

Our ref: CRS-100731
Your ref:

Owen Williams

Sent via Email

David Parker
Historical Railways Estate
3rd Floor
37 Tanner Row
YORK
YO1 6WP

Direct Line: 0771 443 1547
10th February 2020

Dear Mr Williams

Freedom of Information Request – Detailed Examination Reports for HRE Tunnels

I am writing to confirm that we have now completed our search for the information, which you requested on 14th January 2020.

A copy of the information is below.

Please note that I have not provided Detailed Examination reports for the following tunnels as they do not form part of the former railway estate for which we are responsible:

Burdale
Clydach
Gelli Felin
Dorchester
Woodburn Road

For the following structures we do not hold a Detailed Examination report so I have included the most recent type of report that we hold.

Clifton Hall
Norwood End

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If you are unhappy with the way we have handled your request you may ask for an internal review within 2 months of the date of this response for Freedom of Information requests and within 40 days for Environmental Information Regulations requests.

Our internal review process is available at:

<https://www.gov.uk/government/organisations/highways-england/about/complaints-procedure>

If you require a print copy, please phone the Information Line on 0300 123 5000; or e-mail info@highwaysengland.co.uk. You should contact me if you wish to complain.

If you are not content with the outcome of the internal review, you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at:

Information Commissioner's Office
Wycliffe House
Water Lane
Wilmslow
Cheshire
SK9 5AF

If you have any queries about this letter, please contact me. Please remember to quote reference number 100731 in any future communications.

Yours sincerely



David Parker
Historical Railways Estate
Email: dave.parker@highwaysengland.co.uk

Balfour Beatty Rail, Manchester
Woodside (Birkenhead) Tunnel
ELR:CCS1/61 **Examined:03/10/2019**

Balfour Beatty Rail, Manchester

Detailed Examination Report for

Woodside (Birkenhead) Tunnel

ELR: CCS1/61

Examined: 03/10/2019

Structures Examinations
Balfour Beatty Rail
Chaddock Lane
Worsley
Manchester
M28 1XW

Balfour Beatty Rail : Tunnel Examination Report

NAME: Woodside (Birkenhead) Tunnel

BETWEEN: Rock Ferry Junction and Birkenhead Woodside

START MILEAGE: 14m 57ch

LENGTH: 556yds

REFERENCE: CCS1/61

EXAMINED BY: Jackson & Bird

METHOD: Foot/Poles

DATE OF EXAMINATION: 03/10/2019

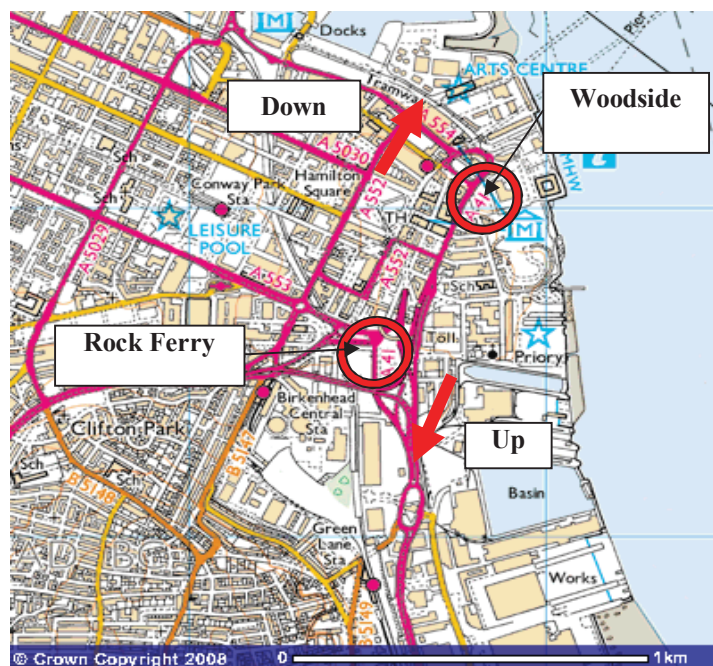
LAST EXAMINATION DATE: 03/10/2018

MARKERS AT: 22yds centres throughout the tunnel.

CONSTRUCTION: Concrete beams & jack arches and steel beams & brick jack arches from 00+00 to 03+09, then stonework portal with a brick arch from 03+09 to 25+06

O.S. Ref.: Rock Ferry Portal SJ 325 886

O.S. Ref.: Woodside Portal SJ 328 890



| Location | Defect | | Action |
|---|---|------------|--|
| 000+00 Portal Up & Down | Rock Ferry Portal, view of solum approach overgrown with a forest of Japanese Knotweed. Access to tunnel difficult. | 1 | Recommend clear solum approach adjacent to portal, Priority 1, work to be completed 03/10/2020. |
| 000+00 Portal Up & Down | Rock Ferry Portal, tunnel gate found open and padlock missing. | 2 | |
| 000+00 Portal Down | Rock Ferry Portal, probable easy access route for trespassers / vandals found at low level fence. | 3 & 4 | Recommend replace fence with higher level security, Priority 1, work to be completed 03/10/2020. |
| 000+00 Portal Up | Rock Ferry Portal, 3No. copings missing. | 5 | Recommend replace coping stones, Priority 1, work to be completed 03/10/2020. |
| 000+00 Portal Up & Down | Rock Ferry Portal, new padlock fitted to gate at this examination, oiling new padlock. | 6 | |
| 000+00 Portal Up & Down | Rock Ferry Portal, oiling gate hinges. | 7 | |
| 000+00 to 003+10 Deck Up & Down | Brickwork, bridge extension to tunnel, concrete encased iron beams and brick jack arches at c.7ft. centres (view of scabbled-off window / investigation). | 8 | Recommend check and/or assess capacity of bridge on the basis of current condition and vehicle loadings above, Priority 1, work to be completed by 03/10/2020. |
| 000+00 to 012+16 Crown & Haunch Up & Down | Soot, depth 10mm, area 3000sq.m., medium. | | |
| 000+00 to 012+15 Solum Up & Down | Debris, fly-tipping & fires throughout. | 9, 10 & 11 | Recommend remove all debris, Priority 1, work to be completed by 03/10/2020. |
| 000+18 Deck Up & Down | Concrete beam with crack to Rock Ferry side, width 1mm, 5m long. | | |
| 001+00 to 001+04 Deck Up & Down | Cable troughs running across the deck between concrete beams. | | |
| 001+03 Deck Up & Down | Cable trough running across the deck of the tunnel between concrete beams. Concrete spalled, ties exposed. | 12 | Recommend repair concrete, Priority 1, work to be completed 03/10/2020. |
| 001+09 Deck Up & Down | Concrete beam burst to both sides, hollow, area 6sq.m., medium. | 13 | Recommend repair concrete beam, Priority 1, work to be completed 03/10/2020. |
| 001+14 Deck Up & Down | Concrete beam burst to the Rock Ferry side, re-bar showing, hollow, depth 50mm, area 6sq.m., medium. | 14 | Recommend repair concrete beam, Priority 1, work to be completed 03/10/2020. |

Balfour Beatty Rail, Manchester**Woodside (Birkenhead) Tunnel****ELR:CCS1/61****Examined:03/10/2019**

| Location | Defect | | Action |
|---------------------------------|---|----|---|
| 002+00 Deck Up & Down | Concrete beam burst to the Rock Ferry side, spalling and hollow, depth 50mm, area 1sq.m., medium. | | Recommend repair concrete beam, Priority 3, work to be completed 03/10/2022. |
| 002+02 Deck Up & Down | Concrete beam, re-bar showing, spalling, depth 25mm, area 1sq.m., sparse. | | Recommend repair concrete beam, Priority 3, work to be completed 03/10/2022. |
| 002+02 Deck Up & Down | Bottom flange of concrete beam, spalling and hollow, depth 75mm, area 1sq.m., medium. | 15 | Recommend repair concrete beam, Priority 1, work to be completed 03/10/2020. |
| 002+04 Deck Up & Down | Concrete beam, hollow, new cracking to bottom of beam, longitudinal, width 4mm, length 6m. | 16 | Recommend repair concrete beam, Priority 1, work to be completed 03/10/2020. |
| 002+06 Deck Up & Down | Concrete beam, old standing cracking to side, longitudinal, hairline, length 1m. | | |
| 002+12 Deck Up & Down | Concrete beam, old standing cracking to side, longitudinal, hairline, length 1m. | | |
| 002+19 Deck Up & Down | Concrete beam, old standing cracking to side, longitudinal, hairline, length 1m. | | |
| 003+10 Full Profile Up & Down | Tunnel changes from a bridge to a brickwork tunnel. | | |
| 005+00 Sidewall Up | Evidence of new tablet number broken off sidewall and cannot be found nearby along the solum. | 17 | Recommend replace tablet number, Priority 1, work to be completed 03/10/2020. |
| 009+01 Haunch Down | Brickwork, spalling, depth 25mm, hollow, 1sq.m. | | |
| 010+03 Low Haunch Down | Brickwork, wet, area 8sq.m. | | |
| 010+05 Crown Up & Down | Ironwork located across crown, 3m long, 200mm wide, corroded 5mm loss of section. | | |
| 010+15 Haunch Down | Brickwork, running water, wet/damp, area 8sq.m., medium. No running water at this examination. | | |
| 011+08 Crown & Haunch Up & Down | Brickwork, open joints & damp, depth 50mm, area 6sq.m., medium. | | |
| 011+09 to 011+17 High Haunch Up | Brickwork, wet, area 12sq.m., medium. | | |

Balfour Beatty Rail, Manchester**Woodside (Birkenhead) Tunnel****ELR:CCS1/61****Examined:03/10/2019**

| Location | Defect | Action | |
|-------------------------------|--|--------------------|--|
| 012+16 Full Profile Up & Down | Blockwork wall built across tunnel. Trespassers and/or 3rd parties repeatedly excavating a hole to wall at high level, now approx. 11ft. x 5ft. x 5ft. deep. | 18 & 19 | |
| 012+16 to 025+06 Full Profile | Tunnel filled. | | |
| 025+06 Portal Up & Down | Woodside Portal, vegetation growth to spandrel, area 20sq.m., light. | 20 | Recommend remove vegetation, Priority 1, work to be completed by 03/10/2020. |
| 025+06 Portal Up & Down | Woodside Portal, filled, with brickwork wall built, no access. | | |
| 025+06 Portal Down | Woodside Portal, side bridge supporting 8m length of footpath above. | 21 & 22 | Recommend add bridge to examinations programme (label CSS1/61A), Priority 1, work to be completed by 03/10/2020. |
| 025+06 Portal Up & Down | Woodside Portal, Brickwork, roadside parapet. | 23 | |
| 025+06 Portal Down | Woodside Portal, Brickwork, roadside parapet, near return, vertical crack up from footpath, forks 2ft. up, full height 2m, max. width 4mm at top. | 24 | Recommend repoint and monitor annually, Priority 1, work to be completed by 03/10/2020. |
| 025+06 Portal Down | Woodside Portal, Brickwork, roadside parapet, near portal parapet return, diagonal stepped crack, full height 2m, max. width 4mm at top. Hairline crack through datal. | 25 & 26 | Recommend repoint and monitor annually, Priority 1, work to be completed by 03/10/2020. |
| 025+06 Portal Up & Down | Woodside Portal, view of approach overgrown with vegetation, shrubs & saplings. | 27 | Recommend clear approach between bridge and portal, Priority 1, work to be completed 03/10/2020. |
| 025+06 Portal Up & Down | Woodside Portal, evidence of trespass under gates at Bridge No.62. | 28 | Recommend build concrete base beneath gates, Priority 1, work to be completed 03/10/2020. |

NOTES

1. Access route to structure: Road adjacent to the Mersey Tunnel Toll Booths then across unmade ground.
2. Site issues and impediments to carrying out repairs, DE's or other works: confined space, solum filled to within 7ft. of the crown with only the crown & haunches visible, chronic trespass & criminal damage to security fence, sharps.

STE2 STE6
Chartered Engineer:



Definitions

The following definitions and conventions were used in producing this report.

1.Description of Defects.

Defects have been described both in terms of their area and their proportion within that area. For example an area of spalled brickwork might be described as:-

Brickwork, spalling, depth 100mm, area 25m², medium.

In this example the spalling extends over a total area of 25m² and is of medium proportion of that area.

Proportional terms are defined below:-

Sparse - less than 10% of the area.

Light - between 10% and <35% of the area.

Medium - between 35% and <75% of the area.

Proportions of 75% and above are not qualified in any way.

2. Water Ingress.

Water percolation has been categorised as:-

Damp - discolouration of the surface, moist to touch but not dripping.

Wet - drops falling regularly.

Running - a continuous trickle of water.

Pressured - a jet of water.

3. Vegetation, Shrubs, Saplings and Trees.

Flora has been categorised as follows:-

Trees - number of trees and trunk girths.

Saplings - number of saplings.

Shrubs - area of shrubs.

Vegetation - area of plants, for e.g. brambles, ivy, etc.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 1 of 16



ROCK FERRY PORTAL



WOODSIDE PORTAL

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 2 of 16



**Photo No.1: Rock Ferry Portal, view of solum approach overgrown with a forest of Japanese Knotweed.
Access to tunnel difficult.**



Photo No.2: Rock Ferry Portal, tunnel gate found open and padlock missing.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 3 of 16



Photo No.3: 000+00 Portal Down, Rock Ferry Portal, probable easy access route for trespassers / vandals found at low level fence.



Photo No.4: 000+00 Portal Down, Rock Ferry Portal, probable easy access route for trespassers / vandals found at low level fence.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 4 of 16



Photo No.5: 000+00 Portal Up, Rock Ferry Portal, 3No. copings missing.



Photo No.6: 000+00 Portal Up & Down, Rock Ferry Portal, new padlock fitted to gate at this examination, oiling new padlock.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 5 of 16



Photo No.7: 000+00 Portal Up & Down, Rock Ferry Portal, oiling gate hinges.



Photo No.8: 000+00 to 003+10 Deck Up & Down, Brickwork, bridge extension to tunnel, concrete encased iron beams and brick jack arches at c.7ft. centres (view of scabbled-off window / investigation).

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 6 of 16



Photo No.9: 000+00 to 012+15 Solum Up & Down, Debris, fly-tipping & fires throughout.



Photo No.10: 000+00 to 012+15 Solum Up & Down, Debris, fly-tipping & fires throughout.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 7 of 16



Photo No.11: 000+00 to 012+15 Solum Up & Down, Debris, fly-tipping & fires throughout.



Photo No.12: 001+03 Deck Up & Down, Cable trough running across the deck of the tunnel between concrete beams. Concrete spalled, ties exposed.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 8 of 16



Photo No.13: 001+09 Deck Up & Down, Concrete beam burst to both sides, hollow, area 6sq.m., medium.



Photo No.14: 001+14 Deck Up & Down, Concrete beam burst to the Rock Ferry side, re-bar showing, hollow, depth 50mm, area 6sq.m., medium.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 9 of 16



Photo No.15: 002+02 Deck Up & Down, Bottom flange of concrete beam, spalling and hollow, depth 75mm, area 1sq.m., medium.



Photo No.16: 002+04 Deck Up & Down, Concrete beam, hollow, new cracking to bottom of beam, longitudinal, width 4mm, length 6m.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 10 of 16

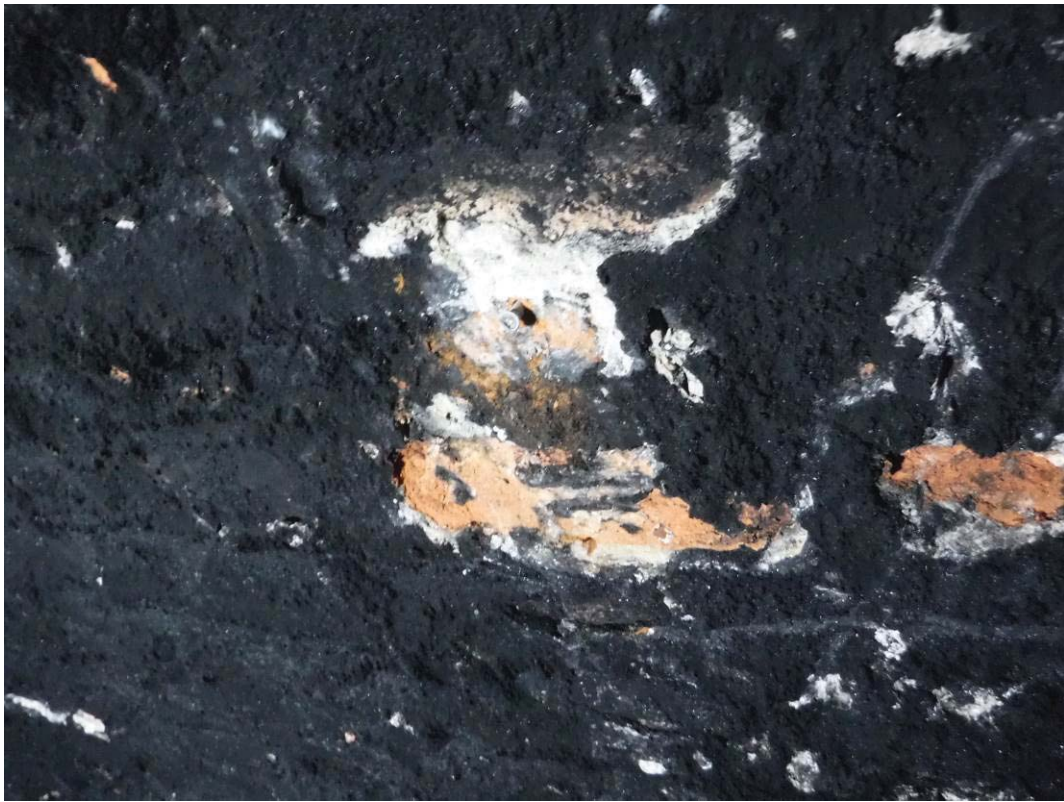


Photo No.17: 005+00 Sidewall Up, Evidence of new tablet number broken off sidewall and cannot be found nearby along the solum.



Photo No.18: 012+16 Full Profile Up & Down, Blockwork wall built across tunnel. Trespassers and/or 3rd parties repeatedly excavating a hole to wall at high level, now approx. 11ft. x 5ft. x 5ft. deep.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 11 of 16



Photo No.19: 012+16 Full Profile Up & Down, Blockwork wall built across tunnel. Trespassers and/or 3rd parties repeatedly excavating a hole to wall at high level, now approx. 11ft. x 5ft. x 5ft. deep.



Photo No.20: 025+06 Portal Up & Down, Woodside Portal, vegetation growth to spandrel, area 20sq.m., light.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 12 of 16



Photo No.21: 025+06 Portal Down, Woodside Portal, side bridge supporting 8m length of footpath above.



Photo No.22: 025+06 Portal Down, Woodside Portal, side bridge supporting 8m length of footpath above.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 13 of 16



Photo No.23: 025+06 Portal Up & Down, Woodside Portal, Brickwork, roadside parapet.



Photo No.24: 025+06 Portal Down, Woodside Portal, Brickwork, roadside parapet, near return, vertical crack up from footpath, forks 2ft. up, full height 2m, max. width 4mm at top.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 14 of 16



Photo No.25: 025+06 Portal Down, Woodside Portal, Brickwork, roadside parapet, near portal parapet return, diagonal stepped crack, full height 2m, max. width 4mm at top. Hairline crack through datal.



Photo No.26: 025+06 Portal Down, Woodside Portal, Brickwork, roadside parapet, near portal parapet return, diagonal stepped crack, full height 2m, max. width 4mm at top. Hairline crack through datal.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 15 of 16



Photo No.27: 025+06 Portal Up & Down, Woodside Portal, view of approach overgrown with vegetation, shrubs & saplings.



Photo No.28: 025+06 Portal Up & Down, Woodside Portal, evidence of trespass under gates at Bridge No.62.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: CCS1 Br. No.: 61

Mileage: 14 M 57 ch Sheet 16 of 16



Photo No.29: One of the roads carried by the tunnel.



Photo No.30: Junction carried by the tunnel.

Balfour Beatty Rail, Manchester

Monks Ferry Tunnel

ELR:CCS3/01

Examined:03/10/2019

Balfour Beatty Rail, Manchester

Detailed Examination Report for

Monks Ferry Tunnel

ELR: CCS3/01

Examined: 03/10/2019

Structures Examinations

Balfour Beatty Rail

Chaddock Lane

Worsley

Manchester

M28 1XW

Balfour Beatty Rail : Tunnel Examination Report

NAME: Monks Ferry Tunnel

BETWEEN: Green Lane Junction and Monks Ferry

START MILEAGE: 14m 56yds

LENGTH: 345yds

REFERENCE: CCS3/01

EXAMINED BY: Jackson & Bird

METHOD: Foot/Poles

DATE OF EXAMINATION: 03/10/2019

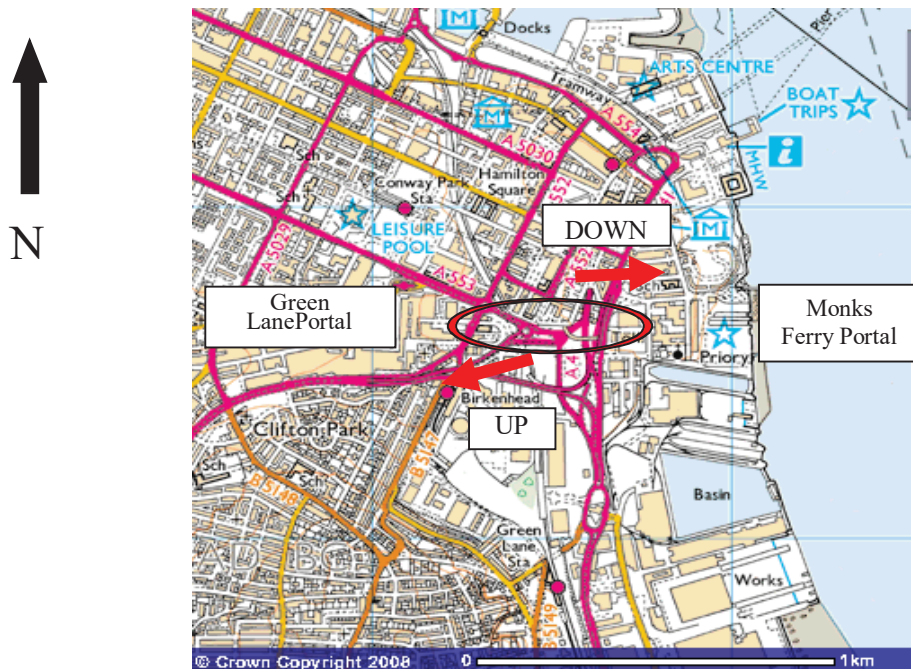
LAST EXAMINATION DATE: 03/10/2018

MARKERS AT: 22yds centres throughout the tunnel.

CONSTRUCTION: Stonework portal with a brickwork, stonework & natural rock arch.

O.S. Ref.: Green Lane Portal SJ 325 886

O.S. Ref.: Monks Ferry Portal SJ 328 887



Balfour Beatty Rail, Manchester**Monks Ferry Tunnel****ELR:CCS3/01****Examined:03/10/2019**

| Location | Defect | | Action |
|--|---|---|--|
| 000+00 Infill wall | Infill wall, hole dug into blockwork by 3rd party, further enlarged, now 200mm ² x 700mm deep. | 1 | Recommend repair blockwork to discourage further vandalism, Priority 1; work to be completed by 03/10/2020. |
| 000+00 to 004+10 Sidewall Up & Down | Patches of natural rock visible. | | |
| 000+00 to 009+00 Crown & Haunch Up & Down | Brickwork, damp, area 1080sq.m., medium. | | |
| 000+00 to 015+15 Crown & Haunch Up & Down | New metal pins found along the tunnel at this examination. | 2 | Recommend investigate ownership and remove from tunnel, Priority 1; work to be completed by 03/10/2020. |
| 000+02 Crown & Haunch Up & Down | Shaft with metal ladder access to surface via manhole. | | |
| 000+02 Crown & Haunch Up & Down | Shaft eye. | 3 | |
| 000+17 Haunch Down | Rotten timber lintel, brickwork above lintel is hollow, area 2sq.m., medium. | 4 | Recommend replace brickwork, Priority 1; work to be completed by 03/10/2020. |
| 001+11 Crown Up & Down | Brickwork, hollow, area 8sq.m., medium. | | |
| 003+06 High Haunch Down | Brickwork, new 3rd party borehole, 4" dia. | 5 | Recommend investigate and obtain remedial works proposal from 3rd party, Priority 1; work to be completed by 03/10/2020. |
| 004+14 Crown Down | Brickwork, new 3rd party borehole, 5" dia. | 6 | Recommend investigate and obtain remedial works proposal from 3rd party, Priority 1; work to be completed by 03/10/2020. |
| 005+06 to 007+04 Crown & Haunch | Concrete patches to the tunnel lining reported to be failed piling scheme. | | |
| 005+15 Sidewall Up | Brickwork, missing bricks, 0.5sq.m. 100mm deep. | 7 | Recommend replace brickwork, Priority 1; work to be completed by 03/10/2020. |
| 006+09 to 007+06 Crown Up & Down | Brickwork, longitudinal fracture, old standing, hollow, area 7sq.m., medium. | | |

Balfour Beatty Rail, Manchester**Monks Ferry Tunnel****ELR:CCS3/01****Examined:03/10/2019**

| Location | Defect | | Action |
|---|---|--------------------|---|
| 007+07 Crown Down | Brickwork, bulging 100mm, length 2m, missing brick, hollow. | 8 | Recommend add section of lining to the 6monthly monitoring examination, Priority 1; work to be completed by 03/10/2020. |
| 007+16 Crown Up | Brickwork, flat, damp, hollow, area 6sq.m., medium. | 9 | Recommend this defect continues to be monitored at 6monthly intervals. |
| 007+19 Crown Up & Down | Brickwork, flat/bulge, damp, hollow, area 4sq.m. | 10 | Recommend this defect continues to be monitored at 6monthly intervals. |
| 010+02 to 010+12 Crown Up & Down | Brickwork, longitudinal hairline fracture in bedding joint, length 10m. | | |
| 010+03 Crown Down | Brickwork, flat, length 4m. | 11 | Recommend this defect continues to be monitored at 6monthly intervals. |
| 011+00 Haunch Up & Down | Brickwork, damp, area 8sq.m. | | |
| 012+04 Haunch Down | Brickwork, hollow, area 1sq.m. | | |
| 014+00 High Haunch Down | Brickwork, flat, length 4m. | 12 | Recommend this defect continues to be monitored at 6monthly intervals. |
| 014+08 to 015+15 Crown & Haunch Up & Down | Stonework. | | |
| 015+15 Portal Up & Down | Green Lane Portal, Internal former security fencing (redundant) vandalised / part collapsed. Sharp edges to ends. | 13 | Recommend remove fencing, Priority 1; work to be completed by 03/10/2020. |
| 015+15 to 016+03 Crown Up & Down | Bridge deck in front of portal, triangular in plan, c.10yds long x c.5yds wide, carries road & footpath above. | 14 & 15 | Recommend add bridge to examinations programme (label CCS3/01A), Priority 1; work to be completed by 03/10/2020. |
| 015+15 to 016+03 Crown Up & Down | Bridge deck in front of portal, iron beams corroded throughout. | | |
| 015+15 to 016+03 Crown Up & Down | Bridge deck in front of portal, Parapet, brickwork, spalling and open joints to both faces. Loose bricks to top of parapet. Capping missing throughout. | 16 | Recommend repair brickwork, Priority 1; work to be completed by 03/10/2020. |

Balfour Beatty Rail, Manchester**Monks Ferry Tunnel****ELR:CCS3/01****Examined:03/10/2019**

| Location | Defect | | Action |
|----------------------------|--|--------------------|---|
| 015+16 Crown Up & Down | Bridge deck in front of portal, Jack Arch adjacent to tunnel, brickwork, spalling, depth 100mm, loose, damp, area 1sq.m., medium. Tie bars corroded at interface with brickwork. | 17 | Recommend replace brickwork, Priority 1; work to be completed by 03/10/2020. |
| 015+19 Crown Up & Down | Bridge deck in front of portal, Jack Arch, second from tunnel, brickwork, spalling, depth 100mm, loose, area 0.5sq.m., medium. Tie bars corroded at interface with brickwork. | | Recommend replace brickwork, Priority 3; work to be completed by 03/10/2022. |
| 016+03 Portal Up & Down | Bridge deck in front of portal, oiling gate padlock. | 18 | |
| 016+03 Portal Up & Down | Bridge deck in front of portal, oiling gate hinges. | 19 | |
| 016+03 Wingwall Up | Bridge deck in front of portal, Wingwall to buttress - Trees/shrubs growing, displaced blocks & copings. | 20 & 21 | Recommend remove trees/shrubs/roots and rebed stonework, Priority 1; work to be complete by 03/10/2020. |
| 016+03 Portal Up & Down | Green Lane Portal, view of solum approach overgrown with a forest of Japanese Knotweed. Access to tunnel difficult. | 22 | Recommend clear solum approach adjacent to portal, Priority 1, work to be completed 03/10/2020. |

Balfour Beatty Rail, Manchester

Monks Ferry Tunnel

ELR:CCS3/01

Examined:03/10/2019

NOTES

1. Access route to structure: Adjacent to Mersey Tunnel Toll Booths.

2. Site issues and impediments to carrying out repairs, DE's or other works: Confined space, ostensibly infilled from the Monks Ferry Portal to the shaft, remaining tunnel is part-filled to within 7ft. of the crown - hidden sidewalls, chronic vandalism & forced entry, hazard - sharps, some monitoring of arch sections is undertaken at 3monthly intervals.

STE2 STE6

Chartered Engineer:

Definitions

The following definitions and conventions were used in producing this report.

1.Description of Defects.

Defects have been described both in terms of their area and their proportion within that area. For example an area of spalled brickwork might be described as:-

Brickwork, spalling, depth 100mm, area 25m², medium.

In this example the spalling extends over a total area of 25m² and is of medium proportion of that area.

Proportional terms are defined below:-

Sparse - less than 10% of the area.

Light - between 10% and <35% of the area.

Medium - between 35% and <75% of the area.

Proportions of 75% and above are not qualified in any way.

2. Water Ingress.

Water percolation has been categorised as:-

Damp - discolouration of the surface, moist to touch but not dripping.

Wet - drops falling regularly.

Running - a continuous trickle of water.

Pressured - a jet of water.

3. Vegetation, Shrubs, Saplings and Trees.

Flora has been categorised as follows:-

Trees - number of trees and trunk girths.

Saplings - number of saplings.

Shrubs - area of shrubs.

Vegetation - area of plants, for e.g. brambles, ivy, etc.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS3 Br. No.: 1

Mileage: 14 M 56 ch Sheet 1 of 13



BRIDGE DECK IN FRONT OF GREEN LANE PORTAL



BLOCKWORK WALL TOWARDS MONKS FERRY END

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS3 Br. No.: 1

Mileage: 14 M 56 ch Sheet 2 of 13



Photo No.1: 000+00 Infill wall, Infill wall, hole dug into blockwork by 3rd party, further enlarged, now 200mm² x 700mm deep.



Photo No.2: 000+00 to 015+15 Crown & Haunch Up & Down, New metal pins found along the tunnel at this examination.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS3 Br. No.: 1

Mileage: 14 M 56 ch Sheet 3 of 13



Photo No.3: 000+02 Crown & Haunch Up & Down, Shaft eye.



Photo No.4: 000+17 Haunch Down, Rotten timber lintel, brickwork above lintel is hollow, area 2sq.m., medium.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS3 Br. No.: 1

Mileage: 14 M 56 ch Sheet 4 of 13



Photo No.5: 003+06 High Haunch Down, Brickwork, new 3rd party borehole, 4" dia.



Photo No.6: 004+14 Crown Down, Brickwork, new 3rd party borehole, 5" dia.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS3 Br. No.: 1

Mileage: 14 M 56 ch Sheet 5 of 13



Photo No.7: 005+15 Sidewall Up, Brickwork, missing bricks, 0.5sq.m. 100mm deep.



Photo No.8: 007+07 Crown Down, Brickwork, bulging 100mm, length 2m, missing brick, hollow.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS3 Br. No.: 1

Mileage: 14 M 56 ch Sheet 6 of 13



Photo No.9: 007+16 Crown Up, Brickwork, flat, damp, hollow, area 6sq.m., medium.



Photo No.10: 007+19 Crown Up & Down, Brickwork, flat/bulge, damp, hollow, area 4sq.m.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS3 Br. No.: 1

Mileage: 14 M 56 ch Sheet 7 of 13



Photo No.11: 010+03 Crown Down, Brickwork, flat, length 4m.



Photo No.12: 014+00 High Haunch Down, Brickwork, flat, length 4m.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS3 Br. No.: 1

Mileage: 14 M 56 ch Sheet 8 of 13



Photo No.13: 015+15 Portal Up & Down, Green Lane Portal, Internal former security fencing (redundant) vandalised / part collapsed. Sharp edges to ends.

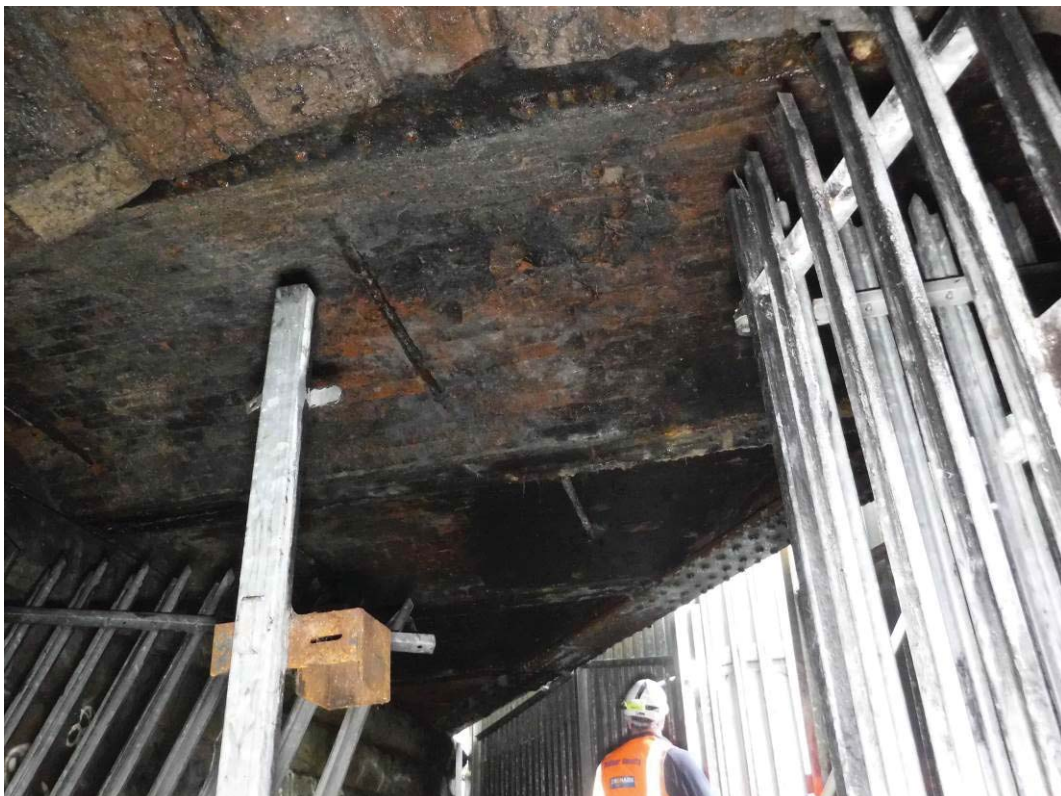


Photo No.14: 015+15 to 016+03 Crown Up & Down, Bridge deck in front of portal, triangular in plan, c.10yds long x c.5yds wide, carries road & footpath above.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS3 Br. No.: 1

Mileage: 14 M 56 ch Sheet 9 of 13



Photo No.15: 015+15 to 016+03 Crown Up & Down, Bridge deck in front of portal, triangular in plan, c.10yds long x c.5yds wide, carries road & footpath above.



Photo No.16: 015+15 to 016+03 Crown Up & Down, Bridge deck in front of portal, Parapet, brickwork, spalling and open joints to both faces. Loose bricks to top of parapet. Capping missing throughout.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS3 Br. No.: 1

Mileage: 14 M 56 ch Sheet 10 of 13



Photo No.17: 015+16 Crown Up & Down, Bridge deck in front of portal, Jack Arch adjacent to tunnel, brickwork, spalling, depth 100mm, loose, damp, area 1sq.m., medium. Tie bars corroded at interface with brickwork.

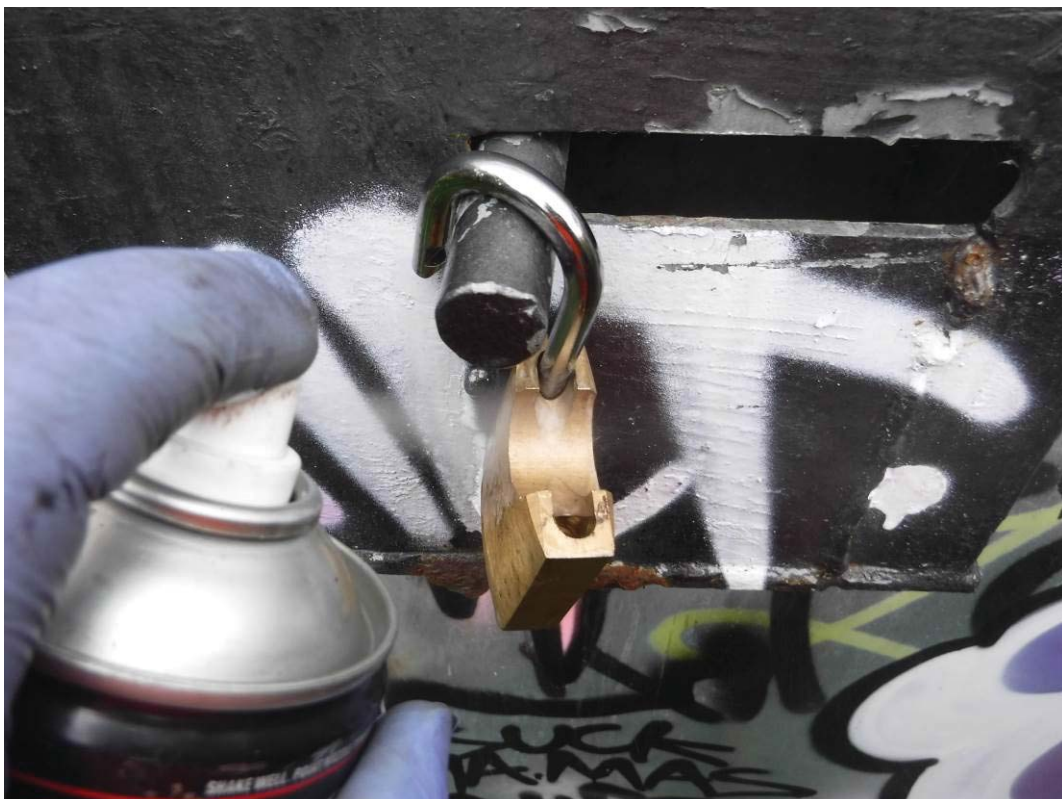


Photo No.18: Bridge deck in front of portal, oiling gate padlock.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS3 Br. No.: 1

Mileage: 14 M 56 ch Sheet 11 of 13



Photo No.19: Bridge deck in front of portal, oiling gate hinges.

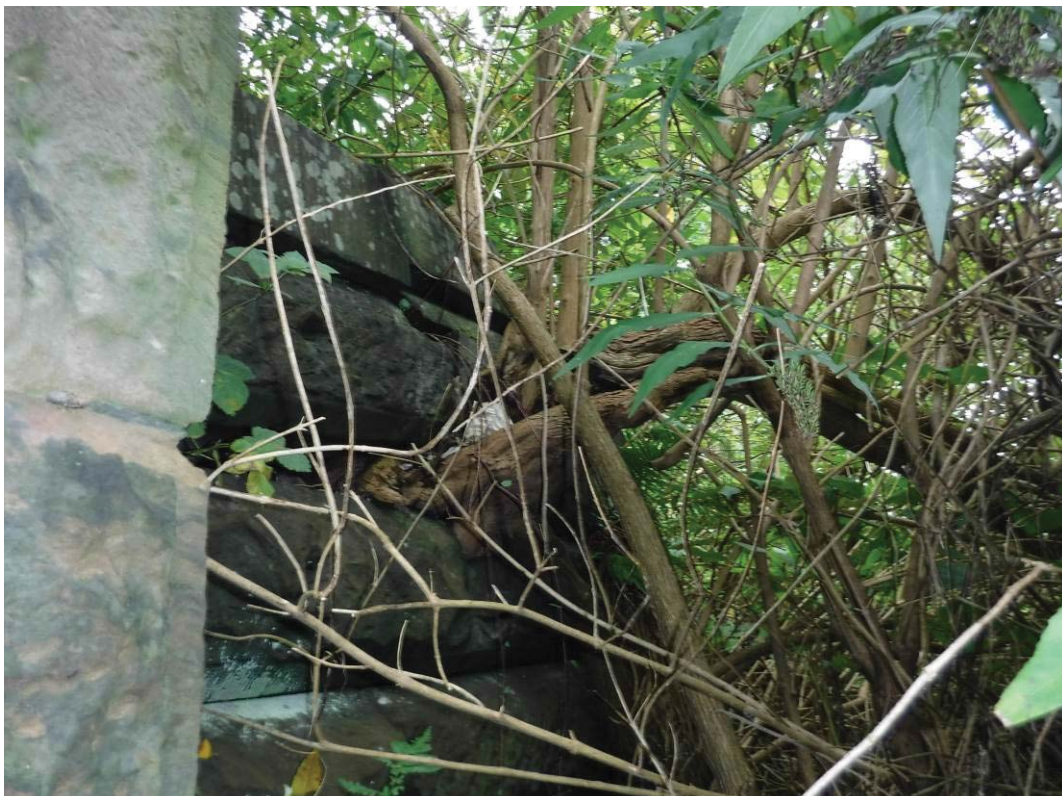


Photo No.20: 016+03 Wingwall Up, Bridge deck in front of portal, Wingwall to buttress - Trees/shrubs growing, displaced blocks & copings.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: CCS3 Br. No.: 1

Mileage: 14 M 56 ch Sheet 12 of 13



Photo No.21: 016+03 Wingwall Up, Bridge deck in front of portal, Wingwall to buttress - Trees/shrubs growing, displaced blocks & copings.



Photo No.22: Green Lane Portal, view of solum approach overgrown with a forest of Japanese Knotweed. Access to tunnel difficult.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CCS3 Br. No.: 1

Mileage: 14 M 56 ch Sheet 13 of 13



Photo No.23: One of the roads carried by the tunnel.

Balfour Beatty Rail, Manchester

Law Tunnel

ELR:DDN/12A

Examined:07/10/2019

Balfour Beatty Rail, Manchester

Detailed Examination Report for

Law Tunnel

ELR: DDN/12A

Examined: 07/10/2019

Structures Examinations

Balfour Beatty Rail

Chaddock Lane

Worsley

Manchester

M28 1XW

Balfour Beatty Rail : Tunnel Examination Report

NAME: Law Tunnel

BETWEEN: Dundee to Newtyle

START MILEAGE: Unknown

LENGTH: c.350yds

REFERENCE: DDN/12A

EXAMINED BY: Jackson Mines Rescue in attendance.

METHOD: Foot/Poles

DATE OF EXAMINATION: 07/10/2019

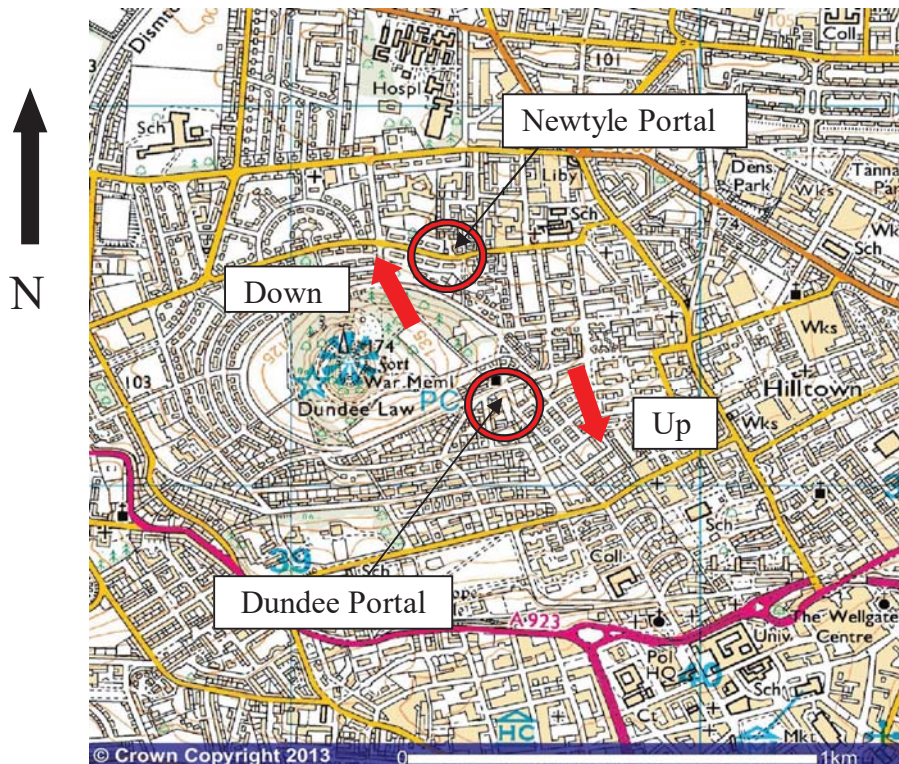
LAST EXAMINATION DATE: 08/10/2018

MARKERS AT: ½ch throughout the tunnel.

CONSTRUCTION: Stonework.

O.S. Ref.: Dundee Portal NO 394 315

O.S. Ref.: Newtyle Portal NO 395 312



Balfour Beatty Rail, Manchester**Law Tunnel****ELR:DDN/12A****Examined:07/10/2019**

| Location | Defect | Photo | Action |
|---|---|---------|--|
| 000+00 Manhole Access | View of manhole cover removed and secondary safety plate underneath. | 1 | |
| 000+00 Manhole Access | View of manhole showing safe zone. | 2 | |
| 000+00 Manhole Access | View of Mines Rescue personnel & tunnel engineer preparing to enter the manhole. | 3 | |
| 000+00 Manhole Access | View looking up the manhole. | 4 | |
| 000+00 Manhole Access Down | Manhole Shaft, top of base section, brickwork, step fracture, length 207cm, max. width 3mm, new house foundations above. | 5 & 6 | Recommend add shaft to CBL and carry out a DE, Priority 1; work to be carried out by 07/10/2020. |
| 000+00 Portal Up | Dundee Portal, Stonework, a small section of the portal can still be seen adjacent to the manhole shaft bottom. | 7 | |
| 000+03 Portal Up | New brickwork wall to base of manhole on entry to tunnel. | 8 | |
| 000+03 to 001+06 Crown & Haunches Up & Down | Stonework, damp and wet throughout with stalactites, area 80sq.m. | 9 | |
| 000+03 to 021+00 Crown & Haunch Up & Down | Stonework, open joints, max. depth 300mm, area 1050sq.m., damp, sparse. | | |
| 000+03 to 021+00 Full Profile Up & Down | Various 25mm core holes and surveying targets throughout the tunnel. | 10 | |
| 000+04 Crown Up & Down | Stonework, construction joint, mortar missing, 100mm x 50mm x 50mm deep, with a circumferential fracture, length 5m, sealed with calcite to the upside and open to the downside, max. width 5mm, wet. | 11 & 12 | Recommend monitor construction joint at each examination. |
| 000+05 Cess Down | Rubbish and fly-tipping laid to solum. | 13 | Recommend that rubbish/fly-tipping be removed, Priority 1; work to be carried out by 07/10/2020. |
| 000+06 Full Profile Down | Brickwork, Old Baffle Wall, 1.8m high x 1.8m wide. | | |

Balfour Beatty Rail, Manchester**Law Tunnel****ELR:DDN/12A****Examined:07/10/2019**

| Location | Defect | Photo | Action |
|-------------------------------|---|-------|---|
| 000+07 Crown Down | Stonework, spalling 200mm x 100mm x 75mm deep. | | Recommend stonework be replaced, Priority 3; work to be carried out by 07/10/2022. |
| 000+07 Mid Haunch Down | Stonework, spalling 300mm x 150mm x 200mm deep. | | Recommend stonework be replaced, Priority 3; work to be carried out by 07/10/2022. |
| 000+09 Sidewall Down | Water and sewage leaking into tunnel at base of sidewall, only a slight smell of sewage at this examination. | 14 | Recommend that water/sewage ingress be investigated and controlled, Priority 1; work to be carried out by 07/10/2020. |
| 001+00 to 021+00 Solum | Old corroded rails run intermittently throughout the tunnel along the middle of the solum. These were fixed to support timber which have now rotted away. | 15 | |
| 001+03 Full Profile Down | Brickwork, Old Baffle Wall, 1.8m high x 1.8m wide. | | |
| 001+09 Refuge Up | Brickwork, Arch, spalled, depth 75mm, open joints, depth 125mm, area 0.25sq.m. Rear of refuge is natural rock with stonework quoins. | 16 | Recommend brickwork be replaced, Priority 1; work to be carried out by 07/10/2020. |
| 001+09 Refuge Up | Stonework, North Quoin, spalled, depth 100mm, area 0.5sq.m. | 17 | Recommend stonework be repaired, Priority 1; work to be carried out by 07/10/2020. |
| 002+00 Full Profile Down | Brickwork, Old Baffle Wall, 1.8m high x 1.8m wide. | | |
| 002+00 Full profile Up & Down | View along tunnel looking northwards, prism array to lining throughout. | 18 | |
| 002+05 Full Profile Down | Brickwork, Old Baffle Wall, 1.8m high x 1.8m wide. | | |
| 003+03 Full Profile Down | Brickwork, Old Baffle Wall, 1.8m high x 1.8m wide. | | |
| 003+02 Sidewall Up | Stonework, window to top of sidewall, 380mm x 380mm x 300mm deep. | | |
| 004+00 Full Profile Down | Brickwork, Old Baffle Wall, 1.8m high x 1.8m wide. | | |

Balfour Beatty Rail, Manchester**Law Tunnel****ELR:DDN/12A****Examined:07/10/2019**

| Location | Defect | Photo | Action |
|-------------------------------|--|--------------------|--|
| 004+07 Full Profile Down | Brickwork, Old Baffle Wall, 1.8m high x 1.8m wide. | | |
| 005+03 Full Profile Down | Brickwork, Old Baffle Wall, 1.8m high x 1.8m wide. | | |
| 006+00 to 013+00 Solum Down | Rubbish and debris laid to Solum. | 19 & 20 | Recommend that rubbish/debris be removed, Priority 1; work to be carried out by 07/10/2020. |
| 006+01 Full Profile Down | Brickwork, Old Baffle Wall, 1.8m high x 1.8m wide. | 21 | |
| 006+08 Full Profile Up & Down | Brickwork, Diaphragm Wall constructed full width of the tunnel with a doorway to the upside. | 22 | |
| 009+09 Full Profile Up & Down | Brickwork, Diaphragm Wall constructed full width of the tunnel with a doorway to the upside. | 23 | |
| 010+00 Full Profile Down | Brickwork, Old Baffle Wall, 1.8m high x 1.8m wide. | | |
| 011+00 Crown Up & Down | Stonework, spalling, depth 50mm, area 0.25sq.m., sparse. | | |
| 011+03 Cess Down | Hole to solum. | 24 | Recommend that hole be filled in, Priority 1; work to be carried out by 07/10/2020. |
| 012+00 Crown Up & Down | Stonework, hollow, damp, area 1sq.m. | | |
| 013+00 Full Profile Up & Down | View along tunnel looking southwards, prism array to lining throughout. | 25 | |
| 013+04 Crown Up & Down | New 150mm dia. borehole from surface through tunnel crown. | 26 & 27 | |
| 013+04 Sidewall Up & Down | Stonework, several windows have been cut out, 150mm x 150mm x 150mm deep. | | |
| 013+04 Solum Up & Down | 300mm deep hole to solum reportedly made by the boring bit being dropped down the vent shaft during the recent boring works. | 28 | Recommend that hole to solum be filled in, Priority 1; work to be carried out by 07/10/2020. |

Balfour Beatty Rail, Manchester**Law Tunnel****ELR:DDN/12A****Examined:07/10/2019**

| Location | Defect | Photo | Action |
|--|--|--------------|---------------|
| 013+07 Crown Up & Down | Stonework, windows cut out, 450mm x 450mm x 300mm deep. | 29 | |
| 013+09 Crown & Haunch Up & Down | Stonework, open construction joint, damp. | | |
| 015+05 Sidewall Down | Stonework, base of sidewall, spalling, depth 50mm, area 0.5sq.m. | | |
| 019+00 Crown & Haunch Up & Down | Stonework, wet, 10sq.m. | | |
| 020+00 Full Profile Up & Down | Earth was ostensibly pushed southwards into the tunnel up to this point. | 30 | |
| 021+00 to Newtyle Portal, Full Profile Up & Down | View looking above partial infilling, bore filled to within 1m of the lining for as far as the eye can see, no access to the northern end of the tunnel - approx. a third of the length of the tunnel. | 31 | |

NOTES

1. Access route to structure: Via manhole.
2. Site issues and impediments to carrying out repairs, DE's or other works: Hidden portals. The tunnel is a confined space and is known to contain a significant quantity of carbon dioxide.
3. A blower fan and an extractor fan were both used to move the heavy gas out of the tunnel. The detailed examination was carried under Mines Rescue Services supervision.
4. Gas readings taken on arrival down manhole: -
CO2 = 7000ppm
Gas readings taken after venting with fans for two hours: -
CO2 = <5000ppm

STE2 STE6

Chartered Engineer:

Definitions

The following definitions and conventions were used in producing this report.

1.Description of Defects.

Defects have been described both in terms of their area and their proportion within that area. For example an area of spalled brickwork might be described as:-

Brickwork, spalling, depth 100mm, area 25m², medium.

In this example the spalling extends over a total area of 25m² and is of medium proportion of that area.

Proportional terms are defined below:-

Sparse - less than 10% of the area.

Light - between 10% and <35% of the area.

Medium - between 35% and <75% of the area.

Proportions of 75% and above are not qualified in any way.

2. Water Ingress.

Water percolation has been categorised as:-

Damp - discolouration of the surface, moist to touch but not dripping.

Wet - drops falling regularly.

Running - a continuous trickle of water.

Pressured - a jet of water.

3. Vegetation, Shrubs, Saplings and Trees.

Flora has been categorised as follows:-

Trees - number of trees and trunk girths.

Saplings - number of saplings.

Shrubs - area of shrubs.

Vegetation - area of plants, for e.g. brambles, ivy, etc.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: **DDN** Br. No.: **12A**

Mileage: **M** **ch** Sheet 1 of 18



SHAFT MANHOLE AT DUNDEE PORTAL



BOREHOLE VENT

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 2 of 18



Photo No.1: View of manhole cover removed and secondary safety plate underneath.



Photo No.2: View of manhole showing safe zone.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 3 of 18



Photo No.3: View of Mines Rescue personnel & tunnel engineer preparing to enter the manhole.



Photo No.4: View looking up the manhole.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 4 of 18



Photo No.5: Manhole Shaft, top of base section, brickwork, step fracture, length 207cm, max. width 3mm, new house foundations above.



Photo No.6: Manhole Shaft, top of base section, brickwork, step fracture, length 207cm, max. width 3mm, new house foundations above.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 5 of 18



Photo No.7: Dundee Portal, Stonework, a small section of the portal can still be seen adjacent to the manhole shaft bottom.



Photo No.8: New brickwork wall to base of manhole on entry to tunnel.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 6 of 18



Photo No.9: Stonework, damp and wet throughout with stalactites, area 80sq.m.

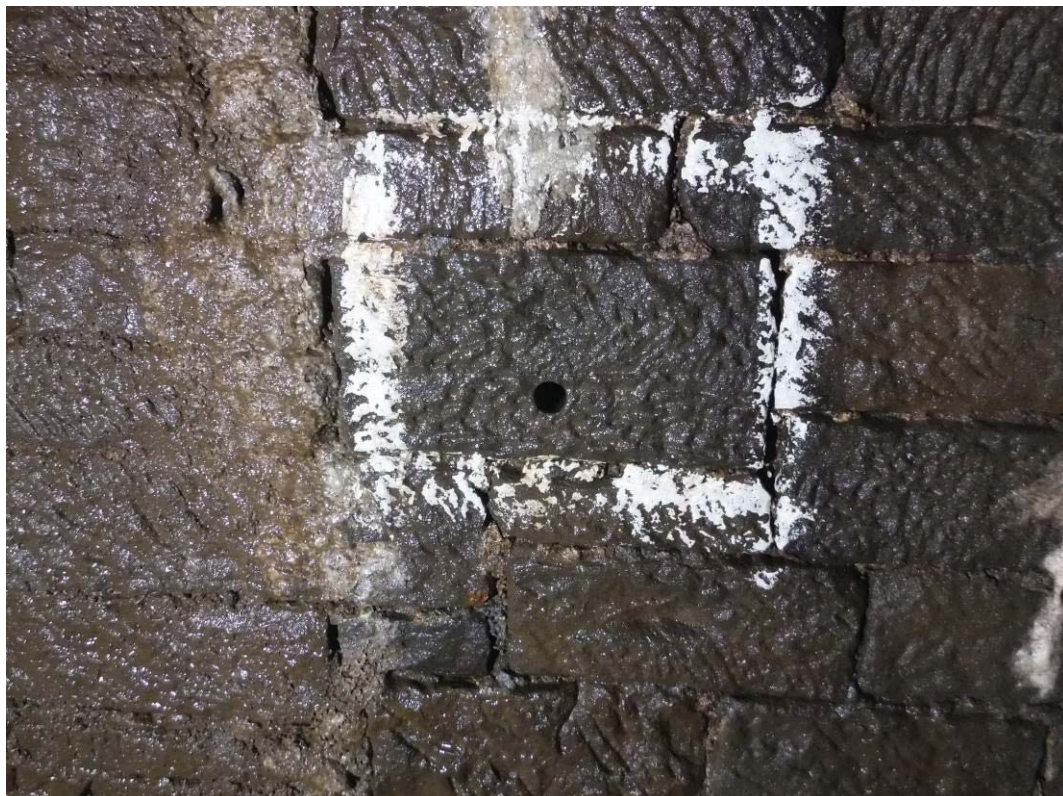


Photo No.10: Various 25mm core holes and surveying targets throughout the tunnel.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 7 of 18



Photo No.11: Stonework, construction joint, mortar missing, 100mm x 50mm x 50mm deep, with a circumferential fracture, length 5m, sealed with calcite to the upside and open to the downside, max. width 5mm, wet.



Photo No.12: Stonework, construction joint, mortar missing, 100mm x 50mm x 50mm deep, with a circumferential fracture, length 5m, sealed with calcite to the upside and open to the downside, max. width 5mm, wet.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 8 of 18



Photo No.13: Rubbish and fly-tipping laid to solum.



Photo No.14: Water and sewage leaking into tunnel at base of sidewall, only a slight smell of sewage at this examination.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 9 of 18



Photo No.15: Old corroded rails run intermittently throughout the tunnel along the middle of the solum. These were fixed to support timber which have now rotted away.



Photo No.16: Brickwork, Arch, spalled, depth 75mm, open joints, depth 125mm, area 0.25sq.m. Rear of refuge is natural rock with stonework quoins.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 10 of 18



Photo No.17: Stonework, North Quoin, spalled, depth 100mm, area 0.5sq.m.



Photo No.18: View along tunnel looking northwards, prism array to lining throughout.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 11 of 18



Photo No.19: Rubbish and debris laid to Solum.



Photo No.20: Rubbish and debris laid to Solum.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 12 of 18



Photo No.21: Brickwork, Old Baffle Wall, 1.8m high x 1.8m wide (typical example at 006+01).



Photo No.22: Brickwork, Diaphragm Wall constructed full width of the tunnel with a doorway to the upside.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 13 of 18



Photo No.23: Brickwork, Diaphragm Wall constructed full width of the tunnel with a doorway to the upside.



Photo No.24: Hole to solum.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 14 of 18



Photo No.25: View along tunnel looking southwards, prism array to lining throughout.

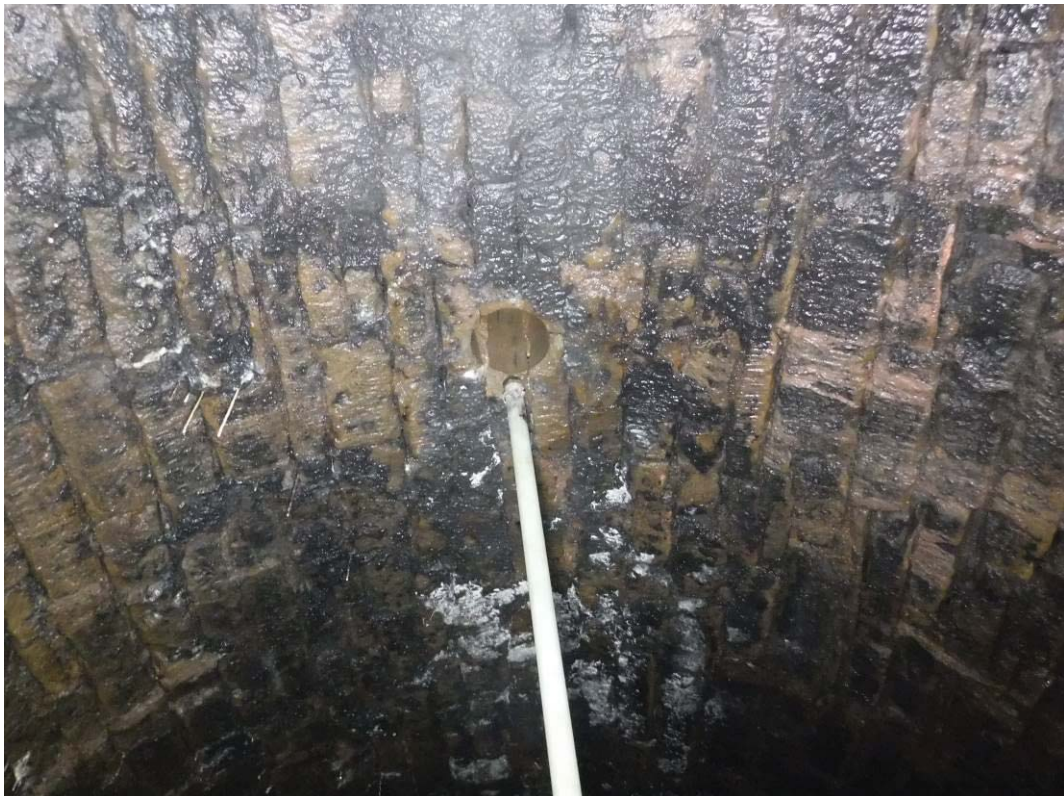


Photo No.26: New 150mm dia. borehole from surface through tunnel crown.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 15 of 18



Photo No.27: New 150mm dia. borehole from surface through tunnel crown.



Photo No.28: 300mm deep hole to solum reportedly made by the boring bit being dropped down the vent shaft during the recent boring works.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 16 of 18



Photo No.29: Stonework, windows cut out, 450mm x 450mm x 300mm deep.



Photo No.30: 020+00 Full Profile Up & Down, Earth was ostensibly pushed southwards into the tunnel up to this point.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: **DDN** Br. No.: **12A**

Mileage: **M** **ch** **Sheet 17 of 18**



Photo No.31: 021+00 to Newtyle Portal, Full Profile Up & Down, View looking above partial infilling, bore filled to within 1m of the lining for as far as the eye can see, no access to the northern end of the tunnel - approx. a third of the length of the tunnel.



Photo No.32: One of the roads carried by the tunnel.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: DDN Br. No.: 12A

Mileage: M ch Sheet 18 of 18



Photo No.31: One of the roads and the side of the church carried by the tunnel.



Photo No.32: Housing built over the tunnel.

Balfour Beatty Rail, Manchester

Talyllyn Tunnel

ELR:BND/03m 41ch

Examined:30/07/2019

Balfour Beatty Rail, Manchester

Detailed Examination Report for

Talyllyn Tunnel

ELR: BND/03m 41ch

Examined: 30/07/2019

Structures Examinations

Balfour Beatty Rail

Chaddock Lane

Worsley

Manchester

M28 1XW

Balfour Beatty Rail : Tunnel Examination Report

NAME: Talyllyn Tunnel

BETWEEN: Brecon and Dowlais (Merthyr Tydfil)

START MILEAGE: 03m 41ch

LENGTH: 680yds

REFERENCE: BND/03m 41ch

EXAMINED BY: Jackson David Wells (Licensed Bat Specialist)

METHOD: Foot/Poles

DATE OF EXAMINATION: 30/07/2019

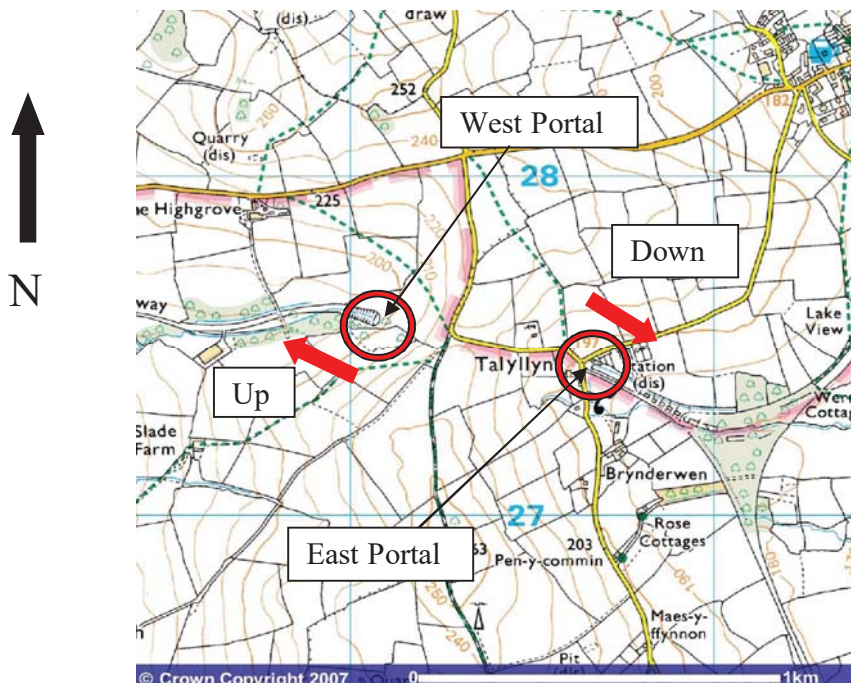
LAST EXAMINATION DATE: 30/07/2018

MARKERS AT: 22yds throughout the tunnel.

CONSTRUCTION: Stonework with relining repairs in brickwork.

O.S. Ref.: West Portal SO 100 275

O.S. Ref.: East Portal SO 106 274



Balfour Beatty Rail, Manchester**Tallylyn Tunnel****ELR:BND/03m 41ch****Examined:30/07/2019**

| Location | Defect | Action |
|---|--|---|
| 000+00 Solum Up & Down | East Portal, Solum on approach to the portal is flooded, maximum depth 200mm. | 1 Recommend water be controlled and drained, Priority 1; work to be completed by 30/07/2020. |
| 000+00 Portal Up | East Portal, Buttress, stonework, 2No. downpipes. | 2 Recommend down pipes be investigated with a view to removal, Priority 1; work to be completed by 30/07/2020. |
| 000+00 Portal Up & Down | East Portal, Stonework, open joints, depth 300mm, area 20sq.m., medium, one block displaced. | 3 Recommend mechanical pointing with a trowel finish, Priority 1; work to be completed by 30/07/2020. |
| 000+00 Portal Up & Down | East Portal, Stonework, vegetation & moss, area 10sq.m., medium. | |
| 000+00 Portal Up & Down | East Portal, unprotected lock. | 4 Recommend fit shroud, Priority 1; work to be completed by 30/07/2020. |
| 000+00 Portal Up & Down | East Portal, severely corroded hinges approaching end of serviceable life. | Recommend replace hinges, Priority 3; work to be completed by 30/07/2022. |
| 000+00 Portal Up & Down | Security Gates, oiling padlock. | 5 |
| 000+00 Portal Up & Down | Security Gates, oiling hinges. | 6 |
| 000+00 to 007+00 Solum Up & Down | Solum flooded maximum depth 200mm. | 7 Recommend water be controlled and drained, Priority 1; work to be completed by 30/07/2020. |
| 000+00 to 009+10 Full Profile Up & Down | Stonework, wet/damp, area 1600sq.m. | |
| 000+00 to 030+20 Crown & Haunch Up & Down | Several wedges are fitted throughout the tunnel most of these have now rotted away. | |
| 000+00 to 030+20 Full Profile Up & Down | Stonework & Brickwork, open joints and perished mortar throughout, depth 25mm, area 6000sq.m., sparse. | |
| 000+00 to 030+20 Sidewall Up & Down | Holes to top of sidewalls, potential bat roosting areas and left open. | |

Balfour Beatty Rail, Manchester**Talyllyn Tunnel****ELR:BND/03m 41ch****Examined:30/07/2019**

| Location | Defect | Action |
|---|---|--------|
| 001+00 to 002+00 Crown Up & Down | Stonework, wet/damp, area 44sq.m. | |
| 001+00 to 002+00 Crown Up & Down | Brickwork, open joints and damp, depth 50mm, area 22sq.m., sparse. | |
| 004+12 Refuge Down | Rubbish and old signalling equipment filling refuge. | |
| 005+00 to 006+00 Full Profile Up & Down | Stonework, calcite, area 220sq.m., medium. | |
| 007+00 to 008+00 Sidewall Up & Down | Stonework, calcite, area 44sq.m., medium. | |
| 009+10 Sidewall Down | Stonework, calcite, area 10sq.m., medium. | |
| 009+10 to 011+00 Full Profile Up & Down | Stonework, damp, area 300sq.m. | |
| 010+20 to 012+00 Sidewall Down | Stonework, calcite and wet, area 48sq.m., medium. | |
| 011+01 Sidewall Down | Base of sidewall, water running with calcite, area 1sq.m. | |
| 011+15 to 012+00 Full Profile Up & Down | Stonework, wet, area 50sq.m. | |
| 011+21 Sidewall Up | Stonework, perished mortar and wet, depth 25mm, area 10sq.m., medium. | |
| 015+10 Refuge Up | Rubbish and old signalling equipment filling refuge, this is being used as a bat roost. | |
| 016+00 to 018+00 Sidewall Up & Down | Stonework, damp, area 88sq.m. | |
| 017+00 to 018+00 Crown & Haunch Up & Down | Stonework, wet, area 180sq.m. | |
| 017+06 Sidewall Down | Stonework, perished mortar and damp, depth 25mm, area 2sq.m., medium. | |
| 019+00 Sidewall Down | Stonework, wet, area 4sq.m. | |

Balfour Beatty Rail, Manchester**Tallylyn Tunnel****ELR:BND/03m 41ch****Examined:30/07/2019**

| Location | Defect | Action |
|---|--|---|
| 019+02 Crown & Haunch Up & Down | Stonework, arch steps up 2" to the west. | |
| 019+14 Crown Up & Down | Bat box fitted to crown. | |
| 020+00 to 023+00 Full Profile Down | Stonework, damp, area 240sq.m. | |
| 020+09 Refuge Up | Railway metal lintel, heavily corroded/laminated. | Recommend lintel be replaced, Priority 3; work to be completed by 30/07/2022. |
| 020+20 Haunch Down | Pan and downpipe, working. | |
| 021+01 to 021+07 Full Profile Up & Down | Stonework, calcite and wet, area 12sq.m., medium. | |
| 021+08 High Haunch Down | Pan fitted, downpipe has become detached and is laid in down cess. | 8 Recommend downpipe be replaced, Priority 1; work to be completed by 30/07/2020. |
| 021+12 Crown & Haunch Up & Down | Stonework, arch steps down 2" to the west. | |
| 022+10- to 022+15 Full Profile Down | Stonework, calcite and wet, area 10sq.m., medium. | |
| 022+10 to 023+10 Crown Up & Down | Stonework & Brickwork, 1m wide strip, hollow, area 20sq.m. | |
| 022+11 Sidewall Down | Pan and downpipe, working. | |
| 023+00 to 024+00 Full Profile Up & Down | Stonework, damp, area 240sq.m. | |
| 023+07 to 024+02 Full Profile Up | Stonework, calcite and wet, area 34sq.m., medium. | |
| 023+12 to 024+00 Full Profile Down | Stonework, calcite and wet, area 16sq.m., medium. | |
| 023+20 High Haunch Down | 3No. Pans and downpipes, working. | |
| 024+00 to 025+00 Full Profile Up & Down | Stonework, damp, area 240sq.m. | |

Balfour Beatty Rail, Manchester**Tallylyn Tunnel****ELR:BND/03m 41ch Examined:30/07/2019**

| Location | Defect | Action |
|---|--|--|
| 024+11 Crown Up & Down | Stonework, missing block. | 9 Recommend block be replaced, Priority 1; work to be completed by 30/07/2020. |
| 025+00 to 025+08 Full Profile Up & Down | Stonework, wet, area 80sq.m. | |
| 025+00 to 025+12 Full Profile Up & Down | Stonework, calcite and wet, area 22sq.m., medium. | |
| 025+07 to 025+08 Full Profile Up & Down | Stonework, calcite and wet, area 10sq.m., sparse. | |
| 025+20 Sidewall Up | Stonework, top, boyot hole/putlog, missing block, loose blocks. | |
| 026+00 Sidewall Up | Stonework, perished mortar and damp, depth 25mm, area 12sq.m., medium. | |
| 026+00 to 028+00 Full Profile up & Down | Stonework, damp, area 480sq.m. | |
| 026+20 High Haunch Down | Pan and downpipe, working. | |
| 026+20 High Haunch Down | Stonework, wet, area 8sq.m. | |
| 027+10 Refuge Down | Stonework, calcite and damp to rear, area 2sq.m. | |
| 027+17 Sidewall Down | Stonework, perished mortar and damp, depth 25mm, area 10sq.m., medium. | |
| 028+00 029+00 Crown | Brickwork. | |
| 028+00 to 030+20 Full Profile Up & Down | Stonework, damp, area 300sq.m. | |
| 028+03 to 028+09 Crown Up & Down | Stonework, perished mortar and damp, depth 25mm, area 10sq.m., medium. | |
| 028+10 to 028+15 Sidewall Down | Stonework, perished mortar and damp, depth 50mm, area 8sq.m., sparse. | |

Balfour Beatty Rail, Manchester**Talylllyn Tunnel****ELR:BND/03m 41ch****Examined:30/07/2019**

| Location | Defect | Action |
|--|---|--|
| 028+10 to 028+15 Sidewall Up | Stonework, perished mortar and damp, depth 50mm, area 4sq.m., medium. | |
| 028+12 Sidewall Up | Stonework, missing block. | |
| 028+24 Refuge Down | Stonework, calcite and damp to rear, area 2sq.m. | |
| 029+10 to 030+10 Full Profile Up & Down | Stonework, calcite and damp, area 220sq.m., sparse. | |
| 030+18 Sidewall Down | Stonework, calcite and damp, area 1sq.m. | |
| 030+20 Portal Up & Down | Security Gate, oiling padlock. | 10 |
| 030+20 Portal Up & Down | Security Gate, oiling hinges. | 11 |
| 030+20 Portal Up & Down | West Portal, Stonework, vegetation, area 100sq.m., medium. | Recommend remove vegetation, Priority 3; work to be completed by 30/07/2022. |
| 030+20 Portal Up & Down | West Portal, Stonework, Stringcourse, spalling, depth 150mm, area 0.25sq.m. | |

Balfour Beatty Rail, Manchester

Talylyn Tunnel

ELR:BND/03m 41ch Examined:30/07/2019

NOTES

1. Access route to structure: Via farm track from High Green Farm.
2. Site issues and impediments to carrying out repairs, DE's or other works: Bats are usually present in the tunnel.

STE2 STE6

Chartered Engineer:

Definitions

The following definitions and conventions were used in producing this report.

1.Description of Defects.

Defects have been described both in terms of their area and their proportion within that area. For example an area of spalled brickwork might be described as:-

Brickwork, spalling, depth 100mm, area 25m², medium.

In this example the spalling extends over a total area of 25m² and is of medium proportion of that area.

Proportional terms are defined below:-

Sparse - less than 10% of the area.

Light - between 10% and <35% of the area.

Medium - between 35% and <75% of the area.

Proportions of 75% and above are not qualified in any way.

2. Water Ingress.

Water percolation has been categorised as:-

Damp - discolouration of the surface, moist to touch but not dripping.

Wet - drops falling regularly.

Running - a continuous trickle of water.

Pressured - a jet of water.

3. Vegetation, Shrubs, Saplings and Trees.

Flora has been categorised as follows:-

Trees - number of trees and trunk girths.

Saplings - number of saplings.

Shrubs - area of shrubs.

Vegetation - area of plants, for e.g. brambles, ivy, etc.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: **BND** Br. No.: **03m 41ch**

Mileage: **03 M 41 ch** Sheet 1 of 7



WEST PORTAL



EAST PORTAL

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: **BND** Br. No.: **03m 41ch**

Mileage: **03 M 41 ch** Sheet 2 of 7



Photo No.1: East Portal, Solum on approach to the portal is flooded, maximum depth 200mm.

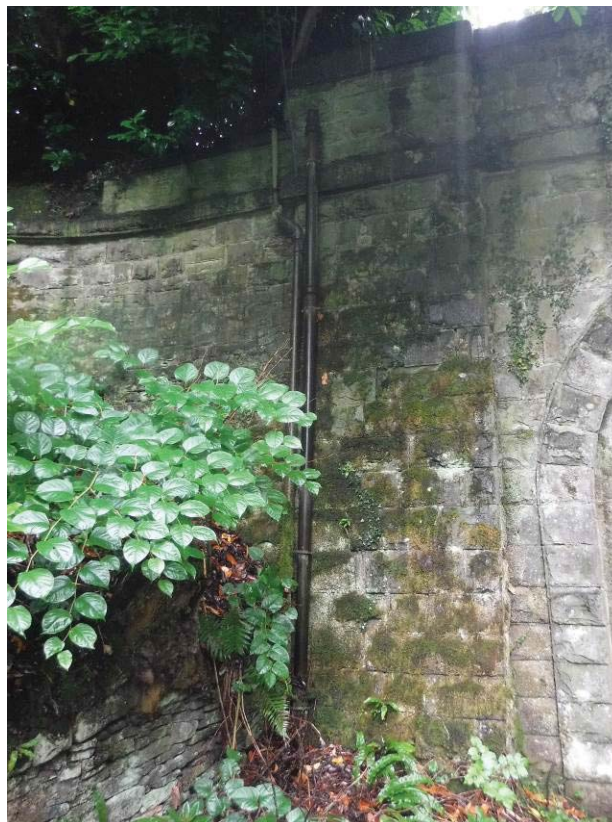


Photo No.2: East Portal, Buttress, stonework, 2No. downpipes.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: **BND** Br. No.: **03m 41ch**

Mileage: **03 M 41 ch** Sheet 3 of 7

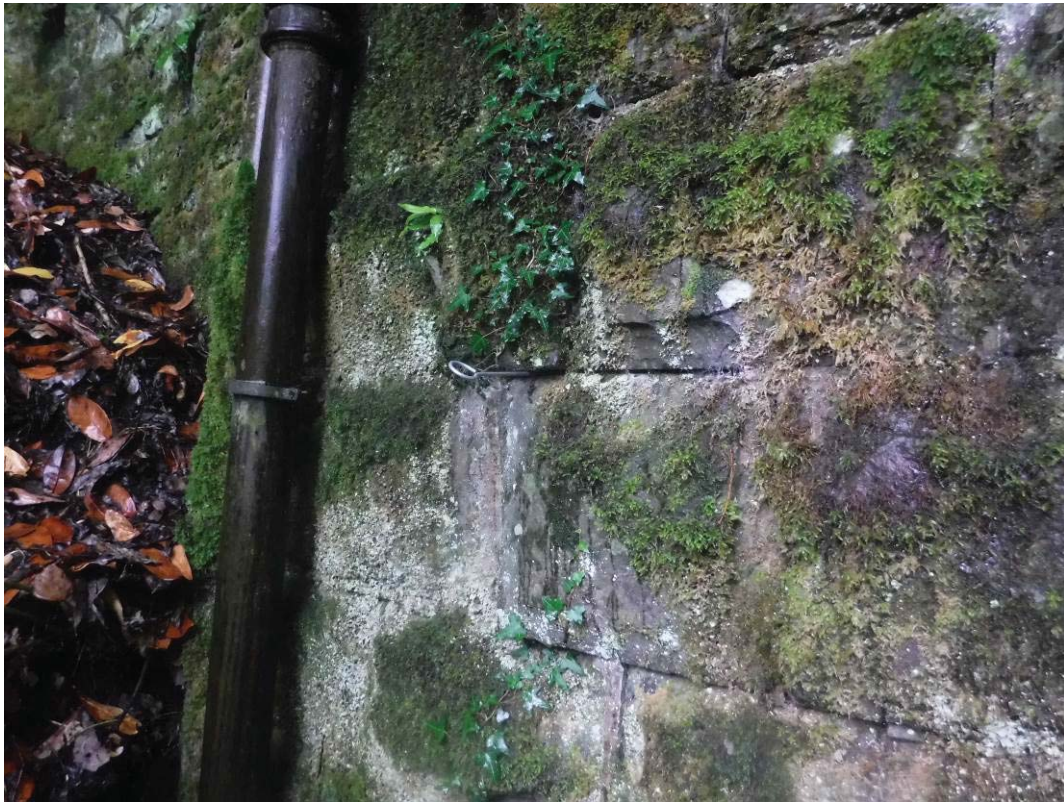


Photo No.3: East Portal, Stonework, open joints, depth 300mm, area 20sq.m., medium, one block displaced.

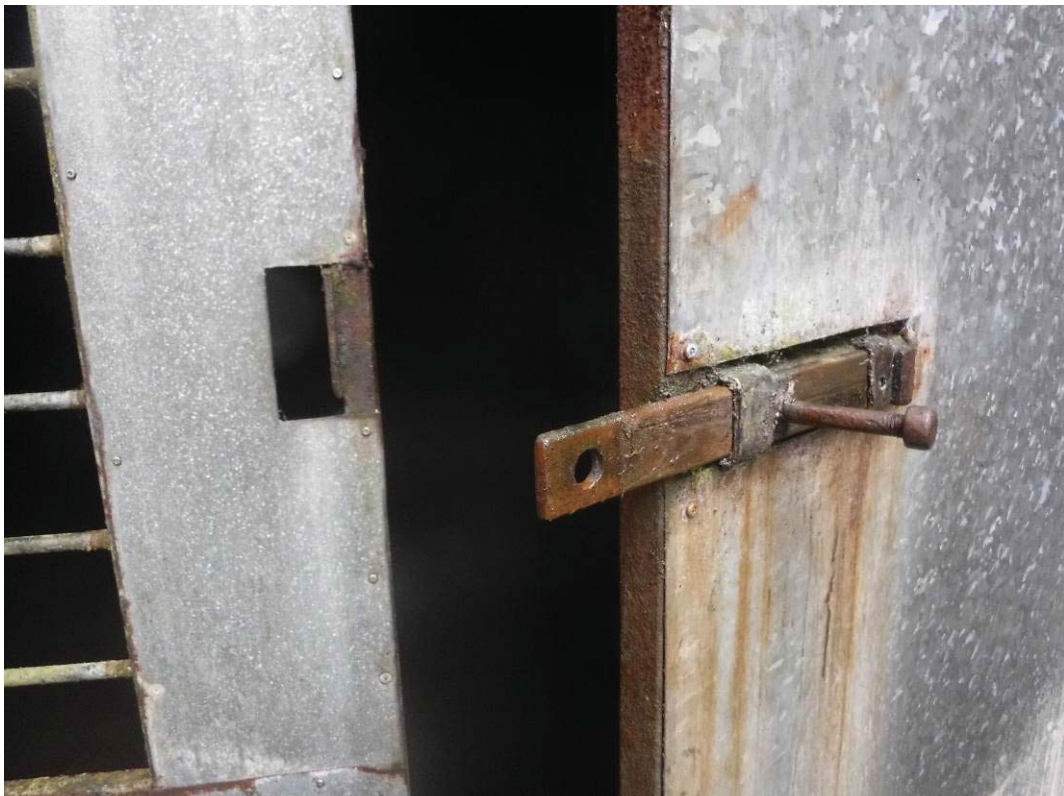


Photo No.4: 000+00 Portal Up & Down, East Portal, unprotected lock.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: **BND** Br. No.: **03m 41ch**

Mileage: **03 M 41 ch** Sheet 4 of 7



Photo No.5: 000+00 Portal Up & Down, Security Gates, oiling padlock.

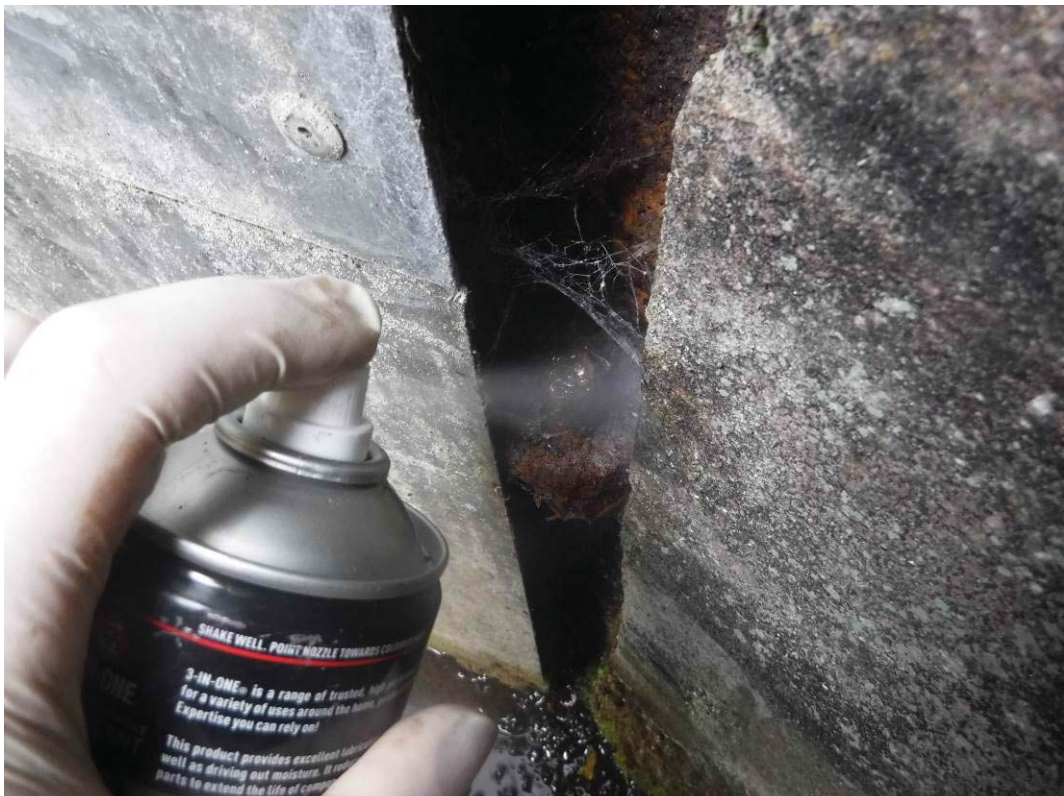


Photo No.6: 000+00 Portal Up & Down, Security Gates, oiling hinges.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: **BND** Br. No.: **03m 41ch**

Mileage: **03 M 41 ch** Sheet 5 of 7



Photo No.7: 000+00 to 007+00 Solum Up & Down, Solum flooded maximum depth 200mm.



Photo No.8: 021+08 High Haunch Down, Pan fitted, downpipe has become detached and is laid in down cess.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: **BND** Br. No.: **03m 41ch**

Mileage: **03 M 41 ch** Sheet 6 of 7



Photo No.9: 024+11 Crown Up & Down, Stonework, missing block.



Photo No.10: 030+20 Portal Up & Down, Security Gate, oiling padlock.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: **BND** Br. No.: **03m 41ch**

Mileage: **03 M 41 ch** Sheet 7 of 7



Photo No.11: 030+20 Portal Up & Down, Security Gate, oiling hinges.



Photo No.12: One of the roads carried by the tunnel.

Balfour Beatty Rail, Manchester
Graig (Pontypridd) Tunnel
ELR:CTD/160 **Examined:31/07/2019**

Balfour Beatty Rail, Manchester

Detailed Examination Report for

Graig (Pontypridd) Tunnel

ELR: CTD/160

Examined: 31/07/2019

Structures Examinations
Balfour Beatty Rail
Chaddock Lane
Worsley
Manchester
M28 1XW

Balfour Beatty Rail : Tunnel Examination Report

NAME: Graig (Pontypridd) Tunnel

BETWEEN: Cadoxton Junction and Trehafod Junction

START MILEAGE: 14m 17ch

LENGTH: 1325yds

REFERENCE: CTD/160

EXAMINED BY: Jackson David Wells (Licensed Bat Specialist)

METHOD: Foot/Poles

DATE OF EXAMINATION: 31/07/2019

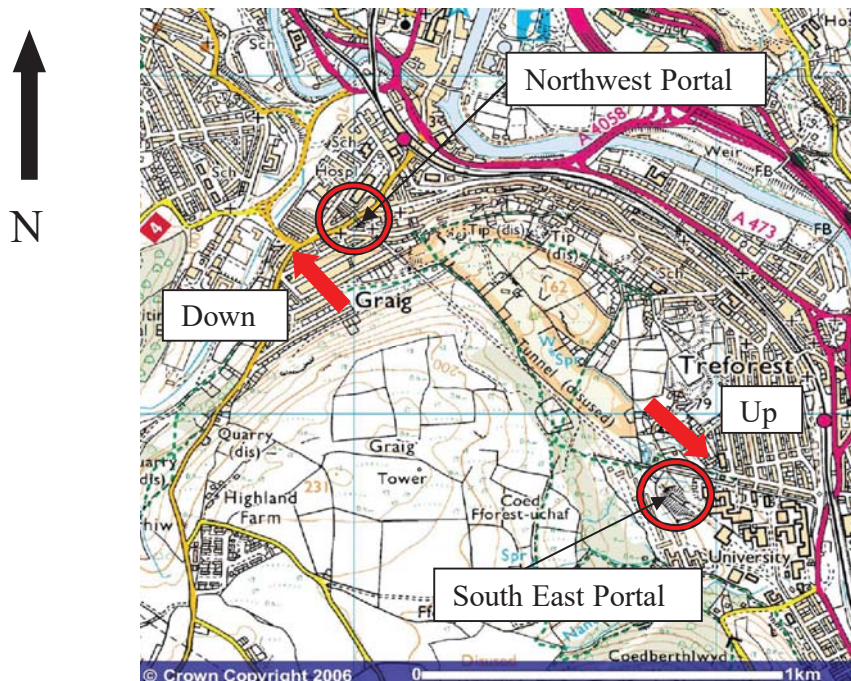
LAST EXAMINATION DATE: 31/07/2018

MARKERS AT: 66ft. throughout the tunnel.

CONSTRUCTION: Stonework portals with a brickwork arch and stonework sidewalls.

O.S. Ref.: Northwest Portal ST 070 896

O.S. Ref.: Southeast Portal ST 079 888



Balfour Beatty Rail, Manchester**Graig (Pontypridd) Tunnel****ELR:CTD/160****Examined:31/07/2019**

| New Location | Defect | Action |
|---|--|--|
| 000+00 Portal Up & Down | Northwest Portal, Gates cannot be opened from inside tunnel to allow access to the external face of the portal for examination purposes. | 1 Recommend contact 3rd party to provide access to padlock from inside tunnel, Priority 1; work to be completed by 31/07/2020. |
| 000+00 to 000+30 Full Profile Up & Down | Stonework/Brickwork, wet with soot deposits, area 200sq.m. | |
| 000+00 to 005+33 Solum Up & Down | Dumped debris. | 2 & 3 Recommend debris be removed, Priority 1; work to be completed by 31/07/2020. |
| 000+00 to 060+15 Full Profile Up & Down | Stonework/Brickwork, damp, area 28,000sq.m., light. | |
| 001+60 to 004+20 Full Profile Down | Stonework/Brickwork, wet, area 1000sq.m., medium. | |
| 002+00 to 002+24 Full Profile Up & Down | Steel ribs fitted with substantial loss of section and appears to support nothing as timbers have rotted away. | 4 Recommend ribs be removed and area above which is unsupported be checked for stability, Priority 1; work to be completed by 31/07/2020. |
| 002+06 to 002+30 Haunch Down | Brickwork, haunch failed with missing bricks, hanging bricks, distorted profile, hollow, area 8sq.m. | 5 Recommend replace brickwork, Priority 1; work to be completed by 31/07/2020. |
| 002+18 Refuge Up | 14¼ MP | |
| 002+55 to 003+05 Haunch Up | Brickwork, open bedding joint, length 5m. | |
| 003+35 Sidewall & Haunch Up | Stonework/Brickwork, calcite and wet, area 5sq.m. | |
| 004+10 Haunch Up & Down | Brickwork, 4No. boyot holes. | |
| 005+05 Haunch Up & Down | Brickwork repair not tied in to existing lining. | |
| 005+30 to 012+24 Full Profile Up & Down | Fibre reinforced sprayed concrete added to lining in c.2012/13, damp and cracked in places. | |
| 007+45 Refuge Up | Shotcrete, wet, area 2sq.m. | |

Balfour Beatty Rail, Manchester**Graig (Pontypridd) Tunnel****ELR:CTD/160****Examined:31/07/2019**

| New Location | Defect | | Action |
|---|---|-----------|---|
| 007+55 Solum Down | Open pit to six-foot area of solum. | 6 | Recommend open pit be covered, Priority 1; work to be completed by 31/07/2020. |
| 008+45 to 009+00 Full Profile Up & Down | Steel ribs, substantial loss of section and appear to support nothing as timbers have rotted away. | 7 | This area in now covered in sprayed concrete. |
| 009+00 Sidewall Up | Tablet Nos.9, 10, 11 & 12 have been replaced in wrong position during the shotcrete works. | 8 | Recommend reposition to correct locations, Priority 1; work to be completed by 31/07/2020. |
| 009+03 Solum Down | Hole to solum with standing water, partially filled with sprayed concrete rebound. | 9 | Recommend hole be cleared of concrete, unblocked and covered, Priority 1; work to be completed by 31/07/2020. |
| 010+00 to 010+50 Full Profile Up & Down | 2No. sections of steel ribs, substantial loss of section and appear to support nothing as timbers have rotted away and are loose. | 10 | This area in now covered in spray concrete. |
| 011+21 Refuge Down | Rear Wall, shotcrete, wet & ochre, area 1sq.m. | | |
| 011+50 to 047+40 Solum Up & Down | Flooding throughout the tunnel, max. depth encountered was 300mm on the day. | 11 | Recommend remove water and clear drain, Priority 1; work to be completed by 31/07/2020. |
| 012+21 Solum Up & Down | Fence and gate. | 12 | |
| 012+21 Solum Up & Down | Oiling padlock. | 13 | |
| 012+21 Solum Up & Down | Oiling gate hinges. | 14 | |
| 047+40 Solum Up & Down | Fence and gate. | 15 | |
| 047+40 Solum Up & Down | Oiling padlock. | 16 | |
| 047+40 Solum Up & Down | Oiling gate hinges. | 17 | |

Balfour Beatty Rail, Manchester**Graig (Pontypridd) Tunnel****ELR:CTD/160****Examined:31/07/2019**

| New Location | Defect | Action | |
|--|--|--------|--|
| 047+40 to 060+15 Solum Up & Down | Flooding throughout the tunnel with a stream flowing towards the Northwest Portal, max. depth encountered was 300mm on the day. | 18 | |
| 048+45 Refuge Down | Brickwork, both quoins, spalling and hollow, depth 100mm, area 1sq.m. Refuge has been sealed with breeze blocks but spalling and hollowness are still present to quoins. | 19 | Recommend replace brickwork, Priority 1; work to be completed by 31/07/2020. |
| 049+05 Crown Up & Down | Brickwork, spalling, depth 75mm, area 2sq.m. | 20 | Recommend replace brickwork, Priority 1; work to be completed by 31/07/2020. |
| 050+00 Low Haunch Up | Brickwork, longitudinal fracture in bedding joint, length 5yds, bulge, hollow, area 5sq.m. | | |
| 050+63 Mid Haunch Down | Brickwork, hollow, area 4sq.m., includes recently repaired patch of brickwork. | | |
| 051+00 to 060+15 Full Profile Up & Down | Construction joints have been pointed through this area and datals fitted at random by 3rd party. | | |
| 051+55 Haunch Up | Brickwork, new spalling knocked off by third party, depth 75mm, area 2sq.m., hollow at top, area 0.5sq.m. | | Recommend replace brickwork, Priority 2; work to be completed by 31/07/2021. |
| 051+62 Refuge Down | Brickwork, arch, spalling, depth 75mm, area 0.5sq.m., medium. Refuge now sealed with breeze blocks but spalling is still present to arch. | | Recommend replace brickwork, Priority 3; work to be completed by 31/07/2022. |
| 052+00 to 060+15 Full Profile Up & Down | Stonework/Brickwork, damp/wet, area 3000sq.m. | | |
| 053+45 Refuge Down | Brickwork, arch, spalling, depth 100mm, area 0.5sq.m. Refuge now sealed with breeze blocks but spalling is still present to arch. | 21 | Recommend replace brickwork, Priority 1; work to be completed by 31/07/2020. |

Balfour Beatty Rail, Manchester**Graig (Pontypridd) Tunnel****ELR:CTD/160****Examined:31/07/2019**

| New Location | Defect | Action |
|---------------------------------|--|--|
| 056+30 Refuge Up | Brickwork, arch, spalling, depth 50mm, area 1sq.m., sparse. This is now sealed with breeze blocks. | |
| 056+55 Refuge Down | Brickwork, arch, spalling, depth 50mm, area 0.5sq.m., medium. This is now sealed with breeze blocks but spalling is still present. | |
| 057+25 Refuge Up | Brickwork, arch, spalling, depth 25mm, area 0.5sq.m. This is now sealed with breeze blocks but spalling is still present. | |
| 058+14 Refuge Up | Brickwork, arch, spalling, depth 75mm, area 1sq.m., light. | Recommend replace brickwork, Priority 3; work to be completed by 31/07/2020. |
| 058+33 Mid Haunch Up | Brickwork, bulge, hollow, area 6sq.m. | |
| 059+02 Low Haunch Down | Brickwork, spalling, depth 75mm, area 3sq.m., sparse. | |
| 059+07 Crown & Haunch Up & Down | Brickwork, arch steps down (max. c.3ft. at apex) through to the Northwest Portal. | |
| 059+64 Low Haunch Down | Brickwork, spalling, depth 25mm, area 0.5sq.m., wet. | |
| 060+14 Sidewall Up & Down | Brickwork, 2No. datals 20/05/1987, hairline cracks, on upside 2No. Fractures extend to cess below repointing, max. width 3mm. | |
| 060+15 Portal Up & Down | Northwest Portal, oiling padlock. | 22 |
| 060+15 Portal Up & Down | Northwest Portal, oiling gate hinges. | 23 |
| 060+15 Portal Up & Down | Northwest Portal, New steel doors cannot be opened/locked from inside tunnel. | 24 Recommend provide access to padlock, Priority 1; work to be completed by 31/07/2020. |
| 060+15 Portal Up & Down | Northwest Portal, Stonework, vegetation & shrubs overhanging copings, area 8sq.m. | Recommend remove vegetation, Priority 3; work to be completed by 31/07/2022. |

Balfour Beatty Rail, Manchester**Graig (Pontypridd) Tunnel****ELR:CTD/160****Examined:31/07/2019**

| New Location | Defect | | Action |
|---------------------|--|-----------|--|
| 060+15 Portal Down | Northwest Portal, Curved Wingwall, stonework, loose blocks pushing forward and open joints, depth 100mm, area 25sq.m., medium. Top hidden by vegetation. | 25 | Recommend remove vegetation, reset blocks and repoint, Priority 1; work to be completed by 31/07/2020. |
| 060+15 Portal Up | Northwest Portal, Curved Wingwall, stonework, bedding joints, open joints, depth 100mm, area 20sq.m., light. | | Recommend mechanical pointing, Priority 3; work to be completed by 31/07/2022. |
| 060+15 Portal Up | Northwest Portal, Curved Wingwall, stonework, missing block at ground level. Hidden by vegetation & trees. | 26 | Recommend recover and reset block, Priority 1; work to be completed by 31/07/2020. |
| 060+15 Portal Up | Northwest Portal, Brickwork, Arch rings at base, deep open joints and possible old standing fracture through mortar, plus cracked bricks on return. | | Recommend rebuild brickwork, Priority 3; work to be completed by 31/07/2022. |
| 060+15 Portal Down | Northwest Portal, 3rd party ladder above wingwall ostensibly from property above, reason unknown, visible attraction to kids, hazard. | 27 | Recommend contact adjacent land owner and remove ladder from DfT property, Priority 1; work to be completed by 31/07/2020. |
| 060+15 Portal Up | Northwest Portal, Retaining Wall above wingwall, stonework, hidden by vegetation. | 28 | Recommend investigate ownership and add to CBL, Priority 1; work to be completed by 31/07/2020. |
| 060+15 Portal Down | Northwest Portal, Retaining Wall above wingwall, stonework, hidden by vegetation. | 29 | Recommend investigate ownership and add to CBL, Priority 1; work to be completed by 31/07/2020. |

NOTES

1. Access route to structure: Via university and hospital.
2. Site issues and impediments to carrying out repairs, DE's or other works: Underfoot conditions are poor with flooding, open catch-pits, ghost sleepers, fallen brickwork and other debris.
3. A detailed examination was carried out under site supervision of our licensed bat specialist.

STE2 STE6
Chartered Engineer:

Definitions

The following definitions and conventions were used in producing this report.

1.Description of Defects.

Defects have been described both in terms of their area and their proportion within that area. For example an area of spalled brickwork might be described as:-

Brickwork, spalling, depth 100mm, area 25m², medium.

In this example the spalling extends over a total area of 25m² and is of medium proportion of that area.

Proportional terms are defined below:-

Sparse - less than 10% of the area.

Light - between 10% and <35% of the area.

Medium - between 35% and <75% of the area.

Proportions of 75% and above are not qualified in any way.

2. Water Ingress.

Water percolation has been categorised as:-

Damp - discolouration of the surface, moist to touch but not dripping.

Wet - drops falling regularly.

Running - a continuous trickle of water.

Pressured - a jet of water.

3. Vegetation, Shrubs, Saplings and Trees.

Flora has been categorised as follows:-

Trees - number of trees and trunk girths.

Saplings - number of saplings.

Shrubs - area of shrubs.

Vegetation - area of plants, for e.g. brambles, ivy, etc.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

Balfour Beatty
Rail

ELR: CTD Br. No.: 160

Mileage: 14 M 17 ch Sheet 1 of 17



SOUTHEAST PORTAL



NORTHWEST PORTAL

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CTD Br. No.: 160

Mileage: 14 M 17 ch Sheet 2 of 17



Photo No.1: Northwest Portal, Gates cannot be opened from inside tunnel to allow access to the external face of the portal for examination purposes.



Photo No.2: 000+00 to 005+33 Solum Up & Down, Dumped debris.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CTD Br. No.: 160

Mileage: 14 M 17 ch Sheet 3 of 17



Photo No.3: 000+00 to 005+33 Solum Up & Down, Dumped debris.



Photo No.4: 002+00 to 002+24 Full Profile Up & Down, Steel ribs fitted with substantial loss of section and appears to support nothing as timbers have rotted away.

**TUNNEL EXAMINATION REPORT
PHOTOGRAPHS OF STRUCTURE**

ELR: CTD Br. No.: 160

Mileage: 14 M 17 ch Sheet 4 of 17

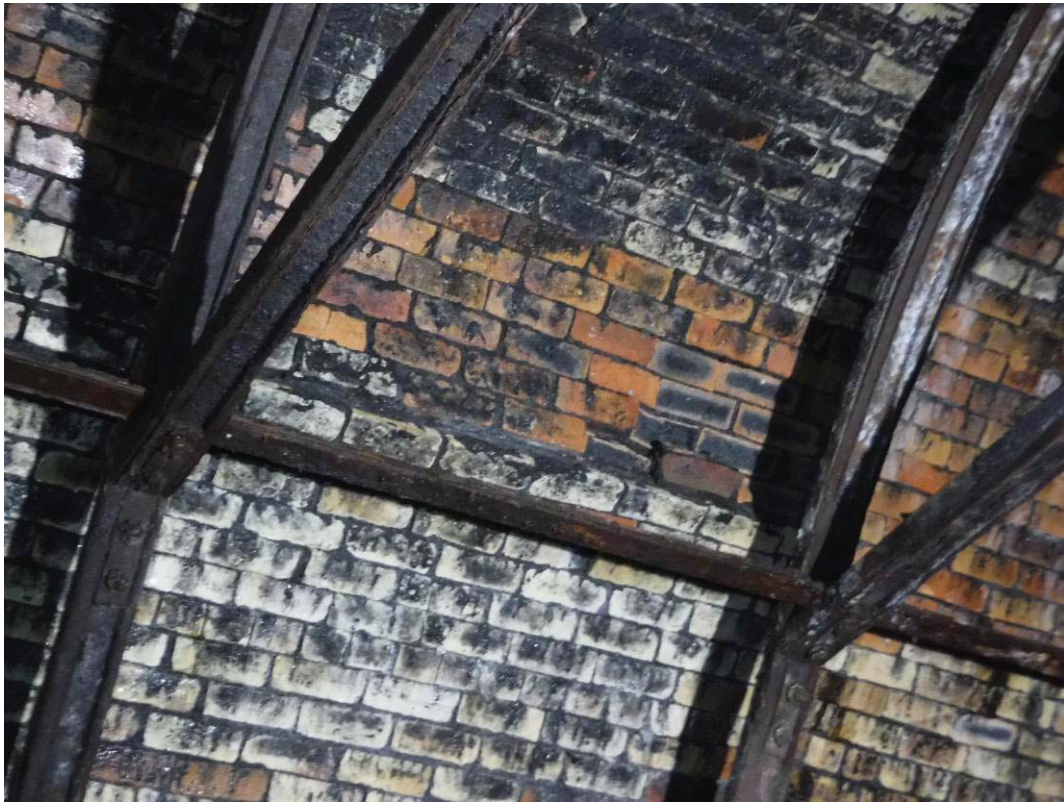


Photo No.5: 002+06 to 002+30 Haunch Down, Brickwork, haunch failed with missing bricks, hanging bricks, distorted profile, hollow, area 8sq.m.



Photo No.6: 007+55 Solum Down, Open pit to six-foot area of solum.