MetroWest

Portishead Branch Line (MetroWest Phase 1)

TR040011
Applicant: North Somerset District Council

8.3 Preliminary Business Case 2014, Part 2 of 3, Appendix A (Part 2)
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009, regulation 5(2)(q). NB. required by para 4.5 of NN NPS Planning Act 2008

Author: North Somerset District Council
Date: November 2019

NetworkRail · West of England Local Enterprise Partnership · West of England Combined Authority · HM Government · Bath & North East Somerset Council · Bristol City Council · North Somerset Council · South Gloucestershire Council · travelwest

Document Purpose

Part 2 of 3 comprises:

- Appendix A QCRA Report
- Appendix A Capability Analysis
- Appendix A Capability Analysis (Analysis & Forecasting)
- Appendix A Environmental Appraisal
- Appendix A Signalling Assessment
- Appendix A Section Trackbed Investigation
- Appendix A Shipway Gate Farm Bridge Photomontage
- Appendix A Combined Interdisciplinary Check
- Appendix A GRIP2 Feasibility Report

The document refers to the promoters business name North Somerset Council, rather than its legal name North Somerset District Council.

Infrastructure Projects

MetroWest Phase 1 QCRA Report

Project Name: MetroWest Phase 1
OP Reference: 140569
Project Manager: Rachel Leighfield Finch

Prepared By: Lorna Buckland
Job Title: Risk and Value Analyst
Signature:
Date:

Endorsed By: John Holdway
Job Title: Risk & Value Manager
Signature:
Date:

Authorised By: Rachel Leighfield Flint
Job Title: Project Development Manager
Signature:
Date:

Contents

GRIP Context

Current GRIP Stage:	2
GRIP Stage(s) to which this report relates:	2-8
Estimated start of significant physical works:	2017

1. Executive Summary

The MetroWest project is a third party project led by a consortium of Local Councils within the South West region. The concept of the MetroWest project is to utilise existing and disused rail corridors to provide a Metro type cross Bristol service of an approximate ½ hourly frequency in order to support economic growth, improve accessibility to the rail network and provide a more resilient transport offer to local communities.

A Qualitative Cost Risk Analysis was required to identify the risks and opportunities for the Phase 1 scheme and to be included as part of the option development report due to be submitted in summer 2014.

- They key assumptions are as follows,
  - Network Rail timetable will accept the new services.
  - RAM will agree to double junction Parson Street Junction
  - Additional cost will not be incurred to the project as a result of re-franchising.

- The highest scored risks are as follows,
  - NR timetable will not accept services
  - Additional works required at Avon Road
  - FOC Interface at Bristol

- The following actions were recorded from the meeting,

Action	Owner	Close Out Date
1 Arrange an internal meeting to discuss the level of Network Rail involvement in the Development Consent Order.	Andrew Holley	23rd May 2014
2 Arrange joint meeting to discuss and review between Network Rail and North Somerset Council the promotion of the Development Consent Order	James Willcock	30th May 2014

2. Background

The MetroWest project is a third party project led by a consortium of Local Constituencies, including South Gloucestershire Council, North Somerset Council, Bristol City Council and Bath and North East Somerset Council.

The concept of the MetroWest project involves delivering an enhanced local rail offer in the Bristol area comprising the following,

- Existing and disused rail corridors feeding into Bristol.
- Approximately ½ hourly service frequency (but some variations possible pending business case).
- Cross Bristol service patterns i.e. Bath to Portishead.
- Providing a Metro type service appropriate for a City Region with a population of 1 million.

The primary objectives of the project are,

- Support economic growth, through enhancing transport links to major employment centres across the West of England.
- Deliver a more resilient transport offer, with more attractive & reliable journey times.
- Improve accessibility to the rail network with new and re-opened rail stations.
- Make a positive contribution to improving quality of life.

The supporting objectives of the project are,

- Contribute to reducing traffic congestion.
- Contribute to enhancing the capacity of the local rail network.
- Contribute to reducing the overall environmental impact of the transport network.

The scope of the project is to deliver a solution that provides a ½ hourly service (approx and subject to Network Capacity Analysis) for the Severn Beach to Bristol line, a local service between Bath Spa and Bristol and the reopened Portishead to Bristol Line.

The following engineering works have been proposed as part of phase 1,

- Rebuild the Portishead to Pill Line.
- Closure of historic crossings.
- New station at Portishead.
- Reopen former station at Pill.
- Double track works at Pill and Ashton Gate area.
- Improve highway access to Pill tunnel.
- Environmental mitigation measures.

- Enhancement to Parson Street Junction.
- Re-signalling the entire line between Temple Meads and Portishead.
- Bathampton Turnback.
- Possible additional signalling at Avonmouth station.
- Possible reinstatement of Down Relief Line to assist recessing / regulation of freight trains.

The MetroWest phase 1 programme consists of the following stages,

Project Stage	**Stage Description**	**Indicative Timescales**
Stage 1	Option Development (inc GRIP 1-2)	Summer 2013 to Summer 2014
Stage 2	Scheme Case (inc GRIP 3)	Summer 2014 to Winter 2015/16
Stage 3	Planning Powers and Procurement (including GRIP 4-5)	Winter 2015/16 to Autumn 2017
Stage 4	Construction & Opening (inc GRIP 6-8)	Autumn 2017 to Spring 2019

Network Rail have been tasked with developing the options for the MetroWest project including GRIP 1-2 and building up the construction cost estimate to be presented as part of the Scheme Case.

A Qualitative Cost Risk Analysis was required to identify the risks and opportunities for the Phase 1 scheme and to be included as part of the option development report due to be submitted in summer 2014.

3. Methodology

A Qualitative Cost Risk Analysis (QCRA) workshop was held at The Tri-Centre, Swindon on Tuesday 13th May 2014 with the objective of identifying the projects risks for the Metrowest Phase 1 project. Representatives of Network Rail, URS, North Somerset Council, CH2M Hill and West of England were present. All participated in the deliberations.

The objectives of the meeting were to:

- identify significant risks to the achievement of the project objectives
- establish a project risk register in Active Risk Manager (ARM)
- conduct an assumption analysis and identify any constraints

The risks to the project were identified in a brainstormed session and a risk owner was allocated. Each risk was then analysed to understand the probability of occurrence and impact of the risks on the project outcome.

Each risk probability and impact was scored qualitatively based on categories ranging from very high likelihood of occurrence / impact to very low likelihood of occurrence / impact. The qualitative assessments were uploaded into ARM and a score for each risk was automatically generated based on a probability/impact matrix.

4. Assumptions Analysis

A number of assumptions were identified and an assumption analysis exercise was undertaken, details are shown in the table below. It should be noted that these assumptions are potentially risks that could occur and actions should be taken to reduce their likelihood of occurrence or impact. Where scored as 'CC' or worse they must be included as a risk in the analysis.

Table 4.1 Assumptions Analysis Key

Stability	Sensitivity
A B C D	A B C D
A – Very Confident	A – Minor Impact
B – Fairly Confident	B – Manageable Impact
C – Uncomfortable	C – Significant Impact
D – Very Uncomfortable	D – Critical Impact
Will the assumption turn out to be correct?	How much does it matter if the assumption turns out to be true?

Assumption	Stability	Sensitivity	Justification
1 Acceptable Benefit Cost Ratio (BCR)	A	C	Project has an acceptable BCR in its current format. Any changes need to be evaluated to see if project viability is affected.
2 Local Transport body accepts business cases	A	B	Body with oversight of transport will need to agree business case with sponsor of project
3 The Metrowest scheme is affordable.	A	C	The budget that is to be bid for must be within acceptable limits
4 There will be local political and stakeholder support	A	C	In order to progress to budget, the scheme must have wide support. Objections will add to cost
5 Scope deliverables include all major infrastructure	B	C	Current scope does not omit any large construction item that is required to implement service.
6 Ashton Gate Station is not to be delivered as part of this project	A	D	Station is under consideration by a number of parties, but is not specified in the metrowest scope. Any new application will come with its own funding.
7 Development Consent Order will be awarded with current scope	A	D	Order will be sought on basis of current scope. Any new items would add to cost.
8 Network Rail timetable will accept the new services.	B	D	Timetable modelling still to be completed. Needs to take into account new services including mooted hourly London to Weston

			Super mare service.
9 RAM will agree to double junction Parson Street Junction	B	D	Timetable depends on this being installed. RAM will have to weigh against costs of maintenance.
10 RAMs will agree to other infrastructure changes	A	C	Multiple assets being installed will have to be approved. Need is known by RAMs
11 Network Change will be approved	A	C	Process to be initiated, is not expected to be complex.
12 Freight Services can be accommodated at the present freight service	A	C/D	Signalling and other systems are adjudged to be capable of maintaining freight service despite introduction of passenger services.
13 Additional cost will not be incurred to the project as a result of re-franchising	B	D	Demands of new franchisee not known and is therefore a risk of changes due to differing management.
14 Pill double track can be delivered under permitted development rights.	A	B	Assumed to be within the current boundaries and is operational use.
15 Pill Station would be Equalities Act compliant	A	A	Estimated costs inclusive of compliance to Equalities Act
16 Adequate resources can be brought into the project	A	A	Assumed that by design / construction phase all the resources will be sufficient that it will not impact on programme.
17 Legal agreements can be agreed	A	A	Agreement will have to be signed by NR and Local Authorities for works on the railway.
18 No judicial review of scheme by outside parties	A	A	This would delay implementation. Local stakeholders are expected to be broadly in support of scheme.
19 Adequate solutions to Environmental / property issues	A	A	All areas where new land is required have expected solutions that are implementable.
20 No adverse impacts of mitigated scheme	A	A	No permanent environmental or neighbourhood impact as a result of deliverables from scheme
21 No delays in confirming location of Portishead Railway Station	A	A	Sites have been identified and a length of time for process has been identified that should be sufficient
22 No delays to other Network Rail schemes (4-tracking, resignalling)	A	A	Project has some dependency on other projects. Programme is calculated to avoid all but the most severe delays.
23 BASRE Commissions as per design.	A	A	Design will assume commissions are as expected in order to link in new assets. Time gap to new project should be sufficient to iron out issues.
24 Stakeholder objections do not cause issues at DCO	A	A	Planning objections are expected to be small and to be able to be accommodated within programme
25 There will be no objections from	A	A	Programme anticipates level of negotiation

land owners at Portbury Station.			required
26 There will be no electrification requirements (only passive provision).	A	A	No plan to electrify Phase 1 sections in this project. Passive provision will only be provided where there is no significant cost impact.
27 Access for construction will be available as planned	A	A	Sites will be identified as methodology is developed. Assumed that access will be sufficient for contractors needs and minimise local impact.
28 Structures works will remain as per current scope.	A	A	No significant loading change is anticipated. Repairs are included where known.
29 No objections from Statutory Environment Bodies.	A	A	Consultation process at early stage, all potential sites of interest are identified.
30 Habitats will not be impacted or cause additional expense	A	A	Consultation process at early stage, all potential sites of interest are identified.
31 Additional Signaller workload is acceptable.	A	A	Expected that can be accommodated within existing plans.
32 Pill GSMR will provide coverage to Portishead.	A	A	Telecoms team expect that aerial will cover all of the new project and that no new infrastructure would be required.

5. Results

The table below displays the top five risks by current Probability / impact scoring;

Table 5.1 Top 10 Risks by Probability / Impact scoring scheme

Risk					Current Qualitative Impact		Current Score	
Risk ID	Risk Title	Risk Description	Risk Owner	Risk Type	Probability	Cost		
328074	NR timetable will not accept services	There is a risk that the current timetables do not have the capacity to accommodate the new Metrowest services, therefore the NR timetable will not accept the services.	Leighfield Finch, Rachel	Risk	3: Medium	4: High	7.	Major
328136	Additional works required at Avon Road	There is a risk that more works are required at Avon Road, such as embankment works / reconstruction of the asset leading to costs over and above the provision in the estimate.	Leighfield Finch, Rachel	Risk	3: Medium	4: High	7.	Major
328076	FOC Interface at Bristol	There is a risk that the FOC request additional scope at Bristol	Leighfield Finch, Rachel	Risk	2: Low	4: High	6.	Significant
328140	Ergonomics of signalling systems	Due to additional signals required on the network to accommodate the Metrowest services, there is a risk that changes to ergonomics of signalling systems causes additional work not estimated for.	Leighfield Finch, Rachel	Risk	2: Low	4: High	6.	Significant
328073	DCO causes additional works	There is a risk that additional works may be identified during the DCO process in order to meet their requirements.	Leighfield Finch, Rachel	Risk	3: Medium	3: Medium	6.	Significant
328108	Additional works at Portished station	Additional works at Portished station	Leighfield Finch, Rachel	Risk	3: Medium	3: Medium	6.	Significant
328127	Construction road access restrictions	Construction road access restrictions (Bristol port negotiations, unknown scope)	Leighfield Finch, Rachel	Risk	3: Medium	3: Medium	6.	Significant
328134	Rail possession access	Rail possession access at Double Junction and freight line access agreement	Leighfield Finch, Rachel	Risk	3: Medium	3: Medium	6.	Significant
328070	Inflation assumptions under estimate costs	Inflation assumptions under estimate costs	Leighfield Finch, Rachel	Risk	2: Low	3: Medium	5.	Significant
328071	Additional deliverables at Detailed Design	Additional deliverables at Detailed Design	Leighfield Finch, Rachel	Risk	2: Low	3: Medium	5.	Significant

6. Actions

The following actions were recorded in the workshop. Owners were assigned from people within the room. These actions should be entered in to the project plan where capital expenditure or time is taken to complete the action.

Table 6.1 Action Table - Example

Action	Owner	Close Out Date
1 Arrange an internal meeting to discuss the level of Network Rail involvement in the Development Consent Order.	Andrew Holley	23rd May 2014
2 Arrange joint meeting to discuss and review between Network Rail and North Somerset Council the promotion of the Development Consent Order	James Willcock	30th May 2014

7. Appendix A – Attendees

Table 7.1 Attendees List

Name	Role	Company
Pete Hillier	CEM	URS
Colin Field	Town Planning Manager	Network Rail
Helen Spackman	Transport Planner	CH2M Hill
James Willcock	Project Manager	North Somerset Council
James White	Programme Manager	West of England
Robert Sully	Senior Project Engineer	Network Rail
Thomas Garner	Assistant Project Engineer	Network Rail
Matt Redstone	Senior Project Engineer	Network Rail
Carolyn Francis	Environment Manager	CH2M Hill
Karl Hatala	Project Manager	URS
Mike Summerfield	Civil Engineering Manager	URS
James Coram	Graduate Civil Engineer	URS
Andrew Holley	Senior Development Manager	Network Rail
Geoff Thomas	Telecommunications Project Engineer	Network Rail
Steve Davey	Senior Legal Counsel	Network Rail
Nick Lake	Designated Project Engineer	Network Rail
Rachel Leighfield Finch	Project Development Manager	Network Rail
Andy Buller	Signalling Design Engineer	Network Rail
Lorna Buckland	Risk and Value Analyst	Network Rail
John Holdway	Risk and Value Manager	Network Rail

8. Revision History

Table 8.1 Document History

Version	Date	Author	Comments
0.1	16th May2014	Lorna Buckland	Draft
1.0	27th May 2014	Lorna Buckland	Final – To be QA'd

9. Full Risk Register

Risk			Current Qualitative Impact			Current Score	
Risk ID	Risk Title	Risk Description	Probability	Cost	Time		
328074	NR timetable will not accept services	There is a risk that the current timetables do not have the capacity to accommodate the new Metrowest services, therefore the NR timetable will not accept the services.	3: Medium	4: High	NIL	7.	Major
328136	Additional works required at Avon Road	There is a risk that more works are required at Avon Road, such as embankment works / reconstruction of the asset leading to costs over and above the provision in the estimate.	3: Medium	4: High	NIL	7.	Major
328076	FOC Interface at Bristol	There is a risk that the FOC request additional scope at Bristol	2: Low	4: High	NIL	6.	Significant
328140	Ergonomics of signalling systems	Due to additional signals required on the network to accommodate the Metrowest services, there is a risk that changes to ergonomics of signalling systems causes additional work not estimated for.	2: Low	4: High	NIL	6.	Significant
328073	DCO causes additional works	There is a risk that additional works may be identified during the DCO process in order to meet their requirements.	3: Medium	3: Medium	NIL	6.	Significant
328108	Additional works at Portished station	Additional works at Portished station	3: Medium	3: Medium	NIL	6.	Significant
328127	Construction road access restrictions	Construction road access restrictions (Bristol port negotiations, unknown scope)	3: Medium	3: Medium	NIL	6.	Significant
328134	Rail possession access	Rail possession access at Double Junction and frieght line access agreement	3: Medium	3: Medium	NIL	6.	Significant
328070	Inflation assumptions under estimate costs	Inflation assumptions under estimate costs	2: Low	3: Medium	NIL	5.	Significant
328071	Additional deliverables at Detailed Design	Additional deliverables at Detailed Design	2: Low	3: Medium	NIL	5.	Significant
328072	Scope review due to stakeholder pressure (incl Ashton Gate)	Scope review due to stakeholder pressure (incl Ashton Gate)	2: Low	3: Medium	NIL	5.	Significant
328075	Network change process causes additional cost	Network change process causes additional cost	2: Low	3: Medium	NIL	5.	Significant
328109	Additional works at Portbury Old Station	Additional works at Portbury Old Station (e.g. land / property acquisition) leading to costs over and above provisions made for in the estimate.	2: Low	3: Medium	NIL	5.	Significant
328113	Interfaces with other NR projects	Due to other NR projects in the Bristol area (BASRE etc) and a limited supply of resources / access / plant etc, there is a risk that the Metrowest works are disrupted.	2: Low	3: Medium	NIL	5.	Significant
328138	Contaminated land issues	Risk of contaminated land leading to additional waste disposal costs over and above provision in the estimate.	2: Low	3: Medium	NIL	5.	Significant
328150	Additional track formation work	Additional track formation work (incl drainage) leading to costs over and above the estimate.	2: Low	3: Medium	NIL	5.	Significant
328153	DCO evidence base causes additional work	DCO evidence base causes additional work	2: Low	3: Medium	NIL	5.	Significant

328112	Galllingway footbridge - local impact	There is a risk that works to Gallingway foorbridge causes a negative local impact (for e.g. environmental impact) not costed for inthe estimate.	3: Medium	2: Low	NIL	5.	Significant
328126	Stakeholder engagement activies over and above estimate	Stakeholder engagement activies over and above estimate (i.e. public meetings, political, additional meetings)	3: Medium	2: Low	NIL	5.	Significant
328137	Additional minor structure repairs / renewals	Additional minor structure repairs / renewals over and above provisions in the estimate	3: Medium	2: Low	NIL	5.	Significant
328139	Additional requirements of statutory environmental bodies	There is a risk that statutory environmental bodies require additional assessments / field studies leading to costs over and above the provisions within the estimate and programme delay.	3: Medium	2: Low	NIL	5.	Significant
328141	GSMR will cover all services	It has been assumed that existing GSMR infrastructure is sufficient, and therefore no works have been costed for. Ther eis a risk that GSMR infrastructure is not sufficient and additional works is required at additional cost to the project.	1: Very Low	3: Medium	NIL	4.	Minor
328069	Additional works requested by local transport body	Additional works requested by local transport body	2: Low	2: Low	NIL	4.	Minor
328077	Resource limitations	Resource limitations (i.e. contractors, project staff, equipment, railway resource) leading to programme delay or additional costs associated with resource premiums.	2: Low	2: Low	NIL	4.	Minor
328078	Environmental issues	Environmental issues (habitats, watercourses, protected species, flood, Japanese knotweed) causing additional costs and programme delay	2: Low	2: Low	NIL	4.	Minor
328105	Impact on residents property	There is a risk that the construction and/or final product disrupt / negatively impact local residents due to noise, construction,visual impacts and operational use, leading to claims over and above the provisions in the estimate.	2: Low	2: Low	NIL	4.	Minor
328107	Additional works at Pill Station	Additional works required to the car park at Pill Station.	2: Low	2: Low	NIL	4.	Minor
328143	Archaeological works	Archaeological works leading to costs over and above the estimate and programme delay.	2: Low	2: Low	NIL	4.	Minor
328151	Procurement delays	Procurement delays due to methodology and market place environment.	2: Low	2: Low	NIL	4.	Minor
328155	Pill Tunnel emergency escape road	An escape Road is required at Pill Tunnel, however the planned site for the road is on provately owned land, therefore there is a risk that the cost of acquiring the land is more than envisaged or an alternative escape road will need to be designed and delivered.	2: Low	2: Low	NIL	4.	Minor
328156	Additional vegetation clearance	Additional vegetation clearance	2: Low	2: Low	NIL	4.	Minor
328157	Train operation assets	Train operation assets (maintenance / no of units)	2: Low	2: Low	NIL	4.	Minor
328152	Standards change	Standards change	1: Very Low	2: Low	NIL	3.	Minor
328144	Unidentified utilities leading to additional diversions	There is a risk that unidentified services will be identified on site leading to additional service diversions at costs over and above the estimate and programme delay.	NIL	NIL	NIL	0.	NIL
328145	Ground obstructions	Ground obstructions, such as asbestos, leading to additional works and costs over and above the estimate.	NIL	NIL	NIL	0.	NIL

328146	Bathampton turn back	Bathampton turn back (OHL rework / world heritage)	NIL	NIL	NIL	0.	NIL
328147	Earlier opportunity to deliver bathampton works	Earlier opportunity to deliver bathampton works as part of GWEp	NIL	NIL	NIL	0.	NIL
328148	Objections to closure of User Worked Crossings	Objections to closure of User Worked Crossings	NIL	NIL	NIL	0.	NIL
328149	Highway Impact at Ashton Gate Level Crossing	Highway Impact at Ashton Gate Level Crossing	NIL	NIL	NIL	0.	NIL
328154	New car park drainage issues	Ther eis a risk that drainage issues are identified at the new car park at Pill Station, therefore leading to additional work at extra over cost.	NIL	NIL	NIL	0.	NIL

Network Strategy and Planning: Capability Analysis
MetroWest Phase 1 Addendum Report

Document Control

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Author:	
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[redacted] 17/7/14

Lee Mowle Signature Date

Project Manager - Capability Analysis (Document Owner)

James Willcock Signature Date

Project Manager MetroWest Phase 1

Andrew Holley Signature Date

Senior Development Manager – Network Rail

DOCUMENT CONTROL & ADMINISTRATION

Change Record

Version	Date	Author(s)	Comments
0.1	20/06/14	Rhys Bowen	First Draft
0.2	01/07/14	Rhys Bowen	Updated from comments received
0.3	03/07/14	Rhys Bowen	Updated from comments received
1.0	16/07/14	Rhys Bowen	Final for issue

Reviewers

Version	Date	Name	Review notes

References

Ref.	Document Name	Doc. Ref. No.	Date	Rev.
1.	MetroWest Interim Report Final Issue	MetroWest Interim Report Final Issue v1.1.docx	16/12/2013	1.1

Stakeholders

Name of stakeholder	Company / Business
James Willcock	Phase One Project Manager, West of England councils.
Andrew Holley	Strategic Planning, Network Rail

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

The MetroWest Phase One project is the first step in a scheme that will radically alter the passenger connections in Bristol and the surrounding areas. It focuses on the increased frequency of services on the Severn Beach line and Bath corridor, and reopening of the Portishead line to passenger trains.

This report details the continuation of previous work conducted by Capability Analysis, Economic Analysis and Halcrow. It focuses on the analysis of two service specification scenarios on the background of Crossrail/IEP Iteration 5 timetable. Both options are assessed for their operational feasibility and infrastructure requirements, with a focus on providing inputs to the investment case for the proposals.

Some minor infrastructure changes above the core proposals are required to construct either timetable. However given these interventions, a relatively even pattern can be constructed for both options. Both options require a theoretical minimum of six units to achieve a viable timetable. The structure of the Crossrail and IEP timetable dictates the operational working of the services. This, together with short turnarounds at the terminal locations, may have an impact on the performance of MetroWest and other services.

It is recommended that both service specification options are taken forward as potential outputs for the scheme and the associated infrastructure progressed to GRIP 3, where further analysis of their connectional benefits, unit requirement and operational strategy will be conducted.

2. INTRODUCTION & OBJECTIVES

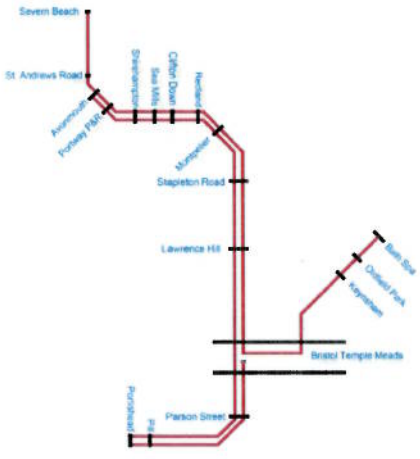
Chronologically, this report details the work that this team has untaken since the issue of the MetroWest Interim Report Final Issue v1, where an introduction to the background and objectives of the MetroWest scheme can be found. The purposes of this particular iteration are:

- to determine whether a suitable MetroWest phase 1 service level can be delivered given the latest timetable and infrastructure assumptions.
- to analyse the timetable structure of the proposed service level options.
- to compare the operational suitability of these timetables, with regard to service regularity, journey times, required unit numbers and connectivity.
- to feed these indicative timetables into the business case studies to be conducted by the Economic Analysis team.
- to inform of any potential infrastructure changes necessary to deliver the required service level.

The assumptions for this analysis can be found in Appendix A

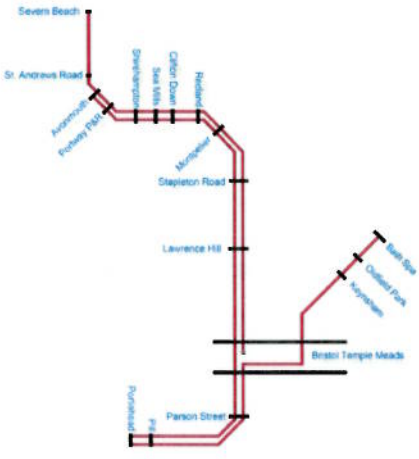
The train service specifications tested are defined as Option 5b and Option 6b; the details of the scenarios are as follows:

Option 5b



•Portishead – Avonmouth : 1 tph
•Severn Beach - Bath : 1tph
•Portishead – Bristol Temple Meads : 1 tph

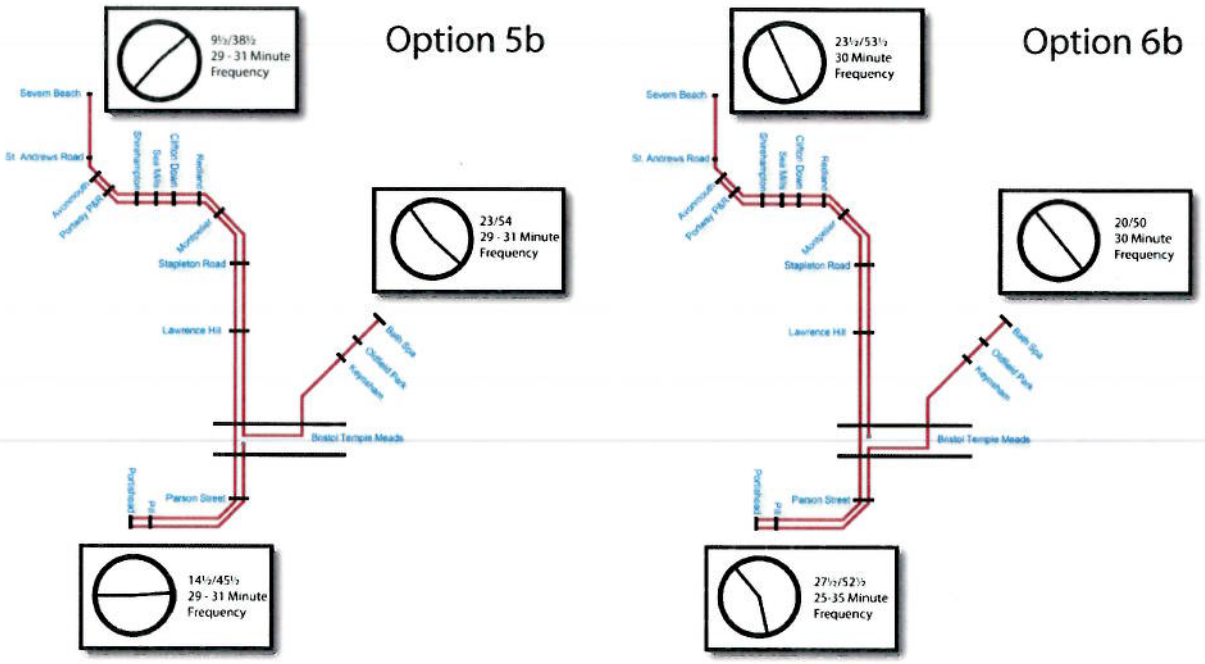
Option 6b



•Portishead – Avonmouth : 1 tph
•Severn Beach - Portishead : 1tph
•Severn Beach - Bristol Temple Meads : 1tph

3. PROJECT FINDINGS

The diagrams below are a visual representation of the timetable findings of both options:

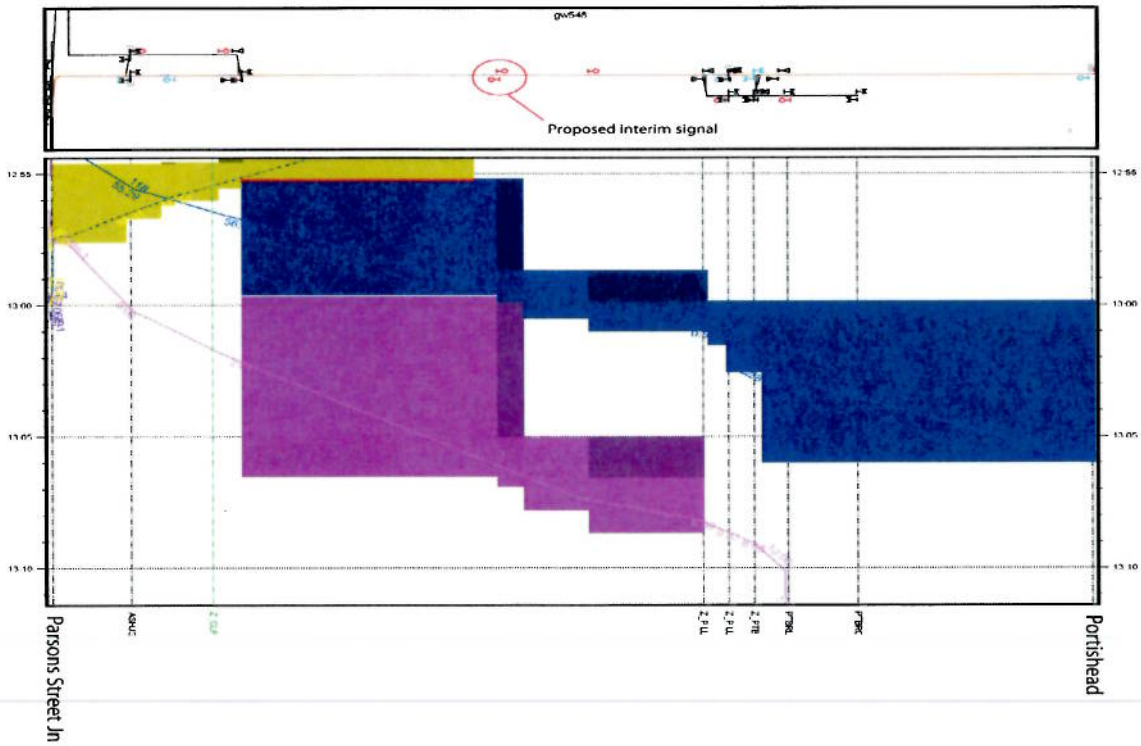


They demonstrate primarily that in both scenarios it has been possible to produce a test timetable that meets the required service specification. Due to the connectivity of the services there are some necessary compromises on regularity of services.

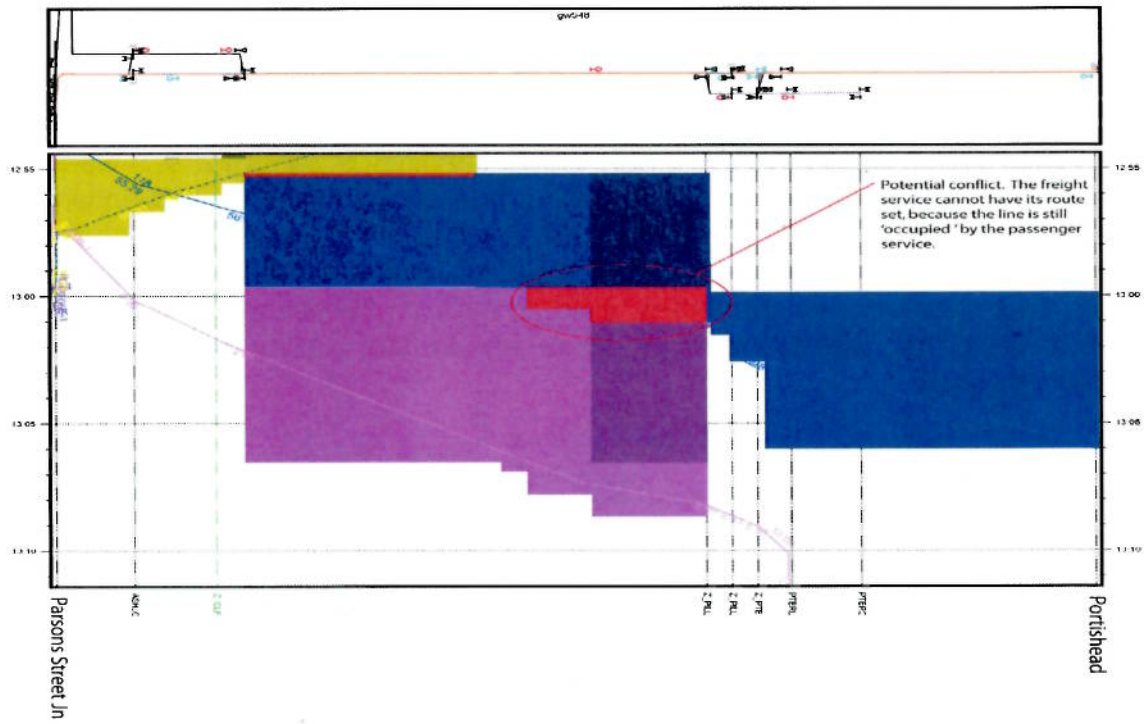
The following infrastructure findings are common to both indicative timetable scenarios.

Portishead Branch intermediate signal

The addition of an intermediate signal on the Portishead Branch has been assumed for this work. The diagram overleaf demonstrates the requirement for this signal.



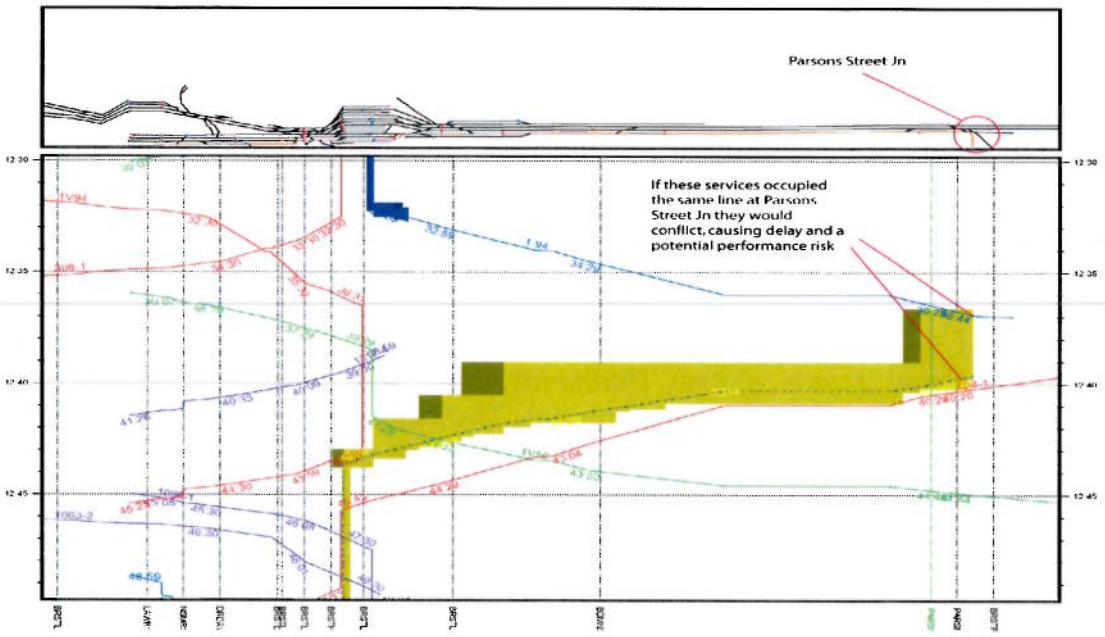
This shows a train graph of the Portishead line with a freight service (lilac) immediately following a passenger train (blue). The blue and lilac boxes surrounding the services represent the required block occupation, as calculated by Railsys. If the intermediate signal is not present, the block occupation of the passenger service increases. This is shown in the diagram below.



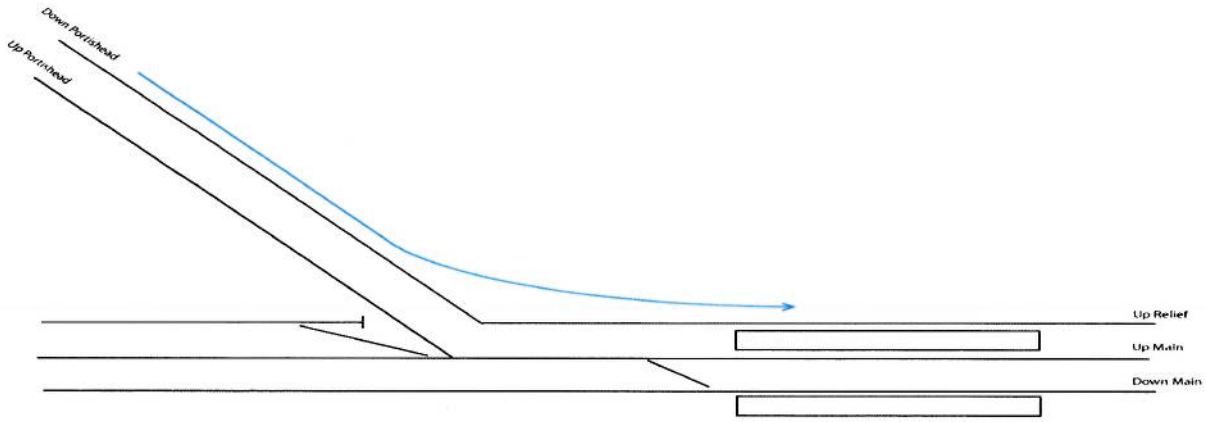
The conflict is marked and labelled on the diagram overleaf, and demonstrates that the passenger and freight service specification is not achievable without an additional signal.

Doubling of Parson St junction

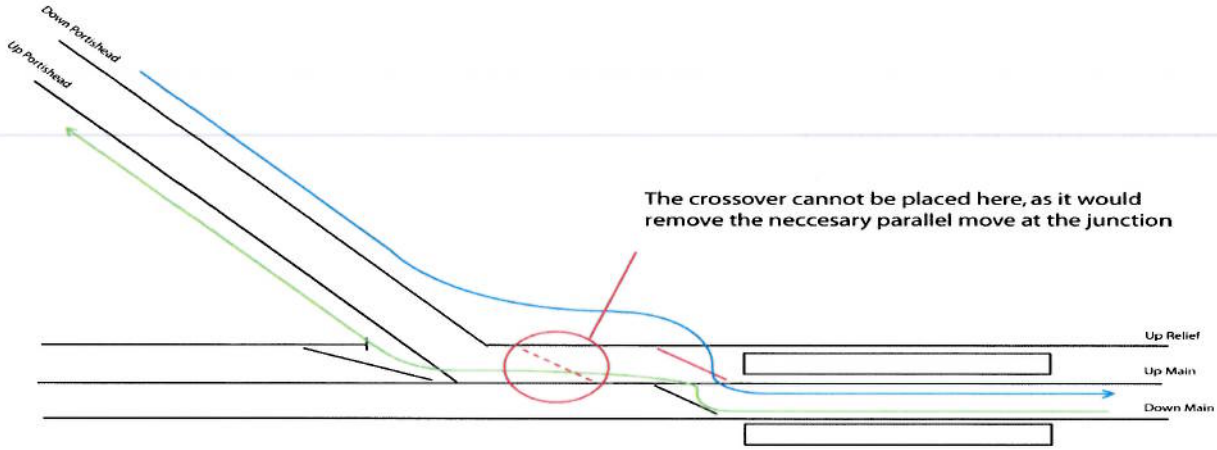
The work conducted has also demonstrated the need to provide a double junction at Parson Street Jn. This will allow a parallel move for services entering and exiting the Portishead branch, which is essential for achieving a regular pattern of MetroWest services.



The diagram above shows a train graph where services cross at Parson Street Jn, making use of a double junction. The yellow box shows the line occupation of a down Portishead train. The marked blue line is an up Portishead Metro service in a parallel move with the down Portishead train. If it were to remain a single lead junction, these services would conflict. It would then be necessary to retime at least one of these trains, which would result in an uneven calling pattern for these Portishead services.



It should be noted that on the layout provided a service leaving the Portishead line must run on the up relief line through Parsons Street.



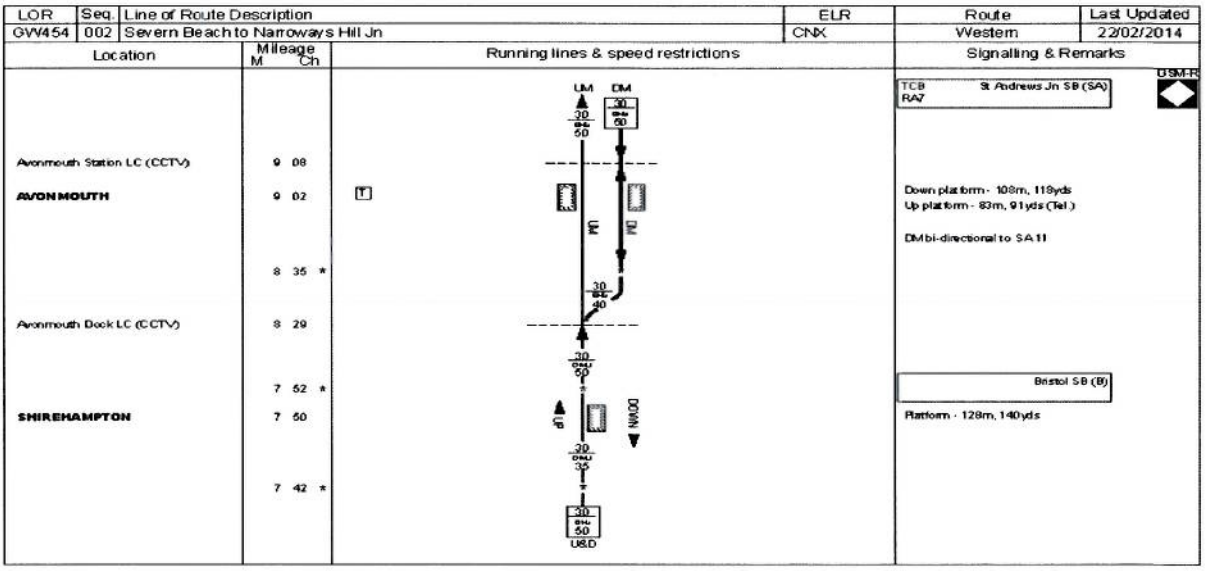
If the layout enabled services to diverge to the Up Main as shown above (whilst maintaining a parallel move with an Up Portishead service) it would provide greater timetable and operational flexibility for both freight and passenger services. This in turn mitigates the performance risk of perturbed services.

Signalling enhancements at Avonmouth (6b) or North of Avonmouth (5b)

At present the capability of Avonmouth station is:

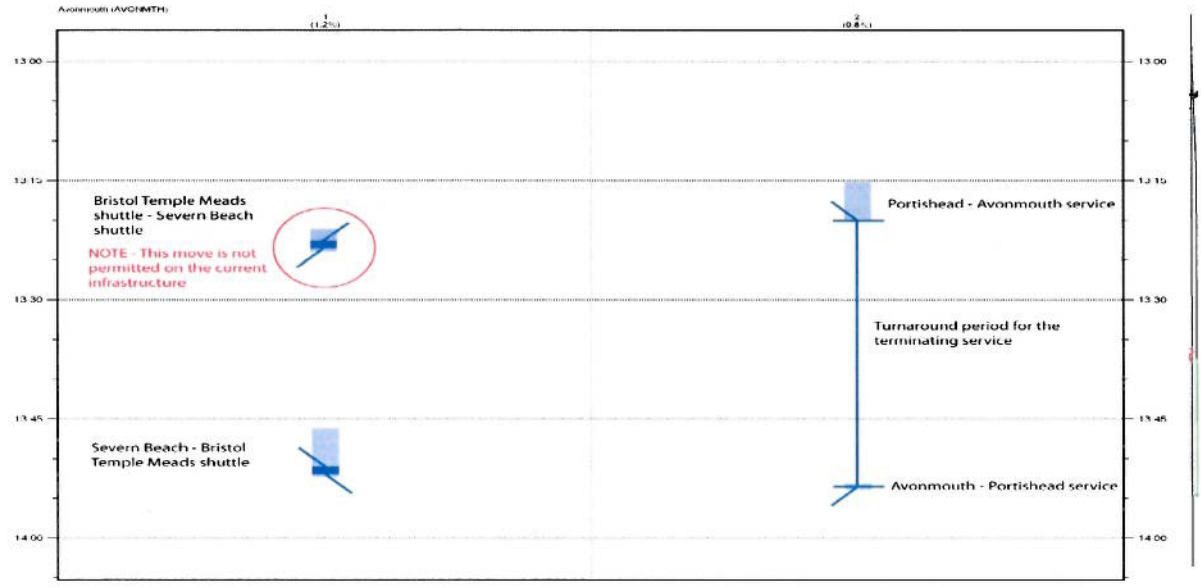
- 1 up Severn Beach line
- 1 bi-directional line/Down Severn beach line

This is shown in the diagram below.



This situation does not allow for a Down Severn Beach service to pass a train that is turning around at Avonmouth.

This diagram shows a platform graph of Avonmouth station. The blue markers represent the MetroWest services. It demonstrates that it is necessary to permit bi-directional running on the up Severn Beach line, in order to achieve a uniform service pattern in Option 6b.



A further advantage of two bidirectional lines is that it allows better access for passengers to Avonmouth station, as it would be possible to depart all up Bristol

services from platform 2. This means that it would not be necessary to cross the level crossing to board the train. This would require extra unit miles to achieve, but would not affect unit numbers.

Given the construction of the timetable, Option 5b timetable does not require the services to cross at Avonmouth, which removes the immediate requirement for signalling enhancements at this location. However, Option 5b has a long service dwell at Severn Beach, which blocks the ability of freight services to enter and leave the LPG freight terminal for a significant proportion of the hour. Here signalling enhancements north of Avonmouth would enable these moves to be performed independently.

It is recommended that the potential for signalling enhancements at either Avonmouth or north of Avonmouth are explored in order to make the best use of capacity for freight and passenger services in this area.

Commentary on Bristol East jn

As stated in the assumptions, these timetable scenarios have been developed using the current Bristol East Jn. Should Bristol East Junction be enhanced (assumed as per option version 5.4.2), the improved layout would allow:

- More efficient usage of Bristol Temple Meads platform capacity
- Potential journey time, service regularity benefits
- Improved performance of the MetroWest scheme and in the wider Bristol area

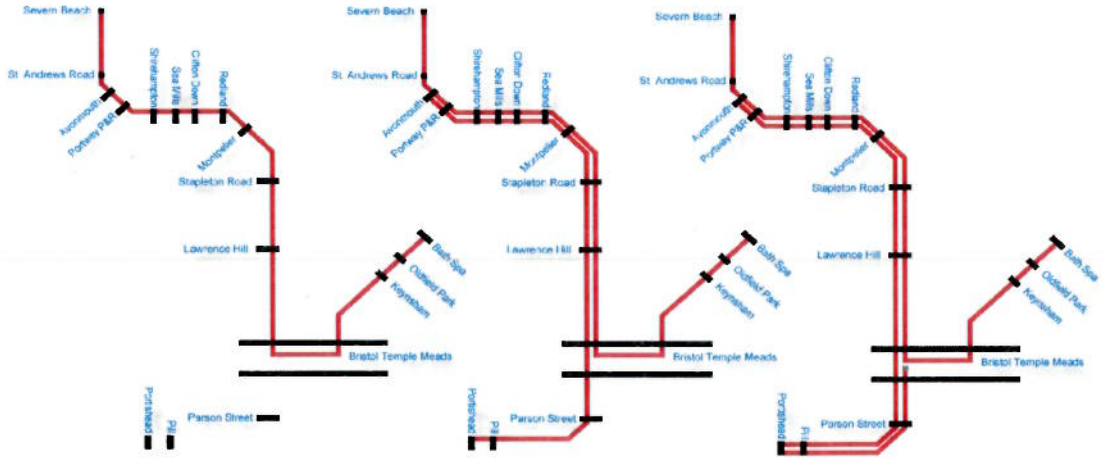
Commentary on rolling stock

All the timetabling work conducted for this report has assumed Class 150 rolling stock for the MetroWest trains. All SRTs, whether previously available or calculated, are for Class 150. There is a proposal to make Class 165 units available for use as MetroWest services. Given the superior acceleration/braking characteristics of Class 165s, this work is valid in both cases.

Timetable comparisons

Given the connective nature of the MetroWest service specification, the development of both scenarios has been a process of 'fixing' a MetroWest service on one route and cascading the broad effect of this to the rest of the area. An example of how this has been achieved is shown overleaf:

Option 5b

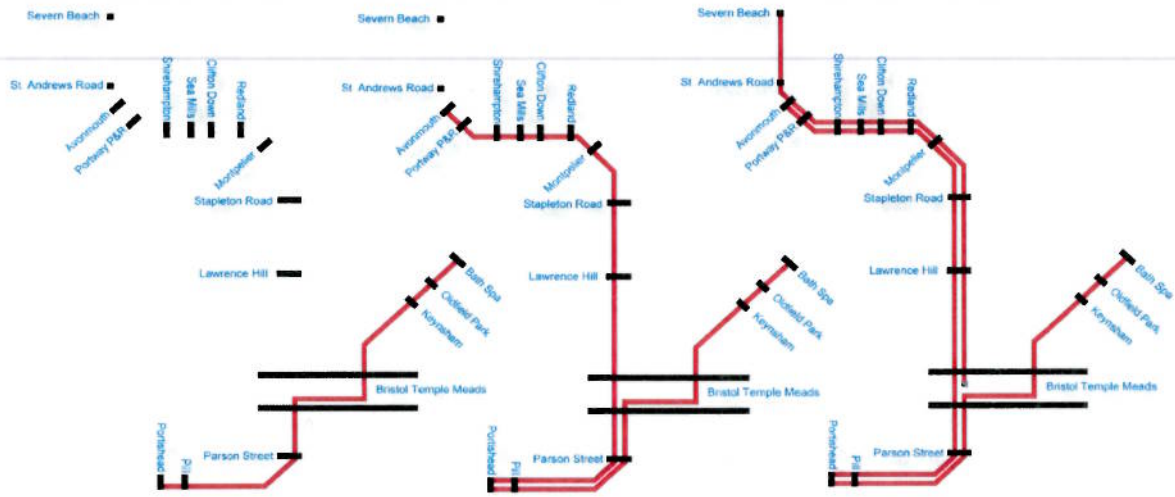


1. Bath - Severn Beach service fixed in both directions, in order to create an even pattern for interim Bath corridor stations

2. Avonmouth - Portishead services can now be fixed in both directions, to ensure an even pattern.

3. Portishead shuttle services can now be added in both directions. The available paths result in the segregation of service groups

Option 6b



1. Bath - Portishead service fixed in both directions, in order to create an even pattern for interim Bath corridor stations

2. Avonmouth - Portishead services can now be fixed in both directions, to ensure an even pattern. Due to the journey time disparity between the Portishead and Severn beach branches, this is necessarily in the opposing half hour from its counterpart in Option 5b

3. Severn beach shuttle services can now be fixed in both directions. Again, to ensure an even pattern, the available paths result in the requirement for service interworking

Furthermore, the different service specifications have resulted in the direction interaction of different services in both cases. This drives a requirement to manipulate the paths in different ways, in order to achieve a balanced timetable.

These two factors have resulted in a number of differences between the two scenarios, which are detailed below:

Portbury dock freight traffic

The proposed reinstatement of passenger services to the Portishead line results in the need to examine the capability of this route to accommodate mixed traffic. The

capacity for one standard path freight train per hour in each direction has been assumed, as agreed with Peter Willey, Senior Freight Manager for Network Rail (Western route).

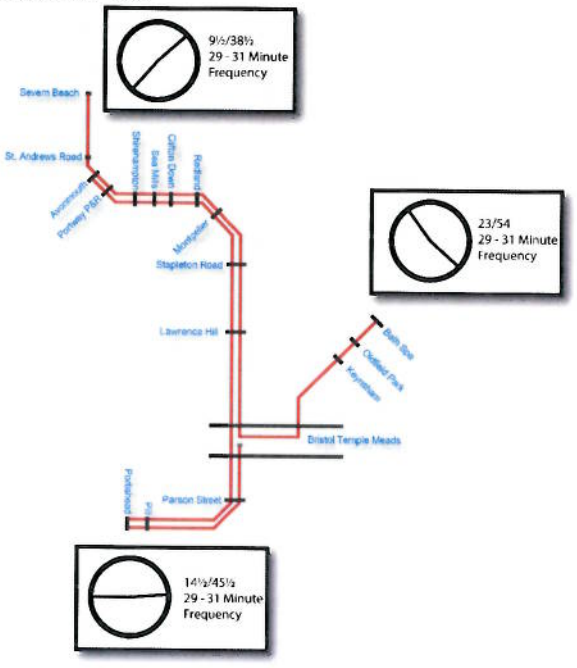
It is possible to accommodate this assumption with both MetroWest scenarios. Both options would require any regulation of freight services to take place away from the Portishead line (assumed to take place either within the Port itself or on both the up and down through lines at Bristol Temple Meads or in the wider area).

It should be noted we have calculated new preliminary SRTs (Sectional running times) for the freight services based on the TRTs (theoretical running times) produced by Railsys. Network Rail Operational Planning 'own' the SRTs and as such the update and/or acceptance of these calculated SRTs for both freight and passenger services, will be required at a later GRIP stage.

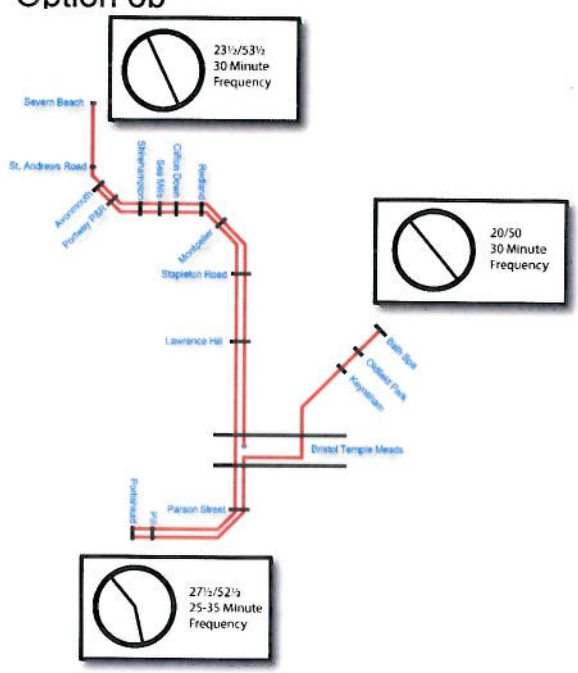
Regularity of pattern

It has been possible to manipulate both timetables to achieve an acceptable clockface pattern on departures from origin stations to Bristol Temple Meads, as shown below

Option 5b



Option 6b



Unit usage

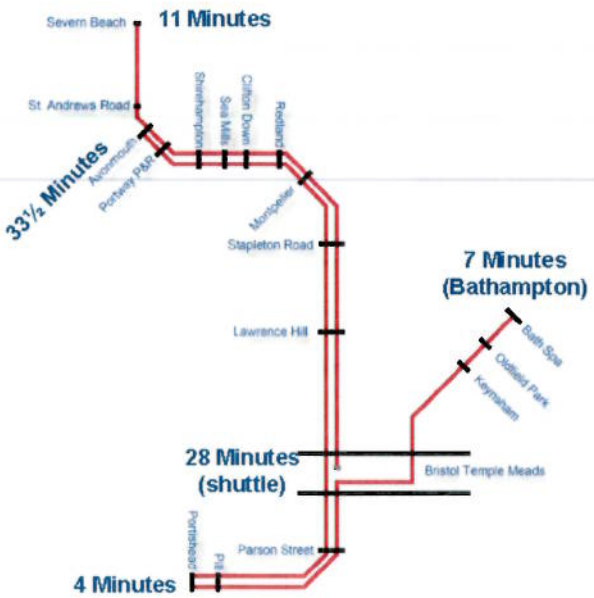
In order to achieve an economy of units whilst fitting within the structure of other services in the area, the requirements of the two service specifications drive different operational strategies. This is due to the fixed nature of each specification scenario and journey time difference on all branches.

Turnaround time at outer locations

The fixed nature of these timetables has resulted in the following turnaround times.

Option 5b

Option 6b



It should be noted that, given the segregation of services in option 5b, the short turnarounds at both Avonmouth and Portishead are a critical factor in terms of unit numbers.

The above diagram also shows the length of the turnarounds at Severn Beach and Avonmouth are inverted in both options. This drives the necessary signalling intervention at Avonmouth, as discussed in the 'Signalling enhancements at Avonmouth (6b) or North of Avonmouth (5b)' section above.

Journey times

Option 5b

	To Bristol	From Bristol
Bath Spa	17	16.5
Avonmouth	33/31	26/26½
Portishead	17½/18½	16½/16½

Option 6b

	To Bristol	From Bristol
Bath Spa	17	16.5
Avonmouth	30/35½	25½/27½
Portishead	17/15½	16½/16½

The journey times overleaf have been calculated. The differences between the two scenarios are again due to the formation of uniform timetables around the surrounding services.

Unit numbers

These two scenarios, operated in different ways, have resulted in the following minimum unit numbers:

	Option 5b	*Option 6b*
Required unit numbers	6	6

These unit numbers are intrinsically linked to the journey, dwell and turnaround times of all MetroWest services and as a result are only indicative of the theoretical minimum number of units needed to timetable the proposed service levels. Due to the (relatively) short turnarounds and dwell times at Temple Meads it can be deduced that both scenarios involve using six units extremely efficiently, which may not be achievable in the course of normal operations. Furthermore, because recovery opportunities are limited in both scenarios, there are performance risks with minimum unit number operation.

The table below demonstrates the operational risks of operating this. It shows the estimated efficiency of the units on the various routes. In this case the estimated efficiency is calculated as the percentage of time the units are in use plus minimum turnaround allowances.

		Unit Efficiency	
	Service Pattern	**6 total units**	**7 total units**
Option 5b	Portishead – Avonmouth	94.2%	62.8%
	Severn Beach – Bath Spa	77.2%	57.9%
	Portishead – Temple Meads	75.8%	37.9%
Option 6b	Bath Spa – Portishead - Avonmouth	86.5%	69.2%
	Severn Beach – Temple Meads	70.8%	47.2%

As can be seen, the addition of another unit on any route results in significantly lower unit efficiency. This would mitigate the performance risk of perturbed services on that route. It should be noted that this is an indicative measure, as the feasibility of interworking an additional ECS move into the timetable, particularly on the single line sections, would need to be explored.

The differences in interworking of services between the two options mean that there are different performance implications. In Option 5b, which is segregated by service, any primary delay will likely be similarly segregated. This will be of particular importance on the Avonmouth – Portishead route, as there are short turnarounds at both ends. Conversely, any delay experienced by the metro services in Option 6b will potentially spread across the connected service groups. This is potentially mitigated by the longer turnaround at Avonmouth, which will provide recovery time for delayed services.

Robustness – Unit usage

The impact of the structure of the timetable on performance can be deduced from these two scenarios. The fact that the connectivity of units vary between scenarios demonstrates that the decision on service specification will have performance, capability and timetable implications. Factors that may mitigate these risks are:

- Enhanced Bristol East Jn – To allow greater flexibility to the timetable, potential recovery opportunities and journey time benefits.
- Further timetable development which will take place as the proposals progress through the GRIP stages, in particular with regards to other services in the area. This will provide a more accurate view on how the timetable will be formed in the future. Better integration of MetroWest services into the timetable will reduce the performance risks.

- The use of Class 165 units would potentially provide some performance benefits, however this cannot be quantified with the present analysis.

4. CONCLUSIONS & RECOMMENDATIONS

The following infrastructure interventions are necessary to deliver the required MetroWest service level in both scenarios:

- Parson Street Junction doubling
- Intermediate signal on the Portishead branch
- Signalling adjustments, at Avonmouth for Option 6b and north of Avonmouth of Option 5b
- Bathampton turnback siding

The enhancement of Bristol East Jn is desirable for the development of this project, due to the increased number of moves across Bristol Temple Meads Eastern throat under MetroWest. Delivery of this scheme would have performance, timetabling and operational benefits for both the MetroWest project and the wider Bristol area.

The nature of the service level in the wider Bristol area and the required connectivity of the MetroWest service drive whether the services are segregated by route or interconnected. Both options have potential performance benefits and drawbacks.

It is recommended that the ability of the project to procure Class 165 units for MetroWest services be explored as thoroughly as possible. Whilst it is not anticipated that this rolling stock will provide journey time benefits, it has the potential to mitigate performance risk inherent in the scheme.

Further timetable development is recommended as the project progresses through the GRIP stages in order to continue to ensure that the required outputs can be delivered in a timetable context.

APPENDIX A. SERVICE SPECIFICATION

Core Timetable Train Service Specification				
Ref.	**Origin**	**Destination**	**Calling Pattern**	**Timing Load**
IE1	London Paddington	Taunton / Weston-Super-Mare	Bristol Parkway, Nailsea & Backwell, Yatton, (Western Milton or Worle), Highbridge & Burnham, Bridgewater	2x5-car Class 800 5-car Class 800
IE2	London Paddington	Bristol Temple Meads	Bristol Parkway	2x5-car Class 800 5-car Class 800
IE3	London Paddington	Bristol Temple Meads	Reading, Didcot Parkway, Swindon, Chippenham, Bath Spa	9-car Class 801
IE4	London Paddington	Bristol Temple Meads	Reading, Didcot Parkway, Swindon, Chippenham, Bath Spa	9-car Class 801
IE5	London Paddington	Carmarthen / Swansea	Didcot Parkway, Bristol Parkway, Newport, Cardiff Central, Bridgend, Port Talbot Parkway, Neath	9-car Class 801
IE6	London Paddington	Swansea / Cardiff Central	Reading, Swindon, Bristol Parkway, Newport, Cardiff Central, Bridgend, Port Talbot Parkway, Neath	9-car Class 801
XC1	Newcastle (North)	Plymouth (South-West)	...Bham, Cheltenham, Bristol Parkway, Bristol Temple Meads, Taunton...	5-car Class 221
XC2	Manchester Piccadilly (North)	Bristol Temple Meads / Paignton (South-West)	...Bham, Cheltenham, Bristol Parkway, Bristol Temple Meads, Western-Super-Mare	5-car Class 221

Core Timetable Train Service Specification				
Ref.	**Origin**	**Destination**	**Calling Pattern**	**Timing Load**
			(1tpD), Taunton...	
LOC1	London Waterloo	Bristol Temple Meads	...Bath Spa, Keynsham **(4tpd)**	3-car Class 159
LOC2	Portsmouth Harbour	Cardiff Central	...Bradford-on-Avon, Bath Spa, Bristol Temple Meads, Filton Abbey Wood, Newport	3-car Class 158
LOC3a	Taunton / Weston-Super-Mare	Cardiff Central / Yate/Gloucester*	...Nailsea & Backwell, Bristol Temple Meads, Filton Abbey Wood, Patchway, Severn Tunnel Jn, Newport, Cardiff Central, Filton Abbey Wood, Patchway	2-car Class 150
LOC3b	Weston-Super-Mare	Cardiff Central / Bristol Parkway*	...Nailsea & Backwell, Parson Street, Bedminster, Bristol Temple Meads, Filton Abbey Wood, Patchway...	3-car Class 158
LOC4a	Westbury (South)	Gloucester	...Bradford-on-Avon, Avon Cliff, Freshford, Bath Spa, Oldfield Park, Keynsham, Bristol Temple Meads, Filton Abbey Wood, Bristol Parkway, Yate...**(0.5tph)**	3-car Class 158
LOC4b	Westbury (South)	Great Malvern	...Bradford-on-Avon, Avoncliff, Freshford, Bath Spa, Oldfield Park, Keynsham,Bristol Temple Meads, Filton Abbey Wood, Bristol Parkway, Yate... **(0.5tph)**	3-car Class 158

Core Timetable Train Service Specification				
Ref.	**Origin**	**Destination**	**Calling Pattern**	**Timing Load**
BM1	Severn Beach	Bristol Temple Meads^	All Stations	4-car Class 150
BM2	Avonmouth	Bristol Temple Meads^	All Stations	4-car Class 150
BM3	Bath Spa	Bristol Temple Meads^	All Stations	4-car Class 150
BM4	Portishead	Bristol Temple Meads^	Pill Only	4-car Class 150
BM5	Portishead	Bristol Temple Meads^	Pill Only	4-car Class 150
FR1	Portbury	Severn Tunnel Jn	1tph each way off peak 1tph one way peak	Class 6 GLW:2000tn from Portbury Class 4 TARE to Portbury

Network Rail – Analysis & Forecasting

MetroWest Interim Report

November 2013

West of England

Bath & North East Somerset Council

Bristol City Council

North Somerset Council

South Gloucestershire Council

TABLE OF CONTENTS

1. Executive Summary

The West of England Partnership are promoting the MetroWest scheme in order to achieve wider economic benefits and modal shift across the Bristol, Bath, North East Somerset and South Gloucestershire area. MetroWest will deliver more opportunities to travel by rail and improved journey times for rail passengers.

Phase 1 of the scheme supports the delivery of these benefits by:

- Reopening the Portishead Branch to passenger services, and;
- Increasing train frequencies on the Severn Beach line and between Bristol and Bath Spa.

Phase 2 will build on these changes and deliver further benefits by:

- Reopening the Henbury line to passenger services, and;
- Increasing train frequencies on the Yate to Weston-super-Mare route.

Revisiting Phase 1

The development of Phase 1 is relatively well advanced with detailed infrastructure proposals for the Portishead Branch (following a previous GRIP study) and an indicative Phase 1 service pattern and associated business case completed by Halcrow on behalf of the West of England Partnership. Following a review of the work completed to date, Network Rail identified some opportunities for further improvement and recommended that further testing of the case for investment for Phase 1 is required for the following reasons:

1. The service pattern developed by Halcrow assumed that other services in the area could theoretically be retimed in order to support the delivery of the MetroWest proposals. The service pattern also excluded some freight paths therefore validation over a wider area the inclusion of all freight assumptions is required.
2. A key infrastructure intervention – the enhancement of Bristol East Junction – was assumed to be delivered outside of the scope of MetroWest, and therefore not included in the business case. Network Rail's current investment plan allows only for a like for like renewal of this junction, and therefore this assumption will need detailed testing in the context of delivering the MetroWest services.
3. The primary focus to date for the development of the timetable and associated business case has been to minimise the number of rolling stock units required. Whilst this has resulted in a timetable which delivers very efficient use of rolling stock, it results in a service pattern which may introduce a significant level of performance risk, both for MetroWest services and other services in the area. Options to mitigate these risks, such as the introduction of a turnback facility beyond Bath, themselves probably drive the need for additional rolling stock units, thus

undermining the case for investment.

Therefore Network Rail undertook an initial exercise to develop indicative service patterns using these findings and updated assumptions.

Balancing the case for investment

In order to support the case for investment, these service patterns had to minimise rolling stock numbers whilst ensuring efficient use of the limited platform capacity at Bristol Temple Meads. Linking at least some of the proposed services across Bristol Temple Meads supports both these requirements, and could also deliver additional benefits.

Focusing on these additional benefits, a high level demand analysis was undertaken. This demonstrated that the greatest uplift in demand, over and above that delivered through the increased frequencies on each of the branches, is delivered by directly linking the Severn Beach line (mainly the Clifton Down area) with the Bath route. A direct link between Portishead and Bath offers about half of these additional benefits, and linking the (primarily residential) areas of Portishead and Severn Beach offers only about 5% of the additional benefits.

Although linking Clifton Down to Bath is shown to deliver the most incremental benefit in terms of demand, it also introduces a significant number of crossing moves at the constrained Bristol East Junction. This introduces potential performance risk and could drive the need for enhancements in this area, thus undermining the case for investment.

Developing the options further

A useful summary table of the various options for linking services is given from page 25 of this report, indicating at a high level the impact of each service pattern on costs, benefits and performance. Given the complexity of balancing the various factors which drive the case for investment, a number of these options will be taken forward for further development.

There is also an opportunity to develop these options further in a wider context. The opening of Crossrail, the electrification of key parts of the Great Western Main Line and the Intercity Express Programme all drive a wholesale change to the timetables in this area from 2017 and beyond. The proposed timetables (Crossrail Iteration 5) will have been developed further by the end of 2013 and these changes can be better taken into account in assessing the service pattern options for MetroWest, including those for Phase 2.

This work will be remitted over the coming months and is planned to start in January 2014. It is required in order to confirm which service patterns can deliver the best value for money, by balancing the need to minimise rolling stock numbers and the scale of capital infrastructure interventions, whilst maximising the impact on demand and also managing performance risk.

2. Introduction

MetroWest (previously named Greater Bristol Metro) is a proposed scheme in the West of England offering new and improved rail services across the region around Bristol, with the objectives of achieving modal shift to public transport and supporting economic growth. The scheme is promoted by West of England Partnership on behalf of North Somerset Council, Bath and North East Somerset Council, South Gloucestershire Council and Bristol City Council.

The MetroWest scheme is split into two phases of deliverables. Phase 1 includes re-opening of the Portishead Line for passenger services and improving service frequencies on the Severn Beach and Bath Spa Lines. Phase 2 includes improving service frequencies between Weston-super-Mare and Yate, and the introduction of passenger services on the Henbury Line.

A series of timetable and business case assessments have been undertaken over the last few years, including the West of England Partnership commissioning Halcrow to develop a high level feasibility study for the service aspirations they have developed. A proposed service pattern and associated demand and revenue forecasts were produced.

Subsequently, West of England has asked Network Rail to develop the scheme to GRIP 1 - 2 and undertake further feasibility assessment to confirm the preferred service pattern, infrastructure requirements and to undertake a socio-economic appraisal based on these assumptions. This is to inform the West of England Partnership in their ambitions of seek funding for the delivery of MetroWest.

The purpose of this report is to summarise the position with regard to MetroWest and will cover:

- The review of the work completed to date, i.e.
  - GRIP 3 development of the Portishead Line
  - Halcrow analysis
- Outline the initial findings and options developed by Network Rail in conjunction with West of England Partnership and stakeholders
- Identify next steps for timetable analysis

3. MetroWest Proposals

This section summarises the aspirations set out by the West of England Partnership and outlines the proposed interventions to deliver the objectives of MetroWest Phase 1 and 2.

3.1 MetroWest Phase 1

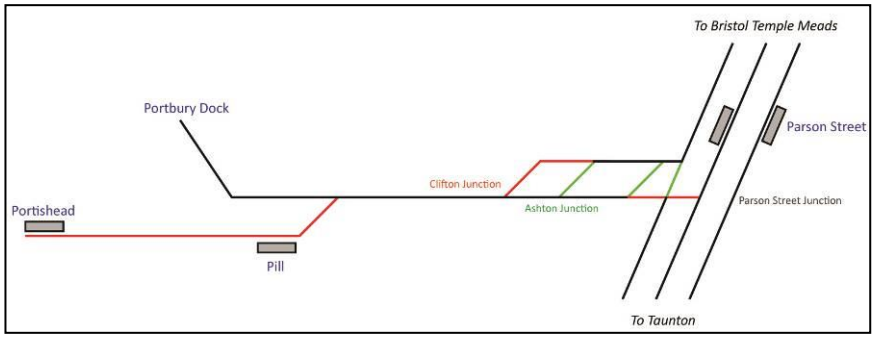
Phase 1 of the MetroWest scheme proposes the re-opening of the Portishead Line & increasing service frequencies on the Severn Beach Line and at intermediate stations between Bristol Temple Meads and Bath Spa.

3.1.1 Re-Opening of the Portishead Line

Phase 1 of the MetroWest scheme includes the re-opening of the former Portishead Line for passenger services between Bristol Temple Meads and Portishead with the re-opening of Pill station as an initial intermediate calling location in order to realise modal transport shift and provide socio-economic benefits to the surrounding areas;

> *"The population of the town of Portishead has grown rapidly over the past 5 years, with a population today of just under 22,000 compared with 17,000 at the 2001 census. Future developments planned for the town are to continue for several more years, with the population rising to around 25,000.*
> *Employment opportunities are limited hence many people commute to nearby centers, particularly Bristol, for work. There is only one main road (A369) out of Portishead, linking to the M5 at junction 19. At peak times the A369, M5 Junction 19, and the Bristol end of the A369 all become very congested. At one time, a rail passenger service operated from Bristol Temple Meads to Portishead, but ceased in 1964. Part of the line was re-opened in 2002 for freight traffic only to serve Portbury Dock." [002]*

Figure 1: Portishead Line Schematic Infrastructure Layout 6



Currently part of the Portishead Line (GW548) operates as a freight route with services operating between Portbury Dock and Parson Street Junction, with no operational line beyond Portbury Dock Junction to Portishead. Freight operations are typically up to 20 train

paths per day in each direction. Previous GRIP 3 development on the Portishead Line has presented six infrastructure options, of which infrastructure layout 6 was proposed as the preferred option. Details on the Portishead Line options are included in APPENDIX A and summarised in Figure 1 above. The proposals for includes operating 2tph in the peak and 1tph off peak.

3.1.2 Increasing Service Frequencies on Existing Routes

In addition to re-opening the Portishead Line, Phase 1 also includes an aspiration to increase service frequency on the Severn Beach Line and the opening of a new station; Portway Park & Ride. The new station, Portway P&R will be located at approximately 8mi on the Severn Beach Line from Bristol Temple Meads, between Shirehampton and Avonmouth.

Currently the Severn Beach Line operates with a ~2 hourly service between Severn Beach and Bristol Temple Meads and a ~30-40[*] minute service frequency between Avonmouth and Bristol Temple Meads. Phase 1 proposes to increase the service frequency on the Severn Beach Line to half hourly services between Severn Beach and Bristol Temple Meads.

The Phase 1 proposals also include increasing the service frequency of services to 2tph between Bristol Temple Meads and Bath Spa at intermediate stations, Keynsham and Oldfield Park. Currently these stations are served by an hourly through services operating between Westbury and Gloucester axes[†]. The proposals include an additional service operating between Bristol Temple Meads and Bath Spa calling at the intermediate stations to form half hourly services with the existing timetable.

3.2 MetroWest Phase 2

Phase 2 of the MetroWest scheme proposes the re-introduction of hourly passenger services on the Henbury Line, and the increase of service frequencies at intermediate stations between Weston-super-Mare and Yate to 2tph.

3.2.1 Re-Introduction of Passenger Services on the Henbury Line

The Henbury Line is currently designated as a freight route between the Avonmouth Docks and Filton Junctions. MetroWest proposes the re-introduction of passenger services on the Henbury Line with several new stations in order to enable the planned Filton Airfield mixed use redevelopment. The opening of the Henbury Line to passenger services also needs to

[*] Frequency of services to Bristol Temple Meads includes the 2 hourly Severn Beach Service.

[†] Westbury – Gloucester services vary by origin and destination every hour. Some peak time services also call at these intermediate stations.

take into account the future aspirations of the Avonmouth Docks which includes the development of international deep sea docks.

3.2.2 Additional Increase of Service Frequencies on Existing Routes

Phase 2 also proposes the increase of intermediate station service frequencies between Weston-super-Mare and Yate. It is proposed that increased service frequency is delivered by potentially extending the current Weston-super-Mare - Bristol Parkway service to Yate, and adding services to provide all day half-hourly services.

4. A summary of work completed

A series of feasibility analysis has been undertaken to accommodate the aspirations of West of England as described in Section 2. The work completed to date includes:

- GRIP 3 option design and selection for the re-opening of the Portishead Line
- Timetable assessment and business case development by Halcrow on behalf of West England Partnership for MetroWest Phase 1.
- Initial analysis on timetable feasibly and option development

The following sections summarise this work.

4.1 Portishead GRIP 3 Development

The re-opening of the Portishead Line progressed through the GRIP stages to GRIP stage 3 by October 2010. This included detailed infrastructure and timetable optioneering and option selection. A total of six options for timetabling and infrastructure designs have been developed with various demand, cost and deliverability assessments. The work focused solely on the Portishead Line area. Option 6 was chosen to be taken forward; this option provides a half-hourly service in the peak and hourly off peak between Portishead and Bristol Temple Meads with an intermediate stop at Pill. The journey time developed in this option is 17 minutes in each direction and is planned to operate between the freight traffic to/from Portbury Dock. See APPENDIX A for further details on option 6 of the Portishead Line development.

4.2 MetroWest Phase 1 Timetable and Business Case Development

Timetable and economic business case analysis for all of MetroWest Phase 1 has been completed by Halcrow on behalf of the West of England Partnership, which was finalised in February 2013. This set out the investment case for Phase 1 and included:

- Rail Operations (timetable analysis)
- Demand & Revenue forecasts (including the proposed new stations) based on the proposed timetables
- An estimate of capital expenditure and operating costs
- An estimate of the socio-economic benefits of the schemes

4.2.1 Area Covered

The geographic scope covered in the Halcrow timetable analysis included the following boundary locations on the rail infrastructure;

- Portishead
- Severn Beach
- Uphill Junction (Weston-super-Mare)
- Standish Junction
- Swindon
- Severn Tunnel Junction
- Bradford-on-Avon

These boundary locations are represented in Figure 2 below.

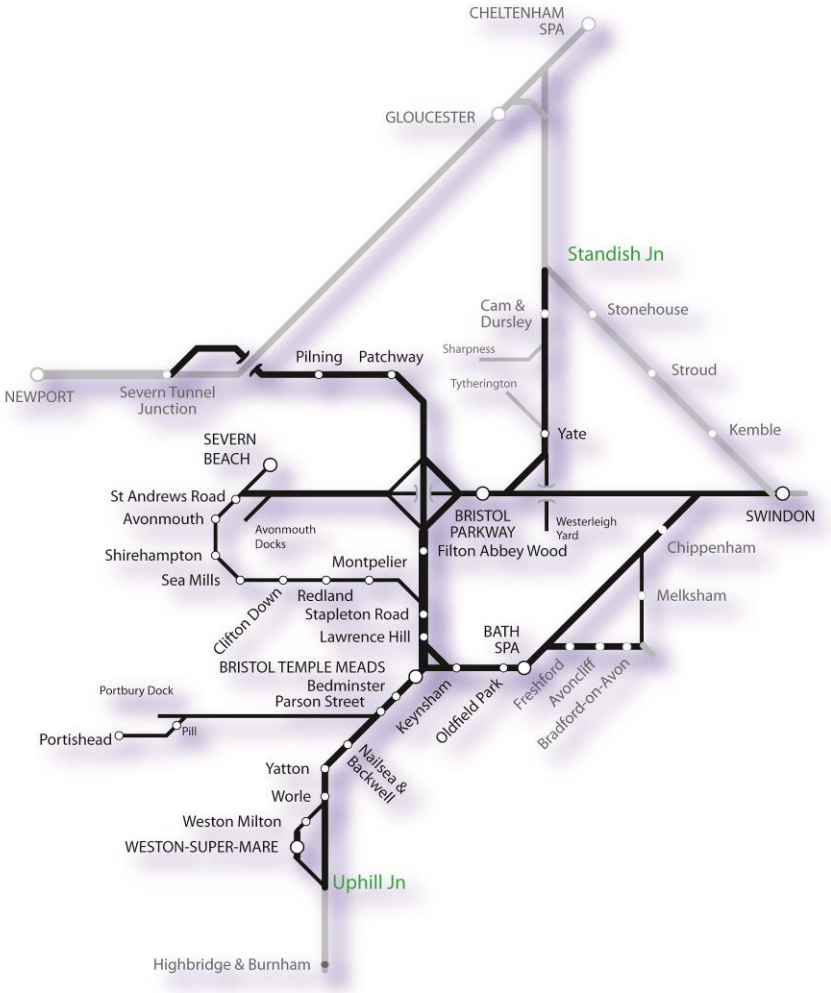


Figure 2: Halcrow Analysis Geographic Scope Map

4.2.2 Assumptions used in the Halcrow Analysis

To develop the timetable, a number of infrastructure interventions were assumed to be in place and therefore their costs were not included in the business case. These are the following:

- Filton Bank four track. (BTM to BPW)
  - Infrastructure proposal to 4-track between Dr Days Junction and Filton Abbey Wood (part of the IEP program)
- Bristol Parkway platform alterations
  - Infrastructure proposal for an additional platform face at Bristol Parkway (part of the IEP program)
- Bristol Temple Meads alterations
  - Infrastructure proposals to extend the current Platform 1 into the 'Midland Shed' and include an additional Platform 0 alongside the extended Platform 1
- Bristol East Junction enhancements
  - Proposed enhancements to Bristol East Junction (BEJ) to provide greater operational flexibility and access to the proposed Platforms 0 & 1.

Further infrastructure enhancements were then identified in order to deliver the aspirations of MetroWest Phase 1. These were included in the timetable analysis and the capital costs were factored into the business case.

- Portishead Line
  - Infrastructure Option (taken from the GRIP 3 proposals October 2010) which proposes the extension of the double track between Parson Street Junction and Ashton Junction to a new Clifton Junction, and an amended Parson Street Junction to include a double junction and alterations to the signalling to accommodate the opening of Pill and Portishead Stations.
- Portway P&R Station
  - Additional station proposal on the Severn Beach Line between Avonmouth Station and Shirehampton station at approximately 8mi 0ch from BTM.

Halcrow developed an off-peak standard hour timetable to represent all the existing services, which forms the base of the Metro West timetable. See APPENDIX B for the assumptions regarding the train service specification.

4.2.3 Timetable Findings

The findings concluded that a basic MetroWest Phase 1 service was achievable. The proposed timetable was designed to meet the aspirations of Phase 1 of MetroWest, i.e.:

- a half-hourly service on the Portishead Line,
- a half hourly service on the Severn Beach Line; and

- an additional stopping service between Bath Spa and Bristol Temple Meads.

The key drivers to the business case include:

- Operational Costs
  - Rolling stock requirement (e.g. units, drivers, train guards), leasing and mileage related costs and staff costs.
- Capital Costs
  - Infrastructure enhancements required
- Demand
  - Demand and revenue impact.

Minimising operational costs (particularly rolling stock costs) was defined as key to the overall business case. Therefore, the timetable was designed with a primary focus on minimising the unit numbers required to operate the proposed Phase 1 services, which resulted in the connection of different routes across Bristol Temple Meads in order to optimise rolling stock use.

The timetable proposed linking each of the three routes across Bristol Temple Meads as follows;

- An hourly service from Bath Spa to Severn Beach via Bristol Temple Meads (forming half hourly services between Bath Spa at Bristol Temple Meads with the existing timetable at the time of analysis)
- An hourly service from Portishead to Severn Beach via Bristol Temple Meads & Avonmouth
- An hourly shuttle between Portishead and Bristol Temple Meads in the peak hours

See APPENDIX C for an illustrative diagram representing the connectivity and service frequency proposed.

As a result the connectivity between the Phase 1 routes has been proposed along with the following unit diagramming pattern;

> *The proposed Severn Beach "… half hourly service is connected at Temple Meads so that one forms a through-service to Portishead and the other reverses in Temple Meads then runs to Bath…" and vise-versa to form the return services along with a peak hours shuttle between Portishead and Bristol Temple Meads. [001]*

This diagramming pattern along with other services in the timetable delivers half hourly services on the Severn Beach Line, near half-hourly services between BTM and Bath Spa and peak half hourly services on the Portishead Line.

Turnround times and journey times were kept as low as possible in order to deliver a

timetable as efficient as possible in terms of the unit numbers required to deliver it.

4.2.4 Halcrow Economic Business Case Summary

A demand assessment and business case was undertaken based on the proposed timetable outlined in 4.2.3. The demand forecasts included:

- Trips at new stations
- Changes in demand at existing stations, and
- Suppression of demand by extra station calls.

The impact of the proposed timetable on existing stations/routes was estimated by following the PDFH (Passenger Demand Forecasting Handbook).

Demand forecasts for the new stations were developed using trip rate analysis and comparison of stations with similar catchment areas. The revenue impact was estimated, taking account of abstracted demand from existing stations to the station.

The report concluded that Phase 1 of the scheme had a high value for money business case with a benefit to cost ratio (BCR) estimated at 2.51. The majority of benefits were found from travel time savings; which were compared against the cost of the infrastructure requirements and operating costs. The business case also included the benefits to non-rail users (e.g. reduction in road congestion).

5. Network Rail Review of Halcrow Analysis

Network Rail has undertaken a review of the previous timetable analysis completed by Halcrow with a focus on updating assumptions as required and on understanding the feasibility of the proposals in a wider context.

5.1 Phase 1 Timetable Development Limitations

The previous timetable analysis completed by Halcrow on behalf of the West of England Partnership concluded with an option that could deliver a Phase 1 timetable. However, the review of the proposed timetable has identified several constraints which would need to be addressed in order for this timetable to be taken forward for further GRIP development.

5.1.1 Performance Risk

Section 3 of this report highlighted that the Halcrow timetable was developed with a primary focus on minimising the operational costs by limiting the number of units required. Whilst this has resulted in a timetable which is very efficient in its use of rolling stock, it also results in a number of potential performance risks. These are described in more detail below.

Unit Diagramming

The diagramming of units operating between Portishead, Severn Beach and Bath Spa required each unit to operate a cycle as follows:

Portishead – BTM – Severn Beach – BTM (reverse) – Bath Spa – BTM (reverse) Severn Beach – BTM - Portishead

The unit cycle therefore links all three routes and thus links the constraints on each of these routes. The Portishead and Severn Beach lines contain single track sections with crossing loops, and the Bath Spa route is constrained due to the number services operating on the route from various origins and destinations. Linking these constraints through the service pattern potentially introduces significant performance risk on both the MetroWest services and the existing services in the wider area. A primary delay event on one route would potentially cause reactionary delay across each of the three routes, impacting on these and other services.

The timetable also introduces a number of crossing moves to the east of Bristol Temple Meads in order to link Severn Beach to Bath Spa. Each trip between Bath Spa and Severn Beach requires units to cross at Bristol East Junction conflicting with services between Bristol Temple Meads and Filton Junction. Several of the services between Bath Spa and Severn Beach are timed with minimum junction margins resulting in potential performance risk. Figure 3 on the following page demonstrates the crossing moves required for linking

services between Bath Spa and Severn Beach.

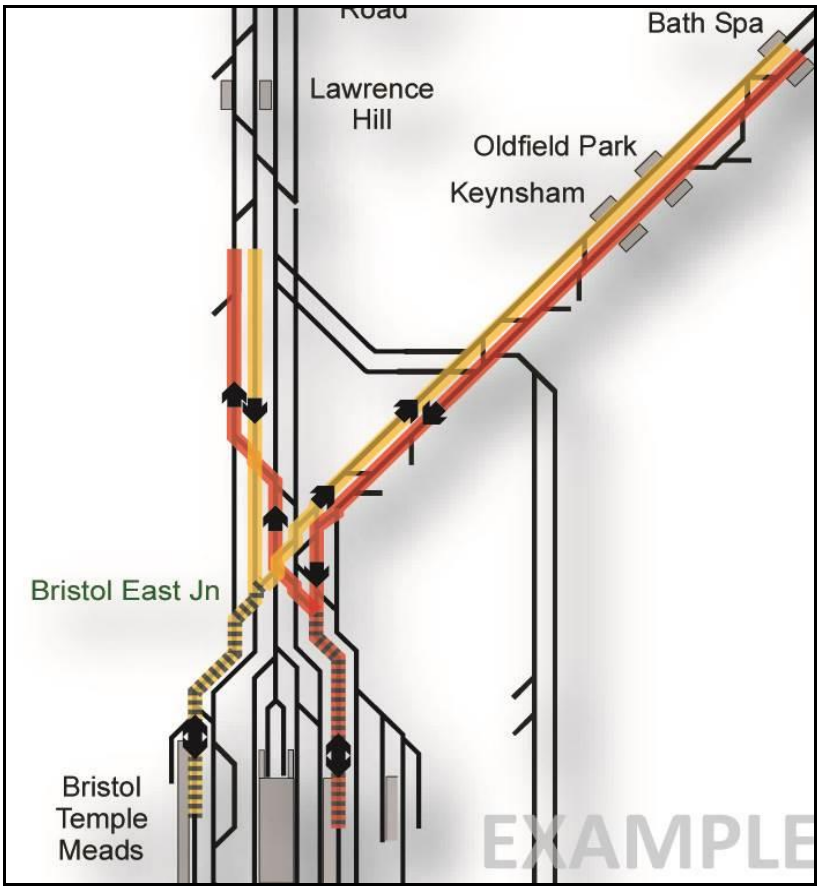


Figure 3: Bath Spa - Severn Beach Crossing moves at BEJ. A service timed as Bath Spa – Severn Beach results 2 crossings at BEJ junction in order to turnback services at BTM.

Turnback Time

MetroWest services have been timetabled to turnback on the main running line at Bath Spa. The turnback time planned for the MetroWest services at Bath Spa is 4 minutes with a following IEP service arriving 12 minutes after the departure of the MetroWest service, and a preceding service departing Bath Spa 7 minutes before the arrival of the MetroWest service. Although there is a moderate margin before and after the MetroWest service turning back at Bath Spa, using the main running line to turnback the service can potentially present significant performance risk both to MetroWest services, and to other services using this route.

The analysis does however suggest the use of a turnback facility at Bathampton Junction to mitigate against the performance risk of turning back services on the main running lines at Bath Spa. However given the efficiency of the proposed timetable (requiring a 4 minute turnback time at Bath Spa in order to meet the return journey), using a turnback facility

beyond Bath Spa at Bathampton Junction would require additional train units to operate the proposed timetable due to the extended journey time required.

There are a number of 'close to' minimum turnrounds across the timetable, offering little opportunity for recovery across the routes. The turnback time available for the MetroWest services at Severn Beach and Portishead is 7 minutes and 5 minutes respectively. Although the minimum Timetable Planning Rules turnround value for class 15x is 3 minutes this presents limited capability for the timetable to recover any delays which might occur. Coupled with the unit diagramming any delays occurring in the timetable could mount up over time, with recovery only easily achievable by requiring services to be cancelled or turned back early.

5.1.2 Assumptions

The assumptions used in the Halcrow analysis regarding both the wider timetable and infrastructure proposals would now need updating, in order to take the proposals through to GRIP 3.

Timetable assumptions

The standard hour approach utilised in the previous analysis resulted in several existing timetable paths changing at the model boundaries. For example the timings for services currently operating between Cardiff Central and Portsmouth Harbor have changed outside the model boundary without any validation on the impact of doing so on the wider area. The assumptions regarding freight paths are also reduced or not included that that required for the model area. It is therefore a potential risk to assume that the changed services interacting outside the model boundary can still be accommodated without further timetable analysis covering an expanded geographic boundary.

Since the previous analysis has been completed assumptions regarding IEP services have changed in regard to the timings and the service specification, a future analysis would therefore also require further validation to test against the latest IEP timetabling assumptions available.

Infrastructure Assumptions

The previous analysis assumed that Bristol East Junction (BEJ) had an enhanced layout providing greater operational and timetabling flexibility.

Network Rail's current investment plans allow for a like for like renewal of BEJ. Whilst there is ongoing work investigating the possibility of delivering an enhanced layout, the latest assumption for this area is to assume a like for like renewal in terms of capability.

This therefore requires the previous analysis to be re-validated against BEJ in its current layout. The previous analysis noted that an enhanced BEJ is significant in supporting the delivery of the timetable option, and therefore the current BEJ layout will need testing to understand whether it could support the level of services proposed.

6. MetroWest Network Rail Analysis

6.1 Introduction

Given these findings, and the requirements to consider a number of service pattern options in order to progress Phase 1, Network Rail has completed an initial high level timetable analysis in order to support this further option development. This focused on the feasibility of delivering the MetroWest Phase 1 proposals, based on the following updated assumptions:

- Current capability of Bristol East Junction
- December 2012 timetable is fixed at model boundaries
  - Updated with the latest IEP assumptions
- Filton Bank 4-tracking latest assumptions
- Portishead Head Line GRIP Infrastructure layout 6 tested
- Platform 1 extension at Bristol Temple Meads only (i.e. no Platform 0)

The timetabling for this initial timetabling analysis focused on the minimal service specification for MetroWest Phase 1, namely;

- 2tph Severn Beach – Bristol Temple Meads (calling all stations)
- 1tph Bath Spa – Bristol Temple Meads (calling all stations)
- 1tph Portishead – Bristol Temple Meads (calling Pill only)
- 1tph (Peak only) Portishead – Bristol Temple Meads (calling Pill only)

The starting point for this analysis was to maintain the timings within the December 2012 timetable (other than IEP timings), so as to confirm or otherwise the feasibility of delivering MetroWest services within this context. Therefore for the purposes of the initial analysis by Network Rail, the geographic scope mirrored that used in the previous analysis by Halcrow.

6.2 Findings

The initial analysis focused firstly on providing shuttle services to and from Bristol Temple Meads in order to build up a timetable in the context of the updated assumptions. This analysis demonstrated that shuttle services are not preferred because:

- They are inefficient in the use of the limited platform capacity at Bristol Temple Meads
- They are inefficient in terms of rolling stock unit numbers
- It proves difficult to deliver an even pattern for the MetroWest services

Therefore, some or all of the routes would require linking in order to achieve greater efficiency of rolling stock use and platform capacity, confirming the key findings of the

previous Halcrow analysis.

The analysis then continued by understanding at a high level the feasibility of linking some or all of the routes. This analysis highlighted that delivering connected services on the proposed infrastructure was challenging, particularly whilst minimising the number of rolling stock units. Key constraints identified were:

- The requirement to move services within the existing timetable (and therefore the need to test the impact over a wider study area)
- The capability of Bristol East Junction
- The linking of constraints (single tracks, congested sections etc.) across each of the routes

Further detailed work was therefore proposed to include updated assumptions and a larger study area. A development workshop was held in order to determine the preferred connectivity options for MetroWest Phase 1 in terms of both demand and capacity, in order to provide a focus for the next phase of analysis. The options from the workshop are presented on the following pages in section 7.

7. Connectivity Options

The initial timetable analysis completed demonstrates that interventions are required in order to realise a Phase 1 MetroWest scheme. Interventions include the retiming of the December 2012 services (which would require an expanded geographic scope in order to validate the timetable against any re-timings of existing services made), or providing further infrastructure enhancements such as Bristol East Junction.

The analysis completed previously by Halcrow highlights that operational and capital expenditure are marginal for developing a business case for MetroWest Phase 1. Therefore in order to reduce the impact on expenditure it's necessary to devise timetabling solutions which require the least costs but deliver value for money whilst considering the aspirations of MetroWest. Through a value management workshop several potential timetabling solutions have been proposed for further analysis. Each potential solution, led by demand forecasts and likely timetabling impacts are discussed below.

Each option presented outlines any likely potential impact on performance, the service achievement, and demand forecasts when compared to a shuttle service option as the base case. The outputs presented here are indicative and are all subject to further detailed analysis in the next phase.

For options 1-4 a sub-option is also presented (option #b). These sub options offer the potential to reduce the unit requirements by turning back 1tph of the 2tph Severn Beach services at Avonmouth. Each of the sub-options is presented in a summary table in 7.6.

7.1 Option 1: Shuttles (Base Case)

This option presents the base case for MetroWest Phase 1 offering the basic aspirations without any connectivity between the three routes. This option will likely result in high operational costs due to the inefficient use of rolling stock required to operate a MetroWest service. There is also the potential for this option to require additional infrastructure interventions such as additional platforming capacity at BTM to facilitate the additional services.

For the purposes of a high level comparison of the benefits of each option, Option 1 has been assumed the base case. The benefits of providing through services across Bristol are thus compared against the base (of option 1), in order to 'value' the different connectivity options.

7.2 Option 2: Portishead – Bath Spa

The first option to connect MetroWest services suggests linking 1tph of the 2tph from Portishead to the 1tph Bath Spa service, with the remaining 1tph Portishead service operating as a peak only shuttle between Portishead and BTM. The Severn Beach 2tph service would operate independently as a half hourly shuttle between BTM and Severn Beach.

This option potentially reduces the rolling stock inefficiencies of the shuttle option, whilst also providing direct connectivity between Portishead and Bath Spa. It also reduces the number of crossing moves at BEJ, and therefore may be better supported by the current layout. However, it may prove difficult to achieve even service intervals on the Portishead and Bath Spa routes of MetroWest.

A high level assessment of demand of this option (against the base option) was undertaken. Demand increases as this option provides an opportunity to travel across Bristol without the need to interchange. In this case, the connection between Portishead and Bath Spa provides a medium increase in revenue and value of time improvements, significantly more than Option 3, but less than half of Option 4.

7.3 Option 3: Portishead – Severn Beach

This option links both the 2tph Portishead Services with the 2tph Severn Beach services with the 1tph Bath Spa service operating as a shuttle service. This option is presented as an all day timetable without a peak variant.

This option potentially reduces the inefficient rolling stock usage further than that in Option 1 & 2 by linking both of the 2tph required between Severn Beach and Portishead together. It also does not introduce additional crossing moves to be made at Bristol East Junction potentially removing a requirement for enhancements.

However, it is unlikely the Severn Beach and Portishead routes will achieve an even service interval. Significant performance risk is also inherent in linking these two routes together due to the nature of single lines of each route.

A high level analysis shows that the demand for travel between Portishead and Severn Beach is low and therefore the value of time improvement and revenue impact is significantly less when compared to other connectivity options.

Option 4: Severn Beach – Bath Spa

This option links 1tph of the 2tph Severn Beach services to the 1tph Bath Spa service and the remaining Portishead services can operate as 2tph peak and 1tph off peak shuttles.

This option would improve the rolling stock inefficiencies of the Bath Spa services operating as a shuttle by linking it to Severn Beach. This option also links the key demand between stations on the route. It also potentially allows for the Portishead services to operate with 2tph even shuttles in the peak with the removal of 1tph in the off peak to reduce operational expenditure.

This option does however increase the likelihood of requiring enhancements to Bristol East Junction, and presents performance risk in requiring its use for additional crossing moves between the Bath Spa route and the Severn Beach route. It may also result in uneven intervals on the Severn Beach Line limiting the extent to which services can reach Severn Beach.

Option 4 provides the largest incremental increase in passenger demand and revenue due to better connections, and is over double that offered by Option 2. Demand increases as this option provides an opportunity to travel across Bristol without the need to interchange and connecting large catchment areas (e.g. Clifton Down) with the major employment centres (e.g. Bath and Bristol). Historic demand data shows that a large number of passengers (72,000 in 2012) travel currently from Clifton Down to Bath Spa .

7.4 Option 5: Previous Proposed Timetable (Halcrow Model)

Option 5 is presented as the previously developed solution for MetroWest and is described fully in 4.2. This option would require updated analysis in order to validate the findings and feasibility of delivering this option against the updated assumptions. It is likely that these changes would drive amendments to the business case.

7.5 Option 6: Portishead - Severn Beach & Bath Spa

Further option development by West of England Partnership continued after the workshop which led to Option 6. Option 6 provides a hybrid option formed from Option 2 and Option 3. The option presented is similar to option 5, but with slightly reduced linking of MetroWest routes. This option links 1tph Severn Beach - Portishead, 1tph Bath Spa – Portishead and 1tph Severn Beach – BTM shuttle.

This option potentially offers a more efficient use of rolling stock and platform capacity at Bristol Temple Meads when compared to Option 2 or 3. It also provides additional connectivity for Phase 1 services when compared to Options 1-3.

However it may result in uneven frequencies across all three routes potentially constraining the Severn Beach Line's ability to achieve 2tph to Severn Beach. Also with all three routes

linked together the potential impact on performance may be worse than Options 1-3. Option 6b has been developed to reduce the potential impact on performance and the operational costs.

7.5.1 Option 6b: Portishead – Avonmouth & Bath Spa

Option 6b reduces the Portishead – Severn Beach service to turnround at Avonmouth, therefore reducing the round trip time per unit and thus the total number of units required to operate this option. The 1tph Severn Beach –BTM shuttle would remain providing services at St Andrews Road and Severn Beach. This option is unlikely to resolve the possible outcome of uneven frequencies on the Severn Beach Line and Portishead Line but could potentially reduce the operational costs.

7.6 MetroWest Options Summary

The following table summarises Options 1- 6 for ease of comparison. For each option a brief overview of the following key factors is included;

- Operational expenditure
- Capital expenditure
- Benefits
- Risks

Note that Operation and Capital costs are subject to further detailed timetable analysis in order to confirm the requirements for each option. The table is provided as a guide to highlight the likely outcomes.

Connectivity Option	Operational Expenditure	Capital Expenditure/ Infrastructure Requirements	Additional Benefits	Risks
Option 1: Shuttles *No direct cross Bristol connectivity between MetroWest services.*	**High** Inefficient rolling stock requirements when compared to linked options, likely requires several units to operate	**High** Likely to require enhancement to BEJ. Likely to require Platforms 0, 1 & 2 at BTM	**Some** Potential for even service patterns on each route. Lower Performance risk – unlinked services	**High** OpEx, CapEx could negatively impact BCR No direct links between MetroWest routes

Connectivity Option	Operational Expenditure	Capital Expenditure/ Infrastructure Requirements	Additional Benefits	Risks
Option 2a: Portishead - Bath Spa *Portishead – Bath Spa 1tph* *Portishead Shuttle 1tph* *Severn Beach shuttle 2tph*	**High** Each route would require multiple units to operate, potential unit reduction from option 1.	**Moderate** Likely to require Platforms 0 or 2 at BTM	**Moderate** Through services from Portishead to Bath improving Cross-Bristol connectivity. Medium positive impact on Value of Time and Revenue (compared to Option1)	**Some** Performance risk increased on Portishead – Bath Spa route, and potentially uneven frequencies with current TT. Reduced conflicting crossings required at BEJ (Bath-Spa Portishead planned to cross at BWJ)
Option 2b: Portishead - Bath Spa *Portishead – Bath Spa 1tph* *Portishead Shuttle 1tph* *Severn Beach Shuttle 1tph* *Avonmouth Shuttle 1tph*	**Moderate** Some reduction of unit requirements may be possible when compared to 2a	**Moderate** Likely to require Platforms 0 or 2 at BTM	**Some** Through services from Portishead to Bath improving Cross-Bristol connectivity. Reduced frequency for services beyond Avonmouth. Slight reduction in Value of Time and Revenue compared with Option 2a.	**Moderate** Performance risk increased on Portishead – Bath Spa route and potentially uneven frequencies with current TT. Reduced conflicting crossings required at BEJ (Bath-Spa Portishead planned to cross at BWJ) Uneven Frequencies between Avonmouth and BTM.

Connectivity Option	Operational Expenditure	Capital Expenditure/ Infrastructure Requirements	Additional Benefits	Risks
Option 3a: Portishead – Severn Beach *Severn Beach – Portishead 2tph* *Bath Spa Shuttle 1tph*	**High** Likely to require several units to operate each route, potential unit reduction from option 1	**Some** May require Platform 0 at BTM	**Some** Through services from Portishead to Severn Beach improving Cross-Bristol connectivity Minimal Value of Time and Revenue (compared to Option 2 and 4)	**High** Performance risk introduced by linking two single lines together. Severn Beach – Portishead unlikely to achieve 30mins frequency (20/40). Bath Spa route potentially uneven frequencies with current timetable.
Option 3b: Portishead – Severn Beach *Severn Beach – Portishead 1tph* *Avonmouth – Portishead 1tph* *Bath Spa Shuttle 1tph*	**High** Likely to require several units to operate each route.	**Some** May require Platform 0 at BTM	**Some** Through services from Portishead to Severn Beach improving Cross-Bristol connectivity Even frequency potentially more likely to achievable except on Bath Spa route Slightly reduced Value of Time and Revenue compared with Option 3a.	**Moderate** Performance risk is reduced from 3a due to the Avonmouth service operating a shorter route.

Connectivity Option	Operational Expenditure	Capital Expenditure/ Infrastructure Requirements	Additional Benefits	Risks
Option 4a: Severn Beach – Bath Spa *Severn Beach – Bath 1tph* *Severn Beach Shuttle 1tph* *Portishead Shuttle 2tph*	**High** Likely to require several units to operate each route, potential reduction from option 1	**Moderate** Platform 2 and 0 BTM may be required.	**Moderate** Uneven frequencies on Severn Beach and Bath Spa routes (with current TT on Bath Spa Route). Highest Value of Time and Revenue (compared to Option 1, 2 and 3)	**High** Increased performance risk requiring 2x BEJ crossings and turnbacks at BTM. Linked single line with constrained Bath Spa route.
Option 4b: Severn Beach – Bath Spa *Severn Beach/ Avonmouth – Bath Spa 1tph* *Severn Beach/ Avonmouth – BTM 1tph* *Portishead Shuttle 2tph*	**Moderate** Potential reduction in unit requirements using Avonmouth to turnback services	**Moderate** Platform 2 and 0 BTM may be required.	**Moderate** Potential slight improvement to frequencies on Severn Beach Line from 4a. Bath Spa route remains with potentially uneven frequencies Slightly reduced Value of Time and Revenue compared with Option 4a.	**High** As 4a however; 1tph on Severn Beach Line turns back earlier reducing single line risks

Connectivity Option	Operational Expenditure	Capital Expenditure/ Infrastructure Requirements	Additional Benefits	Risks
Option 5: (Halcrow Proposal) Severn Beach – Bath Spa & Portishead *Severn Beach – Bath Spa 1tph* *Severn Beach – Portishead 1tph* *Portishead Shuttle 1tph*	**Low** Potential reduction in unit requirements (moderate if using Bathampton Turnback)	**High** Requires Platform 1 & 0 at BTM May also result in requiring BEJ enhancements	**Some** MetroWest routes linked improving cross Bristol connectivity. Long turnround and dwell times between some connecting routes.	**High** Increased performance risk to services via Bath Spa if not using Bathampton Turnback (otherwise increases OpEx) All three Phase 1 routes are linked introducing performance risk through linking of several constrained routes due to single line section or timetable constraints Would require re-working of current timetable expanding the scope to cover long-distance services (e.g. Cardiff – Portsmouth corridors)

Connectivity Option	Operational Expenditure	Capital Expenditure/ Infrastructure Requirements	Additional Benefits	Risks
Option 6a: Portishead – Severn Beach & Bath Spa *Portishead – Bath Spa 1tph* *Portishead – Severn Beach 1tph* *Severn Beach shuttle 1tph*	**High** Likely to require several units to operate each route	**Some** Platform 0 BTM may be required	**Some** Through services from Portishead to Bath Spa/Severn Beach improve Cross-Bristol connectivity. Less conflicting crossings at BEJ (Bath-Spa Portishead planned to cross at BWJ)	**Moderate** Performance risk increased on Portishead – Bath Spa & Portishead – Severn Beach route due to linking Single lines & constrained Bath Spa route. Likely require a unit to run between all routes as in Halcrow Proposal May result in long turnround times at BTM All routes potentially uneven frequencies.
Option 6b: Portishead – Avonmouth & Bath Spa *Portishead – Bath Spa 1tph* *Portishead –Avonmouth 1tph* *Severn Beach shuttle 1tph*	**Low** Potential reduction in units from 6a requirements using Avonmouth to turnback services	**Some** Platform 0 BTM may be required	**Moderate** Through services form Portishead to Bath Spa/Avonmouth maintain some cross Bristol Connectivity Possibility to improve frequencies from option 6a.	**Moderate** As 6a however some potential improvement to performance risk as services turnback earlier on Severn Beach Line

8. Timetable Analysis Next Steps

The analysis and stakeholder workshops carried out to date have identified the key factors which will need to be taken into account in developing the preferred service patterns and associated infrastructure options. Further detailed analysis is required in order to confirm unit numbers, end to end journey times, infrastructure requirements and performance risks for each of the preferred options.

The Capability Analysis team within Network Rail is currently developing a 24 hour timetable for the Crossrail, Great Eastern and Great Western Routes which incorporates the latest proposed IEP & Crossrail timetables. This is known as the Crossrail Iteration 5 Integrated Timetable (ITT). This work offers an opportunity for the MetroWest programme to understand the preferred options in a wider context, with up to date assumptions for both train services and infrastructure proposals. This timetable can then form the basis for more detailed analysis focused on comparing the MetroWest options.

In terms of MetroWest, the expanded geographic boundary allows for validation of changes made against the current services and provides the latest assumptions regarding services that interact with MetroWest.

For the purposes of the wider Crossrail study, initial assumptions regarding MetroWest services have been developed in order to allow for the quantum of services required in the Bristol area. The proposed service pattern is Option 6b, as follows:

- 1tph Portishead – Bath Spa
- 1tph Portishead – Avonmouth
- 1tph Severn Beach – Bristol Temple Meads

This service pattern will be included in the train service specification for the Crossrail analysis.

This does not preclude other options being considered, but merely allows the testing of an option within the wider Crossrail work. Further detailed analysis and comparison of options will be undertaken from January 2014 following completion of the Iteration 5 timetable study, in order to determine (within this wider context) which options present the best value for money. The approach is summarised on the following page and will be remitted between now and January 2014.

Figure 5 below outlines the high level process map for timetable analysis for MetroWest Phase 1 & 2, the process map includes testing a number of the options outlined in this report. It is likely by Phase 2 of the timetable analysis several additional options will be developed in order to optimise operational and capital costs for the delivery of Phase 2.

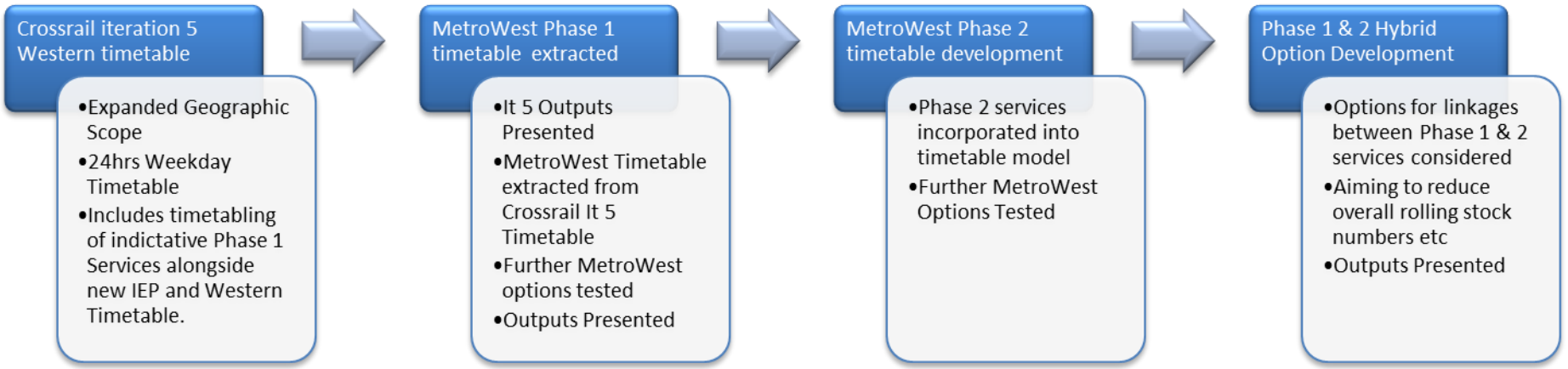


Figure 4: MetroWest Timetable Process Map

9. APPENDIX

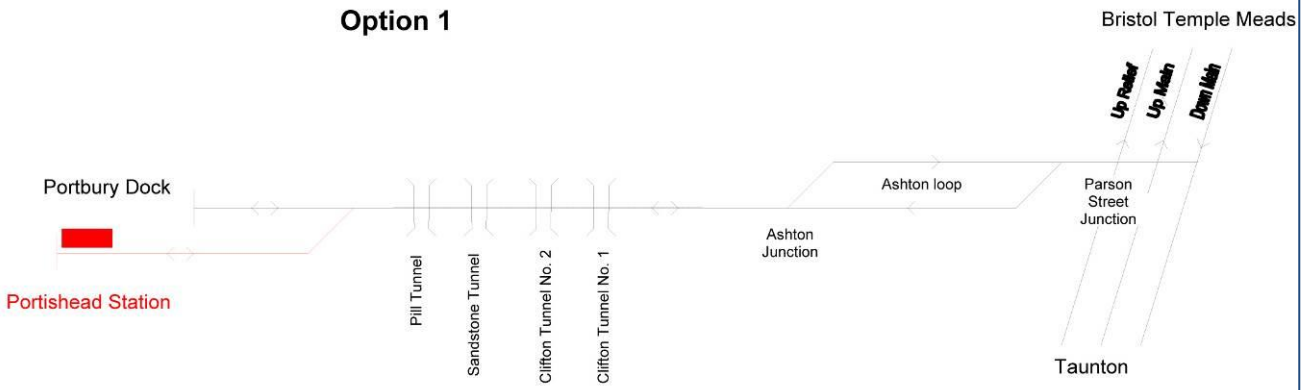
APPENDIX A Portishead GRIP Summary

The following table and figures detail the infrastructure Options 1 – 6 for the Portishead Line GRIP2. Option 6 was selected at GRIP 3 for further development. Each option is incremental from the previous option.

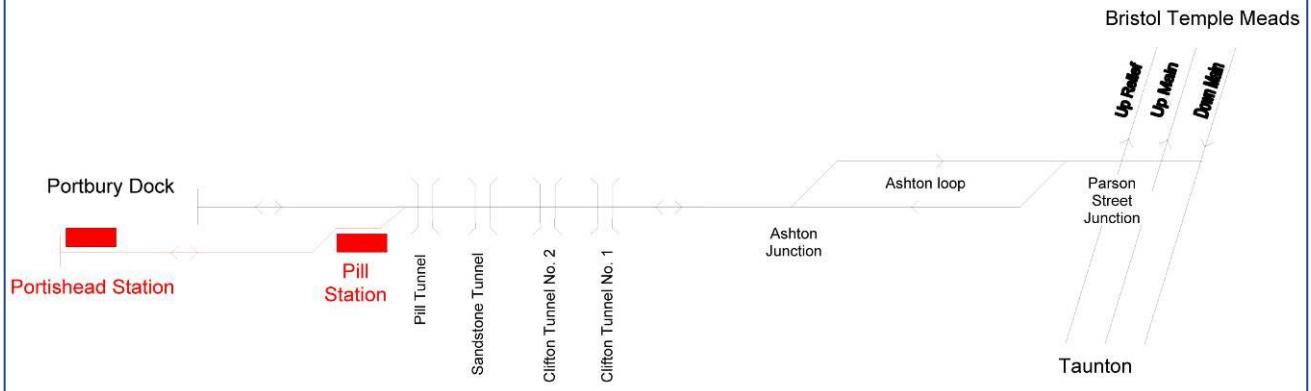
Summary of Portishead GRIP Infrastructure Options 1 –6	
Option 1	Increased line speeds on plain line sections
Option 2	Double track Pill Junction/Pill Station
Option 3	Double track Clifton Junction to Ashton Gate
Option 4	Ashton Gate Station platforms
Option 5	Double lead Parson Street Junction
Option 6	Intermediate signals at Miles Underbridge

Below are a number of drawings to articulate the information contained in the table above. New work is shown in red:

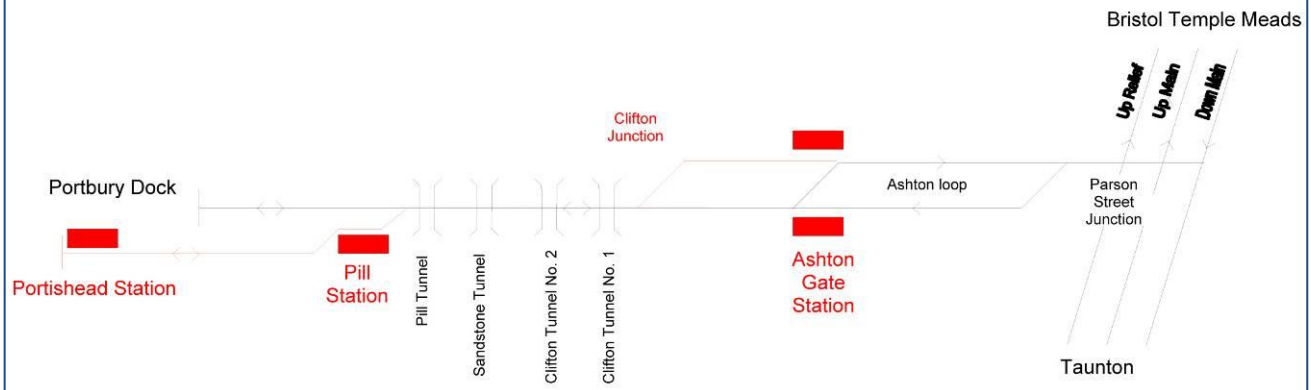
Option 1

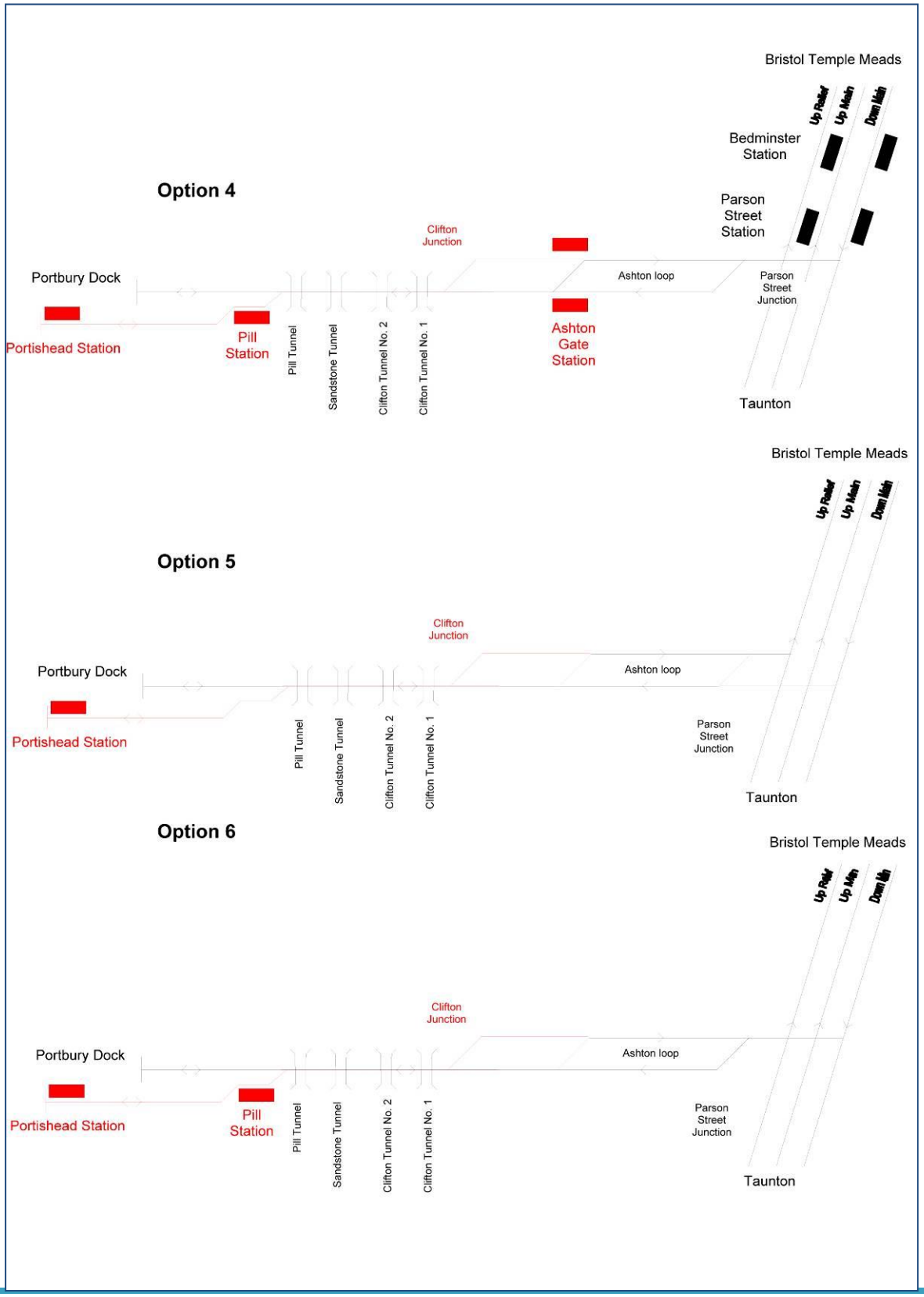


Option 2



Option 3





APPENDIX B Halcrow Train Service Specification

The following table defined the standard hour train services specification for the Halcrow timetable analysis of MetroWest Phase 1 (excluding MetroWest services).

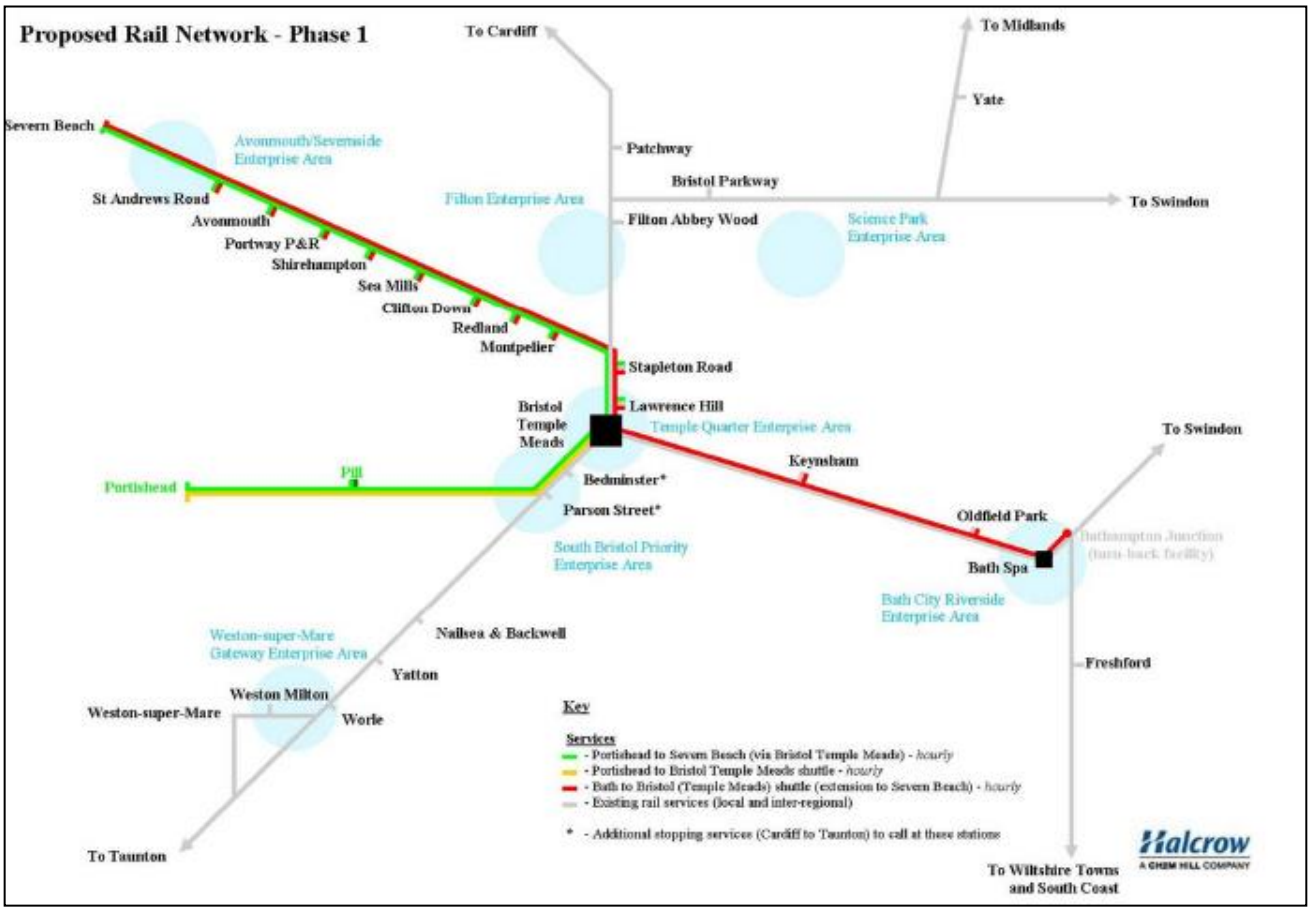
Train Service Specification – Halcrow Timetable Analysis	
Rail Service	**Frequency**
Bristol Temple Meads – Bath – London Paddington (IEP)	2 trains per hour
(Weston-Super-Mare) - Bristol Temple Meads – Bristol Parkway – London Paddington (Super Express Train)	2 trains per hour (1 train per hour WSM)
Weston-Super-Mare – Bristol Parkway	1 train per hour
Cross County (Voyager) service terminating/originating at Bristol Temple Meads	1 train per hour
Cross Country (Voyager) service to/from south-west, via Bristol Temple Meads)	1 train per hour
Westbury – Gloucester axis (class 15x service)	1 train per hour
Taunton – Cardiff (class 15x service)	1 train per hour

The TSS table extracted from the Halcrow MetroWest analysis report [001], does not include freight services, however freight assumptions where included within the timetable model as follows:

- One path per hour per direction between Portbury Dock Junction and South Wales; and
- One path per hour per direction between Avonmouth Dock and The Midlands (i.e. via Henbury)

APPENDIX C Halcrow Proposed Connectivity and Frequency Schematic

The following figure extracted from the Halcrow timetable analysis report [001] represents the connectivity options offered by the proposed timetable. The figure does not represent the unit diagramming pattern.



Environmental Appraisal

1 Environmental issues from earlier GRIP stages

4.1	**List the key environmental and stakeholder issues/actions that were identified during the earlier GRIP Stages 1/2/3) that need to be carried forward for further management.** *Project Description* The proposed project seeks to run passenger services between Severn Beach and Bath Spa, with a new turn back facility at Bathampton Junction. It is the intention to re-instate the current disused line between Portbury Junction and Portishead and run a new passenger service between Portishead and Bathampton, along with two new stations at Portishead and Pill. Associated works on the route, between Parson Street and Bristol Temple Meads, will also be required. The objective is to run half hourly services in peak hours and hourly in non-peak hours from Portishead to Bristol Temple Meads; and half hourly all day on the Severn Beach and Bath lines. The service pattern will be between Portishead, Bath and Severn Beach stations with a number of intermediate stops in between, utilising a new turnback facility at Bathampton. A GRIP 3 Environmental Appraisal was produced in September 2010. The project has now reverted, in April 2014, to the GRIP 2 stage and has been re-appraised. The main issues that are identified and which need to be carried forward for further management are summarised below and are separated into planning, construction and operational issues/actions: **Planning Issues:** • The land between 127m 79ch to 29m 20ch on the POD ELR, now belongs to North Somerset Council who have purchased the three miles of disused track to safeguard the route. • Access points for maintenance along the three mile disused section of the route, emergency services access at Pill Tunnel, and for new stations at Portishead and Pill, may require Network Rail to purchase land. • The land between 127m 79ch to 29m 20ch on the POD ELR is a redundant railway line. As this was previously an operational railway line there is a possibility it could be contaminated land. Ground investigation (GI) works which are currently being undertaken by URS will confirm the extent of contamination.

- The project will require either a Transport Works Act Order (TWAO) or a Development Consent Order (DCO**).**
- There is a station house along the disused section of line (former Portbury station) which is now privately owned. The property will be next to the operational line, consequently the owner may put in an objection to any planning proposal. A public engagement strategy will need to be developed in order to deal with issues like this which may develop.
- The three miles of disused line is overgrown with vegetation, this poses an ecological risk as habitats have been created which can potentially provide habitat for protected species. An ecologist was present during initial vegetation clearance works for the GI to safeguard nesting birds, badgers, reptiles and other potential ecological concerns. An updated Phase 2 report will need to be undertaken to highlight areas of ecological concern.
- Vegetation clearance will need to be carried out inside the Avon Gorge, approximately 115 m from the 122m 30c mile post and the Ham Green area. The Avon Gorge is a SSSI between 122m 30c to 124m 30c and the Ham Green Area is also within the SSSI. Natural England will need to be informed and consent granted to carry out any vegetation clearance in these areas. The vegetation management standard (NR/L2/TRK/5201) must be applied which gives guidelines for the management of line side vegetation.
- The Portishead end of the line is in a populated residential area, which may have design implications.
- The freight line runs along the River Avon, through the Avon Gorge, and goes under the Clifton Suspension Bridge. An old tow path has been converted to a cycle path. This cycle path will need to be redirected away from the proposed train line.
- A track is still in place for virtually the whole route of the three mile disused section, which will have to be removed. A waste management plan will need to be developed for the project in order to meet sustainability objectives and waste standards as well as to make determinations on the potential to recycle the existing infrastructure material.

Construction Issues:

- Reinstating the three miles of the disused section will involve considerable earthworks, to build a stabilised track formation. This will require a detailed construction strategy.
- Track work along the existing freight line is required, which will require some removal of contaminated spoil. GI results will determine the level of contamination and procedures for removal will need to be dictated in a waste management plan.
- An Arboriculture Report was produced in July 2007 between the route 125m 29ch to 12m 40ch. Giant Knotweed was discovered along this route closest to the site of the proposed Portishead station. Before any construction activities are undertaken this will need to be removed.
- There will be an increase in noise during the works. For the disused line, the work is most likely to be conducted during day light hours. For the operational section, the work will most likely be undertaken during the night and at weekends. A noise assessment will be required which will include modelling, this will need to be taken into consideration and applied through the use of a construction strategy.
- Access points are limited on the current freight line and non-existent on the disused section. There is a proposal to open up new permanent access points along the whole route. These may be implemented near or adjacent to dwellings.
- The road at Quays Avenue will require traffic management during the works to construct the bridge and new road layout.
- Reinstating the disused line will result in heavy vehicular traffic during construction – to access the line, remove spoil and deliver material. The design team will need to give careful consideration to construction logistics; this issue will also need to be considered in a Transport Assessment within the EIA.
- The position of Portishead station has yet to be agreed. Major road works at Portishead will be required at Quays Avenue. Construction Logistics Plan and the Transport Assessment will be required as well as several months of traffic surveys to support this.

Operational Issues:

- There is a new housing development close to the proposed reinstated line at Portishead. Although the community is apparently supportive of the project, the reality of having an operational railway close to their homes may generate complaints, due to a change in the noise climate. Residents at Pill have made complaints regarding the noise from the

	freight services. The proposed project may therefore meet with opposition from these residents, as well as complaints during operation. The public engagement and consultation strategy is critical to mitigate this risk. • There will be new pedestrian movements at the new Portishead and Pill stations. Pedestrian flow modelling should be considered. • A lake exists close to the former Ham Green Halt station. This lake is apparently exposed to contamination due to track drainage problems through Pill Tunnel. The proposed works at Pill tunnel should take this into consideration and seek to alleviate the drainage problems associated with the contamination. • There is a known issue at Pill regarding the noise of the freight trains. To help reduce the noise, a 10mph speed restriction has been imposed as a good-will gesture. As the frequency of services through Pill will increase as a result of the new passenger services, this may reignite the whole debate. Although the project will be looking at ways to mitigate this issue, reducing the noise to a tolerable level may be a challenge but can possibly be addressed through track bed design.

2 Environmental Appraisal

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
1.0 GENERAL RISKS							
1.1	Project Description, Town Planning/ Infrastructure Liabilities/ Operational Surveyor Teams, GI PORTAL	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).	✓			• Seek advice from Town Planning/Property/ Environment/Community Relations Teams and consult with external stakeholders/ local authorities (LA) where necessary • Site investigation/ surveys • Design aspects: include in/modify design/relocate to avoid the need to address these issues/ incorporate mitigation measures • Develop a Consent/ Environment/Communication Strategy Plan(s) as required • Obtain consent (TWA Order/ planning permission/ area land rights) if required • Specify protective measures in design/contract/construction requirements	The land between 127m 79ch to 29m 20ch on the POD ELR, now belongs to North Somerset Council. Access points for maintenance along the route; and emergency services access at Pill Tunnel will require land to be purchased by Network Rail. Other access points may require land purchases. There may also be the possibility of land purchases for the new stations at Portishead and Pill depending on the final location.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
1.2	Project Description, Town Planning/ Infrastructure Liabilities/ Operational Surveyor Teams, GI PORTAL, RAR, Utility Diagrams	Is the land leased out or are there 3rd party interests or onsite utilities, telecommunication, etc.)?		✓			On a site along the railway there is the presence of a GSM-R Tower.
1.3	Town Planning Team	Does the acquisition or lease of the land change the status of the land			✓		
1.4	Project Description, GI PORTAL, Town Planning Team	Is land that may need to be purchased/leased contaminated or a licensed waste facility?	✓				The land to be purchased is along an old railway track which was operational up to the 1960's. It is therefore likely that there will be some land will be some contamination. The Ground Investigation survey will determine the extent of contamination.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
1.5	Town Planning Team	Does the project require Transport and Works Act (TWA) order/planning permission or similar?	✓				The project will require purchase of property for the construction of stations at both Pill and Portishead. Access points for maintenance along the route of the proposed railway may need to be purchased as the now disused railway corridor belongs to North Somerset Council. It is therefore highly likely that a DCO will be required pending discussions of land purchases.

	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?			✓	• Seek advice from Town Planning/Property/ Environment/Community Relations Teams • Consult with external stakeholders/LA	The LPA (North Somerset Council) have indicated support for the project along with The Portishead Railway Group which was established in 2000 to encourage the reopening of the railway. There may be interest groups such as farmers or local residents who may bring objections. For mitigation a public engagement strategy and consultation needs to be developed.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
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.	✓			• Seek advice from Town Planning/Property/ Environment/Community Relations Teams • Consult with external stakeholders/LA	There have been complaints by residents in the Pill community about noise emanating from freight services. These complaints have continued since the last 2010 GRIP appraisal with some of the local community even threatening to form blockades on the route (Bristol Post, 17.6.2013). Public engagement strategy needs to be developed to deal with these risks.  Image Source (Bristol Post, 17.6.2013)

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
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?		✓		• Seek advice from Town Planning/Property/ Environment/Community Relations Teams	Along the 3 mile stretch of disused rail line there are several proposed developments plans, including residential development and a £15 million supermarket (Sainsbury's) which is adjacent to an area that may potentially be used to access the proposed Portishead Station. Developments Plans can be illustrated in figure 2. (Taken from Consultation Leaflet February 2013, North Somerset Council).

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
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?		✓		• Consult internal Network Rail stakeholders • Design aspects: include in/modify design/incorporate mitigation measures	Exisintg farm access in the area of the disused track is of concern. Currently there are proposals to alleviate this problem by building bridges to avoid level crossings. These bridges may affect the visual amenity of nearby residents and should be taken into consideration by the EIA team in a Landscape and Visual Section.

	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. issues: inc placing substations next to telecommunication masts) or adjacent to other Network Rail projects?		✓		• Consult internal Network Rail stakeholders • Design aspects: include modify design/incorporate mitigation measures	At the approach to Portishead station there will be a single retro reflective sign (post mounted) displaying a fixed distant symbol warning drivers of the need to stop at the end of the line. Whilst the reconstructed railway will be completed with passive provision for electrification clearances there is no proposal currently to install O.L.E.
2.0	**ENVIRONMENTAL CONSTRAINTS**						
2.1	Project Description, GI PORTAL, RAR, site investigation	Does the local environment constrain the project e.g:				• Consult internal Network Rail stakeholders • Design aspects: include in/modify design/incorporate mitigation measures • Consult with/obtain consent if required (e.g. building on a flood plain/change to coastal defences)	
		Flood plain?	✓				Parts of the track on the operational section are in flood zone 3 and 2 and this needs to be taken into consideration in a flood risk assessment.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
		Flooding?		✓			Majority of the proposed railway line is close to River Avon and some of the areas for the proposed railway are in flood zone 3 therefore flood risk assessment are needed.
		Landslide?	✓				AT 123m 66ch there is a landslide on the down side of the track. Problems such as these need to be alleviated through engineering and design to reduce risk.
		Difficult access (e.g. steep embankment)?	✓				The proposed Site of the New Pill Station is on a steep section and may prove difficult for construction as well as gaining access to the track, this needs to be taken into consideration from a design and engineering aspect.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
		Other (specify e.g. pests such as rabbits)?	✓				Along the 3 miles disused railway giant knotweed has been recorded along and the now overgrown vegetation has the potential to create habitats for other animals.
3.0	**AGRICULTURE /FORESTRY/VEGETATION MANAGEMENT**						
3.1	GI PORTAL, BAP, Site survey	Does the project require taking good quality agricultural land, or affect any agriculture holding (e.g. severance)?	✓			• Site investigation • Consult with external stakeholders (particularly if noticeable amounts of vegetation/trees/ habitat are affected) • Design aspects: include in/ modify design/incorporate mitigation measures • Obtain consent (LA permission, etc.) if required • Specify protective measures	The project may affect access to agricultural land as it cuts off access to land. To alleviate the problem bridges must be built in order to allow farmers access to land. Consultation and Public Engagement as well as Design and Engineering are key aspects to be considered.

	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?	✓				Even though vegetation was cleared previously, the route is again overgrown with bramble and other vegetation, which needs to be cleared before work can begin on the site.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
3.3		Does the project need to remove hedgerows?	✓				Vegetation clearance must be carried out inside the SSI Avon Gorge and the Green Ham Area. Natural England has to be informed and consent will be required to carry out any vegetation clearance for construction . The line side vegetation management standard (NR/L2/TRK/5201) must be applied when the track is operational. Bird Nesting Surveys will need to be carried out before any vegetation clearance is undertaken during breeding season.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
3.4	GI PORTAL, 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?		✓			This is to be determined by the EIA team.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
4	**AIR QUALITY**						
4.1	Project Description, GI PORTAL, 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?	✓			• Modify design/ incorporate mitigation measures • Consult with local authorities • Specify protective measures	During the construction phase there is potential for the production of dust as the proposed railway will require earthworks. This risk increases if the earthworks are conducted during spells of dry weather.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
4.2		Are there adjacent/nearby receptors: residences, businesses, schools, medical facilities, etc.?	✓				Along the route of the disused railway there are several receptors including; Vale Housing Estate, Elm Tree Farm, Sheepway Farm, The Royal Portbury Dockyard, Several residential developments at Portishead, Trinity School, Avon Wildlife Trust, and commercial businesses. On the operational track, there are residential communities at Pill, The Avon Gorge and Green Ham SSSI's. Further Details can be found on the attached map in figure 3.
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)?			✓		

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
5	**BUILDING, STRUCTURES, HISTORIC ASSOCIATION**						
5.1	GI PORTAL, 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?			✓	• Seek advice from Town Planning • Consult with LA/Heritage Agencies • Design aspects: include in/ modify design/ incorporate mitigation measures • Obtain local authority/ heritage consent if required	
5.2		Does the project affect a local planning Conservation Area, historic landscape features or similar designated area?			✓		
5.3		Does the project affect any other historical or man made feature likely to be of value?			✓		

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
6	**CONTAMINATED LAND**						
6.1	GI PORTAL, RAR, Contaminated land reports/ database, Railway Estates/ Environment team	Will the project disturb contaminated land?	✓			• Site investigation • Seek advice from Environment Team • Consult with LA if remediation required • Specify protective measures	Reinstating the 3 mile disused section of the railway will involve earthworks. The land was an active railway line up to the 1960's and as a result has the potential to be contaminated. Only after Ground Investigation works are completed can a conclusion be made on how much contaminated the land there is.
6.2	GI PORTAL, 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?			✓	• Seek advice from Environment Team • Seek alternative site • Site investigation • Specify protective measures, including possible remediation	

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
6.3	Project Description, GI PORTAL, RAR	Will the project activities open up pathways (e.g. channels) from contaminated areas to environment/stakeholder receptors; e.g. SSSIs		✓		• Site investigation • Seek advice from Environment Team • Design aspects: include in/modify design/ incorporate mitigation measures • Specify protective measures	This can be assessed further to planned GI works.
6.4	Project Description	Will produced wastes/spent ballast likely to be contaminated?	✓			• Seek advice from Environment Team • Site investigation/ sampling • Follow NR/SP/ENV/044 for used ballast and/or hazardous/special waste requirements	There will be removal of contaminated waste throughout the entire route.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
7	**ECOLOGY (protected species/areas and invasive species)**						
7.1	GI PORTAL, 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?	✓			• Seek advice from Environment Team • Site survey • Consult with local Conservation Agencies/LA • Design aspects: include in/ modify design/ incorporate mitigation measures • Obtain protected species license if required • Specify protective measures/follow site management plan (SMS) if SSSI • Train staff	The project Site is Nearby to a RAMSAR and SAC of the Severn Estuary. The proposed railway passes through the Avon Gorge Woodland SAC and Leigh Woods Natural Nature Reserve. Pathways which can lead to impacts to these areas need to be assessed.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
7.2		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)?	✓			• Continue monitoring if required	Given the proximity of the project site to the nearby RAMSAR (~350m)and SAC of the Severn Estuary (~350m); as well as the proposed railway passing through the Avon Gorge Woodland SAC and Leigh Woods Natural Nature Reserve, there is potential for the proposed works to affect these designated sites during both construction and operational phases.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
7.3		Are there any protected species and/or habitats e.g. bats, badgers, newts etc. at or near the project site?	✓				A Phase 2 Habitat and Protected Species report produced by Mott MacDonald in 2011 concludes that Bats, Grass Snakes, Slow Worms, Badgers, Greater Crested Newts, Breeding Birds and Invertebrates are present near the project site. This report will need to be updated to reflect what is on site so that ecological risks can be better understood. If engineering works are required for the Pill Tunnel which may cause changes to its structure then bat surveys will have to be conducted.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
7.4	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	An Arboriculture Report was produced in July 2007 between the route 125m 29ch to 12m 40ch. Giant knotweed was discovered along this route. It is possible that it can take up to three years to remove depending on the recommended method of removal. This was again confirmed by the site walkover on 19.03.14 and photographed by the ecologist. See Photo: 

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
8	**LANDSCAPE/TOWNSCAPE/VISUAL**						
8.1	Project Description, Town Planning/ Environment Teams, LA/ Heritage/ Conservation Agencies	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	The freight line runs along the River Avon, through the Avon Gorge, and goes under the Clifton Suspension Bridge. An old tow path has been converted to a cycle path. This whole area is in a conservation area. The diversion of the cycle path will be covered in the DCO.
8.2		Will the visual amenity of lineside residents be affected; e.g. removing vegetation, erecting new/taller structures than existing surroundings, demolition in Conservation Areas?	✓				There is potential for the visual amenity of line side residents to be affected by the potential construction of access bridges for several farms along the disused railway.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
8.3		Will new structures/project components obstruct visual amenity of dwellings/recreational areas/cultural heritage/conservation areas?	✓				There will not be any overhead line electrification but the construction of bridges may have an impact on the visual amenity of some residents, this should be taken into consideration by the EIA team in a Landscape and Visual Assessment with potential to mitigate any impact through design.
8.4		Will grading and vegetation removal with subsequent landscaping be required?	✓				Significant vegetation removal will be required along the disused section of the railway; and grading and vegetation removal may also be required in areas where twin tracking is required on the operational railway between Pill Junction and the Portbury Dock Junction.
9.0 NUISANCE: NOISE, VIBRATION AND LIGHT							

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
9.1	Project Description, GI PORTAL	Will noise/vibration likely to increase from existing levels at site during construction?	✓			• Site noise investigation • Consult with local authorities (EHO) • Design aspects: include in/ modify design/incorporate mitigation measures • Neighbour letter drops/ consultation • Obtain Section 61 consent if required • Specify protective measures • Train staff • Continue monitoring	Noise during construction will increase during daylight hours on the disused section of the railway. While for the operational section of the railway noise during construction will increase during the night and at weekends. A Section 61 consent will be required for these works.
9.2		Will it affect?					Refer to Comment for 9.1
		Adjacent/nearby residences?	✓				Refer to Comment for 9.1
		Adjacent/nearby businesses, worship, schools, hospitals, hotels etc.?	✓				Refer to Comment for 9.1
		Adjacent/nearby SPA/SAC, nesting birds, seasonal constraints?	✓				Refer to Comment for 9.1

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
9.3		Will the project occur at night/weekend or public holiday (use of lights/noise)	✓				Work on the operational freight railway will most likely be conducted at nights/weekends and on public holidays.
9.4	Project Description/ Noise Insulation Regulations	Will noise/vibration likely to increase from existing levels at site during operation?	✓			• Site noise investigation • Seek advice from Environment Team/Other Network Rail departments • Design aspects: include in/ modify design/incorporate mitigation measures	During operation the increase in the number of trains on the line will lead to an increase in noise from the current baseline levels.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
10	**TRAFFIC GENERATION AND ACCESS**						
10.1	Project Description	Will significant traffic (vehicular/heavy loads) particularly through villages and along farm/country roads be generated (Public Rights of Way)?	✓			• Consult local authorities/highways dept. • Design aspects: include in/ modify design • Obtain Highways consent if required • Specify protective measures	During construction and operation there is likely to be an increase of construction traffic which may need to access sections of the track using Public Rights of Way. Moor Lane at Portishead may be restricted until a footbridge can be built. Even though this is not a registered footpath it is being claimed as a Bye-way by a rights of way group.To get equipment during construction to the area, the current road system will have to be employed. To understand the risks a Transport Statement will need to be completed as well as a construction logistics.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
10.2		Will the scheme result in new vehicular traffic flows? (Before and/or after)	✓				One of the options for a new railway station at Portishead can potentially change the existing route of Quays Avenue and Harbour Road and may lead to the removal of the roundabout bounded by these two roads as well as Phoenix Way.
10.3		Will it cause new pedestrian movements? (Before and/or after)	✓				The development of new stations at Portishead and Pill will cause new pedestrian movements during the operational phase of the railway, with increased pedestrian traffic flows expected. Pedestrian flow Modelling could be required.

	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?	✓			• As above	During construction traffic management is likely to be required, to accommodate construction activity and road layouts.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
10.5	Project Description	Will parking outside railway land be required (e.g. on streets, on/near lineside neighbour's land)	✓			• Specify protective measures • Train staff	Although not specifically known at this stage exactly where, but parking on the A369 highway may be needed to gain access to the infrastructure.
10.6		Are access points near adjacent properties (nuisance including noise)	✓				Currently access points are limited and for construction and operational activities there is a proposal to open up permanent access points along the entire route of the railway which could potentially be adjacent to properties.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
11	**WATER RESOURCES, POLLUTION (including Silt) AND DRAINAGE**						
11.1	Project Description, GI PORTAL, RAR, Surface water risk assessment model, Site investigation	Is the project on/near/adjacent to a watercourse and drainage channels?	✓			• Site investigation • Consult with local Environment Agency/DEFRA for coastal/ marine/estuary areas • Design aspects: include in/ modify/design to remove the need for a consent • Obtain work near watercourses, obstruction to watercourse, discharge to controlled waters and/or sewerage system, etc. consents if required • Specify protective measures (e.g. Site Drainage Plan, Emergency Incident Plan) • Continue monitoring	The majority of the existing freight line follows the River Avon, albeit at a higher level. The project is also within close proximity of the Severn Estuary and several smaller ponds along the entire track of the disused railway. A lake exists close to the former Ham Green Halt station. This lake does get contaminated due to track drainage problems through Pill Tunnel.
11.2		Will the works occur within 8-m of the bank and/or in a **designated** main river	✓				The current freight line runs along the Avon River which is a designated river.
11.3		Will the project need to remove vegetation close to/on or in a riverbank?			✓		

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
11.4		Is it likely to affect the flow of watercourses?			✓		
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?			✓		
11.7		Will it generate a discharge either directly to a watercourse or to soakaway/ground; e.g. dewatering operation/discharge from a bund?			✓		
11.8		Will it generate a discharge to a foul sewer?	✓				The station works will have facilities for staff or public usage which will most likely go to a foul sewer.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
11.9	Project Description, GI PORTAL, 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?	✓			• Establish protective measures • Train staff	This will be confirmed when more details are known about construction. A Flood Risk Assessment will need to be conducted because of the nearby estuary and flood plain.
12	**WASTE MANAGEMENT**						

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
12.1	Project Description, NDS/ Town Planning/ Environment Teams	Network Rail requires all projects to develop and implement a Site Waste Management Plan. Key questions to consider in this plan include, but are not limited to; Will onsite disposal or land purchase be required? Will it generate large quantities of surplus material; i.e. spoil, sleepers? Can surplus material be reused (spares, spoil, etc.)? Will it generate hazardous wastes; e.g. oil, paint cans, contaminated land?	 ✓ ✓ ✓	 ✓		• Design aspects: include in/ modify design: reuse, recover, recycle • Consult with and obtain consent from local authorities/Environmental Agencies for storage/ management concerns • Obtain environmental permit if necessary • Specify protective measures in the SWMP	Spoil may be potentially contaminated from the previously used railway line. This may be spread within the infrastructure boundary. The majority of the redundant 3 mile disused rail track cannot be reused and will need to be disposed. There is potential for components such as wooden sleepers, clips and bull head rail to be reused in a heritage railway. Alternatively the redundant line can be sold as scrap. Depending on results from the Ground Investigation, there may be potential for the project to generate spoil from contaminated land.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
13	**SUSTAINABILITY: ENVIRONMENTAL OPPORTUNTITIES**						
13.1	Project Description/ Environment Team	Can recycled/reclaimed materials such as sleepers/ballast/spoil/cables be used instead of raw materials?			✓	• Modify design/contract/ construction strategy to capitalise on opportunities • Build into SWMP • Modify design/contract/ construction strategy to capitalise on opportunities	The reclaimed materials have been determined to be unsuitable for reuse for the proposed development and raw materials will have to be used.
13.2		Can the project help meet the requirements of sustainable consumption; can sustainable materials be incorporated into the design?	✓				Sustainable procurement practices can be employed for the project, for example to procure track timber from credibly certified sources in accordance with standards set by the WWF Global Forest Trade Network (WWF-GFTN).

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
13.3		Can the project demonstrate a reduction in the reliance on fossil fuels; can renewable energy be incorporated into the design? Has whole life embedded carbon been considered?		✓			Whole life carbon has not been taken into consideration at this stage, but the general principle of the development is to reduce congestion and car trips by providing an additional transport route which will lead to a reduction in fossil fuel use.
13.4		Can energy/water efficiency be gained through building design/supply chain?		✓			Sustainable acquisition methods can be used to source materials as close to the project as possible to reduce carbon emissions. Energy efficiency can potentially be gained from design especially in the proposed rail stations but it is too early in the design phase to make conclusive statements on this.
13.5	Project Description/ Environment Team	Can work be performed in parallel with another project reducing wastage, duplication and redundancy of materials,		✓		• Modify design/contract/ construction strategy to capitalise on opportunities	The Portishead re-opening will be integrated with the Bristol Area Resignalling Scheme and

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
	Project Description/ Environment Team	timing and resources?				• Modify design/contract/ construction strategy to capitalise on opportunities	Electrification of the Great Western Main Line thereby reducing wastage, duplication and redundancy of materials, timing and resources.
13.6		Can effluents and discharges be minimised?	✓				By creation of a waste management plan effluents and discharges can be minimised.
13		Can potentially polluting materials be replaced with less harmful materials (e.g. biodegradable oils)?		✓			Potentially but this is not known at this stage.
13.8		Are there other areas where environmental and sustainable benefits can be gained; such as					
13.9		Positive communication/interactive consultation with lineside neighbours/other stakeholders?	✓				A public engagement team can be employed to the project area to take into consideration the stakeholders that are affected by the project.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
13.10		Innovative environmental designs/methods of work?	✓				Through sustainable procurement and sustainable design methods, there is potential for environmental and sustainable benefits of this project.
13.11		Positive contribution to habitats/protected species?		✓			A phase 2 habitat assessment was done in September 2011 by Mott MacDonald. This indicated the presence of Greater Crested Newts, Bats and Slow Worms located in close proximity to the development. There is potentially an opportunity to improve habitats that currently exist but this needs to be done in conjunction with an updated phase 2 habitat and protected species report.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
13.12		Other (specify on action log)?	✓				The railway line, once operational will help reduce road congestion in the area and will aid in reducing carbon emissions by providing a mass transit service which can help to reduce carbon emissions and hence promote sustainable practices while reducing air emissions.

	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
13.13		Are there any other possible environmental effects specific to this project? If so list them: e.g. electro-magnetic effects, settlement, local issues/policies	✓				There are questions of access to private farm land which need to be addressed as mitigation of this particular problem can lead to other environmental effects, such as visual impacts. The ground investigation survey needs to be completed to give a better idea of the extent of the ground contamination present at the project site. An updated Phase 2 habitat survey may need to be carried out in order to make recommendations about possible mitigation strategies for dealing with protected species,
	OTHER						
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	✓				EMR See above. No Overhead Line Electrifying is proposed for the project.

Figure 1: Statutory Areas Within Proposed Railway

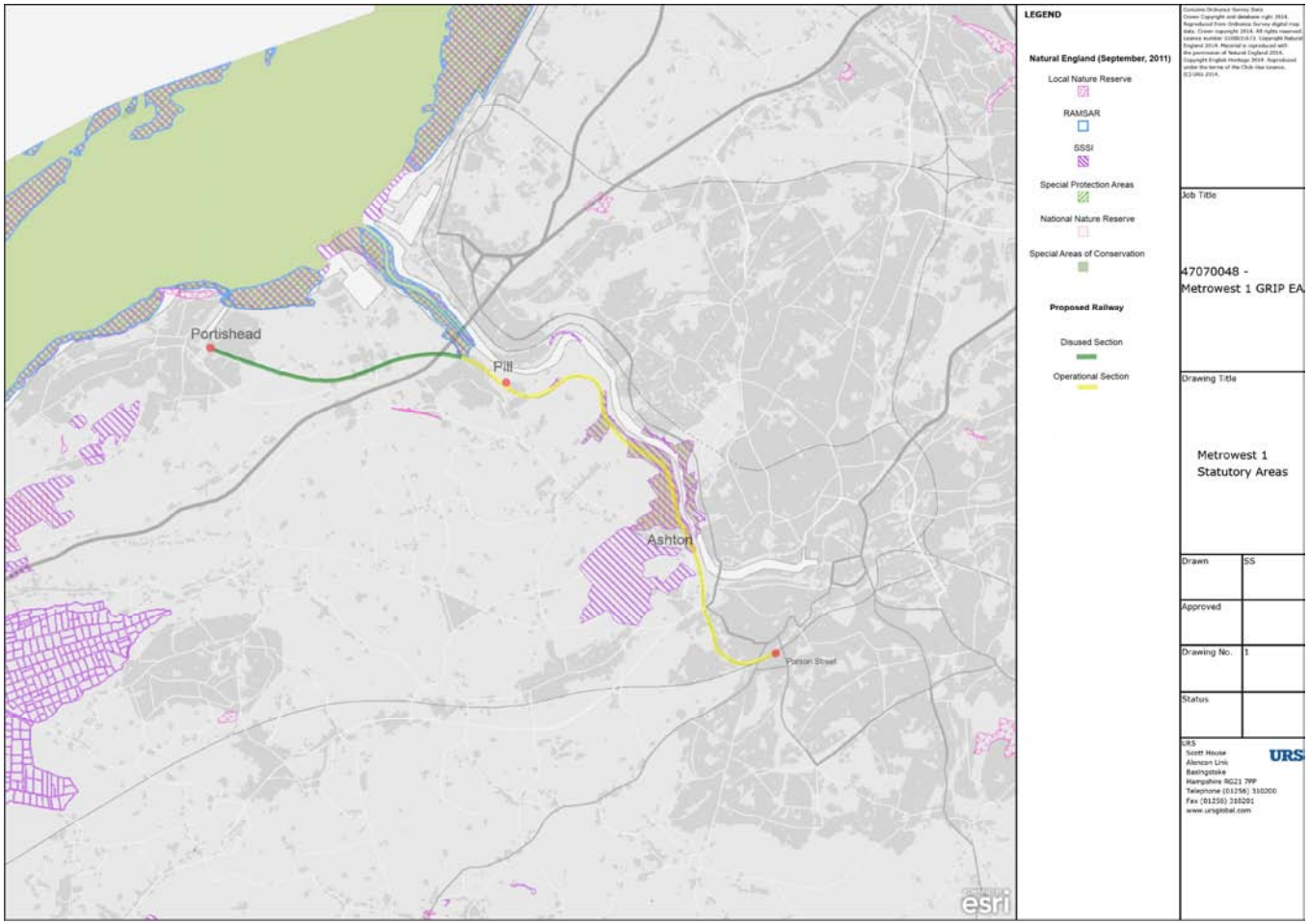


Figure 2: Development Plans(from Consultation Leaflet February 2013, North Somerset Council)

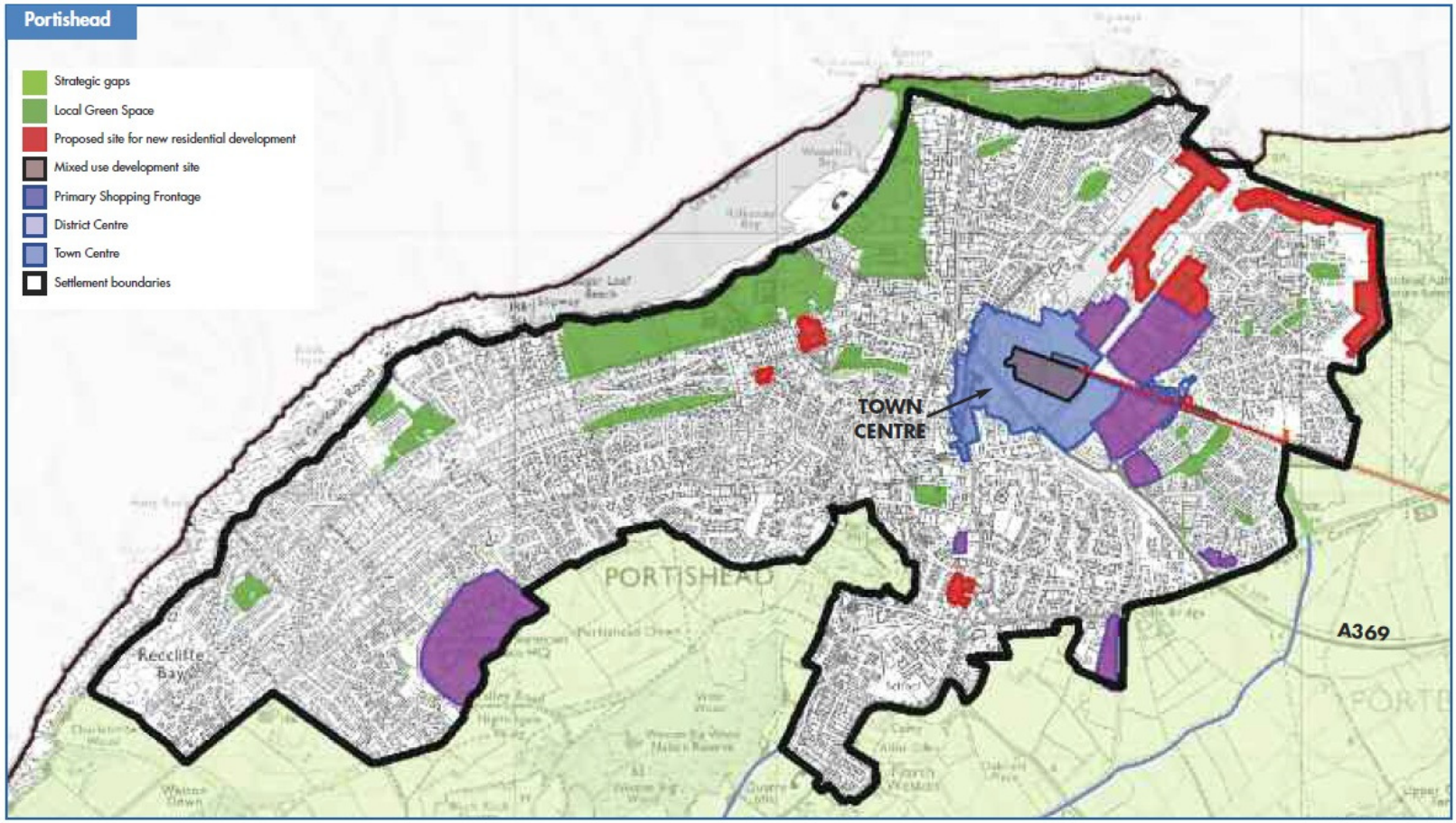


Figure 3.1 – Showing Disused Section 1 In Relation to surroundings.

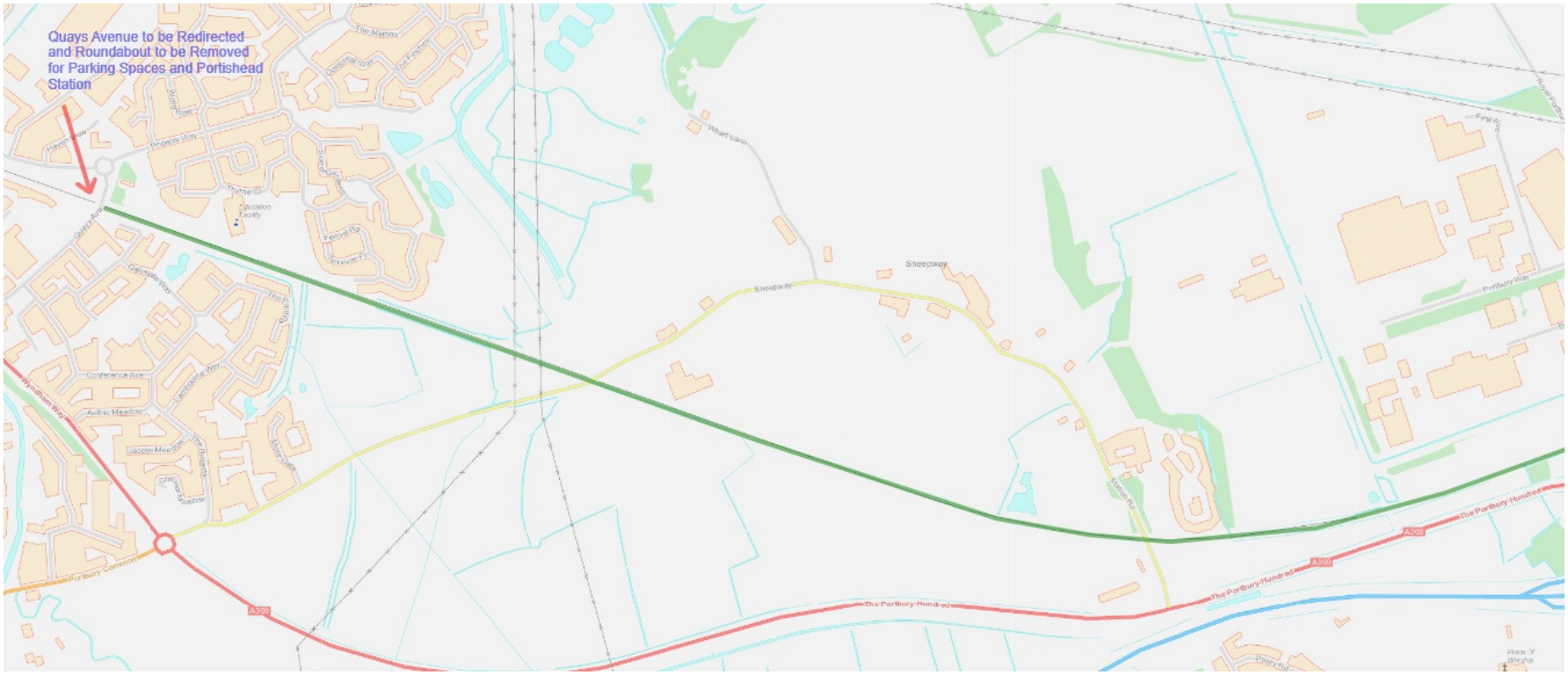


Figure 3.2 – Showing Disused Section 2 In Relation to surroundings.

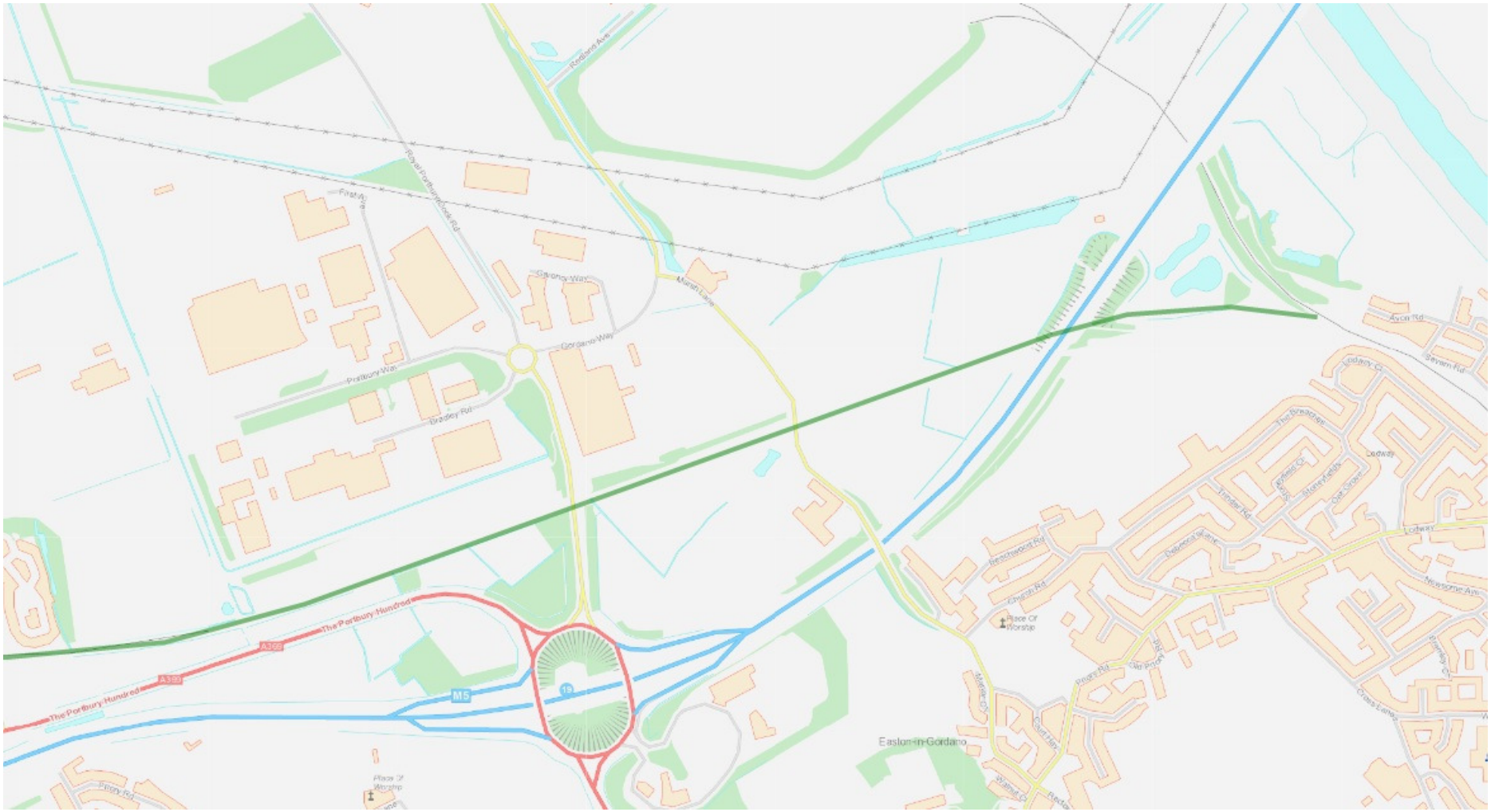
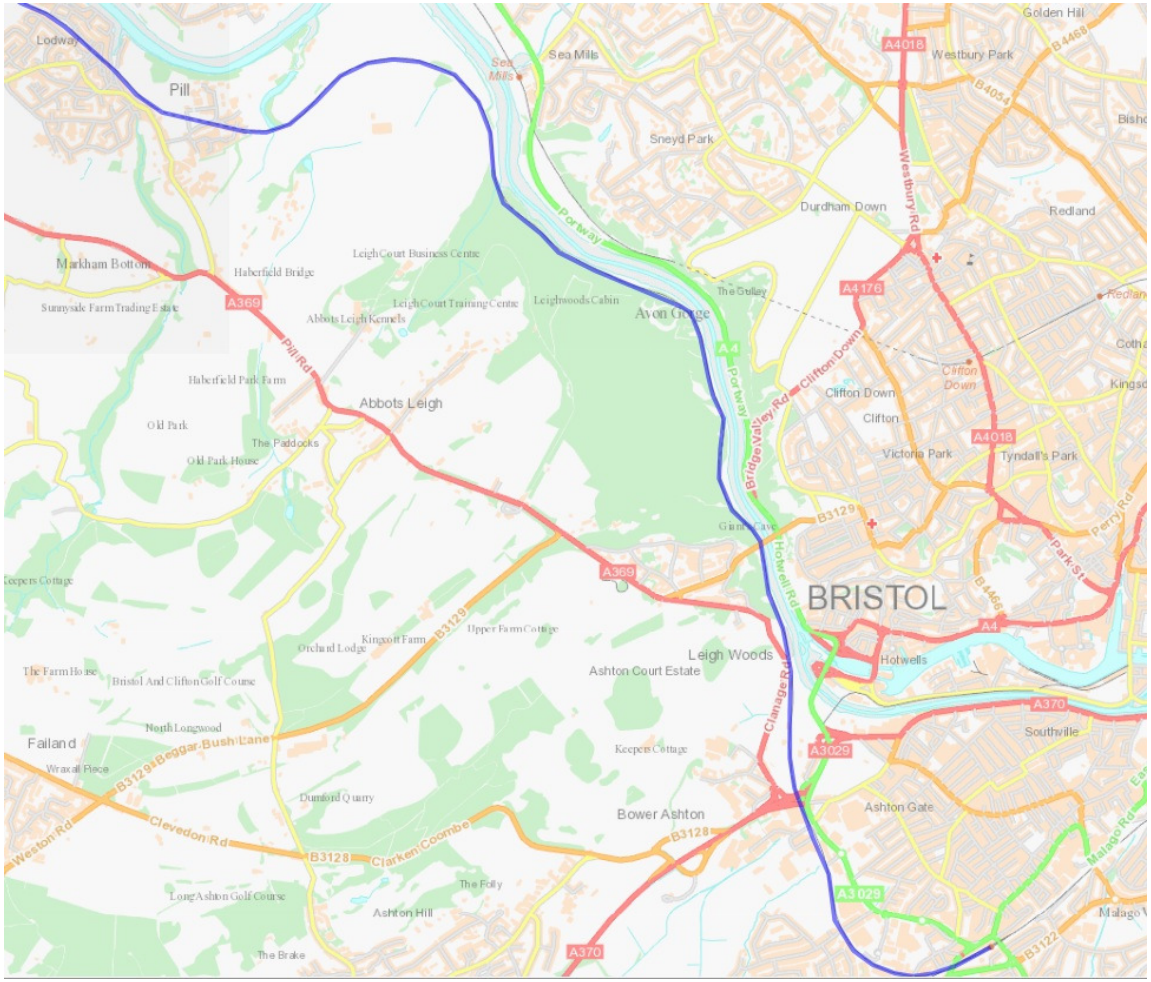


Figure 3.1 – Showing Operational Section of proposed project In Relation to surroundings.



3 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
GI PORTAL	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

Portishead Reopening

Possible Consent Needed for Project Work

Consent Type	Responsible Agency	YES/NO/TBC
Landtake		
• Development Consent Order; or • TWA Order if require compulsory purchase of land	Secretary of State Secretary of State	YES
• Planning permission from local authorities (Town and Country Planning Act 1990)	Local Planning Authority	NO
• Listed Buildings/Conservation Area (Town and Country Planning Act)	Local Planning authority	NO
Trees and Ecology		
• Work affecting Tree Preservation Orders, which offer legal protection to trees (Town and Country Planning (Trees) Regulations 1999)	Local Planning Authority	TBC
• Licence for felling timber (Forestry Act 1967)	Local Planning Authority	TBC
• Works affecting Important Hedgerows (Hedgerow Regulations 1997)	Local Planning Authority	YES
• Licence for disturbance to badgers (Protection of Badgers Act 1992)	Defra	YES
• Other wildlife consents required for works affecting protected species e.g. great crested newts, bats	Natural England/Defra	YES
Noise and Vibration		
• Section 61 consent on nuisance (noise) during construction (under the Control of Pollution Act 1974)	Local Authority – Environment Health Officer	YES
Traffic Generation and Access		
• Highways stopping/diversion consent (including temporary closures) • Vehicle crossing consents (Highways Act 1980)	Local Highways Authority	YES
Water Resources (quality and hydrology)		
• Consent for works over, under or adjacent to **designated** main rivers (Land Drainage Act /Water Resources Act 1991)	Environment Agency	YES
• Works affecting flow/structures in watercourse or navigation (Land Drainage Act 1991)	Environment Agency	NO
• Works around water source protection area (Water Resources Act 1991)	Environment Agency	YES
• Consent for works within 8m of a watercourse (Land Drainage bylaws)	Local Planning Authority	YES
• Water abstraction license (Water Resources Act 1991)	Environment Agency	NO
• Consent for dewatering/discharge of water from excavations (Land Drainage Act 1991)	Environment Agency	TBC
• Consent for discharge to controlled water and/or groundwater (Water Resources Act 1991/Groundwater Regulations)	Environment Agency	NO
• Water Authority Consent to discharge to foul sewer (Water Industries Act 1991)	Sewerage undertaker	NO
• Consent for works in coastal areas and marine waters (Coastal Protection Act 1949/Harbours Act 1964)	Marine Management Organisation	NO
Waste Management		

• Environmental Permitting (England and Wales) Regulations 2006	Environment Agency	NO

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

Ref	140569
Issue	0.2
Date	23rd April 2014

Bristol MetroWest Phase 1

Signalling Assessment (GRIP 2)

Project: Bristol MetroWest Phase 1	Business Unit: Investment Projects
Sponsor: Andrew Holley	Project No.: 140569
Development Manager: Rachel Leighfield Finch	CCMS No.: TBC
Client: 3rd Party funded through North Somerset Council on behalf of the West of England Councils	
Signatures	
Produced by [redacted]	Name: Andy Buller
	Job Title: Signalling Principles Designer
	Date: 23 APRIL 2014
Checked By [redacted]	Name: Mark Bristow
	Job Title: Signalling Design Manager
	Date: 23/4/14

Contents

Issue record

Issue	Date	Comments
0.1	03.04.2014	Initial Draft
0.2	23.04.2014	Updates to review comments + Avonmouth details added.

References

[1] Scheme Sketch 140569-SDG-001 ver. 0.01 (Portbury & Portishead to Ashton Jn)

[2] Scheme Sketch 140569-SDG-002 ver. 0.01 (Parson Street Jn to Bedminster)

[3] Scheme Sketch 140569-SDG-003 ver. 0.01 (Bathampton)

[4] Scheme Sketch 140569-SDG-004 ver. 0.01 (Avonmouth)

1 Executive Summary

The assumption that BASRE project has been implemented prior to commencement of this project is fundamental to the whole process.

The design incorporating the new signal (Option 1) at Bathampton would be the recommended choice.

For the Portishead Line:

The proposed signalling layout should be possible to construct but confirmation that the new proposed speeds and that signal sighting can be achieved would need to be confirmed once the new track design is available.

Specific modelling will need to be carried out to prove that the new proposed speeds will achieve the required traffic frequency and have no effect on the mainline services.

The use of modular signalling for this scheme would not be economical and would be better delivered as an addition to the Smartlock being delivered by BASRE project.

For Avonmouth:

The proposal is to use the existing signal SA5 as the stop signal and replicate SA6 and SA8 with parallel signals on the Up Main, controlled from the existing St. Andrews local panel.

2 Purpose of Document

The purpose of this document is to capture the output of the signalling studies to:

- Provide a new turn-back facility at Bathampton Junction.
- Asses the previously drawn scheme sketch for the Portishead railway re-opening and the impact of the BASRE scheme.
- Provide a new turn-back facility at Avonmouth.

This document can then feed into the wider project option development.

The main driver for this project is the re-introduction of passenger services on the Portishead branch, coupled with revised passenger service between Bristol, Bath and Severn Beach.

The project proposes to remodel Parson Street Junction and Ashton Jn to provide parallel running moves from Ashton Gate to Bristol Temple Meads. A new junction is to be provided between Pill Tunnel and Pill Viaduct to split the freight traffic (to/from Portbury) and the passenger traffic (to/from Portishead).

A new turn-back facility is to be provided at Bathampton Junction incorporating the existing Loop.

A new turn-back facility is to be provided at Avonmouth on the Up Main line to provide moves towards Bristol Temple Meads.

This project will be preceded by BASRE (Bristol Area Signalling Renewal and Enhancement) project. Following completion of BASRE, the signalling will be controlled by TVSC (Thames Valley Signalling Centre) via Smartlock interlockings. This document assumes that BASRE will be commissioned prior to or with this project. It is assumed that sufficient capacity will exist within the Smartlock for the changes to be accommodated.

3 Scheme Assessment

3.1 Bathampton

There are 2 options to be considered for the turnback move at Bathampton:

1. A new signal (BLxxxx) at the Bath end of the Loop (reading back to Bath) giving routes to both the Up and Down Mains through a new crossover (points ZZ).
2. Using existing signal BL1882 (B477) routes to:
   - Up Main and turn back behind BL1879 (B202).
   - Down Main and turn back behind BL1877 (B2).
   - Up Trowbridge and turn back behind BL6640 (B502)

3.2 Portishead Branch

3.2.1 Portishead

The proposal is for 'one-train working (without train staff)' between Portishead and Pill Stations on the single track. Entering Portishead station will be controlled by a reflective distant board leading to a stop light on the buffer stop. Exiting the station will be with a telephone call to TVSC (via a 'noticeboard' instruction) who will advise of any proposed usage of any remaining UWC.

3.2.2 Pill

The proposal is to split the single line before Pill viaduct providing lines to both Portishead and Portbury Dock.

The new station (and parallel move from the Docks) will be fully signalled, incorporating full axle counter detection, to provide control of the single line between the new Pill Junction and Clifton Junction replacing the existing token section.

The provision of complete signalling and train detection over this section will extend the control area of TVSC (introduced by the BASRE project) from its existing end at Ashton Junction to the whole of the Portishead branch.

3.2.3 Parson Street junction

The proposal is to create a new double junction to replace the existing single one, which will have little effect on the existing signalling layout with the exception of the need to review the risk assessment of B21.

Any freight moves from the siding will have a direct effect on the Up Main traffic flow due to occupation of B21 overlap and having to hold trains further out.

3.2.4 Parson Street and Bedminster Stations

The proposed BASRE design for Parson Street replicates the existing platform starter on the Up Relief (B421) and therefore services can easily stop here.

The proposed BASRE design for Bedminster Station replicates the existing arrangements, but that has no platform starters for either the Up Main or Up Relief. Instead the signalling control is via existing B25 and B27 which are approximately ¼ mile in advance but sighting is good, therefore no signalling work required for services to stop here (subject to timetable modelling).

3.3 Avonmouth

The proposal is to use existing signal SA5 as the stop signal and then to replicate SA6 and SA8 with parallel signals on the Up Main.

The control panel at St. Andrews is a turn button panel with no route request (similar to the one at St. Phillips Marsh) and it is anticipated that any alterations required for the new signalling design could be undertaken.

3.4 Assumptions

The following assumptions have been made and if not confirmed may have an effect on the proposed signalling layout:

- The proposed line speeds can be achieved with the new track layout on the Portishead line.
- Modelling confirms that the new proposed speeds will achieve the required service and have no effect on the existing mainline services.
- Modelling confirms that the new required service can be achieved at Avonmouth, including any new turn-back moves with the new proposed signalling.
- Any changes to the main line (including Bathampton) will be updated onto the latest BASRE scheme plans.
- Signal and Point numbers are available within the allocations of the TVSC Numbering Specification.
- It is assumed that sufficient capacity will exist within the Smartlock for the changes to be accommodated

3.5 Potential Design Issues

The following items will need further review during the GRIP3 stage:

- Ashton Gate LX protection due to linespeed increase.
- Confirmation that ALL UWC's are be to closed or replaced with bridge access.
- Provision of further train detection between Portishead and Pill if the above comment about UWC's is not confirmed. This is to support the signaller/crossing user interaction.
- Signal & Sign sighting.
- The swinging overlap at Pill Junction to be reviewed to ease the data preparation.
- Signal spacing at Avonmouth – possible problems due to any new speed and replication of existing signalling with new parallel signals.

3.6 Modular Signalling Design

For the Portishead branch the signalling could be delivered as a modular scheme but it would be more economical as an addition to the Smartlock being delivered by BASRE project rather than as a separate control system.

As Avonmouth is not part of the BASRE project, the minor additions could be delivered as a modular scheme but there is no benefit in using modular signalling process and it would be better to include these modifications into the existing panel at St. Andrews.

4 Conclusion

The assumption that BASRE project has been implemented prior to commencement of this project is fundamental to the whole process.

The design incorporating the new signal (Option 1) at Bathampton would be the recommended choice. Whilst this option incurs 3 extra SEU's, the impact on the present traffic flow using the other option would be major.

The proposed signalling layout for a 'one train working' railway between Portishead and Pill followed by a complete signalling and train detection railway fringing up to the new TVSC (Thames Valley Signalling Centre) area, can be delivered.

Confirmation that any new proposed speeds could be achieved would need to be confirmed once the new track design is available. Once the new track is onsite then signal and sign sighting would need to be undertaken to confirm positioning and may result in slight movement or the requirements for extra banner repeater signals..

Specific modelling will need to be carried out to prove that the new proposed speeds will achieve the required traffic frequency and have no effect on the existing mainline services.

The new proposed service will stop at both Parson Street and Bedminster Stations on the Up Relief line, using the existing signalling arrangements installed for the BASRE project

The use of modular signalling, for the Portishead part of the scheme, would not be economical and would be better delivered as an addition to the Smartlock being delivered by BASRE project. The Avonmouth turn-back design would not be economical for modular signalling as all the other signalling is controlled by a local panel at St. Andrews and any new signalling would be better included here.

For the Bathampton turn-back there is a net 3 additional SEU's.

For the Portishead branch there is a net 8 additional SEU's.

For the Avonmouth turn-back there is a net 3 additional SEU's.

Ref	140569
Issue	1.0
Date	20th May 2014

Bristol MetroWest Phase 1

Signalling Assessment (GRIP 2) - Addendum

Project: Bristol MetroWest Phase 1	Business Unit: Infrastructure Projects
Sponsor: Andrew Holley	Project No.: 140569
Development Manager: Rachel Leighfield Finch	CCMS No.: TBC
Client: 3rd Party funded through North Somerset Council on behalf of the West of England Councils	
Signatures	
Produced by [redacted]	Name: Andy Buller
	Job Title: Signalling Principles Designer
	Date: 21st MAY 2014
Checked By [redacted]	Name: Mark Bristow
	Job Title: Signalling Design Manager
	Date: 21/5/14

Contents

Issue record

Issue	Date	Comments
0.1	20.05.2014	Initial Draft
0.2	20.05.2014	Updated to review comments.
1.0	21.05.2014	Updated to review comments and issued

References

[1] Bristol MetroWest Phase 1 Signalling Assessment (GRIP 2) [CCMS: 64400525]

1 Executive Summary

The proposal to reinstate the old Down Relief line from Bedminster station for approximately 200m towards Parson Street and then join the Down Main line, which provides standage for a 100 SLU freight train behind the new proposed signal at Bedminster station as required.

2 Purpose of Document

The purpose of this document is to capture the output of the signalling studies to:

- Provide a new connection from the Down Relief (the existing Carriage Line) to the Down Main to allow standage for a 100 SLU freight train after Bristol Temple Meads station, so as not to block up Bristol East junction.

This document can then feed into the wider project option development.

3 Scheme Assessment

3.1 Reinstatement of the Down Relief

There is only 1 option being considered.

- Reinstate the old Down Relief line (existing Carriage Line) towards Parson Street, joining on to the Down Main as close to Bedminster station as possible, but allowing for a full overlap for the new signal. This option will require a signal at Bedminster station (parallel to existing B56) and a single end junction to join the mainline just after the station. This will provide adequate signal spacing for the proposed line speed. The upgrading of the Carriage Line to a relief line does not drive the need for any additional trapping protection over the existing provision.

3.2 Assumptions

The following assumptions have been made and if not confirmed may have an effect on the proposed signalling layout:

- It is assumed that sufficient capacity will exist within the Smartlock/TVSC (screen layout) for the changes to be accommodated.

3.3 Potential Design Issues

The following items will need further review during the GRIP3 stage:

- Signal sighting.
- If the new connection is within the overlap of B56 (Bedminster starter signal on the Down Main) traffic up to the new signal on the Down Relief will prevent simultaneous moves to the B56, thus holding trains back at Bristol West Junction. To be considered within the modelling of the train service.

4 Conclusion

The assumption that BASRE project has been implemented prior to commencement of this project is fundamental to the whole process.

As there is sufficient standage on the existing Carriage Line behind the proposed new parallel signal at Bedminster and 771 points to accommodate a 100 SLU freight train the solution meets the requirement, provided the existing track condition is acceptable.

For the chosen option there is a net 2 additional SEU's.

URS

Trackbed Investigation

METROWEST PHASE 1 Factual Report

WESTERN TERRITORY

April 2014

47070043/WT/PL/140569/1

Prepared for:
Network Rail

UNITED KINGDOM & IRELAND

REVISION SCHEDULE					
Rev	**Date**	**Details**	**Prepared by**	**Reviewed by**	**Approved by**
1	April 2014	Factual Report	Jacob Matthews Graduate Engineer	Dave Kite Principal Engineer	Craig Govan Principal Engineer

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Limitations

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The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by URS has not been independently verified by URS, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by URS in providing its services are outlined in the Contract. The work described in this Report was undertaken on the 2nd & 3rd April 2014 and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

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TABLE OF CONTENTS

1 INTRODUCTION

1.1 Background

Network Rail have commissioned URS (under NR3 Contract) on behalf of North Somerset Council and West of England Councils to produce a feasibility report updating the previously issued "Option Selection Report GRIP Stage 3 Portishead re-opening". As part of this report, Trackbed Investigation has been requested to understand the condition of the trackbed below the redundant track.

This Factual Report contains data appendices and figures showing the details of ABS and Trial Pit samples taken during the site work shifts (2-3 April 2014). This report will be followed by an interpretative report which will provide recommendations in relation to the renewal of the trackbed.

1.2 Site Details

The key information is provided below along with actual investigation mileages completed on site.

REFERENCE DETAILS					
Site Name	**UID**	**ELR**	**Line Name / Track ID**	**Renewal Mileage**	**Issue No. / Date**
MetroWest Phase 1	140569	POD	Reversible	126m 728y to 129m 880y	1 / April 2014

UID – Unique Identification ELR – Engineers Line Reference

SITE INVESTIGATION MILEAGE		
Planned Site Investigation	**Actual Site Investigation**	**Reference Milepost / Feature**
126m 945y to 129m 616y	126m 1043y to 129m 616y	No mileposts present on site, therefore sample locations were recorded using with GPS and scaled from OS Mapping.

2 INVESTIGATION SCOPE

The actual investigation completed is summarised in the table below and the results detailed in Figure 1 and Appendices A-B. Any non-compliance between the required Site Investigation and the actual Site Investigation is justified and mitigated against in Section 3.

SCOPE OF INVESTIGATION		
Activity	**Required**	**Completed**
Drainage Investigation	N	N
Ballast Contamination Sampling	Y	N[1]
Structural Investigation	Y	Y
Trial Pit Investigation	N	N
ABS Investigation	Y	Y
Trial Trench Investigation	N	N
LWD Investigation	N	N
Environmental Noise Notice	N	N

Notes:

1. Samples are currently being tested for ballast contamination classification. Results will be delivered with the Interpretative Report.

3 SITE WORK DEFICIENCY AND MITIGATION

Prior to the investigation, sample positions were scoped by Peter Hillier (URS Associate, Track Design Lead) and agreed by Jacob Matthews (Trackbed Engineer). Sample positions were completed as planned during the site work with the exception of ABS 1, ABS 4, ABS 6, ABS 12 and ABS 21. These samples were moved due to heavy vegetation which made site access difficult in the planned locations.

The following samples were converted from ABS to Deep Trial Pits: ABS 9, ABS 17, ABS 18, ABS 19 & ABS 20.

4 BALLAST WASTE CLASSIFICATION

Samples are currently being tested for ballast contamination classification. Results will be delivered with the Interpretative Report.

5 TRACKBED SAMPLE LOCATIONS

The following table shows the actual locations of the samples completed on site:

TRACKBED SAMPLE LOCATION TABLE							
Type	**No.**	**ELR**	**Position**	**Offset**	**Mile**	**Yard**	**Comments**
ABS	1	POD	Cess	Dn SE	126	1043	
ABS	2	POD	Cess	Dn + 2m	126	1252	
ABS	3	POD	4ft	-	126	1430	Culvert soffit not encountered
ABS	4	POD	Cess	Dn SE	126	1650	
ABS	5	POD	Cess	Dn + 2m	127	61	
ABS	6	POD	Cess	Dn + 1.5m	127	548	
ABS	7	POD	4ft	-	127	760	Culvert soffit not encountered
ABS	8	POD	Cess	Dn + 2m	127	827	
ABS	9	POD	4ft	-	127	915	Sample replaced by DP 9 due to ABS refusal
DP	ABS 9	POD	4ft	-	127	915	Culvert soffit encountered
ABS	10	POD	Cess	Dn + 1m	127	1206	
ABS	11	POD	4ft	-	127	1320	
ABS	12	POD	Cess	Dn SE	127	1350	Relocated due to possible buried services
ABS	13	POD	Cess	Up + 2m	128	45	
ABS	14	POD	4ft	-	128	310	Culvert soffit not encountered
ABS	15	POD	4ft	-	128	370	
ABS	16	POD	4ft	-	128	722	
DP	ABS 17	POD	4ft	-	128	913	Culvert soffit encountered
DP	ABS 18	POD	Cess	Dn + 1.5m	128	923	ABS converted to trial pit due to difficulty with site access
DP	ABS 19	POD	Cess	Dn + 2m	128	1385	ABS converted to trial pit due to difficulty with site access
DP	ABS 20	POD	4ft	-	128	1463	Culvert soffit encountered
ABS	21	POD	Cess	Dn + 1.5m	129	158	
ABS	22	POD	Cess	Dn + 1.5m	129	364	
ABS	23	POD	Cess	Dn + 1.5m	129	563	
ABS	24	POD	6ft	-	129	616	Located in 6ft between POD Up and Down tracks

Notes:

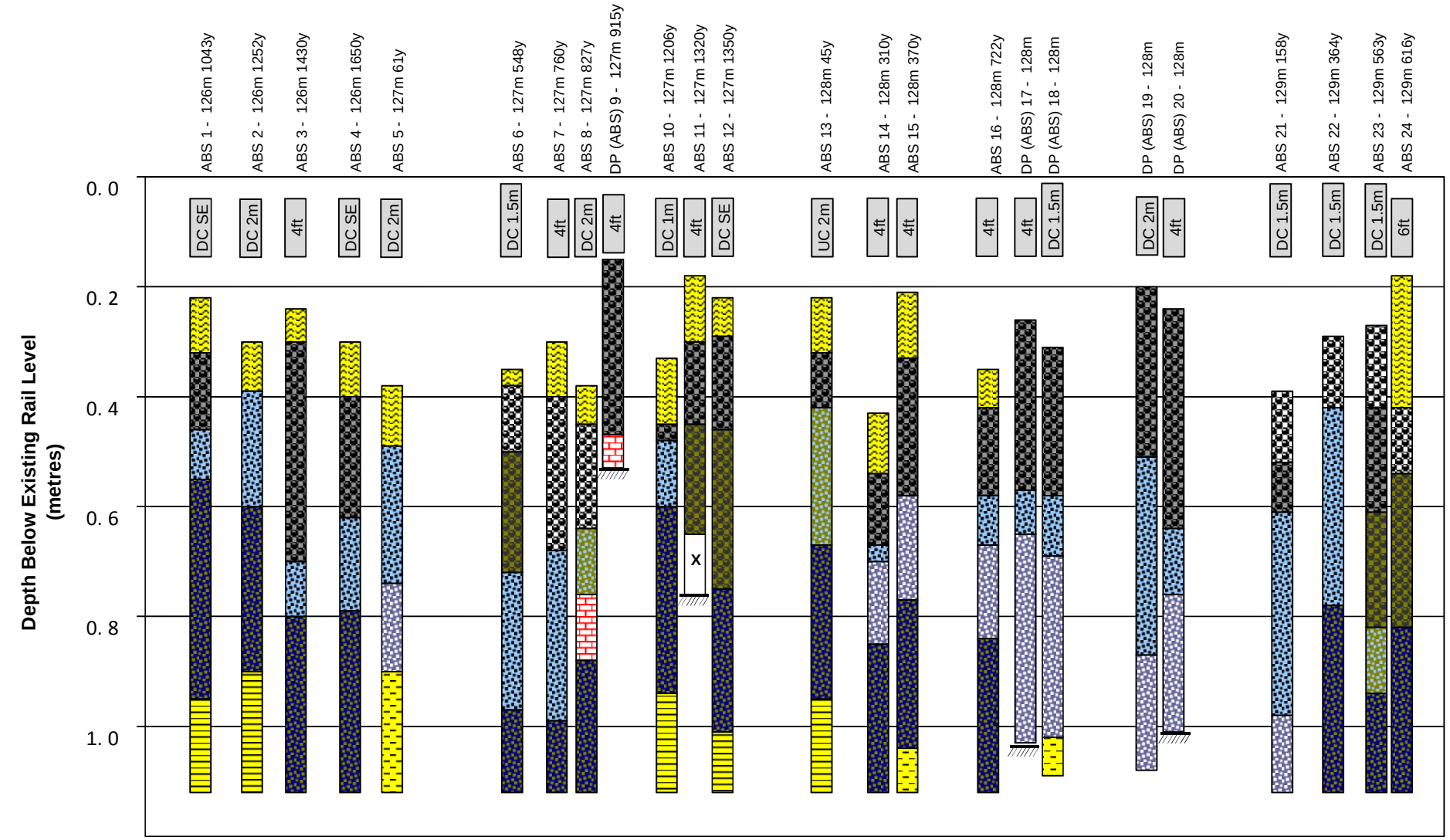
- Offset values are given relative to the Down/Up running rail
- Dn = Downside / Up = Upside / SE = sleeper end

6 TRACKBED RENEWAL RECOMMENDATIONS

Following this Factual Report an Interpretative Report will be provided which will detail recommendations in relation to the renewal of the trackbed.

FIGURE 1A:

LONGITUDINAL SECTION



Grey boxes show the lateral position of the samples relative to the existing redundant track

Abbreviations: DC = Down Cess UC = Up Cess SE = Sleeper End Xm = lateral offset distance of the sample measured from closest running rail in meters

Prepared	AG
Checked	DGK
Job No	47070043
Date	Apr '14

FIGURE 1A

Metrowest Phase 1 - Trackbed Investigation

LONGITUDINAL SECTION

POD - REVERSIBLE - 126m 1043y to 129m 616y

URS

FIGURE 1B:

LONGITUDINAL SECTION LEGEND KEY

1 BALLAST

a) With no subgrade erosion

1		Clean Ballast
2		Slightly Dirty Ballast
3		Dirty Ballast
4		Very Dirty Ballast (non-cohesive)
5		Very Dirty Ballast (cohesive)
6		Very Dirty Ballast (slurried)

b) With subgrade erosion

7		Slurried Ballast <10% fines
8		Slurried Ballast >10% fines
9		Ballast - Voids filled with silt/fine sand
10		Ballast - Voids filled with soft/firm clay

2 TRACKBED LAYERS / FILL

a) Derived from naturally occurring Sands and Gravels.

11		Fine / Medium Sand (<5%)	D = 0.06 to 0.60mm
12		Coarse Sand (<5%)	D = 0.60 to 2.00mm
13		Sand and Gravel (<5%)	
14		Clayey Sand and/or Gravel (5 to 20%)	
15		Slurried Sand and/or Gravel (5 to 20%)	

b) Quarry Products

16		Stone Dust (<5%)
17		Coarse Crushed Stone Aggregate (<5%)
18		Clayey / Silty Crushed Stone Aggregate (5 to 20%)
19		Slurried Crushed Stone Aggregate

(% refers to clay / silt content)

c) Ash

20		Fine ash (sand sized) (<5%)
21		Coarse ash (gravel sized) (<5%)
22		Clayey / silty Ash (5 to 20%)
23		Slurried Ash

d) Other granular trackbed materials

24		Fine grained, susceptible to erosion (<5%)
25		Coarse Granular Layer (<5%)
26		Clayey / silty Granular Layer (5 to 20%)
27		Slurried Granular Layer
28		Any of 2 a-d in a clay matrix (20 to 50%)

3 SUBGRADE

Use legends from section 2 where appropriate, legend with bold outline indicates natural ground

a) Organic soils, clays and silts

31		Organic Soil	
32		Soft Clay/Silt	Cu < 40kN/m^2
33		Firm Clay/Silt	Cu = 40 to 75kN/m^2
34		Stiff Clay/Silt	Cu = 75 to 150kN/m^2
35		Very Stiff / Hard / Very weak Mudstone Cu > 150kN/m2	

b) Mixed (Fine and Coarse) Soils

36		Unstratified (clayey/silty Coarse Soil OR sandy or gravelly Fine Soil)
37		Interbedded or weathered/weakly cemented fine grained rocks

c) Rock or Rockfill

38		Weak fine grained (mudstone, limestone, chalk, fine sandstone)
39		Moderately strong to hard rock

4 PITCHING LAYERS

29		Clean pitching
30		Slurried Pitching

5 SAMPLE LOSS IN ABS

0x	X	Soil penetrated by ABS, but not recovered
0d	D	Soil displaced by ABS - indicative of very soft soil

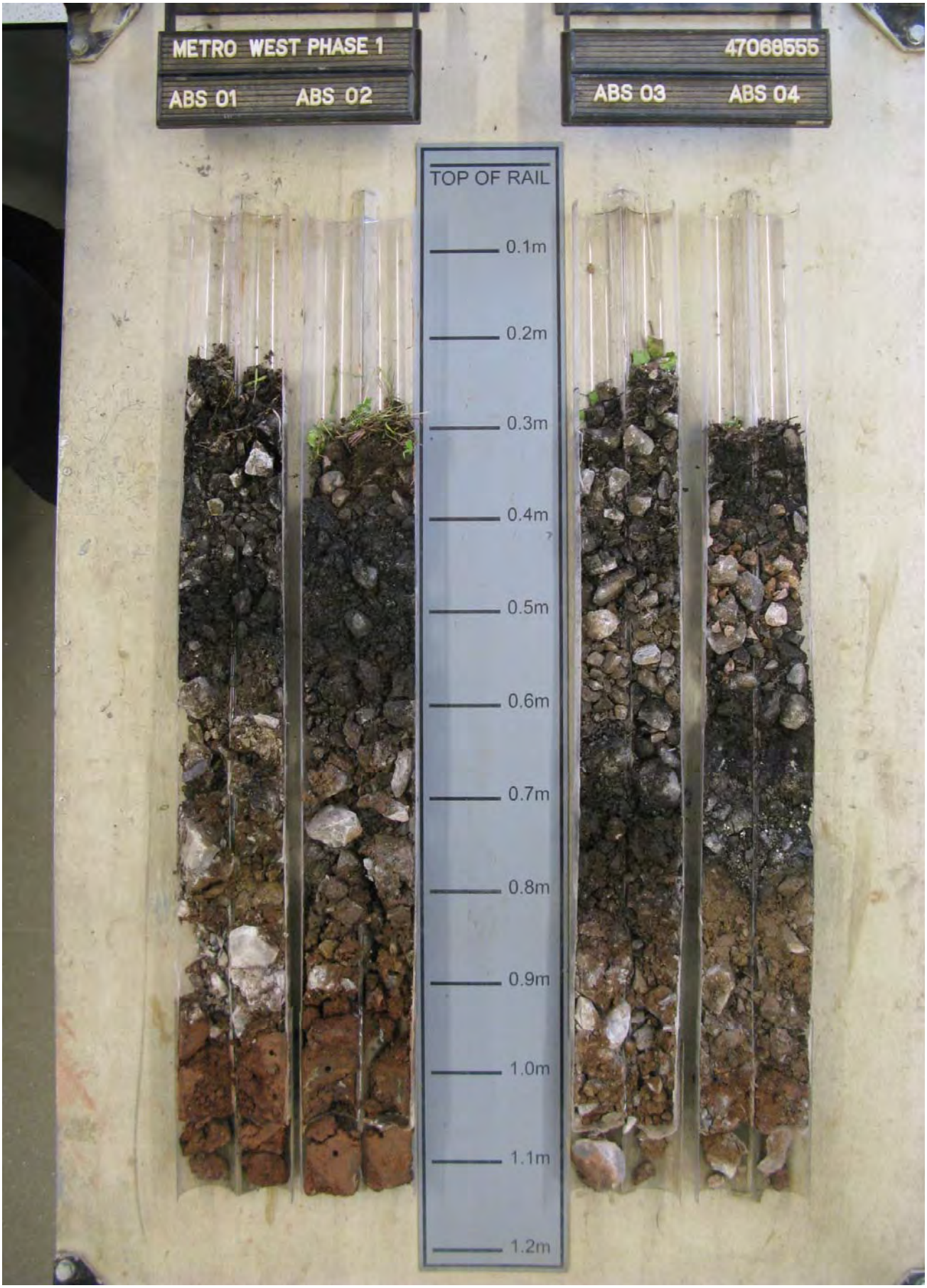
6 ADDITIONAL INFORMATION

g	permeable geotextile separator	**w**	water strike
c	permeable geocomposite	**ws**	water standing
m	reinforcing mesh (geogrid)	**34**	shear strength kN/m^2
p	impermeable membrane (polythene)		
h	impermeable geocomposite		
c-gs	Geosand		
c-tt	Tracktex		
g+m	PW4.0LA / TED4		
hs	evidence of historical slurrying		
e	likely chemical contamination		
L	>10% limestone ballast		

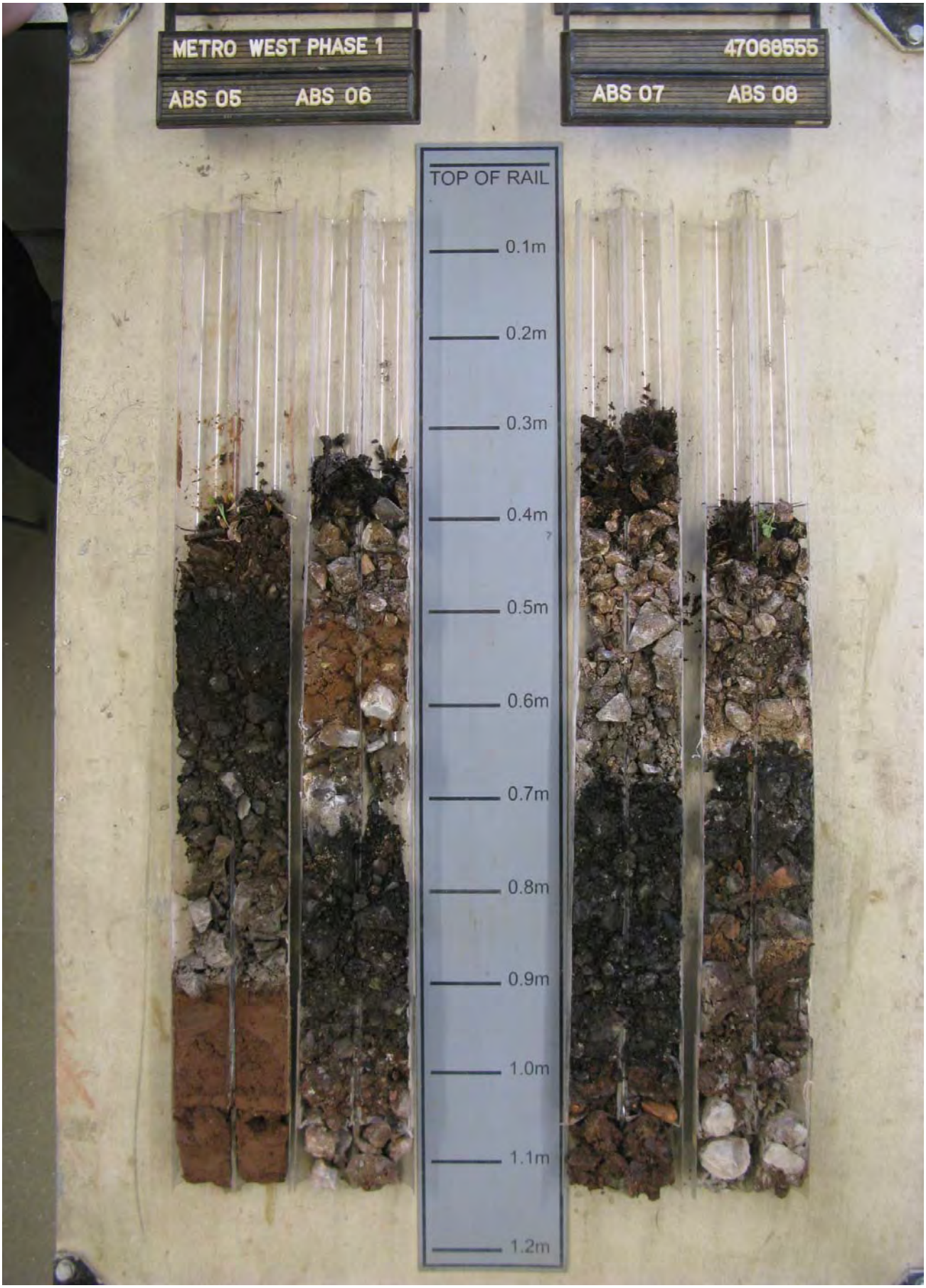
Prepared	AG	FIGURE 1B	URS
Checked	DK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	LONGITUDINAL SECTION LEGEND KEY	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

APPENDIX A:

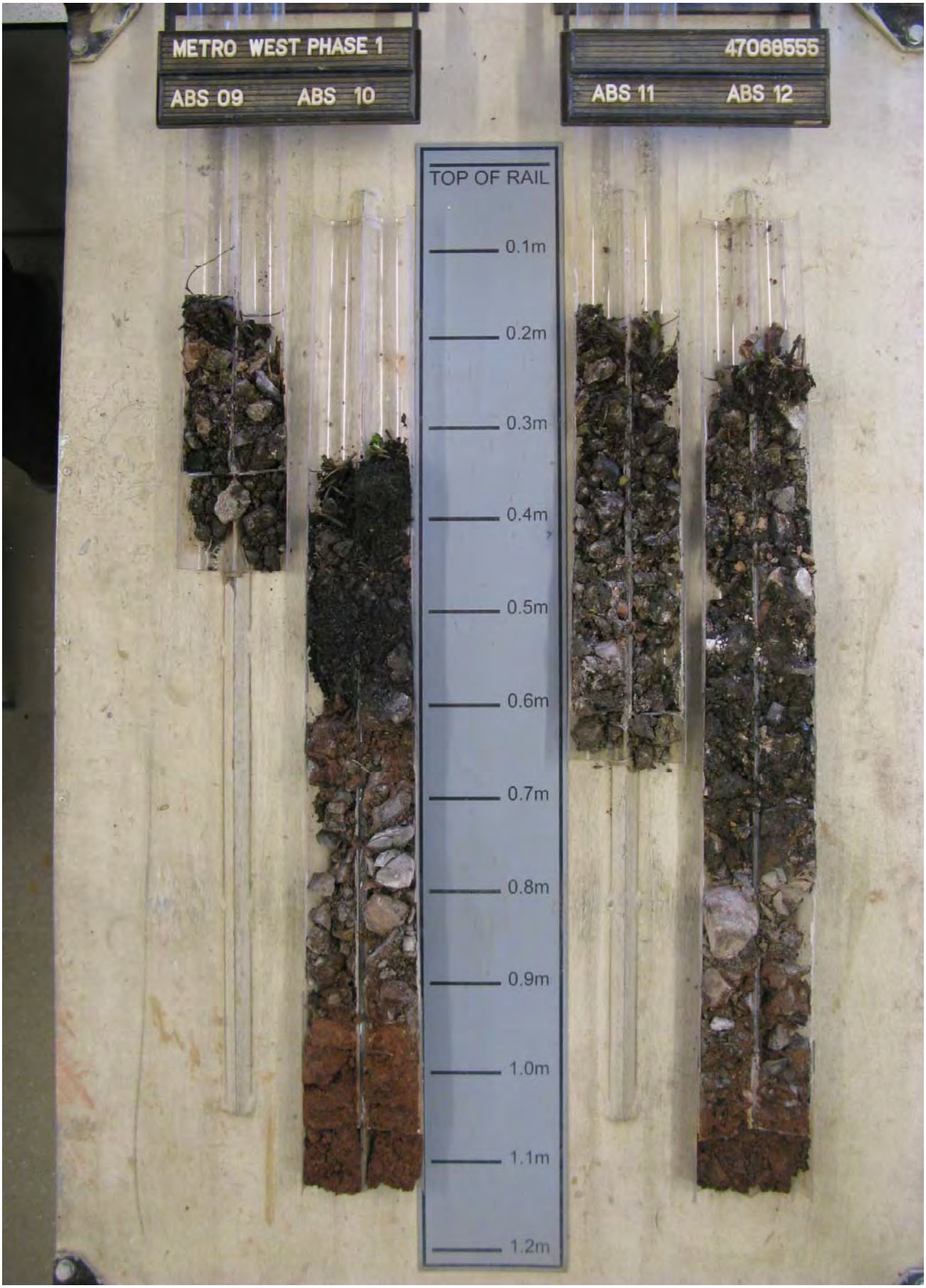
ABS PHOTOGRAPHIC LOGS



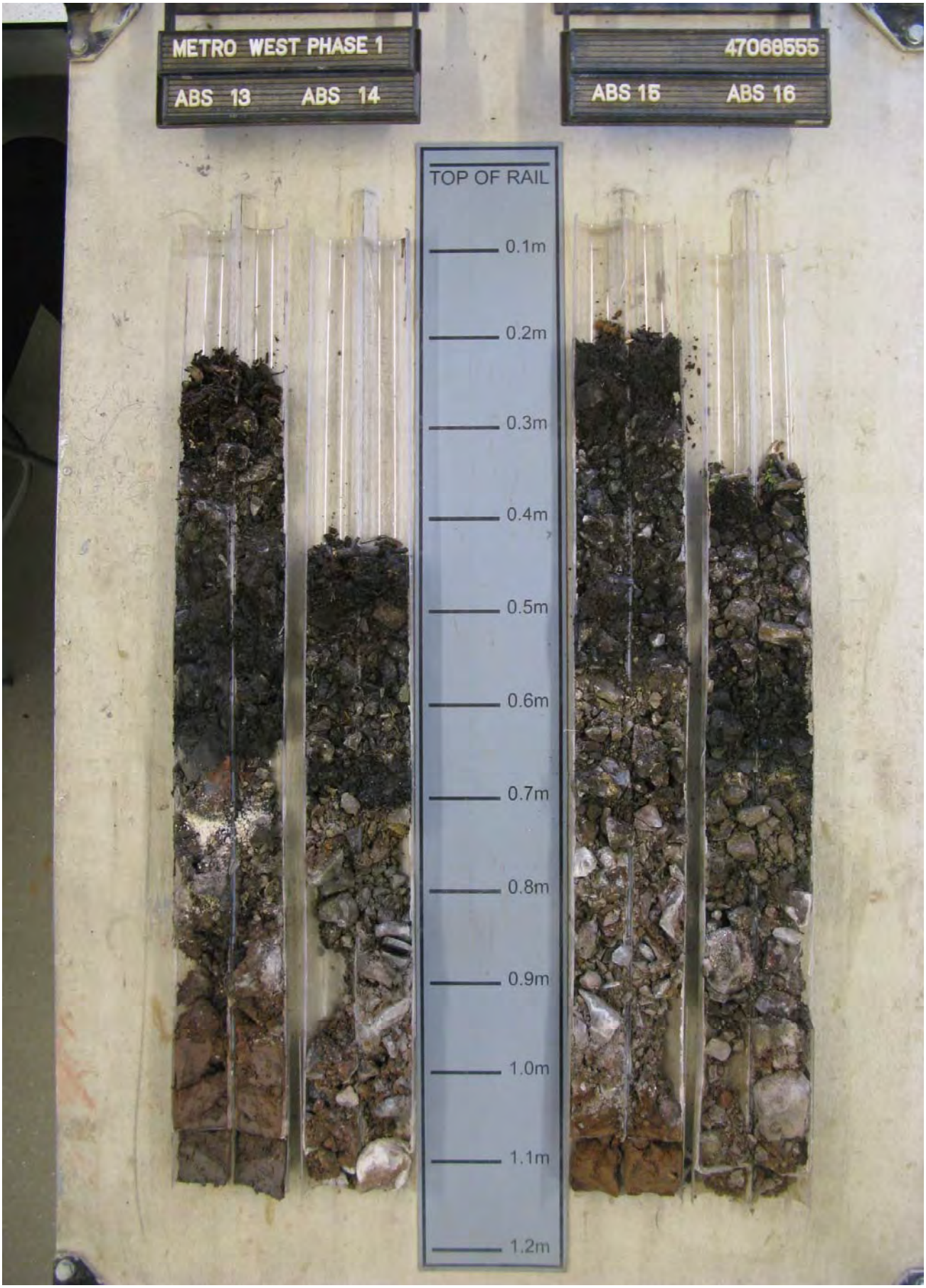
Prepared	AG	APPENDIX A - ABS 1 to ABS 4	URS
Checked	DGK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	ABS PHOTOGRAPHIC LOG	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	



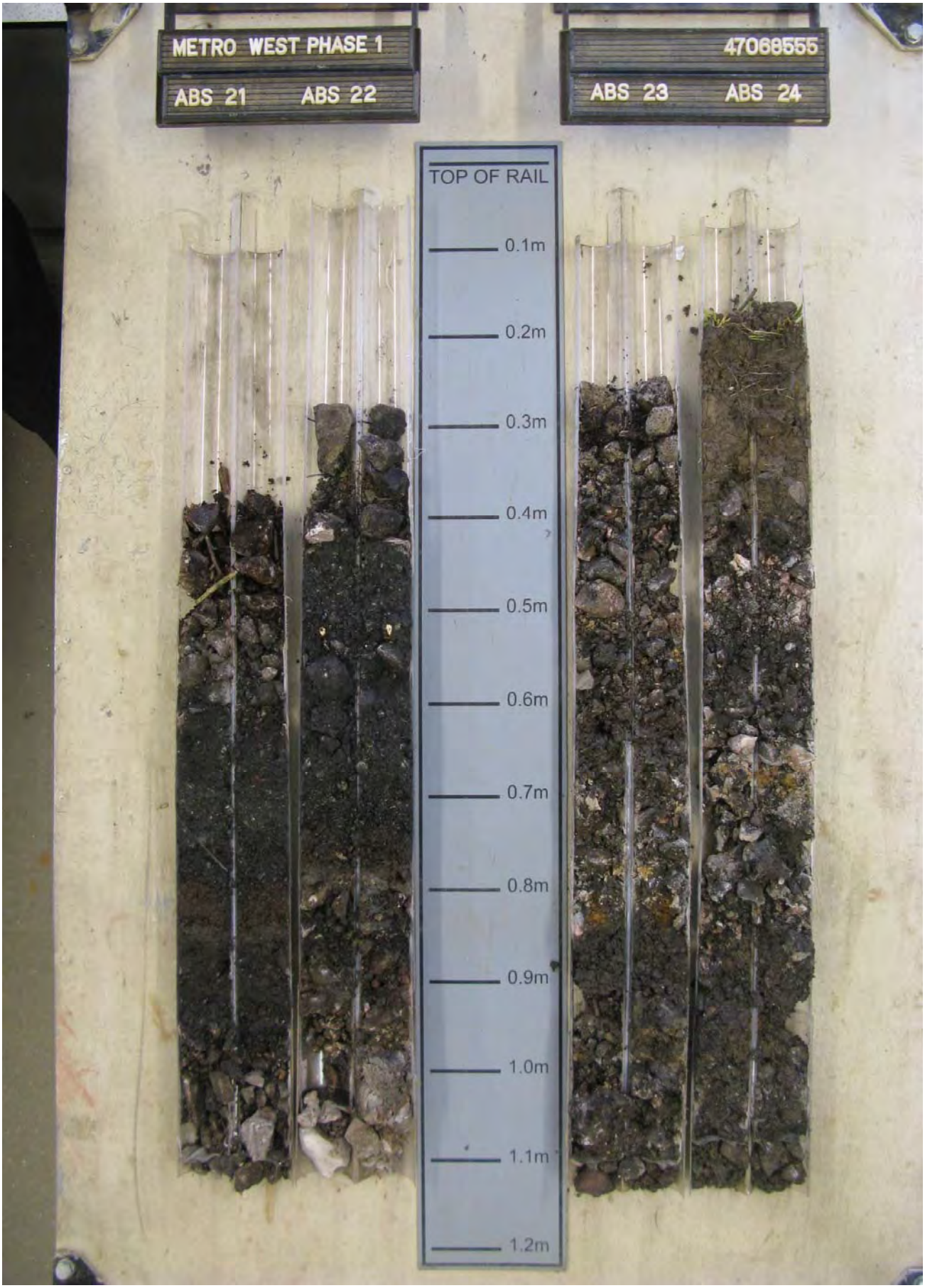
Prepared	AG	APPENDIX A - ABS 5 to ABS 8	URS
Checked	DGK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	ABS PHOTOGRAPHIC LOG	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	



Prepared	AG	APPENDIX A - ABS 9 to ABS 12	URS
Checked	DGK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	ABS PHOTOGRAPHIC LOG	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	



Prepared	AG	APPENDIX A - ABS 13 to ABS 16	URS
Checked	DGK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	ABS PHOTOGRAPHIC LOG	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	



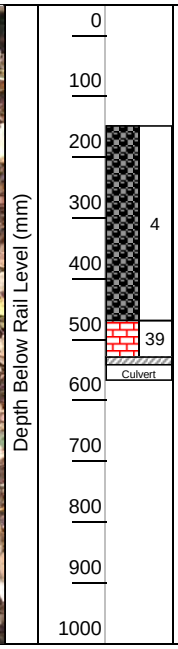
Prepared	AG	APPENDIX A - ABS 21 to ABS 24	URS
Checked	DGK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	ABS PHOTOGRAPHIC LOG	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

APPENDIX B:

TRIAL PIT LOGS

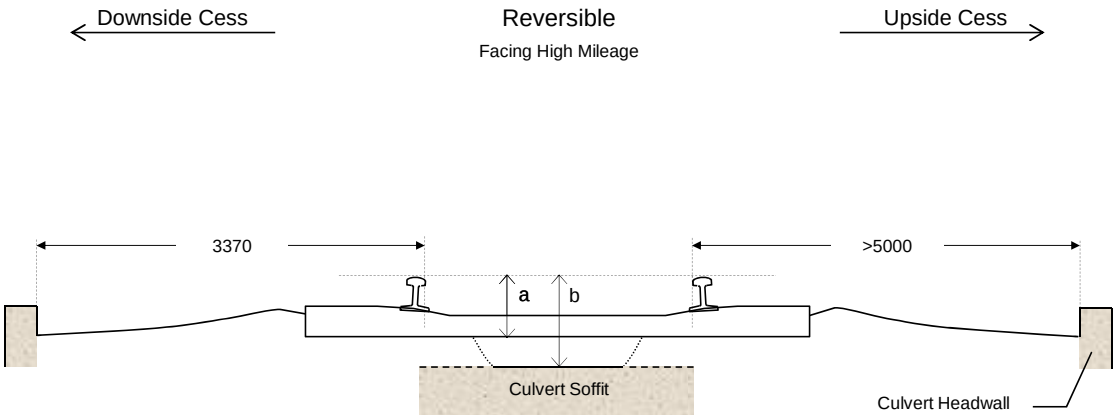
Trial Pit Details			
Pit Type / Number	DP ABS 9	Trial Pit Purpose	Assess clearances to Culvert
Mileage	127m 915y	Reason for termination	Structure encountered
Line	Reversible		
Position	4ft	Structure Reference	Unknown
Rail Type	Flat Bottom JR	**Trackbed conditions encountered (mm below rail level)**	
Sleeper Type	Timber	Wet Material	None
Weather Prior SI	Dry	Standing Water	None
Weather During SI	Dry	Slurry Material	None
Date of Inspection	03/04/2014	Geosynthetics Depth	None
Inspected by	JWM	Geosynthetics Type	N/A

Trial Pit Photo(s) and Material Log



Remarks

Trial Pit Sketch (with approximate dimensions of excavation and structures in mm)



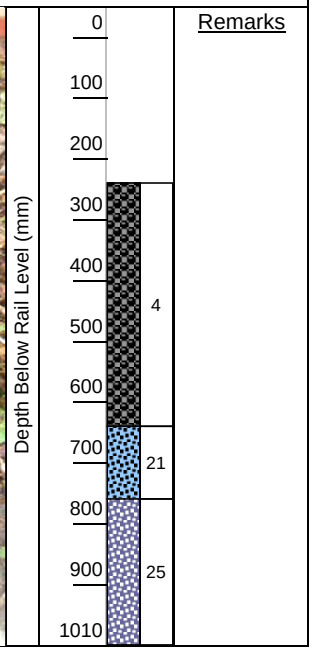
Notes / Comments	Sketch Dimensions
Sketch not to scale. Mileage and Yardage are approximate values as no mileposts were present on site. ABS converted to DP during the site investigation to confirm cause of shallow refusal. DP refused at a depth of 530mm brl on culvert structure.	a= 300 mm b= 530 mm

Prepared	JWM	APPENDIX B - DP ABS 9 **Metrowest Phase 1 - Trackbed Investigation** TRIAL PIT LOG POD - REVERSIBLE	URS
Checked	DGK		
Job No	47070043		
Date	Apr '14		

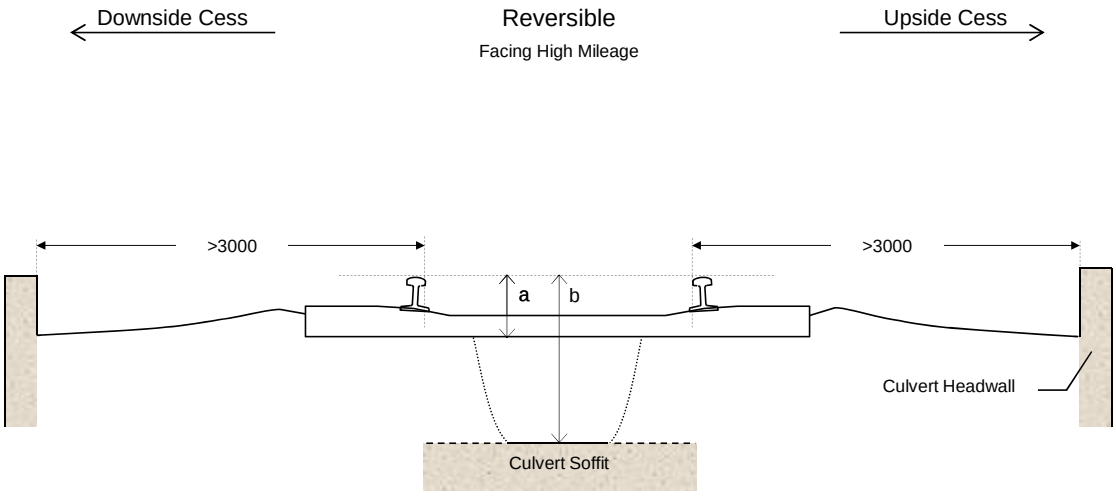
Trial Pit Details

Pit Type / Number	DP ABS 20	Trial Pit Purpose	Assess clearances to Culvert
Mileage	128m 913y	Reason for termination	Design depth achieved
Line	Reversible		
Position	4ft	Structure Reference	Unknown
Rail Type	Flat Bottom JR	**Trackbed conditions encountered (mm below rail level)**	
Sleeper Type	Timber	Wet Material	None
Weather Prior SI	Wet	Standing Water	None
Weather During SI	Dry	Slurry Material	None
Date of Inspection	02/04/2014	Geosynthetics Depth	None
Inspected by	JWM	Geosynthetics Type	N/A

Trial Pit Photo(s) and Material Log



Trial Pit Sketch (with approximate dimensions of excavation and structures in mm)



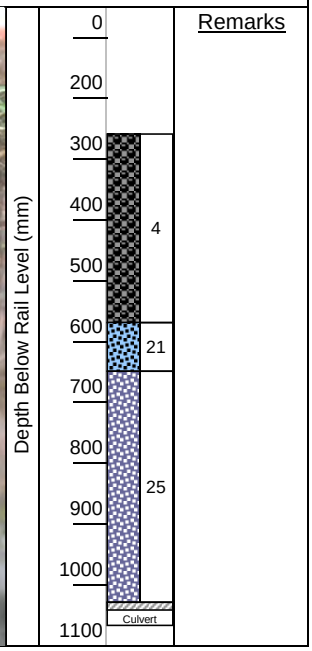
Notes / Comments	Sketch Dimensions
Sketch not to scale. Mileage and Yardage are approximate values. ABS 9 converted to DP during site investigation due to track access. DP completed at a depth of 1010mm brl, culvert soffit encountered at base of DP.	a= 300 mm b= 1010 mm

Prepared	JWM	APPENDIX B - DP ABS 20 **Metrowest Phase 1 - Trackbed Investigation** TRIAL PIT LOG POD - REVERSIBLE	URS
Checked	DGK		
Job No	47070043		
Date	Apr '14		

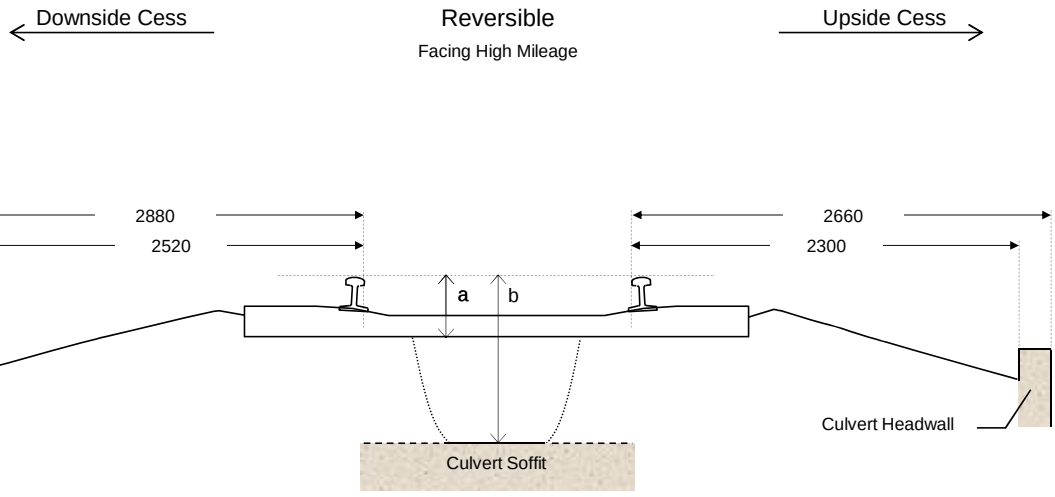
Trial Pit Details

Pit Type / Number	DP ABS 17	Trial Pit Purpose	Assess clearances to Culvert
Mileage	128m 923y	Reason for termination	Structure encountered
Line	Reversible		
Position	4ft	Structure Reference	Unknown
Rail Type	Flat Bottom JR	**Trackbed conditions encountered (mm below rail level)**	
Sleeper Type	Timber	Wet Material	None
Weather Prior SI	Wet	Standing Water	None
Weather During SI	Wet	Slurry Material	None
Date of Inspection	02/04/2014	Geosynthetics Depth	None
Inspected by	JWM	Geosynthetics Type	N/A

Trial Pit Photo(s) and Material Log



Trial Pit Sketch (with approximate dimensions of excavation and structures in mm)

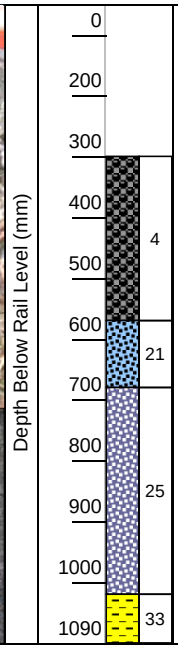


Notes / Comments	Sketch Dimensions
Sketch not to scale. Mileage and Yardage are approximate values. ABS 17 converted to DP during site investigation due to track access. DP completed at a depth of 1040mm brl, culvert soffit encountered at base of DP.	a= 330 mm b= 1040 mm

Prepared	JWM	APPENDIX B - DP ABS 17 **Metrowest Phase 1 - Trackbed Investigation** TRIAL PIT LOG POD - REVERSIBLE	URS
Checked	DGK		
Job No	47070043		
Date	Apr '14		

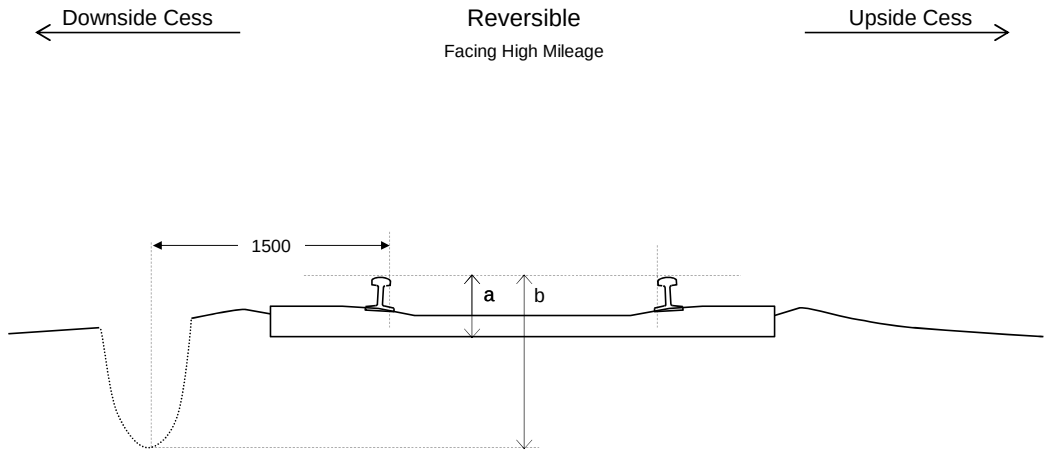
Trial Pit Details			
Pit Type / Number	DP ABS 18	Trial Pit Purpose	ABS Replacement
Mileage	128m 1385y	Reason for termination	Design depth achieved
Line	Reversible		
Position	Cess	Structure Reference	N/A
Rail Type	Flat Bottom JR	**Trackbed conditions encountered (mm below rail level)**	
Sleeper Type	Timber	Wet Material	None
Weather Prior SI	Wet	Standing Water	None
Weather During SI	Wet	Slurry Material	None
Date of Inspection	02/04/2014	Geosynthetics Depth	None
Inspected by	JWM	Geosynthetics Type	N/A

Trial Pit Photo(s) and Material Log



Remarks

Trial Pit Sketch (with approximate dimensions of excavation and structures in mm)

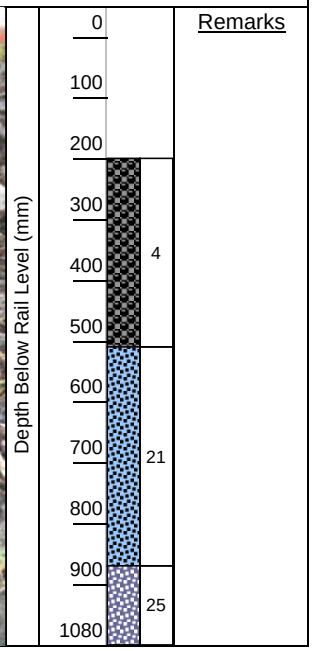


Notes / Comments	Sketch Dimensions
Sketch not to scale. Mileage and Yardage are approximate values. ABS 18 converted to DP during site investigation due to track access. DP advanced at a lateral offset of 1500mm from the downside rail and completed at a depth	a= 330 mm b= 1090 mm

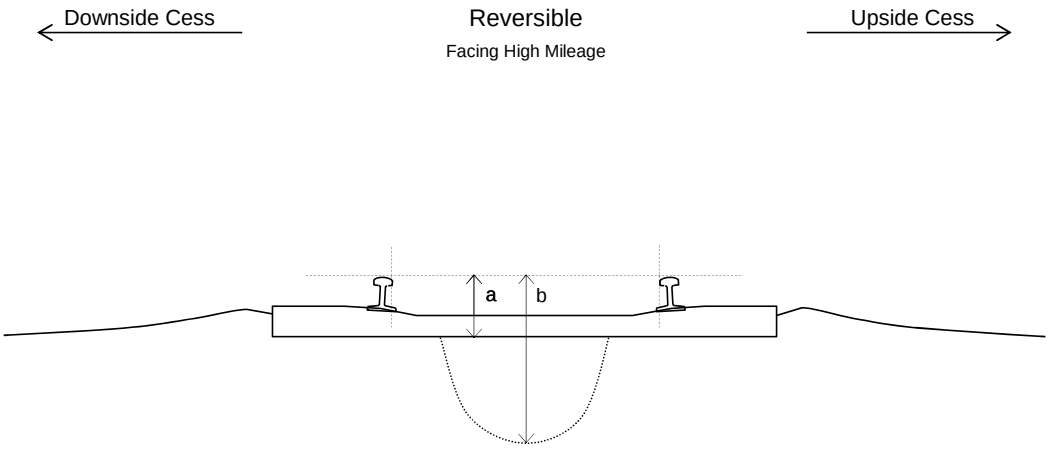
Prepared	JWM	APPENDIX B - DP ABS 18	URS
Checked	DGK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	TRIAL PIT LOG	
Date	Apr '14	POD - REVERSIBLE	

Trial Pit Details			
Pit Type / Number	DP ABS 19	Trial Pit Purpose	ABS Replacement
Mileage	128m 1463y	Reason for termination	Design depth achieved
Line	Reversible		
Position	4ft	Structure Reference	N/A
Rail Type	Flat Bottom JR	**Trackbed conditions encountered (mm below rail level)**	
Sleeper Type	Timber	Wet Material	None
Weather Prior SI	Wet	Standing Water	None
Weather During SI	Dry	Slurry Material	None
Date of Inspection	02/04/2014	Geosynthetics Depth	None
Inspected by	JWM	Geosynthetics Type	N/A

Trial Pit Photo(s) and Material Log



Trial Pit Sketch (with approximate dimensions of excavation and structures in mm)



Notes / Comments	Sketch Dimensions
Sketch not to scale. Mileage and Yardage are approximate values. ABS 19 converted to DP during site investigation due to track access. DP completed at a depth of 1080mm brl.	a= 300 mm b= 1080 mm

Prepared	JWM	APPENDIX B - DP ABS 19 **Metrowest Phase 1 - Trackbed Investigation** TRIAL PIT LOG POD - REVERSIBLE	URS
Checked	DGK		
Job No	47070043		
Date	Apr '14		

URS

Trackbed Investigation

METROWEST PHASE 1 Interpretative Report

WESTERN

April 2014

47070043/WT/PL/140569/2

Prepared for:
Network Rail

UNITED KINGDOM & IRELAND

REVISION SCHEDULE					
Rev	**Date**	**Details**	**Prepared by**	**Reviewed by**	**Approved by**
1	April 2014	Factual Report	Jacob Matthews Graduate Engineer	Dave Kite Principal Engineer	Craig Govan Principal Engineer
2	April 2014	Interpretative Report	Jacob Matthews Graduate Engineer	Dave Kite Principal Engineer	Craig Govan Principal Engineer

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FIGURES

APPENDICES

1 INTRODUCTION

1.1 Background

Network Rail have commissioned URS (under NR3 Contract) on behalf of North Somerset Council and West of England Councils to produce a feasibility report updating the previously issued "Option Selection Report GRIP Stage 3 Portishead re-opening". As part of this report, Trackbed Investigation has been requested to understand the condition of the trackbed below the redundant track.

This Interpretative Report supersedes and incorporates all data provided in the Factual Report. The report contains appendices and figures with details of ABS and Trial Pit samples taken during the site work shifts (2-3 April 2014) and also photographs from the walkover survey. This report also includes recommendations in relation to the renewal of the trackbed required prior to the reinstatement of the redundant tracks.

1.2 Site Details

The key information is provided below along with actual investigation mileages completed on site.

REFERENCE DETAILS					
Site Name	**UID**	**ELR**	**Line Name / Track ID**	**Renewal Mileage**	**Issue No. / Date**
MetroWest Phase 1	140569	POD	Reversible	126m 728y to 129m 880y	2 / April 2014

Notes: UID – Unique Identification, ELR – Engineers Line Reference

SITE INVESTIGATION MILEAGE		
Planned Site Investigation	**Actual Site Investigation**	**Reference Milepost / Feature**
126m 945y to 129m 616y	126m 1043y to 129m 616y	No mileposts present on site, therefore sample locations were recorded using with GPS and scaled from OS Mapping.

The future planned traffic levels (EMGTPA) have not been provided to URS at this time, although the Client has advised that the Track Category will be no higher than a Category 4.

2 INVESTIGATION SCOPE OF WORK

2.1 Desk Study

Since this site is on track which has been redundant for decades, many of the usual desk study data sources are unavailable (track geometry data, GPR data, OMNICOM, etc.). Desk study has encompassed reviewing geological mapping and aerial photos as well as information from previous reporting (GRIP Stage 3).

2.2 Scope of Site Works

The actual investigation completed is summarised in the table below and the results detailed in Figure 1 and Appendices A-B. Any non-compliance between the required Site Investigation and the actual Site Investigation is justified and mitigated against in Section 2.3.

SCOPE OF INVESTIGATION		
Activity	**Required**	**Completed**
Walkover Survey	Y	Y
Drainage Investigation	N	N
Ballast Contamination Sampling	Y	Y
Structural Investigation	Y	Y
Trial Pit Investigation	N	Y
ABS Investigation	Y	Y
Trial Trench Investigation	N	N
LWD Investigation	N	N
Environmental Noise Notice	N	N

Notes:

1. Trial pits used to replace ABS samples where access constraints existed during site work.

2.3 Site work deficiency and mitigation

Prior to the investigation, sample locations and offset positions were scoped by Peter Hillier (URS Associate, Track Design Lead) and agreed by Jacob Matthews (Trackbed Engineer). Sample positions were completed as planned during the site work with the exception of five samples (ABS 1, 4, 6, 12 & 21). These samples were moved due to heavy vegetation which restricted site access in the planned locations.

The following samples were converted from ABS (1.2m core samples) to Deep Pits (hand excavated trial pits): ABS 9, 17, 18, 19 & 20.

2.4 Trackbed Sample Locations

The following table shows the actual locations of the samples completed on site:

TRACKBED SAMPLE LOCATION TABLE							
Type	**No.**	**ELR**	**Position**	**Offset[1]**	**Mile**	**Yard**	**Comments**
ABS	1	POD	Cess	Down SE	126	1043	
ABS	2	POD	Cess	Down + 2m	126	1252	
ABS	3	POD	4ft	-	126	1430	Culvert soffit not encountered
ABS	4	POD	Cess	Down SE	126	1650	
ABS	5	POD	Cess	Down + 2m	127	61	
ABS	6	POD	Cess	Down + 1.5m	127	548	
ABS	7	POD	4ft	-	127	760	Culvert soffit not encountered
ABS	8	POD	Cess	Down + 2m	127	827	
ABS	9	POD	4ft	-	127	915	Sample replaced by DP 9 due to ABS refusal
DP	ABS 9	POD	4ft	-	127	915	Culvert soffit encountered
ABS	10	POD	Cess	Down + 1m	127	1206	
ABS	11	POD	4ft	-	127	1320	Culvert soffit encountered
ABS	12	POD	Cess	Down SE	127	1350	Relocated due to possible buried services
ABS	13	POD	Cess	Up + 2m	128	45	
ABS	14	POD	4ft	-	128	310	Culvert soffit not encountered
ABS	15	POD	4ft	-	128	370	
ABS	16	POD	4ft	-	128	722	
DP	ABS 17	POD	4ft	-	128	913	Culvert soffit encountered
DP	ABS 18	POD	Cess	Down + 1.5m	128	923	ABS converted to trial pit due to difficulty with site access, culvert soffit encountered
DP	ABS 19	POD	Cess	Down + 2m	128	1385	ABS converted to trial pit due to difficulty with site access
DP	ABS 20	POD	4ft	-	128	1463	Culvert soffit encountered
ABS	21	POD	Cess	Down + 1.5m	129	158	
ABS	22	POD	Cess	Down + 1.5m	129	364	
ABS	23	POD	Cess	Down + 1.5m	129	563	
ABS	24	POD	6ft	-	129	616	Located in 6ft between POD Up and Down tracks

Notes:

1. Offset values are given relative to the nearest running rail on the downside or upside. SE indicates sample taken at sleeper end.

3 INTERPRETATION AND RECOMMENDATIONS

3.1 Site Description

The site relates to approximately 3 miles of redundant track situated between Portbury Dock Junction and Portishead, predominantly single track with a short section of dual track at the Portishead (high mileage) end. The track has been disused for a number of decades and is currently overgrown with heavy vegetation. There are no notable topographical features, the track is situated at grade throughout the site.

3.2 Trackbed

A total of 24 trial pit and ABS samples have been taken to a depth of 1.2m below top of existing rail level through the site. Samples have been spaced regularly through the site, although due to heavy vegetation restricting the access, there are gaps of up to 450 yards between samples in places. Some of the samples have also been positioned to target locations of culverts. All of the samples were planned as ABS (a shallow windowless core sampling technique) although due to access restrictions, hand excavated trial pits have replaced ABS in several locations.

Samples show the upper trackbed has been predominantly covered by 50-100mm of organic soil which has intermixed with the underlying materials which make up the trackbed – mainly degraded ballast, coarse ash and other coarse granular materials. Trackbed materials are contaminated to varying extents by clay.

Below the soil, upper trackbed materials are mainly the aged and degraded original ballast (of igneous and calcareous rock) the thickness of which is variable, but often extending to a depth of 200mm below the existing sleeper base. Coarse ash material is typically underlying the former ballast layer.

At the base of the trackbed, a coarse granular material has often been encountered, which in many cases is described as clayey. This material was also observed to contain possible pitching stone, particularly in the trial pits where larger stones were recovered. This material was historically used to cap clay subgrades to prevent upward migration of the clay into the ballast material above.

3.3 Subgrade

Eight of the 24 samples undertaken encountered a clay subgrade, likely to be the natural geology in this area (which consists of a bedrock geology of Mercia Mudstone Group and a superficial geology of tidal flat deposits, both of which comprise clay and silt materials). Samples show this subgrade to consist of a firm to stiff clay, with the surface of the clay at a depth of 0.9m-1.0m below existing rail level.

3.4 Drainage

There was no lineside drainage visible during the walkover survey. There are thought to be drainage ditches in either Cess through some of the site (particularly towards Portishead) although heavy vegetation prevented identifying their extents.

The drainage characteristics of the current trackbed are not relevant since the track is redundant and will be renewed prior to traffic running.

3.5 Structures

Details of the structures encountered on site are summarised in the table below. Please refer to supporting Figures and Appendices for details of samples taken at structures. Also note that clearances to structures have been measured relative to the position of the existing redundant track, rather than the proposed track position.

STRUCTURES						
Structure Type	**Structure Name / Reference**	**From (m,y)**	**To (m,y)**	**Sample Ref.[1]**	**Minimum Vertical Depth[2] (mm)**	**Minimum Lateral Clearance[3] (mm)**
Concrete Deck Overbridge	M5	126m 1290y	126m 1350y	None	N/A	N/A
Underbridge	Agricultural underpass	126m 1430y		3	1200[4]	N/A
Brick Arch Overbridge	Marsh Lane	127m 60y		None	N/A	N/A
Concrete Deck Overbridge	Royal Portbury Dock Road	127m 513y	127m 540y	None	N/A	N/A
Culvert	N/A	127m 760y		7	1200[4]	N/A
Culvert	N/A	127m 915y		9	530	3370
Culvert	N/A	127m 1320y		11	760	N/A
Brick Arch Overbridge	Station Road	127m 1749y		None	N/A	N/A
Culvert	N/A	128m 310y		14	1200[4]	N/A
Culvert	N/A	128m 923y		17	1040	2300
Brick Arch Overbridge	Sheepway Bridge	128m 1222y		None	N/A	N/A
Culvert	N/A	128m 1463y		20	1010	>3000

Notes:

1. Refer to Figure 1A and Appendix A & B for details of samples.
2. All depths referenced from top of existing rail unless otherwise stated.
3. All lateral clearances referenced from running edge of the associated Cess rail of existing track unless otherwise stated.
4. Samples targeted in 4ft of existing track on structures, however culvert decks not encountered.

3.6 Ballast Contamination Testing

Chemical Testing results are shown in Appendix D. Results should be sent to NDS and Route Delivery Project Manager who will determine the extents of potential site contamination through HazWasteOnline system. The results of this assessment will be communicated by NDS directly to the Route Delivery Project Manager, outside the TBI process.

3.7 Condition Summary and Discussion

The current condition of the railway trackbed through this site is not suitable for the passage of traffic without complete renewal of the trackbed. The former ballast material is degraded, undersized and has been contaminated with fines. Soils and heavy vegetation cover the surface of the trackbed, with frequent shrubs, small and mature trees growing in the 4ft and Cess of the track.

Along with former ballast, ash and other coarse granular materials constitutes the trackbed, which in many places is contaminated by cohesive fines. This clayey material, if not removed, could pose a risk to the stability of the trackbed, as the dynamic loading of train axles combined with high moisture content can cause upward migration of fines. This will potentially lead to wet beds, poor geometry, maintenance issues, requiring a full renewal of the trackbed.

Sampling of the subgrade material has not identified any obvious issues with poor support conditions or variable stiffness, with all of the underlying clay subgrade being identified as stiff or firm. However, this information is typically supplemented with GPR data and/or track geometry data (only available for trafficked sites) which assist with identifying these types of problems. It is feasible that problems of this nature may evolve as the track is opened and trafficked, although there are no current signs from the limited trackbed investigation which has so far taken place.

Of the structures identified on site, two culverts where shown to have soffits at shallow depths below the track. The deck of one of the culverts (127m 915y) was encountered at a depth of 530mm below rail level (230mm below the existing sleeper base). The deck of the second culvert (127m 1320y) was encountered at a depth of 760mm below rail level (460mm below the sleeper base). There were no other shallow decks or narrow lateral clearances at structures to note.

3.8 Design Recommendations

The following table details the recommended trackbed design:

TRACKBED DESIGN – PLAIN LINE

From (m,y)	To (m,y)	Minimum Excavation Width (mm)	Continuous Crossfall Direction / Gradient	Ballast Depth bsb (mm)	Blanket Treatment	Geosynthetic
126m 728y	126m 1760y	3900	Down Cess / 1:30	200	N/A	Robust Separator
126m 1760y	127m 170y	3900	Down Cess / 1:30	250	50mm Sand Blanket	Separator (NP)
127m 170y	127m 1639y	3900	Down Cess / 1:30	200	N/A	Robust Separator
127m 1639y	128m 99y	3900	Down Cess / 1:30	250	50mm Sand Blanket	Separator (NP)
128m 99y	128m 1112y	3900	Down Cess / 1:30	200	N/A	Robust Separator
128m 1112y	128m 1332y	3900	Down Cess / 1:30	250	50mm Sand Blanket	Separator (NP)
128m 1332y	129m 880y	3900	Down Cess / 1:30	200	N/A	Robust Separator

Design Justification:

1. For a track of Category 4 or 5 the minimum ballast thickness below sleeper base is 200mm.
2. A robust separator geotextile is required to underlay the ballast and prevent the possibility of cohesive fines migrating upwards into the new ballast layer.
3. A separator overlying the sand blanket is required to prevent migration of sand particles into the overlying new ballast layer.
4. A sand blanket has been specified in the vicinity of the bridge arch overbridges (where track lowering is likely) to prevent future subgrade erosion through this section.

3.9 Design Commentary

The proposed track category for the site stipulates a minimum ballast thickness of 200mm below the sleeper base. With a typical CWR and concrete sleepered track with standard trackbed crossfall, this would result in ballast extending to a depth of 660mm below the rail level. Since the track levels are not proposed to change (with the exception of close to the brick arch overbridges) it can be assumed that material will be excavated to this depth.

As discussed, much of the lower trackbed materials are contaminated with clay, therefore to mitigate against potential migration of cohesive fines, a robust separator has been specified. This will additionally prevent intermixing of lower trackbed materials with the clean ballast.

The material at the base of dig should have a crossfall to the downside (south side) Cess, which is away from the currently proposed platform and the existing cycle path which are both on the upside (north side) of the track. The crossfall should tie into any drainage provided on this side of the track.

Track lowering will be required in the vicinity of the three brick arch overbridges to allow for the installation of electrification infrastructure, due to the low vertical clearances. At this stage a maximum nominal lowering value of 300mm has been assumed at the bridge centres, with nominal ramp lengths of 200m to either side of the bridge.

Samples which have been taken in the vicinity of bridges are shown in the table below, with an estimation of the maximum dig depth at the sample locations. The max dig depth takes into account a depth of 250mm ballast and 50mm sand blanket.

TRACK LOWERING AT BRICK ARCH OVERBRIDGES				
Sample Ref.	**Structure Ref.**	**Distance from Overbridge (y)**	**Estimate value of track lowering at location (mm)**	**Estimated maximum dig depth at location (mm)**
ABS 4	Marsh Lane	171	44	814
ABS 5	Marsh Lane	0	300	1070
ABS 13	Station Road	56	216	986
ABS 19	Sheepway	163	56	826

The only sample which was taken at an overbridge location was ABS 5, where the material log shows the top of the (firm, very sandy clay) subgrade at 900mm below rail level. The maximum dig at this location (Marsh Lane Overbridge) will extend to a depth of 1070mm, which will disturb the subgrade material. Additionally, the max dig depth at ABS 13 is likely to disturb the subgrade (stiff clay) at this location and likely to be further disturbed closer to Station Road Overbridge where the track lowering will be greater.

It should be noted that although the other samples taken in the vicinity of the brick arch overbridges do not show subgrade material shallower than the max dig depths, a limited number of samples have been taken around the overbridges. It is recommended that further samples are taken to fully understand the subgrade depth local to the bridges, and whether the material will be disturbed. This will allow the limits of blanketing sand to be accurately defined and reduce construction costs and time related to the renewal.

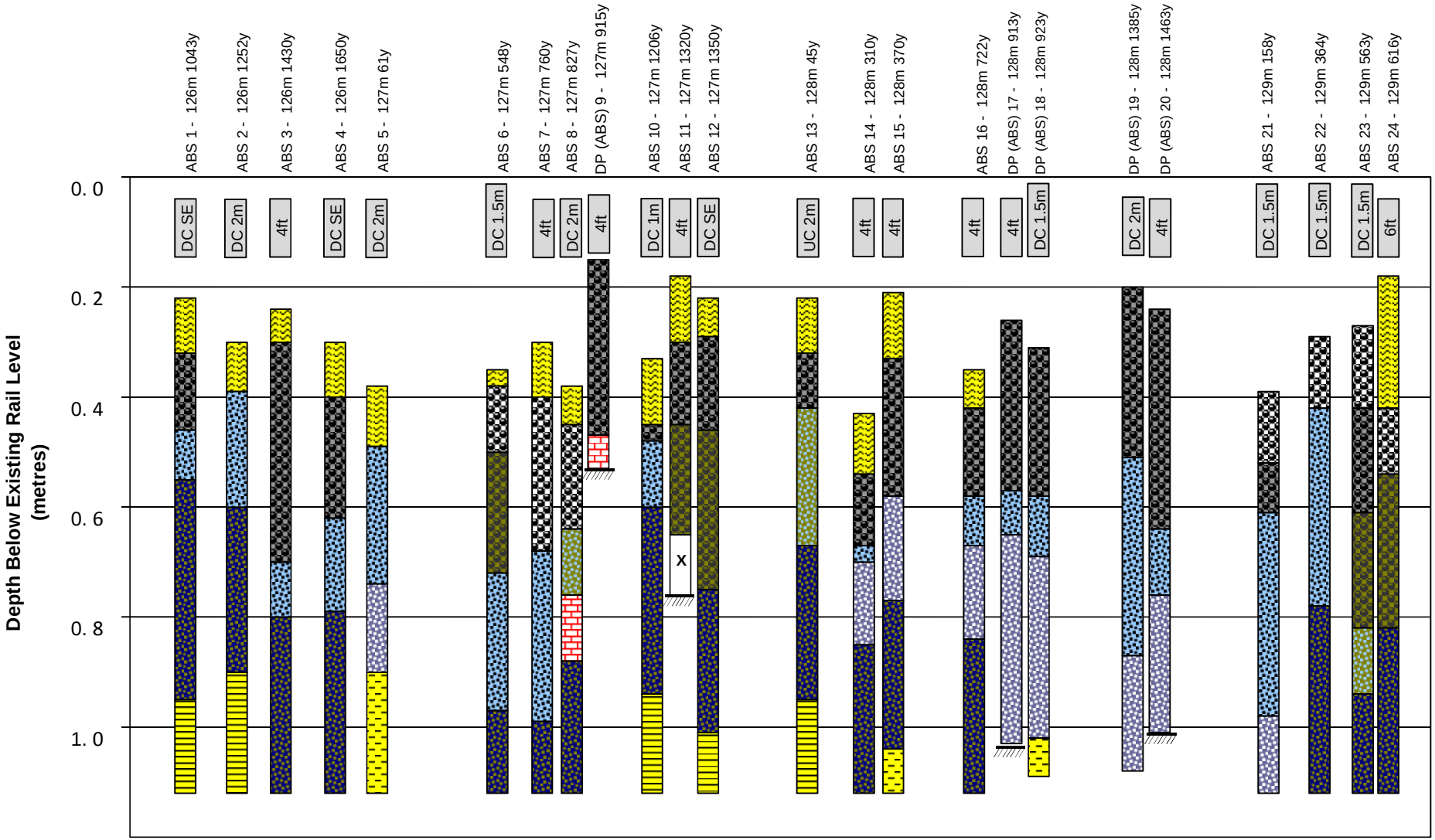
Presently, a precautionary 50mm sand blanket has been recommended 110y either side of each of the brick arch overbridges to prevent upward migration of the clay subgrade and improve drainage characteristics of the trackbed.

3.10 Drainage Recommendations

It is recommended that consideration be given to provision of at least Cess drainage channels to provide a path for effective drainage of water from the trackbed. The drainage characteristics of the site are not fully understood at this stage, although given that this area is historically reclaimed land, effective drainage is likely to be poor to satisfactory, with surcharging of the trackbed likely to be occurring during prolonged wet weather or extreme wet weather events.

FIGURE 1A:

LONGITUDINAL SECTION



Grey boxes show the lateral position of the samples relative to the existing redundant track

Abbreviations: DC = Down Cess UC = Up Cess SE = Sleeper End Xm = lateral offset distance of the sample measured from closest running rail in meters

Prepared	AG
Checked	DGK
Job No	47070043
Date	Apr '14

FIGURE 1A

Metrowest Phase 1 - Trackbed Investigation

LONGITUDINAL SECTION

POD - REVERSIBLE - 126m 1043y to 129m 616y

URS

FIGURE 1B:

LONGITUDINAL SECTION LEGEND KEY

1 BALLAST

a) With no subgrade erosion

1		Clean Ballast
2		Slightly Dirty Ballast
3		Dirty Ballast
4		Very Dirty Ballast (non-cohesive)
5		Very Dirty Ballast (cohesive)
6		Very Dirty Ballast (slurried)

b) With subgrade erosion

7		Slurried Ballast <10% fines
8		Slurried Ballast >10% fines
9		Ballast - Voids filled with silt/fine sand
10		Ballast - Voids filled with soft/firm clay

2 TRACKBED LAYERS / FILL

a) Derived from naturally occurring Sands and Gravels.

11		Fine / Medium Sand (<5%)	D = 0.06 to 0.60mm
12		Coarse Sand (<5%)	D = 0.60 to 2.00mm
13		Sand and Gravel (<5%)	
14		Clayey Sand and/or Gravel (5 to 20%)	
15		Slurried Sand and/or Gravel (5 to 20%)	

b) Quarry Products

16		Stone Dust (<5%)
17		Coarse Crushed Stone Aggregate (<5%)
18		Clayey / Silty Crushed Stone Aggregate (5 to 20%)
19		Slurried Crushed Stone Aggregate

(% refers to clay / silt content)

c) Ash

20		Fine ash (sand sized) (<5%)
21		Coarse ash (gravel sized) (<5%)
22		Clayey / silty Ash (5 to 20%)
23		Slurried Ash

d) Other granular trackbed materials

24		Fine grained, susceptible to erosion (<5%)
25		Coarse Granular Layer (<5%)
26		Clayey / silty Granular Layer (5 to 20%)
27		Slurried Granular Layer
28		Any of 2 a-d in a clay matrix (20 to 50%)

3 SUBGRADE

Use legends from section 2 where appropriate, legend with bold outline indicates natural ground

a) Organic soils, clays and silts

31		Organic Soil	
32		Soft Clay/Silt	Cu < 40kN/m^2
33		Firm Clay/Silt	Cu = 40 to 75kN/m^2
34		Stiff Clay/Silt	Cu = 75 to 150kN/m^2
35		Very Stiff / Hard / Very weak Mudstone Cu > 150kN/m2	

b) Mixed (Fine and Coarse) Soils

36		Unstratified (clayey/silty Coarse Soil OR sandy or gravelly Fine Soil)
37		Interbedded or weathered/weakly cemented fine grained rocks

c) Rock or Rockfill

38		Weak fine grained (mudstone, limestone, chalk, fine sandstone)
39		Moderately strong to hard rock

4 PITCHING LAYERS

29		Clean pitching
30		Slurried Pitching

5 SAMPLE LOSS IN ABS

0x	X	Soil penetrated by ABS, but not recovered
0d	D	Soil displaced by ABS - indicative of very soft soil

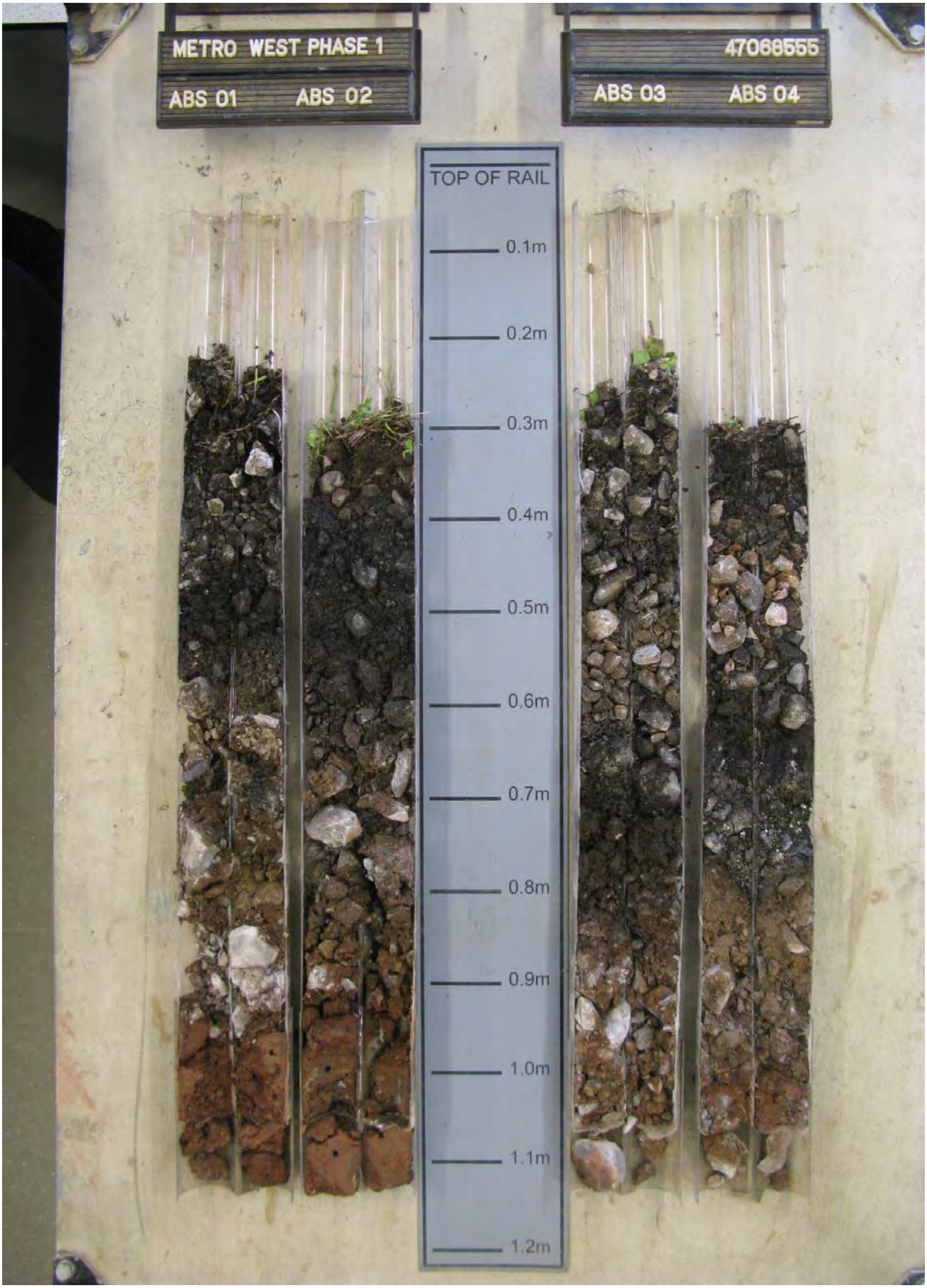
6 ADDITIONAL INFORMATION

g	permeable geotextile separator	**w**	water strike
c	permeable geocomposite	**ws**	water standing
m	reinforcing mesh (geogrid)	**34**	shear strength kN/m^2
p	impermeable membrane (polythene)		
h	impermeable geocomposite		
c-gs	Geosand		
c-tt	Tracktex		
g+m	PW4.0LA / TED4		
hs	evidence of historical slurrying		
e	likely chemical contamination		
L	>10% limestone ballast		

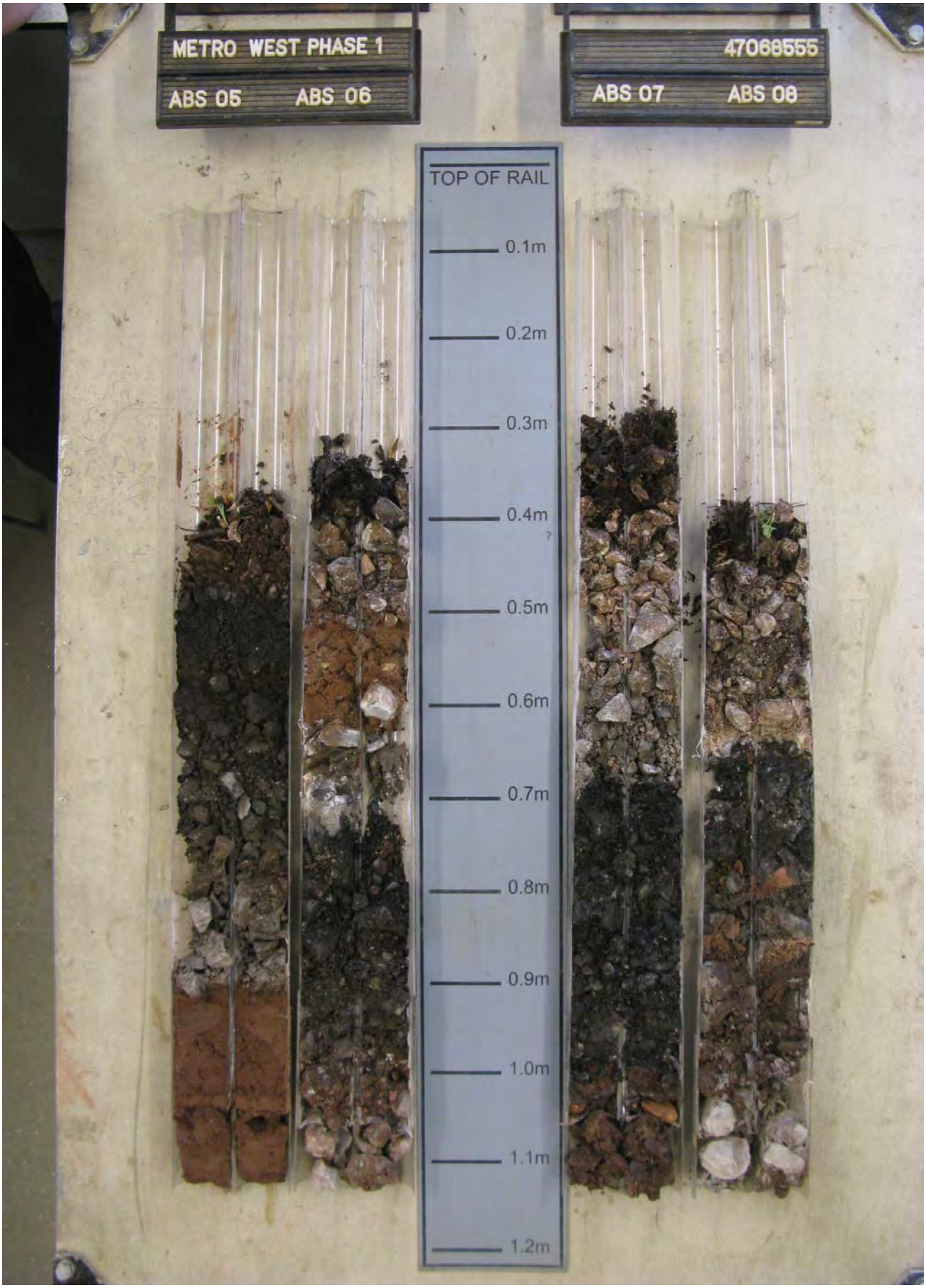
Prepared	AG	FIGURE 1B	URS
Checked	DK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	LONGITUDINAL SECTION LEGEND KEY	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

APPENDIX A:

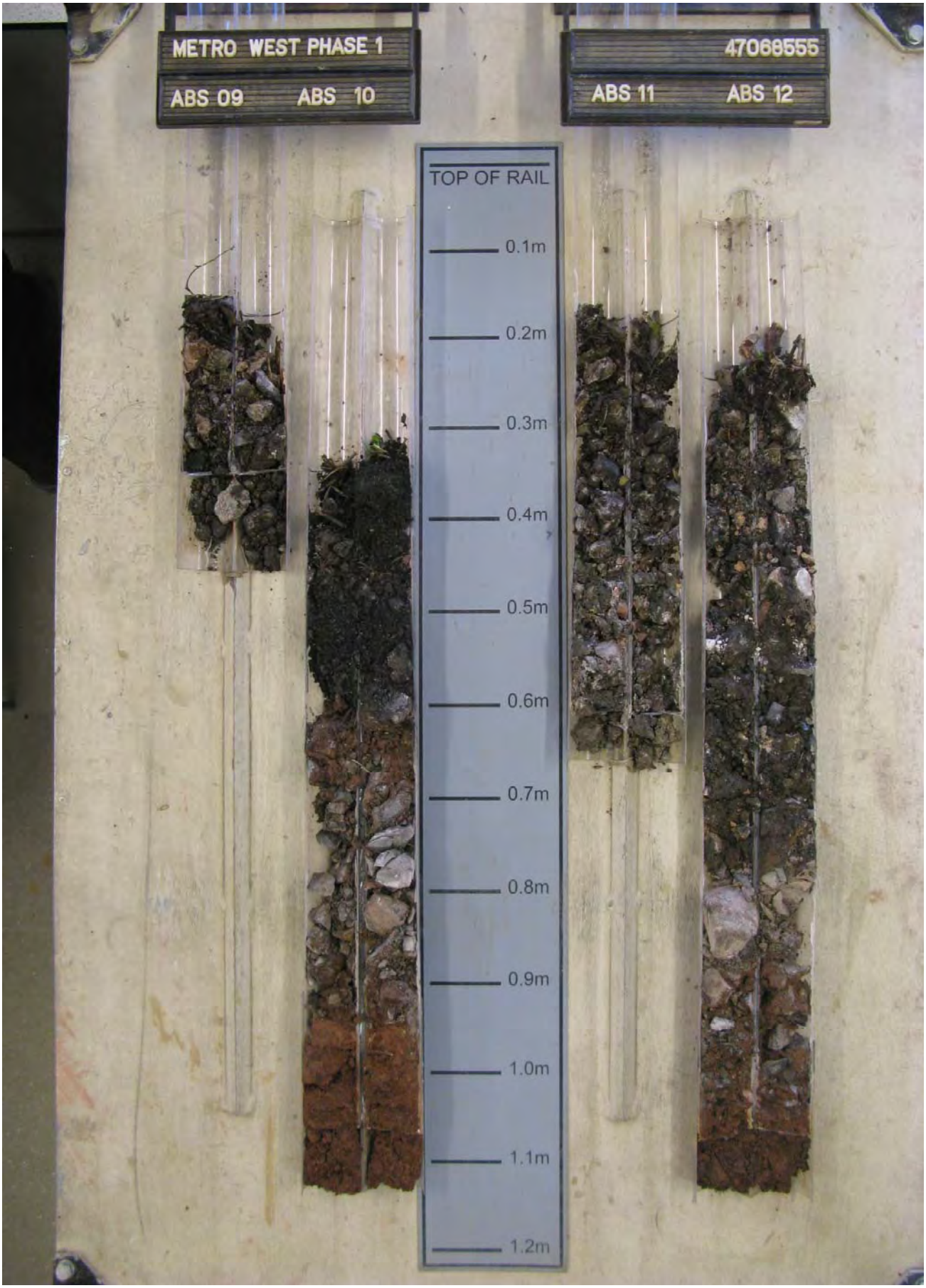
ABS PHOTOGRAPHIC LOGS



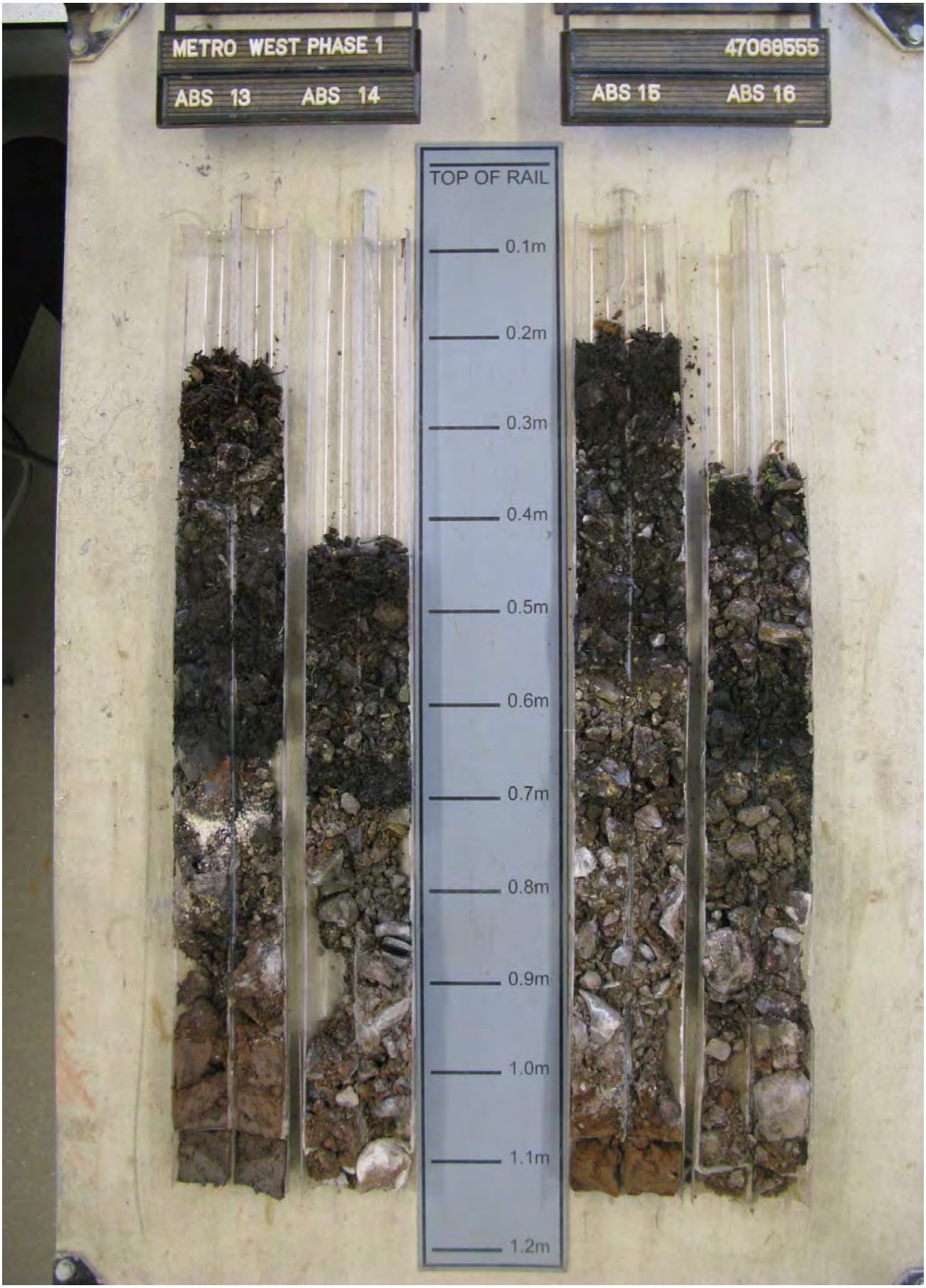
Prepared	AG	APPENDIX A - ABS 1 to ABS 4	URS
Checked	DGK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	ABS PHOTOGRAPHIC LOG	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	



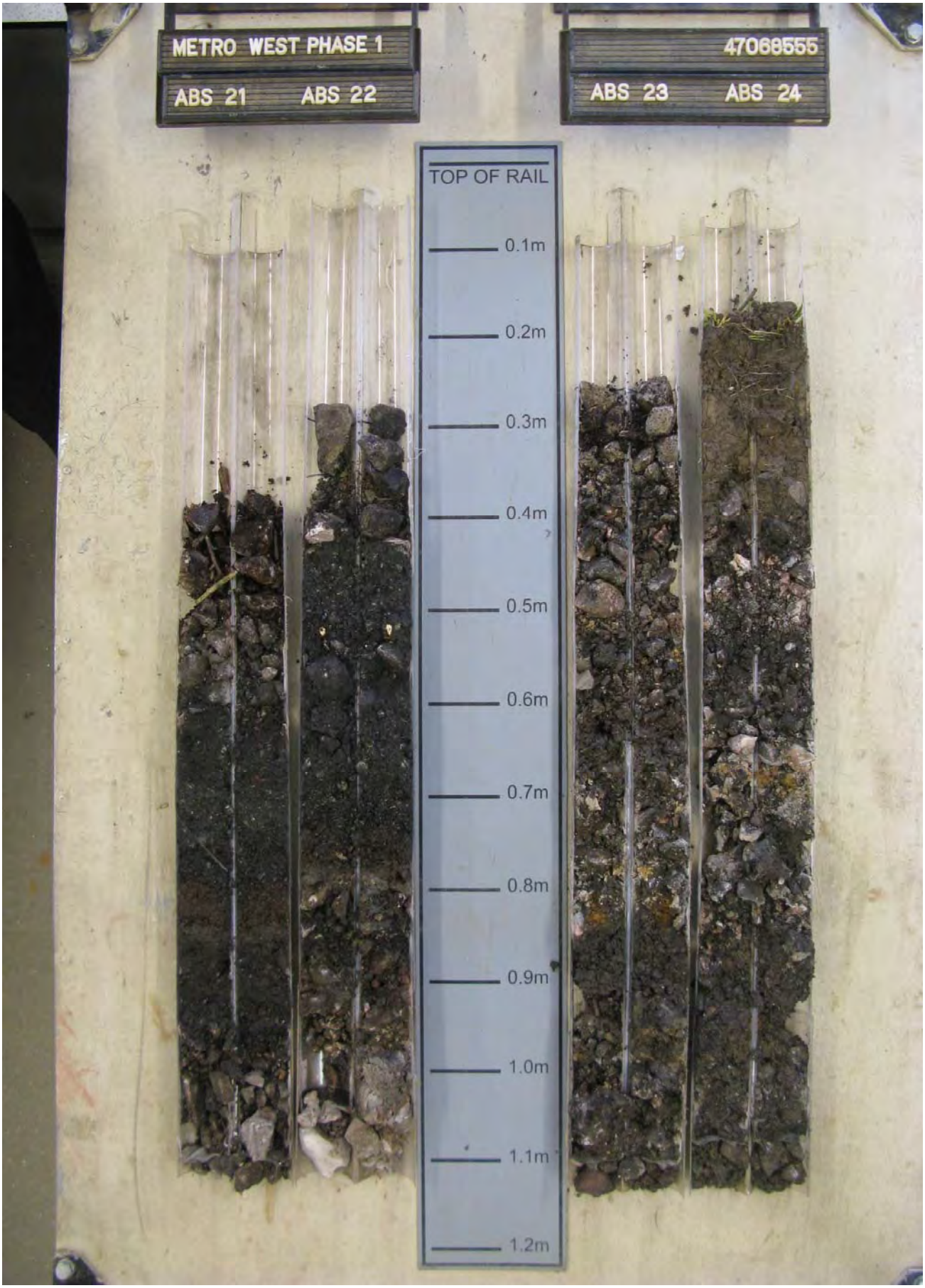
Prepared	AG	APPENDIX A - ABS 5 to ABS 8	URS
Checked	DGK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	ABS PHOTOGRAPHIC LOG	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	



Prepared	AG	APPENDIX A - ABS 9 to ABS 12	URS
Checked	DGK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	ABS PHOTOGRAPHIC LOG	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	



Prepared	AG	APPENDIX A - ABS 13 to ABS 16	URS
Checked	DGK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	ABS PHOTOGRAPHIC LOG	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	



Prepared	AG	APPENDIX A - ABS 21 to ABS 24	URS
Checked	DGK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	ABS PHOTOGRAPHIC LOG	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

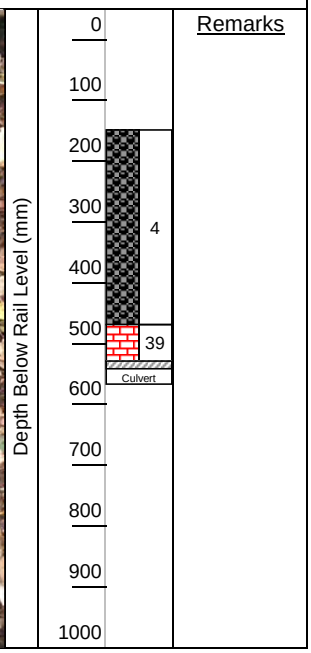
APPENDIX B:

TRIAL PIT LOGS

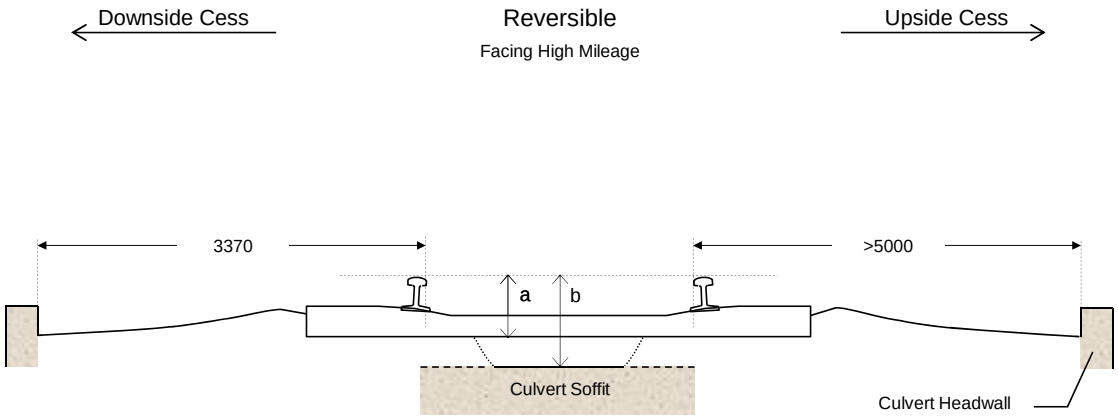
Trial Pit Details

Pit Type / Number	DP ABS 9	Trial Pit Purpose	Assess clearances to Culvert
Mileage	127m 915y	Reason for termination	Structure encountered
Line	Reversible		
Position	4ft	Structure Reference	Unknown
Rail Type	Flat Bottom JR	**Trackbed conditions encountered (mm below rail level)**	
Sleeper Type	Timber	Wet Material	None
Weather Prior SI	Dry	Standing Water	None
Weather During SI	Dry	Slurry Material	None
Date of Inspection	03/04/2014	Geosynthetics Depth	None
Inspected by	JWM	Geosynthetics Type	N/A

Trial Pit Photo(s) and Material Log



Trial Pit Sketch (with approximate dimensions of excavation and structures in mm)



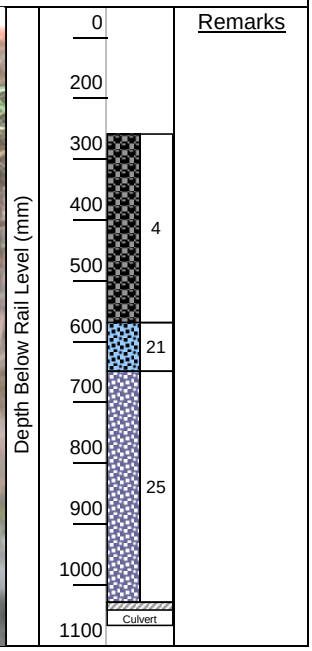
Notes / Comments	Sketch Dimensions
Sketch not to scale. Mileage and Yardage are approximate values as no mileposts were present on site. ABS converted to DP during the site investigation to confirm cause of shallow refusal. DP refused at a depth of 530mm brl on culvert structure.	a= 300 mm b= 530 mm

Prepared	JWM	APPENDIX B - DP ABS 9 **Metrowest Phase 1 - Trackbed Investigation** TRIAL PIT LOG POD - REVERSIBLE	URS
Checked	DGK		
Job No	47070043		
Date	Apr '14		

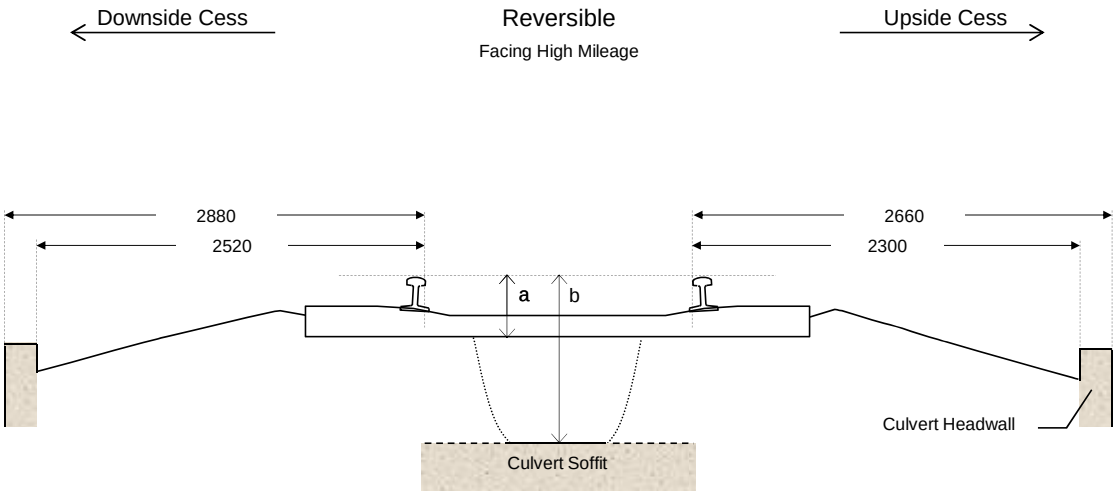
Trial Pit Details

Pit Type / Number	DP ABS 17	Trial Pit Purpose	Assess clearances to Culvert
Mileage	128m 913y	Reason for termination	Structure encountered
Line	Reversible		
Position	4ft	Structure Reference	Unknown
Rail Type	Flat Bottom JR	**Trackbed conditions encountered (mm below rail level)**	
Sleeper Type	Timber	Wet Material	None
Weather Prior SI	Wet	Standing Water	None
Weather During SI	Wet	Slurry Material	None
Date of Inspection	02/04/2014	Geosynthetics Depth	None
Inspected by	JWM	Geosynthetics Type	N/A

Trial Pit Photo(s) and Material Log



Trial Pit Sketch (with approximate dimensions of excavation and structures in mm)

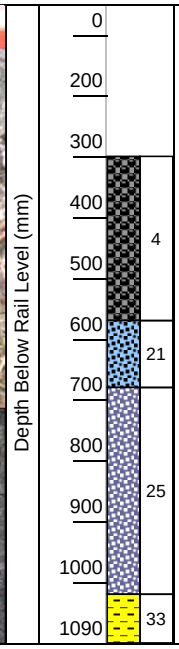


Notes / Comments	Sketch Dimensions
Sketch not to scale. Mileage and Yardage are approximate values. ABS 17 converted to DP during site investigation due to track access. DP completed at a depth of 1040mm brl, culvert soffit encountered at base of DP.	a= 330 mm b= 1040 mm

Prepared	JWM	APPENDIX B - DP ABS 17 **Metrowest Phase 1 - Trackbed Investigation** TRIAL PIT LOG POD - REVERSIBLE	URS
Checked	DGK		
Job No	47070043		
Date	Apr '14		

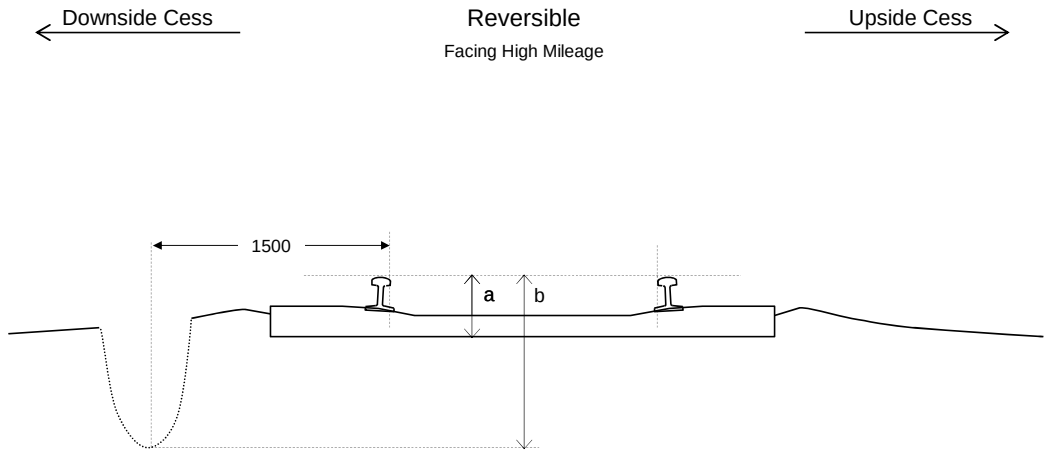
Trial Pit Details			
Pit Type / Number	DP ABS 18	Trial Pit Purpose	ABS Replacement
Mileage	128m 923y	Reason for termination	Design depth achieved
Line	Reversible		
Position	Cess	Structure Reference	N/A
Rail Type	Flat Bottom JR	**Trackbed conditions encountered (mm below rail level)**	
Sleeper Type	Timber	Wet Material	None
Weather Prior SI	Wet	Standing Water	None
Weather During SI	Wet	Slurry Material	None
Date of Inspection	02/04/2014	Geosynthetics Depth	None
Inspected by	JWM	Geosynthetics Type	N/A

Trial Pit Photo(s) and Material Log



Remarks

Trial Pit Sketch (with approximate dimensions of excavation and structures in mm)

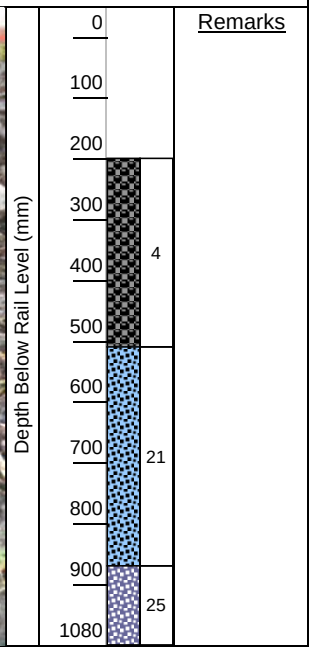


Notes / Comments	Sketch Dimensions
Sketch not to scale. Mileage and Yardage are approximate values. ABS 18 converted to DP during site investigation due to track access. DP advanced at a lateral offset of 1500mm from the downside rail and completed at a depth	a= 330 mm b= 1090 mm

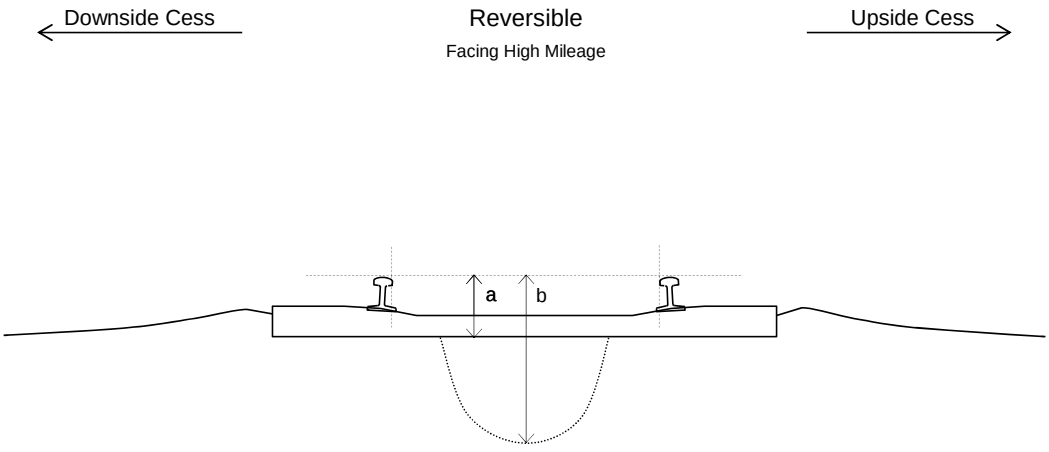
Prepared	JWM	APPENDIX B - DP ABS 18	URS
Checked	DGK	**Metrowest Phase 1 - Trackbed Investigation**	
Job No	47070043	TRIAL PIT LOG	
Date	Apr '14	POD - REVERSIBLE	

Trial Pit Details			
Pit Type / Number	DP ABS 19	Trial Pit Purpose	ABS Replacement
Mileage	128m 1385y	Reason for termination	Design depth achieved
Line	Reversible		
Position	4ft	Structure Reference	N/A
Rail Type	Flat Bottom JR	**Trackbed conditions encountered (mm below rail level)**	
Sleeper Type	Timber	Wet Material	None
Weather Prior SI	Wet	Standing Water	None
Weather During SI	Dry	Slurry Material	None
Date of Inspection	02/04/2014	Geosynthetics Depth	None
Inspected by	JWM	Geosynthetics Type	N/A

Trial Pit Photo(s) and Material Log



Trial Pit Sketch (with approximate dimensions of excavation and structures in mm)

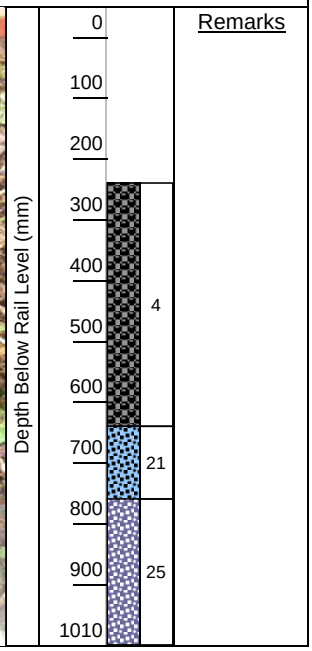


Notes / Comments	Sketch Dimensions
Sketch not to scale. Mileage and Yardage are approximate values. ABS 19 converted to DP during site investigation due to track access. DP completed at a depth of 1080mm brl.	a= 300 mm b= 1080 mm

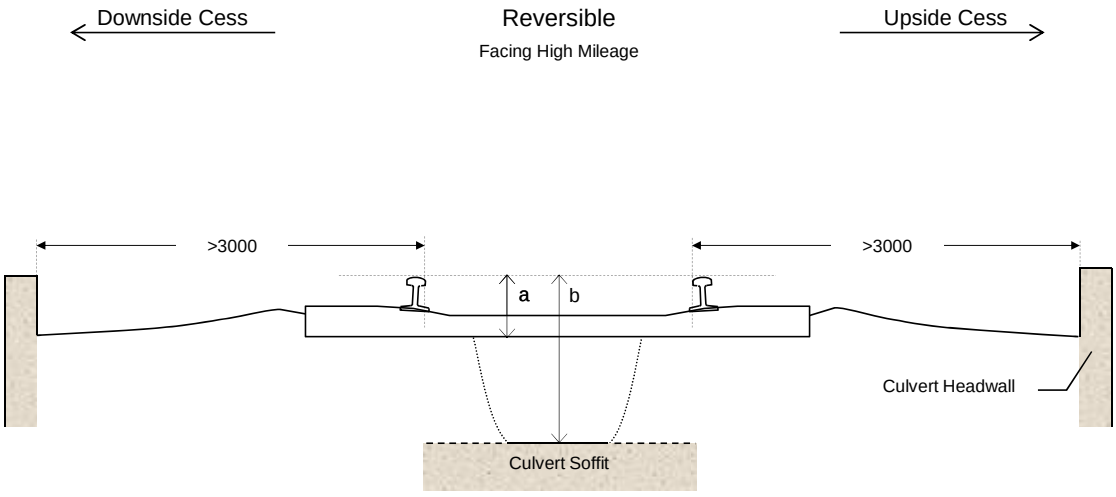
Prepared	JWM	APPENDIX B - DP ABS 19 **Metrowest Phase 1 - Trackbed Investigation** TRIAL PIT LOG POD - REVERSIBLE	URS
Checked	DGK		
Job No	47070043		
Date	Apr '14		

Trial Pit Details			
Pit Type / Number	DP ABS 20	Trial Pit Purpose	Assess clearances to Culvert
Mileage	128m 1463y	Reason for termination	Design depth achieved
Line	Reversible		
Position	4ft	Structure Reference	Unknown
Rail Type	Flat Bottom JR	**Trackbed conditions encountered (mm below rail level)**	
Sleeper Type	Timber	Wet Material	None
Weather Prior SI	Wet	Standing Water	None
Weather During SI	Dry	Slurry Material	None
Date of Inspection	02/04/2014	Geosynthetics Depth	None
Inspected by	JWM	Geosynthetics Type	N/A

Trial Pit Photo(s) and Material Log



Trial Pit Sketch (with approximate dimensions of excavation and structures in mm)



Notes / Comments	Sketch Dimensions
Sketch not to scale. Mileage and Yardage are approximate values. ABS 9 converted to DP during site investigation due to track access. DP completed at a depth of 1010mm brl, culvert soffit encountered at base of DP.	a= 300 mm b= 1010 mm

Prepared	JWM	APPENDIX B - DP ABS 20 **Metrowest Phase 1 - Trackbed Investigation** TRIAL PIT LOG POD - REVERSIBLE	URS
Checked	DGK		
Job No	47070043		
Date	Apr '14		

APPENDIX C:

WALKOVER SURVEY PHOTOGRAPHS

Photo 1. Facing Portishead at 129m 603y

Photo 2. Facing Portbury Jcn at 129m 766y

Prepared	DK	APPENDIX C - PHOTOS 1 to 2	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 3. Facing Portishead at 129m 380y

Photo 4. Facing Portbury Jcn at 129m 380y

Prepared	DK	APPENDIX C - PHOTOS 3 to 4	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 5. Facing Portishead at 129m 244y

Photo 6. Facing Portbury Jcn at 129m 244y

Prepared	DK	APPENDIX C - PHOTOS 5 to 6	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 7. Facing Portishead at 129m 158y

Photo 8. Facing Portbury Jcn at 129m 158y

Prepared	DK	APPENDIX C - PHOTOS 7 to 8	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 9. Facing Portishead at 129m 98y

Photo 10. Facing Portbury Jcn at 129m 98y

Prepared	DK	APPENDIX C - PHOTOS 9 to 10	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 11. Facing Portishead at 128m 1711y

Photo 12. Facing Portbury Jcn at 128m 1711y

Prepared	DK	APPENDIX C - PHOTOS 11 to 12	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 13. Facing Portishead at 128m 1608y

Photo 14. Facing Portbury Jcn at 128m 1608y

Prepared	DK	APPENDIX C - PHOTOS 13 to 14	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 15. Facing Portbury Jcn at 128m 1564y

Photo 16. Facing Portbury Jcn at 128m 1510y

Prepared	DK	APPENDIX C - PHOTOS 15 to 16	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 17. Facing Portishead at 128m 1510y

Photo 18. Facing Portbury Jcn at 128m 1450y

Prepared	DK	APPENDIX C - PHOTOS 17 to 18	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 19. Facing Portishead at 128m 1358y

Photo 20. Facing Portbury Jcn at 128m 1358y

Prepared	DK	APPENDIX C - PHOTOS 19 to 20	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 21. Facing Portishead at 128m 1239y

Photo 22. Facing Portbury Jcn at 128m 1239y: Sheepway Road Overbridge

Prepared	DK	APPENDIX C - PHOTOS 21 to 22	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 23. Facing Portishead at 128m 1168y: Sheepway Road Overbridge

Photo 24. Facing Portbury Jcn at 128m 1168y

Prepared	DK	APPENDIX C - PHOTOS 23 to 24	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 25. Facing Portishead at 128m 1054y

Photo 26. Facing Portbury Jcn at 128m 1054y

Prepared	DK	APPENDIX C - PHOTOS 25 to 26	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 27. Facing at 128m 1005y: Sheepway Gate Farm

Photo 28. Facing at 128m 1005y: Sheepway Gate Farm

Prepared	DK	APPENDIX C - PHOTOS 27 to 28	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 29. Facing Portishead at 128m 929y

Photo 30. Facing Portbury Jcn at 128m 929y

Prepared	DK	APPENDIX C - PHOTOS 29 to 30	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 31. Facing Portishead at 128m 880y

Photo 32. Facing Portbury Jcn at 128m 880y: Disused level crossing

Prepared	DK	APPENDIX C - PHOTOS 31 to 32	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 33. Facing Portishead at 128m 652y

Photo 34. Facing Portbury Jcn at 128m 652y

Prepared	DK	APPENDIX C - PHOTOS 33 to 34	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 35. Facing Portishead at 128m 467y

Photo 36. Facing Portbury Jcn at 128m 467y

Prepared	DK	APPENDIX C - PHOTOS 35 to 36	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 37. Facing Portishead at 128m 310y

Photo 38. Facing Portbury Jcn at 128m 310y

Prepared	DK	APPENDIX C - PHOTOS 37 to 38	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 39. Facing Portishead at 128m 22y

Photo 40. Facing Portbury Jcn at 128m 22y: Station Road Overbridge and disused platform

Prepared	DK	APPENDIX C - PHOTOS 39 to 40	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 41. Facing Portishead at 127m 1640y: Disused platform

Photo 42. Facing Portbury Jcn at 127m 1640y

Prepared	DK	APPENDIX C - PHOTOS 41 to 42	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 43. Facing Portishead at 127m 1407y

Photo 44. Facing Portbury Jcn at 127m 1548y

Prepared	DK	APPENDIX C - PHOTOS 43 to 44	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 45. Facing Portbury Jcn at 127m 1407y

Photo 46. Facing 4ft at 127m 1320y

Prepared	DK	APPENDIX C - PHOTOS 45 to 46	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 47. Facing Portishead at 127m 1179y

Photo 48. Facing Portbury Jcn at 127m 1179y

Prepared	DK	APPENDIX C - PHOTOS 47 to 48	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 49. Facing Portishead at 127m 1032y

Photo 50. Facing Portbury Jcn at 127m 1032y

Prepared	DK	APPENDIX C - PHOTOS 49 to 50	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 51. Facing Portbury Jcn at 127m 1027y

Photo 52. Facing Culvert at 127m 923y

Prepared	DK	APPENDIX C - PHOTOS 51 to 52	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 53. Facing Portishead at 127m 760y

Photo 54. Facing Portbury Jcn at 127m 760y

Prepared	DK	APPENDIX C - PHOTOS 53 to 54	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 55. Facing Portishead at 127m 636y

Photo 56. Facing Portbury Jcn at 127m 636y

Prepared	DK	APPENDIX C - PHOTOS 55 to 56	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 57. Facing Portbury Jcn at 127m 549y: Royal Portbury Dock Road Overbridge

Photo 58. Facing Portishead at 127m 266y

Prepared	DK	APPENDIX C - PHOTOS 57 to 58	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 59. Facing Portbury Jcn at 127m 266y

Photo 60. Facing Portishead at 127m 141y

Prepared	DK	APPENDIX C - PHOTOS 59 to 60	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 61. Facing Portbury Jcn at 127m 141y

Photo 62. Facing Portbury Jcn at 127m 71y: Marsh Lane Overbridge

Prepared	DK	APPENDIX C - PHOTOS 61 to 62	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 63. Facing Portishead at 127m 0y: Marsh Lane Overbridge

Photo 64. Facing Portishead at 126m 1700y

Prepared	DK	APPENDIX C - PHOTOS 63 to 64	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 65. Facing Portbury Jcn at 126m 1700y

Photo 66. Facing Portishead at 126m 1494y

Prepared	DK	APPENDIX C - PHOTOS 65 to 66	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 67. Facing Portbury Jcn at 126m 1494y

Photo 68. Facing Portishead at 126m 1385y

Prepared	DK	APPENDIX C - PHOTOS 67 to 68	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Photo 69. Facing Portbury Jcn at 126m 1385y: M5 Motorway Overbridge

Photo 70. Facing Portishead at 126m 1336y

Prepared	DK	APPENDIX C - PHOTOS 69 to 70	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Prepared	DK	APPENDIX C - PHOTOS 71 to 72	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Prepared	DK	APPENDIX C - PHOTOS 73 to 74	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Prepared	DK	APPENDIX C - PHOTOS 75 to 76	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Prepared	DK	APPENDIX C - PHOTOS 77 to 78	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Prepared	DK	APPENDIX C - PHOTOS 79 to 80	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

Prepared	DK	APPENDIX C - PHOTO 81	URS
Checked	CG	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Job No	47061344	SITE WALKOVER PHOTOGRAPHS (19/03/14)	
Date	Apr '14	POD - REVERSIBLE - 126m 1043y to 129m 616y	

APPENDIX D:

CHEMICAL RESULTS OF BALLAST SAMPLES

Network Rail Ballast Analytical Suite (2008)			Petroleum Hydro-carbons	Asbestos	Arsenic	Nickel	Lead	Copper	Zinc	Chromium
Sample	Miles	Yards								
ABS 1	126	1043	10	nd	1.2	172.9	1461.3	145.7	4952.3	1.2
ABS 2	126	1252	10	nd	10.1	97.2	139.2	119.5	590	28.7
ABS 3	126	1430	19	nd	1.2	166.7	1368.8	145.8	5032	1.2
ABS 4	126	1650	25	nd	1.2	76.1	301.2	92.5	913.1	21.9
ABS 5	127	61	10	nd	16.6	222.2	1741.5	269.4	5516.7	1.2
ABS 6	127	548	34	nd	17.3	57	14.1	13	67.8	27.3
ABS 7	127	760	10	nd	1.2	122.4	501.5	80.3	3956.7	12.1
ABS 8	127	827	10	nd	1.2	166.9	1558.1	233.6	8416.1	1.2
DP 9	127	915	13	nd	1.2	87.1	261.6	73.6	915.8	26.5
ABS 10	127	1206	12	nd	18.1	91.3	63.6	47.3	201.4	30.3
ABS 11	127	1320	10	nd	11.9	99.2	53.8	37.7	160.7	37.8
ABS 12	127	1350	60	nd	1.2	160.2	1363.2	186.7	3642.8	1.2
ABS 13	128	45	55	nd	1.2	166.7	316.9	102.7	1049.8	54.1
ABS 14	128	310	68	nd	1.2	370.4	769.8	111.8	1597.5	48.9
ABS 15	128	370	32	nd	1.2	383.4	2066.3	608.9	5128	1.2
ABS 16	128	722	25	nd	1.2	156	1696.5	315.2	3348.2	1.2
DP 17	128	913	90	nd	1.2	88.7	290.2	31.1	919.8	16.5
DP 18	128	923	15	nd	7.4	89.3	219.8	45.7	887.7	19.1
DP 19	128	1385	16	nd	5.8	58.3	37.7	13.6	129.1	17.7
DP 20	128	1463	14	nd	8.9	57.7	40	18.9	118.2	22.2
ABS 21	129	158	10	nd	8.1	97	28.5	33.8	107.4	38.1
ABS 22	129	364	98	nd	10	142.1	30.9	58.4	106.1	49.8
ABS 23	129	563	10	nd	10.5	70.8	38.4	33.3	105.7	24.9
ABS 24	129	616	10	nd	16.8	86.4	62.3	43.8	181.1	41

Units - mg kg-1 nd - None Detected NS - Not Specified

Prepared	DK	APPENDIX D	URS
Checked	CG	CHEMICAL RESULTS OF BALLAST SAMPLES	
Job No	47070043	**MetroWest Phase 1 (140569) - Trackbed Investigation**	
Date	Apr-14	POD - Reversible - 126m 1043y to 129m 616y	

Job name

Metrowest Phase 1 126m 1043y to 129m 616y

Waste stream

Track Excavation Waste

Comments

Waste classification of used track ballast.

Report

Created by: Ward, Chris
Created date: 02/05/2014 15:56

Job summary

#	Sample name	Depth	Classification result	Hazardous properties
1	ABS 1		Hazardous	H7, H13, H14
2	ABS 2		Hazardous	H7
3	ABS 3		Hazardous	H7, H13, H14
4	ABS 4		Hazardous	H7, H14
5	ABS 5		Hazardous	H7, H13, H14
6	ABS 6		Non Hazardous	
7	ABS 7		Hazardous	H7, H13, H14
8	ABS 8		Hazardous	H7, H13, H14
9	DP 9		Hazardous	H7, H14
10	ABS 10		Non Hazardous	
11	ABS 11		Non Hazardous	
12	ABS 12		Hazardous	H7, H13, H14
13	ABS 13		Hazardous	H7, H14
14	ABS 14		Hazardous	H7, H14
15	ABS 15		Hazardous	H7, H13, H14
16	ABS 16		Hazardous	H7, H14
17	DP 17		Hazardous	H7, H14
18	DP 18		Hazardous	H7
19	DP 19		Non Hazardous	
20	DP 20		Non Hazardous	
21	ABS 21		Non Hazardous	
22	ABS 22		Non Hazardous	
23	ABS 23		Non Hazardous	
24	ABS 24		Non Hazardous	

Classification

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 1
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.146%)
Zinc chromate: (compound conc.:1.374%)

H13: Sensitizing "substances and preparations which, if they are inhaled or if they penetrate the skin, are capable of eliciting a reaction of hypersensitization such that on further exposure to the substance or preparation, characteristic adverse effects are produced. [As far as testing methods are available]."

Risk phrases hit:

R43 "May cause sensitisation by skin contact"

Because of determinand:

Zinc chromate: (compound conc.:1.374%)

H14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment."

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.146%)
Zinc chromate: (compound conc.:1.374%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.228%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:1.584 mg/kg or 0.000158%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:2.308 mg/kg or 0.000231%)
Copper (I) oxide: (Cation conc. entered: 145.7 mg/kg, converted to compound conc.:164.042 mg/kg or 0.0164%)
Lead chromate: (Cation conc. entered: 1461.3 mg/kg, converted to compound conc.:2279.358 mg/kg or 0.228%, "Note 1" conc.: 0.146%)
Nickel dihydroxide: (Cation conc. entered: 172.9 mg/kg, converted to compound conc.:273.095 mg/kg or 0.0273%)
Zinc chromate: (Cation conc. entered: 4952.3 mg/kg, converted to compound conc.:13738.406 mg/kg or 1.374%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 10 mg/kg or 0.001%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

C14.3: Step 5, Equation 1
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"...only for the substances in the waste above the relevant generic cut-off value, use the four equations given in Table C14.2 to decide if the waste is hazardous by H14"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

Test: "H7 on R45" for determinand: "Lead chromate"
Test: "H10 on R60, R61" for determinand: "Lead chromate"
Test: "H10 on R62, R63" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 2
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinand:

Zinc chromate: (compound conc.:0.164%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.0217%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 10.1 mg/kg, converted to compound conc.:13.335 mg/kg or 0.00133%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 28.7 mg/kg, converted to compound conc.:55.192 mg/kg or 0.00552%)
Copper (I) oxide: (Cation conc. entered: 119.5 mg/kg, converted to compound conc.:134.544 mg/kg or 0.0135%)

Lead chromate: (Cation conc. entered: 139.2 mg/kg, converted to compound conc.:217.126 mg/kg or 0.0217%, "Note 1" conc.: 0.0139%)
Nickel dihydroxide: (Cation conc. entered: 97.2 mg/kg, converted to compound conc.:153.527 mg/kg or 0.0154%)
Zinc chromate: (Cation conc. entered: 590 mg/kg, converted to compound conc.:1636.746 mg/kg or 0.164%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 10 mg/kg or 0.001%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"

"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
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4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 3
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.137%)
Zinc chromate: (compound conc.:1.396%)

H13: Sensitizing "substances and preparations which, if they are inhaled or if they penetrate the skin, are capable of eliciting a reaction of hypersensitization such that on further exposure to the substance or preparation, characteristic adverse effects are produced. [As far as testing methods are available]."

Risk phrases hit:

R43 "May cause sensitisation by skin contact"

Because of determinand:

Zinc chromate: (compound conc.:1.396%)

H14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment."

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.137%)
Zinc chromate: (compound conc.:1.396%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.214%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:1.584 mg/kg or 0.000158%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:2.308 mg/kg or 0.000231%)
Copper (I) oxide: (Cation conc. entered: 145.8 mg/kg, converted to compound conc.:164.155 mg/kg or 0.0164%)
Lead chromate: (Cation conc. entered: 1368.8 mg/kg, converted to compound conc.:2135.075 mg/kg or 0.214%, "Note 1" conc.: 0.137%)
Nickel dihydroxide: (Cation conc. entered: 166.7 mg/kg, converted to compound conc.:263.303 mg/kg or 0.0263%)
Zinc chromate: (Cation conc. entered: 5032 mg/kg, converted to compound conc.:13959.505 mg/kg or 1.396%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 19 mg/kg or 0.0019%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

C14.3: Step 5, Equation 1
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"...only for the substances in the waste above the relevant generic cut-off value, use the four equations given in Table C14.2 to decide if the waste is hazardous by H14"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
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HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 4
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinand:

Zinc chromate: (compound conc.:0.253%)

H14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment."

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinand:

Zinc chromate: (compound conc.:0.253%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.047%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:1.584 mg/kg or 0.000158%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 21.9 mg/kg, converted to compound conc.:42.115 mg/kg or 0.00421%)
Copper (I) oxide: (Cation conc. entered: 92.5 mg/kg, converted to compound conc.:104.145 mg/kg or 0.0104%)
Lead chromate: (Cation conc. entered: 301.2 mg/kg, converted to compound conc.:469.816 mg/kg or 0.047%, "Note 1" conc.: 0.0301%)
Nickel dihydroxide: (Cation conc. entered: 76.1 mg/kg, converted to compound conc.:120.2 mg/kg or 0.012%)
Zinc chromate: (Cation conc. entered: 913.1 mg/kg, converted to compound conc.:2533.073 mg/kg or 0.253%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 25 mg/kg or 0.0025%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

C14.3: Step 5, Equation 1
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"...only for the substances in the waste above the relevant generic cut-off value, use the four equations given in Table C14.2 to decide if the waste is hazardous by H14"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 5
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.174%)
Zinc chromate: (compound conc.:1.53%)

H13: Sensitizing "substances and preparations which, if they are inhaled or if they penetrate the skin, are capable of eliciting a reaction of hypersensitization such that on further exposure to the substance or preparation, characteristic adverse effects are produced. [As far as testing methods are available]."

Risk phrases hit:

R43 "May cause sensitisation by skin contact"

Because of determinand:

Zinc chromate: (compound conc.:1.53%)

H14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment."

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.174%)
Zinc chromate: (compound conc.:1.53%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.272%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 16.6 mg/kg, converted to compound conc.:21.917 mg/kg or 0.00219%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:2.308 mg/kg or 0.000231%)
Copper (I) oxide: (Cation conc. entered: 269.4 mg/kg, converted to compound conc.:303.314 mg/kg or 0.0303%)
Lead chromate: (Cation conc. entered: 1741.5 mg/kg, converted to compound conc.:2716.418 mg/kg or 0.272%, "Note 1" conc.: 0.174%)
Nickel dihydroxide: (Cation conc. entered: 222.2 mg/kg, converted to compound conc.:350.965 mg/kg or 0.0351%)
Zinc chromate: (Cation conc. entered: 5516.7 mg/kg, converted to compound conc.:15304.134 mg/kg or 1.53%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 10 mg/kg or 0.001%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

C14.3: Step 5, Equation 1
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"...only for the substances in the waste above the relevant generic cut-off value, use the four equations given in Table C14.2 to decide if the waste is hazardous by H14"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 6
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.0022%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 17.3 mg/kg, converted to compound conc.:22.842 mg/kg or 0.00228%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 27.3 mg/kg, converted to compound conc.:52.5 mg/kg or 0.00525%)
Copper (I) oxide: (Cation conc. entered: 13 mg/kg, converted to compound conc.:14.637 mg/kg or 0.00146%)
Lead chromate: (Cation conc. entered: 14.1 mg/kg, converted to compound conc.:21.993 mg/kg or 0.0022%, "Note 1" conc.: 0.00141%)
Nickel dihydroxide: (Cation conc. entered: 57 mg/kg, converted to compound conc.:90.031 mg/kg or 0.009%)
Zinc chromate: (Cation conc. entered: 67.8 mg/kg, converted to compound conc.:188.087 mg/kg or 0.0188%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 34 mg/kg or 0.0034%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 7
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinand:

Zinc chromate: (compound conc.:1.098%)

H13: Sensitizing "substances and preparations which, if they are inhaled or if they penetrate the skin, are capable of eliciting a reaction of hypersensitization such that on further exposure to the substance or preparation, characteristic adverse effects are produced. [As far as testing methods are available]."

Risk phrases hit:

R43 "May cause sensitisation by skin contact"

Because of determinand:

Zinc chromate: (compound conc.:1.098%)

H14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment."

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinand:

Zinc chromate: (compound conc.:1.098%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.0782%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:1.584 mg/kg or 0.000158%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 12.1 mg/kg, converted to compound conc.:23.269 mg/kg or 0.00233%)
Copper (I) oxide: (Cation conc. entered: 80.3 mg/kg, converted to compound conc.:90.409 mg/kg or 0.00904%)
Lead chromate: (Cation conc. entered: 501.5 mg/kg, converted to compound conc.:782.247 mg/kg or 0.0782%, "Note 1" conc.: 0.0501%)
Nickel dihydroxide: (Cation conc. entered: 122.4 mg/kg, converted to compound conc.:193.331 mg/kg or 0.0193%)
Zinc chromate: (Cation conc. entered: 3956.7 mg/kg, converted to compound conc.:10976.466 mg/kg or 1.098%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 10 mg/kg or 0.001%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

C14.3: Step 5, Equation 1
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"...only for the substances in the waste above the relevant generic cut-off value, use the four equations given in Table C14.2 to decide if the waste is hazardous by H14"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 8
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.156%)
Zinc chromate: (compound conc.:2.335%)

H13: Sensitizing "substances and preparations which, if they are inhaled or if they penetrate the skin, are capable of eliciting a reaction of hypersensitization such that on further exposure to the substance or preparation, characteristic adverse effects are produced. [As far as testing methods are available]."

Risk phrases hit:

R43 "May cause sensitisation by skin contact"

Because of determinand:

Zinc chromate: (compound conc.:2.335%)

H14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment."

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.156%)
Zinc chromate: (compound conc.:2.335%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.243%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:1.584 mg/kg or 0.000158%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:2.308 mg/kg or 0.000231%)
Copper (I) oxide: (Cation conc. entered: 233.6 mg/kg, converted to compound conc.:263.008 mg/kg or 0.0263%)
Lead chromate: (Cation conc. entered: 1558.1 mg/kg, converted to compound conc.:2430.348 mg/kg or 0.243%, "Note 1" conc.: 0.156%)
Nickel dihydroxide: (Cation conc. entered: 166.9 mg/kg, converted to compound conc.:263.618 mg/kg or 0.0264%)
Zinc chromate: (Cation conc. entered: 8416.1 mg/kg, converted to compound conc.:23347.495 mg/kg or 2.335%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 10 mg/kg or 0.001%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

C14.3: Step 5, Equation 1
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"...only for the substances in the waste above the relevant generic cut-off value, use the four equations given in Table C14.2 to decide if the waste is hazardous by H14"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
DP 9
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinand:

Zinc chromate: (compound conc.:0.254%)

H14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment."

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinand:

Zinc chromate: (compound conc.:0.254%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.0408%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:1.584 mg/kg or 0.000158%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 26.5 mg/kg, converted to compound conc.:50.962 mg/kg or 0.0051%)
Copper (I) oxide: (Cation conc. entered: 73.6 mg/kg, converted to compound conc.:82.865 mg/kg or 0.00829%)
Lead chromate: (Cation conc. entered: 261.6 mg/kg, converted to compound conc.:408.048 mg/kg or 0.0408%, "Note 1" conc.: 0.0262%)
Nickel dihydroxide: (Cation conc. entered: 87.1 mg/kg, converted to compound conc.:137.574 mg/kg or 0.0138%)
Zinc chromate: (Cation conc. entered: 915.8 mg/kg, converted to compound conc.:2540.563 mg/kg or 0.254%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 13 mg/kg or 0.0013%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

C14.3: Step 5, Equation 1
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"...only for the substances in the waste above the relevant generic cut-off value, use the four equations given in Table C14.2 to decide if the waste is hazardous by H14"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
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4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 10
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.00992%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 18.1 mg/kg, converted to compound conc.:23.898 mg/kg or 0.00239%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 30.3 mg/kg, converted to compound conc.:58.269 mg/kg or 0.00583%)
Copper (I) oxide: (Cation conc. entered: 47.3 mg/kg, converted to compound conc.:53.255 mg/kg or 0.00533%)
Lead chromate: (Cation conc. entered: 63.6 mg/kg, converted to compound conc.:99.204 mg/kg or 0.00992%, "Note 1" conc.: 0.00636%)
Nickel dihydroxide: (Cation conc. entered: 91.3 mg/kg, converted to compound conc.:144.208 mg/kg or 0.0144%)
Zinc chromate: (Cation conc. entered: 201.4 mg/kg, converted to compound conc.:558.713 mg/kg or 0.0559%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 12 mg/kg or 0.0012%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

Test: "H7 on R45" for determinand: "Lead chromate"
Test: "H10 on R60, R61" for determinand: "Lead chromate"
Test: "H10 on R62, R63" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and

- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 11
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.00839%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 11.9 mg/kg, converted to compound conc.:15.712 mg/kg or 0.00157%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 37.8 mg/kg, converted to compound conc.:72.692 mg/kg or 0.00727%)
Copper (I) oxide: (Cation conc. entered: 37.7 mg/kg, converted to compound conc.:42.446 mg/kg or 0.00424%)
Lead chromate: (Cation conc. entered: 53.8 mg/kg, converted to compound conc.:83.918 mg/kg or 0.00839%, "Note 1" conc.: 0.00538%)
Nickel dihydroxide: (Cation conc. entered: 99.2 mg/kg, converted to compound conc.:156.686 mg/kg or 0.0157%)
Zinc chromate: (Cation conc. entered: 160.7 mg/kg, converted to compound conc.:445.805 mg/kg or 0.0446%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 10 mg/kg or 0.001%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

Test: "H7 on R45" for determinand: "Lead chromate"
Test: "H10 on R60, R61" for determinand: "Lead chromate"
Test: "H10 on R62, R63" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and

- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 12
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.136%)
Zinc chromate: (compound conc.:1.011%)

H13: Sensitizing "substances and preparations which, if they are inhaled or if they penetrate the skin, are capable of eliciting a reaction of hypersensitization such that on further exposure to the substance or preparation, characteristic adverse effects are produced. [As far as testing methods are available]."

Risk phrases hit:

R43 "May cause sensitisation by skin contact"

Because of determinand:

Zinc chromate: (compound conc.:1.011%)

H14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment."

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.136%)
Zinc chromate: (compound conc.:1.011%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.213%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:1.584 mg/kg or 0.000158%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:2.308 mg/kg or 0.000231%)
Copper (I) oxide: (Cation conc. entered: 186.7 mg/kg, converted to compound conc.:210.203 mg/kg or 0.021%)
Lead chromate: (Cation conc. entered: 1363.2 mg/kg, converted to compound conc.:2126.34 mg/kg or 0.213%, "Note 1" conc.: 0.136%)
Nickel dihydroxide: (Cation conc. entered: 160.2 mg/kg, converted to compound conc.:253.036 mg/kg or 0.0253%)
Zinc chromate: (Cation conc. entered: 3642.8 mg/kg, converted to compound conc.:10105.661 mg/kg or 1.011%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 60 mg/kg or 0.006%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

C14.3: Step 5, Equation 1
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"...only for the substances in the waste above the relevant generic cut-off value, use the four equations given in Table C14.2 to decide if the waste is hazardous by H14"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 13
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinand:

Zinc chromate: (compound conc.:0.291%)

H14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment."

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinand:

Zinc chromate: (compound conc.:0.291%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.0494%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:1.584 mg/kg or 0.000158%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 54.1 mg/kg, converted to compound conc.:104.038 mg/kg or 0.0104%)
Copper (I) oxide: (Cation conc. entered: 102.7 mg/kg, converted to compound conc.:115.629 mg/kg or 0.0116%)
Lead chromate: (Cation conc. entered: 316.9 mg/kg, converted to compound conc.:494.305 mg/kg or 0.0494%, "Note 1" conc.: 0.0317%)
Nickel dihydroxide: (Cation conc. entered: 166.7 mg/kg, converted to compound conc.:263.303 mg/kg or 0.0263%)
Zinc chromate: (Cation conc. entered: 1049.8 mg/kg, converted to compound conc.:2912.299 mg/kg or 0.291%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 55 mg/kg or 0.0055%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

C14.3: Step 5, Equation 1
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"...only for the substances in the waste above the relevant generic cut-off value, use the four equations given in Table C14.2 to decide if the waste is hazardous by H14"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 14
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinand:

Zinc chromate: (compound conc.:0.443%)

H14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment."

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinand:

Zinc chromate: (compound conc.:0.443%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.12%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:1.584 mg/kg or 0.000158%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 48.9 mg/kg, converted to compound conc.:94.038 mg/kg or 0.0094%)
Copper (I) oxide: (Cation conc. entered: 111.8 mg/kg, converted to compound conc.:125.874 mg/kg or 0.0126%)
Lead chromate: (Cation conc. entered: 769.8 mg/kg, converted to compound conc.:1200.746 mg/kg or 0.12%, "Note 1" conc.: 0.077%)
Nickel dihydroxide: (Cation conc. entered: 370.4 mg/kg, converted to compound conc.:585.047 mg/kg or 0.0585%)
Zinc chromate: (Cation conc. entered: 1597.5 mg/kg, converted to compound conc.:4431.699 mg/kg or 0.443%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 68 mg/kg or 0.0068%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

C14.3: Step 5, Equation 1
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"...only for the substances in the waste above the relevant generic cut-off value, use the four equations given in Table C14.2 to decide if the waste is hazardous by H14"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
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HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

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Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

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Ward, Chris
Date:
02/05/2014 15:26
Telephone:
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Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 15
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.207%)
Zinc chromate: (compound conc.:1.423%)

H13: Sensitizing "substances and preparations which, if they are inhaled or if they penetrate the skin, are capable of eliciting a reaction of hypersensitization such that on further exposure to the substance or preparation, characteristic adverse effects are produced. [As far as testing methods are available]."

Risk phrases hit:

R43 "May cause sensitisation by skin contact"

Because of determinand:

Zinc chromate: (compound conc.:1.423%)

H14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment."

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.207%)
Zinc chromate: (compound conc.:1.423%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.322%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:1.584 mg/kg or 0.000158%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:2.308 mg/kg or 0.000231%)
Copper (I) oxide: (Cation conc. entered: 608.9 mg/kg, converted to compound conc.:685.553 mg/kg or 0.0686%)
Lead chromate: (Cation conc. entered: 2066.3 mg/kg, converted to compound conc.:3223.046 mg/kg or 0.322%, "Note 1" conc.: 0.207%)
Nickel dihydroxide: (Cation conc. entered: 383.4 mg/kg, converted to compound conc.:605.58 mg/kg or 0.0606%)
Zinc chromate: (Cation conc. entered: 5128 mg/kg, converted to compound conc.:14225.823 mg/kg or 1.423%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 32 mg/kg or 0.0032%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

C14.3: Step 5, Equation 1
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"...only for the substances in the waste above the relevant generic cut-off value, use the four equations given in Table C14.2 to decide if the waste is hazardous by H14"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
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HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 16
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.17%)
Zinc chromate: (compound conc.:0.929%)

H14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment."

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinands:

Lead chromate: ("Note 1" conc.: 0.17%)
Zinc chromate: (compound conc.:0.929%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.265%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:1.584 mg/kg or 0.000158%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:2.308 mg/kg or 0.000231%)
Copper (I) oxide: (Cation conc. entered: 315.2 mg/kg, converted to compound conc.:354.88 mg/kg or 0.0355%)
Lead chromate: (Cation conc. entered: 1696.5 mg/kg, converted to compound conc.:2646.226 mg/kg or 0.265%, "Note 1" conc.: 0.17%)
Nickel dihydroxide: (Cation conc. entered: 156 mg/kg, converted to compound conc.:246.402 mg/kg or 0.0246%)
Zinc chromate: (Cation conc. entered: 3348.2 mg/kg, converted to compound conc.:9288.397 mg/kg or 0.929%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 25 mg/kg or 0.0025%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

C14.3: Step 5, Equation 1
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"...only for the substances in the waste above the relevant generic cut-off value, use the four equations given in Table C14.2 to decide if the waste is hazardous by H14"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

Test: "H7 on R45" for determinand: "Lead chromate"
Test: "H10 on R60, R61" for determinand: "Lead chromate"
Test: "H10 on R62, R63" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

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from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22,

R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word ‘Also’."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

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HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

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Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
DP 17
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinand:

Zinc chromate: (compound conc.:0.255%)

H14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment."

Risk phrases hit:

R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment"

Because of determinand:

Zinc chromate: (compound conc.:0.255%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.0453%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 1.2 mg/kg, converted to compound conc.:1.584 mg/kg or 0.000158%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 16.5 mg/kg, converted to compound conc.:31.731 mg/kg or 0.00317%)
Copper (I) oxide: (Cation conc. entered: 31.1 mg/kg, converted to compound conc.:35.015 mg/kg or 0.0035%)
Lead chromate: (Cation conc. entered: 290.2 mg/kg, converted to compound conc.:452.658 mg/kg or 0.0453%, "Note 1" conc.: 0.029%)
Nickel dihydroxide: (Cation conc. entered: 88.7 mg/kg, converted to compound conc.:140.102 mg/kg or 0.014%)
Zinc chromate: (Cation conc. entered: 919.8 mg/kg, converted to compound conc.:2551.66 mg/kg or 0.255%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 90 mg/kg or 0.009%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

C14.3: Step 5, Equation 1
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"...only for the substances in the waste above the relevant generic cut-off value, use the four equations given in Table C14.2 to decide if the waste is hazardous by H14"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
DP 18
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing dangerous substances)

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinand:

Zinc chromate: (compound conc.:0.246%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.0343%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 7.4 mg/kg, converted to compound conc.:9.77 mg/kg or 0.000977%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 19.1 mg/kg, converted to compound conc.:36.731 mg/kg or 0.00367%)
Copper (I) oxide: (Cation conc. entered: 45.7 mg/kg, converted to compound conc.:51.453 mg/kg or 0.00515%)

Lead chromate: (Cation conc. entered: 219.8 mg/kg, converted to compound conc.:342.847 mg/kg or 0.0343%, "Note 1" conc.: 0.022%)
Nickel dihydroxide: (Cation conc. entered: 89.3 mg/kg, converted to compound conc.:141.049 mg/kg or 0.0141%)
Zinc chromate: (Cation conc. entered: 887.7 mg/kg, converted to compound conc.:2462.61 mg/kg or 0.246%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 15 mg/kg or 0.0015%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"

"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
DP 19
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.00588%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 5.8 mg/kg, converted to compound conc.:7.658 mg/kg or 0.000766%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 17.7 mg/kg, converted to compound conc.:34.038 mg/kg or 0.0034%)
Copper (I) oxide: (Cation conc. entered: 13.6 mg/kg, converted to compound conc.:15.312 mg/kg or 0.00153%)
Lead chromate: (Cation conc. entered: 37.7 mg/kg, converted to compound conc.:58.805 mg/kg or 0.00588%, "Note 1" conc.: 0.00377%)
Nickel dihydroxide: (Cation conc. entered: 58.3 mg/kg, converted to compound conc.:92.085 mg/kg or 0.00921%)
Zinc chromate: (Cation conc. entered: 129.1 mg/kg, converted to compound conc.:358.142 mg/kg or 0.0358%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 16 mg/kg or 0.0016%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
DP 20
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.00624%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 8.9 mg/kg, converted to compound conc.:11.751 mg/kg or 0.00118%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 22.2 mg/kg, converted to compound conc.:42.692 mg/kg or 0.00427%)
Copper (I) oxide: (Cation conc. entered: 18.9 mg/kg, converted to compound conc.:21.279 mg/kg or 0.00213%)
Lead chromate: (Cation conc. entered: 40 mg/kg, converted to compound conc.:62.393 mg/kg or 0.00624%, "Note 1" conc.: 0.004%)
Nickel dihydroxide: (Cation conc. entered: 57.7 mg/kg, converted to compound conc.:91.137 mg/kg or 0.00911%)
Zinc chromate: (Cation conc. entered: 118.2 mg/kg, converted to compound conc.:327.904 mg/kg or 0.0328%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 14 mg/kg or 0.0014%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 21
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.00445%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 8.1 mg/kg, converted to compound conc.:10.695 mg/kg or 0.00107%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 38.1 mg/kg, converted to compound conc.:73.269 mg/kg or 0.00733%)
Copper (I) oxide: (Cation conc. entered: 33.8 mg/kg, converted to compound conc.:38.055 mg/kg or 0.00381%)
Lead chromate: (Cation conc. entered: 28.5 mg/kg, converted to compound conc.:44.455 mg/kg or 0.00445%, "Note 1" conc.: 0.00285%)
Nickel dihydroxide: (Cation conc. entered: 97 mg/kg, converted to compound conc.:153.211 mg/kg or 0.0153%)
Zinc chromate: (Cation conc. entered: 107.4 mg/kg, converted to compound conc.:297.943 mg/kg or 0.0298%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 10 mg/kg or 0.001%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

Test: "H7 on R45" for determinand: "Lead chromate"
Test: "H10 on R60, R61" for determinand: "Lead chromate"
Test: "H10 on R62, R63" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and

- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
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4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 22
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.00482%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 10 mg/kg, converted to compound conc.:13.203 mg/kg or 0.00132%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 49.8 mg/kg, converted to compound conc.:95.769 mg/kg or 0.00958%)
Copper (I) oxide: (Cation conc. entered: 58.4 mg/kg, converted to compound conc.:65.752 mg/kg or 0.00658%)
Lead chromate: (Cation conc. entered: 30.9 mg/kg, converted to compound conc.:48.198 mg/kg or 0.00482%, "Note 1" conc.: 0.00309%)
Nickel dihydroxide: (Cation conc. entered: 142.1 mg/kg, converted to compound conc.:224.447 mg/kg or 0.0224%)
Zinc chromate: (Cation conc. entered: 106.1 mg/kg, converted to compound conc.:294.337 mg/kg or 0.0294%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 98 mg/kg or 0.0098%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
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2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 23
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.00599%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 10.5 mg/kg, converted to compound conc.:13.863 mg/kg or 0.00139%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 24.9 mg/kg, converted to compound conc.:47.885 mg/kg or 0.00479%)
Copper (I) oxide: (Cation conc. entered: 33.3 mg/kg, converted to compound conc.:37.492 mg/kg or 0.00375%)
Lead chromate: (Cation conc. entered: 38.4 mg/kg, converted to compound conc.:59.897 mg/kg or 0.00599%, "Note 1" conc.: 0.00384%)
Nickel dihydroxide: (Cation conc. entered: 70.8 mg/kg, converted to compound conc.:111.829 mg/kg or 0.0112%)
Zinc chromate: (Cation conc. entered: 105.7 mg/kg, converted to compound conc.:293.227 mg/kg or 0.0293%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 10 mg/kg or 0.001%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
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5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Classification

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue 2002

Classified by

Name:
Ward, Chris
Date:
02/05/2014 15:26
Telephone:
0

Company:
NetworkRail
The Quadrant
MK, Elder Gate
Milton Keynes
MK9 1EN

Sample details

Sample Name:
ABS 24
Site:

Project:

Sample Depth:
0 m
Dry Weight Moisture Content:
0%
Comments:

EWC 2002 code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.:0.00972%)

Determinands (Dry Weight Moisture Content: 0%)

Arsenic trioxide: (Cation conc. entered: 16.8 mg/kg, converted to compound conc.:22.181 mg/kg or 0.00222%)
Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex: (Cation conc. entered: 41 mg/kg, converted to compound conc.:78.846 mg/kg or 0.00788%)
Copper (I) oxide: (Cation conc. entered: 43.8 mg/kg, converted to compound conc.:49.314 mg/kg or 0.00493%)
Lead chromate: (Cation conc. entered: 62.3 mg/kg, converted to compound conc.:97.176 mg/kg or 0.00972%, "Note 1" conc.: 0.00623%)
Nickel dihydroxide: (Cation conc. entered: 86.4 mg/kg, converted to compound conc.:136.469 mg/kg or 0.0136%)
Zinc chromate: (Cation conc. entered: 181.1 mg/kg, converted to compound conc.:502.398 mg/kg or 0.0502%)
TPH (C6 to C40) Petroleum Group: (Whole concentration entered as: 10 mg/kg or 0.001%)

User Defined and non CLP Substances

TPH (C6 to C40) Petroleum Group

Comments: Risk phrase data given on page A41
Data source: WM2 3rd edition, 2013
Data source date: 01/08/2013
Classification: R10, R45, R46, R51/53, R63, R65

Test settings

H3-B on R10: Force this test to non hazardous because: "Assumed to be non-flammable below 1000 mg/kg."

Notes utilised in assessment

Additional Risk Phrase Comments
from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

Note used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4
from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"
"identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "TPH (C6 to C40) Petroleum Group"

Substance notes

3.4.2
from section: 3.4.2 in the document: "WM2 - Hazardous Waste Technical Guidance"
"If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic due to the presence of oil if all three of the following criteria are met:

- the waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.2 of the CLP for BaP)
- this has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D, and
- the analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel

"

Note used on:

determinand: "TPH (C6 to C40) Petroleum Group"

Note 1
from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"
"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note used on:

determinand: "Lead chromate"

Note A
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note used on:

determinand: "Chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex"
determinand: "Zinc chromate"

Note E (Table 3.2)
from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"
"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."

Note used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"

Version

Classification utilises the following:
WM2 - Hazardous Waste Technical Guidance, 3rd Edition, August 2013
CLP Regulations - Regulation (EC) No 1272/2008 of the European Parliament and of the Council: 16 December 2008
1st ATP - 1st Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 26 September 2009; binding date 1 Dec 2010
2nd ATP - 2nd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 30 March 2011; binding date 1 Dec 2012 in respect of substances and 1 June 2015 in respect of mixtures
3rd ATP - 3rd Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 31 July 2012; binding date 1 Dec 2013
4th ATP - 4th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 20 June 2013; binding date 1 Jun 2015
5th ATP - 5th Adaptation to Technical Progress for European Regulation 1272/2008: Date entered into force 13 August 2013; binding date 13 Aug 2013

HazWasteOnline Engine: WM2 version 3 (Aug 2013)
HazWasteOnline Engine Version: 1.0.2439.5273 (30 Apr 2014)
HazWasteOnline Database: 1.0.2428.5256 (06 Apr 2014)

Proposed Photomontage - from Sheepway

Rev P00

Existing

Proposed

Location:
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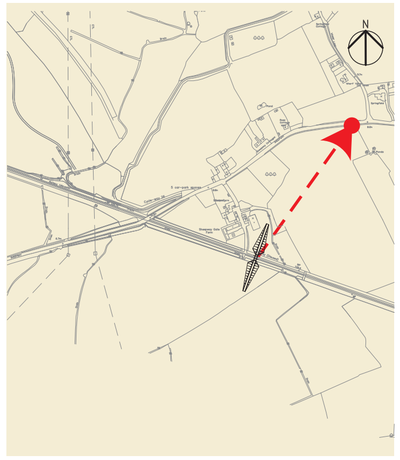
2º44’14” West

Date: 30/04/2014
Time: 10:42



Key Plan

URS

Proposed Sheepway Farm Bridge - Metrowest - Sheepway

Portishead, North Somerset

Proposed Photomontage - from Sheepway Bridge

Rev P00

Existing

Proposed

Location:
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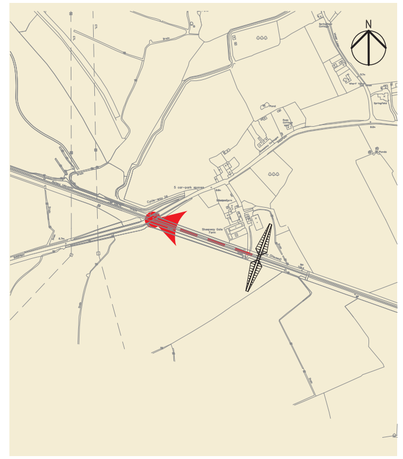
2º44’34” West

Date: 30/04/2014
Time: 10:55



Key Plan

URS

Proposed Sheepway Farm Bridge - Metrowest - Sheepway Bridge

Portishead, North Somerset

Proposed Photomontage - from Sheepway Farm

Rev P00

Existing

Proposed

Location:
51º28’52” North
2º44’28” West

Date: 30/04/2014
Time: 9:01

Key Plan

URS

Proposed Sheepway Farm Bridge - Metrowest - Sheepway Farm

Portishead, North Somerset

INTERDISCIPLINARY CHECK / REVIEW CERTIFICATE		Page
UID No: 140569	Stage:GRIP STAGE 2	Certificate No: **47070043-SW-IDC/R**
Project Name:		

METROWEST – PHASE 1
Portishead Line Reopening

Description of Design Being Reviewed:
Reopening of the former branch line to Portishead. Involves the relaying of 3.5 miles of single line from Portbury Dock Jn. to Portishead and the conversion to passenger status of the existing freight route between Parson Street Jn. and Portbury Dock Jn. New stations will be constructed at Portishead and Pill. A turnback facility will be created for Portishead services at Bathampton Jn.

Discipline Checked	Trackbed Investigation	Permanent Way Design	Signalling Design	Civils & Structural Engineering Design	E&P Design	Telecomms Design
Trackbed Investigation						
Permanent Way Design						
Signalling Design						
Civils & Structural Engineering Design						
E&P Design						
Telecomms Design						

Network Rail

IDC Statement:
We the undersigned certify that the drawings listed on the attached schedule(s) in respect of the above project have been the subject of an Interdisciplinary Check, undertaken to eliminate areas of discrepancy between disciplines. This check assumes normal design checks, in accordance with the relevant British, European, Railway Group and Network Rail Company Standards have been carried out by the relevant design organisation(s).

Contractor's Engineer Responsible for Interdisciplinary Check					
Function	**Contractor**	**Name**	**Title**	**Signature**	**Date**
Trackbed Investigation	**URS**	**David Kite**	**CRE (TBI)**		
Permanent Way	**URS**	**Pete Hillier**	**CEM**		
Signalling	**Network Rail (SDG)**	**Andrew Buller**	**CRE (Signalling)**		
Civil & Structural engineering	**URS**	**Steve Turner**	**CRE (Civils)**		
E&P Engineering	**URS**	**Chris Spellman**	**CRE (E&P)**		
Telecomms	**URS**	**Kevin Goode**	**CRE (Telecomms)**		

IDR Statement:
We the undersigned certify that the drawings listed on the attached schedule(s) in respect of the above project have been the subject of an Interdisciplinary Review, undertaken to eliminate areas of discrepancy between disciplines.

Network Rail Staff Responsible for Interdisciplinary Reviews				
Function	**Name**	**Title**	**Signature**	**Date**
Track	Nick Lake	DPE		
E&P	Tom Garner	PE – E&P		
Signalling	Matt Redstone	PE – Signalling		
Telecomms	Geoff Thomas	PE – Telecomms		
Civil & Structural Engineering	Dale Hall	PE – Civils & Structural Eng.		

I certify that all reasonable professional skill and care have been used in the IDC / IDR described above. I certify that the staff that have carried out the IDC / IDR described above are suitably qualified and competent to carry out these duties. (To be completed by the Designated Project Engineer for the project).		
Name: Nick Lake	Signature:	Date:

I confirm that all the relevant disciplines HAVE / HAVE NOT* satisfactorily completed the IDC / IDR Process on the above documents and the Process IS / IS NOT* complete. (To be completed by the Designated Project Engineer for the project)		
Comments Attached YES / NO*		
Name: Nick Lake	Signature:	Date:

This sheet to be attached to Office Copy of Design Drawing and Network Rail Acceptance Review Copy.

Network Rail

SCHEDULE OF DRAWINGS - The IDC / IDR was carried out with reference to the following design drawings

Category

1	Accepted – Proceed to the next stage in the process.
2	Accepted – Proceed to the next stage in the process subject to the design being updated to the attached comments and an updated copy being submitted to the DPE for records.
3A	Rejected – Do not proceed the design is to be amended and reissued; recommence the IDC and IDR process; the Acceptance Review of the resubmitted design will only review the update to the comments raised.
3B	Rejected - Do not proceed the design is to be amended and reissued; recommence the IDC and IDR process; the Acceptance Review of the resubmitted design will consider the entire design as if it were a new submission.
4	Note.

No.	Document No.	Revision	Document Title	Cat
	Permanent Way			
1	47070043-SW-PW-DRG-7001	P02	Outline 1-1000 Scale Alignment Plan Sheet 1	
2	47070043-SW-PW-DRG-7002	P02	Outline 1-1000 Scale Alignment Plan Sheet 1	
3	47070043-SW-PW-DRG-7003	P02	Outline 1-1000 Scale Alignment Plan Sheet 3	
4	47070043-SW-PW-DRG-7004	P02	Bathampton Jn.- Proposed Turnback Facility	
	Civil & Structural Engineering			
5	47070043-SW-CIV-DRG-0001	P01	Pill Station Car Park – Outline GA	
6	47070043-SW-CIV-DRG-0002	P01	Pill Tunnel Evacuation Route Plan	
7	47070043-SW-CIV-DRG-0011	P01	Galingale Way – Footbridge Option 1 Plan	
8	47070043-SW-CIV-DRG-0012	P01	Galingale Way – Footbridge Option 2 Plan	
9	47070043-SW-CIV-DRG-0013	P01	Galingale Way – Footbridge Elevations Opt. 1	
10	47070043-SW-CIV-DRG-0014	P01	Galingale Way – Footbridge Elevations Opt. 2	
11	47070043-SW-CIV-DRG-0021	P01	Portishead Station Option 2A - GA	
12	47070043-SW-CIV-DRG-0022	P01	Portishead Station Car Park Option 2A - GA	
13	47070043-SW-CIV-DRG-0023	P01	Portishead Station Option 2B - GA	
14	47070043-SW-CIV-DRG-0024	P01	Portishead Station Car Park Option 2B - GA	
15	47070043-SW-CIV-DRG-0031	P01	Sheepway Gate Farm Overbridge - GA	
16	47070043-SW-CIV-DRG-0032	P01	Sheepway Gate Farm O/B – sections/elevations – Option 1	
17	47070043-SW-CIV-DRG-0033	P01	Sheepway Gate Farm O/B – sections/elevations – Option 2	

	Signalling			
18	140569-SDG-001		Scheme Sketch – Parson Street to Portishead	
19	140569-SDG-002		Scheme Sketch – Bedminster to Parson Street	
20	140569-SDG-003		Scheme Sketch – Bathampton Jn.	
	Trackbed Investigation			
21	47070043-WT-PL-140569	001	Trackbed Investigation – Factual Report	
22	47070043-WT-PL-140569	002	Trackbed Investigation – Interpretive Report	

This sheet to be attached to Office Copy of Design Drawing

SCHEDULE OF INTERFACE ISSUES

Category

1	Accepted – Proceed to the next stage in the process.
2	Accepted – Proceed to the next stage in the process subject to the design being updated to the attached comments and an updated copy being submitted to the DPE for records.
3A	Rejected – Do not proceed the design is to be amended and reissued; recommence the IDC and IDR process; the Acceptance Review of the resubmitted design will only review the update to the comments raised.
3B	Rejected - Do not proceed the design is to be amended and reissued; recommence the IDC and IDR process; the Acceptance Review of the resubmitted design will consider the entire design as if it were a new submission.
4	Note.

Document No.	Issue	Category	Raised by	Response by	Date Due
140569-SDG-001	Sig Scheme Sketch to be revised to show Portishead station on north side of single line and moved to straddle Quays Ave.	2	P. Hillier	A. Buller	18-5-14
140569-SDG-001	Sig Scheme Sketch to be revised to show proposed linespeeds in line with p.way plan	2	P. Hillier	A. Buller	18-5-14
47070043-SW-PW-DRG-7001 47070043-SW-CIV-DRG-0001	Potential NR compound and track access point at Pill station car park to be detailed on P. way alignment and Civils car park GA	2	Rachel Leighfield Finch	P. Hillier S Turner	18-5-14
47070043-SW-PW-DRG-7003	P. Way drawing to be amended to show extent of recent additional housing in Moor Lane area	2	Rachel Leighfield Finch	P. Hillier	18-5-14
47070043-SW-PW-DRG-7003	P. Way drawing to be revised to show excavation exclusion zone either side of oil pipeline crossing	2	Rachel Leighfield Finch	P. Hillier	18-5-14
47070043-SW-PM-REP-1001	Conflict between access ramp to Pill station and an existing DNO supply. Feasibility report to record requirement to move DNO supply at the next design phase.	2	S. Turner	C Spellman	18-5-14

General Actions From IDC/R Meeting

- Carolyn Francis to continue to engage with NSC and NR to close out potential issues with Air Quality and encroachment into SSSI.
- Chris Spellman to advise NR of total additional signalling power supply requirements at Bathampton Jn. Parson Street and Ashton Gate
- Chris Spellman to discuss alternative methods of lighting the Galingale Way footbridge within the report.

NAME	PROJECT ROLE
Rachel Leighfield Finch	Network Rail – Project Development Manager
Nick Lake	Network Rail – Designated Project Engineer
Andrew Buller	Network Rail – Signalling Design Group – CRE (Signalling)
Tom Garner	Network Rail – E&P Assistant Project Engineer
Matt Redstone	Network Rail – Signalling Project Engineer
Dale Hall	Network Rail – Civils Project Engineer
Geoff Thomas	Network Rail – Telecomms Project Engineer
Richard Waters	Network Rail – Telecomms Project Engineer
Carolyn Francis	CH2M Hill – Environmental Consultant
Pete Hillier	URS – Contractor's Engineering Manager
Karl Hatala	URS – Project Manager
David Kite	URS – CRE (Trackbed Investigation)
Steve Turner	URS – CRE (Civil & Structural Engineering)
Chris Spellman	URS – CRE (E&P Engineering)
Kevin Goode (By telephone)	URS – CRE (Telecomms)

Feasibility Report

Version 1.00

Project Name:	**MetroWest Phase 1**
OP Reference:	**140569**
Sponsor:	Andrew Holley
Project Manager:	Rachel Leighfield Finch

Signature	[redacted]	[redacted]
Prepared By:	**Name:** Rachel Leighfield Finch	**Name:** Karl Hatala
	Job Title: Project Development Manager	**Job Title:** Senior Project Manager, URS
	Date: 18th July 2014	**Date**: 18th July 2014
Accepted By:	**Name:** Andrew Holley	**Name:** James Willcock
	Job Title: Senior Sponsor	**Job Title:** Project Manager MetroWest Phase 1, North Somerset Council

Ref:	GS2/**140569**
Version:	1.00
Date:	July 2014

Contents

Appendices

A Drawings

B Cost Estimate

C Qualitative Cost Risk Analysis

D Capacity Modelling

E Environmental Appraisal

F Signalling Appraisal

G Photograph Gallery

H Track Bed Investigation (Factual, Interpretative and Hazardous Classification)

I Visualisations (Galingaleway and Sheepway Gate Farm)

J Interdisciplinary Design Certificate

K Portishead Station Options Appraisal Report (produced by North Somerset Council)

Ref:	GS2/**140569**
Version:	1.00
Date:	July 2014

Issue Record

Issue No	Brief History Of Amendment	Date of Issue
0.01	First Draft	30 May 2014
0.02	Second Draft updated to include comments	13 June 2014
1.00	Report Issued	18 July 2014

Distribution List

Name	Organisation	Issue No.
James Willcock	North Somerset Council	0.01
Internal & External Stakeholders	Network Rail & External Stakeholders	0.02
James Willcock	North Somerset Council	1.00

Abbreviations

ADSL	-	Asymmetric Digital Subscriber Line
BASRE	-	Bristol Area Signalling Renewals Project
BRB	-	British Railways Board
BRT	-	Bus Rapid Transport
CCTV	-	Closed Circuit Television
CIS	-	Customer Information Systems
CWR	-	Continuous Welded Rail
DCO	-	Development Consent Order
DDA	-	Disability Discrimination Act
DfT	-	Department for Transport
DNO	-	Distribution Network Operator
DOO	-	Driver Only Operated
EIA	-	Environmental Impact Assessment
GPDO	-	General Permitted Development Order
GRIP	-	Guide to Rail Investment Projects
GSM	-	Global Systems Mobile
GSM-R	-	Global Systems Mobile (Rail)
LED	-	Light Emitting Diode
NWR	-	Network Rail
OLE	-	Overhead Line Equipment
ORR	-	Office of Rail Regulator
PA	-	Public Address
PADS	-	Parts and Drawing Systems
PHP	-	Passenger Help Points
PID	-	Project Initiation Document
REB	-	Relocatable Equipment Building
QCRA	-	Qualitative Cost Risk Analysis
ROGS	-	Railway and Other Guided Transport Systems
RUS	-	Route Utilisation Strategy
SISS	-	Station Information & Surveillance Systems
SSSI	-	Site for Special Scientific Interest
SUDS	-	Sustainable Urban Drainage System
TBI	-	Trackbed Investigation
TOC	-	Train Operating Company
TVSC	-	Thames Valley Signalling Control
WoE	-	West of England

1. Executive Summary

This Report has been produced at the request of the Network Rail Senior Sponsor, on behalf of North Somerset Council and the West of England Councils. This Report is an update to the 'Option Selection Report GRIP Stage 3 111797 Portishead reopening' Report produced in 2010. The remit for this Report was to refresh the 2010 GRIP 3 Report and to undertake additional feasibility study arising from a wider project scope and additional options over and above those addressed in the previous report. The scope of the project has widened to a broader local rail network enhancement including train service improvements for both the Seven Beach line and Bath to Bristol line, combined with re-opening the Portishead to Bristol line. Rather than operating a shuttle only operation, the Portishead line will connect with either the Seven Beach line, or the Bath line, or both lines. The project was launched in 2013 and is known as MetroWest Phase 1. The West of England (WoE) Joint Transport Board has identified its strategic programme and determined that MetroWest Phase 1 is its highest priority for allocation of devolved DfT capital funding. The new inputs for MetroWest Phase 1 GRIP stage 2 include a potential track alignment, Trackbed Investigation results, concept designs for Portishead and Pill Stations, Galingale Way footbridge Options, consideration of cycleway widths / track cess, review of accommodation crossings, review and consideration of the existing freight route between Parson Street and Portbury Dock Junction, Pill tunnel evacuation route and turn back facilities at Bathampton and Avonmouth.

The 2010 report established that a demand for a public transport system to serve Portishead was warranted due to the expansion of the town and the need for an alternative commuter route into Bristol. Portishead's population is now over 27,000 and is expected to reach 30,000 before the project opens in 2019. While the city region's population is expected to 1.1 million 2026. Planning for this growth means the city region needs to make sure its transport infrastructure is not only fit for purpose, but has the ability to respond to increasing demand, and therefore maximise potential for continued economic growth. MetroWest Phase 1 will play a key role in supporting economic growth and major employment areas including Temple Quarter Enterprise Zone and the five Enterprise Areas across WoE. The project is the first major part of the WoE MetroWest programme to uplift the local rail network and achieve better transport network resilience.

Portishead was part of the national rail network until 1964 when it was closed under the Beeching Axe. The route is still present, with 6 miles now reinstated for freight traffic to serve the Royal Portbury Dock and circa 3.5 miles of abandoned track leading up to as far as Quays Avenue in Portishead. Early investigations suggest the 3.5 miles of abandoned track will require planning consent, while the remaining works can be undertaken through Network Rail's General Permitted Development rights. Further scoping of the consents strategy will be needed, however early indications are that the abandoned section of track may require a Development Consent Order for powers to re-build and operate it.

A revisited demand modelling exercise is being undertaken through a hybrid Rail Demand Model which uses both Moria and the Discounted Cashflow models used by Network Rail together with the G-BATS multi-modal transport model developed by the WoE councils. Initial rail network capacity analysis has been undertaken and has identified two viable options connecting the three rail lines together to form through rail routes. The Options under development provide for a half hourly service between 06:00hrs – 19:00hrs then hourly until close to midnight. The service will run between

Portishead, Bath and Severn Beach with a number of intermediate stops in between utilising a new turnback facility at Bathampton Junction. This will entail upgrading the freight only route between Parson Street Junction and Portbury Dock Junction to passenger status and reinstatement of the disused line between Portbury Dock Junction and Portishead. Two new Stations, one at Portishead and the other at Pill (utilising the former station platform) are to be developed in order to facilitate the passenger service. The journey time between Portishead and Bristol Temple Meads is less than 17 minutes in each direction and will operate between the freight traffic serving the Royal Portbury Dock.

Once the Project moves into the design and build stages, it is planned to complete the works and commission the Project within two years. The commissioning date for the Project is planned for spring 2019.

Timescales:

2014-2016

- Detailed technical work, and business case to support a major planning application

2017

- Planning consent awarded
- Procurement completed
- Full business case completed
- Funding approval and contractual arrangements finalised
- Construction started

2019

- Construction completed

2. Introduction

The WoE Local Enterprise Partnership together with the Executive Members for Transport of the four councils, who collectively comprise the WoE Joint Transport Board, has determined that MetroWest Phase 1 and Phase 2 are its highest priorities for devolved DfT funding.

The town of Portishead has grown rapidly with a population today of over 27,000 compared with 17,000 in the 2001 Census and 6,400 in the 1961 Census. It is anticipated that future developments planned for the town will see the population rise to over 30,000 during the next few years.

Main road access to Portishead is via the A369 which is dissected by the M5 at Junction 19. During peak times the A369, M5 Junction 19, and the Bristol end of the A369 all become very congested.

Rail passenger services from Bristol Temple Meads to Portishead ceased to operate in 1964. Part of the line was re-opened in 2002 for freight traffic only to serve Royal Portbury Dock. Sustained economic and population growth over the last decade has increased demand on the sub-regional transport network. As a result the WoE councils have identified a need to ensure the local rail network is sufficiently accessible and has sufficient capacity and resilience, to continue to meet the sub region's needs.

The history of the former Portishead Station is interesting and worth summarising.

After the completion of both Isambard Kingdon Brunel's Great Western Railway (GWR) main lines from London to Bristol and the Bristol & Exeter lines, Brunel proposed a railway link to the pier at Portishead. Although proposed as long ago as 1839, Brunel died before the line was eventually built and opened in 1867; about three years after Brunel's Clifton Suspension Bridge opened. It took less than three years to build the Portishead line, including the four tunnels. The line was operated by the Bristol & Portishead Pier & Railway Company as a single line constructed to broad gauge Standards

The original Main Station at Portishead

Initially there were four Stations on the route serving Clifton Bridge, Pill, Portbury and Portishead. The Portishead pier came into use in 1868, with steamers running to Cardiff, Newport and Ilfracombe. Portishead docks opened in 1879, two years after its rival at Avonmouth.

The 1954 Main Station at Portishead

The former Portishead Pier Station

Historical photograph of Pill Station

In 1880, the route was converted from broad gauge to the Standard 4ft 8½" gauge. This conversion took place between the 24th and 27th January 1880. The route became part of the GWR in 1884.

Ashton Gate Station opened in 1906, and Portbury Shipyard Station opened in 1918 to serve a shipyard being built during World War 1. The shipyard was never completed and the shipyard Station closed in 1923. The former main redbrick building can still be seen at the foot of the steps leading down from the Royal Hotel.

Ham Green Halt opened in 1926 to serve the hospital, and Nightingale Valley Halt just north of the bridge opened in 1928, though it closed in 1932.

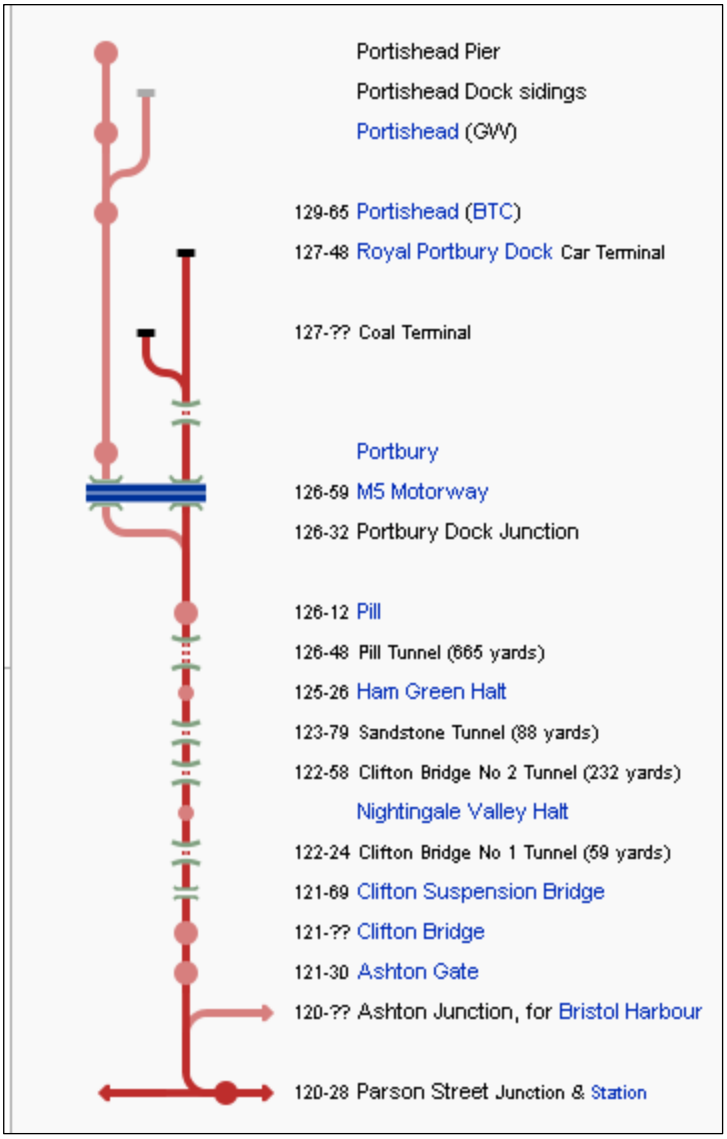
The main Portishead Station was demolished in 1954 to facilitate access to the new Portishead B Power Station, a modern terminus Station was built where the Waitrose petrol Station now stands. The new Station was only to last a decade as the line closed to passenger traffic in 1964 and for freight in 1981. However, the line was never dismantled.

Pill Station opened in 1867 and closed in 1964. A goods yard just north of the Station opened in 1912 and closed in 1963.

Once the Royal Portbury Dock (opened in 1978) became fully established, it was viable to open part of the branch line again to enable cars and coal to be transported from the docks. The line reopened in 2002 but only as far as the Portbury docks and for freight

only. The route is currently served by both DB Schenker and Freightliner services. The major freight flows along the line are bulk coal and newly delivered vehicles.

The remaining old track (a continuous length of circa 3.5 miles) still exists into Portishead and this has been safeguarded from development through North Somerset Council's planning policy. In 2009 North Somerset Council purchased the land containing 3.5 miles of the disused track from BRB Residuary. The land will be transferred to Network Rail, upon re-opening the line and adoption back into the national rail network.



Map showing existing and former route to Portishead

3. Business Objective

3.1 Problem Identified

The West of England (WoE) sub-region is a net contributor to UK PLC, with the highest economic growth of any core city region (3.1% GVA). However, the sub region's economic prosperity is beginning to be constrained by its transport network. As demand on the transport network increases as a result of economic and population growth, further investment is needed to ensure the transport network is sufficiently accessible and has sufficient capacity and resilience, to continue to meet the sub region's needs. Longer term problems of sustained traffic growth and car dependency also need to be tackled, in addition to wider long term issues of carbon emissions and social wellbeing.

Rail travel across the WoE has doubled in the last ten years and this marks a very clear public appetite to increasingly opt for rail. However, rail travel in the WoE has historically been low compared with similar city regions across England. While the WoE benefits from good long distance rail routes, the local rail network is relatively under-developed. Many of the local rail routes have don't have a basic half hourly peak frequency and some terminate at Bristol Temple Meads, rather than operating across the City region. There are also a number of strategically important disused rail lines and re-opening these lines is a key part of the four WoE councils (Bath & North East Somerset, Bristol City, North Somerset and South Gloucestershire Council) strategy to uplift the local rail network, through the MetroWest programme.

The proposal for MetroWest Phase 1 is being taken forward at a time of considerable investment in the Western Route through Control Period 5 (CP5) 2014-2019. The Western Route is to undergo considerable transformation through the delivery of; electrification of the Great Western Main line, strategic enhancement projects to deal with bottlenecks and to increase capacity and renewal projects to modernise infrastructure. The CP5 programme of committed schemes focuses on the high volume main lines and various strategic investments spread across the rest of the Western Route. MetroWest Phase 1 is not a CP5 committed scheme, is it however the largest third party promoted rail scheme in England. MetroWest Phase 1 is the foundation upon which the MetroWest programme will be taken forward over the next decade.

3.2 MetroWest Concept

The MetroWest programme will address the core issue of transport network resilience, through targeted investment to increase both the capacity and accessibility of the local rail network. The MetroWest concept is to deliver an enhanced local rail offer for the sub-region comprising:

- Existing and disused rail corridors feeding into Bristol
- Broadly ½ hourly service frequency (but some variations possible pending business case)
- Cross Bristol service patterns i.e. Bath to Seven Beach etc
- Providing a Metro type service appropriate for a City Region of 1 million population

The programme includes:

- MetroWest Phase 1 - Half hourly local service for the Severn Beach line, Bath to Bristol line and a re-opened Portishead line with stations at Portishead and Pill;
- MetroWest Phase 2 - Half hourly service for the Yate to Bristol line and an hourly service for a re-opened Henbury line, with stations at Henbury, North Filton, and possibly Ashley Down and Horfield.
- Further additional station openings subject to separate business cases; and
- Other potential enhancements including feasibility of extending electrification across the WoE network.

The MetroWest programme is to be delivered over the next ten years during CP5 and CP6. The MetroWest programme will also extend the benefits of strategic transport interventions that are either in the process of being delivered or have been delivered by the WoE councils. These include the Ashton Vale to Temple Meads (MetroBus) project, South Bristol Link (MetroBus), North Fringe to Hengrove Package (MetroBus), Bath Package, Weston Package and the Local Sustainable Travel Fund programme. The delivery of these projects together with the MetroWest programme will result in better modal integration between rail, bus and active modes, providing an important step towards seamless modal transfer at key hubs across WoE.

The MetroWest programme has the full backing of the WoE Local Enterprise Partnership. The WoE LEP together with the Executive Members for Transport of the four councils, who collectively comprise the WoE Joint Transport Board, has determined that MetroWest Phase 1 and Phase 2 are its highest priorities for devolved DfT funding.

3.3 MetroWest Phase 1 Strategic Intervention

MetroWest Phase 1 compliments planned CP5 investment through targeted investment in the WoE local rail network, to enhance the Severn Beach line, the Bath to Bristol line and re-open the Portishead to Bristol line. MetroWest Phase 1 will play a key role enhancing access to major growth areas including Temple Quarter Enterprise Zone and five Enterprise Areas across the sub-region. The project will bring these major employment centres closer to the skilled workforce catchment, by simultaneously enhancing access to the local train network and enhancing train service frequency. Major employers will have a larger skilled workforce pool to draw on within a 30 minute commute and this will play a part removing barriers to inward investment.

The long term trend of continued traffic growth threatens the WoE's economic prosperity; in response to this the four WoE councils have developed the MetroWest programme as a key part of its integrated 'TravelWest' transport strategy. Key highway corridors into and across the city region are at or near capacity and average vehicle speeds are among the lowest for comparable city regions. The case for intervention to re-balance the transport network, through investment in the local rail network is compelling.

3.4 MetroWest Phase 1 Project Objectives

The principal objectives of Metro Phase 1 are:

- To support economic growth, through enhancing the transport links to the TQEZ and into and across Bristol City Centre, from the Portishead, Bath & Avonmouth /Severn Beach arterial corridors.
- To deliver a more resilient transport offer, providing more attractive and guaranteed (future proofed) journey times for commuters, business and residents into and across Bristol, through better utilisation of strategic heavy rail corridors from Portishead, Bath & Avonmouth /Severn Beach.
- To improve accessibility to the rail network with new and re-opened rail stations and reduce the cost (generalised cost) of travel for commuters, business and residents.
- To make a positive contribution to social well being, life opportunities and improving quality of life, across the three arterial corridors.

In addition, Metro Phase 1 has the following supporting objectives:

- To contribute to reducing traffic congestion on the Portishead, Bath & Avonmouth /Severn Beach arterial corridors.
- To contribute to enhancing the capacity of the local rail network, in terms of seats per hour in the AM and PM peak.
- To contribute to reducing the overall environmental impact of the transport network.

4. Business Case

4.1 Business Strategy

Metro Phase 1 forms an important part of the West of England's economic growth agenda, led by WoE Local Enterprise Partnership (LEP). The WoE LEP's economic development strategy is being driven by its Strategic Economic Plan (SEP), submitted to Government in March 2014. The SEP together with the City Region Deal (CRD) provide the framework for unlocking growth across the WoE. The SEP and the CRD will deliver the following key outputs:

- Temple Quarter Enterprise Zone (17,000 new jobs);
- Five Enterprise Areas including Bath 'City of Ideas' (9,300), Weston-super-Mare Gateway J21 (11,000), Filton/A38 (4,000) and Avonmouth Severnside (650ha site);
- Ministry of Defence at Filton Abbey Wood;
- 5,700 homes and 50 ha of employment land at Filton Airfield (partly covered by the Enterprise Area);
- 8,000 and 3,000 new homes at Weston-super-Mare and North Yate respectively; and
- Redevelopment of Keynsham Town Centre and Somerdale (former Cadbury's site).

The city region is set for further population growth which is expected to exceed 1.1 million 2026. Portishead's population is now over 27,000 (2011 census plus new home completions) and is expected to reach 30,000 before the project opens in 2019. Furthermore the population within 1 km catchment of Portishead station is over 13,000, resulting in substantial latent passenger demand. Planning for this growth means the city region needs to make sure its transport infrastructure is not only fit for purpose, but has the ability to respond to increasing demand, and therefore maximise potential for continued economic growth.

4.2 MetroWest Governance

MetroWest Phase 1 is being promoted by the four WoE councils (Bath & North East Somerset, Bristol City, North Somerset and South Gloucestershire Council). The four Councils have entered into an Initial Promotion Agreement setting our how the councils are working together to deliver the project, including cost sharing arrangements. The councils have nominated North Somerset Council as the lead council for taking the detailed technical work forward, supported by the WoE Office. A formal governance structure is in place, including the Rail Programme Board (representatives include Network Rail and First Great Western), along with the Programme Assurance Board having an oversight role. The Boards have responsibility for the delivery of the MetroWest programme and comprise of senior officers. The two officer Boards report to the WoE Joint Transport Board which comprise of the four Executive Members for Transport and representatives of the WoE Local Enterprise Partnership. The WoE Joint Transport Board is the strategic decision maker and directs the MetroWest project, determines options and allocates resources and funding, including devolved DfT transport funding. The WoE Joint Transport Board has identified its strategic programme and determined that MetroWest Phase 1 is its highest priority for allocation of devolved DfT capital funding.

4.3 Business Case Approach

The MetroWest Phase 1 business case is being prepared using the Transport Five Case Model, in accordance with the DfT's WebTAG framework. The five cases comprise; Strategic case, Economic case, Delivery case, Finance case and Commercial case. The Business Case has to:

- address the project objectives and set out wider context about why the intervention is needed - **Strategic Case**
- provide a good investment and offer effective use of public sector funds - **Economic Case**
- show deliverability and robustness - not dependant on other factors - **Delivery Case**
- be affordable to the Councils both capital and revenue / train service subsidy - **Finance Case**
- have a sound commercial footing and robust procurement arrangements - **Commercial Case**

The business case is being prepared by the WoE councils with the exception of the economic case, which is being prepared jointly by Network Rail and the WoE councils. The economic case entails a hybrid Rail Demand Model which uses both Moria and the Discounted Cashflow models used by Network Rail's together with the G-BATS multi-modal transport model developed by the WoE councils. Simplistically, Moria is being used to quantify the user benefits from existing stations, with a direct demand model for new stations and G-BATS is being used to quantify the non-user benefits.

4.4 Business Case Stages

The business case is being developed in three stages; Preliminary Business Case, Outline Business Case and Full Business Case. The Preliminary Business Case is needed for allocation of resources for the development of the project and to inform decision making on the train service option to be taken through to delivery. The Outline Business Case is undertaken to support statutory processes including a Development Consent Order. The Full Business Case follows procurement of construction works and operational arrangements including the train service and confirms the total cost of delivering the project.

4.5 Business Case Timescales

The Preliminary Business Case is undergoing preparation and is scheduled to be completed by late August and submitted to the WoE Joint Transport Board on 12th September 2014. Each stage of the business case is being taken forward in parallel with the respective GRIP stage, as follows:

- Preliminary Business Case - Sept 2014 (GRIP2 June 2014)
- Outline Business Case and GRIP 3 - October 2015
- Full Business Case and GRIP 4 & 5 - September 2017

Construction is programmed to commence November 2017 with completed by April 2019. The MetroWest Phase 1 train services are programmed to start in May 2019. Handover and project close (GRIP 7 & 8) is programmed to be complete by June 2020.

5. Project Scope

The project is a third party project promoted and funded by the WoE Councils. The Project proposal is to introduce rail passenger services across Bristol with a service pattern operating between Portishead, Bath Spa and Severn Beach, with intermediate stops. This will entail upgrading the existing freight only route between Parson Street Junction and Portbury Dock Junction, re-instatement of the current disused line between Portbury Dock Junction and Portishead, and work on the main line between Parson Street and Bristol Temple Meads. A new terminus will be required at Portishead with an intermediate Station at Pill. Initial rail network capacity analysis has been undertaken and has identified two viable train service patterns connecting the three rail lines together to form through rail routes. Further details are set out in section 16 of this report. The two train service patterns are undergoing economic appraisal as part of the WoE council's Preliminary Business Case, which is scheduled to be submitted to the WoE Joint Transport Board on 12th September 2014. The Board will determine which of the two options it wishes to take forward to GRIP stage 3 and through to delivery.

The MetroWest Phase 1 project is a priority for the West of England Councils.

The Project is to;

- deliver a reliable public transport service for the residents of the Portishead and Pill and provide a half hourly local service for the Severn Beach line and the Bath to Bristol line.
- ensure freight operations and pathing rights are not jeopardised
- take into consideration other committed West of England Partnership proposals i.e. interaction with Bus Rapid Transport (BRT)
- not to preclude future cross Bristol services such as MetroWest Phase 2 and potential future services such as Portishead to Bristol Parkway
- provide a timetable to enable a journey between Bristol Temple Meads and Portishead to be in the region of 17 minutes.
- be delivered in collaboration between Network Rail and the WoE Councils, subject to business case, powers to build and operate and allocation of funding.

6. Deliverables

This Report reviews and updates the previous GRIP 3 Single Option Report and the feasibility of operating a rail link between Portishead, Bath Spa and Severn Beach, known as MetroWest Phase 1.

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The following engineering works have been proposed to deliver MetroWest Phase 1;

- Rebuild the Portishead to Pill Line.
- Closure of historic crossings.
- New station at Portishead.
- Reopen former station at Pill (using the Down platform).
- Double track works at Pill and Ashton Gate area.
- Improve highway access to Pill tunnel.
- Environmental mitigation measures.
- Enhancement to Parson Street Junction.
- Re-signalling the entire line between Temple Meads and Portishead.
- Bathampton Turnback.
- Additional signalling at Avonmouth station to facilitate turnback.
- Partial reinstatement of Down Relief Line to assist recessing / regulation of freight trains.

7. Options Considered

7.1 Service Options Previously Considered for the Portishead Line

This Report covers the proposal for what was termed Option 6 in the previous GRIP stage 3 Report. The following Options were addressed during the previous GRIP Stage 2 study and as part of the previous GRIP 3 Option Selection Report, in 2010. The detail behind the Options from the previous GRIP stage 2 Report (2010), are summarised below with the Options taken forward for further development highlighted by a blue box with the sub Options noted below it.

Option	Description	Component parts i.e. platform, track etc.	Impact on Operations	Impact on Maintainability	Constructability	Main advantages	Main disadvantages
Service Options							
1	To provide an hourly service between Portishead and Bristol TM with minimal work and alterations to the infrastructure to achieve this.	• Resignalled route along the Portbury Branch • New track between Portbury junction and Portishead • New Station at Portishead. • New road layout at Quays Avenue	• Freight services are maintained • Main line services maintained	• New track access points required • More maintenance due to increase in infrastructure	• No new or novel equipment being used. • Signalling best delivered on or around the time of the Bristol resignalling Project • Quays Avenue arrangement to be completed prior to the track works	Cheapest Option	Hourly is not suitable for the demand. A Station at Pill is also preferred.
2	To provide an hourly service between Portishead and Bristol TM, including a stop at Pill Station, with minimal work and alterations to the infrastructure to achieve this.	• Resignalled route along the Portbury Branch • New track between a new arrangement around Pill Station and Portishead • New Stations at Portishead and Pill • New road layout at Quays Avenue	• Freight services are maintained • Main line services maintained	• New track access points required • More maintenance due to increase in infrastructure	• No new or novel equipment being used. • Signalling best delivered on or around the time of the Bristol resignalling Project • Pill Station to be brought back into use by using a disused platform • Quays Avenue arrangement to be completed prior to the track works		Hourly is not suitable for the demand.

Option	Description	Component parts i.e. platform, track etc.	Impact on Operations	Impact on Maintainability	Constructability	Main advantages	Main disadvantages
3	To provide an hourly service between Portishead and Bristol TM, including stops at Pill and Ashton Gate Stations, with minimal work and alterations to the infrastructure to achieve this.	• Resignalled route along the Portbury Branch • New track between a new arrangement around Pill Station and Portishead • Ashton loop extended • New Stations at Portishead, Ashton Gate and Pill • New road layout at Quays Avenue	• Freight services are maintained • Main line services maintained	• New track access points required • More maintenance due to increase in infrastructure	• No new or novel equipment being used. • Signalling best delivered on or around the time of the Bristol resignalling Project • Pill Station to be brought back into use by using a discussed platform • Quays Avenue arrangement to be completed prior to the track works	Stops at a number of Stations on route between Portishead and Bristol.	Hourly is not suitable for the demand. Requires 3 new Stations to be built. Expensive beyond likely funding availability. Ashton Gate in particular is an expensive Station to construct due to the requirement for 2 platforms and site location involving construction on an embankment.
4	To provide an hourly service between Portishead and Bristol TM, including stops at Pill, Ashton Gate, Parson Street and Bedminster Stations, with minimal work and alterations to the infrastructure to achieve this.	• Resignalled route along the Portbury Branch • New track between a new arrangement around Pill Station and Portishead • Ashton loop extended • New Stations at Portishead, Ashton Gate and Pill • Minor Station works at Parson Street and Bedminster • New road layout at Quays Avenue	• Freight services are maintained • Main line services maintained	• New track access points required • More maintenance due to increase in infrastructure	• No new or novel equipment being used. • Signalling best delivered on or around the time of the Bristol resignalling Project • Quays Avenue arrangement to be completed prior to the track works • Pill Station to be brought back into use by using a discussed platform	Stops at the greatest number of Stations on route between Portishead and Bristol. Ideal solution – half hourly services stopping at all possible Stations between Portishead and Bristol.	Hourly is not suitable for the demand. Most expensive and beyond likely funding availability.

Option	Description	Component parts i.e. platform, track etc.	Impact on Operations	Impact on Maintainability	Constructability	Main advantages	Main disadvantages
5	To provide a half hourly service in the peak and an hourly off peak between Portishead and Bristol TM with minimal work and alterations to the infrastructure to achieve this.	• Resignalled route along the Portbury Branch • New track between a new arrangement around Pill Station and Portishead • Double junction at Parson Street • Ashton loop extended • New Station at Portishead • New road layout at Quays Avenue	• Freight services are maintained • Main line services maintained	• New track access points required • More maintenance due to increase in infrastructure	• No new or novel equipment being used. • Signalling best delivered on or around the time of the Bristol resignalling Project • Quays Avenue arrangement to be completed prior to the track works	This Option fits in with the requirements set by client in terms of half hourly services between Portishead and Bristol. Has minimal infrastructure to meet the requirements.	Excludes Pill Station.
6	To provide a half hourly service in the peak and an hourly off peak between Portishead and Bristol TM with a stop at Pill.	• Resignalled route along the Portbury Branch • New track between a new arrangement around Pill Station and Portishead • Double junction at Parson Street • Ashton loop extended • New Stations at Portishead and Pill • New road layout at Quays Avenue	• Freight services are maintained • Main line services maintained	• New track access points required • More maintenance due to increase in infrastructure	• No new or novel equipment being used. • Signalling best delivered on or around the time of the Bristol resignalling Project • Quays Avenue arrangement to be completed prior to the track works • Pill Station to be brought back into use by using a discussed platform	Maintains the business case.	None

7.2 Portishead Station Location Options

Since the completion of the previous GRIP2, North Somerset Council has undertaken more detailed assessment of the options for the location of Portishead station. A total of six sites have been assessed through a Portishead Station Options Appraisal Assessment (see appendix K). The previous preferred site at the rear of Waitrose on Harbour Road is not viable, along with two other options. A total of three of the six sites are potentially viable and these are to be subject to public consultation from June to July 2014. Two of these potential sites are included in this report, shown as option A and B (note these are identified as option 2A and 2B respectively by North Somerset Council). North Somerset Council's Option 2C which is a variation of Option 2B was not included in this report for practical purposes of managing scope, however its omission does not in any way imply that it is not being considered by North Somerset Council. Following the close of the public consultation, North Somerset Council will consider the consultation responses and intends to make a decision later this year on which station site it wishes to take forward to GRIP 3 and through to delivery.

8. Portishead to Portbury Dock Junction Overview

8.1 General

The key deliverable for this section is to make provision for a single track between Portishead and Portbury Dock Junction within the existing railway boundary. The railway corridor is still evident except where it has been severed by Quays Avenue. The track, signalling and Station layout drawings contained in Appendix A are to be used as references throughout this Section.

8.2 Land Ownership

Network Rail own the section of railway land from Portbury Dock Junction to the former Portbury Station (exclusive) which is managed by Network Rail's Property Division. This section of railway is currently out of use.

North Somerset Council owns the section of land from Portbury Station (inclusive) to Portishead. The land was purchased from British Rail Board (BRB) (Residuary) Ltd during 2009. North Somerset Council will transfer the land to Network Rail for use as an operational railway.

North Somerset Council is undertaking public consultation on the location for Portishead rail station, in June and July 2014. A total of three sites have been identified as potentially viable sites, all of which are within the vicinity of Quays Avenue. There are existing rights for adjacent landowners and other statutory undertakings and consents to be progressed as the project develops.

8.3 Statutory Powers

The entire route is covered by the Bristol and Portishead Pier and Railway Act, 1863 and subsequent amending Acts.

The 1863 Act proposed a main line, curving away from the existing alignment at the former Portbury Station, terminating to the North-East of Portishead. This line was never built. This Act also proposed a branch line from Portbury to Portishead on a straight alignment crossing the tidal inlet known as Portishead Pill. This Branch was built, although Limits of Deviation of this Act are generally restrictive. It was subsequently amended by the Bristol and Portishead Pier and Railway Act, 1866. This Act allowed a greater Limit of Deviation in the Portishead area. Both Acts, although amended, have not been repealed.

The Limits of Deviation of the 1863 and 1866 Acts have been plotted onto the scheme Drawings. These limits have been based on the original deposited plans. No formal abandonment of the railway has taken place as goods and mineral trains continued to use the railway after its closure to passenger services.

Early investigations suggest the 3.5 miles of abandoned track will require planning consent, while the remaining works can be undertaken through Network Rail's General Permitted Development rights. Further scoping of the consents strategy will be needed, however early indications are that because the abandoned section of track is more than 2km a Development Consent Order may be required for powers to re-build and operate it.

The Planning Act 2008 deems all rail projects involving more than 2 km of track outside the operational railway, to be a Nationally Significant Infrastructure Project (NSIP) and consequently are subject to the Development Consent Order planning process.

The Limits of Deviation of the 1863 Act provide adequate physical limits of work for bringing the railway back into use. Care will need to be taken that any works are undertaken within these limits so as to be within the "Permitted Development" rights that the Private Act confers under The Town and Country Planning (General Permitted Development) Order 1995 Part 11 (Development under Local or Private Acts or Orders, Class A).

Part 11 Rights are subject to Prior Approval of the detailed plans and specifications by the Planning Authority, North Somerset Council. The Planning Authority only has powers to consider the visual impact of the scheme on the amenities of the area.

Network Rail is also permitted under The Town and Country Planning (General Permitted Development) Order 1995 Part 17 (Development by Statutory Undertakers, Class A, Railway or light railway undertakings) to undertake other limited works in connection with the movement of traffic by rail. Part 17 powers are not confined to the Limits of Deviation. They are however restricted to Railway operational land and do not give rights to construct a railway.

Care should be taken on any works that affect the private sidings at Royal Portbury Dock (section of track west of Portbury Dock Junction) and their connection to the Network Rail railway as no statutory powers from an Order under the Transport and Works Act, 1992 nor any Network Exemption from the Office of Rail Regulators were sought for the operation of a railway. Any Connection Contract (Private Sidings Agreement) with The Bristol Port Company will need to be amended (or a new Connection Contract instituted) and approval sought from the Office of Rail Regulator (ORR). No alterations are expected to be required to the Royal Portbury Dock private sidings as per track, signalling and layout drawings in Appendix A. However the above constraint should be noted for consideration in GRIP stage 3 and beyond in order to avoid unnecessarily triggering the need to obtain powers to operate a railway, by means of a Transport and Works Order under the 1992 Act.

8.4 Rights of Way

No registered Public Footpaths, Bridleways or Bye-ways cross the railway according to North Somerset Council's Definitive Map. Moor Lane at Portishead is regarded as a bye-way on railway records land which previously served the corporation tip. Rights to the crossing are held by the Corporation of Bristol.

The Drove at Portbury is being claimed as a Bye-way by a rights of way group. The claim is contested by North Somerset Council. Several private rights of way exist over this railway; some appear to be severed due to adjacent housing or port developments. From examination of the records, three Occupation Crossings are considered to be active: -

Elm Tree Farm access negotiations are ongoing between North Somerset Council and the Land Owner with a view to closing the crossing and providing alternative access via the A369.

Sheepway Farm access negotiations are ongoing between North Somerset Council and the Land Owners with alternative access arrangements being proposed.

Lodway Farm access negotiations are to be progressed by both Network Rail and North Somerset Council to pursue deeds of release so that the occupational crossing can be closed.

9. Engineering Options

9.1 Requirements for reopening the Portishead to Portbury Dock Junction Line

9.1.1 Portishead Station

The proposed new Station at Portishead will form the terminus for services from Bristol Temple Meads, Bath Spa and Severn Beach. The Station is to be located within the vicinity of Quays Avenue. There are two reported Options regarding the location of the Station and these differ from those proposed in the Corus Report of 2010. North Somerset Council have identified a third option which is a variation of Option B and are undertaking public consultation on all three Options in June and July 2014. The third Option was not included in this report for practical purposes of managing scope; however its omission does not in any way imply that it is not being considered by North Somerset Council. For further details about the Options considered by North Somerset Council, see Portishead Stations Options Appraisal Report in Appendix K.

For both reported Options the layout of the Station at Portishead will provide a single platform for 4-cars of 97 metres in length, with passive provision for 5-car units of 122 metres length. A Ticket Office with retail kiosk will be provided adjacent to the platform with access through to the platform.

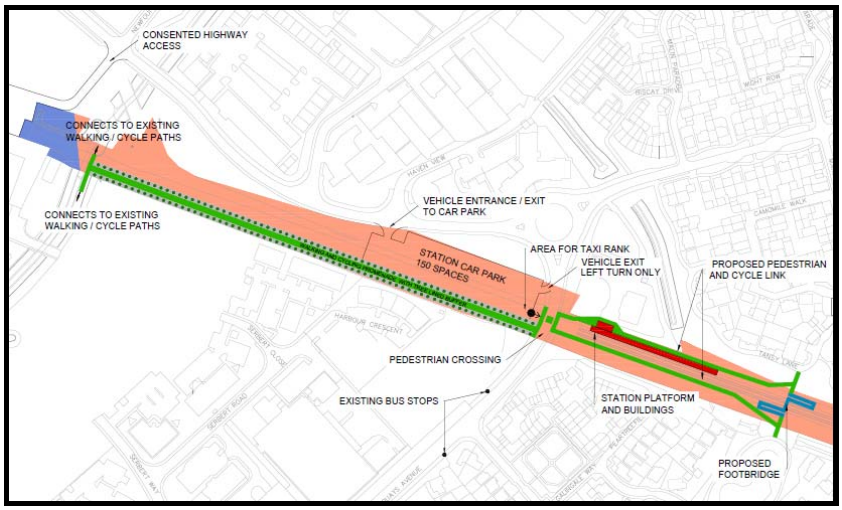
The platform will have the following features:

- Separate DDA compliant access for when the Station is unmanned
- Waiting shelter
- Public toilet block
- 25m long canopy
- Lighting
- Public Address system
- CCTV
- Passenger Information Display
- Customer Help Point
- Cycle rack

The Options provide a “Transport Terminus” close to the centre of Portishead. The town centre is evolving with the redevelopment of Portishead Quays at Harbour Road. The Station would be in the midst of the redevelopment and could be surrounded by an attractive environment. It would make a positive statement of the importance of the new transport link.

The Options considered are:

9.1.1.1. Option A



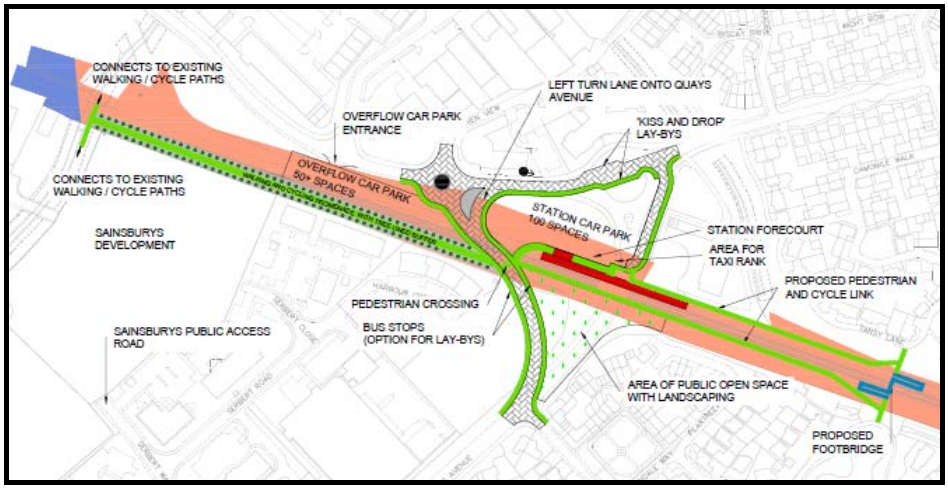
Portishead Station Option A

The new Station building and platform is located to the East of Quays Avenue with the Station car park to the West of Quays Avenue, the two being linked by a pedestrian/ cycle way crossing.

Vehicle access to the car park is proposed to be from a roundabout located on Harbour Road and a junction onto Quays avenue.

This Option provides 150 car spaces with 9 DDA compliant spaces.

9.1.1.2. Option B



Portishead Station Option B

The new Station building and car park are both located across the existing alignment of Quays Avenue, requiring the rerouting of Quays Avenue to the West of the proposed Station and Car park. This option will require the removal of the roundabout on Quays Avenue, a pedestrian crossing for the cycle path and overflow car park will be required. However passengers will not need to cross Quays Avenue to access to the Station from the main car. A drop off and pickup zone will be provided together with a taxi rank adjacent to the Station building within the footprint of the car park.

This Option provides 155 car spaces with 9 DDA compliant spaces. Vehicle access to the car park is proposed to be from a junction on Harbour road.

9.1.2 Civils

For both Options the construction of the platform for Portishead Station can be carried out at any time during overall the construction phase and is therefore not possession dependant. The form of construction adopted may therefore be developed as that offering minimum costs for construction.

A front / rear wall form of construction can be adopted with suitable imported fill as this offers reduced costs for construction and is effectively a greenfield site. The surfacing of the platform can be either block paviours or tarmac depending on available budgets and appearance of the Station required, Standard Network Rail details exist for Platform construction.

A minimum of 2500mm available platform width is required to comply with Network Rail Standards.

Drainage off the rear of the platform will be necessary and it is proposed that this takes the form of a soakway, subject to suitable ground conditions, although alternative options for using this ‘grey’ water should be considered in the next GRIP stage. Connections to a local authority sewer will be necessary for the waste from the toilet block.

For design development a geotechnical investigation is required to prove foundation details of the platform for proposed drainage, soakaways and design of car park surfacing.

Design interface will be required with the lighting design team and the telecoms design team to ensure that cable duct routes and bases for lighting, CCTV, PA and CIS information screens is provided.

Detailed design of the track and platform, following topographical survey, should ensure that the platform is constructed on a 1:500 or shallower gradient as required by Railway Standards, which is a particular requirement at a terminating Station.

Design to be compliant under the Disabled Discrimination Act 1995 (DDA) will need to ensure that access to the Station platform, by ramps, hand railing is given full consideration.

9.1.3 Telecoms

For both Options the following shall apply:

Station Information & Surveillance Systems (SISS)

Closed Circuit Television (CCTV)

A CCTV surveillance system shall be provided to monitor the public areas within the Station and shall comply with Network Rail Standard NR/L2/TEL/30135.

The system shall be designed for the purpose of providing general monitoring of the Station, particularly entrances / exits to the Station platform and will offer a means of protecting the safety and security of the public and staff in the general management of the Station and train operations.

The CCTV system shall make provision to include 24 hour surveillance of the Station car parking facilities. The cameras shall be suitable for both day and night operation, to maintain a good quality level of coverage, for when the light levels diminish.

CCTV images shall be recorded locally on a Digital Video Recorder. The system however, shall be designed to enable monitoring from a remote location if required by the Train Operating Company (TOC).

Public Address (PA)

A standalone PA system shall to be provided at Portishead Station to broadcast secure, fail-safe, and high intelligibility speech to all public areas on the Station platform, including access routing to the platform. The requirements for the new PA system shall comply with Network Rail Standard NR/L2/TEL/30134.

In order to update the announcements a dedicated link from the PA control equipment at the Station, to the associated TOC Control Centre will be required.

Customer Information Systems (CIS)

A Customer Information System shall be provided, delivering live train information to the travelling public in transit from the Station car park and passengers waiting on the Station platform.

The requirements for the new CIS system shall comply with Network Rail Standard NR/L2/TEL/30130.

In order to update the train information displayed a dedicated link from the CIS control equipment at the Station, to the associated TOC Control Centre will be required.

Passenger Help Points (PHP)

Passenger Help Points shall be provided as a focal point for information and in the event of an emergency.

It is proposed that the PHP's be a GSM enabled Help Point.

PHPs shall be a two button type unit with one button marked 'Information', the second 'Emergency'. Information calls are routed via the GSM provider and Public Switched Telephone Network (PSTN) to the information call centre.

To aid passengers with hearing difficulties, the PHP will include an Induction Loop facility, integrated within the passenger help point enclosure.

Telecommunication Equipment Cabinet

A telecoms equipment cabinet shall be provided to house the CCTV, PA and CIS control equipment. This will need to be located in a position that provides unhindered access for maintenance purposes. A power supply will need to be provided for the telecommunication equipment cabinet.

Third Party Connections

It will be necessary for a third party ADSL connection to be provided at Portishead Station.

The third party connection will allow the SISS to be connected to the TOC control centre in order to provide updated information for both the CIS displays and PA.

Operational Communications

The only operational circuit required at Portishead Station is to facilitate an operational telephone at the Bristol end of the platform.

Due to both the lack of existing cable infrastructure and there being no other Lineside telephone requirements, in the area, it is proposed to use a BT 'leased line' circuit to connect the operational telephone to the controlling Signal Box.

9.1.4 Electrical

Distribution Network Operator Supply

The proposal at Portishead for the Options would be to provide a DNO supply for the Station and locate this in the fence line of the area. The DNO cubicle will be double sided and would contain the DNO equipment and meter on the public side of the fence and on the Network Rail side of the fence the distribution and lighting control system would be located. In order to access the Network Rail side of the cubicle an adjacent pedestrian access gate will be required. Alternatively access could be gained through the Station and providing a set of steps to the west of the platform down to the cess level. Providing the access through the Station may prove problematic during the times when the Station is not in operation and access would need to be arranged with the Station Manager prior to the visit.

The DNO distribution would be used to provide a supply for the Station and access lighting, power requirements in the Station building, power and lighting in the toilet and stop blocking lighting. Since the stop lighting is classed as being part of the railway infrastructure and all other supplies would be associated with the Station, the stop block lighting would be sub-metered so that the cost of the stop block light could be factored out of the running costs of the Station.

Lighting

The platform lighting would need to comply with Railway Group Standard GI/RT/7016 and RIS-7702-INS and in general should achieve a maintained horizontal minimum of 20 Lux with a minimum uniformity of 0.4 and this is consistent with driver only operated (DOO) Stations. During the time the Station is manned and lit for the dispatching of trains the lighting parameters will be 10 Lux maintained illuminance with a uniformity of 0.25. The vertical illuminance at a height of 1m above the platform surface at the edge of the platform will need to be 6 Lux for DOO Stations and 2 Lux for manned Stations with 0.125 diversity. However, the RIS Standard advises that lighting should be developed to any task that might be undertaken on the platform and if there are any tasks that require a certain level of detail to be completed the Lux levels will need to be revised relevant to that task.

DDA compliance would see the lighting level on the platform rise to a minimum of 100 Lux and the DfT Code of Practice does not give minimum Lux levels or uniformity so this would be in line with the 0.4 requirement of RIS-7702-INS. Usually DDA requirements are not applied to platform areas so the Group Standard requirements are being adopted.

Under the canopy area, flat glass luminaries have been shown attached to the roof of the canopy and are spaced at 4m intervals. The canopy will need to have cable routes for this equipment along with routes to and from the roof to the platform level to

achieve the looping in and looping out cabling associated with lighting installations. The platform luminaries are shown as being 5m above the platform and at 6m spacing. The heights and spacing's for all luminaries are to be confirmed at the Grip 3 Stage of the Project. The use of raise and lowering columns mean that the maintenance staff can carry out maintenance and repair at platform level.

The waiting shelter is assumed to be a transparent or translucent type structure that will not require separate lighting requirements and the platform lighting will provide enough lighting for its use.

The supplies for the telecoms equipment such as Customer Information System (CIS), Close Circuit Television and Public Announcement will be feed from the Station distribution board located in the confines of the Station building.

The toilet block power, lighting and heating requirements will be fed from a sub distribution board located in the toilet block and fed from the DNO Station fuse switch disconnector via the Station distribution board. The lighting level in the block will need to be in accordance with BS EN 12464-1 and be a minimum maintained illuminance of 200Lux with an uniformity of 0.4.

The Station area will need to be lit to the requirements of BS EN 12464-1 and for Ticket Hall and concourse areas along with entrance halls be a minimum of 200Lux with a 0.5 uniformity. For a ticket counter or ticket machine a minimum of 300Lux with a uniformity of 0.5 will be required. Emergency lighting will also need to be considered during the GRIP 3 stage of the Project.

The stop block lighting will be confirmed as being required at the GRIP 3 Stage by the Signal Sighting Committee along with the colour of the light to be used. A reflective strip across the buffer stop may be more than adequate when taking Station lighting into account in the area. A sub metered fuse switch disconnector will be used in the distribution cubicle and will feed a local 230V/110V transformer and key switch that will used to provide the supply. The lights shall be the PADS approved Marl LED type and draw current in the range of 40mA per light.

The steps to the Station and access ramps will need to be lit to BS 5489 and be 30 Lux with an uniformity of 0.5 but to comply with the Disabled Discrimination Act (DDA, which has since evolved into the Equalities Act 2010) requires a minimum of 100 Lux from the accessible building entrance to the platform access point, measured at floor level. This is detailed in the Department for Transport Accessible Train Station Design for Disabled People: A Code of Practice. There is no uniformity given in the DfT Accessible Train Station document but it is recommended that the uniformity to the BS 5489 Standard be applied.

Selected operating times for lighting/ PA will form an essential element of the design at future GRIP stages.

9.1.5 Utilities

It has been assumed that a gas supply is not required for the Station and water will be provided via a stop cock located outside the Station at a convenient location. The drainage of the Station and toilet block area is assumed to be able to tie into local drains with agreement of the local water authority and water consumption and drainage flow rates will need to be investigated and confirmed with the water authority to establish possible connection to their infrastructure. Hot water for the toilet facilities will be gained via the use of electric instantaneous water heaters or similar.

9.2 Portishead Station Car Park

9.2.1 Electrical

Distribution Network Operator Supply

For both Options it is suggested that a separate DNO be installed so that an under road crossing (URX) will not need to be created to provide power to the lighting of the car park and any CIS, CCTV, pay and display machines, and PA equipment that might be proposed there. However, it may be more cost effective to provide the power from the proposed Station DNO and construct the URX with an appropriate amount of ducts to provide power to the car park. This would mean the supply at the Station would need to include the car park load requirements.

It is proposed that the power to the overflow car park for lighting and any CIS, CCTV and PA equipment as well as pay and display machines if required are to be derived from the Station DNO with routes provided through the main car park to reach the overflow car park.

LIGHTING

Car Park lighting is to comply with CP-PM-42. For both Options and indicative purposes only, 8m columns with luminaries have been shown with typical 12m spacing. Where necessary double headed lighting columns have been used with flat glass luminaries utilised to reduce glare and light pollution.

Where lighting columns are in vulnerable positions collision protection is to be considered and if deemed necessary applied.

For Option B the path way from the North of the Station to the car park has been shown to be lit and the lighting requirements would be the same as those required for the car park. This would not typically have DDA requirements applied to it for lighting levels.

An overflow car park is proposed as part of the works for Option B and this will be required to be lit to the same requirements as those for the main car park and will be dependent on whether DDA requirements are to be applied or not.

9.2.2 Utilities

A soakaway appears to be the most suitable and sustainable method of draining the car park, and should be installed with an oil separator buried in the car park at a suitable location. It has been assumed that this would not require power and would be a passive device, cleaning and removal of the oil would be necessary at least once a year. Ground investigation work will be required to assess permeability together with an assessment of flow rates should be undertaken prior to design.

The car park surface should be a highway compliant surfacing, suitable for any vehicle permitted to travel on the public highway.

9.3 Quays Avenue

During the GRIP 3 study a new bridge over Quays Avenue was proposed, however this option has now been discounted due to the high cost, disruption to local neighbourhood, businesses and land owners..

Option A within this report requires a pedestrian crossing over Quays Avenue opposite the Station entrance linking the Station and the car park, such as a Zebra or Toucan crossing.

Option B involves the diversion of Quays Avenue with its current alignment being blocked-up. A pedestrian crossing (Zebra or Toucan crossing) will be required over the new Quays Avenue alignment in order to link the Station and the overflow car park with the main car park to the North of the Station.

9.4 Conclusion:

Option B has some advantages over Option A as it offers a more integrated solution, where the car park and the Station are situated on connected plots of land. As a result of the Quays Avenue realignment outlined in Option B, the requirement for passengers to cross the highway between the car park and Station is eliminated, making it a key advantage over Option A. The reduced distance between the car park and the Station in Option B is also beneficial over Option A.

9.5 Avon Road Underbridge

Avon Road underbridge will require repairs to the masonry abutments and widening to accommodate the proposed twin-tracking.

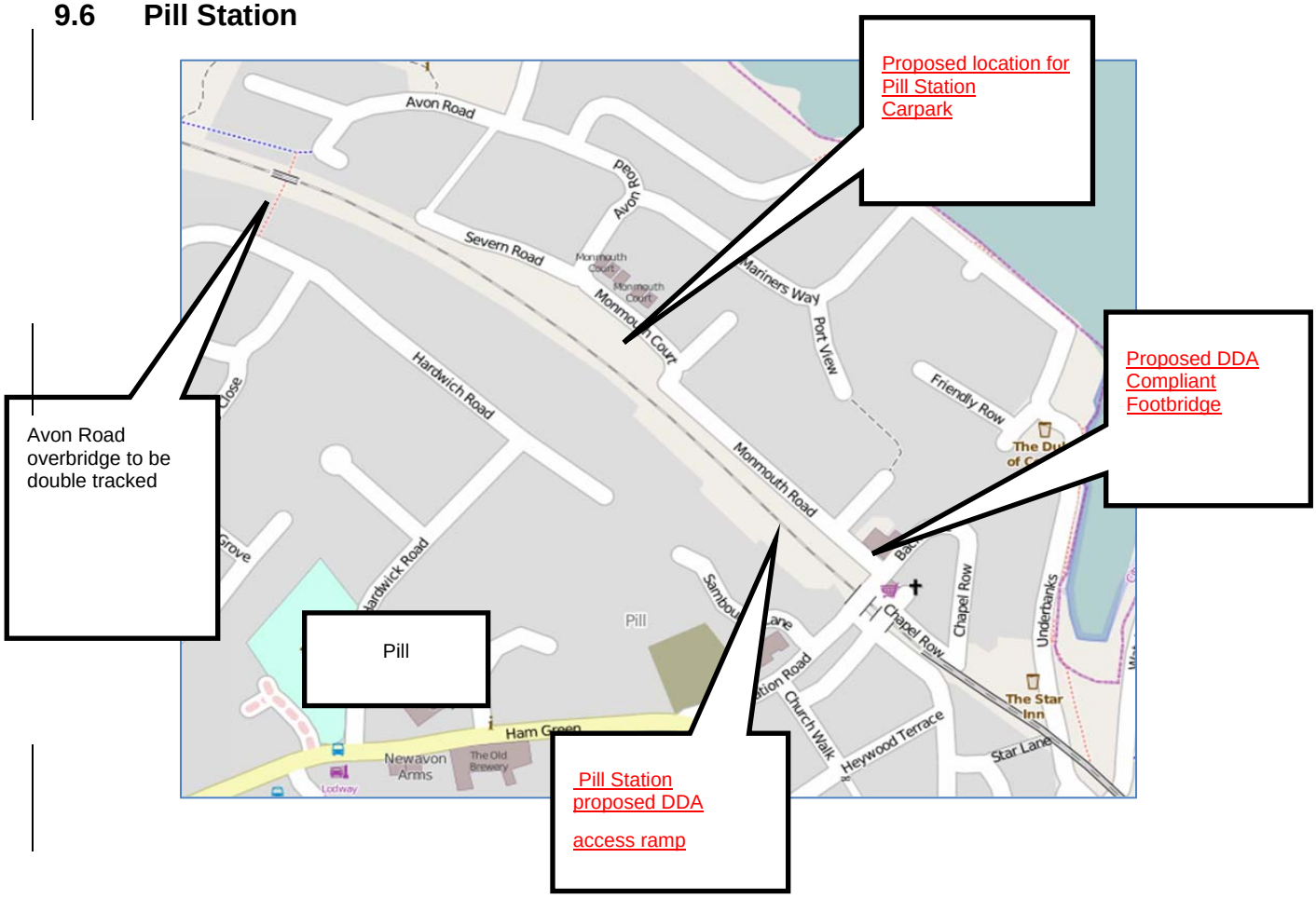
The proposed solution includes the installation of new precast concrete deck units sat on new pile supported precast abutment walls. These would be installed following the removal of the parapet precast edge unit, and breaking down of the existing wing walls to at least 1m below sleeper level. A new precast decking unit would be installed to replace the removed edge unit.

New concrete wingwalls would also be installed perpendicular to the parapet wall, and would also be supported on piles. These proposals are subject to ground conditions, site survey and detailed design.

The embankment adjacent to the bridge will require a topographical survey at GRIP 3 Stage, and needs reinforcing or retaining to constrain the embankment within the Network Rail boundary. The proposed solution for the embankment includes a dual gradient slope, with the lower section graded at 20 degrees to the vertical, and reinforced accordingly with geotextile.

Avon Road Underbridge - location of proposed bridge widening

9.6 Pill Station



The proposed single lead junction layout at Portbury Dock Junction along with a single line all the way to Ashton Junction is not adequate for trains stopping at Pill to meet the timetabling requirements.

The RailSys timetable modelling determined that passenger trains stopping at Pill will occupy the single line section for a length of time that will conflict and impact with freight services.

The proposal developed to resolve this conflict is to provide a twin tracking arrangement from Pill Junction to the Portbury Dock Junction, with the removal of the existing points at Portbury Dock Junction.

This in essence creates two parallel single lines, one a passenger line to Portishead and the other a freight line to Portbury Dock.

9.6.1 Civils

Pill Station would be constructed using the former Down platform, with the cutting slope behind the platform suitably graded. The existing obscured retaining walls (possibly those of the previous Station waiting shelter and signal box) should be inspected and assessed for structural capacity following removal of the heaped spoil in front.

Access to the platform would ideally be from the Down side, but the former Station house is now owned and occupied by a private tenant. The alternative is to construct a DDA compliant footbridge accessed from the Up side and a DDA compliant ramp, with a gradient of 1:20 off the bridge, down to the platform. It is proposed that this is to be either a steel structure supported above the embankment, or a part fill based ramp in a retained terraced embankment. If the former is selected, the supporting columns and corresponding foundations require encasing with sheet piles on three sides to facilitate maintenance access. If the latter is selected, a proprietary interlocking block retaining wall with soil reinforcing, if required, would be a suitable solution to retaining the terraced earth. As the proposed footbridge across the line is a new structure, the track to bridge soffit vertical clearance should be 4880mm, for OLE Normal Clearance with full tolerance passive provision.

The cutting slope should have the vegetation removed, and be surveyed prior to further design work. The platform requires remedial work to the surfacing, coping stones, and the masonry wall. The cavity located approximately halfway along and under the platform should be assessed, repaired or infilled. Attention should be given to the drainage off the Platform; this should be investigated further along with the provision of a 1:40 backfill from Platform Edge.

Pill Station platform – view from bridge towards Portbury

Pill Station platform – Lineside view

A Customer Information system and Customer Help Point will be provided on the new platform. Car parking facilities are proposed within the site of the former station goods yard. REB facilities to provide signalling supply would also be located within the former station goods yard, with power supplies taken from an adjacent sub-station. The land in question is believed to have been sold by Network Rail and may need to be re-purchased. Optical fibre links for the GSM-R radio Network mast will terminate in the Pill area and be linked directly to the signalling REB.

The line speed on the Passenger line is proposed to be 50 mph from Pill Junction through Pill Station to 126m 49ch and 75 mph from this point through to Portishead Station reducing to 25 mph into the Station itself. On the Freight line the line speed will be 40 mph from Pill Junction to the boundary with the Bristol Port Company near the former Portbury Dock Junction. Due to the improved track geometry and higher line speeds the ambient noise levels will be altered, probably beneficially. A noise survey will need to be undertaken at GRIP stage 3.

9.7 Pill Station Car Park

The former goods yard appears to provide adequate capacity for the proposed car park, however, a good pedestrian route between the car park and the footbridge is required to ensure ease of access for users. Network Rail specification NR/L3/CIV/160 ISSUE 1 states that at least three disabled spaces should be provided in a car park of this size, and the required number of disabled spaces are provided however this does not directly adhere to the recommendations set out by BS 8300:5.1. The BS Standard recommends that the maximum distance away from a car park is 50m, the proposed car park is in excess of this distance. Disabled access from the proposed car park to the Station will be via the highway as the entrance to the footbridge is from Monmouth Road, subject to highway consents.

Sufficient CCTV and lighting for the car park must be provided. The car park surface should be a highway compliant surfacing, designed for axle tonnage envisaged.

Pill Station former goods yard: the proposed location for the car park

A pedestrian only area with paths to crossing points over Monmouth Road, in front of the bridge entrance, is required, to ensure a safer pedestrian highway interface. Bollards or other appropriate means of preventing obstruction of, or intrusion onto, the pedestrian area by vehicles should be installed.

9.7.1 Telecoms

Station Information & Surveillance Systems (SISS)

Closed Circuit Television (CCTV)

A CCTV surveillance system shall be provided to monitor the public areas within the Station and shall comply with Network Rail Standard NR/L2/TEL/30135.

The system shall be designed for the purpose of providing general monitoring of the Station, particularly entrances / exits to the Station platform and will offer a means of protecting the safety and security of the public and staff in the general management of the Station and train operations.

The CCTV system shall make provision to include 24 hour surveillance of the Station car parking facilities. The cameras shall be suitable for both day and night operation, to maintain a good quality level of coverage, for when the light levels diminish.

CCTV images shall be recorded locally on a Digital Video Recorder. The system however, shall be designed to enable monitoring from a remote location if required by the Train Operating Company (TOC).

Public Address (PA)

A standalone PA system shall be provided at Pill Station to broadcast secure, fail-safe, and high intelligibility speech to all public areas on the Station platform, including

access routing to the platform. The requirements for the new PA system shall comply with Network Rail Standard NR/L2/TEL/30134.

In order to update the announcements a dedicated link from the PA control equipment at the Station, to the associated TOC Control Centre will be required.

Customer Information Systems (CIS)

A Customer Information System shall be provided, delivering live train information to the travelling public in transit from the Station car park and passengers waiting on the Station platform.

The requirements for the new CIS system shall comply with Network Rail Standard NR/L2/TEL/30130.

In order to update the train information displayed a dedicated link from the CIS control equipment at the Station, to the associated TOC Control Centre will be required.

Passenger Help Points (PHP)

Passenger Help Points shall be provided as a focal point for information and in the event of an emergency.

It is proposed that the PHPs be a GSM enabled Help Point.

PHPs shall be a two button type unit with one button marked ‘Information’, the second ‘Emergency’. Information calls are routed via the GSM provider and Public Switched Telephone Network (PSTN) to the information call centre.

To aid passengers with hearing difficulties, the PHP will include an Induction Loop facility, integrated within the passenger help point enclosure.

Telecommunication Equipment Cabinet

A telecoms equipment cabinet shall be provided to house the CCTV, PA and CIS control equipment. This will need to be located in a position that provides unhindered access for maintenance purposes. A power supply will need to be provided for the telecommunication equipment cabinet.

Third Party Connections

It will be necessary for a third party ADSL connection to be provided at Pill Station.

The third party connection will allow the SISS to be connected to the TOC control centre in order to provide updated information for both the CIS displays and PA.

9.7.2 Electrical

Distribution Network Operator Supply

The DNO would be located in a cubicle at a location to deter vandalism and theft and if necessary within a fenced area. Where lighting columns are in vulnerable positions collision protection is to be considered by the use of Armco barriers.

LIGHTING

Car Park lighting to comply with CP-PM-42.

Lighting will be subject to the same requirements as Portishead Car Park and will be at the least 10 lux with a uniformity of 0.25 or where DDA requirements are deemed to be applied this will rise to 100Lux with a 0.25 uniformity. Again for indicative purposes the lighting has been shown to be 8m columns with typical 12m spacing’s. The GRIP 3 design stage will verify the lighting requirements to achieve the necessary Lux levels.

Power supply requirements for CIS, PA, CCTV and pay and display machines will be derived from the DNO cubicle.

9.7.3 Utilities

The drainage of the car park is assumed to be agreeable with the local water authority and discharge into the water authority's drainage will need to be via an oil separator buried in the car park at a suitable location. It has been assumed that this would not require power and would be a passive device that would require cleaning and removal of the oil at least once a year. Flow rates into the local drainage system would need to be investigated and confirmed with the water authority to establish a connection into their system.

9.7.4 Signalling

The current proposal is to split the single line East of Pill viaduct providing lines to both Portishead and Portbury Dock.

The new Station (and parallel movements from the Docks) will be fully signalled, incorporating full axle counter detection, to provide control of the single line between the new Pill Junction and Clifton Junction replacing the existing token section.

The provision of complete signalling and train detection over this section will extend the control area of Thames Valley Signalling Control (TVSC) introduced by the Bristol Area Signalling Renewals Project (BASRE) from its existing end at Ashton Junction to the whole of the Portishead branch.

9.8 Pill Tunnel

It is noted that Pill Tunnel is a single bore tunnel, 665 yards long. The tunnel and railway was constructed as a broad gauge railway and while this provides an additional 350mm clearance on either side from rolling stock to tunnel wall, evacuation from the train will be difficult due to restricted widths.

Historically Pill tunnel suffered from inadequate drainage and track formation. As a result Network Rail undertook full track renewal during 2012/2013 with the associated provision of enhanced track drainage.

There may be an incremental cost which will need to be borne by this Project regarding the difference between meeting the current 20mph line speed through the tunnel compared to the proposed 55mph, however, the Network Rail Western Track Renewals Team are aware of the passenger train Project and will consider opportunities for future proofing to provide efficiencies.

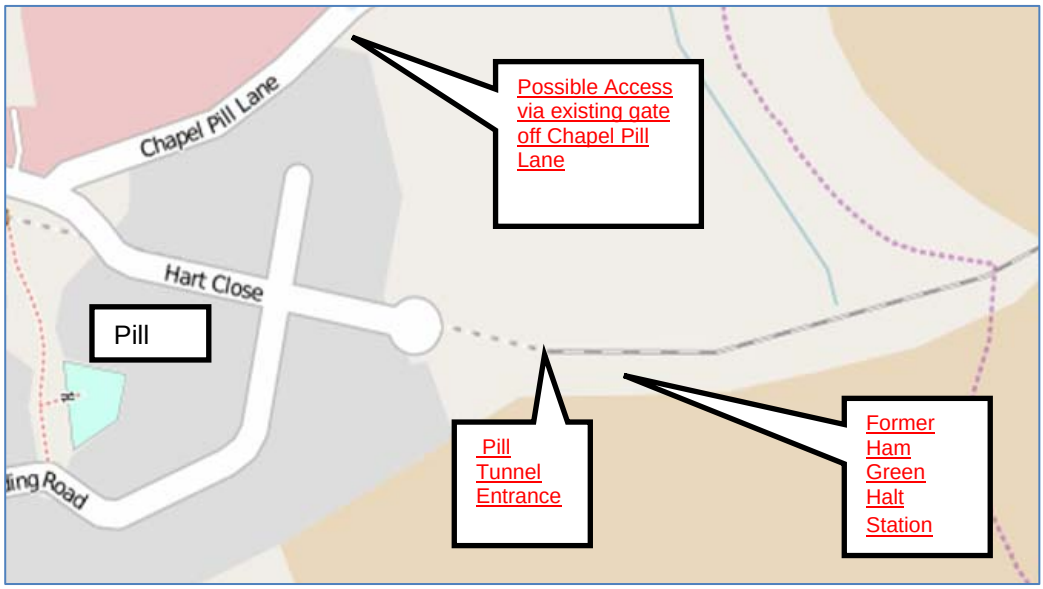
The tunnel will need improved line side access to the portals, the provision of a safe walking route in the cess, lighting, leaky feeder communications and fire hydrants in order to meet the fire and evacuation requirements as agreed at a safety workshop.

Access from Hays Mays Lane (off Chapel Pill Lane) to the Eastern portal of Pill tunnel would Maintenance access points are limited on the current freight line and require some highway work to enable emergency vehicular access should there be an incident involving a passenger train in the tunnel.

Near to the Western portal an access route should be considered at the proposed site for Pill Junction. Access rights are to be investigated and obtained if necessary over the cycle route leading to this site.

An outline design for the evacuation requirements at Pill Tunnel will need to be completed at GRIP stage 3.

GRIP 3 should also include the logistics of materials handling within the single-bore tunnel.



9.8.1 Civils

Previous work has indicated that emergency access provision is to be considered at the East end of the tunnel portal. An evacuation area located in the vicinity of the former Ham Green Halt has been identified as a possible site, see Appendix A. A risk assessment is to be undertaken in GRIP3 to determine if provision is required. If necessary some highway works to enable both emergency and maintenance access may be needed.

It is proposed that a walkway is provided to enable lineside safe access within the railway boundary from the Eastern tunnel portal in the up cess way to an emergency evacuation point on the up cess (north side) of the railway formation. This walkway will be approximately 150m in length.

Its is noted that access to the railway off Chapel Pill Lane follows a relatively steep gradient, some re-profiling, minor retaining walls or re-grading of slopes may be required.

Consideration in GRIP3 is to be given to loadings from fire engines and ambulances; a "Grasscrete" solution could be an option as it offers:

- Minimal visual impact.
- Loading of up to 40t gross vehicle weight.
- Allows adequate drainage capacity.

Improvements to the existing gateway would be necessary to allow access by vehicles in an emergency and not to be hindered by a chain locked gate.

The road and field access rights and ownership must be established with loss of use of an area of land compensated, if appropriate.

9.8.2 Telecoms

In order to maintain radio communications throughout the tunnel, for the GSM-R, Airwave and VHF Channel 5 for the emergency services, a “leaky feeder” communications cable system must be installed.

9.8.3 Electrical

Distribution Network Operator Supply

The DNO, Distribution and light control cubicle would be located in the fence line at the access to the site. A switch on button on the face of the Network Rail side of the cubicle would allow anyone entering the site to switch on the lights and it is proposed that the switch then be by light level sensor or a time delay circuit of duration 2 hours. Thus the lights are not turned off at the end of the area, they will be switched off automatically when sun rise occurs or when the 2 hours has elapsed, saving energy and costs associated with lights being on throughout the night time when not required.

The lights have been shown as being 5m high, raise and lower columns on the road to the compound area at track level with 6m spacing’s. For the compound area it is proposed to install 8m high columns with 8m high, raise and lower columns with 6m separations to achieve higher lux levels than the approach road. The actual lighting level of the area will depend on the tasks that are to be undertaken and it has been assumed that at least a 50Lux light level will be required with a 0.4 uniformity. If the area is just required to park vehicles then the Lux levels can be reduced in line with those for the car park. It may be necessary to add lighting in the centre of the compound area to achieve the necessary lighting levels and this will need to be confirmed at the GRIP 3 stage of the Project.

Where lighting columns are in vulnerable positions collision protection is to be considered and if deemed necessary applied.

This route would typically not have DDA lighting level requirements applied to it.

It has been assumed that there is no drainage or gas requirement associated with the Pill Tunnel Evacuation Route.

9.9 Underline Structures

The higher line speed of 55mph to 60 mph will affect loadings on under-bridges. Pill Viaduct is also proposed for re-instatement of double-track. Records of these structures will need to be examined and possible site investigations under-taken to determine the capability of the structures. However, in the past the structure used to carry two tracks and loading from two DMU trains should not be an issue. Nevertheless, a load carrying assessment and inspection of the structures should be carried out. These surveys will take place at GRIP Stage 3.

9.10 Parson Street Junction to Bedminster and Bristol Temple Meads

To facilitate a robust timetable, the junction at Parson Street will be enhanced and converted to a double junction. The existing is a single lead junction. Several switches and crossings on the Up Portishead line could then be removed, thereby reducing ongoing maintenance costs.

Within Network Rail's long-term RUS (Route Utilisation Strategy) proposed for Control Period 5, but currently unfunded, there is a proposal to add an additional track between Parson Street Junction and Bedminster. This is to rationalise the track configuration to accommodate two Relief lines on the Western side of the alignment and two Main lines on the Eastern side of the alignment. The proposal for a double-lead junction could be made consistent with that rationalisation.

The existing Parson Street Junction forms a constraint on line capacity and performance hence the requirement of the double junction. The current Up Freight Line from Portishead forms the Up Relief line on the Bristol side of Parson Street Station. It is connected directly to the West Freightliner Sidings which were brought back into use during early 2010.

The line speed on the Up Relief line from Parson Street Station to Bedminster should be increased from its current mixture of 25 mph and 40 mph to a uniform speed of 60 mph. Recanting could be accomplished as part of the ongoing maintenance tamping programme.

9.10.1 Train Regulation Bristol Temple Meads – Parson Street

9.10.1.1 Track

Network Rail's track and signalling infrastructure west of Bristol Temple Meads Station is intensively utilised by both passenger and freight trains. The addition of a regular passenger service to and from Portishead will result in additional pressure on the robustness of the service through this area. A daily car train service between Warrington and Portbury Dock, comprising 100 SLU's in length (approx. 650m), is towards one of the longest trains run on the national network. Signaller's instructions normally result in this service being signalled to run, non-stop, through Temple Meads Station and out onto the Down Main line to Parson Street junction where it diverts onto the Portbury Dock line. On the rare occasions that this long train is brought to a stand at Bristol Temple Meads Station the bulk of the East end of the Station is "locked up" by the long length of the train.

The likelihood of the long car train being brought to a stand in the Temple Meads area would be increased by the introduction of the Portishead services. There being no suitable refuge for this train in the Temple Meads area it is sensible to consider the provision of a looping facility to assist during perturbed operating conditions. Historically a long loop line (The Down Relief Line) extended from Temple Meads to the west of Parson Street Station and the reinstatement of part of this former line would represent the most cost effective means of providing a refuge for the long car train. In its simplest form the Down Relief Line would be accessed from existing turnouts at Bristol West junction and be re-laid to a point just to the west of Bedminster Station where a new 40 m.p.h. turnout would be installed in the Down Main line to provide an exit from the loop. Fixed signalling equipment, axle counters, switch heating and a cess pathway would be installed attendant with the reinstated loop. Some 950m on good serviceable CWR on concrete/steel sleepers, together with a new NR57 Cv13 modular

concrete trailing turnout in the Down Main line at approx. 119m 45c would be needed to complete the Down Relief Line.

The Down Relief would be able to hold the long car train and other freight services whilst other services passed in either direction on the adjacent Main Lines.

The arrangements for the potential reinstatement of part of the Down Relief Lines are shown on the Drawings in Appendix A.

Incremental enhancements to the “base case” loop could see it extended, possibly at a higher speed, as far as Parson Street west or converted to passenger status which would further assist with train regulation in the busy Bristol Temple Meads West area.

9.10.1.2 Signalling

There is only 1 Option being considered for Signalling which is to reinstate the old Down Relief line (existing Carriage Line) towards Parson Street, joining on to the Down Main as close to Bedminster Station as possible, but allowing for a full overlap for the new signal. This Option will require a signal at Bedminster Station (parallel to existing BS6) and a single end junction to join the mainline just after the Station . This will provide adequate signal spacing for the proposed line speed. The upgrading of the Carriage Line to a relief line does not drive the need for any additional trapping protection over the existing provision.

9.10.2 Parson Street junction - Signalling

The proposal is to create a new double junction to replace the existing single one, which will have little effect on the existing signalling layout with the exception of the need to review the risk assessment of B21.

Any freight moves from the siding will have a direct effect on the Up Main traffic flow due to occupation of B21 overlap and having to hold trains further out.

9.10.3 Parson Street and Bedminster Stations - Signalling

The proposed BASRE design for Parson Street replicates the existing platform starter on the Up Relief (B421) and therefore services can easily stop here.

The proposed BASRE design for Bedminster Station also replicates the existing arrangements, but has no platform starters for either the Up Main or Up Relief. Instead the signalling control is via existing B25 and B27 which are approximately ¼ mile in advance of the Station but as sighting is good, no signalling work will be required for services to stop (subject to timetable modelling).

9.11 Disused Line Portbury Junction to Portishead

9.11.1 Existing Track

The age of the existing track between Portbury Dock Junction and Portishead is circa 1920's and primarily composed of a mix of BS 95 and GWR 00 section (97.5 lb/yd) jointed bullhead rail on softwood timber sleepers. The turnout at Portbury Dock Jn. leading to the disused section to Portishead has had its switches removed and plain lined such that the disused section is no longer connected to the national network.

Although the Line was originally planned out as a twin tracked route only a single track, with a passing loop on the approach to the former Station at Portishead, currently exists. The switch and crossing layouts at either end of this loop are also formed from bullhead jointed rail on softwood timber bearers. Between approx. mileages 127m 07c and 127m 37c a length of some 600m of FB113A continuous welded rail (CWR) on F27 concrete sleepers was installed in the early 1980's. Adjustment switches are located at either end of this length of CWR.

The bullhead track materials have no residual value as replacement components for life expired Network Rail track assets and should be regarded as having value only as scrap. It may be that individual elements of the switch and crossing layouts and a limited number of plain line rails may be of interest to railway heritage organisations. Subject to visual and ultrasonic testing the lengths of long welded rail may be suitable for incorporation in the replacement trackform although the attendant F27 sleepers would probably be regarded as too historic to be reinstalled in the proposed works.

Many of the existing timber sleepers are completely rotten and would not hold track gauge or support rail construction traffic. It is sensible to assume that the existing track should not be offered to potential installation contractors as being suitable for use in their construction activities.

The ballast profile of the existing track is choked with fines and is completely overgrown with brambles, Butterfly Bush and small deciduous trees. A comprehensive series of automatic ballast sampling and trial pitting has been carried out throughout the route and the resultant factual and interpretive Track Bed Investigation (TBI) Reports will be used to reach agreement as to the nature of the proposed sub-grade and track bed.

There are no piped track drains throughout the route but a comprehensive network of lineside drainage ditches would, if recommended in the TBI Reports, provide adequate outfalls for such drainage systems.

Both underline and overline structures reflect the fact that the route was originally laid out to a double track formation. The resulting generous clearances mean that the proposed single track alignment can easily be accommodated together with a compliant continuous cess path without the need for wholesale reconstruction of bridges and culverts.

9.11.2 Proposed Track Alignment

An alignment proposal has been drafted that demonstrates that the aspiration for a 75 mph Line speed for the bulk of the route is perfectly feasible. The only sharp curvature on the route (approx. 600m radius) applies for around 300m immediately to the west of the current Portbury Dock Junction and through this section a Line speed of 50 mph. is proposed.

The remainder of the proposed alignment is either straight or has radii of approximately 1500m where an installed cant of approx. 65mm would apply. The services on the route will be almost exclusively Diesel Multiple Units running to a uniform speed profile and Network Rail's track team will be engaged to determine if traditional curve/cant relationships should be modified to match the uniformity of speed and weight of the proposed services.

Whilst existing headroom clearances beneath overline structures could accommodate DMU traffic with little deviation from current track levels the Project requirement specification mandates that the route be designed with passive provision for potential installation of Overhead Line Equipment (O.L.E.) The proposed vertical profile of the route will therefore show the need for track lowering of up to 300mm beneath 3 of the existing overline structures.

Driven by the need for the reinstated line to co-exist alongside a cycleway beneath three of the over bridges and for the line to be slued away from a residential property at the former Portbury Station the proposed alignment will not be coincident with the current arrangement. This movement away from the existing alignment is facilitated by the double track width of the existing formation.

9.11.3 Proposed Trackform

The proposed trackwork will conform to the requirements of a Standard gauge passenger railway with a track category of 4. The TBI interpretive Report will determine the nature of any sub-grade treatments needed to support the proposed traffic together with the requirement for any geomembranes, sand blankets and requisite ballast depths etc. A suitable crossfall will be specified to assist natural drainage and recommendations for bespoke piped drainage systems will be identified. New bottom and top ballast will be installed to profiles compliant with CWR. Although steel sleepers could be installed on a Category 4 line such as this recent history suggests that new or very good serviceable G44 concrete sleepers with fastclip fastenings are more likely to be specified. In order to provide a high performance low maintenance asset the track will comprise fully welded and stressed CWR throughout. The Route Asset Manager (Track) and Network Rail's NDS organisation will be engaged to determine if the procurement and installation of serviceable material is appropriate.

There is no requirement for any switch and crossing layouts between Portbury Dock Jn. and Portishead.

At the termination of the line at Portishead Station a bespoke friction buffer stop block, with attendant red lights, will be installed to a design that controls passenger deceleration to within accepted limits in the event of an overrunning train striking the stop block.

A “safe cess” walking route will be provided throughout the entire length of the route and Lineside ditches completely cleared of vegetation and re-profiled if necessary.

Prior to the commencement of the GRIP 3 outline design phase a full 3D topographical survey of the railway corridor is to be undertaken. It would be prudent to adopt the same survey grid for this Project as is being used for other enhancement works in the area such as the Great Western Electrification Project and the Bristol Area Signalling Renewals Project.

A primary survey Station will be installed every ten kilometres with off-track survey studs inserted into permanent structures. The allocation of survey co-ordinates will be via GPS equipment.

Secondary survey Stations will be created at 500m intervals using Permanent Ground Monuments.

Tertiary survey Stations will be created within the existing rail corridor at 200m intervals and at locations that will not only support the survey activities but will remain in-situ to be used for setting out purposes.

The survey works and all subsequent construction activities will be carried out to timescales and methodologies guided by the requirements of an environmental assessment plan.

9.11.4 Track Gauging Issues

As a minimum the railway will be constructed to conform to the Standard structure gauge. A desired rail to soffit height of 4640mm will be achieved and this will retain the potential for the installation of O.L.E. at a future date.

At the M5 motorway overbridge, Marsh Lane and Portbury Dock Road over bridges the railway will co-exist with existing cycle ways through the spans of these structures. If the wholesale realignment of the cycle ways away from these structures is to be avoided then some compromise on the desirable width of the cycleway (3m) and the desirable width of cess (3m both sides of the railway) will be needed at the M5 and Marsh Lane bridges, discussed further in section 9.11.

9.11.5 Signalling

The proposal is to split the single line before Pill viaduct providing lines to both Portishead and Portbury Dock.

The new Station (and parallel move from the Docks) will be fully signalled, incorporating full axle counter detection, to provide control of the single line between the new Pill Junction and Clifton Junction replacing the existing token section.

The provision of complete signalling and train detection over this section will extend the control area of TVSC (introduced by the BASRE Project) from its existing end at Ashton Junction to the whole of the Portishead branch.

9.11.6 Telecoms

Operational Communications

Lineside Infrastructure

There is no requirement for any new operational Lineside telephones, as it is proposed to replace the existing farm crossings at Sheepway Farm with a new over bridge and provide an alternative access route for Elm Tree Farm.

GSM-R

There is currently a GSM-R site (Site 6571) located at Lodway. This consists of a GSM-R Relocateable Equipment Building (REB) and mast, as shown in the accompanying photograph below. It should be noted, however, that this site is not currently operational as associated Lineside cables were found to have been severed.

The GSM-R site is located in a position which will not impeded the construction or gauging of the new track alignment and is therefore able to remain in situ. The associated cable route containing a 24 core Di-Sac fibre cable will require to be relocated to facilitate the proposed track realignment.

To ensure that GSM-R coverage can be provided to meet the requirements for this Project, it is recommended that a full GSM-R coverage survey of the Project area is undertaken as the Project develops, this may necessitate the provision of additional GSM-R infrastructure, as appropriate.

9.11.7 Drainage

From Portishead to Portbury Dock Junction the railway is on a level embankment, generally one metre higher than the surrounding low-lying land; with the exception of Portbury Halt, where the track is in a cutting as it passes under Sheepway Road.

There are “Turn of the Century” (1900) records of drainage schemes on this route. These have not been checked or verified.

There is formation drainage (ditches) at the following locations: -

- Down side, adjacent to Harbour Crescent 129m 30ch -129m 34ch;
- Down and Up sides, partially between Moor Lane and Sheepway Road 128m 68ch – 128m 78ch;
- Down side past Sheepway Gate Farm 128m 40ch – 128m 50ch;
- Down side from Royal Portbury Dock Road to Portbury Station 127m 24ch to 127m 71ch

These ditches will need to be cleaned out as part of the line reopening works.

The track itself is heavily overgrown and impassable as are the adjacent embankments. A full analysis will need to be undertaken at GRIP stage 3 once the line has been cleared of vegetation. It is important that early clearance of vegetation is undertaken in order to identify further opportunities to reduce the construction costs associated with this Project.

Suitable formation drainage will depend on a cross-fall and will be incorporated in the track design.

Where drainage ditches exist, the crossfall will need to discharge into them. A Sustainable Drainage System (SUDS) will be adopted where there is no other drainage or pumped drainage.

Where the railway runs alongside existing watercourses, such as the Drove Rhyne, investigations should be undertaken into the acceptability of surface. There are pumping Stations adjacent to the railway at The Drove (Portbury) and at Quays Avenue (Portishead) operated by Wessex Water Authority.

The Drove Rhyne and the Portbury Ditch are maintained by the Environment Agency.

The Cut drain is maintained by North Somerset Internal Drainage Board.

Land drainage in the whole area is controlled by the North Somerset Internal Drainage Board, with the exception of the Drove Rhyne and The Portbury Ditch.

Consents would be required from the North Somerset Internal Drainage Board for the disposal of surface water and will need to be consulted at GRIP Stage 4.

At all these sites a full drainage investigation will need to be undertaken at GRIP Stage 3.

9.11.8 Fencing/ Security

From Portishead Station to Sheepway Road over-bridge, the railway passes through an area bounded by new housing estates. This poses a high risk of trespass.

The line will be fenced on both sides at the land boundary with welded, close-meshed galvanised steel fencing to a height of 1.8 metres.

Within the land boundary, the railway embankment should be cleared and replanted with a suitable thorn tree, with soil retention properties, such as Blackthorn (Prunus Spinosa). Care should be taken not to impede drainage ditches or plant closer than 3.5 metres from the nearest running rail.

From Sheepway Road over-bridge to The Drove, the line passes through a rural area, with low trespass risk. The main concern here will be livestock straying onto the line. The normal Standard of 5-strand wire fencing strung from concrete posts would be considered adequate in these locations.

From The Drove to Portbury Dock Junction, the line is bounded on the North side by the Drove Rhyne, then a permissive cycle-way and the Bristol Port Company's dock estate.

In this area, temporary wayleaves have been granted by Network Rail to Sustrans – a cycling recreational charity for a cycle-way on railway land adjacent to the track through bridges for the Royal Portbury Dock Road, Marsh Lane and the M5 motorway. The width under these bridges may require alterations to the current alignment and width of the cycle ways to accommodate the railway. GRIP Stage 3 will confirm the extent of these changes and confirm that there is sufficient space to provide a safe

segregated area for the cycle way adjacent to the railway, taking account of the cess requirement and associated train operating speeds. Further details about the cycle paths are set out in section 9.12.

At all other locations between The Drove and Portbury Dock Junction the line passes through a rural area, with low trespass risk. The main concern here will be livestock straying onto the line. The normal Standard of 5-strand wire fencing strung from concrete posts would be adequate for these locations.

The former Portbury Station is now privately owned. The occupier has constructed a conservatory on the former platform with a fence approximately 670mm from the platform edge without coping stones. The track will need to be routed through the centre of the formation in order to provide adequate gauge clearance under the over bridge. This will give a measurement of approx. 2630mm from the nearest running rail to the platform edge without coping stones. This is less than the 4500mm required for collision protection. The distance from the fence to the running rail will be approx. 3300mm. This should be adequate to safely run trains. The main concern here is noise. Close boarded timber fencing up to 4m in height should be considered with consultation to the private home owner.

All fences should be installed and maintained to Network Rail Standards.

The fencing requirements therefore differ widely throughout the route and three types of fencing are needed to secure the railway from trespass and prevent livestock straying onto the track and local area, these can be summarised as follows:

- Galvanised steel palisade fencing approx. 1.8m high to be installed in residential areas and those locations where cycle paths run adjacent to the railway.
- 5 strand post and wire fencing to be installed throughout rural areas where there is the possibility on livestock straying onto the line.
- Close boarded timber fencing up to 4m in height to be installed adjacent to residential properties that are within 10m of the line for noise and visual impact protection.

9.12 Cycle Paths

The initial GRIP 3 study noted that the existing cycle ways may require re-routing due to insufficient clearance under existing structures on the route. This is no longer the case as it is proposed that the track will be slewed to provide greater clearance for cycle ways under the existing structures, subject to confirmation of cess requirements at GRIP stage 3.

The surface finishes of the cycle ways will be reproduced to match the existing.

The following cycleway widths can be provided (subject to detailed topographical survey in GRIP 3):

- M5 Motorway, Ch 1505m – 2m wide cycleway with 4.8m headroom.
- Marsh Lane, Ch 1975m – 2m wide cycleway with minimum 2.5m headroom.
- Portbury Dock Road, Ch 2400m – 2.5m wide cycleway with 5.2m headroom.

It should be noted that on two of the structures, the cycleway will be narrower than the minimum recommended by TD36/93 (Highways Standard) which recommends a minimum width of 2.3m. This should not cause significant issues as the length of the width restriction is relatively short. Potential mitigation could be provided by provision of warning and advanced warning signs noting the width restriction (with appropriate surfacing/markings), this will be subject to future agreement.

9.13 Access Points

The reopening of the line between Portbury Dock Junction and Portishead will require a number of Lineside access points to be constructed to facilitate infrastructure maintenance activity and provide access for emergency vehicles.

Many opportunities exist for the provision of additional pedestrian access for maintenance staff once various forms of fencing have been erected adjacent to the railway. At Portishead the existing footpath crossings at Galingale Way and Moor Lane could have gated access provided in the security fencing for maintenance staff. The existing pedestrian access points at Sheepway Road and Marsh Lane over bridges, Lodway Farm crossing, the gated access opposite the GSM-R mast at 126m 1034yds and the Avon Road underpass access should all be retained for Maintenance use. It would be advantageous to the Maintenance regime if a vehicular access could be provided mid-way between Pill and Portishead. The Network Rail Hazard Directory records an authorised access point, identified as Priory Farm, leading from the Portbury Hundred Road at 127m 1276yds. In actuality this access point is primarily used by Wessex Water as access to their small sewerage pumping Station located immediately adjacent to the south side of the railway. The status of this potential access to the railway is uncertain particularly as Network Rail's Maintenance team at Bristol have not used it for many years and do not hold keys for the access gates. The situation is further complicated by a contested assertion by a local "Rights of Way" group that a track (known as the Drove) crossing the railway at this point is in fact a Bye-way.

The ORR would not sanction the conversion of two Occupational Crossings at Elm Tree Farm and SheepWay Gate Farm to User Worked Crossings status. It is therefore assumed these two access points will not be available to Network Rail as access for maintenance vehicles and that alternatives should be provided elsewhere.

At the southern end of the reopened route it would be possible to provide a short ramp down to rail level from the western end of the proposed Pill Station car park. This would provide for maintenance vehicle parking/turning and also areas for the temporary storage of track materials. Similar facilities could be provided at the proposed Portishead Station, via a gated access from the diverted Quays Avenue.

Notwithstanding the above issues this site would be an excellent location for vehicular parking and has the potential for the installation of a Road/Rail Access Pad.

9.14 User Worked & Footpath Crossings

A site walkout was carried out for this phase of the Project to identify all the crossings either in use or out of use:

Mileage	**Name**	**Proposed action**
129m 06ch	Galingale Way	Footbridge
128m 46ch	Sheepway 1	Accommodation Bridge
128m 39ch	Sheepway 2	Closure
128m 17ch	Elm Tree Farm	Closure with alternative access via the A369
127m 71ch	Portbury Station	Closure
127m 55ch	Drove crossing	Closure
Mileage	**Name**	**Proposed action**
127m 14ch	Portbury No.3	Closure
126m 75ch	Manor Farm No2	Closure
126m 74ch	Manor Farm No1	Closure
126m 56ch	Lodway Farm	Closure

9.15 Structures

During the walkout survey a number of under/ over bridges the following structures crossings and culverts were identified these can be seen in Appendix G.

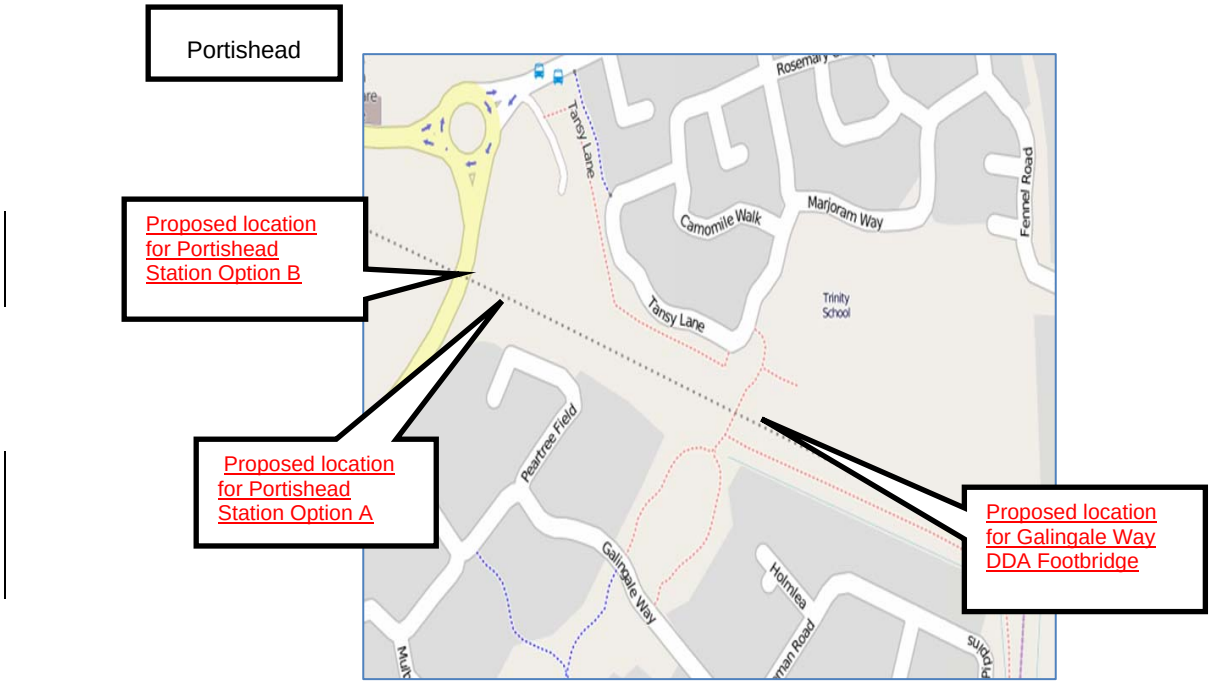
9.16 Galingale Way Footbridge

During the previous 2010 GRIP 3 study three Options were examined for retaining pedestrian access between Trinity School in the Village Quarter and the Vale housing estate, these Options were known as:

- Western Option (Quays Avenue) – provide footpaths parallel to the railway linking to Quays Avenue to provide an indirect pedestrian route
- Middle Option (Galingale Way) – footbridge option
- Eastern Option (Moor Lane) – footbridge option

Since 2010 a new housing estate to the north (Tarragon Place) has been constructed close to the railway boundary, this has meant that there is insufficient space available to install a fully accessible DDA compliant footbridge at the previously proposed Moor Lane Crossing (Eastern Option).

The only feasible Option for bridge placement is therefore the “Middle Option” between Tansy Lane and Galingale Way as this would provide the optimum route for pedestrian traffic utilising the current footpath, and would be adjacent to the entrance of the school.



If the bridge is sited between Tansy Lane and Galingale Way (Middle Option) residents of the Tarragon Place housing estate wishing to cross the bridge will be able to walk between the railway boundary and the southern perimeter fence of Trinity school. This would be a walk of approximately 250m from the corner of the estate to the footbridge. Steps would need to be installed at the corner of the Tydeman Road estate, down to the footpath. For the south side of the railway line, residents could use the proposed bridge by walking through the estate and footpath leading off Galingale Way. Appendix A shows various photographic viewpoints at the main proposed location of the footbridge.

The Middle Option appears to have a strong pedestrian desire line and there is sufficient space to locate, a footbridge in the approximate position of the current crossing near Galingale Way. The access ramps and stairs should be positioned so as to consider the neighbouring houses and school boundary. The footbridge should be clad with timber or a similar aesthetically sympathetic material. To improve appearance, if a standard Network Rail footbridge is adopted then some modification of the design will be required to allow for additional wind loading if infill panels are proposed. The North-East end of the footbridge, overlooking the school should be suitably screened off. There are two Options for the Bridge crossing the plan and elevation can be seen in Appendix A with a visualisation of the bridge Options in Appendix I.

9.16.1 Civils

Both Options provide a DDA compliant ramped and stair access to both sides of the railway. The bridge form is based on Standard Network Rail steel footbridge designs although it is envisaged that these will be developed during GRIP stage 3-5 to provide more aesthetically sympathetic cladding to bridge parapets. Ground investigations will be needed to confirm foundation type although it is envisaged that a piled solution would be most appropriate.

9.16.1.1 Footbridge Option 1

This Option provides a ramp with a single 180 degree turning landing with the ramp footprint extending parallel to the railway corridor. Both stairs and ramp terminate close to the footpath. The design of Option 1 was proposed to minimise the incursion of the bridge into the open public space, and to maximise the proportion of the structure within the railway boundary.

9.16.1.2 Footbridge Option 2

This Option provides a ramp with three 180 degree turning landings which extends the ramp footprint further from the corridor. Both stairs and ramp terminate close to the footpath.

9.16.2 Electrical

Both Options are considered to be similar from an electrical perspective and as such the DNO has been shown to be located in the fence line of the area and be double sided where the DNO equipment and meter would be located in the public side of the fence and the distribution and lighting control would sit in the Network Rail side of the fence. If this is deemed a high risk vandal area then it may be required to site the DNO in a separate compound to deter vandals.

The lighting has been shown with 8m high raise and lower columns along the public side of the footbridge. However additional lighting may be required depending on the side wall construction of the ramps and steps to overcome shadow effects. A light central to the walkway has been shown to aid the lighting levels in the area and the bridge will need to include cable route requirements to cross from one cess to the other and to reach any additional lights that may be needed and installed on frames above the bridge deck as shown on the central walkway.

The minimum lighting requirements for the bridge would be 30 Lux with a 0.5 uniformity in accordance with BS 5489-1 however should DDA compliance be deemed necessary then the lux level would rise to 100Lux and since the DfT Code of practice does not give a uniformity or minimum level of illuminance that stated in BS 5489 (0.5) shall be used.

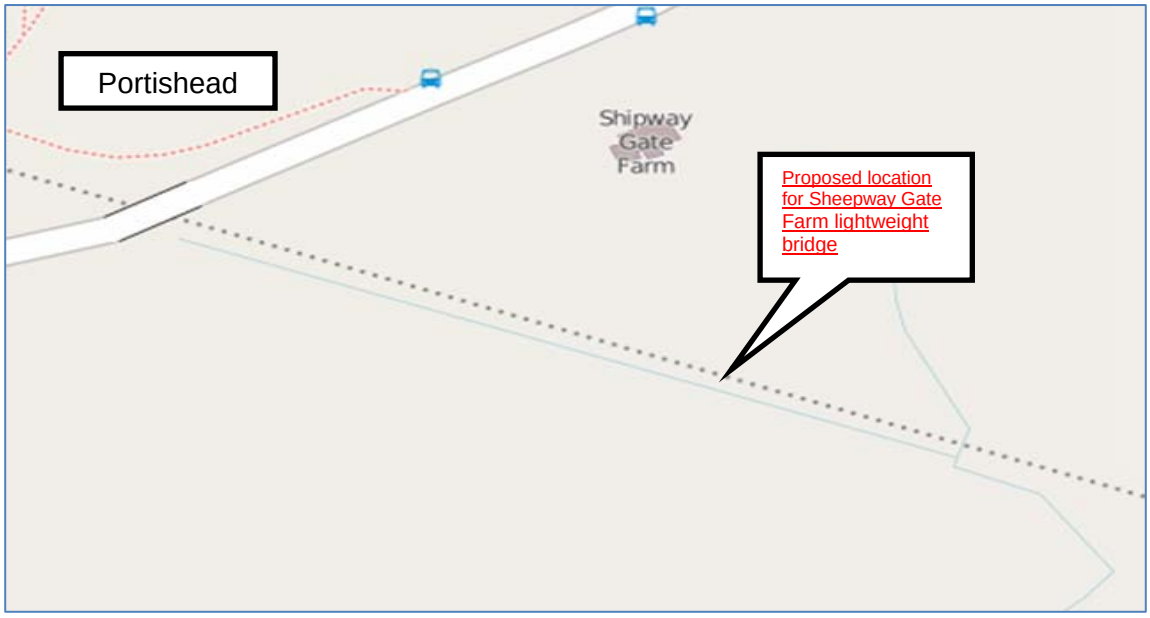
Where lighting columns are in vulnerable positions protection from vehicles collision protection from road vehicles is to be considered and Armco barriers provided.

9.16.3 Conclusion

To be concluded through consultation by North Somerset Council.

9.17 Proposed Sheepway Farm Bridge

It is proposed that the new farm accommodation bridge be located between the two existing farm crossings as this offers the best compromise between available space and convenience to the farmer. Figures 13 and 14, Appendix A, show photographs of the proposed crossing point.



A minimum cost option for this bridge has been proposed comprising a pre-fabricated steel deck similar to a Mabey Bridge "Quickbridge" and a maximum width of 2200mm to allow access for farm vehicles but restricted essentially to a Land Rover. To address vehicular restraint issues additional barriers running parallel with the bridge parapets are proposed and "sleeping policeman" ramps immediately off the bridge to reduce speed.

The next stage of the Project should address the vehicular restraint issue with Network Rail, then consider a cost comparison between a bespoke designed steel deck and a proprietary deck obtained from a modular bridge fabricator.

The bridge abutments and wingwalls, subject to ground investigation data, could be constructed from steel sheet pile sections with a concrete capping beam for the bearing shelf.

This form of construction offers a medium team life span of the structure compared to a structure designed for 120 year life as detailed below.

The bridge form for a 120 year life structure comprises reinforced concrete abutments and wingwalls with precast / prestressed concrete beams. It is proposed that the abutment wall and wingwall sit on piled foundations. The bridge width is limited to a single carriage way capable of carrying a Land Rover, which would require it to be in the order of 2200mm wide. The bridge width and loading capacity will require further consideration at GRIP stage 3, following further discussions with Sheepway Gate Farm.

The bridge span has been designed with a single track railway, allowing a clearance of 4.5m to the abutment wall for collision impact. The bridge span is therefore in the order of 11.0m. A vertical clearance between rail and bridge soffit of 4880mm has been allowed for, giving passive provision for OLE Normal Clearance with full tolerance. 4.88m was chosen over the minimum required clearance of 4640mm, as the bridge is a new structure, and adding the extra clearance does not noticeably increase design complexity or cost.

The bridge deck, for the purposes as this is preliminary design, is detailed as precast prestressed MY beams within the design range for the span. Edge units are provided which are known as MYE beams. The MYE beams will be able to address vehicle incursion requirements through adequate bridge parapet provision. A concrete capping of the beams is proposed as a road surfacing, with a brushed finish, as this provides a favourable surface for cattle.

The approach ramp to the bridge will be constructed at a 9% gradient which is the maximum gradient permitted although dialogue with the farmer may result in a steeper gradient being acceptable to him if restricted to Land Rover use only.

The approach embankment will be constructed of engineering fill material with typically 1:2½ side slopes, however if space is limited then reinforced soils approach can be adopted either by the use of vertical concrete panels with soil reinforcing strips or a "Textomur" approach with a vertical face at 65° reinforced with steel mesh.

9.18 Bridge Electrification Clearance

The track design will need to provide passive provision for future potential Overhead Line Electrification. The vertical alignment for the reopened railway will provide a minimum of 4640mm beneath all of the over line structures to permit future installation of the 25kv Overhead Line Equipment. The achievement of this 4640mm dimension will require track lowering up to 300mm beneath 3 of the arched over bridge structures. Clearances for electricification compliance to TSI (Interoperability) are to be investigated further in GRIP 3.

9.19 Trackbed Investigation

In line with the Client's requirements and NR Standards, trackbed investigation has been undertaken to establish the condition of the trackbed through the redundant Portbury Dock to Portishead section. A total of 24 intrusive trackbed samples have been taken on the site, comprising both Automatic Ballast Samples (windowless core samples, ABS) and hand excavated Trial Pits. Samples extended to a nominal depth of 1.2m below existing rail level to assess the ballast and subgrade materials.

The results of the sampling works are presented in the Interpretative Trackbed Investigation Report (ref. 47070043/WT/PL/140569/2). The Report contains:

- General site description and site walkover survey photographs;
- Information on the trackbed, subgrade, drainage and structural clearances (including photographic sample logs and longitudinal material section);
- Discussion of the trackbed condition;
- Trackbed design recommendations and discussion including impact of the proposed bridge lowering.

Please refer to the Report in Appendix H for full details of the trackbed investigation and design, noting that further trackbed investigation will be required at later GRIP stages to reliably specify the required trackbed treatment.

Additionally, chemical testing of trackbed samples has been undertaken in line with Standard practice (NR/L3/ENV/044) and all 24 samples have been tested using the Network Rail Ballast Analytical Suite (2008). Chemical testing results have been submitted to Network Rail for analysis and the NDS team have confirmed 15 of the 24 samples have triggered the contamination limits. The following table summarises the limits of contaminated ballast required for special disposal:

From	To	Classification Result	Hazardous Properties
126m 1043y	127m 1206y	Hazardous	H7, H13, H14
127m 1206y	127m 1320y	Non-Hazardous	-
127m 1320y	128m 1385y	Hazardous	H7, H13, H14
128m 1385y	129m 616y	Non-Hazardous	-

Hazard properties

The Hazardous properties listed have been triggered by high levels of lead and zinc within the tested material.

Note that material is assumed hazardous up to the location of a sample classified as non-hazardous. Sample ABS 6 (127m 548y) was classified as non-hazardous, however since both adjacent samples were classified as hazardous, the ballast throughout this location is also considered hazardous. In addition, please note that the samples which returned high levels of contaminant were re-tested by the laboratory to confirm these results.

It is recommended that further consideration be given to more regularly spaced trackbed samples to potentially reduce the quantity of ballast required to be removed as hazardous waste. Also consideration in GRIP 3 to be given to leaving such materials on site where deemed acceptable.

9.20 Portbury Line - Parson Street Junction to Portbury Dock Junction

9.20.1 Conversion of the Freight Line to Passenger Status

This Option considered the existing Freight Line from Parson Street to Portbury Dock Junction to be converted to Passenger status. Network Rail convened a Safety Risk Workshop to consider the requirements on the 10th July 2009.

9.20.2 Track Quality and Track Drainage

The existing Freight Line was constructed by Railtrack in 2000 to meet a basic requirement of 20 freight trains in each direction per day. The Line speed was set at 30 mph and the track was installed to meet the minimal safety and operational Standards to accommodate freight only traffic. The existing formation was scarified and new steel sleepers laid with new top ballast only.

No drainage or formation works were undertaken as this was deemed unnecessary. The Line became operational in 2002.

Historically since the 2002 opening the track and its formation has required high levels of maintenance attention to maintain the 20/30 mph ruling Line speed. During 2012/13 the track through Pill Tunnel was relaid and an associated track drain installed (see Pill Tunnel details below). Also during 2012/13 reballasting and drainage works were carried out through Ashton Gate and the Pill Station site.

Further track works are scheduled for Parson Street Junction (formation, reballast and drainage), Clifton No 2 Tunnel (full track renewal) and Sandstone Tunnel (formation and reballast). These works are as yet unassigned.

In order to achieve a satisfactory passenger ride Standard, the alignment needs to be slued and lifted to provide adequate transition curves and cant for the higher line speed of up to 60mph. The existing alignment was laid “as is” and has a series of complex curves with poor transitions which produces lurches at speed and poor ride quality. A comprehensive survey and alignment design package will need to be produced for those sections of the single line that lie outside of the proposed double tracking at Ashton Gate Loop and through Pill Station.

This Project will need to cover the costs of upgrading the existing track to bring it up to passenger Standards and improve line speeds to 50/55mph.

9.21 Ashton Gate Level Crossing

The level crossing at Ashton Gate is to remain in situ. The level crossing is a Manned Crossing Barrier, supervised by CCTV from TVSC (Thames Valley Signalling Centre) “A Desk”. The interlocking with the signalling will need to be reviewed concurrently with any changes proposed to the signalling and control systems.

The level crossing is interlocked with road traffic lights controlling the adjacent road junction at Ashton Vale Road. The double tracking will be restored from Ashton Junction to Clifton Junction.

In this case the level crossing deck would be widened to accommodate the extra track and the barriers, road signals and controls as they are moved accordingly. Initial discussions conducted by Network Rail with the ORR have concluded that this was acceptable.

9.22 Proposed Bus Rapid Transit

There are currently proposals for a guided bus rapid transit (BRT) from Ashton Vale to Bristol Temple Meads and Bristol City Centre. The BRT has achieved a Transport and Works Act Order (TWAO) to deliver its alignment. As part of the TWAO process discussions took place with the promoters of this Project to define an acceptable alignment and a combined BRT and rail line alignment drawing was produced, as the BRT has some impact on operational railway land. The drawing identified the need for

the existing single track to be slued from Ashton Gate level crossing towards Clifton Junction to enable sufficient space for double tracking and the BRT. The bus rapid transit will cross the railway in the vicinity of Ashton Gate Level Crossing by means of an over-bridge.

The bus rapid transit will run southwards adjacent to the Down line of the railway as far as the footpath level crossing at Barons Close, known as Container Crossing. This footpath is due to be closed as part of this scheme with pedestrians using Ashton Gate Level Crossing.

10. Bathampton Turnback

10.1 Track

The current proposal for the reopening of the Portishead line is that services from Portishead and Bristol Temple Meads will terminate at Bath Spa. There is however no possibility of providing, at reasonable cost, a turnback facility at Bath Spa Station itself. Services needing to return to Bristol Temple Meads and Portishead will run, as empty stock, some 1.75 miles further East to Bathampton Junction where the existing Up Passenger Loop (UPL) will be utilised as the turnback facility. To provide the turnback route from the UPL onto the Down Main line for the return to Bath Spa will require a new 25 m.p.h. Left Hand crossover to be located to the west of the existing connection from the Up Main Line into the UPL.

The positioning of this crossover is complicated by the existing Meadow Lane arched overbridge which crosses the railway at this location. Under the Great Western Main Line electrification proposals an outline horizontal and vertical track alignment has been prepared to provide for O.L.E. clearances beneath the Meadow Lane overbridge. In order that the proposed crossover arrangements are not at variance with the electrification proposals the design has been based on the designed electrification alignments. The crossover is located to the west of the overbridge on concentric horizontal radii and a uniform vertical gradient.

It is proposed that the crossover is formed from a Standard NR56 Cv13 with In Bearer Clamplock L.H. crossover on concrete bearers which will provide a 25 m.p.h. move from the UPL to the Down Main line.

Construction of the crossover is suitable for modular delivery. The ballast will be new due to the lowering work being undertaken in 2015-16 as part of track lowering works to facilitate delivery of the electrification project.

The proposal for the Bathampton turnback facility is detailed in Appendix A

10.2 Signalling

There are two Options to be considered for the turnback move at Bathampton:

1. A new signal (BLxxxx) at the Bath end of the Loop (reading back to Bath) giving routes to both the Up and Down Mains through a new crossover (points ZZ)
2. Using existing signal BL1882 (B477) routes to:
    - Up Main and turn back behind BL1879 (B202)
    - Down Main and turn back behind BL1877 (B2)
    - Up Trowbridge and turn back behind BL6640 (B502)

The design incorporating the new signal (Option 1) at Bathampton would be the recommended choice. Whilst this Option incurs 3 extra SEU's, the impact on the present traffic flow using the other Option would be major.

11. Constructability and Access Strategy

11.1 Constructability

11.1.1 Portishead to Portbury Dock Junction

The core works on this section of the line will be the removal of vegetation, surveying, track design and track relaying.

To minimise cost, the proposal is to take advantage of what is in effect a brownfield site. The first element will be to clear vegetation (including tree stump removal) of both the formation and the banks to the fence line; this will have to follow an environmental assessment of the route. Any vegetation clearance will have to take place outside the bird nesting season between February to September.

The next element will be to undertake a topographical survey of the route. This will enable the track and drainage design to be undertaken at GRIP 3/4 (Form A) and 5 (Form B) levels.

Actual construction can be undertaken once the Form B design has been agreed and 'Approved for Construction drawings issued'.

The use of the line as a tyred haulage route should be minimised to avoid damage to the formation. Suitable worksites with road access for Heavy Goods Vehicles should be set up at the proposed Pill Station car park, the site of the proposed Portishead Station and the site of the Wessex Water sewerage pumping Station.

The proposal is to recover the entire existing bullhead/FB CWR track throughout. The existing bullhead track will be sold for its scrap value with potentially some elements offered to heritage railways. Network Rail will assess the approximate 600m length of FB 113A on F27 Concrete Sleepers to determine if this has a worth over and above its scrap value.

The existing ballast/formation would be excavated to the proposed horizontal and vertical design parameters. The surface of the new formation will then be consolidated and graded to support the recommendations contained in the Interpretative Trackbed Report. The spoil will need to be removed by road vehicles to a rail loading point for processing by train to Network Rail's Local Distribution Centre. All the drainage ditches and dykes would be cleaned out and re-profiled as appropriate.

At areas where track lowering beneath overline structures is required and this encroaches significantly into the existing formation (3 no over bridges) a sand blanket would be installed in association with a needle punched separator, or a geotextile as an alternative as appropriate. The bottom stone would be laid and consolidated with a crossfall provided for drainage. Any drainage works recommended in the Trackbed Interpretative Report would be installed at the same time.

Caterpillar–tracked dozers would be used for this work. Any heavy vehicles used for the sand and stone delivery from a stockpile, should have adequate tyres to spread the load.

The next stage is the track laying. The type of sleeper for the construction of this Project will need to be determined by the Route Asset Manager (Track). The current outline specification suggests that new concrete sleepers are required, but a further evaluation of the suitability and availability of serviceable rail and sleepers will be undertaken.

Long welded rail would be delivered from Portbury Dock Junction onwards towards Portishead. The rails would be drawn off the end wagon in 200 metre lengths, thimbled into place and flash-butt welded. Mechanised methods of track installation will be utilised.

Top ballasting would take place with tamping, welding and stressing undertaken to provide a fully stressed CWR track-form throughout.

The first priority would be to lay the section of line from Portbury Dock Junction towards Marsh Lane to enable a siding to be created for the delivery of works materials and the removal of recovered materials including spoil.

Any signalling and telecoms works, including cable-laying in the cess would then take place.

Finally a safe cess would be created on one side of the formation using fine grade stone retained within treated softwood timber edges.

Fencing, variously comprising galvanised steel palisade, 5 strand timber post and wire and close boarded acoustic barriers would be erected.

Any agreed landscaping and planting would be undertaken.

The final stage would be acceptance to bring the line into use from the ORR, following review by the assessing and notifying bodies. A period of testing would also be required before sign-off by Network Rail to enable the acceptance and provision of records and drawings for the Health and Safety file.

11.1.2 Portbury Junction to Parson Street

There are a small number of renewal works scheduled to be completed by Network Rail on the existing freight route that do not form part of the Portishead reopening upgrade works. It is envisaged that the track slewing and lifting required would be accomplished during normal weekend possessions. Similarly the installation of twin or double tracks with associated switches and crossings and signalling, could be accomplished by normal renewals methods during normal weekend possessions.

The full extent of possession requirements will be established at GRIP stage 3/4 when the work is fully understood.

The proposed Station works at Pill would largely be completed in green zone working. The former Station yard should be obtained for use as a work-site for materials delivery.

The widening of the footpath under-bridge at Pill would require a short series of weekend possessions to undertake the embankment and abutment works. The proposed Pill Station car park would be used as a work-site for materials delivery.

The track works at Parson Street Junction will use the concept of modular S&C (Switch & Crossing) to reduce both timescales and costs. This method is now tried and tested proving to be an efficient process when undertaken.

11.1.3 Quays Avenue Highway work

North Somerset Council will separately commission the highway works to be undertaken prior to the any track works in the area. The work will include all the work associated with the new highway layout including potential road diversions, new roundabout in Harbour road and the appropriate highways authority approvals and engagement with local business and residents.

11.2 Access Strategy

11.2.1 Track Access Portishead to Portbury Dock Junction

This section of railway is closed to traffic therefore no disruptive possessions will be required.

Connecting the new line to the existing Freight line will be done using Rules of the Route possessions. Access may be needed for engineering trains for the restoration of the disused line. The Old Portbury junction still exists and if the switches for the turnout were to be reinstated and a length of plain line refurbished it could form a railhead for the delivery of materials for the reopened route.

11.2.2 Track Access Portbury Junction to Parson Street

The line from Portbury Dock Junction to Parson Street Junction is an operational railway. The major constraint here is the need by the Port of Bristol for continuous access to the Royal Portbury Dock. The current possession opportunities are limited as shown in the Rules of the Route (GW548 Parson St Junction To Portbury Docks) for the year 2014 onwards but permit Weekend possessions from 22:10 Saturday to 19:00 Sunday and midweek possessions 23:45 Monday to Thursday to 05:35 Thursday to Friday. The work has been planned as though this will still be the case from 2017 to 2020. However, the possession regime on the current freight line for track slewing and relaying will be established in the next stage of the Project and may require booking some extended weekend possessions of up to 52 hours in order to achieve the works effectively – both in time and cost.

A 72 hour possession should be planned to install and commission the double junction at Parson Street, this includes signalling testing and commissioning time. It may be possible to take advantage of works being undertaken by other Projects such as BASRE the Parson Street S&C Renewal works which are provisionally to be undertaken in 2017-18; however this is dependent on the other Project timescales.

A full access strategy is to be considered as part of GRIP stage 3.

12. Cost Estimates

The total railway related cost of the project is £47,114,305 in 2014 (2nd quarter) prices. In addition, allowance needs to be made for future inflation up to and during construction. Using BCIS Inflation Indices an uplift of 14.25%, totalling £6,713,788 is suggested. Furthermore, the West of England councils will incur some highway costs dependent upon which site for Portishead station is taken forward. The West of England councils will also have other costs in relation to planning powers, environmental assessment, business case and project management. Based on the GRIP2 deliverables in this report and other information available to date, the West of England councils have advised they are assuming a total project delivery cost of circa £55 million in out-turn (2019) prices.

13. Project Risks and Assumptions

A Qualitative Cost Risk Analysis (QCRA) workshop was held 8th May 2014 with the objective of identifying the projects risks for the Metrowest Phase 1 project. Representatives of Network Rail, URS, North Somerset Council, CH2M Hill and West of England were present. All participated in the deliberations.

The objectives of the meeting were to:

- identify significant risks to the achievement of the project objectives
- establish a project risk register in Active Risk Manager (ARM)
- conduct an assumption analysis and identify any constraints

The risks to the project were identified in a brainstormed session and risk owners were allocated. Each risk was then analysed to understand the probability of occurrence and impact of the risks on the project outcome.

Each risk probability and impact was scored qualitatively based on categories ranging from very high likelihood of occurrence / impact to very low likelihood of occurrence / impact. The qualitative assessments were uploaded into ARM and a score for each risk was automatically generated based on a probability/impact matrix.

The full QCRA can be found in Appendix C.

14. High level business case appraisal against whole life costings

As set out in Section 4 Business Case, the economic appraisal is being undertaken jointly by NR and the Councils and is to be submitted to the WoE funding body on 12th September 2014.

15. Project Schedule

Project Stage	Stage Description	Indicative Timescales
Stage 1	• Option Development (GRIP 1-2)	2013 - 2014
Stage 2	• Scheme Case (GRIP 3) • Detailed technical work and Business Case to support a major Planning application	2014 – 2015
Stage 3	• Planning Powers and Procurement (Including GRIP 4-5) • Planning consent awarded, procurement • Completed, full business case completed • Funding approval and contractual arrangements finalised	2015 - 2017
Stage 4	• Construction competed (GRIP 6-8) • Train services operating from Spring 2019	2017 - 2019

16. Capacity/Route Runner Modelling

NR to complete

17. Interface with other Projects

The 2010 GRIP 3 Report mentioned a number of sites between Parson Street and Portbury Dock Junction where Network Rail were scheduled to undertake track renewals and the provision of drainage works. Five of these sites have been completed and the remaining three sites are scheduled for completion during 2015.

Under the Bristol Area Signalling Renewals Project (BASRE) it is proposed to install Axle counters along the route between Parson Street Junction and Portbury Dock. Currently the BASR proposals do not include for the provision of a parallel junction at Parson Street or the reinstatement of the Down Relief line between Bristol Temple Meads and Parson Street. Should these two elements become an essential part of the efficient operation of the Portishead line then synergy between the two Projects would be advantageous.

In addition to the BASRE works the Electrification of the Great Western Main Line will see Overhead Line Equipment extended into the Bristol area, whilst there is no current proposal for the Portishead Line to be electrified passive provision is being made within the design proposals for potential future electrification.

At Pill tunnel any work undertaken will take into account the requirements to raise the Linespeed as well as emergency evacuation requirements under this Project. However, additional work over and above that required to maintain the ‘steady state’ will need to be borne by this Project.

The bus rapid transit will also need to interface correctly with the Portishead passenger railway scheme. This will require the Transport and Works Order secured by the bus rapid transit to be scrutinised further by Network Rail. It is noted that the some track sluing will be required to the existing single track through Ashton Gate, in order to reinstate double tracking, as the BRT has some impact on operational railway land. The Western Route Utilisation Strategy (RUS) has unfunded proposals for altering Parson Street Junction and extending the Down Relief. These should incorporate the requirements of the Portishead Passenger Railway Scheme for a double junction if possible.

European Train Control Systems (ETCS) is a signaling, control and train protection system designed to replace the many incompatible safety systems currently used by European railways. There is an EU directive for all new, upgraded or renewed track to adopt ETCS. Fitment of ETCS on the Western Route is provisionally proposed for 2019. However non-ETCS fitted rolling stock can continue to operate until the Lineside signals are removed.

18. Impact on Existing Customers, Operators and Maintenance Practice

In order to make passenger and freight services run reliably and efficiently from Parson Street to Portishead, the whole line is to be re-signalled to remove the current token block working arrangement. The controlling signal box is currently located at Bristol. Although no novel signalling equipment is being proposed, adding additional signals, point machines and other signalling equipment will result in an increase in the maintenance regime – hence an increase in maintenance budget.

Additional access points have been proposed as part of this Project. These are required to aid Maintenance activities, but more fundamentally to aid the faulting teams should any of the signalling equipment fail.

Improvements to the track along the freight line would help to alleviate constant maintenance intervention, however, 3 miles of additional track between Portbury Junction and Portishead results in additional track maintenance inspections.

In terms of operating a reliable and punctual passenger service, the fully signalled route on the Portishead line assists in this. However, regulating the passenger trains between un-timetabled freight trains, or vice versa will require co-ordination between the Signaller's at Bristol Panel / Thames Valley Signalling Centre and Portbury Dock. Depending on the Option taken forward, there might be a requirement for timetable adjustments to be made on the main line to help operating margins.

Once the passenger service is in the block signalled section between Portbury Dock Junction and Portishead, there is reliance on the driver to inform the Signaller's on departure from Portishead.

19. Consents Strategy

The consents required for this scheme will be complex and require detailed consideration by Network Rail (NWR) consents / legal team. Their view will be based on the definition of the scheme, final rail infrastructure ownership, as well as the operation and maintenance responsibilities. NWR will also consider the 'availability' and benefits associated the Development Consent Order (DCO) process verses the Transport and Works Act, in respect of planning legislation e.g. the Planning Act 2008 and availability of the General Permitted Development Order (GPDO). Other factors may also include the requirement for changes to utilities and utility supplies to the new railway.

The above consideration will indirectly influence the Environmental Impact Assessment (EIA), design development, land referencing and consultation requirements, as well as the overall programme to consent and beyond.

20. Environmental Appraisal

URS have carried out an Environmental Appraisal in line with NWR/LS0/15, in light of the previous GRIP 3 study, and have taken into account the current URS GRIP 3 commission, see Appendix E. This specifically highlights environmental risks and information requirements. This appraisal also highlights a number of key issues that have programme and design implications including ecology, noise, traffic, drainage, contamination and so on. It recognises the need to identify the design, construction and consent related issues/information requirements that will be associated with the next phase (GRIP 3) to ensure the EIA can be completed and the consents requirements and programme met.

21. Common Safety Method for Risk Evaluation Assessment (CSM)

CSM came into force on 1st July 2012 to facilitate mutual recognition between EU member states of risk evaluation and assessment processes to comply with Railway Interoperability Regulations (RIR) legislation.

A submission for assessment under the Railway and Other Guided Transport Systems (Safety) Regulations 2006 (ROGs) for MetroWest Phase 1 is to be made prior to commencement of GRIP 3.

22. Contracting Strategy

The contracting strategy is to be considered in GRIP 3.

23. Concept Design Deliverables

There are a number of drawings contained in Appendices A.

Drawings

The drawings are plotted on OS (Ordinance Survey) maps to give a dimensional picture of the route. These drawings also give additional detail such as access points, crossings, Station locations etc. The index of drawings is as follows:

Deliverable Number	Office	Discipline	Type	Number	Description
47070043	SW	CV	DRG	0001	Pill Station Car Park Plan
47070043	SW	CV	DRG	0002	Pill Tunnel Evacuation Route Plan
47070043	SW	CV	DRG	0011	Galingale Way Footbridge Option 1 Plan
47070043	SW	CV	DRG	0012	Galingale Way Footbridge Option 2 Plan
47070043	SW	CV	DRG	0013	Galingale Way Footbridge Option 1 Elevations and Sections
47070043	SW	CV	DRG	0014	Galingale Way Footbridge Option 2 Elevations and Sections
47070043	SW	CV	DRG	0021	Portishead Station Option 2A Plan
47070043	SW	CV	DRG	0022	Portishead Station Car Park Option 2A Plan
47070043	SW	CV	DRG	0023	Portishead Station Option 2B Plan
47070043	SW	CV	DRG	0024	Portishead Station Car Park Option 2B Plan
47070043	SW	CV	DRG	0031	Sheepway Gate Bridge Plan
47070043	SW	CV	DRG	0032	Sheepway Gate bridge Elevation and Section Option 1
47070043	SW	CV	DRG	0033	Sheepway Gate bridge Elevation and Section Option 2
47070043	SW	CV	DRG	0003	Proposed General Arrangement Underbridge @ 126m 29.5ch
47070043	SW	CV	DRG	0004	Pill Station Proposed Footbridge Option 1
47070043	SW	CV	DRG	0005	Pill Station Proposed Footbridge Option 2
47070043	SW	PW	DRG	7001	Portishead to Pill Alignment Plan 1 of 3
47070043	SW	PW	DRG	7002	Portishead to Pill Alignment Plan 2 of 3
47070043	SW	PW	DRG	7003	Portishead to Pill Alignment Plan 3 of 3
47070043	SW	PW	DRG	7004	Bathampton Up Loop
47070043	SW	PW	DRG	7005	Potential Reinstatement of part of Former Down Relief Line
140569			SDG	001	Portishead Signalling Scheme Sketch 1 of 2
140569			SDG	002	Portishead Signalling Scheme Sketch 2 of 2
140569			SDG	003	Bathampton Signalling Scheme Sketch
140569			SDG	004	Avonmouth Signalling Scheme Sketch

24. Conclusion and Recommendations

The work undertaken by this study provides technical information to support the re-opening of the Portishead line for passenger services and provide an enhanced level of passenger service for the Seven Beach and Bath to Bristol lines. The study looked at the frequency and service patterns of connecting passenger rail services between Portishead, Bath Spa and Severn Beach. The conclusion is that two options (5b & 6b) can be taken forward for further development in GRIP 3. Both options require the following infrastructure to deliver the timetable (in addition to the infrastructure identified through the previous GRIP 3 study to re-open the Portishead line), namely:

- Parson Street Junction doubling
- Intermediate signalling on the Portishead branch
- Signalling adjustments at Avonmouth for Option 6b and north of Avonmouth for Option 5b
- A new crossover at Bathampton to facilitate turning trains back to Bath Spa

The timetable modelling work undertaken has paid due cognisance to maintaining the existing freight path agreements.

The old track (rail & sleepers) is still in place for virtually the whole of the three mile disused section of line. A substantial quantity of vegetation clearance will be required before the old track can be removed and a new stabilised track formation can be built. Trackbed Investigation has identified contaminates in the trackbed of the old railway line; additional ground investigation work will be necessary in GRIP 3 to fully understand the level and extent of contamination.

The study has shown that by slewing the track and installing suitable fencing the existing cycle way can be accommodated under the bridge structures.

Two options (A & B) were explored for the terminus Station with car parking facilities in the vicinity of Quays Avenue, Portishead, with both options proving feasible. Option A will require passengers to cross Quays Avenue between the car park and the Station whereas Option B offers an integrated solution with the car park and Station on connecting land. However Option B will require partial realignment of Quays Avenue. Other options for Portishead station were considered by North Somerset Council, in their 'Portishead Station Options Appraisal Report', which is attached in appendix K.

In the interest of safety the accommodation and footpath crossings are to be closed; the disused section of line has ten such crossings, some of which are historic crossings and not in active use. The study has considered alternative arrangements at two of the crossing locations, Portishead (Trinity School area) and Sheepway Farm.

- Portishead – Provision of a footbridge between Tansy Lane and Galingale Way for access to Trinity School. Two conceptual design options have been proposed and should a footbridge be the selected solution either bridge can be built at this location.
- Sheepway Farm - To replace two existing user accommodation crossings a new farm bridge for livestock and light vehicular access is proposed. The bridge would be located approximately midway between the two existing crossings.

Further consideration was given to the viability of widening Avon Road underbridge; the study concluded that with repairs a new precast concrete deck unit could be installed adjacent to the existing bridge. The embankment will need to be extended to support the new bridge deck; the earthworks can be accommodated within the Network Rail boundary. As part of GRIP 3

surveys of both the bridge and embankment will be necessary together with ground investigation work to provide suitable information to progress design.

Whilst vegetation has encroached over the down platform at Pill Station the study shows that with clearance and work to the cutting slope a footbridge can be installed, accessed from Monmouth Road and refurbishment of the platform is possible. An area for car parking at Pill has been identified but is subject to further consideration by North Somerset Council.

As part of GRIP 3 a comprehensive survey and alignment design will be required to convert the existing freight line from Parson Street to Portbury Dock Junction to passenger status. The study has shown that the double tracking can be restored through Ashton Level Crossing within the existing railway boundary, with the crossing deck widened, barriers and road signals moved. The footpath crossing at Barons Close (known as Container path crossing) will be closed as part of this scheme. The Bus Rapid Transit (BRT) will cross the railway in the vicinity of Ashton Gate Level Crossing by means of an over-bridge the superstructure of which will be within 2.5m of the proposed twin track. Close liaison between the rail and roadway designs will be required.

The study has shown that should a requirement be confirmed at GRIP 3 to provide facilities to regulate freight trains travelling in the down direction, extension of the Carriage Line to a point just west of Bedminster Station to form a Down Relief is possible.

It is recommended that the Bristol Area Signalling Renewal project and other CP5 track renewal or enhancement projects, consider the requirements of this project and identify opportunities to design / deliver infrastructure through a holistic approach. A key issue is the siting for the crossover to re-double Parson Street junction to enable a Down Portishead service to diverge to the Up Main, whilst enabling a parallel move with an Up Portishead service. In respect of Bathampton turnback it is recommended that the dialogue with the GW electrification team is maintained to optimise the design and deliverability of this facility.

A Hazard Identification (HAZID) workshop is to be undertaken at GRIP 3 to identify potential hazards and threats to the Maintainer, Operations, Train Operators and others who may be affected by the change in status and infrastructure to provide input to design and development decisions.

Existing structures will need to be assessed for structural capacity (where applicable) and the condition evaluated for the proposed trains. Interoperability and safe access for examination and maintenance activities should also be determined. Early discussions with the Civils Network Rail Asset Manager are recommended, to determine requirements for acceptance of redundant assets back into operation and the maintenance regime required, and acceptance for increased loadings over operational assets.

The Civils Network Rail Asset Manager will also need to clear any proposed significant track renewals over, under or adjacent to any structures, as well as any track raising or lowering over and under any structures respectively.

The Risks associated with these factors include: overloading of structures, increasing lateral pressure on retaining/ballast walls/arch faces and removal of passive resistance to sliding /undermining the foundations of retaining/abutment walls. A key Project risk is that significant strengthening or repair works above the initial scoped works may be required. These risks are to be evaluated and identified by the Project in the Hazard Log.

In conclusion the report demonstrates that the proposed services and infrastructure changes are feasible and recommends the project progresses to GRIP 3.

References

Option Selection Report GRIP Stage 3 – 111797 Portishead Reopening

Open Street Map

Formal Acceptance of Selected Option by Client, Funders and Stakeholders

Client:			
Comments:			
Acceptance:		Date:	

Appendix A
Drawings

Ref:	GS2/**140569**
Version:	1.00
Date:	July 2014

Appendix B
Cost Estimate

GRIP 2 Estimate Report issued under separate cover

For high level cost figures refer to Section 12

Ref:	GS2/**140569**
Version:	1.00
Date:	July 2014

Appendix C
Qualitative Cost Risk Analysis

Appendix D
Capacity Modelling

Appendix E
Environmental Appraisal

Ref:	GS2/**140569**
Version:	1.00
Date:	July 2014

Appendix F
Signalling Appraisal

Appendix G
Photo Gallery

Site Visit Observations

Further details on the proposed Galingale way Footbridge (Middle Option):

North side of line

The walkway crossing of the railway line appears to be in frequent use, especially to access Trinity Primary School. To the North of the line, there is sufficient space for an access ramp and steps for the footbridge, without excessively impacting the neighbourhood open green space. Consideration needs to be made to the impact on the views from the properties overlooking the site, and the proximity of the structure to the school boundary. There is a slight positive gradient, sloping up from the railway line, but this will not have any significant effect on the bridge design proposals.

Figure 1 - View from line to North side

Figure 2 - View looking towards line from North-West: proposed location of footbridge

Figure 3 - View looking towards line from North

South side of line

The South side of the line appears to be slightly more constrained in terms of available space. There is a difference in elevation of approximately 0.5 – 1m between the land to the South side and the position of the track, due to the former railway embankment. However, the land to the south can be considered level. A drainage channel and culverts sit parallel to the line, but it is not expected for them to pose any significant obstruction to the positioning of bridge. A pond, as seen in Figure 3, is located further south of the proposed location of bridge. The standing water suggests that ground water may be moderately high in the area, and thus foundations for the bridge would most likely be piled. It would appear that due to the location of the lake, access to the site for large plant would be more suitably done from the north side of the site.

. Figure 4 - Culvert lying to South of line

Figure 5 - View from South side towards line

Figure 6 - View from South side towards line: proposed position of footbridge

Figure 7 - Footpath leading to the location of the proposed bridge (looking away from location)

Further details on the previously proposed Eastern Option (Moor Lane):

The footpath at the previously proposed Eastern bridge Option (Moor Lane) location for the footbridge does not appear to be as frequently used as that of the location of the Middle Option (Galingale Way). Since 2010 a new housing estate to the north (Tarragon Place) has been constructed close to the railway boundary, this has meant that there is insufficient space available to install a fully accessible DDA compliant footbridge at the Moor Lane Crossing.

North side of line

If the Middle Option is taken forward, it would be reasonable to install steps into the embankment and a footpath between the boundary of the school and the boundary of the railway to enable the residents of the estate to walk directly to the bridge.

Figure 8 – Previously proposed location of Eastern Option, view to the North of line

Figure 9 – View of embankment to the north of the line

Figure 10 – View from the north towards the line

Figure 11 – School boundary fence along north side of the line

South side of line

The south side of the line is heavily vegetated, and has a drainage ditch running around the edge of the housing estate.

Figure 12 – Footpath leading to the line (view from line towards south)

Sheepway Farm

Existing Sheepway crossing No. 1

Sheepway crossing No. 1 is in use multiple times a day for access to agricultural land by the farmer. Space for a livestock bridge is more of a constraining factor at this location on the North side of the line than the South, if the bridge is to span the line at this location.

Figure 13 - View to the South, away from the farm

Figure 14 - View to the North, into the farm

Existing Sheepway crossing No. 2

The location of the second crossing does not have the spatial constraints that the first crossing location has, however the position would not be as convenient for the user, and therefore the position is not as desirable. The land on the south side of the line slopes down away from the line slightly, increasing the required ramp length slightly.

Figure 15 - Existing Sheepway Crossing No. 2

Figure 16 - Existing Sheepway Crossing No. 2

Drain

A drain and culvert is located between the two Sheepway crossings, on the high mileage side of Mile Post (MP)128.5. The culvert appears to be in good condition, however only limited inspection has been undertaken. Further inspection work will need to be carried out to confirm the condition of the culvert. If the work is required on the culvert, it is recommended to replace the entire culvert with precast sections, to reduce future maintenance requirements.

Figure 17 - Drainage channel / culvert

Sheepway Overbridge

The overbridge appears to be in fair condition, and no obvious serious defects were identified. Minor defects include, but are not limited to the following:

High mileage (west) side

- A hairline crack in the mortar between arch rings.
- Isolated areas of calcite staining to the arch rings.
- Isolated areas of open joints.
- Vegetation growing from and on the structure with approximately 15% coverage.
- Figures 18, 19 and 20 show details of Sheepway Overbridge

Figure 18- Sheepway Overbridge

Low mileage (East) side

- Water staining as a result of drainage hole on the spandrel wall is visible.

Figure 19 - Sheepway Overbridge

Soffit

- Water staining as a result of a drainage hole on the spandrel wall.
- Vegetation growing from and on the structure with approximately 10% coverage.
- Isolated areas of open joints.

Figure 20 - Sheepway Overbridge

Recommended action

It is recommended that the vegetation is removed from the structure, and treated to prevent regrowth. Open joints should be repointed as necessary in accordance with NR/CIV/SD/TUM/101 and drainage holes cleared.

Oil pipeline

An oil pipeline crossing the line at a Reported depth of 1.7m below track level exists. Information confirming depth, size and protection should be sought at GRIP 3 and developed further.

Figure 21 - Pipeline marker post

Elm Tree Farm Crossing

The crossing adjacent to Elmtree farm is proposed to be closed. No replacement structures are to be proposed at this point. Land on the South side is proposed to be made accessible via the Portbury Hundred road (A369).

Figure 22 – Elm Tree Farm Crossing

Culvert

A culvert and drainage channel was observed at the low mileage side of MP128.25. However, the condition of the culvert was not able to be assessed due to its inaccessibility.

Figure 23 – View of culvert from track

Overbridge adjacent to the old Portbury Station (MP128m)

From a brief observation of the structure, the overbridge appears to have the following defects:

- Vegetation growth on the structure on high and low mileage sides.
- Missing bricks and an isolated area spalling to the arch rings on the high mile side.
- Isolated areas of open joints on both sides of the structure.
- Spandrel wall separation on the low mileage side.
- Silt and water staining to the arch soffit.

Further inspection of the structure should be undertaken at GRIP Stage 3 to ascertain required repairs.

Figure 24– High mileage (West) side – overbridge adjacent to old Portbury Station

Figure 25- Arch soffit of overbridge adjacent to old Portbury Station

Figure 26- Low mileage (East) side – overbridge adjacent to old Portbury Station

The Old Portbury Station

Due to the proximity of the line, a new railway boundary fence will be required.

Figure 27 - View of the old Portbury Station looking towards low mileage (East)

Drainage Culverts

Three culverts under the existing railway line were observed between the old Portbury Station and the overbridge carrying the Royal Portbury Dock Road. It is recommended that the replacement of the culverts with precast culvert sections should be considered, to reduce future maintenance obligations, and negate the requirement to repair. If the culverts aren't to be replaced, partial repairs to the arch rings and headwalls would be made. Full condition assessments should be undertaken to ascertain the extent of repairs required. Individual notes and figures of culverts are as follows, from high mileage to low mileage (labelled Culvert A, B and C).

These are shown in figures 23-27 inclusive.

Culvert A (MP127m 760y)

Culvert and channel require clearing out to inspect. Water did not appear to be flowing freely through it, although this may be as a result of the channel silting up.

Culvert B (MP127m 915y)

Currently has only 150mm of ballast between its crown and the underside of the timber sleepers crossing it. In order to provide an acceptable ballast depth for the proposed track form the vertical profile of the proposed alignment will need to accommodate a minimum lift of 150mm across this structure.

Culvert C (MP127m 1320y)

Culvert and channel require clearing out to inspect. Further investigations required due low vertical clearance.

Figure 28 – Culvert A: view from South of the line

Culvert B (High mileage side of MP127.5)

Figure 29 – Culvert B: view South side of line: spalled masonry and open joints visible

Figure 30 – Culvert B: view North side of line: collapsing wingwalls

Culvert C (Low mileage side of MP127.5)

Figure 31 - Culvert C: spalled masonry and silted up channel

Figure 32 - Culvert C: channel silted up

Overbridge carrying Royal Portbury Docks Road

The overbridge presented no obvious issues. It may be desirable to remove the graffiti from the bridge abutments following the installation of the boundary fence. The overbridge is shown in Figure 28 below.

Figure 33 - Overbridge carrying Royal Portbury Docks Road

Overbridge carrying Marsh Lane

The overbridge requires vegetation removal and treating to prevent regrowth. The bridge appears to be in fair condition. However there are isolated areas of spalling and open joints which require repairing. The coping stones on the wing walls require relaying due to fractured joints. These are shown in figures 29 to 32 inclusive.

Figure 34 - Overbridge high mileage end – Marsh Lane

Figure 35 - Overbridge low mileage end – Marsh Lane

Figure 36 - Wing wall fractured joints on coping stones – Marsh Lane

Figure 37 - Stones under newel cap missing

Culvert between overbridge carrying Marsh Lane and MP 127

The culvert should be inspected prior to GRIP Stage 4.

Figure 38 - Culvert adjacent to overbridge requires inspection

Cattle creep

The arch underbridge (as shown in Figures 34 and 35) appears to have areas of open joints and drainage issues. It requires the vegetation to be removed and treated to prevent regrowth prior to a full structural examination being undertaken. It is recommended to remove the asset by breaking the arch and infilling. The ground should be graded to match that of the adjacent embankment.

Figure 39 - Cattle creep

Figure 40 - Cattle creep: open joints visible in the arch rings and spandrel wall

Overbridge carrying M5 motorway (120.76m at centre)

The underbridge seems to be in fair condition for the majority of the structure. There are isolated areas of spalling and visible corroded reinforcing bar in the abutments particularly towards the low mileage end. Areas of offensive graffiti exist on the abutment walls. It is recommended that the asset owner addresses the defects prior to the reopening of the line to traffic.

Figure 41 – View from high mileage end of underbridge – overbridge carrying M5 motorway

Figure 42 – Isolated areas of spalling and visible corroded reinforcing bar

Figure 43 – Isolated areas of spalling and visible corroded reinforcing bar

Figure 44 - Spalling to the abutments

Figure 45 - Overbridge carrying M5 motorway: view from low mileage end

Underbridge over path between Lodway close and Avon Road

The underbridge requires a structural assessment at the next stage to ascertain the repairs required, due to the full length fractures in the up and downside abutments. Spalling of the abutments and minor spalling in the soffit was observed, and should also be taken into consideration when scoping repairs. Further works are required in this area to confirm the requirements for double tracking. The details of this structure are shown in in figures 41 – 47 inclusive.

Figure 46 - North side of underbridge

Figure 47 – South side of underbridge

Figure 48 – Bridge soffit: isolated spalling and visible corrosion

Figure 49 – Spalling to masonry on buttress and abutments

Figure 50 – Spalling and hairline full height fracture (<5mm) to high mileage abutment. Vegetation requires removal from structure and treating to prevent regrowth.

Figure 51 – Spalling and full height vertical fracture in low mileage abutment (<25mm). Stepped hairline fracture visible at top of the abutment.

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Appendix H
Trackbed Investigation Factual Report
Trackbed Investigation Interpretative Report
Hazard Waste Online Classification

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Appendix I
Galingale Way Bridge Visualisation Option 1
Galingale Way Bridge Visualisation Option 2
Sheepway Gate Farm Visualisation

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Appendix J
Interdisciplinary Design Certificate

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Appendix K
Portishead Rail Station Options Appraisal Report