.
Surface Water	The Environment Agency's Risk of Flooding from Surface Water dataset has been used for this assessment.
Surface water depth, velocity and hazard mapping	The surface water depth, velocity, and hazard mapping for the 3.3%, 1% and 0.1% AEP events (considered to be high, medium, and low risk) have been taken from Environment Agency's RoFSW.

Site Reference	UC12
Site Name	Garage Block Between Hughenden Road and The Ridgeway, St Albans

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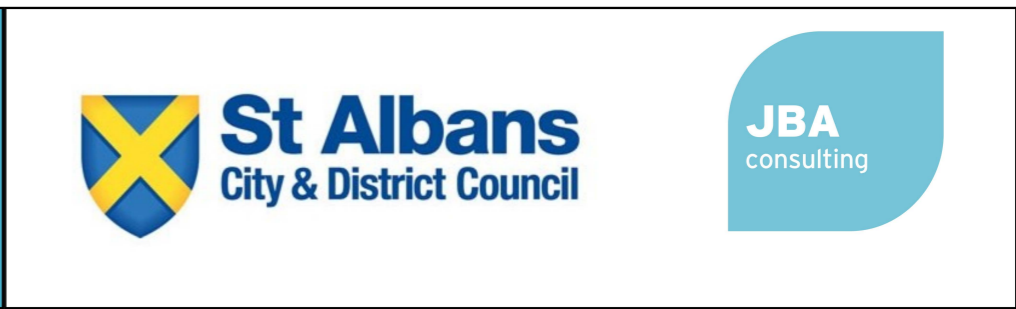


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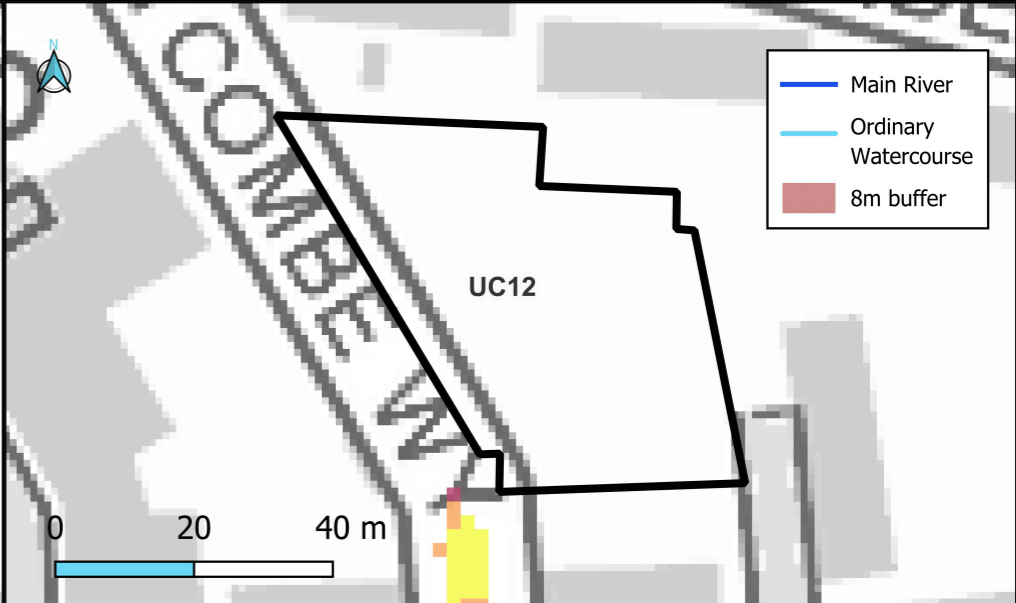
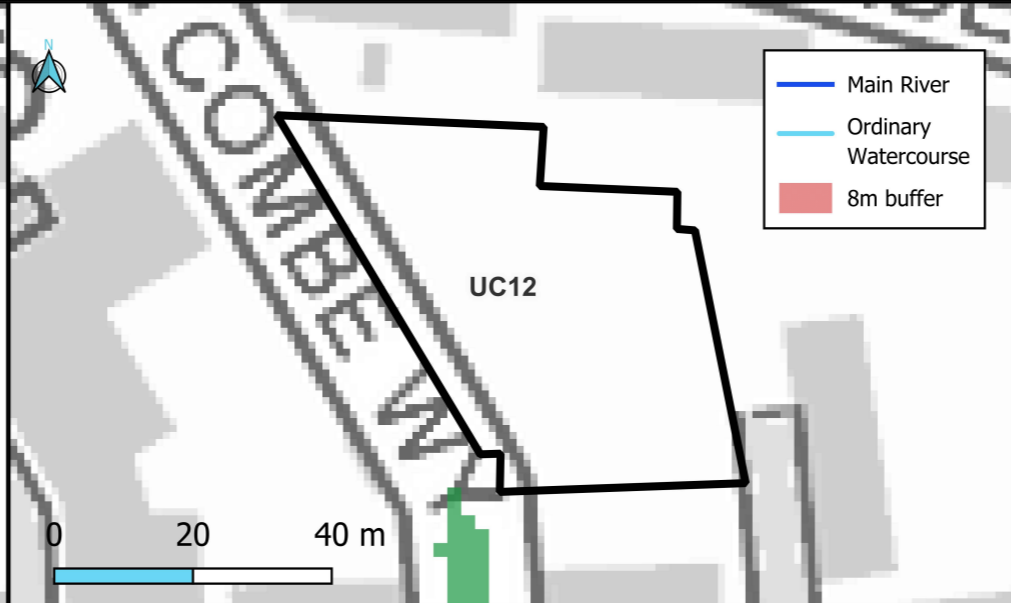
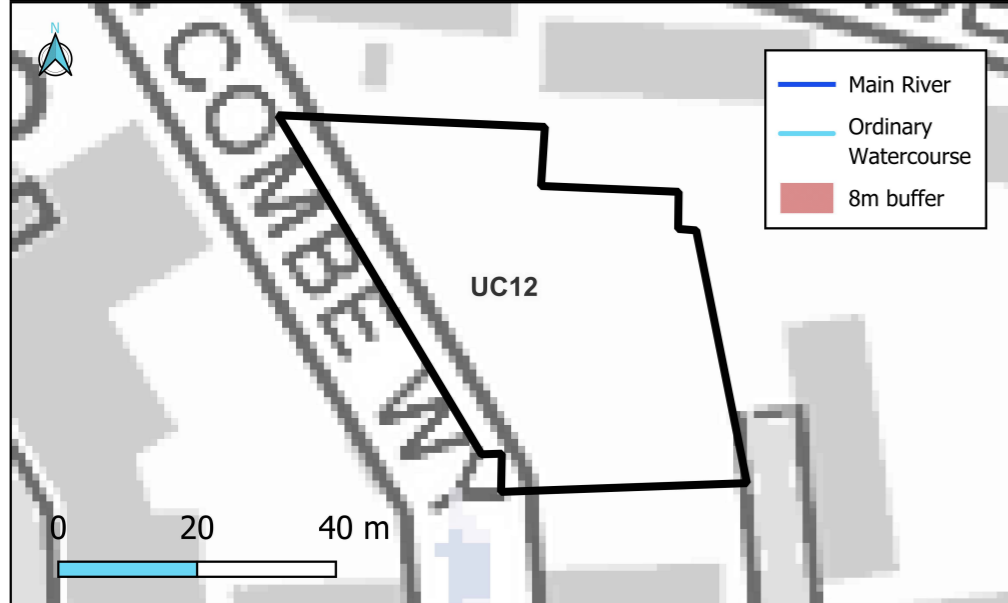
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RoFSW Max Depth - 1% AEP	RoFSW Max Hazard - 1% AEP	RoFSW Max Velocity - 1% AEP
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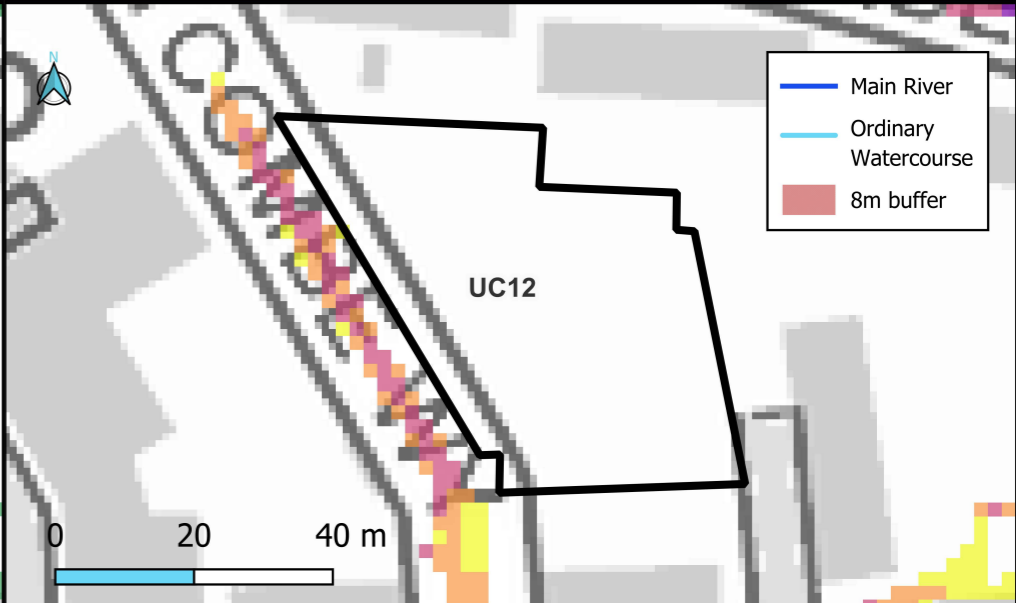
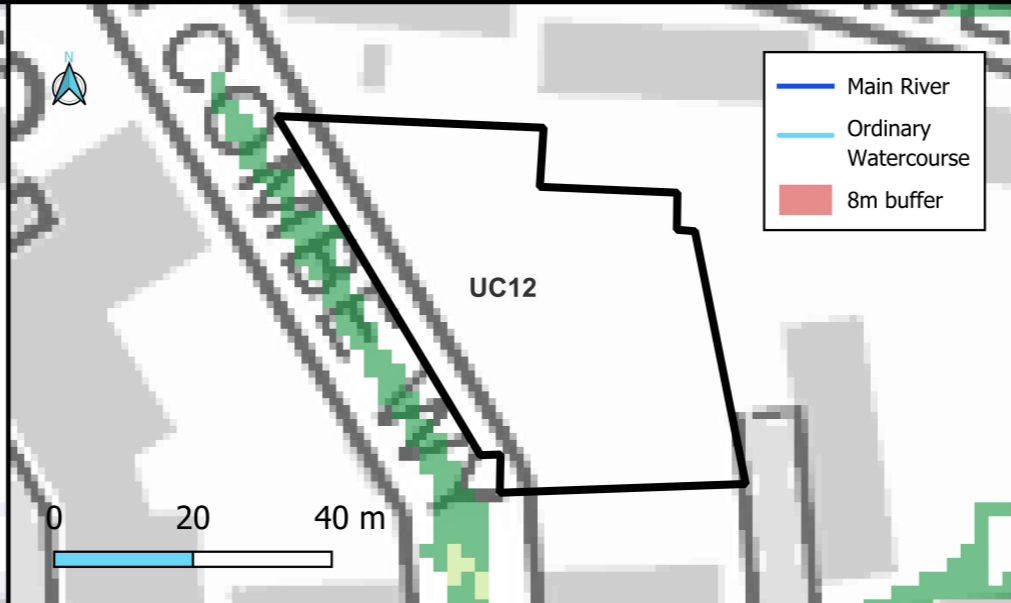
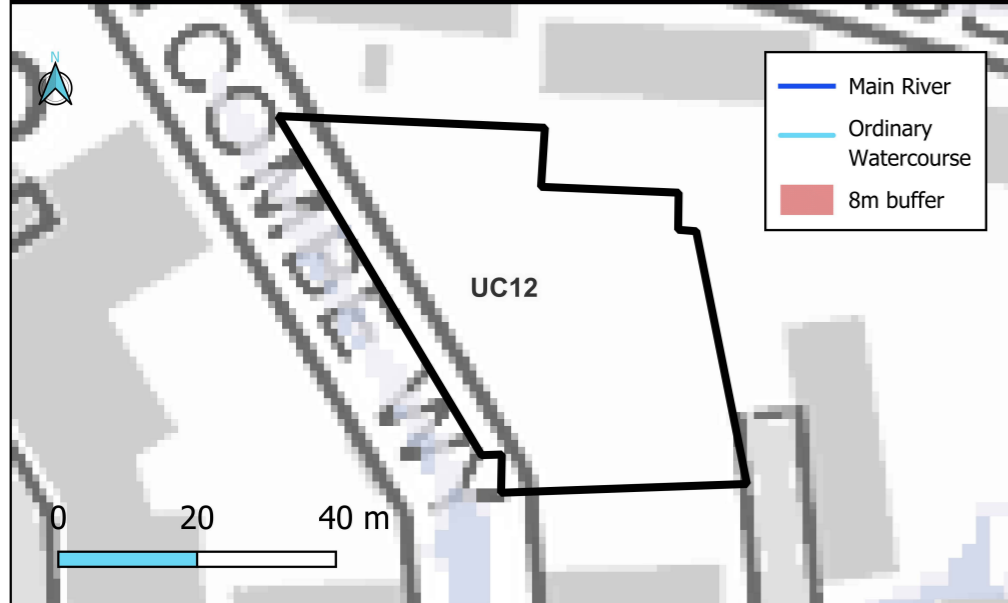


Depth (m)	0.00 - 0.15	0.15 - 0.30	0.30 - 0.60	0.60 - 0.90	0.90 - 1.20	> 1.20	Site boundary	Other site
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Hazard	< 0.75: Low	0.75 - 1.25: Moderate	1.25 - 2.00: Significant	> 2.00: Extreme	Site boundary	Other site
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Velocity (m/s)	0.00 - 0.25	0.25 - 0.50	0.50 - 1.00	1.00 - 2.00	> 2.00	Site boundary	Other site
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RoFSW Max Depth - 1% AEP + 40% CC	RoFSW Max Hazard - 1% AEP + 40% CC	RoFSW Max Velocity - 1% AEP + 40% CC
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Depth (m)	<= 0.15	0.15 - 0.30	0.30 - 0.60	0.60 - 0.90	0.90 - 1.20	> 1.20	Site boundary	Other site
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Hazard	< 0.75: Low	0.75 - 1.25: Moderate	1.25 - 2.00: Significant	> 2.00: Extreme	Site boundary	Other site
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Velocity (m/s)	0.00 - 0.25	0.25 - 0.50	0.50 - 1.00	1.00 - 2.00	> 2.00	Site boundary	Other site
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