

1.0 Introduction

- 1.1 This technical note has been prepared to review the existing flood risk constraints to the proposed Firepool, Taunton development site and identify post development mitigation measures that will ensure the development is safe to occupants and infrastructure for its design lifetime and that minimal/negligible flood impacts are induced. This note is to support the consideration of the masterplan by Somerset West and Taunton Council (SWT)
- 1.2 The Firepool site is located immediately adjacent to the Environment Agency (EA) 'main river' the River Tone that divides the site, within the former Taunton cattle market area. Due to its location, it is primarily at flood risk from fluvial overtopping of the River Tone as illustrated in EA flood maps for planning shown in Figure 1.



Figure 1 - EA Flood Map for Planning

- 1.3 The site has undergone several flood risk assessments (FRA) through separate planning applications, with the most recent being undertaken by Jubb in 2022 for the northern parcel in isolation (i.e. site area north of River Tone). This approved FRA was completed to help support the proposed enabling infrastructure works for the northern parcel (ref: 38/21/0440). The key existing flood risk constraints and post development mitigation measures specified in this FRA are highlighted in Section 2.0.
- 1.4 It should be noted that the latest approved FRA has been informed by many years of consultation with the EA.

2.0 Enabling Infrastructure Works FRA – Key Findings/Design Parameters

- 2.1 As stated in Section 1.0 this FRA investigated flood risk within the northern parcel of the Firepool site, with the findings consistent with previous approved FRA's undertaken for this area of the site. It should be noted that as part of the flood risk assessment undertaken it was assumed that the baseline conditions included the Taunton Strategic Flood Alleviation Improvement Project (TSFAIP) defence upgrades as agreed previously with the EA. A scenario was run under this application to consider delivery ahead of the TSFAIP.
- 2.2 The FRA identifies that the existing northern parcel is at risk of fluvial flooding from overtopping of the River Tone and overland surface water flooding from overtopping of the upstream Mill Lease Stream..
- 2.3 To mitigate this flood risk for the future development, EA/LLFA design parameters that were previously agreed upon were adopted. These included the following;
- Floodplain compensation volume will not be required for the site as compensation volume for the Taunton town centre regeneration has already been allowed for within the existing Longrun Meadow element of the TSFAIP.
 - Mitigation of overland flooding from the Mill Lease Stream catchment will be required.
 - Residual flood risk emanating from the River Tone to be dealt with by future improvement projects managed by the EA and LPA. Considered over-precautionary to design a flood water conveyance culvert or channel through the site to deal with any River Tone sourced flood waters.
 - Design road levels and finished floor levels should be set 150mm and 300mm respectively above the defending 1 in 100 year including climate change allowances fluvial event levels. As the critical design flood level varies across the site subsequently finished design levels will also.
- 2.4 Following these design parameters, development plateaus were designed within the northern parcel with a level offset to allow for anticipated construction build-ups that would enable the required future design road and finished floor levels to be achieved.
- 2.5 A 2x450dia. flood relief culvert has been proposed which will collect and convey anticipated overland flows from the Canal Road-Priory Bridge Road junction to the River Tone. Due to the fluvial flood mechanisms in the area (i.e. heightened downstream River Tone levels during extreme fluvial event would block the relief culvert) formal exceedance routes were also specified that would enable predicted overland/exceedance flows to be conveyed from the Canal Road - Priory Bridge Road junction back into the River Tone above ground and limit the backing up off flows at this junction during extreme events (> 1 in 100 year fluvial event).
- 2.6 Post development hydraulic modelling of the critical design fluvial event was undertaken for this enabling infrastructure works scenario, which showed minimal flood impacts caused by the proposed works.
- 2.7 Flood evacuation planning including use of the EA flood warning service is proposed as part of the construction phase of the development, however, no formalised plan was proposed due to the nature of the enabling infrastructure works (i.e. no permanent site occupancy)

3.0 Existing Flood Risk Constraints

Northern Parcel – Blocks 2, 3, 4 & 5

- 3.1 The primary sources of flood risk to the northern parcel have been described in Section 2.0 and in greater detail within the Jubb enabling infrastructure works FRA.
- 3.2 In summary the existing parcel is at risk from fluvial overtopping of the River Tone and overland surface water flooding from overtopping of the upstream Mill Lease Stream. Other sources of flood risk (i.e. sewer, groundwater and artificial sources) are shown to provide minimal/negligible flood risk to the parcel.

Southern Parcel – Block 1

- 3.3 The southern parcel is also shown to be at risk of fluvial flooding due to overtopping of the adjacent River Tone. However, the extent and depths of flooding are shown to be reduced in comparison with the northern parcel due to the comparatively raised existing levels found in this region and reduced upstream overland flow path extents. Approx. half of the southern parcel is shown to be flood free during the critical design 1 in 100 year including 50% climate change allowance fluvial scenario as shown in Figure 2.

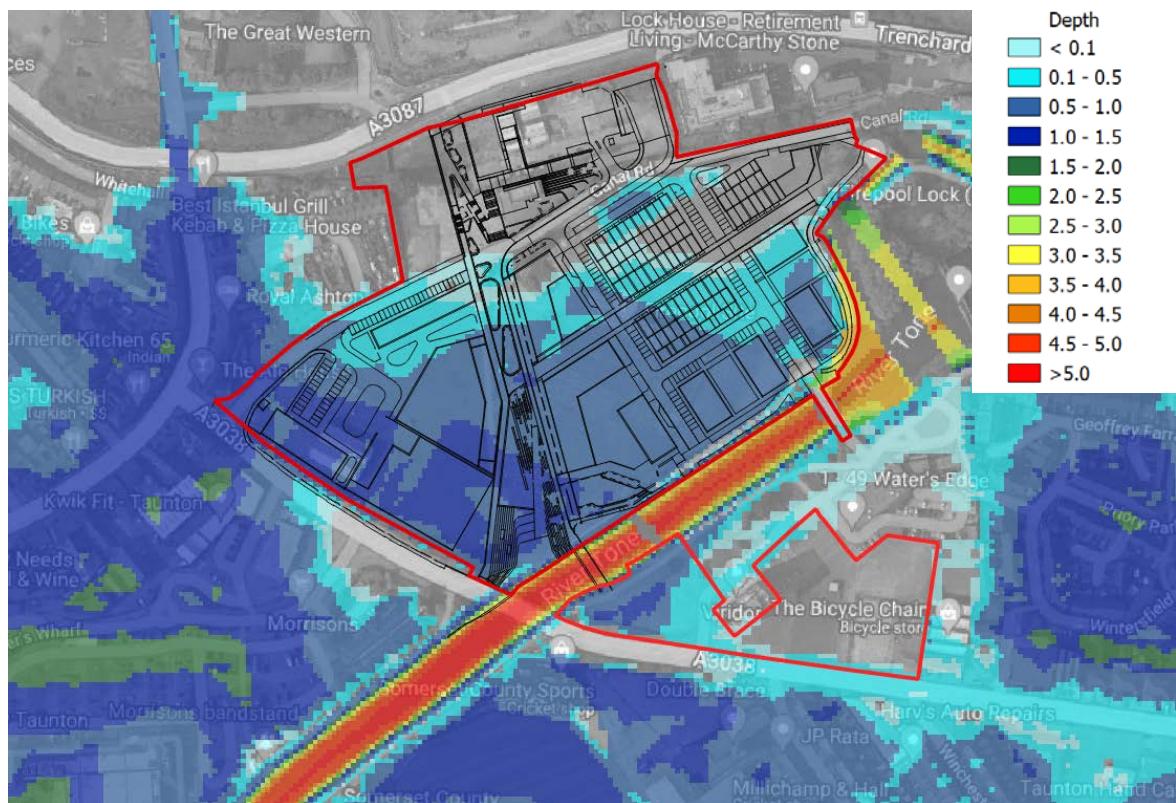


Figure 2 - 2020 EA Baseline Hydraulic Modelling Results – 1 in 100 Year + 50%CC Scenario Max Depth

- 3.4 The critical design fluvial flood level found within the site varies from approx. 15.75 – 15.70mAOD, along the adjacent boundary to the River Tone before falling within the site to an approx. level of 15.10mAOD within the south eastern region of the parcel. The greatest depth of flooding evident within the western area of the southern parcel is due to a localised sag within the existing carparking area located in this area.

3.5 From the EA surface water flood maps the southern parcel is shown to be at minimal risk of onsite and overland surface water flooding as shown in Figure 3.



Figure 3 – Extract from EA Flood Risk from Surface Water Map

- 3.6 The low flood risk identified in Figure 3 appears to be due to localised retention of rainfall, with water ponding within the parcel at isolated sag locations. This risk can be easily mitigated through relatively minimal reprofiling as part of any future development to the parcel.
- 3.7 The site is primarily protected from overland surface water flooding due to the adjacent Priory Bridge Road that forms the southern boundary to the site. This road is raised in comparison to the southern parcel forming a barrier to overland flows entering the site. The remaining boundaries are generally located on or near localised crests and hence overland surface water flood risk to the southern parcel is minimal/negligible.
- 3.8 The southern parcel is at minimal risk of flooding from sewers even though significant public Wessex Water combined sewer infrastructure is located within it. The combined sewers have overflows that discharge into the adjacent River Tone, and hence the risk of overtopping/failure occurring within the parcel is low. As identified above the site is protected from overland flows and hence any overtopping/failure of sewer infrastructure offsite provides negligible flood risk to the parcel.
- 3.9 Ground investigations were undertaken on the northern parcel in March/April 2021, in which groundwater was found at depths between 3-4m below ground. The southern parcel has similar geological stratum to the northern parcel and hence the risk of groundwater flooding to the parcel is also considered minimal.
- 3.10 The EA flood risk from reservoirs map indicates that the southern parcel is at risk of reservoir flooding. However, the chance of this occurring is minimal due to the high level of operation and maintenance provided within the upstream artificial waterbodies.

4.0 Post Development Flood Mitigation Measures

- 4.1 The agreed flood risk design parameters specified in Section 2.0 apply to both the northern and southern parcels and hence the post development flood mitigation measures for the entire site will be explored below as one site/parcel.
- 4.2 The site will ultimately need to be raised as part of the future development to ensure road levels (i.e. not constrained by existing road levels) and finished floor levels are raised 150mm and 300mm above the critical design 1 in 100 year including 50% climate change allowance fluvial flood level respectively.
- 4.3 Onsite flood compensation will not be required to compensate for the raising of onsite levels as this compensation will be provided upstream of the site as part of the future TSFAIP defence scheme including the Longrun Meadow element. It is understood that the Firepool development as a whole including Block 1 formed part of the TSFAIP modelling and the raising of the site forms part of the defence improvement network.
- 4.4 A flood relief culvert has been provided as part of the enabling infrastructure works, which will mitigate overland surface water flood risk within the Canal Rd – Priory Bridge Road junction. Further to this above-ground exceedance flow routes will be provided that will ensure minimal impacts are created by the future raising of the development during extreme exceedance events.
- 4.5 A flood evacuation plan will be required for the future development, which will ensure the safety of occupants during a flood event. As part of this plan occupants will be signed up to the EA flood warning system, whilst designated flood evacuation routes will also be formalised. It should be emphasised that a large proportion of the site (i.e. roads/buildings) is being raised above the design critical flood level and hence the flood risk to occupants will be low.
- 4.6 Flood resilient construction techniques will be recommended for use within the development. For example, concrete base slabs, raised sockets and flood resilient wall construction could be utilised to ensure, if in the rare scenario in which flooding does occur, that the building infrastructure can quickly/cost effectively recover from the damage.

5.0 Conclusions/Recommendations

- 5.1 The northern and southern parcels of the Firepool site, inclusive of the imminent future TSFAIP defence scheme, are both shown to be at risk of fluvial flooding from predicted overtopping of the adjacent River Tone during the critical design 1 in 100 year including 52% climate change allowance fluvial event.
- 5.2 Further to this, the northern parcel is identified as being at risk of overland surface water flooding due to the overtopping of the upstream Mill Lease Stream.
- 5.3 Flood risk mitigation measures agreed through previous consultation with the EA will need to be provided to mitigate this flood risk to the site as part of the future development and ensure safety to all future occupants. These mitigation measures include;
- Raising of road and finished floor levels to be 150mm and 300mm respectively above the critical design 1 in 100 year including climate change allowance fluvial event flood level.
 - Mitigation of overland flooding from the Mill Lease Stream catchment to be provided via a proposed flood relief culvert.
 - Exceedance flow routes to be provided within the development to ensure minimal increases in flood impacts due to site raising during extreme exceedance events.
 - Flood evacuation plan to be provided, including signing up to the EA flood warning system.
 - Flood resilient construction techniques recommended to be used to ensure that if flood damage does occur to infrastructure that it can quickly/cost effectively be recovered.
- 5.4 Onsite floodplain compensation volume will not be required to offset site raising as compensation for the site has already been allowed for within the Longrun Meadow element of the TSFAIP.
- 5.5 If the above flood risk mitigation measures are provided it is considered minimal risk from flooding for both occupants and infrastructure will be evident for any future proposed development on the site.
- 5.6 Further hydraulic modelling will be required to validate the current baseline flood risk levels and also to model the post development scenario and ensure that the agreed EA design parameters are suitably adhered to. Potential impacts from delivery within or ahead of the TSFAIP programme will need to be considered and addressed at the appropriate stage.

