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Part 21: Design Summary for Restoration Section 9: Wales

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21 Design Summary for Restoration Section 9: Wales

21.1 Overview

Gaining a route under the M1 & Replacing the Norwood Tunnel

- 21.1.1 The Wales Section commences at the Western portal of the Norwood Tunnel and extends eastward to the western edge of the former Kiveton Colliery Site.
- 21.1.2 The major problems facing this length are the replacement of the collapsed Norwood Tunnel and achieving a passage under the M1 Motorway which now runs above and across the tunnel site. To determine the best solution a feasibility and outline design study was commissioned from Arup in 2007 (Arup 2008).
- 21.1.3 The Arup study demonstrated that the western portion of the Norwood Tunnel cannot reasonably be restored – some sections have collapsed, others were infilled by the National Coal Board and one length was injection grouted when the M1 was built.
- 21.1.4 Arup examined four alternatives and concluded that the most cost effective and sustainable option for replacing the tunnel was the construction of a new surface route. This is possible because the tunnel lies at a very shallow depth (barely 4m or 12ft below ground surface) and there is an existing farm underpass suitable for conversion to canal channel. Arup noted that a similar conversion had been successfully carried out on the Rochdale Canal during restoration in the 1990's.
- 21.1.5 Arup made recommendations for further work. The proposals here reflect the development of the Arup proposals in the light of that work.
- 21.1.6 The current plan for the Wales restoration section has a new length of canal channel leaves the original line on the off bank around 75 m from the standing West Portal of the Norwood Tunnel. The new line will be carried in shallow cutting to the south of the tunnel entrance wing wall.
- 21.1.7 The towpath will be carried up and around the top of the original Norwood Tunnel mouth across the site once occupied by the Tunnel Keepers cottage and the towing horse stables. The towpath will then rejoin the north bank of the waterway.
- 21.1.8 After 50 m the cutting will deepen and enter the first of the “Norwood Extension Locks”. A bridge over the lock tail will maintain connectivity between the towpath and the public right of way extending south through the Nor Wood to Killamarsh.
- 21.1.9 The Norwood Extension Locks consist of two three-rise locks. The first is the Norwood High Treble Locks (No.'s 19a, 19b and 19c). At the top of this multiple lock the canal enters a short pound and the canal track turns slightly before entering the second three rise group – the Norwood Top Treble Locks (No.'s 19d, 19e and 19f). At the top of the second group the canal turns north-east and reaches the west entrance to the farm underpass below the M1 Motorway.

- 21.1.10 There are two options to the use of the underpass. The simplest involves foundation underpinning, excavation of the farm track surface and insertion of a new canal channel. The towpath would run beside the water channel.
- 21.1.11 The second option involve deep piling beneath the underpass, excavation and the insertion of a concrete culvert at depth followed by re-filling to the current surface level. The culvert would only large enough for single boat and the towpath would pass through the underpass above the canal.
- 21.1.12 This option would require longer cuttings on both east and west flanks of the ridge but would reduce the number of locks by four (2 up and 2 down), extend the summit pound and increase water storage. It would also allow the underpass to be retained for farm traffic.
- 21.1.13 The second option obviously requires more complex civil engineering but the increased cost can be balanced by a reduction in lock construction costs and long term reductions in maintenance costs. It should be noted that the two options do not affect the horizontal alignment of the canal and the track required is the same.
- 21.1.14 On the eastern side of the motorway the canal would run for a short distance a shallow cutting before running on or around the current ground surface. A foot and cycleway bridge over the canal maintains rights of way connectivity.
- 21.1.15 The new summit pound will be relatively short irrespective of which option is adopted. To increase water storage two new side ponds will be created on the off bank. These will also form new off-line wetland nature reserves. The ponds will link, via separate feeders, to the main canal channel to the east and west of a single flood-gate / lock gate. This will be counterbalanced to swing closed after use and will divide the waters in the western and eastern halves of the section. This is intended to ensure separation of the waters of the Rother and Idle catchments in line with the catchment management strategy of the Environment Agency.
- 21.1.16 Beyond the ponds, at the eastern end of this short summit pound, the canal will run onto a short length of low embankment before descending a two-rise staircase lock.
- 21.1.17 At the tail of the lock flight a minor bridge will carry Coalpit Lane over the canal. The route them follows a gently sinuous course across a relatively level area following the edges of the existing field layout. The route proposed utilises the approximate line of existing field edge drains and adopts the extant hedge line as the off-bank boundary.
- 21.1.18 At the western edge of the former Kiveton Colliery Tip (now reclaimed and landscaped as amenity woodlands and country park) the canal descends via a further two locks in a staircase configuration (the Wales Double Locks). Below the locks the canal will be at the Kiveton Waters pound level.
- 21.1.19 A tail-bridge below the locks (Wales Bridge) provides a foot & cycle-path connection between Wales/Kiveton, the community woodlands and Harthill. At this point drainage for the tip is received having been filtered in a reedbed to remove sediment and improve water quality.
- 21.1.20 Beyond this point the canal enters the Kiveton Park section.

21.2 Environment & Ecology

Issues

- 21.2.1 **Norwood Tunnel East Portal:** The western portal of the Norwood Tunnel is bricked up but the blocking has a single rectangular opening. The opening has allowed the tunnel to be used as a bat roost.
- 21.2.2 The channel leading to the portal is in water and although no water vole has been reported in this location, they are present in the upper pond immediately below this level and it is likely that they will be present here also.
- 21.2.3 **Nor wood Margin:** The transition from the original line to the diversionary route takes place on the edge of Nor Wood. This area of partially replanted ancient woodland is an important and diverse habitat. Works within the woodland will require the clearance of a small area of existing plantation woodland (approximately 25m by 20m). The greatest potential damage is to a small area of woodland margin habitat which contains significant diversity.
- 21.2.4 The Nor Wood is host to several protected species including badgers and bats. The area required for works contains no known badger sett or bat roost. This will be confirmed by detailed survey prior to seeking planning permission.
- 21.2.5 **Summit Pound & Summit Ponds:** The new alignment passes along a field margin of moderate diversity and will follow, and incorporate, an existing field drain. The field drain is steep sided and the water is generally well shaded by surrounding vegetation - a tall grass/herb community. There are no records of water vole on this section (and no evidence of their presence such as latrines, were observed during the walk over survey) however, their presence may be expected as they are frequent on both the Norwood Section and the restored canal at Kiveton Park.
- 21.2.6 The surrounding agricultural land is of low biodiversity.

Mitigation & Enhancement

- 21.2.7 **Norwood Tunnel East Portal:** restoration plans have diverted the new canal route south of the original portal. This will enable the eastern portal to remain undisturbed as a bat roost. The structures on the diversion will incorporate bat roosting bricks and niches.
- 21.2.8 The original canal channel will be partially dredged and separated from the new channel by a series of wooden posts to prevent entry by boats. This will enable the old channel to develop as a off-line reserve which will provide excellent conditions for water vole.
- 21.2.9 **Nor Wood Margin:** All works in the area of woodland will be undertaken in winter and early spring. Sequential vegetation removal and installation of mammal fences around the work site, together with capture and release, will ensure no loss of small mammals.
- 21.2.10 There will be a loss of plantation woodland. Cleared trees will be replaced by an equal area of native woodland planting which will be extended along the canal off-bank outside the original area of the woodland. As the key threatened habitat is the woodland margin this should increase the areas of margin type habitat. Soil from the construction area will be cleared and stockpiled separately and will be used to

re-soil the margins of the completed works. The contained seed-bank should encourage rapid growth of field layer plants.

- 21.2.11 Canal bank construction will employ soft banks and, wherever possible, reed-shelves, suitable for water vole and water fowl.
- 21.2.12 Wherever possible new structures, such as bridges, will incorporate bat bricks and roosting niches. During landscaping attention should be given to creating areas suitable for badger setts.
- 21.2.13 The reinstatement of the canal will provide an opportunity to improve the ecological management of the Nor Wood, possibly through some form of stewardship or management agreement. This may include the gradual removal and replacement of non-native species with native trees and the creation of minor clearings to increase woodland margin habitats. The woods are a popular local walking location and there are opportunities to engage the local community in their maintenance and management.
- 21.2.14 **Summit Pound & Summit Ponds:** A detailed water vole survey will be undertaken prior to seeking planning permission. The construction of the new alignment will take every precaution to prevent damage to water vole populations through the use of temporary exclusion, sequential vegetation removal and mammal proof fencing. A vole management plan will be agreed before commencement of works with English Nature and all work will be undertaken by appropriately qualified and licensed contractors.
- 21.2.15 A similar survey will be undertaken for Great Crested Newt and, if present, a management plan will be produced prior to seeking planning permission.
- 21.2.16 The new lengths of canal and side ponds will occupy land which is currently used for agriculture. They will diversify the habitats and create a migration corridor linking east and west sections of the canal.
- 21.2.17 The new canal provides a natural extension of the Kiveton Community Woodlands Park and there are opportunities for linking with the volunteer groups already active in the park.

21.3 Archaeology & Heritage

Key Features

- 21.3.1 The key features relate to the Norwood Tunnel and to coal mining.
- 21.3.2 The Western Portal of the Norwood Tunnel lies at the western end of the section – The tunnel level summit pond is still in water and this runs up to foot of the blocking wall. The curtain wall is visible and in reasonable condition with no obvious indications of immanent collapse. Much of area round the wall is overgrown especially in the summer. For example, the site of the Tunnel Keepers cottage and the stables to the left and above the tunnel entrance can only be seen in the winter when the vegetation is low.
- 21.3.3 The tunnel entrance is infilled with red brick with a single rectangular opening in the middle of the blocking wall. This opening is closed with a series of vertical bars.

Through the bars it is possible to see that the tunnel roof has collapsed into the passage space within approximately 5 to 10 metres of the opening.

- 21.3.4 East of the Portal the original line of the Norwood Tunnel runs under the entire section. The tunnel is shallow and largely collapsed in this area. The construction shafts and other surface features were infilled and obliterated in this section by the National Coal Board during the 1980's (Structural Perspectives 2007).

Proposed Treatment

- 21.3.5 The tunnel portal site will be sensitively cleared of excess vegetation and a programme of woodland management initiated to sensitively control tree growth which could damage the historic fabric.
- 21.3.6 The remaining foundation features of the Toll Cottage and Stables block will be consolidated and stabilised (not rebuilt). On site interpretation will be used to explain the significance of the remains.
- 21.3.7 No surface remains of the construction shafts and brick kilns re visible, should any be located during the works, these should be recorded and if possible consolidated for display as they will add to the story of the tunnel and its construction.
- 21.3.8 The second group of features relate to coal mining. The area adjacent to Coalpit Lane is a known area of early post-mediaeval coal mining, probably using bell pits. This may have had medieval precursors. Other marks on air photographs may also relate to early mining. No remains are visible on the surface but construction this new length of canal offers an opportunity to explore and record them in detail.
- 21.3.9 The Coalpit Lane site offers an opportunity to present information about the origins of the coal industry in the area and to relate it to the later collieries at Norwood, West Kiveton and Kiveton Park. A mining history trail is a future aspiration.

21.4 Economic & Social Regeneration

- 21.4.1 The eastern half of the Wales section is essentially a rural link between two higher density development areas.
- 21.4.2 While parts of the eastern half and adjacent water storage ponds may be developed as fishing ponds the economic contribution will be limited. As the key east-west link it is nonetheless essential to realising the economic benefits of the restoration as a whole and provides the green space which is essential to the development of the canal corridor.
- 21.4.3 The western half of the Wales section may provide more tangible economic benefits through canal side housing development.
- 21.4.4 The allocation of housing development areas within Rotherham is still under discussion and no decisions have been taken. Nonetheless, we note that in some allocation models additional housing is allocated to Wales & Kiveton Park. The prospective development areas lie between the recent housing on the south side of Wales and the proposed canal line. There is therefore long-term potential for canal side housing development along the eastern half of this section (with a small amount of potential in the adjacent Kiveton Park section). As waterside housing can

command premiums of between 15 and 30% over non-waterside housing the reinstatement of the canal may be of great benefit in helping to drive housing regeneration and in raising design standards.

21.5 Planned Works

Canal Track & Channel

- 21.5.1 The canal channel is unconstrained by adjacent structures and it is possible to engineer a channel with soft banks on both sides and in many places a generous reed-shelf.
- 21.5.2 To increase water storage capacity one or more side ponds will be constructed. These will not be navigable and will also function as nature reserves.
- 21.5.3 As this is the summit pound there is a need to reduce leakage and prevent possible bank failure in consequence the Bentomat and concrete block channel liner system will be employed.

Utilities

- 21.5.4 There are no utility crossings or modifications required to accommodate the canal in this section. The route is crossed by one medium voltage overhead power cable in the vicinity of Coalpit Lane. This will not require modification, although the presence of overhead cables will place restrictions on machinery use in the immediate vicinity of the line.

Bridges

- 21.5.5 This section has one major existing bridge to be modified, a single new minor road bridge and three foot & cycle bridges.

Locks

- 21.5.6 This section will require a total of 10 locks arranged in staircase groups of 3, 3, 2, and 2 – a total of four new structures. These will follow the standard designs for new structures and will employ an appropriate mixture of modern and heritage materials.

Water Supply

- 21.5.7 Water supply for this section is challenging. The section is the new summit pound, it is extremely short with limited in-line storage capacity. There are few local sources of water. Five solutions are proposed:
- 21.5.8 **Use of channel liners to reduce water losses:** the Bentomat and concrete block system is proposed
- 21.5.9 **Creation of Side Ponds:** Side ponds will add water storage capacity and will provide additional off-line wetland habitats.
- 21.5.10 **Back pumping at each lock flight:** each group of locks will have its own small scale back pumping system. The electricity for the pumping system may be generated by wind turbine or similar renewable means.

- 21.5.11 **Use of drainage water from the former colliery tip:** A major drain from the tip enters the drain which the canal will replace. It is proposed to continue this arrangement but to construct a reed filter-bed at the point of entry to filter suspended sediment and improve water quality.
- 21.5.12 **Tapping ground water supplies:** Arup identified good potential ground water supplies on the summit level in the underlying Coal Measures sandstones. They proposed tapping these supplies with an artesian borehole. They suggested that while supplies were insufficient to supply the entire section, they are, when linked with a relatively leak proof channel, sufficient to augment the back pumping and replace the inevitable losses.
- 21.5.13 The section is the watershed between the Rother and Ryton/Idle catchments. The two catchments have different chemistries and ecologies and it is a condition of the Environment Agency to ensure that as little water as possible is exchanged between catchments. To that end a single flood gate will be installed on the eastern side of the M1 motorway. The gate will be counterbalanced (chained weights) so as to always return to a closed position. The locks and ponds to the west of the “water bar” will form part of the Rother catchment, those to the east will form part of the Ryton/Idle Catchment.

Construction Impact

- 21.5.14 Construction impact on the section will be relatively minor. The route passes through open agricultural land with no adjacent buildings. The one major road crossing –under the M1 Motorway – utilises an existing structure. In the proposals made here the structure does not require any major modifications and this should reduce the build time and the potential for traffic disruption to a minimum.
- 21.5.15 No other main roads will be disturbed.
- 21.5.16 Construction access will be gained from (1) Wales via Coalpit Lane, from Woodall via Walseker Lane (which links end on to Coalpit Lane) and (3) along the canal track from Kiveton Park. The primary access for earth moving and heavy construction works will be along the new canal line from Kiveton Park. Any access from Wales or Woodall would be restricted to light traffic and subject to considerate contractor rules.

Potential Risks

- 21.5.17 The route of the Norwood Tunnel could pose problems with the stability of lock and bridge foundations. As proposed the route will diverge from the tunnel line before the former western portal of the tunnel and the new route will as a result avoid running directly over the original line.
- 21.5.18 It is known that there are several areas of ancient mine working in the area. It is likely that a least one or more ancient mine will be located in the canal track. The Canal Partnership’s engineering team have considerable experience in the treatment and remediation of mine workings (see, for example, Storey 2009). The exact procedure used will depend upon the exact form of the workings uncovered. In outline it will involve infilling with an inert material (preferably mine waste or coal measure sandstone waste), mechanical compaction of the fill, sealing of the shaft by concrete plug and capping with puddle clay.

21.5.19 There is also one location where the presence of overhead electricity supply cables will limit the use of cranes.

21.6 Access Improvements

Towpath & Access Points / Nodes

21.6.1 The Cuckoo Way at present broadly follows the line of the proposed canal from the top of the existing Norwood Flight (the start of restoration section 9) to the east side of the M1 Poplar Farm underpass. Only minor diversions will be required to bring the Cuckoo Way alongside the waterway and onto the surfaced towpath.

21.6.2 To the east of the M1 motorway underpass the Cuckoo Way follows a path to the north-east and then runs parallel to the south side of the former Killamarsh branch railway. The Cuckoo Way then joins the track around the west and north side of the former Kiveton Colliery tip to the entrance to the Kiveton Community Woodland.

21.6.3 The new surface route of the canal will follow a route to the south of this line around the lower ground on the edge of the fields. It will intersect Coalpit Lane where there will be a new vehicle bridge. The new towpath on this route will be on the north side of the waterway, at least 2m wide, surfaced and suitable for both walkers and cyclists.

21.6.4 Once the new route is completed it would be desirable to move the Cuckoo Way from its present route (which is unsurfaced and difficult in poor weather) to the new towpath. A footpath diversion order will be applied for at the planning permission stage. The old route of the Cuckoo Way may be retained as field paths.

21.6.5 The key access nodes in this section are:

- The west portal of Norwood Tunnel. Public right of way to Killamarsh via Nor Wood (existing access node, AN 48, SK 4745 8195). Upgrading and minor diversion required to accommodate canal line and new bridge.
- The east side of the M1 Underpass where the public footpath from Wales to Woodall cross the canal line at right angles (existing access node AN 49, SK 4775 8201). Upgrading and minor diversion required to accommodate new bridge (dependent upon which option for the underpass is chosen).
- Coalpit Lane where the public footpath and lane carrying National Cycleway Six will cross the line of the canal on a new bridge (Coalpit Lane Bridge, No. 30f). This is a new access node replacing the existing node (AN 50, SK 4790 8205) which lies to the north on the current route of the Cuckoo Way
- Wales Bridge. Foot & Cycle bridge over the tail of the Wales locks giving access to the paths around the south of the Kiveton Community Woodlands site and a public right of way to Harthill. This is a new access node replacing the existing node at "Tunnel Top Crossing, Wales" (AN 51, SK 4843 8220) which lies to the north of the new line.

21.6.6 None of the nodes have direct access to public transport. The nearest bus services are in Wales (800 m) and Kiveton Park (500 m). The nearest car park is the Kiveton

Waters parking area off Hard Lane (SK 4930 8245), approximately 850 m from the east end of the section.

Links to the Wider Foot & Cycleway Network

- 21.6.7 The Cuckoo Way crosses National Cycle Route Six in this section. This connection provides access to Wales, Harthill and Thorpe Salvin.
- 21.6.8 The Wales Bridge path provides access to both Wales and Harthill. It also links the canal track into the south side of the Kiveton Community Woodlands.
- 21.6.9 All of the canal towpath to footpath links in this section, together with those further east and on the already restored section are the subject of a current RMBC Rights of Way Improvement Plan.

Improvements

- 21.6.10 Re-surfacing of the Cuckoo Way throughout this section to bring it access-for-all standards.
- 21.6.11 Re-grading of access ramps to access-for-all standards.
- 21.6.12 Provision of improved gate/access furniture to restrict inappropriate use (such as motorcycles)
- 21.6.13 Provision of information on route(s), connections and public transport at primary access nodes.
- 21.6.14 Re-signposting throughout to indicate local facilities and links at all other nodes. In particular better signposting to enable walkers on the Cuckoo Way to explore the nearby villages – both Wales and Harthill have a core of historic buildings and architecturally interesting Churches. Harthill in particular has strong links to the building the canal many of the navvies lived in and around the village and John Varley, the waterway's resident engineer, is buried in the churchyard there.

Visitor Facilities

- 21.6.15 This section of the route will have few visitor facilities other than the canal and its towpath. The development of Kiveton Waters as a Marina may lead to pressure on fishing and fishing platforms will be provided from the outset on this section.

Interpretation

- 21.6.16 The Coalpit Lane site offers an opportunity to present information about the origins of the coal industry in the area and to relate it to the later collieries at Norwood, West Kiveton and Kiveton Park. A mining history trail is a future aspiration.
- 21.6.17 The section has few surface reminders of the Norwood Tunnel but some interpretation to tell the story of the tunnel and its surface replacement would be appropriate.
- 21.6.18 This to provide the basis for the development of the "Tunneler's" and "Collier's" Walks as described in part 21.

21.7 Future Aspirations

- 21.7.1 The development of additional footpaths links and way-marked routes as described in part 21.
- 21.7.2 The development of on-line interpretation. the western half the section as part of the story of the Norwood Flight. The eastern half as part of the story of the Norwood Tunnel.

21.8 Photographic Survey of Route

- 21.8.1 The plates below illustrate the route. They commence at the western end of the section and conclude at the eastern end. Unless specifically marked “reverse view” all these photographs were taken looking and facing east (towards Kiveton Park) along the canal track.

. Figure
21.1



Norwood Tunnel
West Portal.

The new route (and the start of section nine) will commence to the right of the tunnel wing wall. The new towpath will pass left around and above the headwall and across the site of the Tunnel Keepers Cottage and stables.

Figure 21.2



Cuckoo Way above the Norwood Tunnel Portal looking west.

Un-surfaced path not meeting access for all standards.

Figure 21.3



Looking east and upslope towards the M1 Motorway

The line of the new canal will follow the path around the field edge. The Norwood High Treble Locks will be sited immediately in front of the woodland in the centre and left of the image.

Figure 21.4



Looking west down the line of the canal toward the top of the original Norwood Flight.

The Norwood Tunnel runs to the right of view. The new canal will follow (and retain) the hedge line. The new towpath will be to the right.

Figure 21.5



Poplar Farm Underpass under the M1 Motorway. Looking east.

Under option one the canal water level would be circa 0.3 m below the ground surface shown here. Under option two the canal would be running in a culvert beneath the track level and would not be visible at this point.

Figure 21.6



Poplar Farm Underpass under the M1 Motorway. Looking west.

Reverse view, same event!

Figure 21.7



New surface route looking east.

The photographer has his back to the underpass above and is looking east down the line of the waterway. The canal will run to the left of the field boundary which will form the off-bank side. The towpath will be on the left or north side of the cut.

Figure 21.8



Coal Pit Lane looking south toward the site of Coalpit Lane Locks and Bridge

The canal line runs right to left (west to east) across the middle of this view following the existing field boundaries.

Figure 21.9



Site of Coalpit Lane Locks and Bridge.

The bridge will be in the middle of this view where the track crosses the field boundary hedge line. The locks will be to the right of the bridge.
Note Harthill in the distance.

Figure 21.10



Canal route around the south and west of the former Kiveton Colliery Tip looking east. Part 1

The canal line enters a the right and follows the field boundary hedge line to the left hand edge. The reclaimed colliery tip is the yellow hillock (planted with saplings) behind the hedge line.

Figure 21.11



Canal route around the south and west of the former Kiveton Colliery Tip looking east. Part 2

The canal line enters at the right and follows the field boundary hedge line and around the base of the former tip. The Wales Locks and Bridge will be located in the centre of this view.

Figure 21.12



The site of Wales Locks and Bridge.

The canal line is here running right to left (west to east) across the image. The Locks will be on the right hand side the, bridge centre left.

Figure 21.13



Drain around the southern edge of the former Kiveton Colliery tip.

The water from the drain will enter the canal via a reed filter bed filter.

Figure
21.14

Figure
21.15

