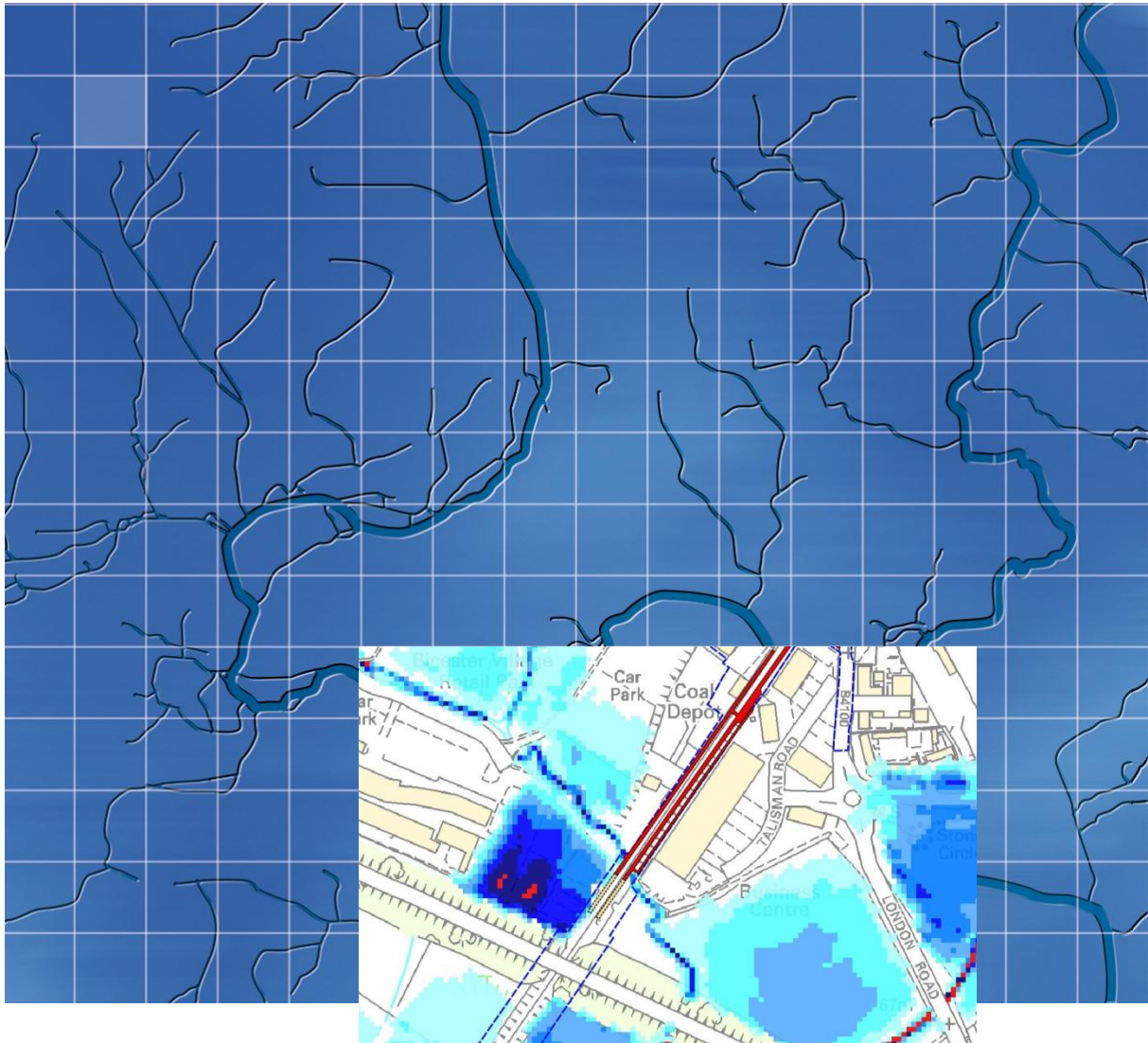


**Network Rail**

November 2013

# **EWR-P1- Level 3 FRA: Bicester Town Station**



**Wallingford HydroSolutions Limited**

# Network Rail

## EWR P1 - Level 3 FRA: Bicester Town Station

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For and on behalf of Wallingford HydroSolutions Ltd.

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Date **29<sup>th</sup> November 2013**

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This report has been produced in accordance with the WHS Quality Management system which is certified as meeting the requirements of ISO 9001:2008.

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## **1 Introduction**

### **1.1 Background**

Environmental Resources Management (ERM) and Wallingford HydroSolutions Ltd. (WHS) completed a Level 2 Flood Risk Assessment (FRA) in 2009 (including a revision in July 2010), together with a Technical Paper outlining flood storage mitigation requirements (Chiltern Railways Bicester to Oxford Improvements Level 2 Flood Risk Assessment, July 2010 & Compensatory Storage Technical Paper and Level 3 FRA Specification) in support of an application for an Order under the Transport and Works Act 1992 (TWA) by Chiltern Railways (CRCL). The TWA Order was granted by the Secretary of State for Transport in October 2012. This gives statutory powers to authorise the East West Rail Phase 1 (EW R P1) project, comprising the redevelopment and operation of the railway between Oxford and Bicester. The project seeks to introduce a new, fast service between London and Oxford.

The Level 2 FRA was conducted in accordance with Planning Policy Statement 25: Development and Flood Risk (PPS25), and its Practice Guide companion. The Level 2 FRA document highlighted a number of locations along the railway corridor where proposed developments lie within Flood Zones 2 or 3 and could potentially have impacts upon the incidence of local flooding. The report identified a number of assessment points (AP's) along the route of the EW R P1 that require further consideration in a Level 3 FRA. These assessment points included AP3 – Bicester Town Station.

### **1.2 Scope of Level 3 FRA**

This document constitutes a Level 3 Flood Risk Assessment for AP3 – Bicester Town Station, as required by Planning Condition 12 of the planning permission granted alongside the Order under the Transport and Works Act 1992.

This document, together with the original Level 2 FRA, also provides the information required by the National Planning Policy Framework (NPPF) and the associated requirements of PPS25.

This FRA document has been commissioned to specifically address the flood risk issues that result from the construction of the Bicester Town Station. A separate document is to be submitted that will deal with the surface water drainage issues associated with this development. The location of the Bicester Town Station is shown in Figure 1 below.



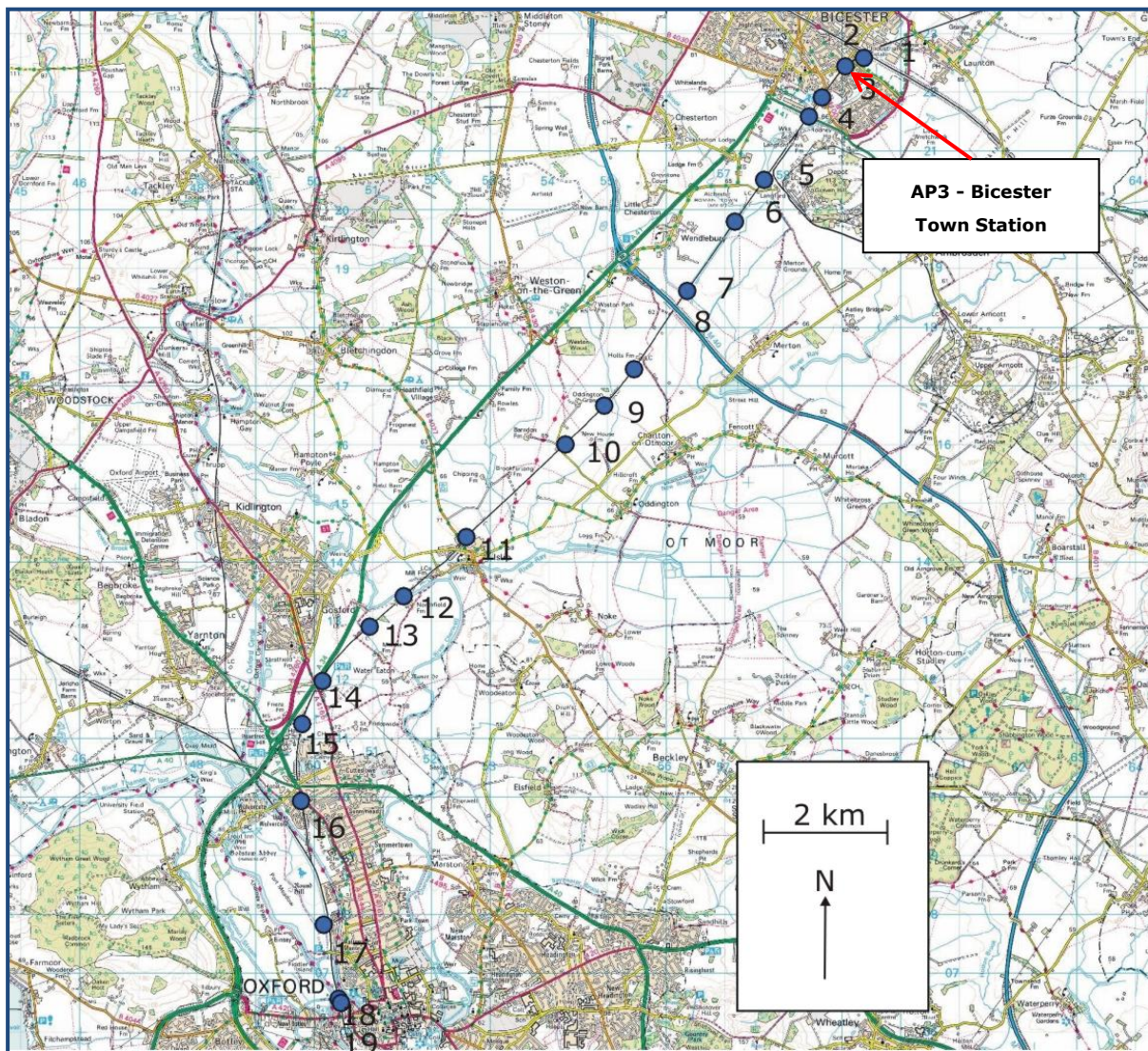


Figure 1 – Scheme Overview showing various assessment points.

## 2 Site Description

### 2.1 Overview

EW R P1 is a major package of infrastructure investments including: the doubling of the line between Bicester town and Oxford North Junction; a new independent line being built between Oxford North Junction and Oxford station, using a disused track bed parallel to the existing railway; the existing stations at Bicester Town and Islip will be rebuilt, and a new station built at Water Eaton Parkway; and at Oxford the disused parcels platforms at the north end of the station will be removed and replaced for passenger use for Chiltern Railways services.

This site specific Level 3 FRA considers Assessment Point 3 – Bicester Town Station. Bicester Town Station will be rebuilt with two platforms, to allow reinstatement of a double track. The existing station is to be demolished. An existing industrial/ coach park/depot area is to be replaced with car parking to serve the new station. Figure 2 below shows the location of the proposed Bicester Town Station platform extension, along with the flood inundation area around the Pingle Brook floodplain defined by the 1 in 100 year (plus an allowance for climate change) Bicester Model output grid<sup>1</sup>. This model, developed by consultants Peter Brett Associates on behalf of the Environment Agency (EA), has been approved by the EA for use in flood risk assessments in the Bicester area.

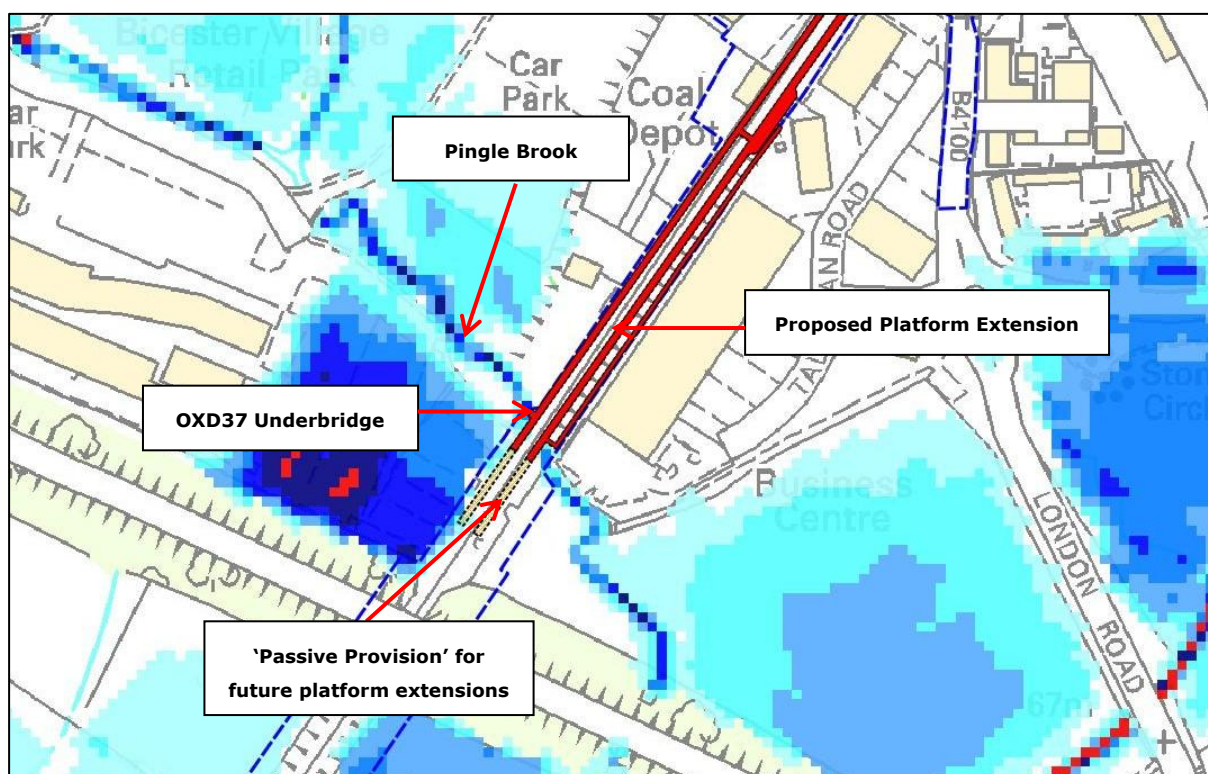


Figure 2 – Bicester Town Station platform extension location plan with 1 in 100 years (plus an allowance for climate change) flood mapping<sup>1</sup>.

<sup>1</sup> Peter Brett Associates (2009) *Flood Risk Mapping Study, Final Modelling Report*.



## 2.2 Description of Works

The new platforms at Bicester Town Station are proposed to be constructed on both sides of the existing railway line with an emergency access route located on the south platform as shown in Figure 3 below. These new platforms extend from Bicester Town Station to the east down to approximately 20m to the west of OXD37 underbridge situated over the Pingle Brook. There is an additional 50m of 'passive provision' for platform extension shown on the Atkins plans but these are for potential future extension proposals and are not considered in this FRA.

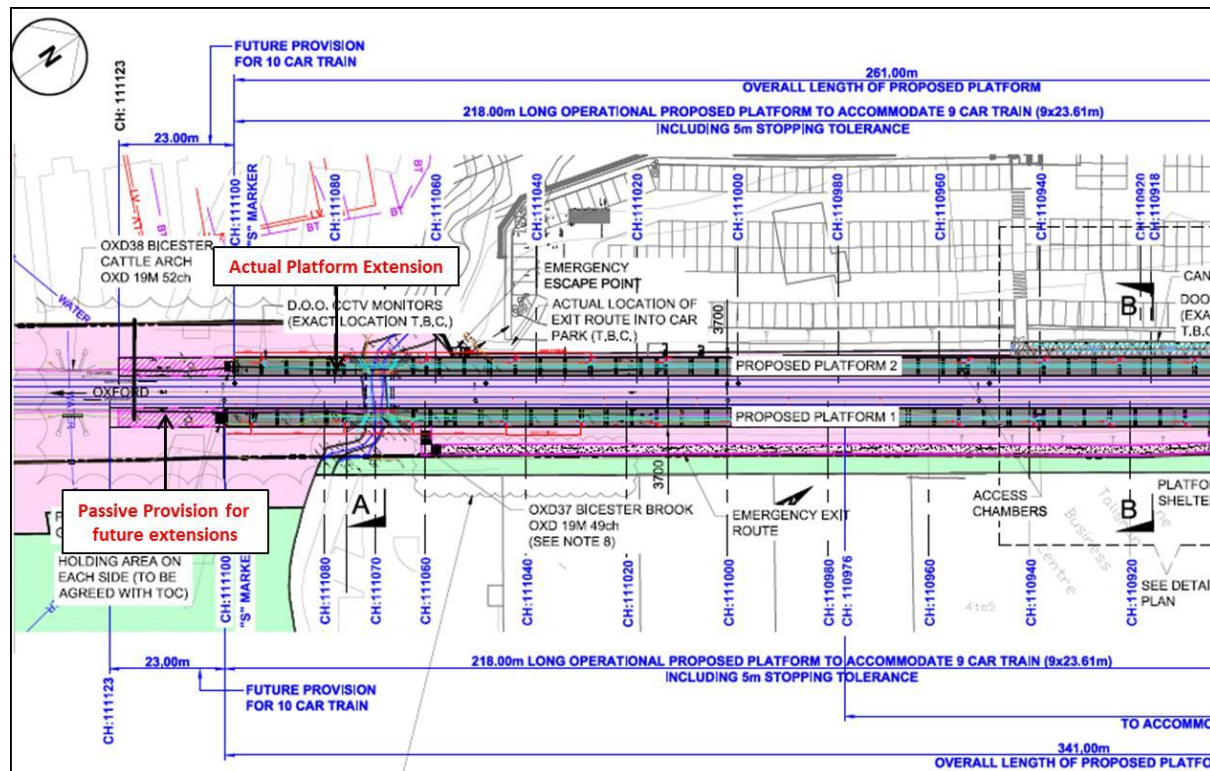


Figure 3 – Proposed Platform Extension at Bicester Town Station. (Atkins 2012. Coordination Drawings) (Actual Platform extension shaded in grey and passive provision shaded in pink)

### 3 Flood Risk Impacts

This section outlines the methodology used in undertaking the flood impact assessment for the proposed platform extension work at Bicester Town Station. This involves an assessment of any potential floodplain storage volume lost as a result of new platform construction. The Bicester hydraulic model<sup>1</sup> has been used to inform design, which has been approved for use for this study by the Environment Agency (EA). The methodology, parameters and working assumptions, together with the results and any potential recommendations for mitigation are all described in the following sections. An outline of the procedure used to calculate floodplain storage loss is presented below:

- Calculate the predicted flood level adjacent to the proposed new platforms at Bicester Town Station using the Bicester model output grids provided<sup>1</sup>.
- Make an assessment of any subsequent flood storage volume lost as a result of the platform extension works. This uses the most up to date Atkins Design Drawings<sup>2</sup> to assess volumes of floodplain lost.
- If required, provide compensatory floodplain storage on a level for level basis as a mitigation measure to ensure flood risk is effectively managed.

The approach used in this assessment has been discussed and agreed with the EA.

#### 3.1 Data Sources Used

A number of data sources have been used in the current assessment which include;

- Atkins Design Drawings<sup>2</sup> of the proposed platform extensions at Bicester Town Station. It should be noted that there is a drafting error associated with the predicted flood levels on these drawings. The reported predicted flood level on both sides of the railway corridor on the existing drawings is 66.22mAOD but in actuality the 1 in 100 year (plus an allowance for climate change predicted flood level is somewhat higher. WHS have reassessed flood levels at this location which are used in this FRA assessment, further details are provided in Section 3.2 of this report.
- The Scheme Boundary, which for the purposes of the flood risk aspects of the Scheme is referred to as the 'blue line' boundary. This boundary incorporates land within the Limits of Deviation (LOD) and those areas of the Limits of Land to be Acquired and Used (LLAU) where Chiltern Railways has the legal powers to install flood mitigation, without further land acquisition.
- Aerial photography has been purchased from Centremaps to use for scheme mapping and to aid in identifying areas suitable to provide compensatory flood storage.
- Hydraulic modelling outputs from the EA Bicester Model<sup>1</sup> are used to delineate the inundation area and obtain design flood levels for the 1:100 year (plus climate change allowances) event. This is a model developed for SFRA purposes, and is the most detailed available for this section of the scheme.

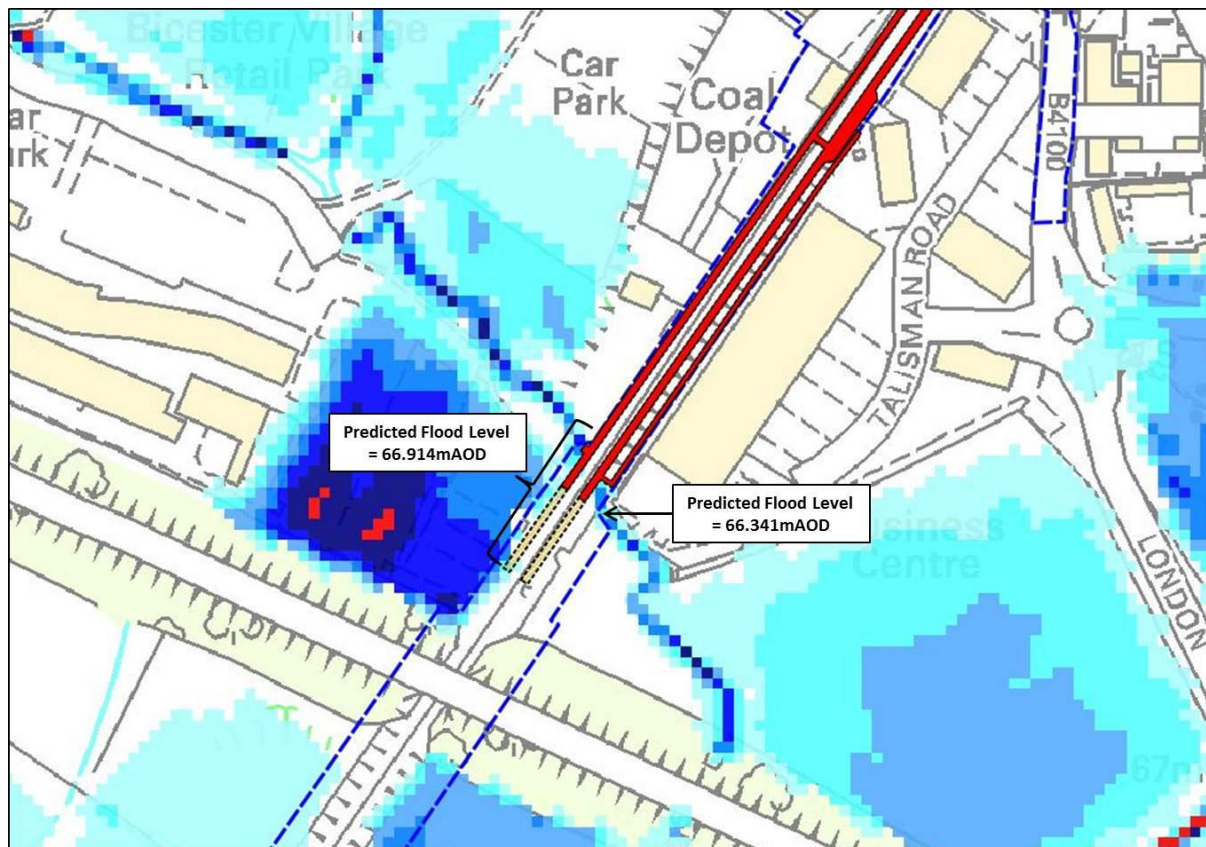
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<sup>2</sup> Atkins. 2013. Bicester Town Station New Platform General Arrangement drawings. (Dwg Refs: 511453-ATK-DRG-CV-007306 & 511453-ATK-DRG-CV-007306) Drawings provided in Appendix 1.



### 3.2 Predicted Flood Level

The Bicester model flood level grid has been used to obtain the predicted flood levels adjacent to the platforms at Bicester Town Station, as shown in Figure 4. This grid has been examined within a GIS software package and a predicted flood level of 66.914mAOD on the upstream side and 66.341mAOD on the downstream side of the railway embankment have been extracted.



**Figure 4 – 1 in 100 year (plus an allowance for climate change) predicted flood level adjacent to the Bicester Town station platforms.**

### 3.3 Flood Impact Assessment

The Bicester Town Station development site lies almost entirely within Flood Zone 1. The south-western edge of the proposed platform extension is situated within the flood outline of the 1 in 100 year (plus an allowance for climate change) Bicester Model output grid<sup>1</sup>. Atkins has provided design drawings<sup>2</sup> for these platforms that are included within Appendix 1.

On review of these drawings it is clear that the lowest level of the foundations of the new platform is around 1.5-2m below track level at around 67-67.5mAOD. Given that the predicted flood level is 66.914mAOD on the upstream side and 66.341mAOD on the downstream side of the railway embankment, it can be concluded that these platforms are to be constructed at a minimum 0.1m above the 1 in 100 year (plus an allowance for climate change) predicted flood level.

Other design elements of the station development that have been confirmed with Atkins' structural engineer include:

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- An emergency access route from the southern platform will be constructed higher than 66.341mAOD (1 in 100 year plus an allowance for climate change predicted flood level) to ensure that it remains open in the event of an extreme flood.
- There are no changes proposed to the existing OXD37 underbridge. Therefore no further analysis was required.
- The 50m sections that have set aside for 'passive provision' for potential platform extensions situated at the western end of the new platforms are not part of this FRA submission. However, any future expansion of these platforms would be at the same level as the current proposed development meaning that flood risk issues are unlikely to be an issue in any future expansion works.

## 4 Conclusions

The Bicester Town Station development site lies almost entirely within Flood Zone 1. The very south-western edge of the proposed platform extension is situated within the flood outline of the 1 in 100 year (plus an allowance for climate change) Bicester Model output grid<sup>1</sup>. However, this FRA has confirmed that the proposed platform extension is to be constructed above the predicted flood level and no compensatory floodplain storage will be required. The key conclusions of this FRA are;

- The platform extension at Bicester Town Station will be constructed outwith of the flood zone and no compensatory floodplain storage will be required.
- The 50m sections that are set aside for 'passive provision' for potential future platforms situated at the western end of the new platforms are not part of this FRA submission. However, any future construction will be at the same platform level and is therefore unlikely to have a flood risk impact.
- The south side emergency access route will be constructed higher than 66.341mAOD (1 in 100 year plus an allowance for climate change predicted flood level) to ensure that it remains open in the event of an extreme flood.
- There are no changes proposed to the existing OXD37 underbridge. Therefore no further analysis was required.
- A separate document will be prepared to deal with the surface water drainage issues associated with the construction of Bicester Town Station.

**Appendix 1 – Atkins Design Drawings (Bicester Town Station New Platforms General Arrangement Plans)**