	St Albans City and District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Table
Site details	
Address	186 Sandridge Road, St Albans
Area	0.19ha
Current land use	Undeveloped
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 an urbanized area in the northern residential part of Bernards Heath, St Albans, east of Sandridge Road (B651), which forms part of the site's western boundary. It is situated behind properties along Sandridge Road and Battlefield Road. The site is within the River Ver Catchment, with the river approximately 2 km to the south. The site is located within the lower catchment which is predominantly urban as it passes through St Albans. The site also falls within the Colne Management Catchment, covering a much larger area of 1,040km^2.
Topography	Environment Agency 1m resolution LIDAR data across the site shows the elevation is reasonably consistent. However, as the site is in a densely developed urban area, the LIDAR data may not accurately represent the actual site topography, potentially impacting some flood risk assessments. The LIDAR indicates the site's elevation ranges from 121.9 to 122.2mAOD. The site consists of a single-track road off Sandridge Road, with a parcel of land extending north at the end of the track, situated between the rear of properties along Sandridge and Battlefield Roads.
Existing drainage features	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.
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. 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 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** – 0% Max depth – N/A Max velocity – N/A **0.1% AEP** – 12% Max depth – 0.15 – 0.30m Max velocity – 0.50 – 1.00m/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 surface water flooding within the site during the 3.3% and 1% AEP events. During the 0.1% AEP event, there is a small area in the western area of the site affected by surface water, where the site meets Sandridge Road. There is also a flow path across the northern area of the site flowing west to east. The depth of flooding within the site is between mainly between 0.15 to 0.30m with small areas where the flood depth is <0.15m. The velocities are primarily <0.25m/s, where the northern flow path leaves the site on the eastern boundary velocities reach between 0.50 to 1.00m/s. The flood hazard is 'Very low' to 'Danger for some'.
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 at the site are likely to be at least 5m below ground level. As a result, groundwater flood risk is not likely.
Sewers	The site is located within a postcode area with 10 historic incidences of sewer flooding, according to the Thames Water Hydraulic Sewer Flood Risk Register.

Flood history	There are no reported flood incidents at 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 at residual risk of flooding.
Emergency planning	
Flood warning	The site is not located within any Environment Agency Flood Warning Areas.
Access and egress	Access and egress to the site is via Sandridge Road, B651. In the 3.3% AEP surface water event, there is an area of surface water ponding on Sandridge Road where the entrance to the site. However, this does not impede access. During the 1% AEP surface water event, the area of ponding on Sandridge Road at the entrance to the site and Seymore Road has expanded. Flood depths reach a maximum of 0.30 to 0.60m with the ponding primarily being between 0.15 to 0.30m deep. The surface water is slow moving mainly <0.25m/s reaching a maximum of 0.25 – 0.50m/s. The flood hazard is classified as 'very low' to 'danger for some,' so vehicular access remains possible. During the 0.1% AEP event, the surface water extent along Sandridge Road has extended to the north and south along the road. Flood depths reach a maximum between 0.30 to 0.60m by the entrance to the site, where Seymore Road meets Sandridge Road. The velocity of the flow path is relatively slow moving mainly <0.25m/s reaching a maximum of 0.25 to 0.50m/s in places. The flow velocity is relatively slow, mainly less than 0.25 m/s, with a maximum of 0.25 to 0.50 m/s in places. The flood hazard is classified as 'very low' to 'danger for some,' so vehicular access and egress to the site remain possible. Developers will need to demonstrate that safe access and egress in the 0.1% AEP event, including allowance for climate change.
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. As the site is within

	Flood Zone 1 even with the climate change allowances applied fluvial flood risk to the site is 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 of the 0.1% AEP event. There is a small area affected along the western border where the site meets Sandridge Road, as well as a surface flow route through the northern part of the site. The maximum flood depth on the site during this event is 0.26 m, with a flow velocity of 0.15 m/s. The flood hazard is classified as 'danger for some'. Vehicular access and egress via Sandridge Road remain possible, though the surface water flow route by the entrance to the site is also classified as 'danger for some'. 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 Lambeth Ground – Clay, silt and sand. This is a sedimentary bedrock.
	  ○ Superficial deposits – The superficial deposits of the site are comprised of Kesgrave Catchment Subgroup – sand and gravel. This is a sedimentary superficial deposit.
	• 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 at least 5m below ground level and groundwater flooding is not likely, however below ground development such as basements may still be susceptible to groundwater flooding.
	• BGS data indicates that the underlying geology is clay, silt and sand 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 whole site is located within Groundwater Source Protection Zones 2 and 3, 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 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 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 0.1% AEP event. 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 integrated flood risk management	• 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 and rain gardens 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 low risk from surface water 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.

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. The FRA must include:
	• All sources of flooding should be considered as part of a site-specific FRA.
	• Consultation with the St Albans City and District Council, Hertfordshire County Council (LLFA), 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 all the surface water events with an appropriate allowance for climate change, using the depth, velocity, and hazard outputs.
	• 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

The site is in Flood Zone 1 and is generally at low risk from all sources of 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.
- 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.

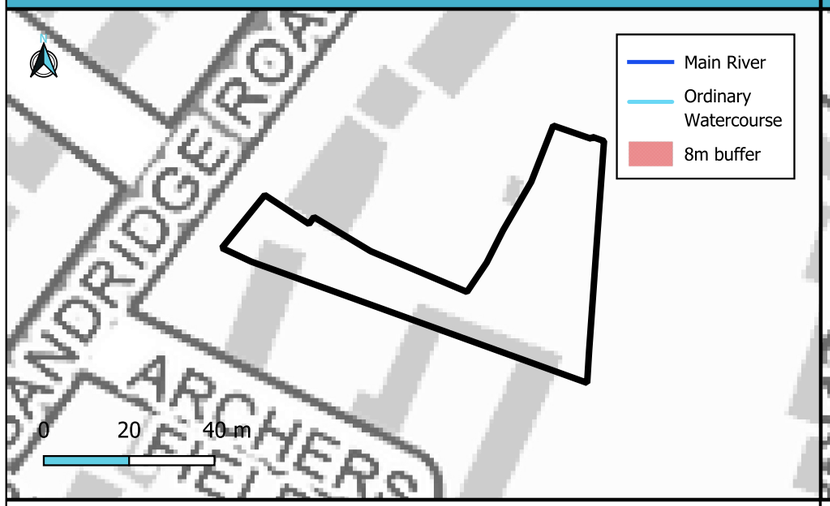
Mapping Information

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 RoFSW map to indicate the impact on surface water flood risk. The site if outside of the 0.1% AEP plus climate change flood extent for the River Ver.
Fluvial depth, velocity and hazard mapping	The site is not within the climate change flood extents assessed.
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	
Site Name	186 Sandridge Road, St Albans

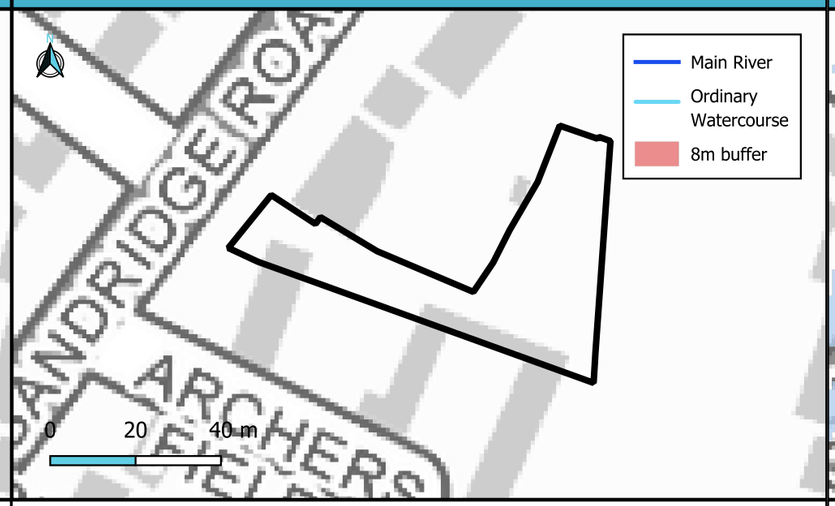
St Albans District Council
Strategic Flood Risk Assessment
Level 2 Detailed Site Summary

Flood Zone Map (present day)



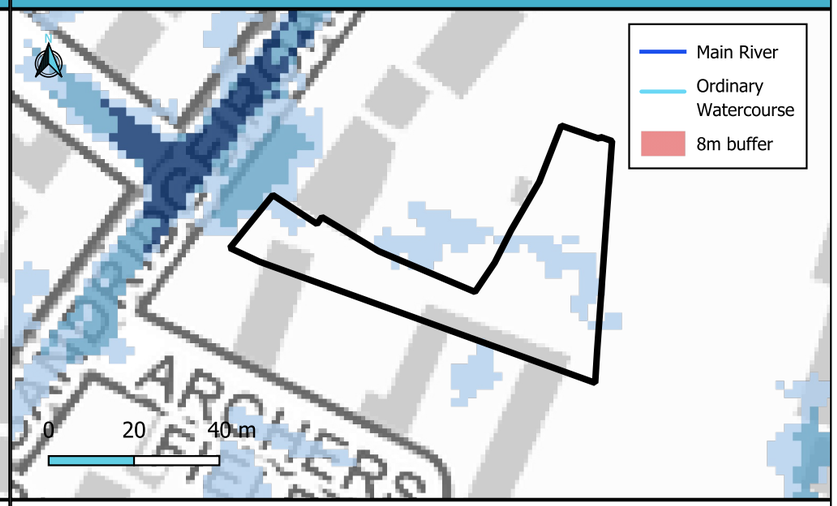
Flood Zone 2 (Between 1% and 0.1% AEP)
Flood Zone 3a (Between 3.33% and 1% AEP)
Flood Zone 3b (Less than 3.33% AEP)
Site boundary
Other site

Flood Zone 3b + Climate Change



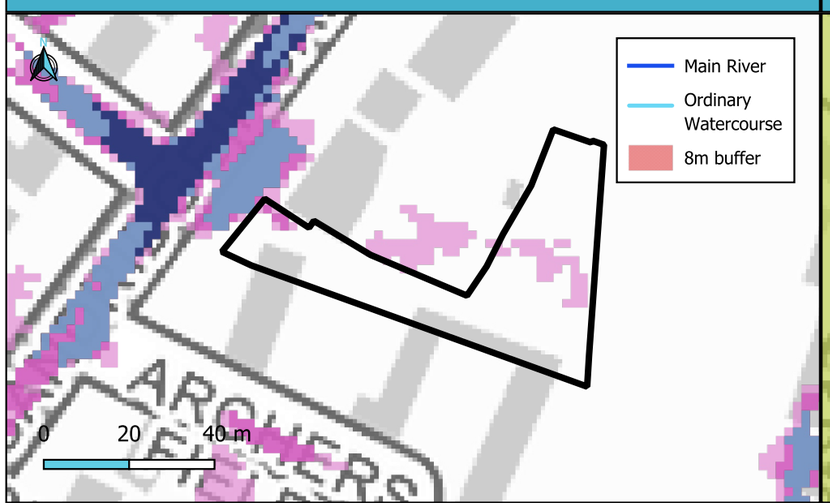
Flood Zone 3b + 21% (Central allowance)
Flood Zone 3b + 35% (Higher allowance)
Flood Zone 3b
Site boundary
Other site

Surface Water Map (RoFSW)



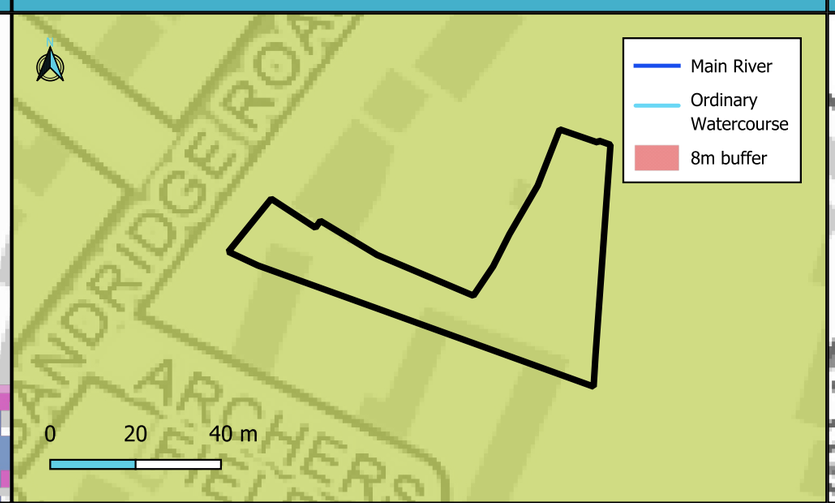
RoFSW 1 in 30-year (3.33% AEP)
RoFSW 1 in 100-year (1% AEP)
RoFSW 1 in 1000-year (0.1% AEP)
Site boundary
Other site

Surface Water Map + Climate Change



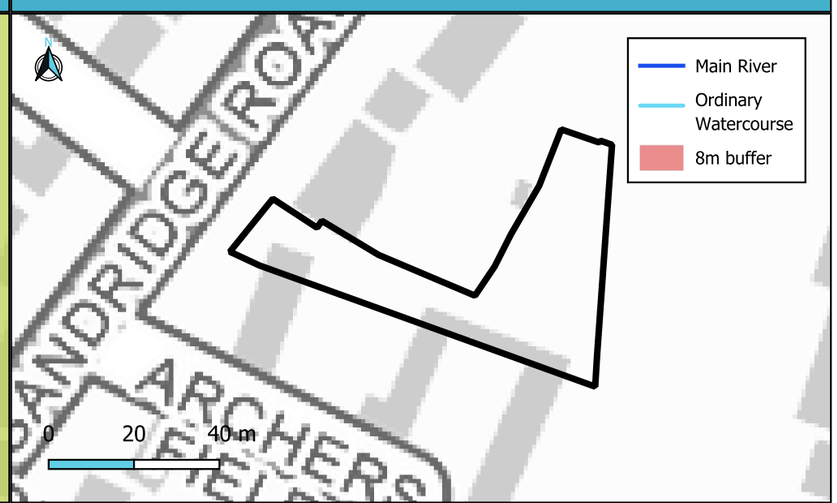
RoFSW 1 in 30-year (3.33% AEP)
RoFSW 1 in 30-year (3.33% AEP) plus 40%
RoFSW 1 in 100-year (1% AEP)
RoFSW 1 in 100-year 1% AEP plus 40%
Site boundary
Other site

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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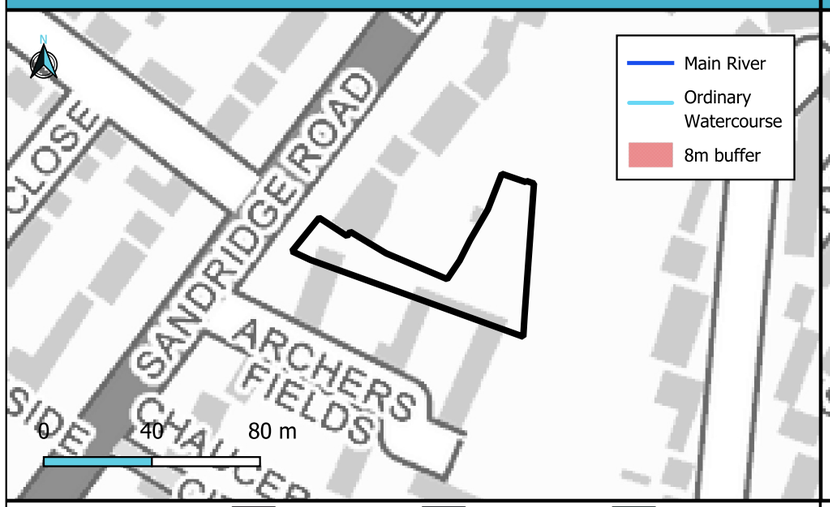
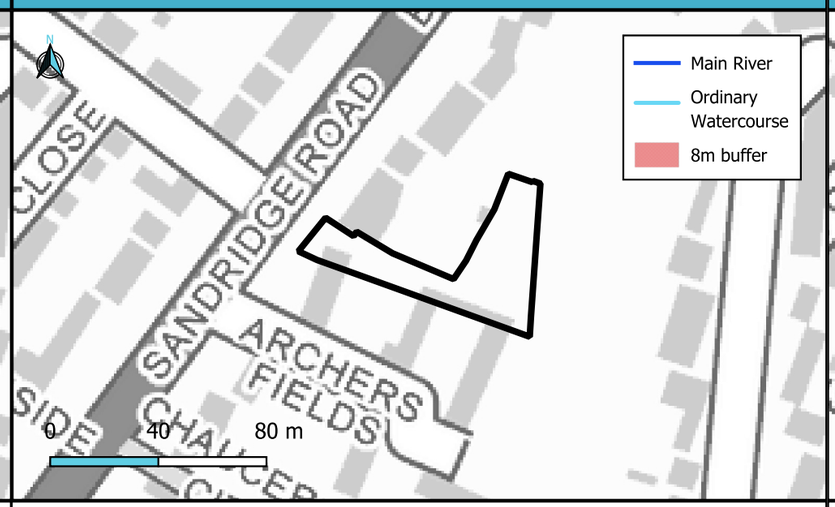
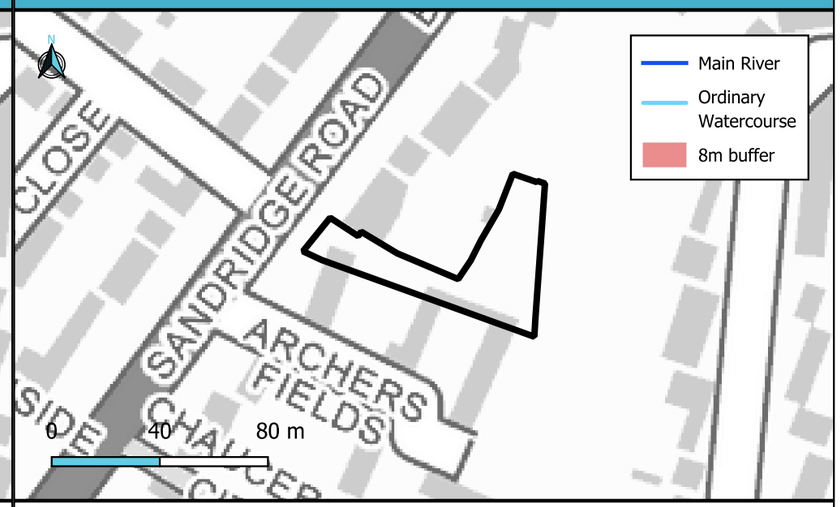
Max Fluvial Flood Depth (m) - 1% AEP



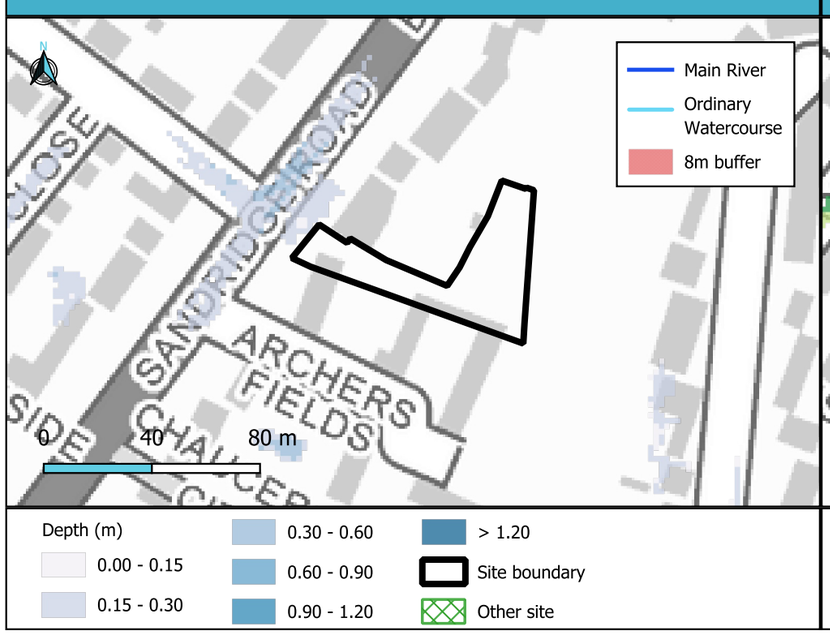
Max Fluvial Flood Level (mAOD) - 1% AEP



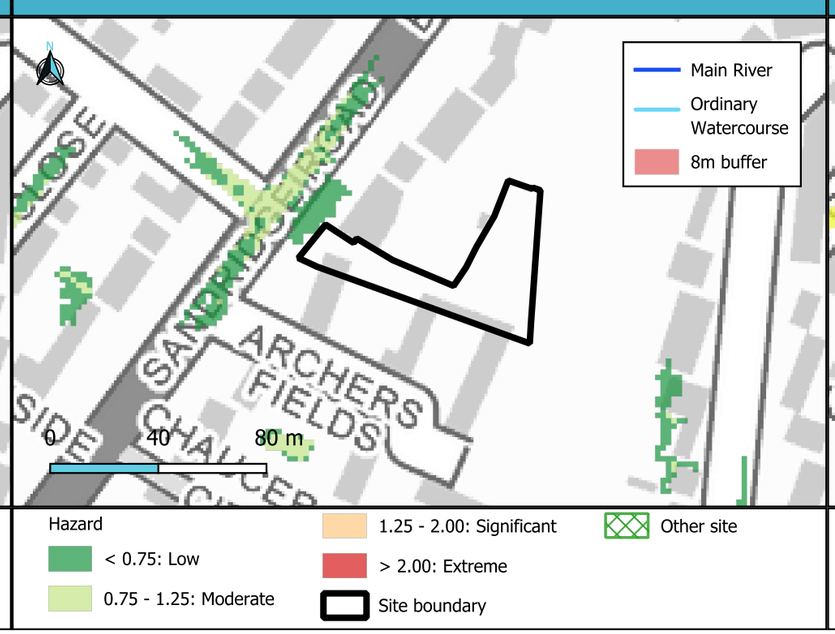
Max Fluvial Flood Velocity (m/s) - 1% AEP



RoFSW Max Depth - 1% AEP



RoFSW Max Hazard - 1% AEP



RoFSW Max Velocity - 1% AEP