

Mutford Lock

Report by Chief Executive, Rivers Engineer, and Solicitor and Monitoring Officer

Summary: This report provides members with an update on the Harbour Revision Order for Mutford Lock and outlines the estimated annual and capital costs associated with owning and managing the asset. The report also provides a summary of the current usage and value of the lock as an asset to the Authority and local area.

The lock is typically used about 800 times per year for boats travelling between Oulton Broad and Lake Lothing. This is a charged service which generates around £10,000 income each year.

The cost of operating and maintaining the lock is between £30,000 and £40,000 per year, but the Authority also needs to be prepared to make adequate provision for substantial capital costs over the long term. Major repair to the lock walls is likely to be one of the most significant capital costs. Further work is needed to understand the repairs that are likely to be required, but it is thought that major work on the lock walls could cost in the region of £500,000 to £1,000,000.

The Navigation Committee is asked to consider this updating report and to reaffirm its support for the completion of the process to transfer ownership of the lock.

1 Background

- 1.1 Mutford Lock is the Broads second access to the North Sea, connecting Oulton Broad with Lake Lothing. Due to different tides in Lake Lothing and Oulton Broad, the lock structure has an unusual bi-directional design. It has two pairs of opposing gates at each end to allow for high water levels on either side of the lock.
- 1.2 The Lock was constructed in 1828 as part of a series of major works undertaken to create a new navigation route for traders from the North Sea to Norwich. This included opening Lake Lothing to the North Sea to provide a harbour and the construction of Mutford Lock to provide controlled navigational access onto Oulton Broad.
- 1.3 In the 1840s, the Norwich and Lowestoft Navigation assets including Mutford Lock were acquired by Samuel Morton Peto who developed the railway link into Lowestoft. The railway was later taken over by the Great Eastern Railway who also took on Lowestoft Harbour and the navigation company until WWII. After the war the Norwich and Lowestoft navigation (including

Mutford Lock) became a nationalised asset and, along with other railway owned docks, became the responsibility of the British Transport Docks Board.

- 1.4 The British Transport Docks Board was abolished by the Transport Act 1981 and docks including Lowestoft were privatised as Associated British Ports. Mutford Lock was not relevant to ABP's business and so ABP encouraged statutory Authorities to take it over, initially Suffolk County Council and subsequently Waveney District Council and the Broads Authority. The process of a Harbour Revision Order was therefore started to amend the port boundary and include the transfer of Mutford Lock to the Broads Authority.
- 1.5 The Harbour Revision Order (HRO) has not yet been completed but the Broads Authority has managed and maintained the Lock since the early 1990s. Since this time members of the Navigation Committee and Broads Authority Committee have received a number of reports on the progress of the HRO and other key aspects including the condition of the lock and its operation.
- 1.6 This report provides members with a further update on the progress of the HRO and gives a summary of the usage, value and potential financial liability associated with maintaining the lock into the future.

2 Harbour Revision Order

- 2.1 The matter of the HRO was considered by the Navigation Committee on 22 April 2010 when it considered a detailed report by the then Director of Waterways. On 14 May 2010 the Broads Authority resolved that the application for a HRO in liaison with Associated British Ports be authorised.
- 2.2 The legal documentation relating to the HRO has been undertaken, as with all associated documentation, by the Authority's external lawyers. A recent meeting with them has informed this section of the report.
- 2.3 The Marine Management Organisation (MMO) has competence over the HRO and has been extensively consulted over the draft. Within this process the need for two, connected HROs has been established. One relates to the transfer of land and the other relates to the transfer of jurisdiction. The two drafts are ready for submission to the MMO. This will trigger a statutory process which will include a number of steps including publicity by the MMO. There is a fee of £4,000 to pay for each HRO.
- 2.4 There is also a tripartite agreement prepared between Associated British Ports, Suffolk County Council and the Broads Authority. This agreement, which has not been formally exchanged pending approval of the HRO's, covers the formal transfer of land and matters such as easements, rights of way and indemnities.
- 2.5 The current operation of the lock reflects an agreement in 1992 which refers to the parties having reached certain understandings concerning the intended transfer of responsibility by Associated British Ports. It also confirmed the

establishment of the endowment fund originally in the sum of £156,000. The operation of the lock in the interim has been on the basis of a degree of goodwill and common purpose by the respective organisations.

3 Existing Level of Use

3.1 Mutford Lock provides access between Lake Lothing and the Broads waterways. It is the principal gateway from the North Sea to Oulton Broad and the Broads' Suffolk waterways. The key reasons craft use the lock is one of the following:

1. For users of the Broads waterways to access marinas in Lake Lothing for permanent and temporary moorings.
2. For users of the Broads waterways to access boatyards on Lake Lothing for maintenance.
3. For users of the Broads waterways with seagoing craft to enjoy trips to sea, avoiding the transit through the Port of Great Yarmouth and associated bridges and tidal currents.
4. For seagoing craft from abroad and other navigation areas to visit the Broads avoiding the transit through the Port of Great Yarmouth and associated bridges and tidal currents.

3.2 Typically each year there are around 800 passages through the Lock with the vast majority within high season between Easter and the end of October. As an indication of how the passage numbers relate to individual vessels, a review has been undertaken of passage data from April to December 2016 and this is summarised in Table 1.

Period	01/04/16 to 31/12/16
Total number of lock passages	705
No. of different vessels	368
No. of vessels that only make single passage (one way)	183 (<i>50% of vessels using the lock</i>)
No. of vessel making one return passage only	119 (<i>32% of vessels using the lock</i>)
No. of vessels making multiple return or single passages	66 (<i>18% of vessels using the lock</i>)
Max no passages for single vessel	22

Table 1: Passage data for April to December 2016

3.3 The 2016 data shows that during that period 368 individual vessels used Mutford Lock. To provide some context, this is around 3% of all private boats on the Broads making use of Mutford Lock.

4 Value of the Lock

- 4.1 Mutford Lock provides a physical access point for the Broads as outlined in 3.1. Passage through the Lock from Oulton Broad to Lake Lothing and the North Sea is a popular route for a variety of reasons, but predominantly Mutford Lock is the gateway from the Broads to Lake Lothing, with its well serviced sheltered marinas. In reverse the lock is a convenient gateway to the beauty and safe navigations of the Broads from Lake Lothing and further afield.
- 4.2 Mutford Lock is also a physical controllable barrier between the North Sea and the fresh water of Oulton Broad and the River Waveney valley. The lock gates are a major control for the water level and flows on Oulton Broad and the separation of saline and fresh water. The Broads Authority manages the lock for the purpose of providing navigational access, not as a tidal barrier. However it does provide this added value to the area and may be considered by the Environment Agency as a third party flood risk management asset.
- 4.3 Economically the lock directly generates an income to the Authority through a charge for passage through the lock. The current fee for a one-way passage is £13 which is collected by the lock operators and transferred to the Authority. Typically there are approximately 800 passages through the lock each year which generates an income of around £10,000. This income is currently transferred to the navigation reserve.
- 4.4 The operators of Mutford Lock also sell short visit tolls at Oulton Broad Yacht Station. Typically around 170 short visit tolls are sold at Oulton Broad Yacht Station each year and the vast majority of these are to boats which enter the Broads through the lock.
- 4.5 Included in the HRO is some adjacent land; this includes a length of quay on the edge of Oulton Broad, which is currently leased by the Authority to a river tours operator. The lease generates an annual income to the Authority of £2,000 and this is transferred to the Property earmarked reserve.
- 4.6 By providing direct navigational access between Lake Lothing and the Broads, Mutford Lock also supports a number of associated businesses and organisations that have grown up and established on Lake Lothing and Oulton Broad. These include a number of marinas, boatyards, contactors, trip boats and sailing clubs and some are heavily reliant on continued access through the lock.

5 Operation and Maintenance Costs

- 5.1 The operation of Mutford Lock is complex in comparison to typical locks found on other inland waterways. It is essentially a sea lock, it has a different tidal cycle at each end and the operation must be coordinated with the lifting of one or two bascule bridges. To manage the operation safely and avoid potential major impacts on Oulton Broad the lock is operated by a team of trained lock keepers and maintained by specialist contractors.

- 5.2 To operate and undertake general maintenance the Authority currently has to budget for an annual expenditure of £30,000 as shown in Table 2.

Operating agreement (service provided by Sentinel Leisure Trust)	£ 18,874
Hydraulic, Electrical & Mechanical Servicing	£ 5,000
Underwater checks and maintenance	£ 3,000
Maintenance consumables & minor repairs	£ 3,126
Total	£ 30,000

Table 2: Typical annual budget expenditure

- 5.3 A significant part of this cost is the fee paid to Sentinel Leisure Trust (SLT), a subsidiary of Waveney District Council, who operates the lock. As part of the operation SLT also operate the road and pedestrian bridges on behalf of Suffolk County Council. Suffolk County Council has entered a joint operating agreement with the Broads Authority and STL and pays an equal fee of £18,874. The apportioning of the total operating fee between the Broads Authority and Suffolk County Council is due to be reviewed in November, but no significant change is expected.
- 5.4 In addition to the general maintenance and operation of the lock, the Authority has an ongoing programme of repairs to restore and replace worn and degraded mechanical parts. At present the Authority has been working through a back log of mechanical repairs and there is a need to spend approximately £10,000 over the next four years to get all mechanical components in a good state of repair. This schedule of repairs for the next four years is outlined in Table 3.

Hydraulic Hoses - replace	£ 5,000
Capstan - Restore 4 no	£ 8,000
Racks Replacement - 6 no.	£ 12,000
Paving -Break out and repave settled areas	£ 5,000
Replace penstock drive couplers and re-align	£ 1,000
Replace hydraulic motors	£ 8,000
Replace motor covers	£ 1,000
Total	£ 40,000
<i>Equivalent annual cost over next 4 years</i>	<i>£ 10,000</i>

Table 3: Current 4 year programme of mechanical repairs

- 5.5 The tripartite agreement to be completed includes an indemnity by the Authority to Associated British Ports to keep the lock in good and substantial repair. Once the current repair programme is complete, it is estimated that an investment of £70,000 to £80,000 will be required over a 20 year period to keep all the mechanical components in a good state of repair. This will cover replacement and refurbishing of components such as those covered in Table

3, but also includes dredging, maintenance of the gates and overhaul of the hydraulic power units.

6 Future Capital Costs

- 6.1 Mutford Lock is approximately 200 years old. Almost every part of the lock over this period has been repaired or replaced over this time. The costs for the Authority to manage the lock will therefore include occasional larger capital sums to cover major repairs.
- 6.2 Managing the lock over the long term, the Authority can expect to face the cost of some significant capital works such as:
- Re-piling of the Oulton Broad quay
 - Replacement of penstocks
 - Re-piling the heavy steel sheet piling on the Lake Lothing approach
 - Major repairs or rebuilding of remaining masonry lock walls
 - Replacing the hydraulic power units
 - Re-paving the quaysides
 - Replacing the lock gates
- 6.3 The most significant costs are likely to be associated with any major repair or reconstruction of the lock walls. The central part of the lock chamber was rebuilt in 1964 following a collapse. This part of the lock chamber is in good condition, however the older masonry walls local to the lock gates are in poor condition in some areas and the stability of these masonry walls has not been fully determined.
- 6.4 Major repairs to the lock walls will require the lock to be de-watered and the lock walls to be stabilised to provide a safe environment to undertake work. De-watering the lock will require significant temporary works that is likely to be a large part of the cost of major repairs. Last year the Authority employed engineers Canham Consulting to investigate the basic design and likely costs of de-watering the lock. The Consultants reported an estimated cost of £400,000 to £500,000.
- 6.5 With a reasonable understanding how the lock could be de-watered, the next stage for the Authority is to investigate the likely scope, urgency and cost of repairs required on the lock walls. It is strongly recommended that the Authority appoint a suitable specialist consultant to do this. Major repairs and reconstruction of masonry locks is undertaken across England by the Canal and Rivers Trust with reported costs varying between £100,000 and £600,000. The Canal and Rivers Trust Projects do not directly compare to Mutford Lock but provide some indication of the cost of structural work within a stable environment.
- 6.6 To give members some perspective on likely costs of capital works, a summary of our current best estimates is included in Table 4 with an indication of timescales. Members should however note that these estimates,

particularly with regard to lock wall repairs need some further engineering consideration.

Element	Estimated cost	Timescale
River Tours Quay (35m)	£ 52,500	Required now (following HRO)
Penstocks	£ 64,000	30 years (if 4 year maintenance plan is implemented)
Steel sheet piling (25m)	£150,000	20 years
De-Watering	£ 500,000	Unknown
Masonry walls inc. gate quoins - repair or rebuild	£100,000 - £500,000	
Hydraulics	£ 70,000	30 years
Paving	£ 10,000	20 years
Lock Gates	£ 320,000	40 years

Table 4: Summary of likely capital costs

- 6.7 The Authority has an earmarked reserve fund for maintenance of Mutford Lock which forms part of the Property Reserve. The potential requirement for significant structural repairs to the lock has always been known and so the Authority has made annual contributions of £27,000 to build up the reserve fund. The current value of the reserve fund (as of August 2017) is £315,949 (specific to Mutford Lock).

7 Financial Implications

- 7.1 In terms of revenue costs the Lock attracts an income of approximately £10,000 per annum and running costs are in the order of £30-40,000 per year.
- 7.2 As members can see from the table of capital costs shown above under the worst case scenario the repair costs could amount to £1.67 million over 40 years, equivalent to c £42,000 per annum contribution to the Property Reserve which is £15,000 per annum above the current provision of £27,000.

8 Risk Analysis

- 8.1 Mutford Lock is an historic piece of engineering. It will require ongoing expenditure to meet the Authority's proposed obligations to keep it in good and substantial repair. As evidenced by the establishment of the endowment fund, much of the routine maintenance had been envisaged from the outset of the proposals. It also seems to be well-established and anticipated that there will always be a shortfall between the annual operation costs and the income generated from users of the lock. The main risk is outlined in paragraph 6.6, which relates to major capital expenditure, especially the relatively uncertain timing of any repairs to masonry.

Background papers:	None
Author:	Tom Hunter, David Harris
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Broads Plan Objectives:	4.1
Appendices:	None