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Part 20: Design Summary for Restoration Section 8: Norwood

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20 Design Summary for Restoration Section 8: Norwood

20.1 Overview

Restoration of the Norwood Flight

- 20.1.1 The Norwood Flight is the most important built heritage on the yet to be restored canal and arguably the most important on the entire navigation. The 13 locks of the Norwood Flight lift the canal 76 ft in just under 3/4 mile and are an un-sung wonder of the early canal age.
- 20.1.2 The Norwood Locks are arranged in four staircases consisting of a three-rise, a three-rise, a three-rise and a four-rise. These are separated by three ponds and side-ponds which regulate flow and provide water storage. When built the lock-flight bywash drained a dry-dock and provided water to power a timber sawmill and carpenter's shop.
- 20.1.3 When construction of the canal started in 1771 the flight and its work yards were one of the first features to be built. The workshops turned out work boats, timber work such as centring for bridges and the tunnel and the lock gates for the western half of the canal.
- 20.1.4 The locks were probably extensively rebuilt in the 1830's along with much of the rest of the canal and the visible lock walls are largely of red brick, rather than stone, construction. The walls also show evidence of successive rebuilding's and later patching with different types and colours of brick. The locks fell into disuse following the collapse of the Norwood Tunnel in 1907 and the cessation of traffic on the western end of the canal by the First World War. Over time the side-ponds became silted, the lock gates were removed and weirs were installed in the lock chambers. The middle three rise lock group was infilled completely and water flow maintained by a pipe.
- 20.1.5 The lower three rise lock groups are in reasonable condition. The upper four-rise lock group is the most heavily damaged, but even here the condition is no worse than that seen on the Turnerwood and Thorpe Flights prior to restoration by British Waterways.
- 20.1.6 Water continues to flow down the flight, some of it draining from the surrounding Nor Wood and some from the remains of the Norwood Tunnel. This water feeds the recently dredged side-ponds (which are now in-water as ornamental and fish ponds) and the in-water section from the end of the Norwood Flight to Rotherham Road Bridge.
- 20.1.7 Work to restore the flight to its last operating condition will commence with detailed archaeological investigation and mitigation works to protect the flora and fauna. The weirs and infilling will be removed and the lock walls stabilised using the techniques successfully applied to the Thorpe and Turnerwood Flights. Repairs to the fabric of the lock chamber will utilise heritage materials and methods.

- 20.1.8 No lock gates or paddle gear survive. Photographs show the gates and gear present prior to disuse were similar to those used elsewhere on the Chesterfield Canal. The design of the new lock gates and paddle gear will be based on these traditional designs. Like the replicated paddle gear used on the Thorpe and Turnerwood restorations the new materials will be discretely date stamped so as to avoid future confusion over its origins.
- 20.1.9 Minor repairs are required to the Grade 2 listed Norwood Bridge at the bottom of the lock flight and entirely new accommodation bridges will be required to provide access to the private houses at the top and bottom of the flight. These will have to fit in very constrained locations and while it may be possible to design a suitable fixed bridge at the lower end of the flight it is likely that a lifting- or swing-bridge design will be necessary at the upper site.
- 20.1.10 The water supply for the flight originally came via a feeder leat from the Woodall and Killamarsh Ponds in the hills above Nor Wood. The feeder leat is overgrown and infilled with mud in places but is generally in good condition. The Killamarsh pond has been slightly lowered but is in use as fishing pond. The Woodall pond dam has been greatly lowered although there are plans for a partial re-watering as a further fishing pond. At present no water from the ponds or feeder leat enters the canal and all water on the flight is derived from drainage from the Norwood Tunnel and overland flow from the Nor Wood.
- 20.1.11 While it is not possible to restore both ponds to their 18th century capacity, the repair of the feeder leat will enable some water to be drawn from them. In addition water will continue to be received from drainage and the remains of the tunnel. Further water will come from groundwater sources, the new summit level and the small summit reservoir in the adjacent Wales Section.
- 20.1.12 These water sources alone will be unable to supply the flight during extended operation or a prolonged dry spell. Consequently back-pumping will be installed throughout the flight to conserve water during operation. Given the sites heritage value this will have to be done sensitively but it is essential to ensure long term viability. The possibility of powering the back-pumps with a wind turbine or other alternative energy source is being actively pursued.

20.2 Environment & Ecology

Issues

- 20.2.1 The Norwood flight and surrounding woodland (the Nor Wood) is of considerable nature conservation value (RMBC Local Site 5).
- 20.2.2 The Nor Wood is, in part, an ancient woodland and contains nationally scarce species such as Large-leaved Lime. It is very varied and diverse wood with a mixture of acid, neutral and wet woodland areas. Parts of the wood are subject to Tree Preservation Orders.
- 20.2.3 The Norwood Locks and side ponds contain a population of the nationally scarce True Fox-sedge and are bordered by Ash-Sycamore-Dog's Mercury woodland. The water-bodies are clean and clear and of good quality but support a surprisingly

modest water-vole population. Bats are present but un-quantified. The complex is bordered throughout by estate grounds and gardens.

- 20.2.4 The Woodall and Killamarsh Ponds are of interest for their neutral and wet grassland margins and for areas of Alder woodland with a nettle understory.

Mitigation and Enhancement

- 20.2.5 **Norwood Flight:** Reconstruction will result in temporary disturbance of wetland areas. The lower and middle side-ponds can be sealed with stop planks or temporary bunds to enable works on the locks. Temporary siphons and pipes will be used to carry water down the flight and maintain water flow in both side ponds and the in-water section at the bottom of the flight.
- 20.2.6 The upper pond also forms the canal channel and will require dredging to navigable depth. It is proposed to erect a silt screen along the outer margins of the dredging area to reduce suspended sediment in the “off-line” area. After completion of dredging and other works this will be retained. Following reconstruction similar silt screens will be erected at the entrances to the middle and lower side ponds (navigation will not be permitted in the side ponds). This should prevent sediments suspended by boat movement and propeller wash in the main channel from entering the side ponds. Similar approaches have been employed on the Rochdale Canal with mixed results – the lessons learned there will be applied here (see IWAC 2008).
- 20.2.7 Opportunities for enhancement of reed beds are limited on this section by the built heritage. New lengths of water will be created however by the reinstatement of the section between around the infilled Middle Norwood Treble Locks.
- 20.2.8 The upper four-rise locks will require vegetation clearance and the removal of young scrub woodland. The pound beyond, from the head of the four-rise to the west portal of the Norwood Tunnel, is in water although it is badly silted and partially infilled with reed growth. Some areas, especially on the off-bank are being encroached by thin Alder carr woodland. Clearance and dredging of this channel will result in some loss of that habitat and steps are being taken to identify areas where compensatory habitat can be created.
- 20.2.9 The new diversionary route will divert from the original channel in this area and pass into a new shallow cutting to the south of the tunnel portal. This will leave an area in water in front of the portal. A wooden post and rail turning bumper will be installed in the channel to enable boats of 57ft or less to wind here if required. This area between the turning bumper and the portal will be dredged to a shallower profile and retained as shallow water reedswamp. This is the boundary with the Wales section.
- 20.2.10 Given the presence of water vole on the flight a management and mitigation plan based on best practice (e.g. Strachan & Moorhouse 2006, ADA / Natural England 2007) will be produced in conjunction with the detailed works phasing plan. This will set out, in agreement with English Nature and the Wildlife Trusts, the procedures to be adopted to ensure that water vole are excluded from working sites and that the works are staggered and phased so as to allow the gradual step-wise movement of water vole. The potential to incorporate some vole access features in the existing wash walls will be investigated provided it can be made compatible with the need to protect the built heritage.

- 20.2.11 A similar management and mitigation plan will be produced for encouraging bats along the canal line and will include measure such as retaining the old tunnel as a bat roost and incorporating bat roosting niches (“bat bricks”) in extensively modified or new structures.
- 20.2.12 **Nor Wood:** There are no major or protected trees on the Norwood Flight. Construction access to the works may require scrub clearance but there is no requirement to remove woodland. Should it be necessary to remove any tree due to proximity to structures or it’s condition it will be replaced by a native woodland species.
- 20.2.13 The Norwood Flight Feeder Leat runs through Nor Wood. The leat is narrow and in relatively good condition. While overgrown in places it does not require any major works. In consequence all vegetation management, repairs and maintenance work on the leat will be carried out by hand or using hand power-tools thereby minimising potential impact on the woodland.
- 20.2.14 The restoration of the leat will restore a shallow woodland-brook type habitat lost since it was drained.
- 20.2.15 **Killamarsh and Woodall Ponds:** Both Ponds are managed as fishing lakes and there will be no change to that management regime. Use of the water already draining from the ponds should have no effect on the ponds themselves. There are opportunities to improve the ecological management of the pond margins possibly with the engagement of the local fishing clubs.
- 20.2.16 The reinstatement of the Norwood Feeder Leat will reduce the amount of water in the County Dike between the Ponds and the County Dike Culvert. At the latter point water “borrowed” from the system is returned to the Dike from the canal via a side weir. The discharge of the Dike to the west of that point should be unaffected. The County Dike has a poor water quality and ecological condition. A study of the ecology of the County Dike is required to assess the impact, and determine the appropriate levels, of abstraction.

20.3 Archaeology & Heritage

Key Features

- 20.3.1 The Norwood Flight is arguably the most significant feature of the early canal age in England which is not listed or subject to some form of legal protection.
- 20.3.2 The Norwood Flight itself is an important structure while the site as a whole has the potential to retain archaeological evidence of the working methods of the early canal builders. Much of the early remains on the site are now buried by landscaping works and this has preserved them. As well as the locks and complicated water control systems, the site has the potential to reveal buried evidence for the dry-dock, the timber yard and sawmill, smithy, brick & lime kilns, the lock keepers and tunnel keepers cottages and the stables for the boat horses.
- 20.3.3 The detailed recording the Thorpe and Turnerwood Canal Locks has thrown up a number of interesting questions as to the working methods of the early canal engineers. Comparison with the exactly contemporary Norwood Locks should

enable these questions to be answered and should throw further light on the origins of civil engineering technique.

Assessment and Recording

20.3.4 There is an urgent need to review the designation of the site and seek proper control measures at an early stage. Overall the archaeology of the site is still remarkably poorly understood.

20.3.5 As noted in construction, below, the preliminary stages of work on this site must be a wholesale programme of archaeological recording and, where damage to the original fabric has already occurred, invasive investigation. In setting out the canal restoration programme the presumption is that:

- Archaeological evidence should be retained in-situ.
- All activity on the site should be subject to archaeological watching briefs.
- Detailed archaeological records of each structure must be made prior to any restoration work or invasive procedure.
- Archaeological excavation should only take place where damage has already occurred or where damage is unavoidable (e.g. the installation of lock ladders to meet health and safety requirements).
- All information recovered is promptly placed in the public realm.

20.3.6 The full programme of works will be summarised in a site specific heritage management plan which will be approved by all parties before planning permission is sought.

20.3.7 The benchmark for the archaeological work is that set by the work of British Waterways on the Thorpe and Turnerwood Flights.

Enhancement

20.3.8 The site is one of the most exciting locations which has not yet been interpreted on the canal. There is great scope for improved low key information and interpretation as outlined below.

20.4 Economic & Social Regeneration

20.4.1 The site is not suited to commercial development or to the development of visitor facilities – these will be centred on Nethermoor Lake and Kiveton Waters. The main economic benefits of this section come from the people moving through it and enjoying it as living history, countryside and recreation.

20.4.2 The site is of great historical and environmental interest. In order to preserve as much of the tranquillity of the site as possible all suggested changes are low key amenity improvements designed to increase and better inform the flow of visitors through the site while reducing or minimising their impact on the environment.

20.4.3 The proposed improvements will include improved towpath surface, fencing, information boards and signposting. Information boards will tell the story of the

Norwood Flight, the Norwood boat-dock and timber yards and the West Kiveton Colliery.

20.4.4 The restoration will increase the connectivity of the site by improving footpath links. The actual paths and connections lie outside this section, but include better links to Rother Valley Country Park, Wales, Woodall and Harthill.

20.4.5 The upgrading of the towpath through the site will provide access for all between Killamarsh and Kiveton Park. Coupled with the improved link paths this will enable “local loop” or “doorstep” walks. This will produce improved health outcomes for the community.

20.5 Planned Works

Preliminary Works

20.5.1 The entirety of this restoration section is original. As noted above it has an extremely high heritage value. The recording and preservation of that heritage is a priority. The methods evolved by British Waterways on the Thorpe and Turnerwood Lock Flights, and recognised as national best practice, will be employed throughout this section.

20.5.2 Prior to the commencement of works detailed archaeological recording will be undertaken. This will be accompanied by trial excavations to determine construction methods and sequence. Any features or structures deemed to require major reconstruction will be dismantled under archeologically controlled conditions and recorded appropriately. The information recorded by the archaeological study will be fed to the engineering team and will inform the delivery of the restoration.

20.5.3 At the same time the ecological value of the site will be protected by a programme of exclusion and relocation for key protected species in line with a method plan agreed in advance with English Nature.

Canal Track & Channel

20.5.4 The existing canal channel will be cleaned and assessed. Where necessary the channel will be re-lined with puddle clay to British Waterways specification (Table D4(ii)).

20.5.5 The wash wall sections between locks will be repaired with heritage materials and methods in line with the treatment of the locks.

Utilities

20.5.6 This section has no main utility crossings. There are domestic gas, electricity and telecommunications supplies to the houses at upper and lower Norwood. The gas and electricity supplies will be re-routed through the new access bridge structures. The telecommunications cables are by overhead supply and initial inspection shows that no modifications will be required to accommodate the restoration.

Bridges

- 20.5.7 Norwood Bridge at the foot of the Flight has been badly damaged by unsympathetic modifications by the owner. The structure is grade II listed but no enforcement action has been taken by RMBC to date.
- 20.5.8 Extensive repairs to Norwood Bridge will need to be carried out as soon as is practicable.
- 20.5.9 Two new accommodation bridges will need to be constructed to provide access to the Houses at the top and bottom of the Flight. It is possible that one or more of these bridges will need to be of either the lifting- or swing-bridge type.

Locks

- 20.5.10 The thirteen locks are a remarkable early example of a multiple lock flight and are the centrepiece of the site. The experience gained in the stabilisation and reconstruction of the Thorpe and Turnerwood Flights to the East of Kiveton Park will be applied to these structures.
- 20.5.11 Restoration will use heritage materials and methods. In line with established practice, all work will be identifiable and reversible.
- 20.5.12 The installation of back pumping throughout the flight will be undertaken with care. Pipe runs and pump stations will be sited away from the immediate margin of the original canal and each potential site will require archaeological investigation prior to construction commencing. The final positioning of equipment will take account of the preliminary investigations.

Water Supply

- 20.5.13 Water supply for this section comes from the Killamarsh and Woodall Ponds and from the western half of the new summit pound.
- 20.5.14 The project will require the reinstatement of the feeder leat through the Nor Wood from the Killamarsh and Woodall Ponds. Repairs to the pond dams may be required to meet current standards. This is under assessment.
- 20.5.15 Back-pumping systems will be installed on the entire Norwood Flight to conserve water. The possibility of building wind turbines to provide power for this system is being investigated.

Construction Impacts

- 20.5.16 Construction impacts will be minimised by working “within track” wherever possible.
- 20.5.17 Construction access to the Norwood Flight will be from Rotherham Road via the private access road to the Norwood Houses. This track will require resurfacing upon completion of works.
- 20.5.18 Construction access to the Killamarsh and Woodall Ponds will be via farm tracks from Woodall Lane (west of the M1 motorway).

Potential Hazards

- 20.5.19 The site history is relatively well known and there is no likelihood of unrecorded mine workings or contaminated ground. The site has not suffered from mining

subsidence and repeated surveys show that it is stable. There are, however, significant potential risks to the natural and built environment caused by the reinstatement works themselves. In consequence:

- 20.5.20 A site management plan will be produced for the natural environment mitigation works. This will be agreed by the project ecologist, the District Ecologist, the Wildlife Trusts and Natural England prior to planning permission being sought. Care will be taken to design working methods which meet, and preferably exceed, all national standards and are approved by our stakeholders.
- 20.5.21 A site management plan will be produced for the heritage works. This will be agreed by the project archaeologist, the District Archaeologist and English Heritage prior to planning permission being sought. Again working standards will meet or exceed national standards.

20.6 Access Improvements

Towpath & Access Points / Nodes

- 20.6.1 The Norwood section is the shortest of the five restoration sections between Killamarsh and Kiveton Park. For a rural section it is also one of the most constrained and least connected of the sections.
- 20.6.2 The access points are at the bottom and top of the flight in the adjacent restoration sections.
- 20.6.3 The Towpath / Cuckoo Way is a well used trail but poorly surfaced in places long this length. The restoration programme would ensure the surface was brought up to access for all standards.

Links to the Wider Foot & Cycleway Network

- 20.6.4 The section has no wider links.

Visitor Facilities

- 20.6.5 No visitor facilities are envisaged on this section.

Interpretation

- 20.6.6 Interpretation boards will be sited at the foot of the Norwood Flight (the story of the flight), adjacent to the middle three rise lock (the Norwood timber yard, workshops and the water economy) and adjacent to the upper Norwood Pond (West Kiveton Colliery and the Norwood boat dock) and facing the Western Portal of the Norwood Tunnel (the story of building the tunnel).

20.7 Future Aspirations

- 20.7.1 The Norwood Flight and the land around it are in private ownership. The present intention is to seek a long term lease only on the canal line and a mutually beneficial management agreement on those areas to which the public will have access (the towpath and lock grounds only).

- 20.7.2 Should the opportunity arise in the future to acquire either ownership or a long term lease on the whole or a larger part of the Norwood Estate there is considerable potential to further develop the site as a major education centre for the built and natural heritage of the waterways employing the resources of the entire site.
- 20.7.3 Built interpretation would be inappropriate but the site would be well suited to the development of “living history interpretation” where visitors are guided around the site by an actor or interpretation officer dressed as an historical figure associated with the site. The actor or officer works from script which outlines the key features of the site and works to bring history to life.

20.8 Photographic Survey of Route

- 20.8.1 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
20.1



Norwood Bridge
(No.30) looking east.

Bridge extensively rebuilt c. 1832. Grade 2 listed, damaged by inappropriate landowner modifications. The start of the Norwood section.

Figure 20.2



Norwood Low Side Weir looking east.

The weir is marked by the handrail and footway on the left side of the roadway – the weir itself (originally a ford like arrangement) has been infilled and tarmaced over by the landowner.

Figure 20.3



Norwood Low Treble Locks (No's 10, 11 & 12)

The building to the right is the much rebuilt Boatman's Inn, now a private house.

Figure 20.4



The Boatman Inn at Norwood in 1972.

The footbridge to the building can be seen crossing the lock chamber. No remains of the lock gate by this time. Photograph by Hugh Potter, with permission.

Figure 20.5



Norwood Lock Keepers House in 1972, looking west.

The house stood adjacent to the Norwood Lower Middle Treble Locks (No's 13,14,15). The white structure is a footbridge originally attached to the upper lock gate. The house has since been demolished. Photograph by Hugh Potter, with permission.

Figure 20.6



The former Norwood Sawmill (now a private house) looking east.

The narrows in the foreground is the top of the buried Norwood Lower Middle Treble Locks, the widening of the water to the right leads to the Middle Norwood Pond and straight ahead is the bottom of the Norwood Upper Middle Treble Locks. Ahead and right is the sawmill.

Figure 20.7



Norwood Sawmill from the west looking east in 1972.

The bridge in the foreground is the same as that in the previous plate. Photograph by Hugh Potter, with permission.

Figure
20.8



Norwood Sawmill
from looking south
west in 1972.

Photograph by Hugh
Potter, with permission.

Figure
20.9



Norwood Upper
Middle Treble Locks
looking east.

The lock chambers are on
the right of the image.

Figure
20.10



Top of the Upper
Middle Treble.

The locks were to the right
of the buildings, the
approximate site of the dry
dock was on the left of the
image.

Figure 20.11



Norwood Upper Pond and West Kiveton Colliery Wharf

The wall on the left is the West Kiveton Colliery Wharf. The start of the four-rise is in the middle of the view.

Figure 20.12



Norwood Upper Quad or Four-Rise Locks looking east.

Even in winter the vegetation growth makes the locks barely visible.

Figure 20.13



Norwood Tunnel West Portal seen through woodland, looking east.

Note opening. Water runs to the foot of the portal.

