

Waterways Specification Update, Irstead
Report by Environment and Design Supervisor

Summary: This report summarises the technical and regulatory feasibility of deepening the channel of the River Ant at Irstead Shoals to meet the Waterways Specification of 1.8 m. This would involve dredging the natural river bed rather than the normal removal of deposited sediment, would therefore be classed as capital dredging with a different suite of regulatory controls to satisfy.

The cost of deepening the channel would be in the order of £60,000 and yet the number of boats affected is very small and the number of times of the year when it is an issue is small.

The Committee is asked for its view as to whether the deepening of this stretch of river should be pursued and its relative priority so that this can be taken into account when officers are compiling the 2017/18 dredging programme, which will be brought to the October meeting for consultation.

1 Introduction

- 1.1 At its meeting on 10 December 2015, the Navigation Committee Members agreed the proposed revision to waterways specification depths in respect of the River Chet at Pye's Mill and the River Bure at Coltishall, but not to the River Ant at Irstead. In relation to the River Ant members requested further detailed information about the implications of dredging a deeper central section, consents and associated costs to be presented in a report at a future meeting with a view to considering a modified specification, the budget implications, and whether to bring forward such dredging work in due course. This report sets out to provide this requested information.
- 1.2 Removing sand and gravel river bed material at Irstead Shoals would be classed as a capital dredging activity because of the removal of consolidated bed material and the deepening of the channel below that which the river would create for itself under the current hydrological conditions. Under the Authority's Sediment Management Strategy such work is outside the strategic aims of only removing accumulated unconsolidated riverine sediments. Although such deepening is permitted under the Broads Act, this does not absolve the Broads Authority from requiring other permits and permissions relating to capital dredging.

- 1.3 Irstead Shoals is a 350 m stretch of river that passes in front of the houses at Irstead. As the name suggests the stretch has traditionally been a shallower stretch of the River Ant, with a relatively hard bottom of sandy clay, some gravel and sand. The river width at this point is also relatively constrained, with quay heading and moored boats on the true right bank and a vegetated bank on the left. The narrowest parts of this section are approximately 14 m wide.
- 1.4 Given the volume of boat traffic passing between How Hill and Barton Broad, the Shoals is the main pinch point for passing vessels, particularly sailing boats and novice motor boat hirers. Vessels of all types are frequently required to use the full width of the river in this stretch.
- 1.5 Complaints and reports of boat keels touching the hard bottom through Irstead Shoals range from those forced into the shallower margin areas when passing; River Cruiser class boats grounding in the centre of the channel; and other large vessels dragging through the shallower spots. All these issues are more noticeable at lower water levels. The hard sand and gravel bottom also makes for an unpleasant sound and generates a more physical impact compared to dragging the hull through softer silts in other shallow margins or shoals.

2 Dredging Requirement to Achieve Waterways Specification at Irstead Shoals

- 2.1 The Broads Authority's Sediment Management Strategy (2007) outlines the generic ideal navigation envelope for the Broads. This includes a waterway specification depth developed through consultation with key users. The generic navigation envelope for the River Ant is shown below in Figure 1, with a 1.8 m depth aimed for in this stretch of the River Ant.

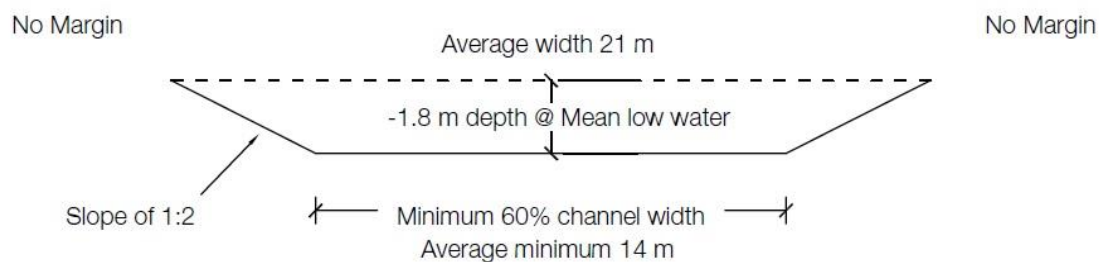
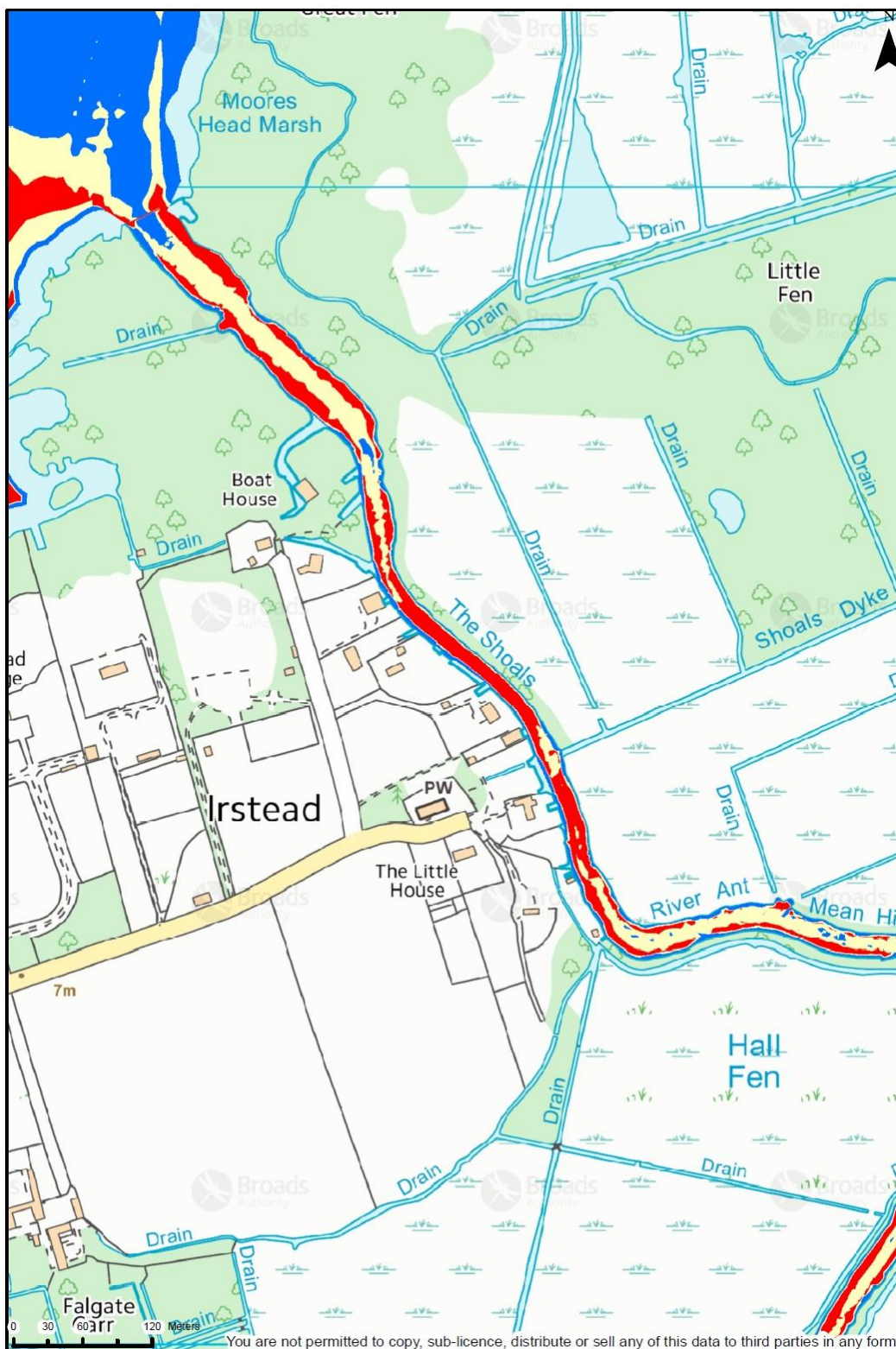


Figure 1: Navigation envelope for River Ant (Barton to Ant Mouth)

- 2.2 As per the Strategy, it is important to maintain a margin where river width allows, ensuring that banks are not undercut and allow for reeded edges to develop, proving a good buffer against erosion. However, the full depth specification should be achieved for a minimum of two thirds of the river width.
- 2.3 River width and volume of boat traffic through Irstead Shoals is insufficient to retain much of a margin. Along the true right bank, the adjacent properties have quay headed frontages. On the left bank is a natural vegetation fringe.

Figure 2 – Map of the River Ant in the areas of Irstead Shoals showing deviation from Waterways Specification depth of 1.8 m



- 2.4 Current water depths in the centre of the channel at mean low water level vary from 1.5 m down to 1.25 m in the shallowest spots. It should be noted that the mean low water level used for setting the baseline of Waterways Specification depths is a very conservative measure of water levels. It is calculated as the lowest 5th percentile point in the range of water levels over several years of data. The average or typical water levels through the year are therefore higher, making passage through the Shoals usually unproblematic. See the map in Appendix 1 for spot depths and depth contours through Irstead Shoals at mean low water. Figure 2 shows the area currently above Waterways Specification depth. Red areas are greater than 30 cm below specification depth and beige areas are between 1 – 30 cm below specification depth. Blue areas are at or above specification depth.
- 2.5 The nature of the substrate below the river bed in this section is such that there are pockets of free running sand among the consolidated sandy clay. This has led to complaints from one resident that previous dredging close to their quay heading caused slumping and measurable movement in their quay heading. For this reason, dredging in 2013 gave a greater margin on the right bank through the downstream end of the Shoals to preserve the structural integrity of the quay heading.
- 2.6 The calculated volume for dredging requirement to reach Waterways Specifications in the Irstead Shoals section is 3,400 m³. This is the first time the dredge requirement has been calculated for the Shoals in isolation, as the whole stretch between Barton Broad and Ludham Bridge has only been reported previously. The nearest available set-back areas for sediment re-use are between How Hill and Ludham Bridge.

3 Process for Gaining Permissions for Capital Dredging

- 3.1 The registered landowner of the bed of the river at Irstead is the Crown Estate and capital dredging would require their consent. The registered owner therefore has rights over the natural substrate removed during a capital dredge operation. Previous discussion with local agents of the Crown Estate indicate that the landowner would be keen to be party to a share of income that may be charged to the beneficiary of the enhanced access created; and to a share of the value of any material dredged where subsequently used beneficially. Income from the benefits of enhanced access is not a specific monetary valuation the Authority has ever calculated or an income that the Authority actually directly receives from individual navigational access projects. The income from tolls is for boat access to the whole system, rather than at specific locations. Similarly, the monetary value of re-used dredge arisings has typically been absorbed in overall project benefits, rather than marketed and given specific cash value. Determining whether the Authority would recompense the landowner in this situation is a mechanism that is as yet untested.
- 3.2 The regulator for dredging activity in the Marine Area in England is the Marine Management Organisation (MMO), which consents such activities through the Marine Licensing process. Capital dredging requires a Marine Licence and the Broads Authority is not exempt, even as a Harbour Authority, as the

dredging activity must have occurred at the site in question and be to a depth previously dredged within the last 10 years. Whilst dredging has occurred at Irstead Shoals in the period, dredge depths of no greater than those currently present have ever been achieved.

- 3.3 The Water Framework Directive (WFD) requires all waterbodies to attain good ecological status (or potential) and that any deterioration in the status is prevented. Any new development must ensure that these fundamental requirements of the Directive are not compromised. It is the responsibility of the operator proposing any works in the waterbody to produce a detailed WFD Compliance Assessment report, which includes a baseline assessment summarising the current status of the waterbody. The compliance assessment evaluates whether the proposed works will affect the quality elements and overall WFD status. Where necessary, mitigation measures will be recommended.
- 3.4 The overall classification of this heavily modified waterbody is “moderate” (as of 2015), with a target to reach “good” potential by 2027. The specific quality elements that currently hold this waterbody to a “moderate” potential are its invertebrate community and the Mitigation Measures Assessment. The latter is the report that identifies the mitigation measures necessary to ensure the hydromorphological characteristics of a water body are consistent with Good or Maximum Ecological Potential; and assessing whether those measures have been taken. Capital dredging by the Authority would need to demonstrate how the work would impact the hydromorphology of the river, such as alteration of the sediment regime; the substrate conditions; the interaction between surface and ground water; and water flow dynamics. There would also need to be an assessment of how this work would affect ecology, such as fisheries (spawning habitat) and invertebrates.
- 3.5 The section of river at Irstead Shoals is not within a SSSI or site of European conservation importance (Natura 2000 site). However, the river at the first bend downstream of Irstead village is within the Ant Broads & Marshes, Broads Special Area of Conservation (SAC) and the Broadland Special Protection Area SPA). As such, given the proximity of less than 500 metres and the upstream location of the Shoals, the Habitat Risk Assessment process would need to be carried out, as each Natura 2000 site has a 500 m development boundary wherein direct impacts could be felt. Usually, the Habitat Risk Assessment process would not be required for routine dredging work, as Natural England have previously assented works carried out in accordance with the Authority’s Sediment Management Strategy. As capital dredging is outside the scope of the Sediment Management Strategy then the Habitat Risk Assessment process would be required.

4 Costs and Staff Resource to Complete Capital Dredge

- 4.1 Table 1 gives a breakdown of predicted dredge project costs for dredging Irstead Shoals to the 1.8 m Waterways Specification. All internal staff costs and plant rates are based on the latest 2015/16 updated figures. Other expenditure is based on most up to date quotes or prices.

4.2 Costs for application for a Marine Licence are based on an hourly rate for MMO staff time, as these licence applications don't have a fixed rate. For this scale of project a minimum £1,000 charge is budgeted, but could be up to £5,000. The time for Environment Officers to complete the various environmental and ecological assessments is the minimum based on the information gathered for a desk study only. No provision is made in Table 1 for more extensive habitat or physical assessments along the River Ant or longer term monitoring. There is a moderate likelihood of EA and/or NE requiring this, which would add up to another ten days of their time to the total. The assessment work for Environment Officers could be absorbed into the team workload, given sufficient advance notice, though would proportionally reduce input to their other navigation based work, such as the preparation for other dredge jobs or planning winter tree clearance work.

Table 1 – breakdown of predicted dredge project costs

Project element	Resource	Work days required	Cost
Project planning & consenting	Rivers Engineer – project planning, site file preparation, and management	10 days	£2,450
	Environment Officer – ecological assessments; consent applications; sediment sampling	10 days (assuming no long term studies required)	£2,450
	Sediment quality analysis		£450
	MMO Marine Licence		MMO staff rate @ £84/hr, up to £5,000.
Construction Team (mobilisation; site preparation; dredging; sediment transport; demobilisation)	5 x Operations Technicians; 3 x wherries; 1 x pontoon mounted excavator; 1 x excavator	5 day set up; 7 week dredging; 5 days site restoration	£54,150
	Internal costs		£59,500
	External costs		£450 plus MMO charge
Total Project cost range			£61K to £67.5K

4.3 The predicted duration of 35 days for the Construction Team dredging is based on a conservative estimate of progress dredging hard consolidated sediment. Previous experience in the area is that the normal clam shell buckets are not entirely effective at removing this material. A pontoon mounted hydraulic excavator is therefore required, with a digging bucket or clam shell bucket with digging teeth.

4.4 The cost per cubic metre for this proposed work would be in the range £17.94 to £19.85. The average figure for river dredging in 2015/16 was £12.64.

5 Routine Navigation Management Actions

5.1 The recommendations presented in section 2.3.7, in the report to December 2015 Navigation Committee are still valid and progress has been made towards them. The more detailed depth chart in Appendix 1 is now publically available on the Authority website in the [Water Depth and Navigation Notes page](#) for the River Ant.

5.2 As experienced in 2013, the routine maintenance dredging operation can effectively remove accumulated silts and achieve water depths to the hard bed. The frequency of return for maintenance dredging to Irstead Shoals is not a set fixture in the dredging forward programme, but could be looked at when plant and equipment are on the River Ant upstream of Ludham Bridge. Aiming to achieve a revised Waterways Specification depth of 1.5 m at mean low water levels is achievable through our routine maintenance dredging activities.

5.3 Clearing back of the riverside trees on the left bank is a regular feature of the Ranger team work programme. Several householders on the right bank were encouraged over last winter to take back some of the tree growth extending out from their properties.

5.4 The reeds that encroach from the left bank out towards the channel have also been removed this summer with the weed harvester. This action will help maintain clear river width for passing boats

5.5 Provision of signage to indicate water depth at the Shoals is also suggested, in a similar manner to those indicating available air draughts for bridges at varying water levels. This would forewarn those boaters who may have an issue with deeper keels as to the water draught across the Shoals, at the particular tidal or seasonal water level.

5.6 The level of complaints has been low for this area and the water depth issues outlined in this report, with perhaps only two or three direct reports in the last three years. However, those who have experienced difficulty have found passage through the Shoals at best unnerving and have not felt it a safe area.

Background papers: [Waterways Specification Revisions, Navigation Committee, 10 December 2015](#)
[Minutes of the Navigation Committee, 10 December 2015](#)

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Broads Plan Objectives: NA1.1

Appendices: Map 1 - Irstead Shoals water depths at mean low water

Appendix 1 - Irstead Shoals water depths at mean low water

