Buckingham Canal Restoration
Outline Feasibility Study
May 2010

Halcrow Group Limited

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Buckingham Canal Society

Buckingham Canal Restoration
Feasibility Study

Contents Amendment Record

This report has been issued and amended as follows:

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Contents

1 Executive Summary

This study was carried out in order to determine whether the restoration of the Buckingham Canal between Cosgrove and Buckingham is a feasible project.

In order to address this, an engineering assessment, environmental assessment and economic assessment have been carried out to determine whether any 'show-stopping' issues or constraints exist.

The conclusion of this report is that this is a technically feasible project. While there are a number of significant issues to address, with the appropriate work and consultation this should be possible.

From an engineering perspective, the two main constraints are crossing the A5 and bypassing Old Stratford/Deanshanger and entering Buckingham itself. Both areas are likely to require canalisation of the River Great Ouse.

While only a high level desk study was carried out to assess the environmental constraints of the scheme, no major problems were identified. Additional detailed work will be required to address this in more detail.

The restored canal will help maximise the potential of key economic drivers along its route and will create new opportunities for economic growth and prosperity. Beyond the purely economic benefits (job creation, increased visitor footfall, etc), the restored canal is likely to deliver wider social benefits.

Obtaining the required capital funding to allow construction of this scheme will pose a significant challenge for the scheme promoters. With a well planned strategy and the correct partners brought in to the project team, it may be possible to secure this money using a broad range of different funders.

2 Introduction

2.1 *Study background*

Halcrow Group Ltd was commissioned in December 2009 to undertake an outline feasibility study on the restoration of the Buckingham Canal from the junction with the Grand Union Canal at Cosgrove to Buckingham.

This feasibility study has been undertaken on behalf of the Buckingham Canal Society with whom copyright of this report lies. Additional funding has been provided by the IWA Restoration Committee and the Buckinghamshire County Council Community Leader's Fund.

2.2 *Study aims*

The aim of this study is to determine whether the restoration of the Buckingham Canal is a feasible project and to assess what the major issues relating to this restoration may be.

This study looks at the following areas:

- Engineering feasibility including a high level cost estimate
- High level ecological assessment
- Economic assessment.

2.3 *Limits of study*

This limited study has been undertaken to determine whether this is a feasible project, rather than necessarily determining what the optimum solution for the restoration may be.

It has been based on an initial walkover and using available OS mapping and Lidar data. All levels are based on available information and due to the complex topography may be subject to significant error. No detailed surveys or topographic surveys have been undertaken. No landowner consultation has been carried out.

An assessment of the water supply and management has not been undertaken as part of this study.

A number of options have been identified as part of the engineering assessment, however it has not been possible within the scope of this study to assess all possible solutions in sufficient detail to determine the optimum route.

2.4 OS Maps

British Waterways has allowed the use of their licence for the Ordnance Survey maps used in this report and its appendices; number 100019843, 2007.

3 Engineering Assessment

3.1 *Background*

The Buckingham Canal was completed in two arms; the first to Watling Street was opened in 1800 and the final section on to Buckingham opened in 1801. It was originally used to transport bricks, coal and manufactured goods and other local goods as wells as imports from the London Docks. The canal was transporting around 20,000 tons per anum for a period of fifty years.

The canal began to suffer from competition from the railways as with much of the network. The canal also suffered from siltation and sewage disposal. A lack of maintenance failed to address these issues and as boat traffic declined the problems worsened. The canal was deemed "barely navigable" in places as early as 1904. The last recorded boat movement was in 1932 and the canal was closed with a temporary dam in 1944; it was finally abandoned in 1960, although a length at Cosgrove is still owned by British Waterways and is classed as a canal, despite its dry condition.

3.2 *Water management*

While water supply and management of the canal has not been assessed, this may be an issue for the canal. Water may be available from the River Great Ouse, though an abstraction agreement would be required with the Environment Agency. A number of options are likely to exist for water supply and ultimately this could be addressed in consultation with British Waterways.

There are potential opportunities to use the canal to aid flood risk management. This should be investigated in partnership with the EA.

3.3 *Route description – Cosgrove to Buckingham*

The Buckingham Canal ran roughly east-west from its junction with the Grand Union Canal at Cosgrove, through Old Stratford and Deanshanger, following the River Great Ouse before terminating in Buckingham. A schematic illustration of this route can be seen in Figure 1 below.

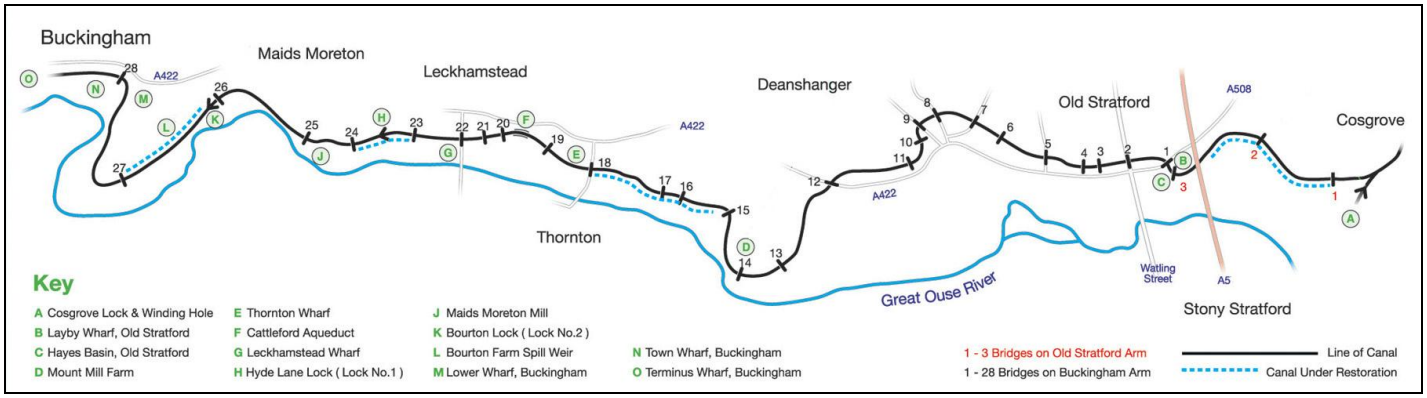


Figure 1 – schematic layout of Buckingham Canal route

Significant lengths of the old canal route remain in a rural setting; in fact the old canal exists as a dry ditch along the majority of the route. The ditch itself would require works to clear away vegetation. The existing clay liner, if still present at all, is likely to be in poor condition. Some earthworks may be required to ensure the required navigation depth is consistent along the length and some puddle clay may be required to ensure the lining is water-tight. The canal banks are present and would require ground investigation to confirm their composition and a structural assessment to ensure they are fit to impound the water. There are a number of constraints now present; along the section of the route from Cosgrove to Deanshanger, there are a number of major obstructions blocking the route, meaning that a new cut is required. The route into Buckingham itself will also require a new route.

A drawing showing the layout of the proposed route can be seen in Appendix A.

A description of the route and various works anticipated is given in the following sections below.

- Cosgrove to the A5
- Through Old Stratford
- Deanshanger
- Old Stratford and Deanshanger By-Pass
- A422 to Thornton Stone Bridge
- Thornton Stone Bridge to Buckingham Canal Nature Reserve
- Buckingham Canal Nature Reserve to Buckingham

3.3.1 *Cosgrove to the A5*

The existing canal at Cosgrove has a pound level of approximately 71.3m AOD. The ground west from here is relatively flat through a rural area to the A5. (Appendix A, Map1)

Figure 2 – Junction with Grand Union Canal at Cosgrove

The existing canal arm ends at Bridge 1. Only the line of the bridge remains – the rest of the structure is now an embankment to prevent water passing this point. The location and prominence of this bridge are such that the planning authorities would probably wish any restoration to be stone-clad with local materials.

The canal exists as a dry ditch for approximately 1000m to Bridge 2. There are a number of field crossings along this length. An agreement would have to be reached with the landowners as to the requirements for retaining these crossings. A pipeline and a sewer also cross the canal along this length. The level of these would have to be established to ensure the navigation depth will be able to pass over.

The line of Bridge 2 is still clear and there is some evidence of the old headwalls, however the majority of the structure is now an embankment. The extent and condition of any remains of the original structure would require investigation, although it will almost certainly be more cost effective to construct a new bridge rather than restore an old structure.

Beyond Bridge 2 there is an old overflow sluice that drains into the Dogsmouth Brook. The brickwork needs a great deal of attention and the requirement for this sluice should be reviewed – it may be possible to remove this altogether.

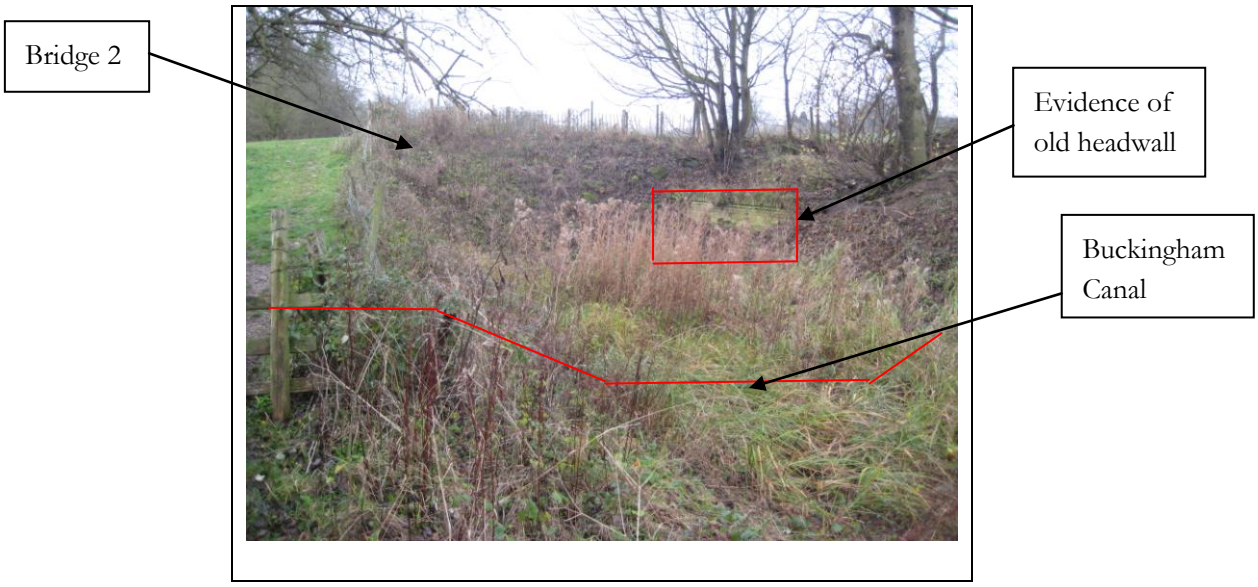


Figure 3 – Bridge 2

The well-established canal line continues for approximately 500m from Bridge 2 to the A5. Crossing the A5 will be one of the most expensive sections of the restoration. The canal is at approximately the same level as the A5. It would therefore be necessary to construct two locks either side of the road with a culvert beneath, or lower the level of the pound through Old Stratford. The latter option will make it easier to pass beneath other bridges within the village, but a canal set at a much lower level than the surrounding buildings and footpaths is unlikely to meet the aesthetic aspirations of the Canal Society.

3.3.2 *Through Old Stratford*

Crossing the A5 at this location will retain the old line of the canal into Old Stratford. The canal would enter Hayes Basin. The basin currently impounds water, suggesting that little work would be required to open this for navigation. There is a 90˚ bend west in the basin and thought should be given to keeping adjacent land clear of buildings and vegetation to try to improve sight-lines for boats. This section is approximately 200m long before it meets Cosgrove Road. In the event that the route through Old Stratford is not found to be feasible, the retention and conservation of Hayes Basin would, however, remain an option

which would preserve the historical link with Old Stratford and provide an attractive asset for the village.

The bridge at Cosgrove Road has been filled in. There would also be limited headroom beneath the bridge if the current canal level was retained; this may be less of an issue if the pound level is reduced to aid its passage under the A5, however this will have knock-on requirements for restoration of the basin.

The exit from the bridge is marked by an immediate 90˚ bend south. Sight lines will be an issue for boats again, as will the area required for turning. There may be a need to enlarge this corner to ensure there is sufficient space for the swept-path of a canal boat. This enlargement may necessitate the removal of the children's playground on the corner of Chapmans Drive.

The canal would then run for 240m to the bridge at Watling Street. The line of the canal here has been encroached upon by the gardens of houses on Cosgrove Road and Water Close. It should be possible to fit the canal along this route although a reduction to single width navigation may be required.

Beyond Watling Street the canal could pass along the rear of properties on Deanshanger Road, crossing Willow Grove. This section is approximately 220m in length and has very limited space for construction. It is likely that a number of properties will require purchase and demolition to achieve the desired line.

Beyond Willow Grove a 90m length of new excavation is required to join with what remains of the old canal close to Brookside Close. There is then a 300m length of the old canal with existing crossings at Brookside Close, Dickens Drive and a community centre off Deanshanger Road.

Figure 4 – Existing Canal through Old Stratford

The crossings do not appear to have sufficient air-draft for boat passage. The canal here would have to be lowered, possibly requiring modifications to the existing bridges. The towpath would be at a lower level than Deanshanger Road and retaining walls may be required, depending on local ground levels, to support the adjacent road. (Appendix A, Map2)

3.3.3 *Deanshanger*

In order to reach Deanshanger the canal would have to cross the A422 close to the junction with Deanshanger Road. This is at a similar level to the canal and would incur similar problems to the A5 crossing; again suggesting that lowering the pound level through Old Stratford is the most viable solution.

A crossing would then be required at Puxley Road in order to link with another short section of the old canal at Northfields Farm.

There is almost no evidence of the old line through Deanshanger due to development within the village. There is a short section of the old canal outside the village behind the petrol station at the junction of Buckingham Road and the A422, but even if this could be linked up another crossing of the A422 would be required to continue the canal. (Appendix A – Maps 2 & 3)

The technical difficulty and considerable expense required to reinstate the old route through Deanshanger make this option unfeasible.

3.3.4 *Old Stratford and Deanshanger By-Pass*

An alternative route to reinstate the canal by-passes Old Stratford and Deanshanger altogether. After crossing the Dogsmouth Brook the canal could turn southeast and run parallel to the A5. This would require a new channel to be cut for a length of around 600m with a drop in pound level from 71.3m to 64m requiring 4 locks. (Appendix A – Map 1)

The River Great Ouse could then be canalised for a length of around 950m to a new lock to the rear of properties on Manorfield Road. The existing bridges under the A5 and Watling Street can be used although some modification may be required to ensure the required air draft is present. In general canalisation is likely to require dredging of the river to achieve the required navigation depth, weirs to control the water level and locks to enter/leave the river. There are operational issues with navigation on rivers as the flow in the river is variable; in particular flood events will not allow passage under the bridges and will have high flow velocities. This will mean that there are times when travelling the length of the canal will not be possible and mooring sites will be required to accommodate boats waiting for access to be open again.

A new canal could then be cut across the fields to the road to Passenham for a length of around 1000m. The fields rise in a gentle hill in this location so a cutting will be required to guard against water supply issues. This cutting will need to be around 5m deep. The pound level here should be 64m at the interface with the river, rising to 67m through 2 locks. A new bridge will be required at the road to Passenham.

The canal will then need to turn west for 260m towards the A422/Stratford Road roundabout. There is a minor access track here that will require a small bridge. The canal will then run parallel to the A422 for 1500m before joining with the old line of the canal opposite the petrol station at the junction with Buckingham Road. This stretch will require a crossing over the small watercourse that runs from Deanshanger to the River Great Ouse. A new road bridge will also be required for the access to the Kingfisher Country Club. This section will mostly be constructed by expanding an existing ditch that runs parallel to the A422 and will have a water level of 67.5m requiring 1 lock to raise it from the previous pound. (Appendix A, Maps 1, 3 & 4)

3.3.5 *A422 to Thornton Stone Bridge*

A 1350m length of the existing line runs south to Mount Mill Farm. This pound should have a water level of 72m which will require 2 locks to raise it from the previous pound. This length will also require a field crossing bridge.

A 640m length to the south of Mount Mill Farm then follows. There is little evidence of the old line and a new channel will need to be cut. This length passes reasonably close to the River Great Ouse and the embankment will need to be able to withstand high flows when the river is in flood. There may also be the additional benefit of protecting the farm from flood events if it is currently at risk. (Appendix A – Map 5)

The existing line is then evident for 880m before arriving at an existing bridge to the rear of Little Hill Farm. This bridge is currently under restoration by volunteers. It will require inspection to ensure its integrity.

A further 800m of the existing line brings the canal to the road to Thornton. There are two crossings in this location. The road runs on an earth embankment that is sufficiently high such that a new bridge could be constructed with the water level in the canal remaining at 72m. Adjacent to the road embankment are the remains of the old canal bridge. The bridge is a stone arch with a stone/masonry wall retaining the towpath beneath. The arch, the towpath wall and the remains of the headwalls are all heavily vegetated and many bricks have been dislodged by root growth; however much of the arch is intact. The bridge only has the capacity to allow a single boat through at a time, but it does represent a link to the old canal and should be preserved for its heritage significance. (Appendix A – Map 6)

Figure 5 – Thornton Stone Bridge

3.3.6 *Thornton Stone Bridge to Buckingham Canal Nature Reserve*

The old canal line is still evident for a further 800m to Cattleford Bridge. At the bridge the canal runs adjacent to the A422, crossing the stream over an aqueduct. The integrity of the aqueduct will need to be established through a detailed structural inspection. The trough is currently vegetated and will almost certainly require replacement. A crash barrier will also be required to safely segregate the canal from the road.

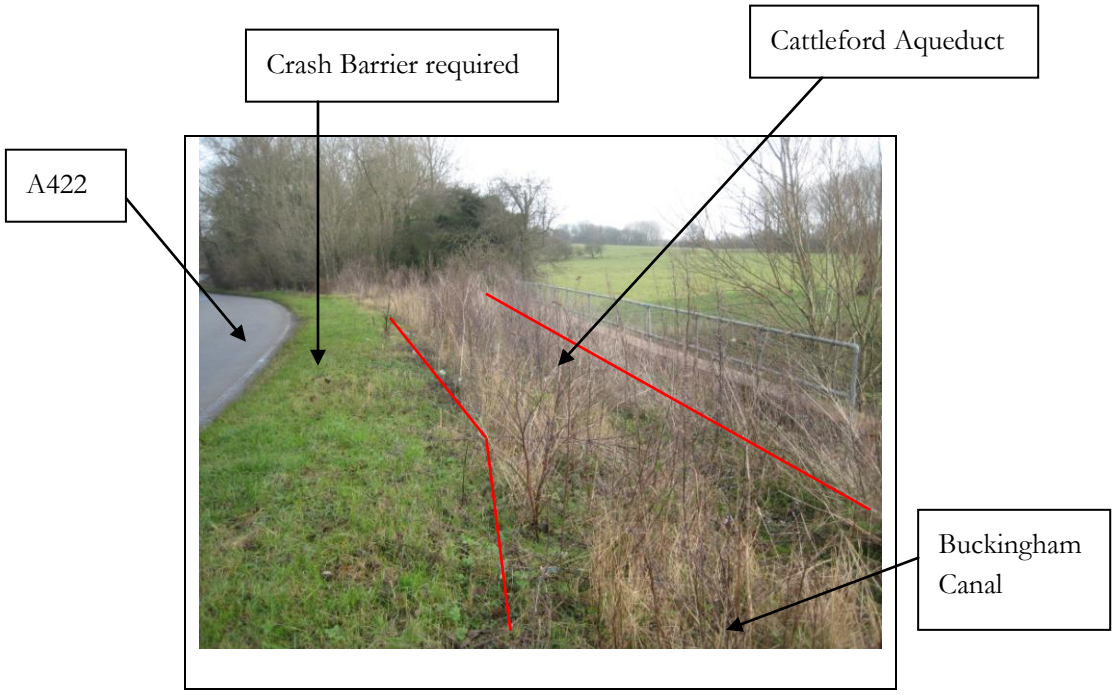


Figure 6 – Cattleford Aqueduct

The old line from Cattleford Aqueduct to the Thornborough Road has largely disappeared and would require a new channel to be cut over this 720m length. The old Leckhampstead Wharf House is now a stable and the buildings and road obstruct the old line. The road will require a new bridge crossing within this area; the buildings will either need to be purchased and demolished, or a by-pass route will need to be considered. Enlarging the drain/stream ditches to the south is a viable solution and will not disproportionably increase the length of canal.

Figure 7 – Buckingham Canal West of Leckhampstead Wharf House

The next 1000m of the old line is still very much in evidence and enters the Buckingham Canal Nature Reserve adjacent to Hydelane Farm. The water level needs to increase from the previous pound level of 72m to 73m. There is an existing lock in this location and restoration by Buckingham Canal Society has already begun. There are also some overflow weirs that regulate the intake from the adjacent reservoir. These weirs have also had some restoration work undertaken by the BCS. (Appendix A – Map 7)

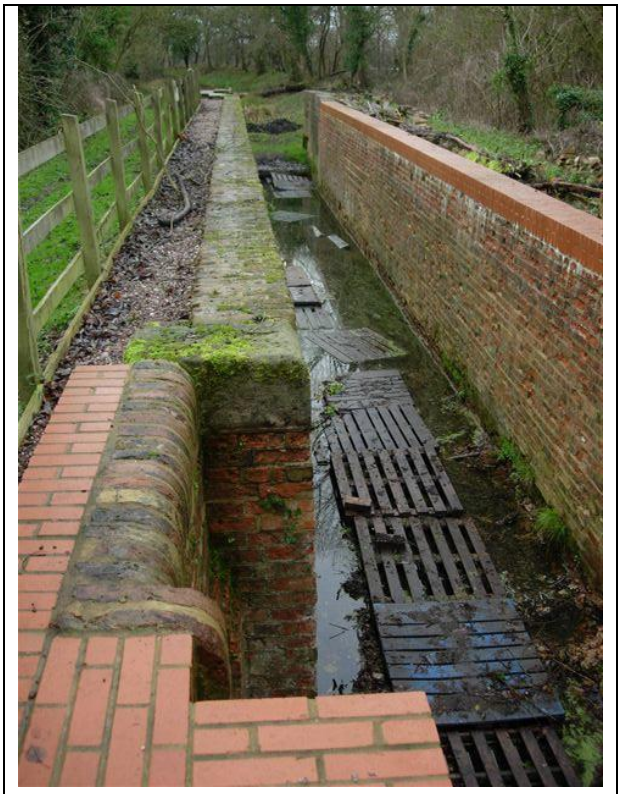


Figure 8 – Lock under restoration by Buckingham Canal Society

3.3.7 *Buckingham Canal Nature Reserve to Buckingham*

The canal then runs adjacent to the reservoir at this location for 500m. The old line is then obscured and a new channel would need to be cut for 1200m to the Old Mill House. There is a drainage ditch to follow along this route that could be expanded to form the navigation. The canal water level needs to rise to 75m at this location requiring 1 lock. It may be advantageous to raise the water level after the access road to the sewage works in order to limit the bridge works required; however this may require larger cuttings or retaining walls.

The next 375m of new-cut channel will then take the canal to the River Great Ouse. At this location the ground runs steeply from the A422 down to the river. A number of springing points release the groundwater into the river. Keeping the canal separate to the river will require a very large retaining wall to cut into the hillside – possibly even a tunnel, given the topography. This will be a technically challenging and expensive option.

Figure 9 – River Great Ouse

Historically the canal joined the river for a short stretch. There is an Environment Agency weir controlling the water level at this location. A 120m stretch of the river could be canalised and entrance and exit locks could be constructed in order to pass this location. There would be operational issues with the section closed during high flows on the river. This would require mooring points and suitable facilities for boaters who are trapped by the high river level. (Appendix A – Map 8)

Figure 10 – Environment Agency Weir

360m of new channel then need to be cut to take the canal as far as the old Lock Cottage. The cottage has been extended directly over the old lock itself. The cottage, or possibly just the extension, would need to be demolished if the lock is to be refurbished. There is no evidence of the lock on the surface and there is no information as to the foundations of the new extension and thus the condition of the lock below. It would be more feasible to divert the canal southeast around the cottage, rejoining the old line of the canal to the rear of the property.

The old line is still in evidence for a length of 440m. This runs up to the A413 at the edge of Buckingham. There is an overflow weir along this length that diverts excess water into the River Great Ouse. This has been restored by the Buckingham Canal Society.

The route into Buckingham itself is blocked by the A413, Bourton Meadow School and other developments. It would be prohibitively expensive to remove these obstructions; instead a new 220m long channel should be cut parallel to the A413. This would rejoin the canal with the River Great Ouse which would require canalisation to continue the navigation into the town itself.

The canal terminus basin could be in the park opposite Bourton Mill. The canal should be disassociated from the river to make the basin less vulnerable to changes in flow in the river. A basin would be required to allow boats to turn around. Moorings should be provided along with other facilities, such as a sanitary station, to make Buckingham a suitable destination location for boaters.

3.3.8 *Alternative Terminus*

An alternative to entering Buckingham would be to have the mooring basin terminus outside the town, to the east of the A413. This would avoid the difficulty of getting into Buckingham itself and the mooring basin could provide the focal point for a new development. A mixed-use commercial/residential development centred on the basin could be an attractive opportunity for third party developers who may even construct the basin itself, contributing to the funding and development of the restoration.

Another alternative terminus would be to take the canal further into Buckingham. This would involve further canalisation of the river as there is very little space to construct a separate canal. There are a number of weirs on the river; these would need to be changed into locks with by-pass weirs. Expanding the channel in this way may derive some flood defence benefits by increasing the capacity of the channel. This would require further investigation as although the channel will be bigger it will also be full of water impounded for navigation so it is not clear at this stage how much conveyance would be improved. It may be possible to design navigation structures, such as locks, so that they do not impede flood flows through the incorporation of sufficient by-pass weirs; existing bridges are to remain relatively unchanged and may still represent constrictions in the channel.

3.4 *Costs*

A cost estimate has been produced based on the description above for the section from Cosgrove to Buckingham.

The following assumptions have been made:

- Cost estimate based on unit costs derived on previous work done for B&MKW Trust by Halcrow and externally verified by professional QS and contractor. While this was based on a broad canal, at this level of confidence, it is not felt appropriate to reduce these.
- No cost has been included for land purchase or negotiations.
- A percentage allowance has been made for general preliminary items as would normally be included in the contract cost (sensitivity ranges included for best/worst case are 15% and 25%).
- Vertical sides of canal pounds have been supported using L8 trench sheeting with walings and anchor piles.

- Costs are at June 2009 prices with no allowance for increased costs.
- All material taken off site assumed to be inert (if much dredging of canal and river silts is required, while not contaminated, a significant amount of this material could be classed as non-hazardous rather than inert).
- No allowance has been made for contaminated land except where expressly stated.
- The risk cost included is as defined in section 6.

It may be possible to reduce some costs by use of volunteers.

Table 1 – Cosgrove to Buckingham cost estimate

	Unit	Quantity	Unit Cost	Sum	Total	Comments
			£k	£k	£k	
Site Clearance	ha	43.69	3.60	157.28	**157.28**	14.15km, 30m wide corridor
Canal Pounds						
Cosgrove to A5	m	1500	0.600	900.00		Restoration of existing channel
Cosgrove to A5	m	600	0.895	537.00		Rural Canal
Canalise River Great Ouse	m	950	1.000	950.00		River Canalisation
River Great Ouse to A422	m	1760	0.895	1575.20		Rural canal
River Great Ouse to A422	m	1000	2.085	2085.00		Rural canal in cutting
A422 to Thornton Stone Bridge	m	3030	0.600	1818.00		Restoration of existing channel
A422 to Thornton Stone Bridge	m	640	0.895	572.80		Rural canal
Thornton Stone Bridge to Bucks Canal Nature Reserve	m	2300	0.600	1380.00		Restoration of existing channel
Thornton Stone Bridge to Bucks Canal Nature Reserve	m	720	0.895	644.40		Rural canal
Bucks Canal Nature Reserve to River Great Ouse	m	1575	0.895	1409.63		Rural canal
Canalise River Great Ouse	m	120	1.000	120.00		River Canalisation
River Great Ouse to Buckingham	m	440	0.600	264.00		Restoration of existing channel
River Great Ouse to Buckingham	m	580	0.895	519.10		Rural canal
River Great Ouse to Buckingham	m	220	1.000	220.00		River Canalisation
Dogsmouth Brook Sluice	sum		200.00	200.00		
Deanshanger Brook Crossing	nr	1	50.00	50.00		
Provision for waste weirs	nr	3	100.00	300.00		Assumed
3m Footpath	m	14150	0.10	1415.00		
Landscaping	sum			1000.00	**15960.13**	
Locks						
Single lock restoration	nr	1	300.00	300.00		Bucks Canal Nature Reserve
River entrance/exit lock	nr	6	800.00	4800.00		Temporary cofferdam required
Single lock new construction	nr	8	775.00	6200.00	**11300.00**	

Bridges						
Bridge 1	nr	1	550.00	550.00		Temporary Cofferdam Required
Bridge 2	nr	1	500.00	500.00		
Passenham Road	nr	1	650.00	650.00		13m wide, 5m span, to include traffic management
Swing bridge for access track	nr	1	300.00	300.00		
Little Hill Farm Bridge		1	300.00	300.00		Restoration
Thornton Road Bridge	nr	1	650.00	650.00		13m wide, 5m span, to include traffic management
Thornborough Road Bridge	nr	1	650.00	650.00		13m wide, 5m span, to include traffic management
Old Mill House Bridge	nr	1	500.00	500.00		
Cattleford Aqueduct	nr	1	450.00	450.00		Including Crash Barrier
Works to existing bridges	nr	3	100.00	300.00	**4850.00**	A5, London Road/Watling Street, A413
Footbridges						
Field Crossings	nr	9	200.00	1800.00		
Thornton Stone Bridge	nr	1	300.00	300.00		Stone Restoration
Bucks Canal Nature Reserve	nr	1	150.00	150.00	**2250.00**	Restoration
Total Measured Cost (£k)					£34,517.41	
Add Contingencies	%	30			£10,355.22	
Total Construction Cost (£k)					**£44,872.63**	
Indirect Costs						
Service diversions				£5,000.00		
Client/Construction Supervision, admin & management	%	10		£4,487.26		
Design	%	6		£2,692.36	**£12,179.62**	
			Total Cost (£k)		**£57,052.25**	

Summary

Cosgrove to Buckingham
14.15 km length

Item	Cost / £k
Works Items	£34,517.41
Contingency	£10,355.22
Indirect Costs	£12,179.62
Total	**£57,052.25**

= £4,031.96 per km

Risk	**£7,000,000**

Grand Total inc Risk **£64,052.25**

Cost assessed June 2009.

It is recommended that for future use, this cost is inflated using the Price Adjustment Formulae for Construction Contracts, also known as the NEDO or Baxter Indices, published by the Office for National Statistics.

3.5 *Phasing*

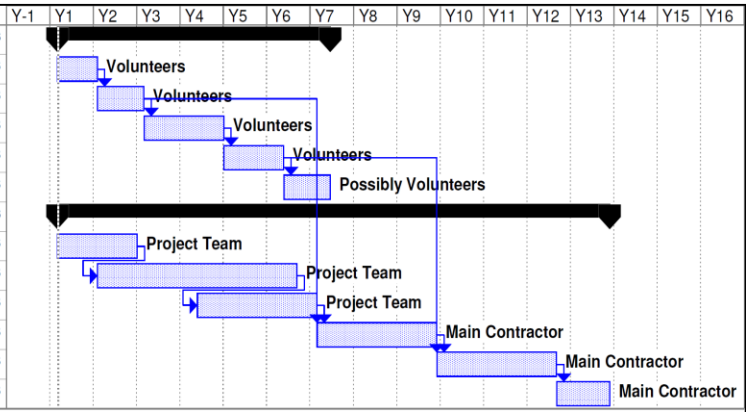
If funding were in place for the construction works, an engineering scheme of this size would be likely to take in the order of 5 – 7 years to complete.

In this case, it is difficult to determine what the likely timescale of the project may be as this will be dependent on funding availability. In order to demonstrate to external bodies that a scheme is going to happen, it can useful to have exemplar sections of channel restored.

A pragmatic approach may therefore be, in the short to medium term, to restore such sections as can be done relatively simply, with the more complex sections tackled once funding is secured.

A possible phasing approach to achieve this is shown below.

Task Name	Duration
Volunteer-led Early Works	**1640 days**
Restoration of Nature Reserve Lock	12 mons
Clearance of Cosgrove to A5	14 mons
Clearance of A422 to Thornton Stone Bridge	24 mons
Clearance of Leckhampstead Wharf House to Nature Reserve	18 mons
Restoration of Little Hill Farm Bridge	14 mons
Main Restoration Works	**3320 days**
Studies and Investigations	24 mons
Funding Applications	60 mons
Detailed Design and Planning Application Works	36 mons
Construction of Cosgrove to A422	36 mons
Construction of A422 to Buckingham	36 mons
Construction of Buckingham Basin	16 mons



4 Ecological Assessment

4.1 *Introduction*

This high level environmental review identifies the key constraints and opportunities in the study area. Data has been obtained from a brief desktop study.

As this is a high level review, further detailed environmental appraisal of the key issues identified will be required at feasibility stage.

4.2 *Protected Sites*

There is one Special Site of Scientific Interest (SSSI) approximately 1.8km north west of the canal. This is Foxcote Reservoir and Wood (Citation 1000665) (approx 50Ha) located at NGR: SP711 364. It consists of an unpolluted eutrophic freshwater reservoir of particular importance for overwintering wildfowl, surrounded by semi improved meadows and bordered to the north by mixed deciduous woodland. The standing open water and canals are in favourable condition whereas the wood is in unfavourable recovering condition.

At 1.8km from the canal it is unlikely that the special interest features at this SSSI would be affected by this scheme.

There are a number of nature reserves close to the canal route, including:

- The Buckingham Sand Pit (Site Code 1083175) located at SP 699 344 at 1.2km north west of the canal. This LNR is owned by AVDC and understood to be of earth heritage interest

- The Buckingham Canal Nature Reserve is located at NGR SP 726 352. The site is owned by the Berks, Bucks and Oxon Wildlife Trust and forms the southern boundary of the nature reserve. The canal towpath is also part of the North Ouse Valley Walk. There are ancient hedgerows on the embankment and the ponds provide a sheltered aquatic home for frogs, toads, dragonflies and damselflies.

- Stony Stratford Nature Reserve is located at NGR SP 785 409 between Queen Eleanor St, Stony Stratford, and the A5. The reserve provides a variety of artificially created wetland habitats especially for waterfowl and

waders. It was created from the gravel workings which supplied materials for the building of the A5 Trunk road

There are no statutory protected sites in the study area. Information on Ancient Woodland areas, and Countryside Stewardship agreements close to the proposed canal route are presented below.

Ancient and Semi-natural Woodland

- Bedlam Copse, 3.2Ha located at NGR SP 752 380 (Theme ID 1108095). Approximately 0.58km north of the canal route;
- Jacks Copse, 2.76Ha located at NGR SP 753 382 (Theme ID 1108096). Approximately 0.77km north west of the canal route;
- Rabbit Wood, 3.1Ha located at NGR SP 747 378 (Theme ID 1108094). Approximately 0.90km north west of the canal route;
- Great Oaken Copse, 5.13Ha located at NGR SP 744 376 (Theme ID 1108093). Approximately 1.01km north west of the canal route;
- Little Oaken Copse, 3.17Ha located at NGR SP 742 378 (Theme ID 1108092). Approximately 1.30km north west of the canal route;
- Park Copse, 16.29Ha located at NGR SP 738385 (ID 1008091), also at same site, replanted ancient woodland 2.08Ha at SP 739 383. Approximately 1.9km north west of the canal route

Countryside Stewardship Agreements

- 7.48Ha adjacent to east side of A413 straddling canal route
- 41.58Ha to south of River Great Ouse close to Thornborough Mill, approximately 0.34km south of the canal.
- 72.67Ha to south of River Great Ouse to the east of Thornton, approximately 0.35km south of the canal

- 19.36Ha to north of A422 and east of Leckhampstead, approximately 0.49km north of the canal

- 7.21Ha to south of A422 south east of Deanshanger, potentially straddling the proposed canal route.

4.3 Flora and Fauna

The Buckinghamshire and Milton Keynes and the Northamptonshire Local Biodiversity Action Plans (LBAP) comprise a series of habitat and species action plans targeted towards those features important in the area. There is no specific BAP for the canal route itself, however likely priority habitat close to or along the proposed route of the canal includes coastal and floodplain grazing marsh located between the A422 and the River Great Ouse near Deanshanger and Old Stratford. The LBAP's will be investigated in more detail at the feasibility stage. Connection of isolated water bodies may have impacts upon flora and fauna by the introduction of alien species or water of differing acidity.

4.4 Water Quality

The River Great Ouse flows parallel and in a north easterly direction to the Buckingham Canal. River Quality is generally good (EA website) (chemical quality A – very good; biological quality A-C and nitrates and phosphates high). Water quality is not thought to be a major constraint; however reconnecting/connecting previously separated water bodies can impact upon water quality and in particular sediment issues. In this instance, work will still be required to ensure this scheme had no adverse impacts particularly at locations where canalisation of the river is proposed. There may also be issues with water quality during flood events with interaction between the canal and other water courses. The EA flood map indicates that parts of the proposed canal route are within the 1 in 100year floodplain, including the area to the south and east of Deanshanger

4.5 Cultural Heritage

There are three Scheduled Monuments within 1km of the proposed canal route, as follows:

- A slight univallate hillfort covering an area of approximately 3.8Ha (monument number 29420) at NGR SP 724 347 is located immediately adjacent to the north west side of the canal.

- The Grove Close Moated Site covering an area of approximately 0.6Ha (monument number 13617) at NGR SP 749 376 is approximately 675m to the north west of the canal route.

- Motte and bailey castle, deserted village and monastic grange at Old Wolverton. The Scheduled Monument (monument number 13609) covers an area of approximately 19.4ha at NGR SP 801 411 and is located approximately 1.1km from the proposed new cut/ river canalisation to the south east of Old Stratford.

- Remains of the church and churchyard of St Mary Magdalen (Monument number 35357) covers an area of approximately 0.5Ha at NGR SP786 406. The site is approximately 0.56km from a section of proposed river canalisation at Old Stratford.

- A Roman Villa south east of Cosgrove Hall covering an area of approximately 1.86Ha straddling the canal (monument number NN119) at NGR SP 795 420

The proximity to the canal route may cause problems depending upon the nature of the ground between the canal and the monuments. It is likely that damage to both the hillfort and the roman villa were caused during the original construction of the canal.

4.6 Human Beings

The canal route starts on the eastern outskirts of the town of Buckingham. On its route in a generally north easterly direction the canal bypasses the small settlements of Thornton and Beachampton to the south, Deanshanger and Old Stratford to the north and north west before terminating at its confluence with the Grand Union Canal south of Cosgrove.

A public footpath follows the route of the disused canal from Buckingham to approximately Thornton (part of The Ouse Valley Way), where it leaves the canal to run to the south of the River Great Ouse. The Ouse Valley Way follows the original towpath of the now disused Buckingham Canal out to Thornton, then follows footpaths through the villages of Beachampton and Calverton before reaching the Milton Keynes riverside walk, the Grand Union Canal and the North Bucks Way.

A number of other footpaths cross the proposed canal route at Deanshanger and closer to Old Stratford, including another section of The Ouse Valley Way adjacent to the River Great Ouse close to Old Stratford (proposed section of river canalisation).

4.7 Traffic and Transport

The main transport links in the study area are the A422 and the A5. The A422 goes from Buckingham to Old Stratford in a roughly south west to north easterly direction, bypassing Deanshanger to the south east and between Old Stratford and Stony Stratford. The A5 travels in a south east to north west direction between Milton Keynes and Towcester. A proposed section of river canalisation passes beneath the A5 east of Old Stratford, before turning north west in a new cut running parallel to the A5.

The canal route also crosses a number of minor roads at Thornborough Mill, Thornton, Passenham and Old Stratford.

4.8 Contaminated Land

Depending on the finalised route and construction methods, contaminated land may prove an issue particularly close to mineral extraction sites close to Deanshanger, Passenham and Cosgrove. Some of these sites have subsequently been used for landfill.

- Anglian Water Services - Foxcote Pumping Station - Landfills taking non-biodegradable wastes (not construction), adjacent to the canal
- Thornton Hall Farm licensed to receive inert waste (approx 500m south of the canal)
- Kingfisher Farm, Deanshanger – inert waste
- RMC Aggregates – Passenham (non-hazardous, inert)
- RMC Aggregates – Passenham Quarry (landfills taking other wastes (construction demolition and dredgings)
- Stratford Road, Cosgrove (inert wastes)

4.9 *Key Opportunities and Constraints*

The scheme presents the opportunity to restore the canal for the benefit and use of the public with the creation of wetland habitats, and a corridor linking other areas of habitat.

Key known and potential constraints in the study area include:

- Buckingham Canal Nature Reserve
- Stony Stratford Nature Reserve
- Heritage and archaeological features
- Protected species/habitats (presence/absence to be confirmed)
- Possible contaminated land issues.
- Possible water quality issues

4.10 *Recommendations*

As a minimum, the following external consultees should be consulted to obtain further baseline information and to maximise potential environmental opportunities:

- Environment Agency Officers
- Relevant Local Authority Officers
- Natural England
- Local Wildlife Trusts
- English Heritage

An ecological walkover survey should be undertaken to ascertain the need for more detailed species surveys. It is likely that an environmental assessment of the proposals will also need to be undertaken. This will determine both positive and negative environmental impacts of the proposals, identify mitigation for adverse impacts and identify potential environmental enhancements to the proposed scheme.

5 Socio-Economic Benefits

5.1 *Introduction*

Canal restorations have the potential to deliver significant benefits for the local communities and economies. In particular, the nature and scale of such positive impacts can be determined by assessing the direct and indirect interactions between the canal and the key drivers within its context area.

Hence, in order to have an early view on the potential impacts of the envisaged restoration of the Buckingham Canal, this chapter identifies the likely impact / economic drivers within the canal's context area. This is followed with a qualitative outline appraisal of the potential impacts.

Realising any socio-economic benefits within the Buckingham Canal's context area may have direct and indirect cost implications. Additionally, the long term maintenance of a restored canal will require a regular stream of income to ensure its operational viability. Given the nature of such concerns, this section provides some initial thoughts on the deliverability of the proposals

5.2 *Context Area and Key Drivers*

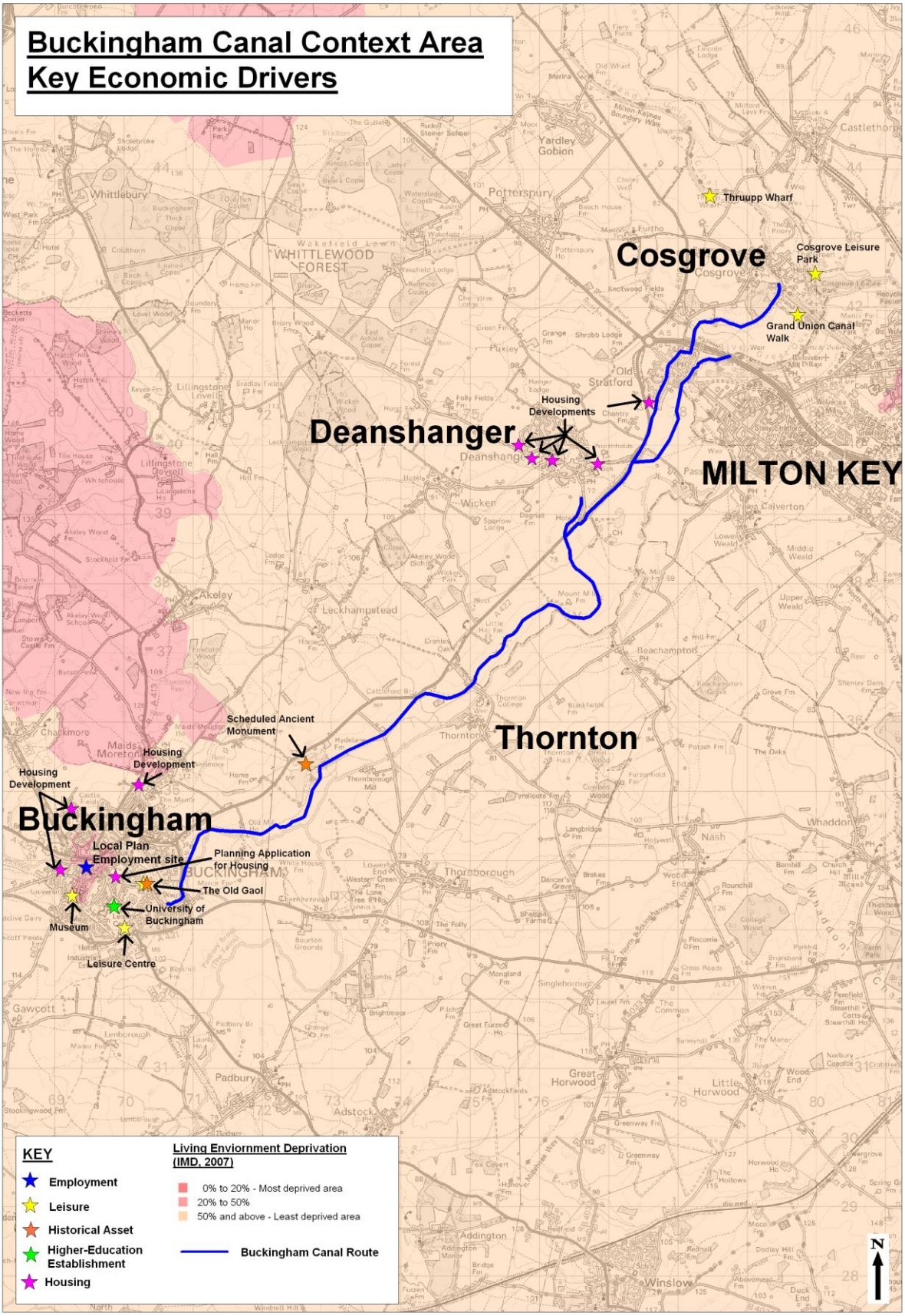
The Buckinghamshire Tourist Board suggests the Grand Union Canal is a key tourism feature within the location. The canal features in an array of tourism brochures and advertisement material, being marketed as a historic transport route. This canal is considered to be well situated within the pleasing Aylesbury Vale countryside and attracts a significant number of visitors each year. The area benefits from being in some of the most attractive countryside in the south of England, nestled between the Cotswolds and the Chilterns, this area offers unique countryside which is considered to have growing potential to attract tourism investment.

The restored canal within its wider context area will have a market town and a number of key villages, including Buckingham, Deanshanger, Passenham and Old Stratford. Milton Keynes is located to the east of the canal which provides links to the south-east and the West Midlands. The context area benefits as being fairly affluent in terms of living environment (indoor and outdoor). In particular, the attached plan shows living environment deprivation to be fairly low and consistent across the study area. Access to the canals and attractive water space for local

residents, workers and tourists, is considered a key competent for driving the high quality of living environment (outdoor) by Aylesbury Vale District Council.

Water attractions are featured in the tourism guides for canal boat tours and other marketing material e.g. Aylesbury Vale Tourism Guide. The key purpose of such promotional material is to maximise the economic gain associated with joint offer which promotes both formal and informal use of the waterways and the surrounding water space.

This proves there is potential to mirror this activity in this study's context area. The canal appears to be one of the key drivers of the tourism economy in the region. The plan indicates potential for marina development alongside the canal. This can strengthen the benefits associated with formal and informal use of waterways and water space in the neighbouring villages. Such benefits may include direct and indirect business activity, economic output and employment generation.


Buckingham Canal Context Area
Key Economic Drivers
Thruupp Wharf
Cosgrove
Cosgrove Leisure Park
Grand Union Canal Walk
Housing Developments
Deanshanger
MILTON KEY
Scheduled Ancient Monument
Thornton
Housing Development
Housing Development
Buckingham
Local Plan Employment site
Planning Application for Housing
The Old Gaol
University of Buckingham
Museum
Leisure Centre
KEY
Employment
Leisure
Historical Asset
Higher-Education Establishment
Housing
Living Enviornment Deprivation (IMD, 2007)
0% to 20% - Most deprived area
20% to 50%
50% and above - Least deprived area
Buckingham Canal Route
N

Another key attraction, which already exists in the area, is the Cosgrove Leisure Park. It is one of England's finest leisure parks and is situated to the east of Cosgrove village. It offers an array of holiday home plots with associated leisure facilities. Likewise, the Grand Union Canal Walk passes to the south of Cosgrove Leisure Park, and is another key pull factor to the area.

The market town of Buckingham benefits from being home to the thriving University of Buckingham. Interestingly, this is the only UK University that is independent from the UK government, and will not be subject to the forthcoming funding cuts proposed by government. The University is a key economic driver in the town and the wider area; it attracts a high proportion of overseas visitors along with a significant proportion of home students. The University is the largest employer in the town providing a number of a high value jobs and is a contributor to the local economy.

The context area has a diverse economic base with various small, yet no major, economic drivers. Milton Keynes and the area to the south is a commuter belt for London. The economy in Aylesbury Vale is mainly made up of rural enterprises. The economic development plan for the area points developments towards the county town of Aylesbury, in the first instance. However, Buckingham is earmarked for residential growth up until the period 2026. The plan also places emphasis upon the larger villages within the Vale. This appears to be the case in the village of Deanshanger, which has had a number of recent planning applications for housing sites. The expansion in the number of dwellings in this village suggests potential for water fronting housing and employment growth. Such developments in the right market conditions are likely to hold a premium on their end use values. Attracting a fraction of such premiums could contribute towards offsetting the significant costs associated with implementation of the canal restoration.

5.3 Conclusions and Recommendation

The restoration of the canal is likely to create additional income for the local economy by attracting formal and informal visitors and associated expenditure. There is already a good visitor base within the context area to build upon, not least due to Cosgrove Leisure Park and over The Iron Trunk, a notable heritage feature, and the Grand Union Canal Walk. Further, the University of Buckingham also attracts a significant number of students and their friends and families to the area.

The canal restoration will open up the area south of the existing network, linking Cosgrove to Buckingham, increasing accessibility to an attractive feature. This could result in greater informal use of the corridor, impacting positively on local trade and employment opportunities.

The navigable canal towards the south of Milton Keynes is a major attraction in the region for formal use of waterways and already provides significant economic benefits. This could be replicated in this section of the canal which would drive the economy around this area.

There appears to be a potential to develop a marina in south Deanshanger. The canal branches off from the main route towards the village of Deanshanger. The location is suitable for such a development not least due to adjacent / nearby uses such as a hotel and public house and other services available in the village. Such a development is likely to become another key economic driver for the local area.

Summarising the findings of the research presented in this chapter, the table below outlines various waterways and water space associated activities and the likely impacts they would generate for the local economy.

Table 5.1: Opportunities and Benefits

Activities	Benefits (outputs and / or outcomes)
Restoration of the Canal Promote the development of potential marina Explore potential to create new moorings	Formal visitors to the context area Income generation for the Canal Society Direct and Indirect expenditure into the local economy Construction jobs for the local economy Direct and indirect jobs (tourism / leisure / recreation) for the local economy
Develop a strategy which explores opportunities for canal corridor to act as catalyst for integrating all the social, commercial, heritage and landscape drivers to maximise output in the context area: Creation of walking and cycle routes along the canal corridor, creating formal links with all towns and villages within the canal's context area Creation of attractive water based gateways for key towns and villages within the canal's context area Joint strategy to create formal links with existing major attractions within the context area e.g. Cosgrove Leisure Park, Buckingham Old Gaol and University of Buckingham Actively promote creation of formal links with the major attractors / drivers in the pipeline e.g. urban extension of Deanshanger, new marina Explore (and implement) water-based passenger movement (e.g. water taxis and water buses) on the canal corridor, particularly linking rural villages to key towns for sustainable access to services Explore (and implement) hydro based power solution to meet the demands of local businesses, education facilities and the wider community Explore (and implement) opportunities for floating houses and commercial developments (hotels, offices etc) along the canal corridor Provide live project opportunities for students	Healthy living and more productive workforce Improved quality of life Practical learning opportunities for local students Community pride Increased visitors to the context area and local attractions / destinations Increased trade for local towns and villages Creation of more tourism based jobs Creation of water transport based jobs (freight and passenger movement) Power generation through renewable sources – green energy Reduced carbon foot print of the context area Improvement in land values Scope for regeneration of areas suffering from deprivation Increased income generating opportunities for the Canal Society through potential diversification of its activities: sale of renewable energy, water based freight activity, water buses / taxis, markets at key gateways and destinations and development of floating homes / commercial developments.

at universities in the vicinity studying engineering and environmental courses	
Participate in Buckinghamshire Green Infrastructure Consortium	Enhancement of Green Infrastructure
Contribute to development of Ouse Valley Regional Park	Ecological and Environmental benefits
Explore (and implement) water management based solutions for mitigating flood risk within the Ouse Valley	Reduced costs for flood damage. Increased confidence for local residents and farmers. Fewer road closures

Considering the envisaged benefits and revenues derived from formal and informal use waterways and water space, the proposed restoration may be operationally viable. However, the capital costs associated with restoring the canal are estimated to be in the region of £64 million. Considering the nature of economic benefits associated with such a provision, only a small fraction of this activity could be funded through economic development / regeneration based public sector investment streams. Further, given the current economic climate and emphasis on safeguarding and creation of new sustainable businesses, rather than seasonal tourism markets, it is unlikely that such investments would be forthcoming. Hence, deliverability of the canal restoration project would require attracting community based recreation funding, gaining local sponsorships and diversifying the activities of the Canal Society into other income generating activities such as floating developments and energy generation.

6 Risks

With any project of this type, a large number of risks are present. An initial risk register has been produced and can be seen below.

The Risk Register has considered risks which may affect the cost, quality of delivery programme for the scheme.

It is recommended that this document is reviewed, updated and maintained by the project promoters as a live document in order to keep track of and work towards mitigation of the main project risks.

Table 6.1: Risks and Mitigations

No.	Risk	Mitigation
1.	High cost of scheme. Difficulty in obtaining the necessary capital funding for construction.	Investigation into likely funding sources and what these funders' criteria are for making awards. Different parts of the project could then be mapped to different funders' criteria.
2.	Land ownership outside that of project promoters.	Early work required to identify land ownership along the route. A SWOT analysis of land owners should then be carried out to determine how they should be approached. Development of solutions that would be advantageous to both parties may address concerns of some landowners. Develop route options to give alternatives to potential problem areas.
3.	Services	Services present along the route may require significant costs to move existing services and identification of unknown services. A detailed assessment of the services present, works required and costs should be carried out.
4.	Interactions with rivers and floodplain may be unacceptable to the Environment Agency.	Early discussion should be held with the EA in order to obtain their view of the project and to establish what studies would be required to obtain their approval. This may be an opportunity to further explore the flood defence potential of the canal.
5.	Ground conditions / geotechnical risk	A number of risks relate to ground conditions; the condition of the existing embankments, the lining, new embankments and cuttings etc. Initially a geotechnical desk study should be undertaken with a site walkthrough by a qualified geotechnical engineer. A programme of detailed ground investigation works will be required for detailed design activities.
6.	Insufficient water resources available to operate canal	The River Great Ouse may be a good source of water for the canal, although this will require agreement with the EA. The locks back up from the Ouse at the A5 to the original route may be a problem and may require water to be abstracted from the Grand Union. This may not be acceptable and a pumping arrangement may be required incurring additional cost, both for construction and maintenance.

7 Additional Strategic Opportunities

This study has examined the restoration of the Buckingham Canal in isolation. This involves a single connection to the wider canal network at Cosgrove. A further study should look into the feasibility of extending the Buckingham Arm across to meet the Oxford Canal, thus creating a new cruising route, which combined with the development of the B&MK Link would significantly extend cruising in the Great Ouse valley. Navigation loops are known to be more popular than branch arms; therefore this is likely to attract wide interest

An increase in leisure and tourism through restoration of the Buckingham Canal has the potential to address social and economic deprivation along the route. Linking the canal to villages through construction of new footpaths and cycle ways can add to the revenue in village shops, cafes and pubs. This can safeguard existing jobs and may lead to the establishment of new businesses.

British Waterways has a long-standing arrangement with fibre-optic companies for placement of cables within their towpaths. It may be possible to achieve such an agreement for the Buckingham Canal. Not only would this be a valuable source of revenue, but it could also bring Broadband to many villages in the Ouse Valley that do not currently have a connection.

8 Summary

Based on this assessment, the restoration of the Buckingham Canal is a feasible project, though with some significant issues to address.

The restoration of this canal is likely to have a positive social and economic impact on the area as well as being of environmental benefit.

The section from Cosgrove to the A422 is a mix of the well-established old line and significant obstructions through Old Stratford and Deanshanger. The obstructions are such that reinstating the line through the villages is not really

feasible. A new route, making use of the river and by-passing Old Stratford, is a more achievable line. This does introduce operational issues with water supply when locking to and from the river and canal closures due to high flow on the River Great Ouse. These issues will be more easily overcome than those posed by threading the canal through the urban areas.

Much of the rest of the old line is visible as existing embankments or ditches. The rural location means that access for construction will be relatively unrestricted, although consultation and agreement with land owners will, of course, be critical.

Reinstatement of the Cattleford Aqueduct will be a technical challenge and much will depend on the condition of the existing structure.

Leckhampstead Wharf House now represents an obstacle to the old line and a diversion will be required, but the rural location means that there is ample room in which to achieve this.

Canalisation of the river near the Old Mill House will again, present operational problems during high flows. The alternative is to construct the line of the canal adjacent to the river, but not connected. This will require a sizeable cutting through a slope that currently generates a number of springs. This option is likely to incur a higher construction cost, but will avoid the canal being closed due to the river.

The Lock Cottage outside Buckingham has been built upon the old lock and this will need to be by-passed. Again, there is plenty of land in which to do this as long as an agreement with the landowner can be reached.

The route into Buckingham itself is blocked by the A413 and further development within the town. An alternative route, again using the river, could terminate in a basin situated in the park. An alternative would be to construct a terminus basin outside the A413 and use this as a focal point for a new development. This would not achieve the aim of reaching the centre of Buckingham, but it may be a more feasible method of generating funding of the scheme by attracting a private developer.

A significant complexity of the whole restoration will be how the canal interacts with the rivers and floodplain. This is an issue that will need to be addressed in some detail in order to obtain approval from the Environment Agency.

In the short term, significant funding will be required in order to undertake further more detail specific studies. While it can be relatively easy to obtain funding for small capital sums, below say £200k, it can be much harder to obtain funding for studies without being able to demonstrate the benefits the study will bring.

In the longer term a strategy will need to be developed of how capital funding in the order of £65M will be obtained.

9 Recommendations

9.1 *Introduction*

The recommendations for this scheme have been split into three categories, short-term, medium-term and long-term.

The short-term recommendations will be targeted at things that should ideally be undertaken in the next 3 - 12 months in order to keep up the momentum of the project. These include studies that should be undertaken and also tasks the promoters should consider undertaking themselves in order to position themselves for the future.

The medium-term recommendations will be issues that should be addressed in the next one to three years and the long-term recommendations are issues beyond three years.

9.2 *Short term*

In order to progress this project a more detailed feasibility study will need to be undertaken. This is likely to cost in the region of £50k - £100k. This should assess the engineering, water management and environmental aspects of the project. It is highly likely that a flood risk assessment will be required on the lower section, by Old Stratford, and on the upper section, around Buckingham, to demonstrate that the construction of a new canal would not have an adverse impact on the River Great Ouse.

It is recommended that the Buckingham Canal Society approach the Environment Agency to obtain their view of the scheme. The benefits the scheme could have in water management and environmental enhancement should be raised.

It is recommended that the requirement for a Transport and Works Act is investigated and if deemed necessary a plan is developed for what this will involve.

Where access is possible, it is recommended that all existing structures and possible locations of original structures are investigated to determine whether they still exist and where they do, what condition they are in. It may then be possible for future studies to incorporate these structures into the proposed restoration.

This study has been undertaken using LiDAR data. This has been useful in estimating the pound levels and thus the requirement for locks, embankments and cuttings. Further studies should examine the water levels in more detail and cross-reference this against Environment Agency flood maps to try to ensure the canal is out of the flood plain as much as possible. Localised site surveys may be required for additional detail.

The landowners along the whole route should be identified.

A wider study could also investigate the potential for connections to the canal network other than the Grand Union at Cosgrove.

9.3 Medium term

No further recommendations are made here for procured work that will need to be undertaken as this would be influenced and defined by the initial feasibility study. As listed above, it is likely that a flood risk assessment will be required; other studies may include further environmental surveys, geotechnical desk studies and further economic studies.

It will be necessary to engage with the service companies with assets along the route. It is possible that this may be undertaken as part of the feasibility study.

The promoters of this project need to consider in what form they wish to drive the project forward. Who will take the lead role? It may be worth considering setting up a project partnership.

The issue of ownership and operation of the restored canal needs to be considered. The owners and operators need not necessarily be the same organisation. Discussion should be opened with British Waterways on what part they may wish to play in the restoration and operation of the canal.

Work should be carried out to identify all possible benefits of the scheme. This should not be limited to large regional benefits but should also consider small scale improvements to local communities or villages.

Public engagement/consultation should be carried out within the next year to ensure the backing of all the communities in the local area and to understand their concerns and aspirations.

There are likely to be a large range of tasks that could be undertaken by volunteers. A volunteer action plan should be produced setting out what skills are required for each task and how this should be managed. It should be noted that for any volunteers carrying out clearance or construction work on site, safe systems of work should be developed with method statements and risk assessments signed off by a competent individual.

9.4 ***Long term***

In order to develop a fundable scheme, significant work will be required over the next three years to engage with all the local communities. A key requirement will be their backing.

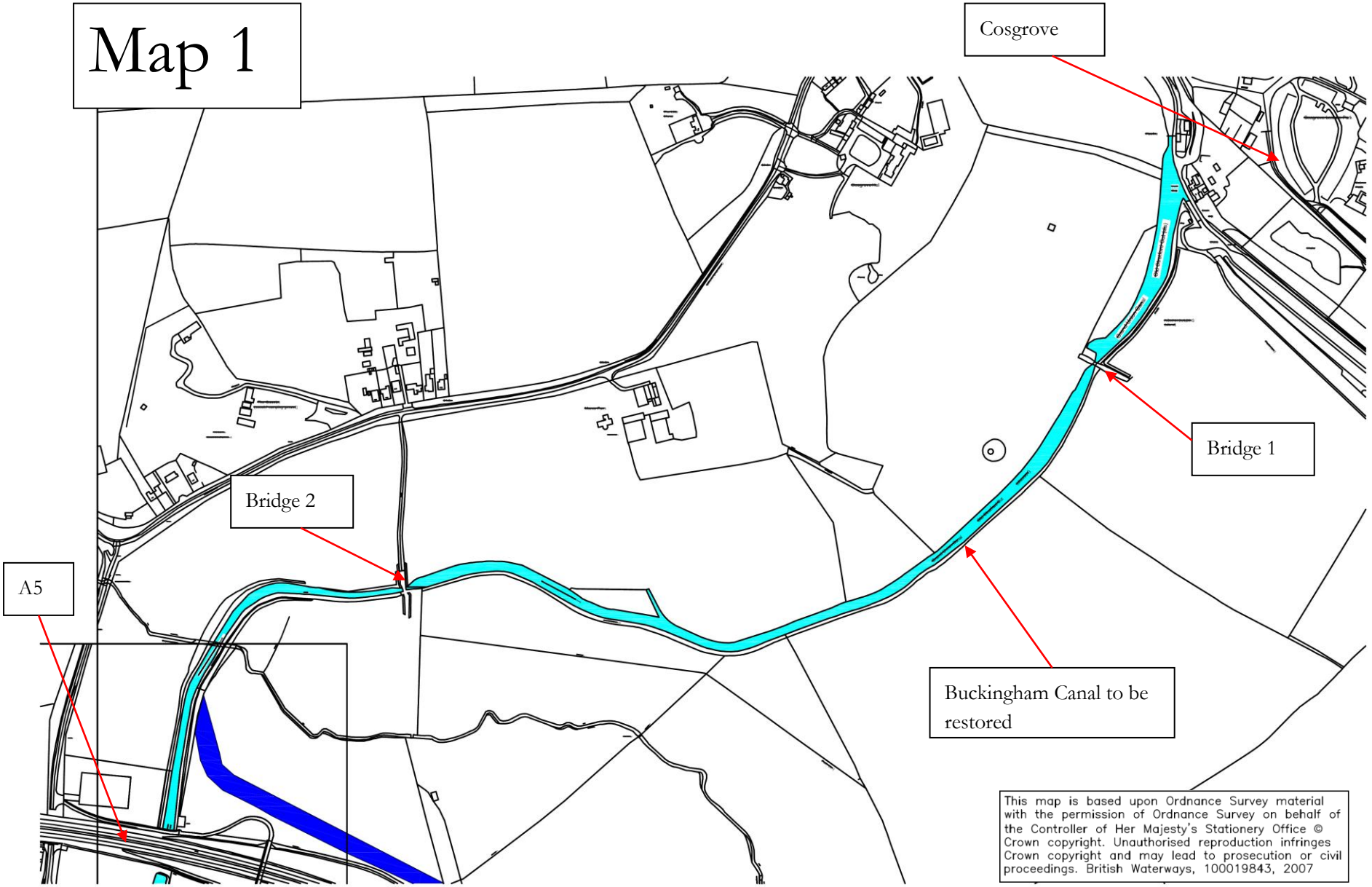
It is recommended that in the long term, the project promoters engage with these communities and work with them to develop options and designs and keep them fully informed as the project progresses.

An overall restoration plan should be developed with timescales from medium term work and also as funding becomes available, areas to concentrate on as key first bits of restoration should be identified.

Appendix A - Route Plans

The route plans that follow are indicative proposals.

Map 1


Cosgrove
Bridge 1
Bridge 2
A5
Buckingham Canal to be restored
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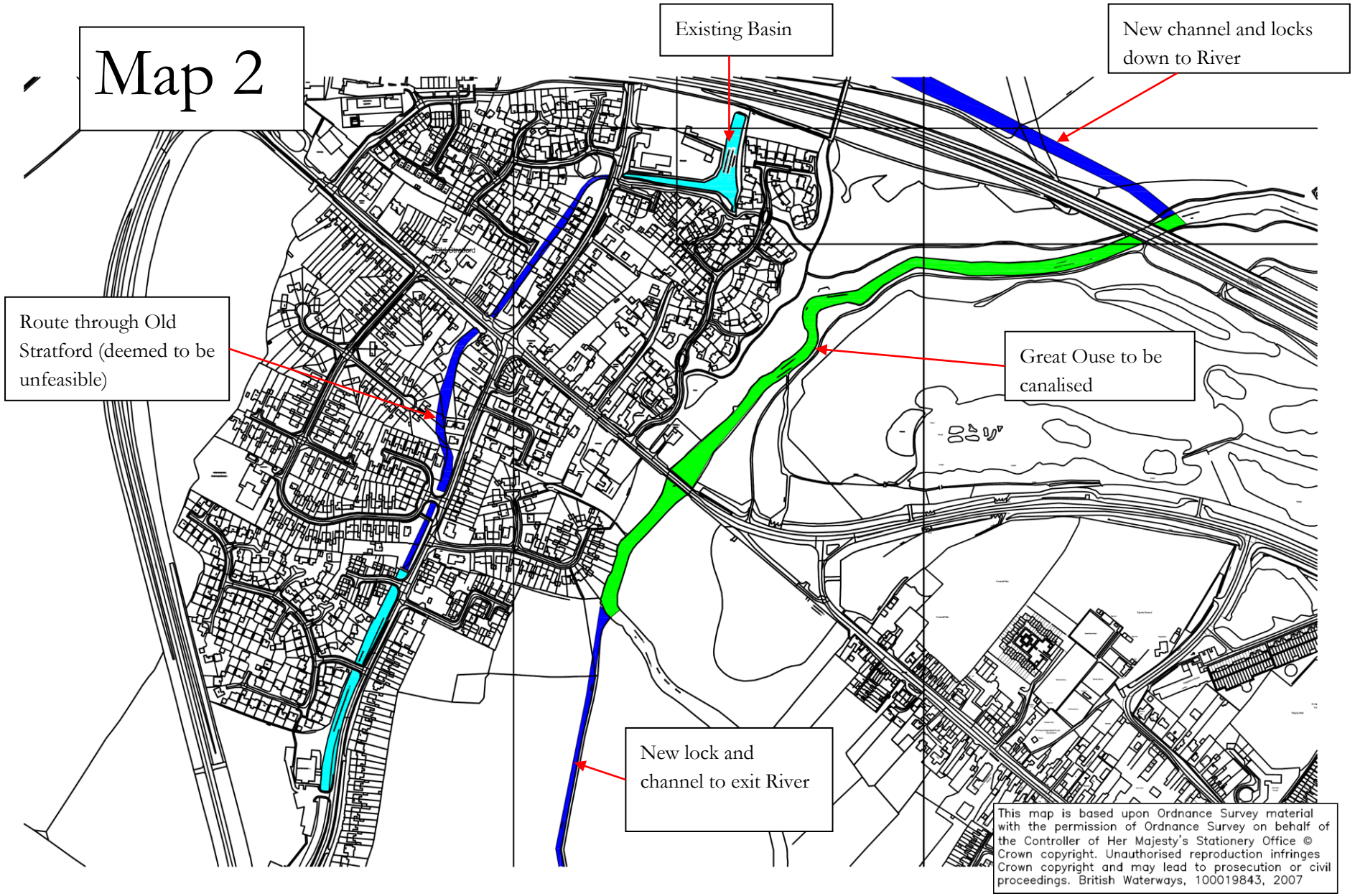
Map 2


Existing Basin
New channel and locks down to River
Route through Old Stratford (deemed to be unfeasible)
Great Ouse to be canalised
New lock and channel to exit River
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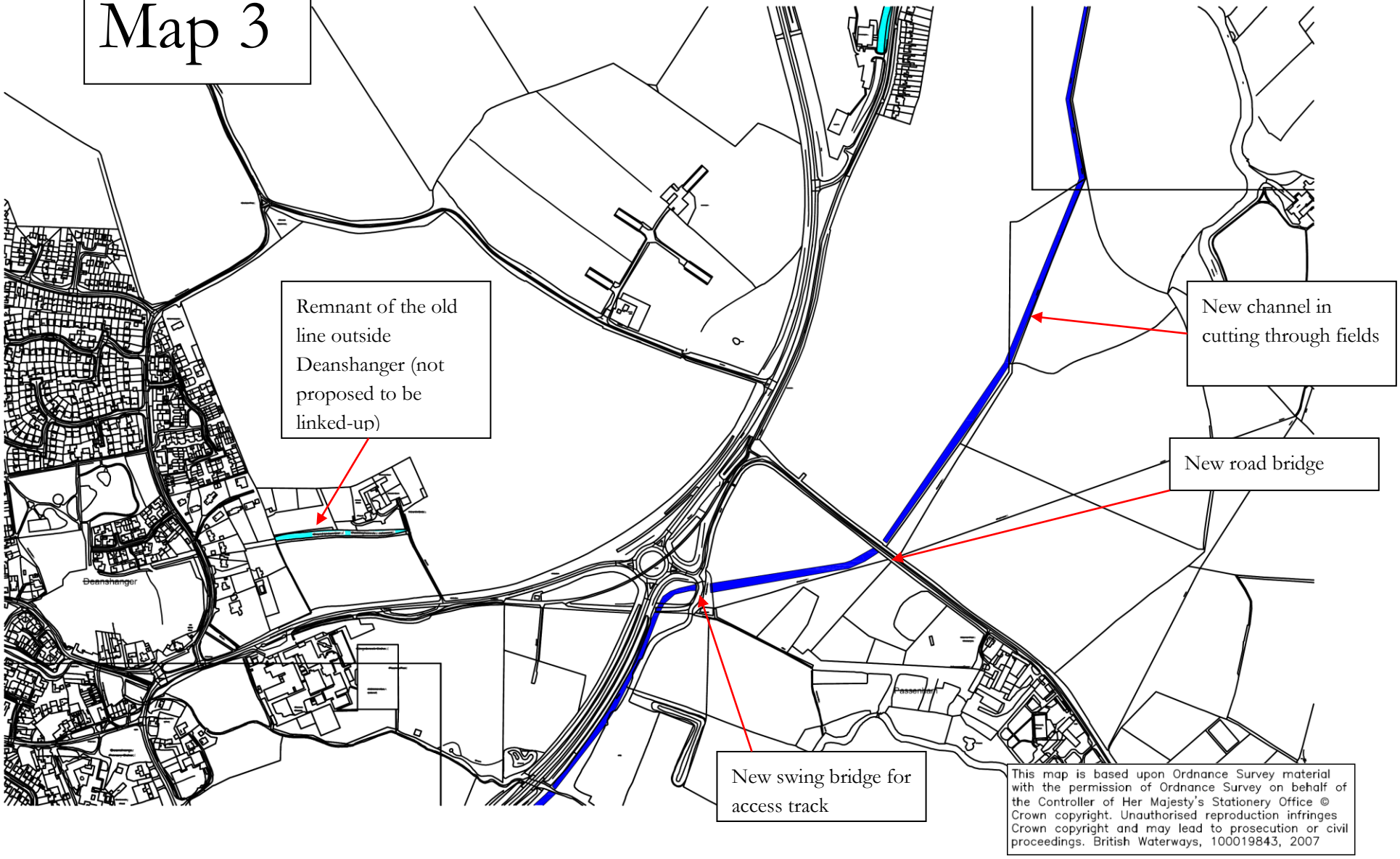
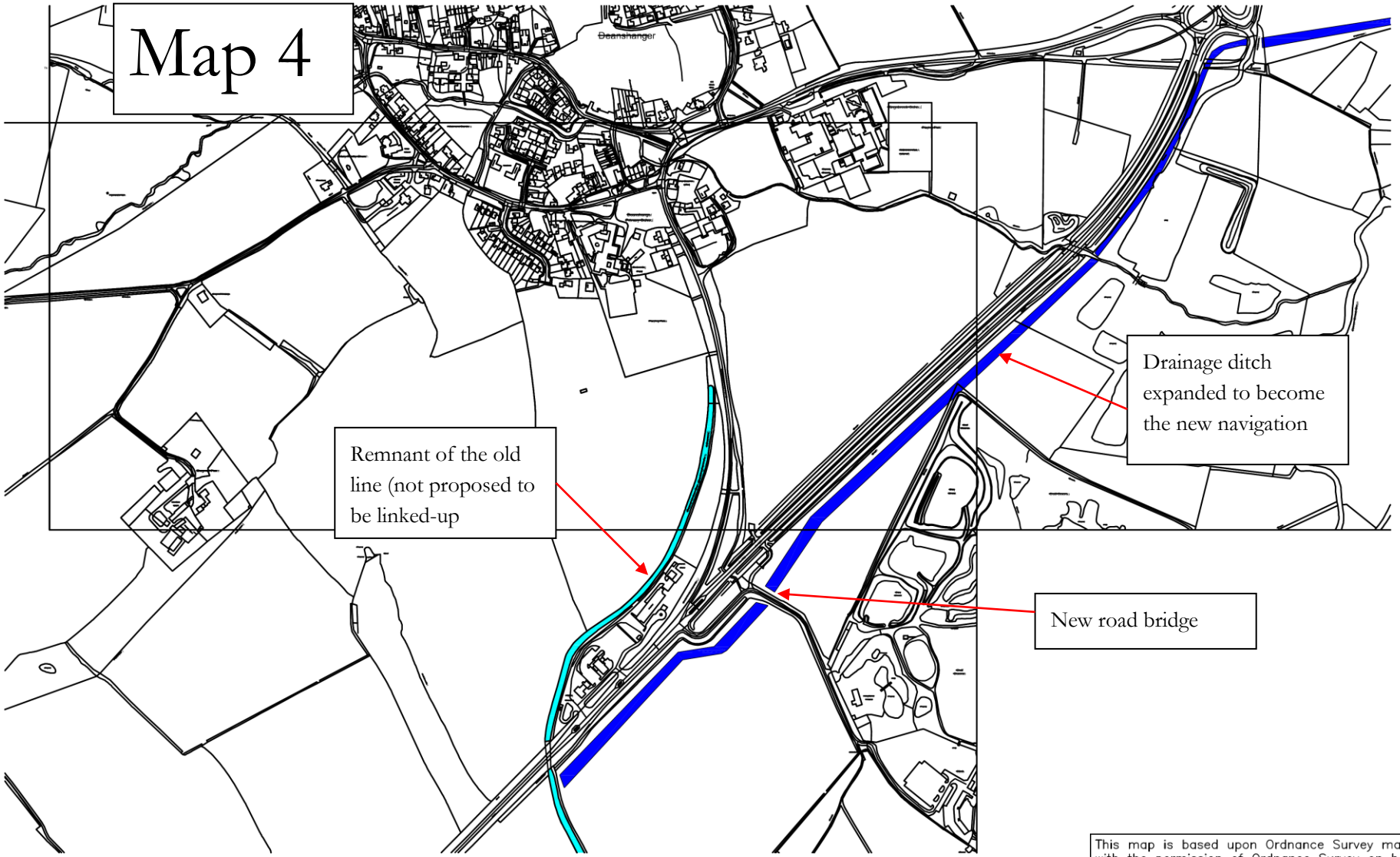
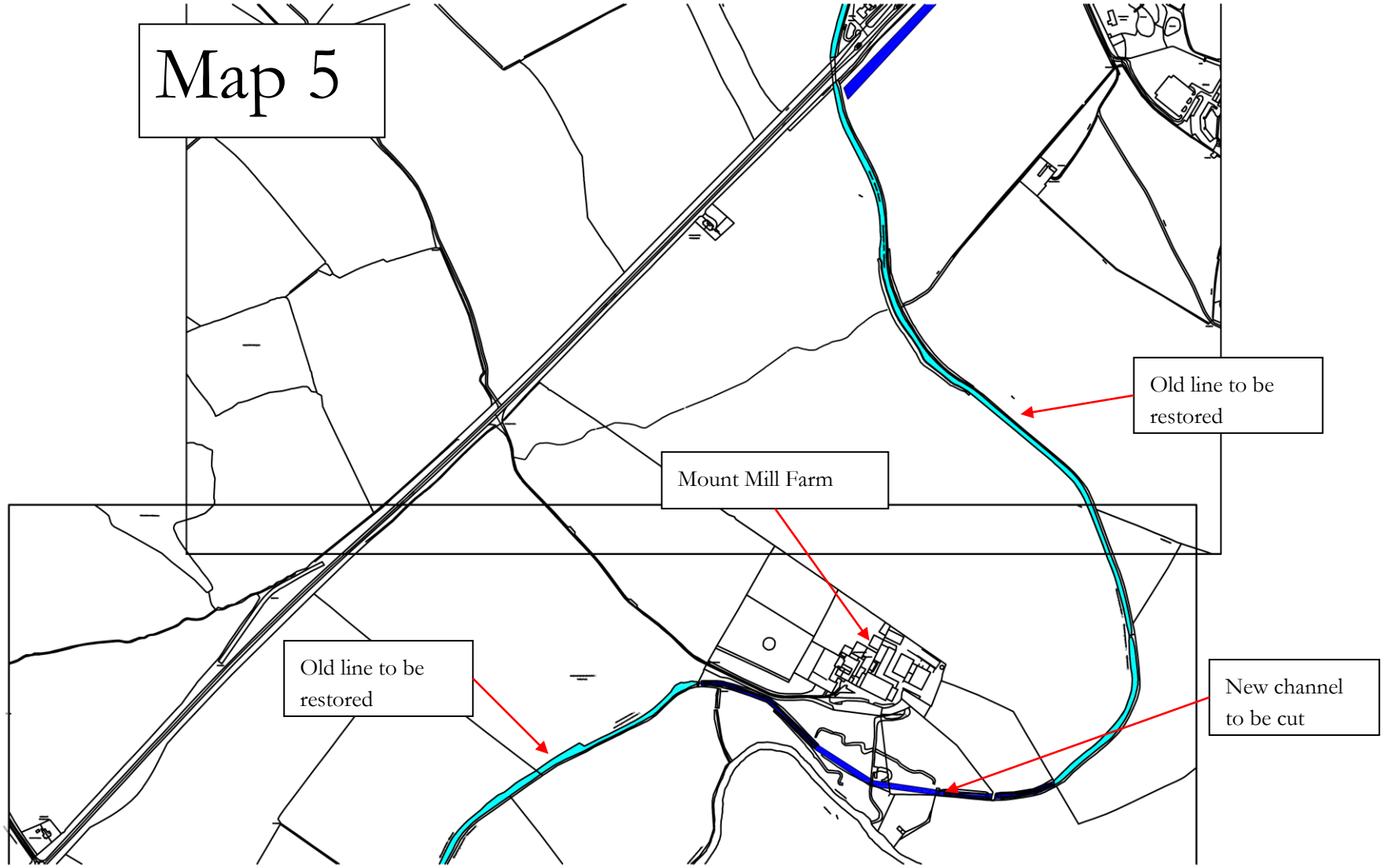
Map 3



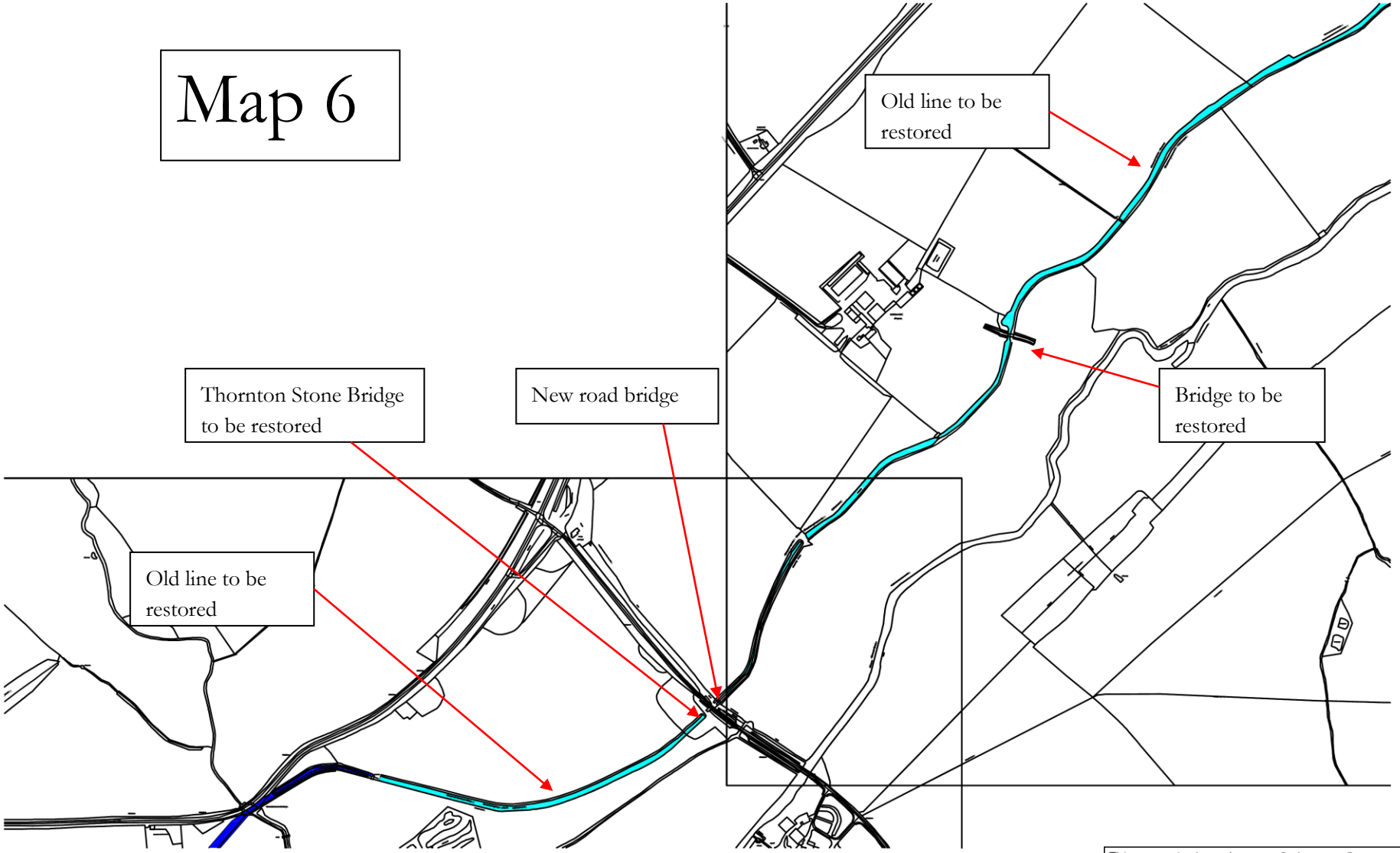
Map 4



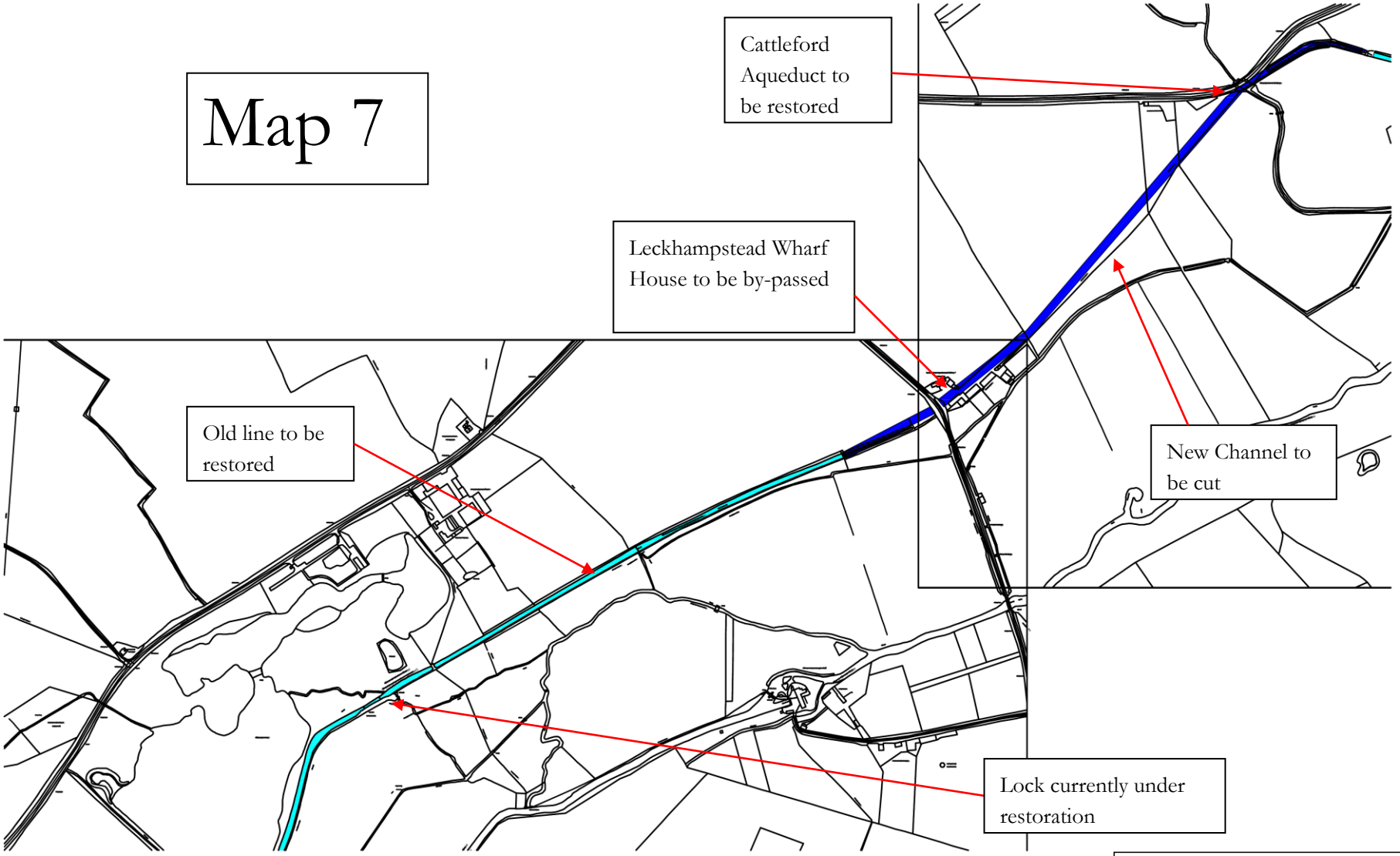
Map 5



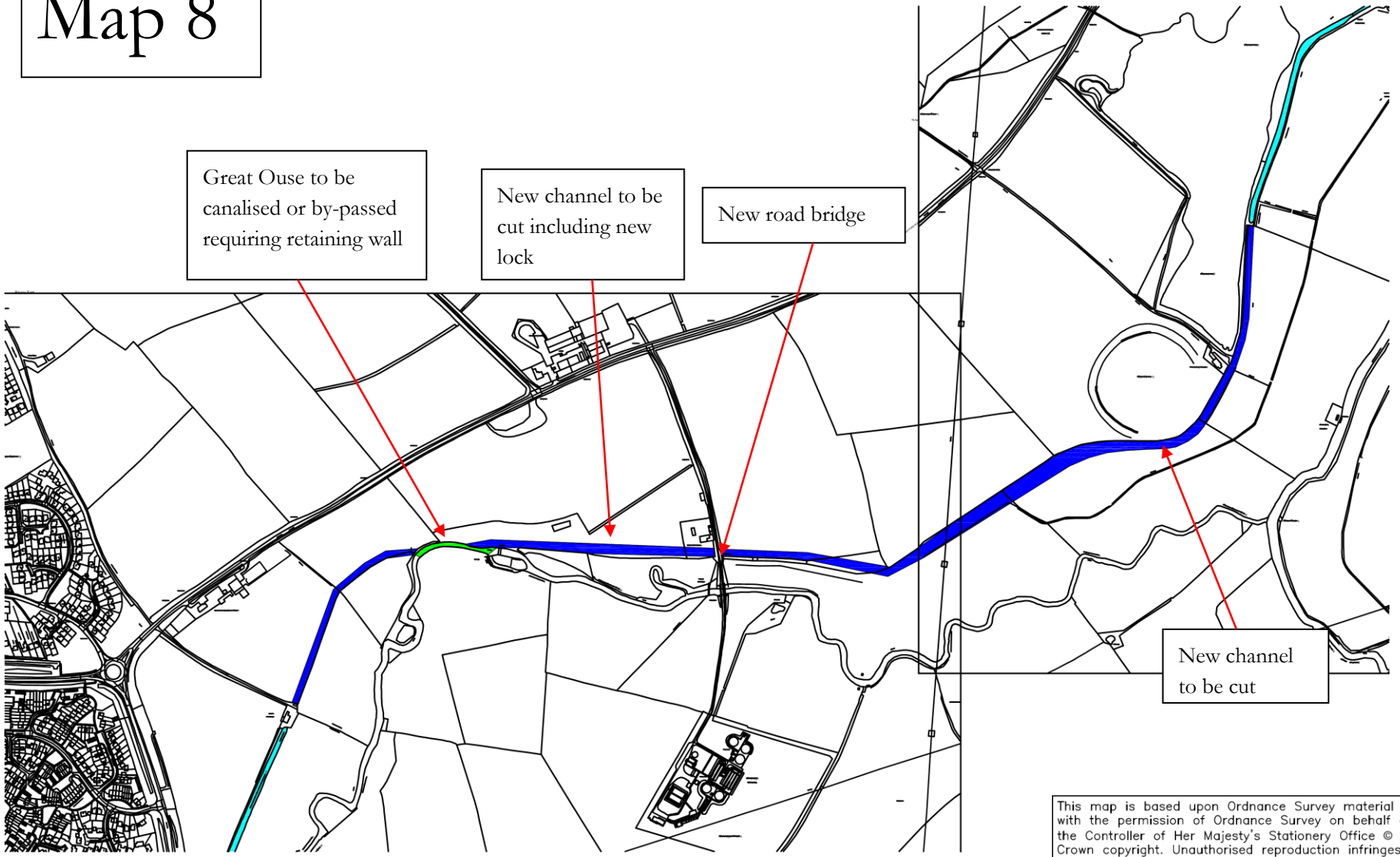
Map 6



Map 7



Map 8



Map 9