Exploring Greater Manchester

a fieldwork guide

Edited by Cathy Delaney

Sale Water Park, the River Mersey and Bridgewater Canal Aqueduct

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Aims: This walk takes the visitor through a landscape that has been totally transformed within a lifetime. After World War II there was no motorway, no water park, but a mixture of farmland, golf courses, sports grounds, waste tips and sewage works. Most of the woodlands visible on the Garmin image below were not there. This part of the valley now contains legacies and indicators of these past land uses and strong evidence of how the present valley is a multi-functional urban greenspace, providing multiple ecosystem services, from carbon uptake to mental health improvement though exercise in regenerated nature. Sale Water Park epitomises the combination of varied recreational activities and flood control works.

Starting point: Sale Water Park Metrolink Station (or the nearby Sale Water Park Visitor Car Park).

Estimated Time: 2-3 hours

Maps: Geographers' Greater Manchester A-Z Street Atlas; Ordnance Survey Explorer (1:25,000) no 277 Manchester and Salford; Google Maps.

Date of Last Revision: December 2021

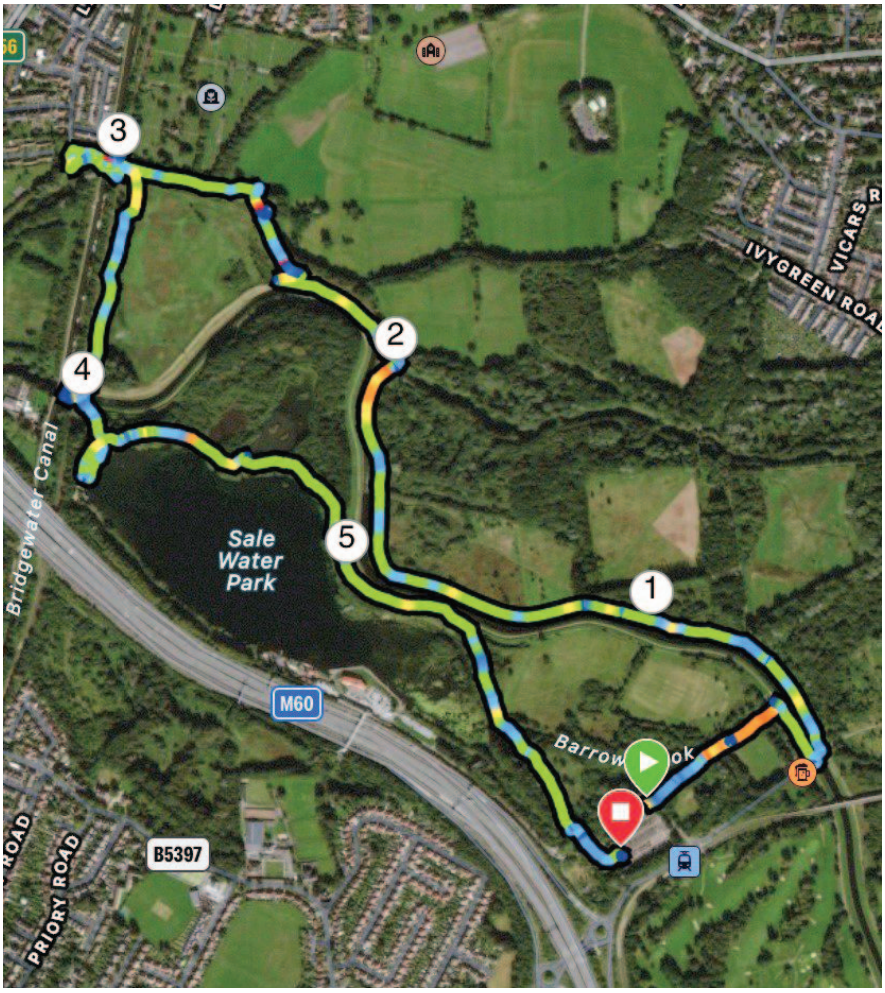

Figure 1: Garmin watch image from a mobile phone of the area covered by this walk showing the route and distances in kilometres (image courtesy of Fiona Harrop).

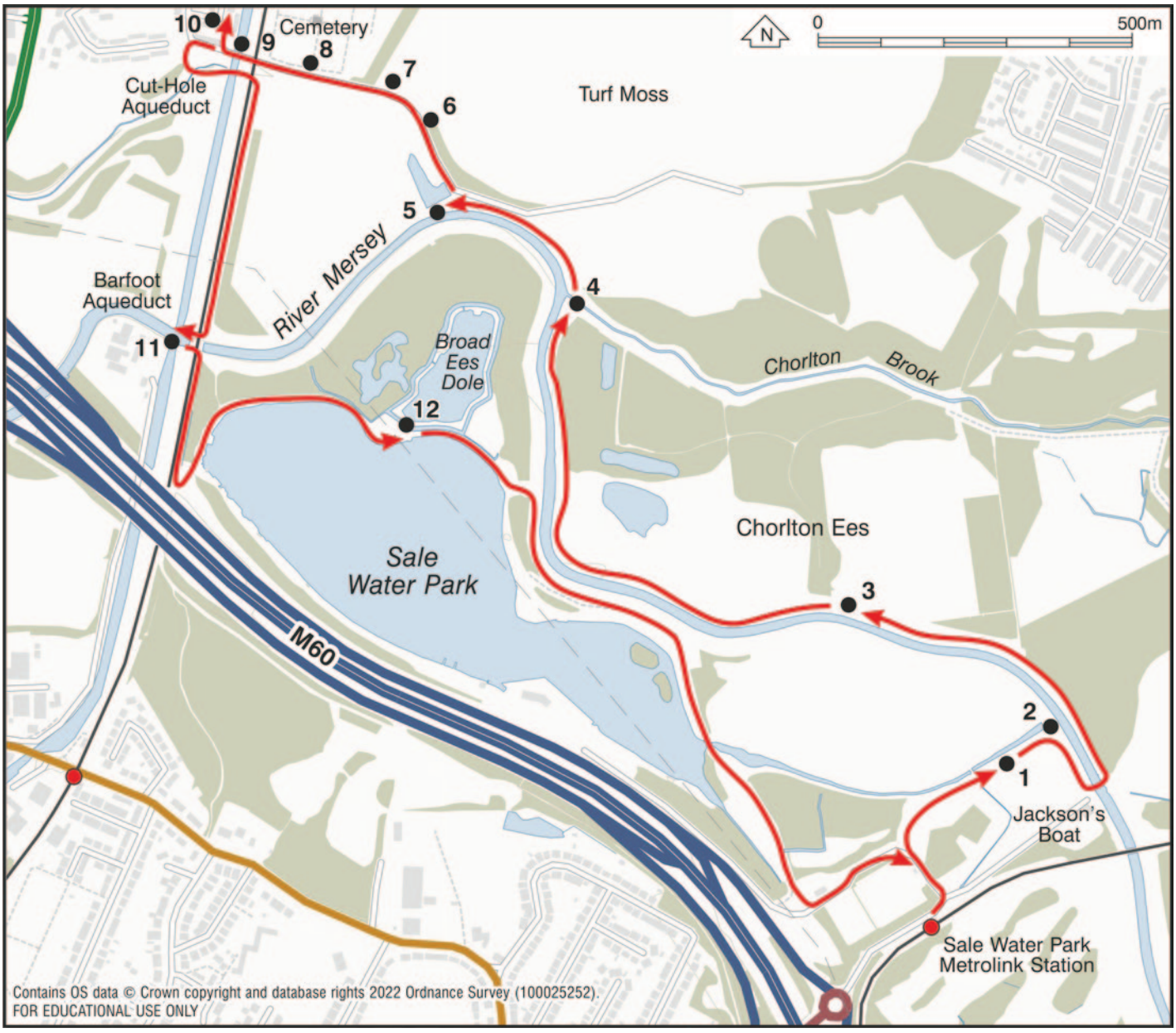

Figure 2: The area covered by the by this walk and the stopping points along the route.

Introduction

Sale Water Park is a by-product of the construction of the M60 motorway. In 1972 work began to extend the then M63 south-eastwards to join the M56 at Northenden. A flyover was built across the A56 at Stretford with the embankment being continued along the Sale section of the Mersey Valley. To avoid the cost and disruption of lorries bring embankment construction material from Derbyshire, Sale Borough Council agreed to gravel being extracted from the valley floor alongside the motorway route, with the promise that afterwards a marina would be created (Swain, 1987). The resulting gravel pit was up to 30 m deep in places and considerable post-excavation earth moving was necessary to create a usable shoreline. The lake is part of the Sale flood basin whose inlet and outlet will be seen on this walk. At the time, Sale was in Cheshire and quite distinct administratively from Lancashire on the opposite side of the river. Hence the Water Park is the Sale Water Park, reflectling the local government areas of 1972.

The current global heating, driven by human activity, is altering rainfall patterns and making heavy rainstorms more frequent. Our ability to cope with flooding is being tested. For centuries the River Mersey in this area has been embanked. This walk will take you to Barfoot Aqueduct (also termed a bridge) built by James Brindley in 1765 to carry the Bridgwater canal over the River Mersey. Brindley had to cope with potential floods and there is an extensive history

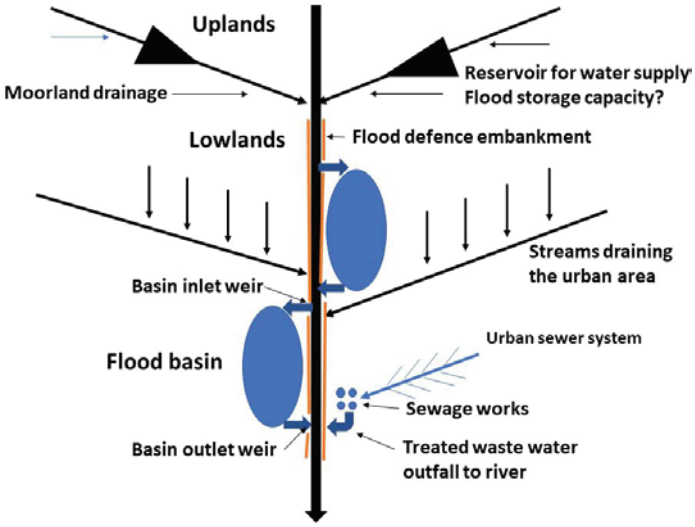

Figure 3: A schematic diagram showing the flood mitigation system on the Greater Manchester section of the River Mersey works.

of actions taken to avoid flood damage to the canal aqueduct. Even before then, landowners built river embankments to prevent the river flooding their lands. The last major improvement to the embankments in this part of the River Mersey occurred in the 1970s when the motorway was built and Sale Water park was created. By 2009 there were over 67 km of raised flood defences in the Upper Mersey catchment management area, which includes the headwaters drained by the Tame and Goyt , the urbanised region from Stockport to the Manchester Ship Canal and the sectors drained by the Sinderland Brook and Bollin separately to the Ship Canal. The three Upper Mersey flood storage areas are at Sale and Didsbury on the Mersey and at Timperley on the Sinderland Brook (Environment Agency, 2009).

While an embankment is an obvious defence of a particular area, it does not reduce the overall flood problem, it merely pushes the floodwater to somewhere else downstream. It shifts the problem onto to someone else. Flood mitigation has to consider the river catchment as a whole and to make space for water. Figure 3 indicates some of the components of the catchment that have to be considered. The upland headwaters include the peat covered moorland within the High Peak area. In the past, the peat was drained and burnt, thereby lowering its water retention capacity. In many places the peat became severely eroded and deep gullies developed. Droughts led to fires after which severe erosion occurred. This erosion and gullying speeded up the runoff of storm water to local upland rivers. Since 2005 there has been a concerted collaborative effort by organisations, including the Moors for the Future Partnership, United Utilities and the University of Manchester, to restore these eroding peatlands by blocking gullies and thereby regulating storm flows to downstream areas (Shuttleworth *et al.*, 2019; see Fig. 95 in Anderson, 2021 for excellent photos of ways of gully blocking). Moorland areas feed the reservoirs in the Goyt and Etherow headwaters of the River Mersey. Although basically for water supply or to maintain water levels in canals, the reservoirs may have some extra storage capacity for runoff from major storms. If available, such storage would also reduce the amount of water entering the Mersey tributaries above Stockport.

Once the tributaries enter the urban area, they receive some runoff from compacted urban surfaces. However, many of these little streams, such as the Chorlton Brook, have been diverted through culverts under roads or buried in large pipes for parts of their courses. Such culverted or piped sections have restricted capacity for high flows. Culverts also tended to become partially blocked by debris. Such conditions create a risk of localised flooding. However, most of the runoff of rainwater from the paved and roofed sections of the urban area goes into drains, which may be storm drains or combined sewers. Both may feed into sewage works, such as that at Davyhulme, but they may have provision for stormwater overflows direct into the Mersey. Whichever path the water takes, the rate of runoff from the impermeable surfaces of the built-up areas is far higher per unit area than that from vegetated surfaces. Space for such run off is limited, due to sewer, culvert and bridge capacities. If we are to avoid properties and other assets being inundated, we have to find more space for water, whether by allowing more of it to infiltrate into the ground, by slowing the rate of runoff to rivers, or by creating opportunities for water to move out of the river and be held somewhere else.

Sale Water Park is one of these "somewhere else" spaces for water. It is what is termed "a flood basin" in Figure 3. Water can pass into the flood basin through an inlet sluice gate (Stops 1 and 2) when the river level is excessively high (Figure 9). It then can be stored until the river level is low enough for the water to be released through an outlet sluice gate at the western end of the flood basin (Stop 11) back in to the river and to continue its journey to the Irish Sea.

As the walk will show, this important flood alleviation function is only required for a few days a year on average, if that. The basin has multiple other functions as a blue and greenspace providing multiple ecosystem services (the benefits that natural ecosystems generate for society and biodiversity) (Birkhofer *et al.*, 2015) (Table 1). Planners recognise the way that multi-functional green and blue spaces can be designed to store flood water and have cited Sale Water Park

Table 1: Some of the ecosystem services provided by the multifunctional Sale Flood Basin.*

Supporting	Provisioning	Regulating	Cultural
Nutrient cycling	Livestock	Flood regulation	Recreation (golf, fishing, boating ...)
Soil formation		CO_2 uptake	Well-being, proximity to nature
Primary production	Allotments	Human physical and mental health	Socialisation, dog-walking

* An ecosystem service is any positive benefit that wildlife or ecosystems provide to people. The benefits can be direct or indirect – small or large. Supporting services are the natural processes that make life possible; provisioning services supply food, fibre and water; regulating services determine the rates of natural processes; and cultural services contribute to the development and social well-being of people.

as a good example of this technique for helping cities hold water and become "absorbent cities" (White, 2008). Successful management of such multifunctional schrmes requires careful consideration of the needs of all the floodplain users, with adequate community consultation (Fitton *et al.*, 2014).

The Water Park is one of the newest features of this part of the upper Mersey Valley. The tramway through the Sale Water Park stop is even newer, but human use of the flood plain goes back to the earliest human settlement after the last Ice Age. The walk will pay attention to changes over the last 300 years from a floodplain used for grazing and hay production to the location of urban services, routeways, sporting facilities and spaces for water and nature (Figure 4). It traces how farmland was invaded for urban waste disposal and treatment, how water, rail and road transport modified the shape of the valley and the river became increasingly controlled; even though the flood threat remained.

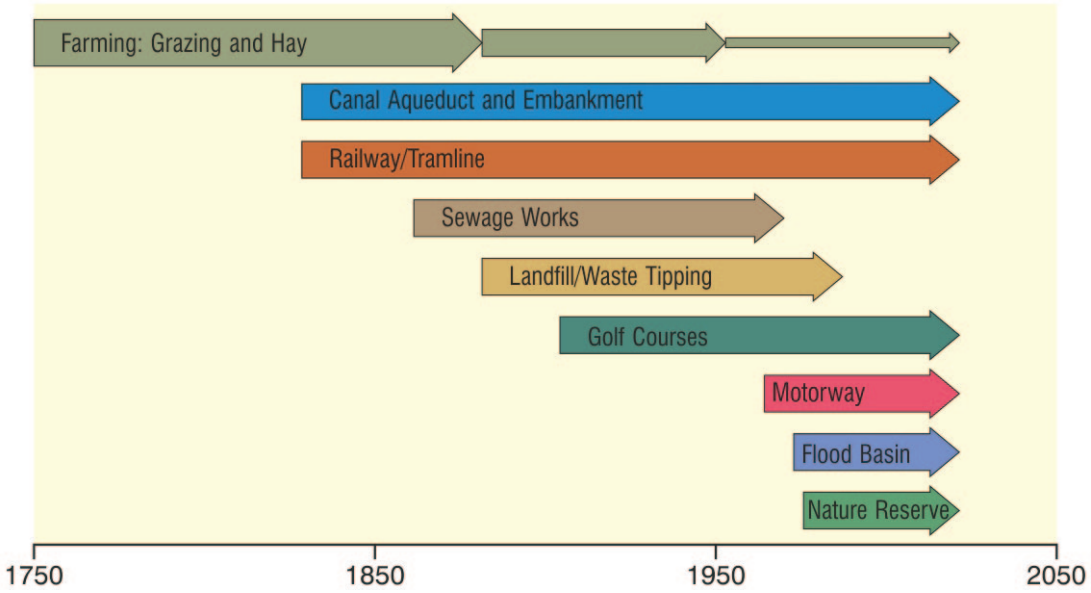

Figure 4: Approximate timelines of major land uses in the area covered by this walk.

The Route

From Sale Water Park tram stop, walk up the road past the Metrolink car park to the Water Park Visitor Centre and Car park. At the top of the slope, or from the car park at the Visitor Centre, take the footpath beyond the entrance road going to the right on the northeast side of the Visitor Centre. This footpath runs along a ridge which represents the south-eastern end of the water park flood basin.

Stop 1: View of the flood overflow sluice gate structure and inlet channel from the ridge above the flood basin

After a wooded section, a view to the left opens (Figures 5a and 5b) and a channel becomes visible (Figure 6). This channel is the inlet for water released from the Mersey at flood times to enter the Water Park's Flood Basin (Figure 7).

Figures 5a and 5b: views toward the water park showing the area into which floodwaters in the river are first released from the sluice gate. All the land in Figure 5 is inundated when the sluice gate is opened (Figure 7).

Figure 6: The water park side of the sluice gate.

Figure 7: Water being released during a flood event in 1981. (Note how high the water level is against the supports of the structure shown in Figure 6; also, note how the trees have grown between 1981 and 2021).

Figure 8: The sluice gate from the river side.

Figure 9: The river and sluice gate structure during a flood when water was being released to the Water Park.

Figure 10: Sale Flood Basin in use in 1981; the electicity pylons are prominent in this winter scene.

> Continue towards the inlet and go to the top of the river bank.

Stop 2: The flood sluice gate

On arriving at the sluice gate structure examine the design to stop debris from the river blocking the sluice gates. Note the river level at the time of your visit and compare it with that shown in Figure 9.

> Follow the footpath going to the right along the river to the footbridge and the Jackson's Boat PH. Compare the river level today with those shown in Figures 9 and 11. Cross the footbridge and turn left along the river bank towards Stretford as indicated on the signpost (Figure 12).

Figure 11: Floodwater passing under the bridge at Jackson's Boat on 20 January 2021, whwn the peak river water level gauge height was 4.06 metres. This compares to a typical low level of 0.31 metres and typical high level of 2.13 metres. Only two flood peaks of over 4 metres at the gauge occurred between 2015 and 2021. These peak levels are affected by the use of the Didsbury and Sale flood basins.

Jackson's Boat public house

Long known as Jackson's Boat, this public house, once named the Bridge Inn (Figure 13) or The Greyhound, was reputedly a haunt of Jacobite sympathisers in the 18th century. According to local tales, they drank to the health of the Pretender Prince Charles 'across the water' in France, symbolising this with a bowl of water placed in the centre of the table.

The changing river course before the modern embankments were built, is relevant here. Historically the River Mersey was the traditional boundary between Cheshire and Lancashire. The old boundary between Cheshire and Lancashire followed the Mersey River and its Etherow tributary all the way from the estuary to the Woodhead Pass. However in the 19th century following channel changes, the Jackson's Boat Inn was in Lancashire, in spite of sitting on the Cheshire side of the river (Figure 13).

Figure 12: The signpost pointing to Stretford.

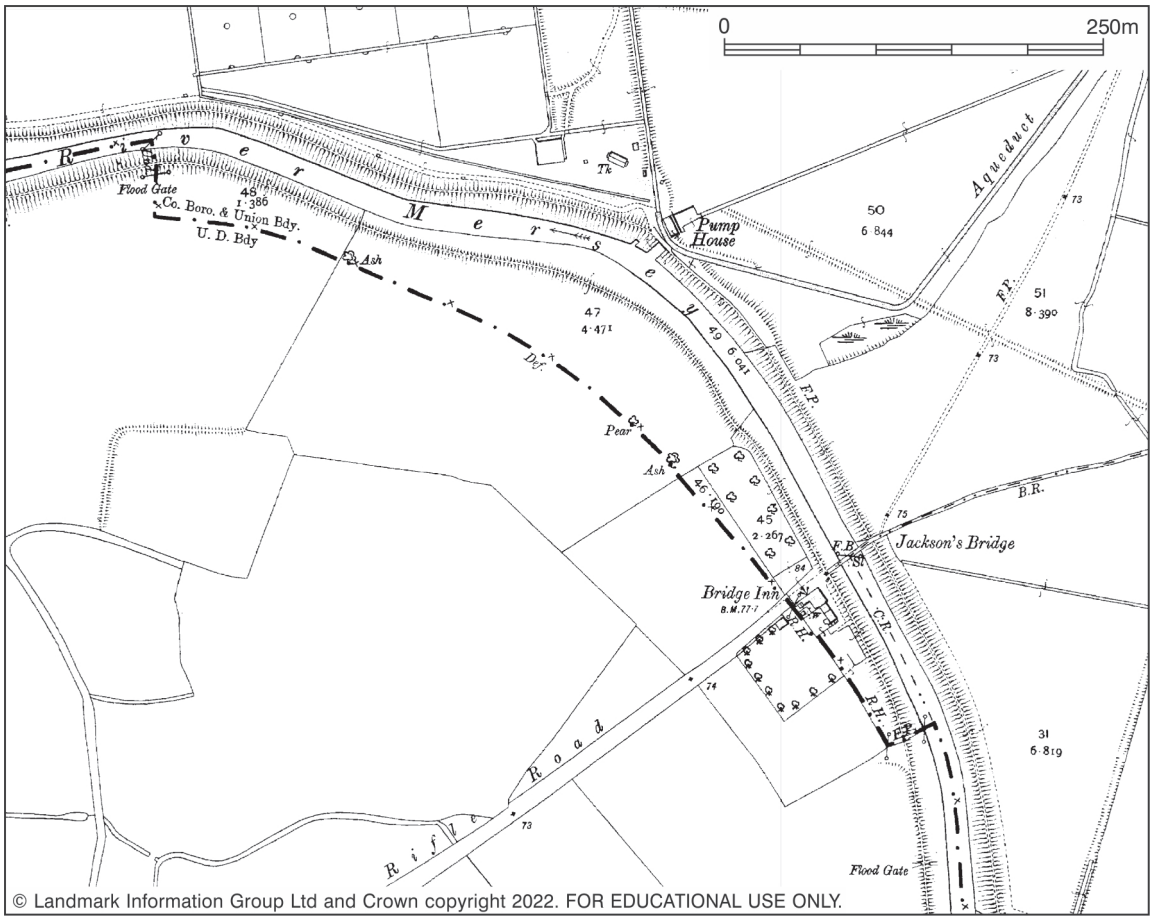

Figure 13: The Jackson's Boat reach of the River Mersey in 1900 showing the County Boundary south of the river. Note the public house is named the Bridge Inn and the river crossing is Jackson's Bridge. Rifle Road take its name from a 19th century rifle range parallel to the river immediately downstream if the then Bridge Inn.

> A good view of the flood sluice gate structure across the river is obtained 100 metres beyond the signpost. Continue in the Stretford direction.

A short distance further towards Stretford, you will see the first sign and entrance for the Chorlton Ees Nature Reserve on your left. (Ees is an archaic English term for a piece of land liable to flood, or water meadow. It is derived from the Anglo-Saxon *¯eg* (or *¯ieg*) meaning 'island', also used of a piece of firm land in a fen and of land situated on a stream or between streams (Ekwall, 1940).

> Continue towards Stretford along the river bank. You will come to a second entrance to the Chorlton Ees Nature Reserve with a low brick wall visible.

Figure 14: The flood sluice gate seen from the far side of the river.

Figure 15: The entrance to Chorlton Ees Nature Reserve from the river bank.

Figure 16: Entrance to Chorlton Ees Nature Reserve with the wall that was around the filter beds of the former sewage works.

Stop 3: The former Withington Sewage Works.

The site of the former Withington Sewage Works is shown on Figure 13 and on the Google Earth image below. This brick wall is part of the filter bed area which appears as an open green square in Figure 17.

The works are one of the earliest urban impacts on this part of the Mersey Valley. Initially, to meet the requirements of the 1875 Public Health Act (the development of the sanitary legislation that was consolidated in the 1875 Act is summarised by Porter, 1997 pp. 409-414) in 1885, a main drain was constructed to take waste water and street runoff from the Levenshulme and Withington Local Board areas. The waste water passed through filter beds and was then spread over the farmland adjacent to the river (Figure 18). The sewage was "distributed upon the land in a crude state" (Swarbrick 1894). Field drains took excess water from the farmland to the River Mersey. When first discussed by the Withington Local Board in 1879 (Kennedy, 1989), the scheme's proponents claimed that Chorlton Ees at the junction of the Chorlton Brook and River Mersey would be the most desirable location for an outfall to the river. At the opening it was claimed that the sewage effluent from the new plant would be the cleanest of all the works in the upper Mersey and Irwell basins, whereas before it had been one of the worst.

Figure 17: Chorlton Ees Nature Reserve showing features related to the former sewage works (image © Google Earth Pro).

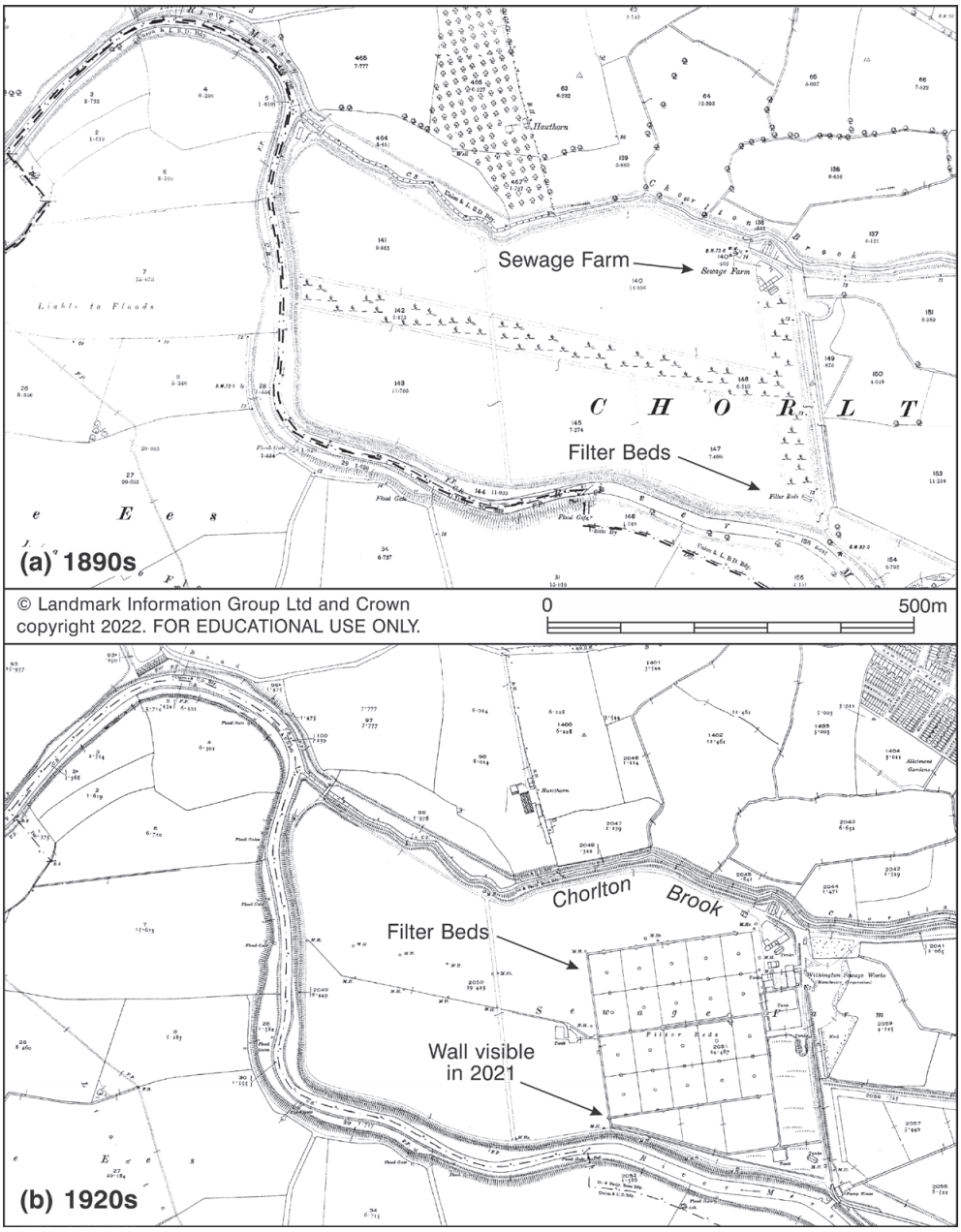

Figure 18: (a) 1890s OS map of Chorlton Ees showing the sites of the original sewage works and filter beds. (b) 1920s OS map of Chorlton Ees with the filter beds clearly indicated.

Twenty years later an improved treatment plant was opened in September 1904. The Lancet reported in October 1904 that "At first land filtration was thought of but objected to and an experimental tank for bacterial treatment was constructed with the result that the system of bacterial treatment was decided on". The filter beds are seen on Figure 18b.

The Withington works were the site of a key experiment to test the treatment of sewage by the activated sludge method, discovered in Manchester's Davyhulme plant laboratories. In 1915, a full-scale flow unit was built in an existing tank to deal with a flow of 1137 m^3 per day (Horan, 2012). So successful were these experiments than many cities rapidly adopted them. This activated sludge process became the dominant technology worldwide for large, urban treatment plants. Despite many process advances, its basic method of organic matter removal has changed little over the past century. Thus, the low wall reminds us of another "Manchester First!".

The works closed in 1972 as higher levels of streatment and sludge disposal were expanded at Davyhulme. By 1988 the large modernised works by the Ship Canal was able to provide higher quality treatment at a lower cost than continuing with the local Withington works. Davyhulme had a sewer catchment area covering a large segment of Greater Manchester (Figure 20).

The activated sludge (AS) process is currently the most widely used biological wastewater treatment process in the developed world. Since its conception in the late nineteenth century and subsequent development into a full-scale process in 1913 by Arden & Lockett at the Davyhulme sewage treatment works in Manchester, the basic process has been widely adopted and further developed giving it a unique flexibility of operation.

The activated sludge process depends on aerobic biological action. In this case the microorganisms, in searching for food, break down the complex organic substances into simple stable substances. This process results in the removal of soluble and suspended organic matter from wastewater.

Sewage farms use sewage for irrigation and fertilizing agricultural land. Sewage farming allows treated water, which might otherwise be wasted, to be used for irrigation. Some of the nutrients and organic solids in wastewater can be usefully incorporated into soil and agricultural products rather than fouling natural aquatic environments.

> Stay on the river embankment, but take the narrow footpath that runs along the crest of the embankment, leaving the main Trans Pennine Trial closer to the river. This higher path enables the walker to see both the river landscape and the meadows and woodlands of Chorlton Ees.

After seeing an open meadow on the right, looking away from the river, there is a patch of dense woodland that continues up to the Chorlton Brook. This woodland covers the former settling ponds just above the outfall from the original sewage works. In the woodland are several water bodies, detectable as dark patches on the Google earth image (Figure 17). These patches of water are the remains of those settling ponds.

Stop 4: Chorlton Brook footbridge

Chorlton Brook here appears to be deeply incised into the landscape (Figure 20). This is related to the fluctuations of river levels in the Mersey which in flood times can be 6 to 8 metres above its normal level. At such times water flows out of the Mersey into the Chorlton Brook channel and could impede runoff from within the urban area upstream. The flood water capacity within this deep channel is thus critical for areas such as Ivy Green and Chorlton Green.

> Keep on the high bank until is descends to the main trail level and you cross the Chorlton Brook.

Immediately across the bridge is a footpath towards the east that leads across the meadow to woodland en route to Ivy Green. That woodland covers the former Ivy Green tip, a waste dumping area that operated for over 50 years. It is a good example of the restoration of greenspaces in the Mersey Valley.

> Keep following the Mersey Bank until you see a set of railings on your left.

Figure 19: Map of the area sending sewage to Davyhulme Sewage Treatment Plant for treatment in 1988 (after Jones and Counsell, 1988).

Figure 20: Chorlton Brook, looking upstream from its confluence with the River Mersey

Figures 21a and 21b: The 1840 flood overflow weir.

Stop 5: The 1840 flood overflow weir

The railings stand on the crest of the 1840 flood overflow weir. You can see the wet area below the weir when standing by the railing. The Bridgewater Canal Company was greatly concerned about flood damage to the Barfoot Bridge aqueduct. To help reduce the problem they built a stone weir upstream, which allowed floodwater to run along a channel, by-passing the bridge. There is still a plaque built into the weir bearing the inscription:

> "This weir was begun on the 16th April 1841 and was completed on the 24th day of September 1841. William Cubbitt FRS Engineer John Tompkinson Contractor who undertook to execute it on the falilure of the previous work, which was swept away by the flood of the River Mersey on the 17th August 1840".

The weir is not the first attempt to have a flood diversion here. Trouble arose with flooding soon after the Bridgewater Canal aqueduct was built. Local historian Andrew Simpson comments in his blog:

> "After a heavy flood in August 1799 broke the banks where Chorlton Brook joined the Mersey, there were fears that the Bridgewater Aqueduct across the flood plain could be damaged by flooding it was decided to build an overflow channel improving the course of Kicketty Brook and build the stone weir. Not that it always worked. Soon after it had been built flood water swept it away and during the nineteenth century neither the weir nor the heighted river banks prevented the Mersey bursting out across the plain. In July 1828 the Mersey flood water transported hay ricks from the farm behind Barlow Hall down to Stretford only later to bring them back the next day" [from https://chorltonhistory.blogspot.com] (Simpson, 2020).

> Turn back and walk to the end of the railings and a few steps further to descend the steps shown in Figure 23 down to the narrow, sealed Hawthorn Road. Turn left.

Figure 22: View of the overflow channel, Kicketty Brook, from the 1840 weir.

Figure 23: The steps going down to Hawthorn Road seen from the river bank

Figure 24: The view of the 1840 weir from Hawthorn Road

After 100 metres or so you can get a view (Figure 24) looking back through the hedge on your right of the face of the overflow weir. Continue along Hawthorn Road. After a while you will see a gas pipeline installation on your right (Figure 25).

Stop 6. Hawthorn Lane Gas valve compound

The gas pipeline reminds us that the Mersey Valley has not only become the transport route for the M60 but the route for utilities, with the electricity pylons (Figure 10) and the underground gas main. Not only this, but James Brindley had a plan to build a branch canal from Sale Moor along the valley to Stockport. It could have been the 18th century equivalent of the 20th century motorway (Figure 26).

Figure 25: The gas valves enclosure in Hawthorn Lane

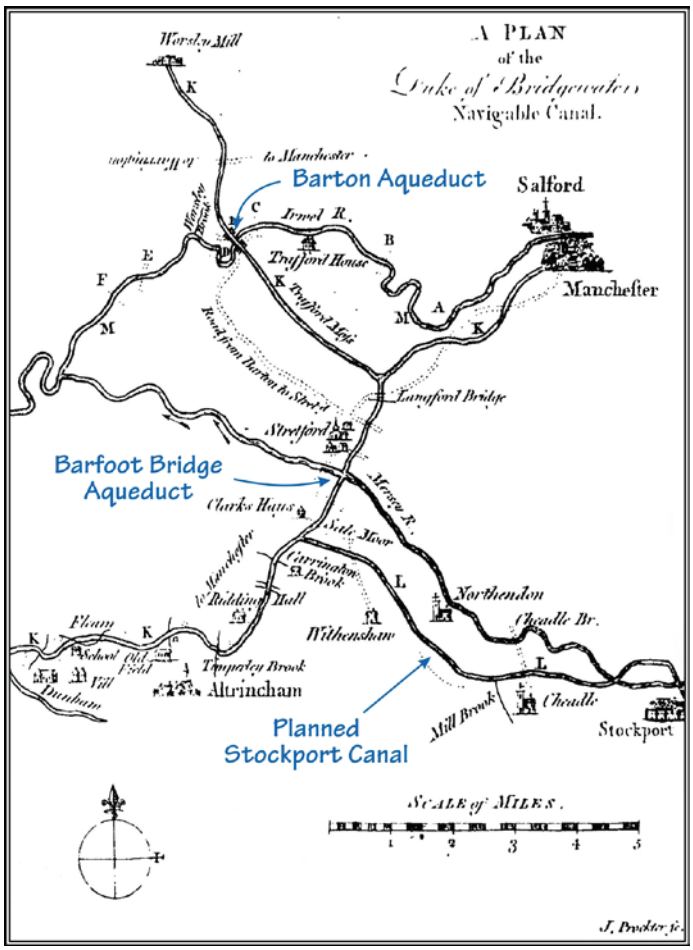

Figure 26: Part of Brindley's map of the Bridgewater canal showing the route across Sale Moor and the proposed Stockport Branch.

> A little further on your right there is a style and gate across the road and an opening leading to a small car park. Go into the car park and look at the Turn Moss playing fields beyond.

Stop 7: Turn Moss

Turf moss or Turn Moss in the low-lying meadows or ees, was mentioned in the Wills of the local landowning family, the Mosleys, in 1611. It became Turf Moss Farm with the farm house being on the floodplain. Its cellars were regularly flooded and the occupants relied on a shallow well and rainwater tank for their water supply. Many local residents work on the farm area during the Second World War Dig for Victory campaign. Turn Moss Playing Fields (Figure 27) now provides the largest area for outdoor sports facilities in Trafford.

A proposal to develop a major football training centre here was included in Trafford Council's *Stretford Refreshed Masterplan (Consultation Draft September 2017)*. Led by Gary Neville, a well-known former Manchester United player, the plan was turned down after great community pressure and protest. Trafford Council claimed that the partnership with Salford City FC would be a great opportunity to complement their vision of Trafford as a focal point for high quality professional and amateur sports provision and that the investment would enable it to improve and upgrade facilities, including improved public pitches, for the benefit of all users of Turn Moss, particularly the local football clubs. Opponents to the scheme said it would harm wildlife, disturb people living in nearby retirement apartments and effectively hand over protected open space to the private sector.

This is a classic example of the many dilemmas about access to greenspaces for urban people to enjoy. In the Mersey Valley, many areas are allocated exclusively for particular activities, not only golf courses, but pitches for team sports, such as cricket at Ashton-on-Mersey and rugby football at Didsbury. Other activities are confined to specific parts of the valley, for example model aircraft flying near Ashton-on-Mersey. There are also nature conservation areas, such as Broad Ees Dole (Stop 12 on this walk), from which

Figure 27: Turn Moss Playing Fields

the public is excluded. However, since 1970, the trend has been to open up the valley to general public access. Several former sewage works, such as the Withington Sewage Works (seen at Stop 3), and past landfill sites are now revegetated and generally fully open for public use. Opinions will be divided over issues such as Turn Moss, but it is important that public consultation and democratic participatory decision making occur in all such cases.

A strong Friends of Turn Moss community organisation emerged during the football controversy. Also, on 26th April 2019, the Turn Moss Steering Group was officially formed with all key stakeholders represented. This is a good example of community action to preserve access to urban greenspace for all. In August 2019 Friends of Turn Moss assisted by Groundwork Greater Manchester conducted a "bioblitz" to discover how many insect species they could find on the Moss. They showed that while six types of insects were found beneath a wildflower meadow, just one species was seen beneath the football pitch, highlighting the stark differences in wildlife when nature is left to its own devices.

> Return to Hawthorn Road and continue towards Stretford. You will pass the southern edge of Stretford Cemetery.


Figures 28a and 28b: Views of Stretford Cemetery and its trees.

Stop 8: Stretford Cemetery

Opened in 1885, the cemetery contains a memorial to residents who lost their lives during the Manchester Blitz of 1940. It is typical of many municipal cemtries established in Britain at this time. In Manchester, Philip's Park Cemetery opened on 1866 and the Southern Cemetery began in 1879. Like many other long-established cemeteries, Stretford's has many mature trees that make it a valuable greenspace that contributes to the mitigation of global heating. Use of cemeteries as recreational greenspace is being widely discussed in North America (Quinton *et al.*, 2020; Rae, 2021).

> Return to Hawthorn Road and continue towards Stretford.

Beyond the Metrolink tramline bridge in front of you is the Cut Hole Aqueduct carrying the Bridgewater Canal.

Stop 9: The Bridgewater Canal Aqueduct and Cut Hole Bridge Aqueduct

The aqueduct is worth examining carefully. The triple span arch bridge aqueduct, constructed in brick is based on a standard template used along most of the canal. It is an English Heritage Grade II Listed Building with the following description:

> "STRETFORD BRIDGEWATER CANAL SJ 79 SE (SJ 7993 NE) 5/8 Aqueduct over - Hawthorn Road - II Canal aqueduct. c.1776. J. Gilbert and J. Brindley engineers. Hammer-dressed stone. 3 segmental-arched spans, one over the road, the others over a River Mersey overflow channel. Each of the arches is of brick construction with a keystone and segmental band. The aqueduct was widened to the west in late C18 or early C19. The overflow channel arches are considerably wider and are separated by a triangular cutwater. Continuous stone band above the arches. Sometimes referred to as Cut Hole Aqueduct."


Figures 29a and 29b: Views of the Cut Hole Railway Bridge with the Canal Aqueduct beyond.

> Go under both bridges. Just beyond the second bridge on the west side of the canal to the right a flight of stone steps leads up to the Canal embankment where the Watch House, now the home of the Watch House Watch Cruising Club, can be found.

Stop 10: The Watch House

Now the oldest building in Stretford, in the late eighteenth century, the Watch House was the residence of the foreman responsible for canal bank maintenance. One of his most important jobs was to 'watch' Barfoot Bridge when the Mersey was in flood. If the bridge was in danger, it could be isolated and the canal waters shut off by placing across the canal massive timber baulks in grooves.

James Brindley is credited for introducing these "safety gates" to canal-building, the aim being to prevent the loss of water after a breach. These gates, which rested flat on the canal bed in normal conditions, were designed to pivot into a vertical position to dam up the channel if a sudden increase in water pressure signalled a breach in the canal banks (Owens, 2013).

Figure 30: The Watch House, Bridgewater Canal, Stretford.

> Return back down the steps to Hawthorn Lane and continue up the road to a junction with a large Trans-Pennine Trail sign (Figure 31a). Turn left following the Bridgewater Way signpost (Figure 31b). A few metres further on see a Route 62 cycleway sign (Figure 31c). Turn left here and walk down back towards the canal aqueduct. Go through the arch on the right. This is the flood overflow channel from the weir back along Hawthorn Road.

Figures 31a, b and c: The signposts indicating the route set out below.

Figure 32: View of the canal aqueduct, with barges passing overhead, 5 April 2009.

> The walk continues under the right hand arch then under the Metrolink tramline bridge and turns right.

Figures 33a and 33b: Pictures showing the channel under arch and on the far (upstream) side of the arch.

> After going through the arch and turning right, follow the footpath immediately adjacent to the former railway that is now the Metrolink line.

As you walk along here you can catch snippets of bird song between the rattles of passing trams. The trams run along the former Manchester South Junction and Altrincham Railway which opened on 20 July 1849 (Swain, 1987). The line was electrified at 1500 V DC in 1931, with electric multiple unit trains first running between Manchester London Road (now Piccadilly) and Altrincham in May. The electric system was converted to 25 kV AC in 1971 with electric trains then running from Altrincham to Piccadilly, Stockport and Crewe. These electric trains ceased operation on 24th December 1991 when the line was closed, in preparation for conversion to Metrolink tam operation.

In addition to the suburban electric trains, for many years, passenger steam trains (later diesel trains) ran along this line on the ex-Cheshire Lines Committee (CLC) route from Chester via Northwich to Manchester Central. The trains were diverted to Oxford Road when Central Station closed, and later were diverted at Navigation Road through Stockport to Manchester Piccadilly from December 1991. The Metrolink line to Altrincham opened on 15 June 1992. Originally expected to carry 10 million passengers per year, this Altrincham to Bury line was carrying about 15 million passengers per year before the COVID-19 pandemic. At first the trams ran on the old heavy rail lines, but the whole track was completely renewed in 2007.

> Continue along this path until it rises up on the Mersey embankment. Cross the river on the bridge adjacent to the railway and turn left immediately and go down to the river embankment. Take a flight of narrow, uneven steps (with care) down to the river and walk under the railway bridge.

Stop 11: Barfoot Canal Aqueduct

Look downstream at the canal aqueduct. Locally known as Barfoot Bridge, this is also a Grade II listed building consisting of a single segmental-arched brick span. The arch is constructed in brick with a band of stone and two continuous bands above that. The west parapet has been rebuilt in brick, concrete and steel whereas the east side retains its stone- coped brick parapet wall. Each side is 823m long and 5.2m high with a 34.1m wide base. It crosses boggy ground and, as he described in his 1779 book, Brindley used timber supports on an earth embankment lined with puddled clay, which was adopted as a standard canal waterproofing technique until the 20th century (Nevell, 2013). This was the main bridge that the 1840 overflow weir and channel were designed to protect.

Here is a contemporary description of the building of the embankment leading to these river crossings:

> "He has finished the cut across Sale Moor in Cheshire, and will soon complete it over the meadows each side of the River Mersey; the entrance of which, from the low and boggy situation, was, by men of common understanding, deemed his *ne plus ultra*. At this place, Mr. Brindley caused trenches to be made, and placed deal balks in an erect position, backing and supporting them on the outside with other balks laid in rows, and screwed fast together; and on the front side he threw the earth and clay; in order to form his navigable canal. After thus finishing forty yards of his artificial river, he removed the balks, and placed them again where the canal was designed to advance." (Brindley, 1779 p.40).

> Return to the river embankment and observe another outflow weir upstream where extremely high floodwaters could flow out of the Sale Water Park flood basin back into the river. (We will see the main outlet sluice a little further on).

Figures 34a and 34b: The Barfoot Aqueduct (Bridge).

Figure 35: The emergency outflow weir from the Water Park.

Figure 36: The Water Park sign.

> Turn round and return to the footpath by the tramline, continue in the original direction until you see the Sale Water Park sign. Go the right of the sign down to the edge of the Lake and read the information about the flood sluices.

Figure 37: The information sign for the sluice gates.

Figure 38: The floodwater outlet sluice gate which is to the right when reading the sign.

> Go to the left and follow the wide, sealed path around the lake to Broad Ees Dole Nature reserve with its areas of wetland, woodland and grassland.

Stop 12: Broad Ees Dole

The name Broad Ees Dole refers to a wetland (Ees) that was made available for the poor (Dole) to use. (The phrase "on the dole" refers to being in receipt of money distributed to people out of work).

The refurbished bird hide, opened in 2017. provides a good view across the main water body with the reserve. In 2003 Broad Ees Dole became the first site in Trafford to be recognised by English Nature as a Local Nature Reserve, primarily because of its importance to migratory birds and the diversity of its plant life. The amount of water entering and leaving the Dole is managed, maintaining its mud flats to make sure they are available for birds like common snipe and redshank throughout the year. Migratory birds like little ringed plovers and common sandpipers also use the Dole as a resting and feeding place on their route north for the summer. In summer and winter, water is allowed in, to prevent the mud from drying up; in spring and autumn, water is released, to expose the mud. In addition to the wading birds, mallards, coots, moorhens and lapwings nest in the reeds in the marshland surrounding the mud flats. Grey herons and kingfishers are also frequently seen. As well as providing a habitat for wild birds the Dole also contains an orchid meadow in which heath spotted-orchids have become established. Also, there are breeding colonies of smooth and great crested newts.

Figure 39: The wetlands of the Broad Ees Dole Nature Reserve.

Figure 40: The Heath Spotted Orchid.

In 2000, the Dole began to become infested by the alien plant swamp stonecrop. The plant began to significantly reduce the value of the nature reserve to wading birds, so in 2005 major work was undertaken to remove it. The Dole was drained, all of the surface soil was removed and the area treated with herbicide before being allowed to return to marshland.

> Return to the broad sealed path and continue to walk back towards the eastern end of the lake. Follow a path in the same direction that enters a woodland area and rises upslope to the ridge on which the Visitor Centre is situated. The visitor car park is behind the visitor centre and the road to the left descends to Sale Water Park Metrolink station. A café adjoinins the visitor centre and there is another café and a bar and restaurant at the main water sports area on the south side of the lake.

Figure 41a and 41b: Swans on the water park in summer and when frozen in winter on 3 January 2011.

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