

# Feasibility Study

## GRIP Stage 2

112053

## Aberdare - Hirwaun Services




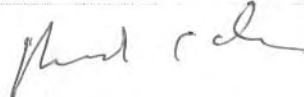


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## Report Control Sheet

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## 1. Executive Summary

This study has been produced on the request of the Senior Sponsor working on behalf of the Welsh Assembly Government (WAG, client). The client set out their requirements in the attached remit which outlined the desire to extend the passenger service to Hirwaun and open stations at Hirwaun (phase 1) and then in the Tower area (phase 2). The completed report shows that a number of options to extend the passenger services from Aberdare to Hirwaun and Tower along the freight only railway are possible but that there is a need to upgrade the physical infrastructure of the line to meet the relevant passenger railway standards.

Set out in the report are four main options for re-instatement of passenger service up to Hirwaun that can be taken forward. One option is described for extending the service to Tower, most probably at a later date.

The report concludes that it is entirely possible to provide passengers service to new stations at both Hirwaun and the Tower Colliery site. Due to the similar nature of the options developed there are a number of common components. The significant key components of the project are as follows;

- Use of the current or old Aberdare stations,
- A single loop in the Aberdare area, the length of which is determined by the outputs to be achieved,
- A new station at the site of the old Hirwaun station
- A new station just south of the current Tower Colliery loading pad, as a second phase
- The need to upgrade Robertstown and Hirwaun crossings for some options to CCTV status
- Track enhancements to a maximum speed of 40 mph

Network Rail has chosen not to consider in any detail a new station close to the A465 south of the old Hirwaun station. Construction of a station at this location is entirely possible and it would not have a significant impact on the other works or the timetable. Land would have to be purchased and road layout changes would be required but the station would be distant from the likely users. As a result the project team have only developed options based on the old station site.

Likewise the construction of the new station at the site of the old Tower station (Hirwaun Pond Halt) has not be considered in any detail due to the complexity of considering a site alongside the current freight operational needs at the far end of the line. This has resulted in options for a "new" Tower station being developed on the Cardiff side of the current loading pad.

The costs of the options for phase 1 range from £16.7 million through to £19.3 million, with the extension to Tower in phase 2 costing additional £9.8M, all of which include a 25% uplift from the point estimates for risk and contingency. 'Add-on costs are also provided for stabling sidings, car parks, and extension of platforms to accommodate 6 car trains.

Set out in the table below is a brief summary of the costs of the options detailed in the report

Options	Description	Cost (£M)
1	Short Passing Loop at Aberdare, Retain Existing Aberdare Station (Up & Down), Install new station and stabling siding at Old Hirwaun Station,	16.7
2	Long (Passing Loop at Aberdare, Retain Existing Aberdare Station (Up & Down), Install new station and stabling siding at Old Hirwaun Station.	18.6
3	Re-use Old Aberdare Station (Up & Down), Short Passing Loop at Aberdare Install new station and stabling siding at Old Hirwaun Station.	17.7
4	As Option 3, but with long passing loop	19.3
Phase 2	Extend passenger service to Tower	9.8
S-H	Stabling Siding at Hirwaun	0.9
S-T	Stabling Siding at Tower	0.5
A-CP	Car-Park at Aberdare (100 spaces)	0.4
H-CP	Car Park at Hirwaun (50 spaces)	0.2
T-CP	Car Park at Tower (100 spaces)	0.4
6C-AE	Extension of Platform at Existing Aberdare station for 6 Car Trains	0.2
6C-AO	Extension of Platform at Old Aberdare station for 6 Car Trains	0.4
6C-OH	Extension of Platform at Old Hirwaun station for 6 Car Trains	0.4
6C-OH	Extension of Platform at New Tower station for 6 Car Trains	0.4

The project schedule shows construction of phase 1 taking place between September 2014 and March 2015, but this depends on the timing of availability of funding.

At present the weekend shut down at the Tower Loading Pad provides for a 34 hour possession window, it is believed that with discussions with the Freight Train Operator this could be extended to 48 hours. This availability of time should enable a more efficient construction methodology to be developed thus further reducing the construction costs and times. This aspect should be explored further in the next phase of the project

Network Rail recommends that WAG and other stakeholders consider the following points prior to deciding which options are to be developed further:

- At Aberdare the choice is whether to use the current station or return to the old station building. It is recommended that use of both stations as separate Up and Down platforms is not pursued for operational reasons.
- The choice of the Aberdare station should consider the wider neighbourhood issues about town centre connections, possible property developments, bus links, car parking, and station access for pedestrians.
- The length of the loop should be finalised in GRIP 3 but should be long enough to hold the current freight trains as well as allowing for growth.



- The need, or otherwise, for any stabling facilities on the route as these could be an expensive add on.
- A further timetable study, covering the length of the line from Abercynon to Tower, should be undertaken to determine the optimum timetable that reduces the need for passenger service reductions when freight services are planned to operate.

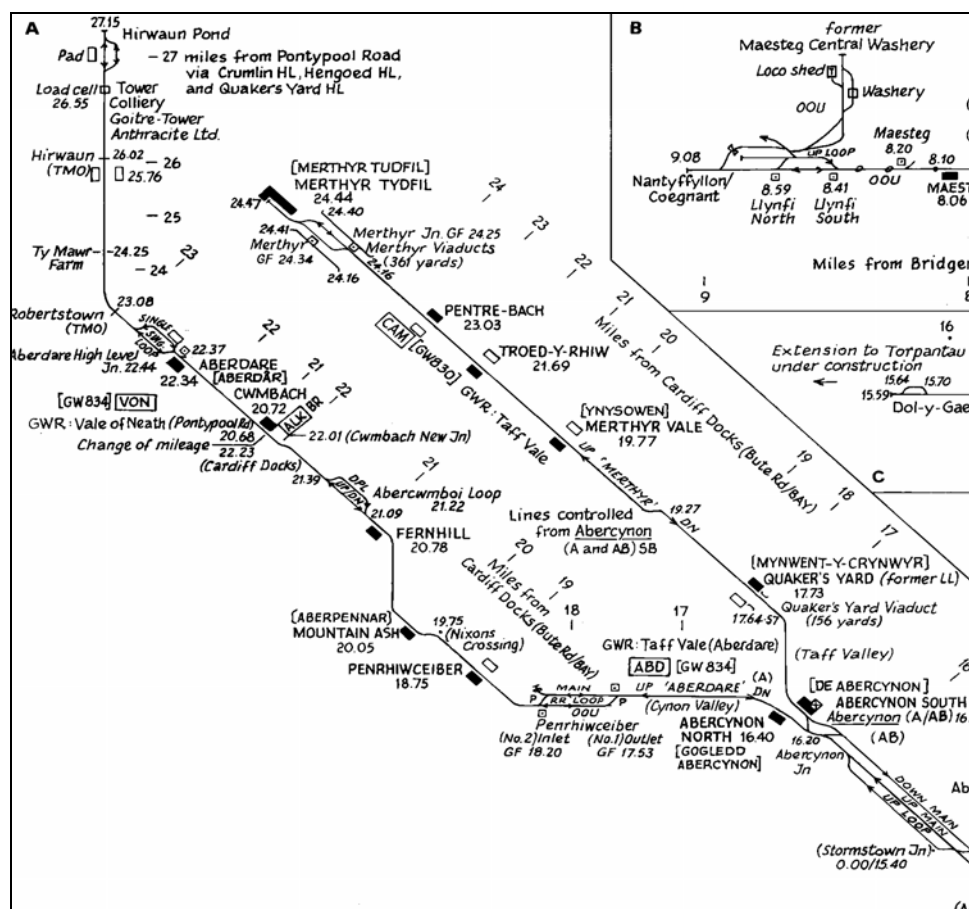
## 2. Introduction

The Welsh Assembly Government (WAG), as part of its on-going programme to encourage the economic regeneration of the South Wales Valleys, is seeking to improve public transport connections in the Upper Cynon Valley. This is a long standing aspiration for the area.

The existing rail passenger service in the area is a half hourly Cardiff to Aberdare provision. The railway, however, extends beyond Aberdare for a further 5 miles to Tower Colliery, but this last 5 mile section is currently only suitable for freight services. Provision exists in the current timetable for up to two freight trains in each direction per day, although the current usage of the 12 paths a week is low. The current daytime WTT freight slots also result in the removal of a number of passenger slots on the Aberdare branch.

WAG has commissioned Network Rail to undertake a GRIP stage 2 Option Assessment Study into the possibilities of extending the existing Aberdare services, firstly to Hirwaun, and as a possible second stage to Tower Colliery.

The diagram below shows the Aberdare to Hirwaun line in its wider Valleys Lines context.



### **3. Business Objective**

The proposed enhancement of the passenger service from Aberdare to Hirwaun and Tower forms part of the wider Welsh Assembly Government (WAG) economic regeneration strategy for the valleys and has been a long held aspiration for the area.

In general the WAG have outlined the following objectives:

- Improve access to the rail network for the surrounding communities.
- Increase accessibility between residential areas and job opportunities.
- Improve education, shopping and leisure facilities.
- Assist in economic regeneration.
- Provide a quality public transport choice to attract additional users.
- Encourage a modal shift from car to rail within the local community.
- Create new transport interchange options along the Heads of the Valley communities

### **4. Business Case**

The Welsh Assembly Government (WAG) will be responsible for all Business Case appraisal and Welsh Transport Planning and Appraisals Guidance (WELTAG) assessments. In addition the WAG will be responsible for all funding to deliver the scheme. Consideration of future operating and renewal costs has yet to be determined.

### **5. Project Scope**

The initial remit was issued to Network Rail in early February 2010 and a Value Management Workshop was held on May 17th 2010 to refine the client requirements for the project in the wider context of the surrounding community and economic growth objectives. Two main options were agreed at the workshop:

1. Provide the infrastructure for a passenger service to the old disused Hirwaun station, but stopping prior to the existing level crossing (north of the old station site)
2. Extend the passenger service beyond Hirwaun to Tower Colliery, extra over option 1

The high level requirements for the proposed extended passenger train service are:

- A phased approach to provide 2 trains per hour in both directions between Cardiff and Hirwaun, and ultimately Tower Colliery
- Make use of the current freight line where possible
- Enhance the existing station facilities at Aberdare, including consideration of re-instating and renovating the currently disused station building and platform
- Provide a new station at Hirwaun
- Provide a station at the site of the Tower Colliery loading pad
- Provision of park and ride car parks at Aberdare, Hirwaun and Tower Colliery
- Provide a stabling facility for up to 3 x 2 car class 150 diesel units somewhere between Aberdare and Tower Colliery inclusive (sites at both Hirwaun and Tower Colliery are to be investigated)

- Retention of capability to operate the existing freight service
- No specific target date for start of public service has been advised by WAG.

## **6. Condition of Existing Infrastructure**

### **6.1. Track**

#### **6.1.1. Layout and Alignment**

The existing layout beyond Aberdare is for freight operations only, and comprises single line from Aberdare Station (22m 34ch) to Tower Colliery (27m 12ch). At Tower Colliery, there exists a run-round loop which is c.340m in length, and which provides the functionality required for the freight operations. It should be noted, however, that the run-round procedure could be simplified if the loop at Tower could be extended to provide at least 400m from fouling point to fouling point.

Along the route, there are no operational sidings or other passing loops, and the two freight paths per day are timetabled accordingly. Train Man Operated (TMO) Level Crossings are located at Robertstown (23m 08ch) and Hirwaun (26m 02ch) and are the only public highway level crossings along the route. There is a completely disconnected 400 metre (approximately) length of track north of Aberdare station which at one time was part of a passing loop.

The route includes a few curved sections with radius of around 500-750m, but the majority of the track is straight or on large radius curves.

The route is generally steep (gradients of up to 1 in 50), with the track rising from Aberdare towards Tower. At Hirwaun and Tower, there are lengths of level track where the former stations were located.

#### **6.1.2. Infrastructure**

The existing single line from Aberdare to Tower is maintained as Track Category 6, and consists primarily of bullhead track which is over 50 years old. The exceptions to this are the track through the existing Aberdare Station which is 113lb FB rail on steel sleepers, and dates from 1998, when the station was constructed. The only other section of significance which is not bullhead is from 24m 24ch to 24m 50ch, which is 113lb FB rail on a mixture of concrete and wood sleepers, and dates from 1978.

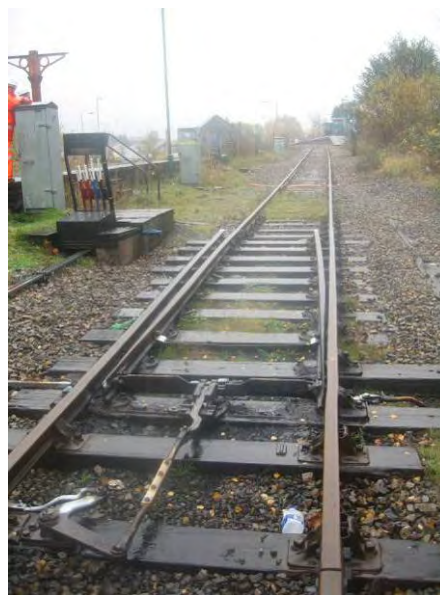
The track is generally jointed, with occasional stretches of CWR protected by adjustment switches, most notably through Aberdare Station, and then in addition from 23m 20ch to 23m 35ch from 24m 24ch to 24m 50ch.

The existing track types are summarised here, with key data taken from GEOGIS (Network Rail's track asset database):

Start Chainage	End Chainage	Length	Rail Type	Rail Age	Sleeper Type	Sleeper Age
22m 20ch	22m 38ch	360m	113lb FB CWR	1998	Steel	1998
22m 38ch	24m 24ch	2920m	Bullhead Jointed (plus short length of CWR)	1948 to 1961	Wood and Concrete	1937 to 1961
24m 24ch	24m 50ch	520m	113lb FB CWR	1978	Wood	1978
24m 50ch	27m 12ch	4040m	Bullhead Jointed	1938 to 1963	Wood	1927 to 1963

### 6.1.3. Switches & Crossings (S&C)

At Aberdare, there is an existing Ground Frame, which enables the current token system for signalling of the freight only route. The S&C in place at Aberdare comprises a bullhead trap point (Bv8 turnout geometry), and is shown in the photographs below:



At Tower, each end of the loop comprises a bullhead Bv8 turnout. The bullhead crossings on each of the turnouts were replaced in 2010, and would therefore be potentially re-usable. The left photo shows the turnout at the high mileage end (with headshunt beyond) and the right photo shows the turnout at the low mileage end.



No other S&C exists on the route. All sidings at Aberdare are now disconnected and out of use.

## 6.2. Stations

### 6.2.1. Existing Aberdare

The only existing operational station affected by the proposed scheme is at Aberdare. This station was built in the mid 1990s, and comprises a single platform on the Up (south) side of the single line. The current platform length is approximately 102m, and is therefore of sufficient length for 4-car running.

The existing platform was constructed on one of the decks of the Underbridge (Abernant Road), and as such, precludes the location of new S&C (or a second track) within the existing station footprint. The platform appears to be straightforward to modify, and has been extended since it was first installed, using a modular Corus type of steel platform.







There is an existing car park at Aberdare station. It is situated on the other (Down) side of line to the platform. It has capacity for about 60 cars, and this is fully utilised, with overspill parking by a further 70 vehicles.

### 6.2.2. Old Aberdare

There is a significant former station building at Old Aberdare Station. It is considered that the existing building could be re-used; however the expense of upgrading the building to current design standards may make preclude this option. The building is confirmed as being owned by the local Council, and is not 'listed'.

No access was provided to the station building during GRIP Stage 2, so suitability for upgrade and inclusion of proposed facilities could not be ascertained.



### 6.2.3. Old Hirwaun

At the old Hirwaun station location, there is still evidence of the two side platforms. To the north, there is an old works, which appears to be disused. To the south there is a large residential area, forming part of Hirwaun itself. Existing clearance between old platforms is 8.5m which is acceptable for double track.



### 6.2.4. Old Tower (Hirwaun Pond)

The former Hirwaun Pond station located on curved track (right hand curve in direction of increasing mileage) with two tracks and two side platforms in situ, including original coping stones.



Station area now acts as Loco Run-Round facility and the track terminates at rail-buffer stop. The new highway (Fifth Avenue) is beyond, and is estimated to be no more than 4m above rail level as it crosses where the railway would have formerly been; the former railway solum beyond Fifth Avenue is now occupied by industrial units which makes future westward extension problematic.

To the north of the existing station site is a Site of Special Scientific Interest (SSSI), which would limit the scope of construction work on this side of the route.



## 6.3. Civils

### 6.3.1. Overbridge (26m 42ch)



The track is laid relatively central to the rectangular aperture Overbridge. Drainage pipes are installed in both cesses. Headroom does not appear to be an issue (5.2m clearance), and gauging likewise (8.5m width), certainly if it continues to be a single track through the bridge.

### 6.3.2. Embankment Slip (26m 20ch)

At approximately 26 miles 20 chains, as the railway runs past the River Cynon, there are signs of failure in the embankment, which appears to coincide with a walking route cut into the slope of the embankment. Timber sleepers appear to have been placed at the top of this walkway to provide shoring, but to no avail.

There is a warning sign in place; however it is recommended that full investigation is carried out, as in poor weather this could lead to a wash-out, with potentially serious consequences. It looks likely that for passenger traffic, this embankment will require significant remedial works.



**6.3.3. Merthyr Road Overbridge and A465 Overbridge (c. 25m 05ch)**

These two bridges are in close succession, and are both wide enough for two tracks should this be necessary. The A465 overbridge is a rectangular box which is 8.75m wide and has a clearance to soffit of 5.6m. The Merthyr Road overbridge is a masonry arch structure with a width of 8.49m. Along this section, an existing drainage ditch is present in the north cess.

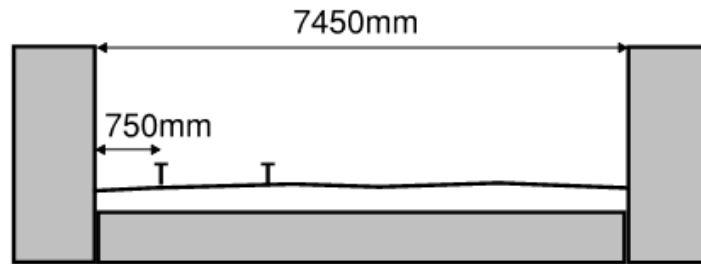


**6.3.4. Road and Stream Underbridge & Embankments (24m 05ch to 24m 00ch)**

The existing bridge is suitable for two tracks. A cross section through the bridge is shown below.







The adjacent embankment, particularly on the north side is very steep, and to introduce the second track would require embankment works, with retaining structures along possibly both sides.



**6.3.5. Llwyncoed Old Tramway Underbridge (23m 57ch)**

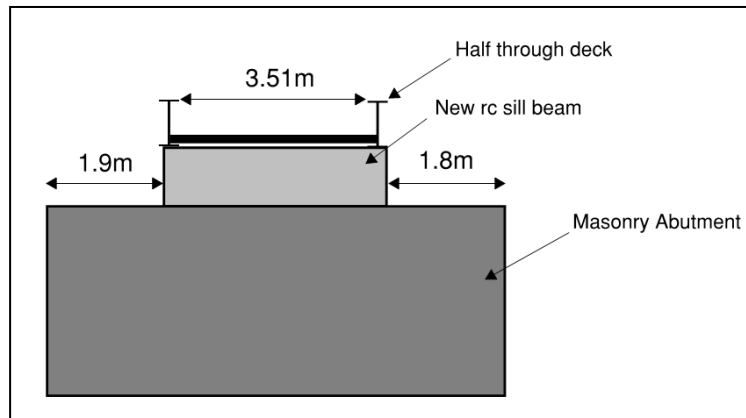
Existing bridge consists of what is effectively 2 half through decks and is suitable for two tracks. There is plenty of room for two tracks on both on both approaches to the bridge.



**6.3.6. Merthyr Road Underbridge & Embankments (23m 36ch)**

This is a major constraint as the existing bridge is single track only. This bridge was renewed in 1996 to allow increased headroom to the road below. The method used was to raise embankment on both sides of the bridge by up to 1.5m (through adding ballast, and raising and centralising the track) over a length of approximately 500m, and the installation of a single line bridge deck.

The existing abutments have been raised by the addition of a centralised reinforced concrete sill beam. It would be difficult to re-double the track at this location as the new sill beam will need to be widened to the full width of the abutment and a new deck would need to be constructed to allow the track to be re-doubled, and major approach earthworks would be required.

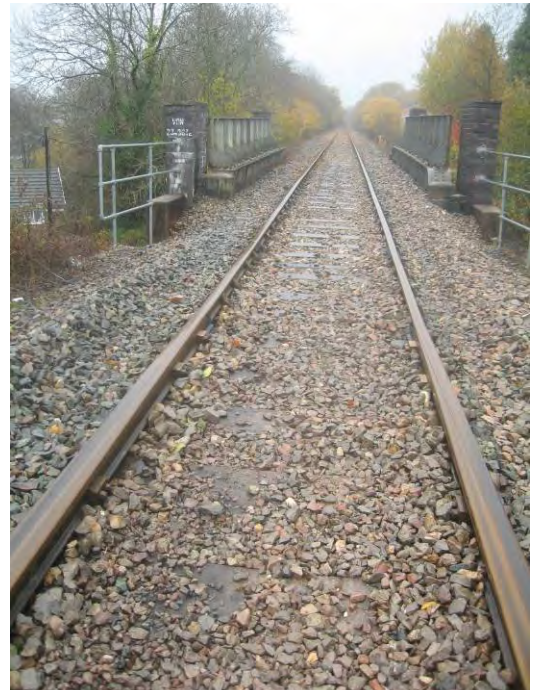
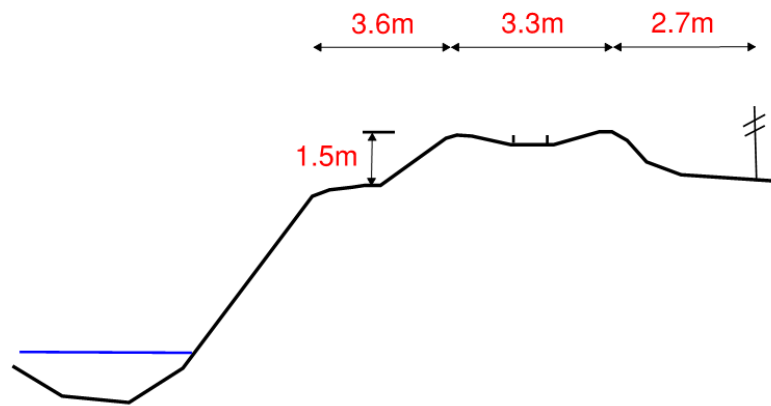


**Cross-section of bridge**

In some areas the embankment is steep which would make it difficult to widen for re-doubling. There is a small retaining wall already in place at the top of the embankment near the bridge, to help retain the ballast. A typical cross section of the embankment is shown below, with site photographs.







### 6.3.7. River Cynon Underbridge (23m 10ch)

No real issues with River Cynon Underbridge at this location, as the second deck already exists. Clear width between main girders on

redundant deck is 3.12m, and as this is almost at rail level adequate clearance exists.





### 6.3.8. Footbridge (22m 67ch)

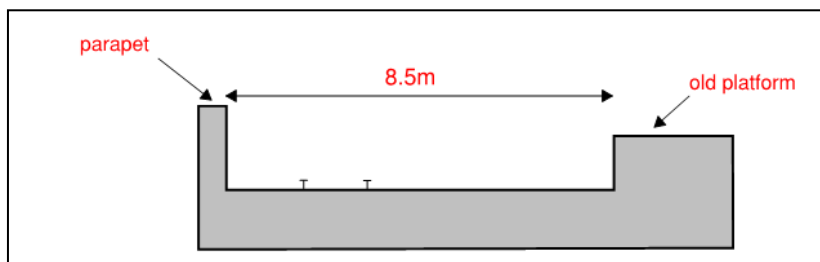
No constraining issues, supports are a significant distance from the railway line. Clearance from running rail to bridge soffit = 4.76m. In this area, the existing track swaps sides along the formation.



### 6.3.9. River Cynon Underbridge (23m 42ch)

No real issues with exist with the River Cynon Underbridge as there is enough room for a second track (which is required for both dynamic loop options). Clearance between old platform edge and River Cynon bridge parapet = 8.5m

The area around this structure is noted in Local Authority Planning documents as liable to flooding: the last recorded inundation of the surrounding area was in 1979.



## 6.4. Level Crossings

### 6.4.1. Hirwaun Level Crossing (26m 02ch)

Hirwaun Old Station Level Crossing is currently Train Man Operated, and would need to be upgraded if passenger service is extended to Tower.



### 6.4.2. Berthllywd Farm Level Crossing (UWC) (25m 44ch)

This User Worked Level Crossing includes an awkward road layout. There are sighting issues due to adjacent buildings and approach slopes. Sighting and gate positions should be reviewed at subsequent GRIP stages.





### 6.4.3. Tir Mawr UWC Level Crossing (24m 25ch)

There are no real issues, here as there is currently considered to be reasonable sighting.



### 6.4.4. Feeder Level Crossing (FP and UWC) (24m 13ch)

Currently there is very poor signage and poor sighting. Pedestrians are to cross at an acute angle, but are not given very good way-finding.



### 6.4.5. Tranboard Level Foot Path Crossing (FP)

The Tranboard FP Level Crossing would need to be retained with a review of signing and surfacing at later GRIP stages.





### 6.4.6. Robertstown Level Crossing (23m 08ch)

Robertstown Level Crossing is a major constraint for the project, and would need to be remotely controlled as a result of the project. The track could be doubled for a long loop, but interface with the adjacent roundabout may require significant highway traffic management systems to be implemented.



However, as a result of implementing remote control of the level crossing, barrier down-time may be reduced when compared with the barrier down-time for a freight train currently (as TMO level crossing currently).

Discussions with the Local Council and Highways Agency are needed with regard to potential for closure suggest as this is a key access / egress route for residential and industrial areas, it is unlikely to be acceptable.



## 6.5. Signalling

The line beyond Aberdare is currently token block signalling, with the token taken at Aberdare Ground Frame (GF), and freight trains are 'locked' in by the trap points, to allow passenger trains to continue to access Aberdare station from the south. There is no active signalling equipment beyond Aberdare. There may be functioning track circuits at Robertstown crossing but this is still being investigated.

Aberdare GF is shown in the photographs below:



## 6.6. Telecoms

The only known telecoms on the route currently is the telephone at Aberdare Ground Frame.

## 6.7. Electrification and Plant

There is no significant E&P equipment on the route currently. The barriers at Robertstown LC are powered, and supplied locally. There is no power provided for Hirwaun crossing.

Discussions with Western Power Distribution (the DNO Supplier) suggest that there is capacity in the local power supply to allow for the increase in power required by the scheme, at the proposed new stations, upgraded level crossings and new signalling equipment.

## 7. Operations inc. Timetable Studies

### 7.1. RailSys Timetable Modelling

This section describes the operational and timetabling studies that have been undertaken. All the studies have assumed use of class 14x or 150 vehicles that operate the existing service between Cardiff and Aberdare.

A number of proposed timetables were examined between Aberdare and Tower Colliery based on the May 2010 Timetable using RailSys software, using the existing 20 mph line speed, and also with an increased line speed of 35 mph. The study also examined potential location for attaching/ detaching movements with stabling points.

The study found that the developing a workable timetable option is feasible between Aberdare and Hirwaun/ Tower Colliery on the single line if the following conditions apply:

- The journey time is less or equal to 39 minutes for the return journey between Aberdare and final terminal station, and thus there would be no effect on train timings south of Aberdare, and no effect on the Valleys network as a whole.
- To enable existing freight services to operate, the Standard Running Time for freight over this branch would have to be reviewed and reduced. If this is not possible then the proposed passenger service would have to be removed on hours when freight operates.
- A suitable passing loop is provided on the single line.
- The level crossings at Robertstown and Hirwaun are upgraded for passenger use or closed.

Key findings on the proposed Passing Loop are:

- In all options the starting point for the Passing Loop is at approx. 22.75 miles (immediately west of Aberdare existing station).
- There are two options for the length of passing loop; a longer loop allowing two trains to pass on the move (known as a dynamic loop). This would require the most infrastructure but produce the best journey times. Or a shorter loop requiring one of the trains to be stationary or both trains to incur some pathing time. However this requires the least infrastructure.
- The only way to combine the passing Loop with a station dwell would be at Aberdare; this would require new Station Infrastructure at Aberdare.
- The lowest cost way to introduce a train service would be to run to Hirwaun only with a line speed of 20 mph and a short passing loop at Aberdare. This would however constrain future expansion to Tower without additional expenditure.

Key findings on Timetable Options are:

- Any option that extends past New or Old Hirwaun Station locations would require line speed improvements to the branch line to be feasible.
- The New Hirwaun Station Location would provide the most feasible timetable options, but this station siting option has been discounted for reasons given in section 8.3.



## **7.2. Route Runner Timetable Modelling**

During the development of the various options there was need to test a few other emerging thoughts and this was carried out using simpler 'RouteRunner' software. This exercise looked at the timetable from Mountain Ash (the current crossing point) through to Tower focusing on the exact loop location along with a maximum speed of 40 mph. This exercise demonstrated that:

- the proposed service could be operated as far as Tower Colliery with either a new short or long passing loop just north of Aberdare,
- Taking into account the need for dwell times to include an allowance for attaching or detaching there would be no effect on train timings south of Mountain Ash, and no impacts on the wider Valleys network.
- With the short loop option there would still be a requirement for at least one return passenger working to be annulled when a freight path is provided,

## **7.3. Modelling Conclusions**

All the developed options outlined in the report are based on a combination of the RailSys and RouteRunner modelling. The overall conclusion of the timetabling studies is that the WAG's aspiration to extend the existing half-hourly passenger service from Aberdare to either Hirwaun or Tower Colliery using existing rolling stock types can be achieved, with no effect on the wider Cardiff Valleys network, provided the additional infrastructure described in the various options is provided. In order to run the passenger service beyond Aberdare one additional unit diagram will be required.

A more detailed timetable study should be undertaken in the next stage to identify infrastructure solutions that can overcome the current passenger pathing constraints required to accommodate the current daytime freight slots.

## 8. OPTIONS CONSIDERED

### 8.1. General

The following table summarises the contents of each option:

Option	Loop (Short or Long)	Station				Option Description (all options include associated Signalling, Telecoms and E&P works)
		Existing Aberdare	Old Aberdare	Old Hirwaun	New Tower	
1	S	Y	N	Y	N	Short (300m) Passing Loop at Aberdare Retain Existing Aberdare Station (Up & Down) Install new single platform station and stabling siding at Old Hirwaun Station Upgrade Robertstown to MCB (CCTV) Level Crossing with single track
2	L	Y	N	Y	N	Long (1200m) Passing Loop at Aberdare Retain Existing Aberdare Station (Up & Down) Install new single platform station and stabling siding at Old Hirwaun Station Upgrade Robertstown to MCB (CCTV) Level Crossing with double track
3	S	N	Y	Y	N	Close Existing Aberdare Station and install new single platform station at location of Old Aberdare Station (Up & Down) Short (300m) Passing Loop beyond Old Aberdare Station Install new single platform station and stabling siding at Old Hirwaun Station Upgrade Robertstown to MCB (CCTV) Level Crossing with double track
4	S	N	Y	Y	Y	As Option 3, but with long passing loop
Phase 2	S/L	N	Y	Y	Y	Passenger service extended to Tower Upgrade Hirwaun LC to MCB (CCTV) Level Crossing Install new single platform station at New Tower

Provision of a stabling siding at Hirwaun or Tower, and car parks at the stations have also been considered as possible 'add-ons'.

General arrangement drawings are to be found in appendix A. They are based on Ordnance Survey tile information, and as such are only indicative of locations and alignment of track, stations etc. at later GRIP stages, accurate topographical surveys will need to be undertaken to accurately position all proposed infrastructure. For the above options, the general arrangement drawings are numbered as follows:

Option 1: RT-SK-111/121/131/141

Option 2: RT-SK-112/121/131/141

Option 3: RT-SK-113/121/131/141

Option 4: RT-SK-114/121/131/141

Phase 2 Rt-SK-142

For all of the options summarised in the table above, the general scope of proposed work for Civils, telecoms, E&P and UWC and Footpath Level Crossings is essentially the same, and is described here.

### **8.1.1. Track**

As the existing track is predominantly bullhead track and is over 50 years old, it is proposed to renew the track for the whole of the route (excepting the two sections of 113lb FB track at the Aberdare Station end, and from 24m 24ch to 24m 50ch.

All track renewal is proposed to be to the specification for Track Category 4, which requires CEN56 (113lb) FB Rail on serviceable concrete sleepers at 650mm spacing, laid on a minimum of 200mm of ballast, or on steel sleepers with a minimum of 150 mm of ballast.

Track drainage design would be confirmed at subsequent GRIP stages, when investigative surveys have been carried out. However, it is considered reasonable to propose new track drainage for the length of the new passing loop, plus approximately 50% of the rest of the affected route (primarily the sections in cutting).

### **8.1.2. Civils**

Of the existing structures on the route from Aberdare to Tower, the proposed double track for the passing loop may affect the following underbridges:

River Cynon Underbridge (22m 42ch)

River Cynon Underbridge (23m 10ch)

Both bridges include decks for a second track. Recent structures examination reports indicate that both bridges are in fair condition, but that timber decking may require replace in a few years.

It is recommended that at subsequent GRIP Stages, the following assessments are carried out, to the two aforementioned bridges in particular, but also for all other structures on the route, as the increase in traffic may warrant risk mitigation measures.

- Preliminary structural assessment of existing underline bridges
- Underbridge Strike Risk Assessment
- Identification of significant risks of vehicle incursion, whether through weak bridge parapets or from adjacent roads
- Trespass and Vandalism risks assessment
- Overbridge demolition risk from derailments

At around 25 miles 20 chains, extra drainage work may be needed to rectify wet formation conditions.

### **8.1.3. Telecoms**

The scope of work for telecoms would include the installation of:

#### **8.1.3.1. Signal Post Telephones**

Signal Post Telephones (SPT) would be required at all main signals on the route. These would be designed in parallel with the signalling design, and would be included in the output from the Signal Sighting Committee activity at a later GRIP stage.

#### **8.1.3.2. Point Zone Telephones**

Point Zone Telephones (PZT) would be required for each unit of S&C on the route, including, for example, both ends of the passing loop and the entry to the stabling siding.

#### **8.1.3.3. UWC Level Crossing Telephones**

New telephones are required at the three User Worked Level Crossings (UWC) along the route at Feeder (24m 13ch), Tir Mawr (24m 25ch) and Berthllwyd (25m 44ch).

#### **8.1.3.4. Cable Troughing**

New cable troughing, with lockable lids, will be required to be laid from the Existing Aberdare Station to the end of the proposed route. Where necessary due to site constraints, under-track crossings (UTX) and under-road crossings (URX) may need to be installed to provide a continuous route.

#### **8.1.3.5. Tight curve around 24 miles 30 chains to 45 chains**

Telephones for possessions of the line for maintenance activities may be needed in this vicinity.



#### **8.1.4. Electrification & Plant**

The scope of work for Electrification & Plant (E&P) would include the installation of:

##### **8.1.4.1. 650V Signalling Power Supply**

A 650V Signalling Power Supply cable would need to be laid for the length of the proposed route, in order to power the proposed signalling system.

##### **8.1.4.2. Principal Supply Point**

A new Principal Supply Point (PSP) will be required to be installed on the route, ideally in the Hirwaun area, to provide the necessary power to supply the proposed signalling and associated equipment, with 12 hour Uninterruptable Power Supply (UPS).

##### **8.1.4.3. Functional Supply Point**

A number of new Function Supply Points (FSP) will be required along the route, to provide the local power supply to the proposed signals on the route.

##### **8.1.4.4. Points Heating**

All new S&C will be provided with appropriate points heating, with new supply cubicles, control boxes and junction boxes as necessary.

##### **8.1.4.5. Level Crossings (UWC)**

A preliminary assessment of issues at these has been made. At the three User Worked Level Crossings (UWC) along the route at Feeder (24m 13ch), Tir Mawr (24m 25ch) and Berthllwyd (25m 44ch), the worst case option would be to upgrade these to include Miniature Stop Lights (MSL). As stated earlier, telephones would also be installed at the three crossings. In GRIP 3 an updated level crossing risk assessment would be under taken to determine if low cost options such as improved signage and user briefing would be acceptable. Berthllywd crossing is approached on both sides by a metalled road and appears to be well used: particular attention will need to be given to this crossing at later stages of the project to ensure safety with frequent passenger trains operating at higher speeds.

Also at these UWC Level Crossings, new surfacing would be installed, plus new signage and gates. The crossing at feeder will probably have to be reprofiled to meet current standard for vertical alignment.

A full assessment of the sighting distances, need for whistle boards and vegetation clearance will be considered at a later GRIP stage.

### **8.1.5. Level Crossings (FP)**

At the two Footpath Level Crossings (FP) along the route Feeder (24m 13ch) and Tranbroad (23m 11ch), the proposal is to retain these as Footpath Level Crossings.

However, as part of the project, these crossings would be improved by the installation of new surfacing, plus improved signage and way-finding, improved access routes and new gates. The alignment of the footpath at feeder crossing is staggered and will need to be re-aligned to 90 degrees.

A full assessment of the sighting distances need for whistle boards and vegetation clearance will be considered at a later GRIP stage.

### **8.1.6. Signalling**

Signalling scheme sketches are in appendix A.

#### **8.1.6.1. Axle Counters**

Additional axle counter sections will be provided to compliment those already in use along the route. The axle counter detail will be designed to suit the chosen option post GRIP 2.

#### **8.1.6.2. TPWS / AWS**

All new signals/signage will be fitted with AWS and TPWS as required by Group/Company and Technical instructions

#### **8.1.6.3. Update to Control Panel at Abercynon Signalling Centre**

The signalling proposals for each option will require the abolition of the existing Aberdare Ground frame and associated equipment, with the revised arrangement being controlled from Abercynon Signalling Centre. The West CAD VDU control and indication system at Abercynon Signalling Centre will require the screen layout modified, along with all other associated modifications to accommodate the extended area controlled by the Signalling Centre. Additional Screens will be required to supervise and control level crossing that will be converted to MCB-CCTV operation. The provision of additional screens and modifications to the signaller's layout will be subject to a detailed ergonomics and workload review.

#### **8.1.6.4. Solid State Interlocking (SSI) Upgrade**

The existing SSI interlocking will also require modification; this can be achieved by extending the existing Data Links and introduction of additional Data Link Modules (DLM) and Trackside Functional Modules (TFM). The existing interlocking currently comprises of 25

TFMs meaning there is enough capacity to cater for any of the options proposed.

The DLM and TFMs will be housed in trackside location case cabinets, which will be served by a cable route housing the data link cables, power, local signalling circuits and apparatus tail cables. The locations will be situated adjacent to the equipment they control as far as reasonably practical.

**8.1.6.5. Signage**

Signage, such as speed restriction boards, will be fitted as required by Group/Company and Technical instructions.

**8.1.6.6. Line speed**

The through Speed of the route will be 20/40 mph, and the signal spacing depicted on the scheme sketches is designed for this speed.

**8.1.6.7. Aberdare Ground Frame**

Aberdare Ground Frame (GF) and associated release controls, signals and point operating equipment will be recovered.

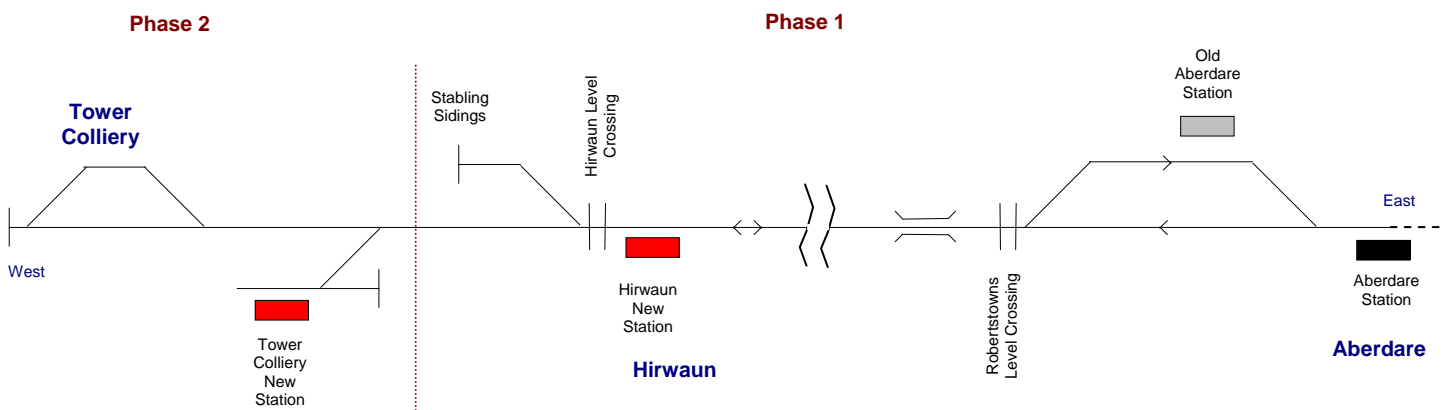
**8.1.6.8. Signals**

Light Emitting Diode (LED) signals will be utilised for all new or replacement signals. These will be mounted on standard plastic or steel posts.

**8.2. Option Descriptions**

**8.2.1. Option 1**

**8.2.1.1. Summary**



In option 1, it is proposed to retain the Existing Aberdare Station (22m 34ch) for both Up & Down trains. It includes the introduction of a short (326m) Passing Loop at Aberdare, which is required to facilitate the proposed time-table.

Further along the route, a new single platform station would be installed at the site of the Old Hirwaun Station (approximately 26m 00ch, immediately on the Aberdare side of Hirwaun crossing), and in addition, a stabling siding would be located just to the west of the Hirwaun Level Crossing.

As a result of a preliminary Level Crossing risk assessment, it is proposed that the vehicular level crossing at Robertstown (23m 08ch), which is currently Train Man Operated (TMO), would be upgraded to a MCB (CCTV) Level Crossing. The route would continue to be a single track through this Level Crossing.

Freight operations beyond Hirwaun Level Crossing (26m 02ch) would be effectively unaffected by this option, as slots would be allowed in the timetable for two freight paths to Tower Colliery each day.

#### **8.2.1.2. Track**

In this option the key feature for track is the introduction of a short (326m from toe to toe) Passing Loop at Aberdare. At each end, this will be provided with a Cv13T turnout, which is capable of 25mph. The turnout would be provided with in-bearer clamplock point machines (or similar approved) and appropriate points heating equipment. The loop will be located on the Down (north) side of the existing single line, and therefore the low mileage turnout would be right-handed, and the high mileage turnout would be left-handed.

As part of the installation of the new passing loop, the existing Ground Frame at Aberdare would be recovered.

At 22m 75ch, the existing single line swaps sides (from Up to Down in direction of increasing mileage) and a realignment would be implemented to improve the alignment for the proposed higher line speed. This would require around 150-200m of realignment.

At around 26m 00ch, a new single platform station would be constructed at Old Hirwaun on the Up (south) side of the existing single line. As the track is level and straight, the alignment is ideally suited to the reinstatement of a station at this location.

To the immediate west of the level crossing at Old Hirwaun (26m 02ch), a new stabling siding would be constructed on the Down (north) side of the existing single line. This would provide sufficient length for up to 3No. 2-Car trains, and would be protected by a buffer stop at the west end, and a trap point at the east end. The turnout into the stabling siding would be a Cv13T right-hand turnout, capable of 25mph. As the stabling siding is for occasional use only, it is not considered that the level crossing would require to be upgraded from its existing status as a Train Man Operated (TMO) level crossing.

### **8.2.1.3. Civil**

As the existing Aberdare Station would be retained for both Up and Down trains in this option, the proposal would be to carry out the minimum works necessary in order to allow for the additional services.

It is expected that general refurbishment work to the station would be carried out (painting, fencing, surfacing etc), and in addition, the current systems and controls may require updating or improving. For example, additional CCTV cameras and lighting may be required. It is considered that the existing access, ticket office, shelter and passenger communication systems are adequate for continued use of this station. The scope of works required would be clarified and confirmed at subsequent GRIP stages.

For 6-car running, the existing platform would need to be lengthened by approximately 20m, and it is considered that this would be achievable at the east (low mileage) end of the platform.

Additional car parking would be relatively straightforward to construct at Aberdare. The existing car park has around 50 spaces, although as the car park is free, up to 50 additional vehicles can park here on the grassed areas, on the entrance road or on the surfaced area towards the Old Aberdare Station. It is considered that at least another 100 car parking spaces could be allowed for, without the need to cross the River Cynon. The land is currently owned by the Local council, and so land purchase is not considered necessary. The incorporation of three bus stops would also be relatively straightforward, and would connect easily with existing local buses.

At around 26m 00ch, a new single platform station would be constructed at Old Hirwaun on the Up (south) side of the existing single line. In order to ease construction there may be merit in sluing the track towards the downside. Facilities would include a suitable shelter, CCTV, lighting, passenger communication systems, ticket office (mornings only) and signage. A new DNO supply is likely to be required at Hirwaun to provide the power supply for the new station.

At the station, 50 new car parking spaces are required. Site constraints and approved development plans in the immediate vicinity will make this provision difficult. Land purchase will be required, and the inclusion of up to 25 new car parking spaces should be achievable, plus associated cycle parking. A new bus stop can potentially be included on Railway Terrace but would require alterations to existing bus routes, as buses do not currently serve this area of Hirwaun.

At Robertstown LC (23m 08ch), highway works would be necessary for this option as the level crossing is upgraded to Manually Controlled Barrier (CCTV). The works would include re-surfacing, white-lining and the incorporation of wig-wag traffic signals. It may also be shown at subsequent GRIP stages that filter lanes would be required to be constructed on the A4059 roundabout which lies adjacent to the level crossing. Traffic management design would be required to confirm requirements, coupled with traffic census data.

For the installation of the new station and parking areas, and for alterations to existing level crossings, some service diversions may be required. These are recommended to be carried out well in advance of proposed railway works, and could be undertaken by the statutory service providers.

New cess walkway would be provided for the length of the affected route, with full new construction for the length of the loop, and demarcation of the cess walkway for the remainder of the route.

Finally, new fencing along the affected route will be required in certain areas, either where fencing is currently not provided, or where the construction work affects the existing boundary.

#### **8.2.1.4. Signalling**

Existing Signals A170 and A170R:

A170R will be converted from a fixed yellow to a Yellow/Green repeater signal at its existing location. A170 will be relocated towards the existing Aberdare station to accommodate the proposed turnout and will become a Red/Green signal. The existing A170 structure and fixed red signal with associated position light will be recovered.

Short Passing Loop with no platform:

326m from toe to toe (226m from clearance point to clearance point. 70m overlaps allowed for starter signal (A169). Loop speed 25mph (Cv13T turnouts provided at both ends).

Signals A169, A167, A165, A165R, A168R, A168:

A169 New R/G signal situated at the end of the new loop with 70m Overlap.

A167 New R/Y/G with JI Position 1 acting as the junction signal for the loop, with 180m overlap.

A165 New R/Y/G protecting Robertstown level crossing.

A165R New Y/G Repeater signal.

A168R New Y/G Repeater signal.

A168 New R/G Signal protecting Robertstown level crossing.

Upgrade Robertstown LC to MCB (CCTV):

Single track over Level Crossing. MCB-CCTV crossing controlled from Abercynon Signalling Centre.

Signals A164 and A164R:

A164 New R/Y signal, with position light aspect with miniature route indicator signal, with 90m overlap. This signal provides a shunt route into Tower and a main and shunt routes into the new stabling siding.

A164R New Y/G Repeater signal.

Signal A163:

New R/G signal and acts as platform starting signal with 180m overlap.

Signal A161 & trap points:

New R/Y/G signal and exit signal from the Tower facility.

Signal A159 & trap points:

New R/Y/G signal and exit signal from the stabling facility.

#### **8.2.1.5. Level Crossings**

The main activity for Option 1 with regard to level crossing is the upgrade of Robertstown Level Crossing from Train Man Operated (TMO) to Manually Controlled Barrier (CCTV) type. The operation will include the provision of wig-wag road traffic control, signage, road surfacing and white lining, and suitable traffic management.

Related Signalling, Telecoms, E&P and Civil Engineering activities are discussed elsewhere.

#### **8.2.1.6. Land Issues**

Land issues are of key concern at Hirwaun Station, where an approved development site for 10 dwellings is located immediately adjacent to the proposed station. The plans for the development also indicate an additional area of land which is in the ownership of the developer.

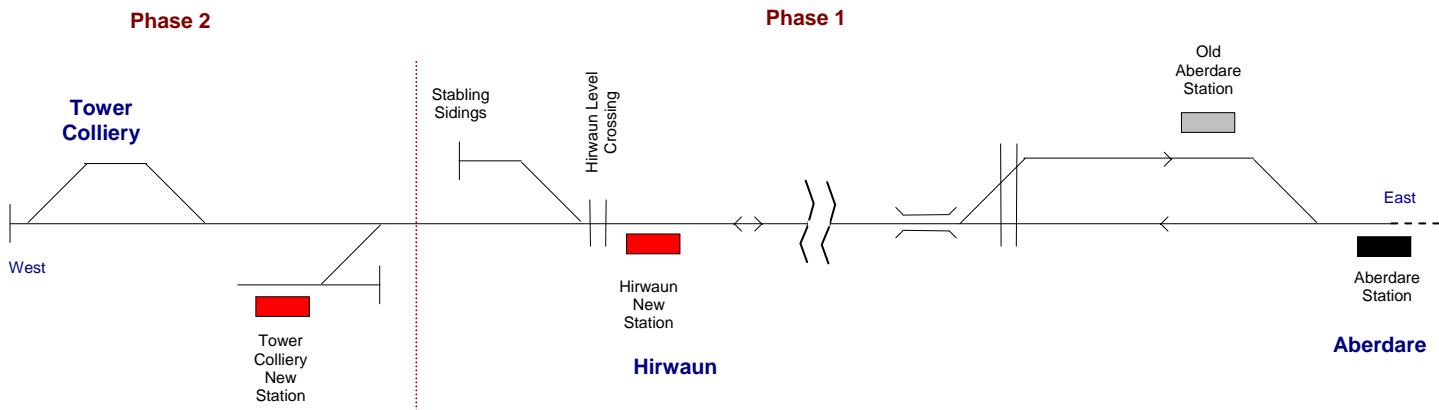
For the implementation of the new station and parking area, it is likely that land purchase will be required, and it is recommended that this process be initiated as soon as possible. It may be necessary to slue the track around 2 metres to the north to create sufficient space for a platform

#### **8.2.1.7. Programme**

Option 1 is expected to require a construction period of **6 months**, excluding site set-up and any enabling works.

## 8.2.2. Option 2

### 8.2.2.1. Summary



Option 2 includes the introduction of a long (1300m) Passing Loop at Aberdare, which is required to facilitate the proposed time-table. In this option, it is proposed to retain the Existing Aberdare Station (22m 34ch) for both Up & Down trains.

Further along the route, a new single platform station would be installed at the site of the Old Hirwaun Station (approximately 26m 00ch), and in addition, a stabling siding would be located just to the west of the Hirwaun Level Crossing.

As a result of a preliminary Level Crossing risk assessment, it is proposed that the vehicular level crossing at Robertstown (23m 08ch), which is currently Train Man Operated (TMO), would be upgraded to a MCB (CCTV) Level Crossing. The route would be enhanced to double track across this Level Crossing.

Freight operations beyond Hirwaun Level Crossing (26m 02ch) would be effectively unaffected by this option, as slots would be allowed in the timetable for two freight paths to Tower Colliery each day.

### 8.2.2.2. Track

In this option the key feature for track is the introduction of a long (1308m from toe to toe) Passing Loop at Aberdare. At the low mileage end, this will be provided with a Cv13T turnout, which is capable of 25mph. At the high mileage end, this will be provided with an Fv24T turnout, which is more than capable of 40mph. The turnouts would be provided with in-bearer clamplock point machines (or similar approved) and appropriate points heating equipment. The loop will be located on the Down (north) side of the existing single line, and therefore the low mileage turnout would be right-handed, and the high mileage turnout would be left-handed.

As part of the installation of the new passing loop, the existing Ground Frame at Aberdare would be recovered.



At 22m 75ch, the existing single line swaps sides (from Up to Down in direction of increasing mileage) and a realignment would be implemented to improve the alignment for the proposed higher line speed. This would require around 150-200m of realignment.

At around 26m 00ch, a new single platform station would be constructed at Old Hirwaun on the Up (south) side of the existing single line. As the track is level and straight, the alignment is ideally suited to the reinstatement of a station at this location.

To the immediate west of the level crossing at Old Hirwaun (26m 02ch), a new stabling siding would be constructed on the Down (north) side of the existing single line. This would provide sufficient length for up to 3No. 2-Car trains, and would be protected by a buffer stop at the west end, and a trap point at the east end. The turnout into the stabling siding would be a Cv13T right-hand turnout, capable of 25mph. As the stabling siding is for occasional use only, it is not considered that the level crossing would require to be upgraded from its existing status as a Train Man Operated (TMO) level crossing.

### **8.2.2.3. Civil**

As the existing Aberdare Station would be retained for both Up and Down trains in this option, the proposal would be to carry out the minimum works necessary in order to allow for the additional services.

It is expected that general refurbishment work to the station would be carried out (painting, fencing, surfacing etc), and in addition, the current systems and controls may require updating or improving. For example, additional CCTV cameras and lighting may be required. It is considered that the existing access, ticket office, shelter and passenger communication systems are adequate for continued use of this station. The scope of works required would be clarified and confirmed at subsequent GRIP stages.

For 6-car running, the existing platform would need to be lengthened by approximately 20m, and it is considered that this would be achievable at the east (low mileage) end of the platform.

Additional car parking would be relatively straightforward to construct at Aberdare. The existing car park has around 50 spaces, although as the car park is free, up to 50 additional vehicles can park here on the grassed areas, on the entrance road or on the surfaced area towards the Old Aberdare Station. It is considered that at least another 100 car parking spaces could be allowed for, without the need to cross the River Cynon. The land is currently owned by the Local council, and so land purchase is not considered necessary. The incorporation of three bus stops would also be relatively straightforward, and would connect easily with existing local buses.

At around 26m 00ch, a new single platform station would be constructed at Old Hirwaun on the Up (south) side of the existing single line. Facilities would include a suitable shelter, CCTV, lighting, passenger communication systems, ticket office (mornings only) and

signage. A new DNO supply is likely to be required at Hirwaun to provide the power supply for the new station.

At the station, 50 new car parking spaces are required. Site constraints and approved development plans in the immediate vicinity will make this provision difficult. Land purchase will be required, and the inclusion of up to 25 new car parking spaces should be achievable, plus associated cycle parking. A new bus stop can potentially be included on Railway Terrace but would require alterations to existing bus routes, as buses do not currently serve this area of Hirwaun.

At Robertstown LC (23m 08ch), highway works would be necessary for this option as the level crossing is upgraded to Manually Controlled Barrier (CCTV), and altering the configuration to double track. The works would include re-surfacing, white-lining and the incorporation of wig-wag traffic signals. It may also be shown at subsequent GRIP stages that filter lanes would be required to be constructed on the A4059 roundabout which lies adjacent to the level crossing. Traffic management design would be required to confirm requirements, coupled with traffic census data.

For the installation of the new station and parking areas, and for alterations to existing level crossings, some service diversions may be required. These are recommended to be carried out well in advance of proposed railway works, and could be undertaken by the statutory service providers.

New cess walkway would be provided for the length of the affected route, with full new construction for the length of the loop, and demarcation of the cess walkway for the remainder of the route.

Finally, new fencing along the affected route may be required in certain areas, either where fencing is currently not provided, or where the construction work affects the existing boundary.

#### **8.2.2.4. Signalling**

Signals A170 and A170R:

A170R will be converted from a fixed yellow to a Yellow/Green repeater signal at its existing location. A170 will be relocated towards the existing Aberdare station to accommodate the proposed turnout and will become a Red/Green signal. The existing A170 structure and fixed red signal with associated position light will be recovered.

Long Passing Loop with no platform:

1308m from toe to toe (178m from clearance point to clearance point. 180m overlaps allowed for starter signal. Loop speed 40mph (Cv13T turnout provided at low mileage end, Fv24T turnout provided at high mileage end).

Signals A169, A169R A167, A167R, A168R, A168:

A169 New R/G signal situated at the end of the new loop with 180m Overlap.

A169R New Y/G Repeater signal.

A167 New R/G with acting as the junction signal for the loop and protecting signal for Robertstown level crossing, with 180m overlap.

A167R New Y/G Repeater signal.

A168R New Y/G Repeater signal.

A168 New R/G Signal protecting Robertstown level crossing.

Upgrade Robertstown LC to MCB (CCTV):

Double track over Level Crossing. CCTV MCB-CCTV crossing controlled from Abercynon Signalling Centre.

Signals A164 and A164R:

A164 New R/Y signal, with position light aspect with miniature route indicator signal, with 90m overlap. This signal provides a shunt route into Tower and a main and shunt routes into the new stabling siding.

A164R New Y/G Repeater signal.

Signal A163:

New R/G signal and acts as platform starting signal with 180m overlap.

Signal A165

New R/G signal and acts as platform starting signal with 180m overlap.

Signal A161 & trap points:

New R/Y/G signal and exit signal from the Tower facility

Signal A159 & trap points:

New R/Y/G signal and exit signal from the stabling facility.

#### **8.2.2.5. Level Crossings**

The main activity for Option 2 with regard to level crossing is the upgrade of Robertstown Level Crossing from Train Man Operated (TMO) to Manually Controlled Barrier (CCTV) type, and altering the configuration to double track. The operation will include the provision of wig-wag road traffic control, signage, road surfacing and white lining, and suitable traffic management.

Related Signalling, Telecoms, E&P and Civil Engineering activities are discussed elsewhere.

### 8.2.2.6. Land Issues

Land issues are of key concern at Hirwaun Station, where an approved development site for 10 dwellings is located immediately adjacent to the proposed station. The plans for the development also indicate an additional area of land which is in the ownership of the developer.

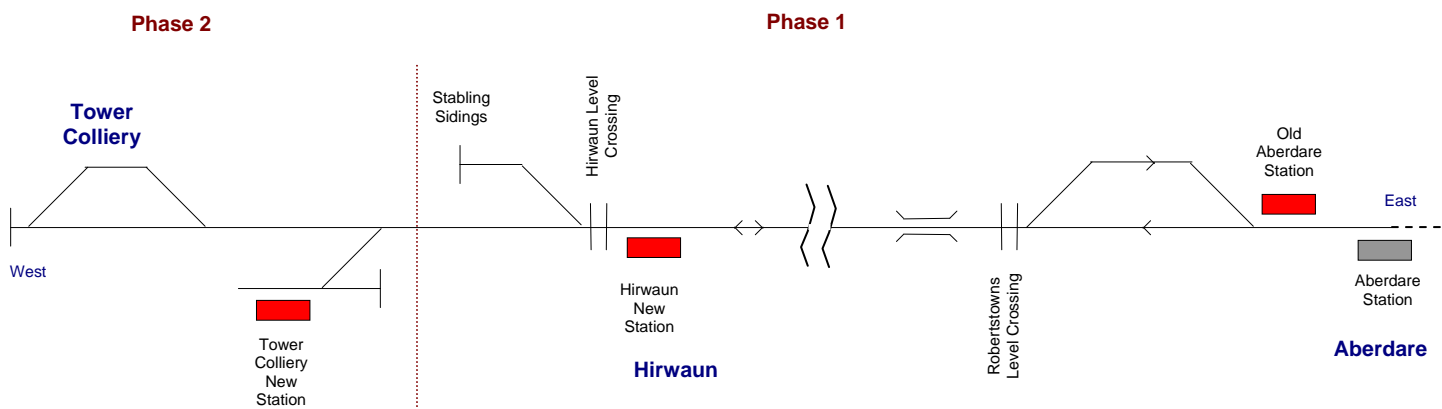
For the implementation of the new station and parking area, it is likely that land purchase will be required, and it is recommended that this process be initiated as soon as possible.

### 8.2.2.7. Programme

Option 2 is expected to require a construction period of **6 months**, excluding site set-up and any enabling works.

## 8.2.3. Option 3

### 8.2.3.1. Summary



In this option, it is proposed to build a new station at the site of the Old Aberdare Station (22m 40ch) for both Up & Down trains. Option 3 also includes the introduction of a short (326m) Passing Loop at Aberdare, which is required to facilitate the proposed time-table. The Existing Aberdare Station would be redundant, and therefore closed. The new passing loop would be located to the west of the re-activated Old Aberdare Station.

Further along the route, a new single platform station would be installed at the site of the Old Hirwaun Station (approximately 26m 00ch), and in addition, a stabling siding would be located just to the west of the Hirwaun Level Crossing.

As a result of a Level Crossing risk assessment, it is proposed that the vehicular level crossing at Robertstown (23m 08ch), which is currently Train Man Operated (TMO), would be upgraded to a MCB (CCTV) Level Crossing. The route would continue to be a single track across this Level Crossing.

Freight operations beyond Hirwaun Level Crossing (26m 02ch) would be effectively unaffected by this option, as slots would be allowed in the timetable for two freight paths to Tower Colliery each day.

### **8.2.3.2. Track**

In this option at the site of the original Old Aberdare Station, a new single platform station would be constructed on the Down (north) side of the new passing loop. This would provide the station facility for all Up and down trains. As the track is level and straight, the alignment is ideally suited to the reinstatement of a station at this location.

In this option the key feature for track is the introduction of a short (326m from toe to toe) Passing Loop at Aberdare. At each end, this will be provided with a Cv13T turnout, which is capable of 25mph. The turnout would be provided with in-bearer clamplock point machines (or similar approved) and appropriate points heating equipment. The loop will be located on the Down (north) side of the existing single line to the immediate west of the new Old Aberdare Station, and therefore the low mileage turnout would be right-handed, and the high mileage turnout would be left-handed.

As part of the installation of the new passing loop, the existing Ground Frame at Aberdare would be recovered.

At 22m 75ch, the existing single line swaps sides (from Up to Down in direction of increasing mileage) and a realignment would be implemented to improve the alignment for the proposed higher line speed. This would require around 150-200m of realignment.

At around 26m 00ch, a new single platform station would be constructed at Old Hirwaun on the Up (south) side of the existing single line. As the track is level and straight, the alignment is ideally suited to the reinstatement of a station at this location.

To the immediate west of the level crossing at Old Hirwaun (26m 02ch), a new stabling siding would be constructed on the Down (north) side of the existing single line. This would provide sufficient length for up to 3No. 2-Car trains, and would be protected by a buffer stop at the west end, and a trap point at the east end. The turnout into the stabling siding would be a Cv13T right-hand turnout, capable of 25mph. As the stabling siding is for occasional use only, it is not considered that the level crossing would require to be upgraded from its existing status as a Train Man Operated (TMO) level crossing.

### **8.2.3.3. Civil**

At the site of the original Old Aberdare Station, a new single platform station would be constructed on the Down (north) side of the new passing loop. The new platform would be located to coincide with the original platform. The proposed scheme does not allow for the use of the Old Aberdare Station building as part of the new station, as it is considered that it would be more cost effective to provide new facilities on the new platform. Facilities would include a suitable

shelter, CCTV, lighting, passenger communication systems, ticket office (mornings only) and signage. A new DNO supply is likely to be required at Hirwaun to provide the power supply for the new station.

Additional car parking would be relatively straightforward to construct at Aberdare. The existing car park has around 50 spaces, although as the car park is free, up to 50 additional vehicles can park here on the grassed areas, on the entrance road or on the surfaced area towards the Old Aberdare Station. It is considered that at least another 100 car parking spaces could be allowed for, without the need to cross the River Cynon. The land is currently owned by the Local council, and so land purchase is not considered necessary. The incorporation of three bus stops would also be relatively straightforward, and would connect easily with existing local buses.

At around 26m 00ch, a new single platform station would be constructed at Old Hirwaun on the Up (south) side of the existing single line. Facilities would include a suitable shelter, CCTV, lighting, passenger communication systems, ticket office (mornings only) and signage. A new DNO supply is likely to be required at Hirwaun to provide the power supply for the new station.

At the station, 50 new car parking spaces are required. Site constraints and approved development plans in the immediate vicinity will make this provision difficult. Land purchase will be required, and the inclusion of up to 25 new car parking spaces should be achievable, plus associated cycle parking. A new bus stop can potentially be included on Railway Terrace but would require alterations to existing bus routes, as buses do not currently serve this area of Hirwaun.

At Robertstown LC (23m 08ch), highway works would be necessary for this option as the level crossing is upgraded to Manually Controlled Barrier (CCTV). The works would include re-surfacing, white-lining and the incorporation of wig-wag traffic signals. It may also be shown at subsequent GRIP stages that filter lanes would be required to be constructed on the A4059 roundabout which lies adjacent to the level crossing. Traffic management design would be required to confirm requirements, coupled with traffic census data.

For the installation of the new station and parking areas, and for alterations to existing level crossings, some service diversions may be required. These are recommended to be carried out well in advance of proposed railway works, and could be undertaken by the statutory service providers.

New cess walkway would be provided for the length of the affected route, with full new construction for the length of the loop, and demarcation of the cess walkway for the remainder of the route.

Finally, new fencing along the affected route may be required in certain areas, either where fencing is currently not provided, or where the construction work affects the existing boundary.

#### **8.2.3.4. Signalling**

Signals A170 and A170R:

A170 New (relocated) R/Y/G signal acting as Aberdare station starting signal.

Short Passing Loop with platform at Old Aberdare:

326m from toe to toe (226m from clearance point to clearance point. 70m overlaps allowed for starter signal. Loop speed 25mph (Cv13T turnouts provided at both ends).

Signals A169, A167, A165, A165R, A168R, A168:

A169 New R/G signal situated at the end of the new loop with 70m Overlap.

A167 New R/Y/G with JI Position 1 acting as the junction signal for the loop, with 180m overlap.

A165 New R/Y/G protecting Robertstown level crossing.

A165R New Y/G Repeater signal.

A168R New Y/G Repeater signal.

A168 New R/G Signal protecting Robertstown level crossing.

Upgrade Robertstown LC to MCB (CCTV):

Single track over Level Crossing. MCB-CCTV crossing controlled from Abercynon Signalling Centre.

Signals A164 and A164R:

A164 New R/Y signal, with position light aspect with miniature route indicator signal, with 90m overlap. This signal provides a shunt route into Tower and a main and shunt routes into the new stabling siding.

A164R New Y/G Repeater signal.

Signal A163:

New R/G signal and acts as platform starting signal with 180m overlap.

Signal A161 & trap points:

New R/Y/G signal and exit signal from the Tower facility

Signal A159 & trap points:

New R/Y/G signal and exit signal from the stabling facility.

### 8.2.3.5. Level Crossings

The main activity for Option 9 with regard to level crossing is the upgrade of Robertstown Level Crossing from Train Man Operated (TMO) to Manually Controlled Barrier (CCTV) type. The operation will include the provision of wig-wag road traffic control, signage, road surfacing and white lining, and suitable traffic management.

Related Signalling, Telecoms, E&P and Civil Engineering activities are discussed elsewhere.

### 8.2.3.6. Land Issues

Land issues are of key concern at Hirwaun Station, where an approved development site for 10 dwellings is located immediately adjacent to the proposed station. The plans for the development also indicate an additional area of land which is in the ownership of the developer.

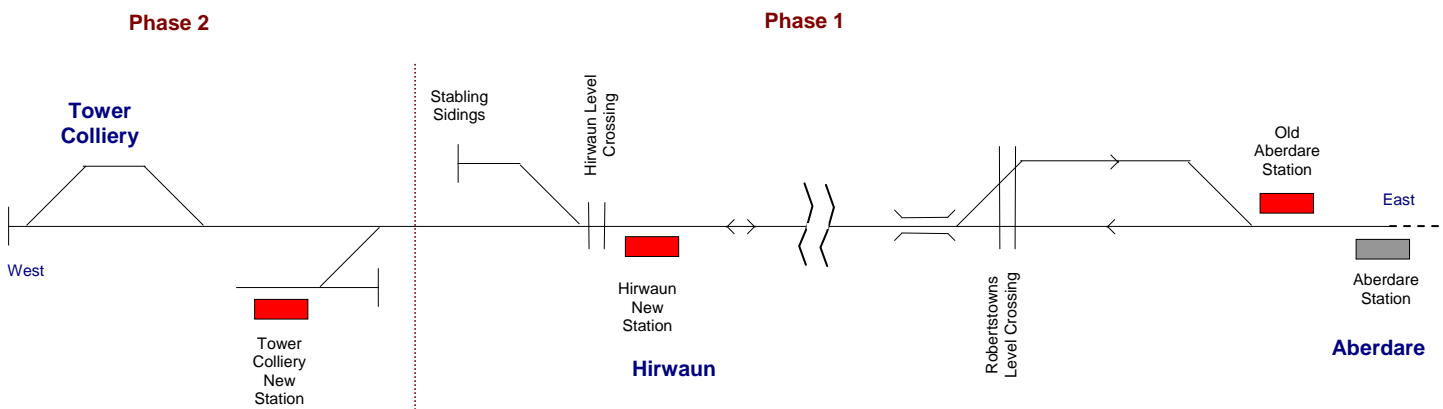
For the implementation of the new station and parking area, it is likely that land purchase will be required, and it is recommended that this process be initiated as soon as possible.

### 8.2.3.7. Programme

Option 3 is expected to require a construction period of **6 months**, excluding site set-up and any enabling works.

## 8.2.4. Option 4

### 8.2.4.1. Summary



Option 4 includes the introduction of a long (1111m) Passing Loop at Aberdare, which is required to facilitate the proposed time-table. In this option, it is proposed to build a new station at the site of the Old Aberdare Station (22m 40ch) for both Up & Down trains. The Existing Aberdare Station would be redundant, and therefore closed. The new passing loop would be located to the west of the re-activated Old Aberdare Station.



Further along the route, a new single platform station would be installed at the site of the Old Hirwaun Station (approximately 26m 00ch), and in addition, a stabling siding would be located just to the west of the Hirwaun Level Crossing.

As a result of a Level Crossing risk assessment, it is proposed that the vehicular level crossing at Robertstown (23m 08ch), which is currently Train Man Operated (TMO), would be upgraded to a MCB (CCTV) Level Crossing. The route would be a double track across this Level Crossing.

Freight operations beyond Hirwaun Level Crossing (26m 02ch) would be effectively unaffected by this option, as slots would be allowed in the timetable for two freight paths to Tower Colliery each day.

#### **8.2.4.2. Track**

At the site of the original Old Aberdare Station, a new single platform station would be constructed on the Down (north) side of the new passing loop. This would provide the station facility for all Up and down trains. As the track is level and straight, the alignment is ideally suited to the reinstatement of a station at this location.

In this option, the key feature for track is the introduction of a long (1111m from toe to toe) Passing Loop at Aberdare. At the south end, this will be provided with a Cv13T turnout, which is capable of 25mph, and at the north end, a turnout with 40 mph capability would be provided. The turnout would be provided with in-bearer clamplock point machines (or similar approved) and appropriate points heating equipment. The loop will be located on the Down (north) side of the existing single line to the immediate west of the new Old Aberdare Station, and therefore the low mileage turnout would be right-handed, and the high mileage turnout would be left-handed.

As part of the installation of the new passing loop, the existing Ground Frame at Aberdare would be recovered.

At 22m 75ch, the existing single line swaps sides (from Up to Down in direction of increasing mileage) and a realignment would be implemented to improve the alignment for the proposed higher line speed. This would require around 150-200m of realignment.

At around 26m 00ch, a new single platform station would be constructed at Old Hirwaun on the Up (south) side of the existing single line. As the track is level and straight, the alignment is ideally suited to the reinstatement of a station at this location.

To the immediate west of the level crossing at Old Hirwaun (26m 02ch), a new stabling siding would be constructed on the Down (north) side of the existing single line. This would provide sufficient length for up to 3No. 2-Car trains, and would be protected by a buffer stop at the west end, and a trap point at the east end. The turnout into the stabling siding would be a Cv13T right-hand turnout, capable of 25mph. As the stabling siding is for occasional use only, it is not considered that the level crossing would require to be

upgraded from its existing status as a Train Man Operated (TMO) level crossing.

### **8.2.4.3. Civil**

At the site of the original Old Aberdare Station, a new single platform station would be constructed on the Down (north) side of the new passing loop. The new platform would be located to coincide with the original platform. The proposed scheme does not allow for the use of the Old Aberdare Station building as part of the new station, as it is considered that it would be more cost effective to provide new facilities on the new platform. Facilities would include a suitable shelter, CCTV, lighting, passenger communication systems, ticket office (mornings only) and signage. A new DNO supply is likely to be required at Hirwaun to provide the power supply for the new station.

Additional car parking would be relatively straightforward to construct at Aberdare. The existing car park has around 50 spaces, although as the car park is free, up to 50 additional vehicles can park here on the grassed areas, on the entrance road or on the surfaced area towards the Old Aberdare Station. It is considered that at least another 100 car parking spaces could be allowed for, without the need to cross the River Cynon. The land is currently owned by the Local council, and so land purchase is not considered necessary. The incorporation of three bus stops would also be relatively straightforward, and would connect easily with existing local buses.

At around 26m 00ch, a new single platform station would be constructed at Old Hirwaun on the Up (south) side of the existing single line. Facilities would include a suitable shelter, CCTV, lighting, passenger communication systems, ticket office (mornings only) and signage. A new DNO supply is likely to be required at Hirwaun to provide the power supply for the new station.

At the station, 50 new car parking spaces are required. Site constraints and approved development plans in the immediate vicinity will make this provision difficult. Land purchase will be required, and the inclusion of up to 25 new car parking spaces should be achievable, plus associated cycle parking. A new bus stop can potentially be included on Railway Terrace but would require alterations to existing bus routes, as buses do not currently serve this area of Hirwaun.

At Robertstown LC (23m 08ch), highway works would be necessary for this option as the level crossing is upgraded to Manually Controlled Barrier (CCTV). The works would include re-surfacing, white-lining and the incorporation of wig-wag traffic signals. It may also be shown at subsequent GRIP stages that filter lanes would be required to be constructed on the A4059 roundabout which lies adjacent to the level crossing. Traffic management design would be required to confirm requirements, coupled with traffic census data.

For the installation of the new station and parking areas, and for alterations to existing level crossings, some service diversions may be required. These are recommended to be carried out well in

advance of proposed railway works, and could be undertaken by the statutory service providers.

New cess walkway would be provided for the length of the affected route, with full new construction for the length of the loop, and demarcation of the cess walkway for the remainder of the route.

Finally, new fencing along the affected route may be required in certain areas, either where fencing is currently not provided, or where the construction work affects the existing boundary.

#### **8.2.4.4. Signalling**

Signals A170 and A170R:

A170 New (relocated) R/Y/G signal acting as Aberdare station starting signal.

Short Passing Loop with platform at Old Aberdare:

326m from toe to toe (226m from clearance point to clearance point. 70m overlaps allowed for starter signal. Loop speed 25mph (Cv13T turnouts provided at both ends).

Signals A169, A167, A165, A165R, A168R, A168:

A169 New R/G signal situated at the end of the new loop with 70m Overlap.

A167 New R/Y/G with JI Position 1 acting as the junction signal for the loop, with 180m overlap.

A165 New R/Y/G protecting Robertstown level crossing.

A165R New Y/G Repeater signal.

A168R New Y/G Repeater signal.

A168 New R/G Signal protecting Robertstown level crossing.

Upgrade Robertstown LC to MCB (CCTV):

Single track over Level Crossing. MCB-CCTV crossing controlled from Abercynon Signalling Centre.

Signals A164 and A164R:

A164 New R/Y signal, with position light aspect with miniature route indicator signal, with 90m overlap. This signal provides a shunt route into Tower and a main and shunt routes into the new stabling siding.

A164R New Y/G Repeater signal.

Signal A163:

New R/G signal and acts as platform starting signal with 180m overlap.

Signal A161 & trap points:

New R/Y/G signal and exit signal from the Tower facility

Signal A159 & trap points:

New R/Y/G signal and exit signal from the stabling facility.

#### **8.2.4.5. Level Crossings**

The main activity for Option 4 with regard to level crossing is the upgrade of Robertstown Level Crossing from Train Man Operated (TMO) to Manually Controlled Barrier (CCTV) type. The operation will include the provision of wig-wag road traffic control, signage, road surfacing and white lining, and suitable traffic management.

Related Signalling, Telecoms, E&P and Civil Engineering activities are discussed elsewhere.

#### **8.2.4.6. Land Issues**

Land issues are of key concern at Hirwaun Station, where an approved development site for 10 dwellings is located immediately adjacent to the proposed station. The plans for the development also indicate an additional area of land which is in the ownership of the developer.

For the implementation of the new station and parking area, it is likely that land purchase will be required, and it is recommended that this process be initiated as soon as possible.

#### **8.2.4.7. Programme**

Option 4 is expected to require a construction period of **6 months**, excluding site set-up and any enabling works.

### **8.2.5. Phase 2 - Addition of Tower Station**

#### **8.2.5.1. Summary**

Phase 2 is an add-on to any of the options 1 to 4 with the addition of a new station at New Tower, which would extend the western limit of the passenger services by approximately 1 mile.

Therefore, the scope and associated land issues for Phase 2 are as Options 1 to 4 with the following omission:

The stabling siding and associated signalling at Old Hirwaun are not required

The following additional work would be required, described by discipline.

### **8.2.5.2. Track**

At around 27m 00ch, a new single platform station would be constructed at New Tower on the Up (south) side, with its own designated station line. As the track is level and straight, the alignment is ideally suited to the reinstatement of a station at this location.

The station line would be formed via a new Cv13T left hand turnout to the immediate west of the A4059 Overbridge at 26m 40ch. The station line would then run parallel to the existing single line up to a buffer stop adjacent to the existing Tower Colliery loading bay area.

In order to expedite freight train loading and operations, and thus minimise potential perturbations to passenger services, it is proposed to extend the freight run-round loop at Tower by around 30 metres, and improve drainage along its length.

As the stabling siding at Old Hirwaun would not be constructed for this option, the proposal is to locate the stabling siding to the east of the proposed platform. This would provide sufficient length for up to 3No. 2-Car trains, and would be protected by a buffer stop at the east end, and a trap point at the west end. The turnout into the stabling would be a Cv13T right-hand turnout, capable of 25mph.

At the embankment slip site (26 miles, 20 chains) it is recommended that the track be realigned away from the embankment edge, in order to reduce the potential risk.

### **8.2.5.3. Civil**

At around 27m 00ch, a new single platform station would be constructed at New Tower on the Up (south) side, with its own designated station line. Facilities would include a suitable shelter, CCTV, lighting, passenger communication systems, ticket office (mornings only) and signage. At the station, 50 new car parking spaces are required. Land purchase is likely to be required, however it is not considered that there will be any difficulty in providing 50 car parking spaces plus associated cycle parking and bus stop. Aspirations for 100 or even 500 car parking spaces are considered achievable, but would involve either decked car parking or significant land purchase to the south, or both.

The current ground conditions at Tower are very wet. An existing drainage ditch runs in the Down cress, and functions satisfactorily, however the area would evidently benefit from further drainage installations. Should the station be constructed at New Tower, the solution would need to incorporate an appropriate drainage system for both the station and the track formation. Liaison with Tower Colliery may be required in order to provide a suitable drainage system to the benefit and acceptance of all parties. Consents may be required, and due consideration of the adjacent SSSI would need to be included in any design work at future GRIP stages.

#### **8.2.5.4. Signalling**

Signals A164 and A164R:

A164 New R/Y/G, with 180m overlap. Signal acts as Hirwaun starting signal and Hirwaun MCB-CCTV protecting signal.

A164R New Y/G Repeater signal.

Signal A163:

New R/G signal and acts as Hirwaun MCB-CCTV protecting signal with 180m overlap.

Upgrade Hirwaun LC to MCB (CCTV):

Single track over Level Crossing. MCB-CCTV crossing controlled from Abercynon Signalling Centre.

Signal A166:

A166 New R/Y/G with JI Position 1 acting as the junction signal for the new Tower station facility, with 180m overlap.

Signal A161 & trap points:

New R/G signal and exit signal from the Tower freight facility.

Signal A159:

New R/G and position light signal acting as new Tower starting signal with shunt route into the new Tower stabling facility.

Ground Signal A450:

New PLG Signal providing a shunt route out of the new Tower stabling facility into new Tower station.

#### **8.2.5.5. Level Crossings**

The main activity for Phase 2 (in addition to the works in Options 1 to 4) with regard to level crossings is the upgrade of Hirwaun Level Crossing from Train Man Operated (TMO) to Manually Controlled Barrier (CCTV) type. The operation will include the provision of wig-wag road traffic control, signage, road surfacing and white lining, and suitable traffic management.

Related Signalling, Telecoms, E&P and Civil Engineering activities are discussed elsewhere.



### 8.2.5.6. Land Issues

Land issues for Phase 2 (in addition to the land issues in Options 1 to 4) are of concern, as it is considered that for the implementation of the new station and parking area at New Tower, it is likely that land purchase will be required, and it is recommended that this process be initiated as soon as possible. This will be especially significant should greater than 50 car parking spaces be the aspiration.

### 8.2.5.7. Programme

Phase 2 is expected to require a construction period of 5 months, if done after the completion of phase 1. If it were constructed at the same time as phase 1, it would extend the total construction period by 2 months.

## 8.3. Discounted Project Elements

Element	Reason for Discounting
Robertstown Station	Station would be too close to Aberdare Station, and would cause problems with the operation of the Level Crossing at Robertstown.
New Hirwaun Station	Station would be Park & Ride only, but location has difficult road access off A465, and the station would be in a significant cutting, leading to difficult DDA access. The site is also remote from the settlement of Hirwaun.
Old Tower Station	Station would be Park & Ride only, but location has difficult road access, and would have to be located to the south of the railway due to SSSI to the north. Significant interface with Tower Colliery freight operations, which would be difficult to overcome.
50mph Dynamic Loop (3000m long)	In order to implement the length of double track to provide this dynamic loop, would involve the re-doubling of the Merthyr Road Bridge at 23m 36ch, which would also involve significant earthworks and retaining structures on each side. The cost and potential requirement for land purchase preclude this option.
20mph Dynamic Loop (1500m long)	In order to implement the length of double track to provide this dynamic loop, would involve the re-doubling of the Merthyr Road Bridge at 23m 36ch, which would also involve significant earthworks and retaining structures on the east side. The cost and potential requirement for land purchase preclude this option.
Robertstown LC Upgrade to AHB (Automatic Half Barrier)	Network Rail Operations Risk Control Co-ordinator confirms that this Level Crossing will have to be upgraded to MCB

Element	Reason for Discounting
	(CCTV) type, subject to re-assessment at GRIP stage 4.
Hirwaun LC Upgrade to AHB (Automatic Half Barrier)	Network Rail Operations Risk Control Co-ordinator confirms that this Level Crossing will have to be upgraded to MCB (CCTV) type, subject to re-assessment at GRIP stage 4.
Level Crossing Closures (Robertstown or Hirwaun)	Correspondence with the Local Council and Highway Agency confirms that the closure of either of these Level Crossings would not be possible due to current usage.
Split site for Aberdare station	It is physically possible to configure Aberdare station with the existing in-use platform on one leg of the passing loop serving Up trains, and Down trains calling at the platform of a re-instated (currently out of use) station on the other loop leg. This possibility has been discounted as the split site would be confusing to passengers, and it would render the Down platform remote from the enlarged car park and bus interchange.

#### 8.4. Possible Trecynon station

Some stakeholders have expressed interest in there being an intermediate station at Trecynon, located between 23 miles 40 chains and 23 miles 70 chains. At this location there would be issues with track gradient, site access, and relationship to proposed housing developments. It has not been considered further in this report.

## 9. Assumptions

The following assumptions have been made:

- Estimates of cost have been made at 4th quarter 2010 prices
- Implementation will have no effect on other services in the Cardiff Valleys Network
- Only the existing paths for freight trains will be needed in the future. It is recognised that there may be an increase in utilisation of the exiting available paths if Planning Consent is granted for open cast mining in the vicinity of Tower Colliery.
- No upgrade of Hirwaun level crossing will be needed if passenger trains terminate at Hirwaun, although it is recognised that there may be additional moves over the crossing to and from the proposed stabling siding should this sub-option be taken forward.
- The proposed service is operable on the basis of the modelling work carried out so far, provided the proposed infrastructure upgrades are implemented.
- No level crossings of any type can be closed, but this will be subject to review at GRIP stage 4
- The loading bay at Tower Colliery is to be retained

- There will be no environmentally unacceptable changes, such as increased noise level, as a result of extending the passenger service beyond Aberdare
- Changes to Arriva Trains Wales's franchise agreement can be successfully negotiated
- Gauge clearances along the line are satisfactory for operation with classes 142 and 150 units.

## 10. Risks and Opportunities

In the development so far of this project, no severe threats to its successful implementation have been identified. The normal construction and weather risks could, of course, affect the timescale. The other risks that have been identified are:

- The reliable operation of train further than Aberdare is readily attainable as far as Hirwaun, but extension to Tower may pose a risk. It is essential that a further Railways modelling exercise is carried out in stage 3, and it is important that that modelling takes into account the pathing dwell time at Mountain Ash, which may well mitigate the currently perceived risk.
- The availability of rolling stock at UK national level is limited so procuring extra units for the proposed extended service may be difficult
- Provision of filter lanes on the A5059 near Robertstown crossing may involve the cost of widening the road bridge over the river
- A preliminary assessment of signal sighting has been made, and no significant problems identified. A formal sighting exercise is required in GRIP stage 4 and there is a risk that un-anticipated issues may arise.
- No topographical, ground or on-site buried services surveys have been carried, so there is the risk that currently unforeseen ground conditions and services could result in additional cost.
- The track levels and embankments have been raised by up to 1.5 metres from original construction between 23 miles 20 chains and 23 miles 50 chains. This has been done to increase headroom for highway vehicles beneath the underbridge at 23 miles 36 chains (Merthyr Road). There is a risk that the operation of frequent passenger trains at an increased line speed may require significant embankment strengthening works.
- At Old Hirwaun station site there is a risk that no car parking space will be available because of the proposed housing development for which Planning Consent was granted in 2008
- The whole of the Cardiff Valleys area has many former coal mining workings, and these may cause problems in constructing new stations, car parks, and additional track for passing loops, Tower station track and stabling sidings. It is recommended that a Mining survey be undertaken at GRIP stage 3.
- Rhondda Taff Council has drawn attention to the risk of flooding at Aberdare Old station.

An opportunity exists in that it may be possible to reduce the estimated outlay for upgrading the track if local sourced re-usable materials, such as rails and sleepers, become available

## 11. Summary of Costs

A full tabulation of costs estimates is provided at appendix 'B'. The estimates include for design, construction, project management, and Network Rail possession and overhead costs. A 25% up lift is also included to allow for risk and uncertainty. The following is a summary table, at 4th quarter 2010 prices:

Options	Cost (£M)	Description
1	16.7	Short Passing Loop at Aberdare, Retain Existing Aberdare Station (Up & Down), Install new station and stabling siding at Old Hirwaun Station,
2	18.6	Long (Passing Loop at Aberdare, Retain Existing Aberdare Station (Up & Down), Install new station and stabling siding at Old Hirwaun Station.
3	17.7	Re-use Old Aberdare Station (Up & Down), Short Passing Loop at Aberdare Install new station and stabling siding at Old Hirwaun Station.
4	19.3	As Option 3, but with long passing loop
Phase 2	9.8	Extend passenger service to Tower
S-H	0.9	Stabling Siding at Hirwaun
S-T	0.5	Stabling Siding at Tower
A-CP	0.4	Car-Park at Aberdare (100 spaces)
H-CP	0.2	Car Park at Hirwaun (50 spaces)
T-CP	0.4	Car Park at Tower (100 spaces)
6C-AE	0.2	Extension of Platform at Existing Aberdare station for 6 Car Trains
6C-AO	0.4	Extension of Platform at Old Aberdare station for 6 Car Trains
6C-OH	0.4	Extension of Platform at Old Hirwaun station for 6 Car Trains
6C-OH	0.4	Extension of Platform at New Tower station for 6 Car Trains

## 12. Environmental Considerations

### 12.1. General

An Environmental Appraisal/Action Plan is provided in appendix D. The key issues and actions worth noting are:

Issue	Action
SSSI and SAC	Screening for appropriate assessment Phase 1 habitat survey
Flood risk	Discussion with EA and agreement that no measures are required
Heritage	If excavating off site, risk of archaeological impact, e.g. on Scheduled Monuments (Hirwaun)
Landscape	Removal of vegetation between Trecynon and Hirwaun has potential to affect the visual aspect of the area
Noise	Noise insulation regulations survey to be considered
Air Quality	Initial screening for air quality impacts due to increased traffic and poor existing air quality (demonstrated through multiple AQMA)
Water	Several water crossings Consents may be required from EA (Flood Risk Consent) if works impact on watercourse – e.g. Tower area drainage.

### 12.2. Sustainability

The proposed extension of passenger services to Hirwaun, and on to Tower if Phase 2 is implemented, brings key benefits with regard to sustainability.

The stated project business case of transferring local transport methods from road to rail brings the direct benefits of reduced fuel usage, improved air quality and reduced noise. The general consideration is that increasing rail traffic is good, and by improving the rail connection to other residential areas should lead to a significant increase in rail usage.

With regard to the required infrastructure, although materials will require to be imported to site for the introduction of the length second track and the renewal track infrastructure for the route, it is considered that these materials (in particular rail and sleepers) could be serviceable components, rather than new. It is considered that some of the recovered materials may be re-useable on site, particularly newer sleepers and rail. It is possible that ballast could be re-used on site, although this will be dependent on analysis of contamination at subsequent design stages. If the ballast cannot be used under the track, it may be possible to incorporate waste ballast in site earthworks, to reduce the amount

of material to be recovered. Also, any surplus or un-usable rail and sleepers could potentially be recycled.

### **12.3. Vegetation Clearance**

It is not expected that the proposed scheme will require extensive vegetation clearance. In the price build-up, allowance has been made for limited vegetation clearance for the re-doubled section of the route (i.e. the proposed loop length), although site visits (in the winter) suggest that vegetation clearance should not be too onerous in this section of the route. Further consideration, including necessary Ecological Surveys, will be necessary in due course to confirm this view.

As mentioned earlier in the report, the further risk assessment work to be carried out at subsequent GRIP stages for each of the UWC and footpath level crossings, may lead to a need to provide localised vegetation clearance to ensure sighting requirements are met.

## **13. Access Strategy and Constructability**

### **13.1. Access for Construction**

Access for construction purposes is readily facilitated for highway vehicles and plant at the sites of old Aberdare, Old Hirwaun and Tower Colliery station sites. For access to track works the station site accesses can be supplemented at the 3 User worked crossings to a limited extent: this does mean that for the 3 miles between Robertstown and Hirwaun road crossings access is possible, but limited in vehicle size.

Site compounds could be readily constructed at Aberdare and Tower Colliery station sites, but a compound at Old Hirwaun would require use of land now in non Network Rail ownership.

In terms of possession access the line north of Aberdare offers a generous window each weekend of about 34 hours between the last train departing on Saturday evening and the first train arriving on Monday morning. It is understood that with the agreement of the freight train operator and the loading pad this could be extended on a regular basis to 48 hours. This will have a significant positive impact on the construction timescales, methodology as well as cost of undertaking the works. A detailed study of this benefit will be made in the next stage.

### **13.2. Access for Maintenance**

As for construction, maintenance access is most readily facilitated at Aberdare, Hirwaun, and Tower station sites, supplemented by Robertstown and Hirwaun level crossings. Access to all turnouts is readily attained from these points.



Access to most signals will be similarly be readily attained from the station and highway crossing points, but access to some signals will be more easily attained from some of the foot or user worked crossings.

## **14. Safety Strategy**

This will be initiated at GRIP stage 4.

## **15. Consents and Land Issues**

The existing running line between Aberdare and Tower Colliery is entirely on land in Network Rail ownership. There is adequate space alongside in Network Rail ownership to construct either short or long loops.

At Aberdare the old (currently disused) station building and land north of the railway (proposed for use as an expanded car park) is in Local Authority ownership. It is assumed that agreement for use of this land for purposes of the project can be agreed with current owners.

At Old Hirwaun, the site of the former south side station platform is now in non-Network Rail ownership, and has Planning Consent for the construction of 10 dwellings. To create a new station platform the following options exist:

- Purchase of the land now in private ownership;
- Or slewing of the track towards the north and construct the platform in the vacated track bed.

At Tower Colliery, there is adequate space on the south side of the line to construct a new station platform, 100 space car park, and stabling siding. If a larger car park is needed, land south of the NR boundary would probably have to be purchased. The currently disused platforms at Tower Colliery could not be utilised as the freight locomotive run-round and headshunt tracks are situated between them. The land on the north side of the NR boundary is a SSSI, and so cannot be utilised

## **16. Interfaces with other Projects**

An application has been submitted for Open cast mining in the Tower Colliery area, and this could mean an increase in freight, resulting in the full utilisation of the current (but often not used) freight paths in the timetable. This should not impact the proposed extended passenger service because the proposed timetable already has gaps in the passenger service to allow freight trains to operate.

## **17. Impacts on Operational and Maintenance Practices**

The timetable studies, as described in section 7, have shown that it is possible to operate the proposed extended half hourly passenger services to tower Colliery, provided an additional loop is constructed at Aberdare, and section running times for freight trains are re assessed. There would be no impact on operation of the wider Cardiff valleys network. Additional passenger rolling stock would probably be required.

Regarding maintenance workload, the increased number of trains running at greater speeds over category 4 track, and the installation of full signalling would both bring increased maintenance activity, though this is expected to be contained within the current Valley Line maintenance strategy of weeknight cyclical access

## 18. Contracting Strategy

Due to the large number of common features between all 10 options developed to date Network Rail would propose that the next phase of the project be let on the basis of a combined single option selection (GRIP 3) and then Development (GRIP 4) contract. Following this a Design and Build Contract would be let to enable the works to be completed.

## 19. Conclusions and Recommendations

Network Rail is confident that the existing infrastructure can be upgraded to enable the reintroduction of passenger services to Hirwaun and Tower.

The project can be undertaken in one or two phases dependant of customer need and funding availability.

The best location for a station at Tower is Cardiff side of the current Loading Pad

The best location for a station at Hirwaun is at the site of the old station, though land availability for the full WAG aspiration may be limited.

At Aberdare options are available for retention of the current facility, or transfer to the old facility, but not a combination of both.

At Aberdare the selected station option should be on a single site and that decision should take account of its position relative to the town centre, bus interchange, pedestrian access and car parking. This is a decision for the WAG and stakeholders, but should the refurbishment of the old station be taken forward then only options 3 & 4 are possible.

There is a need for a passing loop just north of the current Aberdare station; the function of the loop is to allow two trains to pass.

Loop Length impacts journey time and is likely to have a bearing on the ability to run both freight and passenger slots without the current constraint of having to remove some daytime passenger services to allow the daytime freight service to operate. At this moment in time Network Rail believes that the long loop option offers the best long term value.

The provision of passenger rolling stock stabling facilities may not be required; if they are to be built then discussions with Arriva Trains Wales about changes in the current operating practise for the Aberdare/Hirwaun services will be required. These will need to be led by WAG.

Possession availability on the line North of Aberdare is good and offers the opportunity, through negotiation, for blockades. This would shorten the construction time; reduce costs and the overall project duration.

Network Rail believes that the project does offer value for money and would recommend commissioning of the next phases by WAG in the Spring of 2011.

## 20. Recommendations

Network Rail recommends that WAG and other stakeholders consider the following points prior to deciding which options are to be developed further:

- At Aberdare the choice is whether to use the current station or return to the old station building. It is recommended that use of both stations as separate Up and Down platforms is not pursued for operational reasons.
- The choice of the Aberdare station should consider the wider neighbourhood issues about town centre connections, possible property developments, bus links, car parking, and station access for pedestrians.
- The length of the loop should be finalised in GRIP 3 but should be long enough to hold the current freight trains as well as allowing for growth.
- The need, or otherwise, for any stabling facilities on the route as these could be an expensive add on.

In view of the limited number of options, and elements that comprise those options, it is recommended that GRIP stages 3 and 4 be combined into one exercise.

Network Rail recommends that a detailed timetable study is undertaken, taking account of operations at least as far south as Abercynon, and quite possibly further on the Cardiff valleys network, in the next phase to determine the most cost-effective solution for the passing loop.

It is also recommended that further studies should give consideration to a possible station at Trecynon.

## 21. Consultations

Name	Role	Capacity
Dave Thomas	WAG Rail Projects Manager	Overall scope of project
Peter Leppard	ATW Operations Director	Operational issues
Martin Buckle	SEWTA Manager	Local Authority interests
Peter Willey	NR. Route Freight Manager	Freight customer interests
Bob Harper	Rhondda Cynon Taff Council Planner	Town planning issues
Colin Field	NR Senior Town Planner	Planning issues
Andrew Genever	NR Network Planner	Rail network issues
Christine Booth	Operations Risk Advisor	Level Crossing Issues
Lucie Anderton	Environmental Specialist	Environmental issues
Phil Roderick	Structures Engineer	Bridge reports and assessments
Brian Baralos	Senior signalling Engineer	Signalling issues

# Appendix A

(Drawings)





**Please refer to separate folder**



# Appendix B

(Cost Estimates)



Option	Description	Loop Length	Existing Aberdare Station	Old Aberdare Station	Old Hirwaun Station	New Tower Station	Cost to Customer for New Amended Options
1	Short Passing Loop at Aberdare, <b>Retain Existing Aberdare</b> Station and new station at Old Hirwaun	S	Y	N	Y	N	£16,705,332
2	Long Passing Loop at Aberdare, <b>Retain Existing Aberdare</b> Station and new station at Old Hirwaun	L	Y	N	Y	N	£18,551,324
3	Short Passing Loop at Aberdare, <b>Reinstate Old Aberdare</b> Station and new station at Old Hirwaun	S	N	Y	Y	N	£17,699,716
4	Long Passing Loop at Aberdare, <b>Reinstate Old Aberdare</b> Station and new station at Old Hirwaun	L	N	Y	Y	N	£19,253,351
<b>Add ons:</b>							
5	Extend Passenger Service to Tower						£9,813,237
6	Stabling Siding at Hirwaun						£918,949
7	Stabling Siding at Tower						£499,107

Stabling at Hirwaun added	Extension of Passenger Service to Tower and Stabling at Hirwaun	Extension of Passenger Service to Tower and Stabling Tower	plus Extension to Tower but NO Stabling
£17,624,281	£27,437,518	£27,017,675	£26,518,569
£19,470,273	£29,283,509	£28,863,667	£28,364,560
£18,618,665	£28,431,902	£28,012,060	£27,512,953
£20,172,300	£29,985,536	£29,565,694	£29,066,587

180m long	includes for Turnout
150m long	Turnout for this included in 5 - Tower Station cost

**Approximate Costings:**

Extend Platforms from standard or existing length at the following stations for 6 cars (as build up on 50 OP PROPERTY Tab below)		<b>Cost to customer</b>
at: Existing Aberdare Station (currently in use)		£184,685
Old Aberdare Station		£369,369
Old Hirwaun Station		£369,369
New Tower Station		£369,369
Car parking etc as build up on 70 GEN CIVILS Tab below	<b>Not by Network Rail</b>	
at: Aberdare Station	100 spaces, etc.	£406,000
Old Hirwaun Station	50 spaces, etc.	£187,000
New Tower Station	100 spaces, etc.	£406,000

already 102m long thus shorter extension



Oracle Project No. 112053 Aberdare to Hirwaun - Options					
Project Description				TOTAL	£ 653,921.25
Ref	Description	Quantity	Unit	Rate	Cost
50	<b>Operational Property</b>				
	<b>Extend Platform at Existing Aberdare Station</b>				
	Extend platform + 20m for 6 car, currently 102m	70	m2	£ 1,500.00	£ 105,000.00
	Add for Possessions at 1%				£ 1,050.00
	add Preliminaries at 18%				£ 18,900.00
	Add Design say 5%				£ 5,250.00
	Network Rail Project Management 9.6%				£ 10,080.00
	TOC/FOC compensation				£ 1,785.00
	Add 30% residual factors (risk)				£ 42,619.50
				<b>Total</b>	<b>£ 184,684.50</b>
	<b>Extend Platform at Old Aberdare Station</b>				
	Install new Platform (assumed lighting included for in this rate) allowance for six car	140	m2	£ 1,500.00	£ 210,000.00
	Add for Possessions at 1%				£ 2,100.00
	add Preliminaries at 18%				£ 37,800.00
	Add Design say 5%				£ 10,500.00
	Network Rail Project Management 9.6%				£ 20,160.00
	TOC/FOC compensation				£ 3,570.00
	Add 30% residual factors (risk)				£ 85,239.00
				<b>Total</b>	<b>£ 369,369.00</b>
	<b>Extend Platform at Old Hirwaun Station</b>				
	Install new Platform (assumed lighting included for in this rate) allowance for six car	140	m2	£ 1,500.00	£ 210,000.00
	Add for Possessions at 1%				£ 2,100.00
	add Preliminaries at 18%				£ 37,800.00
	Add Design say 5%				£ 10,500.00
	Network Rail Project Management 9.6%				£ 20,160.00
	TOC/FOC compensation				£ 3,570.00
	Add 30% residual factors (risk)				£ 85,239.00
				<b>Total</b>	<b>£ 369,369.00</b>





*Standard Template for Stage 1-2 Estimates*

**Enhancements Estimating**

**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 1

**Project Description:** Short Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun

**Estimate Stage:** 2

**Level of Confidence - +/- 40% (Stage 1), +/- 30% (Stage 2)**

<b>Issue and Revision Record:</b>					
<b>Rev.</b>	<b>Date</b>	<b>Consultant</b>	<b>Prepared by</b>	<b>Checked / Reviewed</b>	<b>Description</b>
Rev 00	26-Jan-11	Franklin and Andrews	Ian Smith	Nick Bennett	For comment

## **Estimate Document Contents**

<b>1</b>	<b>Assumptions</b>
<b>2</b>	<b>Estimating Risk Register</b>
<b>3</b>	<b>Estimate Summary Report</b>
<b>4</b>	<b>Summary by GRIP</b>
<b>5</b>	<b>Indirect Costs (Auto generated)</b>
<b>6</b>	<b>10. Signalling, measured works</b>
<b>7</b>	<b>20. Electrification and Power, measured works</b>
<b>8</b>	<b>30. Track, measured works</b>
<b>9</b>	<b>40. Telecommunications, measured works</b>
<b>10</b>	<b>50. Operational Property, measured works</b>
<b>11</b>	<b>60. Structures, measured works</b>
<b>12</b>	<b>70. General Civils, measured works</b>
<b>13</b>	<b>80. Utilities, measured works</b>
<b>14</b>	<b>Other Contractors Indirect Costs</b>
<b>15</b>	<b>Network Rail Direct Costs</b>

**Estimate Stage:** 2  
**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 1  
**Project Description:** Short Passing Loop at Aberdare, Retain Existing Aberdare Station and

## Assumptions

### General / Drawings & Documents / Exclusions

#### General

- G1 The estimate base date is 4Q 2010
- G2 Escalation has not been included within the Project AFC as the AFC is below £50m in value and the construction phase will be under two years in duration; the estimate is therefore valid at the current time and as long as 4Q 2010 price levels are seen to be constant.
- G3 The cost of escalation shown has been calculated using RPI and this is the potential increase in the cost of the project from 4Q 2010 to the mid point of construction at 4Q 2014.
- G4 An uplift factor of 25% for cost and scope uncertainty has been applied after consultation with the Estimating Manager.
- G5 Arup are provided signalling scheme plans for these new options which the estimator has not had sight of yet. However A Wilkins has briefed I Smith of the new requirements for each of the new Options 1 to 4.

#### Preliminaries

- P1 Preliminaries have been allowed based on percentages allowed as per allocations on Indirects Tab which equate to an overall 18% of Contractor's Base Construction Cost inc OH&P

#### 10 Signalling

- 10.1 Tail Cables assumed as 200m long each.
- 10.2 Testing & Commissioning has been calculated as 15% of Signalling total cost. Refer to Indirects Tab.

#### 20 E&P - Electrification and Plant

- 20.1 We have been advised that a new Principal Supply Point PSP (power supply) is are required for this scheme and is likely to be located at the new Old Hirwaun Station site.
- 20.2 Testing & Commissioning has been calculated as 10% of E&P total cost. Refer to Indirects Tab.

#### 30 Track

- 30.1 This section has been priced on the assumption that the works can be carried in a conventional manner using tracked excavators and dozers to carry out the lowering and slewing of the existing line.
- 30.2 It has been assumed that the existing track Category 6 track will be completely replaced in order to provide a minimum track category of Cat 4 using servicable rail and sleepers. However the availability of servicable materials for this project can only be assumed at this stage and there is a risk that the project requirement may not be fulfilled and new materials will be required.
- 30.3 De-vegetation of the route where the track is doubled is assumed. It is assumed that the track is currently maintained for single track.

#### 40 Telecoms

- 40.1 All new telephone quantities have been confirmed with Arup for this section.
- 40.2 An allowance has been made for CCTV cable from Hirwaun LC to Robertstown LC to the Signal Box at Abercynon.
- 40.3 Copper telecoms cable from the furthest away level crossing has been assumed as required.
- 40.4 Testing & Commissioning has been calculated as 10% of Telecoms total cost. Refer to Indirects Tab.

## 50 Operational Property

- 50.1 Allowances for refurbished station buildings, new waiting shelters, new ticket offices, new platforms, etc. have been allowed as per Arup list of requirements.
- 50.2 Reasonable assumptions of quantities of CIS (customer information signs), PA (public address) equipment, CCTV and help points have been made.
- 51.3 No allowance has been made for ticket machines. If required a sum of £35k each should be made.

## 60 Structures

- 60.1 No structures work allowed. All bridges and culverts along route assumed sound.

## 70 Gen Civils

- 70.1 Carparking, cycleparking and bus stops is assumed to be by others.
- 70.2 For the cess walkway the specification has been reduced to remove the timber edgings.
- 70.3 For Vegetation clearance have allowed only where track is doubled as assumed that maintainer already clears for single track.
- 70.4 No allowance has been made for external works such as main highway entrance, station forecourts works, CCTV, car park lighting nor bus turning circles etc.

## 80 Utilities

- 80.1 A provisional sum has been allowed for utility diversions.

## Other Contractor Indirects

- 90.1 Ecology surveys, noise insulation modelling and environment impact statement report allowed for here.

## Drawings & Documents

The following documents have been used in the preparation of this estimate:

- D1 Original signalling scheme sketches prepared for Options 1 to 8.
- D2 Project Remit
- D3 Briefing from A Wilkins to adjust certain original Options to new options 1 to 4.

## Exclusions

- E1 Excludes any allowance for Optimism Bias.
- E2 Escalation allowance is excluded from the "Cost to Customer" figure.
- E3 VAT is excluded.
- E2 Excludes 3rd party compensation charges except compensation to TOC/FOC.
- E3 Excludes planning and approval charges.
- E4 Excludes permanent land purchases.
- E5 Excludes costs associated with Statutory Fees (e.g. HMRI, Local Authority, etc.).
- E6 Excludes Costs associated with taxes and levies, including VAT.
- E7 Excludes Costs associated with licences and all associated costs and fees except where stated.
- E8 Excludes costs associated with changes in legislation and any form of applicable standards.
- E9 Excludes costs associated with changes in legislation, regulation and interpretation covering discriminatory, specific and general issues that may lead to design and cost changes.
- E10 Excludes costs associated with ground investigation/design unless stated otherwise in the summary.
- E11 Excludes allowances for adverse ground conditions / provisions for ground stabilisation / service diversions unless specifically identified.
- E12 Excludes contingency costs.



**Estimate Stage:** 2

**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 1

**Project Description:** Short Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun

**Estimating Risk Register**

Ref	Risk Type	Description	Probability	Potential Cost Impact
1		<p><i>The estimator is asked to identify any risks to the project and/or estimate identified in preparing the estimate; this is to inform the QCRA process only and any potential cost impacts will not impact on the estimate total. The estimator should indicate his assessment of the level of cost impact (by percentage/H/M/L assessment / cost value or range), it is recognised that this will be a subjective assessment only</i></p> <p>The availability of servicable rail and sleepers from NDS to furnish this projects substantial requirements is assumed. There is a risk that this requirement may not be fulfilled and that new materials will have to be used at greater cost.</p>		

**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision	A	Estimate Stage	2
Estimate Date	26-Jan-11	Price 'Base date'	4Q2010		
Anticipated Start Date	01-Sep-14	Anticipated Finish Date	01-Mar-15		
Project No.	112053 Aberdare to Hirwaun - Option 1				
Project Title / Location	Short Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun				

WBS	Estimate Breakdown	Value	Escalation (Y/N)	%age of Point Estimate	Remarks
	<b>Contractor's direct costs -</b>				
10	Signalling	3,040,945	Y		
20	Electrification & Plant	599,560	Y		
30	Track	3,493,650	Y		
40	Telecoms	741,657	Y		
50	Operational Property	715,204	Y		
60	Structures	-	Y		
70	General Civils	149,148	Y		
80	Utilities	200,000	Y		
	Contractor's Base Construction Cost inc OH&P: Sub-Total A	8,940,164			
	<b>Network Rail's "direct costs"</b>				
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Fleet		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Engineering trains		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Tampers		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Possession / Isolation Management	62,169			
	Sub - Total B	62,169			
	Total Base Construction Cost inc OH&P: Sub-Total C (A+B)	9,002,333		0.00%	
	<b>Contractor's indirect costs</b>				
tbc	Preliminaries	1,609,230	Y		
tbc	Design	1,021,386	Y		
tbc	Testing & Commissioning	559,854	Y		
tbc	Training		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Spares		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Other	41,250	Y		
	Sub - Total D	3,231,719			
	<b>Total Construction Cost E (C+D)</b>	<b>12,234,052</b>			
	<b>Network Rail's indirect &amp; other costs</b>				
tbc	Network Rail Project Management, (COWD)		N		To be advised by project manager if applicable
tbc	Network Rail Project Management, (forecasted remaining costs)	855,213	Y		Adjusted after comments by R Cole 20-12-10
tbc	Compensation charges (TOC & FOC), (costs from NDS)	150,000	Y	1.68%	Adjusted after comments by R Cole 20-12-10
tbc	DCO Charges	-	Y		Refer "NR Indirects" tab
tbc	Land / Property Costs & compensation	125,000	Y		Refer "NR Indirects" tab
tbc	Escalation (see Note 1)	%	NA		See Note 1
tbc	Other ( State )	-			Refer "NR Indirects" tab
	Sub - Total F	1,130,213			
	<b>Point Estimate - Sub - Total G (E+F)</b>	<b>13,364,265</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>13,364,265</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)	% 25%			Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
	<b>Project Anticipated Final Cost (AFC)</b>	<b>16,705,332</b>			Authorised AFC
	<b>Other Costs to the Customer</b>				
tbc	Allowance for Escalation (see Note 1)	<b>Not included in Cost to Customer</b>	2,009,104		Escalation to Midpoint of construction works taken as 3Q2014 See Note 1
tbc	Allowance for Network Rail Fee Fund				provided by Sponsor
tbc	Allowance for Industry Risk Fund				provided by Sponsor
tbc	Allowance for Insurance Top-up				provided by Sponsor
	<b>Cost to Customer</b>	<b>16,705,332</b>			<b>NB Escalation is excluded from Cost to Customer</b>

**APPROVAL & ENDORSEMENT**

	Estimate Produced by :-	Estimate Approved by :-	Estimate Endorsed by :-
Name :-	Ian Smith Estimator	Nick Bennett Estimating Manager	
Position :-	Franklin and Andrews Limited	Network Rail	
Signed :-			
Date :-			

**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  
Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calculated as described herein and shown in the Estimate Summary Report under "Other Costs to the Customer" for advice only. Escalation has been calculated to the estimated midpoint of the construction period ie 4Q 2014. The increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%; NB this amount has not been included within the estimate for 'Cost to the Customer'.

2. An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating. The basis for applying the uplift value seen herein is as follows:

An adjusted uplift for Residual Factors of +25% has been applied for this estimate at Grip Stage 2. Normally an uplift of 30% is applied however the Estimating Manger has agreed that due to the level of detailed measurement that 25% is a reasonable allowance in this case.

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)

A QRA meeting has not been held yet thus these figures are not available.

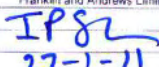
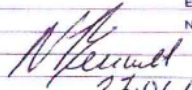
**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision	A	Estimate Stage	2
Estimate Date	26-Jan-11	Price 'Base date'	4Q2010		
Anticipated Start Date	01-Sep-14	Anticipated Finish Date	01-Mar-15		
Project No.	112953 Aberdare to Hirwaun - Option 1				
Project Title / Location	Short Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun				

WBS	Estimate Breakdown	Value	Escalation (Y/N)	%age of Point Estimate	Remarks
	<b>Contractor's direct costs -</b>				
10	Signalling	3,040,945	Y		
20	Electrification & Plant	599,560	Y		
30	Track	3,493,650	Y		
40	Telecoms	741,657	Y		
50	Operational Property	715,204	Y		
60	Structures	-	Y		
70	General Civils	149,148	Y		
80	Utilities	200,000	Y		
	Contractor's Base Construction Cost inc OH&P: Sub-Total A	8,940,164			
	<b>Network Rail's "direct costs"</b>				
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Fleet		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Engineering trains		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Tampers		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Possession / Isolation Management	62,169			
	Sub - Total B	62,169			
	Total Base Construction Cost inc OH&P: Sub-Total C (A+B)	9,002,333		0.00%	
	<b>Contractor's indirect costs</b>				
tbc	Preliminaries	1,609,230	Y		
tbc	Design	1,021,386	Y		
tbc	Testing & Commissioning	559,854	Y		
tbc	Training		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Spares		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Other	41,250	Y		
	Sub - Total D	3,231,719			
	Total Construction Cost E (C+D)	12,234,052			
	<b>Network Rail's indirect &amp; other costs</b>				
tbc	Network Rail Project Management, (COWD)		N		To be advised by project manager if applicable
tbc	Network Rail Project Management, (forecasted remaining costs)	855,213	Y		Adjusted after comments by R Cole 20-12-10
tbc	Compensation charges (TOC & FOC), (costs from NDS)	150,000	Y	1.68%	Adjusted after comments by R Cole 20-12-10
tbc	DCO Charges	-	Y		Refer "NR Indirects" tab
tbc	Land / Property Costs & compensation	125,000	Y		Refer "NR Indirects" tab
tbc	Escalation (see Note 1)	-	NA		See Note 1
tbc	Other (State)	-			Refer "NR Indirects" tab
	Sub - Total F	1,130,213			
	Point Estimate - Sub - Total G (E+F)	13,364,265			
	<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>	13,364,265			<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)	% 25%		3,341,066	Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
	<b>Project Anticipated Final Cost (AFC)</b>	16,705,332			Authorised AFC
	<b>Other Costs to the Customer</b>				
tbc	Allowance for Escalation (see Note 1)	<u>Not</u> included in Cost to Customer	2,009,104		Escalation to Midpoint of construction works taken as 3Q2014 See Note 1
tbc	Allowance for Network Rail Fee Fund				provided by Sponsor
tbc	Allowance for Industry Risk Fund				provided by Sponsor
tbc	Allowance for Insurance Top-up				provided by Sponsor

<b>Cost to Customer</b>	<b>16,705,332</b>	NB Escalation is excluded from Cost to Customer
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**APPROVAL & ENDORSEMENT**

	Estimate Produced by :-	Estimate Approved by :-	Estimate Endorsed by :-
Name :-	Ian Smith	Nick Bennett	
	Estimator	Estimating Manager	
Position :-	Franklin and Andrews Limited	Network Rail	
Signed :-			
Date :-	27-1-11	27-01-11	

**Notes:-**

- 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  
Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calculated as described herein and shown in the Estimate Summary Report under "Other Costs to the Customer" for advice only. Escalation has been calculated to the estimated midpoint of the construction period ie 4Q 2014. The increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%. NB this amount has not been included within the estimate for "Cost to the Customer".
  - An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating. The basis for applying the uplift value seen herein is as follows:  
An adjusted uplift for Residual Factors of +25% has been applied for this estimate at Grip Stage 2. Normally an uplift of 30% is applied however the Estimating Manager has agreed that due to the level of detailed measurement that 25% is a reasonable allowance in this case.
  - 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)
- A QRA meeting has not been held yet thus these figures are not available.

**Enhancements Estimating**

**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 1

**Project Description:** Short Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun

**Estimate Stage:** 2

		Assumed Expenditure Profile										
Total		% Stage 1	% Stage 2	% Stage 3	% Stage 4	% Stage 5	% Stage 6	% Stage 7	% Stage 8			
<b>Direct Costs</b>												
<i>Asset-</i>												
Signalling & Telecoms	3,040,945						98%	2,980,126	2%	60,819		
Electrification & Plant	599,560						98%	587,569	2%	11,991		
Track	3,493,650						98%	3,423,777	2%	69,873		
Telecoms	741,657						98%	726,824	2%	14,833		
Operational Property	715,204						98%	700,900	2%	14,304		
Structures	0						98%	0	2%	0		
General Civils	149,148						98%	146,165	2%	2,983		
Utilities	200,000						100%	200,000				
<b>Indirect Costs</b>												
Preliminaries	1,609,230						98%	1,577,045	2%	32,185		
Design	1,021,386		1% 10,214	8% 81,711	30% 306,416	55% 561,762	6%	61,283				
Test and Commission	559,854						100%	559,854				
Network Rail Management	715,213	4% 28,609	10% 71,521	10% 71,521	12% 85,826	12% 85,826	45%	321,846	5%	35,761	2% 14,304	
Sponsor	140,000	20% 28,000	20% 28,000	20% 28,000	10% 14,000	10% 14,000	10%	14,000	6%	8,400	4% 5,600	
<b>Other Costs</b>												
TOC/ FOC compensation	150,000						100%	150,000				
Land purchase						100%	0					
Possessions/ Isolations	62,169						100%	62,169				
TWA Charges	0			20% 0	60% 0	20% 0						
Land / Property Costs & compensation	125,000					15%	18,750	85%	106,250			
Escalation (see Note 1)	0			2% 0	4% 0	18%	0	60%	0	15%	0	
Other ( State )	41,250					15%	6,188	70%	28,875	15%	6,188	
<i>Point Estimate Total</i>	<i>13,364,265</i>											
Uplift for Risk & Contingency	3,341,066			2% 66,821	4% 133,643	18%	601,392	60%	2,004,640	15%	501,160	1% 33,411
<b>Total expenditure by GRIP Stage</b>		<b>56,609</b>	<b>109,735</b>	<b>248,054</b>	<b>539,884</b>	<b>1,287,917</b>	<b>13,651,323</b>	<b>758,496</b>	<b>53,315</b>			
Project Anticipated Final Cost	16,705,332											

<b>Estimate Stage:</b>	<b>2</b>										
<b>Oracle Project No.:</b>	<b>112053 Aberdare to Hirwaun - Option 1</b>										
<b>Project Name:</b>	<b>Short Passing Loop at Aberdare, Retain Existing Aberdare Station and new s</b>										
<b>Calculation of Contractors and Network Rail's Indirect Costs</b>											
<b>Asset</b>	<b>Total Direct Costs</b>	<b>%</b>	<b>Preliminaries</b>	<b>%</b>	<b>Design</b>	<b>%</b>	<b>Test &amp; Commission</b>	<b>%</b>	<b>Network Rail Management</b>	<b>%</b>	<b>Sponsor</b>
Signalling	3,040,945	18%	547,370	10%	304,095	14%	425,732	8%	243,276	2%	47,097
Electrification & Plant	599,560	18%	107,921	30%	179,868	10%	59,956	8%	47,965	1%	8,199
Track	3,493,650	18%	628,857	10%	349,365	0%	0	8%	279,492	2%	58,076
Telecoms	741,657	18%	133,498	10%	74,166	10%	74,166	8%	59,333	1%	4,911
Operational Property	715,204	18%	128,737	10%	71,520	0%	0	8%	57,216	1%	9,001
Structures	0	18%	0	15%	0	0%	0	8%	0	0%	0
General Civils	149,148	18%	26,847	15%	22,372	0%	0	8%	11,932	6%	8,585
Utilities	200,000	18%	36,000	10%	20,000	0%	0	8%	16,000	2%	4,130
			1,609,230		1,021,386		559,854		715,213		140,000
<b>Allowance for TOC / FOC Compensation - calculator</b>											
	8,940,164		1,609,230				559,854				
					TOTAL		11,109,247				
					<b>Allowance for TOC / FOC compensation (%)</b>	<b>1.35%</b>	<b>150,000</b>				

Oracle Project No. 112053 Aberdare to Hirwaun - Option 1					
Project Description Short Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun				TOTAL	£ 3,040,945.00
Ref	Description	Quantity	Unit	Rate	Cost
10	<b>Signalling</b>				
	<b>Controls</b>				
1	Mods to Control System @ Abercynon Signal Box	1	No	£ 25,000.00	£ 25,000.00
2	Mods to Indication System @ Abercynon Signal Box	1	No	£ 15,000.00	£ 15,000.00
3	Mods to train describer	1	No	£ 10,000.00	£ 10,000.00
	<b>Interlockings</b>				
4	Mods to Interlocking	1	Psum	£ 200,000.00	£ 200,000.00
	<b>Recoveries</b>				
5	Recover Ground Frame at Aberdare	1	Nr	£ 3,300.00	£ 3,300.00
6	Signal head and post recovered at Aberdare	2	Nr	£ 6,975.00	£ 13,950.00
7	Independent Position light on post at Aberdare (Slot)	1	No	£ 3,055.00	£ 3,055.00
	<b>New Signals</b>				
8	Install Signals A170 and 170R 2 aspect at Existing Aberdare Station	2	Nr	£ 6,975.00	£ 13,950.00
9	Install Signal A169, 2 aspect for Loop	1	Nr	£ 6,975.00	£ 6,975.00
10	Install Signal A167 at Old Hirwaun Station	1	Nr	£ 6,975.00	£ 6,975.00
11	Install Signals A164 and 164R 2 aspect after Old Hirwaun Station	2	Nr	£ 6,975.00	£ 13,950.00
12	Position light signal, attached to main signal on post at Old Hirwaun Station	1	No	£ 3,939.00	£ 3,939.00
13	Install Signal A165 at Old Hirwaun Station	1	Nr	£ 6,975.00	£ 6,975.00
	<b>New signs</b>				
14	Install 20/40 permissible speed Sign on post at Existing Aberdare Station and at Old Hirwaun	2	Nr	£ 626.00	£ 1,252.00
15	Install 20/40 permissible speed Sign at high mileage end of Short Loop	1	Nr	£ 626.00	£ 626.00
16	Install 25 permissible speed Sign and directional arrow at high mileage end of Short Loop	1	Nr	£ 672.00	£ 672.00

Ref	Description	Quantity	Unit	Rate	Cost
	<b>Train Detection</b>				
17	Axle counters; in possessions	3	nr	11,160	£ 33,480.00
18	Axle counters	5	nr	10,200	£ 51,000.00
19	REB Type 1	2	nr	25,000	£ 50,000.00
20	Axle counter evaluators + telephone	2	nr	26,000	£ 52,000.00
	<b>Protection and Warning Systems</b>				
21	TPWS - OSS + TSS to signal in short loop	1	nr	12,325	£ 12,325.00
22	TPWS - OSS + TSS; in possessions	4	nr	13,588	£ 54,352.00
23	AWS - in short loop	1	nr	3,613	£ 3,613.00
24	AWS - suppressed; in possessions	4	nr	7,154	£ 28,616.00
	<b><u>Level Crossings</u></b>				
25	Upgrade Robertstown Level Crossing to MCB (CCTV) type, with full barriers	1	Sum	£ 1,300,000.00	£ 1,300,000.00
26	Allowance for highway works on the A4059 at Robertstown.	1	Sum	£ 500,000.00	£ 500,000.00
27	Tranbroad Feeder FP foot crossing to be retained, with new boards / signage	1	Nr	£ 20,000.00	£ 20,000.00
28	Feeder FP foot crossing to be retained, with new boards / signage	1	Nr	£ 20,000.00	£ 20,000.00
29	Tir Mawr Farm UWC to be retained, with new surfacing, signage and telecoms	1	Nr	£ 225,000.00	£ 225,000.00
30	Berthllwyd UWC to be retained, with new surfacing, signage and telecoms	1	Sum	£ 225,000.00	£ 225,000.00
	<b>Trackside</b>				
	<u>Cabling</u>				
31	Multicore cabling (for signals)	5996	m	£ 15.00	£ 89,940.00
32	Tail cables for trackside equipment (x 200m each)	5000	m	£ 10.00	£ 50,000.00
	<b>Page Total</b>				£ 3,040,945.00



Oracle Project 112053 Aberdare to Hirwaun - Option 1						
Project No.		Short Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun			TOTAL	£ 599,560.00
Ref	Description	Quantity	Unit	Rate	Cost	
20	<b><u>Electrification and Plant</u></b>					
1	650V Signalling Power Supply cable for the route	5996	m	£ 20.00	£ 119,920.00	
2	New PSP Principal Supply point to be installed (possibly at Hirwaun)	1	Nr	£ 250,000.00	£ 250,000.00	
3	DNO supply	1	nr	£ 25,000.00	£ 25,000.00	
4	Install new FSP along the route	2	Nr	£ 12,000.00	£ 24,000.00	
5	Loc cases to serve pairs of signals	2	Nr	£ 26,570.00	£ 53,140.00	
	<b><i>Points Heating</i></b>					
6	Power supply	3	nr	12,500	£ 37,500.00	
7	Control cabinet	3	nr	20,000	£ 60,000.00	
8	Heating (point ends)	6	nr	5,000	£ 30,000.00	
	<b>Page Total</b>				£ 599,560.00	

Oracle Project No. 112053 Aberdare to Hirwaun - Option 1					
Project Description				TOTAL	£ 3,493,650.00
Ref	Description	Quantity	Unit	Rate	Cost
30	<b>Track</b>				
	<b>Track Replacement</b>				
1	Recover existing Ground Frame at Aberdare			incl in signalling	
2	Strip out and recover plain line track	5473	m	£ 50.00	£ 273,650.00
3	Upgrade of track to provide Track Category 4 infrastructure; majority of current track is to lower Category 6; this <u>allows for replacing all track with servicable track and sleepers</u> from Aberdare to the extent of new passengerised route except for 523m of 1978 track at Aberdare. This item assumes that this amount of sevicable material will be available from NDS. potential future availability is to be confirmed with NDS and is a risk to the project	5323	m	£ 450.00	£ 2,395,350.00
4	Install Short Loop (240m long CP to CP) (assume new construction for Track Category 4) 113A	240	m	£ 450.00	£ 108,000.00
5	Preparation of sub-base for new track bed; excavation, disposal of contaminated and excavated material, filling to formation and sand base to receive bottom ballast	240	m	£ 200.00	£ 48,000.00
6	New track where existing track swapped sides; <u>servicable materials assumed</u> ; availability to be confirmed with NDS	150	m	£ 450.00	£ 67,500.00
7	Install new Cv13T turnout at Aberdare Station end of short loop	1	Nr	£ 220,000.00	£ 220,000.00
8	Install new CV13T turnout at High Mileage end of Short Loop	1	Nr	£ 220,000.00	£ 220,000.00
9	Install set of trap points to main freight line just beyond Old Hirwaun Station	1	Nr	£ 100,000.00	£ 100,000.00
10	Twist Rail Panels - 113A - 9.144m	8	Nr	£ 4,000.00	£ 32,000.00
11	De-vegetation of route where there is second track ie for new Short Loop (assume currently maintained for single track)	240	m	£ 15.00	£ 3,600.00
	<b>Track Drainage</b>				
	<u>Under track drainage (at loop)</u>				
12	300 diameter pipe (as loop length)	240	m	£ 95.00	£ 22,800.00
	<u>Catch pits (at loop)</u>				
13	Aqua precast	5	nr	£ 550.00	£ 2,750.00
	<b>Page Total</b>				£ 3,493,650.00

Oracle Project No. 112053 Aberdare to Hirwaun - Option 1					
Project Description				TOTAL	£ 741,657.00
Ref	Description	Quantity	Unit	Rate	Cost
40	<u>Telecoms</u>				
1	Install SPT (signal post telephone) for the route	7	Nr	£ 7,500.00	£ 52,500.00
2	Install PZT (point zone telephone) for Short Loop	1	Nr	£ 3,500.00	£ 3,500.00
3	New telephone for Tir Mawr UWC	2	Nr	£ 3,500.00	£ 7,000.00
4	New telephone for Berthllwyd UWC	2	Nr	£ 3,500.00	£ 7,000.00
	<u>Route Works and Cable Renewals</u>				
5	12 core fibre optic cable from Abercynon Signal box to Robertstown Level Crossing	10863	m	£ 5.00	£ 54,315.00
6	Supply and Install telecoms copper cable from Abercynon Signal box to Hirwaun Station	15519	m	£ 14.00	£ 217,266.00
	<u>Small Concentrator</u>				
7	Telephone concentrator card	1	No	7,500	£ 7,500.00
8	Data Changes @ Concentrators	12	No	1,000	£ 12,000.00
	<u>Cable Troughing</u>				
9	New Troughing C1/9 - full length	5996	m	£ 57.00	£ 341,772.00
	<u>Crossings</u>				
10	UTX - (under track crossing) 11m wide	2	No	£ 17,402.00	£ 34,804.00
11	Turning Chambers	4	No	£ 1,000.00	£ 4,000.00
	<b>Page Total</b>				£ 741,657.00

Oracle Project No. 112053 Aberdare to Hirwaun - Option 1					
Project Description				TOTAL	£ 715,203.97
Ref	Description	Quantity	Unit	Rate	Cost
50	<b>Operational Property</b>				
	<b>Refurbish Existing Aberdare Station</b>				
1	Refurbish Existing Aberdare Station building (provisional allowance)	1	Sum	£ 50,000.00	£ 50,000.00
2	Extend platform + 20m for 6 car, currently 102m	70	m2	£ 1,500.00	refer to separate add ons
	<b>Install new Station at Old Hirwaun</b>				
3	Install new Platform (assumed lighting included for in this rate)	280	m2	£ 1,500.00	£ 420,000.00
4	Install new Platform (assumed lighting included for in this rate) <b>extra for 6 car</b>	140	m2	£ 1,500.00	refer to separate add ons
5	Shelter Macemain or similar	1	Nr	£ 45,000.00	£ 45,000.00
6	Ticket office (pod with ticket office, toilet and store); NB ticket machine requirement TBC not currently allowed for	1	Sum	£ 150,000.00	£ 150,000.00
7	CIS - All in rate per CIS panel	1	Nr	£ 7,031.25	£ 7,031.25
8	CIS Summary Screen	1	Nr	£ 10,000.00	£ 10,000.00
9	PA Public address	2	Nr	£ 969.89	£ 1,939.78
10	CCTV Close circuit TV	2	Nr	£ 7,500.00	£ 15,000.00
11	Help Point - All in rate per Help Point	1	Nr	£ 6,232.94	£ 6,232.94
12	Fire/evacuation control system - allowance	1	Psum	£ 5,000.00	£ 5,000.00
13	DDA ramp access from carpark	1	Sum	£ 5,000.00	£ 5,000.00
	<b>Page Total</b>				£ 715,203.97

Oracle Project No. 112053 Aberdare to Hirwaun - Option 1					
Project Description				TOTAL	£ -
Ref	Description	Quantity	Unit	Rate	Cost
60	<u>Structures</u>				
<b>Page Total</b>					£ -

Oracle Project No. 112053 Aberdare to Hirwaun - Option 1					
Project Description				TOTAL	£ 149,148.00
Ref	Description	Quantity	Unit	Rate	Cost
70	<b>General Civils</b>				
	<b><u>Carparking and associated works:</u></b>				
	<b>Aberdare Station</b>				
1	Install new Car Parking	100	spaces	£ 2,500.00	refer to separate add ons
2	Cycle parking (assumed for 20 cycles)	20	Nr	£ 350.00	refer to separate add ons
3	Bus stops (assumed shelters)	3	Nr	£ 20,000.00	refer to separate add ons
	<b>Old Hirwaun Station</b>				
4	Install new Car Parking	50	spaces	£ 2,500.00	refer to separate add ons
5	Cycle parking (assumed for 20 cycles)	10	Nr	£ 350.00	refer to separate add ons
6	Bus stops (assumed shelters)	1	Nr	£ 20,000.00	refer to separate add ons
	<b>Highway works at level crossings</b>				
7	Highway works at Robertstown LC for double track solution	1	Psum	included elsewhere	£ -
8	Highway works at Robertstown LC for single track solution	1	Psum	included elsewhere	£ -
	<b>Boundary Fencing</b>				
9	Install post and wire fencing for the route, where currently not provided	2000	m	£ 7.41	£ 14,828.00
	<b>Walking Routes</b>				
10	Cess walkway 700 wide ; reduced specification demarcation only i.e. no timber edgings included for	5996	m	£ 20.00	£ 119,920.00
11	Cess Walkway for route (new construction for loop length)	240	m	£ 60.00	£ 14,400.00
	<b>Page Total</b>				£ 149,148.00

Oracle Project No. 112053 Aberdare to Hirwaun - Option 1					
Project Description				TOTAL	£ 200,000.00
Ref	Description	Quantity	Unit	Rate	Cost
80	<u>Utilities</u>				
1	Utility Diversions required to enable the construction of the proposed loop, LC upgrade and new stations	1	Psum	£ 200,000.00	£ 200,000.00
<b>Page Total</b>					£ 200,000.00



Oracle Project No. 112053 Aberdare to Hirwaun - Option 1					
Project Description		Short Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun			£ 41,250.00
Ref	Description	Quantity	Unit	Rate	Cost
	<b>Other Contractors Indirect Costs</b>				
	<b>Spares</b>				
	Signalling			£ -	£ -
	Electrification and Power			£ -	£ -
	Track			£ -	£ -
	Telecoms			£ -	£ -
				<b>To Estimate Summary F</b>	£ -
	<b>Other Costs</b> <i>(The Consultant shall enter details)</i>				
				£ -	£ -
				£ -	£ -
	Ecology Surveys and associated remedial works (possibly less if Short Loop / no New Tower)	1	Sum	£ 30,000.00	£ 30,000.00
				£ -	£ -
	Noise Insulation Modelling Exercise (possibly less if Short Loop / no New Tower)	1	Sum	£ 11,250.00	£ 11,250.00
				£ -	£ -
	Environmental Impact Statement to be prepared for the route	1%	Sum	£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				<b>To Estimate Summary F</b>	£ 41,250.00





Oracle Project No. 112053 Aberdare to Hirwaun - Car Parking etc.						
Project Description Car parking and associated works (Not by Network Rail)					TOTAL	
Ref	Description	Quantity	Unit	Rate	Cost	
70	<b>General Civils</b>					
	<b>Carparking and associated works:</b>					
	<b>Aberdare Station</b>					
1	Install new Car Parking ; surface level car parking including lighting and drainage	100	spaces	£ 1,950.00	£ 195,000.00	
2	Cycle parking (assumed for 20 cycles)	20	Nr	£ 350.00	£ 7,000.00	
3	Bus stops (assumed shelters)	3	Nr	£ 20,000.00	£ 60,000.00	
	Add:					
	Preliminaries 18%				£ 262,000.00	
	Add Design say 5%				£ 47,160.00	
	Project management 10%				£ 13,100.00	
	Add 30% residual factors (risk)				£ 4,716.00	
					£ 78,600.00	
					<b>Total rounded £ 406,000.00</b>	
	<b>Old Hirwaun Station</b>					
4	Install new Car Parking	50	spaces	£ 1,950.00	£ 97,500.00	
5	Cycle parking (assumed for 20 cycles)	10	Nr	£ 350.00	£ 3,500.00	
6	Bus stops (assumed shelters)	1	Nr	£ 20,000.00	£ 20,000.00	
	Add:					
	Preliminaries 18%				£ 121,000.00	
	Add Design say 5%				£ 21,780.00	
	Project management 10%				£ 6,050.00	
	Add 30% residual factors (risk)				£ 2,178.00	
					£ 36,300.00	
					<b>Total rounded £ 187,000.00</b>	
	<b>New Tower Station</b>					
7	Install new Car Parking	100	spaces	£ 1,950.00	£ 195,000.00	
8	Cycle parking (assumed for 20 cycles)	20	Nr	£ 350.00	£ 7,000.00	
9	Bus stops (assumed shelters)	3	Nr	£ 20,000.00	£ 60,000.00	
	Add:					
	Preliminaries 18%				£ 262,000.00	
	Add Design say 5%				£ 47,160.00	
	Project management 10%				£ 13,100.00	
	Add 30% residual factors (risk)				£ 4,716.00	
					£ 78,600.00	
					<b>Total rounded £ 406,000.00</b>	



*Standard Template for Stage 1-2 Estimates*

**Enhancements Estimating**

**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 2

**Project Description:** Long Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun

**Estimate Stage:** 2

**Level of Confidence - +/- 40% (Stage 1), +/- 30% (Stage 2)**

<b>Issue and Revision Record:</b>					
<b>Rev.</b>	<b>Date</b>	<b>Consultant</b>	<b>Prepared by</b>	<b>Checked / Reviewed</b>	<b>Description</b>
Rev 00	26-Jan-11	Franklin and Andrews	Ian Smith	Nick Bennett	For comment

## **Estimate Document Contents**

<b>1</b>	<b>Assumptions</b>
<b>2</b>	<b>Estimating Risk Register</b>
<b>3</b>	<b>Estimate Summary Report</b>
<b>4</b>	<b>Summary by GRIP</b>
<b>5</b>	<b>Indirect Costs (Auto generated)</b>
<b>6</b>	<b>10. Signalling, measured works</b>
<b>7</b>	<b>20. Electrification and Power, measured works</b>
<b>8</b>	<b>30. Track, measured works</b>
<b>9</b>	<b>40. Telecommunications, measured works</b>
<b>10</b>	<b>50. Operational Property, measured works</b>
<b>11</b>	<b>60. Structures, measured works</b>
<b>12</b>	<b>70. General Civils, measured works</b>
<b>13</b>	<b>80. Utilities, measured works</b>
<b>14</b>	<b>Other Contractors Indirect Costs</b>
<b>15</b>	<b>Network Rail Direct Costs</b>

**Estimate Stage:** 2  
**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 2  
**Project Description:** Long Passing Loop at Aberdare, Retain Existing Aberdare Station and r

## Assumptions

### General / Drawings & Documents / Exclusions

#### General

- G1 The estimate base date is 4Q 2010
- G2 Escalation has not been included within the Project AFC as the AFC is below £50m in value and the construction phase will be under two years in duration; the estimate is therefore valid at the current time and as long as 4Q 2010 price levels are seen to be constant.
- G3 The cost of escalation shown has been calculated using RPI and this is the potential increase in the cost of the project from 4Q 2010 to the mid point of construction at 4Q 2014.
- G4 An uplift factor of 25% for cost and scope uncertainty has been applied after consultation with the Estimating Manager.
- G5 Arup are provided signalling scheme plans for these new options which the estimator has not had sight of yet. However A Wilkins has briefed I Smith of the new requirements for each of the new Options 1 to 4.

#### Preliminaries

- P1 Preliminaries have been allowed based on percentages allowed as per allocations on Indirects Tab which equate to an overall 18% of Contractor's Base Construction Cost inc OH&P

#### 10 Signalling

- 10.1 Tail Cables assumed as 200m long each.
- 10.2 Testing & Commissioning has been calculated as 15% of Signalling total cost. Refer to Indirects Tab.

#### 20 E&P - Electrification and Plant

- 20.1 We have been advised that a new Principal Supply Point PSP (power supply) is are required for this scheme and is likely to be located at the new Old Hirwaun Station site.
- 20.2 Testing & Commissioning has been calculated as 10% of E&P total cost. Refer to Indirects Tab.

#### 30 Track

- 30.1 This section has been priced on the assumption that the works can be carried in a conventional manner using tracked excavators and dozers to carry out the lowering and slewing of the existing line.
- 30.2 It has been assumed that the existing track Category 6 track will be completely replaced in order to provide a minimum track category of Cat 4 using servicable rail and sleepers. However the availability of servicable materials for this project can only be assumed at this stage and there is a risk that the project requirement may not be fulfilled and new materials will be required.

- 30.3 De-vegetation of the route where the track is doubled is assumed. It is assumed that the track is currently maintained for single track.

#### 40 Telecoms

- 40.1 All new telephone quantities have been confirmed with Arup for this section.
- 40.2 An allowance has been made for CCTV cable from Hirwaun LC to Robertstown LC to the Signal Box at Abercynon.
- 40.3 Copper telecoms cable from the furthest away level crossing has been assumed as required.
- 40.4 Testing & Commissioning has been calculated as 10% of Telecoms total cost. Refer to Indirects Tab.



## 50 Operational Property

- 50.1 Allowances for refurbished station buildings, new waiting shelters, new ticket offices, new platforms, etc. have been allowed as per Arup list of requirements.
- 50.2 Reasonable assumptions of quantities of CIS (customer information signs), PA (public address) equipment, CCTV and help points have been made.
- 51.3 No allowance has been made for ticket machines. If required a sum of £35k each should be made.

## 60 Structures

- 60.1 No structures work allowed. All bridges and culverts along route assumed sound.

## 70 Gen Civils

- 70.1 Carparking, cycleparking and bus stops is assumed to be by others.
- 70.2 For the cess walkway the specification has been reduced to remove the timber edgings.
- 70.3 For Vegetation clearance have allowed only where track is doubled as assumed that maintainer already clears for single track.
- 70.4 No allowance has been made for external works such as main highway entrance, station forecourts works, CCTV, car park lighting nor bus turning circles etc.

## 80 Utilities

- 80.1 A provisional sum has been allowed for utility diversions.

### Other Contractor Indirects

- 90.1 Ecology surveys, noise insulation modelling and environment impact statement report allowed for here.

### Drawings & Documents

The following documents have been used in the preparation of this estimate:

- D1 Original signalling scheme sketches prepared for Options 1 to 8.
- D2 Project Remit
- D3 Briefing from A Wilkins to adjust certain original Options to new options 1 to 4.

### Exclusions

- E1 Excludes any allowance for Optimism Bias.
- E2 Escalation allowance is excluded from the "Cost to Customer" figure.
- E3 VAT is excluded.
- E2 Excludes 3rd party compensation charges except compensation to TOC/FOC.
- E3 Excludes planning and approval charges.
- E4 Excludes permanent land purchases.
- E5 Excludes costs associated with Statutory Fees (e.g. HMRI, Local Authority, etc.).
- E6 Excludes Costs associated with taxes and levies, including VAT.
- E7 Excludes Costs associated with licences and all associated costs and fees except where stated.
- E8 Excludes costs associated with changes in legislation and any form of applicable standards.
- E9 Excludes costs associated with changes in legislation, regulation and interpretation covering discriminatory, specific and general issues that may lead to design and cost changes.
- E10 Excludes costs associated with ground investigation/design unless stated otherwise in the summary.
- E11 Excludes allowances for adverse ground conditions / provisions for ground stabilisation / service diversions unless specifically identified.
- E12 Excludes contingency costs.

Estimate Stage: 2

Oracle Project No.: 112053 Aberdare to Hirwaun - Option 2

Project Description: Long Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun

**Estimating Risk Register**

Ref	Risk Type	Description	Probability	Potential Cost Impact
1		<p><i>The estimator is asked to identify any risks to the project and/or estimate identified in preparing the estimate; this is to inform the QCRA process only and any potential cost impacts will not impact on the estimate total. The estimator should indicate his assessment of the level of cost impact (by percentage/H/M/L assessment / cost value or range), it is recognised that this will be a subjective assessment only</i></p> <p>The availability of servicable rail and sleepers from NDS to furnish this projects substantial requirements is assumed. There is a risk that this requirement may not be fulfilled and that new materials will have to be used at greater cost.</p>		

**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision	A	Estimate Stage	2
Estimate Date	26-Jan-11	Price 'Base date'	4Q2010		
Anticipated Start Date	01-Sep-14	Anticipated Finish Date	01-Mar-15		
Project No.	112053 Aberdare to Hirwaun - Option 2				
Project Title / Location	Long Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun				

WBS	Estimate Breakdown	Value	Escalation (Y/N)	%age of Point Estimate	Remarks
	<b>Contractor's direct costs -</b>				
10	Signalling	3,068,572	Y		
20	Electrification & Plant	638,130	Y		
30	Track	4,408,980	Y		
40	Telecoms	767,157	Y		
50	Operational Property	715,204	Y		
60	Structures	-	Y		
70	General Civils	205,428	Y		
80	Utilities	200,000	Y		
	Contractor's Base Construction Cost inc OH&P: Sub-Total A	10,003,471			
	<b>Network Rail's "direct costs"</b>				
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Fleet		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Engineering trains		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Tampers		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Possession / Isolation Management	72,062			
	Sub - Total B	72,062			
	Total Base Construction Cost inc OH&P: Sub-Total C (A+B)	10,075,533		0.00%	
	<b>Contractor's indirect costs</b>				
tbc	Preliminaries	1,800,625	Y		
tbc	Design	1,138,244	Y		
tbc	Testing & Commissioning	570,129	Y		
tbc	Training		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Spares		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Other	41,250	Y		
	Sub - Total D	3,550,248			
	<b>Total Construction Cost E (C+D)</b>	<b>13,625,781</b>			
	<b>Network Rail's indirect &amp; other costs</b>				
tbc	Network Rail Project Management, (COWD)		N		To be advised by project manager if applicable
tbc	Network Rail Project Management, (forecasted remaining costs)	940,278	Y		Adjusted after comments by R Cole 20-12-10
tbc	Compensation charges (TOC & FOC), (costs from NDS)	150,000	Y		Adjusted after comments by R Cole 20-12-10
tbc	DCO Charges	-	Y		Refer "NR Indirects" tab
tbc	Land / Property Costs & compensation	125,000	Y		Refer "NR Indirects" tab
tbc	Escalation (see Note 1)		NA		See Note 1
tbc	Other ( State )	-			Refer "NR Indirects" tab
	Sub - Total F	1,215,278			
	<b>Point Estimate - Sub - Total G (E+F)</b>	<b>14,841,059</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>14,841,059</b>			<b>for Project Manager's reference</b>
tbc	ORA Value - at P50 (see Note 3)	£			Sponsor to advise if P50 or P80 value shall apply See Note 3
tbc	ORA 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)	3,710,265			Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
	<b>Project Anticipated Final Cost (AFC)</b>	<b>18,551,324</b>			Authorised AFC
	<b>Other Costs to the Customer</b>				
tbc	Allowance for Escalation (see Note 1)	2,231,117			Escalation to Midpoint of construction works taken as 3Q2014 See Note 1
tbc	Allowance for Network Rail Fee Fund				provided by Sponsor
tbc	Allowance for Industry Risk Fund				provided by Sponsor
tbc	Allowance for Insurance Top-up				provided by Sponsor
	<b>Cost to Customer</b>	<b>18,551,324</b>			NB Escalation is excluded from Cost to Customer

**APPROVAL & ENDORSEMENT**

	Estimate Produced by :-	Estimate Approved by :-	Estimate Endorsed by :-
Name :-	Ian Smith	Nick Bennett	
	Estimator	Estimating Manager	
Position :-	Franklin and Andrews Limited	Network Rail	
Signed :-			
Date :-			

**Notes:-**

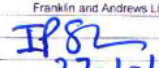
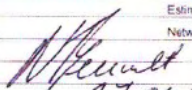
- Escalation will only be included within the Project Anticipated Final Cost (Project AFC) where the Project AFC is in excess of £50m and where the site works will be over 2 years duration; escalation shall be calculated using RPI indices from the estimate 'base date' to the mid-point of the construction phase  
Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calculated as described herein and shown in the Estimate Summary Report under "Other Costs to the Customer" for advice only. Escalation has been calculated to the estimated midpoint of the construction period ie 4Q 2014. The increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%; NB this amount has not been included within the estimate for 'Cost to the Customer'.
  - An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating. The basis for applying the uplift value seen herein is as follows:  
An adjusted uplift for Residual Factors of +25% has been applied for this estimate at Grip Stage 2. Normally an uplift of 30% is applied however the Estimating Manager has agreed that due to the level of detailed measurement that 25% is a reasonable allowance in this case.
  - The project team or Risk & Value Manager should provide 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)
- A QRA meeting has not been held yet thus these figures are not available.

**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision	A	Estimate Stage	2
Estimate Date	26-Jan-11	Price 'Base date'	4Q2010		
Anticipated Start Date	01-Sep-14	Anticipated Finish Date	01-Mar-15		
Project No.	112053 Aberdare to Hirwaun - Option 2				
Project Title / Location	Long Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun				

WBS	Estimate Breakdown	Value	Escalation (Y/N)	%age of Point Estimate	Remarks
<b>Contractor's direct costs -</b>					
10	Signalling	3,068,572	Y		
20	Electrification & Plant	638,130	Y		
30	Track	4,408,980	Y		
40	Telecoms	767,157	Y		
50	Operational Property	715,204	Y		
60	Structures	-	Y		
70	General Civils	205,428	Y		
80	Utilities	200,000	Y		
	Contractor's Base Construction Cost inc OH&P: Sub-Total A	10,003,471			
<b>Network Rail's "direct costs"</b>					
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Fleet		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Engineering trains		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Tampers		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Possession / Isolation Management	72,062			
	Sub - Total B	72,062			
	Total Base Construction Cost inc OH&P: Sub-Total C (A+B)	10,075,533		0.00%	
<b>Contractor's indirect costs</b>					
tbc	Preliminaries	1,800,625	Y		
tbc	Design	1,138,244	Y		
tbc	Testing & Commissioning	570,129	Y		
tbc	Training		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Spares		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Other	41,250	Y		
	Sub - Total D	3,550,248			
	<b>Total Construction Cost E (C+D)</b>	<b>13,625,781</b>			
<b>Network Rail's indirect &amp; other costs</b>					
tbc	Network Rail Project Management, (COWD)		N		To be advised by project manager if applicable
tbc	Network Rail Project Management, (forecasted remaining costs)	940,278	Y		Adjusted after comments by R Cole 20-12-10
tbc	Compensation charges (TOC & FOC), (costs from NDS)	150,000	Y		Adjusted after comments by R Cole 20-12-10
tbc	DCO Charges	-	Y		Refer "NR Indirects" tab
tbc	Land / Property Costs & compensation	125,000	Y		Refer "NR Indirects" tab
tbc	Escalation (see Note 1)	-	NA		See Note 1
tbc	Other ( State )	-			Refer "NR Indirects" tab
	Sub - Total F	1,215,278			
	<b>Point Estimate - Sub - Total G (E+F)</b>	<b>14,841,059</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>14,841,059</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)	% 25%			Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
	<b>Project Anticipated Final Cost (AFC)</b>	<b>18,551,324</b>			<b>Authorised AFC</b>
<b>Other Costs to the Customer</b>					
tbc	Allowance for Escalation (see Note 1)	<b>Not included in Cost to Customer</b>	2,231,117		Escalation to Midpoint of construction works taken as 3Q2014 See Note 1
tbc	Allowance for Network Rail Fee Fund				provided by Sponsor
tbc	Allowance for Industry Risk Fund				provided by Sponsor
tbc	Allowance for insurance Top-up				provided by Sponsor
	<b>Cost to Customer</b>	<b>18,551,324</b>			NB Escalation is excluded from Cost to Customer

**APPROVAL & ENDORSEMENT**

	Estimate Produced by :-	Estimate Approved by :-	Estimate Endorsed by :-
Name :-	Ian Smith	Nick Bennett	
	Estimator	Estimating Manager	
Position :-	Franklin and Andrews Limited	Network Rail	
Signed :-			
Date :-	27-1-11	27.01.11	

**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.

Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calculated as described herein and shown in the Estimate Summary Report under "Other Costs to the Customer" for advice only. Escalation has been calculated to the estimated midpoint of the construction period ie 4Q 2014. The increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%; NB this amount has not been included within the estimate for 'Cost to the Customer'.

2 An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating. The basis for applying the uplift value seen herein is as follows:

An adjusted uplift for Residual Factors of +25% has been applied for this estimate at Grip Stage 2. Normally an uplift of 30% is applied however the Estimating Manager has agreed that due to the level of detailed measurement that 25% is a reasonable allowance in this case.

3 The project team of Risk & Value Manager should provide 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).

A QRA meeting has not been held yet thus these figures are not available.

**Enhancements Estimating**

**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 2

**Project Description:** Long Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun

**Estimate Stage:** 2

		Assumed Expenditure Profile									
Total		% Stage 1	% Stage 2	% Stage 3	% Stage 4	% Stage 5	% Stage 6	% Stage 7	% Stage 8		
<b>Direct Costs</b>											
<i>Asset-</i>											
Signalling & Telecoms	3,068,572						98%	3,007,201	2%	61,371	
Electrification & Plant	638,130						98%	625,367	2%	12,763	
Track	4,408,980						98%	4,320,800	2%	88,180	
Telecoms	767,157						98%	751,814	2%	15,343	
Operational Property	715,204						98%	700,900	2%	14,304	
Structures	0						98%	0	2%	0	
General Civils	205,428						98%	201,319	2%	4,109	
Utilities	200,000						100%	200,000			
<b>Indirect Costs</b>											
Preliminaries	1,800,625						98%	1,764,612	2%	36,012	
Design	1,138,244		1% 11,382	8% 91,060	30% 341,473	55% 626,034	6%	68,295			
Test and Commission	570,129						100%	570,129			
Network Rail Management	800,278	4% 32,011	10% 80,028	10% 80,028	12% 96,033	12% 96,033	45% 360,125	5% 40,014	2%	16,006	
Sponsor	140,000	20% 28,000	20% 28,000	20% 28,000	10% 14,000	10% 14,000	10% 14,000	6% 8,400	4%	5,600	
<b>Other Costs</b>											
TOC/ FOC compensation	150,000						100%	150,000			
Land purchase						100%	0				
Possessions/ Isolations	72,062						100%	72,062			
TWA Charges	0			20% 0	60% 0	20% 0					
Land / Property Costs & compensation	125,000					15% 18,750	85%	106,250			
Escalation (see Note 1)	0			2% 0	4% 0	18% 0	60% 0	15% 0	1%	0	
Other ( State )	41,250					15% 6,188	70% 28,875	15% 6,188			
<i>Point Estimate Total</i>	<i>14,841,059</i>										
Uplift for Risk & Contingency	3,710,265			2% 74,205	4% 148,411	18% 667,848	60% 2,226,159	15% 556,540	1%	37,103	
<b>Total expenditure by GRIP Stage</b>		<b>60,011</b>	<b>119,410</b>	<b>273,293</b>	<b>599,917</b>	<b>1,428,853</b>	<b>15,167,908</b>	<b>843,223</b>	<b>58,708</b>		
Project Anticipated Final Cost	18,551,324										

<b>Estimate Stage:</b>	<b>2</b>										
<b>Oracle Project No.:</b>	<b>112053 Aberdare to Hirwaun - Option 2</b>										
<b>Project Name:</b>	<b>Long Passing Loop at Aberdare, Retain Existing Aberdare Station and new st</b>										
<b>Calculation of Contractors and Network Rail's Indirect Costs</b>											
<b>Asset</b>	<b>Total Direct Costs</b>	<b>%</b>	<b>Preliminaries</b>	<b>%</b>	<b>Design</b>	<b>%</b>	<b>Test &amp; Commission</b>	<b>%</b>	<b>Network Rail Management</b>	<b>%</b>	<b>Sponsor</b>
Signalling	3,068,572	18%	552,343	10%	306,857	14%	429,600	8%	245,486	2%	47,097
Electrification & Plant	638,130	18%	114,863	30%	191,439	10%	63,813	8%	51,050	1%	8,199
Track	4,408,980	18%	793,616	10%	440,898	0%	0	8%	352,718	1%	58,076
Telecoms	767,157	18%	138,088	10%	76,716	10%	76,716	8%	61,373	1%	4,911
Operational Property	715,204	18%	128,737	10%	71,520	0%	0	8%	57,216	1%	9,001
Structures	0	18%	0	15%	0	0%	0	8%	0	0%	0
General Civils	205,428	18%	36,977	15%	30,814	0%	0	8%	16,434	4%	8,585
Utilities	200,000	18%	36,000	10%	20,000	0%	0	8%	16,000	2%	4,130
			1,800,625		1,138,244		570,129		800,278		140,000
<b>Allowance for TOC / FOC Compensation - calculator</b>											
	10,003,471		1,800,625				570,129				
					TOTAL				12,374,225		
					<b>Allowance for TOC / FOC compensation (%)</b>	<b>1.21%</b>			<b>150,000</b>		

Oracle Project No. 112053 Aberdare to Hirwaun - Option 2					
Project Description				TOTAL	£ 3,068,572.00
Ref	Description	Quantity	Unit	Rate	Cost
10	<b>Signalling</b>				
	<b>Controls</b>				
1	Mods to Control System @ Abercynon Signal Box	1	No	£ 25,000.00	£ 25,000.00
2	Mods to Indication System @ Abercynon Signal Box	1	No	£ 15,000.00	£ 15,000.00
3	Mods to train describer	1	No	£ 10,000.00	£ 10,000.00
	<b>Interlockings</b>				
4	Mods to Interlocking	1	Psum	£ 200,000.00	£ 200,000.00
	<b>Recoveries</b>				
5	Recover Ground Frame at Aberdare	1	Nr	£ 3,300.00	£ 3,300.00
6	Signal head and post recovered at Aberdare	2	Nr	£ 6,975.00	£ 13,950.00
7	Independent Position light on post at Aberdare (Slot)	1	No	£ 3,055.00	£ 3,055.00
	<b>New Signals</b>				
8	Install Signals A170 and 170R 2 aspect at Existing Aberdare Station	2	Nr	£ 6,975.00	£ 13,950.00
9	Install Signals A169 and 169R 2 aspect for Loop	2	Nr	£ 6,975.00	£ 13,950.00
10	Install Signals A168 and 168R 2 aspect for northbound trains to south of Robertstown LC	2	Nr	£ 6,975.00	£ 13,950.00
11	Install Signal A167 at Old Hirwaun Station	1	Nr	£ 6,975.00	£ 6,975.00
12	Install Signals A164 and 164R 2 aspect after Old Hirwaun Station	2	Nr	£ 6,975.00	£ 13,950.00
13	Position light signal, attached to main signal on post at Old Hirwaun Station	1	Nr	£ 3,939.00	£ 3,939.00
14	Install Signal A165 at Old Hirwaun Station	1	Nr	£ 6,975.00	£ 6,975.00
	<b>New signs</b>				
15	Install 20/40 permissible speed Sign on post at Existing Aberdare Station & at Old Hirwaun Station	2	Nr	£ 626.00	£ 1,252.00

Ref	Description	Quantity	Unit	Rate	Cost
	<b>Train Detection</b>				
16	Axle counters; in possessions	3	nr	11,160	£ 33,480.00
17	Axle counters	5	nr	10,200	£ 51,000.00
18	REB Type 1	2	nr	25,000	£ 50,000.00
19	Axle counter evaluators + telephone	2	nr	26,000	£ 52,000.00
	<b>Protection and Warning Systems</b>				
20	TPWS - OSS + TSS to signal in long loop	1	nr	12,325	£ 12,325.00
21	TPWS - OSS + TSS; in possessions	4	nr	13,588	£ 54,352.00
22	AWS - in long loop	1	nr	3,613	£ 3,613.00
23	AWS - suppressed; in possessions	4	nr	7,154	£ 28,616.00
	<b><u>Level Crossings</u></b>				
24	Upgrade Robertstown Level Crossing to MCB (CCTV) type, with full barriers	1	Sum	£ 1,300,000.00	£ 1,300,000.00
25	Allowance for highway works on the A4059 at Robertstown.	1	Sum	£ 500,000.00	£ 500,000.00
26	Tranbroad Feeder FP foot crossing to be retained, with new boards / signage	1	Nr	£ 20,000.00	£ 20,000.00
27	Feeder FP foot crossing to be retained, with new boards / signage	1	Nr	£ 20,000.00	£ 20,000.00
28	Tir Mawr Farm UWC to be retained, with new surfacing, signage and telecoms	1	Nr	£ 225,000.00	£ 225,000.00
29	Berthllwyd UWC to be retained, with new surfacing, signage and telecoms	1	Sum	£ 225,000.00	£ 225,000.00
	<b>Trackside</b>				
	<u>Cabling</u>				
30	Multicore cabling (for signals)	5996	m	£ 15.00	£ 89,940.00
31	Tail cables for trackside equipment (10 nr x 200m each)	5800	m	£ 10.00	£ 58,000.00
	<b>Page Total</b>				£ 3,068,572.00



Oracle Project 112053 Aberdare to Hirwaun - Option 2						
Project No.		Long Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun			TOTAL	£ 638,130.00
Ref	Description	Quantity	Unit	Rate	Cost	
20	<b><u>Electrification and Plant</u></b>					
1	650V Signalling Power Supply cable for the route	5996	m	£ 20.00	£ 119,920.00	
2	New PSP Principal Supply point to be installed (possibly at Hirwaun)	1	Nr	£ 250,000.00	£ 250,000.00	
3	DNO supply	1	nr	£ 25,000.00	£ 25,000.00	
4	Install new FSP along the route	3	Nr	£ 12,000.00	£ 36,000.00	
5	Loc cases to serve pairs of signals	3	Nr	£ 26,570.00	£ 79,710.00	
	<b><i>Points Heating</i></b>					
6	Power supply	3	nr	12,500	£ 37,500.00	
7	Control cabinet	3	nr	20,000	£ 60,000.00	
8	Heating (point ends)	6	nr	5,000	£ 30,000.00	
	<b>Page Total</b>				£ 638,130.00	

Oracle Project No. 112053 Aberdare to Hirwaun - Option 2						
Project Description Long Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun					TOTAL	£ 4,408,980.00
Ref	Description	Quantity	Unit	Rate	Cost	
30	<b>Track</b>					
	<b>Track Replacement</b>					
1	Recover existing Ground Frame at Aberdare					
				incl in signalling		
2	Strip out and recover plain line track	5473	m	£ 50.00	£ 273,650.00	
3	Upgrade of track to provide Track Category 4 infrastructure; majority of current track is to lower Category 6; this <u>allows for replacing all track with servicable track and sleepers</u> from Aberdare to the extent of new passengerised route except for 523m of 1978 track at Aberdare. This item assumes that this amount of servicable material will be available from NDS. potential future availability is to be confirmed with NDS and is a risk to the project	5323	m	£ 450.00	£ 2,395,350.00	
4	Install Long Loop (1178m long excluding turnouts) (assume new construction for Track Category 4) 113A	1178	m	£ 450.00	£ 530,100.00	
5	Preparation of sub-base for new track bed; excavation, disposal of contaminated and excavated material, filling to formation and sand base to receive bottom ballast	1178	m	£ 200.00	£ 235,600.00	
6	New track where existing track swapped sides; <u>servicable materials assumed</u> ; availability to be confirmed with NDS	150	m	£ 450.00	£ 67,500.00	
7	Install new Cv13T turnout at Aberdare Station end of long loop	1	Nr	£ 220,000.00	£ 220,000.00	
8	Install new Fv24T turnout at High Mileage end of Long Loop	1	Nr	£ 412,000.00	£ 412,000.00	
9	Install set of trap points to main freight line just beyond Old Hirwaun Station	1	Nr	£ 100,000.00	£ 100,000.00	
10	Twist Rail Panels - 113A - 9.144m	8	Nr	£ 4,000.00	£ 32,000.00	
11	De-vegetation of route where there is second track ie for new Long Loop (assume currently maintained for single track)	1178	m	£ 15.00	£ 17,670.00	
	<b>Track Drainage</b>					
	<u>Under track drainage (at loop)</u>					
12	300 diameter pipe (as loop length)	1178	m	£ 95.00	£ 111,910.00	
	<u>Catch pits (at loop)</u>					
13	Aqua precast	24	nr	£ 550.00	£ 13,200.00	
	<b>Page Total</b>				£ 4,408,980.00	

Oracle Project No. 112053 Aberdare to Hirwaun - Option 2						
Project Description Long Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun					TOTAL	£ 767,157.00
Ref	Description	Quantity	Unit	Rate	Cost	
40	<u>Telecoms</u>					
1	Install SPT (signal post telephone) for the route	10	Nr	£ 7,500.00	£ 75,000.00	
2	Install PZT (point zone telephone) at high mileage end of Long Loop	1	Nr	£ 3,500.00	£ 3,500.00	
3	New telephone for Tir Mawr UWC	2	Nr	£ 3,500.00	£ 7,000.00	
4	New telephone for Berthilwyd UWC	2	Nr	£ 3,500.00	£ 7,000.00	
	<u>Route Works and Cable Renewals</u>					
5	12 core fibre optic cable from Abercynon Signal box to Robertstown Level Crossing	10863	m	£ 5.00	£ 54,315.00	
6	Supply and Install telecoms copper cable from Abercynon Signal box to Hirwaun Station	15519	m	£ 14.00	£ 217,266.00	
	<u>Small Concentrator</u>					
7	Telephone concentrator card	1	No	7,500	£ 7,500.00	
8	Data Changes @ Concentrators	15	No	1,000	£ 15,000.00	
	<u>Cable Troughing</u>					
9	New Troughing C1/9 - full length	5996	m	£ 57.00	£ 341,772.00	
	<u>Crossings</u>					
10	UTX - (under track crossing) 11m wide	2	No	£ 17,402.00	£ 34,804.00	
11	Turning Chambers	4	No	£ 1,000.00	£ 4,000.00	
	<b>Page Total</b>				<b>£ 767,157.00</b>	

Oracle Project No. 112053 Aberdare to Hirwaun - Option 2					
Project Description				TOTAL	£ 715,203.97
Ref	Description	Quantity	Unit	Rate	Cost
50	<b>Operational Property</b>				
	<b>Refurbish Existing Aberdare Station</b>				
1	Refurbish Existing Aberdare Station building (provisional allowance)	1	Sum	£ 50,000.00	£ 50,000.00
2	Extend platform + 20m for 6 car, currently 102m	70	m2	£ 1,500.00	refer to separate add ons
	<b>Install new Station at Old Hirwaun</b>				
3	Install new Platform (assumed lighting included for in this rate)	280	m2	£ 1,500.00	£ 420,000.00
4	Install new Platform (assumed lighting included for in this rate) <b>extra for 6 car</b>	140	m2	£ 1,500.00	refer to separate add ons
5	Shelter Macemain or similar	1	Nr	£ 45,000.00	£ 45,000.00
6	Ticket office (pod with ticket office, toilet and store); NB ticket machine requirement TBC not currety allowed for	1	Sum	£ 150,000.00	£ 150,000.00
7	CIS - All in rate per CIS panel	1	Nr	£ 7,031.25	£ 7,031.25
8	CIS Summary Screen	1	Nr	£ 10,000.00	£ 10,000.00
9	PA Public address	2	Nr	£ 969.89	£ 1,939.78
10	CCTV Close circuit TV	2	Nr	£ 7,500.00	£ 15,000.00
11	Help Point - All in rate per Help Point	1	Nr	£ 6,232.94	£ 6,232.94
12	Fire/evacuation control system - allowance	1	Psum	£ 5,000.00	£ 5,000.00
13	DDA ramp access from carpark	1	Sum	£ 5,000.00	£ 5,000.00
	<b>Page Total</b>				£ 715,203.97

Oracle Project No. 112053 Aberdare to Hirwaun - Option 2					
Project Description		Long Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun		TOTAL	£ -
Ref	Description	Quantity	Unit	Rate	Cost
60	<u>Structures</u>				
<b>Page Total</b>					£ -

Oracle Project No. 112053 Aberdare to Hirwaun - Option 2					
Project Description				TOTAL	£ 205,428.00
Ref	Description	Quantity	Unit	Rate	Cost
70	<b>General Civils</b>				
	<b><u>Carparking and associated works:</u></b>				
	<b>Aberdare Station</b>				
1	Install new Car Parking	100	spaces	£ 2,500.00	refer to separate add ons
2	Cycle parking (assumed for 20 cycles)	20	Nr	£ 350.00	refer to separate add ons
3	Bus stops (assumed shelters)	3	Nr	£ 20,000.00	refer to separate add ons
	<b>Old Hirwaun Station</b>				
4	Install new Car Parking	50	spaces	£ 2,500.00	refer to separate add ons
5	Cycle parking (assumed for 20 cycles)	10	Nr	£ 350.00	refer to separate add ons
6	Bus stops (assumed shelters)	1	Nr	£ 20,000.00	refer to separate add ons
	<b>Highway works at level crossings</b>				
7	Highway works at Robertstown LC for double track solution	1	Psum	included elsewhere	£ -
8	Highway works at Robertstown LC for single track solution	1	Psum	included elsewhere	£ -
	<b>Boundary Fencing</b>				
9	Install post and wire fencing for the route, where currently not provided	2000	m	£ 7.41	£ 14,828.00
	<b>Walking Routes</b>				
10	Cess walkway 700 wide ; reduced specification demarcation only i.e. no timber edgings included for	5996	m	£ 20.00	£ 119,920.00
11	Cess Walkway for route (new construction for loop length)	1178	m	£ 60.00	£ 70,680.00
	<b>Page Total</b>				£ 205,428.00

Oracle Project No. 112053 Aberdare to Hirwaun - Option 2					
Project Description				TOTAL	£ 200,000.00
Ref	Description	Quantity	Unit	Rate	Cost
80	<u>Utilities</u>				
1	Utility Diversions required to enable the construction of the proposed loop, LC upgrade and new stations	1	Psum	£ 200,000.00	£ 200,000.00
<b>Page Total</b>					<b>£ 200,000.00</b>

Oracle Project No. 112053 Aberdare to Hirwaun - Option 2					
Project Description		Long Passing Loop at Aberdare, Retain Existing Aberdare Station and new station at Old Hirwaun			£ 41,250.00
Ref	Description	Quantity	Unit	Rate	Cost
	<b>Other Contractors Indirect Costs</b>				
	<b>Spares</b>				
	Signalling			£ -	£ -
	Electrification and Power			£ -	£ -
	Track			£ -	£ -
	Telecoms			£ -	£ -
				<b>To Estimate Summary R</b>	£ -
	<b>Other Costs</b> <i>(The Consultant shall enter details)</i>				
				£ -	£ -
				£ -	£ -
	Ecology Surveys and associated remedial works (possibly less if Short Loop / no New Tower)	1	Sum	£ 30,000.00	£ 30,000.00
				£ -	£ -
	Noise Insulation Modelling Exercise (possibly less if Short Loop / no New Tower)	1	Sum	£ 11,250.00	£ 11,250.00
				£ -	£ -
	Environmental Impact Statement to be prepared for the route	1%	Sum	£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				<b>To Estimate Summary R</b>	£ 41,250.00









*Standard Template for Stage 1-2 Estimates*

**Enhancements Estimating**

**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 3

**Project Description:** Short Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun

**Estimate Stage:** 2

**Level of Confidence - +/- 40% (Stage 1), +/- 30% (Stage 2)**

<b>Issue and Revision Record:</b>					
<b>Rev.</b>	<b>Date</b>	<b>Consultant</b>	<b>Prepared by</b>	<b>Checked / Reviewed</b>	<b>Description</b>
Rev 00	26-Jan-11	Franklin and Andrews	Ian Smith	Nick Bennett	For comment

## **Estimate Document Contents**

<b>1</b>	<b>Assumptions</b>
<b>2</b>	<b>Estimating Risk Register</b>
<b>3</b>	<b>Estimate Summary Report</b>
<b>4</b>	<b>Summary by GRIP</b>
<b>5</b>	<b>Indirect Costs (Auto generated)</b>
<b>6</b>	<b>10. Signalling, measured works</b>
<b>7</b>	<b>20. Electrification and Power, measured works</b>
<b>8</b>	<b>30. Track, measured works</b>
<b>9</b>	<b>40. Telecommunications, measured works</b>
<b>10</b>	<b>50. Operational Property, measured works</b>
<b>11</b>	<b>60. Structures, measured works</b>
<b>12</b>	<b>70. General Civils, measured works</b>
<b>13</b>	<b>80. Utilities, measured works</b>
<b>14</b>	<b>Other Contractors Indirect Costs</b>
<b>15</b>	<b>Network Rail Direct Costs</b>

**Estimate Stage:** 2  
**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 3  
**Project Description:** Short Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun

## Assumptions

### General / Drawings & Documents / Exclusions

#### General

- G1 The estimate base date is 4Q 2010
- G2 Escalation has not been included within the Project AFC as the AFC is below £50m in value and the construction phase will be under two years in duration; the estimate is therefore valid at the current time and as long as 4Q 2010 price levels are seen to be constant.
- G3 The cost of escalation shown has been calculated using RPI and this is the potential increase in the cost of the project from 4Q 2010 to the mid point of construction at 4Q 2014.
- G4 An uplift factor of 25% for cost and scope uncertainty has been applied after consultation with the Estimating Manager.
- G5 Arup are provided signalling scheme plans for these new options which the estimator has not had sight of yet. However A Wilkins has briefed I Smith of the new requirements for each of the new Options 1 to 4.

#### Preliminaries

- P1 Preliminaries have been allowed based on percentages allowed as per allocations on Indirects Tab which equate to an overall 18% of Contractor's Base Construction Cost inc OH&P

#### 10 Signalling

- 10.1 Tail Cables assumed as 200m long each.
- 10.2 Testing & Commissioning has been calculated as 15% of Signalling total cost. Refer to Indirects Tab.

#### 20 E&P - Electrification and Plant

- 20.1 We have been advised that a new Principal Supply Point PSP (power supply) is are required for this scheme and is likely to be located at the new Old Hirwaun Station site.
- 20.2 Testing & Commissioning has been calculated as 10% of E&P total cost. Refer to Indirects Tab.

#### 30 Track

- 30.1 This section has been priced on the assumption that the works can be carried in a conventional manner using tracked excavators and dozers to carry out the lowering and slewing of the existing line.
- 30.2 It has been assumed that the existing track Category 6 track will be completely replaced in order to provide a minimum track category of Cat 4 using servicable rail and sleepers. However the availability of servicable materials for this project can only be assumed at this stage and there is a risk that the project requirement may not be fulfilled and new materials will be required.
- 30.3 De-vegetation of the route where the track is doubled is assumed. It is assumed that the track is currently maintained for single track.

#### 40 Telecoms

- 40.1 All new telephone quantities have been confirmed with Arup for this section.
- 40.2 An allowance has been made for CCTV cable from Hirwaun LC to Robertstown LC to the Signal Box at Abercynon.
- 40.3 Copper telecoms cable from the furthest away level crossing has been assumed as required.
- 40.4 Testing & Commissioning has been calculated as 10% of Telecoms total cost. Refer to Indirects Tab.

## 50 Operational Property

- 50.1 Allowances for refurbished station buildings, new waiting shelters, new ticket offices, new platforms, etc. have been allowed as per Arup list of requirements.
- 50.2 Reasonable assumptions of quantities of CIS (customer information signs), PA (public address) equipment, CCTV and help points have been made.
- 51.3 No allowance has been made for ticket machines. If required a sum of £35k each should be made.

## 60 Structures

- 60.1 No structures work allowed. All bridges and culverts along route assumed sound.

## 70 Gen Civils

- 70.1 Carparking, cycleparking and bus stops is assumed to be by others.
- 70.2 For the cess walkway the specification has been reduced to remove the timber edgings.
- 70.3 For Vegetation clearance have allowed only where track is doubled as assumed that maintainer already clears for single track.
- 70.4 No allowance has been made for external works such as main highway entrance, station forecourts works, CCTV, car park lighting nor bus turning circles etc.

## 80 Utilities

- 80.1 A provisional sum has been allowed for utility diversions.

### Other Contractor Indirects

- 90.1 Ecology surveys, noise insulation modelling and environment impact statement report allowed for here.

### Drawings & Documents

The following documents have been used in the preparation of this estimate:

- D1 Original signalling scheme sketches prepared for Options 1 to 8.
- D2 Project Remit
- D3 Briefing from A Wilkins to adjust certain original Options to new options 1 to 4.

### Exclusions

- E1 Excludes any allowance for Optimism Bias.
- E2 Escalation allowance is excluded from the "Cost to Customer" figure.
- E3 VAT is excluded.
- E2 Excludes 3rd party compensation charges except compensation to TOC/FOC.
- E3 Excludes planning and approval charges.
- E4 Excludes permanent land purchases.
- E5 Excludes costs associated with Statutory Fees (e.g. HMRI, Local Authority, etc.).
- E6 Excludes Costs associated with taxes and levies, including VAT.
- E7 Excludes Costs associated with licences and all associated costs and fees except where stated.
- E8 Excludes costs associated with changes in legislation and any form of applicable standards.
- E9 Excludes costs associated with changes in legislation, regulation and interpretation covering discriminatory, specific and general issues that may lead to design and cost changes.
- E10 Excludes costs associated with ground investigation/design unless stated otherwise in the summary.
- E11 Excludes allowances for adverse ground conditions / provisions for ground stabilisation / service diversions unless specifically identified.
- E12 Excludes contingency costs.

**Estimate Stage:** 2

**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 3

**Project Description:** Short Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun

**Estimating Risk Register**

Ref	Risk Type	Description	Probability	Potential Cost Impact
1		<p><i>The estimator is asked to identify any risks to the project and/or estimate identified in preparing the estimate; this is to inform the QCRA process only and any potential cost impacts will not impact on the estimate total. The estimator should indicate his assessment of the level of cost impact (by percentage/H/M/L assessment / cost value or range), it is recognised that this will be a subjective assessment only</i></p> <p>The availability of servicable rail and sleepers from NDS to furnish this projects substantial requirements is assumed. There is a risk that this requirement may not be fulfilled and that new materials will have to be used at greater cost.</p>		

**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision	A	Estimate Stage	2
Estimate Date	26-Jan-11	Price 'Base date'	4Q2010		
Anticipated Start Date	01-Sep-14	Anticipated Finish Date	01-Mar-15		
Project No.	112053 Aberdare to Hirwaun - Option 3				
Project Title / Location	Short Passing Loop at Aberdare, Reinstale Old Aberdare Station and new station at Old Hirwaun				

WBS	Estimate Breakdown	Value	Escalation (Y/N)	%age of Point Estimate	Remarks
	<b>Contractor's direct costs -</b>				
10	Signalling	3,046,945	Y		
20	Electrification & Plant	599,560	Y		
30	Track	3,493,650	Y		
40	Telecoms	741,657	Y		
50	Operational Property	1,291,378	Y		
60	Structures	-	Y		
70	General Civils	149,148	Y		
80	Utilities	200,000	Y		
	<b>Contractor's Base Construction Cost inc OH&amp;P: Sub-Total A</b>	<b>9,522,338</b>			
	<b>Network Rail's "direct costs"</b>				
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Fleet		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Engineering trains		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Tampers		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Possession / Isolation Management	65,080			
	<b>Sub - Total B</b>	<b>65,080</b>			
	<b>Total Base Construction Cost inc OH&amp;P: Sub-Total C (A+B)</b>	<b>9,587,418</b>		0.00%	
	<b>Contractor's indirect costs</b>				
tbc	Preliminaries	1,714,021	Y		
tbc	Design	1,079,603	Y		
tbc	Testing & Commissioning	560,694	Y		
tbc	Training		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Spares		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Other	41,250	Y		
	<b>Sub - Total D</b>	<b>3,395,568</b>			
	<b>Total Construction Cost E (C+D)</b>	<b>12,982,986</b>			
	<b>Network Rail's indirect &amp; other costs</b>				
tbc	Network Rail Project Management, (COWD)		N		To be advised by project manager if applicable
tbc	Network Rail Project Management, (forecasted remaining costs)	901,787	Y		Adjusted after comments by R Cole 20-12-10
tbc	Compensation charges (TOC & FOC), (costs from NDS)	150,000	Y		Adjusted after comments by R Cole 20-12-10
tbc	DCO Charges	-	Y		Refer "NR Indirects" tab
tbc	Land / Property Costs & compensation	125,000	Y		Refer "NR Indirects" tab
tbc	Escalation (see Note 1)		NA		See Note 1
tbc	Other ( State )	-			Refer "NR Indirects" tab
	<b>Sub - Total F</b>	<b>1,176,787</b>			
	<b>Point Estimate - Sub - Total G (E+F)</b>	<b>14,159,773</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>14,159,773</b>			<b>for Project Manager's reference</b>
tbc	ORA Value - at P50 (see Note 3)	£			Sponsor to advise if P50 or P80 value shall apply See Note 3
tbc	ORA 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)	3,539,943			Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
	<b>Project Anticipated Final Cost (AFC)</b>	<b>17,699,716</b>			Authorised AFC
	<b>Other Costs to the Customer</b>				
tbc	Allowance for Escalation (see Note 1)	2,128,696			Escalation to Midpoint of construction works taken as 3Q2014 See Note 1
tbc	Allowance for Network Rail Fee Fund				provided by Sponsor
tbc	Allowance for Industry Risk Fund				provided by Sponsor
tbc	Allowance for Insurance Top-up				provided by Sponsor
	<b>Cost to Customer</b>	<b>17,699,716</b>			NB Escalation is excluded from Cost to Customer

**APPROVAL & ENDORSEMENT**

	Estimate Produced by :-	Estimate Approved by :-	Estimate Endorsed by :-
Name :-	Ian Smith	Nick Bennett	
	Estimator	Estimating Manager	
Position :-	Franklin and Andrews Limited	Network Rail	
Signed :-			
Date :-			

**Notes:-**

- 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  
Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calculated as described herein and shown in the Estimate Summary Report under "Other Costs to the Customer" for advice only. Escalation has been calculated to the estimated midpoint of the construction period ie 4Q 2014. The increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%; NB this amount has not been included within the estimate for 'Cost to the Customer'.
  - An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating. The basis for applying the uplift value seen herein is as follows:  
An adjusted uplift for Residual Factors of +25% has been applied for this estimate at Grip Stage 2. Normally an uplift of 30% is applied however the Estimating Manager has agreed that due to the level of detailed measurement that 25% is a reasonable allowance in this case.
  - The project team or Risk & Value Manager should provide 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)
- A QRA meeting has not been held yet thus these figures are not available.

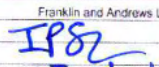
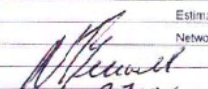


**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision	A	Estimate Stage	2
Estimate Date	26-Jan-11	Price 'Base date'	4Q2010		
Anticipated Start Date	01-Sep-14	Anticipated Finish Date	01-Mar-15		
Project No.	112053 Aberdare to Hirwaun - Option 3				
Project Title / Location	Short Passing Loop at Aberdare, Reinstated Old Aberdare Station and new station at Old Hirwaun				

WBS	Estimate Breakdown	Value	Escalation (Y/N)	%age of Point Estimate	Remarks
	<b>Contractor's direct costs -</b>				
10	Signalling	3,046,945	Y		
20	Electrification & Plant	590,560	Y		
30	Track	3,493,650	Y		
40	Telecoms	741,657	Y		
50	Operational Property	1,291,378	Y		
60	Structures	-	Y		
70	General Civils	149,148	Y		
80	Utilities	200,000	Y		
	Contractor's Base Construction Cost inc OH&P: Sub-Total A	9,522,338			
	<b>Network Rail's "direct costs"</b>				
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Fleet		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Engineering trains		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Tamperers		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Possession / Isolation Management	65,080			
	Sub - Total B	65,080			
	Total Base Construction Cost inc OH&P: Sub-Total C (A+B)	9,587,418		0.00%	
	<b>Contractor's indirect costs</b>				
tbc	Preliminaries	1,714,021	Y		
tbc	Design	1,079,603	Y		
tbc	Testing & Commissioning	560,694	Y		
tbc	Training		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Spares		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Other	41,250	Y		
	Sub - Total D	3,395,568			
	Total Construction Cost E (C+D)	12,982,986			
	<b>Network Rail's indirect &amp; other costs</b>				
tbc	Network Rail Project Management, (COWD)		N		To be advised by project manager if applicable
tbc	Network Rail Project Management, (forecasted remaining costs)	901,767	Y		Adjusted after comments by R Cole 20-12-10
tbc	Compensation charges (TOC & FOC), (costs from NDS)	150,000	Y		Adjusted after comments by R Cole 20-12-10
tbc	DCO Charges	-	Y		Refer "NR Indirects" tab
tbc	Land / Property Costs & compensation	125,000	Y		Refer "NR Indirects" tab
tbc	Escalation (see Note 1)	-	NA		See Note 1
tbc	Other (State)	-			Refer "NR Indirects" tab
	Sub - Total F	1,176,767			
	Point Estimate - Sub - Total G (E+F)	14,159,773			
	<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>	14,159,773			for Project Manager's reference
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)	3,539,943			Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
	<b>Project Anticipated Final Cost (AFC)</b>	17,699,716			Authorized AFC
	<b>Other Costs to the Customer</b>				
tbc	Allowance for Escalation (see Note 1)	Not included in Cost to Customer	2,128,696		Escalation to Midpoint of construction works taken as 3Q2014 See Note 1
tbc	Allowance for Network Rail Fee Fund				provided by Sponsor
tbc	Allowance for Industry Risk Fund				provided by Sponsor
tbc	Allowance for Insurance Top-up				provided by Sponsor
	<b>Cost to Customer</b>		17,699,716		NB Escalation is excluded from Cost to Customer

**APPROVAL & ENDORSEMENT**

	Estimate Produced by :-	Estimate Approved by :-	Estimate Endorsed by :-
Name :-	Ian Smith	Nick Bennett	
Position :-	Estimator Franklin and Andrews Limited	Estimating Manager Network Rail	
Signed :-			
Date :-	27-1-11	27.01.11	

**Notes:-**

- 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  
Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calculated as described herein and shown in the Estimate Summary Report under "Other Costs to the Customer" for advice only. Escalation has been calculated to the estimated midpoint of the construction period ie 4Q 2014. The increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%; NB this amount has not been included within the estimate for 'Cost to the Customer'.
- An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating. The basis for applying the uplift value seen herein is as follows:  
An adjusted uplift for Residual Factors of +25% has been applied for this estimate at Grip Stage 2. Normally an uplift of 30% is applied however the Estimating Manager has agreed that due to the level of detailed measurement that 25% is a reasonable allowance in this case.
- 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)  
A QRA meeting has not been held yet thus these figures are not available.

**Enhancements Estimating**

**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 3

**Project Description:** Short Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun

**Estimate Stage:** 2

		Assumed Expenditure Profile										
Total		% Stage 1	% Stage 2	% Stage 3	% Stage 4	% Stage 5	% Stage 6	% Stage 7	% Stage 8			
<b>Direct Costs</b>												
<i>Asset-</i>												
Signalling & Telecoms	3,046,945						98%	2,986,006	2%	60,939		
Electrification & Plant	599,560						98%	587,569	2%	11,991		
Track	3,493,650						98%	3,423,777	2%	69,873		
Telecoms	741,657						98%	726,824	2%	14,833		
Operational Property	1,291,378						98%	1,265,550	2%	25,828		
Structures	0						98%	0	2%	0		
General Civils	149,148						98%	146,165	2%	2,983		
Utilities	200,000						100%	200,000				
<b>Indirect Costs</b>												
Preliminaries	1,714,021						98%	1,679,740	2%	34,280		
Design	1,079,603		1% 10,796	8% 86,368	30% 323,881	55% 593,782	6%	64,776				
Test and Commission	560,694						100%	560,694				
Network Rail Management	761,787	4% 30,471	10% 76,179	10% 76,179	12% 91,414	12% 91,414	45%	342,804	5%	38,089	2% 15,236	
Sponsor	140,000	20% 28,000	20% 28,000	20% 28,000	10% 14,000	10% 14,000	10%	14,000	6%	8,400	4% 5,600	
<b>Other Costs</b>												
TOC/ FOC compensation	150,000						100%	150,000				
Land purchase						100%	0					
Possessions/ Isolations	65,080						100%	65,080				
TWA Charges	0			20% 0	60% 0	20% 0						
Land / Property Costs & compensation	125,000					15%	18,750	85%	106,250			
Escalation (see Note 1)	0			2% 0	4% 0	18%	0	60%	0	15%	0	
Other ( State )	41,250					15%	6,188	70%	28,875	15%	6,188	
<i>Point Estimate Total</i>	<b>14,159,773</b>											
Uplift for Risk & Contingency	3,539,943			2% 70,799	4% 141,598	18%	637,190	60%	2,123,966	15%	530,991	1% 35,399
<b>Total expenditure by GRIP Stage</b>		<b>58,471</b>	<b>114,975</b>	<b>261,346</b>	<b>570,893</b>	<b>1,361,323</b>	<b>14,472,077</b>	<b>804,396</b>	<b>56,235</b>			
Project Anticipated Final Cost	17,699,716											

<b>Estimate Stage:</b>	<b>2</b>										
<b>Oracle Project No.:</b>	<b>112053 Aberdare to Hirwaun - Option 3</b>										
<b>Project Name:</b>	<b>Short Passing Loop at Aberdare, Reinstate Old Aberdare Station and new st</b>										
<b>Calculation of Contractors and Network Rail's Indirect Costs</b>											
<b>Asset</b>	<b>Total Direct Costs</b>	<b>%</b>	<b>Preliminaries</b>	<b>%</b>	<b>Design</b>	<b>%</b>	<b>Test &amp; Commission</b>	<b>%</b>	<b>Network Rail Management</b>	<b>%</b>	<b>Sponsor</b>
Signalling	3,046,945	18%	548,450	10%	304,695	14%	426,572	8%	243,756	2%	47,097
Electrification & Plant	599,560	18%	107,921	30%	179,868	10%	59,956	8%	47,965	1%	8,199
Track	3,493,650	18%	628,857	10%	349,365	0%	0	8%	279,492	2%	58,076
Telecoms	741,657	18%	133,498	10%	74,166	10%	74,166	8%	59,333	1%	4,911
Operational Property	1,291,378	18%	232,448	10%	129,138	0%	0	8%	103,310	1%	9,001
Structures	0	18%	0	15%	0	0%	0	8%	0	0%	0
General Civils	149,148	18%	26,847	15%	22,372	0%	0	8%	11,932	6%	8,585
Utilities	200,000	18%	36,000	10%	20,000	0%	0	8%	16,000	2%	4,130
			1,714,021		1,079,603		560,694		761,787		140,000
<b>Allowance for TOC / FOC Compensation - calculator</b>											
	9,522,338		1,714,021				560,694				
					TOTAL						11,797,053
					<b>Allowance for TOC / FOC compensation (%)</b>	<b>1.27%</b>					<b>150,000</b>

Oracle Project No. 112053 Aberdare to Hirwaun - Option 3					
Project Description				TOTAL	£ 3,046,945.00
Ref	Description	Quantity	Unit	Rate	Cost
10	<b>Signalling</b>				
	<b>Controls</b>				
1	Mods to Control System @ Abercynon Signal Box	1	No	£ 25,000.00	£ 25,000.00
2	Mods to Indication System @ Abercynon Signal Box	1	No	£ 15,000.00	£ 15,000.00
3	Mods to train describer	1	No	£ 10,000.00	£ 10,000.00
	<b>Interlockings</b>				
4	Mods to Interlocking	1	Psum	£ 200,000.00	£ 200,000.00
	<b>Recoveries</b>				
5	Recover Ground Frame at Aberdare	1	Nr	£ 3,300.00	£ 3,300.00
6	Signal head and post recovered at Aberdare	2	Nr	£ 6,975.00	£ 13,950.00
7	Independent Position light on post at Aberdare (Slot)	1	No	£ 3,055.00	£ 3,055.00
	<b>New Signals</b>				
8	Install Signals A170 and 170R 2 aspect at Existing Aberdare Station	2	Nr	£ 6,975.00	£ 13,950.00
9	Install Signal A169, 2 aspect for Loop	1	Nr	£ 6,975.00	£ 6,975.00
10	Install Signal A167 at Old Hirwaun Station	1	Nr	£ 6,975.00	£ 6,975.00
11	Install Signals A164 and 164R 2 aspect after Old Hirwaun Station	2	Nr	£ 6,975.00	£ 13,950.00
12	Position light signal, attached to main signal on post at Old Hirwaun Station	1	No	£ 3,939.00	£ 3,939.00
13	Install Signal A165 at Old Hirwaun Station	1	Nr	£ 6,975.00	£ 6,975.00
	<b>New signs</b>				
14	Install 20/40 permissible speed Sign on post at Existing Aberdare Station and at Old Hirwaun	2	Nr	£ 626.00	£ 1,252.00
15	Install 20/40 permissible speed Sign at high mileage end of Short Loop	1	Nr	£ 626.00	£ 626.00
16	Install 25 permissible speed Sign and directional arrow at high mileage end of Short Loop	1	Nr	£ 672.00	£ 672.00

Ref	Description	Quantity	Unit	Rate	Cost
	<b>Train Detection</b>				
17	Axle counters; in possessions	3	nr	11,160	£ 33,480.00
18	Axle counters	5	nr	10,200	£ 51,000.00
19	REB Type 1	2	nr	25,000	£ 50,000.00
20	Axle counter evaluators + telephone	2	nr	26,000	£ 52,000.00
	<b>Protection and Warning Systems</b>				
21	TPWS - OSS + TSS to signal in short loop	1	nr	12,325	£ 12,325.00
22	TPWS - OSS + TSS; in possessions	4	nr	13,588	£ 54,352.00
23	AWS - in short loop	1	nr	3,613	£ 3,613.00
24	AWS - suppressed; in possessions	4	nr	7,154	£ 28,616.00
	<b><u>Level Crossings</u></b>				
25	Upgrade Robertstown Level Crossing to MCB (CCTV) type, with full barriers	1	Sum	£ 1,300,000.00	£ 1,300,000.00
26	Allowance for highway works on the A4059 at Robertstown.	1	Sum	£ 500,000.00	£ 500,000.00
27	Tranbroad Feeder FP foot crossing to be retained, with new boards / signage	1	Nr	£ 20,000.00	£ 20,000.00
28	Feeder FP foot crossing to be retained, with new boards / signage	1	Nr	£ 20,000.00	£ 20,000.00
29	Tir Mawr Farm UWC to be retained, with new surfacing, signage and telecoms	1	Nr	£ 225,000.00	£ 225,000.00
30	Berthllwyd UWC to be retained, with new surfacing, signage and telecoms	1	Sum	£ 225,000.00	£ 225,000.00
	<b>Trackside</b>				
	<u>Cabling</u>				
31	Multicore cabling (for signals)	5996	m	£ 15.00	£ 89,940.00
32	Tail cables for trackside equipment (10 nr x 200m each)	5600	m	£ 10.00	£ 56,000.00
	<b>Page Total</b>				£ 3,046,945.00

Oracle Project No. 112053 Aberdare to Hirwaun - Option 3					
Project Description		Short Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun		TOTAL	£ 599,560.00
Ref	Description	Quantity	Unit	Rate	Cost
20	<b>Electrification and Plant</b>				
1	650V Signalling Power Supply cable for the route	5996	m	£ 20.00	£ 119,920.00
2	New PSP Principal Supply point to be installed (possibly at Hirwaun)	1	Nr	£ 250,000.00	£ 250,000.00
3	DNO supply	1	nr	£ 25,000.00	£ 25,000.00
4	Install new FSP along the route	2	Nr	£ 12,000.00	£ 24,000.00
5	Loc cases to serve pairs of signals	2	Nr	£ 26,570.00	£ 53,140.00
	<b>Points Heating</b>				
6	Power supply	3	nr	12,500	37,500
7	Control cabinet	3	nr	20,000	60,000
8	Heating (point ends)	6	nr	5,000	30,000
	<b>Page Total</b>				£ 599,560.00

Oracle Project No. 112053 Aberdare to Hirwaun - Option 3						
Project Description Short Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun					TOTAL	£ 3,493,650.00
Ref	Description	Quantity	Unit	Rate	Cost	
30	<b>Track</b>					
	<b>Track Replacement</b>					
1	Recover existing Ground Frame at Aberdare			incl in signalling		
2	Strip out and recover plain line track	5473	m	£ 50.00	£ 273,650.00	
3	Upgrade of track to provide Track Category 4 infrastructure; majority of current track is to lower Category 6; this <u>allows for replacing all track with servicable track and sleepers</u> from Aberdare to the extent of new passengerised route except for 523m of 1978 track at Aberdare. This item assumes that this amount of servicable material will be available from NDS. potential future availability is to be confirmed with NDS and is a risk to the proiect	5323	m	£ 450.00	£ 2,395,350.00	
4	Install Short Loop (240m long CP to CP) (assume new construction for Track Category 4) 113A	240	m	£ 450.00	£ 108,000.00	
5	Preparation of sub-base for new track bed; excavation, disposal of contaminated and excavated material, filling to formation and sand base to receive bottom ballast	240	m	£ 200.00	£ 48,000.00	
6	New track where existing track swapped sides; <u>servicable materials assumed</u> ; availability to be confirmed with NDS	150	m	£ 450.00	£ 67,500.00	
7	Install new Cv13T turnout at Aberdare Station end of short loop	1	Nr	£ 220,000.00	£ 220,000.00	
8	Install new CV13T turnout at High Mileage end of Short Loop	1	Nr	£ 220,000.00	£ 220,000.00	
9	Install set of trap points to main freight line just beyond Old Hirwaun Station	1	Nr	£ 100,000.00	£ 100,000.00	
10	Twist Rail Panels - 113A - 9.144m	8	Nr	£ 4,000.00	£ 32,000.00	
10	De-vegetation of route where there is second track ie for new Short Loop (assume currently maintained for single track)	240	m	£ 15.00	£ 3,600.00	
	<b>Track Drainage</b>					
	<u>Under track drainage (at loop)</u>					
11	300 diameter pipe (as loop length)	240	m	£ 95.00	£ 22,800.00	
	<u>Catch pits (at loop)</u>					
12	Aqua precast	5	nr	£ 550.00	£ 2,750.00	
	<b>Page Total</b>				£ 3,493,650.00	

Oracle Project No. 112053 Aberdare to Hirwaun - Option 3						
Project Description Short Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun					TOTAL	£ 741,657.00
Ref	Description	Quantity	Unit	Rate	Cost	
40	<u>Telecoms</u>					
1	Install SPT (signal post telephone) for the route	7	Nr	£ 7,500.00	£ 52,500.00	
2	Install PZT (point zone telephone) for Short Loop	1	Nr	£ 3,500.00	£ 3,500.00	
3	New telephone for Tir Mawr UWC	2	Nr	£ 3,500.00	£ 7,000.00	
4	New telephone for Berthilwyd UWC	2	Nr	£ 3,500.00	£ 7,000.00	
	<u>Route Works and Cable Renewals</u>					
5	12 core fibre optic cable from Abercynon Signal box to Robertstown Level Crossing	10863	m	£ 5.00	£ 54,315.00	
6	Supply and Install telecoms copper cable from Abercynon Signal box to Hirwaun Station	15519	m	£ 14.00	£ 217,266.00	
	<u>Small Concentrator</u>					
7	Telephone concentrator card	1	No	7,500	£ 7,500.00	
8	Data Changes @ Concentrators	12	No	1,000	£ 12,000.00	
	<u>Cable Troughing</u>					
9	New Troughing C1/9 - full length	5996	m	£ 57.00	£ 341,772.00	
	<u>Crossings</u>					
10	UTX - (under track crossing) 11m wide	2	No	£ 17,402.00	£ 34,804.00	
11	Turning Chambers	4	No	£ 1,000.00	£ 4,000.00	
	<b>Page Total</b>				£ 741,657.00	



Oracle Project No. 112053 Aberdare to Hirwaun - Option 3					
Project Description				TOTAL	£ 1,291,377.83
Ref	Description	Quantity	Unit	Rate	Cost
50	<b>Operational Property</b>				
	<b>Decomission Existing Aberdare Station</b>				
1	Demolish Existing Aberdare Station building (provisional allowance)	1	Sum	£ 5,000.00	£ 5,000.00
2	Recover lighting columns, CIS etc.	1	Sum	£ 10,000.00	£ 10,000.00
	<b>Old Aberdare Station</b>				
3	Install new Platform (assumed lighting included for in this rate)	140	m2	£ 1,500.00	£ 210,000.00
4	Refurbish existing platform (assumed lighting included for in this rate)	140	m2	£ 1,000.00	£ 140,000.00
4.1	Install new Platform (assumed lighting included for in this rate) allowance for six car	140	m2	£ 1,500.00	refer to separate add ons
5	Shelter Macemain or similar	1	Nr	£ 45,000.00	£ 45,000.00
6	Ticket office (pod with ticket office, toilet and store)	1	Sum	£ 150,000.00	£ 150,000.00
7	CIS - All in rate per CIS panel	1	Nr	£ 7,031.25	£ 7,031.25
8	CIS Summary Screen	1	Nr	£ 10,000.00	£ 10,000.00
9	PA Public address	3	Nr	£ 969.89	£ 2,909.67
10	CCTV Close circuit TV	4	Nr	£ 7,500.00	£ 30,000.00
11	Help Point - All in rate per Help Point	1	Nr	£ 6,232.94	£ 6,232.94
12	Fire/evacuation control system - allowance	1	Psum	£ 5,000.00	£ 5,000.00
13	DDA ramp access from carpark	1	Sum	£ 5,000.00	£ 5,000.00
14	Refurbish Old Aberdare Station Building for use as an operational Station ( <b>by Council if taken forward</b> )	215	m2	£ 3,000.00	<b>By Others</b>
15	Asbestos survey	1	Sum	£ 10,000.00	<b>By Others</b>
	<b>Install new Station at Old Hirwaun</b>				
3	Install new Platform (assumed lighting included for in this rate)	280	m2	£ 1,500.00	£ 420,000.00
4	Install new Platform (assumed lighting included for in this rate) <b>extra for 6 car</b>	140	m2	£ 1,500.00	refer to separate add ons
5	Shelter Macemain or similar	1	Nr	£ 45,000.00	£ 45,000.00
6	Ticket office (pod with ticket office, toilet and store); NB ticket machine requirement TBC not curretlly allowed for	1	Sum	£ 150,000.00	£ 150,000.00
7	CIS - All in rate per CIS panel	1	Nr	£ 7,031.25	£ 7,031.25
8	CIS Summary Screen	1	Nr	£ 10,000.00	£ 10,000.00
9	PA Public address	2	Nr	£ 969.89	£ 1,939.78
10	CCTV Close circuit TV	2	Nr	£ 7,500.00	£ 15,000.00
11	Help Point - All in rate per Help Point	1	Nr	£ 6,232.94	£ 6,232.94
12	Fire/evacuation control system - allowance	1	Psum	£ 5,000.00	£ 5,000.00
13	DDA ramp access from carpark	1	Sum	£ 5,000.00	£ 5,000.00
	<b>Page Total</b>				<b>£ 1,291,377.83</b>

Oracle Project No. 112053 Aberdare to Hirwaun - Option 3						
Project Description				TOTAL	£	-
Ref	Description	Quantity	Unit	Rate	Cost	
60	<u>Structures</u>					
<b>Page Total</b>					£	-

Oracle Project No. 112053 Aberdare to Hirwaun - Option 3					
Project Description				TOTAL	£ 149,148.00
Ref	Description	Quantity	Unit	Rate	Cost
70	<b>General Civils</b>				
	<b><u>Carparking and associated works:</u></b>				
	<b>Aberdare Station</b>				
1	Install new Car Parking	100	spaces	£ 2,500.00	refer to separate add ons
2	Cycle parking (assumed for 20 cycles)	20	Nr	£ 350.00	refer to separate add ons
3	Bus stops (assumed shelters)	3	Nr	£ 20,000.00	refer to separate add ons
	<b>Old Hirwaun Station</b>				
4	Install new Car Parking	50	spaces	£ 2,500.00	refer to separate add ons
5	Cycle parking (assumed for 20 cycles)	10	Nr	£ 350.00	refer to separate add ons
6	Bus stops (assumed shelters)	1	Nr	£ 20,000.00	refer to separate add ons
	<b>Highway works at level crossings</b>				
7	Highway works at Robertstown LC for double track solution	1	Psum	included elsewhere	£ -
8	Highway works at Robertstown LC for single track solution	1	Psum	included elsewhere	£ -
	<b>Boundary Fencing</b>				
9	Install post and wire fencing for the route, where currently not provided	2000	m	£ 7.41	£ 14,828.00
	<b>Walking Routes</b>				
10	Cess walkway 700 wide ; reduced specification demarcation only i.e. no timber edgings included for	5996	m	£ 20.00	£ 119,920.00
11	Cess Walkway for route (new construction for loop length)	240	m	£ 60.00	£ 14,400.00
	<b>Page Total</b>				£ 149,148.00

Oracle Project No. 112053 Aberdare to Hirwaun - Option 3					
Project Description				TOTAL	£ 200,000.00
Ref	Description	Quantity	Unit	Rate	Cost
80	<u>Utilities</u>				
1	Utility Diversions required to enable the construction of the proposed loop, LC upgrade and new stations	1	Psum	£ 200,000.00	£ 200,000.00
<b>Page Total</b>					<b>£ 200,000.00</b>

Oracle Project No. 112053 Aberdare to Hirwaun - Option 3						
Project Description		Short Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun			£	41,250.00
Ref	Description	Quantity	Unit	Rate	Cost	
	<b>Other Contractors Indirect Costs</b>					
	<b>Spares</b>					
	Signalling			£ -	£ -	-
	Electrification and Power			£ -	£ -	-
	Track			£ -	£ -	-
	Telecoms			£ -	£ -	-
				<b>To Estimate Summary R</b>	£	-
	<b>Other Costs</b>					
	<i>(The Consultant shall enter details)</i>					
				£ -	£ -	-
				£ -	£ -	-
	Ecology Surveys and associated remedial works (possibly less if Short Loop / no New Tower)	1	Sum	£ 30,000.00	£	30,000.00
				£ -	£ -	-
	Noise Insulation Modelling Exercise (possibly less if Short Loop / no New Tower)	1	Sum	£ 11,250.00	£	11,250.00
				£ -	£ -	-
	Environmental Impact Statement to be prepared for the route	1%	Sum	£ -	£ -	-
				£ -	£ -	-
				£ -	£ -	-
				£ -	£ -	-
				£ -	£ -	-
				£ -	£ -	-
				<b>To Estimate Summary R</b>	£	41,250.00







*Standard Template for Stage 1-2 Estimates*

**Enhancements Estimating**

**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 4

**Project Description:** Long Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun

**Estimate Stage:** 2

**Level of Confidence - +/- 40% (Stage 1), +/- 30% (Stage 2)**

<b>Issue and Revision Record:</b>					
<b>Rev.</b>	<b>Date</b>	<b>Consultant</b>	<b>Prepared by</b>	<b>Checked / Reviewed</b>	<b>Description</b>
Rev 00	26-Jan-11	Franklin and Andrews	Ian Smith	Nick Bennett	For comment



## **Estimate Document Contents**

<b>1</b>	<b>Assumptions</b>
<b>2</b>	<b>Estimating Risk Register</b>
<b>3</b>	<b>Estimate Summary Report</b>
<b>4</b>	<b>Summary by GRIP</b>
<b>5</b>	<b>Indirect Costs (Auto generated)</b>
<b>6</b>	<b>10. Signalling, measured works</b>
<b>7</b>	<b>20. Electrification and Power, measured works</b>
<b>8</b>	<b>30. Track, measured works</b>
<b>9</b>	<b>40. Telecommunications, measured works</b>
<b>10</b>	<b>50. Operational Property, measured works</b>
<b>11</b>	<b>60. Structures, measured works</b>
<b>12</b>	<b>70. General Civils, measured works</b>
<b>13</b>	<b>80. Utilities, measured works</b>
<b>14</b>	<b>Other Contractors Indirect Costs</b>
<b>15</b>	<b>Network Rail Direct Costs</b>

**Estimate Stage:** 2  
**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 4  
**Project Description:** Long Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun

## Assumptions

### General / Drawings & Documents / Exclusions

#### General

- G1 The estimate base date is 4Q 2010
- G2 Escalation has not been included within the Project AFC as the AFC is below £50m in value and the construction phase will be under two years in duration; the estimate is therefore valid at the current time and as long as 4Q 2010 price levels are seen to be constant.
- G3 The cost of escalation shown has been calculated using RPI and this is the potential increase in the cost of the project from 4Q 2010 to the mid point of construction at 4Q 2014.
- G4 An uplift factor of 25% for cost and scope uncertainty has been applied after consultation with the Estimating Manager.
- G5 Arup are provided signalling scheme plans for these new options which the estimator has not had sight of yet. However A Wilkins has briefed I Smith of the new requirements for each of the new Options 1 to 4.

#### Preliminaries

- P1 Preliminaries have been allowed based on percentages allowed as per allocations on Indirects Tab which equate to an overall 18% of Contractor's Base Construction Cost inc OH&P

#### 10 Signalling

- 10.1 Tail Cables assumed as 200m long each.
- 10.2 Testing & Commissioning has been calculated as 15% of Signalling total cost. Refer to Indirects Tab.

#### 20 E&P - Electrification and Plant

- 20.1 We have been advised that a new Principal Supply Point PSP (power supply) is are required for this scheme and is likely to be located at the new Old Hirwaun Station site.
- 20.2 Testing & Commissioning has been calculated as 10% of E&P total cost. Refer to Indirects Tab.

#### 30 Track

- 30.1 This section has been priced on the assumption that the works can be carried in a conventional manner using tracked excavators and dozers to carry out the lowering and slewing of the existing line.
- 30.2 It has been assumed that the existing track Category 6 track will be completely replaced in order to provide a minimum track category of Cat 4 using servicable rail and sleepers. However the availability of servicable materials for this project can only be assumed at this stage and there is a risk that the project requirement may not be fulfilled and new materials will be required.
- 30.3 De-vegetation of the route where the track is doubled is assumed. It is assumed that the track is currently maintained for single track.

#### 40 Telecoms

- 40.1 All new telephone quantities have been confirmed with Arup for this section.
- 40.2 An allowance has been made for CCTV cable from Hirwaun LC to Robertstown LC to the Signal Box at Abercynon.
- 40.3 Copper telecoms cable from the furthest away level crossing has been assumed as required.
- 40.4 Testing & Commissioning has been calculated as 10% of Telecoms total cost. Refer to Indirects Tab.

## 50 Operational Property

- 50.1 Allowances for refurbished station buildings, new waiting shelters, new ticket offices, new platforms, etc. have been allowed as per Arup list of requirements.
- 50.2 Reasonable assumptions of quantities of CIS (customer information signs), PA (public address) equipment, CCTV and help points have been made.
- 51.3 No allowance has been made for ticket machines. If required a sum of £35k each should be made.

## 60 Structures

- 60.1 No structures work allowed. All bridges and culverts along route assumed sound.

## 70 Gen Civils

- 70.1 Carparking, cycleparking and bus stops is assumed to be by others.
- 70.2 For the cess walkway the specification has been reduced to remove the timber edgings.
- 70.3 For Vegetation clearance have allowed only where track is doubled as assumed that maintainer already clears for single track.
- 70.4 No allowance has been made for external works such as main highway entrance, station forecourts works, CCTV, car park lighting nor bus turning circles etc.

## 80 Utilities

- 80.1 A provisional sum has been allowed for utility diversions.

## Other Contractor Indirects

- 90.1 Ecology surveys, noise insulation modelling and environment impact statement report allowed for here.

## Drawings & Documents

The following documents have been used in the preparation of this estimate:

- D1 Original signalling scheme sketches prepared for Options 1 to 8.
- D2 Project Remit
- D3 Briefing from A Wilkins to adjust certain original Options to new options 1 to 4.

## Exclusions

- E1 Excludes any allowance for Optimism Bias.
- E2 Escalation allowance is excluded from the "Cost to Customer" figure.
- E3 VAT is excluded.
- E2 Excludes 3rd party compensation charges except compensation to TOC/FOC.
- E3 Excludes planning and approval charges.
- E4 Excludes permanent land purchases.
- E5 Excludes costs associated with Statutory Fees (e.g. HMRI, Local Authority, etc.).
- E6 Excludes Costs associated with taxes and levies, including VAT.
- E7 Excludes Costs associated with licences and all associated costs and fees except where stated.
- E8 Excludes costs associated with changes in legislation and any form of applicable standards.
- E9 Excludes costs associated with changes in legislation, regulation and interpretation covering discriminatory, specific and general issues that may lead to design and cost changes.
- E10 Excludes costs associated with ground investigation/design unless stated otherwise in the summary.
- E11 Excludes allowances for adverse ground conditions / provisions for ground stabilisation / service diversions unless specifically identified.
- E12 Excludes contingency costs.

Estimate Stage: 2

Oracle Project No.: 112053 Aberdare to Hirwaun - Option 4

Project Description: Long Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun

**Estimating Risk Register**

Ref	Risk Type	Description	Probability	Potential Cost Impact
1		<p><i>The estimator is asked to identify any risks to the project and/or estimate identified in preparing the estimate; this is to inform the QCRA process only and any potential cost impacts will not impact on the estimate total. The estimator should indicate his assessment of the level of cost impact (by percentage/H/M/L assessment / cost value or range), it is recognised that this will be a subjective assessment only</i></p> <p>The availability of servicable rail and sleepers from NDS to furnish this projects substantial requirements is assumed. There is a risk that this requirement may not be fulfilled and that new materials will have to be used at greater cost.</p>		

**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision	A	Estimate Stage	2
Estimate Date	26-Jan-11	Price 'Base date'	4Q2010		
Anticipated Start Date	01-Sep-14	Anticipated Finish Date	01-Mar-15		
Project No.	112053 Aberdare to Hirwaun - Option 4				
Project Title / Location	Long Passing Loop at Aberdare, Reinstated Old Aberdare Station and new station at Old Hirwaun				

WBS	Estimate Breakdown	Value	Escalation (Y/N)	%age of Point Estimate	Remarks
	<b>Contractor's direct costs -</b>				
10	Signalling	3,068,572	Y		
20	Electrification & Plant	638,130	Y		
30	Track	4,257,060	Y		
40	Telecoms	767,157	Y		
50	Operational Property	1,291,378	Y		
60	Structures	-	Y		
70	General Civils	193,608	Y		
80	Utilities	200,000	Y		
	<b>Contractor's Base Construction Cost inc OH&amp;P: Sub-Total A</b>	<b>10,415,905</b>			
	<b>Network Rail's "direct costs"</b>				
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Fleet		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Engineering trains		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Tampers		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Possession / Isolation Management	73,365			
	<b>Sub - Total B</b>	<b>73,365</b>			
	<b>Total Base Construction Cost inc OH&amp;P: Sub-Total C (A+B)</b>	<b>10,489,270</b>		0.00%	
	<b>Contractor's indirect costs</b>				
tbc	Preliminaries	1,874,863	Y		
tbc	Design	1,178,897	Y		
tbc	Testing & Commissioning	570,129	Y		
tbc	Training		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Spares		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Other	41,250	Y		
	<b>Sub - Total D</b>	<b>3,665,139</b>			
	<b>Total Construction Cost E (C+D)</b>	<b>14,154,408</b>			
	<b>Network Rail's indirect &amp; other costs</b>				
tbc	Network Rail Project Management, (COWD)		N		To be advised by project manager if applicable
tbc	Network Rail Project Management, (forecasted remaining costs)	973,272	Y		Adjusted after comments by R Cole 20-12-10
tbc	Compensation charges (TOC & FOC), (costs from NDS)	150,000	Y		Adjusted after comments by R Cole 20-12-10
tbc	DCO Charges	-	Y		Refer "NR Indirects" tab
tbc	Land / Property Costs & compensation	125,000	Y		Refer "NR Indirects" tab
tbc	Escalation (see Note 1)		NA		See Note 1
tbc	Other ( State )	-			Refer "NR Indirects" tab
	<b>Sub - Total F</b>	<b>1,248,272</b>			
	<b>Point Estimate - Sub - Total G (E+F)</b>	<b>15,402,681</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>15,402,681</b>			<b>for Project Manager's reference</b>
tbc	ORA Value - at P50 (see Note 3)	£			Sponsor to advise if P50 or P80 value shall apply See Note 3
tbc	ORA 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)	3,850,670			Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
	<b>Project Anticipated Final Cost (AFC)</b>	<b>19,253,351</b>			Authorised AFC
	<b>Other Costs to the Customer</b>				
tbc	Allowance for Escalation (see Note 1)	2,315,548			Escalation to Midpoint of construction works taken as 3Q2014 See Note 1
tbc	Allowance for Network Rail Fee Fund				provided by Sponsor
tbc	Allowance for Industry Risk Fund				provided by Sponsor
tbc	Allowance for Insurance Top-up				provided by Sponsor
	<b>Cost to Customer</b>	<b>19,253,351</b>			NB Escalation is excluded from Cost to Customer

**APPROVAL & ENDORSEMENT**

	Estimate Produced by :-	Estimate Approved by :-	Estimate Endorsed by :-
Name :-	Ian Smith	Nick Bennett	
	Estimator	Estimating Manager	
Position :-	Franklin and Andrews Limited	Network Rail	
Signed :-			
Date :-			

**Notes:-**

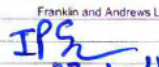
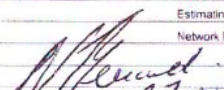
- Escalation will only be included within the Project Anticipated Final Cost (Project AFC) where the Project AFC is in excess of £50m and where the site works will be over 2 years duration; escalation shall be calculated using RPI indices from the estimate 'base date' to the mid-point of the construction phase  
Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calculated as described herein and shown in the Estimate Summary Report under "Other Costs to the Customer" for advice only. Escalation has been calculated to the estimated midpoint of the construction period ie 4Q 2014. The increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%; NB this amount has not been included within the estimate for 'Cost to the Customer'.
  - An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating. The basis for applying the uplift value seen herein is as follows:  
An adjusted uplift for Residual Factors of +25% has been applied for this estimate at Grip Stage 2. Normally an uplift of 30% is applied however the Estimating Manager has agreed that due to the level of detailed measurement that 25% is a reasonable allowance in this case.
  - The project team or Risk & Value Manager should provide 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)
- A QRA meeting has not been held yet thus these figures are not available.

**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision	A	Estimate Stage	2
Estimate Date	26-Jan-11	Price 'Base date'	4Q2010		
Anticipated Start Date	01-Sep-14	Anticipated Finish Date	01-Mar-15		
Project No. 112053 Aberdare to Hirwaun - Option 4					
Project Title / Location: Long Passing Loop at Aberdare, Reinstated Old Aberdare Station and new station at Old Hirwaun					

WBS	Estimate Breakdown	Value	Escalation (Y/N)	% of Point Estimate	Remarks
<b>Contractor's direct costs -</b>					
10	Signalling	3,068,572	Y		
20	Electrification & Plant	638,130	Y		
30	Track	4,257,060	Y		
40	Telecoms	767,157	Y		
50	Operational Property	1,291,378	Y		
60	Structures	-	Y		
70	General Civils	193,608	Y		
80	Utilities	200,000	Y		
Contractor's Base Construction Cost inc OH&P: Sub-Total A		10,415,905			
<b>Network Rail's "direct costs"</b>					
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Fleet		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Engineering trans		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Tampers		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Possession / Isolation Management	73,365			
Sub - Total B		73,365			
Total Base Construction Cost inc OH&P: Sub-Total C (A+B)		10,489,270		0.00%	
<b>Contractor's indirect costs</b>					
tbc	Preliminaries	1,874,863	Y		
tbc	Design	1,178,897	Y		
tbc	Testing & Commissioning	570,129	Y		
tbc	Training		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Spares		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Other	41,250	Y		
Sub - Total D		3,665,139			
<b>Total Construction Cost E (C+D)</b>		<b>14,154,408</b>			
<b>Network Rail's indirect &amp; other costs</b>					
tbc	Network Rail Project Management, (COWD)		N		To be advised by project manager if applicable
tbc	Network Rail Project Management, (forecasted remaining costs)	973,272	Y		Adjusted after comments by R Cole 20-12-10
tbc	Compensation charges (TOC & FOC), (costs from NDS)	150,000	Y		Adjusted after comments by R Cole 20-12-10
tbc	DCO Charges	-	Y		Refer "NR Indirects" tab
tbc	Land / Property Costs & compensation	125,000	Y		Refer "NR Indirects" tab
tbc	Escalation (see Note 1)		NA		See Note 1
tbc	Other (State)	-			Refer "NR Indirects" tab
Sub - Total F		1,248,272			
<b>Point Estimate - Sub - Total G (E+F)</b>		<b>15,402,681</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>15,402,681</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)	% 25%			Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
<b>Project Anticipated Final Cost (AFC)</b>		<b>19,253,351</b>			Authorised AFC
<b>Other Costs to the Customer</b>					
tbc	Allowance for Escalation (see Note 1)	<u>Not included in Cost to Customer</u>			Escalation to Midpoint of construction works taken as 3Q2014 See Note 1
tbc	Allowance for Network Rail Fee Fund				provided by Sponsor
tbc	Allowance for Industry Risk Fund				provided by Sponsor
tbc	Allowance for Insurance Top-up				provided by Sponsor
<b>Cost to Customer</b>		<b>19,253,351</b>			NB Escalation is excluded from Cost to Customer

**APPROVAL & ENDORSEMENT**

	Estimate Produced by :-	Estimate Approved by :-	Estimate Endorsed by :-
Name :-	Ian Smith	Nick Bennett	
Position :-	Estimator	Estimating Manager	
	Franklin and Andrews Limited	Network Rail	
Signed :-			
Date :-	27-1-11	27.01.11	

**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. Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calculated as described herein and shown in the Estimate Summary Report under "Other Costs to the Customer" for advice only. Escalation has been calculated to the estimated midpoint of the construction period ie 4Q 2014. The increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%; NB this amount has not been included within the estimate for 'Cost to the Customer'.

2. An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating. The basis for applying the uplift value seen herein is as follows:  
An adjusted uplift for Residual Factors of +25% has been applied for this estimate at Grip Stage 2. Normally an uplift of 30% is applied however the Estimating Manager has agreed that due to the level of detailed measurement that 25% is a reasonable allowance in this case.

3. The project team of Risk & Value Manager should provide 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).  
A QRA meeting has not been held yet thus these figures are not available.

**Enhancements Estimating**

**Oracle Project No.:** 112053 Aberdare to Hirwaun - Option 4

**Project Description:** Long Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun

**Estimate Stage:** 2

	Total	Assumed Expenditure Profile												
		% Stage 1	% Stage 2	% Stage 3	% Stage 4	% Stage 5	% Stage 6	% Stage 7	% Stage 8					
<b>Direct Costs</b>														
<i>Asset-</i>														
Signalling & Telecoms	3,068,572									98%	3,007,201	2%	61,371	
Electrification & Plant	638,130									98%	625,367	2%	12,763	
Track	4,257,060									98%	4,171,919	2%	85,141	
Telecoms	767,157									98%	751,814	2%	15,343	
Operational Property	1,291,378									98%	1,265,550	2%	25,828	
Structures	0									98%	0	2%	0	
General Civils	193,608									98%	189,736	2%	3,872	
Utilities	200,000									100%	200,000			
<b>Indirect Costs</b>														
Preliminaries	1,874,863									98%	1,837,366	2%	37,497	
Design	1,178,897		1% 11,789	8% 94,312	30% 353,669	55% 648,393				6%	70,734			
Test and Commission	570,129									100%	570,129			
Network Rail Management	833,272	4% 33,331	10% 83,327	10% 83,327	12% 99,993	12% 99,993				45%	374,973	5%	41,664	2% 16,665
Sponsor	140,000	20% 28,000	20% 28,000	20% 28,000	10% 14,000	10% 14,000				10%	14,000	6%	8,400	4% 5,600
<b>Other Costs</b>														
TOC/ FOC compensation	150,000									100%	150,000			
Land purchase						100% 0								
Possessions/ Isolations	73,365									100%	73,365			
TWA Charges	0			20% 0	60% 0	20% 0								
Land / Property Costs & compensation	125,000					15% 18,750				85%	106,250			
Escalation (see Note 1)	0			2% 0	4% 0	18% 0				60%	0	15%	0	1% 0
Other ( State )	41,250					15% 6,188				70%	28,875	15%	6,188	
<i>Point Estimate Total</i>	<i>15,402,681</i>													
Uplift for Risk & Contingency	3,850,670			2% 77,013	4% 154,027	18% 693,121				60%	2,310,402	15%	577,601	1% 38,507
<b>Total expenditure by GRIP Stage</b>		<b>61,331</b>	<b>123,116</b>	<b>282,652</b>	<b>621,689</b>	<b>1,480,444</b>	<b>15,747,679</b>	<b>875,667</b>	<b>60,772</b>					
Project Anticipated Final Cost	19,253,351													

<b>Estimate Stage:</b>	<b>2</b>										
<b>Oracle Project No.:</b>	<b>112053 Aberdare to Hirwaun - Option 4</b>										
<b>Project Name:</b>	<b>Long Passing Loop at Aberdare, Reinstate Old Aberdare Station and new sta</b>										
<b>Calculation of Contractors and Network Rail's Indirect Costs</b>											
<b>Asset</b>	<b>Total Direct Costs</b>	<b>%</b>	<b>Preliminaries</b>	<b>%</b>	<b>Design</b>	<b>%</b>	<b>Test &amp; Commission</b>	<b>%</b>	<b>Network Rail Management</b>	<b>%</b>	<b>Sponsor</b>
<b>Signalling</b>	3,068,572	18%	552,343	10%	306,857	14%	429,600	8%	245,486	2%	47,097
<b>Electrification &amp; Plant</b>	638,130	18%	114,863	30%	191,439	10%	63,813	8%	51,050	1%	8,199
<b>Track</b>	4,257,060	18%	766,271	10%	425,706	0%	0	8%	340,565	1%	58,076
<b>Telecoms</b>	767,157	18%	138,088	10%	76,716	10%	76,716	8%	61,373	1%	4,911
<b>Operational Property</b>	1,291,378	18%	232,448	10%	129,138	0%	0	8%	103,310	1%	9,001
<b>Structures</b>	0	18%	0	15%	0	0%	0	8%	0	0%	0
<b>General Civils</b>	193,608	18%	34,849	15%	29,041	0%	0	8%	15,489	4%	8,585
<b>Utilities</b>	200,000	18%	36,000	10%	20,000	0%	0	8%	16,000	2%	4,130
			1,874,863		1,178,897		570,129		833,272		140,000
<b>Allowance for TOC / FOC Compensation - calculator</b>											
	10,415,905		1,874,863				570,129				
					TOTAL		12,860,896				
					<b>Allowance for TOC / FOC compensation (%)</b>	<b>1.17%</b>	<b>150,000</b>				



Oracle Project No. 112053 Aberdare to Hirwaun - Option 4					
Project Description				TOTAL	£ 3,068,572.00
Ref	Description	Quantity	Unit	Rate	Cost
10	<b>Signalling</b>				
	<b>Controls</b>				
1	Mods to Control System @ Abercynon Signal Box	1	No	£ 25,000.00	£ 25,000.00
2	Mods to Indication System @ Abercynon Signal Box	1	No	£ 15,000.00	£ 15,000.00
3	Mods to train describer	1	No	£ 10,000.00	£ 10,000.00
	<b>Interlockings</b>				
4	Mods to Interlocking	1	Psum	£ 200,000.00	£ 200,000.00
	<b>Recoveries</b>				
5	Recover Ground Frame at Aberdare	1	Nr	£ 3,300.00	£ 3,300.00
6	Signal head and post recovered at Aberdare	2	Nr	£ 6,975.00	£ 13,950.00
7	Independent Postion light on post at Aberdare (Slot)	1	No	£ 3,055.00	£ 3,055.00
	<b>New Signals</b>				
8	Install Signals A170 and 170R 2 aspect at Existing Aberdare Station	2	Nr	£ 6,975.00	£ 13,950.00
9	Install Signals A169 and 169R 2 aspect for Loop	2	Nr	£ 6,975.00	£ 13,950.00
9	Install Signals A168 and 168R 2 aspect for northbound trains to south of Robertstown LC	2	Nr	£ 6,975.00	£ 13,950.00
10	Install Signal A167 at Old Hirwaun Station	1	Nr	£ 6,975.00	£ 6,975.00
11	Install Signals A164 and 164R 2 aspect after Old Hirwaun Station	2	Nr	£ 6,975.00	£ 13,950.00
12	Postion light signal, attached to main signal on post at Old Hirwaun Station	1	No	£ 3,939.00	£ 3,939.00
13	Install Signal A165 at Old Hirwaun Station	1	Nr	£ 6,975.00	£ 6,975.00
	<b>New signs</b>				
14	Install 20/40 permissible speed Sign on post at Existing Aberdare Station and at Old Hirwaun	2	Nr	£ 626.00	£ 1,252.00
	<b>Train Detection</b>				
17	Axle counters; in possessions	3	nr	11,160	£ 33,480.00

Ref	Description	Quantity	Unit	Rate	Cost
18	Axle counters	5	nr	10,200	£ 51,000.00
19	REB Type 1	2	nr	25,000	£ 50,000.00
20	Axle counter evaluators + telephone	2	nr	26,000	£ 52,000.00
<b>Protection and Warning Systems</b>					
21	TPWS - OSS + TSS to signal in short loop	1	nr	12,325	£ 12,325.00
22	TPWS - OSS + TSS; in possessions	4	nr	13,588	£ 54,352.00
23	AWS - in short loop	1	nr	3,613	£ 3,613.00
24	AWS - suppressed; in possessions	4	nr	7,154	£ 28,616.00
<b><u>Level Crossings</u></b>					
25	Upgrade Robertstown Level Crossing to MCB (CCTV) type, with full barriers	1	Sum	£ 1,300,000.00	£ 1,300,000.00
26	Allowance for highway works on the A4059 at Robertstown.	1	Sum	£ 500,000.00	£ 500,000.00
27	Tranbroad Feeder FP foot crossing to be retained, with new boards / signage	1	Nr	£ 20,000.00	£ 20,000.00
28	Feeder FP foot crossing to be retained, with new boards / signage	1	Nr	£ 20,000.00	£ 20,000.00
29	Tir Mawr Farm UWC to be retained, with new surfacing, signage and telecoms	1	Nr	£ 225,000.00	£ 225,000.00
30	Berthllwyd UWC to be retained, with new surfacing, signage and telecoms	1	Sum	£ 225,000.00	£ 225,000.00
<b>Trackside</b>					
<b><u>Cabling</u></b>					
31	Multicore cabling (for signals)	5996	m	£ 15.00	£ 89,940.00
32	Tail cables for trackside equipment ( x 200m each)	5800	m	£ 10.00	£ 58,000.00
<b>Page Total</b>					<b>£ 3,068,572.00</b>

Oracle Project No. 112053 Aberdare to Hirwaun - Option 4					
Project Description				TOTAL	£ 638,130.00
Ref	Description	Quantity	Unit	Rate	Cost
<b>20</b>	<b>Electrification and Plant</b>				
1	650V Signalling Power Supply cable for the route	5996	m	£ 20.00	£ 119,920.00
2	New PSP Principal Supply point to be installed (possibly at Hirwaun)	1	Nr	£ 250,000.00	£ 250,000.00
3	DNO supply	1	nr	£ 25,000.00	£ 25,000.00
4	Install new FSP along the route	3	Nr	£ 12,000.00	£ 36,000.00
5	Loc cases to serve pairs of signals	3	Nr	£ 26,570.00	£ 79,710.00
	<b>Points Heating</b>				
6	Power supply	3	nr	12,500	37,500
7	Control cabinet	3	nr	20,000	60,000
8	Heating (point ends)	6	nr	5,000	30,000
	<b>Page Total</b>				£ 638,130.00

Oracle Project No. 112053 Aberdare to Hirwaun - Option 4						
Project Description Long Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun					TOTAL	£ 4,257,060.00
Ref	Description	Quantity	Unit	Rate	Cost	
30	<b>Track</b>					
	<b>Track Replacement</b>					
1	Recover existing Ground Frame at Aberdare			incl in signalling		
2	Strip out and recover plain line track	5473	m	£ 50.00	£ 273,650.00	
3	Upgrade of track to provide Track Category 4 infrastructure; majority of current track is to lower Category 6; this <u>allows for replacing all track with servicable track and sleepers</u> from Aberdare to the extent of new passengerised route except for 523m of 1978 track at Aberdare. This item assumes that this amount of servicable material will be available from NDS. potential future availability is to be confirmed with NDS and is a risk to the proiect	5323	m	£ 450.00	£ 2,395,350.00	
4	Install Long Loop (981m long excluding turnouts) (assume new construction for Track Category 4) 113A	981	m	£ 450.00	£ 441,450.00	
5	Preparation of sub-base for new track bed; excavation, disposal of contaminated and excavated material, filling to formation and sand base to receive bottom ballast	981	m	£ 200.00	£ 196,200.00	
6	New track where existing track swapped sides; <u>servicable materials assumed</u> ; availability to be confirmed with NDS	150	m	£ 450.00	£ 67,500.00	
7	Install new Cv13T turnout at Aberdare Station end of short loop	1	Nr	£ 220,000.00	£ 220,000.00	
8	Install new Fv24T turnout at High Mileage end of Long Loop	1	Nr	£ 412,000.00	£ 412,000.00	
9	Install set of trap points to main freight line just beyond Old Hirwaun Station	1	Nr	£ 100,000.00	£ 100,000.00	
10	Twist Rail Panels - 113A - 9.144m	8	Nr	£ 4,000.00	£ 32,000.00	
11	De-vegetation of route where there is second track ie for new Short Loop (assume currently maintained for single track)	981	m	£ 15.00	£ 14,715.00	
	<b>Track Drainage</b>					
	<u>Under track drainage (at loop)</u>					
12	300 diameter pipe (as loop length)	981	m	£ 95.00	£ 93,195.00	
	<u>Catch pits (at loop)</u>					
13	Aqua precast	20	nr	£ 550.00	£ 11,000.00	
	<b>Page Total</b>				£ 4,257,060.00	

Oracle Project No. 112053 Aberdare to Hirwaun - Option 4						
Project Description		Long Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun			TOTAL	£ 767,157.00
Ref	Description	Quantity	Unit	Rate	Cost	
40	<u>Telecoms</u>					
1	Install SPT (signal post telephone) for the route	10	Nr	£ 7,500.00	£ 75,000.00	
2	Install PZT (point zone telephone) at high mileage end of Long Loop	1	Nr	£ 3,500.00	£ 3,500.00	
3	New telephone for Tir Mawr UWC	2	Nr	£ 3,500.00	£ 7,000.00	
4	New telephone for Berthilwyd UWC	2	Nr	£ 3,500.00	£ 7,000.00	
	<u>Route Works and Cable Renewals</u>					
5	12 core fibre optic cable from Abercynon Signal box to Robertstown Level Crossing	10863	m	£ 5.00	£ 54,315.00	
6	Supply and Install telecoms copper cable from Abercynon Signal box to Hirwaun Station	15519	m	£ 14.00	£ 217,266.00	
	<u>Small Concentrator</u>					
7	Telephone concentrator card	1	No	7,500	£ 7,500.00	
8	Data Changes @ Concentrators	15	No	1,000	£ 15,000.00	
	<u>Cable Troughing</u>					
9	New Troughing C1/9 - full length	5996	m	£ 57.00	£ 341,772.00	
	<u>Crossings</u>					
10	UTX - (under track crossing) 11m wide	2	No	£ 17,402.00	£ 34,804.00	
11	Turning Chambers	4	No	£ 1,000.00	£ 4,000.00	
	<b>Page Total</b>				<b>£ 767,157.00</b>	

Oracle Project No. 112053 Aberdare to Hirwaun - Option 4					
Project Description				TOTAL	£ 1,291,377.83
Ref	Description	Quantity	Unit	Rate	Cost
<b>50</b>	<b><u>Operational Property</u></b>				
	<b>Decomission Existing Aberdare Station</b>				
1	Demolish Existing Aberdare Station building (provisional allowance)	1	Sum	£ 5,000.00	£ 5,000.00
2	Recover lighting columns, CIS etc.	1	Sum	£ 10,000.00	£ 10,000.00
	<b>Old Aberdare Station</b>				
3	Install new Platform (assumed lighting included for in this rate)	140	m2	£ 1,500.00	£ 210,000.00
4	Refurbish existing platform (assumed lighting included for in this rate)	140	m2	£ 1,000.00	£ 140,000.00
4.1	Install new Platform (assumed lighting included for in this rate) allowance for six car	140	m2	£ 1,500.00	refer to separate add ons
5	Shelter Macemain or similar	1	Nr	£ 45,000.00	£ 45,000.00
6	Ticket office (pod with ticket office, toilet and store)	1	Sum	£ 150,000.00	£ 150,000.00
7	CIS - All in rate per CIS panel	1	Nr	£ 7,031.25	£ 7,031.25
8	CIS Summary Screen	1	Nr	£ 10,000.00	£ 10,000.00
9	PA Public address	3	Nr	£ 969.89	£ 2,909.67
10	CCTV Close circuit TV	4	Nr	£ 7,500.00	£ 30,000.00
11	Help Point - All in rate per Help Point	1	Nr	£ 6,232.94	£ 6,232.94
12	Fire/evacuation control system - allowance	1	Psum	£ 5,000.00	£ 5,000.00
13	DDA ramp access from carpark	1	Sum	£ 5,000.00	£ 5,000.00
14	Refurbish Old Aberdare Station Building for use as an operational Station ( <b>by Council if taken forward</b> )	215	m2	£ 3,000.00	<b>By Others</b>
15	Asbestos survey	1	Sum	£ 10,000.00	<b>By Others</b>
	<b>Install new Station at Old Hirwaun</b>				
3	Install new Platform (assumed lighting included for in this rate)	280	m2	£ 1,500.00	£ 420,000.00
4	Install new Platform (assumed lighting included for in this rate) <b>extra for 6 car</b>	140	m2	£ 1,500.00	refer to separate add ons
5	Shelter Macemain or similar	1	Nr	£ 45,000.00	£ 45,000.00
6	Ticket office (pod with ticket office, toilet and store); NB ticket machine requirement TBC not currety allowed for	1	Sum	£ 150,000.00	£ 150,000.00
7	CIS - All in rate per CIS panel	1	Nr	£ 7,031.25	£ 7,031.25
8	CIS Summary Screen	1	Nr	£ 10,000.00	£ 10,000.00
9	PA Public address	2	Nr	£ 969.89	£ 1,939.78
10	CCTV Close circuit TV	2	Nr	£ 7,500.00	£ 15,000.00
11	Help Point - All in rate per Help Point	1	Nr	£ 6,232.94	£ 6,232.94
12	Fire/evacuation control system - allowance	1	Psum	£ 5,000.00	£ 5,000.00
13	DDA ramp access from carpark	1	Sum	£ 5,000.00	£ 5,000.00
	<b>Page Total</b>				<b>£ 1,291,377.83</b>

Oracle Project No. 112053 Aberdare to Hirwaun - Option 4					
Project Description				TOTAL	£ -
Ref	Description	Quantity	Unit	Rate	Cost
60	<u>Structures</u>				
<b>Page Total</b>					£ -

Oracle Project No. 112053 Aberdare to Hirwaun - Option 4					
Project Description				TOTAL	£ 193,608.00
Ref	Description	Quantity	Unit	Rate	Cost
70	<b>General Civils</b>				
	<b><u>Carparking and associated works:</u></b>				
	<b>Aberdare Station</b>				
1	Install new Car Parking	100	spaces	£ 2,500.00	refer to separate add ons
2	Cycle parking (assumed for 20 cycles)	20	Nr	£ 350.00	refer to separate add ons
3	Bus stops (assumed shelters)	3	Nr	£ 20,000.00	refer to separate add ons
	<b>Old Hirwaun Station</b>				
4	Install new Car Parking	50	spaces	£ 2,500.00	refer to separate add ons
5	Cycle parking (assumed for 20 cycles)	10	Nr	£ 350.00	refer to separate add ons
6	Bus stops (assumed shelters)	1	Nr	£ 20,000.00	refer to separate add ons
	<b>Highway works at level crossings</b>				
7	Highway works at Robertstown LC for double track solution	1	Psum	included elsewhere	£ -
8	Highway works at Robertstown LC for single track solution	1	Psum	included elsewhere	£ -
	<b>Boundary Fencing</b>				
9	Install post and wire fencing for the route, where currently not provided	2000	m	£ 7.41	£ 14,828.00
	<b>Walking Routes</b>				
10	Cess walkway 700 wide ; reduced specification demarcation only i.e. no timber edgings included for	5996	m	£ 20.00	£ 119,920.00
11	Cess Walkway for route (new construction for loop length)	981	m	£ 60.00	£ 58,860.00
	<b>Page Total</b>				£ 193,608.00



Oracle Project No. 112053 Aberdare to Hirwaun - Option 4					
Project Description				TOTAL	£ 200,000.00
Ref	Description	Quantity	Unit	Rate	Cost
80	<u>Utilities</u>				
1	Utility Diversions required to enable the construction of the proposed loop, LC upgrade and new stations	1	Psum	£ 200,000.00	£ 200,000.00
<b>Page Total</b>					£ 200,000.00

Oracle Project No. 112053 Aberdare to Hirwaun - Option 4					
Project Description		Long Passing Loop at Aberdare, Reinstate Old Aberdare Station and new station at Old Hirwaun			£ 41,250.00
Ref	Description	Quantity	Unit	Rate	Cost
	<b>Other Contractors Indirect Costs</b>				
	<b>Spares</b>				
	Signalling			£ -	£ -
	Electrification and Power			£ -	£ -
	Track			£ -	£ -
	Telecoms			£ -	£ -
				<b>To Estimate Summary F</b>	£ -
	<b>Other Costs</b> <i>(The Consultant shall enter details)</i>				
				£ -	£ -
				£ -	£ -
	Ecology Surveys and associated remedial works (possibly less if Short Loop / no New Tower)	1	Sum	£ 30,000.00	£ 30,000.00
				£ -	£ -
	Noise Insulation Modelling Exercise (possibly less if Short Loop / no New Tower)	1	Sum	£ 11,250.00	£ 11,250.00
				£ -	£ -
	Environmental Impact Statement to be prepared for the route	1%	Sum	£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				<b>To Estimate Summary F</b>	£ 41,250.00



Ref	Description	Quantity	Unit	Rate	Cost
	<i>NDS Materials &amp; Fleet (Tampers, etc.) costs generally within rates at GRIP 0-2</i>			£ -	£ -
	<b>NDS - Possession / Isolation management</b>			£ -	£ -
1	Track	1	%	£4,257,060.00	£ 42,570.60
2	Remainder of works excluding track	0.5	%	£6,158,844.83	£ 30,794.22
	<b>Possession Management</b>			£ -	£ -
	Midweek Day		nr	£ -	£ -
	Midweek Night		nr	£ -	£ -
	Weekend		nr	£ -	£ -
	Bank Holiday		nr	£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
	<b>To Estimate Summary Report</b>			£	£ 73,364.82
	<b>Other Costs</b>				
	DCO Charges		sum	£ -	£ -
	Land / Property Costs & compensation - Land Purchase (particular concern at Old Hirwaun)	1	sum	£ 125,000.00	£ 125,000.00
					£ 125,000.00
	Other ( State )		sum	£ -	£ -
	Driver Training		sum		£ -
	Spares		sum	£ -	£ -
			sum	£ -	£ -
	<b>To Estimate Summary Report</b>			£	£ -
	<b>Page Total</b>				£ 198,364.82



*Standard Template for Stage 1-2 Estimates*

**Enhancements Estimating**

**Oracle Project No.:**

**Project Description:**

**Estimate Stage:**

**Level of Confidence - +/- 40% (Stage 1), +/- 30% (Stage 2)**

<b>Issue and Revision Record:</b>					
<b>Rev.</b>	<b>Date</b>	<b>Consultant</b>	<b>Prepared by</b>	<b>Checked</b>	<b>Description</b>
Rev 00	26-Jan-11	Franklin and Andrews	Ian Smith	Nick Bennett	For comment

## **Estimate Document Contents**

<b>1</b>	<b>Assumptions</b>
<b>2</b>	<b>Estimating Risk Register</b>
<b>3</b>	<b>Estimate Summary Report</b>
<b>4</b>	<b>Summary by GRIP</b>
<b>5</b>	<b>Indirect Costs (Auto generated)</b>
<b>6</b>	<b>10. Signalling, measured works</b>
<b>7</b>	<b>20. Electrification and Power, measured works</b>
<b>8</b>	<b>30. Track, measured works</b>
<b>9</b>	<b>40. Telecommunications, measured works</b>
<b>10</b>	<b>50. Operational Property, measured works</b>
<b>11</b>	<b>60. Structures, measured works</b>
<b>12</b>	<b>70. General Civils, measured works</b>
<b>13</b>	<b>80. Utilities, measured works</b>
<b>14</b>	<b>Other Contractors Indirect Costs</b>
<b>15</b>	<b>Network Rail Direct Costs</b>

**Estimate Stage:** 2  
**Oracle Project No.:** 112053 Aberdare to Hirwaun  
**Project Description:** ADDITION for Passenger Line Extension from Hirwaun to Tower

## Assumptions

### General / Drawings & Documents / Exclusions

#### General

- G1 The estimate base date is 4Q 2010
- G2 Escalation has not been included within the Project AFC as the AFC is below £50m in value and the construction phase will be under two years in duration; the estimate is therefore valid at the current time and as long as 4Q 2010 price levels are seen to be constant.
- G3 The cost of escalation shown has been calculated using RPI and this is the potential increase in the cost of the project from 4Q 2010 to the mid point of construction at 4Q 2014.
- G4 An uplift factor of 25% for cost and scope uncertainty has been applied after consultation with the Estimating Manager.
- G5 Arup are provided signalling scheme plans for these new options which the estimator has not had sight of yet. However A Wilkins has briefed I Smith of the new requirements for each of the new Options 1 to 4.

#### Preliminaries

- P1 Preliminaries have been allowed based on percentages allowed as per allocations on Indirects Tab which equate to an overall 18% of Contractor's Base Construction Cost inc OH&P

#### 10 Signalling

- 10.1 Tail Cables assumed as 200m long each.
- 10.2 Testing & Commissioning has been calculated as 15% of Signalling total cost. Refer to Indirects Tab.

#### 20 E&P - Electrification and Plant

- 20.1 We have been advised that a new Principal Supply Point PSP (power supply) is are required for this scheme and is likely to be located at the new Old Hirwaun Station site.
- 20.2 Testing & Commissioning has been calculated as 10% of E&P total cost. Refer to Indirects Tab.

#### 30 Track

- 30.1 This section has been priced on the assumption that the works can be carried in a conventional manner using tracked excavators and dozers to carry out the lowering and slewing of the existing line.
- 30.2 It has been assumed that the existing track Category 6 track will be completely replaced in order to provide a minimum track category of Cat 4 using servicable rail and sleepers. However the
- 30.3 De-vegetation of the route where the track is doubled is assumed. It is assumed that the track is currently maintained for single track.

#### 40 Telecoms

- 40.1 All new telephone quantities have been confirmed with Arup for this section.
- 40.2 An allowance has been made for CCTV cable from Hirwaun LC to Robertstown LC to the Signal Box at Abercynon.
- 40.3 Copper telecoms cable from the furthest away level crossing has been assumed as required.
- 40.4 Testing & Commissioning has been calculated as 10% of Telecoms total cost. Refer to Indirects Tab.

#### 50 Operational Property

- 50.1 Allowances for refurbished station buildings, new waiting shelters, new ticket offices, new

50.2 Reasonable assumptions of quantities of CIS (customer information signs), PA (public address) equipment, CCTV and help points have been made.

51.3 No allowance has been made for ticket machines. If required a sum of £35k each should be made.

60 **Structures**

60.1 No structures work allowed. All bridges and culverts along route assumed sound.

70 **Gen Civils**

70.1 Carparking, cycleparking and bus stops is assumed to be by others.

70.2 For the cess walkway the specification has been reduced to remove the timber edgings.

70.3 For Vegetation clearance have allowed only where track is doubled as assumed that maintainer already clears for single track.

70.4 No allowance has been made for external works such as main highway entrance , station

80 **Utilities**

80.1 A provisional sum has been allowed for utility diversions.

**Other Contractor Indirects**

90.1 Ecology surveys, noise insulation modelling and environment impact statement report allowed

**Drawings & Documents**

The following documents have been used in the preparation of this estimate:

D1 Original signalling scheme sketches prepared for Options 1 to 8.

D2 Project Remit

D3 Briefing from A Wilkins to adjust certain original Options to new options 1 to 4.

**Exclusions**

E1 Excludes any allowance for Optimism Bias.

E2 Escalation allowance is excluded from the "Cost to Customer" figure.

E3 VAT is excluded.

E2 Excludes 3rd party compensation charges except compensation to TOC/FOC.

E3 Excludes planning and approval charges.

E4 Excludes permanent land purchases.

E5 Excludes costs associated with Statutory Fees (e.g. HMRI, Local Authority, etc.).

E6 Excludes Costs associated with taxes and levies, including VAT.

E7 Excludes Costs associated with licences and all associated costs and fees except where stated.

E8 Excludes costs associated with changes in legislation and any form of applicable standards.

E9 Excludes costs associated with changes in legislation, regulation and interpretation covering discriminatory, specific and general issues that may lead to design and cost changes.

E10 Excludes costs associated with ground investigation/design unless stated otherwise in the summary.

E11 Excludes allowances for adverse ground conditions / provisions for ground stabilisation / service

E12 Excludes contingency costs.



**Estimate Stage:** 2  
**Oracle Project No.:** 112053 Aberdare to Hirwaun  
**Project Description:** ADDITION for Passenger Line Extension from Hirwaun to Tower

**Estimating Risk Register**

Ref	Risk Type	Description	Probability	Potential Cost Impact
1		<p><i>The estimator is asked to identify any risks to the project and/or estimate identified in preparing the estimate; this is to inform the QCRA process only and any potential cost impacts will not impact on the estimate total. The estimator should indicate his assessment of the level of cost impact (by percentage/H/M/L assessment / cost value or range), it is recognised that this will be a subjective assessment only</i></p> <p>The availability of servicable rail and sleepers from NDS to furnish this projects substantial requirements is assumed. There is a risk that this requirement may not be fulfilled and that new materials will have to be used at greater cost.</p>		

**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision		Estimate Stage	2
Estimate Date	26-Jan-11	Price 'Base date'	4Q2010		
Anticipated Start Date	01-Sep-14	Anticipated Finish Date	01-Mar-15		
Project No.	112053 Aberdare to Hirwaun				
Project Title / Location	ADDITION for Passenger Line Extension from Hirwaun to Tower				

WBS	Estimate Breakdown	Value	Escalation (Y/N)	%age of Point Estimate	Remarks
	<b>Contractor's direct costs -</b>				
10	Signalling	1,466,679	Y		
20	Electrification & Plant	186,420	Y		
30	Track	2,288,600	Y		
40	Telecoms	274,706	Y		
50	Operational Property	665,204	Y		
60	Structures	-	Y		
70	General Civils	395,294	Y		
80	Utilities	100,000	Y		
	Contractor's Base Construction Cost inc OH&P: Sub-Total A	5,376,903.17			
	<b>Network Rail's "direct costs"</b>				
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Fleet		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Engineering trains		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Tampers		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Possession / Isolation Management	38,328			
	Sub - Total B	38,328			
	Total Base Construction Cost inc OH&P: Sub-Total C (A+B)	5,415,231		0.00%	
	<b>Contractor's indirect costs</b>				
tbc	Preliminaries	967,843	Y		
tbc	Design	594,739	Y		
tbc	Testing & Commissioning	251,448	Y		
tbc	Training		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Spares		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Other	13,750	Y		
	Sub - Total D	1,827,779			
	<b>Total Construction Cost E (C+D)</b>	<b>7,243,010</b>			
	<b>Network Rail's indirect &amp; other costs</b>				
tbc	Network Rail Project Management, (COWD)		N		To be advised by project manager if applicable
tbc	Network Rail Project Management, (forecasted remaining costs)	497,901	Y		Calculated as Percentage on "Indirects" tab
tbc	Compensation charges (TOC & FOC), (costs from NDS)	84,678	Y		Calculated as Percentage or preliminary estimate on "Indirects" tab
tbc	DCO Charges	-	Y		Refer "NR Indirects" tab
tbc	Land / Property Costs & compensation	25,000	Y		Refer "NR Indirects" tab
tbc	Escalation (see Note 1) %		NA		See Note 1
tbc	Other ( State )	-			Refer "NR Indirects" tab
	Sub - Total F	607,579			
	<b>Point Estimate - Sub - Total G (E+F)</b>	<b>7,850,589</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>7,850,589</b>			<b>for Project Manager's reference</b>
tbc	ORA Value - at P50 (see Note 3)	£			Sponsor to advise if P50 or P80 value shall apply See Note 3
tbc	ORA 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) % 25%	1,962,647			Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
	<b>Project Anticipated Final Cost (AFC)</b>	<b>9,813,237</b>			Authorised AFC
	<b>Other Costs to the Customer</b>				
tbc	Allowance for Escalation (see Note 1) <b>Not included in Cost to Customer</b>	1,180,211			Escalation to Midpoint of construction works taken as 3Q2013 See Note 1
tbc	Allowance for Network Rail Fee Fund				provided by Sponsor
tbc	Allowance for Industry Risk Fund				provided by Sponsor
tbc	Allowance for Insurance Top-up				provided by Sponsor
	<b>Cost to Customer</b>	<b>9,813,237</b>			<b>NB Escalation is excluded from Cost to Customer</b>

**APPROVAL & ENDORSEMENT**

	Estimate Produced by :-	Estimate Approved by :-	Estimate Endorsed by :-
Name :-	Ian Smith	Nick Bennett	
	Estimator	Estimating Manager	
Position :-	Franklin and Andrews Limited	Network Rail	
Signed :-			
Date :-			

**Notes:-**

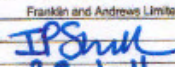
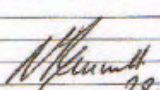
- Escalation will only be included within the Project Anticipated Final Cost (Project AFC) where the Project AFC is in excess of £50m and where the site works will be over 2 years duration; escalation shall be calculated using RPI indices from the estimate 'base date' to the mid-point of the construction phase  
Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calculated as described herein and shown in the Estimate Summary Report under "Other Costs to the Customer" for advice only. Escalation has been calculated to the estimated midpoint of the construction period ie 4Q 2014. The increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%; NB this amount has not been included within the estimate for 'Cost to the Customer'.
  - An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating. The basis for applying the uplift value seen herein is as follows:  
An adjusted uplift for Residual Factors of +25% has been applied for this estimate at Grip Stage 2. Normally an uplift of 30% is applied however the Estimating Manager has agreed that due to the level of detailed measurement that 25% is a reasonable allowance in this case.
  - 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)
- A QRA meeting has not been held yet thus these figures are not available.

**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision		Estimate Stage	2
Estimate Date	25-Jan-11	Price Base date		4Q2010	
Anticipated Start Date	01-Sep-14	Anticipated Finish Date		01-Mar-15	
Project No.	112053 Aberdare to Hirwaun				
Project Title / Location	ADDITION for Passenger Line Extension from Hirwaun to Tower				

WBS	Estimate Breakdown	Value	Escalation (Y/N)	Stage of Point Estimate	Remarks
	<b>Contractor's direct costs -</b>				
10	Signalling	1,466,679	Y		
20	Electrification & Plant	166,420	Y		
30	Track	2,288,600	Y		
40	Telecoms	274,706	Y		
50	Operational Property	665,204	Y		
60	Structures	-	Y		
70	General Civils	395,294	Y		
80	Utilities	100,000	Y		
	<b>Contractor's Base Construction Cost inc OH&amp;P: Sub-Total A</b>	<b>5,376,903.17</b>			
	<b>Network Rail's "direct costs"</b>				
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Float		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Engineering trains		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Tampers		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Possession / Isolation Management	38,328			
	<b>Sub - Total B</b>	<b>38,328</b>			
	<b>Total Base Construction Cost inc OH&amp;P: Sub-Total C (A+B)</b>	<b>5,415,231</b>		0.00%	
	<b>Contractor's indirect costs</b>				
tbc	Preliminaries	967,843	Y		
tbc	Design	584,739	Y		
tbc	Testing & Commissioning	251,448	Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Training		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Spares		Y		
tbc	Other	13,750	Y		
	<b>Sub - Total D</b>	<b>1,827,779</b>			
	<b>Total Construction Cost E (C+D)</b>	<b>7,242,910</b>			
	<b>Network Rail's indirect &amp; other costs</b>				
tbc	Network Rail Project Management, (COWD)		N		To be advised by project manager if applicable
tbc	Network Rail Project Management, (forecasted remaining costs)	497,901	Y		Calculated as Percentage on "Indirects" tab
tbc	Compensation charges (TOC & FOC), (costs from NDS)	84,678	Y		Calculated as Percentage or preliminary estimate on "Indirects" tab
tbc	OCO Charges	-	Y		Refer "NR Indirects" tab
tbc	Land / Property Costs & compensation	25,000	Y		Refer "NR Indirects" tab
tbc	Escalation (see Note 1)	%	NA		See Note 1
tbc	Other ( State )	-			Refer "NR Indirects" tab
	<b>Sub - Total F</b>	<b>607,579</b>			
	<b>Point Estimate - Sub - Total G (E+F)</b>	<b>7,850,589</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>7,850,589</b>			for Project Manager's reference
tbc	QRA Value - at P50 (see Note 3)				Sponsor to advise if P50 or P60 value shall apply See Note 3
tbc	QRA Value - at P60 - incremental on P50 value (see Note 3)				Sponsor to advise if P50 or P60 value shall apply See Note 3
tbc	Adjustment for residual factors (see Note 2)	% 25%			Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
	<b>Project Anticipated Final Cost (AFC)</b>	<b>9,813,237</b>			Authorised AFC
	<b>Other Costs to the Customer</b>				
tbc	Allowance for Escalation (see Note 1)	Not included in Cost to Customer	1,180,211		Escalation to Midpoint of construction works taken as 3Q2013 See Note 1
tbc	Allowance for Network Rail Fee Fund				provided by Sponsor
tbc	Allowance for Industry Risk Fund				provided by Sponsor
tbc	Allowance for Insurance Top-up				provided by Sponsor
	<b>Cost to Customer</b>	<b>9,813,237</b>			NB Escalation is excluded from Cost to Customer

**APPROVAL & ENDORSEMENT**

	Estimate Produced by :-	Estimate Approved by :-	Estimate Endorsed by :-
Name :-	Ian Smith	Nick Bennett	
Position :-	Estimator	Estimating Manager	
Signed :-			
Date :-	28-1-11	28.01.11	

**Notes:-**

- 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 data' to the mid-point of the construction phase. Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calculated as described herein and shown in the Estimate Summary Report under "Other Costs to the Customer" for advice only. Escalation has been calculated to the estimated endpoint of the construction period ie 4Q 2014. The increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%; NB this amount has not been included within the estimate for 'Cost to the Customer'.
  - An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating. The basis for applying the uplift value seen herein is as follows: An adjusted uplift for Residual Factors of +25% has been applied for this estimate at Grip Stage 2. Normally an uplift of 30% is applied however the Estimating Manager has agreed that due to the level of detailed measurement that 25% is a reasonable allowance in this case.
  - The project team or Risk & Value Manager should provide the values for uplifts to Mean, P50 and P60. The uplifts to Mean and P50 should be entered in the spaces provided; the incremental value to P60 (beyond P50) should be shown in the box provided (ie P60 value - P50 value)
- A QRA meeting has not been held yet thus these figures are not available.

**Enhancements Estimating**

**Oracle Project No.:** 112053 Aberdare to Hirwaun

**Project Description:** ADDITION for Passenger Line Extension from Hirwaun to Tower

**Estimate Stage:** 2

	Total	Assumed Expenditure Profile											
		% Stage 1	% Stage 2	% Stage 3	% Stage 4	% Stage 5	% Stage 6	% Stage 7	% Stage 8				
<b>Direct Costs</b>													
<i>Asset-</i>													
Signalling & Telecoms	1,466,679								98%	1,437,345	2%	29,334	
Electrification & Plant	186,420								98%	182,692	2%	3,728	
Track	2,288,600								98%	2,242,828	2%	45,772	
Telecoms	274,706								98%	269,212	2%	5,494	
Operational Property	665,204								98%	651,900	2%	13,304	
Structures	0								98%	0	2%	0	
General Civils	395,294								98%	387,388	2%	7,906	
Utilities	100,000								100%	100,000			
<b>Indirect Costs</b>													
Preliminaries	967,843								98%	948,486	2%	19,357	
Design	594,739		1% 5,947	8% 47,579	30% 178,422	55% 327,106			6%	35,684			
Test and Commission	251,448								100%	251,448			
Network Rail Management	430,152	4% 17,206	10% 43,015	10% 43,015	12% 51,618	12% 51,618			45%	193,569	5%	21,508	2% 8,603
Sponsor	67,749	20% 13,550	20% 13,550	20% 13,550	10% 6,775	10% 6,775			10%	6,775	6%	4,065	4% 2,710
<b>Other Costs</b>													
TOC/ FOC compensation	84,678								100%	84,678			
Land purchase						100% 0							
Possessions/ Isolations	38,328								100%	38,328			
TWA Charges	0			20% 0	60% 0	20% 0							
Land / Property Costs & compensation	25,000					15% 3,750			85%	21,250			
Escalation (see Note 1)	0			2% 0	4% 0	18% 0			60%	0	15% 0	1% 0	
Other ( State )	13,750					15% 2,063			70%	9,625	15% 2,063		
<i>Point Estimate Total</i>	<b>7,850,589</b>												
Uplift for Risk & Contingency	1,962,647			2% 39,253	4% 78,506	18% 353,277			60%	1,177,588	15% 294,397	1% 19,626	
<b>Total expenditure by GRIP Stage</b>		<b>30,756</b>	<b>62,512</b>	<b>143,397</b>	<b>315,321</b>	<b>744,589</b>	<b>8,038,795</b>	<b>446,927</b>	<b>30,939</b>				
Project Anticipated Final Cost	9,813,237												

<b>Estimate Stage:</b>	<b>2</b>										
<b>Oracle Project No.:</b>	<b>112053 Aberdare to Hirwaun</b>										
<b>Project Name:</b>	<b>ADDITION for Passenger Line Extension from Hirwaun to Tower</b>										
<b>Calculation of Contractors and Network Rail's Indirect Costs</b>											
<b>Asset</b>	<b>Total Direct Costs</b>	<b>%</b>	<b>Preliminaries</b>	<b>%</b>	<b>Design</b>	<b>%</b>	<b>Test &amp; Commission</b>	<b>%</b>	<b>Network Rail Management</b>	<b>%</b>	<b>Sponsor</b>
<b>Signalling</b>	1,466,679	18%	264,002	10%	146,668	14%	205,335	8%	117,334	7%	18,480
<b>Electrification &amp; Plant</b>	186,420	18%	33,556	30%	55,926	10%	18,642	8%	14,914	7%	2,349
<b>Track</b>	2,288,600	18%	411,948	10%	228,860	0%	0	8%	183,088	7%	28,836
<b>Telecoms</b>	274,706	18%	49,447	10%	27,471	10%	27,471	8%	21,976	7%	3,461
<b>Operational Property</b>	665,204	18%	119,737	10%	66,520	0%	0	8%	53,216	7%	8,382
<b>Structures</b>	0	18%	0	15%	0	0%	0	8%	0	7%	0
<b>General Civils</b>	395,294	18%	71,153	15%	59,294	0%	0	8%	31,624	7%	4,981
<b>Utilities</b>	100,000	18%	18,000	10%	10,000	0%	0	8%	8,000	7%	1,260
			967,843		594,739		251,448		430,152		67,749
<b>Allowance for TOC / FOC Compensation - calculator</b>											
	5,376,903		967,843				251,448				
					TOTAL		6,596,193				
					<b>Allowance for TOC / FOC compensation (%)</b>	<b>1.28%</b>	<b>84,678</b>				

Oracle Project No. 112053 Aberdare to Hirwaun					
Project Description				TOTAL	£ 1,466,679.00
Ref	Description	Quantity	Unit	Rate	Cost
10	<b>Signalling</b>				
	<b>Controls</b>				
1	Mods to Control System @ Abercynon Signal Box	1	No	£ 25,000.00	as main Options
2	Mods to Indication System @ Abercynon Signal Box	1	No	£ 15,000.00	as main Options
3	Mods to train describer	1	No	£ 10,000.00	as main Options
	<b>Interlockings</b>				
4	Mods to Interlocking	1	Psum	£ 200,000.00	as main Options
	<b>New Signals</b>				
5	Install Signal A165 2 aspect at New Tower Station	1	Nr	£ 6,164.00	£ 6,164.00
6	Install Signals A164 and 164R at New Tower Station	2	Nr	£ 6,975.00	£ 13,950.00
7	Position light signal, attached to main signal on post at New Tower Station	1	No	£ 3,939.00	£ 3,939.00
8	Install Signal A163 for Freight / Trap Points at New Tower	1	Nr	£ 6,975.00	£ 6,975.00
9	Install Signal A162 Single head one aspect for Stabling Siding at New Tower Station	1	Nr	£ 6,028.00	NIL part of Stabling siding
10	Position light signal, attached to main signal on A162 post at New Tower Station	1	No	£ 3,278.00	NIL part of Stabling siding
11	Install GS450 position light signal ground mounted at New Tower Stabling Siding	1	Nr	£ 3,939.00	NIL part of Stabling siding
12	Buffer stop red lights at New Tower Station	2	Nr	£ 621.00	NIL part of Stabling siding
	<b>New signs</b>				
13	Install 25 permissible speed Sign and directional arrow at start of New Tower line	1	Nr	£ 672.00	£ 672.00
14	Install 20/40 Sign at New Tower	1	Nr	£ 626.00	£ 626.00
	<b>Train Detection</b>				
15	Axle counters; in possessions	2	nr	11,160	£ 22,320.00

Ref	Description	Quantity	Unit	Rate	Cost
16	Axle counters		nr	10,200	<b>as main Options</b>
17	REB Type 1		nr	25,000	<b>as main Options</b>
18	Axle counter evaluators + telephone		nr	26,000	<b>as main Options</b>
<b>Protection and Warning Systems</b>					
19	TPWS - OSS + TSS; in possessions	2	nr	13,576	£ 27,152.00
20	AWS - suppressed; in possessions	2	nr	7,148	£ 14,296.00
<b><u>Level Crossings</u></b>					
21	Upgrade Old Hirwaun Level Crossing - to MCB (CCTV) type with full barriers	1	Sum	£1,300,000.00	£ 1,300,000.00
<b>Trackside</b>					
<b><u>Cabling</u></b>					
22	Multicore cabling (for signals)	2839	m	£ 15.00	£ 42,585.00
23	Tail cables for trackside equipment (x 200m each)	2800	m	£ 10.00	£ 28,000.00
<b>Page Total</b>					<b>£ 1,466,679.00</b>



Oracle Project 112053 Aberdare to Hirwaun					
Project No.					
Project Description				TOTAL	£ 186,420.00
Ref	Description	Quantity	Unit	Rate	Cost
20	<b>Electrification and Plant</b>				
1	650V Signalling Power Supply cable for the route	2839	m	£ 20.00	£ 56,780.00
2	New PSP Principal Supply point to be installed (possibly at Hirwaun)	1	Nr	£ 250,000.00	<b>as main Options</b>
3	DNO supply	1	nr	£ 25,000.00	<b>as main Options</b>
4	Install new FSP along the route	2	Nr	£ 12,000.00	£ 24,000.00
5	Loc cases to serve pairs of signals	2	Nr	£ 26,570.00	£ 53,140.00
	<b>Points Heating</b>				
6	Power supply	1	nr	12,500	12,500
7	Control cabinet	1	nr	20,000	20,000
8	Heating	4	nr	5,000	20,000
	<b>Page Total</b>				£ 186,420.00



Oracle Project 112053 Aberdare to Hirwaun						
Project No.						
Project Description					TOTAL	£ 2,288,600.00
Ref	Description	Quantity	Unit	Rate	Cost	
30	<b>Track</b>					
1	Install Stabling Siding at New Tower Station (beyond new Station Platform - 26 miles 1270 to 26miles 1420)	150	m	£ 450.00	<b>Nil see Stabling Add On</b>	
2	Install New Tower Station line (26miles 905m to 26 miles 1270m)	365	m	£ 450.00	£ 164,250.00	
3	Preparation of sub-base for new track bed; excavation, disposal of contaminated and excavated material, filling to formation and sand base to receive bottom ballast	515	m	£ 200.00	£ 103,000.00	
4	Install new CV13T turnout New Tower Station / stabling	1	Nr	£ 220,000.00	£ 220,000.00	
5	Install Buffer Stop at New Tower	2	Nr	£ 20,000.00	<b>Nil see Stabling Add On</b>	
6	Install set of trap points to main freight line at Tower new station	1	Nr	£ 100,000.00	£ 100,000.00	
7	Twist Rail Panels - 113A - 9.144m	5	Nr	£ 4,000.00	£ 20,000.00	
	<b>Existing Tower Freight Loop</b>					
8	Upgrade loop at Tower to allow 400m long trains to use without difficult operations; loop extended 100m	100	m	£ 550.00	£ 55,000.00	
9	Heavy maintenance of S+C	2	Nr	£ 60,000.00	£ 120,000.00	
	<b>Track Replacement</b>					
10	Strip out and recover plain line track	2389	m	£ 50.00	£ 119,450.00	
11	Upgrade of track to provide Track Category 4 infrastructure; majority of current track is to lower Category 6; this allows for replacing all track from Old Hirwaun Station to Tower new station	2389	m	£ 550.00	£ 1,313,950.00	
12	De-vegetation of route where there is second track ie at loop (assume currently maintained for single track)	365	m	£ 15.00	£ 5,475.00	
	<b>Track Drainage</b>					
	<u>Under track drainage at New Tower to improve track conditions</u>					
13	300 diameter pipe	635	m	£ 95.00	£ 60,325.00	
	<u>Catch pits</u>					
14	Aqua precast	13	nr	£ 550.00	£ 7,150.00	
	<b>Page Total</b>				£ 2,288,600.00	

Oracle Project 112053 Aberdare to Hirwaun					
Project No.					
Project Description				TOTAL	£ 274,706.00
Ref	Description	Quantity	Unit	Rate	Cost
40	<u>Telecoms</u>				
1	Install SPT (signal post telephone) for the route	3	Nr	£ 7,500.00	£ 22,500.00
2	New telephones at Hirwaun LC	2	Nr	£ 3,500.00	£ 7,000.00
	<u>Route Works and Cable Renewals</u>				
3	12 core fibre optic cable from Roberstown to Hirwaun Level Crossing	4707	m	£ 5.00	£ 23,535.00
4	Supply and Install telecoms copper cable from Hirwaun Station to new Tower Station	1146	m	£ 14.00	£ 16,044.00
	<u>Small Concentrator</u>				
5	Telephone concentrator card	1	No	7,500	<b>as main Options</b>
6	Data Changes @ Concentrators	5	No	1,000	£ 5,000.00
	<u>Cable Troughing</u>				
7	New Troughing C1/9 - full length	2839	m	£ 57.00	£ 161,823.00
	<u>Crossings</u>				
8	UTX - (under track crossing) 11m wide	2	No	£ 17,402.00	£ 34,804.00
9	Turning Chambers	4	No	£ 1,000.00	£ 4,000.00
	<b>Page Total</b>				<b>£ 274,706.00</b>

Oracle Project 112053 Aberdare to Hirwaun					
Project Description				TOTAL	£ 665,203.97
Ref	Description	Quantity	Unit	Rate	Cost
50	<b>Operational Property</b>				
	<b>Install new Station at New Tower</b>				
1	Install new Platform (assumed lighting included for in this rate)	280	m2	£ 1,500.00	£ 420,000.00
2	Install new Platform (assumed lighting included for in this rate) <b>extra for 6 car</b>	140	m2	£ 1,500.00	refer to separate additions
3	Shelter Macemain or similar	1	Nr	£ 45,000.00	£ 45,000.00
4	Ticket office (pod with ticket office, toilet and store)	1	Sum	£ 150,000.00	£ 150,000.00
5	CIS - All in rate per CIS panel	1	Nr	£ 7,031.25	£ 7,031.25
6	CIS Summary Screen	1	Nr	£ 10,000.00	£ 10,000.00
7	PA Public address	2	Nr	£ 969.89	£ 1,939.78
8	CCTV Close circuit TV	2	Nr	£ 7,500.00	£ 15,000.00
9	Help Point - All in rate per Help Point	1	Nr	£ 6,232.94	£ 6,232.94
10	Fire/evacuation control system - allowance	1	Psum	£ 5,000.00	£ 5,000.00
11	DDA ramp access from carpark	1	Sum	£ 5,000.00	£ 5,000.00
<b>Page Total</b>					£ 665,203.97



Oracle Project No. 112053 Aberdare to Hirwaun					
Project Description ADDITION for Passenger Line Extension from Hirwaun to Tower				TOTAL	£ 395,294.20
Ref	Description	Quantity	Unit	Rate	Cost
70	<b>General Civils</b>				
	<b><u>Carparking and associated works:</u></b>				
	<b>New Tower Station</b>				
1	Install new Car Parking	100	spaces	£ 2,500.00	refer to separate add ons
2	Cycle parking (assumed for 20 cycles)	10	Nr	£ 350.00	refer to separate add ons
3	Bus stops (assumed shelters)	1	Nr	£ 20,000.00	refer to separate add ons
	<b>Boundary Fencing</b>				
4	Install post and wire fencing for the route, where currently not provided	300	m	£ 7.41	£ 2,224.20
5	Install drainage system at New Tower to improve ground conditions	515	m	£ 400.00	£ 206,000.00
6	Catch pits; Aqua precast	11	nr	£ 550.00	£ 6,050.00
7	Remedial Works to Embankment Slip (assume not required if end at Old Hirwaun)	1	Psum	£ 150,000.00	£ 150,000.00
	<b>Walking Routes</b>				
8	Cess walkway 700 wide ; reduced specification demarcation only i.e. no timber edgings included for	1146	m	£ 20.00	£ 22,920.00
9	Cess Walkway for route; timber edgings	135	m	£ 60.00	£ 8,100.00
	<b>Page Total</b>				£ 395,294.20

Oracle Project No. 112053 Aberdare to Hirwaun					
Project Description		ADDITION for Passenger Line Extension from Hirwaun to Tower		TOTAL	£ 100,000.00
Ref	Description	Quantity	Unit	Rate	Cost
80	<u>Utilities</u>			£ -	£ -
1	Utility Diversions required to enable the construction of Level Crossing upgrade and new station	1	Psum	£ 100,000.00	£ 100,000.00
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
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				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
<b>Page Total</b>					<b>£ 100,000.00</b>

Oracle Project No. 112053 Aberdare to Hirwaun					
Project Description		ADDITION for Passenger Line Extension from Hirwaun to Tower			£ 13,750.00
Ref	Description	Quantity	Unit	Rate	Cost
	<b>Other Contractors Indirect Costs</b>				
	<b>Spares</b>				
	Signalling			£ -	£ -
	Electrification and Power			£ -	£ -
	Track			£ -	£ -
	Telecoms			£ -	£ -
				<b>To Estimate Summary R</b>	£ -
	<b>Other Costs</b> <i>(The Consultant shall enter details)</i>			£ -	£ -
				£ -	£ -
	Ecology Surveys and associated remedial works (possibly less if Short Loop / no New Tower)	1	Sum	£ 10,000.00	£ 10,000.00
				£ -	£ -
	Noise Insulation Modelling Exercise (possibly less if Short Loop / no New Tower)	1	Sum	£ 3,750.00	£ 3,750.00
				£ -	£ -
	Environmental Impact Statement to be prepared for the route	1%	Sum	£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				<b>To Estimate Summary R</b>	£ 13,750.00





Ref	Description	Quantity	Unit	Rate	Cost
	<i>NDS Materials &amp; Fleet (Tampers, etc.) costs generally within rates at GRIP 0-2</i>			£ -	£ -
	<b>NDS - Possession / Isolation management</b>			£ -	£ -
1	Track	1	%	£2,288,600.00	£ 22,886.00
2	Remainder of works excluding track	0.5	%	£3,088,303.17	£ 15,441.52
	<b>Possession Management</b>			£ -	£ -
	Midweek Day		nr	£ -	£ -
	Midweek Night		nr	£ -	£ -
	Weekend		nr	£ -	£ -
	Bank Holiday		nr	£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
	<b>To Estimate Summary Report</b>				<b>£ 38,327.52</b>
	<hr/>				
	<b>Other Costs</b>				
	DCO Charges		sum	£ -	£ -
	Land / Property Costs & compensation - Land Purchase (particular concern at Old Hirwaun)	1	sum	£ 25,000.00	£ 25,000.00
					<b>£ 25,000.00</b>
	Other ( State )		sum	£ -	£ -
	Driver Training		sum	£ -	£ -
	Spares		sum	£ -	£ -
			sum	£ -	£ -
	<b>To Estimate Summary Report</b>				<b>£ -</b>
	<hr/>				
	<b>Page Total</b>				<b>£ 63,327.52</b>



*Standard Template for Stage 1-2 Estimates*

**Enhancements Estimating**

**Oracle Project No.:**

**Project Description:**

**Estimate Stage:**

**Level of Confidence - +/- 40% (Stage 1), +/- 30% (Stage 2)**

<b>Issue and Revision Record:</b>					
<b>Rev.</b>	<b>Date</b>	<b>Consultant</b>	<b>Prepared by</b>	<b>Checked</b>	<b>Description</b>
Rev 00	26-Jan-11	Franklin and Andrews	Ian Smith	Nick Bennett	For comment

## **Estimate Document Contents**

<b>1</b>	<b>Assumptions</b>
<b>2</b>	<b>Estimating Risk Register</b>
<b>3</b>	<b>Estimate Summary Report</b>
<b>4</b>	<b>Summary by GRIP</b>
<b>5</b>	<b>Indirect Costs (Auto generated)</b>
<b>6</b>	<b>10. Signalling, measured works</b>
<b>7</b>	<b>20. Electrification and Power, measured works</b>
<b>8</b>	<b>30. Track, measured works</b>
<b>9</b>	<b>40. Telecommunications, measured works</b>
<b>10</b>	<b>50. Operational Property, measured works</b>
<b>11</b>	<b>60. Structures, measured works</b>
<b>12</b>	<b>70. General Civils, measured works</b>
<b>13</b>	<b>80. Utilities, measured works</b>
<b>14</b>	<b>Other Contractors Indirect Costs</b>
<b>15</b>	<b>Network Rail Direct Costs</b>

**Estimate Stage:** 2  
**Oracle Project No.:** 112053 Aberdare to Hirwaun  
**Project Description:** ADDITION for Stabling Siding at Hirwaun Station

## Assumptions

### General / Drawings & Documents / Exclusions

#### General

- G1 The estimate base date is 4Q 2010
- G2 Escalation has not been included within the Project AFC as the AFC is below £50m in value and the construction phase will be under two years in duration; the estimate is therefore valid at the current time and as long as 4Q 2010 price levels are seen to be constant.
- G3 The cost of escalation shown has been calculated using RPI and this is the potential increase in the cost of the project from 4Q 2010 to the mid point of construction at 4Q 2014.
- G4 An uplift factor of 25% for cost and scope uncertainty has been applied after consultation with the Estimating Manager.
- G5 Arup are provided signalling scheme plans for these new options which the estimator has not had sight of yet. However A Wilkins has briefed I Smith of the new requirements for each of the new Options 1 to 4.

#### Preliminaries

- P1 Preliminaries have been allowed based on percentages allowed as per allocations on Indirects Tab which equate to an overall 18% of Contractor's Base Construction Cost inc OH&P

#### 10 Signalling

- 10.1 Tail Cables assumed as 200m long each.
- 10.2 Testing & Commissioning has been calculated as 15% of Signalling total cost. Refer to Indirects Tab.

#### 20 E&P - Electrification and Plant

- 20.1 We have been advised that a new Principal Supply Point PSP (power supply) is are required for this scheme and is likely to be located at the new Old Hirwaun Station site.
- 20.2 Testing & Commissioning has been calculated as 10% of E&P total cost. Refer to Indirects Tab.

#### 30 Track

- 30.1 This section has been priced on the assumption that the works can be carried in a conventional manner using tracked excavators and dozers to carry out the lowering and slewing of the existing line.
- 30.2 It has been assumed that the existing track Category 6 track will be completely replaced in order to provide a minimum track category of Cat 4 using servicable rail and sleepers. However the availability of servicable materials for this project can only be assumed at this stage and there is a risk that the project requirement may not be fulfilled and new materials will be required.
- 30.3 De-vegetation of the route where the track is doubled is assumed. It is assumed that the track is currently maintained for single track.

#### 40 Telecoms

- 40.1 All new telephone quantities have been confirmed with Arup for this section.
- 40.2 An allowance has been made for CCTV cable from Hirwaun LC to Robertstown LC to the Signal Box at Abercynon.
- 40.3 Copper telecoms cable from the furthest away level crossing has been assumed as required.
- 40.4 Testing & Commissioning has been calculated as 10% of Telecoms total cost. Refer to Indirects Tab.

## 50 **Operational Property**

- 50.1 Allowances for refurbished station buildings, new waiting shelters, new ticket offices, new platforms, etc. have been allowed as per Arup list of requirements.
- 50.2 Reasonable assumptions of quantities of CIS (customer information signs), PA (public address) equipment, CCTV and help points have been made.
- 51.3 No allowance has been made for ticket machines. If required a sum of £35k each should be made.

## 60 **Structures**

- 60.1 No structures work allowed. All bridges and culverts along route assumed sound.

## 70 **Gen Civils**

- 70.1 Carparking, cycleparking and bus stops is assumed to be by others.
- 70.2 For the cess walkway the specification has been reduced to remove the timber edgings.
- 70.3 For Vegetation clearance have allowed only where track is doubled as assumed that maintainer already clears for single track.
- 70.4 No allowance has been made for external works such as main highway entrance , station

## 80 **Utilities**

- 80.1 A provisional sum has been allowed for utility diversions.

### **Other Contractor Indirects**

- 90.1 Ecology surveys, noise insulation modelling and environment impact statement report allowed

### **Drawings & Documents**

The following documents have been used in the preparation of this estimate:

- D1 Original signalling scheme sketches prepared for Options 1 to 8.
- D2 Project Remit
- D3 Briefing from A Wilkins to adjust certain original Options to new options 1 to 4.

### **Exclusions**

- E1 Excludes any allowance for Optimism Bias.
- E2 Escalation allowance is excluded from the "Cost to Customer" figure.
- E3 VAT is excluded.
- E2 Excludes 3rd party compensation charges except compensation to TOC/FOC.
- E3 Excludes planning and approval charges.
- E4 Excludes permanent land purchases.
- E5 Excludes costs associated with Statutory Fees (e.g. HMRI, Local Authority, etc.).
- E6 Excludes Costs associated with taxes and levies, including VAT.
- E7 Excludes Costs associated with licences and all associated costs and fees except where stated.
- E8 Excludes costs associated with changes in legislation and any form of applicable standards.
- E9 Excludes costs associated with changes in legislation, regulation and interpretation covering discriminatory, specific and general issues that may lead to design and cost changes.
- E10 Excludes costs associated with ground investigation/design unless stated otherwise in the summary.
- E11 Excludes allowances for adverse ground conditions / provisions for ground stabilisation / service
- E12 Excludes contingency costs.

**Estimate Stage:** 2  
**Oracle Project No.:** 112053 Aberdare to Hirwaun  
**Project Description:** ADDITION for Stabling Siding at Hirwaun Station

**Estimating Risk Register**

Ref	Risk Type	Description	Probability	Potential Cost Impact
<i>The estimator is asked to identify any risks to the project and/or estimate identified in preparing the estimate; this is to inform the QCRA process only and any potential cost impacts will not impact on the estimate total. The estimator should indicate his assessment of the level of cost impact (by percentage/H/M/L assessment / cost value or range), it is recognised that this will be a subjective assessment only</i>				

**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision		Estimate Stage	2
Estimate Date	26-Jan-11	Price 'Base date'	4Q2010		
Anticipated Start Date	01-Sep-14	Anticipated Finish Date	01-Mar-15		
Project No.	112053 Aberdare to Hirwaun				
Project Title / Location	ADDITION for Stabling Siding at Hirwaun Station				

WBS	Estimate Breakdown	Value	Escalation (Y/N)	%age of Point Estimate	Remarks
	<b>Contractor's direct costs -</b>				
10	Signalling	36,407	Y		
20	Electrification & Plant	44,500	Y		
30	Track	399,000	Y		
40	Telecoms	14,200	Y		
50	Operational Property	-	Y		
60	Structures	-	Y		
70	General Civils	12,505	Y		
80	Utilities	-	Y		
	<b>Contractor's Base Construction Cost inc OH&amp;P: Sub-Total A</b>	<b>506,612</b>			
	<b>Network Rail's "direct costs"</b>				
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Fleet		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Engineering trains		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Tampers		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Possession / Isolation Management	4,528			
	<b>Sub - Total B</b>	<b>4,528</b>			
	<b>Total Base Construction Cost inc OH&amp;P: Sub-Total C (A+B)</b>	<b>511,140</b>		0.00%	
	<b>Contractor's indirect costs</b>				
tbc	Preliminaries	91,190	Y		
tbc	Design	60,186	Y		
tbc	Testing & Commissioning	10,967	Y		
tbc	Training		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Spares		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Other	-	Y		
	<b>Sub - Total D</b>	<b>162,344</b>			
	<b>Total Construction Cost E (C+D)</b>	<b>673,484</b>			
	<b>Network Rail's indirect &amp; other costs</b>				
tbc	Network Rail Project Management, (COWD)		N		To be advised by project manager if applicable
tbc	Network Rail Project Management, (forecasted remaining costs)	46,912	Y		Calculated as Percentage on "Indirects" tab
tbc	Compensation charges (TOC & FOC), (costs from NDS)	14,763	Y		Calculated as Percentage or preliminary estimate on "Indirects" tab
tbc	DCO Charges	-	Y		Refer "NR Indirects" tab
tbc	Land / Property Costs & compensation	-	Y		Refer "NR Indirects" tab
tbc	Escalation (see Note 1) %	-	NA		See Note 1
tbc	Other ( State )	-			Refer "NR Indirects" tab
	<b>Sub - Total F</b>	<b>61,675</b>			
	<b>Point Estimate - Sub - Total G (E+F)</b>	<b>735,159</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>735,159</b>			<b>for Project Manager's reference</b>
tbc	ORA Value - at P50 (see Note 3)	£			Sponsor to advise if P50 or P80 value shall apply See Note 3
tbc	ORA 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) % 25%	183,790			Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
	<b>Project Anticipated Final Cost (AFC)</b>	<b>918,949</b>			<b>Authorised AFC</b>
	<b>Other Costs to the Customer</b>				
tbc	Allowance for Escalation (see Note 1) <b>Not included in Cost to Customer</b>	110,519			Escalation to Midpoint of construction works taken as 3Q2013 See Note 1
tbc	Allowance for Network Rail Fee Fund				provided by Sponsor
tbc	Allowance for Industry Risk Fund				provided by Sponsor
tbc	Allowance for Insurance Top-up				provided by Sponsor
	<b>Cost to Customer</b>	<b>918,949</b>			<b>NB Escalation is excluded from Cost to Customer</b>

**APPROVAL & ENDORSEMENT**

	Estimate Produced by :-	Estimate Approved by :-	Estimate Endorsed by :-
Name :-	Ian Smith Estimator	Nick Bennett Estimating Manager	
Position :-	Franklin and Andrews Limited	Network Rail	
Signed :-			
Date :-			

**Notes:-**

- 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  
Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calculated as described herein and shown in the Estimate Summary Report under "Other Costs to the Customer" for advice only. Escalation has been calculated to the estimated midpoint of the construction period ie 4Q 2014. The increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%; NB this amount has not been included within the estimate for 'Cost to the Customer'.
  - An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating. The basis for applying the uplift value seen herein is as follows:  
An adjusted uplift for Residual Factors of +25% has been applied for this estimate at Grip Stage 2. Normally an uplift of 30% is applied however the Estimating Manager has agreed that due to the level of detailed measurement that 25% is a reasonable allowance in this case.
  - The project team or Risk & Value Manager should provide 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)
- A QRA meeting has not been held yet thus these figures are not available.

## ESTIMATE SUMMARY REPORT

Estimate No.		Revision		Estimate Stage	2
Estimate Date	26-Jan-11	Price 'Base date'	4Q2010		
Anticipated Start Date	01-Sep-14	Anticipated Finish Date	01-Mar-15		
Project No.	112053 Aberdare to Hirwaun				
Project Title / Location	ADDITION for Stabling Siding at Hirwaun Station				

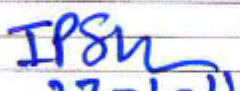
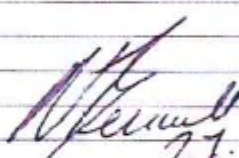
WBS	Estimate Breakdown	Value	Escalation (Y/N)	% of Estimate
	<b>Contractor's direct costs -</b>			
10	Signalling	36,407	Y	
20	Electrification & Plant	44,500	Y	
30	Track	399,000	Y	
40	Telecoms	14,200	Y	
50	Operational Property	-	Y	
60	Structures	-	Y	
70	General Civils	12,505	Y	
80	Utilities	-	Y	
	<b>Contractor's Base Construction Cost inc OH&amp;P: Sub-Total A</b>	<b>506,612</b>		
	<b>Network Rail's "direct costs"</b>			
tbc	NDS - Materials		Y	
tbc	NDS - Fleet		Y	
tbc	- Engineering trains		Y	
tbc	- Tampers		Y	
tbc	NDS - Possession / Isolation Management	4,528		
	<b>Sub - Total B</b>	<b>4,528</b>		
	<b>Total Base Construction Cost inc OH&amp;P: Sub-Total C (A+B)</b>	<b>511,140</b>		
	<b>Contractor's indirect costs</b>			
tbc	Preliminaries	91,190	Y	
tbc	Design	60,186	Y	
tbc	Testing & Commissioning	10,967	Y	
tbc	Training		Y	
tbc	Spares		Y	
tbc	Other	-	Y	
	<b>Sub - Total D</b>	<b>162,344</b>		
	<b>Total Construction Cost E (C+D)</b>	<b>673,484</b>		
	<b>Network Rail's indirect &amp; other costs</b>			
tbc	Network Rail Project Management, (COWD)		N	
tbc	Network Rail Project Management, (forecasted remaining costs)	46,912	Y	
tbc	Compensation charges (TOC & FOC), (costs from NDS)	14,763	Y	
tbc	DCO Charges	-	Y	
tbc	Land / Property Costs & compensation	-	Y	
tbc	Escalation (see Note 1)	-	NA	
tbc	Other ( State )	-		
	<b>Sub - Total F</b>	<b>61,675</b>		
	<b>Point Estimate - Sub - Total G (E+F)</b>	<b>735,159</b>		
	<b>Uplift for Risk and Contingency</b>			



<b>Uplift for Risk and Contingency</b>			
tbc	To Mean (see Note 3)	£	
<b>Project Budget (Point Estimate + Uplift to Mean)</b>			<b>735,159</b>
tbc	CRA Value - at P50 (see Note 3)	£	
tbc	CRA Value - at P80 - incremental on P50 value (see Note 3)	£	
tbc	Adjustment for residual factors (see Note 2)	% 25%	183,790
<b>Project Anticipated Final Cost (AFC)</b>			<b>918,949</b>
<b>Other Costs to the Customer</b>			
tbc	Allowance for Escalation (see Note 1)	<u>Not included in Cost to Customer</u>	110,519
tbc	Allowance for Network Rail Fee Fund		
tbc	Allowance for Industry Risk Fund		
tbc	Allowance for Insurance Top-up		
<b>Cost to Customer</b>			<b>918,949</b>

NB Escalation is e

**APPROVAL & ENDORSEMENT**

	<b>Estimate Produced by :-</b>	<b>Estimate Approved by :-</b>	<b>Estir</b>
Name :-	Ian Smith	Nick Bennett	
	Estimator	Estimating Manager	
Position :-	Franklin and Andrews Limited	Network Rail	
Signed :-			
Date :-	27-1-11	27-01-11	

**Notes:-**

- 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 from the estimate 'base date' to the mid-point of the construction phase  
Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calcul to the Customer" for advice only. Escalation has been calculated to the estimated midpoint of the construction period ie 4Q 2014. The increase ca NB this amount has not been included within the estimate for "Cost to the Customer".
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- 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 b shown in the box provided (ie P80 value - P50 value)  
A QRA meeting has not been held yet thus these figures are not available.



See Note 3

**Project Manager's reference**

or to advise if P50 or P80 value shall apply See Note 3

or to advise if P50 or P80 value shall apply See Note 3

on Point Estimate Value (excluding the Cost of Work Done) See Note 2

rised AFC

tion to Midpoint of construction works taken as 3Q2013 See Note 1

led by Sponsor

led by Sponsor

led by Sponsor

icalation is excluded from Cost to Customer

**Estimate Endorsed by :-**

nd where the site works will be over 2 years duration; escalation shall be calculated using RPI indices

all be calculated as described herein and shown in the Estimate Summary Report under "Other Costs"  
; increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%;

ie uplift value seen herein is as follows:

however the Estimating Manager has agreed that due to the level of detailed measurement that 25%

150 should be entered in the spaces provided; the incremental value to P80 (beyond P50) should be

**Enhancements Estimating**

**Oracle Project No.:** 112053 Aberdare to Hirwaun

**Project Description:** ADDITION for Stabling Siding at Hirwaun Station

**Estimate Stage:** 2

	Total	Assumed Expenditure Profile								
		% Stage 1	% Stage 2	% Stage 3	% Stage 4	% Stage 5	% Stage 6	% Stage 7	% Stage 8	
<b>Direct Costs</b>										
<i>Asset-</i>										
Signalling & Telecoms	36,407						98%	35,679	2%	728
Electrification & Plant	44,500						98%	43,610	2%	890
Track	399,000						98%	391,020	2%	7,980
Telecoms	14,200						98%	13,916	2%	284
Operational Property	0						98%	0	2%	0
Structures	0						98%	0	2%	0
General Civils	12,505						98%	12,255	2%	250
Utilities	0						100%	0		
<b>Indirect Costs</b>										
Preliminaries	91,190						98%	89,366	2%	1,824
Design	60,186		1% 602	8% 4,815	30% 18,056	55% 33,103	6%	3,611		
Test and Commission	10,967						100%	10,967		
Network Rail Management	40,529	4% 1,621	10% 4,053	10% 4,053	12% 4,863	12% 4,863	45%	18,238	5% 2,026	2% 811
Sponsor	6,383	20% 1,277	20% 1,277	20% 1,277	10% 638	10% 638	10%	638	6% 383	4% 255
<b>Other Costs</b>										
TOC/ FOC compensation	14,763						100%	14,763		
Land purchase						100%	0			
Possessions/ Isolations	4,528						100%	4,528		
TWA Charges	0			20% 0	60% 0	20% 0				
Land / Property Costs & compensation	0					15% 0	85%	0		
Escalation (see Note 1)	0			2% 0	4% 0	18% 0	60%	0	15% 0	1% 0
Other ( State )	0					15% 0	70%	0	15%	0
<i>Point Estimate Total</i>	<i>735,159</i>									
Uplift for Risk & Contingency	183,790			2% 3,676	4% 7,352	18% 33,082	60%	110,274	15% 27,568	1% 1,838
<b>Total expenditure by GRIP Stage</b>		<b>2,898</b>	<b>5,931</b>	<b>13,820</b>	<b>30,909</b>	<b>71,687</b>	<b>748,866</b>	<b>41,934</b>	<b>2,904</b>	
Project Anticipated Final Cost	918,949									

<b>Estimate Stage:</b>	<b>2</b>											
<b>Oracle Project No.:</b>	<b>112053 Aberdare to Hirwaun</b>											
<b>Project Name:</b>	<b>ADDITION for Stabling Siding at Hirwaun Station</b>											
<b>Calculation of Contractors and Network Rail's Indirect Costs</b>												
<b>Asset</b>	<b>Total Direct Costs</b>	<b>%</b>	<b>Preliminaries</b>	<b>%</b>	<b>Design</b>	<b>%</b>	<b>Test &amp; Commission</b>	<b>%</b>	<b>Network Rail Management</b>	<b>%</b>	<b>Sponsor</b>	
Signalling	36,407	18%	6,553	10%	3,641	14%	5,097	8%	2,913	7%	459	
Electrification & Plant	44,500	18%	8,010	30%	13,350	10%	4,450	8%	3,560	7%	561	
Track	399,000	18%	71,820	10%	39,900	0%	0	8%	31,920	7%	5,027	
Telecoms	14,200	18%	2,556	10%	1,420	10%	1,420	8%	1,136	7%	179	
Operational Property	0	18%	0	10%	0	0%	0	8%	0	7%	0	
Structures	0	18%	0	15%	0	0%	0	8%	0	7%	0	
General Civils	12,505	18%	2,251	15%	1,876	0%	0	8%	1,000	7%	158	
Utilities	0	18%	0	10%	0	0%	0	8%	0	7%	0	
			91,190		60,186		10,967		40,529		6,383	
<b>Allowance for TOC / FOC Compensation - calculator</b>												
	506,612		91,190				10,967					
					TOTAL		608,769					
					<b>Allowance for TOC / FOC compensation (%)</b>	<b>2.43%</b>	<b>14,763</b>					

Oracle Project No. 112053 Aberdare to Hirwaun					
Project Description				TOTAL	£ 36,407.00
Ref	Description	Quantity	Unit	Rate	Cost
10	<b>Signalling</b>				
	<b>Controls</b>				
1	Mods to Control System @ Abercynon Signal Box	1	No	£ 25,000.00	as main Options
2	Mods to Indication System @ Abercynon Signal Box	1	No	£ 15,000.00	as main Options
3	Mods to train describer	1	No	£ 10,000.00	as main Options
	<b>Interlockings</b>				
4	Mods to Interlocking	1	Psum	£ 200,000.00	as main Options
	<b>New Signals</b>				
5	Install Signal A163 2 aspect for Stabling Siding at Old Hirwaun Station	1	Nr	£ 6,975.00	£ 6,975.00
6	Buffer stop red lights at Old Hirwaun Station	1	Nr	£ 621.00	£ 621.00
	<b>New signs</b>				
7	Install 25 permissible speed Sign and directional arrow at start of Hirwaun Stabling siding	1	Nr	£ 672.00	£ 672.00
	<b>Train Detection</b>				
8	Axle counters; in possessions		nr	11,160	not applicable
9	Axle counters		nr	10,200	as main Options
10	REB Type 1		nr	25,000	as main Options
11	Axle counter evaluators + telephone		nr	26,000	as main Options
	<b>Protection and Warning Systems</b>				
12	TPWS - OSS + TSS	1	nr	12,325	£ 12,325.00
13	AWS - suppressed	1	nr	6,314	£ 6,314.00

Ref	Description	Quantity	Unit	Rate	Cost
	<b>Trackside</b>				
	<u>Cabling</u>				
15	Multicore cabling (for signals)	100	m	£ 15.00	£ 1,500.00
16	Tail cables for trackside equipment (x 200m each)	800	m	£ 10.00	£ 8,000.00
<b>Page Total</b>					£ 36,407.00

Oracle Project 112053 Aberdare to Hirwaun					
Project Description				TOTAL	£ 44,500.00
Ref	Description	Quantity	Unit	Rate	Cost
20	<b>Electrification and Plant</b>				
1	650V Signalling Power Supply cable for the route	100	m	£ 20.00	£ 2,000.00
2	New PSP Principal Supply point to be installed (possibly at Hirwaun)	1	Nr	£ 250,000.00	<b>as main Options</b>
3	DNO supply	1	nr	£ 25,000.00	<b>as main Options</b>
4	Install new FSP along the route	2	Nr	£ 12,000.00	<b>see New Tower Add On</b>
5	Loc cases to serve pairs of signals	2	Nr	£ 26,570.00	<b>see New Tower Add On</b>
	<b>Points Heating</b>				
6	Power supply	1	nr	12,500	£ 12,500.00
7	Control cabinet	1	nr	20,000	£ 20,000.00
8	Heating	2	nr	5,000	£ 10,000.00
	<b>Page Total</b>				£ 44,500.00



Oracle Project No. 112053 Aberdare to Hirwaun						
Project Description ADDITION for Stabling Siding at Hirwaun Station					TOTAL	£ 399,000.00
Ref	Description	Quantity	Unit	Rate	Cost	
30	<b>Track</b>					
1	Install Stabling Siding at Hirwaun Station (26 miles 0075 to 26miles 0255)	180	m	£ 450.00	£ 81,000.00	
2	Preparation of sub-base for new track bed; excavation, disposal of contaminated and excavated material, filling to formation and sand base to receive bottom ballast	180	m	£ 200.00	£ 36,000.00	
3	Install new CV13T turnout New Tower Station / stabling	1	Nr	£ 220,000.00	£ 220,000.00	
4	Install Buffer Stop	2	Nr	£ 20,000.00	£ 40,000.00	
	<b>Track Replacement</b>					
5	De-vegetation of route where there is second track	180	m	£ 15.00	£ 2,700.00	
	<b>Track Drainage</b>					
	<u>Under track drainage at New Tower to improve track conditions</u>					
6	300 diameter pipe	180	m	£ 95.00	£ 17,100.00	
	<u>Catch pits</u>					
7	Aqua precast	4	nr	£ 550.00	£ 2,200.00	
	<b>Page Total</b>				£ 399,000.00	

Oracle Project No. 112053 Aberdare to Hirwaun						
Project Description ADDITION for Stabling Siding at Hirwaun Station					TOTAL	£ 14,200.00
Ref	Description	Quantity	Unit	Rate	Cost	
40	<u>Telecoms</u>					
1	Install SPT (signal post telephone) for the route	1	Nr	£ 7,500.00	£ 7,500.00	
	<u>Small Concentrator</u>					
2	Telephone concentrator card	1	No	7,500	<b>as main Options</b>	
3	Data Changes @ Concentrators	1	No	1,000	£ 1,000.00	
	<u>Cable Troughing</u>					
4	New Troughing C1/9 - full length	100	m	£ 57.00	£ 5,700.00	
<b>Page Total</b>					<b>£ 14,200.00</b>	

Oracle Project 112053 Aberdare to Hirwaun					
Project Description					
ADDITION for Stabling Siding at Hirwaun Station				TOTAL	£ -
Ref	Description	Quantity	Unit	Rate	Cost
50	<u>Operational Property</u>				
<b>Page Total</b>					£ -

<b>Oracle Project No. 112053 Aberdare to Hirwaun</b>					
<b>Project Description ADDITION for Stabling Siding at Hirwaun Station</b>				<b>TOTAL</b>	<b>£ -</b>
<b>Ref</b>	<b>Description</b>	<b>Quantity</b>	<b>Unit</b>	<b>Rate</b>	<b>Cost</b>
<b>60</b>	<b><u>Structures</u></b>			£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
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	<b>Page Total</b>				£ -

Oracle Project No. 112053 Aberdare to Hirwaun					
Project Description				TOTAL	£ 12,505.22
Ref	Description	Quantity	Unit	Rate	Cost
70	<b>General Civils</b>				
	<b><u>Carparking and associated works:</u></b>				
	<b>Boundary Fencing</b>				
1	Install post and wire fencing for the route, where currently not provided	230	m	£ 7.41	£ 1,705.22
	<b><u>Walking Routes</u></b>				
2	Cess Walkway for route; timber edgings	180	m	£ 60.00	£ 10,800.00
<b>Page Total</b>					<b>£ 12,505.22</b>

Oracle Project No. 112053 Aberdare to Hirwaun					
Project Description ADDITION for Stabling Siding at Hirwaun Station				TOTAL	£ -
Ref	Description	Quantity	Unit	Rate	Cost
80	<u>Utilities</u>			£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
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				£ -	£ -
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<b>Page Total</b>					£ -

Oracle Project No. 112053 Aberdare to Hirwaun					
Project Description ADDITION for Stabling Siding at Hirwaun Station					£ -
Ref	Description	Quantity	Unit	Rate	Cost
	<b>Other Contractors Indirect Costs</b>				
	<b>Spares</b>				
	Signalling			£ -	£ -
	Electrification and Power			£ -	£ -
	Track			£ -	£ -
	Telecoms			£ -	£ -
				<b>To Estimate Summary R</b>	£ -
	<b>Other Costs</b> <i>(The Consultant shall enter details)</i>				
				£ -	£ -
				£ -	£ -
	Ecology Surveys and associated remedial works (possibly less if Short Loop / no New Tower)	1	Sum	£ -	£ -
				£ -	£ -
	Noise Insulation Modelling Exercise (possibly less if Short Loop / no New Tower)	1	Sum	£ -	£ -
				£ -	£ -
	Environmental Impact Statement to be prepared for the route	1%	Sum	£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				£ -	£ -
				<b>To Estimate Summary R</b>	£ -

<b>Oracle Project No. 112053 Aberdare to Hirwaun</b>					
<b>Project Description</b>				<b>TOTAL</b>	<b>£ 4,528.06</b>
<b>Ref</b>	<b>Description</b>	<b>Quantity</b>	<b>Unit</b>	<b>Rate</b>	<b>Cost</b>
	<u>Network Rail Direct Costs</u>				







*Standard Template for Stage 1-2 Estimates*

**Enhancements Estimating**

**Oracle Project No.:**

**Project Description:**

**Estimate Stage:**

**Level of Confidence - +/- 40% (Stage 1), +/- 30% (Stage 2)**

<b>Issue and Revision Record:</b>					
<b>Rev.</b>	<b>Date</b>	<b>Consultant</b>	<b>Prepared by</b>	<b>Checked</b>	<b>Description</b>
Rev 00	26-Jan-11	Franklin and Andrews	Ian Smith	Nick Bennett	For comment

## **Estimate Document Contents**

<b>1</b>	<b>Assumptions</b>
<b>2</b>	<b>Estimating Risk Register</b>
<b>3</b>	<b>Estimate Summary Report</b>
<b>4</b>	<b>Summary by GRIP</b>
<b>5</b>	<b>Indirect Costs (Auto generated)</b>
<b>6</b>	<b>10. Signalling, measured works</b>
<b>7</b>	<b>20. Electrification and Power, measured works</b>
<b>8</b>	<b>30. Track, measured works</b>
<b>9</b>	<b>40. Telecommunications, measured works</b>
<b>10</b>	<b>50. Operational Property, measured works</b>
<b>11</b>	<b>60. Structures, measured works</b>
<b>12</b>	<b>70. General Civils, measured works</b>
<b>13</b>	<b>80. Utilities, measured works</b>
<b>14</b>	<b>Other Contractors Indirect Costs</b>
<b>15</b>	<b>Network Rail Direct Costs</b>

**Estimate Stage:** 2  
**Oracle Project No.:** 112053 Aberdare to Hirwaun  
**Project Description:** ADDITION for Stabling Siding at Tower

## Assumptions

### General / Drawings & Documents / Exclusions

#### General

- G1 The estimate base date is 4Q 2010
- G2 Escalation has not been included within the Project AFC as the AFC is below £50m in value and the construction phase will be under two years in duration; the estimate is therefore valid at the current time and as long as 4Q 2010 price levels are seen to be constant.
- G3 The cost of escalation shown has been calculated using RPI and this is the potential increase in the cost of the project from 4Q 2010 to the mid point of construction at 4Q 2014.
- G4 An uplift factor of 25% for cost and scope uncertainty has been applied after consultation with the Estimating Manager.
- G5 Arup are provided signalling scheme plans for these new options which the estimator has not had sight of yet. However A Wilkins has briefed I Smith of the new requirements for each of the new Options 1 to 4.

#### Preliminaries

- P1 Preliminaries have been allowed based on percentages allowed as per allocations on Indirects Tab which equate to an overall 18% of Contractor's Base Construction Cost inc OH&P

#### 10 Signalling

- 10.1 Tail Cables assumed as 200m long each.
- 10.2 Testing & Commissioning has been calculated as 15% of Signalling total cost. Refer to Indirects Tab.

#### 20 E&P - Electrification and Plant

- 20.1 We have been advised that a new Principal Supply Point PSP (power supply) is are required for this scheme and is likely to be located at the new Old Hirwaun Station site.
- 20.2 Testing & Commissioning has been calculated as 10% of E&P total cost. Refer to Indirects Tab.

#### 30 Track

- 30.1 This section has been priced on the assumption that the works can be carried in a conventional manner using tracked excavators and dozers to carry out the lowering and slewing of the existing line.
- 30.2 It has been assumed that the existing track Category 6 track will be completely replaced in order to provide a minimum track category of Cat 4 using servicable rail and sleepers. However the availability of servicable materials for this project can only be assumed at this stage and there is a risk that the project requirement may not be fulfilled and new materials will be required.
- 30.3 De-vegetation of the route where the track is doubled is assumed. It is assumed that the track is currently maintained for single track.

#### 40 Telecoms

- 40.1 All new telephone quantities have been confirmed with Arup for this section.
- 40.2 An allowance has been made for CCTV cable from Hirwaun LC to Robertstown LC to the Signal Box at Abercynon.
- 40.3 Copper telecoms cable from the furthest away level crossing has been assumed as required.
- 40.4 Testing & Commissioning has been calculated as 10% of Telecoms total cost. Refer to Indirects Tab.

## 50 **Operational Property**

- 50.1 Allowances for refurbished station buildings, new waiting shelters, new ticket offices, new platforms, etc. have been allowed as per Arup list of requirements.
- 50.2 Reasonable assumptions of quantities of CIS (customer information signs), PA (public address) equipment, CCTV and help points have been made.
- 51.3 No allowance has been made for ticket machines. If required a sum of £35k each should be made.

## 60 **Structures**

- 60.1 No structures work allowed. All bridges and culverts along route assumed sound.

## 70 **Gen Civils**

- 70.1 Carparking, cycleparking and bus stops is assumed to be by others.
- 70.2 For the cess walkway the specification has been reduced to remove the timber edgings.
- 70.3 For Vegetation clearance have allowed only where track is doubled as assumed that maintainer already clears for single track.
- 70.4 No allowance has been made for external works such as main highway entrance , station

## 80 **Utilities**

- 80.1 A provisional sum has been allowed for utility diversions.

### **Other Contractor Indirects**

- 90.1 Ecology surveys, noise insulation modelling and environment impact statement report allowed

### **Drawings & Documents**

The following documents have been used in the preparation of this estimate:

- D1 Original signalling scheme sketches prepared for Options 1 to 8.
- D2 Project Remit
- D3 Briefing from A Wilkins to adjust certain original Options to new options 1 to 4.

### **Exclusions**

- E1 Excludes any allowance for Optimism Bias.
- E2 Escalation allowance is excluded from the "Cost to Customer" figure.
- E3 VAT is excluded.
- E2 Excludes 3rd party compensation charges except compensation to TOC/FOC.
- E3 Excludes planning and approval charges.
- E4 Excludes permanent land purchases.
- E5 Excludes costs associated with Statutory Fees (e.g. HMRI, Local Authority, etc.).
- E6 Excludes Costs associated with taxes and levies, including VAT.
- E7 Excludes Costs associated with licences and all associated costs and fees except where stated.
- E8 Excludes costs associated with changes in legislation and any form of applicable standards.
- E9 Excludes costs associated with changes in legislation, regulation and interpretation covering discriminatory, specific and general issues that may lead to design and cost changes.
- E10 Excludes costs associated with ground investigation/design unless stated otherwise in the summary.
- E11 Excludes allowances for adverse ground conditions / provisions for ground stabilisation / service
- E12 Excludes contingency costs.

**Estimate Stage:** 2  
**Oracle Project No.:** 112053 Aberdare to Hirwaun  
**Project Description:** ADDITION for Stabling Siding at Tower

**Estimating Risk Register**

Ref	Risk Type	Description	Probability	Potential Cost Impact
<i>The estimator is asked to identify any risks to the project and/or estimate identified in preparing the estimate; this is to inform the QCRA process only and any potential cost impacts will not impact on the estimate total. The estimator should indicate his assessment of the level of cost impact (by percentage/H/M/L assessment / cost value or range), it is recognised that this will be a subjective assessment only</i>				

**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision		Estimate Stage	2
Estimate Date	26-Jan-11	Price 'Base date'	4Q2010		
Anticipated Start Date	01-Sep-14	Anticipated Finish Date	01-Mar-15		
Project No.	112053 Aberdare to Hirwaun				
Project Title / Location	ADDITION for Stabling Siding at Tower				

WBS	Estimate Breakdown	Value	Escalation (Y/N)	%age of Point Estimate	Remarks
	<b>Contractor's direct costs -</b>				
10	Signalling	44,626	Y		
20	Electrification & Plant	44,500	Y		
30	Track	155,650	Y		
40	Telecoms	14,200	Y		
50	Operational Property	-	Y		
60	Structures	-	Y		
70	General Civils	10,483	Y		
80	Utilities	-	Y		
	<b>Contractor's Base Construction Cost inc OH&amp;P: Sub-Total A</b>	<b>269,459</b>			
	<b>Network Rail's "direct costs"</b>				
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Fleet		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Engineering trains		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Tampers		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Possession / Isolation Management	2,126			
	<b>Sub - Total B</b>	<b>2,126</b>			
	<b>Total Base Construction Cost inc OH&amp;P: Sub-Total C (A+B)</b>	<b>271,584</b>		0.00%	
	<b>Contractor's indirect costs</b>				
tbc	Preliminaries	48,503	Y		
tbc	Design	36,370	Y		
tbc	Testing & Commissioning	12,118	Y		
tbc	Training		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Spares		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Other	-	Y		
	<b>Sub - Total D</b>	<b>96,990</b>			
	<b>Total Construction Cost E (C+D)</b>	<b>368,575</b>			
	<b>Network Rail's indirect &amp; other costs</b>				
tbc	Network Rail Project Management, (COWD)		N		To be advised by project manager if applicable
tbc	Network Rail Project Management, (forecasted remaining costs)	24,952	Y		Calculated as Percentage on "Indirects" tab
tbc	Compensation charges (TOC & FOC), (costs from NDS)	5,759	Y		Calculated as Percentage or preliminary estimate on "Indirects" tab
tbc	DCO Charges	-	Y		Refer "NR Indirects" tab
tbc	Land / Property Costs & compensation	-	Y		Refer "NR Indirects" tab
tbc	Escalation (see Note 1) %	-	NA		See Note 1
tbc	Other (State)	-			Refer "NR Indirects" tab
	<b>Sub - Total F</b>	<b>30,711</b>			
	<b>Point Estimate - Sub - Total G (E+F)</b>	<b>399,286</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>399,286</b>			<b>for Project Manager's reference</b>
tbc	ORA Value - at P50 (see Note 3)	£			Sponsor to advise if P50 or P80 value shall apply See Note 3
tbc	ORA 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) % 25%	99,821			Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
	<b>Project Anticipated Final Cost (AFC)</b>	<b>499,107</b>			Authorised AFC
	<b>Other Costs to the Customer</b>				
tbc	Allowance for Escalation (see Note 1) <b>Not included in Cost to Customer</b>	60,026			Escalation to Midpoint of construction works taken as 3Q2013 See Note 1
tbc	Allowance for Network Rail Fee Fund				provided by Sponsor
tbc	Allowance for Industry Risk Fund				provided by Sponsor
tbc	Allowance for Insurance Top-up				provided by Sponsor
	<b>Cost to Customer</b>	<b>499,107</b>			<b>NB Escalation is excluded from Cost to Customer</b>

**APPROVAL & ENDORSEMENT**

	Estimate Produced by :-	Estimate Approved by :-	Estimate Endorsed by :-
Name :-	Ian Smith	Nick Bennett	
	Estimator	Estimating Manager	
Position :-	Franklin and Andrews Limited	Network Rail	
Signed :-			
Date :-			

**Notes:-**

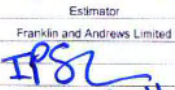
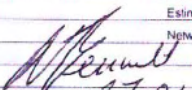
- Escalation will only be included within the Project Anticipated Final Cost (Project AFC) where the Project AFC is in excess of £50m and where the site works will be over 2 years duration; escalation shall be calculated using RPI indices from the estimate 'base date' to the mid-point of the construction phase  
Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calculated as described herein and shown in the Estimate Summary Report under "Other Costs to the Customer" for advice only. Escalation has been calculated to the estimated midpoint of the construction period ie 4Q 2014. The increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%; NB this amount has not been included within the estimate for 'Cost to the Customer'.
  - An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating. The basis for applying the uplift value seen herein is as follows:  
An adjusted uplift for Residual Factors of +25% has been applied for this estimate at Grip Stage 2. Normally an uplift of 30% is applied however the Estimating Manager has agreed that due to the level of detailed measurement that 25% is a reasonable allowance in this case.
  - 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)
- A QRA meeting has not been held yet thus these figures are not available.

**ESTIMATE SUMMARY REPORT**

Estimate No.		Revision		Estimate Stage	2
Estimate Date	26-Jan-11	Price 'Base date'	4Q2010		
Anticipated Start Date	01-Sep-14	Anticipated Finish Date	01-Mar-15		
Project No.	112053 Aberdeen to Hirwaun				
Project Title / Location	ADDITION for Stabling Siding at Tower				

WBS	Estimate Breakdown	Value	Escalation (Y/N)	%age of Point Estimate	Remarks
<b>Contractor's direct costs -</b>					
10	Signaling	44,626	Y		
20	Electrification & Plant	44,500	Y		
30	Track	155,650	Y		
40	Telecoms	14,200	Y		
50	Operational Property	-	Y		
60	Structures	-	Y		
70	General Civils	10,483	Y		
80	Utilities	-	Y		
Contractor's Base Construction Cost inc OH&P Sub-Total A		269,459			
<b>Network Rail's "direct costs"</b>					
tbc	NDS - Materials		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Fleet		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Engineering trains		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	- Tampers		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	NDS - Possession / Isolation Management	2,126			
Sub - Total B		2,126			
Total Base Construction Cost inc OH&P: Sub-Total C (A+B)		271,584		0.00%	
<b>Contractor's indirect costs</b>					
tbc	Preliminaries	48,503	Y		
tbc	Design	36,370	Y		
tbc	Testing & Commissioning	12,118	Y		
tbc	Training		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Spares		Y		Generally within the rates (direct costs) at Stages 1 - 2
tbc	Other		Y		
Sub - Total D		96,990			
<b>Total Construction Cost E (C+D)</b>		<b>368,575</b>			
<b>Network Rail's indirect &amp; other costs</b>					
tbc	Network Rail Project Management, (COWD)		N		To be advised by project manager if applicable
tbc	Network Rail Project Management, (forecasted remaining costs)	24,962	Y		Calculated as Percentage on "Indirects" tab
tbc	Compensation charges (TOC & FOC), (costs from NDS)	5,759	Y		Calculated as Percentage or preliminary estimate on "Indirects" tab
tbc	DCO Charges		Y		Refer "NR Indirects" tab
tbc	Land / Property Costs & compensation		Y		Refer "NR Indirects" tab
tbc	Escalation (see Note 1)		NA		See Note 1
tbc	Other ( State )				Refer "NR Indirects" tab
Sub - Total F		30,711			
<b>Point Estimate - Sub - Total G (E+F)</b>		<b>399,286</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>399,286</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)	% 25%			Uplift on Point Estimate Value (excluding the Cost of Work Done) See Note 2
<b>Project Anticipated Final Cost (AFC)</b>		<b>498,107</b>			Authorised AFC
<b>Other Costs to the Customer</b>					
tbc	Allowance for Escalation (see Note 1)	Not included in Cost to Customer	60,026		Escalation to Midpoint of construction works taken as 3Q2013 See Note 1
tbc	Allowance for Network Rail Fee Fund				provided by Sponsor
tbc	Allowance for Industry Risk Fund				provided by Sponsor
tbc	Allowance for Insurance Top-up				provided by Sponsor
<b>Cost to Customer</b>		<b>498,107</b>			NB Escalation is excluded from Cost to Customer

**APPROVAL & ENDORSEMENT**

	Estimate Produced by :-	Estimate Approved by :-	Estimate Endorsed by :-
Name :-	Ian Smith	Nick Bennett	
Position :-	Estimator	Estimating Manager	
	Franklin and Andrews Limited	Network Rail	
Signed :-			
Date :-	27-1-11	27-01-11	

**Notes:-**

- 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  
Where the project AFC is below £50m or the construction phase will be shorter than two years, escalation shall not be included but it shall be calculated as described herein and shown in the Estimate Summary Report under 'Other Costs to the Customer' for advice only. Escalation has been calculated to the estimated midpoint of the construction period ie 4Q 2014. The increase calculated from the RPI indices (Planning & Regulation Forecast (4)) is for just over 12%. NB this amount has not been included within the estimate for 'Cost to the Customer'.
- An 'Adjustment for residual factors' has been applied in accordance with the Guidance Notes on Estimating. The basis for applying the uplift value seen herein is as follows:  
An adjusted uplift for Residual Factors of +25% has been applied for this estimate at Grip Stage 2. Normally an uplift of 30% is applied however the Estimating Manager has agreed that due to the level of detailed measurement that 25% is a reasonable allowance in this case.
- The project team or Risk & Value Manager should provide 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)
- A QRA meeting has not been held yet thus these figures are not available.



**Enhancements Estimating**

**Oracle Project No.:** 112053 Aberdare to Hirwaun

**Project Description:** ADDITION for Stabling Siding at Tower

**Estimate Stage:** 2

	Total	Assumed Expenditure Profile								
		% Stage 1	% Stage 2	% Stage 3	% Stage 4	% Stage 5	% Stage 6	% Stage 7	% Stage 8	
<b>Direct Costs</b>										
<i>Asset-</i>										
Signalling & Telecoms	44,626						98%	43,733	2%	893
Electrification & Plant	44,500						98%	43,610	2%	890
Track	155,650						98%	152,537	2%	3,113
Telecoms	14,200						98%	13,916	2%	284
Operational Property	0						98%	0	2%	0
Structures	0						98%	0	2%	0
General Civils	10,483						98%	10,273	2%	210
Utilities	0						100%	0		
<b>Indirect Costs</b>										
Preliminaries	48,503						98%	47,533	2%	970
Design	36,370		1% 364	8% 2,910	30% 10,911	55% 20,004	6%	2,182		
Test and Commission	12,118						100%	12,118		
Network Rail Management	21,557	4% 862	10% 2,156	10% 2,156	12% 2,587	12% 2,587	45%	9,701	5% 1,078	2% 431
Sponsor	3,395	20% 679	20% 679	20% 679	10% 340	10% 340	10%	340	6% 204	4% 136
<b>Other Costs</b>										
TOC/ FOC compensation	5,759						100%	5,759		
Land purchase						100%	0			
Possessions/ Isolations	2,126						100%	2,126		
TWA Charges	0		20% 0	60% 0	20% 0					
Land / Property Costs & compensation	0					15%	0	85%		
Escalation (see Note 1)	0		2% 0	4% 0	18% 0	60%	0	15%	0	1% 0
Other ( State )	0					15%	0	70%	0	
<i>Point Estimate Total</i>	<i>399,286</i>									
Uplift for Risk & Contingency	99,821			2% 1,996	4% 3,993	18% 17,968	60%	59,893	15% 14,973	1% 998
<b>Total expenditure by GRIP Stage</b>		<b>1,541</b>	<b>3,198</b>	<b>7,741</b>	<b>17,830</b>	<b>40,898</b>	<b>403,719</b>	<b>22,614</b>	<b>1,565</b>	
Project Anticipated Final Cost	499,107									

<b>Estimate Stage:</b>	<b>2</b>											
<b>Oracle Project No.:</b>	<b>112053 Aberdare to Hirwaun</b>											
<b>Project Name:</b>	<b>ADDITION for Stabling Siding at Tower</b>											
<b>Calculation of Contractors and Network Rail's Indirect Costs</b>												
<b>Asset</b>	<b>Total Direct Costs</b>	<b>%</b>	<b>Preliminaries</b>	<b>%</b>	<b>Design</b>	<b>%</b>	<b>Test &amp; Commission</b>	<b>%</b>	<b>Network Rail Management</b>	<b>%</b>	<b>Sponsor</b>	
<b>Signalling</b>	44,626	18%	8,033	10%	4,463	14%	6,248	8%	3,570	7%	562	
<b>Electrification &amp; Plant</b>	44,500	18%	8,010	30%	13,350	10%	4,450	8%	3,560	7%	561	
<b>Track</b>	155,650	18%	28,017	10%	15,565	0%	0	8%	12,452	7%	1,961	
<b>Telecoms</b>	14,200	18%	2,556	10%	1,420	10%	1,420	8%	1,136	7%	179	
<b>Operational Property</b>	0	18%	0	10%	0	0%	0	8%	0	7%	0	
<b>Structures</b>	0	18%	0	15%	0	0%	0	8%	0	7%	0	
<b>General Civils</b>	10,483	18%	1,887	15%	1,572	0%	0	8%	839	7%	132	
<b>Utilities</b>	0	18%	0	10%	0	0%	0	8%	0	7%	0	
			48,503		36,370		12,118		21,557		3,395	
<b>Allowance for TOC / FOC Compensation - calculator</b>												
	269,459		48,503				12,118					
					TOTAL		330,079					
					<b>Allowance for TOC / FOC compensation (%)</b>	1.74%	5,759					

Oracle Project No. 112053 Aberdare to Hirwaun					
Project Description ADDITION for Stabling Siding at Tower				TOTAL	£ 44,626.00
Ref	Description	Quantity	Unit	Rate	Cost
10	<b>Signalling</b>				
	<b>Controls</b>				
1	Mods to Control System @ Abercynon Signal Box	1	No	£ 25,000.00	as main Options
2	Mods to Indication System @ Abercynon Signal Box	1	No	£ 15,000.00	as main Options
3	Mods to train describer	1	No	£ 10,000.00	as main Options
	<b>Interlockings</b>				
4	Mods to Interlocking	1	Psum	£ 200,000.00	as main Options
	<b>New Signals</b>				
5	Install Signal A162 Single head one aspect for Stabling Siding at New Tower Station	1	Nr	£ 6,028.00	£ 6,028.00
6	Position light signal, attached to main signal on A162 post at New Tower Station	1	No	£ 3,278.00	£ 3,278.00
7	Install GS450 position light signal ground mounted at New Tower Stabling Siding	1	Nr	£ 3,939.00	£ 3,939.00
8	Buffer stop red lights at New Tower Station	2	Nr	£ 621.00	£ 1,242.00
	<b>New signs</b>				
9	Install 25 permissible speed Sign and directional arrow at start of New Tower line	1	Nr	£ 672.00	see New Tower Add On
10	Install 20/40 Sign at New Tower	1	Nr	£ 626.00	see New Tower Add On
	<b>Train Detection</b>				
11	Axle counters; in possessions	2	nr	11,160	see New Tower Add On
12	Axle counters		nr	10,200	as main Options
13	REB Type 1		nr	25,000	as main Options
14	Axle counter evaluators + telephone		nr	26,000	as main Options
	<b>Protection and Warning Systems</b>				
15	TPWS - OSS + TSS	1	nr	12,325	£ 12,325.00

Ref	Description	Quantity	Unit	Rate	Cost
16	AWS - suppressed	1	nr	6,314	£ 6,314.00
	<b>Trackside</b>				
	<u>Cabling</u>				
18	Multicore cabling (for signals)	100	m	£ 15.00	£ 1,500.00
19	Tail cables for trackside equipment (x 200m each)	1000	m	£ 10.00	£ 10,000.00
	<b>Page Total</b>				£ 44,626.00

Oracle Project 112053 Aberdare to Hirwaun					
No.					
Project Description				TOTAL	£ 44,500.00
Ref	Description	Quantity	Unit	Rate	Cost
20	<b>Electrification and Plant</b>				
1	650V Signalling Power Supply cable for the route	100	m	£ 20.00	£ 2,000.00
2	New PSP Principal Supply point to be installed (possibly at Hirwaun)	1	Nr	£ 250,000.00	<b>as main Options</b>
3	DNO supply	1	nr	£ 25,000.00	<b>as main Options</b>
4	Install new FSP along the route	2	Nr	£ 12,000.00	<b>see New Tower Add On</b>
5	Loc cases to serve pairs of signals	2	Nr	£ 26,570.00	<b>see New Tower Add On</b>
	<b>Points Heating</b>				
6	Power supply	1	nr	12,500	£ 12,500.00
7	Control cabinet	1	nr	20,000	£ 20,000.00
8	Heating	2	nr	5,000	£ 10,000.00
	<b>Page Total</b>				£ 44,500.00

Oracle Project No. 112053 Aberdare to Hirwaun						
Project Description ADDITION for Stabling Siding at Tower					TOTAL	£ 155,650.00
Ref	Description	Quantity	Unit	Rate	Cost	
30	<b>Track</b>					
1	Install Stabling Siding at New Tower Station (beyond new Station Platform - 26 miles 1270 to 26miles 1420)	150	m	£ 450.00	£ 67,500.00	
2	Preparation of sub-base for new track bed; excavation, disposal of contaminated and excavated material, filling to formation and sand base to receive bottom ballast	150	m	£ 200.00	£ 30,000.00	
3	Install New Tower Station line (26miles 905m to 26 miles 1270m)	365	m	£ 450.00	<b>see New Tower Add On</b>	
4	Install new CV13T turnout New Tower Station / stabling	2	Nr	£ 220,000.00	<b>see New Tower Add On</b>	
5	Install Buffer Stop at New Tower	2	Nr	£ 20,000.00	£ 40,000.00	
6	Install set of trap points to main freight line at Tower new station	1	Nr	£ 100,000.00	<b>see New Tower Add On</b>	
7	Twist Rail Panels - 113A - 9.144m	5	Nr	£ 4,000.00	<b>see New Tower Add On</b>	
	<b>Track Replacement</b>					
8	De-vegetation of route where there is second track ie at loop (assume currently maintained for single track)	150	m	£ 15.00	£ 2,250.00	
	<b>Track Drainage</b>					
	<u>Under track drainage at New Tower to improve track conditions</u>					
9	300 diameter pipe	150	m	£ 95.00	£ 14,250.00	
	<u>Catch pits</u>					
10	Aqua precast	3	nr	£ 550.00	£ 1,650.00	
	<b>Page Total</b>				£ 155,650.00	

Oracle Project No. 112053 Aberdare to Hirwaun					
Project Description ADDITION for Stabling Siding at Tower				TOTAL	£ 14,200.00
Ref	Description	Quantity	Unit	Rate	Cost
40	<b>Telecoms</b>				
1	Install SPT (signal post telephone) for the route	1	Nr	£ 7,500.00	£ 7,500.00
	<u>Route Works and Cable Renewals</u>				
2	Supply and Install telecoms copper cable from Hirwaun Station to new Tower Station	0	m	£ 14.00	<b>see New Tower Add On</b>
	<u>Small Concentrator</u>				
3	Telephone concentrator card	1	No	7,500	<b>as main Options</b>
4	Data Changes @ Concentrators	1	No	1,000	£ 1,000.00
	<u>Cable Troughing</u>				
5	New Troughing C1/9 - full length	100	m	£ 57.00	£ 5,700.00
<b>Page Total</b>					<b>£ 14,200.00</b>

Oracle Project 112053 Aberdare to Hirwaun					
Project No.					
Project Description				TOTAL	£ -
Ref	Description	Quantity	Unit	Rate	Cost
50	<u>Operational Property</u>				
<b>Page Total</b>					£ -



Oracle Project 112053 Aberdare to Hirwaun							
No.							
Project Description					TOTAL	£	-
Ref	Description	Quantity	Unit	Rate	Cost		
60	<u>Structures</u>			£	-	£	-
				£	-	£	-
				£	-	£	-
				£	-	£	-
				£	-	£	-
				£	-	£	-
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<b>Page Total</b>					£	-	-

Oracle Project No. 112053 Aberdare to Hirwaun						
Project Description ADDITION for Stabling Siding at Tower					TOTAL	£ 10,482.80
Ref	Description	Quantity	Unit	Rate	Cost	
70	<b>General Civils</b>					
	<b><u>Carparking and associated works:</u></b>					
	<b>Boundary Fencing</b>					
1	Install post and wire fencing for the route, where currently not provided	200	m	£ 7.41	£ 1,482.80	
	<b><u>Walking Routes</u></b>					
2	Cess Walkway for route; timber edgings	150	m	£ 60.00	£ 9,000.00	
<b>Page Total</b>					£ 10,482.80	



Oracle Project No. 112053 Aberdare to Hirwaun						
Project Description		ADDITION for Stabling Siding at Tower			£	-
Ref	Description	Quantity	Unit	Rate	Cost	
	<b>Other Contractors Indirect Costs</b>					
	<b>Spares</b>					
	Signalling			£ -	£ -	-
	Electrification and Power			£ -	£ -	-
	Track			£ -	£ -	-
	Telecoms			£ -	£ -	-
				<b>To Estimate Summary R</b>	£	-
	<b>Other Costs</b> <i>(The Consultant shall enter details)</i>					
				£ -	£ -	-
				£ -	£ -	-
	Ecology Surveys and associated remedial works (possibly less if Short Loop / no New Tower)	1	Sum	£ -	£ -	-
				£ -	£ -	-
	Noise Insulation Modelling Exercise (possibly less if Short Loop / no New Tower)	1	Sum	£ -	£ -	-
				£ -	£ -	-
	Environmental Impact Statement to be prepared for the route	1%	Sum	£ -	£ -	-
				£ -	£ -	-
				£ -	£ -	-
				£ -	£ -	-
				£ -	£ -	-
				£ -	£ -	-
				<b>To Estimate Summary R</b>	£	-



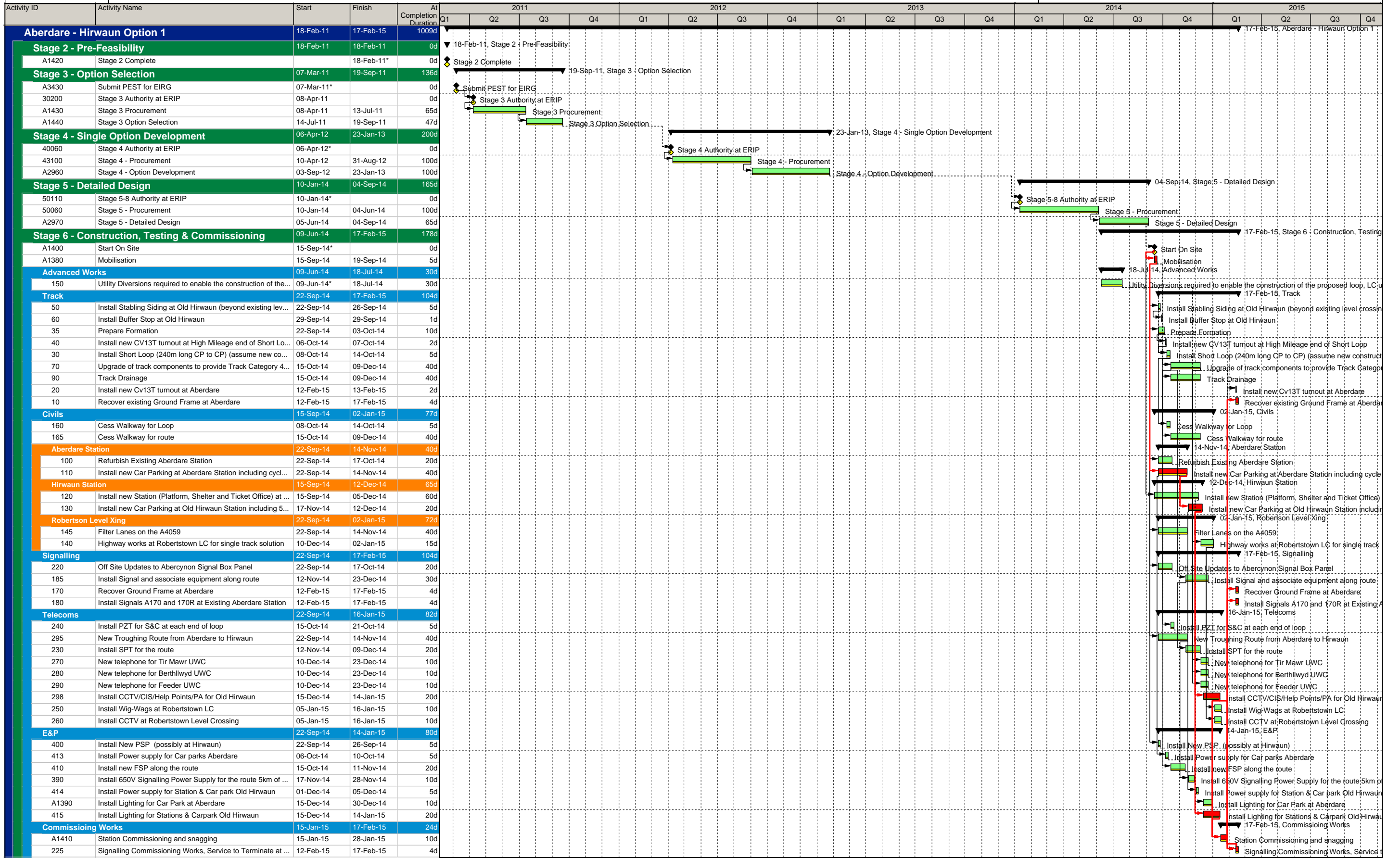


# Appendix C

(P3e Schedule)







■ Remaining Level of Effort   
 ▬ Remaining Work   
 ▬ Critical Remaining Work   
 ◆ Milestone   
 ◆ Baseline Milestone  
▬ Actual Level of Effort   
 ▬ Actual Work   
 ▨ WBS Summary   
 ▾ Summary   
 ▬ Primary Baseline

Layout : TW Standard Schedule  
Baseline : , Data Date: 09-Dec-10



# Appendix D

(Environmental Appraisal/Action Plan)



# Environmental Appraisal

## Project 112053

### Aberdare to Hirwaun

Project Name: <b>Aberdare to Hirwaun</b>	Business Unit:
Sponsor: <b>Richard Cole</b>	Document Reference:
Project Manager: <b>Alan Wilkins</b>	Project Code: <b>112053</b>

Signature	
Prepared by: (Project Manager)	Name: <b>Alan Wilkins</b>
	Job Title: <b>Project Development Manager</b>
	Date: January 2011
Accepted by: (Programme Manager)	Name:
	Job Title:
	Date:
Reviewed by: 	Name: Lucie Anderton
	Job Title: Environmental Specialist
	Date: 27/01/11

## **PURPOSE:**

The purpose of this appraisal is to assist Programme/Project Managers in identifying potential environmental issues and risks early in the GRIP Stages and to ensure that actions are undertaken through optioneering and detailed design (GRIP Stages 2-5) to construction (GRIP Stage 6) to address the highlighted issues. This is not a discrete document but one that is part of the building process as the project progresses and associated environmental issues become more defined or eliminated through to project implementation and close-out.

## **GUIDANCE ON HOW TO USE THIS DOCUMENT:**

**NOTE:** This is a “working document” and is a practical tool that should be used to direct project activities and requirements in order that the environmental issues and risks are effectively managed and controlled through project design and engineering.

**If in doubt consult the appropriate Environment/Town Planning/Community Relations Team and sponsor’s agent to discuss the project’s likely implications.**

1. The Environmental Appraisal should be started in GRIP Stage 2; and reviewed during GRIP Stage 3 and 4
2. Indicate the appropriate GRIP Stage.
3. Review environmental information/risk identification from the previous GRIP stage(s): complete Section 4 or attach as an addendum.
4. Collect pertinent environment documentation/information; e.g. print Marlin maps or National Hazard Directory extract and attach as appropriate. Note: The listed information sources are to be used as prompts and is not a complete listing of sources available to complete the checklist.
5. Use during Stage 3 to evaluate and select the project option with the least environmental risk/constraint.
6. Review the Environmental Appraisal as the project develops through the GRIP design stages and/or if the project design is modified.
  - Note: Environmental and project information may not be available or is limited particularly in the early stages of Project design and engineering. The checklist should be completed as much as possible in GRIP stage 2-3. As the project becomes more defined and more information becomes available through subsequent GRIP stages, the EA and action plan should be reviewed and updated at each GRIP Stage until handover to the Contractor, or the project issues are managed through the PESP.
7. Provide a copy to the Environment Manager/Specialist for review.

## ENVIRONMENTAL APPRAISAL

### 1 INTRODUCTION

1. Project Name: **Aberdare to Hirwaun**
2. Address/Location:
3. Project Manager: **Alan Wilkins (Project Development Manager)**
4. GRIP Stage a: Pre-feasibility (Stage 2) YES  
b: Option Selection (Stage 3) \_\_\_\_\_  
c: Single Option Development (Stage 4) \_\_\_\_\_

### 2 PURPOSE

The purpose of this document is to identify potential environmental issues and risks that may arise during the design and construction of Aberdare to Hirwaun and to ensure that actions are undertaken to manage these aspects.

### 3 SCOPE AND DESCRIPTION OF PROJECT

#### 3.1 Scope

This Environmental Appraisal covers a preliminary assessment of the environmental factors affecting the project their potential impacts, and identifies actions needed to enable the project to proceed.

#### 3.2 Project Description

This project seeks to extend the existing half-hourly Cardiff to Aberdare passenger service a further 4 miles to Hirwaun, and eventually to Tower (another mile). The project is funded by welsh assembly Government (WAG), and timing is largely dependant on their finances. It is thought that implementation could be in 2015.

### 4 ENVIRONMENTAL ISSUES FROM EARLIER GRIP STAGE

4.1	None provided pre-GRIP Stage 2
-----	--------------------------------

## 5 ENVIRONMENTAL APPRAISAL

NOTE: IF CHECKED "YES", BEST TO EVALUATE WHETHER THE PROJECT/SITE AND/OR ACTIVITIES CAN BE MOVED TO AVOID THE NEED TO ADDRESS THESE ENVIRONMENTAL RISKS/CONSTRAINTS.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
<b>1.0 GENERAL RISKS</b>							
1.1	Project Description, Town Planning/ Infrastructure Liabilities/ Operational Surveyor Teams, MARLIN	Does land or land rights (easements/way leaves/permanent – temporary site compounds, etc.) need to be purchased? Note: even if works are within permitted development (PD) rights there may be restrictions as to what activities are allowed (e.g vegetation clearance during nesting season).	✓			<ul style="list-style-type: none"> <li>Seek advice from Town Planning/Property/ Environment/Community Relations Teams and consult with external stakeholders/ local authorities (LA) where necessary</li> <li>Site investigation/ surveys</li> <li>Design aspects: include in/modify design/relocate to avoid the need to address these issues/ incorporate mitigation measures</li> <li>Develop a Consent/ Environment/Communication Strategy Plan(s) as required</li> <li>Obtain consent (TWA Order/ planning permission/ area land rights) if required</li> <li>Specify protective measures in design/contract/construction requirements</li> </ul>	Old Hirwaun and Old Tower Stations may require land purchase.
1.2	Project Description, Town Planning/ Infrastructure Liabilities/ Operational Surveyor Teams, MARLIN, RAR, Utility Diagrams	Is the land leased out or are there 3 <sup>rd</sup> party interests or onsite utilities, telecommunication, etc.)?	✓				Services cross the route at several locations.
1.3	Town Planning Team	Does the acquisition or lease of the land change the status of the land		✓			To be confirmed at subsequent GRIP stages.
1.4	Project Description, MARLIN, Town Planning Team	Is land that may need to be purchased / leased contaminated or a licensed waste facility?			✓		
1.5	Town Planning Team	Does the project require Transport and Works Act (TWA) order/planning permission or similar?		✓			NR to confirm



	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
1.6	Town Planning/ Environment/ Community Relations Teams	Has the Local Planning Authority or any other Statutory Body expressed concern over the project or similar projects?		✓		<ul style="list-style-type: none"> <li>• Seek advice from Town Planning/Property/ Environment/Community Relations Teams</li> <li>• Consult with external stakeholders/LA</li> </ul>	NR to confirm
1.7	Town Planning/ Community Relations/ Environment Teams	Have residents or any other interest group indicated concern over the project or similar projects? Note: even if the works are within PD rights and are common activities, e.g. vegetation/tree clearance, this may still be sensitivity for stakeholders.		✓		<ul style="list-style-type: none"> <li>• Seek advice from Town Planning/Property/ Environment/Community Relations Teams</li> <li>• Consult with external stakeholders/LA</li> </ul>	NR to confirm
1.8	Town Planning Team/local authority	Are there any local plans/development proposals of land adjacent to/near the project that may have future ramifications on the project?	✓			<ul style="list-style-type: none"> <li>• Seek advice from Town Planning/Property/ Environment/Community Relations Teams</li> </ul>	Route is identified for improvement in Rhondda-Cynon-Taff LDP. Several land development sites identified along the route. Key interface likely to be at Old Hirwaun station, where approved development site is immediately adjacent to proposed station.
1.9	Project Description	Are there new or unusual features associated with the project that may become an issue with internal/external stakeholders e.g. tall masts, incompatible features with existing Network Rail structures?			✓	<ul style="list-style-type: none"> <li>• Consult internal Network Rail stakeholders</li> <li>• Design aspects: include in/modify design/incorporate mitigation measures</li> </ul>	

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
1.10	Guidance from Asset steward/ other Network Rail departments,	Any relevant Network Rail policies (such as TWA/planning process)/conditions that may require derogation (e.g. siting issues: substations next to telecommunication masts) or adjacent Network Rail projects?		✓		<ul style="list-style-type: none"> <li>Consult internal Network Rail stakeholders</li> <li>Design aspects: include in/modify design/incorporate mitigation measures</li> </ul>	NR to confirm
<b>2.0</b>	<b>ENVIRONMENTAL CONSTRAINTS</b>						
2.1	Project Description, MARLIN, RAR, site investigation	Does the local environment constrain the project e.g:	✓			<ul style="list-style-type: none"> <li>Consult internal Network Rail stakeholders</li> <li>Design aspects: include in/modify design/incorporate mitigation measures</li> <li>Consult with/obtain consent if required (e.g. building on a flood plain/change to coastal defences)</li> </ul>	
		Flood plain?		✓			Flood plain throughout the route, but should be no issue if footprint / level changes avoided.
		Flooding?	✓				Possible Flood constraints at Aberdare highlighted in Local Council report.
		Landslide?		✓			
		Difficult access (e.g. steep embankment)?		✓			Sections of the route are on steep embankments or in steep cuttings, however access in these locations not required.
		Other (specify e.g. pests such as rabbits)?		✓			Ecology surveys required
<b>3.0</b>	<b>AGRICULTURE /FORESTRY/VEGETATION MANAGEMENT</b>						
3.1	MARLIN, BAP, Site survey	Does the project require taking good quality agricultural land, or affect any agriculture holding (e.g. severance)?			✓	<ul style="list-style-type: none"> <li>Site investigation</li> <li>Consult with external stakeholders (particularly if</li> </ul>	

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
3.2		Does the project need to clear vegetation or trees on railway land or access routes?	✓			<ul style="list-style-type: none"> <li>noticeable amounts of vegetation/trees/ habitat are affected)</li> <li>• Design aspects: include in/ modify design/incorporate mitigation measures</li> <li>• Obtain consent (LA permission, etc.) if required</li> <li>• Specify protective measures</li> </ul>	Vegetation removal will be required, although should be possible to limit to localised areas. Level crossing sighting considerations may lead to additional vegetation clearance.
3.3		Does the project need to remove hedgerows?		✓			To be confirmed as part of vegetation removal considerations.
3.4	MARLIN, BAP, HERITAGE, Town Planning/ Environment Teams	Will the project need to remove, trim, cut trees under Tree Preservation Order (TPO) or in local planning conservation areas?		✓			Not known at present
<b>4</b>	<b>AIR QUALITY</b>						
4.1	Project Description, MARLIN, Town Planning Team/ LA – (Environmental Health Officers)	Will there be significant project activity that could generate large quantities of dust / noxious fumes or change the local air quality?	✓			<ul style="list-style-type: none"> <li>• Modify design/ incorporate mitigation measures</li> <li>• Consult with local authorities</li> <li>• Specify protective measures</li> </ul>	Increase in diesel-hauled passenger traffic is the driver behind the proposed scheme.
4.2		Are there adjacent/nearby receptors: residences, businesses, schools, medical facilities, etc.?	✓				Yes, residential and business areas at Aberdare, Robertstown, Trecynon and Hirwaun.
4.3		Are there any local authority policy constraints (e.g. within/close to an Air Quality Management Area, breaching of government air quality objectives or limit values)?		✓			AQMA for Aberdare Town Centre for NO <sub>2</sub> , however not relevant to rail corridor.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
<b>5</b>	<b>BUILDING, STRUCTURES, HISTORIC ASSOCIATION</b>						
5.1	MARLIN, RAR, HERITAGE, LA, Town Planning Team	Does the project affect a Listed Building, structure and/or Scheduled Ancient Monument; e.g. from piling, excavation, demolition, change of use, visual obstruction, potential for subsidence, cable attachments, bridge platforms?		✓		<ul style="list-style-type: none"> <li>• Seek advice from Town Planning</li> <li>• Consult with LA/Heritage Agencies</li> <li>• Design aspects: include in/modify design/ incorporate mitigation measures</li> <li>• Obtain local authority/ heritage consent if required</li> </ul>	Old Aberdare Station is <u>not</u> Listed. All Listed buildings and scheduled monuments are shown on the project Environmental Constraints Plans, but no significant issues identified, unless off site excavations are required.
5.2		Does the project affect a local planning Conservation Area, historic landscape features or similar designated area?		✓			Special Landscape Area designation NSA26 crosses track near Hirwaun.
5.3		Does the project affect any other historical or man made feature likely to be of value?			✓		
<b>6</b>	<b>CONTAMINATED LAND</b>						
6.1	MARLIN, RAR, Contaminated land reports/ database, Railway Estates/ Environment team	Will the project disturb contaminated land?	✓			<ul style="list-style-type: none"> <li>• Site investigation</li> <li>• Seek advice from Environment Team</li> <li>• Consult with LA if remediation required</li> <li>• Specify protective measures</li> </ul>	Track formation is likely to include contaminated material, due to the history of industry in the local area. Historic landfills at Hirwaun to south of the track.
6.2	MARLIN, RAR Contaminated land reports/ database, site survey, Railway Estates/ Environment team	Is the project site located adjacent to/near an externally owned (e.g. landfill/industrial site) or Network Rail potentially contaminated site or sidings?		✓		<ul style="list-style-type: none"> <li>• Seek advice from Environment Team</li> <li>• Seek alternative site</li> <li>• Site investigation</li> <li>• Specify protective measures, including possible remediation</li> </ul>	Possible given the industrial heritage of area.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
6.3	Project Description, MARLIN, RAR	Will the project activities open up pathways (e.g. channels) from contaminated areas to environment/stakeholder receptors; e.g. SSSIs		✓		<ul style="list-style-type: none"> <li>• Site investigation</li> <li>• Seek advice from Environment Team</li> <li>• Design aspects: include in/modify design/ incorporate mitigation measures</li> <li>• Specify protective measures</li> </ul>	Possible as route intersects SSSI at Tower end (Cors Bryn Y Gaer). Also, SAC (Blaen Cynon) includes Marsh Fritillary butterfly and marsh / grassland / woodland. Species-rich grassland
6.4	Project Description	Will produced wastes/spent ballast likely to be contaminated?	✓			<ul style="list-style-type: none"> <li>• Seek advice from Environment Team</li> <li>• Site investigation/ sampling</li> <li>• Follow NR/SP/ENV/044 for used ballast and/or Special Waste requirements</li> </ul>	Track formation is likely to include contaminated material, due to the history of industry in the local area.
<b>7</b>	<b>ECOLOGY (protected species/areas and invasive species)</b>						
7.1	MARLIN, BAP, RAR, HERITAGE, Town Planning/ Environment Teams, site survey, LA BAP local conservation organisations	Is the project site/access/staging areas/ compounds on/adjacent/nearby a statutory nature conservation site (e.g. SSSI, RAMSAR, SPA/SAC/cSAC/pSPA site) or other ecological designations?	✓			<ul style="list-style-type: none"> <li>• Seek advice from Environment Team</li> <li>• Site survey</li> <li>• Consult with local Conservation Agencies/LA</li> <li>• Design aspects: include in/ modify design/ incorporate mitigation measures</li> <li>• Obtain protected species license if required</li> <li>• Specify protective</li> </ul>	SSSI and SAC as above (6.3)
		Will the activity (e.g. working in a culvert, drainage works) and/or materials used have the potential to indirectly affect the designation and/or a protected area (e.g. downstream SSSI water quality)?	✓				SSSI and SAC as above (6.3). Drainage required at Tower and in cutting areas.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
7.2		Are there any protected species and/or habitats e.g. bats, badgers, newts etc. at or near the project site?		✓		measures/follow site management plan (SMS) if SSSI • Train staff • Continue monitoring if required	No Phase 1 survey carried out to date, however likely given SSSI and SAC.
7.3	BAP, RAR, Site survey	Are there any invasive vegetation species (Japanese knotweed, Giant hogweed, etc.) at or near the project site?		✓		• Site investigation • Enabling works for removal • Specify protective measures	No Phase 1 survey carried out to date.
<b>8</b>	<b>LANDSCAPE/TOWNSCAPE/VISUAL</b>						
8.1	Project Description, Town Planning/ Environment Teams, LA/	Is the site at/near or can be seen from a National Park/World Heritage Site/Area of Outstanding Natural Beauty (AONB)/local landscape/coastal/townscape designation?	✓			• Site investigation • Consult with local Heritage/ Conservation Agencies • Design aspects: include in/ modify design/incorporate mitigation measures (e.g. restoration plan) • Specify protective measures	Special Landscape Area designation NSA26 crosses track near Hirwaun.
8.2	Heritage/ Conservation Agencies	Will the visual amenity of lineside residents be affected; e.g. removing vegetation, erecting new/taller structures than existing surroundings, demolition in Conservation Areas?		✓			Potential at station sites.
8.3		Will new structures/project components obstruct visual amenity of dwellings/recreational areas/cultural heritage/conservation areas?		✓			Potential at station sites.
8.4		Will grading and vegetation removal with subsequent landscaping be required?	✓				Highly likely around stations and around Robertstown LC.
<b>9.0 NUISANCE: NOISE, VIBRATION AND LIGHT</b>							

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
9.1	Project Description, MARLIN	Will noise/vibration likely to increase from existing levels at site during construction?	✓			<ul style="list-style-type: none"> <li>• Site noise investigation</li> <li>• Consult w/local authorities (EHO)</li> <li>• Design aspects: include in/modify design/incorporate mitigation measures</li> <li>• Neighbour letter drops/consultation</li> <li>• Obtain Section 61 consent if required</li> <li>• Specify protective measures</li> <li>• Train staff</li> <li>• Continue monitoring</li> </ul>	
9.2		Will it affect?					
		Adjacent/nearby residences?	✓				
		Adjacent/nearby businesses, worship, schools, hospitals, hotels etc.?	✓				
		Adjacent / nearby SPA / SAC, nesting birds, seasonal constraints?			✓		
9.3		Will the project occur at night/weekend or public holiday (use of lights/noise)	✓				Likely for implementation to be to optimum programme.
9.4	Project Description/ Noise Insulation Regulations	Will noise/vibration likely to increase from existing levels at site during operation?	✓			<ul style="list-style-type: none"> <li>• Site noise investigation</li> <li>• Seek advice from Environment Team/Other Network Rail departments</li> <li>• Design aspects: include in/modify design/incorporate mitigation measures</li> </ul>	Yes due to increased frequency of traffic. Need for Noise Insulation Modelling to be considered at subsequent GRIP Stages.
<b>10</b>	<b>TRAFFIC GENERATION AND ACCESS</b>						
10.1	Project Description	Will significant traffic (vehicular/heavy loads) particularly through villages and along farm/country roads be generated (Public Rights of Way)?		✓		<ul style="list-style-type: none"> <li>• Consult local authorities/highways dept.</li> <li>• Design aspects: include in/modify design</li> <li>• Obtain Highways consent if required</li> <li>• Specify protective measures</li> </ul>	No real change to traffic, however as level crossings are to be upgraded and the number of trains increases, there may be an effect on traffic routes and driver behaviour.
10.2		Will the scheme result in new vehicular traffic flows? (Before and/or after)		✓			As 10.1.
10.3		Will it cause new pedestrian movements? (Before and/or after)		✓			Footpath crossing to be retained (with improved surfacing / signage).

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
10.4	As above	Any footpath, road closures/diversions required during construction?	✓			<ul style="list-style-type: none"> <li>As above</li> </ul>	Likely to be required for level crossing upgrades.
10.5	Project Description	Will parking outside railway land be required (e.g. on streets, on/near lineside neighbour's land)	✓			<ul style="list-style-type: none"> <li>Specify protective measures</li> <li>Train staff</li> </ul>	Scheme includes new parking for stations, generally on Local Council land.
10.6		Are access points near adjacent properties (nuisance including noise)		✓			Not known currently.
<b>11</b>	<b>WATER RESOURCES, POLLUTION (including Silt) AND DRAINAGE</b>						
11.1	Project Description, MARLIN, RAR, Surface water risk assessment model, Site investigation	Is the project on/near/adjacent to a watercourse and drainage channels?	✓			<ul style="list-style-type: none"> <li>Site investigation</li> <li>Consult with local Environment Agency/DEFRA for coastal/ marine/estuary areas</li> <li>Design aspects: include in/ modify/design to remove the need for a consent</li> <li>Obtain work near watercourses, obstruction to watercourse, discharge to controlled waters and/or sewerage system, etc. consents if required</li> <li>Specify protective measures (e.g. Site Drainage Plan, Emergency Incident Plan)</li> <li>Continue monitoring</li> </ul>	River Cynon and other watercourses along the route.
11.2		Will the works occur within 8-m of the bank and/or in a <b>designated</b> main river		✓			Relevant if River Cynon is a designated main river. To be confirmed.
11.3		Will the project need to remove vegetation close to/on or in a riverbank?		✓			Possible.
11.4		Is it likely to affect the flow of watercourses?		✓			Possible for drainage at Tower.
11.5		Will works occur around a water source protection area or require abstraction of water from a well?			✓		
11.6		Will works occur near marine waters, on coastal areas below mean high tide or affecting navigation?			✓		No SPZ identified on EA mapping. Route located partially on Secondary A aquifer.
11.7		Will it generate a discharge either directly to a watercourse or to soakaway/ground; e.g. dewatering operation/discharge from a bund?		✓			Possible for drainage at Tower.
11.8		Will it generate a discharge to a foul sewer?		✓			Possible for station drainage.



	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
11.9	Project Description, MARLIN, RAR, Site investigation	Will waste/spoil be stockpiled, materials/chemicals/fuels/oils stored at site that could enter a watercourse, major aquifer underneath or on a flood plain?		✓		<ul style="list-style-type: none"> <li>Establish protective measures</li> <li>Train staff</li> </ul>	Possible during construction.
<b>12</b>	<b>WASTE MANAGEMENT</b>						
12.1	Project Description, NDS/ Town Planning/ Environment Teams	<p>Network Rail requires all projects to develop and implement a Site Waste Management Plan.</p> <p>Key questions to consider in this plan include, but are not limited to;</p> <p>Will onsite disposal or land purchase be required?</p> <p>Will it generate large quantities of surplus material; i.e. spoil, sleepers?</p> <p>Can surplus material be reused (spares, spoil, etc.)?</p> <p>Will it generate hazardous wastes; e.g. oil, paint cans, contaminated land?</p>		✓		<ul style="list-style-type: none"> <li>Design aspects: include in/ modify design: reuse, recover, recycle</li> <li>Consult with and obtain consent from local authorities/Environmental Agencies for storage/ management concerns</li> <li>Obtain environmental permit if necessary</li> <li>Specify protective measures in the SWMP</li> <li>Ensure that the surplus remains in the chain of utility and is not seen as "getting rid of"; a waste exemption if applicable may also be required, seek advice from Environment Team</li> </ul>	Not known at this stage, however all of the listed issues are potential for this scheme.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
<b>13</b>	<b>SUSTAINABILITY: ENVIRONMENTAL OPPORTUNITIES</b>						
13.1	Project Description/ Environment Team	Can recycled/reclaimed materials such as sleepers/ballast/spoil/cables be used instead of raw materials?	✓			<ul style="list-style-type: none"> <li>• Modify design/contract/ construction strategy to capitalise on opportunities</li> <li>• Build into SWMP</li> <li>• Modify design/contract/ construction strategy to capitalise on opportunities</li> </ul>	Track Category to be 4, therefore serviceable sleepers are allowed. Possible to use cascaded materials.
13.2		Can sustainable materials or renewable energy be incorporated into the design?		✓			Unlikely, except at Stations where alternative energy sources may be worth considering.
13.3		Can energy/water efficiency be gained through building design/supply chain?			✓		
13.4	Project Description/ Environment Team	Can work be performed in parallel with another project reducing wastage, duplication and redundancy of materials, timing and resources?		✓		<ul style="list-style-type: none"> <li>• Modify design/contract/ construction strategy to capitalise on opportunities</li> </ul>	Doubtful, unless another local scheme, or if materials can be cascaded.
13.5		Can effluents and discharges be minimised?	✓				Contractor responsibility.
13.6		Can potentially polluting materials be replaced with less harmful materials (e.g. biodegradable oils)?			✓		
13.7		Are there other areas where environmental and sustainable benefits can be gained; such as			✓		
		Positive communication/interactive consultation with lineside neighbours/other stakeholders?	✓				
		Innovative environmental designs/methods of work?			✓		
		Positive contribution to habitats/protected species?			✓	Potential to enhance SAC / SSSI through habitat mgmt in discussion with CCW.	

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	<b>Information Sources</b>	<b>Environmental Considerations and Risks</b>	<b>Yes</b>	<b>?</b>	<b>No</b>	<b>Possible action (but not limited to)</b>	<b>Comments</b>
13.8		Other (specify on action log)?		✓			

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
<b>14</b>	<b>OTHER</b>						
14.1		Are there any other possible environmental effects specific to this project? If so list them: e.g. electro-magnetic effects, settlement, local issues/policies			✓		

### ACTION PLAN

Note: For each positive or ? response, the issue must be taken forward into the action plan for further management with the specific actions required, the responsible party for that action, start and target completion date identified. Evaluating the probability and the significance of the risk will assist to prioritise the issues and identify areas with unacceptable risk that will need to be eliminated, reduced and/or controlled.

ISSUE	PROBABILITY OF OCCURRENCE <sup>1</sup>			LEVEL OF RISK <sup>2</sup>			ACTIONS TO BE TAKEN <sup>3</sup>	RESPONSIBLE PARTY(IES)	START STAGE	TARGET COMPLETION
	Low	Medium	High	Low	Medium	High				
1.1 Land purchase needed at old Hirwaun and Tower			x		x		Negotiations with adjacent land owners	Project Manager	3	Stage 4
1.2: Services cross the land at several locations			x		x		Negotiations with Utility companies	Project Manager	3	Stage 4
1.3 Change of status of land			x		x		Town planning checks to be made	Senior Town Planner	3	Stage 3
1.5 Is TWA, Town Planning Consent or similar needed?			x		x		Consultation with Local Authority	Senior Town Planner	3	Stage 4
1.6: Local Authority and stakeholder concerns			x		x		Consultation with stakeholders	Sponsor/Senior Town Planner	3	Stage 4
1.7 Concern from residents and other interest groups			x		x		Communications with residents and interest groups	Community relations Dept.	3	Stage 4
1.8 Adjacent development proposals			x			x	To be investigated in stages 3 and 4	Sponsor	3	Stage 4
1.10 Network Rail policies and projects etc			x		x		Liaison with Route Freight Manager and others	Sponsor/Project Manager	3	Stage 4

ISSUE	PROBABILITY OF OCCURRENCE <sup>1</sup>			LEVEL OF RISK <sup>2</sup>			ACTIONS TO BE TAKEN <sup>3</sup>	RESPONSIBLE PARTY(IES)	START STAGE	TARGET COMPLETION
	Low	Medium	High	Low	Medium	High				
2.1 Local environmental constrains: Flood plain, steep cutting and embankment slopes, wildlife			x		x		Ecological and Environmental and geotechnical surveys	Project Manager	3	Stage 3
3.2 Vegetation clearance			x	x			Clearance to be scheduled to avoid nesting season	Project Manager	3	Stage 5
3.3 Removal of hedgerows	x				x		To be investigated with other vegetation clearance	Project Manager	3	Stage 5
3.4 Need to remove, trim or cut trees under Tree Preservation Order.	x			x			To be investigated with other vegetation clearance	Project Manager	3	Stage 5
4.1 Dust generation and noxious fumes from diesel trains			x		x		Liaison with Local authority and other stakeholders	Sponsor/Community Relations	3	Stage 4
4.2 Local receptors in Aberdare, Trecynon, Hirwaun			x		x		Liaison with Local authority and other stakeholders	Sponsor/Community Relations	3	Stage 4
4.3 Air Quality Management Areas			x	x			Liaison with Local authority and other stakeholders	Sponsor/Community Relations	3	Stage 4
5.1 Possible effects on Listed Structures etc.	x				x		Liaison with Local Authority	Senior Town Planner	3	Stage 4
5.2 Landscape Area designation NSA26 crosses track near Hirwaun	x			x			Care to avoid affecting designated area	Project Manager	3	Stage 4
6.1 Disturbance of contaminated land			x		x		Disposal to approved sites	Project Manager and Contractor	5	Stage 6

ISSUE	PROBABILITY OF OCCURRENCE <sup>1</sup>			LEVEL OF RISK <sup>2</sup>			ACTIONS TO BE TAKEN <sup>3</sup>	RESPONSIBLE PARTY(IES)	START STAGE	TARGET COMPLETION
	Low	Medium	High	Low	Medium	High				
6.2 Proximity of site to externally owned and Network Rail contaminated land			x		x		Investigate in stages 3 to 6	Project Manager and Contractor	3	Stage 6
6.3 Possible channels to receptors such as SSSI at Tower			x		x		Precautions during construction	Contractor	5	Stage 6
6.4 Contaminated wastes			x		x		Disposal to approved sites	Contractor	5	Stage 6
7.1 Proximity of worksites to SSSIs etc., particularly at Tower.			x			x	Consultation with CCW to ascertain if permission for the work is required, and precautions during construction.	Project Manager, and Contractor	3	Stage 6
7.2 Protected species			x	x			Ecological survey	Project Manager	3	Stage 4
7.3 Invasive vegetation species		x			x		Ecological survey	Project Manager	3	Stage 4
8.1 Visibility from Special Landscape Area NSA 26			x	x			Consult Local Authority and Conservation agencies	Project Manager	3	Stage 4
8.2 Visual amenity of lineside residents			x	x			Liaison with potentially affected persons	Community relations	4	Stage 6
8.3 Obstruction of visual amenity of residents	x				x		Liaison with potentially affected persons	Community relations	4	Stage 6
8.4 Grading and vegetation removal around stations and level crossings			x		x		Design to minimise	Project Manager	3	Stage 4

ISSUE	PROBABILITY OF OCCURRENCE <sup>1</sup>			LEVEL OF RISK <sup>2</sup>			ACTIONS TO BE TAKEN <sup>3</sup>	RESPONSIBLE PARTY(IES)	START STAGE	TARGET COMPLETION
	Low	Medium	High	Low	Medium	High				
9.1 Noise increase during construction			x		x		Minimise by appropriate construction practices	Contractor	5	Stage 6
9.2 Effect on nearby houses, schools, hospitals etc		x		x			Minimise by appropriate construction practices	Contractor	5	Stage 6
9.3 Nuisance at night or weekends		x		x			Low level of freight activity should enable much work to be done during weekday daytime	Project Manager/Community Relations	4	Stage 6
9.4 Increase in noise from Operations			x	x			Liaison with Local Authority and residents. Modelling to be considered in stage 4.	Sponsor/Project Manager/Community Relations	4	Stage 6
10.1 Increase in effect on road traffic, particularly at Level Crossings			x		x		Design of traffic mitigating measures on highways around Level Crossings	Project Manager	3	Stage 4
10.2 New vehicular flows to/from car parks			x	x			Design of traffic mitigating measures on highways	Project Manager	3	Stage 4
10.3 New pedestrian flows			x	x			Suitable footpath design, signage, and surfacing	Project Manager	3	Stage 5
10.4 Footpath closure during construction			x		x		Minimise by appropriate construction practices	Contractor	5	Stage 6
10.5 Parking on land outside NR ownership during construction			x		x		Minimise by appropriate construction practices	Contractor	5	Stage 6
10.6 Access points near adjacent properties			x	x			Minimise by appropriate construction practices	Contractor	5	Stage 6



ISSUE	PROBABILITY OF OCCURRENCE <sup>1</sup>			LEVEL OF RISK <sup>2</sup>			ACTIONS TO BE TAKEN <sup>3</sup>	RESPONSIBLE PARTY(IES)	START STAGE	TARGET COMPLETION
	Low	Medium	High	Low	Medium	High				
11.1 Proximity to watercourses (Afon Cynon and others)			x		x		Minimise by appropriate construction practices	Contractor	5	Stage 3
11.2 Works within 8 metres of bank of designated main river (status of Afon Cynon to be confirmed)			x		x		Minimise by appropriate construction practices	Contractor	5	Stage 6
11.3 Removal of vegetation on river bank	x			x			Minimise by appropriate construction practices	Contractor	5	Stage 6
11.4 Effect on flow of watercourses	x				x		Minimise by appropriate construction practices	Contractor	5	Stage 6
11.7 Generation of discharges to watercourses	x				x		Minimise by appropriate construction practices	Contractor	5	Stage 6
11.8 Discharges to foul sewer		x		x			Design to accommodate, and agree connection with utility company	Project Manager	4	Stage 5
11.9 Waste or stored materials entering watercourses		x			x		Minimise by appropriate construction practices	Contractor	5	Stage 6
12.1 Waste Management Plan			x		x		To be compiled	Project Manager	5	Stage 6
13.1 Use of recycled materials			x		x		Sources to be investigated	Project Manager	4	Stage 5
13.2 Use of sustainable materials and renewable energy	x			x			To be investigated	Project Manager	3	Stage 5

ISSUE	PROBABILITY OF OCCURRENCE <sup>1</sup>			LEVEL OF RISK <sup>2</sup>			ACTIONS TO BE TAKEN <sup>3</sup>	RESPONSIBLE PARTY(IES)	START STAGE	TARGET COMPLETION
	Low	Medium	High	Low	Medium	High				
13.3 Energy and water efficiency in supply chain	x			x			To be investigated	Project Manager	3	Stage 5
13.4 implementation in parallel with another project to reduce waste	x			x			To be investigated	Project Manager	3	Stage 5
13.5 Minimisation of discharges			x	x			Minimise by appropriate construction practices	Contractor	5	Stage 6
13.6 Replacement of polluting materials with less harmful materials		x			x		To be investigated	Project Manager	3	Stage 5
13.7 & 8 Other environmental and sustainability benefits such as: <ul style="list-style-type: none"> <li>• Positive communications with neighbours and stakeholders</li> <li>• Environmental designs</li> <li>• Positive contributions to habitats and species</li> </ul>		x		x			To be investigated	Sponsor/Project Manager/Community relations	3	Stage 5

**Note: The Environmental Appraisal and Action Plan should be reviewed through the GRIP design stages and/or if the project design is modified**

**NOTES:**

<sup>1</sup> Probability	<sup>2</sup> Risk
1. Low: Unlikely to occur during the lifetime of the project	1. Low: Unlikely to affect to cost or schedule of the programme
2. Medium: Can be expected to occur	2. Medium: Fairly likely to affect the cost or schedule of the programme
3. High: Almost certain to occur	3. High: Almost certain to have a significant adverse impact on the project

<sup>3</sup> Actions to be Taken: Be specific in what, where, how and who

<p>1. Carry Actions forward in</p> <ul style="list-style-type: none"><li>• Safety risk log</li><li>• Safety and Environment Strategy Plan/ Other Project Documents</li><li>• Project Environment Strategy Plan</li><li>• RT/LS/S/015 – CR-E Checklist</li></ul>	<p>2. Undertake more detailed assessment work/site investigation</p> <p>3. Consult with affected parties and/or statutory authorities</p> <p>4. Obtain environmental consents/permissions</p> <p>5. Modify design to reduce or mitigate impact</p> <p>6. Specify environmental protective measures within EMP to mitigate during construction</p>
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## GLOSSARY

### Abbreviations

AONB	Area of Natural Beauty
BAP	Biodiversity Action Plan (plus accompanying guidance sheets/toolkits)
CR-E	NR/SP/ENV/015 Network Rail Contract Requirements, Environment
cSAC	Candidate Special Areas of Conservation
EA	Environmental Appraisal
EHO	Environmental Health Officer
EMP	Environment Management Plan
GRIP	Guide to Railway Investment Projects
HERITAGE	Network Rail-wide database of protected land and/or buildings
LA	Local Authority
MARLIN	Network Rail-wide property Geographical Information System
NDS	National Delivery Service
PD	Permitted Development
PSPA	Potential Special Protection Area
RAMSAR Site	Wetlands of International Importance Designation
RAR	Railtrack Asset Register
SAC	Special Areas of Conservation
SMS	Site Management Statement
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TPO	Tree Preservation Order
TWA	Transport and Works Act

### Statutory Agencies

Environment Agencies	Environment Agency for England and Wales Scottish Environment Protection Agency (SEPA)
Conservation Agencies	Department of Environment, Food and Rural Affairs (DEFRA) Scottish Executive Environment and Rural Affairs Department (SEERAD) Natural England (NE) Countryside Council for Wales (CCW) Scottish Natural Heritage (SNH)
Heritage Agencies	English Heritage Welsh Heritage Agency (CADW) Historic Scotland

### Possible Consent Needed for Project Work

<b>Landtake</b>	<b>Responsible Agency</b>
• TWA Order if require compulsory purchase of land	Planning authority
• Planning permission from local authorities (Town and Country Planning Act 1990). Prior Approval or Permitted Development	Local Planning Authority
<b>Scheduled Ancient Monument/Listed Building/Conservation Area</b>	
• Consent to disturb a scheduled ancient monument (Ancient Monument and Archaeological Areas Act 1979)	Secretary of State/Local Planning Authority
• Listed Buildings/Conservation Area (Town and Country Planning Act)	Planning authority
<b>Trees and Ecology</b>	
• Work affecting Tree Preservation Orders, which offer legal protection to trees (Town and Country Planning (Trees) Regulations 1999)	Local Planning Authority
• Licence for felling timber (Forestry Act 1967)	Local Planning Authority
• Works affecting Important Hedgerows (Hedgerow Regulations 1997)	Local Planning Authority
• Licence for disturbance to badgers (Protection of Badgers Act 1992)	DEFRA
• Other wildlife consents required for works affecting protected species e.g. great crested newts, bats	NE/SNH/CCW; DEFRA
<b>Noise and Vibration</b>	
• Section 61 consent on nuisance (noise) during construction (under the Control of Pollution Act 1974)	Local Authority – Environment Health Officer
<b>Traffic Generation and Access</b>	
• Highways stopping/diversion consent (including temporary closures)	Highways authority
• Vehicle crossing consents (Highways Act 1980)	
<b>Water Resources (quality and hydrology)</b>	
• Consent for works over, under or adjacent to <b>designated</b> main rivers (Land Drainage Act /Water Resources Act 1991)	Environment Agency/SEPA
• Works affecting flow/structures in watercourse or navigation (Land Drainage Act 1991)	Environment Agency/SEPA
• Works around water source protection area (Water Resources Act 1991)	Environment Agency/SEPA
• Consent for works within 8m of a watercourse (Land Drainage bylaws)	Local Planning Authority
• Water abstraction license (Water Resources Act 1991)	Environment Agency/SEPA
• Consent for dewatering/discharge of water from excavations (Land Drainage Act 1991)	Environment Agency/SEPA
• Consent for discharge to controlled water and/or groundwater (Water Resources Act 1991/Groundwater Regulations)	Environment Agency/SEPA
• Water Authority Consent to discharge to foul sewer (Water Industries Act 1991)	Sewerage undertaker/ Environment Agency/SEPA
• Consent for works in coastal areas and marine waters (Coastal Protection Act 1949/Harbours Act 1964)	Marine Consents & Environment Unit (DEFRA)/Local Harbour Authority
<b>Waste Management</b>	
• Environmental Permitting (England and Wales) Regulations 2006	Environment Agency/SEPA

\*\*Note Legislation refers to regulations in England and Wales; regulation in Scotland differs; however, similar permission/consents apply



# Appendix E

(Time Table Study)





# Network Planning: Capability Analysis

## Aberdare – Hirwaun Passenger Service Extension

### Report

#### Document Control

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### References

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1.	Aberdare – Hirwaun Proposed Passenger Service Extension - Value Management 1 Report	112053	19/05/2010	1
2.				

### Stakeholders

Name of stakeholder	Company / Business
David Emms	TBC Midlands, Network Rail

### Abbreviations

Acronym	Meaning
ROTP	Rules of the Plan
ROTR	Rules of the Route
SRT	Sectional Running Time

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## 1. EXECUTIVE SUMMARY

This study examined the feasibility of extending the existing two trains per hour Cardiff - Aberdare services to Hirwaun.

A number of proposed timetables were examined between Aberdare and Tower Colliery based on the May 2010 Timetable. The study also examined potential location for attaching/ detaching movements with stabling points.

The study found that the Timetable Option is feasible between Aberdare and Hirwaun/ Tower Colliery on the single line if the following conditions apply:

- The journey time is less or equal to 39 minutes for the return journey between Aberdare and final terminal station.
- To enable existing freight services to operate, the SRT for freight over this branch would have to be reviewed and reduced. If this is not agreed then the proposed passenger service would have to be removed on hours when freight operates.
- A suitable passing loop is provided on the single line.
- Appropriate length of holding siding is provided.
- The level crossings at Robertstown and Hirwaun are upgraded for passenger use or closed.

Key findings on Passing Loop:

- In all options the starting point for the Passing Loop is at approx. 22.75 miles.
- There are two options for the length of passing loop
  - A longer loop allowing two trains to pass on the move. This would require the most infrastructure but produce the best journey times.
  - A shorter loop requiring one of the trains to be stationary or both trains to incur some pathing time. However this requires the least infrastructure.
- The only way to combine the passing Loop with a station dwell would be at Aberdare, this would require new Station Infrastructure at Aberdare. This would require a 4½ minute journey time extension to passenger trains.
- A service to Hirwaun can be achieved most economically with the introduction of 20 mph line speed and a short loop. Robertsown requiring upgrade and also review of User Worked Crossings<sup>1</sup> (2 footpath crossing and 3 User Worked Crossings).

---

• <sup>1</sup> UWC are located at Public 24m 13ch, Tir Mawr Farm 24m25, Berthllwyd (UWC with whistle boards) 25m 44ch

Key findings on Timetable Options:

- Any option that extends past New or Old Hirwaun Station locations would require line speed improvements to the branch line to be feasible.
- The New Hirwaun Station Location provides the most feasible timetable options. This is due to having the shortest journey time from Aberdare, therefore giving maximum flexibility on passing loop length, location and line speed.
- Tower Colliery (A4059) is the only achievable location north of Hirwaun that provides the opportunity to shorten the passing loop length. This would still require line speed improvements.

## 2. INTRODUCTION & OBJECTIVES

The Welsh Assembly Government (WAG) has commissioned a GRIP 1-2 Option Selection study on a scheme to provide passenger services to Hirwaun by extending the Aberdare service. It requires a GRIP 2 output to include a timetable study to ensure extension of passenger services is achievable and will have no adverse effect on the PPM of existing services.

The objective of this project is to examine the feasibility of extending the existing half hourly Cardiff - Aberdare services to Hirwaun by utilising the single line between Aberdare and Hirwaun.

There were two main options identified in the Aberdare area for timetable study:

- Option 1: Extend the line to the old disused Hirwaun station but stopping prior to the existing level crossing - the short term option.
- Option 2: Extend the line to a new station site near Tower Colliery, extra over option 1 - the longer term option.

The study has not taken into account the two level crossings on the single line (at Robertstown and Hirwaun) between Aberdare and Tower Colliery. It is assumed that the rail service will take priority at the level crossings and therefore does not impact on the timetable development.

This report details the analysis of proposed timetable options that have been carried out using the May 2010 Timetable with freight paths and the proposed stopping pattern on the single line between Aberdare and Tower Colliery.

The output of this timetable study is a number of feasibility timetables with necessary infrastructure proposals and interventions identified.

### 2.1 Study Scope

A VM1 workshop was held to agree the preliminary project scope. A number of options were put forward during that workshop and it was agreed that in order to reduce the scope the findings of the TT study would be crucial. The TT study will define the project scope in the following way:

- Most suitable location for a passing loop
- Most suitable location for stabling of units

The TT study will also contribute towards defining:

- Whether the project develops a scheme that takes the service further than Hirwaun

### 3. PROJECT FINDINGS

This section summarises a number of feasibility timetables with necessary infrastructure proposals and interventions identified for options proposed by the scheme sponsor (Welsh Assembly Government, WAG).

The study was completed in the following stages:

1. Identify suitable location for passing loop with required type and length on infrastructure with current line speed (15/ 20 mph).
  - a. Examine possible passing loop length.
  - b. Examine the effects of line speed improvement (to 35 mph) beyond Aberdare.
2. Investigate impact on current freight traffic.
3. Define suitable location for possible attaching/ detaching.

#### 3.1 Timetable Findings – Option 1a

In order to understand what would be the necessary expenditure and benefit of the different timetables with necessary infrastructure enhancement ten timetable options were proposed with four sub options each.

The structure of these options is similar except their stopping patterns and terminal locations. This means that the first timetable Option (1a) is repeated in further options except changing calling or terminal location, or both. These options are listed in Appendix C.

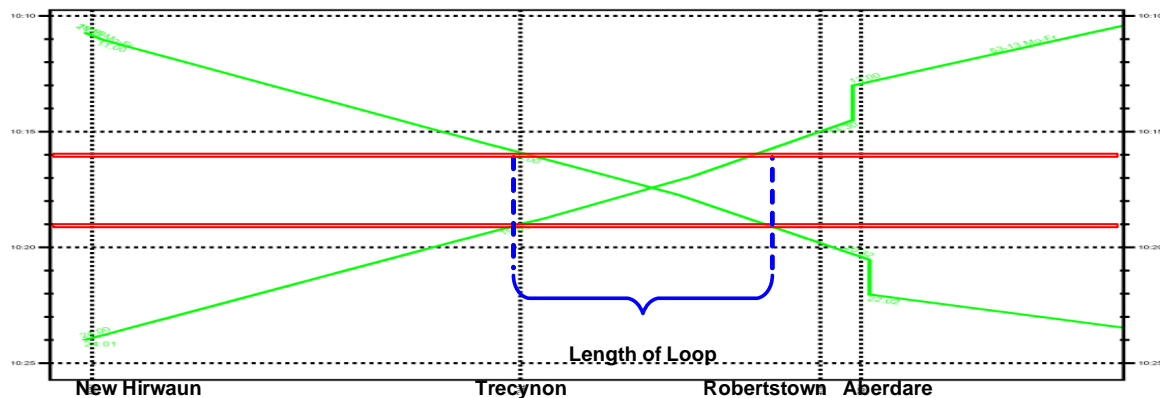
To test the feasibility of these timetables Option (1a) was first examined. This analysis showed that there are different options for passing loop location and length which depends on line speed and journey time. Examination of Option 1a is included in detail in the following section. The findings from all options are then summarised in section 3.3.

#### 3.2 Identify suitable location for passing loop – current line speed

This stage examined how the timetable would be structured with the current line speed (15/ 20 mph) and where the services would need to pass each other on the single line. This provided the optimum location of the passing loop.

According to this timetable the train paths were crossing on the single line between Aberdare and Trecynon, close to Trecynon.

To allow crossing moves on the single line to occur while both trains are moving a loop of approximately 1575m between 22  $\frac{3}{4}$  and 23  $\frac{1}{2}$  miles is required. This is due to the 3 minutes junction margin required at both ends of the loop. The next diagram illustrates these findings.



**Figure 1:** Train Graph extract from RailSys showing where the passenger trains would cross. (The x-axis shows the locations and the y-axis shows time.)

The green lines illustrate the extended train paths between Aberdare and New Hirwaun in both directions. The red lines show 3 minutes time interval across the graph. The points where the green and red lines cross each other demonstrate where the two services are 3 minutes apart. These indicate the optimal location of the beginning and ending of the passing loop for this timetable option.

This timetable option demands a relatively long passing loop which could result in high cost. In order to reduce the cost of constructing a long loop the length of passing loop had to be reduced. The next stages summarise this.

### 3.2.1 Shorter Passing Loop

In order to reduce the length of the passing loop the train paths need to cross in a shorter distance than in section 3.2. This is only possible if pathing time or dwell time is introduced in the schedules.

In the previous stage the beginning and ending of the passing loop was identified assuming that the services have no pathing times in their timetables after Aberdare.

This scenario could be achieved if one of the trains is stationary or both trains incur some pathing time.

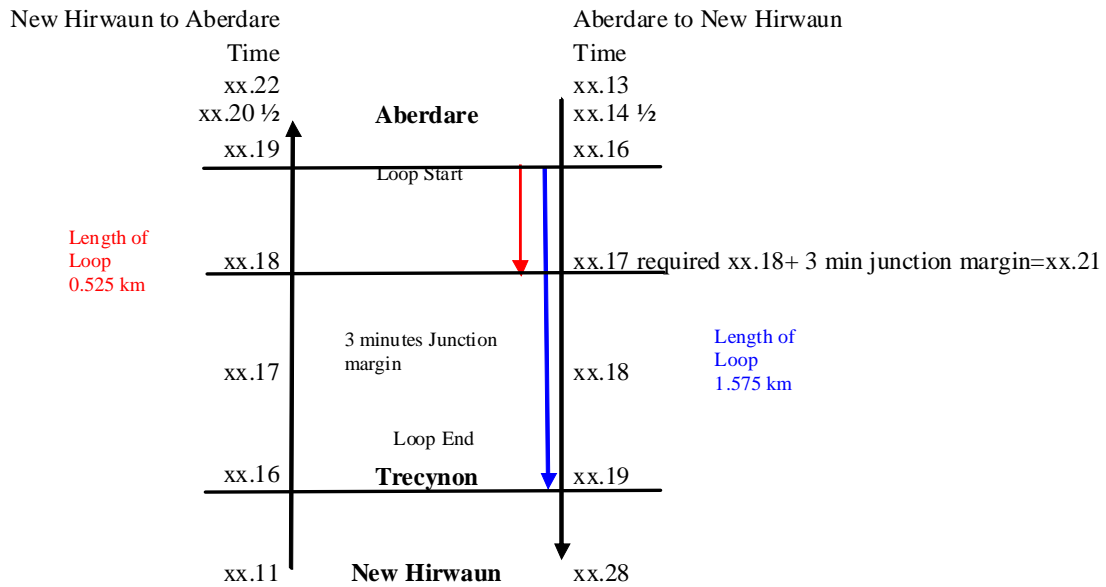
#### Journey time impact for one service:

If the Aberdare to New Hirwaun service has added pathing/ stopping time while it is in the passing loop then this would allow the New Hirwaun to Aberdare service to pass through the loop.

The required pathing time for this service depends on the required length of the loop. For a passing loop approx. 525m long then the minimum pathing time required for the Aberdare to Hirwaun service is 4 minutes. This is shown in the following diagrams.

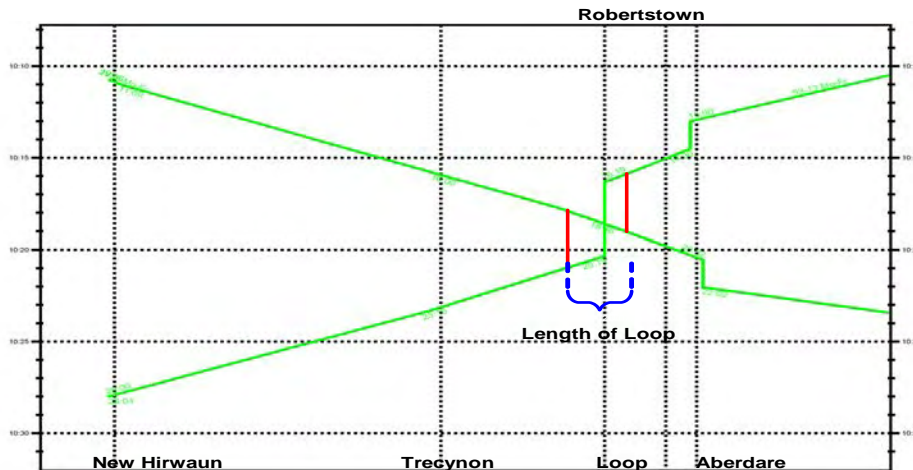
For a passing loop approx. 100m long then the minimum pathing time required for the Aberdare to Hirwaun service is 6 minutes.





The blue and red lines show the length of primary and shorter passing loop respectively. If the pathing time is increased then the length of the passing loop can be decreased.

The next diagram shows how the services would occupy shorter distance of the single line at the same time if the Aberdare to Hirwaun service has 4 minutes pathing time while it passes through in the passing loop.



**Figure 2:** Train Graph extract from RailSys showing where the passenger trains would cross. (The x-axis shows the locations and the y-axis shows time.)

The red lines illustrate the time interval where the services are 3 minutes apart. The blue bracket shows the length of loop for this timetable option.

### **Journey time impact for both services**

An alternative way to reduce the length of the passing loop while allowing opposite directional moves on the single line is if both services have pathing/ stopping time introduced in their timetable at the same place. This is possible in two ways; if the services are in the passing loop or at Aberdare station.

#### **Passing Loop**

For a passing loop approx. 500m long then the minimum pathing time required for both services is 2 minutes. For a passing loop approx. 100m long then the minimum pathing time required for both service is 3 minutes. In these cases the passing loop could be shorter (as required), but both services would have increased journey times due to added pathing/ stopping time.

#### **Aberdare station**

An extended dwell could be introduced at Aberdare if the services cross at this location in a passing loop. This loop could be shorter in length (assumed to be 450m long to accommodate the length of freight).

There is a 6 minute time interval between the departure of Aberdare to Hirwaun and arrival of Hirwaun to Aberdare services at Aberdare station. In order to have the crossing as well as keep a 3 minute junction margin at Aberdare station the dwell time would need to be increased up to a minimum of 6 minutes for both up and down services. The disadvantage of this scenario is that both services would have a minimum of 4 ½ minutes longer journey time than without any passing/ stopping time.

### **3.2.2 35 mph Line speed**

The journey time between Aberdare and New Hirwaun (and any other terminal locations) could be improved if the line speed on the single line is increased. In the next stage the effect of increased line speed on the single line and passing loop is analysed.

#### **Passing loop – Maximum length**

With 35mph line speed, the passenger services would pass further down the single line between Trecynon and New Hirwaun (closer to Trecynon).

To provide the required 3 minutes junction margin at both ends of the passing loop, the loop has to be longer than in the previous scenario (where the line speed is 15/ 20 mph) since these services take a shorter time to travel the same distance. The passing loop is required to be approx. 2000m.

In this case the 35 mph line speed has the benefit of shorter journey times, but the passing loop is longer than in section 3.2.

### **Journey time impact for one service:**

The increase of line speed would increase the length of the loop to approx. 1125m compared to the 525m passing loop on the single with 15/ 20 mph line speed. This assumes that 4 minutes of pathing/ stopping time is used in one of the trains. The length of loop could be reduced if further pathing/ stopping time is applied. However this would reduce the benefit of higher line speed on the single line.

For a passing loop approx. 100m long then the minimum pathing time required for the Aberdare to Hirwaun service is 6 minutes.

### **Journey time impact for both services**

#### **Passing Loop**

As in the previous scenario, the increased line speed results in a longer passing loop than with the lower line speed. The passing loop is required to be approx. 725m long where 2 minutes pathing time is added in each direction.

For a passing loop approx. 100m long then the minimum pathing time required for both service is 3 minutes.

#### **Aberdare station:**

Location of the loop and journey time impact at Aberdare station would not be affected by the higher line speed (35 mph) on the single line north of Aberdare.

### **3.3 Timetable Findings – All Options**

This section presents the findings of all options which have been examined in the same way as Option 1a in section 3.2. Option 6a – 10d have the same results as Option 1a –5d as there is no time penalty in the timings for stopping at Aberdare Old Station compared to the existing Aberdare station location.

Keeping the timetable fixed south of Aberdare provides the key criteria used for whether options are feasible or not. There is a maximum of 39 minutes between arrival and departure at Aberdare to complete the Up and Down journeys over the section north of Aberdare. Therefore if the journey time is less than or equal to 39 minutes over this section the timetable option is feasible and if journey time is over 39 minutes then the timetable option is not feasible.

It was find that any option that extends past New or Old Hirwaun Station locations would require line speed improvements to the branch line to be feasible. The New Hirwaun Station Location provides most feasible timetable locations. This is due to having the shortest journey time from Aberdare, therefore giving maximum flexibility on passing loop length, location and line speed. Tower Colliery (A4059) is the only achievable location north of Hirwaun that provides the opportunity to shorten the passing loop length. This would still require line speed improvements. These findings are shown in the next tables.

Options	Stopping Pattern	Minimum Journey Time (mins) including total journey time, turn round and attaching/detaching allowance											
		No Pathing/ stopping time for services		Pathing/ stopping time (4 minutes) for a service in the passing loop		Pathing/ stopping time (6 minutes) for a service in the passing loop		Pathing/ stopping time (2 minutes) for both services in the passing loop		Pathing/ stopping time (3 minutes) for both services in the passing loop		Pathing/ stopping time (6 minutes) for both services at Aberdare Station	
		20 mph 1575 m	35 mph 2000 m	20 mph 525 m	35 mph 1125 m	20 mph 100 m	35 mph 100 m	20 mph 500 m	35 mph 725 m	20 mph 100 m	35 mph 100 m	20 mph 450 m	35 mph 450 m
Option 1a	Aberdare via Trecynon New Hirwaun	32	24.5	36	28.5	38	30.5	36	28.5	38	30.5	36	28.5
Option 1b	Aberdare Trecynon New Hirwaun	34	27	38	31	40	33	38	31	40	33	38	31
Option 1c	Aberdare via Trecynon Old Hirwaun	37	27	41	31	43	33	41	31	43	33	41	31
Option 1d	Aberdare Trecynon Old Hirwaun	39	30	43	34	45	36	43	34	45	36	43	34
Option 2a	Aberdare via Trecynon Old Hirwaun Tower Colliery 4059	43	32.5	47	36.5	49	38.5	47	36.5	49	38.5	47	36.5
Option 2b	Aberdare Trecynon Old Hirwaun Tower Colliery 4059	45	35.5	49	39.5	51	41.5	49	39.5	51	41.5	49	39.5
Option 2c	Aberdare via Trecynon New Hirwaun Tower Colliery 4059	43	33	47	37	49	39	47	37	49	39	47	37
Option 2d	Aberdare Trecynon New Hirwaun Tower Colliery 4059	45	35.5	49	39.5	51	41.5	49	39.5	51	41.5	49	39.5
Option 3a	Aberdare via Trecynon Old Hirwaun Tower Colliery Old Platforms	46	34.5	50	38.5	52	40.5	50	38.5	52	40.5	50	38.5
Option 3b	Aberdare Trecynon Old Hirwaun Tower Colliery Old Platforms	48	37.5	52	41.5	54	43.5	52	41.5	54	43.5	52	41.5
Option 3c	Aberdare via Trecynon New Hirwaun Tower Colliery Old Platforms	46	34.5	50	38.5	52	40.5	50	38.5	52	40.5	50	38.5
Option 3d	Aberdare Trecynon New Hirwaun Tower Colliery Old Platforms	48	37	52	41	54	43	52	41	54	43	52	42
Option 4a	Aberdare via Trecynon Old Hirwaun Tower Colliery 5 <sup>th</sup> Avenue	47	34.5	51	38.5	53	40.5	51	38.5	53	40.5	51	38.5
Option 4b	Aberdare Trecynon Old Hirwaun Tower Colliery 5 <sup>th</sup> Avenue	49	37.5	53	41.5	55	43.5	53	41.5	55	43.5	53	41.5
Option 4c	Aberdare via Trecynon New Hirwaun Tower Colliery 5 <sup>th</sup> Avenue	47	36	51	40	53	42	51	40	53	42	51	40
Option 4d	Aberdare Trecynon New Hirwaun Tower Colliery 5 <sup>th</sup> Avenue	49	37.5	53	41.5	55	43.5	53	41.5	55	43.5	53	41.5
Option 5a	Aberdare via Trecynon Old Hirwaun Tower Colliery 4061	45.5	33.5	49.5	37.5	51.5	39.5	49.5	37.5	51.5	39.5	49.5	37.5
Option 5b	Aberdare Trecynon Old Hirwaun Tower Colliery 4061	47.5	36.5	51.5	40.5	53.5	42.5	51.5	40.5	53.5	42.5	51.5	40.5
Option 5c	Aberdare via Trecynon New Hirwaun Tower Colliery 4061	46	35	50	39	52	41	50	39	52	41	50	39
Option 5d	Aberdare Trecynon New Hirwaun Tower Colliery 4061	48	36.5	52	40.5	54	42.5	52	40.5	54	42.5	52	40.5

**Key for the table:**

Grey = Options which are not feasible.

Via = Locations which are not require a station call.

Option 6a – 10d	The same results as Option 1a – Option 5d as there is no time penalty in the timings for stopping at Aberdare Old Station compared to the existing Aberdare location
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The above table shows Option 1a as the most efficient option requiring the least changes to the infrastructure; no increase to the current line speed and flexibility on passing loop length and location. However to enable existing freight services to operate without the need to remove the passenger service, the SRT for freight over this branch would still have to be reviewed.

A longer passing loop and/or increased line speed would be required for the other options to be feasible.

This table summarises the infrastructure required for the Passing Loop.

Options	Stopping Pattern	Infrastructure required for the Passing Loop (This is based on minimum Journey Time (mins) including total journey time, turn round and attaching/detaching allowance)
Option 1a	Aberdare via Trecynon New Hirwaun	<ul style="list-style-type: none"> <li>Least infrastructure required for Passing Loop (100m long) <ul style="list-style-type: none"> <li>No line speed improvement required</li> </ul> </li> </ul>
Option 1b	Aberdare Trecynon New Hirwaun	<ul style="list-style-type: none"> <li>In order to have the least infrastructure for Passing Loop (100m long): <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>Or Passing Loop location at Aberdare station</li> </ul> </li> <li>Or to avoid line speed improvement a greater than 100m Passing Loop required</li> </ul>
Option 1c	Aberdare via Trecynon Old Hirwaun	<ul style="list-style-type: none"> <li>In order to have least infrastructure for Passing Loop (100m long): <ul style="list-style-type: none"> <li>Line speed improvement required</li> </ul> </li> </ul>
Option 1d	Aberdare Trecynon Old Hirwaun	<ul style="list-style-type: none"> <li>In order to have the least infrastructure for Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> </ul> </li> <li>Or to avoid line speed improvement approximately 1500m Passing Loop required</li> </ul>
Option 2a	Aberdare via Trecynon Old Hirwaun Tower Colliery 4059	<ul style="list-style-type: none"> <li>In order to have the least infrastructure (100m long) or to have Passing Loop with length between 725 - 2000m: <ul style="list-style-type: none"> <li>Line speed improvement required</li> </ul> </li> </ul>
Option 2b	Aberdare Trecynon Old Hirwaun Tower Colliery 4059	<ul style="list-style-type: none"> <li>In order to have the Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the Passing Loop approximately 2000m long</li> </ul> </li> </ul>
Option 2c	Aberdare via Trecynon New Hirwaun Tower Colliery 4059	<ul style="list-style-type: none"> <li>In order to have the least infrastructure (100m long) or to have Passing Loop with length between 725 - 2000m: <ul style="list-style-type: none"> <li>Line speed improvement required</li> </ul> </li> </ul>
Option 2d	Aberdare Trecynon New Hirwaun Tower Colliery 4059	<ul style="list-style-type: none"> <li>In order to have the Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the Passing Loop approximately 2000m long</li> </ul> </li> </ul>
Option 3a	Aberdare via Trecynon Old Hirwaun Tower Colliery Old Platforms	<ul style="list-style-type: none"> <li>In order to have the least infrastructure for Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And Passing Loop location at Aberdare station</li> </ul> </li> <li>To have Passing Loop ( greater than 100m long): <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the length of the Passing Loop is between 725 - 2000m</li> </ul> </li> </ul>
Option 3b	Aberdare Trecynon Old Hirwaun Tower Colliery Old Platforms	<ul style="list-style-type: none"> <li>In order to have the Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the Passing Loop approximately 2000m long</li> </ul> </li> </ul>
Option 3c	Aberdare via Trecynon New Hirwaun Tower Colliery Old Platforms	<ul style="list-style-type: none"> <li>In order to have the least infrastructure for Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And Passing Loop location at Aberdare station</li> </ul> </li> <li>To have Passing Loop ( greater than 100m long): <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the length of the Passing Loop is between 725 - 2000m</li> </ul> </li> </ul>
Option 3d	Aberdare Trecynon New Hirwaun Tower Colliery Old Platforms	<ul style="list-style-type: none"> <li>In order to have the Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the Passing Loop approximately 2000m long</li> </ul> </li> </ul>
Option 4a	Aberdare via Trecynon Old Hirwaun Tower Colliery 5 <sup>th</sup> Avenue	<ul style="list-style-type: none"> <li>In order to have the least infrastructure for Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And Passing Loop location at Aberdare station</li> </ul> </li> <li>To have Passing Loop ( greater than 100m long): <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the length of the Passing Loop is between 725 - 2000m</li> </ul> </li> </ul>
Option 4b	Aberdare Trecynon Old Hirwaun Tower Colliery 5 <sup>th</sup> Avenue	<ul style="list-style-type: none"> <li>In order to have the Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the Passing Loop approximately 2000m long</li> </ul> </li> </ul>
Option 4c	Aberdare via Trecynon New Hirwaun Tower Colliery 5 <sup>th</sup> Avenue	<ul style="list-style-type: none"> <li>In order to have the Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the Passing Loop approximately 2000m long</li> </ul> </li> </ul>
Option 4d	Aberdare Trecynon New Hirwaun Tower Colliery 5 <sup>th</sup> Avenue	<ul style="list-style-type: none"> <li>In order to have the Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the Passing Loop approximately 2000m long</li> </ul> </li> </ul>
Option 5a	Aberdare via Trecynon Old Hirwaun Tower Colliery 4061	<ul style="list-style-type: none"> <li>In order to have the least infrastructure for Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And Passing Loop location at Aberdare station</li> </ul> </li> <li>To have Passing Loop ( greater than 100m long): <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the length of the Passing Loop is between 725 - 2000m</li> </ul> </li> </ul>
Option 5b	Aberdare Trecynon Old Hirwaun Tower Colliery 4061	<ul style="list-style-type: none"> <li>In order to have the Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the Passing Loop approximately 2000m long</li> </ul> </li> </ul>
Option 5c	Aberdare via Trecynon New Hirwaun Tower Colliery 4061	<ul style="list-style-type: none"> <li>In order to have the least infrastructure for Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And Passing Loop location at Aberdare station</li> </ul> </li> <li>To have Passing Loop ( greater than 100m long): <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the length of the Passing Loop is between 725 - 2000m</li> </ul> </li> </ul>
Option 5d	Aberdare Trecynon New Hirwaun	<ul style="list-style-type: none"> <li>In order to have the Passing Loop: <ul style="list-style-type: none"> <li>Line speed improvement required</li> <li>And the Passing Loop approximately 2000m long</li> </ul> </li> </ul>

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	Tower Colliery 4061	
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### 3.3.1 Loop Location

The possible location of a passing loop was identified through examination of the timetable options. This analysis showed that there are different options for the passing loop location and length dependent on line speed and journey time. The following table displays these findings where the location and length of the passing loop is rounded to the nearest quarter mile/ kilometre.

Option		Loop Location (Approximate Mileage)	Loop Length (approximate m)
No Pathing/ stopping time for services	20 mph	22.75 - 23.50	1575
	35 mph	23.00 – 24.00	2000
Pathing/ stopping time (4 minutes) for a service in the passing loop	20 mph	22.75 – 23.00	525
	35 mph	22.75 – 23.50	1125
Pathing/ stopping time (6 minutes) for a service in the passing loop	20 mph	22.50 – 22.75	100
	35 mph	22.50 – 22.75	100
Pathing/ stopping time (2 minutes) for both services in the passing loop	20 mph	22.75 – 23.00	500
	35 mph	22.75 – 23.25	725
Pathing/ stopping time (3 minutes) for both services in the passing loop	20 mph	22.50 – 22.75	100
	35 mph	22.50 – 22.75	100
Pathing/ stopping time (6 minutes) for both services at Aberdare Station	20 mph	22.25 -22.50	450
	35 mph	22.25 – 22.50	450

### 3.4 Investigate impact on current freight traffic

The current timetable (May 2010) has 2 freight paths a day in both directions. These are displayed in the next two tables.

Aberdare to Tower Colliery:		4C42	4C46
Aberdare	arr	06.05	13.16
	dep	06.15	13.18
Trecynon			
New Hirwaun		06/42	13/45
Tower Colliery	arr	06.57	14.00

Aberdare to Tower Colliery:		6C45	6C47
Tower Colliery	dep	10.54	18.17
New Hirwaun		10/08	18/31
Trecynon			
Aberdare	arr	11.36	18.59
	dep	11.41	19.01

Key for Table:

Time 06.05 shows when services are scheduled to stop at the station.

Time 06/42 shows when services are not scheduled to stop at the station.

When the freight service is scheduled from/ to Tower Colliery there is only one passenger service in operation in either direction. This situation occurs in the current timetable. This is assumed the same throughout all options.

Freight services between Aberdare and Tower Colliery (current location) have a scheduled journey time of 42 minutes in both directions. RailSys analysis of the Theoretical Running Time indicates that freight trains running over this section can cover this distance in 13 ½ minutes. Stopwatch timings of freight trains over this section suggest a running time of approximately 17 minutes. This includes time for the train crew to operate the level crossings on the route. If the line is upgraded, this may no longer be necessary. Therefore, it is recommended that the sectional running time (SRT) over this section be reviewed in order to determine whether there is any scope for reduction.

One of the objectives of this study was to extend the current passenger services from Aberdare whilst keeping the current freight services. In order to identify the impact of an extended passenger service on current freight services the timetable was checked. This analysis showed that if freight remains in its current schedules it would conflict with the proposed extended passenger services between the various terminal locations and Trecynon. This is due to a long scheduled running time for freight services.

The following table illustrates the possible conflicts between extended passenger services and freight services.

### Up Direction Freight Path

The proposed passenger service would conflict with the freight path in all options that extend past Hirwaun – as can be seen in the table below:

Aberdare to Tower Colliery:		4C46	2A16
			Aberdare – Tower Colliery (20mph)
Aberdare	arr	13.16	13.43
	dep	13.18	13.44 ½
Trecynon			13/49
New Hirwaun		13/45	13.54
Tower Colliery	arr	13.00	13.57

The freight path would be valid in all options which terminate at Hirwaun except the increased line speed (35mph) option with the long loop.



### Down Direction Freight Path

In all options the extended passenger services conflict directly with the Down direction freight path. The reason for this is that there is no infrastructure to allow the passenger services to pass the freight. This is due to the passenger services having a much shorter SRT than the freight over this section. As a result the passenger services would catch up with the freight services on the single line and could not arrive at Aberdare as scheduled.

The conflicts arising could be reduced by decreasing the scheduled journey time for freight services according to the selected timetable option. These conflicts could be resolved by a review of the SRT for the freight services.

For example this conflict could be overcome by allowing the passenger services to operate before the freight services. This would require the freight services to depart later from Tower Colliery. Also in order to have 8 minutes headway allowance between the passenger and freight services at New Hirwaun the freight services would need to depart 16 minutes later from Tower Colliery. This could be achieved with a reduction in the freight SRT for this section, which would allow the timings south of Aberdare to remain the same. The next diagram illustrates this example.



**Figure 3:** Train Graph extract from RailSys showing where the passenger and freight trains would conflict. (The x-axis shows the locations and the y-axis shows time.)

### 3.5 Define suitable location for possible attaching / detaching.

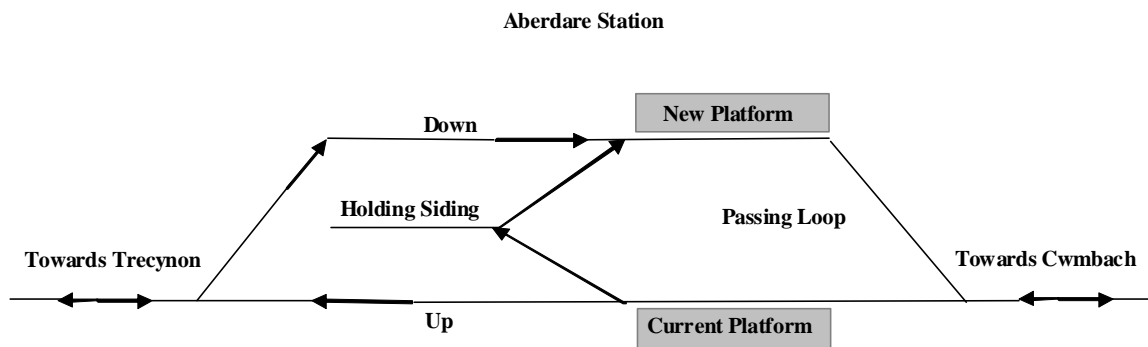
This section analyses the timetable options for possible locations to stable up to 3 x 2 car sets. The VM workshop suggested Aberdare or Hirwaun as suitable locations.

In order to find the optimal location for attaching/ detaching the selected location has to have a minimum of 5/ 4 minutes respectively. This was examined through the timetable analysis which is summarised in the table in section 3.3 and displayed in more detail in Appendix C.

It was found that depending on the timetable option, there is a potential for attaching/ detaching moves at Aberdare and New Hirwaun. Both locations would require a holding siding to accommodate the 3 x 2 car sets.

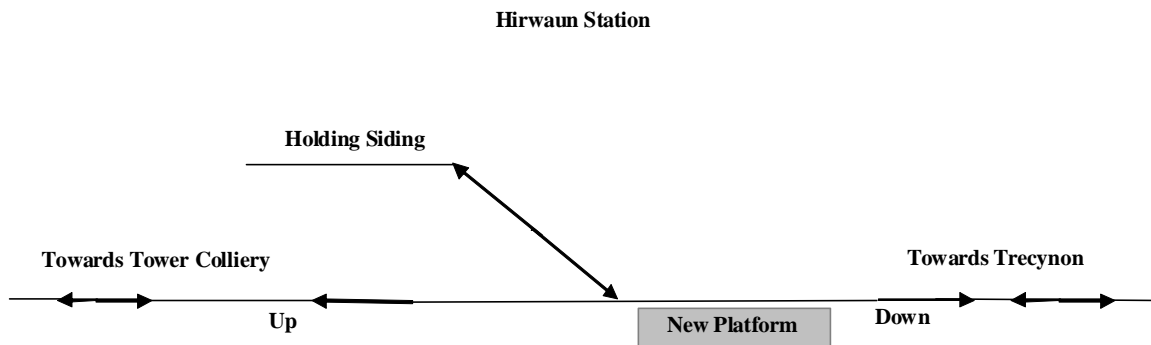
### 3.5.1 Aberdare

If attaching/ detaching is appointed at Aberdare station, the old loop north of Aberdare Station could be used as a passing loop. To accommodate 3 x 2 car sets a holding siding is required. The next diagram shows a possible layout for this.



### 3.5.2 Hirwaun

To enable attaching/ detaching at Hirwaun a holding siding is required. A possible layout for this is shown in the next diagram.



## 4. CONCLUSIONS & RECOMMENDATIONS

This study examined the feasibility of extending the existing two services per hour from Cardiff - Aberdare to Hirwaun by utilising the single line between Aberdare and Hirwaun, and identified necessary infrastructure proposals and interventions.

A number of proposed timetables were examined between Aberdare and Tower Colliery based on the May 2010 Timetable. The study also examined potential locations for attaching/ detaching moves with stabling points.

The study found that the Timetable Option is feasible between Aberdare and Hirwaun/ Tower Colliery on the single line if the following conditions apply:

- Journey time is less or equal to 39 minutes for the return journey between Aberdare and final terminal station.
- To enable existing freight services to operate, the SRT for freight over this branch would have to be reviewed and reduced. If this is not agreed then the proposed passenger service would have to be removed when freight services operate.
- A suitable passing loop is provided on the single line
- Appropriate length of holding siding is provided
- The level crossings at Robertstown and Hirwaun are upgraded for passenger use or closed.

Key findings on Timetable Options:

- Any option that extends past New or Old Hirwaun Station locations would require line speed improvements to the branch line for them to be feasible.
- The New Hirwaun Station Location provides the most feasible timetable locations. This is due to having the shortest journey time from Aberdare, therefore giving maximum flexibility on the passing loop length, location and line speed.
- Tower Colliery (A4059) is the only achievable location north of Hirwaun that provides the opportunity to shorten the passing loop length. This would still require line speed improvements.

Key findings on Passing Loop:

- In all options the starting point for the Passing Loop is at approx. 22.75 miles.
- There are two options for the length of the passing loop
  - A longer loop allowing two trains to pass on the move. This would require the most infrastructure but produce the best journey times.
  - A shorter loop requiring one of the trains to be stationary or both trains to incur some pathing time. However this requires the least infrastructure.
- The only way to combine the passing Loop with a station dwell would be at Aberdare, this would require new Station Infrastructure at Aberdare. This would require a 4½ minute journey time extension to passenger trains.

- A service to Hirwaun can be achieved most economically with the introduction of 20 mph line speed and a short loop. Robertsown requiring upgrade and also review of User Worked Crossings<sup>2</sup> (2 footpath crossing and 3 User Worked Crossings).

- 
- <sup>2</sup> UWC are located at Public 24m 13ch, Tir Mawr Farm 24m25, Berthllwyd (UWC with whistle boards) 25m 44ch

## **APPENDIX A. RAILSYS METHODOLOGY & DELAY DISTRIBUTION**

### **A.1 Background**

RailSys is a deterministic simulation tool that works at signal level detail. All aspects of track/line characteristics are considered (excluding curvature). The RailSys package performs automatic re-routing of trains, on both existing and new infrastructure, calculation of technical headways and minimum Sectional Running Times (SRTs).

Performance modelling within RailSys is achieved by inputting historical TRUST delays into the system. The TRUST data needs to be manipulated by eliminating the secondary delays (knock-on delays), so that only primary delays remain. The train interaction within RailSys then mimics the secondary delays. All models are required to be base-lined against actual performance to show that the secondary delays are being realistically simulated.

### **A.2 Limitations**

- RailSys does not display signal aspect, train speed or route set when the simulation is running; although this data is recorded for data analysis.
- RailSys does not record signals displayed at double yellow and flashing yellow aspects and these would be omitted from any report that the software produced.
- Distance units are only available in metric format.

RailSys is designed to simulate colour light track circuited signal systems. It is possible to simulate absolute block but infrastructure manipulation is required.

### **A.3 RailSys Delay Distribution**

The Systems Support Team provide performance data for RailSys projects, which involves sourcing, processing and manipulating data into a final format which the RailSys modeller is able to use. The necessary data falls into three categories: delay distributions; punctuality calculations (Time 3, 5 & 10); and freight specifications (freight runners).

#### ***A.3.1 Delay Distribution***

The source of delay data is TRUST - a mainframe system which records the actual running activity of trains against the planned activity.

A 'perfect' running of the timetable would be simulated without delay distribution. Therefore, a perturbed simulation (one that includes disturbances in train running) is required to provide a realistic simulation of the timetable.

The delay distributions are expressed as Average Delay; Maximum Delay; and Percentage of Trains Affected. RailSys creates perturbed simulations by using these

parameters to calculate negative exponential distributions of delays/lateness. These distributions are applied to patterns of trains which are categorised by Service Code.

Reference to delay data or delay distributions is actually delay & lateness data or delay & lateness distributions. Lateness is the difference between actual arrival, departure and planned arrival or departure at a particular point. Lateness is the result of delay incidents. There are several different delay & lateness distributions that can be used for a perturbed RailSys simulation:

- **In-Model Delays** – are primary attributed delays occurring inside the model area. Split into two categories:
  - **Dwell Time Delays** (also referred to as Location Delays)  
are delays which have been attributed to a particular Recording Point, i.e. have been incurred between the arrival at and departure from the same Recording Point.
  - **Departure Delays** (also referred to as Section Delays)  
these are delays which have been attributed between two successive recording points
- **Model Entry Lateness** - the actual arrival time at a location minus the scheduled arrival time at that location. These are considered separately to In-Model Delays as the distributions are based on a calculated lateness figure at the entry location

### **A.3.2 Freight Specifications / Freight Runners**

Freight specifications or paths are required by RailSys to establish which freight services have run over a particular timetable period. Timetabled freight trains are included in all RailSys modelling, however numbers may differ to make outputs more realistic. Lateness data will be derived from the previous three periods and may include Q-Paths and Y-Paths.

## APPENDIX B. ASSUMPTIONS

### B.1 Timetable

- The May 2010 Timetable will be used.
- The study examines Monday to Friday (weekdays) Timetable which is the standard hour Timetable.
- The proposed two trains per hour between Aberdare and Hirwaun/ Tower Colliery will be the extension of existing Cardiff/south of Cardiff to Aberdare services.
- The extended services are required to proceed through to Hirwaun at xx:13/ xx:43 and return back to form the xx:52/ xx:22 services.
- Timetable is fixed south of Aberdare.

### B.2 Rules Of The Plan

- Rules of The Plan 2010 will be used for this timetable study. The assumptions are as follows:
- Headway: the signalling will be an extension of Abercynon's control area which is track circuit block (TCB), however the headway would be assumed as if the single line was absolute block (AB).
- 3 min junction margin which is based on the assumed speed and length of rolling stock
- Minimum Dwell Time:
  - Aberdare 1½ min
  - Trecynon 1 min
  - Hirwaun 1 min
- 5 minute minimum turn round time at the final station on branch (Hirwaun or Tower Colliery). Where it is possible the minimum should not be used for consecutive turn rounds.
- The minimum attaching allowance is 5 min for Class 142
- The minimum detaching allowance is 4 min for Class 142
- Pathing time can be used to allow crossing from/ to single line

### B.3 SRTs

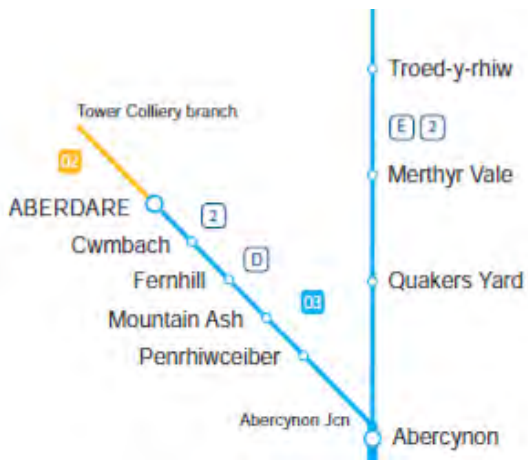
- Timing load Class 142 to be used and assumed to be 4 cars in length.

### B.4 Geographic Scope

The study area will only examine possible timetable and infrastructure options north of Aberdare. This route is illustrated by orange in the following diagram.

There will be no alterations to the timings of services to the south of Aberdare.





## B.5 Infrastructure

This study has not taken into account the two level crossings on the single line (at Robertstown and Hirwaun) between Aberdare and Tower Colliery. It is assumed that the rail service would take priority at the level crossings and therefore does not impact on the timetable development.

The proposed service frequency/ two trains per hour from Cardiff to Hirwaun require a passing loop on the single line. The most suitable location and length of passing loop will be identified in the development of the standard hour timetable.

In order to assess the feasibility of two trains per hour on a single line between Aberdare and Hirwaun the sectional running times were required for passenger services over this section. To produce these, the infrastructure had been updated in RailSys which allowed theoretical running times (TRTs) to be calculated. These were based on the following information received from the sponsor:

- Mileage and gradient of
  - Required stations
  - Level crossings
- signalling diagram
- speed limit of single line
  - current (15 and 20 mph) speed limit
  - 35 mph speed limit
  - 50 mph speed limit
  - 75 mph speed limit

## B.6 Sectional Running Times (SRTs)

The TRTs were provided to Train Planning Centre Midlands who converted these to SRTs. The proposed SRTs were used for this project/ feasibility timetable work and are listed in Appendix C.

## B.7 Timetable Options

The Capability Analysis Team developed standard hour timetables between Aberdare and Hirwaun for the proposed options.



This stage examined each sub option individually to identify possible timetable solutions and their infrastructure requirements. These options are listed in Appendix B. Locations listed in the 'Via' and 'Stopping' column require a station call.

Options 1-5 were examined first and then the findings were used as the base for options 6 to 10 examining the impact of a different location for Aberdare.

### **B.8 Timetable analysis of possible attaching/detaching**

In the off peak there is a requirement to reduce the length of trains. This will require stabling up to 3 x 2 car sets. This analysis will look at possibilities to detach at either Hirwaun or Aberdare following the morning peak, and attach pre the evening peak – defining where the best stabling point is.

## APPENDIX C. TIMETABLE OPTIONS

Option	From	To	Via	Stopping
1a	Aberdare	New Hirwaun Station (A465)		
1b	Aberdare	New Hirwaun Station (A465)		Trecynon B4276
1c	Aberdare	Old Hirwaun Station		
1d	Aberdare	Old Hirwaun Station		Trecynon B4276
2a	Aberdare	Tower Colliery (A4059)	Old Hirwaun Station	
2b	Aberdare	Tower Colliery (A4059)	Old Hirwaun Station	Trecynon B4276
2c	Aberdare	Tower Colliery (A4059)	New Hirwaun Station (A465)	
2d	Aberdare	Tower Colliery (A4059)	New Hirwaun Station (A465)	Trecynon B4276
3a	Aberdare	Tower Colliery (old platforms)	Old Hirwaun Station	
3b	Aberdare	Tower Colliery (old platforms)	Old Hirwaun Station	Trecynon B4276
3c	Aberdare	Tower Colliery (old platforms)	New Hirwaun Station (A465)	
3d	Aberdare	Tower Colliery (old platforms)	New Hirwaun Station (A465)	Trecynon B4276
4a	Aberdare	Tower Colliery (West of 5th Avenue)	Old Hirwaun Station	
4b	Aberdare	Tower Colliery (West of 5th Avenue)	Old Hirwaun Station	Trecynon B4276
4c	Aberdare	Tower Colliery (West of 5th Avenue)	New Hirwaun Station (A465)	
4d	Aberdare	Tower Colliery (West of 5th Avenue)	New Hirwaun Station (A465)	Trecynon B4276
5a	Aberdare	Tower Colliery (A4061)	Old Hirwaun Station	
5b	Aberdare	Tower Colliery (A4061)	Old Hirwaun Station	Trecynon B4276

5c	Aberdare	Tower Colliery (A4061)	New Hirwaun Station (A465)	
5d	Aberdare	Tower Colliery (A4061)	New Hirwaun Station (A465)	Trecynon B4276
6a	Aberdare Old Station	New Hirwaun Station (A465)		
6b	Aberdare Old Station	New Hirwaun Station (A465)		Trecynon B4276
6c	Aberdare Old Station	Old Hirwaun Station		
6d	Aberdare Old Station	Old Hirwaun Station		Trecynon B4276
7a	Aberdare Old Station	Tower Colliery (A4059)	Old Hirwaun Station	
7b	Aberdare Old Station	Tower Colliery (A4059)	Old Hirwaun Station	Trecynon B4276
7c	Aberdare Old Station	Tower Colliery (A4059)	New Hirwaun Station (A465)	
7d	Aberdare Old Station	Tower Colliery (A4059)	New Hirwaun Station (A465)	Trecynon B4276
8a	Aberdare Old Station	Tower Colliery (old platforms)	Old Hirwaun Station	
8b	Aberdare Old Station	Tower Colliery (old platforms)	Old Hirwaun Station	Trecynon B4276
8c	Aberdare Old Station	Tower Colliery (old platforms)	New Hirwaun Station (A465)	
8d	Aberdare Old Station	Tower Colliery (old platforms)	New Hirwaun Station (A465)	Trecynon B4276
9a	Aberdare Old Station	Tower Colliery (West of 5th Avenue)	Old Hirwaun Station	
9b	Aberdare Old Station	Tower Colliery (West of 5th Avenue)	Old Hirwaun Station	Trecynon B4276
9c	Aberdare Old Station	Tower Colliery (West of 5th Avenue)	New Hirwaun Station (A465)	
9d	Aberdare Old Station	Tower Colliery (West of 5th Avenue)	New Hirwaun Station (A465)	Trecynon B4276
10a	Aberdare Old Station	Tower Colliery (A4061)	Old Hirwaun Station	
10b	Aberdare Old Station	Tower Colliery (A4061)	Old Hirwaun Station	Trecynon B4276
10c	Aberdare Old Station	Tower Colliery (A4061)	New Hirwaun Station (A465)	
10d	Aberdare Old Station	Tower Colliery (A4061)	New Hirwaun Station (A465)	Trecynon B4276

### APPENDIX D. SUMMARY TABLE FOR TIMETABLES

Key for Table:

Via = Locations which are not require a station call.

Up: Aberdare to Hirwaun/ Tower Colliery

Down: Hirwaun/ Tower Colliery to Aberdare

Journey times include dwell time at Aberdare and Trecynon stations.

Option	Stopping Pattern	Direction	No Pathing/ stopping time for services						Pathing/ stopping time (4 minutes) for a service in the passing loop						Pathing/ stopping time (2 minutes) for both services in the passing loop						Pathing/ stopping time (6 minutes) for both services at Aberdare Station					
			20 mph			35 mph			20 mph			35 mph			20 mph			35 mph			20 mph			35 mph		
			Journey Time (mins)	Turnround time (mins)	Attaching/ detaching time (mins)	Journey Time (mins)	Turnround time (mins)	Attaching/ detaching time (mins)	Journey Time (mins)	Turnround time (mins)	Attaching/ detaching time (mins)	Journey Time (mins)	Turnround time (mins)	Attaching/ detaching time (mins)	Journey Time (mins)	Turnround time (mins)	Attaching/ detaching time (mins)	Journey Time (mins)	Turnround time (mins)	Attaching/ detaching time (mins)	Journey Time (mins)	Turnround time (mins)	Attaching/ detaching time (mins)	Journey Time (mins)	Turnround time (mins)	Attaching/ detaching time (mins)
Option 1a	Aberdare via Trecynon	Up	11	12	5	7	19 ½	5	15	8	5	11	15 ½	5	13	8	5	9	15 ½	5	15 ½	8	5	11 ½	15 ½	5
	New Hirwaun	Down	11			7 ½			11			7 ½			13			9 ½			15 ½			12		
Option 1b	Aberdare	Up	12	10	5	8 ½	17	5	16	6	5	12 ½	13	5	14	6	5	10 ½	13	5	16 ½	6	5	13	13	5
	Trecynon New Hirwaun	Down	12			8 ½			12			8 ½			14			10 ½			16 ½			13		
Option 1c	Aberdare via Trecynon	Up	13 ½	7	5	8	17	5	17 ½	5	3	12	13	5	15 ½	5	3	10	13	5	18	3	5	12 ½	13	5
	Old Hirwaun	Down	13 ½			9			13 ½			9			15 ½			11			18			13 ½		
Option 1d	Aberdare	Up	14 ½	10	5	10	19	5	18 ½	5	1	14	10	5	16 ½	5	1	12	10	5	19	1	5	14 ½	10	5
	Trecynon Old Hirwaun	Down	14 ½			10			14 ½			10			16 ½			12			19			14 ¼		
Option 2a	Aberdare via Trecynon	Up	16 ½	5	1	11	11 ½	5	20 ½	2	0	15	7	5 ½	18 ½	2	0	13	7	5 ½	21	-3	5	15 ½	7 ½	5
	Old Hirwaun Tower Colliery 4059	Down	16 ½			11 ½			16 ½			11 ½			18 ½			13 ½			21			16		
Option 2b	Aberdare	Up	17 ½	4	0	13	8 ½	5	21 ½	0	0	17	5	4 ½	19 ½	0	0	15	5	4 ½	22	-5	5	17 ½	4 ½	5
	Trecynon Old Hirwaun Tower Colliery 4059	Down	17 ½			12 ½			17 ½			12 ½			19 ½			14 ½			22			17		



<b>Option 2c</b>	Aberdare via Trecynon New Hirwaun Tower Colliery 4059	Up	16 ½	5	1	11 ½	11	5	20 ½	2	0	15 ½	7	5	18 ½	2	0	13 ½	7	5	21	-3	5	16	7	5
		Down	16 ½			11 ½			16 ½				11 ½			18 ½			13 ½			21			16	
<b>Option 2d</b>	Aberdare Trecynon New Hirwaun Tower Colliery 4059	Up	17 ½	4	0	13	8 ½	5	21 ½	0	0	17	5	4 ½	19 ½	0	0	15	5	4 ½	22	-5	5	17 ½	4 ½	5
		Down	17 ½			12 ½			17 ½			12 ½			19 ½			14 ½			22			17		
<b>Option 3a</b>	Aberdare via Trecynon Old Hirwaun Tower Colliery Platforms Old	Up	18	3	0	12	9 ½	5	22	-1	0	16	5	5 ½	20	-1	0	14	5	5 ½	22 ½	-6	5	16 ½	5 ½	5
		Down	18			12 ½			18			12 ½			20			14 ½			22 ½			17		
<b>Option 3b</b>	Aberdare Trecynon Old Hirwaun Tower Colliery Platforms Old	Up	19	1	0	14	6 ½	5	23	-3	0	18	5	2 ½	21	-3	0	16	5	2 ½	23 ½	-8	5	18 ½	2 ½	5
		Down	19			13 ½			19			13 ½			21			15 ½			23 ½			18		
<b>Option 3c</b>	Aberdare via Trecynon New Hirwaun Tower Colliery Platforms Old	Up	18	3	0	12 ½	9 ½	5	22	-1	0	16 ½	5 ½	5	20	-1	0	14 ½	5 ½	5	22 ½	-6	5	17	5 ½	5
		Down	18			12			18			12			20			14			22 ½			16 ½		
<b>Option 3d</b>	Aberdare Trecynon New Hirwaun Tower Colliery Platforms Old	Up	19	1	0	14	7	5	23	-3	0	18	5	3	21	-3	0	16	5	3	23 ½	-8	5	18 ½	2	5
		Down	19			13			19			13			21			15			23 ½			18 ½		
<b>Option 4a</b>	Aberdare via Trecynon Old Hirwaun Tower Colliery 5 <sup>th</sup> Avenue	Up	18 ½	2	0	12	9 ½	5	22 ½	-2	0	16	5 ½	5	20 ½	-2	0	14	5 ½	5	23	-7	5	16 ½	5 ½	5
		Down	18 ½			12 ½			18 ½			12 ½			20 ½			14 ½			23			17		
<b>Option 4b</b>	Aberdare Trecynon Old Hirwaun Tower Colliery 5 <sup>th</sup> Avenue	Up	19 ½	0	0	14	6 ½	5	23 ½	-4	0	18	5	2 ½	21 ½	-4	0	16	5	2 ½	24	-9	5	18 ½	2 ½	5
		Down	19 ½			13 ½			19 ½			13 ½			21 ½			15 ½			24			18		
<b>Option 4c</b>	Aberdare	Up	18 ½	2	0	12 ½	8	5	22 ½	-2	0	16 ½	5	4	20 ½	-2	0	14 ½	5	4	23	-7	5	17	4	5



	via Trecynon New Hirwaun Tower Colliery 5 <sup>th</sup> Avenue	Down	18 ½			13 ½			18 ½			13 ½			20 ½			15 ½			23			18		
<b>Option 4d</b>	Aberdare Trecynon New Hirwaun Tower Colliery 5 <sup>th</sup> Avenue	Up	19 ½	0	0	14	6 ½	5	23 ½	-4	0	18	5	2 ½	21 ½	-4	0	16	5	2 ½	24	-9	5	18 ½	2 ½	5
		Down	19 ½			13 ½			19 ½			13 ½			21 ½			15 ½			24			18		
<b>Option 5a</b>	Aberdare via Trecynon Old Hirwaun Tower Colliery 4061	Up	18	3 ½	0	11 ½	10 ½	5	22	-½	0	15 ½	6 ½	5	20	-½	0	13 ½	6 ½	5	22 ½	-5 ½	5	16	6 ½	5
		Down	17 ½			12			17 ½			12			19 ½			14			22			16 ½		
<b>Option 5b</b>	Aberdare Trecynon Old Hirwaun Tower Colliery 4061	Up	19	1 ½	0	13 ½	7 ½	5	23	-2 ½	0	17 ½	5	3 ½	21	-2 ½	0	15 ½	5	2 ½	23 ½	-7 ½	5	18	3 ½	5
		Down	18 ½			13			18 ½			13			20 ½			15			23			17 ½		
<b>Option 5c</b>	Aberdare via Trecynon New Hirwaun Tower Colliery 4061	Up	18	3	0	12	9	5	22	-1	0	16	5	5	20	-1	0	14	5	5	22 ½	-6	5	16 ½	5	5
		Down	18			13			18			13			20			15			22 ½			17 ½		
<b>Option 5d</b>	Aberdare Trecynon New Hirwaun Tower Colliery 4061	Up	19	1	0	13 ½	7 ½	5	23	-3	0	17 ½	5	3 ½	21	-3	0	15 ½	5	3 ½	23 ½	-8	5	18	3 ½	5
		Down	19			13			19			13			21			15			23 ½			17 ½		

Option 6a – 10d	The same results as Option 1a – Option 5d as there is no time penalty in the timings for stopping at Aberdare Old Station compared to the existing Aberdare location
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## APPENDIX E. FEASIBLE TIMETABLES

### Option 1a

#### No Pathing/ stopping time for services

##### *Line speed 20mph*

Loop includes Trecynon station and Length is approx. 1575m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon		xx/19	xx/49
New Hirwaun	arr	xx.24	xx.54

Station		2Y37	2Y35
New Hirwaun	dep	xx.41	xx.11
Trecynon		xx/46	xx/16
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

##### *Line speed 35mph*

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon		xx/17	xx/47
New Hirwaun	arr	xx.20	xx.50

Station		2Y37	2Y35
New Hirwaun	dep	xx.44 ½	xx.14 ½
Trecynon		xx/47 ½	xx/ 17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

#### Passing/ stopping time for a service

##### *Line speed 20mph*

Loop is between Aberdare and Trecynon and Length is approx. 525m long and 4 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(4)	(4)
Trecynon		xx/23	xx/53
New Hirwaun	arr	xx.28	xx.58

Station		2Y37	2Y35
New Hirwaun	dep	xx.41	xx.11
Trecynon		xx/46	xx/16
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

##### *Line speed 35mph*

Loop is including Trecynon and Length is approx. 1125m long and 4 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(4)	(4)
Trecynon		xx/21	xx/51
New Hirwaun	arr	xx.24	xx.54

Station		2Y37	2Y35
New Hirwaun	dep	xx.44 ½	xx.14 ½
Trecynon		xx/47 ½	xx/ 17 ½
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Line speed 20mph**

Loop is between Aberdare and Trecynon and Length is approx. 100m long and 6 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(6)	(6)
Trecynon		xx/25	xx/55
New Hirwaun	arr	xx.30	xx.00

Station		2Y37	2Y35
New Hirwaun	dep	xx.41	xx.11
Trecynon		xx/46	xx/16
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Line speed 35mph**

Loop is between Aberdare and Trecynon and Length is approx. 100m long and 6 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(6)	(6)
Trecynon		xx/23	xx/53
New Hirwaun	arr	xx.26	xx.56

Station		2Y37	2Y35
New Hirwaun	dep	xx.44 ½	xx.14 ½
Trecynon		xx/47 ½	xx/ 17 ½
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for both services in the passing loop****Line speed 20mph**

Loop is between Aberdare and Trecynon and Length is approx. 500m long and 2 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
	dep	(2)	(2)
Trecynon		xx/21	xx/51
New Hirwaun	arr	xx.26	xx.56

Station		2Y37	2Y35
New Hirwaun	dep	xx.39	xx.09
Trecynon		xx/44	xx/14
		(2)	(2)
Loop		xx/47	xx/17
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Line speed 35mph**

Loop is between Aberdare and Trecynon and Length is approx. 725m long and 2 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(2)	(2)
Trecynon		xx/19	xx/49

Station		2Y37	2Y35
New Hirwaun	dep	xx.42 ½	xx.12 ½
Trecynon		xx/45 ½	xx/ 15 ½
		(2)	(2)
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½



New Hirwaun	arr	xx.22	xx.52
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	dep	xx.52	xx.22
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**Line speed 20mph**

Loop is between Aberdare and Trecynon and Length is approx. 100m long and 3 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
	dep	(3)	(3)
Trecynon		xx/22	xx/52
New Hirwaun	arr	xx.27	xx.57

Station		2Y37	2Y35
New Hirwaun	dep	xx.38	xx.08
Trecynon		xx/43	xx/13
		(3)	(3)
Loop		xx/47	xx/17
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Line speed 35mph**

Loop is between Aberdare and Trecynon and Length is approx. 100m long and 3 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(3)	(3)
Trecynon		xx/20	xx/50
New Hirwaun	arr	xx.23	xx.53

Station		2Y37	2Y35
New Hirwaun	dep	xx.41 ½	xx.11 ½
Trecynon		xx/44 ½	xx/ 14 ½
		(3)	(3)
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for both services at Aberdare station****Line speed 20mph**

Loop is including Aberdare satation and Length is approx. 450m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.19	xx.49
Trecynon		xx/23 ½	xx/53 ½
New Hirwaun	arr	xx.28 ½	xx.58 ½

Station		2Y37	2Y35
New Hirwaun	dep	xx.36 ½	xx.06 ½
Trecynon		xx/41 ½	xx/11 ½
Aberdare	arr	xx.46	xx.16
	dep	xx.52	xx.22

**Line speed 35mph**

Loop is including Aberdare satation and Length is approx. 450m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.19	xx.49
Trecynon		xx/21 ½	xx/51 ½
New Hirwaun	arr	xx.24 ½	xx.54 ½

Station		2Y37	2Y35
New Hirwaun	dep	xx.40	xx.10
Trecynon		xx/43	xx/13
Aberdare	arr	xx.46	xx.16
	dep	xx.52	xx.22

**Option 1b****No Pathing/ stopping time for services*****Line speed 20mph***

Loop includes Trecynon station and Length is approx. 1575m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon	arr	xx.19	xx.49
	dep	xx.20	xx.50
New Hirwaun	arr	xx.25	xx.55

Station		2Y37	2Y35
New Hirwaun	dep	xx.40	xx.10
Trecynon	arr	xx.45	xx.15
	dep	xx.46	xx.16
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

***Line speed 35mph***

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon	arr	xx.17 ½	xx.47 ½
	dep	xx.18 ½	xx.48 ½
New Hirwaun	arr	xx.21 ½	xx.51 ½

Station		2Y37	2Y35
New Hirwaun	dep	xx.43 ½	xx.13 ½
Trecynon	arr	xx.46 ½	xx.16 ½
	dep	xx.47 ½	xx.17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for a service*****Line speed 20mph***

Loop is between Aberdare and Trecynon and Length is approx. 525m long and 4 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(4)	(4)
Trecynon	arr	xx.23	xx.53
	dep	xx.24	xx.54
New Hirwaun	arr	xx.29	xx.59

Station		2Y37	2Y35
New Hirwaun	dep	xx.40	xx.10
Trecynon	arr	xx.45	xx.15
	dep	xx.46	xx.16
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Line speed 35mph**

Loop is including Trecynon and Length is approx. 1125m long and 4 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(4)	(4)
Trecynon	arr	xx.21 ½	xx.51 ½
	dep	xx.22 ½	xx.52 ½
New Hirwaun	arr	xx.25 ½	xx.55 ½

Station		2Y37	2Y35
New Hirwaun	dep	xx.43 ½	xx.13 ½
Trecynon	arr	xx.46½	xx. 16 ½
	dep	xx.47 ½	xx. 17 ½
Loop	dep	xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Line speed 35mph**

Loop is including Trecynon and Length is approx. 100m long and 6 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(6)	(6)
Trecynon	arr	xx.23 ½	xx.53 ½
	dep	xx.24 ½	xx.54 ½
New Hirwaun	arr	xx.27 ½	xx.57 ½

Station		2Y37	2Y35
New Hirwaun	dep	xx.43 ½	xx.13 ½
Trecynon	arr	xx.46½	xx. 16 ½
	dep	xx.47 ½	xx. 17 ½
Loop	dep	xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for both services in the passing loop****Line speed 20mph**

Loop is between Aberdare and Trecynon and Length is approx. 500m long and 2 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(2)	(2)
Trecynon	arr	xx.21	xx.51
	dep	xx.22	xx.52
New Hirwaun	arr	xx.27	xx.57

Station		2Y37	2Y35
New Hirwaun	dep	xx.38	xx.08
Trecynon	arr	xx.43	xx.13
	dep	xx.44	xx.14
		(2)	(2)
Loop	dep	xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Line speed 35mph**

Loop is between Aberdare and Trecynon and Length is approx. 725m long and 2 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(2)	(2)
Trecynon	arr	xx.19 ½	xx.49 ½
	dep	xx.20 ½	xx.50 ½
New Hirwaun	arr	xx.23 ½	xx.53 ½

Station		2Y37	2Y35
New Hirwaun	dep	xx.41 ½	xx.11 ½
Trecynon	arr	xx.44½	xx. 14 ½
	dep	xx.45 ½	xx. 15 ½
		(2)	(2)
Loop	dep	xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Line speed 35mph**

Loop is between Aberdare and Trecynon and Length is approx. 100m long and 3 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(3)	(3)
Trecynon	arr	xx.20 ½	xx.50 ½
	dep	xx.21 ½	xx.51 ½
New Hirwaun	arr	xx.24 ½	xx.54 ½

Station		2Y37	2Y35
New Hirwaun	dep	xx.40 ½	xx.10 ½
Trecynon	arr	xx.43½	xx. 13 ½
	dep	xx.44 ½	xx. 14 ½
		(3)	(3)
Loop	dep	xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for both services at Aberdare station**

**Line speed 20mph**

Loop is including Aberdare and Length is approx. 450m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.19	xx.49
Trecynon	arr	xx.23 ½	xx.53 ½
	dep	xx.24 ½	xx.54 ½
New Hirwaun	arr	xx.29 ½	xx.59 ½

Station		2Y37	2Y35
New Hirwaun	dep	xx.35 ½	xx.05 ½
Trecynon	arr	xx.40 ½	xx.10 ½
	dep	xx.41 ½	xx.11 ½
Aberdare	arr	xx.46	xx.16
	dep	xx.52	xx.22

**Line speed 35mph**

Loop is including Aberdare and Length is approx. 450m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.19	xx.49
Trecynon	arr	xx.22	xx.52
	dep	xx.23	xx.53

Station		2Y37	2Y35
New Hirwaun	dep	xx.39	xx.09
Trecynon	arr	xx.42	xx.12
	dep	xx.43	xx.13
Aberdare	arr	xx.46	xx.16

New Hirwaun	arr	xx.26	xx.56
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	dep	xx.52	xx.22
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**Option 1c****No Pathing/ stopping time for services*****Line speed 20mph***

Loop includes Trecynon station and Length is approx. 1575m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon		xx/19	xx/49
New Hirwaun		...	...
Old Hirwaun	arr	xx.26 ½	xx.56 ½

Station		2Y37	2Y35
Old Hirwaun	dep	xx.38 ½	xx.08 ½
New Hirwaun		...	...
Trecynon		xx/46	xx/16
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

***Line speed 35mph***

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon		xx/17	xx/47
New Hirwaun		...	...
Old Hirwaun	arr	xx.21	xx.51

Station		2Y37	2Y35
Old Hirwaun	dep	xx.43	xx.13
New Hirwaun		...	...
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for a service*****Line speed 35mph***

Loop is including Trecynon and Length is approx. 1125m long and 4 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(4)	(4)
Trecynon		xx/21	xx/51
New Hirwaun		...	...
Old Hirwaun	arr	xx.25	xx.55

Station		2Y37	2Y35
Old Hirwaun	dep	xx.43	xx.13
New Hirwaun		...	...
Trecynon		xx/47 ½	xx/17 ½
Loop	dep	xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Line speed 35mph**

Loop is including Trecynon and Length is approx. 100m long and 6 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(6)	(6)
Trecynon		xx/23	xx/53
New Hirwaun		...	...
Old Hirwaun	arr	xx.27	xx.57

Station		2Y37	2Y35
Old Hirwaun	dep	xx.43	xx.13
New Hirwaun		...	...
Trecynon		xx/47 ½	xx/ 17 ½
Loop	dep	xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for both services in the passing loop****Line speed 35mph**

Loop is between Aberdare and Trecynon and Length is approx. 725m long and 2 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(2)	(2)
Trecynon		xx/19	xx/49
New Hirwaun		...	...
Old Hirwaun	arr	xx.23	xx.53

Station		2Y37	2Y35
Old Hirwaun	dep	xx.41	xx.11
New Hirwaun		...	...
Trecynon		xx/45 ½	xx/ 15 ½
		(2)	(2)
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Line speed 35mph**

Loop is between Aberdare and Trecynon and Length is approx. 100m long and 3 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(3)	(3)
Trecynon		xx/20	xx/50
New Hirwaun		...	...
Old Hirwaun	arr	xx.24	xx.54

Station		2Y37	2Y35
Old Hirwaun	dep	xx.40	xx.10
New Hirwaun		...	...
Trecynon		xx/44 ½	xx/ 14 ½
		(3)	(3)
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

### Passing/ stopping time for both services at Aberdare station

#### *Line speed 35mph*

Loop is including Aberdare and Length is approx. 450m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.19	xx.49
Trecynon		xx/21 ½	xx/51 ½
New Hirwaun		...	...
Old Hirwaun	arr	xx.25 ½	xx.55 ½

Station		2Y37	2Y35
Old Hirwaun	dep	xx.38 ½	xx.08 ½
New Hirwaun		...	...
Trecynon		xx/43	xx/13
Aberdare	arr	xx.46	xx.16
	dep	xx.52	xx.22

### Option 1d

#### No Pathing/ stopping time for services

#### *Line speed 20mph*

Loop includes Trecynon station and Length is approx. 1575m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon	arr	xx.19	xx.49
	dep	xx.20	xx.50
New Hirwaun		...	...
Old Hirwaun	arr	xx.27 ½	xx.57 ½

Station		2Y37	2Y35
Old Hirwaun	dep	xx.37 ½	xx.07 ½
New Hirwaun		...	...
Trecynon	arr	xx.45	xx.15
	dep	xx.46	xx.16
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

#### *Line speed 35mph*

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon	arr	xx.17 ½	xx.47 ½
	dep	xx.18 ½	xx.48 ½
New Hirwaun		...	...
Old Hirwaun	arr	xx.23	xx.53

Station		2Y37	2Y35
Old Hirwaun	dep	xx.42	xx.12
New Hirwaun		...	...
Trecynon	arr	xx.46 ½	xx.16 ½
	dep	xx.47 ½	xx.17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

### Passing/ stopping time for a service

#### *Line speed 35mph*

Loop is including Trecynon and Length is approx. 1125m long and 4 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(4)	(4)
Trecynon	arr	xx.21 ½	xx.51 ½
	dep	xx.22 ½	xx.52 ½
New Hirwaun		...	...
Old Hirwaun	arr	xx.27	xx.57

Station		2Y37	2Y35
Old Hirwaun	dep	xx.42	xx.12
New Hirwaun		...	...
Trecynon	arr	xx.46 ½	xx.16 ½
	dep	xx.47 ½	xx.17 ½
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

#### *Line speed 35mph*

Loop is including Trecynon and Length is approx. 100m long and 6 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(6)	(6)
Trecynon	arr	xx.23 ½	xx.53 ½
	dep	xx.24 ½	xx.54 ½
New Hirwaun		...	...
Old Hirwaun	arr	xx.29	xx.59

Station		2Y37	2Y35
Old Hirwaun	dep	xx.42	xx.12
New Hirwaun		...	...
Trecynon	arr	xx.46 ½	xx.16 ½
	dep	xx.47 ½	xx.17 ½
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

### Passing/ stopping time for both services in the passing loop

#### *Line speed 35mph*

Loop is between Aberdare and Trecynon and Length is approx. 725m long and 2 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(2)	(2)
Trecynon	arr	xx.19 ½	xx.49 ½
	dep	xx.20 ½	xx.50 ½
New Hirwaun		...	...
Old Hirwaun	arr	xx.25	xx.55

Station		2Y37	2Y35
Old Hirwaun	dep	xx.40	xx.10
New Hirwaun		...	...
Trecynon	arr	xx.44 ½	xx.14 ½
	dep	xx.45 ½	xx.15 ½
		(2)	(2)
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22



**Line speed 35mph**

Loop is between Aberdare and Trecynon and Length is approx. 100m long and 3 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop	arr	xx/16	xx/46
		(3)	(3)
Trecynon	arr	xx.20 ½	xx.50 ½
	dep	xx.21 ½	xx.51 ½
New Hirwaun		...	...
Old Hirwaun	arr	xx.26	xx.56

Station		2Y37	2Y35
Old Hirwaun	dep	xx.39	xx.09
New Hirwaun		...	...
Trecynon	arr	xx.43 ½	xx.13 ½
	dep	xx.44 ½	xx.14 ½
		(3)	(3)
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for both services at Aberdare station****Line speed 35mph**

Loop is including Aberdare and Length is approx. 450m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.19	xx.49
Trecynon	arr	xx.22	xx.52
	dep	xx.23	xx.53
New Hirwaun		...	...
Old Hirwaun	arr	xx.27 ½	xx.57 ½

Station		2Y37	2Y35
Old Hirwaun	dep	xx.37 ½	xx.07 ½
New Hirwaun		...	...
Trecynon	arr	xx.42	xx.12
	dep	xx.43	xx.13
Aberdare	arr	xx.46	xx.16
	dep	xx.52	xx.22

**Option 2a****No Pathing/ stopping time for services****Line speed 35mph**

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon		xx/17	xx/47
New Hirwaun		...	...
Old Hirwaun	arr	xx.21	xx.51
	dep	xx.22	xx.52
Tower Colliery 4059	arr	xx.24	xx.54

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx. 40 ½	xx.10 ½
Old Hirwaun	arr	xx.42	xx.12
	dep	xx.43	xx.13
New Hirwaun		...	...
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for a service*****Line speed 35mph***

Loop is including Trecynon and Length is approx. 1125m long and 4 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(4)	(4)
Trecynon		xx/21	xx/51
New Hirwaun		...	...
Old Hirwaun	arr	xx.25	xx.55
	dep	xx.26	xx.56
Tower Colliery 4059	arr	xx.28	xx.58

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx. 40 ½	xx.10 ½
Old Hirwaun	arr	xx.42	xx.12
	dep	xx.43	xx.13
New Hirwaun		...	...
Trecynon		xx/47 ½	xx/17 ½
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

***Line speed 35mph***

Loop is including Trecynon and Length is approx. 100m long and 6 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(6)	(6)
Trecynon		xx/23	xx/53
New Hirwaun		...	...
Old Hirwaun	arr	xx.27	xx.57
	dep	xx.28	xx.58
Tower Colliery 4059	arr	xx.30	xx.00

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx. 40 ½	xx.10 ½
Old Hirwaun	arr	xx.42	xx.12
	dep	xx.43	xx.13
New Hirwaun		...	...
Trecynon		xx/47 ½	xx/17 ½
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

### Passing/ stopping time for both services in the passing loop

#### Line speed 35mph

Loop is between Aberdare and Trecynon and Length is approx. 725m long and 2 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(2)	(2)
Trecynon		xx/19	xx/49
New Hirwaun		...	...
Old Hirwaun	arr	xx.23	xx.53
	dep	xx.24	xx.54
Tower Colliery 4059	arr	xx.26	xx.56

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx.38 ½	xx.08 ½
Old Hirwaun	arr	xx.40	xx.10
	dep	xx.41	xx.11
New Hirwaun		...	...
Trecynon		xx/45 ½	xx/15 ½
		(2)	(2)
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

#### Line speed 35mph

Loop is between Aberdare and Trecynon and Length is approx. 100m long and 3 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(3)	(3)
Trecynon		xx/20	xx/50
New Hirwaun		...	...
Old Hirwaun	arr	xx.24	xx.54
	dep	xx.25	xx.55
Tower Colliery 4059	arr	xx.27	xx.57

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx.37 ½	xx.07 ½
Old Hirwaun	arr	xx.39	xx.09
	dep	xx.40	xx.10
New Hirwaun		...	...
Trecynon		xx/44 ½	xx/14 ½
		(3)	(3)
Loop		xx/49	xx/19
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

### Passing/ stopping time for both services at Aberdare station

#### Line speed 35mph

Loop is including Aberdare and Length is approx. 450m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.19	xx.49
Trecynon		xx/21 ½	xx/51 ½
New Hirwaun		...	...
Old Hirwaun	arr	xx.25 ½	xx.55 ½

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx.36	xx.06
Old Hirwaun	arr	xx.37 ½	xx.07 ½
	dep	xx.38 ½	xx.08 ½
New Hirwaun		...	...
Trecynon		xx/43	xx/13

	dep	xx.26 ½	xx.56 ½
Tower Colliery 4059	arr	xx.28 ½	xx.58 ½

Aberdare	arr	xx.46	xx. 16
	dep	xx.52	xx.22

**Option 2b****No Pathing/ stopping time for services****Line speed 35mph**

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon	arr	xx.17 ½	xx.47 ½
	dep	xx.18 ½	xx.48 ½
New Hirwaun		...	...
Old Hirwaun	arr	xx.23	xx.53
	dep	xx.24	xx.54
Tower Colliery 4059	arr	xx.26	xx.56

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx.39 ½	xx.09 ½
Old Hirwaun	arr	xx.41	xx.11
	dep	xx.42	xx.12
New Hirwaun		...	...
Trecynon	arr	xx.46 ½	xx.16 ½
	dep	xx.47 ½	xx.17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Option 2c****No Pathing/ stopping time for services****Line speed 35mph**

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon		xx/17	xx/47
New Hirwaun	arr	xx.20	xx.50
	dep	xx.21	xx.51
Old Hirwaun		...	...
Tower Colliery 4059	arr	xx.24 ½	xx.54 ½

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx. 40 ½	xx.10 ½
Old Hirwaun		...	...
New Hirwaun	arr	xx.43 ½	xx.13 ½
	dep	xx.44 ½	xx.14 ½
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for a service****Line speed 35mph**

Loop is including Trecynon and Length is approx. 1125m long and 4 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(4)	(4)

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx. 40 ½	xx.10 ½
Old Hirwaun		...	...
New Hirwaun	arr	xx.43 ½	xx.13 ½
	dep	xx.44 ½	xx.14 ½

Trecynon		xx/21	xx/51
New Hirwaun	arr	xx.24	xx.54
	dep	xx.25	xx.55
Old Hirwaun		...	...
Tower Colliery 4059	arr	xx.28 ½	xx.58 ½

Loop		xx/46	xx/16
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Line speed 35mph**

Loop is including Trecynon and Length is approx. 100m long and 6 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(6)	(6)
Trecynon		xx/23	xx/53
New Hirwaun	arr	xx.26	xx.56
	dep	xx.27	xx.57
Old Hirwaun		...	...
Tower Colliery 4059	arr	xx.30 ½	xx.00 ½

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx.40 ½	xx.10 ½
Old Hirwaun		...	...
New Hirwaun	arr	xx.43 ½	xx.13 ½
	dep	xx.44 ½	xx.14 ½
Loop		xx/46	xx/16
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for both services in the passing loop****Line speed 35mph**

Loop is between Aberdare and Trecynon and Length is approx. 725m long and 2 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(2)	(2)
Trecynon		xx/19	xx/49
New Hirwaun	arr	xx.22	xx.52
	dep	xx.23	xx.53
Old Hirwaun		...	...
Tower Colliery 4059	arr	xx.26 ½	xx.56 ½

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx.38 ½	xx.08 ½
Old Hirwaun		...	...
New Hirwaun	arr	xx.41 ½	xx.11 ½
	dep	xx.42 ½	xx.12 ½
Loop		xx/46	xx/16
		(2)	(2)
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Line speed 35mph**

Loop is between Aberdare and Trecynon and Length is approx. 100m long and 3 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx.37 ½	xx.07 ½

	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(3)	(3)
Trecynon		xx/20	xx/50
New Hirwaun	arr	xx.23	xx.53
	dep	xx.24	xx.54
Old Hirwaun		...	...
Tower Colliery 4059	arr	xx.27 ½	xx.57 ½

Old Hirwaun		...	...
New Hirwaun	arr	xx.40 ½	xx.10 ½
	dep	xx.41 ½	xx.11 ½
Loop		xx/45	xx/15
		(3)	(3)
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

### Passing/ stopping time for both services at Aberdare station

#### Line speed 35mph

Loop is including Aberdare and Length is approx. 450m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.19	xx.49
Trecynon		xx/21 ½	xx/51 ½
New Hirwaun	arr	xx.24 ½	xx.54 ½
	dep	xx.25 ½	xx.55 ½
Old Hirwaun		...	...
Tower Colliery 4059	arr	xx.29	xx.59

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx.36	xx.06
Old Hirwaun		...	...
New Hirwaun	arr	xx.39	xx.09
	dep	xx.40	xx.10
Trecynon		xx/43	xx/13
Aberdare	arr	xx.46	xx.16
	dep	xx.52	xx.22

### Option 2d

#### No Pathing/ stopping time for services

#### Line speed 35mph

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon	arr	xx.17 ½	xx.47 ½
	dep	xx.18 ½	xx.48 ½
New Hirwaun	arr	xx.21 ½	xx.51 ½
	dep	xx.22 ½	xx.52 ½
Old Hirwaun		...	...
Tower Colliery 4059	arr	xx.26	xx.56

Station		2Y37	2Y35
Tower Colliery 4059	dep	xx.39 ½	xx.09 ½
Old Hirwaun		...	...
New Hirwaun	arr	xx.42 ½	xx.12 ½
	dep	xx.43 ½	xx.13 ½
Trecynon	arr	xx.46 ½	xx.16 ½
	dep	xx.47 ½	xx.17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Option 3a****No Pathing/ stopping time for services****Line speed 35 mph**

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon		xx/17	xx/47
New Hirwaun		...	...
Old Hirwaun	arr	xx.21	xx.51
	dep	xx.22	xx.52
Tower Colliery 4059		...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...
Tower Colliery Old Platform	arr	xx.25	xx.55

Station		2Y37	2Y35
Tower Colliery Old Platform	dep	xx. 39 ½	xx.09 ½
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun	arr	xx.42	xx.12
	dep	xx.43	xx.13
New Hirwaun		...	...
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for a service****Line speed 35mph**

Loop is including Trecynon and Length is approx. 1125m long and 4 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/17	xx/47
		(4)	(4)
Trecynon		xx/21	xx/51
New Hirwaun		...	...
Old Hirwaun	arr	xx.25	xx.55
	dep	xx.26	xx.56
Tower Colliery 4059		...	...
Tower Colliery current		...	...

Station		2Y37	2Y35
Tower Colliery Old Platform	dep	xx. 39 ½	xx.09 ½
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun	arr	xx.42	xx.12
	dep	xx.43	xx.13
New Hirwaun		...	...
Loop		xx/46	xx/16
Trecynon		xx/47 ½	xx/17 ½



Tower Colliery 4061		...	...
Tower Colliery Old Platform	arr	xx.29	xx.59

Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22



### Passing/ stopping time for both services in the passing loop

#### Line speed 35mph

Loop is between Aberdare and Trecynon and Length is approx. 725m long and 2 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/17	xx/47
		(2)	(2)
Trecynon		xx/19	xx/47
New Hirwaun		...	...
Old Hirwaun	arr	xx.23	xx.53
	dep	xx.24	xx.54
Tower Colliery 4059		...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...
Tower Colliery Old Platform	arr	xx.27	xx.57

Station		2Y37	2Y35
Tower Colliery Old Platform	dep	xx.37 ½	xx.07 ½
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun	arr	xx.40	xx.10
	dep	xx.41	xx.11
New Hirwaun		...	...
Loop		xx/46	xx/16
		(2)	(2)
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

### Passing/ stopping time for both services at Aberdare station

#### Line speed 35 mph

Loop is including Aberdare and Length is approx. 450m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.19	xx.46
Trecynon		xx/21 ½	xx/51 ½
New Hirwaun		...	...
Old Hirwaun	arr	xx.25 ½	xx.55 ½
	dep	xx.26 ½	xx.56 ½
Tower Colliery 4059		...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...

Station		2Y37	2Y35
Tower Colliery Old Platform	dep	xx.35	xx.05
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun	arr	xx.37 ½	xx.07 ½
	dep	xx.38 ½	xx.08 ½
New Hirwaun		...	...
Trecynon		xx/43	xx/13
Aberdare	arr	xx.46	xx.16



Tower Colliery Old Platform	arr	xx.29 ½	xx.59 ½
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	dep	xx.52	xx.22
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**Option 3b****No Pathing/ stopping time for services****Line speed 35 mph**

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon	arr	xx.17 ½	xx.47 ½
	dep	xx.18 ½	xx.48 ½
New Hirwaun		...	...
Old Hirwaun	arr	xx.23	xx.53
	dep	xx.24	xx.54
Tower Colliery 4059		...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...
Tower Colliery Old Platform	arr	xx.27	xx.57

Station		2Y37	2Y35
Tower Colliery Old Platform	dep	xx.38 ½	xx.08 ½
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun	arr	xx.41	xx.11
	dep	xx.42	xx.12
New Hirwaun		...	...
Trecynon	arr	xx.46 ½	xx.16 ½
	dep	xx.47 ½	xx.17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Option 3c****No Pathing/ stopping time for services****Line speed 35mph**

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon		xx/17	xx/47
New Hirwaun	arr	xx.20	xx.50
	dep	xx.21	xx.51
Old Hirwaun		...	...
Tower Colliery 4059	arr	...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...

Station		2Y37	2Y35
Tower Colliery Old Platform	dep	xx. 40	xx.10
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun		...	...
New Hirwaun	arr	xx.43 ½	xx.13 ½
	dep	xx.44 ½	xx.14 ½
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½



Tower Colliery Old Platform		xx.25 ½	xx.55 ½
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	dep	xx.52	xx.22
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**Passing/ stopping time for a service****Line speed 35mph**

Loop is including Trecynon and Length is approx. 1125m long and 4 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(4)	(4)
Trecynon		xx/21	xx/51
New Hirwaun	arr	xx.24	xx.54
	dep	xx.25	xx.55
Old Hirwaun		...	...
Tower Colliery 4059	arr	...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...
Tower Colliery Old Platform		xx.29 ½	xx.59 ½

Station		2Y37	2Y35
Tower Colliery Old Platform	dep	xx.40	xx.10
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun		...	...
New Hirwaun	arr	xx.43 ½	xx.13 ½
	dep	xx.44 ½	xx.14 ½
Loop		xx/46	xx/16
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for both services in the passing loop****Line speed 35mph**

Loop is between Aberdare and Trecynon and Length is approx. 725m long and 2 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(2)	(2)
Trecynon		xx/19	xx/49
New Hirwaun	arr	xx.22	xx.52
	dep	xx.23	xx.53
Old Hirwaun		...	...
Tower Colliery 4059	arr	...	...
Tower Colliery		...	...

Station		2Y37	2Y35
Tower Colliery Old Platform	dep	xx.38	xx.08
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun		...	...
New Hirwaun	arr	xx.41 ½	xx.11 ½
	dep	xx.42 ½	xx.12 ½
Loop		xx/46	xx/16
		(2)	(2)
Trecynon		xx/47 ½	xx/17 ½



current			
Tower Colliery 4061		...	...
Tower Colliery Old Platform		xx.27 ½	xx.57 ½

Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

### Passing/ stopping time for both services at Aberdare station

#### Line speed 35 mph

Loop is including Aberdare and Length is approx. 450m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.19	xx.49
Trecynon		xx/21 ½	xx/51 ½
New Hirwaun	arr	xx.24 ½	xx.54 ½
	dep	xx.25 ½	xx.55 ½
Old Hirwaun		...	...
Tower Colliery 4059		...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...
Tower Colliery Old Platform	arr	xx.30	xx.55 ½

Station		2Y37	2Y35
Tower Colliery Old Platform	dep	xx.35 ½	xx.05 ½
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun		...	...
New Hirwaun	arr	xx.39	xx.09
	dep	xx.40	xx.10
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.46	xx.16
	dep	xx.52	xx.22

### Option 3d

#### No Pathing/ stopping time for services

#### Line speed 35 mph

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon	arr	xx.17 ½	xx.47 ½
	dep	xx.18 ½	xx.48 ½
New Hirwaun	arr	xx.21 ½	xx.51 ½
	dep	xx.22 ½	xx.52 ½
Old Hirwaun		...	...
Tower Colliery 4059		...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...
Tower Colliery Old Platform	arr	xx.27	xx.57

Station		2Y37	2Y35
Tower Colliery Old Platform	dep	xx.39	xx.09
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun		...	...
New Hirwaun	arr	xx.42 ½	xx.12 ½
	dep	xx.43 ½	xx.13 ½
Trecynon	arr	xx.46 ½	xx.16 ½
	dep	xx.47 ½	xx.17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22



Platform			
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**Option 4a****No Pathing/ stopping time for services****Line speed 35 mph**

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon		xx/17	xx/47
New Hirwaun		...	...
Old Hirwaun	arr	xx.21	xx.51
	dep	xx.22	xx.52
Tower Colliery 4059		...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...
Tower Colliery Old Platform		...	...
Tower Colliery 5 <sup>th</sup> Avenue	arr	xx.25	xx.55

Station		2Y37	2Y35
Tower Colliery 5 <sup>th</sup> Avenue	dep	xx. 39 ½	xx.09 ½
Tower Colliery Old Platform		...	...
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun	arr	xx.42	xx.12
	dep	xx.43	xx.13
New Hirwaun		...	...
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for a service*****Line speed 35mph***

Loop is including Trecynon and Length is approx. 1125m long and 4 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(4)	(4)
Trecynon		xx/21	xx/51
New Hirwaun		...	...
Old Hirwaun	arr	xx.25	xx.55
	dep	xx.26	xx.56
Tower Colliery 4059		...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...
Tower Colliery Old Platform		...	...
Tower Colliery 5 <sup>th</sup> Avenue	arr	xx.29	xx.59

Station		2Y37	2Y35
Tower Colliery 5 <sup>th</sup> Avenue	dep	xx. 39 ½	xx.09 ½
Tower Colliery Old Platform		...	...
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun	arr	xx.42	xx.12
	dep	xx.43	xx.13
New Hirwaun		...	...
Loop		xx/46	xx/16
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

### Passing/ stopping time for both services in the passing loop

#### *Line speed 35mph*

Loop is between Aberdare and Trecynon and Length is approx. 725m long and 2 mins pathing time:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Loop		xx/16	xx/46
		(2)	(2)
Trecynon		xx/19	xx/49
New Hirwaun		...	...
Old Hirwaun	arr	xx.23	xx.53
	dep	xx.22	xx.54
Tower Colliery 4059		...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...
Tower Colliery Old Platform		...	...
Tower Colliery 5 <sup>th</sup> Avenue	arr	xx.27	xx.57

Station		2Y37	2Y35
Tower Colliery 5 <sup>th</sup> Avenue	dep	xx. 37 ½	xx.07 ½
Tower Colliery Old Platform		...	...
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun	arr	xx.40	xx.10
	dep	xx.41	xx.11
New Hirwaun		...	...
Loop		xx/46	xx/16
		(2)	(2)
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Passing/ stopping time for both services at Aberdare station**
***Line speed 35 mph***

Loop is including Aberdare and Length is approx. 450m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.19	xx.19
Trecynon		xx/21 ½	xx/51 ½
New Hirwaun		...	...
Old Hirwaun	arr	xx.25 ½	xx.55 ½
	dep	xx.26 ½	xx.56 ½
Tower Colliery 4059		...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...
Tower Colliery Old Platform		...	...
Tower Colliery 5 <sup>th</sup> Avenue	arr	xx.29 ½	xx.59 ½

Station		2Y37	2Y35
Tower Colliery 5 <sup>th</sup> Avenue	dep	xx.35	xx.05
Tower Colliery Old Platform		...	...
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun	arr	xx.37 ½	xx.07 ½
	dep	xx.38 ½	xx.08 ½
New Hirwaun		...	...
Trecynon		xx/43	xx/13
Aberdare	arr	xx.46	xx.16
	dep	xx.52	xx.22

**Option 4b****No Pathing/ stopping time for services****Line speed 35 mph**

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon	arr	xx.17 ½	xx.47 ½
	dep	xx.18 ½	xx.48 ½
New Hirwaun		...	...
Old Hirwaun	arr	xx.23	xx.53
	dep	xx.24	xx.54
Tower Colliery 4059		...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...
Tower Colliery Old Platform			
Tower Colliery 5 <sup>th</sup> Avenue	arr	xx.27	xx.57

Station		2Y37	2Y35
Tower Colliery 5 <sup>th</sup> Avenue	dep	xx.38 ½	xx.08 ½
Tower Colliery Old Platform		...	...
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun	arr	xx.41	xx.11
	dep	xx.42	xx.12
New Hirwaun		...	...
Trecynon	arr	xx.46 ½	xx.16 ½
	dep	xx.47 ½	xx.17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Option 4c****No Pathing/ stopping time for services****Line speed 35 mph**

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon		xx/17	xx/47
New Hirwaun	arr	xx.20	xx.50
	dep	xx.21	xx.51
Old Hirwaun		...	...
Tower Colliery 4059		...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...
Tower Colliery Old Platform		...	...
Tower Colliery 5 <sup>th</sup> Avenue	arr	xx.25 ½	xx.55 ½

Station		2Y37	2Y35
Tower Colliery 5 <sup>th</sup> Avenue	dep	xx. 38 ½	xx.08 ½
Tower Colliery Old Platform		...	...
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun		...	...
New Hirwaun	arr	xx.42 ½	xx.12 ½
	dep	xx.43 ½	xx.13 ½
Trecynon		xx/47 ½	xx/17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Option 4d****No Pathing/ stopping time for services****Line speed 35 mph**

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16
Aberdare	arr	xx.13	xx.43
	dep	xx.14 ½	xx.44 ½
Trecynon	arr	xx.17 ½	xx.47 ½
	dep	xx.18 ½	xx.48 ½
New Hirwaun	arr	xx.21 ½	xx.51 ½
	dep	xx.22 ½	xx.52 ½
Old Hirwaun		...	...
Tower Colliery 4059		...	...
Tower Colliery current		...	...
Tower Colliery 4061		...	...
Tower Colliery Old Platform			
Tower Colliery 5 <sup>th</sup> Avenue	arr	xx.27	xx.57

Station		2Y37	2Y35
Tower Colliery 5 <sup>th</sup> Avenue	dep	xx.38 ½	xx.08 ½
Tower Colliery Old Platform		...	...
Tower Colliery 4061		...	...
Tower Colliery current		...	...
Tower Colliery 4059		...	...
Old Hirwaun		...	...
New Hirwaun	arr	xx.42 ½	xx.12 ½
	dep	xx.43 ½	xx.13 ½
Trecynon	arr	xx.46 ½	xx.16 ½
	dep	xx.47 ½	xx.17 ½
Aberdare	arr	xx.50 ½	xx.20 ½
	dep	xx.52	xx.22

**Option 5a****No Pathing/ stopping time for services****Line speed 35 mph**

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16	Station		2Y37	2Y35
Aberdare	arr	xx.13	xx.43	Tower Colliery 4061	dep	xx.40	xx.10
	dep	xx.14 ½	xx.44 ½	Tower Colliery current		...	...
Trecynon		xx/17	xx/47	Tower Colliery 4059		...	...
New Hirwaun		...	...	Old Hirwaun	arr	xx.42	xx.12
Old Hirwaun	arr	xx.21	xx.51		dep	xx.43	xx.13
	dep	xx.22	xx.52	New Hirwaun		...	...
Tower Colliery 4059		...	...	Trecynon		xx/47 ½	xx/17 ½
Tower Colliery current		...	...	Aberdare	arr	xx.50 ½	xx.20 ½
Tower Colliery 4061	arr	xx.24 ½	xx.54 ½		dep	xx.52	xx.22

**Passing/ stopping time for a service****Line speed 35mph**

Loop is including Trecynon and Length is approx. 1125m long and 4 mins pathing time:

Station		2A14	2A16	Station		2Y37	2Y35
Aberdare	arr	xx.13	xx.43	Tower Colliery 4061	dep	xx.40	xx.10
	dep	xx.14 ½	xx.44 ½	Tower Colliery current		...	...
Loop		xx/16	xx/46	Tower Colliery 4059		...	...
		(4)	(4)	Old Hirwaun	arr	xx.42	xx.12
Trecynon		xx/21	xx/51		dep	xx.43	xx.13
New Hirwaun		...	...	New Hirwaun		...	...
Old Hirwaun	arr	xx.25	xx.55	Loop		xx/46	xx/16
	dep	xx.26	xx.56				
Tower Colliery 4059		...	...	Trecynon		xx/47 ½	xx/17 ½
Tower Colliery current		...	...	Aberdare	arr	xx.50 ½	xx.20 ½
Tower Colliery 4061	arr	xx.28 ½	xx.58 ½		dep	xx.52	xx.22



### Passing/ stopping time for both services in the passing loop

#### Line speed 35mph

Loop is between Aberdare and Trecynon and Length is approx. 725m long and 2 mins pathing time:

Station		2A14	2A16	Station		2Y37	2Y35
Aberdare	arr	xx.13	xx.43	Tower Colliery 4061	dep	xx.38	xx.08
	dep	xx.14 ½	xx.44 ½	Tower Colliery current		...	...
Loop		xx/16	xx/46	Tower Colliery 4059		...	...
		(2)	(2)	Old Hirwaun	arr	xx.40	xx.10
Trecynon		xx/19	xx/49		dep	xx.41	xx.11
New Hirwaun		...	...	New Hirwaun		...	...
Old Hirwaun	arr	xx.23	xx.53	Loop		xx/46	xx/16
	dep	xx.24	xx.54			(2)	(2)
Tower Colliery 4059		...	...	Trecynon		xx/47 ½	xx/17 ½
Tower Colliery current		...	...	Aberdare	arr	xx.50 ½	xx.20 ½
Tower Colliery 4061	arr	xx.26 ½	xx.56 ½		dep	xx.52	xx.22

### Passing/ stopping time for both services at Aberdare station

Loop is including Aberdare and Length is approx. 450m long:

Station		2A14	2A16	Station		2Y37	2Y35
Aberdare	arr	xx.13	xx.43	Tower Colliery 4061	dep	xx.35 ½	xx.05 ½
	dep	xx.19	xx.19	Tower Colliery current		...	...
Trecynon		xx/21 ½	xx/51 ½	Tower Colliery 4059		...	...
New Hirwaun		...	...	Old Hirwaun	arr	xx.37 ½	xx.07 ½
Old Hirwaun	arr	xx.25 ½	xx.55 ½		dep	xx.38 ½	xx.08 ½
	dep	xx.26 ½	xx.56 ½	New Hirwaun		...	...
Tower Colliery 4059		...	...	Trecynon		xx/43	xx/13
Tower Colliery current		...	...	Aberdare	arr	xx.46	xx.16
Tower Colliery 4061		xx.29	xx.59		dep	xx.52	xx.22

**Option 5b****No Pathing/ stopping time for services****Line speed 35 mph**

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16	Station		2Y37	2Y35
Aberdare	arr	xx.13	xx.43	Tower Colliery 4061	dep	xx.39	xx.09
	dep	xx.14 ½	xx.44 ½	Tower Colliery current		...	...
Trecynon	arr	xx.17 ½	xx.47 ½	Tower Colliery 4059		...	...
	dep	xx.18 ½	xx.48 ½	Old Hirwaun	arr	xx.41	xx.11
New Hirwaun		...	...		dep	xx.42	xx.12
Old Hirwaun	arr	xx.23	xx.53	New Hirwaun		...	...
	dep	xx.24	xx.54	Trecynon	arr	xx.46 ½	xx.16 ½
Tower Colliery 4059		...	...		dep	xx.47 ½	xx.17 ½
Tower Colliery current		...	...	Aberdare	arr	xx.50 ½	xx.20 ½
Tower Colliery 4061	arr	xx.26 ½	xx.56 ½		dep	xx.52	xx.22

**Option 5c****No Pathing/ stopping time for services****Line speed 35 mph**

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16	Station		2Y37	2Y35
Aberdare	arr	xx.13	xx.43	Tower Colliery 4061	dep	xx. 39	xx.09
	dep	xx.14 ½	xx.44 ½	Tower Colliery current		...	...
Trecynon		xx/17	xx/47	Tower Colliery 4059		...	...
New Hirwaun	arr	xx.20	xx.50	Old Hirwaun		...	...
	dep	xx.21	xx.51	New Hirwaun	arr	xx.42 ½	xx.12 ½
Old Hirwaun		...	...		dep	xx.43 ½	xx.13 ½
Tower Colliery 4059		...	...	Trecynon		xx/47 ½	xx/17 ½
Tower Colliery current		...	...	Aberdare	arr	xx.50 ½	xx.20 ½
Tower Colliery 4061	arr	xx.25	xx.55		dep	xx.52	xx.22

### Passing/ stopping time for a service

#### *Line speed 35mph*

Loop is including Trecynon and Length is approx. 1125m long and 4 mins pathing time:

Station		2A14	2A16	Station		2Y37	2Y35
Aberdare	arr	xx.13	xx.43	Tower Colliery 4061	dep	xx. 39	xx.09
	dep	xx.14 ½	xx.44 ½	Tower Colliery current		...	...
Loop		xx/16	xx/46	Tower Colliery 4059		...	...
		(4)	(4)	Old Hirwaun		...	...
Trecynon		xx/21	xx/51	New Hirwaun	arr	xx.42 ½	xx.12 ½
New Hirwaun	arr	xx.24	xx.54		dep	xx.43 ½	xx.13 ½
	dep	xx.25	xx.55	Loop		xx/46	xx/16
Old Hirwaun		...	...				
Tower Colliery 4059		...	...	Trecynon		xx/47 ½	xx/17 ½
Tower Colliery current		...	...	Aberdare	arr	xx.50 ½	xx.20 ½
Tower Colliery 4061	arr	xx.29	xx.59		dep	xx.52	xx.22

### Passing/ stopping time for both services in the passing loop

#### *Line speed 35mph*

Loop is between Aberdare and Trecynon and Length is approx. 725m long and 2 mins pathing time:

Station		2A14	2A16	Station		2Y37	2Y35
Aberdare	arr	xx.13	xx.43	Tower Colliery 4061	dep	xx. 37	xx.07
	dep	xx.14 ½	xx.44 ½	Tower Colliery current		...	...
Loop		xx/16	xx/46	Tower Colliery 4059		...	...
		(2)	(2)	Old Hirwaun		...	...
Trecynon		xx/19	xx/49	New Hirwaun	arr	xx.40 ½	xx.10 ½
New Hirwaun	arr	xx.22	xx.52		dep	xx.41 ½	xx.11 ½
	dep	xx.23	xx.53	Loop		xx/46	xx/16
Old Hirwaun		...	...			(2)	(2)
Tower Colliery 4059		...	...	Trecynon		xx/47 ½	xx/17 ½
Tower Colliery current		...	...	Aberdare	arr	xx.50 ½	xx.20 ½
Tower Colliery 4061	arr	xx.27	xx.57		dep	xx.52	xx.22

### Passing/ stopping time for both services at Aberdare station

#### *Line speed 35 mph*

Loop is including Aberdare and Length is approx. 450m long:

Station		2A14	2A16	Station		2Y37	2Y35
Aberdare	arr	xx.13	xx.43	Tower Colliery 4061	dep	xx. 34 ½	xx.04 ½
	dep	xx.19	xx.49	Tower Colliery current		...	...
Trecynon		xx/21 ½	xx/51 ½	Tower Colliery 4059		...	...
New Hirwaun	arr	xx.24 ½	xx.54 ½	Old Hirwaun		...	...
	dep	xx.25 ½	xx.55 ½	New Hirwaun	arr	xx.48	xx.08
Old Hirwaun		...	...		dep	xx.49	xx.09
Tower Colliery 4059		...	...	Trecynon		xx/43	xx/13
Tower Colliery current		...	...	Aberdare	arr	xx.46	xx.16
Tower Colliery 4061	arr	xx.29 ½	xx.59 ½		dep	xx.52	xx.22

### Option 5d

#### No Pathing/ stopping time for services

#### *Line speed 35 mph*

Loop includes Trecynon station and Length is approx. 2000m long:

Station		2A14	2A16	Station		2Y37	2Y35
Aberdare	arr	xx.13	xx.43	Tower Colliery 4061	dep	xx.39	xx.09
	dep	xx.14 ½	xx.44 ½	Tower Colliery current		...	...
Trecynon	arr	xx.17 ½	xx.47 ½	Tower Colliery 4059		...	...
	dep	xx.18 ½	xx.48 ½	Old Hirwaun		...	...
New Hirwaun	arr	xx.21 ½	xx.51 ½	New Hirwaun	arr	xx.42 ½	xx.12 ½
	dep	xx.22 ½	xx.52 ½		dep	xx.43 ½	xx.13 ½
Old Hirwaun		...	...	Trecynon	arr	xx.46 ½	xx.16 ½
Tower Colliery 4059		...	...		dep	xx.47 ½	xx.17 ½
Tower Colliery current		...	...	Aberdare	arr	xx.50 ½	xx.20 ½
Tower Colliery 4061	arr	xx.26 ½	xx.56 ½		dep	xx.52	xx.22