

River Severn bank-side survey Worcester to Tewkesbury

(English Heritage 5301 PD)

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21 July 2008

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Project 3039

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River Severn bank-side survey: Worcester to Tewkesbury

By Derek Hurst and Darren Miller (with a contribution by Margaret Noke)

Illustration by Carolyn Hunt and Margaret Noke

Part 1 Project summary

This report is intended as a review of the historic environment of the River Severn between Worcester and Tewkesbury, an overall length of 29km. This is based on a desktop survey, involving documentary research and map regression, and on field survey, involving a 'sail-past' and walkover. The work was funded by the Aggregates Levy Sustainability Fund (ALSF) administered through English Heritage.

The full background to the project is described in Section 1. Section 2 is concerned with the desktop survey – its aims, sources, methods, and results. In summary, a total of 186 sites were identified at this stage. Section 3 describes the results of the 'sail-past' and walkover surveys. Both methods were effective, resulting in the discovery of a further 22 sites. In Section 4, the overall results of the desktop and field survey are discussed, and several themes developed relating to past river use. Finally, in Section 5, the main implications for future research and management are discussed.

The survey has established that the historic environment of this stretch of the river is mostly a creation of the 19th and 20th centuries – the result of massive investment in navigation and associated infrastructure producing the riverscape of today. Most of the visible monuments in the river corridor accordingly reflect these developments, and this is reflected in the HER which is largely based on the extensive documentary evidence relating to these developments. By contrast, the post-medieval and earlier use of the river for transport, fishing, and other activities is largely invisible. However, despite this, it is still possible, using documentary evidence, to identify several major themes in the past character and use of the river corridor, such as fords, ferries, fisheries and local wharves. It can be assumed that significant remains of some of these activities still survive in the river-bed, and especially along its margins.

The river-banks may still hold considerable potential for the survival of archaeological remains, as they are observed to be slumping inwards, and so to be generally burying any former bank-side features. This is apart from where fishermen are building fishing platforms, which are often accompanied by access steps cut into the banks, and this is where localised erosion of the banks is evident in many cases.

Investigation of the river has so far been limited to visual observation from the river-bank or from a boat. There is still the prospect that more evidence of the ancient use of the river remains on the river-bed itself, where exploration by diving has previously revealed the survival of archaeological remains at, at least, one site, where by implication it is proven that modern dredging has only affected part of the river-bed deposits. In the light of this assumptions about the wholesale dredging away of the river-bed need to be revised, and the possibility of the survival of significant archaeological remains in this location now needs to be seriously addressed.

1. **General introduction**

The primary purpose of this project (WCM101600) is to review the historic environment of part of the River Severn in the light of the modern emergence of river transportation of aggregates in order to overcome environmental objections based, for instance, on the unsuitability of local roads and the proximity of local settlements. This project is targeted on that area of the river (ie to the south of Worcester) where this practice is already in evidence, and where there is expected to be increasing pressure for large-scale extraction in the future.

1.1 **Survey zone**

The survey zone is a 29km (18 mile) length of the River Severn stretching from the city river bridge in Worcester (NGR SO 847548) southwards to Tewkesbury (NGR SO 882328), and encompasses the width of the river within its banks and the strip of publicly accessible land on either bank, the latter up to a maximum 30m-wide corridor from the top of the river-bank (Fig 1).

Strategically this project extends the assessment of heritage assets in the Severn estuary being carried out by the RCZA of the archaeology of the Severn Estuary (Mullin 2005; English Heritage 2007) (see below) into an inland waterway.

1.2 **General background to the project**

The River Severn is the longest river, as well as the longest navigable river, in the country. River transport was a principal means of inland communication in the past and this lasted into the later 19th century. Canals boosted this system from the mid 18th century, these being a very substantial extension of the pre-existing river navigation system. On the banks of the River Severn there were major inland ports such as Worcester, and many other smaller quays (eg at Hanley Castle; Toomey 2001, 21) that grew up to serve local industries and communities. Some of the latter have documented histories showing their presence from at least the medieval period, but all have now been lost and there are no obvious visible remains.

Similarly other riverside features have been lost from sight, but archaeological remains could remain. In the west Midlands specialised prehistoric sites often known as 'burnt mounds' occur on the edges of watercourses, and there has also been some evidence for Bronze Age ritual deposition in wet environments (see below). The river also historically has served a variety of purposes which supported the livelihoods of those on its banks, for instance fish-traps, and artificial leats for mills, were in widespread use. Carriers and sluices also served to flood and drain water meadows. Past river management will have involved structures which were deliberately installed to assist navigation and these could include hulks sunk on the river-bed to stabilise the banks. Typically earlier bridges have usually been rebuilt on slightly different positions potentially leaving the remains of earlier structures submerged underwater. The defensive potential of the river was also exploited in wartime, though little is now recorded about whether any remains survive - a recent Defence of Britain project has demonstrated how prominently the river was used for this purpose in WWII (see below). The river, therefore, has served as the focus for a host of different uses over a long period, and continuing up to the modern day, when the Severn provides the longest riverside walk in Britain (Marsh and Meech 1999).

Current use of the river for the transportation of aggregates

One particular aspect in which potential quarry sites in this area have the potential to meet planning requirements is through the use of river transport for aggregate from one quarry to be moved to another where an existing processing plant can be used.

This renders applications more likely to fulfil planning requirements in respect of transport and access, and, therefore, attain a higher degree of overall sustainability for aggregate extraction.

One quarry, the Cemex site at Ripple, has already been required as a condition of planning permission to use the river to solve the access and transport problems raised by the site's location at the end of a minor road leading through the village at Ripple. Here, commercial extraction started in 2005 and aggregates from the site are loaded onto barges at a purpose-built wharf and shipped upstream to the processing plant at the Cemex quarry at Ryall. In May 2007 the Cemex quarry sent out 161 loads weighing a total of 26,375 tons. There has been no prior survey of the impacts of this transition from road to river in terms of the impacts on any archaeological remains associated with the river.

Future trend in river transportation of aggregates

The area of the River Severn south of Worcester has substantial gravel reserves and is considered likely to have the potential for attracting applications (for both new quarries and extensions to existing quarries), which are likely to meet current planning requirements. Sand and gravel terraces flanking the River Severn, south and immediately north of Worcester, are liable to come under increasing pressure from aggregate extraction as the Mineral Planning Authority (MPA) works to maintain the required minimum seven-year land-bank of reserves through the development of a minerals and waste scheme to replace the Minerals Local Plan (outcome of discussions with the Worcestershire Mineral Planning Authority (MPA) as part of the Worcestershire Aggregate Resource Assessment (PNUM 3966).

An emerging trend is that the aggregates extraction industry is looking towards sustainable transport initiatives, and towards this end, a recent condition of a planning permission for one of the major gravel operations in south Worcestershire is that the gravel is removed by river (as noted above). This is set to become an increasing trend, and the general concept of increasing use of the river for this purpose is viewed as interesting and useful, subject to any full planning assessment (N Dean, Worcestershire County Council Minerals Officer; pers comm). Inland waterways boards are also understood to be in support of an increasing move to river transportation, and this concept will potentially form part of the *Worcestershire Mineral Core Strategy*. The policy of avoiding as far as possible the additional impact that the movement of minerals has on the historic environment has also been stated in 2006 (English Heritage 2006) based on the broad principles of *Transport and the Historic Environment* (English Heritage 2004a).

There is apparently no necessity that the Environment Agency, for instance, as a body responsible for aspects of rivers, would require any survey of the impact of this transition from road to river transportation which as a policy would plainly be encouraged as having environmental advantages.

1.3 **Relevance to ASLF objectives**

The ongoing Worcestershire Aggregates Resource Assessment (PNUM 3966) highlights the role of the river in the historic era, and especially in the medieval and post-medieval periods.

The present project seeks to demonstrate the historic associations between the river and aggregates extraction, and, particularly, to investigate the possible (positive as well as negative) impacts of a modern move to river transport. Specifically the establishment of base-line data about the historic environment in relation to the river and its immediate environs will contribute to 'research to enhance the understanding of the ... character of the historic environment ... in order to provide the baseline

information necessary for the effective future management' (*ASLF priorities objective 2*).

Through consideration of aspects such as erosion it is also proposed to provide information to 'support the development of management and conservation strategies for the historic environment' (*ASLF priorities objective 2*).

The development of a methodology for the study of rivers based on the RCZA (Mullin 2005) will be a contribution to the wider management of the historic resource, and this will provide both 'methodological and technical research to improve predictive, evaluation and mitigation tools in order to promote the maximum information gain and cost effectiveness' for the 'extraction industry and the historic environment' (*ASLF priorities objective 2*).

Taken together the above objectives would be in accordance with the primary purpose of 'promoting environmentally friendly extraction and transport' (*ASLF priorities objective 2*).

The project, therefore, would meet a range of the English Heritage ALSF core objectives, as well as the locally defined objectives of the project in relation to aggregates production in Worcestershire (Section 1.4).

The ongoing ASLF-funded Worcestershire Aggregates Resource Assessment (PNUM 3966) has highlighted the projected substantial increase in need for aggregates in the south Midlands (Jackson and Dalwood 2007, 41) due to housing expansion planned in this region.

1.4 **Project aims and objectives**

In general the survey aims to support and enhance the recently defined wider strategic archaeological management focus on the River Severn by contributing to the understanding, research and future management of the archaeological resource in the river valley, thereby encompassing the broad aim of making accessible information about the historic environment of the river to the following:

- Professional Archaeologists – for enhancement of the HER;
- Archaeological Curators – to facilitate providing up-to-date advice;
- Planners – for identification of conservation issues of archaeological import;
- Aggregates Industry - to promote use of the river for transportation based on a modern assessment of the historic environment and the impacts;
- Environment Agency – to improve the information base for the curation of the historic environment for flood risk management schemes; and
- General public – for appreciation of how the aggregates industry is responding to modern demands for conservation and sustainability.

The overall broad aim of this project is, therefore, to provide management data for establishing the potential impact of the riverine transport of aggregates. By considering similar issues and collecting data of a similar kind this project will serve to continue the process of historic environment assessment from the Severn estuary (RCZA; Mullin 2005) into inland waterways, thereby providing a consistent enhancement of base-line data from coastal to inland zones – though with a 10km (7 mile) gap between Maisemore and Tewkesbury weirs in Gloucestershire, the former

being the northward limit of the Severn Estuary RCZA, and the latter the southern limit of the proposed survey, respectively.

Primary project objectives (POBs) are as follows:

- POB1 – to inform the strategic management process through the provision of data about the historic environment of the river (ASLF PO1 and 2);
- POB2 – to gather information that would be useful for characterisation of the modern river, and so useful for assessing both the positive and negative impacts from modern usage (ASLF PO2);
- POB3 – to augment regional research by developing appropriate themes as identified in Exploring our Past, such as contributing data that will be of use for archaeological study for periods such as the early post-medieval ‘that hitherto have been the preserve of economic historians’ (EoP98, 37), and with reference to the West Midlands Research Framework (http://www.iaa.bham.ac.uk/research/fieldwork_research_themes/projects/wmrrfa/sem6.htm), where the role of river transport in supporting an expanding economy for instance in the Industrial Revolution is not always fully acknowledged eg Hemingway 2003 (ASLF PO1 and 2);
- POB4 – to develop a model methodology that could be applied in other river valleys, there being a need to extend coastal survey to include inland rivers (ASLF PO2);
- POB5 – subject to agreement and an UPD, to disseminate the overall results of the project in a way that reaches a larger audience, including the wider public, and including the HER (ASLF PO2 and 3).

The analysis and dissemination of the project archive would also support the recently defined wider strategic focus on the River Severn (English Heritage 2004b) by contributing to the general understanding, research and future management of the archaeological resource in the river valley.

2. Desktop survey (stage 1)

2.1 Introduction

The desktop study constituted an initial stage of the overall project to establish baseline data for part of the middle River Severn (between Worcester and Tewkesbury). The project has been conducted in accordance with MAP2 (English Heritage 1991) and with reference to EoP98 and the West Midlands Regional Research Framework (work in progress).

2.2 Aims and objectives

The overall aim of the proposed desktop project was to gather and collate as much data as possible in order to inform future stages of the project.

Objectives

- 1) OB1 – to establish the range of sources that would contribute to providing a context for the fieldwork in the following stage, and collect data. The intention will be to identify potential sites of archaeological and/or historic interest, such as local quays, fishing structures, and traces of any other activities based on the historic and modern river.
- 2) OB2 – to assimilate useful data that relates to impacts on the modern usage of the river.
- 3) OB3 – to amalgamate and assemble the data relating to the survey area from as many different sources as appropriate to produce a draft plan that will serve as the basis of the Stage 2 extensive survey, where it will be amended, refined, and enhanced with additional sites, as appropriate.
- 4) OB4 – to further define the principal themes for analysis, and methods of dissemination (Stage 3).

2.3 Methods

Collection and collation of data (Objectives 1 and 2)

During this stage sources were gathered together and studied in order to provide a context for the fieldwork and as part of the archaeological resource assessment. A variety of information is held the River Severn by a range of bodies as readily available resources in most instances, and the following have been approached in the course of this stage of the project:

Historic environment records

- HER data held for Worcester City
- HER data held for Gloucestershire
- HER data held for Worcestershire (WHEAS)
- NMR, Swindon

Record offices

- County Record Office, Worcester (ie archives produced by the Severn Commission, Severn Navigation Company, and British Transport Commission; and the deposition of Severn Trent archives in 2007)
- County Record Office, Gloucester, especially earlier depositions of archives relating to the predecessor organisations of British Waterways (notably the Severn Commissioners; Severn Navigation Association/Commissioners for the Improvement of the Navigation of the River Severn (GRO D2460)). Related maps are at the British Waterways Archive in Gloucester.
- Bristol Record Office
- British Waterways Archive, Gloucester
- National Archives, Kew (via website only)

Museums

- Local museums (Tewkesbury, Worcestershire County and Worcester City)

Other sources of data

- ADS site records
- Defence of Britain Project – regional centre at WHEAS office in Worcester
- NMR library of air photographs – cover search
- Portable Antiquities Scheme (PAS) database
- PastScape
- British Waterways (Nigel Crowe) re data on current usage of river (Objective 2)
- Local studies library in Worcester, and local county archaeology library at the University of Worcester

Other potential sources of information such as doctoral theses were also sought (see below), and used as data source in the course of the project. Where it has also been possible to trace local individuals and groups (eg Worcester sub-Aqua Club) with specialised knowledge of the river, they have been consulted.

Both textual and cartographic sources have been included. The existing HER lists of sites have been checked and these will form the basis for taking the project forward to Stages 2 and 3.

Data recording

A project database was designed in consultation with the WHEAS HER in order to record each site so that the project data can subsequently be incorporated in the HER site by site (Stage 3), and so that the HER record constitutes the primary database. The data structure has followed the guidance in WHER 2004 to ensure that data exchange is as smooth as possible. The desk-top project database was largely based on information drawn from the HERs, the NMR, sources held by WHEAS, and select cartographic sources.

Where data was duplicated across HERs as in the case of Worcester City and Worcestershire County, then the more up-to-date Worcester City data took precedence. A distinction has been firmly drawn between new data collected through the project (for Worcestershire sites this collates with sites referenced WSM 39961

onwards), and the original existing HER data so that the Stage 3 incorporation of data into the HER will be as straightforward as possible.

Data was originally extracted from HERs in Excel and used to create an Access database. Sites were then added to this throughout the project. An Arcview 3.3 shape file was created so that the sites could be shown on OS 1:5000 mapping.

A draft database and survey plan (for Objectives 3 and 4) were produced for the field survey stage (Stage 2). The draft survey plan consisted of twenty-two OS 1:10,000 base map sheets, on which the sites listed in the database were plotted as accurately as possible, and labelled with brief descriptions and reference numbers (project UID number).

During the reporting stage mapped data from Arcview was finally edited in Adobe Illustrator.

Archive

The project archive is intended to only contain any data that will not be transferred into the HER (eg any scanned and digital images, though, digital storage space permitting, these may also be stored in the HER).

2.4 **Results**

Brief history of the River Severn

The Severn valley is a major element of the west Midlands landscape and has itself been instrumental in shaping this landscape. It is associated with a series of sand and gravel terraces at increasing heights and distances from the present river courses; the highest terrace deposits representing the oldest such formations. It is also a major influence on settlement and agriculture in the region, in the latter case being the source of the richer alluvial soils in the valley bottom, which have underpinned productive agriculture and, therefore, the creation of wealth in the region. Many aspects of this part of the Severn have been discussed in some detail by Beckinsale and Richardson (1964) and Richardson (1964), the latter including useful aspects such as its navigation, whereas the geomorphological aspects have been reviewed most recently by Darrel and Lewis (2005).

Overall the River Severn is about 220 miles long and a major waterway for a large part of its length (178 miles; Trinder 2005), which has been variously exploited over a long history. Navigation, though a primary use, was difficult in the past because of shallows and the tendency of the river to silt up. The most navigable length was 92 miles long from Stourport southwards, though it was considered in the earlier period to also be navigable as far as Welshpool in Powys, where Pool Quay was located (Richardson 1964).

The river has a varied character and remains in its natural state above Stourport. A series of rock-bars were once a prominent feature above Worcester, whereas below Worcester, where the Severn was accumulating alluvial fill (Beckinsale and Richardson 1964), there were only occasional rock-bars, which in this location were formed from Mercian Mudstone. The latter mark the positions of the original fords, in which the river generally abounded in its natural state. Flow, and thereby the prevailing current strength, was affected by variation in gradient of the river-bed, as the river above Worcester falls at 0.32m per kilometre, and below Worcester at only 0.08m per kilometre (Richardson 1964), a factor which made crossing the river below Worcester both easier and safer. However, the river was tidal as far as Upton, which clearly aided navigation in this part of the river, and the tidal stretch reached as far as Worcester on very high tides. The river must, therefore, have been rather

unpredictable to all except the locals, and this must have made it hazardous to anyone crossing on foot or horseback. Its tendency to flood also made it hazardous to navigation though the effects of this are exacerbated today by modern drainage regimes and the loss of wetland habitats, for instance at Longdon which would have absorbed large amounts of excess rainfall, while the canalised river from the mid 19th century retains a higher water level in the middle Severn than the natural river would have sustained, thereby making serious flooding a more likely event.

Documentary evidence for earlier navigation is, however, scarce as there was no body responsible for operation of the river as a waterway, and so documentary evidence for the use of the river is particularly sparse from the medieval and earlier periods. Though there is indirect archaeological evidence, for instance from pottery distributions, that suggest that the river was being heavily used for moving goods to market. Broadly occasional details from documents (eg relevant tithe maps) can also be used to supplement this meagre data for the medieval period. For instance, the bishop of Hereford brought in wine through Upton-on-Severn indicating that the river was being used for freighting of luxury goods (Jeremiah 1998). Despite the drawbacks of a natural watercourse, with its changing water levels and hazards, it is clear, therefore, that navigation was a primary use of the river.

Another early activity based on the river was the taking of fish, including elvers. This can be documented from the Middle Ages, when any weirs would have been set up for this purpose. In 1286 Henry de Ribbesford was appointed to investigate weirs between Shrewsbury and Gloucester, and in 1425 commissioners were appointed to view the banks of the river and to remove any obstructions. In 1575 a similar appointment makes it clear that the purpose was to ensure space was left for boats to pass, though weirs made in the last 50 years were to be removed (Pannett 1987-8).

From the early post-medieval period there is a great increase in available documentary sources. A parliamentary act in 1503 indicates efforts being made to carry out necessary improvements, and eventually a group of people were appointed as trustees of the River Severn to oversee the works, towards which they were empowered to take tolls (the Severn Navigation). The formation of this body was the beginning of the more extensive record keeping that survives to illustrate the use of the river for trade. The extensive run of Gloucester port books reveals that from the later 16th century it was mainly wool, grain and hides that were conveyed downstream, and wine and other foreign luxuries in the opposite direction. By the 17th century it was claimed that the River Severn was busier than every other European river except the Meuse (Jeremiah 1998). In the 17th-18th centuries salt from Droitwich, conveyed via Worcester, became another staple cargo, and grew in scale to dominate the river trade in terms of its volume.

However, obstructions were a continuously serious problem to navigation, and, for instance in the late 16th century, there was an edict to clear a 50-foot wide channel in the deepest part in the effort to keep it open (Richardson 1964). Nash (1781-2) mentions a site at *Ripple Lock Stake* which sounds like an early attempt to improve the navigation using bank-side works. In 1784, as Coalbrookdale iron-masters stoked the fires of the industrial revolution, they commissioned a survey of the river, and it was suggested that a depth of 4-feet of water could be maintained below Worcester by dredging and constricting the channel, but that locks were required above Worcester to attain a similar depth (Richardson 1964, 14) – ensuing works were limited to the installation of 'jetties', where the channel was crossed by a sluice which held back enough water to float a boat over shoals once the sluice gate was opened.

In the 18th century plans to construct static weirs were being floated in order to further improve the river navigation, and the landed gentry expressed concerns (WRO BA3762) as it was feared that flooding would result (Underdown 1986, 97).

The river was already heavily used, and a contemporary commentator reckoned, for instance, that 100,000 tons of coal left Coalbrookdale every year down river to Bristol whence merchants despatched their goods upriver (Underdown 1986, 95); freighting cost 10s per ton from Shrewsbury to Bristol, and 15s in the other direction. In this middle section of the river there was clearly a great deal of trade and some were far from critical of the state of the river for navigation (Perry 1758).

Telford proposed locks between Coalbrookdale and Worcester, but this was resisted by the trowmen who at the time were prepared to put up with the inconveniences of occasionally having to pay hauliers rather than routinely paying tolls. As a lesser measure permission was granted to build 'jetties' above the shoals which had the effect of raising the water level slightly by narrowing the channel, but the danger these posed to the trowmen meant they were rapidly removed. The seriously poor state of the navigation in the later 18th century is indicated by Telford's survey in 1789-1800 when he found the level of the water (presumably in the summer) averaged 12-16-inches and was often 9-inches, and that such levels could sometimes restrict boat movements to only two months in the year (Underdown 1986, 97). Despite these apparent drawbacks a view of Tewkesbury in 1804 shows a busy scene with several wharves (British Waterways undated, 'View of Tewkesbury Quay 1804' – the north end of the island that was to lend itself conveniently to the installation of a lock 54 years later can also be seen.

Access to the river system was also problematic in the lower Severn and improvements were necessary here before investment in the middle Severn was worthwhile. Preliminary surveys for a ship canal to bypass the shallows of the lower Severn were carried out in 1792, and an Act was passed in 1793, although the cost had been underestimated. Work started from Gloucester in 1794. The first engineer was dismissed in 1797 and the second left in 1800 having built only 5 miles, as far as Hardwicke, and run out of money. This work was often slow, and a canal (known as the Gloucester and Berkeley Canal until 1935 when it was renamed the Gloucester and Sharpness Canal) was finally completed with public money in 1827.

The first basin at Gloucester had been built in the 1790s at the same time as work began on the canal, but was not actually opened until 1812, and warehouses continued to be built in the 1820s. With the completion of the canal in 1827 it was now possible to reach the Midlands by boat from the Bristol Channel via the docks at Sharpness, and from London via the Thames and Severn, and Stroudwater Canals, the junction of the Stroudwater and Gloucester and Berkeley Canals having been made in 1820 (British Waterways undated). Contemporary directories of the early 19th century list towns that were based at Upton-on-Severn and Worcester suggesting that most boats were attached to these riverside towns (M McGregor, pers comm).

Though the river had been linked with the canal system by 1770 (at Stourport) and this had been extended to a link at Worcester by the end of 1815, the intervening river navigation was still comparatively poor, and it was the same as far as Gloucester. This hampered realising the potential of the canal investments and the improvements at Gloucester, and caused pressure for the pursuit of major improvements to also be undertaken on the middle Severn. Bewdley seems to have been the main 18th century trading centre for river traffic on the middle Severn navigation because it was linked to Birmingham and the Black Country via busy overland routes seeking an outlet to the wider Midlands and the sea (Trinder 2005). Though Worcester was in a prime position to benefit from the developments that were being promoted in the early-mid 19th century to improve this middle stretch of the river.

While the improvements of the lower Severn were being proposed and carried through, it seems that the navigation of the middle Severn in particular was further deteriorating – possibly one impact of enclosure was to prevent the water meadows

acting as temporary reservoirs by holding back water, the consequence being that the river level now rose and fell more quickly after heavy rain causing more devastating floods (Trinder 2005, 12). Improvements to the middle Severn began with the construction of a horse towpath from Shrewsbury to Gloucester which was completed in 1812 (Underdown 1986, 97), the stretch from Diglis to Gloucester being legislated for in 1811 (Trinder 2005). As a consequence the customary routes for hauling, which may on occasion have been the other side of the river, were considered to be no longer available, and the new routes were established on the opposite river-bank. Sometimes the hauliers disagreed with this, as they had to pay a toll to use the newer and better paths.

Demands for improving the Severn led to the creation of the Severn Navigation Company in 1835. This immediately set about proposing an ambitious scheme for locks on the middle Severn navigation that would have allowed 300 ton barges to reach Worcester, but Gloucester opposed the scheme due to concerns about losing their transshipment work and the Worcester and Birmingham Canal due to the high tolls that were anticipated, and so it was defeated in 1837, and the company dissolved in 1838 (British Waterways undated). In 1840 the Severn Navigation Improvement Association was formed in order to appoint commissioners (Commissioners for the Improvement of the River Severn) representing all parties (Underdown 1986, 98). A bill was finally passed in 1842 despite considerable disagreement between the interested parties. One amendment was to omit a lock and weir at Upton-on-Severn in favour of dredging, the latter being only to a depth that would allow river vessels, but not sea-going vessels, to proceed towards Worcester (Underdown 1986, 98). This effectively killed any idea of making Worcester a major inland port, and therefore usurping the position of Gloucester.

To improve the river between Stourport-on-Severn and Gloucester locks (including Diglis in the survey area discussed here) and weirs were finally built, and bridges were improved to allow larger vessels to pass them, and the river-bed was dredged regularly to keep the navigation open (British Waterways undated). Once the new locks were opened in 1843-4, then there was two years of intensive dredging to get the river depth to 6 feet, which held up the imposition of tolls which could only be levied once this depth was achieved (Underdown 1986, 98). But the removal of the natural dams in the form of the rock bars below Diglis simply led to the more rapid draining of the river, and so the water level below the new lock now fell lower than it had been before (Richardson 1964, 18).

Further south, in anticipation of an increase in trade, a new basin at Gloucester was built in the late 1840s; first called the Southgate Street Dock, it was also known as the Victoria Dock. All these improvements in the first half of the 19th century inaugurated a great deal of detailed recording of the river - the 1849 survey by Captain Beachey is now regarded as the most complete and informative (GRO D2460; see Hurst *et al* 2007, figs 5-6 for sample). The practical economic result of all these improvement works was that it is estimated that 400,000 tons were carried downstream and 100,000 tons upstream in 1848 (Trinder 2005, 118).

Sufficient depth of water, however, could not be maintained, and another lock had to be built at Upper Lode near Tewkesbury in 1858 to counteract the problem. Within a few years of the canalisation of the river from Upper Lode to Stourport, the stretch as far as Diglis was being celebrated as 'one of the finest pieces of inland navigation in the kingdom, with an uninterrupted depth, at low water, of nine feet throughout its entire length' (Richardson 1964, 21).

Further locks were added for similar reasons further down the river up to 1871. But rail competition was now making its effects felt, and when the Severn rail bridge was opened in 1879, there was a downturn in the river trade. The various bank-side paths that had been set up started to be little used once powered boats became the norm and tolls mainly ceased to be collected from these in the 1880s, and, though

north of Worcester to Bewdley the horse-way was open until 1906, the use of steam boats finally prevailed throughout the river system.

In the 1890s the river was further deepened by dredging so that the river now had a depth of 7 feet above Worcester to Stourport and of 10 feet below Worcester to Gloucester. This meant that steam-driven boats up to 200 tons could safely navigate the river. During the later 19th century the drawn barges finally ceased to be used above Bridgnorth, but continued below the town into the early 20th century (Jeremiah 1998). From about 1883-1938 the traditional ferries of the river were also being abandoned (Underdown 1986, 99).

In 1909 a Royal Commission had recommended that the river be improved again so that vessels up to 750 tons to Worcester and 600 tons to Stourport could be used, but this was never implemented. Many different cargoes were still being carried on the canal and river. Salt, coal, iron and steel were brought for export from the Midlands. Imports included grain which was brought up to the mills in Gloucester, Tewkesbury and the Midlands, and chocolate crumb from their factory and wharf at Frampton-on-Severn was brought up to Bournville in Birmingham by Cadbury Brothers via the river and the Worcester and Birmingham Canal. Traffic on the river remained at a reasonable level and only declined in the later 19th to early 20th century until the late 1920s, when oil and petrol traffic increased.

Only the transportation of oil now prolonged the river navigation and saved it from an early demise, and as part of this revival large wharves and a depot for oil were built at Diglis, and, for instance, on the east bank of the river at Timberdine on the southern edge of Worcester. As part of the war effort these wharves were extended in 1944. Motor barges of 280 tons, with dumb barges of 330 tons, regularly plied the route to Worcester. In addition to the stockpiling of oil at the Diglis and at Bath Road depots, which had all been transported by water, this stretch of the River Severn was also planned to play a significant role in the proposed defences of the industrial Midlands in the event of German invasion during World War II (Mick Wilks, pers comm).

In 1949 the river was nationalised as part of the Docks and Inland Waterways Executive of the British Transport Commission. Traffic was still quite high going into the 1960s, with for instance 358,797 tones of cargo arriving at Worcester from Gloucester in 1961 (Richardson 1964, 26). The oil traffic lasted until the late 1960s, following the improvement of the Gloucester and Sharpness Canal to take tankers to the oil depots at Quedgeley. By 1964 oil pipelines were supplying Diglis rather than the river boats.

Today the river and associated canals are mainly used by pleasure boats, but passenger transport is not just a thing of the last twenty years. From the early days, packet boats transported passengers to and from the towns along the river and canal, taking people to market as well as on outings to places such as Sharpness Pleasure Grounds (below Gloucester) and Wainlode Hill. This pleasure use continues with boats based in Worcester and with larger boats from Gloucester making trips to Worcester. Canal boats also ply the river in some numbers, as they move from one canal to another, and the renovation of the Diglis basin as a marina suggests that there will be increasing use of the waterways for recreation.

The river has also played a major part in a safe general water supply in the region. In the 18th-19th centuries the responsibilities for water supply and waste treatment were exercised by towns and private companies, and a very complex provision resulted. As part of a rationalisation programme Severn Trent Water was set up in 1974 and continues water supply today, involves water abstraction from the River Severn and the treatment of sewage, with an accompanying outfall into the river.

2.4.1 **Middle Severn from Worcester to Tewkesbury**

The river in more recent historic times has been divided into three navigational areas: the upper Severn from Welshpool to Bewdley/Stourport, middle Severn from Stourport to Gloucester, and the lower Severn below Gloucester. This report therefore relates to the middle part of the middle Severn. The Severn has generally been regarded as tidal as far as Tewkesbury (Trinder 2005) - the tidal nature of the lower river assisting in the navigation - and so the middle Severn was without this natural advantage, except perhaps during exceptional tidal surges. The following summarises the data available for specific sites (mainly from the HERs; Figs 21-30) along this stretch of the river in preparation for field survey, by identifying some principal themes which contribute towards its characterisation based on its historic use. A total of 186 sites were identified by the end of this stage (Stage 1).

Prehistoric and Roman find-spots (Fig 31)

The earliest objects discovered in this stretch of the river itself are mainly of Bronze Age date. These finds were brought to light mainly during the building of locks and dredging that occurred from the 19th century, but similar finds are also known from the Bewdley area. Typically these are earlier prehistoric weapons:

bronze spearhead discovered at Diglis Lock in 1844, now in Cheltenham Museum (UID 265);

bronze palstave axe from Diglis (UID 270);

bronze sword from 'just below Diglis' (UID 263; Edwards 1907, 17), now in Worcester City Museum;

bronze spearhead from Powick, now in Kingston upon Hull Museum (UID 10);

Neolithic flint blades, now in Birmingham City Museum (UID 271);

and a flint dagger from near Diglis, now in Birmingham City Museum (UID 91).

Some have seen these prehistoric metal finds as evidence of where prehistoric route-ways crossed the river, as near Bewdley above Worcester, and, therefore, of where objects might be lost due to mishap. However, in the light of deposits elsewhere, and in particular at Flag Fen in Cambridgeshire, it is perhaps better to see such aquatic deposits as more likely to be deliberate votive offerings (Pryor 2001). Finds of early date in the immediate close vicinity of the river have otherwise been rare, which is unsurprising given the alluvial deposition associated with regular periodic flooding. It is difficult to be precise about the role of the River Severn in the more distant past, but there is a strong impression from the prehistoric metalwork finds in particular that the river should be seen as a significant element of the sacred landscape of these early cultures, in addition to any more mundane and practical uses that the river was serving in these early periods.

The later prehistoric (Iron Age) and Roman periods are not represented in the immediate vicinity of the river by much direct archaeological evidence, though Edwards (1907) does make reference to 'two fine examples of early British coins, one gold...' being dredged from the Severn, though unfortunately without indicating whereabouts.

The location of Roman towns on the banks of the Severn at Worcester and Gloucester probably implies an intention to use the river as a waterway for supplies, but so far the evidence for this in the form of identifiable quayside structures has not been found. Some antiquarian Roman finds, however, are known from the riverside at Diglis on the south side of Worcester during the construction of the lock (UID 291; Allies 1840), and Roman pottery was noted in the alluvium at the Upper Lode (Tewkesbury) lock-pit (UID 133; Gloucs 5522), and there are also antiquarian

references to large amounts of iron slag at Pitchcroft on the north side of Worcester, which may also not be unconnected with the river (Richardson 1955).

Roman pottery was recovered by divers at Hanley Quay (UID 47) just above Upton-on-Severn, where plentiful Roman finds have been observed just beyond the river bank proper (eg UID 40). The timber structure found in Powick (in association with a possible prehistoric votive offering; UID 10) has been interpreted as the location of a Roman bridge (Purton 1900), and deserves further investigation, though this seems inherently unlikely. In fact the latter constitutes some of the best evidence to date for an early structure, and it may have been exposed by the 1840s river engineering works which were reported to have lowered the river level even further than normal (see above).

The further potential of the river-bank may be indicated by Ripple where finds from several periods were found in association (UID 29), Strensham (UID 32; WSM11801), and at Clifton on the east bank of the river, where Roman activity has been identified across the flood plain (UID 33-6). However, to date there is no indication that prehistoric and finds scatters in such positions are other than the result of agricultural activity.

Wharves/quays

An early quay has been suggested based on route-ways down to the river at an area known as *Drakeland* in the early 15th century (UID 295) and this site is located at the northern limit of Upton-on-Severn parish, and field-name evidence suggests that the site was accessible to several adjacent parishes. Such a site may have been most useful prior to a bridge at Upton, as it would have provided a quayside on the east bank of the river, whereas both Upton and Hanley were on the west bank.

The best evidence so far identified for a village quayside is at Hanley Castle where there is good documentary evidence (Toomey 2001) and where underwater timber structures have also been located by diving (UID 60). Here, in the presumed vicinity of the medieval quay, quantities of later medieval finds (locally made pottery) have come to light (Hurst 2004; UID 46). The latter included imported early post-medieval German wares which represent good evidence for goods both being loaded and unloaded at this point. Documentary evidence also corroborates the use of this local quay to supply the nearby castle (Toomey 2001).

Another early quay may be expected at Upton-on-Severn (UID 106/7, 120) from 1289 at the latest, and both Worcester and Tewkesbury must have had quaysides from an early period. Though evidence is lacking it is difficult to believe that Kempsey would have been without some sort of quayside where goods and passengers could alight for the bishop's palace. Additional quays may also possibly be expected at Clevelode and Saxons Lode as the 'lode' element has been interpreted as indicating a place where goods could be loaded or unloaded (Trinder 2005, 7), though others have interpreted this place-name element as indicating a ferrying point.

The River Teme in its natural state was also an extension of the Severn navigation and during the 19th century it was plied by coal boats up to Powick Bridge (NMR UID 1343057), and so there was no need for any additional wharfage where the two rivers joined.

Warehouses

At Worcester a large post-medieval warehouse on the river (NMR UID 514981), and the remains of other possible buildings (?warehouses) have been found at south quay in Worcester (NMR UID 1356334). At Upton a warehouse building has been identified (UID 71), and a possible warehouse has also been recognised at Hanley Castle. Similar buildings are presumably present in Tewkesbury.

Ferries (Fig 32)

Based on the documentary sources these had been established by the medieval period (eg at Upton, UID 89 and 110), but may be much earlier. Other ferries documented in later times have been recognised in order downstream from Worcester at:

the Ketch (UID 42);

Kempsey (UID 103);

Pixham (UID 116);

Clevelode (UID 92);

Rhydd (UID 93);

and Uckinghall (UID 94; traditionally regarded locally as of great antiquity).

The ferries have been usefully listed and described by Guyatt (1996).

The 'lode' name-element is understood by Gelling and Cole (2000, 81-3) as being indicative of a difficult river crossing, often associated with dramatic flooding; and so where a ferry becomes a secondary meaning by association, presumably because a boat became a better option than attempting to ford the river.

Road bridges, for instance at Upton, will generally have forced the closure of such services, though sometimes the old ferry clung on seasonally as at Worcester. Ferries may have increased in numbers with the raised river levels from the mid 19th century, where they may have succeeded the more ancient fording points. This has potentially made distinguishing between the sites of fords and ferries much more problematic, and it is possible that both operated at some locations according to the local conditions and the season.

Additional facilities could be related to major institutions such as Worcester Priory (the Watergate, UID 253), and hostleries, such as possibly at Kempsey based at the Old Oak Inn on the riverside (UID 53), Pixham, and at Upton (in the early 19th century, now the Plough Inn; UID 75). At the Ketch the ferry was taking passengers from the inn over to Powick (Jeremiah 1998), but ferries like this may have been periodic according to river conditions and demand, and may have been short-lived reflecting only temporary travelling arrangements at the time.

Fords (Fig 32)

Fords are listed by the HER as follows (in order going downstream from Worcester):

Withy Bed/Duck Brook in Worcester (UID 104);

Rhydd (UID 117);

and at Saxon's Lode (UID 123; but see above re 'lode' names).

Most of the fords are most likely to relate to the earlier unimproved (pre-19th century) state of the river, as the later major improvements generally deepened the river significantly. However, the Young plan of 1772 indicates fords at Clevelode, Rhydd, Severn Stoke, and Hanley for the stretch from Worcester to Upton.

Alternatively the Taylor map of 1784 (also cited in Harrison 1964) has listed fords between Worcester and Tewkesbury, based on the shoals shown on this map, as: Diglis, Clerkenleap ('The Catch', or Ketch), Kempsey, 'Picksam' or Pixham, Clevelode, Rhydd, Stoke, Hanley, Upton, 'Royal Hill' or Ryall, 'Sextons' or Saxon's Lode, Mythe Hill and Upper Lode. Guyatt (1996) has also usefully listed and described the possible fords.

Prior to the mid-19th century canalisation of the river these features especially were regarded as damaging to navigation, and an earlier trader commented about 'encountering the dangers and annoyances of the rapids over the Ketch, Clevelode, and the Rhydd fords ... the sand-banks of Upton and Sexton's Lode' (Williams 1863). This comment suggests that the 18th century list provides a good indication of where the fords were located, which adds to the list of those attested from more explicit documentary evidence. It is likely that the fords were not all usable all the time according to changing conditions, and that they were only in seasonal use.

Fisheries (Fig 33)

The earliest fishery is at the manor of Timberdine, now on the south edge of Worcester on the east bank, which was recorded in the 11th century (UID 99), and another have been documented at Severnstoke (17th century; UID 101). Bushley was associated with a 'fish house' (UID 102), as was Tewkesbury (UID 132), and these buildings might also imply a specialist fishing installation on the river.

Guyatt (1996) has also usefully listed other evidence for fisheries, though this is slightly more oblique as it derives from suggestive field-name evidence: at Kempsey there is a 16th century reference to a meadow called 'the Neyte' (UID 100), where the name derives from a term for an 'islet' (R Coates, pers comm). An islet would lend itself readily to a fish-weir, as was widely evidenced further upstream in Shropshire (see Pannett 1987-8), where the main channel could be fully occupied by a fish weir with navigation via a bylet to one side. On similar evidence another islet may be suggested further downstream at Ripple (UID 128).

However, the soft alluvial fills of most of the river-bed south of Worcester would have made the maintenance of any island in mid-stream much more problematic than upstream in Shropshire. Any such features in this part of the river are liable to have been more akin to sand-bars, and were, therefore, swept away before they were recorded by cartographers from the later 18th century onwards.

Water meadows and other agricultural features

Water meadows may once have been a common feature but they are easily confused with ridge and furrow and so few have been recognised to date. The only examples within the survey area are at: Buryend Farm (UID 51), Powick (UID 55-6), and Severn Stoke (UID 52), and possibly at Ripple (UID 125).

Sunken boats

A sunken barge is known at Clerkenleap, Worcester (UID 114), at Saxon's Lode (UID 281), and at Diglis (UID 277). A possible sunken barge has also been reported at Kempsey (UID 48), possibly in the vicinity of the lost Royal Oak Inn.

Bridges

Bridges form a major theme in the transport history of the region, and were usually located at points where major land routes crossed the river. The historic road bridges, as described by Gwilliam (1976), were:

- at Worcester where a Roman bridge has been suspected and an 18th century bridge (UID 194) replaced an earlier bridge sited further up stream;
- at Upton where a 15th century bridge (UID 69) superseded a 14th century ferry and was rebuilt in stone in 1605, but destroyed by flooding in 19th century;

- and at Tewkesbury where the Mythe Bridge was built in the 18th century by Telford (originally tolled; UID 61, Gloucs 5535; with a tollhouse Gloucs 7995; and associated turnpike Gloucs 7996).

There was also a railway bridge of the now disused Ashchurch to Malvern branch line (UID 39).

Industry

The river clearly attracted industry as it offered transport that was much cheaper than by road. The medieval Hanley Castle potteries undoubtedly took advantage of cheap transport on the river to reach a very extensive market (Vince 1984; Hurst 2004) for their products, and by the mid 18th century pottery works were being set up virtually on the river-bank at Worcester when the Warmstrey porcelain works set up production in 1751 (NMR UID 631586).

From the 18th century onwards brick and tile works appeared on the river-bank at several locations, with brickworks being identified at the following places (listed in order going downstream from Worcester; Fig 34):

on the east bank of the river below Diglis (UID 112; 18th century);

near Pixham (UID 68; 20th century);

Severn Stoke (UID 118);

Upton - on the east bank below the bridge (UID 74) and on the west bank above the bridge (UID 88), and a limekiln is also documented on the west bank just above the bridge in the late 18th century (UID 122);

Holdfast (UID 124) in the 18th century;

Queenhill (UID 126) in the 19th century;

and just north of Tewkesbury (UID 129-30; both brick and lime kilns).

At Upton the industry had been set up by the Addis family that had also been prominent in the earlier Hanley Castle pottery industry (Hurst 1994).

Improved navigation

Pre-19th century attempts to improve the navigation cannot presently be identified. Some hints of where earlier improvement works were carried out are given on the 1784 map by Young, which shows lengths of river-bank labelled with 'faggoting' (eg above Hanley Quay). This may well be a reference to the use of channel-constricting wooden structures above fords to speed up the current to try and wash away some of the gravel that formed obstacles to navigation – such structures were also referred to contemporaneously as 'jetties'; see above).

River locks and a weir were constructed in the mid 19th century at Diglis (UID 258) and 14 years later at Tewkesbury (UID 139; Gloucs 11366), both with associated structures. At Diglis there were also locks into the Worcester and Birmingham Canal finished in 1815 (NMR UID 1339427). All the locks in the survey area built up to the 19th century continue in use today.

WWII defensive works

The Defence of Britain project has located a considerable number of sites where preparations for defence had been made based on strategies such as casting a defensive loop around Birmingham using the major waterways such as the Severn ('the Severn Stop Line'; Mick Wilks, pers comm). At Worcester these included anti-tank defences on Worcester Bridge and machine gun emplacements in the vicinity, and the defences looked west as invasion was expected from this direction. A

detailed account of this period is presently being compiled (Wilks 2007) in order to supplement the data already collected by the national project which was completed in 2002.

There were large-scale works to prevent aircraft landing at Ripple, Upton (UID 86-7; and above Upton Bridge UID 121), and Tewkesbury on the flat flood plain adjacent the river (UID 289). Other sites were a gun emplacement (WSM 19615) and pillbox (WSM 24702) in Ryall (UID 14); the stockpiling of fuel at Diglis (heavily defended, for instance by a trench complex; UID 184) and at Bath Road (UID 278) on the southern boundary of Worcester, which was reinforced by river defences further south at Saxon's Lode (UID 290; NMR UID 1428057). Anti-tank WWII defences are also known on Worcester (eg UID 176) and at Upton (UID 84) bridges (Wilks 2007).

Other

Many other types of site have been identified dating to the medieval and later periods. These comprise: 'scoriae and cinders' of unknown date at Ripple (UID 292); a Civil War earthwork at Upton-on-Severn (UID 66) and the Battle of Worcester 1642 and 1651 battlefield (English Heritage 1995) and another Civil War earthwork in Diglis of the same date (UID 193); Worcester Cathedral precinct including a watergate (UID 253); miscellaneous cropmarks at Ripple (UID 127); an ice house at the Rhydd (UID 63); and a motte and bailey castle at the Mythe/Royal Hill in Tewkesbury (UID 137; Jones 1987) reported to have partly collapsed in to the river (and not accessible in 2008).

2.4.2 **Map regression analysis (by Margaret Noke)**

Map regression analysis was carried out based on comparing the modern river and the first edition OS mapping (c 1880s) and a sample of the 1849 Beechey map of the River Severn (WRO BA 4120/148). Landmarks and boundaries outside the river on the 1849 map were used to georeference the river to the modern map (Hurst *et al* 2007), rather than using the present river course itself. Where field boundaries on the 1849 map were no longer present the 1st edition OS map (1880s) was used to locate the point, although these also showed differences with the 1849 map.

The geo-referencing showed that the 1849 map was only drawn as an accurate survey of the river channel, and that the adjacent landscape features and buildings along the river were only represented schematically. Comparison between the 1849 and modern mapping of the river course showed little evidence for active change of any significance.

The map regression analysis, in keeping with the Stage 3 project, was not accompanied by the use of a project-dedicated GIS. Instead the project database (see below) was designed to be read directly into the HER to enable enhancement on the completion of the project, thereby avoiding the need to create a separate GIS.

2.5 **Summary of principal documentary sources**

A great deal of original documentation survives, especially in relation to the very major engineering works that were carried out in the 19th century which fundamentally changed the character of the waterway and enabled its more regular use for the conveyance of heavy goods (for maps see Table 1). This legacy largely remains in working order and maintains the potential of the river for this purpose.

Date	Title	Repository	Reference(s)
1772	A map of the River Severn from Upton to Bewdley describing the different properties and the extent of the several parishes on both sides. Also the present	British Waterways Archive	BW 127

	foot towing paths and the proposed horse road. Surveyed and drawn by G. Young, 1772		
1784	The River Severn from Stourport to Deerhurst described in its present state with the propos'd improvements of the navigation by George Young, Worcester, 1784	British Waterways Archive	BW 127/336
1802	The River Severn from Diglis below Worcester to Bewdley, describing the path now used for towing vessels along the said river by men. The same path being proposed to be used for towing or haling vessels by horses George Young, Surveyor, 1802	Worcestershire Record Office	161:41, BA 338/4
1810	A map or plan of the horse towing path on the banks of the River Severn through part of Worcestershire and Gloucestershire...Surveyed by Trophimus Fulljames 1810. Engraved by J Cary	Worcestershire Record Office	705:192, BA 5589/7
1837	Plan and section of the River Severn from the Lower Parting below Gloucester to the bridge at Worcester, shewing the intended improvements thereon	Worcestershire Record Office	1) BA 438 2) BA 4426 3) 900.9:3, BA 6507/3 4) BA 4870 5) BA 7740
		Gloucestershire Record Office	D2460/1/5/17
1849	Chart of the River Severn from Mythe Bridge, Tewkesbury, to Worcester, by Captain F.W. Beechey R.N., F.R.S., Lieut. G.M. Alldridge, A.B. Usbourne, Master, and C.T. Williamson, Masters's Ass't R.N	Worcestershire Record Office	1) 705: 477, BA 4120/148 (& 2) r705: 271, BA 1624
		Gloucestershire Record Office	D2460/2/3/5/28
1849	Longitudinal section of the River Severn from near the Lower Parting below Gloucester to Gladder Brook above Stourport	Worcestershire Record Office	1) f900.0:13, BA 6507/3 2) r970.5:8, BA 7440
		Gloucestershire Record Office	D2460/4/12/2

Table 1 Large-scale maps produced before c1850 showing the middle River Severn

Gloucestershire Record Office (GRO)

Archives of the Commission for the Improvement of the Navigation of the River Severn [Severn Commission], 1835-1947 (GRO DR2460/2)

Part of a collection created from archives deposited by British Waterways between 1969 and 2003. Divided into three parts: Clerks' Records (DR2460/2/1), Accountants' Records (DR 2460/2/2), and Engineers' Records (DR2460/2/3). Each part is sub-divided further according to the type of source of documents. According to the Catalogue, the most relevant archives are in the following sub-divisions:

Severn Navigation Acts and Bills (109 bundles, 1840-1914) (GRO DR260/2/1/1) - Includes documents concerning proposed, ongoing, and completed works (eg details of parts of River Severn where dredging is required; 1889-90).

In-letters and out-letters (255 bundles, 1842-1941) (GRO DR2460/2/1/9-10) - According to the Catalogue, the Clerk's correspondence "...gives a detailed picture of the workings of the Commission and covers administrative, legal, financial, engineering, and maintenance matters". The Catalogue includes an appendix which notes the subjects covered in each bundle.

Engineers' records (14 bundles, 1879-1922) (GRO DR2460/2/3) - Mainly annual reports to the Commission.

Improvements, works, and maintenance (68 bundles, 1850-1945) (GRO DR2460/2/3/2) - Includes papers and plans relating to Severn Navigation Act of 1890, and improvements 1889-1894; three

reports on dredging; plan and cross-section showing proposed improvements to the River Severn between Worcester and Upper Parting at Gloucester.

In-letters (94 bundles, 1842-1913) (GRO DR2460/2/3/3)

Out-letters (2 volumes, 1856-1878) (GRO DR2460/2/3/4)

General Engineering papers (93 bundles, 1836-1944) (GRO DR 2460/2/3/5)

Engineer's workbooks, plans etc. Includes papers concerning bank protection works, 1892-3.

British Waterways Archive (BW)

BW 127 - A Plan of the River Severn from Upton to Bewdley describing the different properties and the extent of the several parishes on both sides. Also the present foot towing path and the proposed horse road. Survey'd and drawn by George Young, 1772.

BW 127/336 - The River Severn from Stourport to Deerhurst. Described in its present state, with the propos'd improvements of the navigation. By George Young, Worcester, 1784.

BW 127/1044 - Copy of H. J. Marten [Engineer to the Severn Commissioners], Report to the Committee of Works for Finance and for General Purposes of the Severn Commission upon the Past History, Present State, and Further Improvements of the Navigation of the River Severn (September 17th, 1894).

The Severn Commission Map of the Severn Navigation (1 inch: 1 mile), showing areas and tonnages dredged 1943-5.

Worcestershire Record Office (WRO)

Archives of the Severn Commission (WRO BA 1624, ref. (r) 705: 271)

Deposit made by former Clerk to the Severn Commission. Parcel 1 includes a Chart of the River Severn in Three Parts (1849). Parcel 13 includes a Book of reference to the map of the River Severn from the Lower Parting, Gloucester, to Gladder or Whitehouse Brook, Worcester (19th century). Copies of the plan and book of reference are held in BA 4925/115.

Archives of the Gloucester and Worcester Horse Towing Path Company (WRO BA 5589, ref 705: 192) - Parcel 7 includes Acts, Bills, and plans, 1810-11.

Archives of the Severn Navigation Company (WRO BA 1006, 3175, 3762, 4120, 4380, 5589, and 6134) - Letters, reports, and other papers, 1786-1913

Archives of the British Transport Commission (WRO BA 6507, ref (f) 900.9:3) - Parcel 3 includes a Plan of the River Severn (1837), and a Longitudinal Section of the River Severn from below Gloucester to the Gladder Brook in Arley Kings [1849]. A photocopy of the plan is held in BA 4870.

Archives of the River Severn Catchment Board and Successor Bodies B (WRO A 9879, ref (b) 010:33) - About 435 minutes, agendas, reports, account books, ledgers, correspondence, and other papers of the River Severn Catchment Board, the Severn River Board, the Severn River Authority, the Severn Trent Water Authority, and District Water Boards, 1881-1975. Deposited by Severn Trent Water.

Various archives, 1893-1914 (WRO BA 160, 754, 1533, 3525, 5569, 7121 and 8782)

Various archives, 1881-1973 (WRO BA 914, 1912, 3236, 9463, and 11240)

Sources not consulted

Cambridge University Air Photo Collection (NB website not very useful for listing relevant photos)

Davies, S W, 1981 *An economic history of Bewdley before c1700*, London School of Economics, unpublished PhD thesis

Port Books of Bristol (available as CD)

Wakelin, A P, 1991 *Pre-industrial trade on the River Severn: a computer-aided study of the Gloucester port books c1640 to c1770*, CNAA Wolverhampton Polytechnic, unpublished PhD thesis.

3. **Field survey (stage 2)**

The extensive survey constituted Stage 2 of the project, and as with previous stages of the project was focussed on the river-bank and the margins of the river including any foreshore (see Section 1 for definition of survey zone).

3.1 **Aims and objectives**

The overall aim of the extensive survey was to update and check the results of the desktop survey (Stage 1) as far as possible to inform the reporting and dissemination stage of the project. The following specific objectives of this stage are in accordance with the overall project objectives described in the original Project Design (POB1-5, see Section 1.4; Hurst 2007).

Objectives (for project objectives OB1-5 see Desktop survey; Hurst 2007)

- 6) Determination of whether physical remains survive for sites attested in sources (OB6).
- 7) Identification of any additional sites or other observations (eg obvious signs of recent erosion) (OB7).
- 8) Basic recording of any surviving remains whether of known sites or newly identified sites (OB8).
- 9) Amalgamation of any additional and/or updated data relating to the survey area into the project database, together with the updating of project mapping (OB9).
- 10) To further refine and develop the principal themes for analysis and reporting in Stage 3, including through continuing liaison with others who either have a professional interest in the river or may hold useful information (OB10).

3.2 **Methods**

The extensive survey was executed in two main stages:

- a) sail-past survey (whole survey area), and;
- b) walk-over (where public access was available; primarily the west bank where about 90% of the survey was accessible);

and both were undertaken in February 2008, when die-bank of the bank-side vegetation enabled maximum visibility. The walkover was programmed after the sail-past, in order that any features observed during the sail-past stage could be checked out further on the ground.

The results of the desktop survey (stage 1; both data from the stage 1 database, and mapping) formed the basis of the field survey. A copy of this was generated for taking into the field and checking, with the map data being plotted at 1:5000 for this purpose, and sites being manually inserted on the 1:5000 map sheets prior to survey. Site recording was essentially by photography (digital camera with 3 million pixels minimum), and by GPS readings taken while afloat using the Trimble system (GeoXT; nominally with sub-1m realtime accuracy).

The principal task of this stage was to check as far as possible the existing data as collated in Stage 1 (Hurst *et al* 2007), and to record and map the locations of any new features.

Sail-past

The sail-past was carried out in collaboration with members of the Worcester sub-Aqua club, who provided the boat and organised appropriate associated insurances, and a river licence for the survey work was sought from British Waterways. It should also be noted that during the winter months there are minimal operating windows for the use of the river locks, and details of these were essential for the satisfactory planning of the survey programme. Both banks were individually observed, the east bank while travelling upstream, and the west bank while travelling downstream.

The timetable of the survey conveniently allowed, as intended, for the close checking of the river-banks due to foliage die-back in the late winter conditions (ie after periods of hard frost). The state of the banks, in particular any erosion, was also noted, but there is no attempt here to explain any river-bank erosion processes (or other geomorphological process), and their effects, except in a general way.

As part of the sail-past a valuable opportunity was taken to work with members of the local diving club (the Worcester sub-Aqua Club) who kindly made available their craft for this stage, as well as volunteering to pilot the craft, thereby greatly assisting with the project.

At the time of the sail-past the river levels at Diglis Lock were as follows: 14th February, upper (3.48m) and lower (4.16m); 15th February, upper (3.46m) and lower (4.00m).



Figure 2 'Sail-past' equipment and crew moored at Upton Marina

Walkover

The updated map plot created during the sail-past was the basis of further observation and recording during the walkover. During this stage, apart from checking sites already recorded during the desktop survey, any sites newly observed during the sail-past were also further investigated and recorded. GPS co-ordinates recording during the sail-past were initially used to locate such sites. A descriptive record was then made (visible extents, nature, condition, potential), and photography was again a principal method of recording. A provisional interpretation of function of any historic features was undertaken as far as possible.

Some parts of the survey length will be inaccessible during the sail-past on safety grounds (ie in the immediate vicinity of the main locks at Diglis, Worcester, and Upper Lode, Tewkesbury). In south Worcester the large area of the old Diglis docks, on the east bank of the river, was also out of bounds due to major redevelopment works in progress, and where associated public rights of way are currently suspended.

3.2.1 **Dissemination of results (Stage 3)**

The principal aim of this stage was to furnish useful data, and to furnish a project discussion and conclusions to a range of different bodies, which have an interest in the river, and, therefore, there were the following objectives at this stage:

- 11) To produce a finalised set of site records/plots of the survey area and submit the finalised project database to the HER for the purposes of updating and enhancing the HERs within the survey area (WHEAS, Gloucestershire, and Worcester City) (OB11).
- 12) To compose a commentary and report on the sites in the survey area covering the principal themes determined in Stage 2 with a copy of the plots (OB12).
- 13) To give a reflective account of the project in terms of its general aims, methods and results for the purposes of providing a framework for further studies of this type (OB13).
- 14) Prepare text and illustrations for County website page (OB14).
- 15) To archive the project – this is expected to be minimal as the project data and plotting of sites will be directly inset into the HERs (OB15).

Methods of dissemination

The final dissemination of the project results comprises this report which is intended to form the basis of an article covering the overall results of the project for publication in a local journal (with plots at a smaller scale) which will be suitable for bodies with a general interest in the river, and which will also be made available in full through ADS together with the desktop report (Hurst *et al* 2007), as appropriate (OB11-12); a short methodological report for publication in a national journal (OB13); and the updating of the HERs (Worcester City, and Worcestershire and Gloucestershire County Councils) (OB14).

3.3 **Results**

Survey conditions

The survey took place on 14-15 February (sail-past) and 18 February (walkover) following two winter flood spates which were not exceptional events for the time of year, and as a result there were localised areas where visibility was poor due to deposition of flotsam and jetsam; it was also noted in passing that various groups on some stretches of river-bank are volunteering to carry out rubbish clearance.

Water conditions were poor for visibility (less than 0.5m) and so no observation of the river-bed was possible, and these conditions are typical of the river throughout the year.

Sites from Worcester to Tewkesbury

The following photographs indicate some of the principal observations made during the survey, which added 22 new sites. These comprised hitherto unmapped, undocumented, or unrecognised features. They are presented in order proceeding downstream from Worcester bridge, and with extended captions to place them in a wider context, where appropriate. They represent a very varied collection of site types, indicating the varied uses of the river over a long period. In many cases, however, the observed evidence was minimal due to the tendency of the banks to slump forward towards the river, and obscure any features at the edge of the water.



Figure 3 Stone steps below Worcester bridge (UID 275; east bank); probably marking the site of a disused landing stage shown on the First Edition Ordnance Survey map



Figure 4 Brickwork covered by river-bank and situated opposite where Worcester and Birmingham Canal meets the river at Diglis (UID 276; west bank)



Figure 5 Sunken barge at Clerkenleap (UID 114; east bank); one of several sites of this type. See also Saxon's Lode below



Figure 6 Possible coursed stonework at base of river-bank at Clevelode (UID 283; west bank)



Figure 7 Posts possibly representing the last landing stage of Clevelode ferry (UID 92; west bank)



Figure 8 Stonework at Rhydd (UID 278; west bank). Being on private land it could not be investigated to establish its function, but it may relate to a boathouse recorded near the site (UID 63).



Figure 9 Disused oil storage facility south of Upton-on-Severn (UID 280; east bank). Six wooden towers holding vertical pipes were associated with a World War II fuel depot which was supplied by barges from Avonmouth in Gloucestershire (Wilks 2007, 134-5). A jetty stood beneath the towers but was demolished in the 1970s or 1980s. The fuel tanks were in the compound 350m to the east, although others probably lie beneath the long mound immediately behind the river-bank. A similar complex is also located just south of Worcester (UID 278).



Figure 10 Sunken barge at Saxon's Lode (UID 281; east bank)



Figure 11 'Slipway' at Lower Ham just below Upton-on-Severn (UID 282; west bank). The cutting is marked as a slipway on current digital Ordnance Survey maps, and is shown without a label on the first edition OS map. It may have been a slipway, but it seemed quite wide, and did not slope evenly down to the river



Figure 12 Aggregate loading at Ripple (east bank)



Figure 13 Clay pit (now a large pond) associated with late 18th to early 19th century brick making at Holdfast (UID 124; west bank). A brick kiln is shown next to its footprint on Young's map of 1784 (BW 127/336), and the field containing the pond was known as 'Brickworks Field' by the mid 19th century (Holdfast Inclosure, WRO ref 989.976, BA 2396). The pond is shown as a relict feature on the first edition OS map of 1880s.



Figure 14 River transportation of aggregate; upstream from Ripple



Figure 15 Empty barge returning downstream to Ripple



Figure 16 Exposed brickwork under bank at Mythe Hook (UID 283; east bank). This brick structure 5-6 courses high and about 5m wide was visible at the bottom of the bank. It had been cut into the bank and projected about 1m into the river. Now obviously truncated it was covered with collapsed bank material. Though unclear what this structure represents, it was obviously not recent, and presumably relates to the brick and lime kilns shown on Young's map of 1784. An adjacent clay pit is depicted on the first edition OS map of the 1880s, and is now a long pond. It may have been the pier of a jetty, in which case other foundations might survive in the river-bed



Figure 17 Possible timber revetment (UID 284; west bank). The post alignment was represented by two groups of three stakes c 20m apart, which were not the remains of modern fishing platforms, the latter found (but not recorded) along both banks throughout the length of the survey area. Rather, these stakes suggest the elements of a timber revetment, like the 'faggoting' shown on the Beechey map survey of 1849 (WRO BA 1624), though the form this took is unknown archaeologically. This part of the west bank

has clearly been eroding for a long time, judging by the number of lateral scarps and concavities such as that above the northern group of stakes

4. Discussion

A wide variety of river features were recorded during the desktop study, most of which were based on documentary sources. These included ferries, fords, fisheries, industrial sites (especially brickworks), and a substantial number of World War II military installations (after Wilks 2007). A total of 186 sites were recorded at this stage in the 29km (18 mile) survey stretch of the river.

The field survey stage (sail-past and walkover) resulted in the addition of 22 new sites making an overall total of 208 sites. Some of these were the direct result of the field survey, and others were from a re-appraisal of the cartographic evidence in the light of the further characterisation of the river in terms of its possible earlier uses.

There was little evidence for pre-post-medieval bank-side sites. However, in addition to the known medieval wharf at Hanley Castle, where the association of submerged timber structures has been demonstrated (Hurst 2004), the identification of two more sites of possible early wharves or landing points may be particularly significant. These are at Clevelode (UID 283) and at *Drakeland* (UID 295). The former was essentially undated but was close to a settlement that had its own medieval chapel. The latter was based entirely on documentary evidence, the site being within Upton-on-Severn at its northernmost extent where a number of parishes conjoin, and it is likely that this position reflects a much earlier arrangement where Upton was part of the larger land unit of Ripple (Mawer and Stenton 1927) – this riverside site may, therefore, be of particularly early date, and was presumably superseded in medieval times by the growing prominence of the present-day settlement at Upton.

The riverside wharves would have been part of a larger system of provision for the passing boats, and these would most likely have included facilities for the workmen carrying out the manhandling of cargoes, as well as the gangs involved in hauling the boats. Simple mooring points at strategic points may have sufficed for more intermediate places where there was no need for unloading or storage facilities, but where refreshments could be taken – a site such as the Bushley Inn (UID 287), despite its apparent isolation, presumably did a good trade due to its location on the river-bank above Tewkesbury. Though such sites were only documented from the 19th century, it is likely that they, or similar sites, were in use from a much earlier date.

Aside from the urban areas the river-bank sites most evident during the field survey were those associated with post-medieval to 19th century industry, and in particular brick making. The scale of the associated clay and aggregate pits, such as at Holdfast (UID 124) and at Mythe Hook (UID 129), shows how much exploitation of this kind took place, where the cheap transportation on the river was the chief attraction.

Given the efforts that went into improving the river for navigation in the 18th century it might be thought that field survey might have recorded the sites where the artificial narrowing of the river channel was carried out above any shoals. Some hints of the types of structures used for this purpose can be seen on the Young 1784 map, where lengths of river-bank were labelled with 'faggoting' (eg above Hanley Quay), probably a reference to the use of wooden structures above the shoals/fords to slightly speed up the current to try and so wash away some of the gravel that formed the obstacle – such structures were also referred to contemporaneously as 'jetties' (see above). However, the remains of such structures are likely to have been vulnerable to being washed away in floods, though any associated driven posts may still remain. Where such posts survive faggoting or jettying may be an alternative interpretation to a conventional riverside jetty structure (eg UID 284).

Many of the sites recorded during the desktop survey in association with the improvement of the navigation in the mid to later 19th century were still intact, and

even still in everyday use. The character of the river that was engineered into being in the 19th century is, therefore, still the character of the river today. These works will have raised the river levels up to about 2m above the locks, and in ordinary (ie no-flood) conditions effectively canalised the river, which, of course, was the objective of the engineering scheme, as it enabled much larger craft to come up the river and provided a more consistent water level to guarantee navigation. Field survey was unable to directly assess the impact of this rise in water level on any pre-existing riverside structures, but it is likely that any structures at the immediate waterside would have been submerged and would have to have been rebuilt to remain in operation. Any more ancient riverside wharves or jetties would probably, therefore, have disappeared for good at this time

The field survey showed that beyond the urban areas of Worcester, Upton-on-Severn and Tewkesbury, except for the brickworks shown on 18th-19th century maps, and existing structures forming parts of the major mid to later 19th century works, there were few obvious traces of any sites identified at the desktop stage. Even the ferries, which seem to have been a prominent feature of this part of the river into the 20th century, are hardly visible in terms of bank-side features, though the house belonging (presumably) to the ferryman (eg at the Rhydd and Clevelode) may still exist alongside the river-bank. Fords and fisheries were submerged by the raised river levels from the mid 19th century, and the former in particular would have been largely removed during subsequent dredging.

It was also observed during the field survey that the banks are tending to slump inwards (see below), which would further obscure any waterside features. In addition massive amounts of stone blocks have been dumped along the foot of the banks over long stretches of the river, which is another factor which would obscure any feature located on the edge of the water. The latter was presumably an attempt to stabilise the banks and protect them from erosion at water level. This suggests that the introduction of larger boats following the mid 19th century improvements led to bank-side erosion through undercutting by the wash from boats, which would perhaps have only become a major problem with the advent of powered craft rather than in the era of the bow-hauled trow. Apart, therefore, from the raised water level and naturally murky condition of the water, the condition of the banks on the modern river also tends to militate against there being any good conditions for the observation of archaeological features along the river-bank.

The following discussion identifies some of the main themes stemming from the results of the field survey and that were not already covered during the desktop study (see above).

River defences

The flood-bank on the east bank ends just south of Kempsey, from which point northwards the river terrace provides a natural barrier. On the west bank, it ends a little further to the north, opposite Beauchamp Court. The dates of establishment of these structures are presently unknown.

A major feature of the river-bank in the survey area was that much of it was re-enforced by the dumping of huge stone blocks of Cotswold limestone. The precise date of this construction is unclear but it is likely to be in the 20th century. It is likely that that this was in response to an increasing rate of erosion probably due to larger powered vessels being used at this time.



Figure 18 Stone revetment at base of the river-bank typical of both banks of the river in this part of the Severn

Towing paths

Both the Fulljames map of 1810 and the First Edition OS map of the 1880s show towing-paths on the east bank from Worcester to Upton, and on the west bank from Upton to Tewkesbury and beyond. However, no sign of any surfaced path, or related feature, was observed along this route during the field survey. The towing-paths would have presumably had the effect that their respective sides of the river would have been entirely cleared of any obstructive vegetation, which of course would be unlikely to be apparent today archaeologically.

Minor features



Figure 19 Scaped access to river for watering livestock. Though generally taken for granted and overlooked the scrapes in the river-bank for giving access to cattle to drink may well represent an ancient practice, and it is conceivable that such sites, once created, may well have considerable longevity.



Figure 20 Wind-powered water pump near Bushley. This must post-date the 1880s; such features reflecting the original movement towards the industrialisation of farming are now much rarer in the landscape, and it may be necessary to record surviving examples in due course.

Timber platforms, and their usually associated steps hacked out of the bank, are constructions by fishermen, and these were observed to be very widespread on both sides of the river. Though of little age, the repeated use and refurbishment of such features can clearly initiate localised erosion. Where abandoned the remnants of these old platforms usually consists of the slender timber uprights which may survive well in the wet conditions and should not be mistaken for remains of an earlier date.

State of the river bank

General observations about the river-bank suggest that it is in a dynamic state with movement inwards on the river rather than receding through erosion. This conclusion is based on the mud bank often being seen to have partially covered over the very large stone blocks and which are probably from the era of oil transportation, when heavy barges, usually travelling with dumb barges in tow, presumably created a great wash. This pattern of river-bank movement would suggest a high potential for any remains now being buried, especially where little or no erosion has previously taken place.

There was also clear evidence of more localised erosion, which tended to concentrate where fishing platforms had been built at the base of steep banks (see above).

4.1 Review of survey

Desktop survey

The amalgamation of records from HER databases from four different organisations into a single project database presented a range of issues:

- in the case of the HER records from Worcestershire County and Worcester City there was some degree of overlap, and so it was necessary to identify records which should be coalesced and/or replaced;
- positional information sometimes needed (generally slight) amendment, and;
- in the case of older, and especially antiquarian, records there was often uncertainty about exact site location.

Sail-past

As a strategy the combination of the two survey methods (sail-past and walkover, and in that order) can be shown to have been effective because they complemented each other, and between them, have probably identified the main visible features along the river-banks.

The vantage point from the river was most effective at identifying structures within or even hidden under the river-bank, which was particularly important as it is considered likely that the natural movement of the bank is tending to spill over and cover such remains. This was especially proven in the case of the brickwork (UID 285) noted in the east bank at Mythe Hook. However, when viewing from the boat, the steep and deep banks of the river throughout the survey area prevented any appreciation of anything beyond the top of the bank itself. Unfortunately due to the high silt content of the river there was also no possibility of examining by eye from the boat any part of the bed of the river, including even the very edges where the water was shallow. The latter had the unfortunate consequence that it was very easy to steer the boat too close to the side of the bank when making closer inspection and to then foul the propeller, as happened on several occasions.

The use of the boat also had the advantage that it allowed the easy viewing of parts of the river-bank where there was no public access, though in the case of the survey area this was not critical, as the whole length of the survey area was accessible from at least one river-bank.

Though in practice it proved just possible to work on paper copies of the mapping during the sail-past, it was clearly not ideal to be working in this way, as there was the constant risk that the breeze on the moving boat would cause the loss of map sheets, especially as standing up in the boat to get a better view meant having to hold on, so that handling paperwork as well could be problematical. Though the boat provided a stable platform to be working from, there was also the need periodically to hold on with both hands due to surging of the engine or the execution of sharp manoeuvres to get past obstacles in the water seen at the last moment. This also increased the chance of losing items overboard, though in practice nothing was lost in this way.

The use of the GPS during the sail-past proved essential for the rapid location of features deemed worthy of further investigation and recording when carrying out the walk-over. This was especially the case where these features were virtually invisible from the top of the river-bank, and would, therefore, never have been spotted if only the walk-over had been carried out (eg brickwork at the Mythe Hook; UID 285).

It was observed on both days of the survey that the Trimble GPS system, though it worked effectively, did not achieve its full accuracy based on locking onto three satellites, and instead achieved a slightly lesser accuracy using fewer satellites. In practice this did not matter, and it is unknown whether this was caused by the unfamiliarity of the user with this equipment, or whether being on the boat and therefore constantly moving, even if only minimally, was preventing the GPS from operating optimally.

Walkover

This was a more routine survey practice and the winter conditions proved very suitable, as would be expected. The walkover was essential in order to cover what lay beyond the crest of the river-bank, and was, therefore, invisible from the boat. The viewpoint from the river-bank was also useful to establish more carefully the character of any feature, and, therefore, to distinguish between features which might appear superficially similar, or insignificant from the boat. Accordingly the possible slipway on the west bank at Lower Ham below Upton-on-Severn (UID 282) was observed in the walkover survey but was not identified when viewed from the river.

5. **Conclusions**

Archaeological surveys of riverine environments are very rare, both regionally and nationally. Much attention has been focused on river valleys, estuaries, and, in recent years, on coastal and off-shore environments, but riverine environments have remained comparatively under-researched. To the authors' knowledge, the present project is only the second survey of a length of river corridor to be undertaken in the west Midlands, the first being a rapid walkover survey along part of the River Teme in Herefordshire (Cook 1998). As a result, the project represents an early stage of knowledge and expertise, and its conclusions must be regarded in this light.

Two main points stand out from the evidence presented and discussed above. In the first place, many of the documented sites could not be identified on the ground. This was especially clear in the case of the fisheries, fords and ferries. Where maps or photographs record these sites these records themselves are now the principal evidence. This may reflect that the river has a habit of scouring away and burying its own history, and that much of that history, until more recent times, was not associated with any substantial structures that would leave any obvious archaeological trace.

In the second place, in contrast to this dearth of evidence for earlier activities in the vicinity of the river, there are extensive monumental remains of the mid- to late 19th century that survive despite the great floods that have occurred over the last 150 years. These attest the grand scale of the designs of this period, and are the equal of other contemporary monuments to the expansion of the transport industry that are to be found on the canal and rail systems. And so, compared to other parts of the historic environment record for the Worcester to Tewkesbury stretch of the River Severn, a great deal survives of the original Diglis complex, which formed a major part of the 19th century river improvement scheme. All the locks in the survey area, for instance (ie both at Worcester and at Tewkesbury), built in the 19th century continue in use today. Apart from the locks further clues to the river's commercial past in this period are the sunken barges, such as at Saxon's Lode, or on Diglis island. These provide a tangible link with the navigation heritage of the river, though only with the last stage of this era. In a sense the whole of this stretch of the River Severn is a continuing legacy of 19th century engineering, given that the raised water level achieved in this period through weirs and locks, is still intact today.

It is clear that, apart from these comparatively youthful survivals at the sites of the main locks, there is very little obvious remaining to represent the use of the river in more remote times. The present historic environment record, therefore, reflects in the main a rich documentary record and folk memory relating to specific points on the river rather than any more tangible archaeological survival. It turns out, therefore, that the recorded sites probably only reveal a very incomplete view of the history of the river. This history can currently be summarised briefly by the river's early significance as a place for votive offerings, followed by the establishment of various local wharves, fords, ferries, fisheries by the medieval period, and then a post-medieval boom in industrial activity, the latter presumably linked to some extent to

the Industrial Revolution, the cradle of which lay just to the north of the survey area at Coalbrookdale in Shropshire. Given our present knowledge one of the main challenges would be to establish more clearly the degree to which later prehistoric and Romano-British inhabitants made use of the river, and this could still be crucial to understanding some key elements of the regional socio-economic life in these periods.

Today the commonest structure on the river-bank are the fishermen's platforms and their associated access, a reflection of the modern era and the boom in leisure activities. This serves to give the river an entirely different character from its past when it would largely have been a working river where navigation was its chief use, with a subsidiary role being as food provider in the form of fish.

In the light of the somewhat limited extant archaeological remains on the river-banks themselves as evidenced by this survey, there is still the prospect that more evidence of the ancient use of the river, whether for straight-forward physical transportation of goods and people, or in the landscape of the mind (ie symbolically, as the home for votive offerings, as the numerous antiquarian finds of fine prehistoric artefacts suggests), remains on the river-bed itself. It is likely that more modern dredging has been confined to a main channel and that deposits in the river-bed otherwise survive intact. The exploration of this realm by diving has already revealed archaeological riches, and this is likely to counter-balance spectacularly the apparent lack of evidence for past activities on the modern river-bank.

The results of this survey have resulted in a broad appreciation of the state of the historic environment of the river, and the addition of 22 sites to bring the total to 208, an increase of about 12%. In contrast survey of this type on part of the River Teme in Herefordshire resulted in a more than three-fold increase of site numbers (Cook 1998), though here the new sites were largely relict river channels, or adjacent earthwork sites. Such results indicate a river with a very different nature than the middle Severn, and in a very different landscape, and so the results from these surveys are not directly comparable. However, in both cases the results have made a positive contribution to understanding the historic development of river use, and the pronounced role of the river in influencing human settlement.

5.1 **Potential for future stages/projects**

It remains unassessed as to what extent there are remains of archaeological interest in the river-bed itself. Preliminary investigation has indicated that there is considerable potential for the survival of well preserved remains (Hurst 2004), the management of which is currently problematic given that the quality of these remains and their whereabouts and extents are currently unknown.

A further stage of work could, therefore, be to carry out an on-site evaluation through diving on specific sites, for instance at Hanley quay, and at the newly discovered sites at 'Drakeland' and Clevelode, and to investigate the extent of dredging where this may have been largely confined to the establishment of a main channel, thereby leaving large parts of the river-bed unaffected.

6. **Acknowledgements**

The provision of HER data is gratefully acknowledged: Emma Hancox and Victoria Bryant (WHEAS HER), Tim Grubb (Gloucestershire HER), Katy Whitaker (NMR site records), Nigel Wilkins (NMR buildings record), and James Dinn (Worcester City).

The following also provided data that was useful for the project:

Record Offices: Helen Bartlett and Carol Cook (Gloucestershire County Record Office), Deborah Craggs (British Waterways Archive), Margaret McGregor (Bristol Record Office), Katy Whitaker (NMR air photos), Robin Whittaker (Worcestershire Record Office) and Andy Warren (Severn Trent plc);

and other bodies: Angie Bolton (Portable Antiquities Scheme), Nigel Crowe and Grahame Newman (British Waterways), Nick Dean (Worcestershire County Council), Deborah Fox (Worcester City Museum), Caroline Jones (British Waterways Archive, Gloucester), David Kendrick (Worcestershire County Museum), Lisa Moffett (English Heritage), Thomas Richards (Herefordshire and Worcestershire Earth Heritage Trust), and Douglas Wilkes (Defence of Britain).

Edward Wilson and Cathy Beeching (Environment Agency), and Maggie Thornton (Curator, Tewkesbury Borough Museum) were also contacted during the project.

Digital images of the 1849 map showing the River Severn from Mythe Bridge, Tewkesbury, to Worcester (W.R.O. ref: BA4120/148 f705:477) were kindly created by Worcestershire Records Office (John France and Jonathan Brusby). Emma Hancox (WHEAS HER) created the overall database, and provided every assistance with establishing the GIS link for the project.

Thanks are especially due to John Cuthbertson, and Dave Rees (Worcester sub-Aqua Club divers) who made possible the smooth operation of the sail-past stage through their professionalism which took care of all eventualities some of which were unfamiliar to landlubbers; and to the members of Worcester club who provided use of their dry suits for the occasion. British Waterways (Paul Griffin) supported the work of the survey, as did the Upton-on-Severn Marina by providing free launching facilities, and thanks are also due to Ian Cundy for providing overnight mooring facilities. I would also like to acknowledge the enthusiastic support of diver Richard Hart, without whose efforts in previous forays there would still be no knowledge of the archaeological potential of river-bed deposits in this part of the Severn.

English Heritage (Peter Busby, Dr Helen Keeley, and Kath Buxton) made the project possible by their support, as did the Aggregates Levy Sustainability Fund, and this is gratefully acknowledged.

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8. Abbreviations

BW	British Waterways
HER	Historic Environment Record
RCZA	Rapid Coastal Zone Assessment (Mullin 2005)
WHEAS	Worcestershire Historic Environment and Archaeology Service
WHER	Worcestershire Historic Environment Record
WSM	Numbers prefixed with 'WSM' are the primary reference numbers used by the Worcestershire County Sites and Monuments Record.

Appendix 1 List of sites

UID	WSM_no	Name	Easting	Northing	Parish	Evidence_type	East_bank	West_bank	River_bed
2	WSM00249	Battles at Powick Bridge during English Civil War	384694	253178	Powick etc	Documentary	No	No	No
10	WSM02562	Bronze Age spearhead & Bridge, R Severn, Powick	384470	248780	Powick	Find-spot	No	No	Yes
14	WSM35025	Ryall North. A cultural assessment , Upton on Severn	385137	241760	Upton on Severn	Archaeological (APs), architectural (buildings and foundations); documentary, and cartographic.	Yes	Yes	Yes
17	WSM32187	Desk based assessment and evaluation of land South-west of Ripple	386998	236845	Ripple	Archaeological and documentary.	Yes	No	No
18	WSM19755	Medieval urban component, Upton; tenement plots W of High St/N of Churchyard	385183	240719	Upton upon Severn	Cartographic	No	Yes	No
19	WSM30124	Kempsey flood alleviation scheme, Kempsey	384751	248885	Kempsey		Yes	No	No
20	WSM37120	Railway bridge over Severn	386312	239050	Ripple	Cartographic, earthwork	No	No	No
21	WSM19761	Medieval street system, Upton upon Severn	385176	240567	Upton upon Severn	Cartographic and documentary	No	Yes	No
22	WSM23930	Salvage Recording in 1996, Powick Booster & Main Supply Deficiency Scheme,	385067	251263	Powick	Archaeological (stratigraphy and artefacts)	No	Yes	No
24	WSM24700	Site of rifle range, The Upper Ham, Upton upon Severn	385768	240520	Upton upon Severn	Architectural and documentary	No	Yes	No
27	WSM26375	Cottages, Ferry Lane, Uckinghall	386300	237590	Ripple	Architectural	No	Yes	No
28	WSM29077	Possible medieval occupation, Quay Lane.	384322	241950	Hanley Castle	Architectural	Yes	No	No
29	WSM29785	Evaluation in 1990, Ryall House Farm, Ripple	386687	239920	Ripple	Archaeological (stratigraphy and artefacts)	Yes	No	No
30	WSM29949	Salvage recording in 1991, Broadheath Drought Main, Malvern Hills	379406	260216	Grimley	Parent activity numbers are relevant for the HER but not for this project - omit.	No	Yes	No
32	WSM30183	Salvage recording in 1991, Upton to Strensham Raw Water Main, Strensham	388849	239800	Strensham	Archaeological (artefacts)	Yes	No	No
33	WSM30892	Evaluation in 2001, land north of Clifton Quarry, Severn Stoke and Kempsey	384523	247026	Kempsey	Archaeological (geophysical anomalies and artefacts)	Yes	No	No
34	WSM30893	Fieldwalking in 2001, Clifton Quarry, Severn Stoke	384419	247114	Severn Stoke	Archaeological (artefacts)	Yes	No	No
35	WSM30894	Fieldwalking in 2001, Clifton Quarry, Kempsey	384699	247308	Kempsey	Archaeological (artefacts)	Yes	No	No
36	WSM30895	Metal detector survey in 2001, Clifton Quarry, Kempsey	384523	247026	Kempsey	Archaeological (artefacts)	Yes	No	No
37	WSM30896	Geophysical survey at Clifton Quarry	384635	246803	Kempsev. Severn	Archaeological (geophysical anomalies)	Yes	No	No

					Stoke				
39	WSM31672	Railway (disused) - Ashchurch to Malvern - Section BEA/5	386579	238933	Hanley Castle	Cartographic	Yes	Yes	No
40	WSM32068	Fieldwalking and dowsing in 2002, in Field to South of Bonners Cottage, Han	384396	241787	Hanley Castle	Archaeological (artefacts)	No	Yes	No
41	WSM32075	Possible drove road along Guarford Road, Guarford	382150	245288	Guarford		No	Yes	No
42	WSM32613	Ferry, The Ketch, Worcester	385177	251721	St Peter the Great County and Powick	Documentary and cartographic evidence	Yes	Yes	No
45	WSM33640	Watching brief in 2004 on Callow End flood alleviation scheme, Powick	384326	249517	Powick	Stratigraphy and artefacts	No	Yes	No
46	WSM33770	Underwater recovery from River Severn at Quay Lane, Hanley Castle	384586	241988	Hanley Castle	Structure	No	Yes	Yes
47	WSM33771	Unstratified finds from River Severn at Hanley Quay, Hanley Castle	384586	241988	Hanley Castle	Find-spot	No	Yes	Yes
48	WSM33851	Report of possible sunken barge in River Severn, Severn Stoke	384717	247750	Kempsey	Oral?	No	No	Yes
49	WSM33852	Possible line of old track, Holdfast	385833	237674	Holdfast	Cartographic	No	Yes	No
51	WSM34590	Water meadow system Buryend Farm, Upton on Severn	385464	238724	Hanley Castle	Archaeological (earthworks)	No	Yes	No
52	WSM34925	Water meadow west of Severn Stoke	385534	244013	Kempsey	Archaeological (earthwork)	Yes	No	No
53	WSM35161	Site of Old Oak Inn, Riverside, Kempsey	384740	247575	Kempsey	Cartographic	Yes	No	No
54	WSM36028	Bridge, Beauchamp Court, Powick	384816	250520	Powick	Cartographic	No	Yes	No
55	WSM36034	Water meadow, east of Freemans Wells, north-east of Beauchamp Court, Powick	384720	250897	Powick	Archaeological (earthworks) and documentary	No	Yes	No
56	WSM36035	Water meadow, north-east of Beauchamp Court, Powick	384847	250953	Powick	Documentary	No	Yes	No
57	WSM36939	Putative creek, River Severn, Severn Stoke	385535	243727	Severn Stoke	Documentary and cartographic.	Yes	No	No
60	WSM05770	Wharf, Quay Lane, Hanley Castle	384524	241960	Hanley Castle	Documentary	No	Yes	Yes
61	WSM06985	Mythe Bridge, Bushley	388870	233740	Bushley	Architectural	Yes	Yes	Yes
63	WSM07771	Icehouse, Rhydd Court, Guarford	383700	245140	Guarford	Architectural	No	Yes	No
66	WSM11369	Enclosure, Near Severn Cottages, Upton upon Severn	384932	240850	Upton upon Severn	Archaeological (earthwork)	No	Yes	No
67	WSM11801	Finds, S of Ryall House, Ripple	386400	239900	Ripple	Archaeological (artefacts)	Yes	No	No
68	WSM11939	Old Pottery brickworks (Site of), Pixham, Powick	384065	248467	Powick	Documentary and architectural	No	No	No
69	WSM12309	Old Bridge & Ferry (Site of) across the R. Severn, Upton upon Severn	385242	240766	Upton upon Severn	Documentary	Yes	Yes	Yes

70	WSM12349	Waterside House, Waterside, Upton upon Severn	385334	240641	Upton upon Severn	Architectural	No	Yes	No
71	WSM12350	White Swan complex, Waterside, Upton upon Severn	385294	240680	Upton upon Severn	Extant Building	No	Yes	No
72	WSM12372	Bridge across R Severn, Upton on Severn	385165	240805	Upton upon Severn	Architectural	Yes	Yes	Yes
73	WSM16791	21, Dunn's Lane, Upton-upon-Severn	385277	240671	Upton upon Severn	Architectural	No	Yes	No
74	WSM16802	Brickworks (Site of), north bank of R.Severn, Upton upon Severn	385407	240755	Upton upon Severn	Documentary and cartographic	Yes	No	No
75	WSM16851	Plough Inn, Riverside, Upton upon Severn	385160	240726	Upton upon Severn	Architectural	No	Yes	No
76	WSM16852	Riverside Cottage, Upton upon Severn	385188	240722	Upton upon Severn	Architectural	No	Yes	No
77	WSM16853	Kings Head, Riverside, Upton upon Severn	385203	240717	Upton upon Severn	Architectural	No	Yes	No
78	WSM16854	Bridge House, Riverside, Upton upon Severn	385234	240700	Upton upon Severn	Architectural	No	Yes	No
79	WSM16859	Front Wall and Gate, Waterside House, Upton upon Severn	385333	240656	Upton upon Severn	Architectural	No	Yes	No
80	WSM16860	Bankside House, Waterside, Upton upon Severn	385350	240643	Upton upon Severn	Architectural	No	Yes	No
81	WSM16861	Barn, North-East of Malthouse, Waterside, Upton upon Severn	385429	240609	Upton upon Severn	Architectural and documentary	No	Yes	No
82	WSM16862	Severn House, Waterside, Upton upon Severn	385442	240602	Upton upon Severn	Architectural	No	Yes	No
83	WSM16863	Old wall and barn, Waterside, Upton upon Severn	385461	240588	Upton upon Severn	Architectural	No	Yes	No
84	WSM17080	Road block, Riverside, Upton upon Severn	384968	240856	Upton upon Severn	Archaeological	No	Yes	No
85	WSM17124	Pillbox (site), old bridge abutment, Upton upon Severn	385270	240799	Upton upon Severn	Documentary Evidence	Yes	No	No
86	WSM17332	Aircraft landing obstacle, Upper Ham, Upton-upon-Severn	385929	239961	Upton upon Severn	Archaeological (earthworks), photographic, and documentary	No	Yes	No
87	WSM17333	Aircraft Landing obstacle, Lower Ham, Upton upon Severn	385926	238682	Upton upon Severn	Photographic evidence, documentary Evidence, Earthwork	No	Yes	No
88	WSM19615	Brickworks, South Bank of R.Severn, Upton upon Severn	385015	240828	Upton upon Severn	Documentary	No	Yes	No
89	WSM19762	Ferry, site of later bridge, Upton upon Severn	385240	240760	Upton upon Severn	Documentary	Yes	Yes	No
91	WCM100700	Flint dagger, R Severn (though found at Diglis it was from dredgings from N of Teme confluence ie approx location only	385100	252400	Worcester	Find-spot	No	No	Yes
92	WSM22936	Clevelode Ferry, Madresfield	383600	246800	Powick and Guarlford/Severn Stoke	Documentary	Yes	Yes	No
93	WSM22937	Crossing of R.Severn; Rhydd Ferry, Guarlford	383711	245170	Guarlford and Hanley Castle/Severn Stoke	Documentary	Yes	Yes	No
94	WSM22939	Uckinghall Ferry, Ripple	386300	237550	Ripple/Holdfast	Documentary	Yes	Yes	No

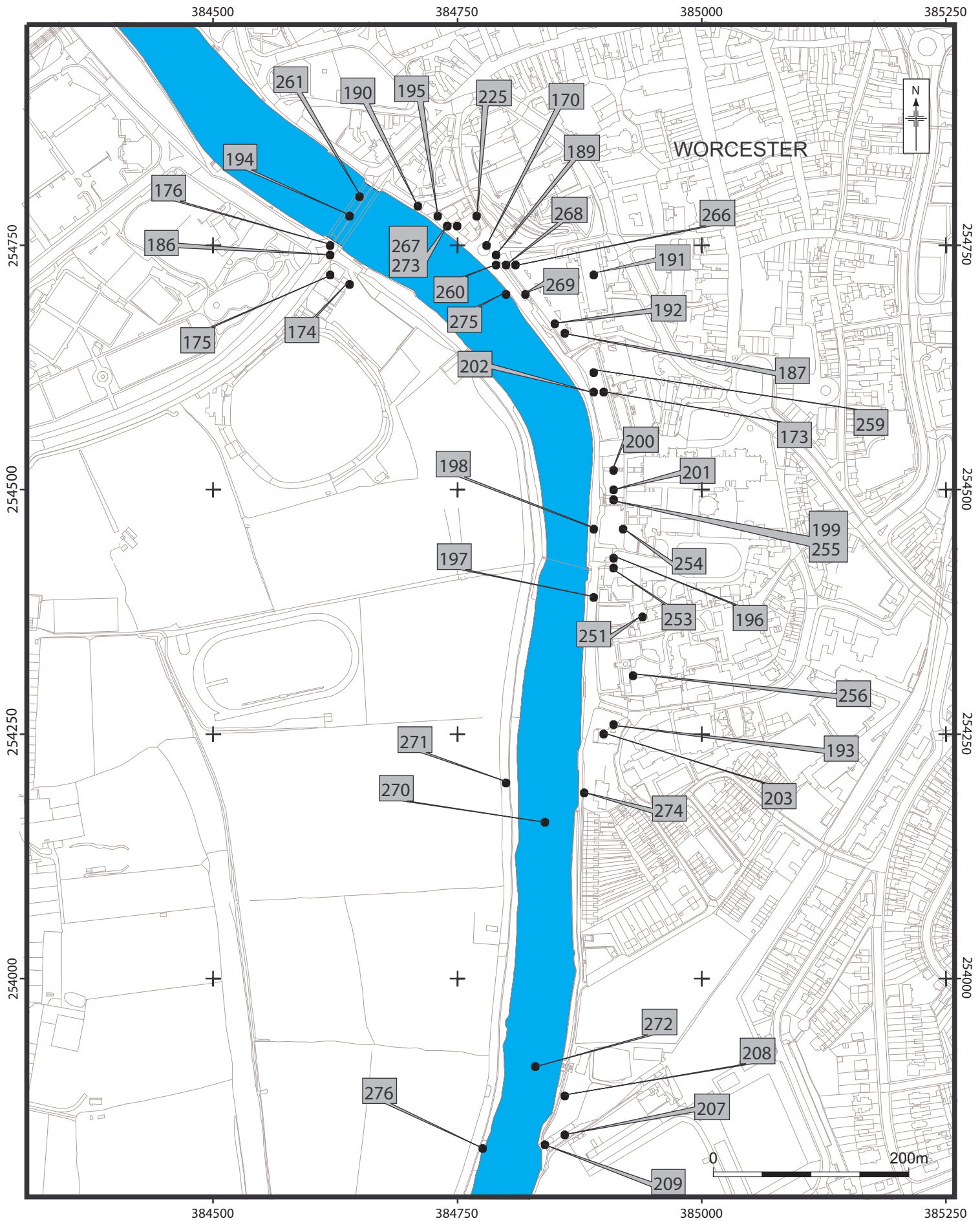
95	WSM22942	Tollkeeper's cottage, Mythe Bridge, Bushley	388850	233770	Bushley	Architectural?	No	Yes	No
96	WSM22943	Toll booth, Mythe Bridge, Bushley	388850	233770	Bushley	Cartographic?	No	Yes	No
99	WSM23811	Fish weir, River Severn, near the Ketch, St. Peters	385000	252000	St Peter the Great County	Documentary	Yes	No	Yes
100	WSM23814	Fish weir, River Severn nr Clenkenleap, Kempsey	385050	251103	Kempsey	Documentary	Yes	No	No
101	WSM23818	Fish weir, River Severn, Severn Stoke	384300	247200	Severn Stoke	Documentary	Yes	No	No
102	WSM23821	Fish weir, River Severn, Fish House, Bushley	388600	233000	Bushley	Documentary and cartographic	No	Yes	No
103	WSM23828	Ferry or ford, Kempsey	384687	249118	Kempsey	Cartographic	Yes	Yes	No
104	WSM23829	Withy bed Ford, Diglis, near Bunn's Hill, Timberdine, St Peters	385100	252700	St Peter the Great County/Powick	Documentary	Yes	Yes	No
106	WSM19752	Quay, west of bridging point, Upton upon Severn	385162	240713	Upton on Severn	Documentary and cartographic	No	Yes	No
107	WSM19751	Quay, east of bridging point, Upton upon Severn	385276	240705	Upton upon Severn	Documentary and cartographic	No	Yes	No
109	WSM19748	Bridging point across R.Severn, Upton upon Severn	385241	240764	Upton upon Severn/Ripple	Documentary	No	No	No
110	WSM19762	Site of medieval ferry at Upton-on-Severn	385240	240730	Upton-on-Severn/Ripple	Documentary	Yes	Yes	Yes
111	WSM19763	Medieval bridge(s) at Upton-on-Severn	385240	240760	Upton-on-Severn/Ripple	Documentary	Yes	No	No
112	WCM99102	Brickworks on west bank below Diglis	385200	252500	St Peter the Great, Worcester	Cartographic	Yes	No	No
114	WSM39961	Submerged boat near Clerkenleap.	385210	251468	St Peter the Great, Worcester/Kempsey.	Structure	Yes	No	Yes
116	WSM22323	Pixham Ferry	384100	248500	Powick/Kempsey	Documentary	Yes	Yes	No
117	WSM22937	Rhydd ford	383500	245700	Hanley Castle	Cartographic	Yes	Yes	Yes
118	WSM39965	'Brickyard' (1849)	384656	244749	Severn Stoke	Cartographic	Yes	No	No
119	WSM39980	'Stonehouse' (1849)	385400	243550	Severn Stoke	Cartographic	Yes	No	No
121	WSM17331	Anti-glider trenches above Upton bridge	385200	241150	Upton-on-Severn	Archaeological	Yes	No	No
122	WSM39981	'Lime kiln' (1784)	385100	240750	Upton-on-Severn	Cartographic	No	Yes	No
123	WSM22938	Saxon's Lode ford	386300	238700	Ripple/Upton-on-Severn	Documentary	Yes	Yes	No
124	WSM39982	Brick kiln	386249	237539	Holdfast	Cartographic	No	Yes	No
125	WSM5737	Cropmarks south of Ferry Lane	386600	237400	Ripple	Archaeological (APs), cropmark	Yes	No	No
126	WSM39970	Brick kilns	386542	237103	Queenhill	Cartographic	No	Yes	No
127	WSM33396	Possible terminus of monument and/or causeway	386900	236400	Ripple	Archaeological	Yes	No	No

128	WSM39971	Possible fish weir	386845	236273	Ripple	Cartographic and place-name	Yes	No	No
129	GL	Brick and lime kilns	388550	234450	Twynning, Gloucs	Cartographic	Yes	No	No
130	GL	Kiln	388650	234200	Twynning, Gloucs	Cartographic	Yes	No	No
131	WSM39983	'Windmill and distillery' (1784)	388804	233445	Bushley	Cartographic	No	Yes	No
132	WSM39984	'Fish house' (1849)	388661	233129	Bushley	Cartographic	No	Yes	No
133	GL 5522	Romano-British pottery observed during construction of lock and weir	388200	232800	Tewkesbury	Find-spot	No	No	Yes
134	GL 20564	Watching brief at Upper Lode weir, Tewkesbury	388100	232750	Tewkesbury	Archaeological	Yes	No	Yes
135	GL 7995	Tollhouse at Mythe Bridge	388920	233750	Tewkesbury	Architectural	No	Yes	No
136	GL 8848	'Stoney Knapps' field-name	387500	235400	Tewkesbury	Place-name	Yes	No	No
137	GL 5003	The Mythe Tute Motte or Royal Hill	388900	233860	Tewkesbury	Documentary	No	Yes	No
138	GL 5535	Mythe Bridge by Telford, Tewkesbury	388800	233700	Tewkesbury	Architectural	Yes	Yes	Yes
139	GL 11366	Tewkesbury Lock	388120	232900	Tewkesbury	Architectural	No	Yes	Yes
140	GL 12421	Severn Trent mains water pipeline OS parcel 9960	389000	233500	Tewkesbury	Archaeological	Yes	No	No
141	GL 7996	Turnpike Shelter at Mythe Bridge	388920	233730	Tewkesbury	Architectural	No	Yes	No
142	GL 5536	Bushley lock keepers house	388110	232860	Tewkesbury	Architectural	No	Yes	No
168	WCM91136	Bridge of boats, R Severn	385050	252220	St Peter the Great County	Documentary	Yes	Yes	No
169	WCM92200	Aircraft landing obstacles, Hams at Lower Wick	385000	252210	Worcester	?Documentary	No	Yes	No
170	WCM92204	Pillbox, Copenhagen St / Quay Street	384780	254750	Worcester	?Documentary	Yes	No	No
171	WCM92209	Loopholed strongpoint, Diglis Island	384670	253400	Worcester	?Documentary	No	No	No
172	WCM92213	Gun positions, Gascoyne's Warehouse, South Quay	384750	254770	Worcester	?Documentary	No	No	No
173	WCM92215	Gun positions, Deanery Gardens, Deansway	384900	254600	Worcester	?Documentary	Yes	No	No
174	WCM92221	Loopholed building, former farm, New Road	384640	254710	Worcester	?Documentary	No	Yes	No
175	WCM92223	Road block, S of New Road adj to Bridge	384620	254720	Worcester	?Documentary	No	Yes	No
176	WCM92224	Road block, SW end of Road Bridge over Severn	384620	254750	Worcester	?Documentary	No	Yes	No
177	WCM92225	Diglis basin - use in WW2	384820	253540	Worcester	?Documentary	Yes	No	No
178	WCM92226	Petrol depot, Diglis Basin	384780	253460	Worcester	?Documentary	Yes	No	No
179	WCM92227	Trenches, Diglis Island	384670	253470	Worcester	?Documentary	No	No	No
180	WCM92228	Shelter, Diglis Island	384680	253440	Worcester	?Documentary	No	No	No
181	WCM92229	Trench, Diglis Locks	384730	253220	Worcester	?Documentary	Yes	No	No
182	WCM92230	Barriers, Diglis Weir	384640	253470	Worcester	?Documentary	Yes	Yes	No

183	WCM92231	Proposed minefield, Diglis Weir	384620	253440	Worcester	?Documentary	No	No	No
184	WCM92232	Trenches, Diglis Oil Terminal	384770	253150	Worcester	?Documentary	Yes	No	No
185	WCM92233	Trench, Diglis basin	384780	253620	Worcester	?Documentary	Yes	No	No
186	WCM92241	Defensive position, Severn Road Bridge	384620	254740	Worcester	?Documentary	No	No	No
187	WCM92378	Dent, Allcroft & Co, Warmstry Slip (WW2 glove manufacture)	384860	254660	Worcester	?Documentary	Yes	No	No
188	WCM92424	Wharf and transit shed, Diglis	384800	253720	Worcester	Cartographic	Yes	No	No
189	WCM96098	Stone foundation / building, South Quay	384790	254740	Worcester	Structure	Yes	No	No
190	WCM96126	City wall (line of), Bar Gate - The Quay	384710	254790	Worcester	Cartographic	Yes	No	No
191	WCM96127	City wall (line of), The Quay - Warmstry Slip	384890	254720	Worcester	Cartographic	Yes	No	No
192	WCM96128	City wall, Warmstry slip - Bishop's Palace (buried remains)	384850	254670	Worcester	Cartographic	Yes	No	No
193	WCM96154	Civil War bastion, Severn Street / Diglis	384910	254260	Worcester	Cartographic	Yes	No	No
194	WCM96179	Worcester Bridge (18th century)	384640	254780	Worcester	Structure	Yes	Yes	Yes
195	WCM96305	South Quay (medieval and later)	384730	254780	Worcester	Cartographic	Yes	No	No
196	WCM96349	Water Gate	384910	254430	Worcester	Architectural	Yes	No	No
197	WCM96357	Precinct boundary: riverside wall (S of Water Gate)	384890	254390	Worcester	Architectural	Yes	No	No
198	WCM96358	Precinct boundary: riverside wall (N of Water Gate)	384890	254460	Worcester	Architectural	Yes	No	No
199	WCM96380	Reredorter	384910	254490	Worcester	Architectural	Yes	No	No
200	WCM96381	Infirmery	384910	254520	Worcester	Architectural	Yes	No	No
201	WCM96623	Sandstone wall below Reredorter	384910	254500	Worcester	Structure	Yes	No	No
202	WCM96627	Riverside wall, Bishop's Palace	384890	254600	Worcester	Structure	Yes	No	No
203	WCM96656	Diglis House Hotel	384900	254250	Worcester	Architectural	Yes	No	No
204	WCM98260	Diglis basin: Diglis River Dock Bridge	384720	253530	Worcester	Cartographic	Yes	No	No
205	WCM98213	Old clay pit	384700	253400	Worcester	Cartographic	No	No	No
206	WCM98214	Brickworks	384700	253300	Worcester	Cartographic	No	No	No
207	WCM98230	Diglis: Barge lock no 2	384860	253840	Worcester	Cartographic	Yes	No	No
208	WCM98234	Diglis basin: riverside side pond	384860	253880	Worcester	Cartographic	Yes	No	No
209	WCM98238	Diglis basin: new bridge	384840	253830	Worcester	Cartographic	Yes	No	No
210	WCM98388	Diglis lock island and River Severn lock complex	384680	253400	Worcester	Cartographic	No	No	Yes
211	WCM98389	Diglis weir	384640	253500	Worcester	Cartographic	No	Yes	Yes
212	WCM98390	Diglis River Severn locks: Lock separating wall	384720	253300	Worcester	Architectural	No	No	Yes

213	WCM98391	Diglis Island: chapel ('Bethel')	384680	253370	Worcester	Architectural	No	No	No
214	WCM98392	Diglis Island: lock cottages	384690	253330	Worcester	Architectural	No	No	No
215	WCM98393	Diglis Island: crane	384700	253440	Worcester	Structure	No	No	No
216	WCM98394	Diglis Island: unidentified	384690	253400	Worcester	Structure	No	No	No
217	WCM98395	Diglis Island: original crane	384700	253350	Worcester	Structure	No	No	No
218	WCM98396	Diglis Island: forge	384680	253410	Worcester	Extant building	No	No	No
219	WCM98398	Diglis Island: blacksmiths	384700	253470	Worcester	Extant building	No	No	No
220	WCM98399	Diglis Island: unidentified	384690	253360	Worcester	?	No	No	No
221	WCM98400	Diglis Island: building West of Chapel	384670	253370	Worcester	Extant building	No	No	No
222	WCM98401	Diglis Island: compound and buildings	384680	253390	Worcester	Cartographic	No	No	No
223	WCM98402	Diglis River Severn locks: narrow lock	384730	253360	Worcester	Cartographic	Yes	No	Yes
224	WCM98403	Diglis River Severn locks: broad lock	384710	253330	Worcester	Cartographic	Yes	No	Yes
225	WCM98452	Brown's Restaurant, South Quay	384770	254780	Worcester	Architectural	Yes	No	No
251	WCM100024	10 College Green	384940	254370	Worcester	?	No	No	No
253	WCM100292	Watergate	384910	254420	Worcester	Structure	Yes	No	No
254	WCM100303	Guesten Hall lawn	384920	254460	Worcester	?	Yes	No	No
255	WCM100344	Refectory undercroft	384910	254490	Worcester	Structure	Yes	No	No
256	WCM100348	Norman defences, Severn Street	384930	254310	Worcester	Structure	Yes	No	No
258	WCM100432	Severn navigation lock, Diglis	384720	253330	Worcester	Documentary	No	No	Yes
259	WCM100533	Sewer trench, Old Palace garden	384890	254620	Worcester	?	No	No	No
260	WCM100542	Riverside revetment wall, South Quay	384790	254730	Worcester	Structure	No	No	No
261	WCM100654	Worcester bridge	384650	254800	Worcester	Structure	Yes	Yes	Yes
263	WCM100698	Bronze Age sword, R Severn	384720	253160	Worcester	Find-spot	No	No	Yes
265	WCM100705	Bronze Age spearhead, R Severn	385100	252600	Worcester	Find-spot	No	No	Yes
266	WCM100714	Copenhagen Street car park ('kiln trench')	384810	254730	Worcester	Archaeological	Yes	No	No
267	WCM100721	South Quay	384740	254770	Worcester	Archaeological	Yes	No	No
268	WCM100753	Quay Head works	384800	254730	Worcester	Archaeological	Yes	No	No
269	WCM100832	City centre CCTV - Copenhagen Street car park	384820	254700	Worcester	Archaeological	Yes	No	No
270	WCM100957	Palstave, Diglis	384840	254160	Worcester	Find-spot	No	No	Yes
271	WCM100975	Flint blades from Severn (river bed)	384800	254200	Worcester	Find-spot	No	No	Yes
272	WCM100976	Severn (river at Diglis)	384830	253910	Worcester	Structure	Yes	No	No
273	WCM100175	South Quay	384740	254770	Worcester	Structure	Yes	No	No

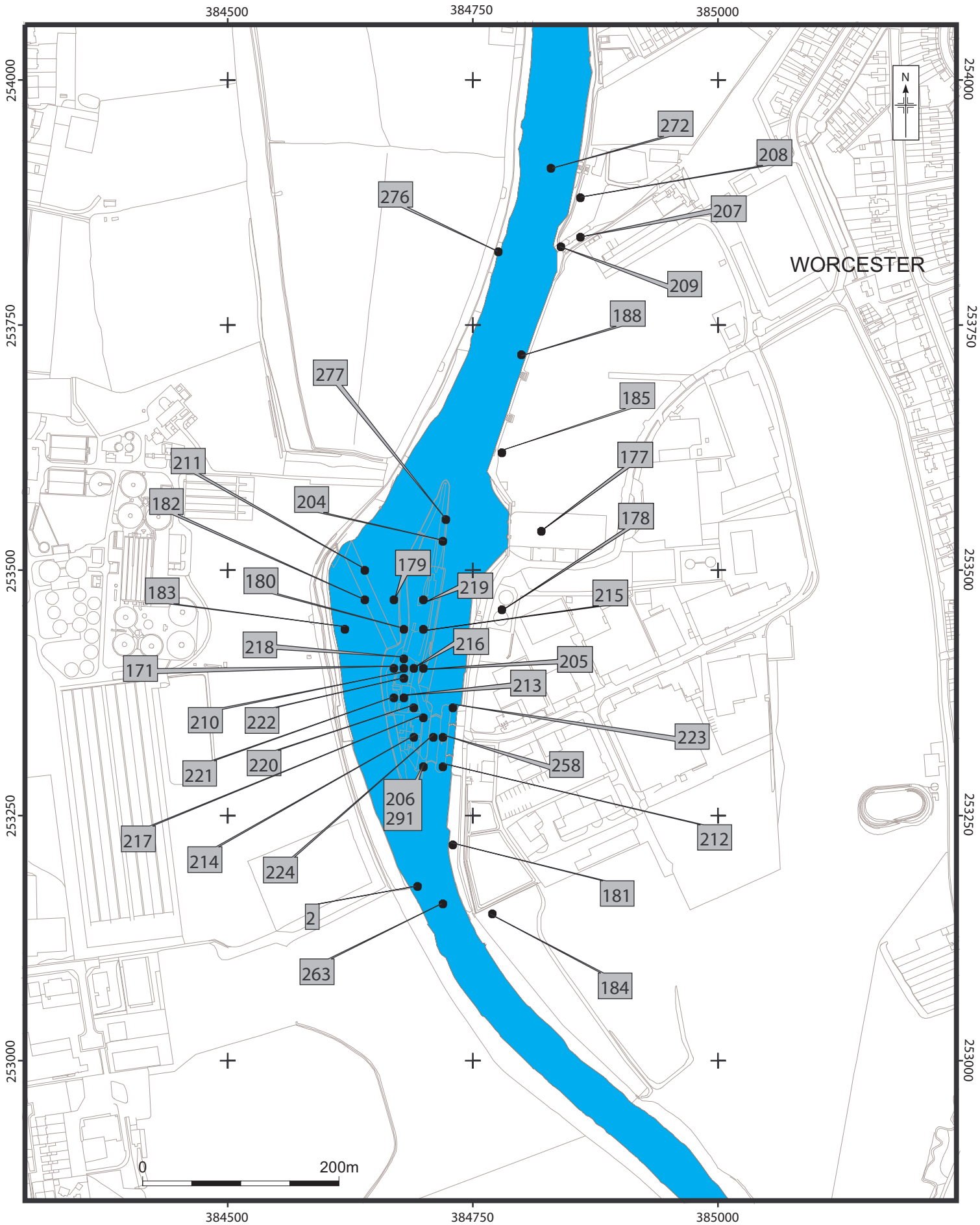
274	WCM101221	Riverside revetment, Diglis	384880	254190	Worcester	Structure	Yes	No	No
275	WCM99099	Steps downstream from Worcester Bridge	384800	254700	Worcester	Structure	Yes	No	No
276	WCM99100	Brickwork at base of bank	384800	253800	Worcester	Structure	No	Yes	No
277	WCM99101	Submerged boats off Diglis island	384700	253550	Worcester	Structure	No	No	Yes
278	WCM92401	Oil depot at Bath Road	385100	252300	Worcester	Structure	Yes	No	No
279	WSM39964	Wall at the Rhydd	383720	245150	Hanley Castle	Structure	No	Yes	No
280	WSM39967	Oil depot below Upton	386357	239222	Ripple	Structure	Yes	No	No
281	WSM39968	Submerged boat at Saxon's Lode	386271	238803	Ripple	Structure	Yes	No	No
282	WSM39969	'Slipway' (20th century)	385922	238522	Upton-on-Severn	Cartographic	No	Yes	No
283	WSM39963	Possible wharf above Clevelode	383975	247090	Powick	Structure	No	Yes	No
284	WSM39973	Timber structure at Mythe Hook	387973	234658	Bushley	Structure	No	Yes	No
285	GL	Brickwork under bank at Mythe	388270	234500	Tewkesbury	Structure	Yes	No	No
286	WSM39962	'Stable' (1849) at Pixham	384113	248548	Powick	Cartographic	No	Yes	No
287	GL	'Bushley Inn' (1849)	387900	234800	Tewkesbury	Cartographic	Yes	No	No
288	GL	'Drinkwater House' (1849) - possible former riverside inn	388350	234450	Tewkesbury	Cartographic	Yes	No	No
289	GL	WWII grid of trenches on Severn Ham	388500	232500	Tewkesbury	Documentary	Yes	No	No
290	WSM17333	WWII defences at Saxon's Lode - presumed to be focused on the oil depot	386250	239050	Ripple	Documentary	Yes	No	No
291	WCM100432	Roman pottery from Diglis lock construction (1844)	384700	253300	Worcester	Find-spot	Yes	No	No
292	WSM39972	'Scoriae and cinders' where Cinder Point encroaches on the bank of Severn	387185	235748	Ripple	Place-name	Yes	No	No
293	WSM39966	Building showing on Beechey map (1849)	385284	242836	Upton-on-Severn	Cartographic	Yes	No	No
294	GL	Building on river bank shown on OS first edition (1880s)	388000	234700	Tewkesbury	Cartographic	Yes	No	No
295	WSM39974	Possible ancient quay site (1407) listed as NMR 115977	385073	242710	Upton-on-Severn	Documentary	Yes	No	No
296	WSM16802	'Kiln' (1849)	385529	240678	Upton-on-Severn	Cartographic	Yes	No	No
297	WCM101600	Project to rapid survey banks of River Severn	0	0	various		Yes	Yes	Yes



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River Severn Survey: Map 1

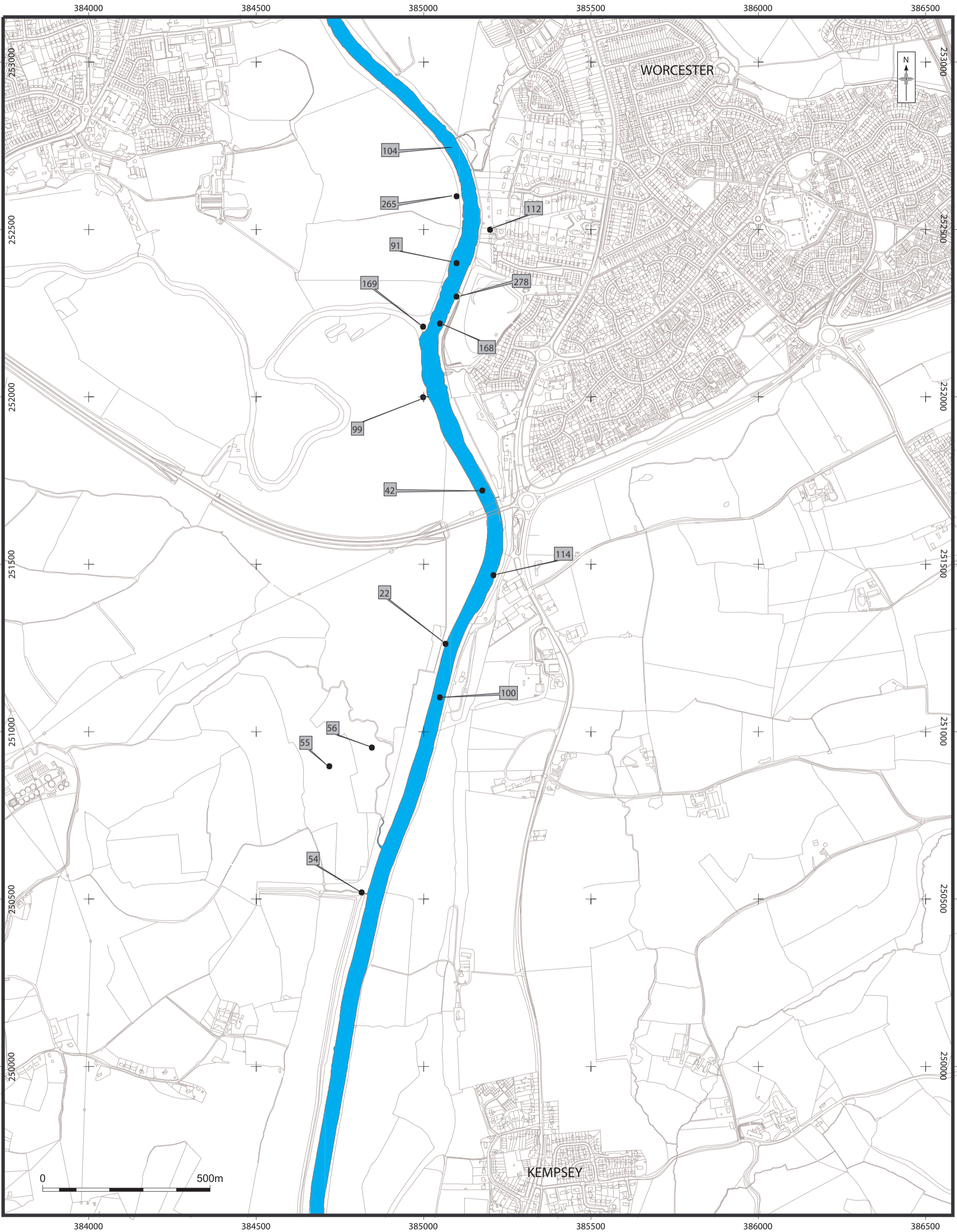
Figure 21



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River Severn Survey: Map 2

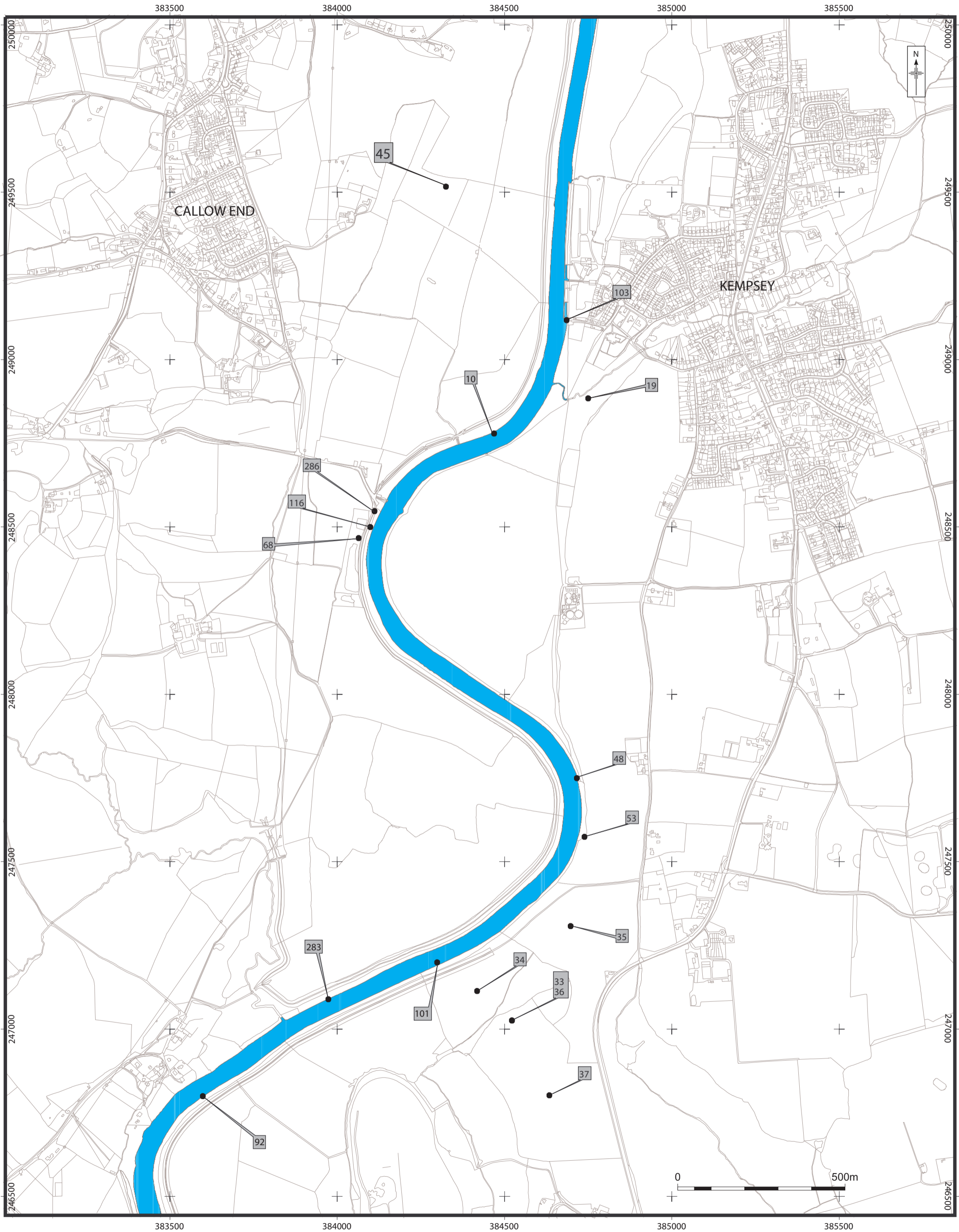
Figure 22



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River Severn Survey: Map 3

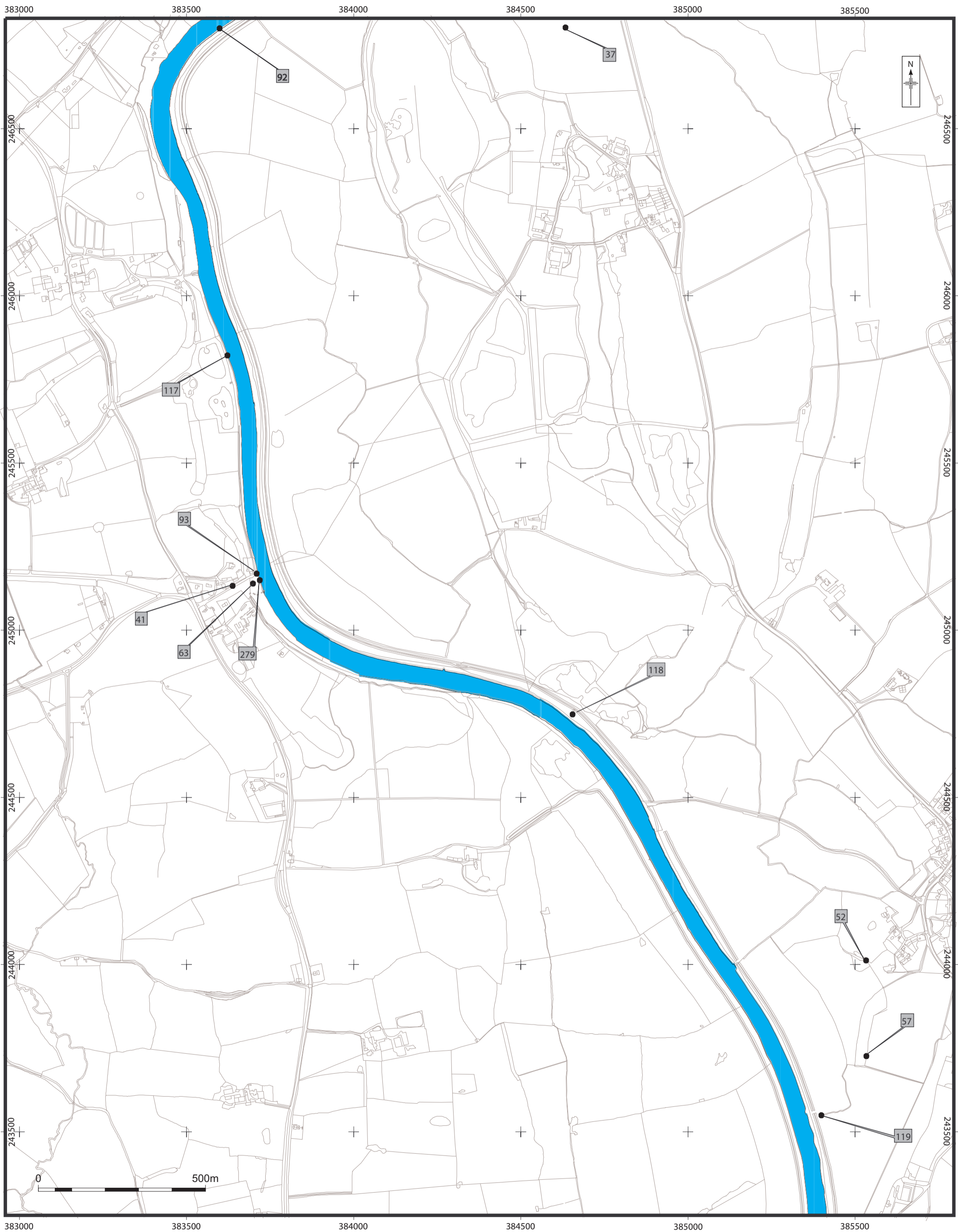
Figure 23



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River Sever Survey: Map 4

Figure 24



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River Severn Survey: Map 5

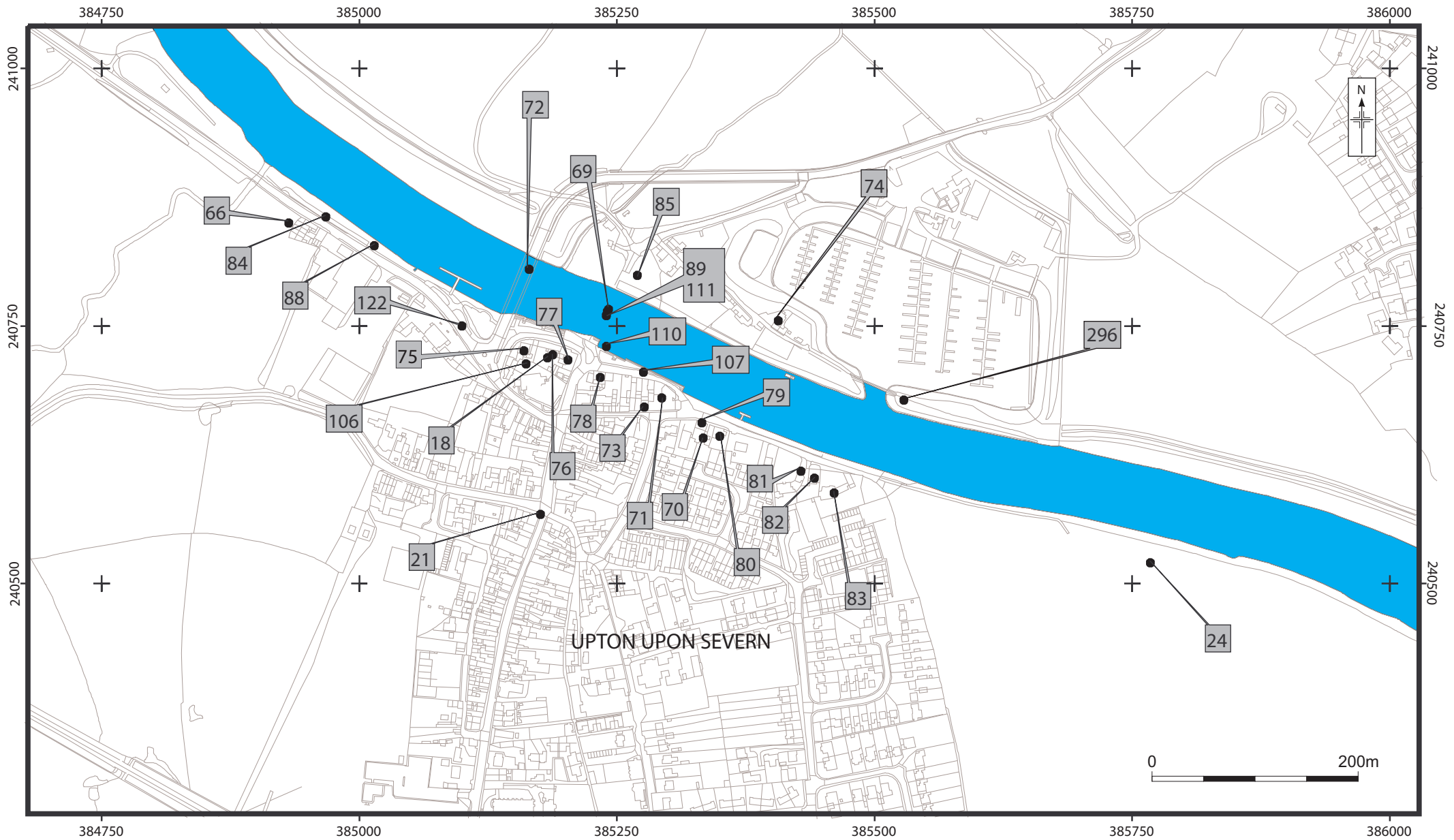
Figure 25



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River Sever Survey: Map 6

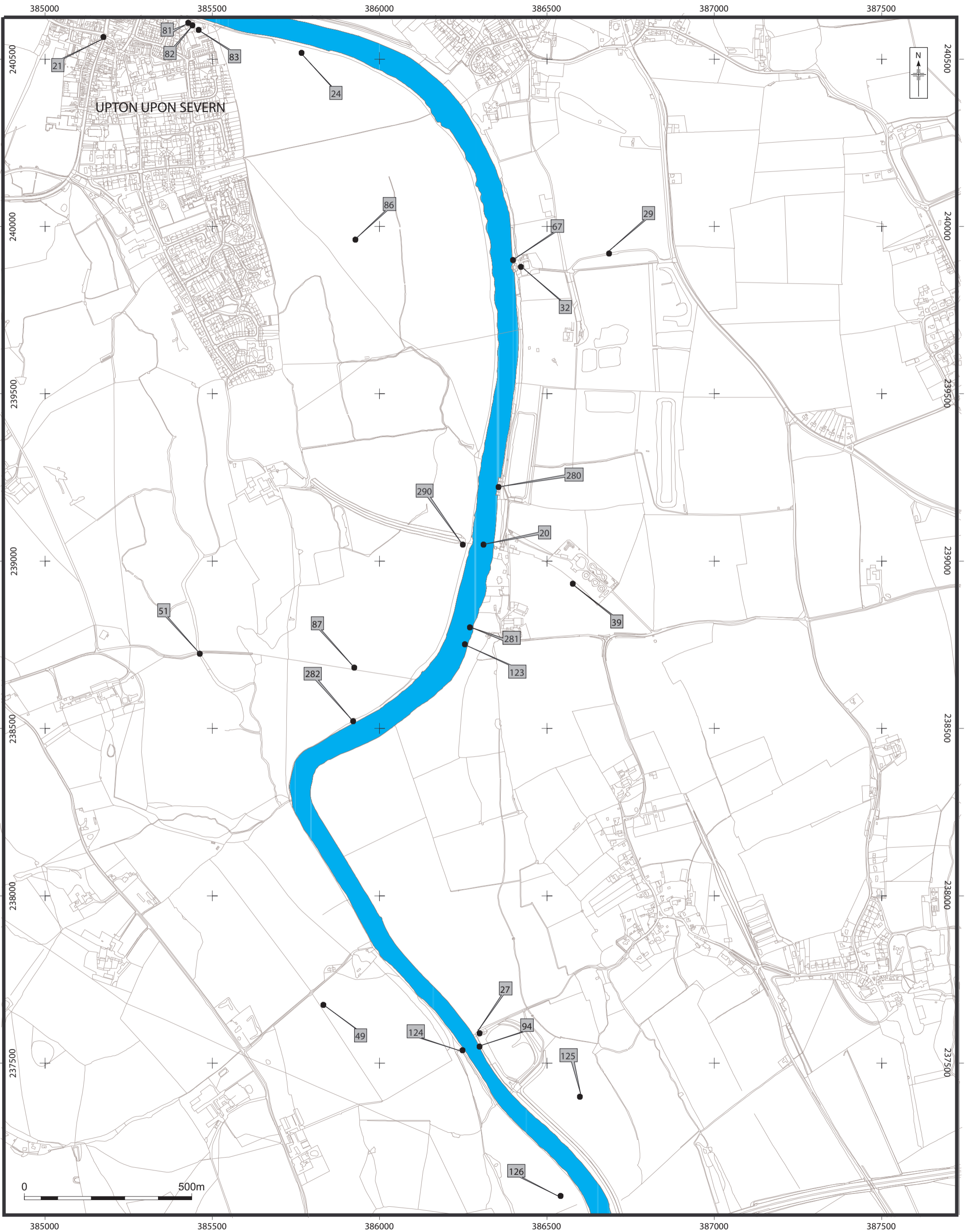
Figure 26



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River Severn Survey: Map 7

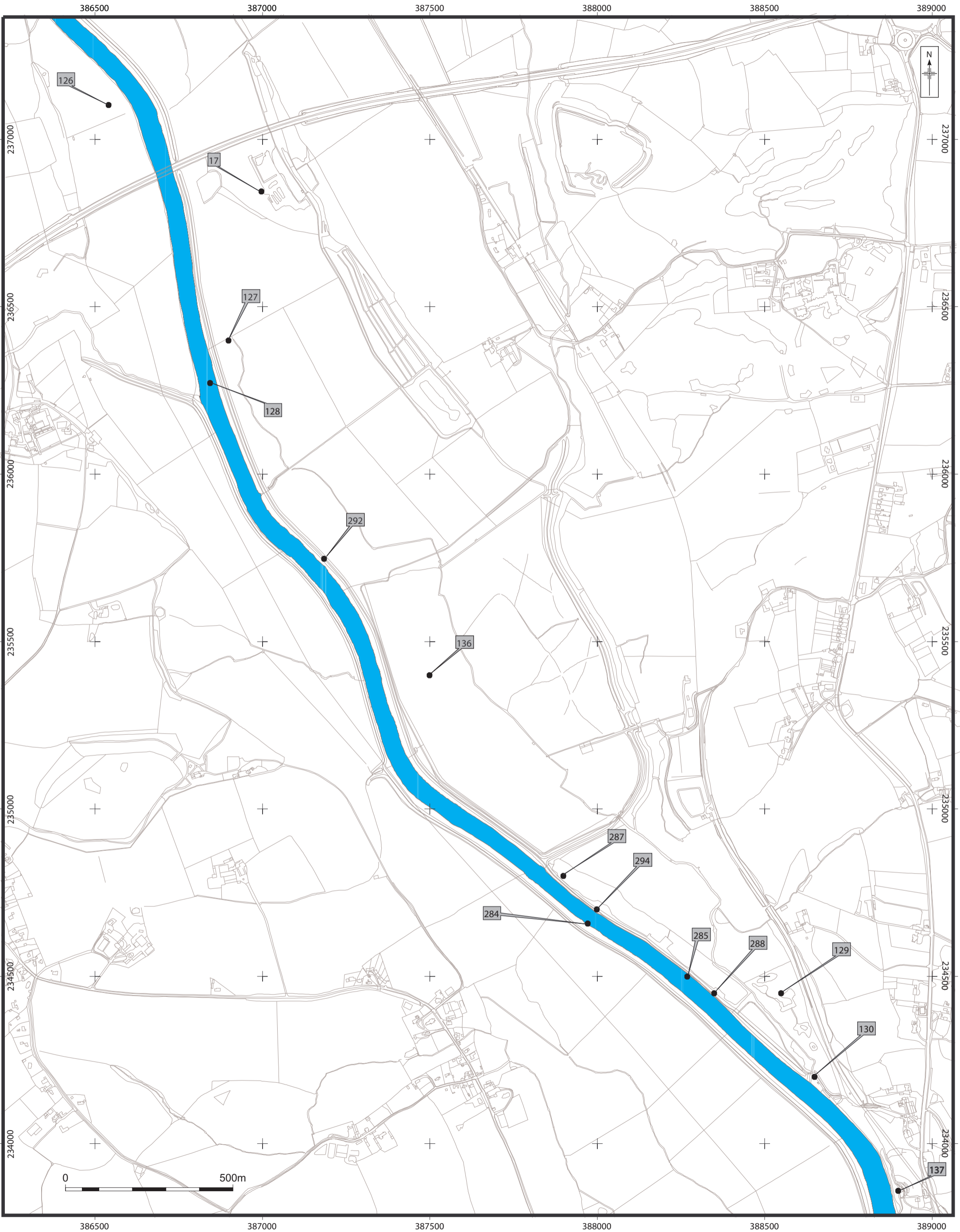
Figure 27



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River Severn Survey: Map 8

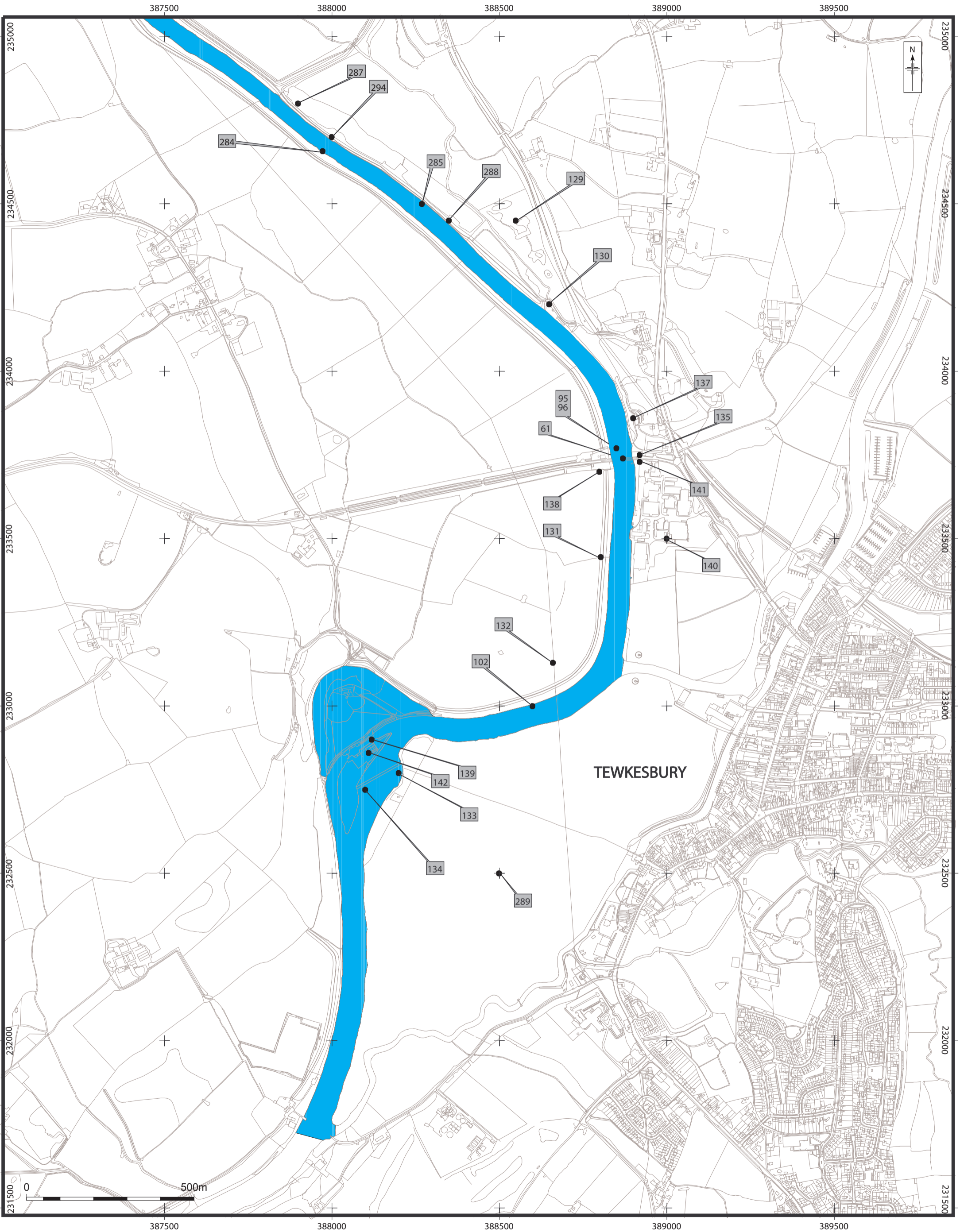
Figure 28



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River Sever Survey: Map 9

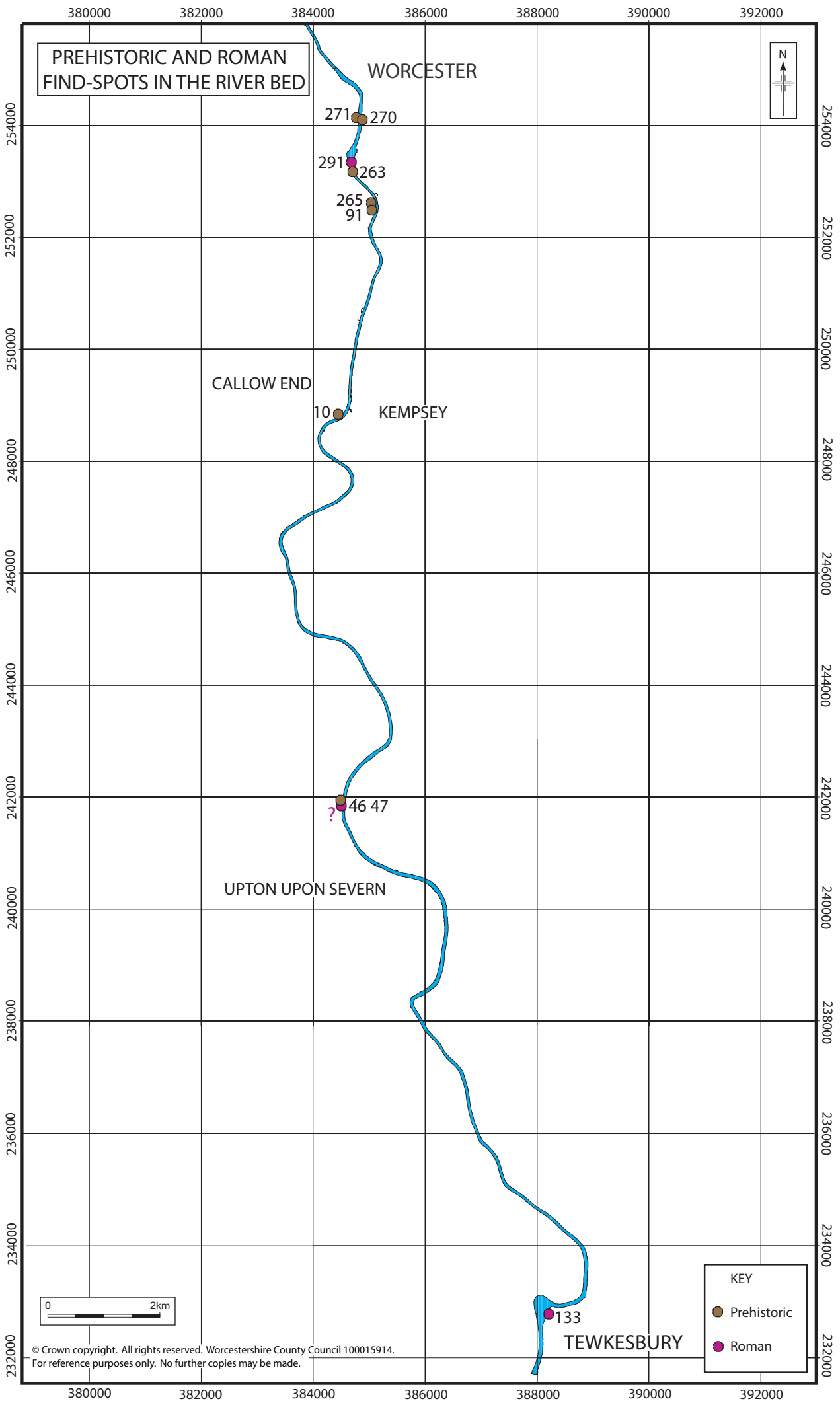
Figure 29



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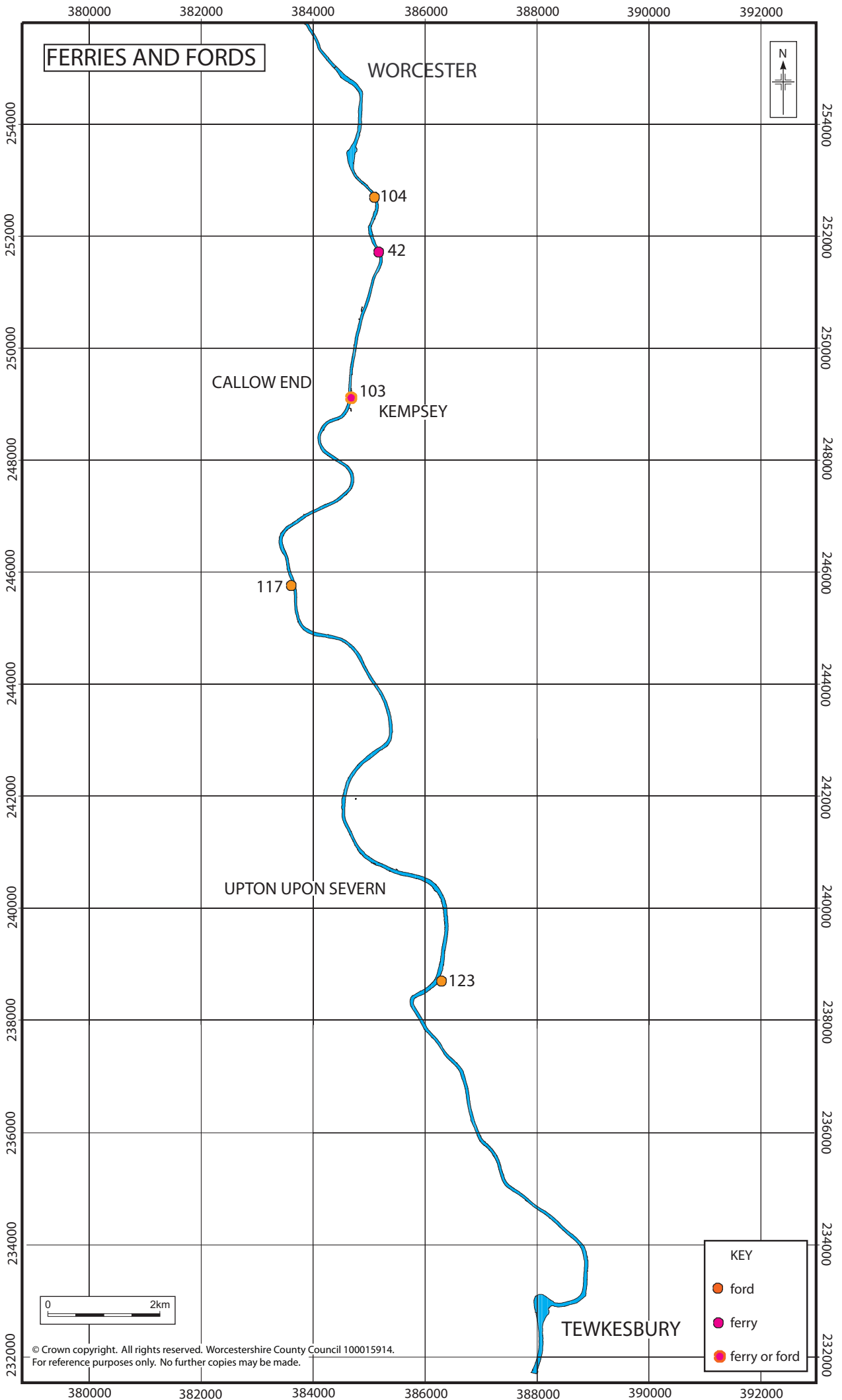
River Severn Survey: Map 10

Figure 30



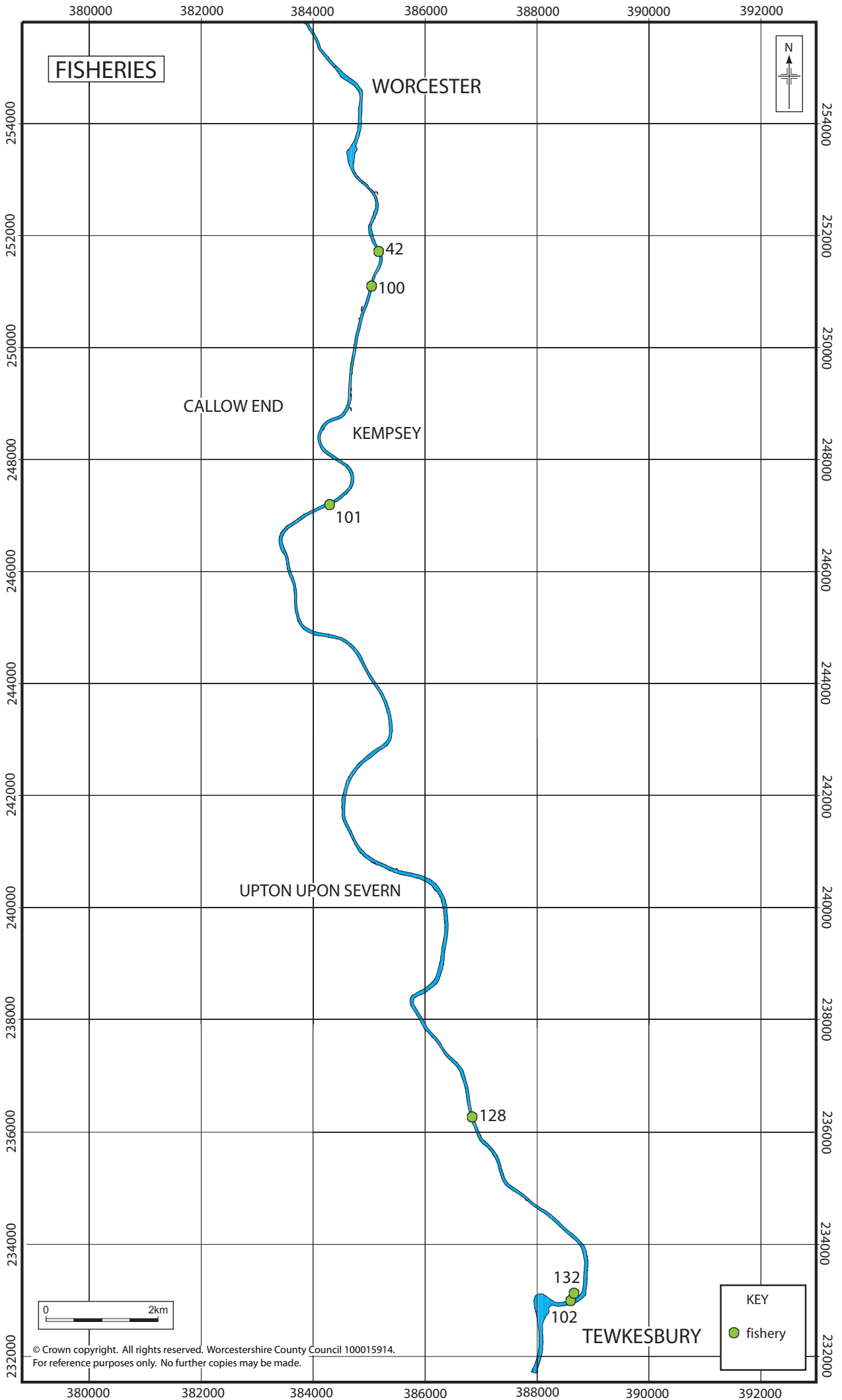
River Severn Survey: Prehistoric and Roman find-spots in the river bed

Figure 31



River Severn Survey: ferries and fords

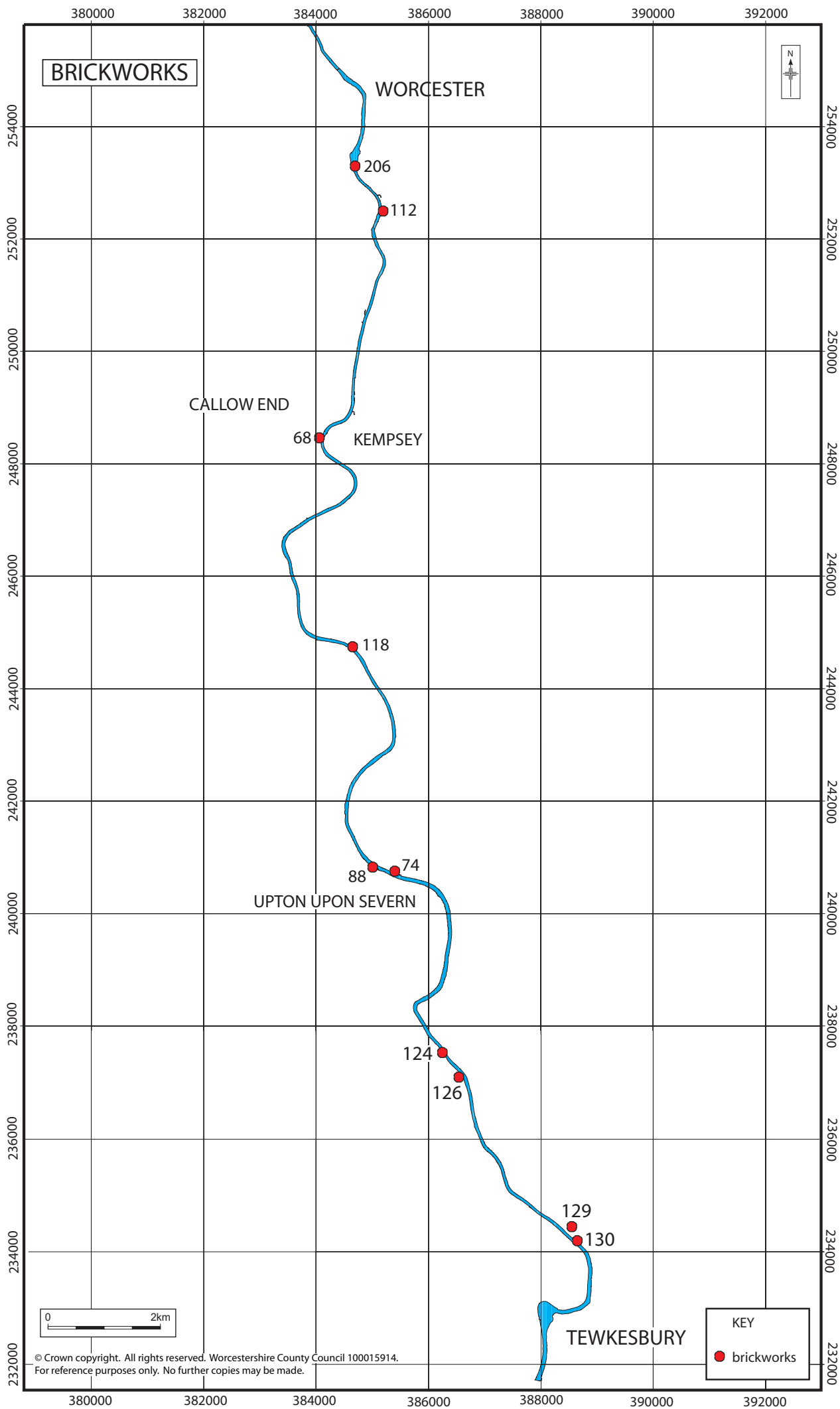
Figure 32



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River Severn Survey: fisheries

Figure 33



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River Severn Survey: brickworks

Figure 34