

NOTE TO FILE

JBA Project Code 2020s1397
Contract Julian Terrace Flood Modelling
Client Kennedy James Griffiths
Day, Date and Time 01 December 2020
Author Paul Redbourne
Subject Julian Terrace Flood Modelling

JBA
group

1 Introduction

JBA Consulting were commissioned by Kennedy James Griffiths in October 2020 to undertake a flood modelling study to gain a better understanding of the impact of flooding and potential displacement of flood water onto third parties from a development on Julian Terrace in Port Talbot. The proposed development consists of a ground floor commercial unit and two first floor residential units.

JBA licensed from Natural Resources Wales (NRW), their FCA Product 7 data for the area. This data consisted of the 1D-2D linked ESTRY-TUFLOW Model of Port Talbot, developed by JBA Consulting in August 2017.

This technical note has been produced to provide an overview of the flood modelling work undertaken and analysis of the model outputs. The focus of the study is to address the comments raised by NRW following their review of the Flood Consequence Assessment¹. Along with the assessment of third-party impacts, their review requested documentation regarding the proposed ground levels for the car parking area and the rate or rise and speed of inundation to the site. The technical note has looked to address these comments as well.

2 Modelling approach

The existing Port Talbot model as provided by NRW was last run in September 2017. The TUFLOW software executable has been updated since then, therefore the model has been re-run using the latest version of TUFLOW (2020-01-AB).

New site-specific topographical survey data collected by Kennedy James Griffiths in March 2020 has been provided. This survey data included a number of spot-levels across the site. These levels were used to create a triangulated Ascii grid which has been used to represent the site elevations in the baseline model, the extent of the Ascii grid is shown below in Figure 2-1.

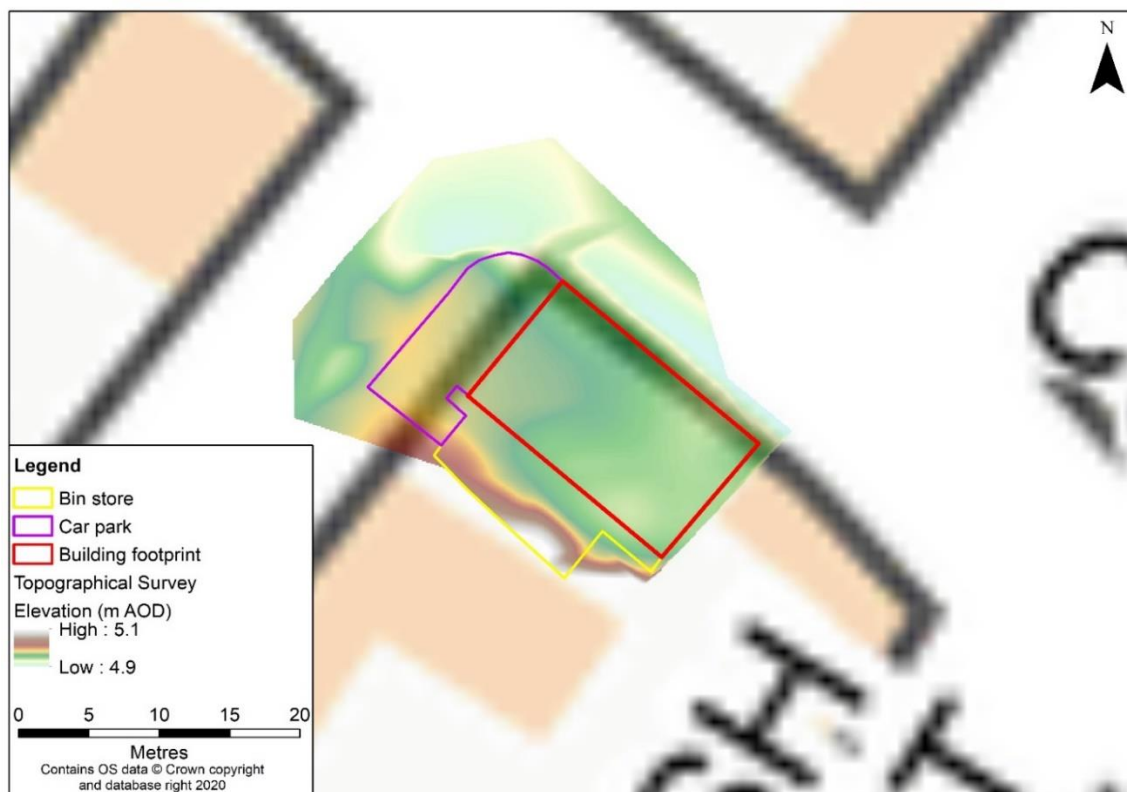


Figure 2-1 Additional topographical survey data

¹ P2020 0303 – 1A Julian Terrace (V2). August 2020. Natural Resources Wales.

NOTE TO FILE

JBA Project Code 2020s1397
Contract Julian Terrace Flood Modelling
Client Kennedy James Griffiths
Day, Date and Time 01 December 2020
Author Paul Redbourne
Subject Julian Terrace Flood Modelling

JBA
group

3 Model Results

3.1 Baseline

3.1.1 Maximum Depths

The baseline model results show that the site floods to a peak water level of 5.66mAOD during the 1% AEP plus climate change event and a peak water level of 6.23mAOD during the 0.1% AEP event. The depth maps for both of these scenarios are shown below in Figure 3-1 and Figure 3-2.

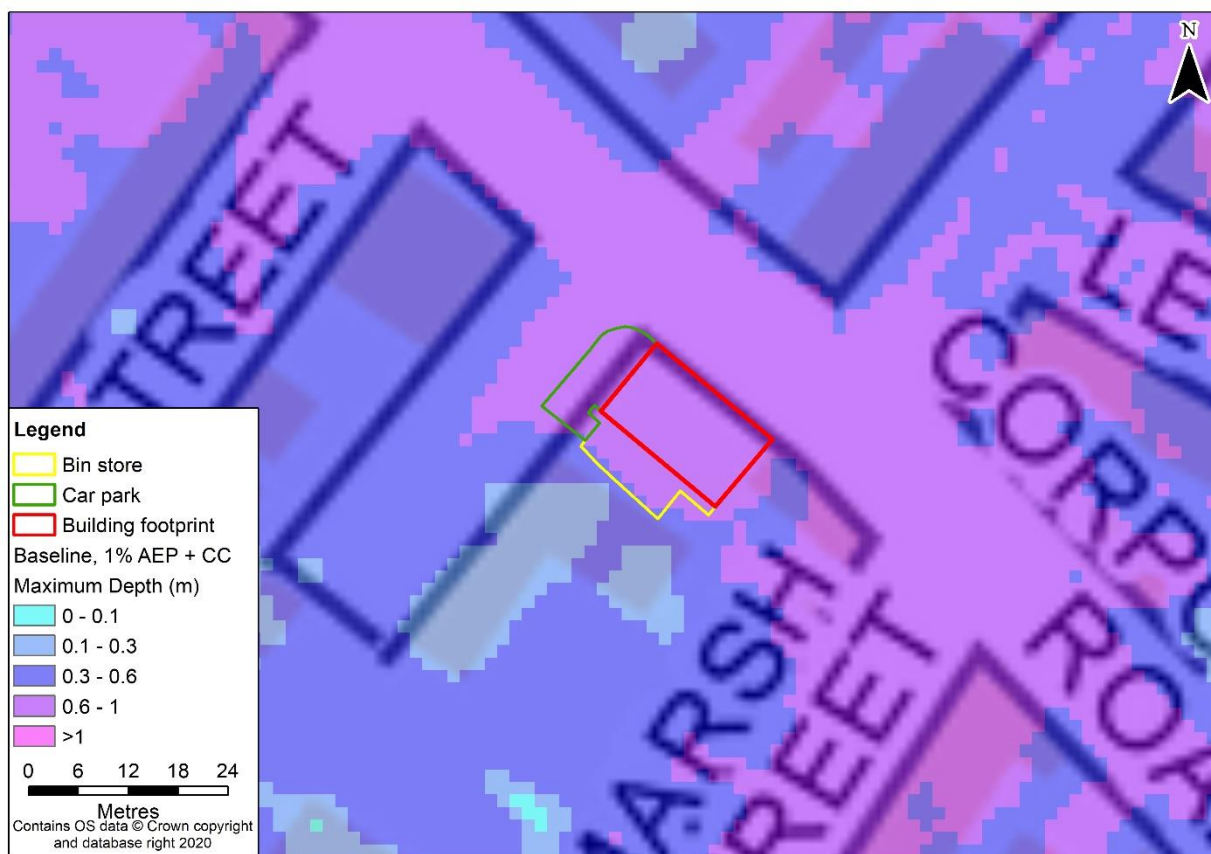


Figure 3-1 Baseline scenario, 1% AEP plus climate change event - Maximum Depths

NOTE TO FILE

JBA Project Code 2020s1397
Contract Julian Terrace Flood Modelling
Client Kennedy James Griffiths
Day, Date and Time 01 December 2020
Author Paul Redbourne
Subject Julian Terrace Flood Modelling

JBA
group

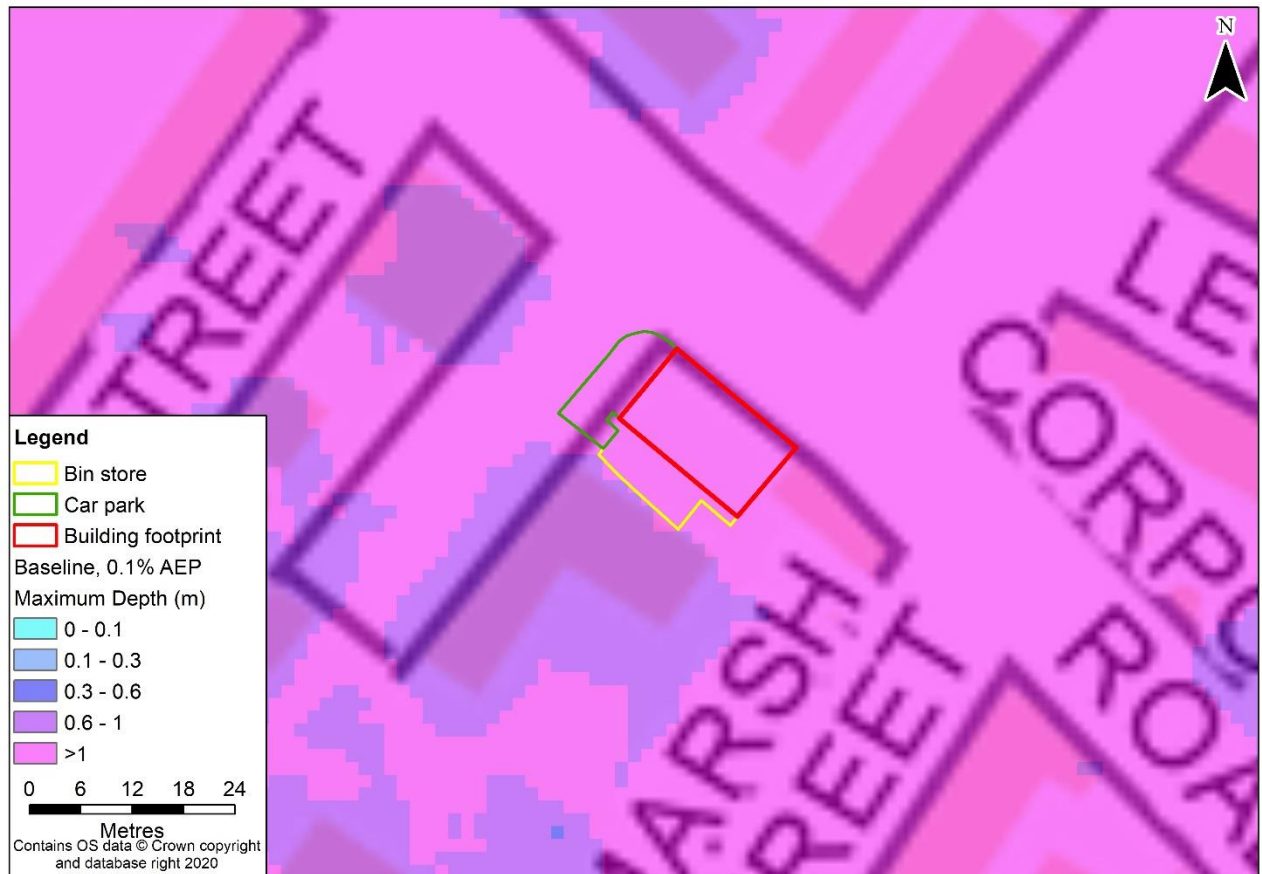


Figure 3-2 Baseline scenario, 0.1% AEP event - Maximum Depths

3.2 Post-Development

3.2.1 Maximum Depths

In order for the development to be compliant with TAN 15, the building finished floor level has been raised to 5.66mAOD during the post development scenario so that it is free from flooding during the 1% AEP plus climate change event.

The car park area was set to a level of 4.87mAOD. This level has been chosen so that it aligns with the surrounding ground levels along Julian Terrace Road. NRW have queried why the car parking is not set to the same FFL elevation of the commercial unit (5.66mAOD). Unfortunately, it is not practical to raise the park spaces any further whilst providing a suitable tie-in with the adjacent highway. The vacant lot is currently used for car parking and only one of the park spaces is proposed to be allocated to the residential unit, the rest shall be allocated to the commercial property (less vulnerable development).

During the 1% AEP plus climate change event, the building remains free from flooding, while a maximum depth of 0.79m is experienced in the car park. The depth results for the post development scenario during the 1% AEP plus climate change event are shown below in Figure 3-3. The figure suggests that there is a small amount of flooding inside the building footprint for the 1% AEP plus climate change event. This is attributed to the modelled grid size and grid orientation. The modelled peak water level is 5.656mAOD which is below the recommended finished floor level and therefore the building is not actually experiencing flooding in this event.

NOTE TO FILE

JBA Project Code 2020s1397
Contract Julian Terrace Flood Modelling
Client Kennedy James Griffiths
Day, Date and Time 01 December 2020
Author Paul Redbourne
Subject Julian Terrace Flood Modelling

JBA
group

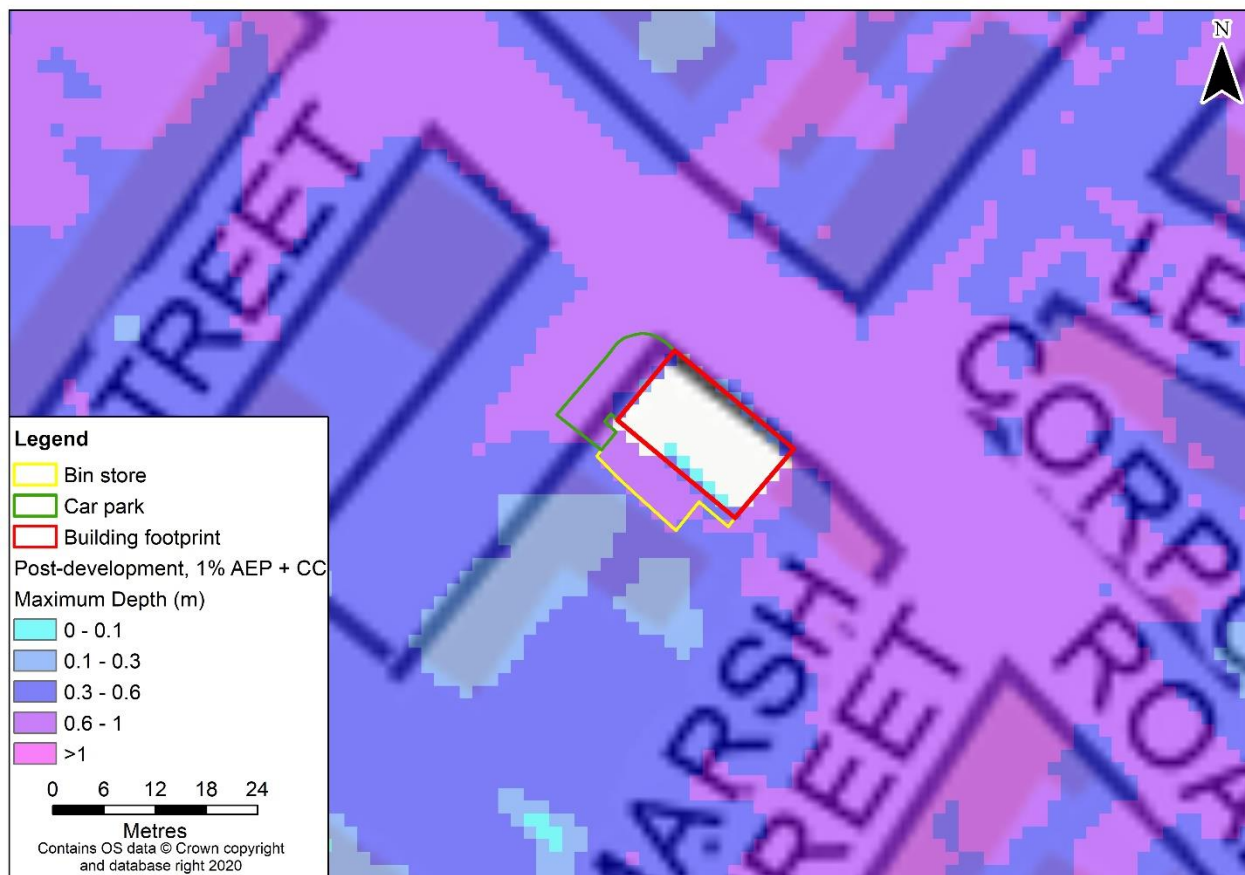


Figure 3-3 Post-development scenario, 1% AEP plus climate change event - Maximum Depths

During the 0.1% AEP event, the post-development results show that a maximum water level of 6.23mAOD is experienced in the commercial building footprint. This represents a maximum depth of 0.57m within the building, while the car park experiences a maximum depth of 1.36m. The post-development results for the 0.1% AEP event are shown below in Figure 3-4. As with Figure 3-3, the results indicate the flood depths exceed 0.6m but this is attributed to the modelled grid size and grid orientation impacting the boundary of the building footprint.

NOTE TO FILE

JBA Project Code 2020s1397
Contract Julian Terrace Flood Modelling
Client Kennedy James Griffiths
Day, Date and Time 01 December 2020
Author Paul Redbourne
Subject Julian Terrace Flood Modelling

JBA
group

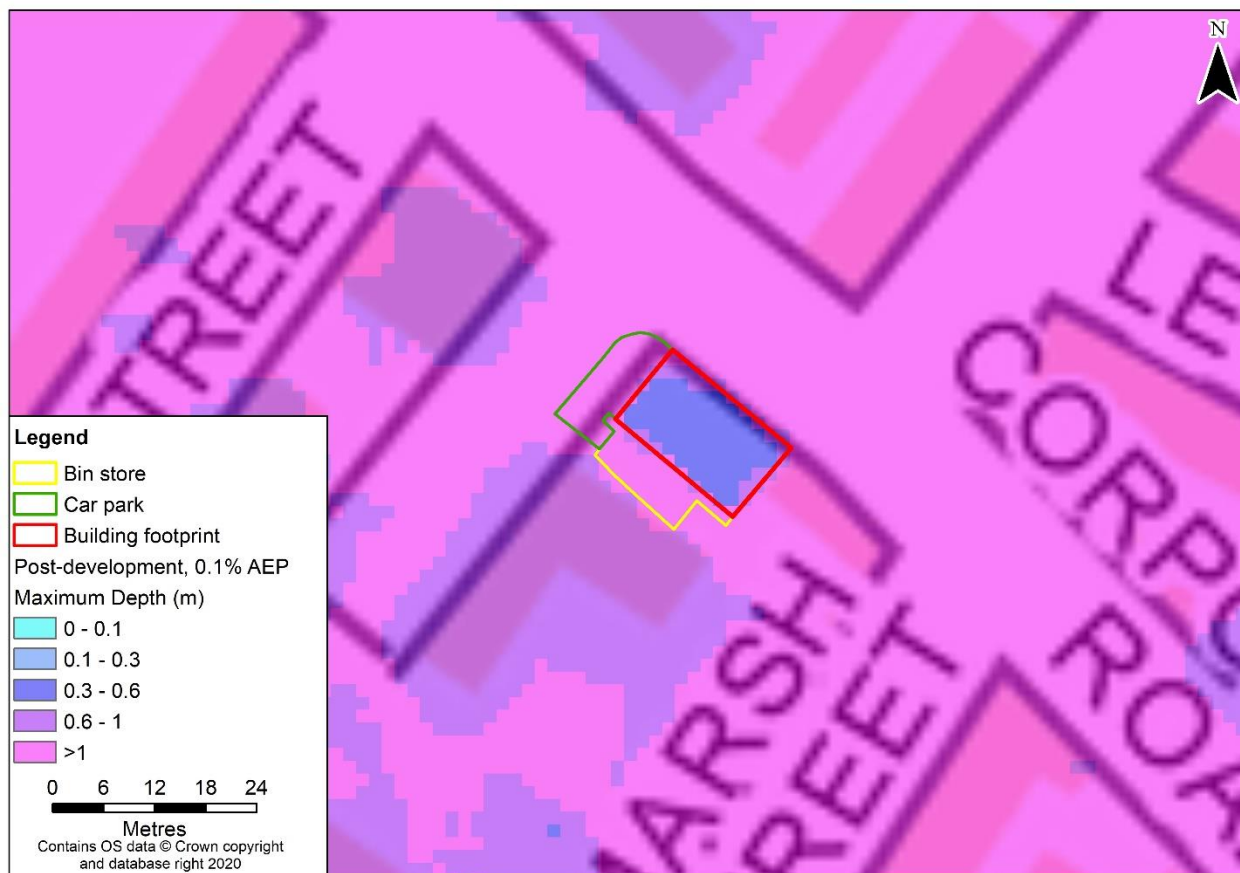


Figure 3-4 Post-development scenario, 0.1% AEP event - Maximum Depths

3.2.2 Third party impacts

During both the 1% AEP plus climate change and 0.1% AEP events, there is no increase in water levels to any third party properties or the adjacent areas as a result of the proposed development. Level comparison maps for both events are shown below in Figure 3-5 and Figure 3-6.

NOTE TO FILE

JBA Project Code 2020s1397
Contract Julian Terrace Flood Modelling
Client Kennedy James Griffiths
Day, Date and Time 01 December 2020
Author Paul Redbourne
Subject Julian Terrace Flood Modelling

JBA
group

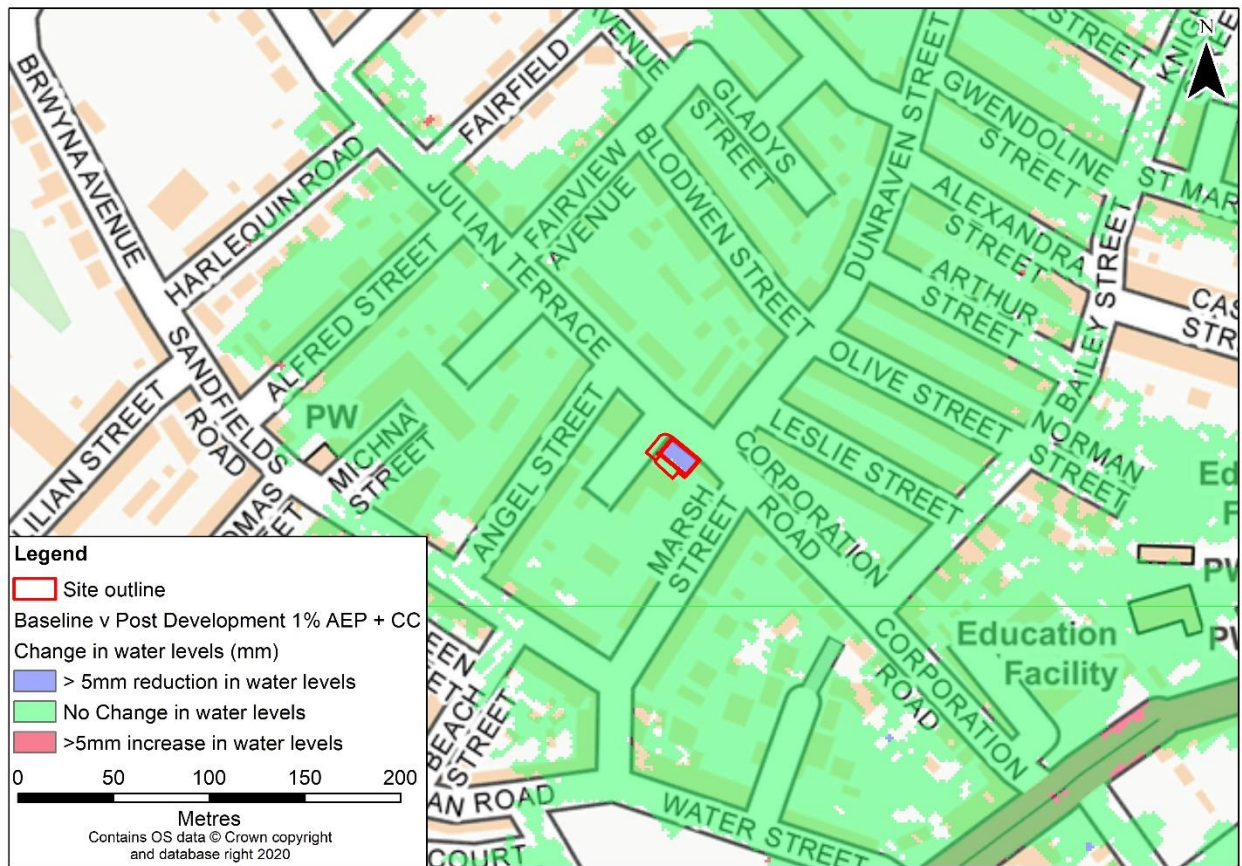


Figure 3-5 Third party impacts, 1% AEP plus climate change event

NOTE TO FILE

JBA Project Code 2020s1397
Contract Julian Terrace Flood Modelling
Client Kennedy James Griffiths
Day, Date and Time 01 December 2020
Author Paul Redbourne
Subject Julian Terrace Flood Modelling

JBA
group

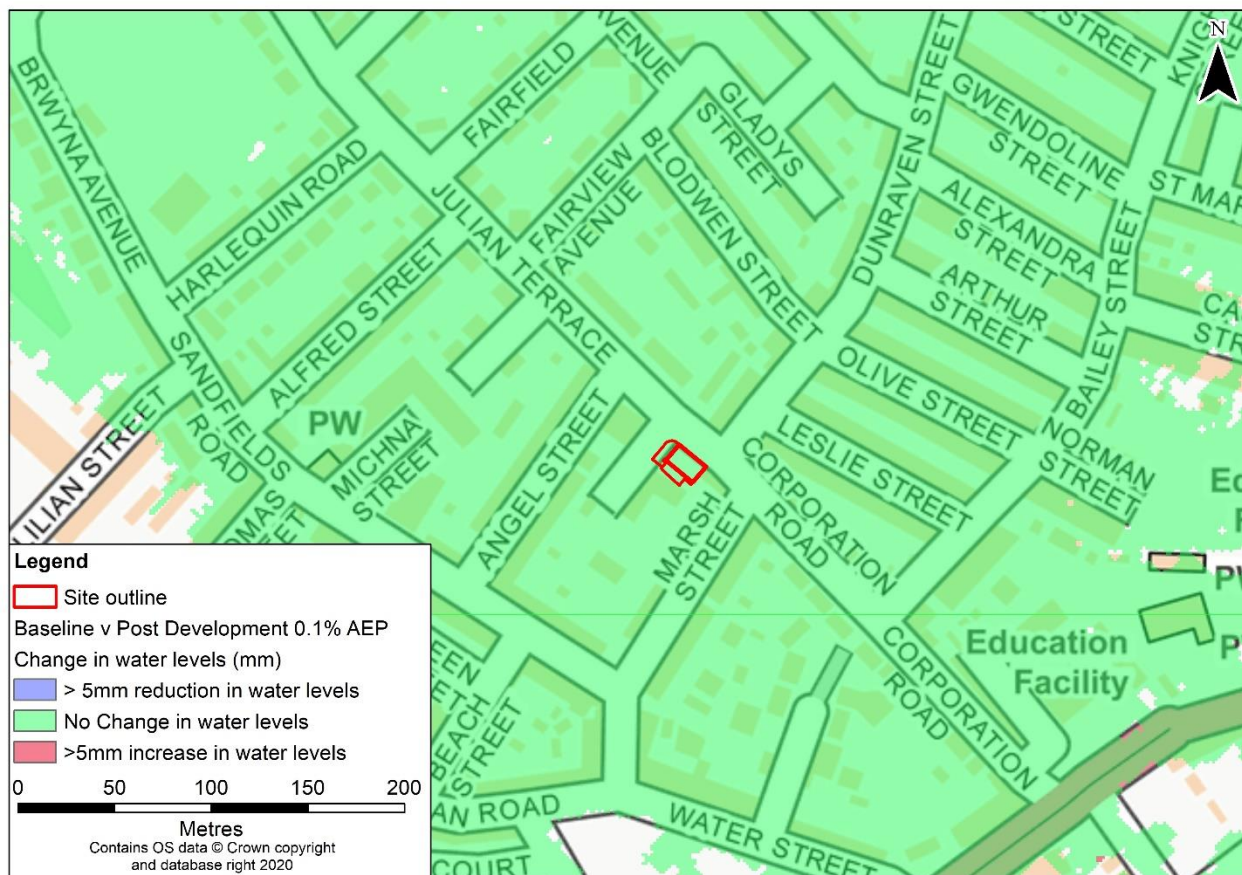


Figure 3-6 Third party impacts, 0.1% AEP event

3.2.3 Rate of rise

The rate at which floodwater rises at the proposed development site, and the potential impact that this could have on the surrounding areas has been assessed. Figure 3-7 shows two locations at which water level data has been extracted from the model at 10-minute output intervals for the 0.1% AEP event.

NOTE TO FILE

JBA Project Code 2020s1397
Contract Julian Terrace Flood Modelling
Client Kennedy James Griffiths
Day, Date and Time 01 December 2020
Author Paul Redbourne
Subject Julian Terrace Flood Modelling

JBA
group

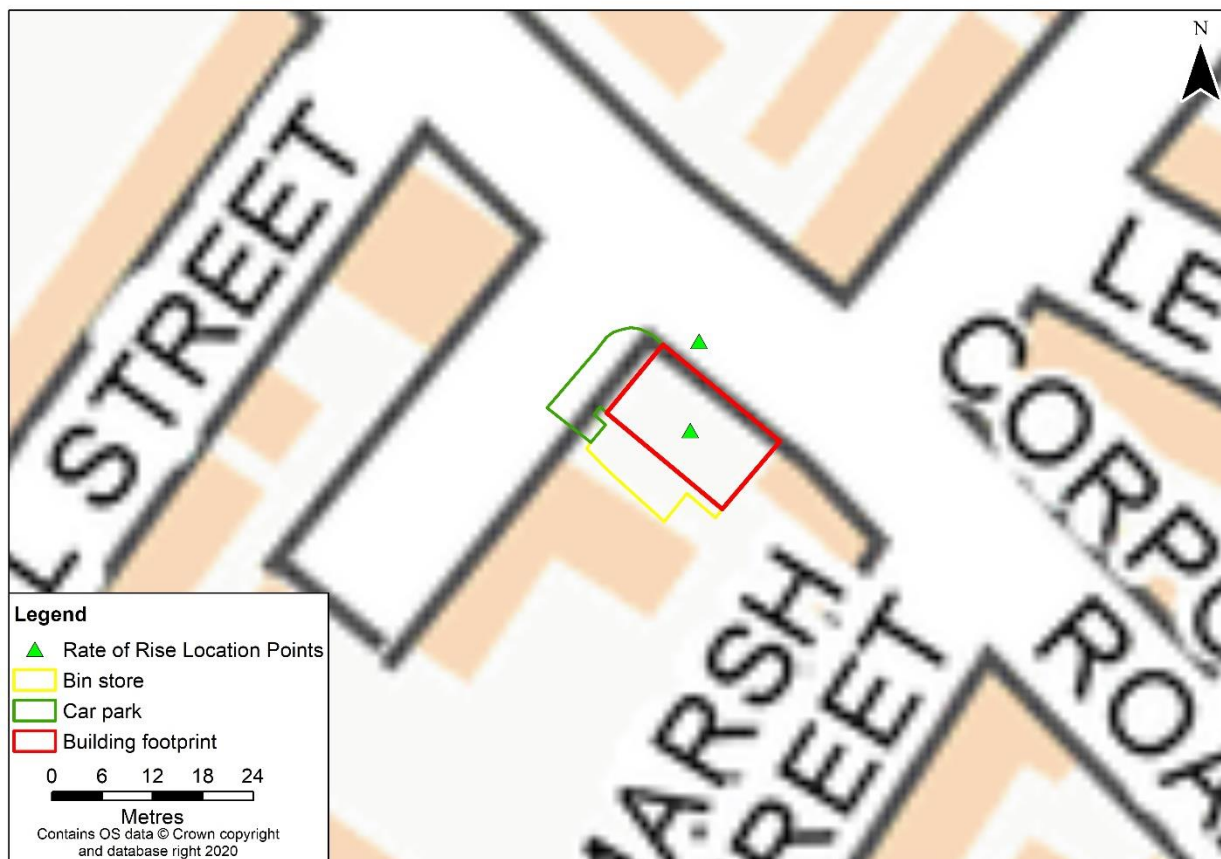


Figure 3-7 Rate of Rise Location Points

The extracted water level data has then been plotted in Figure 3-8 and Figure 3-9 to show the rate of rise and whether there are any discernible changes as a result of the proposed development. The rate of rise plots show that the proposed development site has no discernible impact on the onset of flooding or the rate of rise on or around the site during the 0.1% AEP event.

Out of bank flooding originates from the River Afan at 14 hours into the model simulation. It then takes 40 minutes for the floodwater to travel overland to reach the site location during the 0.1% AEP event. It then takes a further 1 hour and 40 minutes for the floodwater to rise to a level that is sufficient to cause flooding to the commercial building footprint. Once the building footprint is flooded, it takes a further 3.5 hours from the onset of flooding to reach its peak flood depth of 0.57m.

NOTE TO FILE

JBA Project Code 2020s1397
 Contract Julian Terrace Flood Modelling
 Client Kennedy James Griffiths
 Day, Date and Time 01 December 2020
 Author Paul Redbourne
 Subject Julian Terrace Flood Modelling

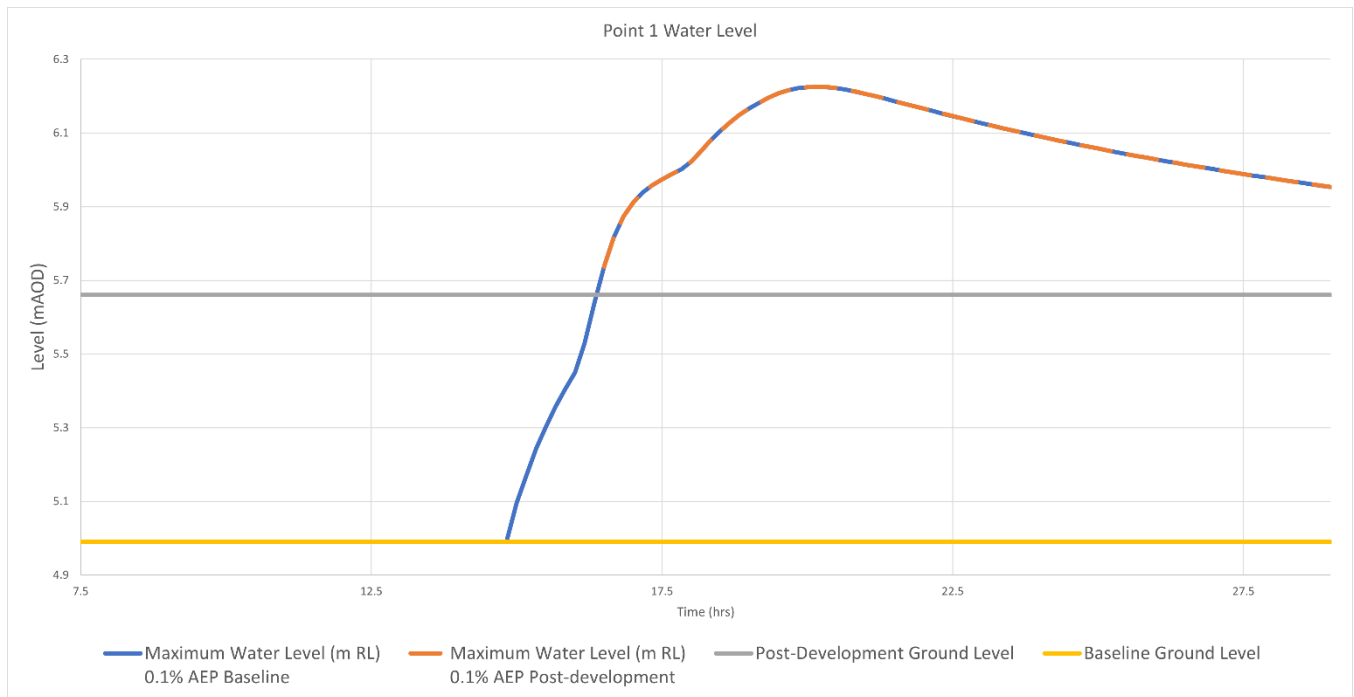


Figure 3-8 Rate of rise plot - location 1 (proposed building), 0.1% AEP event

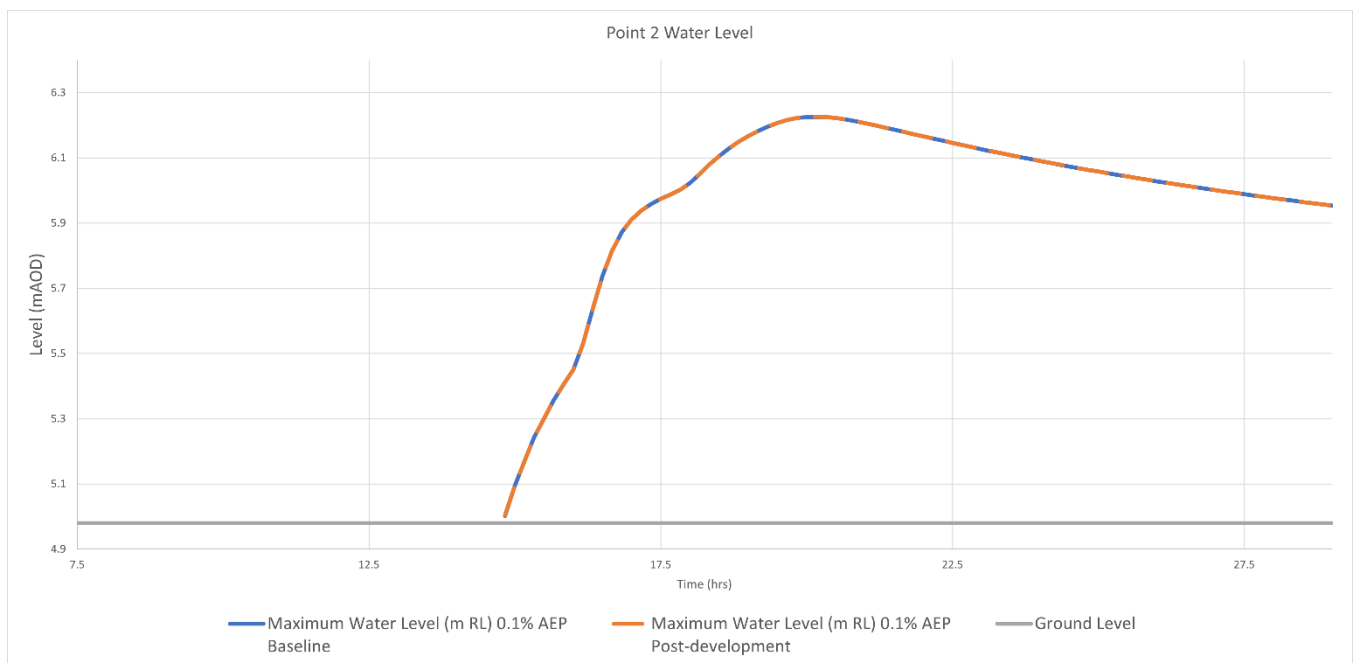


Figure 3-9 Rate of rise plot - location 2 (road), 0.1% AEP event

NOTE TO FILE

JBA Project Code	2020s1397
Contract	Julian Terrace Flood Modelling
Client	Kennedy James Griffiths
Day, Date and Time	01 December 2020
Author	Paul Redbourne
Subject	Julian Terrace Flood Modelling



4 Conclusions

- JBA Consulting were commissioned by Kennedy James Griffiths to undertake flood modelling to gain a better understanding of the potential displacement of flood water onto third party land as a result of the development at Julian Terrace.
- The NRW Port Talbot model was updated to run with the latest version of TUFLOW and to include updated topographic levels on the site.
- The baseline model results show a maximum water level of 5.66mAOD during the 1% AEP plus climate change event and 6.23mAOD during the 0.1% AEP event occur at the site.
- The post development scenario was represented by raising the building footprint to 5.66mAOD and setting the car park and bin storage areas to 4.87mAOD.
- During the post-development scenario, the building is flood free during the 1% AEP plus climate change event.
- During the 0.1% AEP event for the post development scenario, the building footprint experiences a maximum depth of 0.57m.
- There is no third-party detriment as a result of the proposed development.
- Raising the car park level to 5.66mAOD so that it aligns with the floor level of the commercial unit is not feasible given the need to tie-in with surrounding road levels.