	St Albans City and District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Table
Site details	
Site Code	**UC36**
Address	Garages off Park Street Lane, Park Street
Area	0.13ha
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	The site is located in Park Street, a village to the south of St Albans, on the London Northwest Railway line. The site is situated behind the commercial row of buildings by the junction of Park Street Lane and A5183. To the north of the site is residential, there is a small access road to the east between the commercial units, to the south again is the commercial units as well as a residential block of flats. To the west is residential. The River Ver is 0.03km to the east of the site. The site is located within the Colne Management Catchment, which covers an area of 1040km^2.
Topography	Environment Agency 1m resolution LiDAR across the site shows that topography is fairly flat. 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 sites elevation is between 68.0mAOD to 68.6mAOD.
Existing drainage features	There are no existing drainage features within the site that are visible on topographic mapping or aerial imagery. The site is approximately 0.03km west of the River Ver. There are no major topographic depressions in the site that could act as drainage ditches.
Fluvial	**The proportion of site at risk FMFP:** FZ3b – 0% FZ3a – 0% FZ2 – 0% FZ1 – 100% 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%). **Available data:** The Environment Agency's Flood Zone mapping has been used in this assessment, alongside the River Ver (2019) 1D-2D hydraulic model received for this Level 2 SFRA. The site lies outside the 0.1% AEP flood extents from the Environment Agency's River Ver (2019) Model. **Flood characteristics:** The site is located within Flood Zone 1 and is therefore at negligible risk of fluvial flooding.
Surface Water	**Proportion of site at risk (RoFSW):** **3.3% AEP** – 0% Max depth – N/A Max velocity – N/A **1% AEP** – 20% Max depth – 0.30 – 0.60m Max velocity – 0.00 – 0.25m/s **0.1% AEP** – 43% Max depth – 0.30 – 0.60m Max velocity – 0.25 – 0.50m/s. **Available data:** The Environment Agency's Risk of Flooding from Surface Water (RoFSW) map has been used within this assessment. **Description of surface water flow paths:** There is no flooding within the site during the 3.3% AEP event. During the 1% AEP event, pooling occurs within the centre of the site, extending to affect a portion of its northern boundary. Flood depths typically range from 0.15 to 0.30m with a small area in the centre of the ponding reaching a maximum depth of between 0.30 to 0.60m. The associated velocities are slow moving, <0.25m/s. The flood hazard ranges from 'very low' to 'Danger to some'. During the 0.1% AEP event, a larger area of pooling occurs, covering approximately 43% of the site. Flood depths predominantly range between 0.30 to 0.6 meters, with velocities remaining primarily below 0.25m/s. There is a small area to the east of the pooling where velocities increase to between 0.25 to 0.50m/s. The flood hazard is mostly 'Danger to some' with the permitter of the extent classed as 'very low'.
Reservoir	The Environment Agency's reservoir maps show the site is not at risk of flooding from any reservoir.
Groundwater	The JBA Groundwater mapping shows that groundwater levels are between 0.5 and 5m below ground level and therefore, the whole site is shown to have low risk of groundwater flooding.

Sewers	The site is located within a postcode area with 25 historic incidences of sewer flooding, according to the Thames Water Hydraulic Sewer Flood Risk Register.
Flood history	There are no reported flood incidents within the site. One incident was reported to St Albans District Council, a commercial unit on the corner of Park Street Lane and the A5183 reported external flooding on Park Street Lane due to a blocked drain, no data was recorded but flood depths were reported to be 3 feet.
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 maybe at residual risk from the River Ver. The River Ver is located 0.03km away from the site and splits into two branches just upstream of the site. The right arm of the River Ver flowing through a conduit system under Park Mill, and the left branch continuing as an open channel until it flows under the Burydell Lane road bridge. Both or one of these structures may become blocked causing the River Ver to back up potentially leading to flooding out of bank and affecting the surrounding area.
Emergency planning	
Flood warning	The site is not located within any Environment Agency Flood Warning or Alert Areas.
Access and egress	There are currently two access and egress routes to the site. The first one is via an access road off Park Street Lane and the second via a access road off the A5183. Both of the access and egress routes are single tack roads. During the 3.3% AEP event there is surface water flooding along Park Street Lane, with flood depths <0.15m and a velocity of between 0.50 to 1.00m/s. The flood hazard is 'Very low', so safe access and egress is possible. There is no flooding by the access route off the A5183, thus the route providing safe access and egress. During the 1% AEP event, the flood depths along the surface water flow route on Park Street Lane increase to between 0.15 to 0.30m. With an area of ponding on Park Street close to the junction with the A5183 reaching a maximum 0.30 to 0.60m. The velocities by the entrance to the sites access road off Park Street Lane reach a maximum velocity between 0.50 to 1.00m/s. The flood hazard ranges between 'Danger for some' to 'Danger to most' by the entrance to the access road on Park Street Lane. Therefore, safe access and egress via this route is impeded. The access and egress route off the A5183 is not flooded so provides safe access and egress. During the 0.1% event, the surface water flood extent has extended along Park Street Lane and covers part of the single-track access route into the

	site from Park Street Lane. Flood depths are mainly between 0.30 to 0.60m on Park Street Lane, with the flood depths on the access road ranging between 0.15 to 0.30m. Velocities along Park Street Lane are between 1.00 to 2.00m/s. The A5183 also has a small surface water flow route along the road by the entrance to the site. However, the flood depths are <0.15m but velocities are between 1.00 to 2.00m/s. The flood hazard by the access and egress route off Park Street Lane is 'Danger for most', so vehicular assess is not possible, but the access and egress route of the A5183 is classed as 'Very low'. Thus, providing a safe access and egress route.
Dry Islands	The site is not located on a dry island.
Climate change	
Implications for the site	**Management Catchment: Colne Management Catchment** Increased storm intensities due to climate change may increase the extent, depth, velocity, hazard, and frequency of both fluvial and surface water flooding **Fluvial:** The latest climate change allowances have been applied to the River Ver (2019) model to indicate the impact of fluvial flood risk. Mapping shows that the site is within Flood Zone 1 and with the latest climate change allowances applied fluvial flood risk to the site remains negligible. **Surface Water:** 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. In the 1% AEP plus 40% climate change event the flood extent is similar to that in the 0.1% AEP event, with a slightly larger extent along the single-track road into the site from Park Street Lane. The maximum flood depth, velocity and hazard within the site is 0.44m, 0.84m/s and 'Danger for some'. This shows that the site is somewhat sensitive to increases in pluvial flooding due to climate change. 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 – Bedrock geology of the site is Lewes Nodular Chalk Formation and Seaford Chalk Formation – chalk. This is a sedimentary bedrock.

	○ Superficial deposits – Superficial deposits of the site is comprised of River Terrace Deposits – sands and gravels. A sedimentary superficial deposit. • Soils at the site consist of: ○ Freely draining slightly acid bust base-rich soils. **Sustainable Drainage Systems (SuDS)** • Groundwater levels are indicated to be between 0.5 and 5m below ground level and there is a risk of flooding to subsurface assets and below ground development such as basements. Groundwater monitoring is recommended to determine the seasonal variability of groundwater levels, as this may affect the design of the surface water drainage system. • BGS data indicates that the underlying geology is chalk which is likely to be free draining. This should be confirmed through infiltration testing, with the use of infiltration maximised as much as possible in accordance with the SuDS hierarchy. • The site is partially located within Groundwater Source Protection Zone (SPZ) 1 and infiltration techniques may not appropriate for anything other than clean roof drainage. If infiltration is proposed for anything other than clean roof drainage in SPZ 1, a hydrogeological risk assessment should be undertaken to ensure that the system does not pose an unacceptable risk to the source of supply. Proposed SuDS should be discussed with relevant stakeholders (St Albans City and District Council, Hertfordshire County Council (LLFA) 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 also ensure they are using the latest guidance available. • 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 permeable surfaces on site using a combination of permeable surfacing and soft landscaping techniques. • The Risk of Flooding from Surface Water (RoFSW) mapping indicates the presence of surface water flow paths during the 1% and 0.1% AEP events. Existing flow paths should be retained and integrated with blue-green infrastructure and public open space. • 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.
Opportunities for wider sustainability benefits and	• 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

integrated flood risk management	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 (LLFA) 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.
NPPF and planning implications	
Exception Test requirements	The site is within Flood Zone 1 but at risk from surface water and 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, even though the site is classified as 'More Vulnerable'. 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.
Requirements and guidance for site-specific Flood Risk Assessment	**Flood Risk Assessment:** • At the planning application stage, a site-specific FRA will be required as the site is: ○ At risk of flooding from surface water and groundwater • All sources of flooding should be considered as part of a site-specific FRA. • 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 Practice Guidance (PPG); St Albans City and District Council's Local Plan Policies and Hertfordshire County Council's Guidance for Developers. • The development should be designed with mitigation measures in place where required. **Guidance for site design and making development safe:**

- 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).
- The risk from surface water flow routes should be quantified as part of a site-specific FRA, including a drainage strategy, so runoff magnitudes from the development are not increased by development across any ephemeral surface water flow routes. A drainage strategy should help inform site layout and design to ensure runoff rates are as close as possible to greenfield rates.
- Planning permission is required to surface more than 5 square metres of unpaved ground using a material that cannot absorb water.
- Arrangements for safe access and egress will need to be demonstrated for the 1% and 0.1% surface water events with an appropriate allowance for climate change, using the depth, velocity, and hazard outputs.
- Should built development be proposed within the 1% AEP surface water flood extent, careful consideration will need to be given to flood resistance and resilience measures.
- Flood resilience and resistance measures should be implemented where appropriate during the construction phase, e.g. raising of floor levels. These measures should be assessed to make sure that flooding is not increased elsewhere.
    - raise them as much as possible
    - include extra flood resistance and resilience measures.
- Other examples of flood resistance and resilience measures include:
    - using flood resistant materials that have low permeability to at least 600mm above the estimated flood level
    - making sure any doors, windows or other openings are flood resistant to at least 600mm above the estimated flood level
    - by raising all sensitive electrical equipment, wiring and sockets to at least 600mm above the estimated flood level.

Key messages

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.
- Safe access and egress can be demonstrated in the surface water plus climate change events. This includes measures to reduce flood risk along these routes such as raising access, but not displacing floodwater elsewhere.

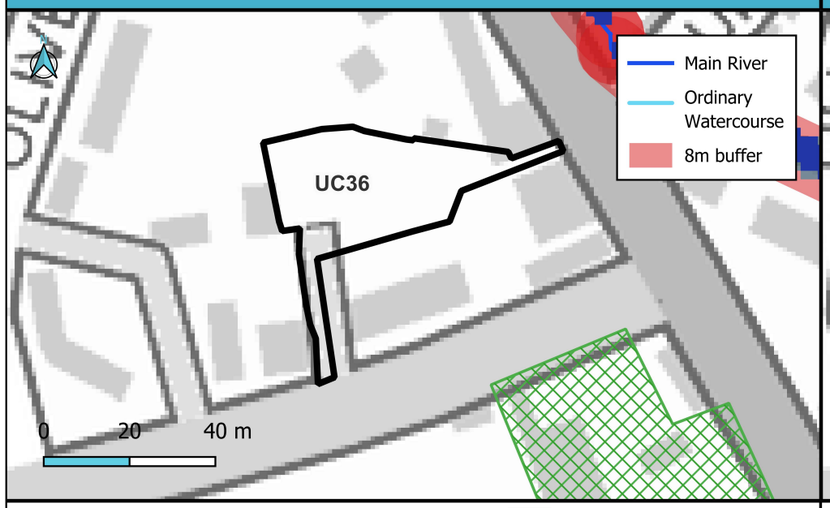
- A site-specific FRA demonstrates that the site is not at an increased risk of flooding in the future and that development of the site does not increase the risk of surface water flooding on the site and to neighbouring areas.
- If flood mitigation measures are implemented then they are tested to check 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. Flood Zone 3b has been created from the River Ver (2019) hydraulic model.
Climate change	The most recent uplifts have been applied to the River Ver (2019) hydraulic model to indicate the impacts on fluvial flood risk.
Fluvial depth, velocity and hazard mapping	Depth, velocity, and hazard data was derived from the River Ver (2019) hydraulic model.
Surface Water	The Environment Agency's Risk of Flooding from Surface Water dataset has been used for this assessment. The latest climate change allowances have been applied to the RoFSW map to indicate the impact on pluvial flood risk.
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	UC36
Site Name	Garages off Park Street Lane, Park Street

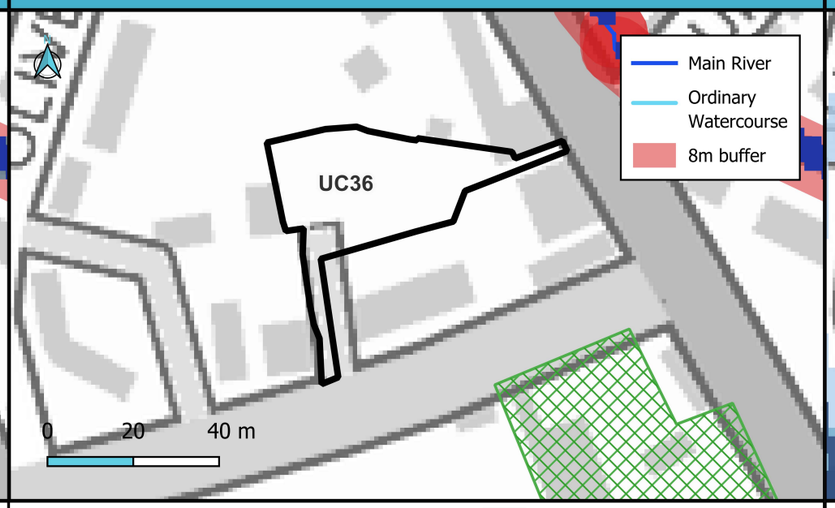
St Albans District Council
Strategic Flood Risk Assessment
Level 2 Detailed Site Summary

Flood Zone Map (present day)



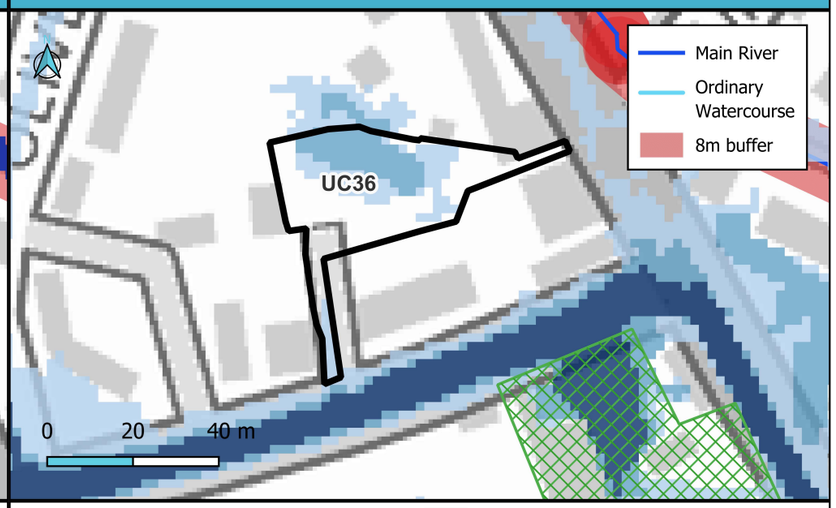
Flood Zone 2 (Between 1% and 0.1% AEP)
Flood Zone 3a (Between 3.33% and 1% AEP)
Flood Zone 3b (Less than 3.33% AEP)
Site boundary
Other site

Flood Zone 3b + Climate Change



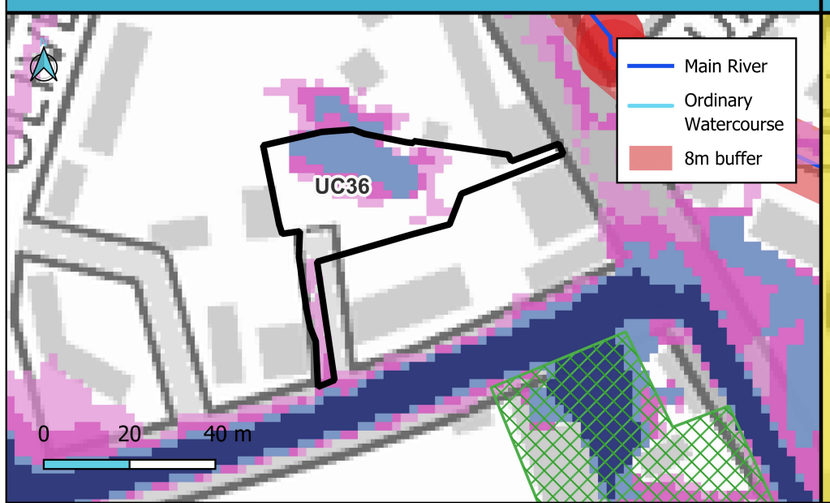
Flood Zone 3b + 21% (Central allowance)
Flood Zone 3b + 35% (Higher allowance)
Flood Zone 3b
Site boundary
Other site

Surface Water Map (RoFSW)



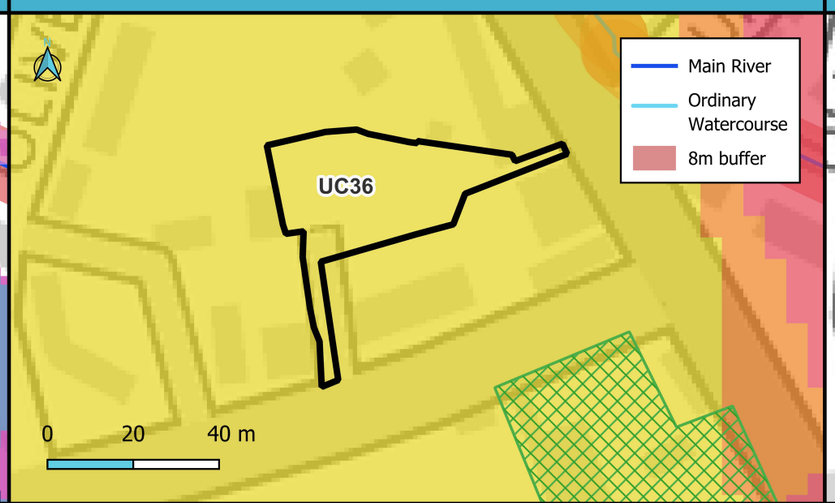
RoFSW 1 in 30-year (3.33% AEP)
RoFSW 1 in 100-year (1% AEP)
RoFSW 1 in 1000-year (0.1% AEP)
Site boundary
Other site

Surface Water Map + Climate Change



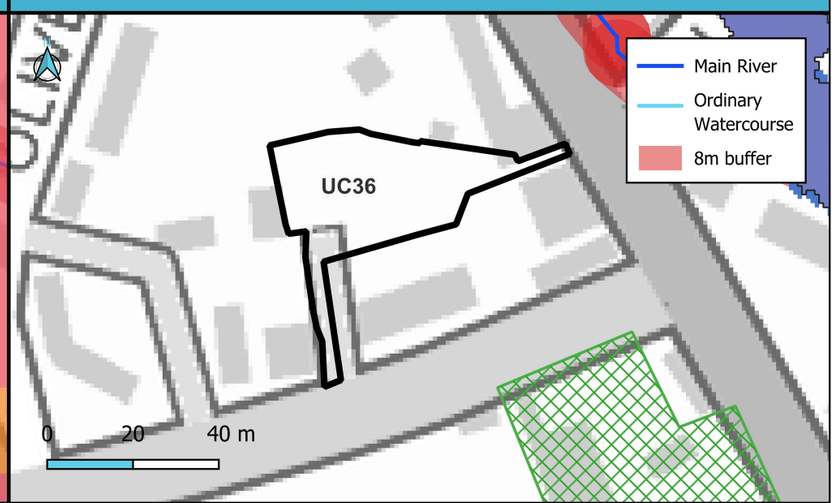
RoFSW 1 in 30-year (3.33% AEP)
RoFSW 1 in 30-year (3.33% AEP) plus 40%
RoFSW 1 in 100-year (1% AEP)
RoFSW 1 in 100-year 1% AEP plus 40%
Site boundary
Other site

Groundwater (Gw) Flood Risk 1% AEP



GW levels <0.025m below ground
GW levels 0.025m to 0.5m below ground
GW levels 0.5 to 5m below ground
GW levels atleast 5m below ground
Site boundary
Other site

Reservoir Flood Risk



Reservoir 'Dry Day' flood extent
Reservoir 'Wet Day' flood extent
Reservoir - Fluvial contribution to flood extent
Site boundary
Other site

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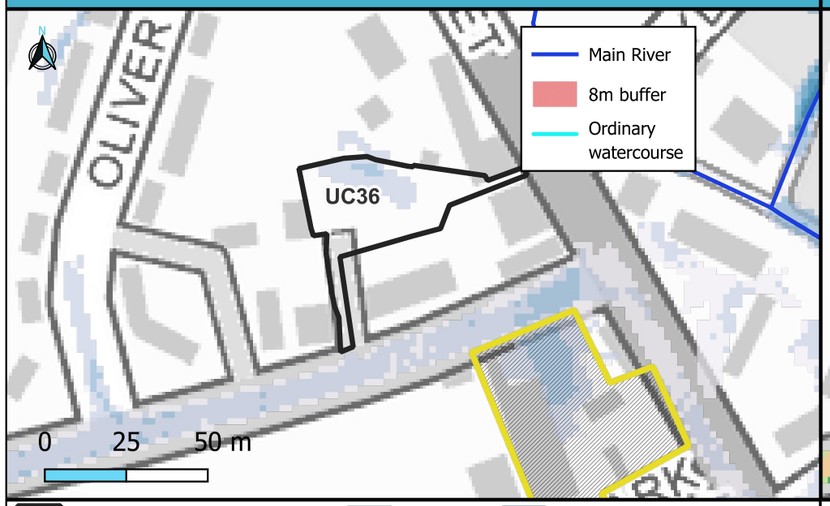
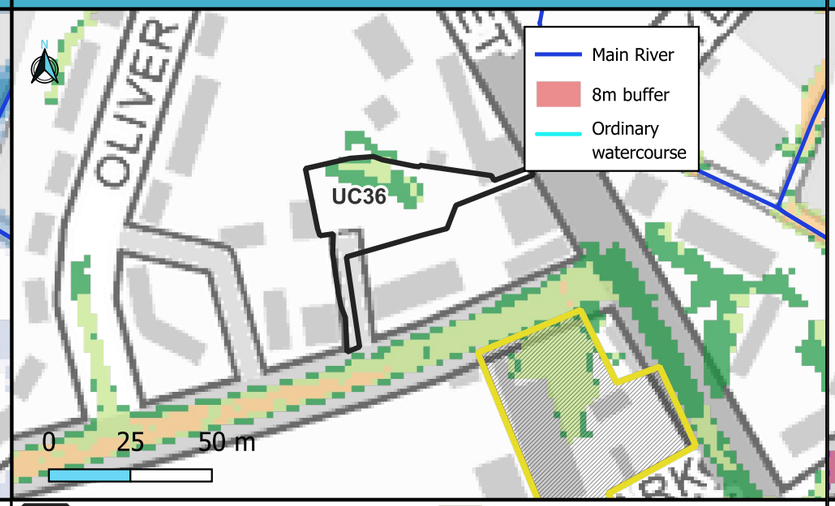
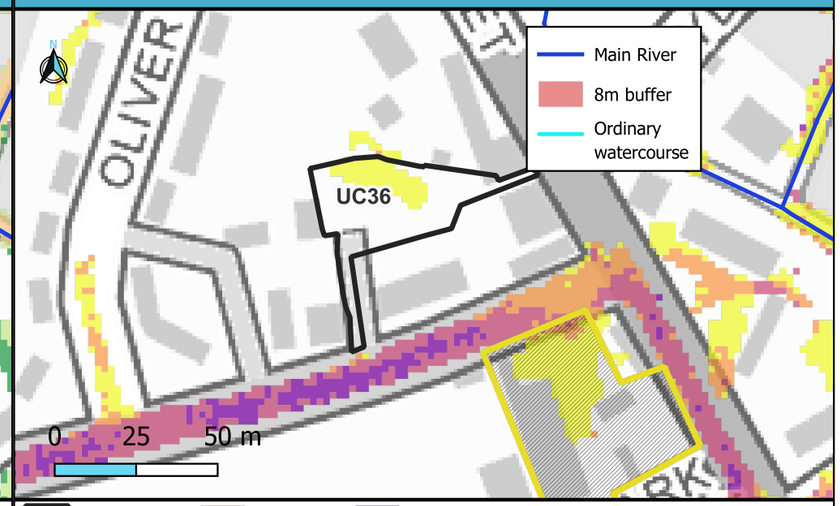
RoFSW Max Depth - 1% AEP



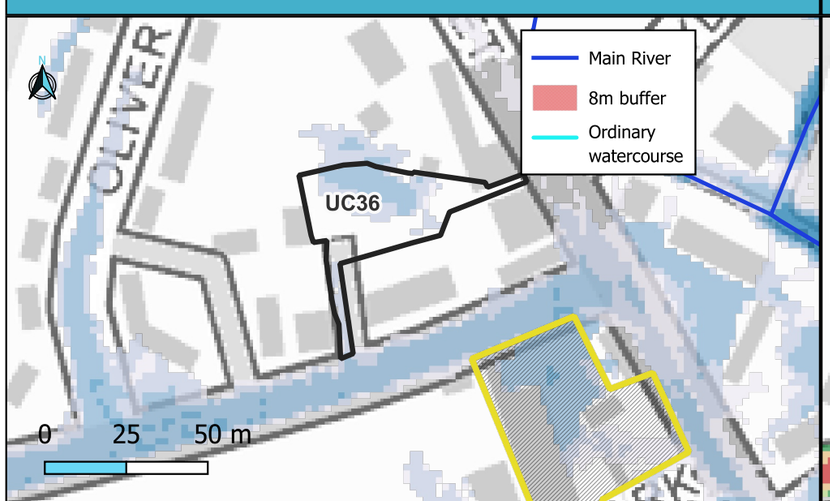
RoFSW Max Hazard - 1% AEP



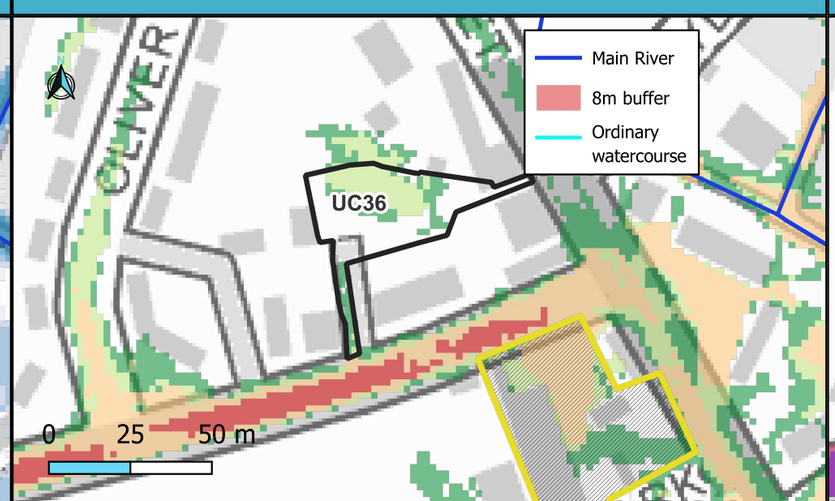
RoFSW Max Velocity - 1% AEP



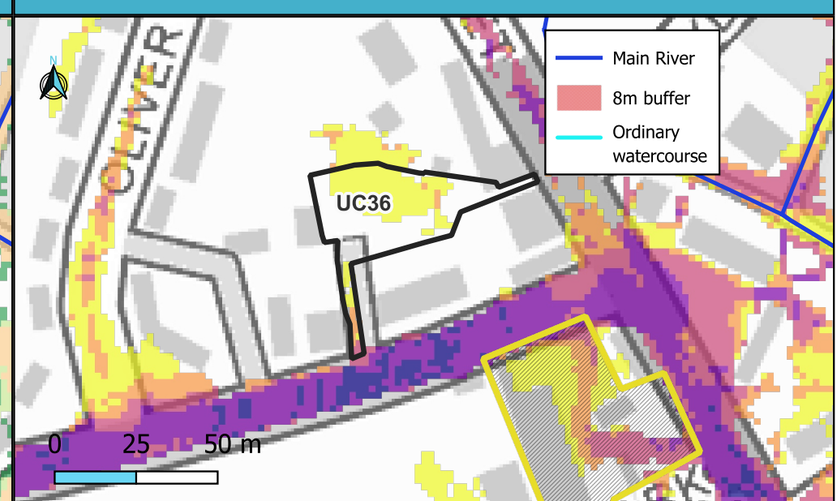
RoFSW Max Depth - 1% AEP + 40% CC



RoFSW Max Hazard - 1% AEP + 40% CC



RoFSW Max Velocity - 1% AEP + 40% CC



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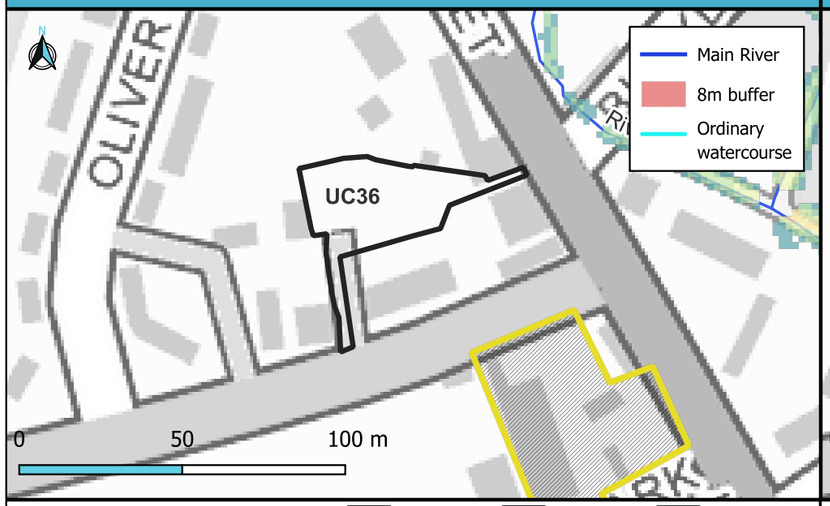
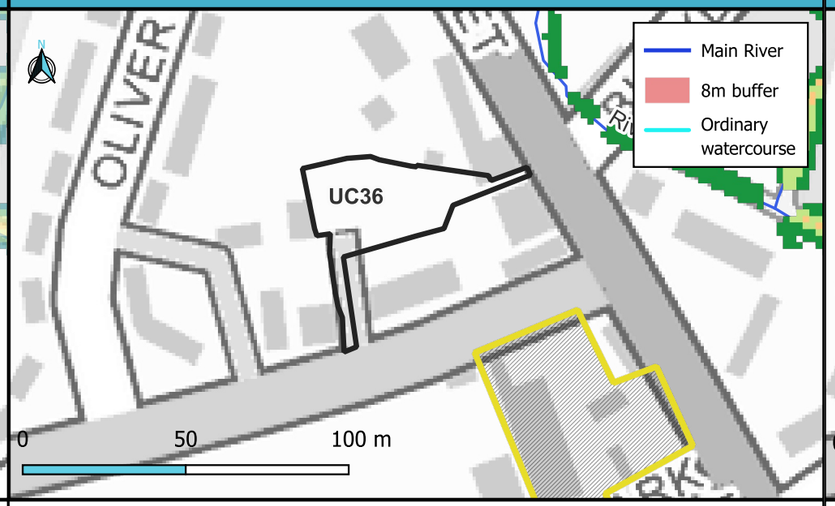
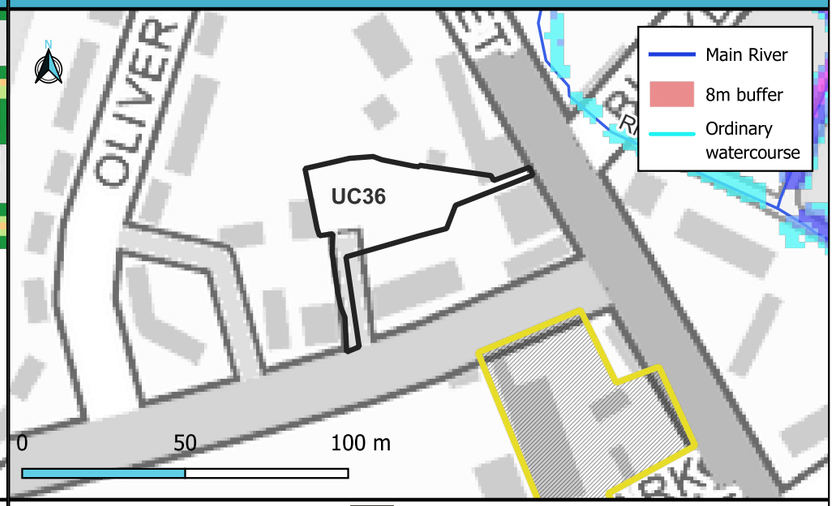
Max Fluvial Flood Depth (m) - 1% AEP



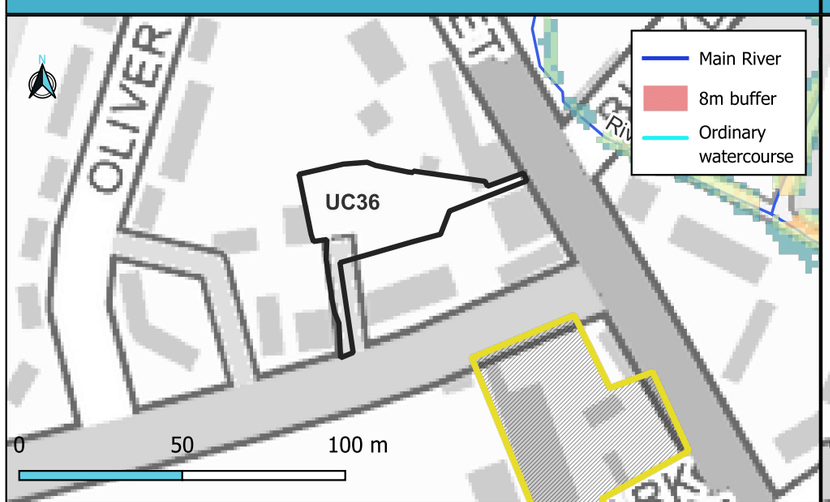
Max Fluvial Flood Hazard - 1% AEP



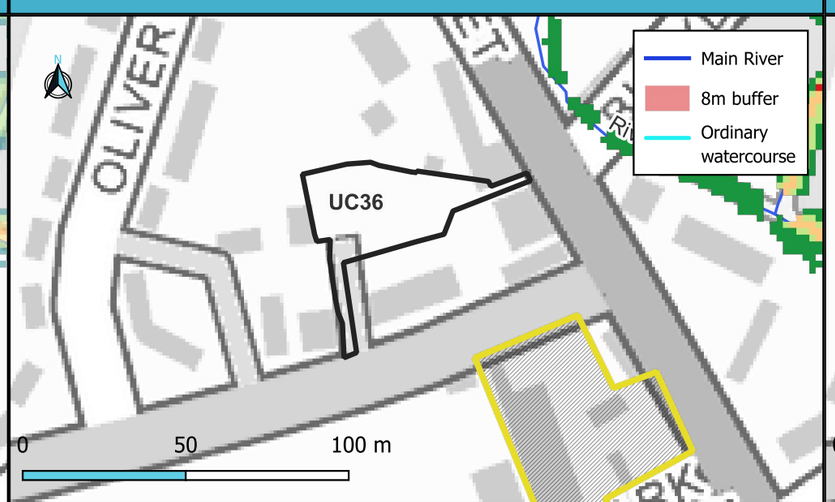
Max Fluvial Flood Velocity (m/s) - 1% AEP



Max Fluvial Flood Depth - 1% AEP +35% CC



Max Fluvial Flood Hazard - 1% AEP +35% CC



Max Fluvial Flood Velocity - 1% AEP +35% CC