

**44 St. Helens Canal**

the small number of commercial abstractors.

*Category: Remainder 23.5km**Map: Plate 37 Profile: Not applicable*

1. The St. Helens Canal, otherwise known as the Sankey Brook Navigation, comprised the canalisation and improvement of the Sankey Brook, from the River Mersey below Warrington towards St. Helens. The connection to the River Mersey was later moved 2.4km downstream by an artificial cut to Fiddler's Ferry and subsequently extended a further 5.6km to Widnes, where a pair of entrance locks and a dock were built. At the northern end, artificial cuts followed the course of the Black Brook and Rainford Brook to Gerrards Bridge.

2. This was one of the earliest of eighteenth century canals, the original navigation being authorised in 1754, some five years before the Duke of Bridgewater's Canal. The final extension to Widnes was authorised in 1830. The Canal was incorporated in the St. Helens Canal and Railway Company in 1845 and became vested in the London and North Western Railway in 1864, thus subsequently passing to the L.M.S. Railway. It was closed to navigation between St. Helens and Earlstown by an Order of 1930, and in 1955 the Gerrards Bridge Branch was transferred to St. Helens Corporation. Traffic ceased in 1959, and the legal closure of the remainder was effected by the B.W.B. Act of 1963.

3. It was a broad gauge canal, the locks having a width of about 4.4m. The remaining twelve locks are derelict or cascaded and all the remaining lengths of waterways are un-navigable.

4. Due to the progressive elimination of the canal the number of bridges has been reduced considerably, and of those remaining the Board is responsible for thirty two of which two are public road bridges. Most of the other thirty are foot-bridges or swing bridges, some of which have been fixed since closure.

5. There is a water intake from Carr Mill Reservoir, which is not owned by the BWB who only have the storage rights and responsibility for maintaining the dam and ancillary works. This water provides a stand-by feed to the C.E.G.B.'s Bold Power Station, being no longer available to the lower part of the main line due to the elimination of part of the canal. The Sankey Brook provides the main supply to the lower part of the main line. This supply is polluted and leads to heavy siltation of the canal. At times of flood, the quantities of water discharged are excessive, resulting in overtopping of the canal banks and in flooding, particularly in the Dallam Area of Warrington. The remaining part of the Pocket Nook Branch, which receives its water from the Sprays Brook, is used as a cooling and fire fighting reservoir by adjacent glass manufacturers. There are no other water sales on this canal.

6. The canal is in the Wigan Area and the maintenance staff are based at the Wigan Section Yard on the Leeds and Liverpool Canal (45). No bank protection or dredging has been carried out for a number of years and the water is ordinarily maintained at a low level to reduce the risk of flooding.

7. No commercial, cruising or other amenity activities exist, save for a few anglers and walkers. Although it lies throughout in industrial surroundings, there are proposals for local authorities to develop most of the canal for amenity purposes. Otherwise its only function is as an aqueduct for

## 45. Leeds and Liverpool Canal

*Category: Cruising 215km & Remainder 16.5km.  
Map: Plates 38-41 Profile: Figure 27*

1. The canal comprises a single Main Line 204km in length between the cities of Leeds and Liverpool, with a few short branches totalling some 24km. The Main Line passes through Shipley, Skipton, Burnley, Blackburn and Wigan. At the Liverpool end, the Stanley Dock branch connects with the docks system of the Mersey Docks and Harbour Board, while at Leeds there is an end-on connection with the Aire and Calder Navigation (35a). The Rufford Branch, of 11.75km, links the Main Line at Burscough, 40km from Liverpool with the tidal R. Douglas at Tarleton; the Leigh branch, also of 11.75km, connects Wigan with the Bridgewater Canal (of the Manchester Ship Canal Company) at Leigh. There is also the 0.6km Springs Branch at Skipton. Of the other former branches, that at Johnson's Hillock (to Walton Summit) is largely derelict, whilst that at Shipley (to Bradford) has been eliminated for many years. From Liverpool docks the canal rises by a total of fifty one locks to the Foulridge Summit, 149m above sea level, and then descends by forty four locks to Leeds, about 26m above sea level.
2. Construction of the canal commenced under an initial act of 1770 and the first lengths from Leeds to Gargrave and from Liverpool to Wigan were in operation by 1777. Work on the middle section did not start until 1790 and was not completed until 1816. At that time the length from Wigan to Johnson's Hillock was shared with the Lancaster Canal (46), of which it formed the southern extremity. Later the Lancaster Canal leased this length to the Leeds and Liverpool Canal, the arrangement being eventually confirmed by Parliament in 1846, when also the connection with the Liverpool docks was opened. Subject to this qualification, and to a leasing of tolls for a short time to the London and North Western Railway Company, the whole of the Leeds and Liverpool remained independent until nationalisation.
3. The one hundred and five locks (including eight on the Rufford and two on the Leigh branches) are generally 4.57m wide and constructed to take barges of a length not exceeding 18.9m; but from Wigan to Liverpool (including the Leigh Branch) they were made to take 21.95m barges.
4. There are over five hundred and fifty bridges of various kinds crossing the canal, but the Board maintain only ninety six highway and two hundred and sixty six accommodation bridges. Many of these in the upper reaches are substantial masonry structures, but at each end there are numerous swing bridges, usually of timber construction. Other features include two tunnels, one at Gannow, Burnley (509m) and the other at the summit at Foulridge (1488m), and sixty three aqueducts, some of substantial masonry construction. In Burnley, a large span modern aqueduct of steel and reinforced concrete, which carries the canal over a main road, is maintained by the local authority. The canal contains no very deep cuttings, those at the tunnel approaches being of moderate depth, but there are long and high embankments at Blackburn and Burnley and on the Leigh Branch.
5. A group of five reservoirs with a total capacity of 4023 MI supplies water to the Foulridge summit; from the Winterburn Reservoir, water is conveyed to the summit by a 16km length of 0.9m cast iron pipe line. A few streams discharge directly into the summit. On the Lancashire side, the Barrowford reservoir (454MI) collects surplus water from the summit and, together with the Rishton Reservoir (554 MI), near Blackburn, helps to meet demands on the 37km Burnley pound. Purified sewage effluents also are discharged into the Burnley pound in exchange for cooling water extracted by the C.E.G.B. The Eshton Beck and Morton feeder flow into the Yorkshire section near Gargrave and Bingley respectively. Stream flows fall off rapidly in dry weather and the system is heavily dependent on autumn and winter rainfall. Supplies to the lower reaches in Lancashire are available from the R. Douglas, but this water is generally polluted. Water can also be pumped up from Stanley Dock to the top of the locks. Supplies of water for industrial purposes are of significant volume at several points; the C.E.G.B. take supplies at Whitebirk and Huncoats power stations near Blackburn, and other users purchase considerable quantities in the Liverpool area. On the Yorkshire side the demands are small.
6. Generally, the canal was constructed with bank protection, usually drystone, on the towpath side only. At the western end of the canal, however, there are long stretches of timber sheet piling consisting of horizontal planking to just below water level which are restrained by tied timber posts, back-filled with broken stone and surmounted by a couple of courses of drystone. Much of the timber's life has expired and extensive replacement will be needed within a few years. There are long lengths of contour canal, for example the 27km pound from Gargrave to Bingley, where the canal is often at a considerable height above the Aire Valley. Although much bank protection has been repaired or replaced, mainly with steel sheet piling and concrete walling, there are many sections, particularly on the Yorkshire side, which require further attention. Leakage of water through the bed and banks of the canal persists at a number of points, but not to an extent likely to involve danger to public safety. Priority of attention is given to places where adjoining landowners or the public are affected, or where lack of first aid repairs would entail a risk of rapidly worsening conditions.
7. The towing paths in general are of adequate width, in some places allowing access for road vehicles for inspection and maintenance purposes, and the surfaces reasonably good. Steps are taken to prevent or limit access in the vicinity of large towns e.g. Liverpool and Burnley, where greater risks to public safety are to be feared. In the Bootle area four safety patrol men are employed by the Board at the insistence of the local authority in an attempt to keep young children away from the canal.
8. Dredging is carried out fairly steadily throughout the canal, each of the four sections utilising one hydraulic grab dredger with a tug and one to three hoppers and a discharger. In view of the long length of waterway to be dealt with, it is evident that any particular section can receive attention only at long intervals; tip sites are widely spread and the time and distance involved in disposal of the spoil makes the dredging work expensive.
9. Subsidence of the ground due to coal mining has taken place in the past at a number of places, necessitating raising of the banks to maintain water levels. Where the cumulative subsidence is large (as, for instance, on the Leigh Branch) the canal is now carried on wide embankments up to 10m high. Subsidence continues at Huncoats, and to a small extent on the Leigh branch where the embankment material gives rise to some concern as to its ultimate safety.
10. The whole of the canal comes within the control, for maintenance and operation, of the Area Engineer at Wigan.

Section Inspectors, each having a depot and other facilities, are located at Burscough, Wigan, Burnley and Apperley Bridge. Warehouses exist at several places, but there are few buildings of note. The only 'listed' structures are Bingley Five Rise Locks and the Seven Arches aqueduct a few kilometres to the south east.

11. Since coal traffic on the Leigh Branch ceased in 1967, commercial traffic has been negligible. There is, however, appreciable use of the canal by pleasure craft, particularly on the longer pounds, but the long flights of locks do not encourage through traffic. Boatyards and moorings exist at many places with boat clubs in evidence here and there, but there are no marina type developments on the scale frequently encountered further south. A development of this kind would be appropriate at Bingley, to relieve a long stretch of moored boats.

12. Angling is a recreational activity carried on throughout the length of the canal. Coarse fishing predominates but there are trout in the higher reaches above Skipton. There is little evidence of other recreation or amenity pursuits on the canal, nor is any part set aside as a nature reserve.

13. A particular problem presents itself in the region of Liverpool, where the neighbourhood is heavily industrialised and dumping of rubbish frequently takes place. Except for the fact that it gives navigational access to the Mersey through the dock system, this section appears to be of little value either commercially or for pleasure cruising to the canal as a whole. It could perhaps be made into an urban amenity, on the lines of the Ashton Canal project in Manchester.

## 46 Lancaster Canal

*Category: Cruising 68.5km & Remainder 14km*  
*Map: Plate 42 Profile: Figure 28*

1. The Lancaster Canal was originally constructed in two sections – the South End ran 22.5km from Wigan to Walton Summit and what remains of this section is now part of the Leeds and Liverpool Canal. The North End ran 92km from Preston to Kendal, with a 4.5km branch to the Lune estuary at Glasson. The intended link between the two ends was never built and the Lancaster Canal, today, consists of the remaining part of the North End. The Main Line from Preston to Tewitfield and the Glasson Branch are in the 'Cruising' category. Tewitfield to Stainton (14km) is designated 'Remainder' waterway, whilst most of the rest has been disposed of, including 1km at the Preston end and the dewatered length north of Stainton. On the Main Line the only locks were the disused flight of eight at Tewitfield, which raised the canal 23m to its summit level of 44m above sea level. The Glasson Branch falls by 16m through six locks from the Main Line at Galgate to the Glasson Basin.
2. The history of the Lancaster Canal (South End) is described briefly in the introduction to the Leeds and Liverpool Canal (45). Authorised by an Act of 1792, the Main Line (North End) was opened from Preston to Tewitfield in 1799. The extension on to Kendal was completed twenty years later, and in 1826 an outlet to the sea was provided with the opening of the Glasson Branch. In 1843, the canal company leased the competing Lancaster and Preston Railway, but transferred the lease to the London and North Western Railway Company in 1849 and was finally absorbed by that company in 1885.
3. The only locks now open are those on the Glasson Branch which were built 23m long by 4.6m wide with a minimum depth of 1.5m over the sills. The Tewitfield flight of eight locks were the same size. Originally the ruling depth of the channel was 1.8m, but this is now reduced and the aim of the present dredging programme is to produce a 1.2m deep channel, with this depth being guaranteed over lock sills. Minimum headroom under bridges is 2.6m.
4. There are one hundred and forty bridges over the 'Cruising' section and fifty four crossing the 'Remainder' section. Of these totals, one hundred and fifteen (one hundred and six public road bridges) and forty three (sixteen public road bridges) respectively are the responsibility of the Board. So, too, is the 340m long Hincaster Tunnel, which is on the length of canal now dewatered. Most of the bridges are of masonry construction and there are few swing bridges. From Tewitfield northwards, the canal is crossed by road and motorway embankments, through which the canal is piped. Rennie's Lune Aqueduct, 180m long and a maximum of 18m high, is the major aqueduct on the waterway. There are some twenty three other aqueducts, seven of which are on the 'Remainder' section and are now dewatered. A total of six bridges and aqueducts are listed as being structures of architectural or historic interest. There are no very deep cuttings or high embankments on this canal.
5. Killington Reservoir feeds into the canal at Crooklands on the 'Remainder' section and is the only reservoir supplying the canal. This and the Tarleton feeder (from Lupton Beck) provide most of the water requirements but can be supplemented on the upper pound by the Stainton feeder, and on the lower pound by both the Whitebeck feeder, near Tewitfield, and the Catterall feeder, from the River Calder. On the Glasson Branch, between Locks Nos. 4 and 5, the canal shares the course of the Conder Brook, which leaves by a channel to Pye's Mill. In addition to land drainage, the canal receives considerable surface water run-off from the motorway crossings.
6. The major industrial user of water is the ICI factory at Fleetwood, which draws about 6 MI/day from the Main Line at Nateby. Killington Reservoir is used to supply local farmers and there are several other users along the course of the canal.
7. Most of the original structures on the canal are still in sound order. In recent years, the only work undertaken on the 'Remainder' section has been the lining of aqueducts and bed repairs to stop leakages, which occur chiefly where the canal is built on limestone bed rock. During heavy or prolonged rain, the water table rises and the build up of pressure beneath the canal eventually causes blow-outs. These blow-outs were particularly prevalent on the eliminated section north of Crowpart Bridge, and the disposal of this section resulted in large savings of water. No bank protection work has been undertaken on the above section, the water level having been lowered to about 0.8m deep. Leaks have been prevalent in the past on the 'Cruising' section north of Lancaster and bank protection work has been concentrated on this area, mainly using steel piping. Most of the embankments in built up areas have been dealt with, but there still remains a considerable length to be attended to. Elsewhere, timber slabbing is the order of the day, but considerable stretches remain unprotected and the offside, in particular, is prone to damage by watering cattle.
8. A towing path of adequate width exists along the entire length of the canal and, in the north, extends as a public right of way to the original terminus at Kendal. The Board's ownership does not now extend beyond Stainton Crossing except for the Hincaster Tunnel and the former horse track over it. On the 'Cruising' section the path is mowed regularly, but north of Tewitfield the situation is less good.
9. Hedges, in general, are in a somewhat unkempt state and require considerable attention. There are, however, no major problems with weed growth in the channel, which is cleared annually.
10. Dredging equipment consists of a grab crane on a flat, one tug and three 300 tonne hoppers. There are five dredging tugs. The dredging fleet has only been established since 1972, so a considerable backlog of work remains.
11. As the canal runs through largely rural surroundings, there is no large scale industrial pollution. Occasional discharges from Storey's Mill at Lancaster cause some pollution, but this is not of great importance.
12. With the exception of Hincaster Tunnel, the canal is under the control of the Area Engineer, Wigan. The Section Inspector is based at the Lancaster Depot, the only one on the canal, Hincaster Tunnel is presently the responsibility of the Development Section, Leeds.
13. The only buildings in BWB ownership are at Lancaster, where the Old Boat House at the Aldcliffe Road Basin is a 'listed' building.

14. Passing, as it does, through attractive rural scenery, extensive use of the canal is made by pleasure cruisers. There are several private moorings along the 'Cruising' section and BWB moorings in Glasson Basin. No access to any other part of the BWB system is available.

15. Other recreational uses include rambling and angling. Excellent coarse fishing is to be had throughout the canal and brown trout have been introduced in a few places. Most of the fishing rights are leased to the Northern Anglers Association.

16. The only other problem of note is one common to canals in urban areas, the dumping of rubbish in the final built-up stretch through Preston.

17. As well as its use for amenity purposes, the canal has considerable sales of water, with further room for development. If necessary, Lily Mere, above Killington Reservoir could be used to supplement supplies and not all of the present feeders are fully utilised. The 'Remainder' section has to be retained to supply the 'Cruising' section south of Tewitfield and it might be possible to reduce leakage problems by culverting or piping works on this stretch.

18. Because of its isolated nature, the canal has no value to the system generally and most of the cruising craft using it are locally based.

## 47 Caledonian Canal

Category: Commercial 96.5km

Map: Plate 43 Profile: Figure 29

1. The Caledonian Canal is an inland navigation between Inverness at the head of Moray Firth on the east coast of Scotland, and Fort William at the head of Loch Linnhe on the west coast. It passes through Fort Augustus and close to Invergarry. The navigation consists of a series of freshwater lochs, Loch Dochfour, Loch Ness, Loch Oich and Loch Lochy connected by artificial canals provided with locks. Loch Oich forms the summit pound at a height of 32m above sea level; Loch Dochfour is effectively a small extension of Loch Ness. Loch Oich and Loch Dochfour have buoyed channels, some lengths of which have had to be deepened by excavating the bed of the loch; the other lochs are very deep overall (the maximum depth of Loch Ness is 230m) and navigation there is unrestricted.
2. The commencement of the canal is at Clachnaharry on Beaulie Firth above the narrows leading to Inverness Firth; a sea lock and basin is followed by a staircase flight of four locks and a canal section to Dochgarroch 10.5km from Clachnaharry, where a regulating lock leads to Loch Dochfour. The 2.4km navigation of Loch Dochfour is followed by a 37.5km navigation of Loch Ness to Fort Augustus where a flight of five locks lead to a 8.5km canal section with one central lock and a final regulating lock at Aberchalder at the eastern end of Loch Oich, the summit pound. The latter is 6km long leading without a lock into the 2.7 Laggan Cut, at the western end of which a flight of two locks permits a descent to Loch Lochy. The navigation of Loch Lochy is 16km long, being followed by the final 12.8km canal section to Corpach at the junction of the two seawater lochs, Loch Linnhe and Loch Eil. A sea lock and basin are provided at Corpach. The entrance from Loch Lochy has two locks, and there are a further eleven on this length of canal, eight of these forming "Neptune's Staircase" at Banavie. Its general course, following the Great Glen, is nearly straight from end to end; it has no connections.
3. The canal was first conceived in 1726 and government studies were initiated in 1773 and 1802; an Act of 1803 finally authorised its construction. It took many years to build, and its cost escalated. Further Acts were passed on several occasions during the construction period to provide additional funds. The section from Clachnaharry to Fort Augustus was opened in 1818, the Corpach basin in 1819 and the complete canal in 1822. The canal shortens the sea passage between the east and west coasts of the British Isles by some 205km, thereby avoiding the necessity for navigating the Pentland Firth. This was an important consideration in the days of sail, but navigating the narrow lochs in the difficult wind conditions occasioned by the surrounding mountains was expected by some to prove difficult. This turned out to be the case and tugs were brought in for this purpose after a few years. However the more general use of steam power soon made these unnecessary but, at the same time, reduced the advantages the canal held over the alternative route via Pentland Firth as the latter then became less hazardous.
4. During the period up to 1850 a number of defects were discovered in the original construction, and some failures occurred. Various surveys and reports were undertaken and a Select Committee sat for several years. Certain design changes were made and incorporated in the works largely with funds voted by the Government, and also used to rectify the defects. Through passage was not possible from 1843 to 1847 when, amongst other improvements, many locks were reconstructed. An Act of 1919 transferred control from the Commissioners to the Ministry of Transport.
5. The canal was planned to have a top width of 33.5m, a bed width of 15.2m and a depth of 6.1m; the locks were to measure 49.4m by 11.6m, but this was subsequently increased to 51.8m by 12.2m to accommodate 32-gun frigates. The locks were built to this latter size save for the staircase locks which were made 54.8m long. When opened however the canal only had a 3.7m depth of water, but this was deepened over the years to 4.6m and to 5.2m after the reconstruction work in 1847. Whilst there are no fixed bridges over the canal an overhead electricity transmission line which crosses it just west of Inverness restricts headroom to a more than adequate safe height of 36.6m above water level.
6. The high proportion of the length of the navigation in lochs coupled with the few roads in the area means that only ten bridges cross the canal. All are opening bridges; two carry railways and are operated and maintained by British Rail, and one is a road bridge operated by the Highway Authority. The remainder are operated by BWB bridge keepers, six being public road bridges and one an accommodation bridge. With one exception all are mechanically operated single leaf swing bridges; the exception is the manually controlled swing bridge at Moy, which comprises two leaves and can only be fully operated by the gate-keeper rowing from one side of the canal to the other.
7. There are no tunnels or aqueducts except those which are in fact culverts carrying streams under the canal. Three of these in the Gairloch to Corpach section have been combined with farm underpasses in a single brick or stoned arched structure.
8. There are twenty nine locks on the canal. The chambers and approaches, of masonry construction, are generally in good condition requiring only localised pointing and repair. Towards the southern end, the situation is less good and a number of chambers are being pressure grouted to fill voids which have developed behind the walls. The gates, which were originally constructed of timber, are gradually being replaced. Some of the old gates are over sixty years old and the programme of replacement needs accelerating to overcome accumulating deficiencies of maintenance. The hollow quoins of the chambers are particularly prone to wear and need considerable attention. All of the new gates incorporate buoyancy tanks and have timber hinge posts, mitre posts and sill bearing pads. Mechanisation of the locks was commenced in 1963, the gates, sluices and paddles being hydraulically operated with electric controls contained either in a control cabin or a lockable cabinet.
9. This canal has a plentiful supply of water, the surrounding high mountains forming an extensive catchment area feeding the lochs which form part of the navigation. The supply to the summit pound Loch Oich comes from Loch Garry via the River Garry; it is delivered in a controlled manner by the Scottish Hydro-Electric Board thus ensuring a stable continuous supply. Located as it is in a major cleft in the Scottish Highlands, the canal is naturally paralleled by rivers flowing in either direction from the summit between Loch Oich and Loch Lochy. The Rivers Oich and Ness flow north-eastwards, from Loch Oich to Loch Ness and from Loch Ness to the North Sea via the Inner Moray Firth, respectively. The River Lochy flows south-westwards from Loch

Lochy to Loch Linnhe and ultimately to the North Atlantic. The outlet from each of these lochs is controlled by weirs maintained by BWB, and at various points along the canal overflow weirs and/or sluices provide means of draining water from the canal into the rivers. These arrangements, together with the canal's capability of passing water along its length by the use of lock sluices and paddles, enables the canal system to help control flooding. The recently opened power station feeding the North of Scotland Hydro-Electric Board's Highland Grid at Foyers, on Loch Ness, derives about 75% of its power by pumping water from the Loch; the remainder is produced from the natural flow of the catchments.

10. In general the canal sections are in shallow cuttings or on low embankments, the exception being the Laggan Cut which has steep banks on both sides. The lengths of canal at either end are alike, in that they are alongside and close to a steep river, the descent of which is matched in the canal by flights of locks. Upstream of these locks the canal is supported on high embankments reaching down to the river, the stability of the former depending on the behaviour of the latter. The River Lochy near Gairlochy threatens the canal in this way necessitating the use of steel sheet piles to support the embankments and demanding continual attention. The sloping sides of the canal are protected by stone pitching which extended from towpath level to well below water level. Over the years the wash from passing vessels has caused much of it to become dislodged, and repairs have been carried out. Despite the imposition of a speed limit, this problem has increased in recent years and maintenance has lagged behind; more rapid but less permanent remedial measures have been tried to safeguard the bank. The Laggan Cut was constructed with steep earth sides which are now heavily wooded. Slips are occurring continually, encouraged by erosion and undercutting of the bank, and accompanied by trees falling into the canal.

11. With the exception of the Laggan Cut, a well maintained towpath extends for the full length of the artificial canal sections, and public highways are located along the shores of the lochs. This towpath is motorable, at least by maintenance vehicles. Maintenance in the Laggan Cut would be greatly facilitated by the construction of a similar track.

12. Although dredging was necessary in Loch Oich in order to excavate the original navigable channel (using two of the earliest steam bucket dredgers), maintenance dredging has never been a significant activity for this canal, and can easily be dealt with by the equipment available at Inverness. This is a steam operated grab dredger used in conjunction with one 80 tonne bottom door hopper which deposits at sea or in Loch Ness. Land based dredging is necessary to clear the silt traps at two locations where burns enter canalised sections, and some of the sandy gravel thus collected is sold locally. Additionally, Clachnaharry Sea Lock is dredged every four years.

13. The Senior Inspector in charge of the canal is based at Inverness, and there are small subsidiary depots at Fort Augustus and Banavie. A dual-purpose vessel, "Scott I", owned by the Board, acts as a tug or as a pleasure steamer, capable of carrying sixty five passengers.

14. Traffic through the canal is varied, consisting of fishing vessels, small coasters and yachts on passage from east to west or vice-versa. Corpach Sea Loch was lengthened to 62m in the early 1960's enabling the Basin to be used by 1000 tonne ships serving the large paper mills around Fort William. This traffic is mainly timber and is an important

source of revenue. Some pleasure craft are based on the canal, including several boat hire firms, and 'Scot II' operates cruises into Loch Ness from Inverness during the summer months.

15. The scenic attractions of Loch Ness and its immediate environs are self evident. Angling and walking are both popular and of high quality, but no revenue accrues to the Board from either activity.

## 48 Crinan Canal

*Category: Commercial 13.5km*

*Map: Plate 44 Profile: Figure 29*

1. The Crinan Canal connects Loch Gilp on Loch Fyne with Crinan Loch on the Sound of Jura; running from Ardrishaig, it passes close to Lochgilphead and terminates at Crinan. Both termini were selected to be at points away from the heads of the lochs to avoid shallow water. The canal has three main pounds: an eastern pound stretching from the four locks (including the sea lock) at Ardrishaig Harbour to Cairnbaan; a summit pound 19.5m above sea level but only 1km long, between Cairnbaan (four locks) and Dunardry (four locks); and a western pound from Dunardry to Crinan where there is a sea lock and one other lock. There are basins at Crinan and Bellanoch on the western pound; the latter basin used to be part of the estuary of the River Add from which it is now cut off by the canal embankment. At Ardrishaig there is a basin and also a pier. The canal is an isolated one with no connections.

2. The Crinan Canal was first proposed in 1771 as a means of reducing by some 140km the distance between Glasgow and the Western Isles, and at the same time avoiding passage of the dangerous Mull of Kintyre. In time it vied with the alternative of a much shorter canal further south between East Loch Tarbert and West Loch Tarbert that would however only save 100km. It was not until 1793 after various studies and reports had been made and a Parliamentary Committee had considered the project that promoters organised the passage of a successful Bill. Work commenced on the Crinan Canal in 1794 but was delayed and hampered by lack of funds. An Act of 1799 authorised the promoters to borrow money, but Government funds were also needed and provided under Acts of 1804, 1811 and 1816; under the 1816 Act the completion of the construction work was entrusted to the Commissioners of the Caledonian Canal. The project was never completed exactly as planned. It was opened in 1801 in an incomplete state and not filled to its designated level as a precaution against faulty construction. Disasters to canal or reservoir embankments occurred in 1805, 1811 and 1859, each time causing closure of the canal for repairs and stimulating surveys and reports in 1813 and 1814, recommending various additional works and replacement of faulty construction. Additional works were ordered and completed throughout the 19th century. These included constructing, improving or extending piers at Ardrishaig and Crinan, raising embankments of impounding reservoirs, dredging and so on. In 1898 an Act was passed vesting ownership of the Crinan Canal in the Commissioners of the Caledonian Canal, and in 1919 an Act transferred ownership of the canal to the Ministry of Transport. New sea locks were constructed at Ardrishaig in 1932; the old sea lock at Crinan is now used as a mooring.

3. The dimensions of the canal vary over its length; the locks are all 29.2m long x 7.3m wide, save the sea locks which are 34.1m long x 8.3m wide; the eastern and summit pounds were planned to be 25.6m wide with bed widths of 14.6m and 12.8m respectively, whilst the western pound was to be 17.1m wide at the surface and 9.1m wide at the bottom, narrowing to 14.6m and 7.6m respectively in the rock cutting between Bellanoch and Crinan. Depths were planned to be 4.3m for the summit pound and 4.0m elsewhere. These dimensions were never quite achieved, but the canal can still be navigated by vessels 26.8m

long with a beam of 6.1m and drawing not more than 2.9m.

4. Four highway and three accommodation bridges cross the canal. With the exception of one of the latter, which is a timber drawbridge (moving horizontally across the canal), they are all steel swing bridges; two of the highway bridges are power operated.

5. There is only one aqueduct on the canal, which is little more than a brick arch culvert carrying a burn below the canal. The chambers and approaches of the locks at Ardrishaig and the sea lock at Crinan are constructed of dressed freestone masonry, elsewhere roughly coursed rubble blocks have been used for all except quoins and short adjacent lengths of wall.

6. In recent years considerable leakage has been taking place at all locks and voids have been forming behind the walls, causing settlement of the surrounding ground, and in one case leakage of canal water. Normal pointing of the masonry failed to halt this process but void-filling by pressure-grouting followed by surface guniting is now being used successfully. Most of the thirty lock gates are made of timber, but some are steel with buoyancy tanks; three are operated hydraulically, the remainder manually. They are all operated by BWB employees, who in winter are mobile "pass men". The 6.4km pound from Ardrishaig to Cairnbaan is mostly on sidelong ground with the canal partly on embankment and partly in cutting. The summit pound is mainly in cutting, and a section at Bellanoch is on an embankment across which, before the advent of the canal, was a branch of the River Add estuary. For the final 2.3km to Crinan, the canal is a channel cut from solid rock.

7. The supply of water to the canal is maintained by a series of lochs in the low hills south-west of Cairnbaan. The primary supply enters the summit pound by the Dunardry Burn Feeder from Daill Loch, which acts as a service reservoir. This in turn is supplied by water from Loch an Add, whose water can also be supplemented by that stored in Loch na Bric. Glen Loch, supplied by Loch Clachaig which in turn can be supplied by Camloch forms another group of reservoirs. Their natural outlet is via Carndubh Burn which forms a natural feeder to the summit pound just above the Cairnbaan flight of locks. If required this flow can be shut down and instead directed to Loch an Add (and thence to the primary feeder Dunardry Burn) via Loch na Feoline. Loch Bharain situated alongside the canal just above the Dunardry top lock, increases the water capacity of the short summit pound; an overflow weir/sluice from it to the River Add relieves the pound of excess water. Surplus water from the Crinan pound can be drained directly into the sea by means of an overflow weir and sluices; that from the Ardrishaig pound can be drained by an automatic 'waster' directly into Loch Gilp.

8. The canal banks were originally protected throughout by stone pitching. Over the years this has become eroded on some sections and replaced by timber posts or planks, notably in the long pound east of Cairnbaan. Erosion is continuing, and the timbers are now suffering also. Early records show that the embankment across the tidal inlet and shoreline at Bellanoch leaked badly, and frequently had to be repaired. Significant leaks are still noticeable at the western end of that section, due possibly to the embankment having been constructed with porous rock spoil from the nearby rock cuttings. The hardness of the rock and the cost and difficulty of excavating it to form a channel of uniform width and with regular sides resulted in the builder leaving a canal varying in



width from 12m to 15m at water level in the final stretch of canal before Crinan Harbour. The effective width, however, is less than this as the walls were left with overhangs in places and sharp edges protruding both above and below water line; substantial fenders have been installed at strategic points on both sides of the canal to protect passing vessels.

9. A towing path exists for the full length of the canal but only a short length can carry normal vehicular traffic. This is located at the summit pound where it also serves as access to houses. Whilst a main road runs alongside the canal for at least half its length, it is often so narrow and tortuous as to render it quite unsuitable for use in gaining access to the canal.

10. The Section Inspector is based at the depot at Ardrishaig. Dredging is carried out by an old grab hopper dredger of some 60 tonnes capacity, which was formerly based on the Forth and Clyde Canal (49).

11. Traffic through the canal consists mainly of yachts and fishing craft en route to new fishing grounds. Although the latter category has tended to decline over recent years, the former and heavier traffic, has increased. The basins at each end provide safe moorings, both for boats based there and for those cruising the adjacent sea lochs. Ardrishaig Pier, just outside the sea lock, is used for berthing coastal tankers. The isolated nature of the canal means that other amenity activities are on a small scale, despite the fact that the canal passes through attractive rural scenery.

## 49 Forth and Clyde, and Monkland Canals

### Forth and Clyde Canal

*Category: Remainder 58km*

*Map: Plates 45 & 46 Profile: Figure 30*

### Monkland Canal

*Category: Remainder 5km*

*Map: Plates 45 & 46 Profile: Figure 30*

1. When in full operation the Forth and Clyde Canal together with the Monkland Canal formed a unified canal system 82km long. The Forth and Clyde Canal stretched from Grangemouth on the River Forth to Bowling on the River Clyde, a distance of 37km, passing through Falkirk, Bonnybridge, Kilsyth, Kirkintilloch, Maryhill, Dalmuir and Kilpatrick. It rose from the Forth to a summit level of 47.5m near Castlecary by means of twenty locks, and descended to the Clyde by means of nineteen locks, the terminal locks both being tidal. The Forth and Clyde connected with the Union Canal (50) at Falkirk and with the former Forth and Cart Canal (1840-1890) at Whitecreek; at Stockingfield Junction the Glasgow Branch extended for 5.6km to Pinkston Basin where it formed the Monkland Canal.

2. This latter canal continued a further 19.3km through the middle and to the east of Glasgow, and then on through Coatbridge and Airdrie to terminate at Woodhall Weir on North Calder Water. Ten locks were needed for a total climb of 35.6m; this occurred for the greater part at Blackhill (29.2m), where the flight of eight double locks were supplemented for a time by an inclined plane. The Monkland Canal had short spur branches to iron works at Calder, Gartsherrie, Dundyvan and Langloan.

3. The Forth and Clyde Canal was constructed to facilitate trade between the two Firths, and also as a general navigation for sea-going vessels of benefit to the British Isles as a whole. The Monkland Canal was built to accommodate the trade between the Lanarkshire coalfields and Glasgow. Both canals had a chequered history; forty two years elapsed from the time the Government ordered a feasibility study for a canal linking the Firths of Forth and Clyde to the date its construction was authorised in 1768, and it was not until 1790 that the first through passage was made. Work commenced from the east and a 32km length to Kirkintilloch was opened in 1773, followed by a further length of 42km to Stockingfield in 1775. By then a decision had been reached to build the Glasgow Branch and this was constructed as far as Hamilton Hill in 1777, then, after a lapse of several years work was recommenced in 1786, and by an Act of 1787 the original terminus at Dalmuir was changed to Bowling, that point being reached in 1790.

4. The Act for the Monkland Canal was passed in 1770; the canal was to run from Sheepford in the heart of the Collieries to Germiston. Subsequently in 1790 a further Act was passed enabling the Monkland to be extended eastwards to its present terminus, and westwards to join the Forth and Clyde, including the basin at what was to become Port Dundas. All this work was finally completed in 1792. The main justification for the connection of the two canals and the eastwards extension of the Monkland was the shortage of water for both, and the opportunity it gave of tapping the catchment of the River Calder. The Forth and Clyde was initially constructed to a depth of 2.13m, but this was increased to 2.44m by the Act of 1787. Subsequently, in 1814, a further Act authorised an increase in depth to 3.05m. The

Monkland Canal was built to a depth of 0.91m, but when the connection to the Forth and Clyde was constructed the whole canal was deepened to accommodate vessels drawing 1.37m. The Monkland Canal was sold to the Forth and Clyde Canal Company in 1846, and both were purchased by the Caledonian Railway Company in 1865; the ownership was transferred to the L.M.S. in 1923. The Monkland Canal was legally closed to navigation in 1950 and the Forth and Clyde Canal and Glasgow Arm in 1962.

5. Neither canal now exists entirely in its former state. The Forth and Clyde has been de-watered and filled in from its terminus at Grangemouth to immediately west of the M9, a distance of about 2.5km. The connection with the Union Canal has been de-watered and filled in too, as also has the Forth and Cart Canal. In addition, to facilitate highway and other local developments, isolated sections of canal have been replaced by twin piped culverts; two of these, Cloberhill and Duntreath at the western end are of significant length. The greater part of the length of the Monkland Canal has been piped in this way also, in fact only a short length near Pinkston Basin, a 2.5km length at Coatbridge and the last 2.5km to the summit at Woodhall Weir remain in canal form, and even these contain two piped highway/railway crossings. All branches of the Monkland Canal have been de-watered and filled in.

6. The Forth and Clyde Canal was originally constructed with a surface width of 18.3m and a bed width of 9.14m, the successive depth increases from 2.13m to 2.43m to 3.05m probably being assisted by raising banks and/or reducing freeboards. Since the canal was closed to navigation the water level has been reduced by about 0.5m leaving the banks with a present freeboard of about one metre. The locks at the eastern end had sill depths of 2.9m and could take boats 20.1m long and 6.10m wide, whilst the later locks at the western end had sill depths of 3.66m and chamber dimensions suitable for vessels 27.4m long and 6.10m wide. The Monkland Canal was constructed with a surface width of 9.14m and a bed width of 4.57m; the locks had sill depths of 1.83m and chamber dimensions suitable for vessels 20.1m long and 4.12m wide.

7. The original total of twenty eight bridges which crossed the two canals included nine railway bridges; many of these have been incorporated in the various improvement schemes involving piping or filling in the canal, or have otherwise ceased to be a BWB responsibility. Of those remaining ten carry public roads, and eight are accommodation bridges, footbridges or towpath bridges. In addition the Board has responsibility for six footbridges and one public road bridge over feeders. All bridges crossing the Forth and Clyde Canal were capable of being opened to allow navigation by high masted ships, the standard design being a manually operated two-leafed timber bascule-type bridge. During the later years of the active life of the canal, many of the bridges carrying main roads were replaced by steel and made power-operated. Since closure of the canal they have all been fixed in the closed position. Bridges on the Monkland Canal were all fixed timber decks on masonry abutments. Few now remain.

8. There are no tunnels on either canal, but there are twenty nine aqueducts: twenty five on the Forth-and-Clyde Canal, three on the Glasgow Branch and one on the Monkland Canal. These aqueducts variously carried the canal over rivers or streams, railways, roads or footways, the two latter sometimes being combined with streams. The original aqueducts were of masonry construction but those constructed later to permit new railways to pass below the canal were of brick.

The largest and most impressive aqueduct is the 84m long by 21m high four-arch structure carrying the canal over the River Kelvin at Maryhill. It was said to be the largest in the world when the canal was opened in 1790, and is now listed as an Ancient Monument.

9. The lock chambers were constructed of dressed masonry blocks as were the basins at Bowling, Maryhill, etc. They were well constructed and are still in good condition, in fact the same is true of the masonry on the aqueducts and bridges. The gates however, with the exception of those belonging to the sea lock at Bowling, have been allowed to deteriorate and are not now operable. Most have been fixed in the closed position and cut down to act as weirs. Control of water levels in the various pounds can in general still be effected by use of paddles in these gates and/or side sluices. Eight locks at the Grangemouth end of the Forth and Clyde Canal and all the locks on the Monkland Canal have been eliminated by the developments referred to in paragraph 3. One of the two sea locks at the Bowling Basin is not now in use due to heavy silting in the Clyde at its outlet.

10. The Forth and Clyde has a 26km long summit pound stretching from Lock 20 in the east at Netherwood to Maryhill in the west; the Glasgow Branch and the Monkland Canal as far as Blackhill are at the same level. In the east the system is fed with water from Townhead Reservoir, which in turn is supplemented with water from Birken Burn Reservoir; the water enters the canal east of Kilsyth through an artificial feeder. Further west at Kirkintilloch the Lenzie Feeder is another source of supply. This is an artificial channel intercepting flow in Bothlin Burn, which itself is fed from a series of natural lochs further south, viz Lochend Loch, Woodend Loch, Bishop Loch and Johnston Loch. The third but primary source of supply is the Monkland Canal itself, fed through Woodhall sluices at its head by North Calder Water. This is fed by an artificial feeder from Hillend Reservoir, which has been provided with piped connections from Black Loch and Lilly Loch. This ample reserve of water, far more than adequate for locking operations even in the heyday of the two canals, has been exploited commercially in the sale of water to numerous undertakings spread over the whole system, including two mills on North Calder Water. Most of the water sold is returned to the canal. The importance of this function of the two canals as a distributor of water, both from the point of view of canal economics and the much wider implications of the national economy, is the principal reason for their remaining in existence, and explains why expensive culverting measures have been adopted when local development has engulfed sections of the disused canals. Whilst in practice the intake flow at Woodhall sluices rarely exceeds 18 MI/day, the piped sections have been designed to pass up to 64 MI/day. This spare capacity allows both for any increased demand in the future and to accept storm water.

11. The canals were constructed with vertical masonry walls supporting both towpath and offside where this was on embankment; the toes of high embankments were supported by low drystone retaining walls. This work was well done and most of it remains. Localised problems have been dealt with over the years by timber, concrete, and more recently by steel sheet piling. The present condition of banks is good, and this is augmented by the greater freeboard occasioned by the lowering of the water level referred to in paragraph 3. At one point the upper reaches of the Monkland pass close to and about 21m above North Calder Water at a point where the latter has cut itself a deep winding gorge-like channel. It is now cutting into the bank immediately below the canal and

surface erosion is causing small slips. The canal has been protected by steel sheet piles supporting the towpath, but a revetment at the toe of the bank is needed to resist the river action.

12. A towpath exists for all sections of canal not piped: it is continuous over viaducts but not always under bridges. It is everywhere adequate for foot traffic, frequently so for maintenance vehicles and sometimes suitable for ordinary vehicles. It is generally in a satisfactory condition for a Remainder waterway although somewhat overgrown in places, particularly on the upper reaches of the Monkland.

13. Both canals are in the charge of a Section Inspector based at the Old Basin Works in Glasgow. Dredging, where required, is carried out by an excavator working from the towpath.

14. As well as the Kelvin Aqueducts, nine other structures or groups of structures are listed as Ancient Monuments including the Antonine Wall which crosses the Board's property at several points. In addition, the canal buildings at Cadder are listed under the Town and Country Planning Act of 1972.

15. Due to the piped lengths, only a few craft are to be found on the inland stretches of the Forth and Clyde Canal and none at all on the Monkland. There is, however, a concentration of craft at the western end, where small sea-going vessels can gain access through the sea lock to Bowling Basin. Outside the urban areas the Forth and Clyde is well patronised by anglers, and fishing is reportedly of outstanding quality.

## 50 Union Canal

*Category: Remainder 48.5km*

*Map: Plate 46 Profile: Not applicable*

1. The Union Canal, or, to give it its full title, the Edinburgh and Glasgow Union Canal, stretched from Hope-toun (Fountainbridge Basin) in the heart of the City of Edinburgh to Port Downie, a basin linked with the Forth and Clyde Canal (49) near Camelon. It passed through or close to Ratho, Broxburn, Linlithgow and Falkirk. Everywhere at a constant level of 73.5m above sea level, and finally descending 33.5m to Port Downie by means of a flight of eleven locks. The basin and locks have been filled in and there is now no connection. There was also a 0.35km extension westwards at the upper level close to the top lock to a basin known as Port Maxwell. Apart from its link with the Forth and Clyde Canal, the Union Canal had no other link with a canal or navigable waterway.

2. The provision of a canal linking Edinburgh with Glasgow was first mooted in 1791, with the object of providing Edinburgh with a supply of cheap coal to match that supplied to Glasgow by the use of the Monkland Canal. Over the years a number of alternative routes were considered; all the well known canal builders were involved in surveys and reports, and various uses to which the canal could be put were investigated. The present route was finally selected, and its construction authorised by an Act of 1817. Work commenced in 1818 and the canal was finally opened in 1822. During construction a supplementary Act of 1819 gave powers for route improvements at several points, and an Act of 1823 gave powers for the short extension at Port Maxwell. Negotiations which commenced in 1845 for an amalgamation with the Forth and Clyde Canal eventually fell through, but in 1849 an Act was passed vesting ownership of the canal in the Edinburgh and Glasgow Railway. In 1865 ownership of canal and railway passed to the North British Railway Company, and in 1923 it was transferred to the London and North Eastern Railway. The canal was never a great financial success and commercial traffic finally ceased in 1933, when it was severed from the Forth and Clyde Canal by the filling in of Port Downie and the locks at Camelon. A petition for the closure of the canal was submitted in 1955; this was followed by a Committee of Inquiry in 1958, and formal closure to navigation in 1965.

3. The canal was constructed to a top width of 11.27m, a bed width of 6.09m and a depth of 1.52m. The locks were 21m long and 3.8m wide. In recent years to facilitate the construction of new highway crossings (e.g. M8), the improvement of existing highway crossings, and in one case to facilitate the development of a housing estate in Edinburgh, the canal section has been replaced at some nine locations by twin pipe culverts.

4. There are seventy two bridges crossing the canal, only fifty five of which are the responsibility of BWB; of these twenty seven are public highway bridges, the remainder being accommodation bridges or foot-bridges. The majority of the bridges are masonry or brick arch construction in a good state of repair, but there is one steel electrically operated lifting bridge near the Edinburgh terminal.

5. There are twenty two aqueducts on the canal carrying it over rivers, streams, public or accommodation roads, and in one case over a railway line. The aqueducts are of masonry construction and well maintained. One, carrying the canal over the

A70 in Edinburgh, was taken over and re-built by Edinburgh Corporation in 1937, but responsibility for maintenance has reverted to the Board. Another carries the canal over the A9 in Linlithgow, which passes under it in an S-bend controlled by traffic lights. The low headroom available has been insufficient for some road users in past years, the heavy scoring of the arch soffit bearing witness to this. Three of the aqueducts are major structures; the Avon Aqueduct has twelve arches and is 25.9m high; the Almond Aqueduct has five arches and is 23.2m high, and the Slateford Aqueduct has eight arches and is 19.8m high. The last is in Edinburgh and carries the canal over a public road, the other two cross inaccessible tree-lined valleys far from centres of population. A survey of their condition was carried out in 1974 by a firm of Consulting Engineers who recommended certain structural repairs.

6. The canal also has a 636m long tunnel near Falkirk. This cuts through solid sandstone more or less parallel with the bedding planes so that masonry lining is only necessary in parts. Deep approach cuttings were necessary on both sides, and the towpath is carried through the tunnel. There are no locks remaining on this canal.

7. The 1817 Act authorised the construction of up to five reservoirs and the abstraction of water from eleven rivers or streams. In the event Cobbinshaw Reservoir was the only one constructed; it feeds the River Almond via Bog Burn. The River Almond was the only river from which water was abstracted. The intake, located alongside the 90m long weir at Almondell leads via sluices to the Almond Feeder, an artificial channel nearly 5km long. The feeder incorporates four unlined rock tunnels of small cross-sectional area and an aqueduct (which carries a footway) over the narrow steep sided Almond Valley. In addition bridges cross the channel, all but one being accommodation bridges for which the Board is responsible. The feeder joins the canal close to the east end of the Almond Aqueduct. By its nature the canal acts as a large catchwater drain, curving around the hillsides following the same contour. It thus receives a considerable amount of inflow from land drainage, and water supply was always adequate for locking purposes. Now that the locks are closed, water from the feeder is rarely required except in periods of dry weather. Instead, surplus water often has to be run off at the nine overflow weirs supplemented by sluices at various points along the canal, and the outlets to Edinburgh City sewers at the Fountainbridge Basin.

8. Abstraction of water for commercial use is substantial, only a small proportion of which is returned; the users, who include brewers, distillers and British Rail, are mainly concentrated at the Edinburgh end of the canal. To safeguard their supplies, automatic stand-by pumps have been installed to boost the flow through the 1.75km Wester Hailes piped section, should the need arise.

9. The canal was well made and much of the masonry walling constructed to support the towpath still remains and in good condition. Except near Falkirk where leaks have necessitated treatment in recent years, the banks are standing up well in the absence of any craft to damage them by their wash. The lack of craft does however stimulate the growth of weeds and rushes, floating weeds and algae requiring considerable maintenance effort.

10. The 'Remainder' classification of the canal demands little dredging effort and accumulations of silt are taking place at several places, an old Priestman Cub with dragline bucket, mounted on an engineless pontoon being the only available

equipment. The canal passes through an area of massive oil shale 'bings' at Philpstoun; one of these has been worked in recent years to win material for constructing the nearby M9 Motorway causing material to fall down the 'bings' steep scree-like slope, covering the towpath for some distance, and in places part-filling the canal.

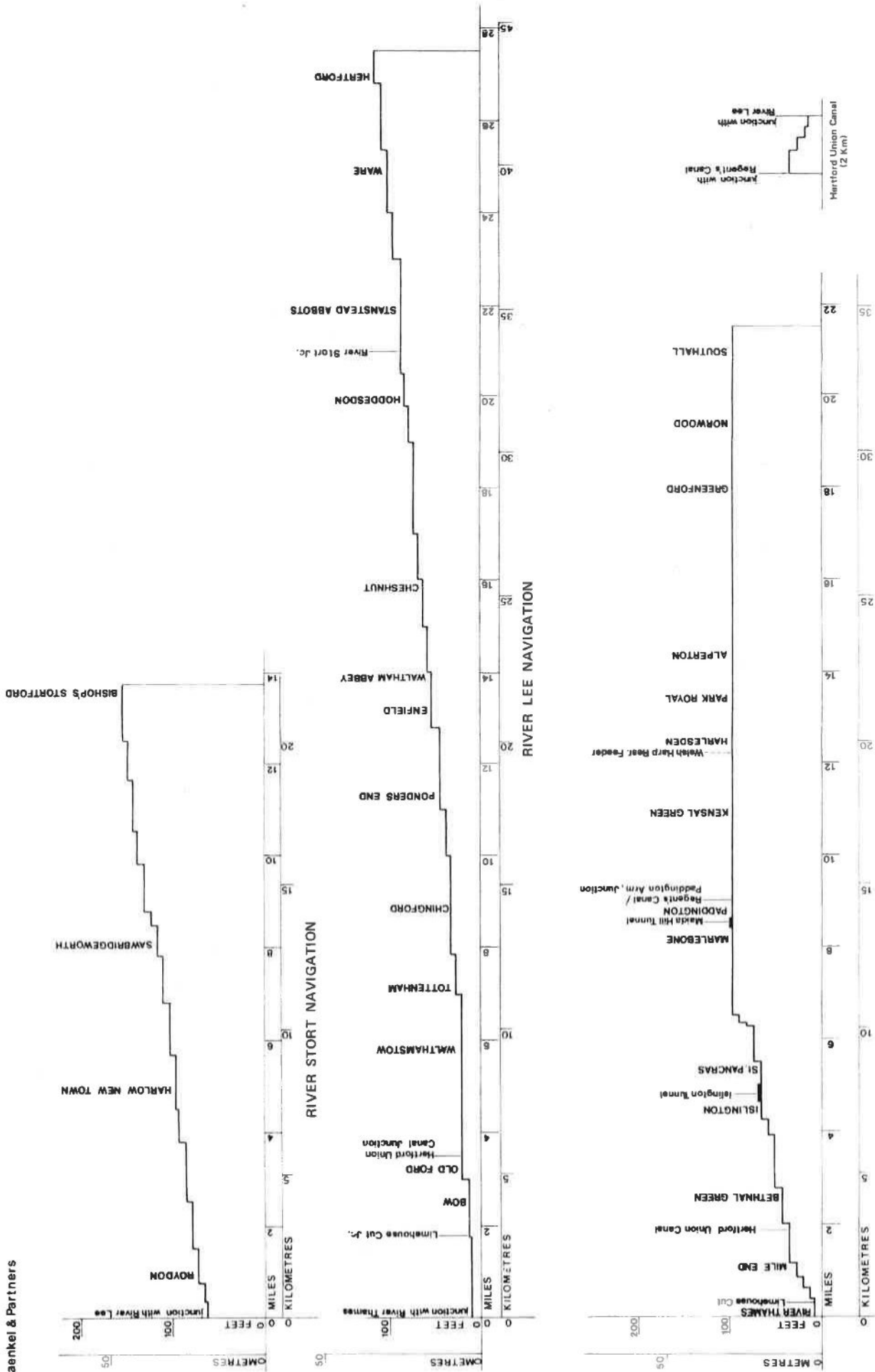
11. With the exception of the piped sections a continuous towpath exists for the full length of the canal, interrupted only occasionally at some bridges, and even being carried through the long Falkirk Tunnel. It is adequate for foot traffic everywhere, but not very suitable for maintenance vehicles because of its overgrown condition.

12. The canal comes under the immediate supervision of the Section Inspector based at a small depot at Broxburn, the only one on the canal.

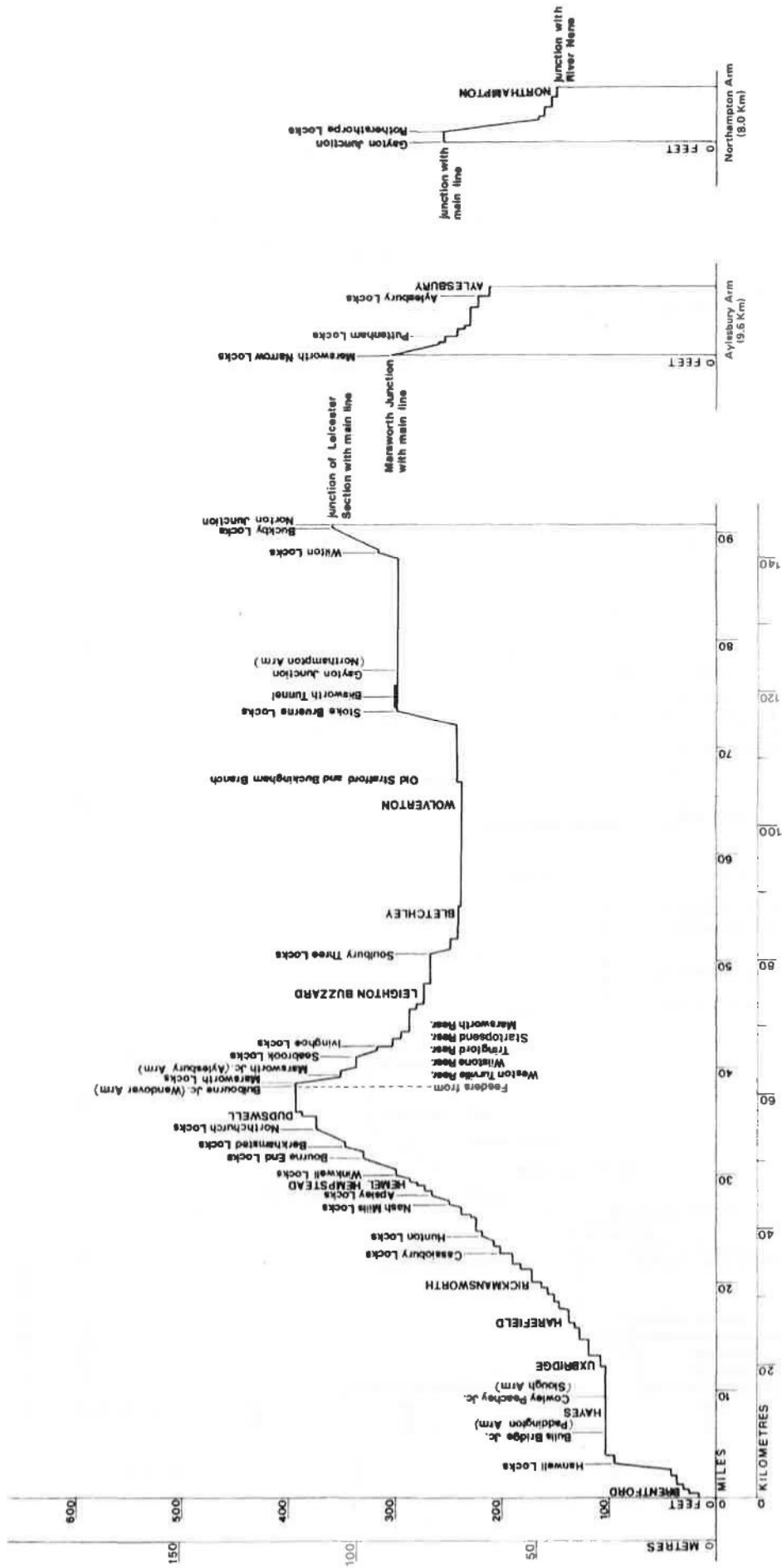
13. Some fourteen structures on the canal are 'listed', twelve of them as Ancient Monuments, including all the major aqueducts.

14. Good coarse fishing is to be had throughout the canal. There is also some boating, concentrated at the eastern end of the canal. The fact that the canal has been piped under a number of bridges severely restricts the length available for motor cruising, out of what would otherwise be a considerable length of lock-free canal.

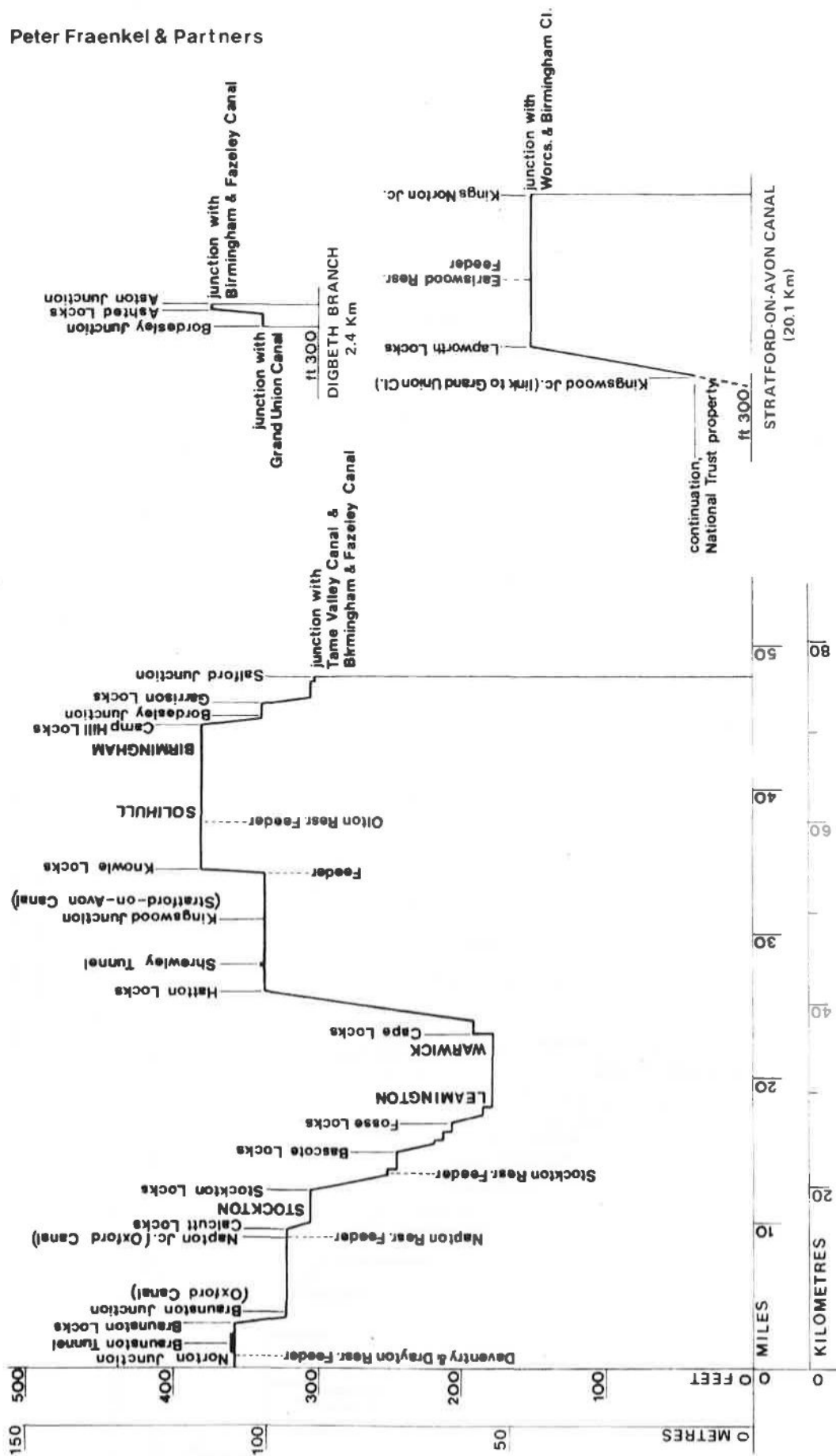
15. This canal, together with the Forth and Clyde Canal has been the subject of study by a Working Party, which has published a report making a number of suggestions as to the future development of the waterway.



REGENTS CANAL AND GRAND UNION CANAL (PADDINGTON ARM)



GRAND UNION CANAL  
(BRENTFORD TO NORTON JUNCTION)



GRAND UNION CANAL (NORTON JUNCTION TO BIRMINGHAM) AND STRATFORD-ON-AVON CANAL