Technical Report

Bristol New Stations High Level Assessment Study – Ashton Gate

Prepared for

Bristol City Council

November 2014

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SECTION 1

1. Introduction

1.1 Background

A number of initiatives are on-going that will see major rail developments around Bristol, in particular electrification of the Great Western Main line and upgrades of Temple Meads Station. Also, following two Direct Award extensions to the Great Western passenger rail franchise, the current operator (First Great Western) will remain in place until at least March 2019. The longer-term future of this franchise and how it operates is to be determined. In conjunction with these initiatives, the West of England Area Rail Studies packaged proposed a series of local rail enhancement schemes. This was initially known as the 'Greater Bristol Metro', subsequently renamed MetroWest.

The four West of England authorities (North Somerset, Bristol City, Bath & North East Somerset and South Gloucestershire Councils) are jointly promoting MetroWest, which includes:

- MetroWest Phase 1 – half hourly train services for the Severn Beach line, local stations between Bristol Temple Meads, Bath Spa and Weston-super-Mare (Bedminster and Parson Street) and the reopened Portishead line, including stations at Portishead & Pill;
- MetroWest Phase 2 – half hourly train services to Yate and hourly services on a reopened Henbury line (capacity for two new stations) with (at the time of writing) potential additional stations at Horfield and Ashley Down; and
- A range of smaller projects including additional potential station (re)openings.

Bristol City Council has appointed CH2M HILL to progress work on future development of potential new stations in the city that are identified as part of MetroWest Phase 2 and the New Stations Package. One of these potential new stations is located at Ashton Gate (which would be on the, to be reopened, Portishead line). The potential location of the station is shown in Figure 1-1.

Note that Ashton Gate station lies outside of MetroWest Phase 1 and is part of the New Stations Package for station schemes that could come forward subject to a business case and funding. MetroWest Phase 1 will be future proofed to enable Ashton Gate station to come forward when the funding and business case allow.

1.2 The Study

A High Level Assessment has been carried out, to understand the station locations and potential designs, and potential demand for the stations. There are two key elements to the study, including:

- Station location and design – outline design concepts for the station, including key elements such as platform locations, access to the station from the highway network (for pedestrians – it is understood that no car parking is to be provided) and access to platforms, with initial cost estimates based on benchmarking with other new stations; and
- Demand analysis – demand forecasts and initial assessment of economic benefits. This builds on demand forecasting work undertaken as part of the West of England Rail Studies, improving the rigour of the forecasts. Output from demand forecasts are used to generate an initial set of economic benefits, considering issues such as levels of demand, impact on highway congestion, impact on other PT modes and overall time savings for all transport users.

This report

After this introduction there are four further chapters in the report:

- Chapter 2 discusses the location and preliminary design and outline cost of a station in this location;
- Chapter 3 sets out demand forecasts that have been developed for the potential new station, including broad economic assessments; and
- Finally, Chapter 4 draws together the study's findings in the form of a summary and conclusions.

Appendices include:

- A – Economic assessment tables

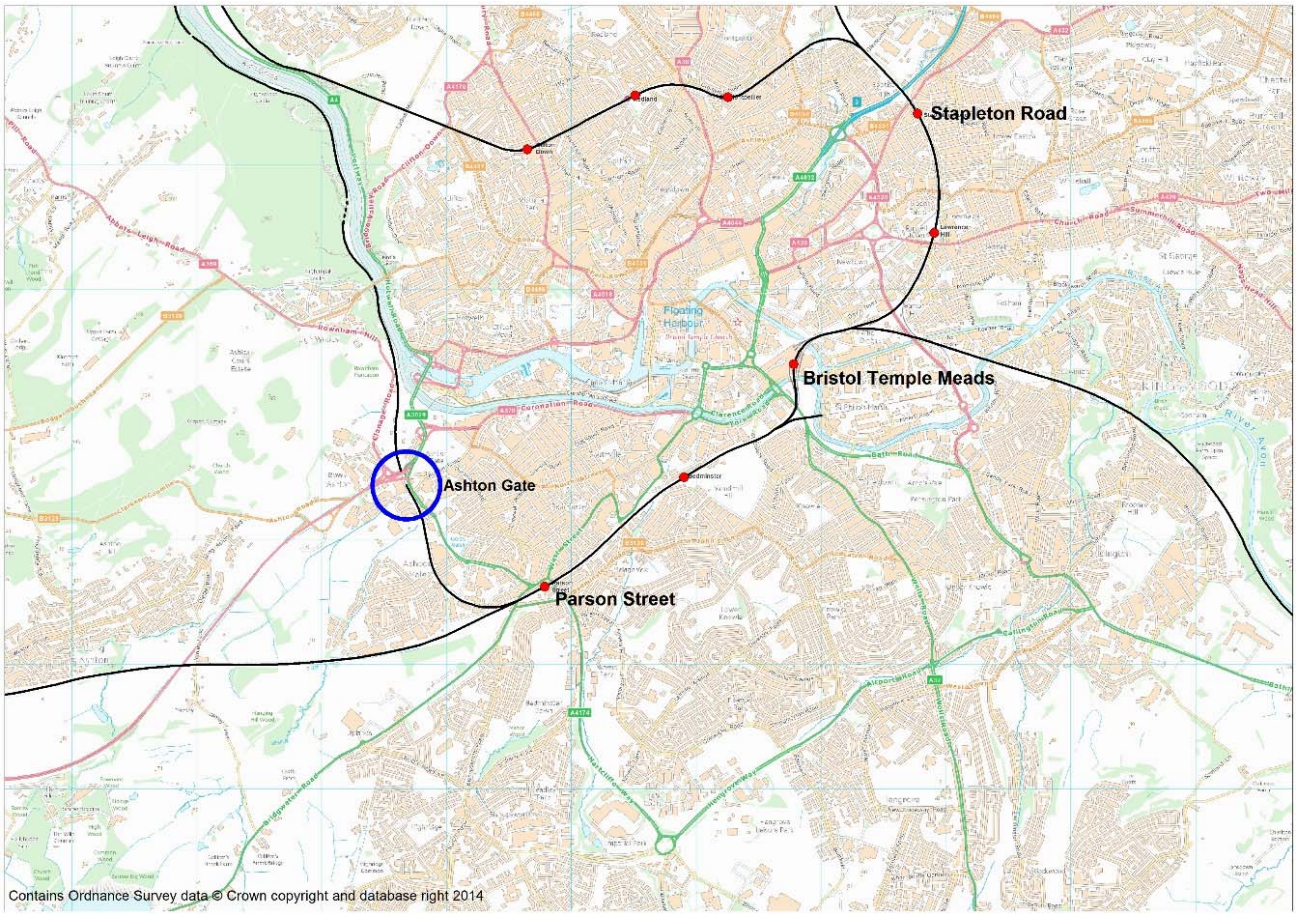

Figure 1-1: Locations of potential new station sites

SECTION 2

2. Ashton Gate station

2.1 Location

This section of the report briefly describes the engineering issues and outline designs for a potential station location at Ashton Gate. The broad site location is shown in Figure 1-1, and is located on the south-western edge of the city of Bristol, some two miles from the city centre and Temple Meads railway station. The site for the station is located parallel to Winterstoke Road and can be accessed through Barons Close, as shown in Figure 2-1. The existing railway through Ashton Gate currently is freight only, serving the Port of Bristol at Portbury. Re-opening of the Portishead line for passenger services will result in the line becoming a mixed traffic route (freight and passengers), and moreover comprising of two tracks (there is currently only one in this location). The installation of the second track is part of the Portishead re-opening, and as such is in the infrastructure baseline for an Ashton Gate station.

Figure 2-1: Ashton Gate potential station site

2.2 Design/Cost

2.2.1 Station requirements

The station design considered in this study is based on a series of basic assumptions and inclusions in terms of station facilities, as follows:

- Two single faced station platforms, each 100m long;
- Sheltered waiting areas (using a basic bus shelter type);
- Platform seating;
- Provision for long line public address (LLPA) system, customer information system (CIS), closed circuit television cameras (CCTV) for security and operations and customer 'Help Points';
- Fully lighted platform;
- Automatic ticketing machines;
- Storage space for platform maintenance and small office with single male female toilet;

- Cycle spaces;
- Basic vehicle access – drop-off/pick-up area for taxis and cars including turning area if appropriate and possible (no station car parking);
- Station to be fully DDA compliant;
- Station design to general guidelines in SRA "New Stations A guide for Promoters"; and
- Fencing.

Initial Site Selection

A desktop study of the site location was undertaken using Google Earth, OS mapping, the NR Sectional Appendix, 5 Mile diagrams and Quail maps. Additionally, a site visit was undertaken to get a general impression of the proposed station location. The initial site selection was based on five major criteria:

- Land availability;
- Size of station, including construction footprint;
- Accessibility;
- Permanent way factors, such as alignments, switches & crossings, etc; and
- Environmental factors.

Barons Close is proposed as the access for the station and where the associated drop off/pickup area, taxi rank and bus stop would be constructed. Note though that, in general, there are no major earthworks for the erection of the station footprint including its operational facilities. Initial potential issues are highlighted from desk study:

- The area in the yellow box in Figure 2-2 indicates an area of woodland/trees that could be fully or partially cleared to allow construction works and to form the permanent footprint for the development. Removal of natural woodland could be contentious and will require local council approval. Seasonal restrictions on tree removal during nesting period may also apply. Organisation of mitigation measures may include, responsible disposable/recycling of material, where possible considering use of community involvement projects with artists, schools or local project groups to use waste material for local benefit. This method is likely to improve local relations and local acceptance of the project. However, Option 2b (only) potentially involves use of an area of local community allotments to construct an access road. This is likely to be a large risk to the project in terms of community acceptance.
- Note that research into the existence of invasive plant species or protected wildlife in this location is not accounted for at this stage/desktop study. Whilst this is highlighted as a potential risk area is largely surrounded by industrial buildings with direct impact on residential housing and the local community may reduce the realisation of this risk item.
- Additional traffic usage will be incurred from the use of the station on the surrounding road network. This influence on local services may merit further consideration if deemed significant. Community benefits for improved transport networks and favourable localised economy are likely to offset local community concerns.

Figure 2-2: Possible station access area

Other areas should be assessed, and appropriate mitigation developed, in any subsequent more detailed design work:

- Ecology & Nature Conservation;
- Historic Environment;
- Townscape & Visual Amenity;
- Water Resources;
- Noise & Vibration;
- Air Quality;
- Geology, Soils & Land Contamination;
- Resources Use & Waste Management;
- Traffic & Transport;
- Socio-Economic Impacts;
- Cumulative impacts with other developments; and
- Third party land and access issues/requirements.

Existing Conditions and Site Visit

The future station location will be south of Barons Close pedestrian level crossing (LX) in a rather commercial area to its east and allotments/ green field to its west. It is located on ELR (Engineer's Line Reference) POD at approximately 121M 00ch (middle of platform), near Ashton Gate football ground. The existing (single) line is bi-directional. During the site visit it was established that the topography around the proposed station location is essentially flat, i.e. there are no embankments or cuttings. The LX is at the end of a 750m curve coming from the north leading into a 200m long straight. See Sectional Appendix extract in Figure 2-3 also showing details of the PRR scheme for more information. The track in the area of question looks in a sound condition, the rails (113A) are on steel sleepers, they are continuously welded (CWR) and fixed with clips. There is no 5 Mile diagram of the proposed station site.

This scheme is not based on the existing conditions but on the future conditions after the implementation of Portishead re-opening. All of the options considered include two single face platforms either side of the rail lines. An island platform has not been considered as this would involve substantial re-alignment works for both lines. Within the Portishead re-opening project the Up Portbury line will be extended to close to Clifton Bridge No. 1 tunnel, turning the proposed station location from a single into a double track area. The existing turnout will move to the north and therefore not be an obstacle for the proposed station. For structural clearances and ideal stepping distances the proposed station is located alongside the straight stretch of alignment mentioned further above.

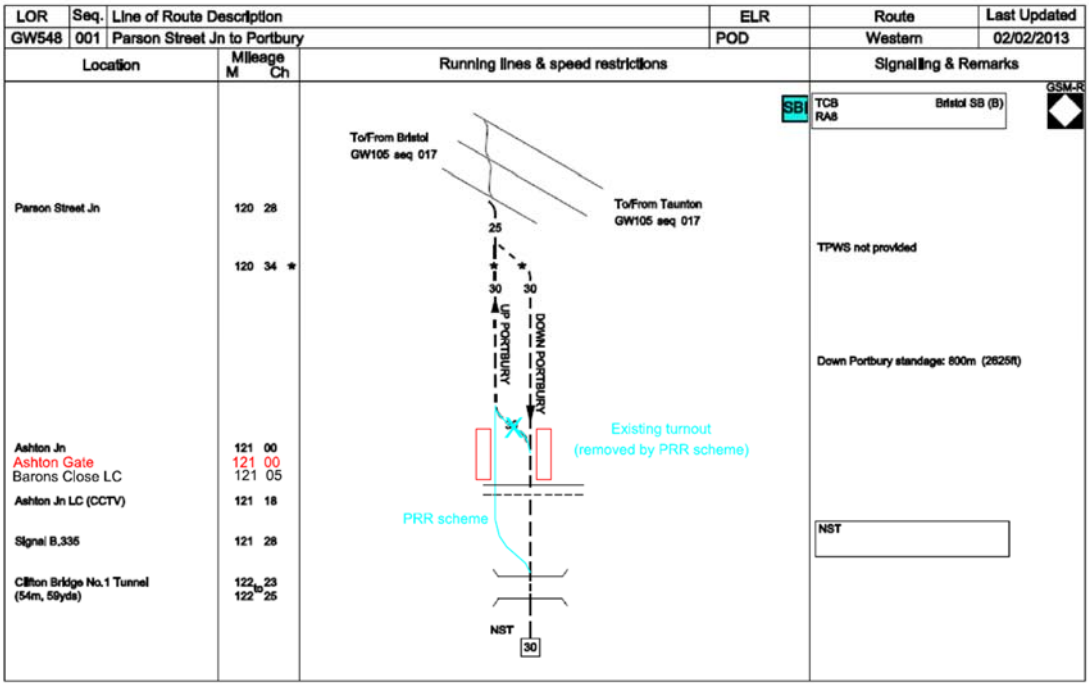

Figure 2-3: Sectional Appendix extract showing proposed Ashton Gate station location based on PRR scheme

2.2.2 Station design

The Ashton Gate station scheme would not be based on the existing conditions but on future conditions after the Portishead line is re-opened for passengers. No detailed alignment design for the Portishead line scheme has been available for this project, though as noted above, double-track will be extant at the Ashton Gate station site. As such, an indicative double track alignment (based on the previous Portishead GRIP 3 studies) has been used as the basis. The following assumptions have been made:

- The alignment of both tracks is still straight in the area of the proposed station after the implementation of the PRR project;
- The vertical gradient is less than 0.5% in the area of the proposed station after the implementation of the PRR project. This will have to be confirmed at a later stage by a topographical survey;
- There is no electrification after the implementation of the PRR project; and
- With two tracks there will be no bi-directional traffic.

The following three options were identified:

(1) Station access via Barons Close
(2a) Station access via Barons Close through a level crossing
(2b) Station access via Barons Close through a level crossing & new road via Ashton Drive

Figure 2-4 sets out a proposed station layout with operational facilities (based on the assumptions outlined earlier) for Option 1. Figure 2-5 shows Option 2a (access via Barons Close through level crossing). Figure 2-6 shows Option 2b with access via Barons Close through the level crossing, and Figure 2-7 shows Option 2b via a new road connection to Ashton Drive.

The basic construction cost of the station layouts shown are £2,191,910 (Option 1), £2,191,200 (Option 2a) and £2,541,200 (Option 2b). These costs exclude contingency. [1] [2] [3]

[1] Contingency (of 20% or 40%) is added to total costings later in this chapter. Likewise, non-construction costs (including contractor preliminaries, GRIP stages 4 development costs, GRIP stage 5 detailed design, project management & sponsorship, testing & commissioning, and possession management) are similarly added.

[2] All prices exclude VAT. Rules of the route possessions are assumed. NR asset protection costs included within Project Management, GRIP 4 development, GRIP 5 detailed design and testing and commissioning.

[3] Note that TOC compensation and land acquisition costs are not included. There is also no provision for contaminated waste disposal.

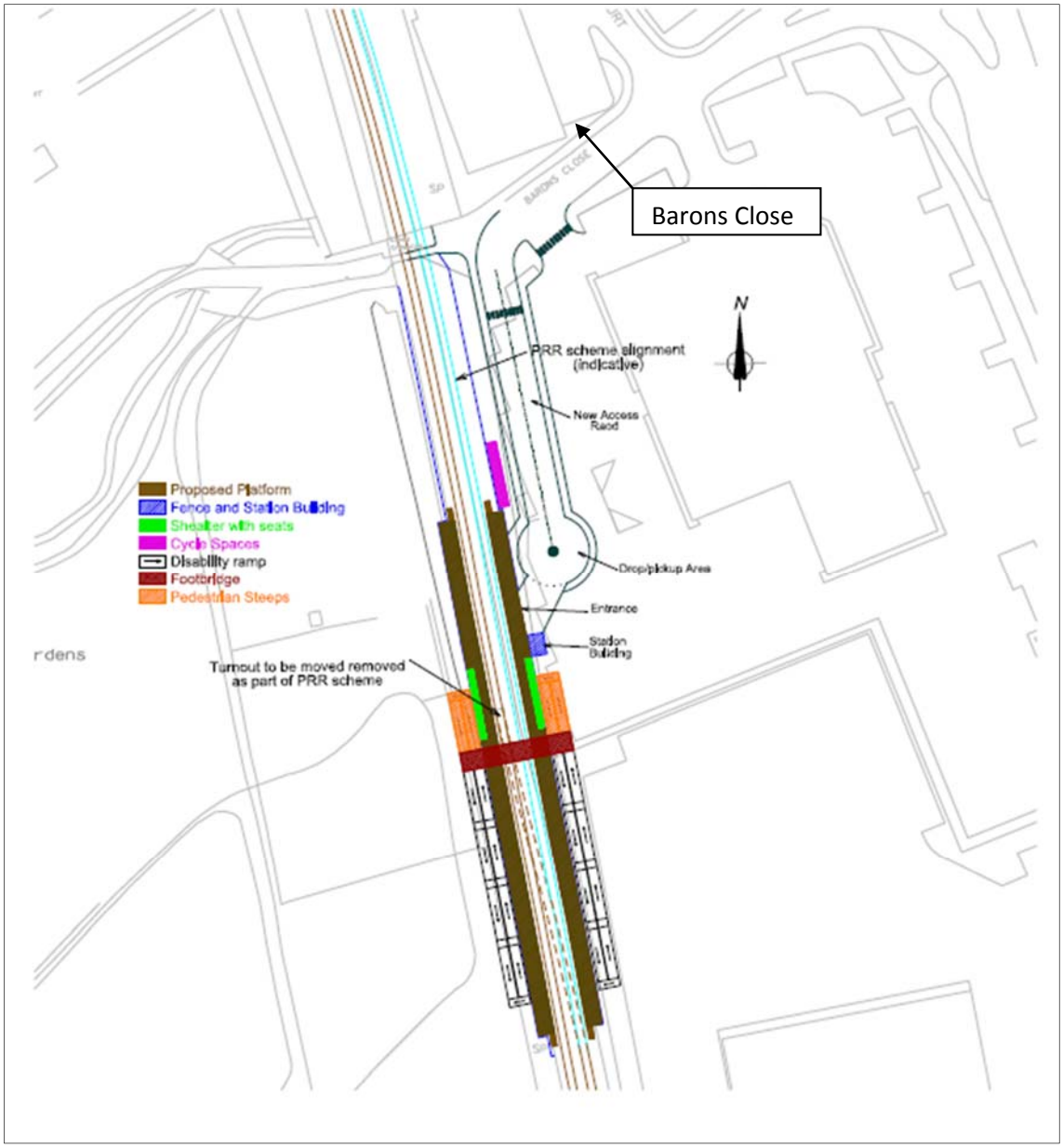

Figure 2-4: Ashton Gate station – layout Option 1

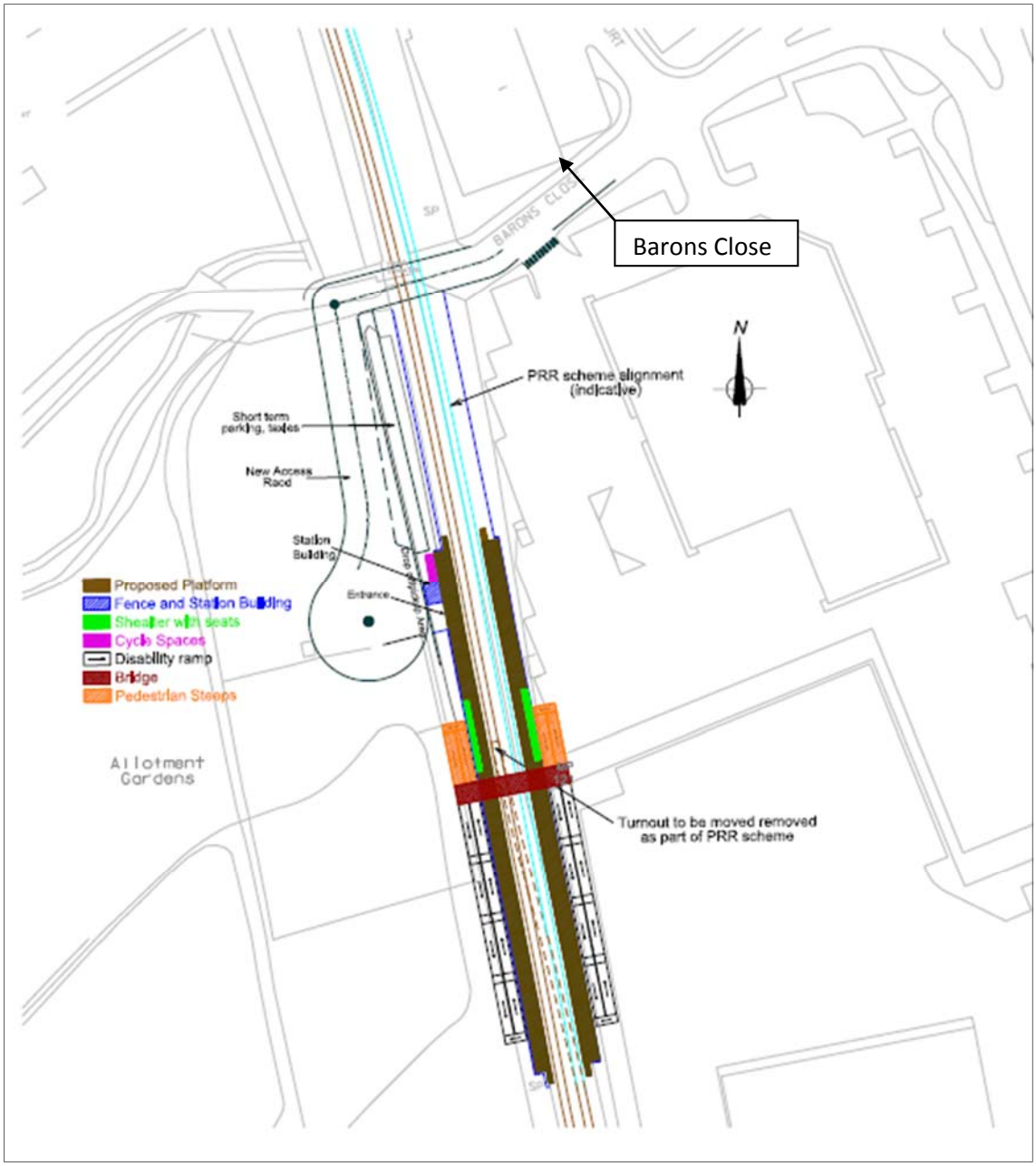

Figure 2-5: Ashton Gate station – layout Option 2a (station layout with turning area)

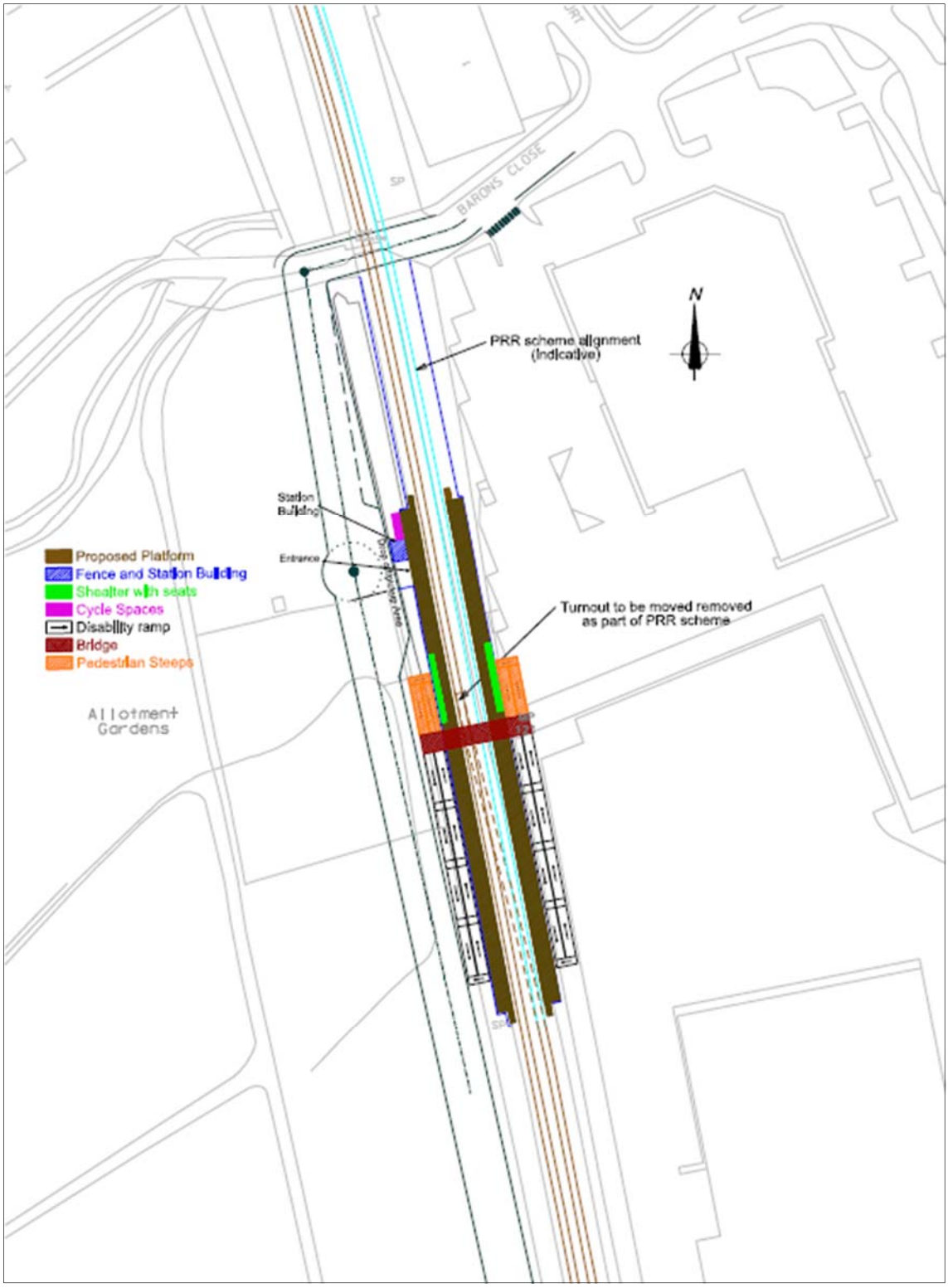

Figure 2-6: Ashton Gate station – layout Option 2b (station layout and new access road)

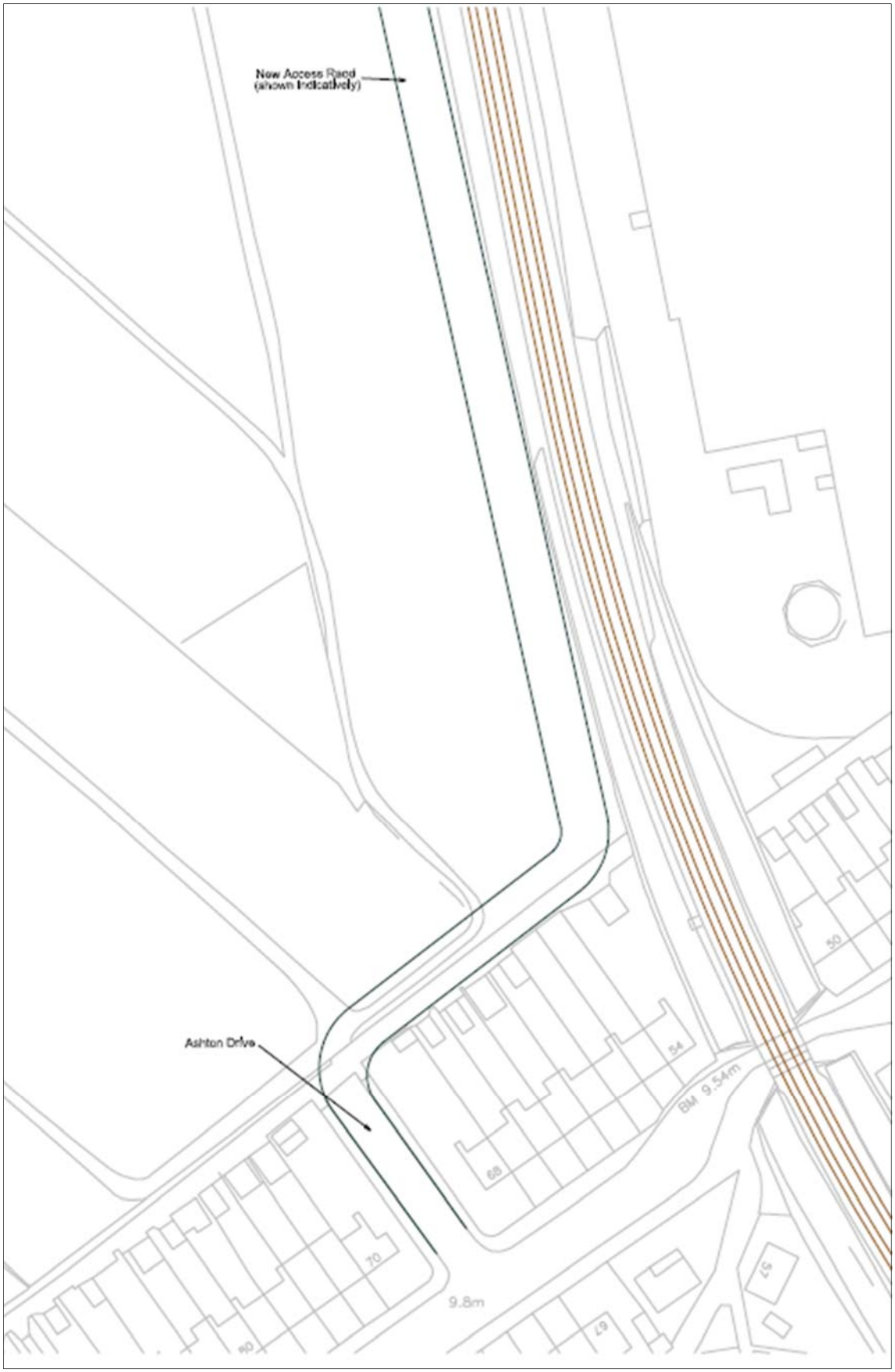

Figure 2-7: Ashton Gate station – layout Option 2b (new access road via Ashton Drive)

2.2.3 Permanent way

No significant costs are envisaged for the Permanent Way part of this scheme. Implementation of Ashton Gate would be after the re-opening of the Portishead line for passenger services, which would enhance the permanent way in the vicinity of an Ashton Gate station. After the installation of the Portishead scheme, the track should be in a decent condition. It is assumed that tamping alongside the future platform is required prior to its installation (plus 30m to either side). The overall cost of this is £11,059 including design but excluding contingency (added later).

2.2.4 Signalling & telecommunications (S&T)

Signalling system arrangements for a station at Ashton Gate, including exact signal positions, will need to be assessed during the GRIP design process (likewise existing track circuit arrangements). The 'Up' and 'Down' lines through the platforms will need to be provided with the associated colour light signalling. For example, new platform end start signals with associated berth track circuits and location cases with power supplies (PSUs) will be required. Any requirement for bi-directional signalling will also have to be examined, though it is assumed that bi-directional running through the station is not required for the purposes of this study.

A red-green signalling scheme plan should be produced for the station signalling area at GRIP 3 stage (option selection). To take account of the repositioning of the existing turnout, the red-green signalling scheme plan should indicate track circuit alterations. A final option will eventually be developed at GRIP 4 stage (outline design/single option development). Signal positions and train stopping point locations will be subject to a signal sighting chairman's recommendation prior to GRIP 5 design.

Signalling and telecoms cost would need to cover adapting the Existing Signalling Scheme plan and master records to provide:

- Platform Starts and berth train detection Up and Down Ashton Gate Platform areas;
- Berth train detection in UP and Down Ashton Gate Platform 1 and 2 areas;
- Platform 1 and 2 S&T Cable Route management systems and locations cases with local signalling and train detection PSUs;
- Preliminary Signal Sighting and Final signal sighting of Platform Starts; and
- Identification of platform stopping positions for the required Rolling Stock.

Both Platform start signals are assumed to require TPWS (TSS-OSS)[4] and overlaps.

Signalling Scheme Plan

Development of scheme plan, then detailed design Location Area plan, wiring diagrams, installation testing and commissioning costs including platform train detection and stopping point arrangements would be approximately £80,000, covering two new platform start signals supplied along with cable route management systems. [5]

To this should be added approximately £5,000 for Signal Sighting (SS) costs using a Signal Sighting Chairman and Committee to produce Prelim Signal Sighting Forms, SS Report, carry out a SS Committee walk through and the final Signal Sighting.

The total cost of signalling & telecommunications design & build changes related to the Signalling Scheme Plan would be some £85,000.

Screen layout & ergonomic train describer modifications

Around £5,000 should be allowed for signalling screen layout changes and ergonomic and train describer mods/considerations at the signalling control centre, so that passenger/operational trains may be observed stopping, entering and exiting the proposed new Ashton Gate platforms. Note though that if other stations were located on a shared line of route and designed for cost efficiencies could be

[4] TPWSS – Train Protection and Warning System; TSS – Train Stop System; OSS – Overspeed Sensor System

[5] Contingency (of 20% or 40%) is added to total costings later in this chapter. Likewise, non-construction costs are similarly added.

achieved by doing all signalling control screen layout changes and train describer based on the all stations final scheme plan and control tables in one go.

CCTV & Help Points

Provision of Customer Information System (CIS), Help Points and Closed Circuit television (CCTV) would require an additional £30,000. This assumes that works placed under Platform Telecoms are for 136m long platforms on both Up and Down Relief lines.

Total S&T cost

The total S&T cost estimated to incorporate Ashton Gate station would be some £120,000 (excluding contingency). Note though that these costs are very preliminary as they are suggested in isolation from any other proposed new stations (such as those included in MetroWest Phase 1 or 2). The separated station signalling design and construction costs for all stations, when added up to form one total, would be reduced if intelligently packaged and programmed as one project (potentially by around 20%).

2.2.5 Total cost of Ashton Gate station

Table 2-1 shows the total costs of developing Ashton Gate station, all three options considered. Note that this table assumes that the MetroWest Phase 2 Project would cover scheme preparation work, so does not include the full array of non-construction costs (including GRIP stages 4 development, GRIP stage 5 detailed design and project management & sponsorship), and also has a 20% allowance for contingency. This is considered a realistic assessment, and has been used in economic assessments.

TABLE 2-1
Ashton Gate – station costs
February 2014 figures

Element	%	1	2a	2b
Construction cost				
Station		£2,191,910	£2,191,200	£2,541,200
Platforms (incl lighting, signage, furniture)		£911,200	£911,200	£911,200
Footbridge, ramps, steps (as appropriate)		£800,000	£800,000	£800,000
Other station costs (fencing, buildings)		£66,500	£66,500	£66,500
Access road, bus turning and cycle stands		£192,710	£182,000	£532,000
Technology (ticket machines, CCTV, PA)		£151,000	£151,000	£151,000
Site preparation, drainage & utilities		£70,500	£80,500	£80,500
Infrastructure & permanent way		£131,059	£131,059	£131,059
Permanent Way		£11,059	£11,059	£11,059
Electrification		£0	£0	£0
Signalling & Telecommunications		£120,000	£120,000	£120,000
Sub-total		£2,322,969	£2,322,259	£2,672,259
Non-construction cost				
Contractor preliminaries	20%	£464,594	£464,452	£534,452
Testing and commissioning	2.5%	£58,074	£58,056	£66,806
Possession management	2.5%	£58,074	£58,056	£66,806
Sub-total	25%	£580,742	£580,565	£668,065
Total cost (excluding contingency)l		£2,903,711	£2,902,824	£3,340,324
Contingency	20%	£580,742	£580,565	£668,065
TOTAL		£3,484,454	£3,483,389	£4,008,389

Notes:

- Includes 20% contingency
- All prices exclude VAT
- Generic cost of land acquisition not included
- No provision for contaminated waste disposal
- Overheads and profit have not been included in the cost estimate
- No provision for TOC compensation
- Rules of the route possessions assumed
- MetroWest Phase 2 project covers Project Management, GRIP 4 development and GRIP 5 detailed design

Table 2-2 shows a worst case assessment of costs, incorporating the full non-construction costs (including GRIP stages 4 development, GRIP stage 5 detailed design and project management & sponsorship) and furthermore with an increase contingency allowance of 40%. This has also been used in economic assessments.

TABLE 2-2
Ashton Gate – station costs
February 2014 figures

Element	%	1	2a	2b
Construction cost				
Station		£2,191,910	£2,191,200	£2,541,200
Platforms (incl lighting, signage, furniture)		£911,200	£911,200	£911,200
Footbridge, ramps, steps (as appropriate)		£800,000	£800,000	£800,000
Other station costs (fencing, buildings)		£66,500	£66,500	£66,500
Access road, bus turning and cycle stands		£192,710	£182,000	£532,000
Technology (ticket machines, CCTV, PA)		£151,000	£151,000	£151,000
Site preparation, drainage & utilities		£70,500	£80,500	£80,500
Infrastructure & permanent way		£131,059	£131,059	£131,059
Permanent Way		£11,059	£11,059	£11,059
Electrification		£0	£0	£0
Signalling & Telecommunications		£120,000	£120,000	£120,000
Sub-total		£2,322,969	£2,322,259	£2,672,259
Non-construction cost				
Contractor preliminaries	20%	£464,594	£464,452	£534,452
GRIP stages 4 development	1%	£23,230	£23,223	£26,723
GRIP stage 5 detailed design	6%	£139,378	£139,336	£160,336
Project Management & Sponsorship	10%	£232,297	£232,226	£267,226
Testing and commissioning	2.5%	£58,074	£58,056	£66,806
Possession management	2.5%	£58,074	£58,056	£66,806
Sub-total	42%	£975,647	£975,349	£1,122,349
Total cost (excluding contingency)l		£3,298,616	£3,297,608	£3,794,608
Contingency	40%	£1,319,446	£1,319,043	£1,517,843
TOTAL		£4,618,062	£4,616,651	£5,312,451

Notes:

- Includes 40% contingency
- All prices exclude VAT
- Generic cost of land acquisition not included
- No provision for contaminated waste disposal
- Overheads and profit have not been included in the cost estimate
- No provision for TOC compensation
- Rules of the route possessions assumed
- NR asset protection costs included within Project Management, GRIP 4 development, GRIP 5 detailed design and testing and commissioning

2.2.6 Advantages & Disadvantages

A brief appraisal of the Ashton Gate station site options is shown in Table 2-3.

TABLE 2-3
Ashton Gate station site options
Advantages & disadvantages

Option	Advantages	Disadvantages
1 – station access via Barons Close	• Passengers do not have to cross level crossing, in vehicles or as pedestrians or cyclists • Access via Barons Close, i.e. no new access road required	• Land needs to be acquired from adjacent business park (currently a Ford dealership) • Pedestrians coming from the west will have to cross level crossing
2a – station access via Barons Close through level crossing	• No land acquisition required from business park	• New road required to west of railway line (for which land would be required) • Requires conversion of existing foot level crossing to allow access for vehicles to the station • Car drop-off passengers dropped to the east (Barons Close) use the level crossing. Similarly for pedestrian and cycle access
2b – station access via Barons Close through the level crossing or via a new road connection via Ashton Drive	• No land acquisition required from business park	• Land needs to be acquired to west of railway line to build new access road where there currently are allotment gardens • New access road required to west of railway line (500m approx) • Requires conversion of existing foot level crossing to allow access for vehicles to the station • Car drop-off passengers dropped to the east (Barons Close) use the level crossing, though alternative new southern approach would also be available from Ashton Drive (unlike option 2a). Similarly for pedestrian and cycle access

From this initial appraisal, albeit with limited criteria as noted, Option 1 looks the most promising at this stage. In particular, as well as comparison with the costs identified, conversion of an existing foot level crossing for use by vehicles is avoided.

Such use of a level crossing is unlikely to be justified if alternatives are available. As such, Option 2a may not actually be achievable. Option 2b could be amended to eliminate vehicular and pedestrian/cycle station cycle access using the existing foot crossing, with an alternative pedestrian/cycle route developed on the eastern side of the railway to supplement the Ashton Drive link, in a similar location to the option 1 station access.

SECTION 3

3. Demand forecasting

3.1 Methodology

Demand forecasts of the potential new stations in Bristol have been carried out using a similar methodology to that used for other recent studies associated with the development of MetroWest Phase 2 and the new stations package. In outline, the methodology makes use of rail industry data and derived techniques to forecast demand at new stations broadly based on relationships at existing stations elsewhere.

Forecasts have employed existing data sources, as well as made use of previous forecasts carried out for the West of England Rail Studies during earlier development of the 'Greater Bristol Metro'.

3.1.1 Key data sources

National Rail Travel Survey (NRTS)

The National Rail Travel Survey (NRTS) provides estimates of the number of rail trips at stations on a notional and typical day and includes origins and destinations of trips using the rail network, both in terms of rail journeys themselves (the first, intermediate and last stations used) and the 'true' origin and destination of trips (including the locations where the overall journey started and finished, such as home, work or other location and the mode of station access/egress). Other journey characteristics derived from NRTS data includes ticket types, journey purposes and journey frequency. NRTS data is key to developing the bespoke gravity type model for new stations, as well as assessing potential demand changes at existing stations using PDFH derived calculations.

Office of Rail Regulation (ORR) statistics

Passenger counts at stations. The latest ORR station statistics were published in February 2013 covering the annual period 2011-12. ORR station totals are used in conjunction with NRTS and MOIRA2 data to update figures as required.

West of England annual station survey

Passenger counts at stations. The latest West of England station survey was carried out in November 2013. The survey results are used in conjunction with ORR station statistics.

MOIRA2

MOIRA2 is used by the rail industry to forecast the impact of timetables on passenger revenue, including analysing the effect of changes such as stopping patterns, infrastructure and rolling stock on the passenger numbers carried and the revenue impact. MOIRA2 was previously provided to the study team by the DfT for use in the Metro West studies. Information from these previous analyses has been utilised in this study in generalised cost and fare/revenue calculations, though no specific assessments have been possible for this study. MetroWest was modelled using MOIRA2 as Phase 1, Phase 2 and a 'new stations package'. This sought to forecast changes in demand at existing stations as a result of changes to the rail service. As such, Henbury and Filton North have not been modelled using MOIRA2.

Passenger Demand Forecasting Handbook (PDFH)

The PDFH summarises knowledge of the effects of changes to services, fares and other factors on rail passenger demand, and provides guidance on applying this to forecasts. Values in the PDFH can be used to assess demand responses to timetabling and operating decisions.

3.1.2 New station demand forecasts

A series of approaches are required to assess different aspects of new stations. These consider three main elements that together enable the net total benefit to the railway to be established, and include:

- Total trips generated by the new station;
- Existing rail trips diverted from existing trips to the new station; and
- Suppression of demand at existing stations by an extra station call.

Total station demand

This has employed a simple gravity model technique, which takes into account the relationship between journeys and catchments at a number of similar stations. Regression has been used to identify a series of demand/catchment relationships for several types of movements, including journeys made using full price tickets, reduced price tickets and season tickets, and between 'independent' stations (such as Keynsham), 'regional' stations (such as Bristol Parkway), 'urban' stations (such as Stapleton Road) and London stations, as the characteristics of such trips can differ. Stations used in the regressions are drawn from the local West of England area locations as much as possible. The specific models used to forecast demand at the Bristol stations has been calibrated using demand quantum and access modes at Stapleton Road station, as it is considered that the potential new stations would have similar 'urban' characteristics.

Diversions of existing trips to new station

An estimate of how many trips are new to the railway or transferring from other stations is assessed using a station choice logit model, using generalised costs calculated for whole journeys from origin (home in many cases) to destination (for example, work) via the existing station used, which NRTS data identifies, compared with a similar trip using the new station.

Suppression of demand

Overlaying the direct demand impact of the station is an appraisal of lost demand to existing rail passengers on the stopping train. Where a new station is implemented on an existing line, there is potential to affect demand on services passing through (and stopping) at the new station, as a result of lengthening journey times. This can have a significant effect on revenue if the services to be stopped at a new station are fast and/or long distance, where the journey time penalty is greater and/or fares paid are higher than more local journeys. The new stations at Henbury and Filton North are not located on an existing passenger rail line, and no existing services would be delayed to stop at them. As such, suppression of demand at existing stations does not apply to these new stations.

3.1.3 Future demand

Demand for rail travel has grown significantly in recent years, with, for example, an almost 70% increase in passenger numbers being recorded through stations in the West of England area between 2004/05 and 2011/12 (based on ORR figures). This includes even larger increases on specific routes, such as more than doubling of patronage on the Severn Beach line. Historic growth rates at groups of West of England stations are shown in Table 3-1 and Figure 3-1. Apart from a slight levelling in 2007/08, growth has continued in spite of the economic recession, and seems likely to continue, albeit it is debatable whether the rates will be as high as seen in recent times.

Looking into the future, the Great Western RUS (published in March 2010) forecasted that demand in the Bristol area would rise by 41% at peak times between 2008 and 2019 (a rate of 3.2% per annum), and 37% off peak (2.9% per annum), with an average growth rate of 3.0% per annum.

The LTPP Regional Urban Markets study (published October 2013) uses a series of wider economic scenarios to frame changes in rail use, and forecasts are presented for rail use in/around key urban centres. The resulting growth rates for the Bristol area vary from 0.6% per annum to 3.9% per annum. More details of the LTPP growth rates are shown in Table 3-2.

TABLE 3-1
ORR historic patronage growth in West of England area
2004-2012 figures

Station groupings	2010/11 to 2011/12	2009/10 to 2010/11	2004/05 to 2011/12	2004/05 to 2011/12
	per annum	per annum	TOTAL	per annum
Bristol main (Temple Meads & Parkway)	5.7%	6.1%	57%	6.6%
Severn Beach Line	9.8%	18.9%	163%	14.8%
Other Bristol urban	8.7%	13.3%	142%	13.5%
B&NES (incl. Keynsham)	8.7%	9.3%	54%	6.4%
South Gloucestershire (excl. Parkway)	11.8%	13.2%	115%	11.5%
North Somerset	6.0%	10.9%	56%	6.5%
OVERALL	8.7%	10.9%	69%	7.8% [6]

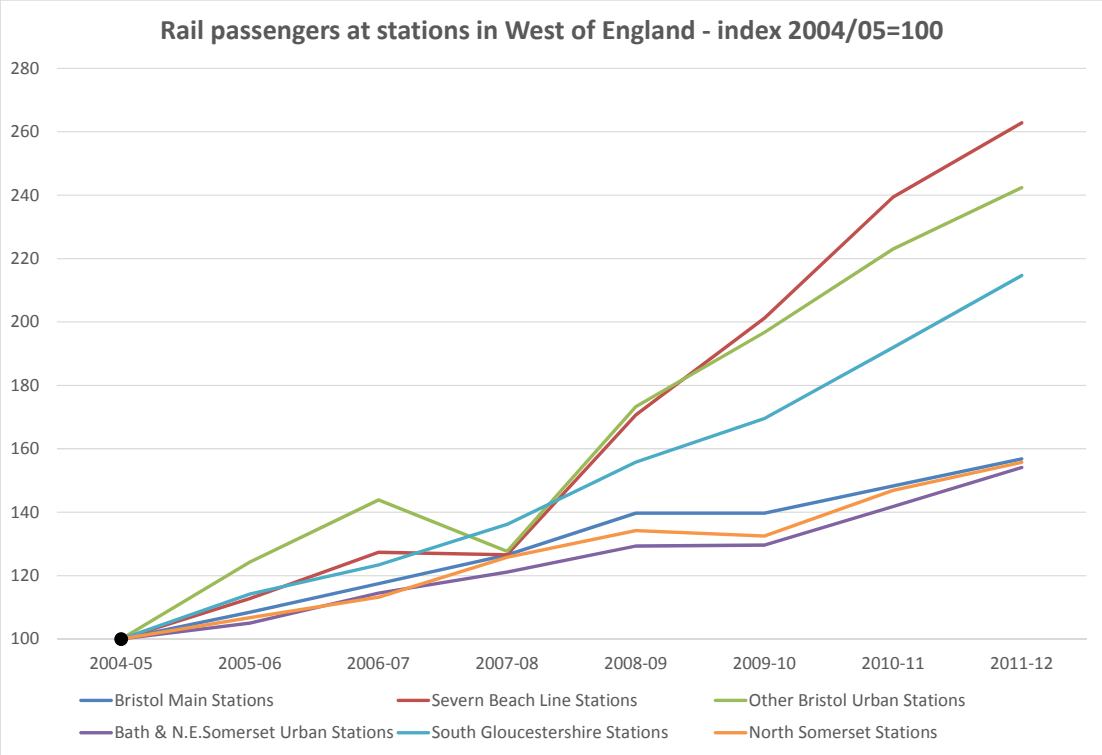

Figure 3-1: ORR historic growth in West of England area

TABLE 3-2
Network Rail LTPP: Regional Urban Markets Study – Bristol area forecast growth
(October 2013)

Economic scenario	2013-23	2013-23	2023-2043	2023-2043
	total	per annum	total	per annum
'Prosperity in isolation'	14%	1.3%	33%	1.4%
'Global stability'	47%	3.9%	44%	1.8%
'Struggling in isolation'	6%	0.6%	15%	0.7%
'Global turmoil'	35%	3.0%	21%	1.0%
AVERAGE	26%	2.3%	29%	1.3%

[6] As a comparison, the West of England station survey showed a 6.5% per annum increase from 2005 to 2012

In spite of recorded growth in recent years, it is possible that these rates would not continue unabated. As such, future year forecasts for North Fringe stations have been produced using a combination of decrementing historic rates, RUS and LTPP figures, as follows: [7]

- 2013 to 2017 – taper from recent historic growth rates at West of England stations (7.8% per annum) to RUS average of peak and off peak (3.0% per annum);
- 2018 & 2019 – RUS average rate (3.0% per annum);
- 2020 to 2023 – taper from RUS average rate (3.0% per annum) to an LTPP average rate derived from the four economic scenarios (2.3% per annum); and
- 2023 to 2043 – taper from 2023 LTPP average rate (2.3% per annum) to 2043 LTPP average rate (1.3% per annum).

3.2 Results of forecasts

3.2.1 Demand and revenue

Headline results of demand forecasts for Ashton Gate are shown in Table 3-3. Forecasts are based on the following 2 trains per hour serving the station (the Portishead line service). A sensitivity test is also shown. The sensitivity test is to illustrate the potential effects full build-out of the Temple Quarter Enterprise Zone could have on demand. This has the effect of adding more jobs to the area surrounding Bristol Temple Meads Station (this sensitivity test assumes the same two trains per hour service at the station). Note that there is no difference between demand forecasts for the three station design options discussed earlier in this report.

Forecasts are shown for 2022, as this represents the first full year after commencement of MetroWest Phase 2, assuming that the new stations were opened with MetroWest Phase 2 in 2021. It should be noted that the daily forecasts represent an 'average day', based on a new stations annualisation factor of 315 (in turn based on analysis of data extracted from MOIRA2) and do not take into account daily or weekly fluctuations in demand from, for example, seasonal variation, and incorporate future growth assumptions described earlier.

TABLE 3-3
Ashton Gate demand
2022 figures (2)

Demand/revenue	Main test	Sensitivity test: Enterprise Zone
	2 trains/hr	2 trains/hr
Annual demand	67,000	72,000
Daily demand (average)	213	230
Annual revenue (£)	£163,000	£172,000

Demand for Ashton Gate station is estimated to be around 67,000 trips per annum in 2022 (total of two-way movements). This represents some 213 one-way trips per day made by around 123 individuals, and could generate up to £163,000 in revenue. Full build-out of the Enterprise Zone could increase demand by around 8%.

Note that forecasts for do not specifically account for the potential effect of redevelopment at Ashton Gate stadium. Stadia are highly peak-orientated in terms of demand, to the extent that specific decisions may be needed as to whether catering for event day traffic is practical or possible. For instance, this could range from closing the station on event days to prevent extreme overcrowding, through additional services and crowd management, to providing long platforms to cater for charter trains. None of these

[7] Given recent historic rates of growth of rail patronage, the forecast growth rates assumed can be considered comparatively conservative.

options would make much difference to average or annual patronage figures in the forecasts, though the latter two would require appropriate infrastructure. Of the demand forecast at Ashton Gate, only around 5% of trips are likely to be as a result of existing rail trips that have transferred from other stations.

Figure 3-2 shows summary future year forecasts of demand at the stations from opening in 2021 to 2043, including annual and daily (average day) demand and revenue. Both the main test and sensitivity test are included. Note that growth assumptions are conservative when compared with recent actual growth in rail use, but still indicate that demand could increase substantially as time passes, in effect increasing by over 50% between opening in 2021 and 2043.

3.2.2 Catchment and access modes

The total demand forecasts have been further analysed to identify the locations that potential users of the potential new stations would come from, as well as the likely modes of transport they would use to reach the stations. This is based primarily on analysis of users at Stapleton Road, Bedminster and Parson Street stations. NRTS data is used, as this provides the true origin of trips, as well as the mode of transport used to access the station.

Table 3-4 shows catchment distance and mode of access for Ashton Gate station, for 2022 demand forecasts. Almost half of all one-way trips are likely to be outward and return portions of day returns, thus suggesting some 123 individuals arrive at the station (213 trips).

TABLE 3-4
Rail users accessing Ashton Gate – by origin catchment and access mode
2022 figures, 2 trains per hour

Catchment	Walk	Bus	Car parked	Car drop off	Bicycle	Taxi	ALL
Less than 1 km	35	-	-	1	-	-	40
from 1 to 2 km	51	10	-	1	-	5	67
from 2 to 3 km	15	1	-	-	-	-	16
from 3 to 4 km	-	-	-	-	-	-	-
from 4 to 5 km	-	-	-	-	-	-	-
from 5 to 10 km	-	-	-	-	-	-	-
More than 10 km	-	-	-	-	-	-	-
TOTAL	101	11	-	2	-	5	123

numbers may not add up exactly to totals due to rounding

Catchments of the station is considered to be local in nature, and the rail services essentially also a local link, and while this will provide opportunities for people to make longer journeys on the wider rail network, neither station is anticipated to be a major railhead.

The stations is not intended to have dedicated car parking, and as such no ‘car parked’ access trips are forecast. This is consistent with NRTS data for stations in Bristol that do not have parking provided at the station (such as Stapleton Road and Bedminster), in that respondents in the NRTS at these stations did not indicate ‘car parked’ as their access mode.

Hence, the majority of station users are anticipated to come from within 2km of the stations (around 85% of demand). This is based on the likely use of the stations, as noted, and comparison with similar locations elsewhere in the Bristol area.

There is limited catchment overlap between the potential new station at Ashton Gate and existing stations on the network. Where overlaps exist, these are generally more than 1km from both the new and existing station. The nearest existing stations to Ashton Gate are Parson Street (almost 1.5km away) and Bedminster (2.2km). These overlaps have been taken into account in the catchment areas, but as they are at the outer ranges (particularly Bedminster) they are judged to have little effect.

3.3 Initial economic assessment

3.3.1 Methodology

Initial economic assessments have been carried out for the potential new stations. These draw on the demand forecasts and catchment analysis outlined earlier in this chapter, and bring in the potential development costs set out in Chapter 3 of the report.

Benefits

The economic assessment has focused on readily identifiable elements of rail demand, and made use of available data and parameters to estimate costs and benefits over a 60 year appraisal period. A series of costs and benefits have been calculated for the potential new stations, including (and not including) the following elements:

- Benefits:
  - Consumer and business travel time – car and rail
  - Consumer and business vehicle operating costs – car
  - Private sector providers revenue
- Costs (assumed to be allocated to local government):
  - Capital costs -
  - Operating costs (station maintenance only)

This is a simplified assessment, making use of available data to convert direct demand forecasts for rail demand to road and rail user benefits. The economic assessment includes assessment of the time benefits associated with car and rail trip changes. Trips to/from the stations are split into to generate benefits based on the AM and PM peaks, using annualisation factors enshrined in GBATS. Opening year is assumed as 2021, with construction being in 2020 in all cases.

The economic assessment does not include vehicle operating costs, user charges (platform fees and fares), costs/benefits during construction and maintenance, monetisation of environmental or wider economic impacts, and assessment of the effects on tax revenues.

Times and trips

Results of the station catchment analysis from demand forecasts are allocated to a grouped zoning from the GBATS models ('GBM zones'). The local station catchment is defined in terms of GBATS zones that cover the distance-based catchments identified in the demand forecasts.

Corresponding car trip and journey times are extracted from the GBATS multi modal model. Similarly, existing rail trips and journey times are also extracted, to give consistent base figures for both modes for the station catchment.

Origin to destination car trips to/from the station catchment are adjusted to reflect station forecasts, using initial car trips to distribute changes. Similarly, forecast rail trips are allocated to the catchment using existing rail trips as a guide. Assumptions used in this adjustment are as follows:

- Mode split of station access is as reported earlier in this chapter.
- Demand forecasts are converted to 2011 figures, for consistency with GBATS trips/times.
- 20% of rail trips transfer from car –trips are removed from the car origin-destination matrix for the station catchment, and added to movements that access the station itself. [8]

[8] Figures based on generic figures presented in Leeds ITS research: "several studies have shown that, while around 60% of new usage comes from bus, around 20% is transferred from car use, and 20% newly generated (Nash, 1992; Cristobal, Garcia and Gonzalez, 2001)".
http://www.konsult.leeds.ac.uk/private/level2/instruments/instrument004/l2_004b.htm

- The remaining trips are a combination of transfers from other modes and newly generated trips (the latter 25%).
- Car journey times for zone-to-zone movements are not adjusted to reflect reductions in congestion, as this has not been specifically modelled.
- Assumed savings in rail journey time are included to allow for better journey times for newly generated rail passengers.

Costs[9]

The assessment takes into account both capital and operating costs of the station. No allowance is made for fares and train operating costs, making the tacit assumption that any additional train operating costs incurred by stopping at the new stations are matched by additional revenue, considered pessimistic.

Capital costs used in the initial economic assessment are those for 'Option1' of the station designs discussed earlier in this report, which have been calculated for Ashton Gate station site options as £3.5m

Costs include construction and some development costs and an allowance for signalling, with results for contingency at both 20% and 40% of construction and development costs. Note that no allowance is included for land acquisition required for the station and/or access or TOC compensation during construction. Optimism bias of 50% is added to total capital costs for the assessment (based on rail scheme appraisal in TAG unit A1.2).

Station operating costs have been calculated using assumptions based on capital costs, derived from CH2M HILL experience on other studies, as follows:

- Annual maintenance at 1.5% of capital costs per annum.
- Periodic cost 1 – additional 9% of capital costs every 10 years.
- Periodic cost 2 – additional 13% of capital costs every 30 years.

A 5% premium is added to these figures to allow for on-going risk. Optimism bias of 40% is added to operating costs (based on rail scheme appraisal in WebTAG unit 3.13.3).

3.3.2 Results

Table 3-5 shows results of the economic assessment, including Analysis of Monetised Costs and Benefits (ACMB) for the station. Further details of the assessment can be found the full economic assessment tables in Appendix A; including Transport Economic Efficiency (TEE), Public Accounts and Analysis of Monetised Costs and Benefits (ACMB), for the station options.

Results of the initial economic assessment indicate that Ashton Gate station is very close to producing a positive Net Present Value (NPV) and consequently a benefit cost ratios (BCR) of 1 (at 0.98) with a 20% contingency on costs. However, this drops to 0.74 if contingency is increased to 40%.

[9] More details of the derivation of capital costs can be found in the chapter on station design.

TABLE 3-5
Summary of economic assessment results

Analysis of Monetised Costs and Benefits	**Ashton Gate** 20% contingency 2 trains/hr	**Ashton Gate** 40% contingency 2 trains/hr
Greenhouse Gases	-	-
Economic Efficiency: Consumer Users (Commuting)	1,660	1,660
Economic Efficiency: Consumer Users (Other)	271	271
Economic Efficiency: Business Users and Providers	3,210	3,210
Wider Public Finances (Indirect Taxation Revenues)	-	-
Present Value of Benefits (PVB)	**5,141**	**5,141**
Broad Transport Budget	5,229	6,930
Present Value of Costs (PVC)	**5,229**	**6,930**
OVERALL IMPACTS		
Net Present Value (NPV)	**-88**	**-1,789**
Benefit to Cost Ratio (BCR)	**0.98**	**0.74**

Costs and benefits both appear as positive numbers
All entries are present values discounted to 2010, in 2010 prices

Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Year	Ashton Gate 2 trains per hour			Ashton Gate EZ max (2 tph)			
	Demand		Revenue	Demand		Revenue	
	annual	daily	annual	annual	daily	annual	
2014	-	-	-	-	-	-	
2015	-	-	-	-	-	-	
2016	-	-	-	-	-	-	<< electrification PARTIAL
2017	-	-	-	-	-	-	<< electrification COMPLETE
2018	-	-	-	-	-	-	
2019	-	-	-	-	-	-	<< Metro PHASE 1 (assumed)
2020	-	-	-	-	-	-	
2021	65,452	208	£154,976	70,593	224	£167,151	<< Metro PHASE 2 (assumed)
2022	67,198	213	£159,111	72,477	230	£171,611	
2023	68,866	219	£163,062	74,276	236	£175,872	
2024	70,448	224	£166,808	75,983	241	£179,912	
2025	72,031	229	£170,556	77,690	247	£183,955	
2026	73,614	234	£174,303	79,397	252	£187,996	
2027	75,194	239	£178,045	81,101	257	£192,032	
2028	76,770	244	£181,777	82,801	263	£196,057	
2029	78,341	249	£185,496	84,496	268	£200,069	
2030	79,905	254	£189,199	86,182	274	£204,062	
2031	81,459	259	£192,880	87,859	279	£208,032	
2032	83,003	264	£196,536	89,524	284	£211,975	
2033	84,535	268	£200,162	91,176	289	£215,887	
2034	86,052	273	£203,755	92,812	295	£219,762	
2035	87,553	278	£207,310	94,432	300	£223,596	
2036	89,037	283	£210,822	96,032	305	£227,384	
2037	90,501	287	£214,288	97,611	310	£231,123	
2038	91,943	292	£217,704	99,166	315	£234,807	
2039	93,363	296	£221,065	100,697	320	£238,431	
2040	94,757	301	£224,366	102,201	324	£241,992	
2041	96,125	305	£227,604	103,676	329	£245,484	
2042	97,463	309	£230,775	105,120	334	£248,904	
2043	98,772	314	£233,873	106,532	338	£252,246	

Figure 3-2: Ashton Gate station forecasts – demand and revenue over time

SECTION 4

4. Summary & Conclusions

This report briefly describes the outline design for a potential station at Ashton Gate (located on the, to be reopened, Portishead rail line), as well as providing demand forecast and initial economic assessments.

Note that Ashton Gate station lies outside of MetroWest Phase 1 and is part of the New Stations Package for station schemes that could come forward subject to a business case and funding. MetroWest Phase 1 will be future proofed to enable Ashton Gate station to come forward when the funding and business case allow.

Rail engineering

Outline design work undertaken in this study has considered the station locations, design of station platforms and other supporting station infrastructure, and signalling and telecommunications (S&T) equipment. The level of detail is broadly that of a GRIP2 study.

No specific consideration has been included of permanent way constraints, such as changes to alignments as a result of horizontal and vertical track positioning.

This study has indicated that, a station at Ashton Gate would cost between £3.5m and £4.0m, depending on station access arrangements, including 20% contingency (and between £4.6m and £5.3m if including a 40% contingency on costs). At this early stage of considering options, a preferred option would be to provide access to the station via Barons's Close with a footbridge to cross the line (at a cost of £3.5m/£4.6m). Other options are likely to face problems in needing to increase the utilisation of an existing foot only level crossing.

Demand

Demand forecasts indicate that around 70,000 trips would use the station per annum (soon after opening in 2022), generating revenue of some £170,000.

Outline economic assessment

Results of the initial economic assessment indicate that Ashton Gate station is very close to producing a positive Net Present Value (NPV) and consequently a benefit cost ratios (BCR) of 1 (at 0.98). However, this drops to 0.74 if contingency is increased to 40%.

Appendix A

Appendix A: Economic assessment tables

Tables:

- Transport Economic Efficiency (TEE)
- Public Accounts
- Analysis of Monetised Costs and Benefits (ACMB)

For:

- Ashton Gate – 20% contingency
- Ashton Gate – 40% contingency

Ashton Gate – 20% contingency

Economy:Economic Efficiency of the Transport System(TEE)

Consumer - Commuting user benefits	All Modes	Road	Rail	
Travel Time	1,307	670	637	
Vehicle operating costs	353	353	-	partially assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**1,660**	**1,023**	**637**	
Consumer - Other user benefits	**All Modes**	**Road**	**Rail**	
Travel Time	214	110	104	
Vehicle operating costs	58	58	-	partially assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**271**	**167**	**104**	
Business	**All Modes**	**Road**	**Rail**	
Travel Time	414	212	202	
Vehicle operating costs	112	112	-	partially assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**526**	**324**	**202**	
Private Sector Provider Impacts	**All Modes**	**Road**	**Rail**	
Revenue	2,684	-	2,684	
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Grant/subsidy	-	-	-	not assessed
Subtotal	**2,684**	**-**	**2,684**	
Other business Impacts	**All Modes**	**Road**	**Rail**	
Developer contributions	-	-	-	not assessed
NET BUSINESS IMPACT	**3,210**	**324**	**2,885**	
TOTAL	**All Modes**	**Road**	**Rail**	
Present Value of Transport Economic **Efficiency Benefits (TEE)**	**5,141**	**1,515**	**3,626**	

Benefits appear as positive numbers, while costs appear as negative numbers
All entries are present values discounted to 2010, in 2010 prices

Public Accounts

Local Government Funding	ALL MODES	Road	Rail	
Revenue	-	-	-	not assessed
Operating Costs	1,940	-	1,940	
Investment Costs	3,289	-	3,289	
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**5,229**	**-**	**5,229**	
Central Government Funding: Transport	**ALL MODES**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**-**	**-**	**-**	
Central Government Funding: Non-Transport				
Indirect Tax Revenues	-	-	-	not assessed
TOTALS				
Broad Transport Budget	5,229	-	5,229	
Wider Public Finances	-	-	-	

Costs appear as positive numbers, while revenues and developer contributions appear as negative numbersin 2010 prices
All entries are present values discounted to 2010, in 2010 prices

Analysis of Monetised Costs and Benefits

Greenhouse Gases	-	not assessed	TUBA PVB	5,141	
Economic Efficiency: Consumer Users (Commuting)	1,660		Noise	-	not assessed
Economic Efficiency: Consumer Users (Other)	271		Local Air Quality	-	not assessed
Economic Efficiency: Business Users and Providers	3,210		Journey Ambience	-	not assessed
Wider Public Finances (Indirect Taxation Revenues)	-	not assessed	Accidents	-	not assessed
Present Value of Benefits (PVB)	**5,141**		Reliability	-	not assessed
Broad Transport Budget	5,229		Rail	-	not assessed
Present Value of Costs (PVC)	**5,229**		Wider Impacts	-	not assessed
OVERALL IMPACTS			Final PVB	5,141	
Net Present Value (NPV)	**-88**		NPV	-88	
Benefit to Cost Ratio (BCR)	**0.98**		**BCR**	**0.98**	

Costs and benefits both appear as positive numbers
All entries are present values discounted to 2010, in 2010 prices

Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Ashton Gate – 40% contingency

Economy:Economic Efficiency of the Transport System(TEE)

Consumer - Commuting user benefits	All Modes	Road	Rail	
Travel Time	1,307	670	637	
Vehicle operating costs	353	353	-	partially assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**1,660**	**1,023**	**637**	
Consumer - Other user benefits	**All Modes**	**Road**	**Rail**	
Travel Time	214	110	104	
Vehicle operating costs	58	58	-	partially assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**271**	**167**	**104**	
Business	**All Modes**	**Road**	**Rail**	
Travel Time	414	212	202	
Vehicle operating costs	112	112	-	partially assessed
User charges	-	-	-	not assessed
During Construction & Maintenance	-	-	-	not assessed
Subtotal	**526**	**324**	**202**	
Private Sector Provider Impacts	**All Modes**	**Road**	**Rail**	
Revenue	2,684	-	2,684	
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Grant/subsidy	-	-	-	not assessed
Subtotal	**2,684**	**-**	**2,684**	
Other business Impacts	**All Modes**	**Road**	**Rail**	
Developer contributions	-	-	-	not assessed
NET BUSINESS IMPACT	**3,210**	**324**	**2,885**	
TOTAL	**All Modes**	**Road**	**Rail**	
Present Value of Transport Economic **Efficiency Benefits (TEE)**	**5,141**	**1,515**	**3,626**	

Benefits appear as positive numbers, while costs appear as negative numbers
All entries are present values discounted to 2010, in 2010 prices

Public Accounts

Local Government Funding	ALL MODES	Road	Rail	
Revenue	-	-	-	not assessed
Operating Costs	2,571	-	2,571	
Investment Costs	4,359	-	4,359	
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**6,930**	**-**	**6,930**	
Central Government Funding: Transport	**ALL MODES**	**Road**	**Rail**	
Revenue	-	-	-	not assessed
Operating costs	-	-	-	not assessed
Investment costs	-	-	-	not assessed
Developer Contributions	-	-	-	not assessed
Grant/Subsidy Payments	-	-	-	not assessed
NET IMPACT	**-**	**-**	**-**	
Central Government Funding: Non-Transport				
Indirect Tax Revenues	-	-	-	not assessed
TOTALS				
Broad Transport Budget	6,930	-	6,930	
Wider Public Finances	-	-	-	

Costs appear as positive numbers, while revenues and developer contributions appear as negative numbersin 2010 prices
All entries are present values discounted to 2010, in 2010 prices

Analysis of Monetised Costs and Benefits

Greenhouse Gases	-	not assessed	TUBA PVB	5,141	
Economic Efficiency: Consumer Users (Commuting)	1,660		Noise	-	not assessed
Economic Efficiency: Consumer Users (Other)	271		Local Air Quality	-	not assessed
Economic Efficiency: Business Users and Providers	3,210		Journey Ambience	-	not assessed
Wider Public Finances (Indirect Taxation Revenues)	-	not assessed	Accidents	-	not assessed
Present Value of Benefits (PVB)	**5,141**		Reliability	-	not assessed
Broad Transport Budget	6,930		Rail	-	not assessed
Present Value of Costs (PVC)	**6,930**		Wider Impacts	-	not assessed
OVERALL IMPACTS			Final PVB	5,141	
Net Present Value (NPV)	**-1,789**		NPV	-1,789	
Benefit to Cost Ratio (BCR)	**0.74**		**BCR**	**0.74**	

Costs and benefits both appear as positive numbers
All entries are present values discounted to 2010, in 2010 prices

Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.