

# CAPITA



## Bow Street Station: Option Selection Report

Final Report | March 2016

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Bow Street Station: Option Selection Report  
Final Report

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# ***Option Selection Report***

Bow Street Station  
March 2016

***FINAL***

Project Name:	Bow Street Station
OP Reference:	
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**GRIP**

**Governance of Railway Investment Projects**

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## 1 Project Scope & Requirements

### Introduction

Bow Street station is a proposed new railway station and strategic Park and Ride to be provided on the Cambrian Line between Borth Station and Aberystwyth Station. The railway station would be serviced by one train per hour (in the peak as at 2016 – which may increase to full hourly in the future) operated by the Train Operating Company (TOC) (currently Arriva Trains Wales).

The proposed site is at the southern end of Bow Street (OS Reference SN 620 842) adjacent to a builders merchants and sited directly off the A487 (T). The communities of Penrhyncoach and Plats Gogerddan are within one mile to the east of this site, Llandre is 2 miles to the North and Aberystwyth 3.5 miles to the south.

### Background

The Bow Street Station site was originally identified in the TraCC Rail Utilisation Study (2010) which considered station options in the vicinity of Llandre and Bow Street. The Bow Street site was chosen as being well situated to capture commuter traffic into Aberystwyth from the A48 (T) as well as the Bow Street and Llandre environs.

Further information and a business case specific to the proposed new railway station, was included in the WelTAG transport appraisal undertaken by Capita (Carno & Bow Street Station WelTAG Stage 1+2 Assessment Revision D Final Report May 2011) on behalf of TraCC Regional Transport Consortium.

This work concluded that Bow Street Station had a moderate BCR (two hourly and hourly service) for the central business case and that an hourly service to the site in particular had the potential for a strategic Park and Ride for the Aberystwyth sub-region. Subsequently, service frequency on the route has been increased from two hourly to hourly for the majority of the day including peak periods with the aspiration to move to a full hourly service in the future.

In 2015 the Minister for Economy, Science and Transport gave funding for the scheme to be progressed to outline design and planning application stage, with the inclusion of a strategic Park and Ride and new highway access within the scope of the design.

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## Strategic and Local Context

The proposed scheme is part of a strategic approach to facilitating sustainable economic growth in the Mid Wales region and in particular, the Aberystwyth area of North Ceredigion. The proposed scheme that will facilitate improved passenger transport access to employment sites and a range of services and opportunities provided in the Aberystwyth area – such as health, retail, employment, education and skills training and leisure/ recreation. In addition, the proposed scheme will support the tourism sector in Mid Wales, offer better connectivity within Wales, UK and Europe and bring environmental benefits.

The proposed interchange is identified within the current Joint Mid Wales Local Transport Plan 2015-2020 and land has been identified for use as a passenger transport interchange / new railway station within the current Local Development Plan. The proposed scheme supports the County Council’s Corporate Plan priorities and aspirations of the Growing Mid Wales economic development partnership. In addition the scheme will support delivery of the Welsh Government’s Wales Transport Strategy and National Transport Plan Finance Plan 2015.

The proposed scheme will specifically enable the interception of journeys made by private motor cars (particularly single occupancy) from the North (A487) and East (A44/ A4159) by providing much needed ‘out of town’ longer stay parking to enable easy interchange between the car, walking and cycling and either train or local/ longer distance bus services. This will provide new and greater opportunities for a positive modal shift in favour of passenger transport with greater opportunities for part of the journey to be made by forms of Active Travel (walking and cycling). The scheme will provide improved pedestrian and cycling access with existing and proposed links to into Bow Street, Llandre, Penrhyncoch and the nearby IBERS/ Aberystwyth University Plas Gogerddan Campus which is to be developed as the Aberystwyth Innovation & Enterprise Campus (AIEC).

There will also be new provision for vehicular and pedestrian access to/ from the site from the adjacent A487 Trunk Road with redesign of the existing A487/ A4159 junction. Changes to the junction layout at the A487 / A4159 will aid in safety improvements, with a roundabout enabling safer vehicle movement compared to the existing right turn movements undertaken at the ‘T’ junction.

Car parking is extremely limited at Aberystwyth Railway Station and at Cambrian Line railway stations to and including Machynlleth. The same is true for car parking in communities serviced by the strategic TrawsCymru network and other longer distance and local bus services – such as the T1, T2, T5, 701, seasonal X1 and X4

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and National Express 409. Longer stay car parking to access passenger transport services in Aberystwyth itself is similarly scarce and set to become less available due to proposed developments in the town centre. The proposed scheme will provide improved car parking capacity specifically to access rail passenger services into Aberystwyth and between Aberystwyth and other Welsh, UK and European destinations.

The scheme also offers the future opportunity to address local/ regional freight movements by facilitating HGV parking on adjacent land as well as looking at coach parking outside of Aberystwyth town centre.

### Project scope

The proposal is to provide a new station public transport interchange comprising both a:

- Railway Station; and
- Bus-based Park & Ride/ Park & Share site.

Both facilities will benefit from car and cycle parking, appropriate safety and personal security features such as lighting, CCTV, bus stop and waiting facilities and the proposed facility will incorporate pedestrian and cycle access to encourage Active Travel to/ from the site.

The station comprises;

- 150m (operational length) single faced 'bidirectional' platform station designed to accommodate 6x23.7m vehicles (142.2m). Total 150m including stopping allowance (min 3m). Two Passenger Waiting Shelters, platform lighting, CIS, CCTV, Help Point and Ticket Machine.

The bus based Park and Ride / Park and Share Site will comprise:

- 110 space car park (with room for additional parking capacity subject to future demand) proposed with lighting and CCTV, together with pedestrian access to Bow Street and highway access to the A487 (T) and A4159;
- 10 dedicated disabled parking bays;
- Bus shelters;
- Bus timetable cases/ information displays;
- Poles and flags;
- Cycle parking;
- Shared use/ Active Travel access to/ from the site - with appropriate safe crossing provision;

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- Passive provision for future electric vehicle charging points;
- Lighting;
- Directional signs – e.g. from A487 and A44 Trunk Roads and A4159.

Access to the existing track access point will be improved for Network Rail. The Train Operating Company will be provided with access to the station for any maintenance activities as required.

Associated works comprise;

- New roundabout and highway access road at junction of A487 (T) and A4159;
- Track re-alignment.

#### Ownership and Delivery arrangements

The station platform and related assets would be owned by Network Rail and operated and maintained by the Wales and Borders Franchise holder (currently Arriva Trains Wales).

It is intended that the car park and highway access including cycle parking will be owned and maintained by Ceredigion County Council. The new roundabout and highway will be owned and maintained by the Welsh Government.

Network Rail will be granted right of access from the roundabout to the existing access point and station platform for maintenance and operational purposes.

#### Delivery Arrangements

At this present stage this has yet to be determined. It is assumed that the delivery of the scheme will be progressed by Ceredigion County Council, which would oversee design and construction works as the project manager. It would be assumed that Network Rail would act in an Asset Protection Role and would be the Technical Approval Authority for the Station platform and associated track works, with Ceredigion County Council being the Technical Approval Authority for the Highway and Car Park works. Welsh Government would be the Technical Approval Authority for the roundabout works.

#### Purpose of this document

This document summarises the work undertaken to progress the design of Bow Street Station Park and Ride to draft Approval in Principle (AIP). It outlines the preferred option providing a summary of the work undertaken to date and those elements to be undertaken in the future.

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## **2 Preliminary Design**

### **2.1 Selected Option**

#### Existing Situation

The site chosen for a new Station and Park and Ride facility is located near to the former Bow Street Railway Station on the Cambrian Line.

The proposed site is at the southern end of Bow Street (OS Reference SN 620 842) Adjacent to a builders merchants and sited directly off the A487 (T).

The site is currently used for storing caravans and is bounded by the builder's merchants to the north, agricultural land to the east and a detached residential property. Current vehicular access to the site is via the builder's merchant's access. There is an existing Network Rail access point at the southern end of the site together with a GSM-R mast for the new European Train Control System (ETCS) signalling.

The station would be located on the Cambrian Line and would be served by an hourly service (in the peaks).

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**Pictures 2.1 to 2.3 Existing Site**



**Figure 2.1: Location Plan**



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**Figure 2.2: Site Location**



### Selected Option

Please refer to drawings BSS-CAP-00-XX-DR-S-000001 and ED3251/01PD in **Appendix A**.

### Overview

The station platform would be situated on the east side of the line at approximately c 91m 26ch running to 91m 33.5ch. The platform will contain a 4m wide entrance point level to the footway with a 1.5m high bow top fence to the rear of the platform. To meet current road-rail incursion regulations a crash barrier will be provided at the rear of the platform, with anti-ram raid bollards to protect the entrance.

The single platform will have an operational length of 150m and be 3.5m wide. The platform will serve services in both directions. The station is unmanned therefore no staff accommodation will be provided.

### Buildings and Civils

Earth Works:

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Due to existing ground conditions ground improvement will be required to support the platform either stone columns (current assumption) or mini piles. In the car park significant amounts of fill will be required to raise the level of the former station yard from the field and to provide level access to the platform. The access road and parking will be reinforced with terram layers to achieve adequate stability. A reinforced earth wall will be constructed to support the echelon parking which is at a higher level from the rest of the car park.

#### Platform:

The platform is proposed to be constructed using a traditional method of block wall, solid infill and bit mac surfacing. Rear walls will be constructed over approximately 1/3 of the total length with the remainder being level to and supported by the road access road (subject to constructability assessment alternative methods of platform construction may be deployed). The platform design will accommodate raise and lower lighting columns and associated cabling, back of platform fencing and platform drainage.

Lighting and Telecommunications multi ducting, for the platform, will be provided along the back length of the platform with inspection chambers adjacent to each lighting column. The ducting system will enable the installation to comply with Network Rail standards and Electrical Regulations, and provide for 25% spare capacity for future expansion

Ducting for potential future through signal and telecommunication services will be separately provided along the centre of the platform. For this ducting inspection chambers at a minimum of every 30m will be situated in the platform and at its ends to cover the transition of cable troughing to cable ducts.

The distance between the edge of the coper nearest the track and any obstruction should be >2.5m in accordance with the requirements of GI/RT7014. Floor surfaces will be even.

The platforms will have stepped ends providing authorised access to lineside and be fenced with lockable gates. Lock down covers will be provided to all chambers and pits on platforms and in the vicinity of the platforms.

#### Drainage:

Drainage on the platform will be via slot drains provided to the rear of the platform exiting into outfall pipes that will feed into the drainage system provided for the car park.

#### Changes in Level:

The platform is level with the car park footway and highway access and therefore no steps or ramps to the platform are required.

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#### Shelter:

The platform will contain two shelters. The shelters will be Paragon Anti-Vandal AV9 with Integral Recessed LED Lighting (approximate dimension 7.5m x 1.6m). The roof of the shelter overhangs the enclosure by 275mm to each side and 500mm to each end. This is constructed from stainless steel. 10mm toughed glass in secure rebated frame will be used on the sides of the shelters. The lower sections of the rear and side wall panels are to be coated embossed stainless steel. Upper panels are made from panels of toughed glass. Drainage is from the roof of the shelter through the stainless steel columns to the ground. Seating is to be provided within the shelters and be of perched type along 2/3 of the length of the shelters with wheelchair space.

The shelters are to be located at either ends of the platform.

**Picture 2.4** – Example of Paragon Anti Vandal Shelter Fitted at Ebbw Vale Parkway



#### Signage:

The following is an indication of the signage that will be required for the new station platform at Bow Street:

<b>Sign Type</b>	<b>Quantity</b>
Station Name Sign	4 per platform
National Rail Logo (totem Pole)	1
Two Car Stop Board	2 per platform
Four Car Stop Board	2 per platform
Six Car Stop Board	2 per platform
Help Point Sign	1 per platform
Information Board (3DR)	1 per platform
CCTV Sign	1 per platform

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Trespass Sign	2 per platform
Way out Sign	1 per platform
No Smoking Signs	1 per platform

Platform numbers are not required for a single platform station.

Where appropriate, the signage shall be provided in both Welsh and English.

Signage is to be provided at the entrance to the station and at other suitable locations to indicate trains direction. Directional and information signage will be provided on the platforms and within car parks at the stations. Additional signage will be provided to highlight location of disabled parking spaces and pick up/drop off points and car park entrance and exit.

Signs are to be standardised and placed at appropriate positions to suit platform arrangement. The structure is to be vandal resistant, heavy duty, easy clean, graffiti resistant with a maintenance free finish. Railway Group Standards GI/RT7033 applies to Lineside Operational Signs. Reference should also be made to Traffic Signs Regulations & General Directions 2002, The Health & Safety (safety signs & signals) Regulations 1996, and BS 5499-1:2002 Fire safety signs, notices & graphic symbols: Specification for geometric shapes, colours and layout.

Station name signs to be located at a frequency to suit platform length and configuration. Signs will be mounted on a 'goalpost' structure. Up to four station name signs will be provided along the platform.

Warning & prohibition signs are to be placed at unauthorised access points and ends of platforms (as specified in GI/RT 7033).

Car stop signs are to be provided on each platform at the point where two, four and six car trains would be required to stop.

Clear signage is to be provided indicating the location of the help and information points. Signs will be positioned directly above the help point and at other suitable locations along each platform indicating directions to it.

Heavy-duty vandal poster boards and frames are to be used throughout. It is proposed to provide a single sided type 4DR headed structure at the station entrance displaying timetable information and a poster showing useful information. A 3DR board will be provided on the platform.

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**Picture 2.5** – Example of 3DR Poster Board (Arriva Trains Wales corporate branding)



### Platform Furniture

Furniture provided on the platform will include:

- Benches (x2)
- Litter bins
- Salt bin
- Signage (as detailed above)

A canopy will be provided for the ticket machine. The canopy will be a paragon CV canopy to match the shelters.

### Electrification and Plant

LED lighting fitted with PIR sensors (proposed to use the Urbis Schreder Axia LED luminaire with the recommended WattStopper FSP-211 digital sensor) will be provided along the platform via 9 lighting columns (5m hinged aluminium lighting column c/w Urbis Schreder Axia 16 LED/5078/350mA Luminare (21w) post top mounted at 5degree inclination with PIK sensor control).

LED lighting will be provided within each shelter.

Cabinets for the incoming power supply and cut off and telecoms will be located to the rear of the platform.

A ticket machine will provided at the entrance to the platform and will be of a Scheidt & Bachmann Ticket Xpress Lite specification.

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## Telecoms

The telecoms and CCTV systems proposed at the new Bow Street Railway Station are as follows:

- Security CCTV system on the station platform (there will be 10 CCTV cameras on the platform including two situated in each of the shelters).
- Customer Information System (CIS)
- Help Point – single encased system with a button for passenger emergency use. This enables passenger to converse directly with the CCTV central operator for assistance if required.
- Ticket machine (network and mains supply only, machine to be supplied and installed by the Train Operating Company)

The CCTV system will comprise:

- 5 x Column mounted cameras each comprising of an analogue CCD Camera with Auto-Iris lens to suit the required view, both enclosed in a weatherproof heated IP65 housing and mounted on wind-down columns fitted with anti-vandal spikes; viewing the platform areas;
- 4 x Vandal resistant IP65 domes, 2 mounted internally to each shelters' corner to view the shelter entrances and the area within;
- 1 x Vandal resistant IP65 dome mounted on the ticket machine shelter to view purchasing customers, positioned to avoid visibility of the card reader keypad;
- 1 x Adpro FastTrace 2 Digital Video Recorder, with the capacity to record all cameras for 31 days, mounted within the external cabinet;
- 1 x NVT Video Hub and ELV Power Supply unit mounted within the external cabinet;
- All associated signal network and ELV cabling;
- All associated mains supplies.

The CCTV cameras will be ELV type 12V DC/24V AC in accordance with NR/L2//TEL/30135, fixed, colour and fitted with lenses to comply with the image viewing requirements of NRL/GN/TEL/50017.

Camera and camera housing ELV power will be provided by the NVT Video Hub and ELV Power Supply unit.

All CCTV Equipment is Network Rail approved; specific models to be decided at GRIP 5.

The Customer Information system will comprise:

- A Network Rail approved single Infotec P1124 double sided display will be mounted on a suitable pole to provide minimum head clearance of 2.5m;
- The display will include "text to speech" (Micro PA) which will be activated;
- Associated signal network cabling;
- Associated mains supply.

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The helpoint system will comprise:

- A Network Rail approved single button GAI-Tronics PHP400 VOIP Help Point unit mounted to the CIS support pole at an appropriate height;
- Associated signal network cabling;
- Associated mains supply.

The external telecom cabinets will be the same model of Altron cabinet (AEC 90-10-65) as implemented on the Wales and Borders franchised estate, with height sized to accommodate the telecom and CCTV equipment.

They will be installed on the carpark side of the platform fence line.

Site Geometry prevents the telecoms cabinet having rear access; in mitigation, the cabinets will be provided with swing frame 19" rack mounting.

The cabinets will be fitted with independent fan, heater and thermostat units to provide environmental control.

The cabinets will house the following:

- ADPRO FastTrace 2 DVR
- NVT Video Hub and ELV Power Supply unit
- TOC WAN interface equipment (provided by TOC)
- RJ45 Patch Panel
- UPS battery back-up PSU and batteries
- Mains Power Distribution Strips for UPS Distribution and Non UPS Distribution

### Permanent Way

The platform is located on a near straight in a flattish part of a sag with grades of c 1 in 87-89 climbing in each direction. There is sufficient space to accommodate a 150m platform north of the current access point in the short flat to c1 in 340 section before encroaching significantly into the northern climb. This also avoids encroaching on the maintainer's area to the south with the platform position. It would be possible to move the platform about 10m further south if required without affecting the maintenance access.

The current design is a vertical alignment proposing 1 in 300 grade within the platform access. The maximum generated lift is 141mm (within the station) and the maximum lowering is 80mm (beyond the low mileage end of the station). This option has a smaller dig north and south and a lift of up to 120mm through the platform. The northern gradient is maintained at 1 in 89. This option is compliant with current Rail Group Standards and the Track Design Handbook. An alternative 1:500 design was also considered but resulted in a significant 250m dig to the north and steeping of the gradient to 1 in 67.

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Network Rail have requested that an alternative design based on a 1:500 gradient preferred in the Track Design Handbook with additional lifting is also considered, with track replacement over circa 400m.

It is currently assumed that the existing bullhead track will be laid on new timber sleepers over 340 meters.

New lineside fencing will be provided from the platform to the access point to demarcate the boundary. This will be 1.8m high panel mesh to help prevent trespass.

### Signalling

Network Rail are reviewing the signalling implications of the scheme. This is likely to include an update of the ERTMS data to include the station and changes to the timings of the level crossings at Llandre.

### Maintenance Access Point

The existing Network Rail maintenance access point will be retained with a new gated access. The area (scale) of the compound will be maintained unchanged, with the GSM-R Mast remaining in the existing location. Access is designed to permit delivery of 60ft rail.

Fencing and gates provided will be 1.8m high panel mesh to help prevent trespass.

### Statutory Undertaker Apparatus

Statutory Undertaker	Apparatus	Comment
Welsh Water Foul	150mm diam vitrous clay pipe, 1.4m depth to invert in proposed car parking area.	No diversionary works necessary, cover levels to be adjusted to suit new levels.
Welsh Water Clean	6 inch cast iron water main in western verge of existing A486.	Localised diversionary works may be required to the main.
Scottish Power Manweb	11 KV overhead cable to the west of the property Werndeg and crosses the Network rail line.	Position of existing SP post not affected by the station road roundabout, height of cable remains unchanged.
British Telecom	Overhead cable to the west of the property Werndeg. Underground plant in the Eastern verge of the A486 and the eastern verge of	Localised diversionary works will be required at the A486/A4159 roundabout.

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	the A4159.	
National Grid	Not Affected	
Environment Agency	None Identified.	
Virgin Media	Not Applicable	Not Applicable
Network Rail		To be confirmed

### New Service Connections

New service connections required at the site will include:

- Metered connection for station (Train Operating Company)
- BT telephone line for station (Train Operating Company)
- Assumed that car park will be unmetered supply for lighting

### Highway Access and Parking

Junction:

A new highway access arrangement will be provided at the junction of the A487 (T) and A4159 in the form of a four arm roundabout.

Highway Access:

A new access road will provide entry to the car park, disabled parking area and the Network Rail maintenance access point from the A487 (T). The access road will rise in level to meet the platform to enable level access for users.

Car Park:

A car park will be provided to the rear of the station providing 110 spaces (total). Parking spaces are to be 4800mm x 2600mm (100) and disabled spaces will be 6000mm x 3600mm (10).

Disabled parking will be provided in a dedicated area adjacent to the southern end of the platform providing level step free access to the platform entrance. 10 disabled bays in addition to the 100 spaces referred to above will be provided.

Passive provision has been designed within the car park for electric car charging points and future car park ticket machines, with ducting to be provided to permit easy installation at a later date.

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A lighting plan will be developed for the car park and access road / roundabout at detailed design stage.

A signage plan will be developed for the car park and access road at detailed design stage. This will include signage off the trunk road.

Drainage of the car park and highway will be split into two systems. One for trunk road and the roundabout using a traditional kerb/gully system discharging through an oil bypass separator into a retention pond and soakaway system. A separate system using permeable paving and blocks for the car park, station platform and access roads will be constructed. This will discharge into a contained storage system discharging into an oil separator then into the same retention pond and soakaway system as the roundabout surface water.

#### Bus Shelter / Layby:

A bus drop off / pick up point is provided to the rear of the station entrance, with stands for three buses providing shelters and travel information. This will also act as the 'kiss and ride' drop off point for passengers. A turning circle allowing for movement of a 12m bus is provided to the north of the drop of point.

#### Cycle Parking:

Cycle parking will be provided within the pedestrian area adjacent to the turning circle, with a covered shelter over 30 Sheffield style stands.

#### Walking and Cycling:

To the rear of the platform will be a pedestrian area linking the bus drop off / pick up point and disabled parking area with the entrance of the station. Pedestrian access to the platform from the car park will be via a level footpath provided to the north-east of the car park following around the turning circle area connecting to the platform entrance.

Two raised crossings allowing ease of access for pedestrians will be provided across the access road between the disabled parking area and car park and also near the turning circle area where the eastern footpath exits the car park.

The entrance to the station, ticket machine and customer information point will be protected via ram-raid / anti-collision bollards in order to prevent road / rail incursion.

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Safe Active Travel connections will be provided to the surrounding area (to the east to Penrhynoch and the nearby IBERS/ Aberystwyth University Plas Gogerddan Campus and to a Safe Routes in Communities' scheme to the north of the village). A crossing with Splitter Island will be provided across the A487 (T) for cyclist and pedestrian access to the interchange.

### Summary of proposed works

- New category F station (150m single platform);
- 110 space Park and Ride car park;
- Highway access road including bus drop of and turning circle;
- New four arm roundabout at junction of A487 (T) and A4159;
- Permanent way revised vertical alignment.

## **2.2 Compliance of Selected Option with Project Requirement Specification**

A CRD and RRD have not been prepared (replacement of PRS). The proposals are compliant with the Welsh Government requirement to construct the station at this location.

## **2.3 Constructability Assessments**

Possession working would be required for platform construction and permanent way works. Where possible this would utilise rules of route possessions. Disruptive possessions may be required for reasons of safety and efficiency particularly for the track works.

Car Park and platform construction behind the front wall should be able to be undertaken with limited disruption, however, existing access to the local businesses on site e.g. the builder's merchant's would need to be maintained.

The new roundabout and trunk road is essentially an online improvement but will be constructed in two/three phases utilising two/three way traffic management.

It is envisaged that all construction traffic will utilise a haul road from the trunk road that will eventually form part of the roundabout. This avoid unnecessary disruption to the builder's merchants and to the nearby residential property.

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## 2.4 Discarded Options

- Smaller car park (56 spaces) and access via existing vehicular route (builder's merchant access). Discarded due to the need to act as a strategic Park and Ride for Aberystwyth, therefore new highway access required and larger car park to match future demand.
- No station at Bow Street. This option was discarded due to the need to meet Welsh Government commitment to design a station and strategic Park and Ride to planning application stage.

## 2.5 Access and Possession Strategy

It is assumed that the platform construction will be undertaken using a combination of green zone working and white period possessions. There may be some requirements for disruptive possessions in order to complete all station works for reasons of safety and efficiency.

Car park and highway works will not affect the operation of the railway. The works are all located behind the new platform.

A detailed Access Strategy will be produced at GRIP stage 4.

## 2.6 Project Programme

The scheme will be prepared to a position where Approval in Principle designs will be ready to be submitted for approval together with a planning application.

Final elements required to gain full GRIP 4 approval will be undertaken from April, funding for 2016/17 permitting. More details on future packages of work to progress the scheme are provided in section 15.

A full programme for delivery will be developed once funding has been committed for the construction of the station. For assessment purposes an opening date of 2018 has been assumed, which is achievable given AIP approval in 2016. A potential programme to achieve this is set out below; subject to funding.

### Key Dates

March 2016 – Approval in Principle submitted and scheme developed to a stage where a planning application can be submitted.

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AIP Submission / Approval	May 2016
Planning Application	May 2016
GRIP 4 Approval	July 2016
Capital Investment Decision	Summer / Autumn 2016
Detailed Design	Autumn 2016 – Summer 2017
Land Acquisition	Autumn 2016 – December 2017
Tender	Summer 2017
Construction	January 2018
Opening	December 2018

## 2.7 Whole Life Cost Assessment of Options

Traditional forms will be utilised, which will have low impact on future maintenance requirements. The platform will be located on straight track therefore reducing future maintenance.

## 2.8 Estimates (including whole life costings)

The current project cost is estimated as £2.483m for the railway station works. The Park and Ride and highways elements are estimated at £2.543m. The total scheme costs is estimated at £5.026m excluding land and compensation costs. **Appendix B** contains a breakdown of these estimated costs.

Cost estimates include recommended allowances for risk of optimism bias together with Industry Risk Fund (IRF) and Network Rail Fee Fund (NRFF) uplifts assuming an emerging cost bias.

Station	£2.483m
Park and Ride and Highway	£2.543m
TOTAL	£5.026m

## 2.9 QRA

A QRA has not been undertaken at this stage.

## 2.10 Risk Register

The current Project Risk Register is attached as **Appendix C**.

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The main risks associated with this scheme are (these will be updated as the project progresses):

- Flood Risk – The field that the car park will be located on is within a flood risk zone. However the station and footpath to station are at a higher level (FCA currently ongoing);
- Ground Investigations – Current GI work has found that land near to the railway line is poorly consolidated with very low CBR values. Further, the watertable is very high in the area of the car park (field). Further GI work is required nearer to the railway line and platform site to confirm design requirements for foundations etc with a risk of increased costs if poor ground requires a more extensive engineering solution. The results of the soil analyses have shown some minor areas of contamination by PAHs and asbestos. These are along the western boundary of the site adjacent to the railway line. As these locations are to be underneath the railway station and access road, there is no pathway as the site will be capped. However, care will need to be taken during the construction phase that the contamination is not released to the environment, or that workers are exposed to it;
- Ecology –Desktop and scoping ecological surveys have been carried out. Risk of protected species - It is possible that there is a bat roost in the adjacent dwelling. Recommended pre-construction surveys in the appropriate seasons include checks for badgers, otters and water voles, a reptile survey and a bat activity survey of the adjacent house and flight line survey. The draft plans include replacement of the hedgerow which may be used a bat flight line, additional tree planting and landscaping and low UV directional lighting.
- Invasive Non-Native Species - There is Japanese Knotweed present throughout the site. The development will need to be carried out without causing the Japanese Knotweed to be spread. The knotweed will need to be treated appropriately. There are a number of possible methods of control which could be utilised. These include off-site disposal at a controlled site, on site containment or on site treatment.
- A487 (T) Access – Gaining approval from Welsh Government for the highway access design;
- Compensation – Residents may bring part 1 or nuisance claims post construction of the station. Eligibility for noise compensation is being assessed as part of the current stage of work.
- Provision of CCTV at car park – A future operator of the Car Park CCTV is yet to be identified;
- Potential Signalling changes may be required to the timings of the nearby level crossings and an assessment of the impact on ERTMS is required. Network Rail are undertaking a review of the signalling impacts.
- Track condition. Existing track is bull head rail on timber sleeps. To achieve compliant vertical geometry. The track will need to be re-laid. This is

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currently assumed to be a like for like replacement with new sleepers. The track RAM may request replacement with flat bottom CWR on concrete sleepers.

- Track design – Proposed 1 in 300 track design. If Network Rail require 1 in 500 additional dig will require further GI and incur additional construction costs.

## 2.11 Assumptions

- Cambrian Timetable – Assumed that the station stop can be accommodated within the current timetable. A separate Welsh Government study has reported to the Minister;
- Station Design will be compliant with all standard requirements including Railway Group Standards (RSSB), Network Rail Company Standards (NR), Equalities Act and Common Safety Standards;
- Assumed that connections to power and telecoms will be straightforward as close to residential properties and that suppliers will work with project parties;
- Accidental obstruction –Rail / road incursion will need to be addressed with crash barrier and bollards provided as part of the design;
- The GSM-R mast is located outside the footprint of the station (design retains Network Rail vehicular access to southern end of site);
- Rubbish bins on platform will be emptied by the Train Operating Company mobile team.

## 2.12 Signed Design Compliance Certificate

As there is no PRS this is not required.

## 2.13 Asset Condition Surveys / GI / Topographical

No Asset Condition Surveys have been carried out at this stage. The main asset affected is the existing permanent way which comprises bullhead track on timber sleeps.

Two topographic surveys aligned to a common grid have been undertaken at the site. One covering the areas for the highway access improvements, access road and Park and Ride and another for the railway station platform and Permanent Way. Existing cant values need to be confirmed on the site for the Permanent Way.

Ground Investigation (GI) work has been undertaken in the field adjacent to the area where a new station platform would be located, and in a number of locations where the Park and Ride car park facility and highway access will be provided.

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GI investigations have indicated poor ground conditions in the area near to where the station platform would be located. Further GI is required to confirm the conditions at lineside. GI has also indicated that the water table in the location of the scheme is high (ground water was encountered at between 0.75m and 2.00m in the trial pits with an average strike depth of 1.41m). Mitigating measures have been included within the car park drainage design to address this issue e.g. oil interceptors within the car park to avoid contamination.

The results of the soil analyses have shown some minor areas of contamination by PAHs and asbestos. These are along the western boundary of the site adjacent to the railway line. As these locations are to be underneath the railway station, there is no pathway. However, care will need to be taken during the construction phase that the contamination is not released to the environment, or that workers are exposed to it.

#### **2.14 Capacity & Pedflow modelling output (if required)**

To accompany the planning application for the scheme, a Transport Statement (TS) and Design and Access Statement (DAS) has been produced.

Demand forecasting for the new station undertaken in 2011 indicates an expected demand of 64k trips at opening (2018) with an hourly service. Additional rail demand may be generated by the revised scheme with improved highway access and improved bus connections. The Park and Ride will also permit use for Park and Share.

A review of the data within the TS shows the peak hours on the existing network to be:

- 08:00 to 09:00 and 17:00 to 18:00 on a weekday
- 11:00 to 12:00 on a Saturday morning

Using the existing traffic data the traffic demand was calculated.

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### **A487 Bow Street**

Start Junction: A4159/Bow Street

End Junction: B4353/Bow Street

Year	AADT Without Station	AAWT Without Station	AAWT With Station
2014	8206	8510	8510
2016	8352	8661	8661
2018	8607	8925	9057
2033	10489	10877	11078

### **A4159**

Start Junction: A487/A4159 Bow Street

End Junction: A44/A4159 Lovesgrove

Year	AADT Without Station	AAWT Without Station	AAWT With Station
2014	4333	4493	4493
2016	4410	4573	4573
2018	4545	4713	4779
2033	5538	5743	5843

### **A487 South**

Start Junction: Maeshendre, Aberystwyth

End Junction: A4159

Year	AADT Without Station	AAWT Without Station	AAWT With Station
2014	7556	7836	7836
2016	7691	7976	7976
2018	7926	8219	8285
2033	9658	10015	10115

A review of the expected traffic generation from the site has shown that there will be an insignificant increase to the peak hour traffic flows on the A487 and A4159 leading to the site.

The TS concludes that the development promotes sustainable travel. It further summarises that the development location and design accords with the requirements

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of current transport and land use policy and there are no traffic or transport related impacts that cause demonstrable harm.

The DAS summarises the key access considerations within the design, which comply with current standards.

Pedflow modelling is not required for the platform as the anticipated demand is within the capacity of the standard width platform (64k passengers per annum at opening 2018 and 122k in design year (15 years at 4% growth per annum)).

### **2.15 System Integration Output (if required)**

Not required.

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## **3 Contracting Strategy**

**3.1** The contracting strategy will be determined at GRIP stage 4. There is currently no funding commitment for construction works. Alternatives include traditional contract with separate detailed design and tender at GRIP 5 or Design and Build with tender at GRIP 4. The contract may be procured by Welsh Government, Ceredigion CC or Network Rail as a single contract for all works or split e.g. separate contract for on track and off track works.

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## **4 Interfaces with Other Projects**

- The Minister has received an independent timetable report indicating that stops may be made at Bow Street;
  - Local walking and cycling improvements - The scheme will connect to proposed new Active Travel links into Bow Street, Llandre, Penrhyncoch and the nearby IBERS/ Aberystwyth University Plas Gogerddan Campus which is to be developed as the Aberystwyth Innovation & Enterprise Campus (AIEC);
  - There are future plans under consideration to provide an extension to the car park as a future phase to accommodate HGV and coach parking.
-

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## 5 CDM Information

5.1 Ceredigion CC is lead on the scheme and are the Principal Designer under CDM 2015.

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## 6 Safety Verification Recommendations (CIP)

6.1 Not applicable.

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## 7 Compliance with Corporate objectives (Inc 7DR, Operational impact, maintenance impact)

7.1 Access to the existing maintenance access point will be improved. The project will create a new station assets which will need to be maintained and operated by Network Rail and the Train Operating Company (currently Arriva Trains Wales). No novel infrastructure is proposed. Designs are in accordance with Network Rail Standards and Standard Construction Details and the furniture and equipment meets Train Operating Company common requirements for a new station in Wales.

Ceredigion County Council will own and be responsible for the maintenance of the station access and car park including cycle parking.

The Train Operating Company will need to undertake driver training for the new station prior to its entry into service.

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## 8 Consents Strategy

8.1 The following consents will be required for the provision of a new station at Bow Street:

- Planning Permission – For new highway access, park and Ride car park and station;
  - Network Change Notice;
  - Compensation – Assessment under The Noise Insulation (Railways and Other Guided Systems) regulations 1996, The Land and Compensation Act 1973.
  - Design Approval:
-

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- Land drainage consent (dependent on outfall arrangements);
- Ecology licences (dependent on outcome of surveys);
- Design consents – Station outline design;
  - Civils Form 1/2/4
  - Telecoms AIP design approval
  - M&E Form EA approval
  - Permanent Way Form A Approval
  - Signalling approvals to TBC
- Design consents – Station detailed design;
  - Buildings and Civils Form 3 approval
  - Telecoms Detailed Design approval
  - M&E form FB approval
  - Permanent Way Form B approval
  - Signalling approvals to TBC
- Highway Authority Design Approval
- Trunk Road Authority Design Approval

## **9 Environmental Impact Assessment**

### **9.1 Environment**

Desktop and scoping ecological-environmental studies have been undertaken.

The development site comprises three distinct areas. There is a low lying field which is currently used for agricultural plant research; there is a raised area of hardcore on made ground which is currently used for storage of caravans and for access to rail infrastructure. The third area is a steep bank with approximately 140m of tall hedgerow and small trees which divides the raised part of the site from the lower field.

The site has direct hydrological links with Afon Clarach and the lower part of the site is within a flood risk zone.

The higher part of the site and the steep bank and hedgerow are infested with Japanese Knotweed.

There are local records of bats within Bow Street, badgers, lapwings and hares within the neighbouring fields being used by IBERS and water voles on the west side of the railway line. There are otters on nearly all water courses in Wales and they are known to be present on Cors Fochno and to cross from the Rheidol catchment to the Clarch catchment.

There is an adjacent dwelling with bat roost potential and linkage to the long hedgeline.

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The site is unlikely to be suitable for water voles or otters. There are no badger or mammal tracks across the site or entering the Japanese Knotweed and bramble areas so it is unlikely that there is a badger sett in the hedgebank and Japanese Knotweed. The available habitat is suboptimal for reptiles. It is possible that there is a bat roost in the adjacent dwelling. Full surveys have yet to be undertaken at the site.

The draft plans include replacement of the hedgerow which may be used a bat flight line, additional tree planting and landscaping and low UV directional lighting.

Recommended surveys at the appropriate seasons include pre-construction checks for badgers, otters and water voles; a reptile survey; a bat activity survey of the adjacent house and flight line survey.

The development will need to be carried out without causing the Japanese Knotweed to be spread. The knotweed will need to be treated appropriately. There are a number of possible methods of control which could be utilised. These include off site disposal at a controlled site, on site containment or on site chemical treatment.

A root barrier may be required under the affected areas of the car park and access road.

The documents submitted for the planning application will have to include a Flood Consequence Assessment and meet the Ceredigion Local Authority Local Development Plan policies for ecological enhancements as well as providing any necessary mitigation e.g. directed and low UV lighting, hedgerow retention or replacement.

Protected species surveys will be undertaken from May 2017 onwards (funding permitting).

## **9.2 Noise**

A report assessing the change in noise due to the proposed railway station in Bow Street has been produced. This contains results of a detailed assessment of traffic noise in accordance with the requirements of the Noise Insulation (Amendment) Regulations 1988, in order to determine properties eligible for Insulation against future traffic noise, along with The Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996 (amended in 1998).

Regulation 3 of the Noise Insulation (Amendment) Regulations 1988 states that a Highway Authority is required to make offers of noise insulation to occupiers of

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residential properties where certain criteria are met. The three conditions which must all be satisfied to qualify are as follows:

- (i) The predicted L10 (18 hour) noise level at the facade of a building, within 15 years of a road opening to traffic, must be at least 68 dB(A).
- (ii) The relevant L10 (18 hour) noise level must be greater by at least 1 dB(A) than the noise level prevailing before the new road scheme.
- (iii) Noise from the new or altered carriageway must make an effective contribution to the total noise level of at least 1 dB(A).

The Noise Insulation Regulations for Railways provide a methodology for assessing whether residential properties are entitled to sound insulation as a result of a new railway line or alteration of an existing line. The duty to carry out insulation work or to make grants is determined by the following criteria:

- the relevant noise level is greater by at least 1 dB(A) than the prevailing day-time or night time noise level and is not less than the specified day-time or night-time level; and
- the noise caused, or expected to be caused, by the movement of vehicles makes an effective contribution to the relevant noise level of at least 1 dB(A); and
- the dwelling is within 300m of the new and altered railway;

where:

- the relevant noise level is the noise level in dB that is caused or is expected to be caused by the movement of vehicles using the new railway line or the altered railway line,
- the prevailing noise level is the level of noise caused by the movement of the vehicles on the relevant system immediately before any construction or alteration works commence, and,
- the specified level is 68 dB  $L_{Aeq}$  and 63 dB  $L_{Aeq}$  for day-time and night-time respectively.

The day-time period is defined as the period of 18 hours between 0600 hours and midnight. The night-time period is defined as the period of 6 hours between midnight and 0600 hours.

The relevant noise level is calculated using the methodology set-out in the Calculation of Railway Noise (CRN) 1995 and is based on traffic flows expected under normal operating conditions within a period of 15 years from opening of the new railway line or alteration.

In order to determine the noise model's accuracy, actual noise measurements were carried out in February 2016 within the Proposed Railway Station scheme area. The results of which were validated against the noise model and are shown in the tables below:

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Table ES1 - Noise Site Surveys (CRTN)

Location No.	Reference	Measured Level – 2016 dB(A) (LAF10)	Calculated Level – 2016 dB(A) (LAF10)	Level Difference dB(A) (LAF10)
1	Werndeg (PM)	51.1	51.4	0.3
2	No. 7 Y Ddol (AM)	48.1	47.5	0.6

From the table, the above measurements were shown to validate the calculated levels.

Table ES2 - Noise Site Surveys (CRN)

Location No.	Reference	Measured Level – 2016 dB(A) – Day time (LAeq)	Measured Level – 2016 dB(A) – night time (LAeq)
A	Bow Street	48.4	34.6
B	Borth Station	39.5	34.7

From the above table, as a comparison between station locations there is a variance in the day period but this is a result of various noise impacts in the area at Bow Street such as the builder's merchants in the vicinity of the proposed station and the noise emerging from the A487(T)/ A4119 highway. In reference to the night time levels the above measurements are shown to be similar between each station.

It should be noted that the above measured results have been analysed to remove any anomalies that the site surveys might have recorded e.g. humans shouting / HGV's unloading / dogs barking etc.

A total of 146 properties were assessed in the Noise Assessment Report. The results show that **no properties** qualify for physical noise insulation measures in accordance with the Noise Insulation (Amendment) Regulations 1998 (as shown in the criteria above). The results (including the predicted future noise levels) can be found in the Noise Schedule in Noise Assessment Report.

### 9.3 Flood Consequences Assessment

A Flood Consequences Assessment (FCA) for the site is currently ongoing.

A Network Rail Environmental assessment has not been undertaken at this stage due to budget constraints. This will be included in the GRIP 4 deliverables.

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## **10 Engineering Outputs**

**10.1** The main Network Rail engineering outputs at this stage are:

- Signalling (TBC)
- Buildings and Civils – AIP for Station and Platform (Form 1/2)
- Electrification & Plant AIP (form RSA)
- Telecoms AIP
- Permanent Way AIP (at this stage a track design only has been undertaken)

The main local authority engineering outputs at this stage are general arrangement for highway access and car park.

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## **11 GRIP 3 Deliverables**

**11.1** The main deliverable for the GRIP stages 1-3 is the option selection report and the accompanying AIP design for each discipline.

The options selection report include the following as appendices:

- Qualitative Risk Register;
- Cost Estimate;

The final suite of accompanying GRIP documentation has been deferred by the client to be completed for GRIP 4.

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## **12 Property Opportunity Register (If required)**

**12.1** Not applicable

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## 13 Conclusion and Recommendations

**13.1** This study has presented the preferred option for the implementation of a new station and Park and Ride at Bow Street. This confirms that subject to completion of the supporting technical documentation, that the construction of the station and associated park and ride and bus facility is technically feasible.

**13.2** It is recommended that the items listed in section 15 (Way Forward) are undertaken to complete the technical design and progress the scheme to implementation.

## 14 Formal Acceptance of Selected Option by Client, Funders and Stakeholders

**14.1** Those consulted in the production of this document include:

Charles Varey	Network Rail
Adrian Carrington	Arriva Trains Wales
Stuart Jones	Arriva Trains Wales
Matthew Nobbs	Welsh Government
Dave Thomas	Welsh Government
Steve Hallows	Ceredigion County Council
Chris Wilson	Ceredigion County Council
Lyn Williams	Ceredigion County Council

**14.2** As part of the WelTAG report undertaken on Bow Street Station, a public consultation day was held on the 10th July 2010, where stakeholders were consulted. User surveys conducted on the Cambrian Railways in 2013 and 2015 indicated that was an issue in terms of parking provision at Aberystwyth, which a new station at Bow Street will help to alleviate.

**14.3** The Train Operating Company for the route and have been informally informed of the proposals and have not at this stage raised any issues.

**14.4** This report has been prepared for acceptance of the proposed option by Network Rail and Welsh Government (funder).

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## 15. Way Forward

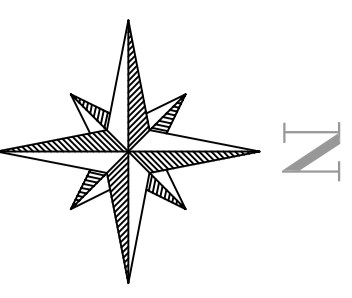
There are a number of further tasks that would need to be undertaken in order to progress the Bow Street Station scheme to a point where the works could be tendered for construction:


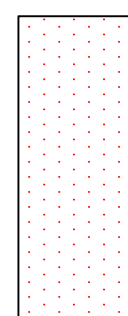



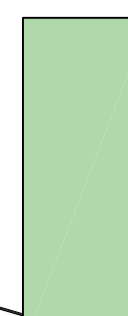
- **Further GI for station platform**– Further ground investigation work should be undertaken alongside the railway line in order to confirm the structural design and foundation requirements for the platform. In particular to confirm extent to which ground improvement may be required.
- **Permanent Way Design** – Completion of permanent way AIP documentation.
- **Network Rail Approvals to AIP documents** – The AIP suite of documents will be submitted to Network Rail for approval.
- **Completion of GRIP 4 Documentation** – Documentation will need to be produced to close out GRIP 4. This should include a quantified cost risk assessment.
- **WeITAG and Business Case Refresh** – A WeITAG stage 1+/2 was undertaken on the scheme in 2011. This should be updated to reflect current circumstances such as the change in scope of the scheme and the current hourly timetable in operation which have an impact on demand forecasts and project cost. The EqlA will also need to be updated.
- **Public Consultation** – Prior to the planning application, a public consultation should be undertaken to obtain feedback on the proposals.
- **Planning Application submitted** – The planning application should be submitted to the planning authority in order to gain the necessary approval to build the new station, Park and Ride and highway access.
- **Ecology Surveys** – The permitted summer season to undertake species surveys should be utilised to undertake surveys to confirm if the site for the proposed station and Park and Ride contains any protected species.
- **Contracting Strategy** – The contracting strategy for the scheme needs to be agreed prior to the commencement of GRIP 5.
- **Land Negotiations** – A number of pieces of land will need to be purchased from private owners in order to provide the new station and Park and Ride. Early negotiations may negate the need for compulsory purchase orders.
- **Detailed Design** – Further design work will need to be progressed on both the station platform and railway elements as well as the Park and Ride and revised highway access. This will need to take account of comment received on the AIP design and as part of the planning consent.

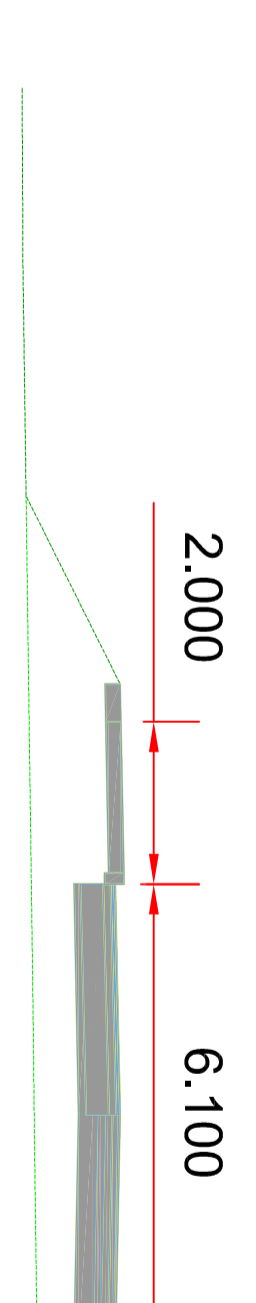
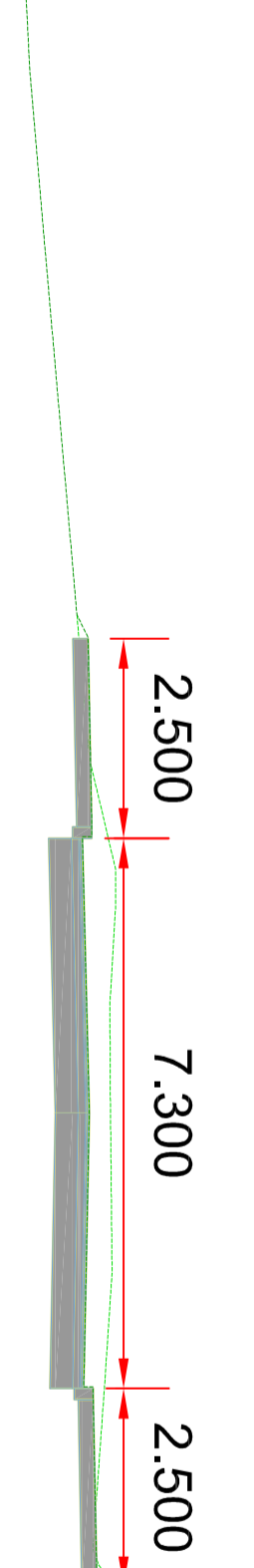
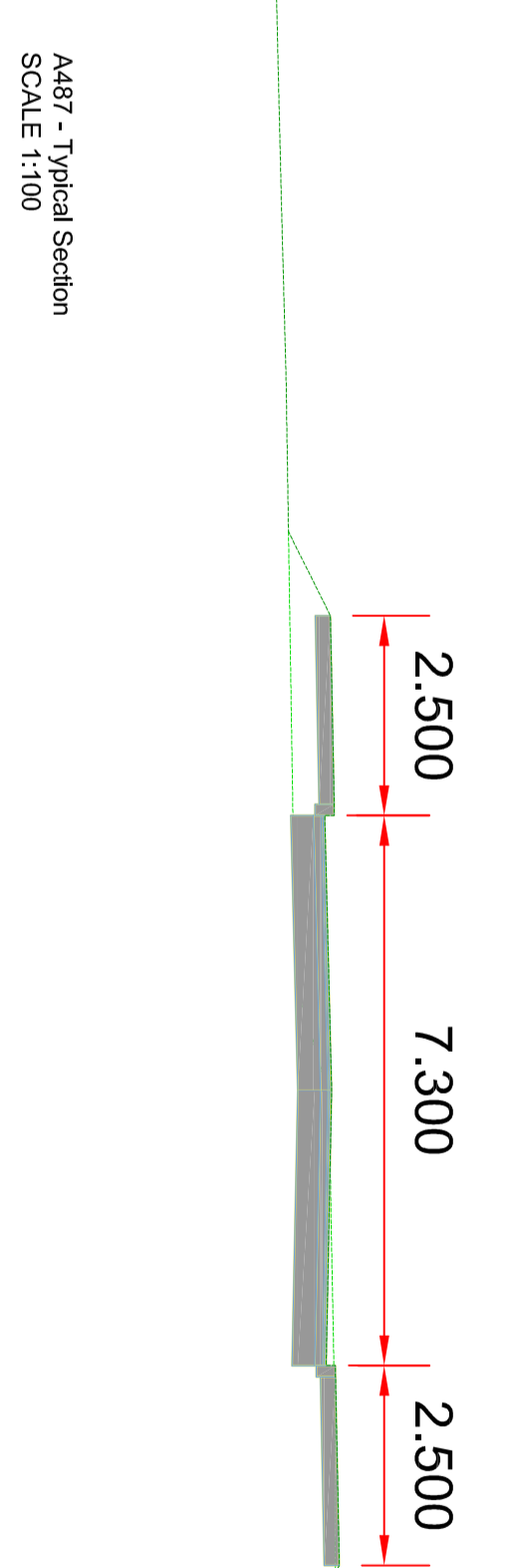
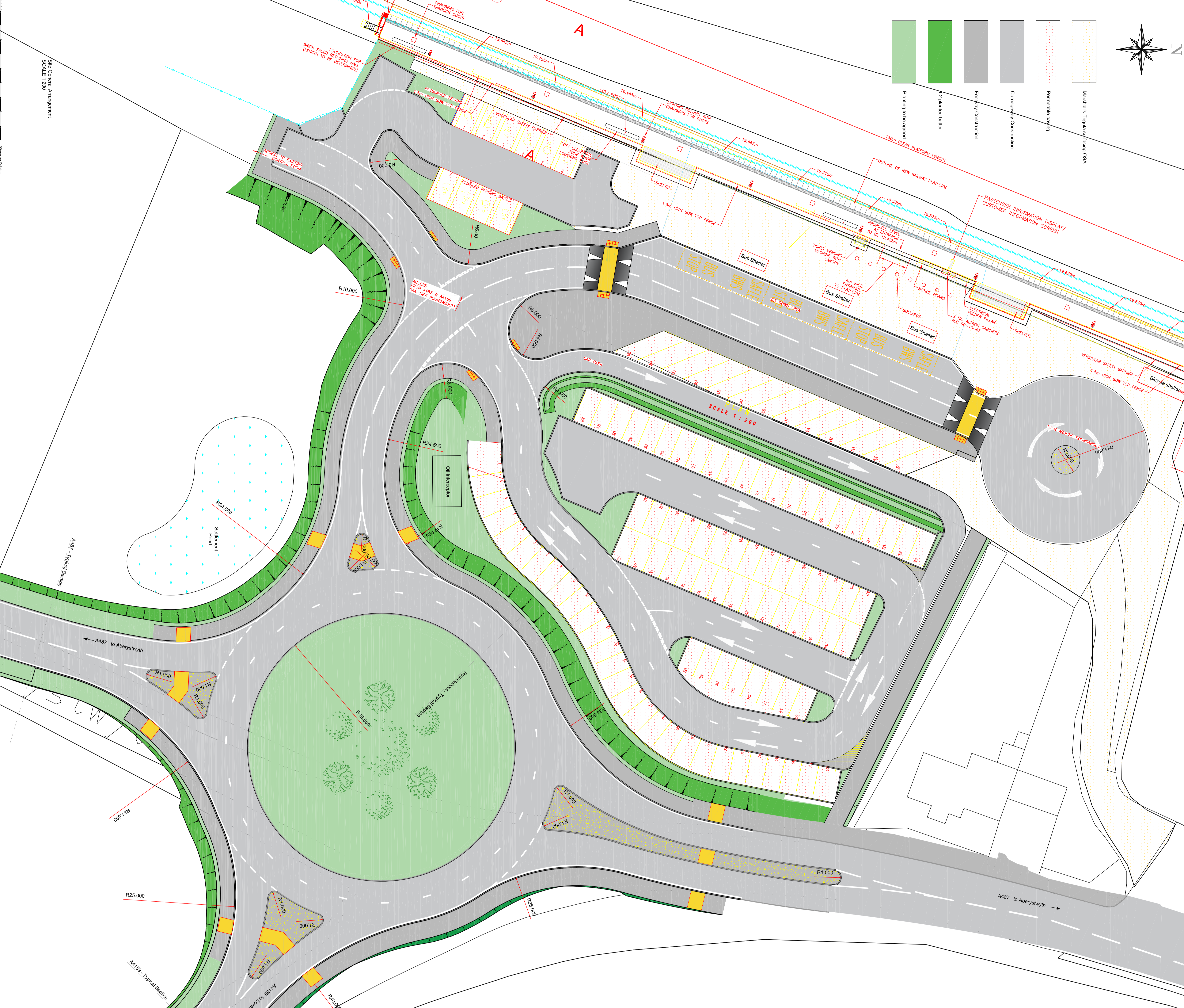
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## Appendix A – General Arrangement





-  Manureira Regra eplanado OSA
-  Permeable paving
-  Carriageway Construction
-  Footway Construction
-  1/2 garden lawn
-  Paving to be agreed



 <b>Engineering Design Services</b> 1155 East Main Road, Clonilla Park, Clonilla NSW 2171 02 9321 5723   <a href="http://www.edesignservices.com.au">www.edesignservices.com.au</a>		<b>Bow Street Station</b> Intermodal Facility Preliminary Design General Arrangement		<b>ED3251</b> 01 PD 08 SHOWN	
Project: Bow Street Station Intermodal Facility Client: NSW Government Date: 15/08/2018	Design: [ ] Check: [ ] Approve: [ ]	Drawn: [ ] Checked: [ ] Approved: [ ]	Scale: [ ] Date: [ ]	Sheet: [ ] of [ ]	Total: [ ]

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**Notes**

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## Appendix B – Cost Estimates

**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision	A	Estimate Stage	3	Station works only
Estimate Date	17-Mar-16	Price 'Base date'	Mar-16			
Anticipated Start Date	01-Jan-18	Anticipated Finish Date	Dec-18			
Project No.	CS/083886					
Project Title / Location	Bow Street Station					

WBS	Estimate Breakdown	Value	Escalation (Y/N)	%age of Point Estimate	Remarks
	<b>Contractor's direct costs -</b>				
10	Signalling	69,399	Y		
20	Electrification & Plant	22,575	Y		
30	Track	250,446	Y		
40	Telecoms	194,557	Y		
50	Operational Property	-	Y		
60	Structures	167,899	Y		
70	General Civils	228,966	Y		
80	Utilities	7,000	Y		
	Contractor's Base Construction Cost inc OH&P: Sub-Total A	940,843.14			
	<b>Network Rail's "direct costs"</b>				
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 0 - 2
tbc	NDS - Fleet		Y		Generally within the rates (direct costs) at Stages 0 - 2
tbc	- Engineering trains		Y		Generally within the rates (direct costs) at Stages 0 - 2
tbc	- Tampers		Y		Generally within the rates (direct costs) at Stages 0 - 2
tbc	NDS - Possession / Isolation Management				
	Sub - Total B	-			
	Total Base Construction Cost inc OH&P: Sub-Total C (A+B)	940,843		0.00%	
	<b>Contractor's indirect costs</b>				
tbc	Preliminaries	224,565	Y		
tbc	Design	118,443	Y		
tbc	Testing & Commissioning	50,332	Y		
tbc	Training		Y		Generally within the rates (direct costs) at Stages 0 - 2
tbc	Spares		Y		Generally within the rates (direct costs) at Stages 0 - 2
tbc	Other		Y		
	Sub - Total D	393,339			
	<b>Total Construction Cost E (C+D)</b>	<b>1,334,182</b>			
	<b>Network Rail's indirect &amp; other costs</b>				
tbc	Network Rail Project Management, (COWD)		N		To be advised by NR; Apportionment of GRIP 1 cost
tbc	Network Rail Project Management, (forecasted remaining costs)	141,126	Y		To be advised by NR
tbc	Compensation charges (TOC & FOC), (costs from NDS)	182,361	Y		Calculated as 15% of construction costs. Allowance for disruptive possession
tbc	DCO Charges	0%	Y		
tbc	Land / Property Costs & compensation	0.00%	Y		
tbc	Escalation (see Note 1)		NA		See Note 1
tbc	Other ( State )				
	Sub - Total F	323,487			
	<b>Point Estimate - Sub - Total G (E+F)</b>	<b>1,657,670</b>			
	<b>Uplift for Risk and Contingency</b>				
tbc	To Mean (see Note 3)	£			See Note 3
	<b>Project Budget (Point Estimate + Uplift to Mean)</b>	<b>1,657,670</b>			<b>for Project Manager's reference</b>
tbc	QRA Value - at P50 (see Note 3)	£			Sponsor to advise if P50 or P80 value shall apply See Note 3
tbc	QRA Value - at P80 - incremental on P50 value (see Note 3)	£			Sponsor to advise if P50 or P80 value shall apply See Note 3
tbc	Adjustment for residual factors (see Note 2)	% 40%	663,068		Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
	<b>Project Anticipated Final Cost (AFC)</b>	<b>2,320,737</b>			Authorised AFC
	<b>Other Costs to the Customer</b>				
tbc	Allowance for Escalation (see Note 1)				See Note 1
tbc	Allowance for Network Rail Fee Fund	5%	116,037		Emerging cost basis
tbc	Allowance for Industry Risk Fund	2%	46,415		provided by Sponsor
tbc	Allowance for Insurance Top-up				
	<b>Cost to Customer</b>	<b>2,483,189</b>			

APPROVAL & ENDORSEMENT		
Estimate Produced by :-	Estimate Approved by (Network Rail) :-	Estimate Endorsed by (Network Rail) :-
Name :- G Knight		
Company :- Capita Symonds		
Position :- Principal QS	Estimator / Senior Estimator	
Signed :-		
Date :- 17/03/2016	Estimating Manager	

**Notes:-**

1. Escalation will only be included within the Project Anticipated Final Cost (Project AFC) where the Project AFC is in excess of £50m and where the site works will be over 2 years duration; escalation shall be calculated using RPI indices from the estimate 'base date' to the mid-point of the construction phase

2. An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating and Supplementary Note (dated 18th March 2010). The basis for applying the uplift value seen herein is as follows:

3. The project team or Risk & Value Manager should provide the the values for uplifts to Mean, P50 and P80. The uplifts to Mean and P50 should be entered in the spaces provided; the incremental value to P80 (beyond P50) should be shown in the box provided (ie P80 value - P50 value)

**Estimate Summary Report – A487/A4159 Roundabout and the Park and Ride Car Park and Access Road serving the Railway Station.**

	<u>Cost Estimate for Bow Street Station</u>		
<u>SERIES</u>	<b>A487/A4159 Roundabout</b>	<b>Park and Ride Car Park &amp; Access Road to the Station.</b>	<b>Total</b>
S100 - Preliminaries	50000.00	100000.00	150000.00
S200 - Site Clearance	5000.00	200000.00	205000.00
S300 - Fencing	5000.00	5000.00	10000.00
S500 - Drainage	50000.00	95000.00	145000.00
S600 - Earthworks	60000.00	100000.00	175000.00
S700 - Pavements	260000.00	426000.00	686000.00
S1100 – Kerbs & Footways	32000.00	85000.00	120000.00
S1200 – Signs & Markings	15000.00	8000.00	23000.00
S1300 Lighting Columns	50000.00	60000.00	115000.00
S1400 Electrical Work	10000.00	12000.00	22000.00
S2700 Accommodation Works	40000.00	25000.00	65000.00
S3000 - Landscaping	15000.00	25000.00	40000.00
<b>TOTAL</b>	<b>615000.00</b>	<b>1141000.00</b>	<b>1,756,000.00</b>
Design and Supervision Costs			200,000.00
Uplift for Risk and Contingency 30%			586,800.00
Final Estimated Cost of Scheme			<b>£2,542,800.00</b>

Land and compensation costs are excluded

Ref:	<b>CS/083886/SIG</b>
Version:	2.0
Date:	17/03/2016

## Appendix C – Risk Register

Bow Street Station Risk Register

Risk ID	Status	Category	Risk / Issue / Assumption / Exclusion	Title	Description	Impact Description	Mitigation Action	Likelihood	Cost Impact	Prob*Cost	Comments
B1	Active	Planning & Consents	R	Planning Consent	Planning Consent will be required for construction of the station	Planning consent may not be granted or may be granted with conditions which increase cost/time	Early discussions with Planning Authority	1	1	1	Meetings held with CCC Planners by CCC design team
B2	Active	Planning & Consents	R	Drainage	No sewer. Risk that soakaways do not work, therefore having to connect to the attenuation pond or river	Greater design work required and increased cost	Drainage solution to be identified and consents obtained	3	1	3	
B3	Active	Planning & Consents	R	Flood Risk	Part of the site is shown as prone to flooding on the EA flood map. Access will need to be retained to station if car park floods	Flood Risk report and/or mitigation measures	Flood maps are only indicative. FCA is being undertaken by CCC	2	2	4	FCA currently being undertaken. Access to the station would be maintained via pedestrian route being provided along the existing highway access.
B4	Active	Planning & Consents	A	Compliance with Standards	Assumption - Station design will be compliant with all standards requirements inc. Railway Group Standards (RGS) , Network Rail Company Standards (NR), Equalities Act and Common Safety Standards if Network Rail are to undertake work on the crossings. Potential for interoperability issues	If compliance not possible (or possible at economic cost) derogations/dispensations may be required	Identify list of potential non compliances/dispensations				
B5	Active	Statutory Undertakers	R	Statutory Undertakers Apparatus	Potential SU apparatus - (inc Electricity cables on telegraph poles cross site)	SU apparatus may be present which may have to be moved	Stats information has been gathered by CCC for proposed site. NR stats requested and will be considered in the design	2	2	4	
B6	Active	Statutory Undertakers	A	SU connections	Connections for Power and Telecoms. Some suppliers within the area (BT and Scottish Power) have been identified as being difficult to liaise with and slow to provide required connections	Assumed that connections to power and telecoms will be straightforward as close to residential properties and that suppliers will work with project parties	Contact SU to establish where connections will need to be made. Early warning of required works to those suppliers who have poor track record				
B7	Closed	Site Investigation	R	Topographic Survey	Topographic Information	May increase size of embankments and/or affect design/land requirements. Increased fill may be required for at grade design	Topographic survey has been undertaken	2	1	2	Topographic survey been undertaken on highway elements and on railway elements
B8	Active	Site Investigation	R	Ground Investigation	GI information for park and ride site only, not station platform site. GI information shown poor ground in area near fence line to station area and that water table is high	May affect foundation requirements for platform/and or affect design. Oil interceptors required within drainage design to prohibit any potential contamination to water table. Building up maybe required for soakaway drainage design. Costs to the scheme may increase to accommodate these design factors	Engineering options developed to accommodate poor ground e.g. geo grids or piling. Oil interceptors, building up and potential attenuation pond included in soak away drainage design	3	2	6	Further GI to be undertaken on exact station platform location to confirm ground conditions.
B9	Active	Site Investigation	R	Potential Land Contamination	Assumption - No significant contamination. Brownfield site. Currently used for storing caravans (recent incident of fire at site). Former uses unknown.	The results of the soil analyses have shown some minor areas of contamination by PAHs and asbestos. These are along the western boundary of the site adjacent to the railway line. As these locations are to be underneath the railway station, there is no pathway. Increased cost if contamination found.	Care will need to be taken during the construction phase that the contamination is not released to the environment, or that workers are exposed to it.	3	2	6	Desktop study and sampling been undertaken on park and ride site (as close as possible to the rail site)
B10	Active	Site Investigation	R	Ecology	Potential for protected species/invasive plants. Large amounts of Japanese Knotweed known to be present on site. Protected species surveys yet to be undertaken (can be started in May).	Increased costs for translocation of protected species and or treatment of invasive plants. Also potential impact on programme for construction.	Knownweed will be treated and buried on site as part of the works. A root barrier will be implemented under the car park. Species surveys to be started in May (if funding for next stages available), desktop work already undertaken.	3	2	6	
B11	Active	Land	R	Land ownership - Railway Land	Land adjacent to railway understood to be owned by Network Rail. Ownership of land for park and ride car park understood to be University. Future ownership would need to be agreed and existing lease terminated	Potential cost of acquiring land/agreeing land ownership	Undertake discussions with NR. Initial discussions by CCC with park and ride landowners appears positive.	1	2	2	Land assumed to be retained by NR
B12	Active	Land	R	Land purchase / CPO	CPO required to acquire field unless land acquired by agreement	Increased cost and time for land acquisition	Undertake early negotiations with land owner. Initial discussions by CCC with park and ride landowners appears positive	1	2	2	Discussions held with Aberystwyth University
B13	Active	Highway	R	A487 (T) Access	Improvements to existing access to station site. New roundabout highway access at junction of A487 (T) and A4159. Approval of Welsh Government required to change	Increased cost if further highway works required/land acquired. Welsh Government not approving highway design	Initial discussions have been undertaken by Ceredigion CC and Welsh Government and further design discussion meeting scheduled	1	3	3	
B14	Active	Permanent Way	R	Track works/Station Gradient	Track design based on 1 in 300 option. Additional cost/works to achieve 1 in 500 desirable.	Additional permanent way costs and increased possession requirements	Some leeway to move station platform. Assessment by Network Rail Asset Engineer if movement required	2	2	4	Subject to Network Rail accepting 1 in 300.
B15	Active	Possessions	R	Possession working costs	Possession working required for platform construction and any permanent way works. Disruptive possessions may be required	Increased costs if disruptive possessions required if 'white periods' insufficient. However possible time saving to works	Construction/Possession strategy to be identified at the earliest opportunity. Disruptive possession require min 18 months notice	1	2	2	
B16	Active	Highway	A	Accidental obstruction	Assume rail / road incursion will need to be addressed as at grade platform / highway access. Crash barrier and bollards to be provided	Crash Barrier provided within Design. Possible increased cost to scheme	Crash barrier and bollards provided within design				
B17	Active	Operations	A	Cambrian Timetable / Network Change	Assumed that Station stop can be accommodated within the Cambrian (hourly) timetable. Assume train operating company agreement will be gained before Network Rail can take change forward	Potential for further infrastructure works to mitigate against impact of stopping services	Timetable assessment work has reported to the Minister				
B18	Active	Telecoms	A	GSM-R Mast	The GSM-R mast is located outside the footprint of the station (design retains NR vehicular access to southern end of site)	Local redesign required if clash with GSM-R mast. Possible loss of parking. Need to ensure avoid any cables to mast when constructing access road.	Undertake topographic survey as above. NR stats provided for cables to mast.				
B19	Active	Land	R	Compensation	Residents may bring Part 1 or Nuisance claims post construction	Costs may incur dealing with Part 1 or Nuisance claims post construction	Noise impact work being undertaken, including noise surveys to establish impact. Mitigating measures will be developed if appropriate within design	2	2	4	Noise modelling work being undertaken
B20	Active	Telecoms	R	Car Park CCTV costs / Provision of CCTV in Car Park	A future operator of the car park CCTV is yet to be identified	No CCTV at station car park, impacting on user perception of safety at the facility	Investigation to be undertaken by CCC design team into options for implementing CCTV within the car park	2	2	4	
B21	Active	Park and Ride	R	Bus Services	Failure to tie in with local bus services to call at station site. Funding for dedicated park and ride service	Lack of co-ordination between bus services and rail timetable could reduce usage and station patronage	Early discussions with bus operators / Identification of connecting services	2	2	4	Work undertaken by CCC to identify services
B22	Active	Operations	R	Cambrian Timetable - Cross party working within Train Operating Company	One division of the Arriva Trains Wales progressing timetabling works to establish if station can be accommodated. Another division providing input and support to a new station	Potential conflict of interest for train operating company if timetable work is not favourable	Current timetable work ongoing with cross party communication. Instruction provided by Welsh Government to assume at this stage that a station can be accommodated at Bow Street	1	1	1	
B23	Active	Operations	R	Driver Training	Driver training - ensuring all drivers are trained before station opening. Cost to undertake driver training	Not enough drivers are trained before station opens	Driver training will be via DVD / presentation and should not be over complicated	1	1	1	
B24	Active	Operations	R	Updating Ticket and Timetable Information with New Station	Ensuring all ticket and information services information is updated with new station before opening. Codes required by train operating company before update can be undertaken	Codes not received in time by train operating company and delay in recording information system updates	Bow Street will be CS (text to speech so easy to update). PA where present at each connecting station will need updating as will information service on 158's (information needs recording)	1	1	1	
B25	Active	Operations	R	Signalling Changes	Potential changes required to level crossing striking points and assessment of impact on ERMS required	Potential for impact and changes required to the signalling from new station	Network Rail undertaking signalling assessment work to establish required impact from new station	2	3	6	
B26	Active	Operations	A	Rubbish Collection	Assume collection of rubbish from station platform will be undertaken by Train Operative Company	Uncollected rubbish could cause environmental issue	Rubbish will be collected by Arriva Trains Wales mobile team	1	1	1	
B27	Active	Operations	R	Fire regulations	Design will have to pass Arriva Trains Wales assessment for fire regulations	Not passing fire regulations assessment	Early input of Arriva Trains Wales in design process to ensure will meet fire regulations	1	1	1	
B28	Active	Operations	R	Light pollution in a rural area	New park and ride and station could have potential to generate light pollution	Light pollution negatively impact on local wildlife e.g. bats	Lighting design to be reflective of conditions. For example LED lighting to be utilised which can be fully controlled and gradually dimmed. PIR system to be used on platform lighting, allowing lighting to go on and off based on platform activity, lighting to be switched of 30 minutes after last train has left station	1	1	1	

**QUALITATIVE PROBABILITY MATRIX**

**Likelihood**

The following table shows the Likelihood score that is to be attributed to each Risk dependant on the Workshop's assessment of the Probability of the occurrence of the event.

Probability			Likelihood	Description
1%	to	40%	1	Unlikely
40%	to	60%	2	As Likely As Not
60%	to	99%	3	Probable

**Cost**

The following tables show the Cost Impact scores that are to be attributed to each Risk dependant on the Workshop's assessment of the cost and programme effects of the occurrence of the event.

COST IMPACT			Impact Score
£1	to	£60,000	1
£60,001	to	£125,000	2
£125,001	to	£1m+	3

**IMPACT CLASSIFICATION MATRIX**

	Low	Med	High
Low	1	2	3
Med	2	4	6
High	3	6	9

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