Report for Consideration by Natural England and the Regulators

Wightlink Propulsion Units on Lymington – Yarmouth Ferries

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Summary

The Voith-Schneider propulsion units "thrusters" on the C-Class ferries have had a major effect on the Lymington River bed and channel. The thrusters on the W-Class ferries, which have the potential to be an order of magnitude more damaging than the C-Class ones, will re-circulate the water column across the river in less than one minute, in strong crosswinds when the tide is low. The mean water velocity from the thrusters is ten times the shear strength of mud sediments. For these reasons the W-class thrusters will probably be the most significant ferry contributor to damage to the river sediments. A work programme to investigate the environmental impact of the thrusters must be completed before any regulatory decisions on the environmental acceptability of the W-Class ferries is made.

2 January 2010

Background

1 It first became evident that Wightlink intended to introduce much larger vessels on the Lymington – Yarmouth route during the latter part of 2007. For unknown reasons this was disregarded by all of the organisations who Wightlink claimed to have consulted at that time. The Lymington River Association (LRA) was formed at that time as result of the failures in the local community to seek satisfactory assessments of any of the potential impacts of the new design.

2 It was recognised that the propulsion arrangements on both the C and W-Class vessels to allow them to navigate in the shallow Lymington River had the potential to damage the river channel and its adjacent banks. These "thrusters" are Voith-Schneider propulsion units – there is no conventional propeller or rudder. There are two very large units and Figure 1 shows a unit which is of very similar size to that on the W-Class ferry, the blades are 1.35m long and 2.1m in diameter. The thrusters push a large flow of water from one side of the unit to the other – the propulsion flow, really a big and high velocity jet of water. The existing ferries have similar but significantly smaller units (see Figure 2). Wightlink have found it necessary to increase the power output of their engines from 800hp to over 2360hp, nearly 3 times as much[1]. Simple analysis of the effect of strong (Force 8-9) winds on the side of both ferry designs indicates that the designers recognised that this power was required to maintain the W-Class vessel in the river channel when its speed through the water would be constrained. This concern was identified by the LRA at a public meeting arranged by the Lymington Society in late 2007. Unfortunately these concerns have not yet been addressed by any of the "stakeholder" or regulatory organisations involved with Wightlink or the W-Class vessels.

3 Wightlink's navigational consultants ELP[2] have drawn attention to a number of serious effects with the new ferry hull design which they suggest will require the ferries to travel very slowly in the river to limit the damage to the banks and to reduce the hazard to passing craft.

4 HR Wallingford, in 1991[3] (commissioned by LHC) has recognised that larger ferries will have very significant effects on the river channel. They also recognised in 2009[4] (commissioned by Natural England), that the thrusters will make an (unassessed) contribution, see Appendix 2.

5 The Lymington River Association has offered advice (see Appendix 1) to the Lymington Harbour Commissioners and to Natural England that detailed investigation of the effect of the thrusters on the river banks and channel must be carried out; otherwise any assessment of the environmental impact of the ferries will be significantly incomplete. The recent HRW study (ref.4) was a limited paper study (Appendix 2).

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[1] http://www.lymingtonriver.co.uk/Ferry%20Dimensions%202.0.pdf
[2] ELP ReportELP-55272-1206-57219-Rev 1
[3] HR Wallingford Report EX 2390, July 1991, Proposed new tonnage Lymington/Yarmouth Ferry – Mud Erosion in Lymington River
[4] HR Wallingford Report EX 5937, Jan 2009, Wightlink Ferries, Lymington – Shoreline Management & Geomorphological advice to Natural England

Effect of Thrusters

6 The overall position is that:

6.1 The safety studies undertaken on behalf of LHC by BMT Seatech[5] only made limited measurements of mean surface water flows which are of no relevance to the water flows on the river bed and banks. Apparently "safety" considerations led to it not being possible to make any measurements which would be valid for strong wind conditions in the river. The ferry was tied up to the pier wall, but no attempt is made to determine whether the close presence of the wall affects the thruster flow. Moreover they time averaged the data over 30seconds, which would ensure that the turbulent flows which would be expected to damage the channel banks (and cause safety problems) were largely avoided. Notwithstanding this it is apparent that the measurements carried out were significantly limited by the severe turbulence which they avoided measuring.

6.2 The W-Class ferries operate in the River using their bow thruster for propulsion and the aft one at low thrust for steering only, since it was accepted by Wightlink that the wash from the stern thruster at propulsion power would be unacceptable (i.e. dangerous to other river users). The result of this is that all of the propulsion flow is forced under the ferry and along the river bed and banks (out of sight and out of mind!) This probably explains the very obvious impact on river sediment and weed (Figure 3).

6.3 Wightlink have had model tests and fluid dynamics calculations (referred to in a presentation at a Saltmarshes Conference and in the ABPmer Report[6]) which are relevant to the performance of the ferries and their thrusters in the river, but Wightlink refused to release these despite a request through the LHC.

6.4 On the C-Class ferries (in Force 9 crosswind), each thruster will be moving about 7.4te/s of water at a mean speed of about 5.2m/s across the channel and its banks; on the W-Class, the figures for each thruster are 15.6te/s at 5.8m/s. This must be seen in the context that flows as low as 0.5m/s (1kt) will disrupt soft sediments[3]. The situation is considerably worse for the W-Class vessels as far as the river bed and banks are concerned, as the thrusters are positioned at the full depth of the vessel (Fig. 2), therefore much of the energy is dissipated adjacent to the surface of the sediments, particularly below half tide. On the C-Class much of the thruster energy is dissipated on the surface, due to their shallower position and location towards the side of the hull (this difference is very evident to an observer). The extent to which any deepening and widening of the channel will impact on the integrity of the environmentally sensitive areas above mean low water spring level has regrettably not been considered by any of the assessments which have been carried out. For the W-Class ferries in strong wind conditions, the flow of the water column across the river channel, re-circulated by the thrusters, will take as little as

[5] BMT Seatech Ferry Operations at Lymington: the W-Class Ferries, C13537.01.R01.V7, May 2009

[6] ABPmer Wightlink – Replacement Lymington – Yarmouth Ferries: Information for Appropriate Assessment R/3772/1 May 2008

30-60 seconds. There is therefore good reason to believe that the dominant source of damage to the river bed and channel banks is due to the thrusters.

6.5 In the absence of any measurements of water velocities and sedimentation in the river and any assessment of the streamline and turbulent flows from the thrusters, Appendix 3 semi-quantitatively highlights the major differences between the two ferry designs. It concludes that the W-Class ferries are capable of putting an order of magnitude more energy into the river bed and banks that the C-Class vessels. If this was in a rock channel, the effects would probably be negligible; in a mud sediment channel is it likely to be considerable.

6.6 Before the introduction of the C-Class ferries, the natural depth of the channel was about 2.5 metres below Chart Datum and the bottom was mud, the thrusters have cut through these levels over years and exposed the gravel that would otherwise be under the mud[7], the gravel is barren (it is now over 4.5m in Short Reach). Prof Carl Amos (private communication) shows that naturally the river would accrete; the effect of the thrusters is to keep the whole water column in suspension so that there is no "accommodation space" and nothing falls out. The erosion of the whole system is a result of the pumping action from the ferry thrusters. Until scientifically sound studies are undertaken, it must be assumed that the thrusters on the W-Class ferries will accumulate substantial damage to the river channel, which will be expected to spread out onto the surrounding banks due to the proximity of deeper water.

Ferry Speed and Thrusters Damage to the River

7 Wightlink, with the support of their consultants, ABPmer and using a statement from the LHC Chief Executive and Harbourmaster have argued that the C-Class vessels travelled at 8kt in the river. This does not concur with the knowledge of any regular river users, a previous Senior C-Class Ferry Master and the previous Harbourmaster. Notwithstanding that, they argue that the effects (on wash and drawdown – the surface effects which can be seen and which cross the shallow banks) of the W-Class ferries at 6 kt will be no worse than the C-class at 8kt. The reality is that the historic speeds of the C-Class ferries are typically very similar to those of the W-Class ferries.

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[7] Effect of C-Class Ferries on Lymington River Dredging
The following is taken from Jean Chitty's "The River is within Us" published in 1983, pp 66-8

Mr. P. W. Penny, Manager of Sealink ferries, gave me an account of the present day running of the ferry service and its future prospects, when I visited him in his office on 9th June 1981. The extract below describes the introduction of the C-Class ferries (Caedmon from the Portsmouth service replaced Freshwater in 1980).
"We have got three ships on this service, which is a combined passenger and car ferry service. The Cenwulf and the Cenred are sister ships and are absolutely identical and there is also the smaller Freshwater. They all have this Swiss Voith Schneider propulsion, with a unique type of propeller which can be feathered as in an aircraft. There is one propeller at each end and you can literally run the ship round on the spot and also crab her sideways. So these are ideal for this type of work in the river. which is very restricted and where there are many yachts. Another advantage is that in the river, where there is a lot of silting, the propellers skim and scour the bottom. Whereas before 1965 we had to have a regular dredging programme every four or five years, we have not needed to dredge since then."

8 As Appendix 4 demonstrates, once the thrusters are taken into account, this 6 versus 8kt comparison will no longer offer an apparent amelioration for the W-Class ferries. This will be particularly relevant when the ferries are operating in their highest power (and most damaging) mode, such as in strong crosswinds when the thrust jets of water and turbulence impinge directly on the banks of the channel and across the mud flats. Essentially this is because, the slower the ferry goes, the more it must rely on its thrusters to remain in the navigable channel and the greater the power that must be exerted for a longer period, creating complex and rapid water flows outside its track. The conclusion of this is that, the longer the ferry spends in the river, the more potential for damage to sediments is to be expected from the thrusters.

Conclusions

9 It is known that the C-Class ferries with their smaller thrusters made radical changes to the river[7]. The thrusters made either a major or the dominant contribution to these changes, with the largest effects expected below half tide in strong crosswind conditions. The W-class vessels have the potential to be very much more damaging, with the capability to re-circulate the entire water column across the river in less than one minute.

10 None of the responsible authorities have chosen to insist that the necessary scientific studies linked to the thrusters should be carried out; therefore the observations above cannot be regarded as definitive. However, the arguments put forward are believed to be sufficiently compelling to demonstrate that the thrusters are at the very least a major contributor to and probably the most significant contributor to damage to the river sediments. It is notable that Wightlink have avoided releasing the limited amount of work they have commissioned, this may be taken to imply that the content of this work would not support their contentions, it is also notable that they have not commissioned any measurements of water velocity or sedimentation, which would prove or otherwise that their ferries are causing no damage to the river.

11 The following work programme must be completed before any regulatory decisions on the environmental acceptability of the W-Class ferries is made:

11.1 Wightlink must provide full data on the streamline and turbulent flows expected from Voith-Schneider propulsion units of the type on the W-Class ferries in shallow water conditions.

11.2 Comprehensive measurements must made of river water turbidity together with mean and turbulent flow velocities adjacent to the river bed and banks and linked to ferry operations over their full range of operating conditions.

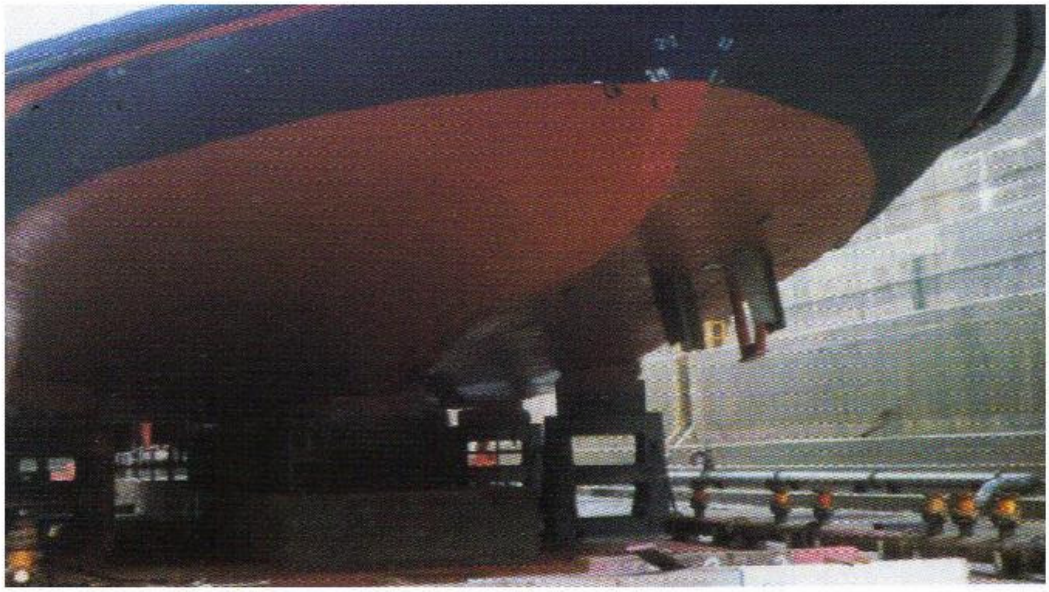
11.3 An analysis must be carried out of the expected impact of the W-Class thrusters on the sediments in the river bed and banks together with the effect of this on the protected areas of the banks.

The cost of this work should be bourn by Wightlink, but carried out under direction independent of their commercial interests.

Figure 1 - A Voith Schneider propulsion unit of similar size to that fitted on W-Class ferries

Figure 2 – Comparison of thrusters on C and W – Class ferries

Current C Class Ferry
Small thruster on one side



New W Class Ferry
Large thrustern on centre line

Figure 3 – A typical example of weed and sediment stirred up by a W-Class ferry

Appendix 1 – Letter to LHC asking them to identify what work they are undertaking to investigate the effect of thrusters on the river.

Lymington River Association
66-67 High Street
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Hampshire SO41 9AL

24 November 2008

Peter Griffiths
Chairman, Lymington Harbour Commissioners
Harbour Office
Bath Road
Lymington SO41 3SE

Dear Peter

Responsibility of LHC for the Environment

You will be aware of the LHC's duty of care for the environment (PMSC Clause 1.2.7) and more specifically through the Lymington Harbour Revision (Constitution) Order 2002. The purpose in writing is to draw your attention to the need to take this fully into account in considering the appropriateness of any Interim Operating Procedure you may be considering for the W-Class ferries. These responsibilities, as we understand it, are quite separate from the Appropriate Assessment which is being carried out.

You have also received Michael O'Flynn's recent description of our understanding of the effects of both the ferry designs on the river. The concerns described below are additional to the explanation he has provided you with.

It is inevitable that the propulsion units on the new ferries will at all times be providing substantially more water flow, deeper in the river, than the C-class ferries will do under comparable operating conditions. Unfortunately, neither the BMT Phase 1 Report nor the work undertaken by ABPmer for Wightlink (the assessment of the AA, which Natural England is relying on) has investigated this in any depth. We know from the work which HR undertook for LHC in 1991 that surface flow velocities of over about 0.5m/s will cause sediment damage. Also from the limited amount of information which has been disclosed, the water velocities (for both ferry designs) due to both the propulsion units and to backflow will exceed this threshold by a very large factor over a substantial volume surrounding and behind the ferry. There can be no doubt that these high velocities will far exceed the threshold level on the river banks and bed to a much greater degree with the W-class ferries.

The problem is significantly exacerbated by the Wightlink choice to use the forward unit for propulsion in the river (to avoid the extensive surface wake from the aft unit). This must create a rapid aft flow under the barge-like centre section of the hull when the vessel is going ahead and with a much more complex flow situation when turning and in crosswinds.

Regrettably no relevant water flow measurements have been undertaken. I understand that all of the BMT work is focussed on surface and not on river bed and bank flows (in view of the work specification for safety and risk to persons and vessels and not to the environment). Also, we are not aware of any qualitative or quantitative assessments undertaken or planned. It has been suggested that slowing the W-Class ferries may be regarded as sufficient to prevent "adverse effects" on the Natura 2000 sites. While this may have some effect for some of the damaging factors, it will not do so for either the use of the forward unit for propulsion or in crosswinds when the need for side thrust will be greater as the ferries travel more slowly.

In view of the observations above, it appears to be impossible, based on the information available at present, for LHC to discharge their duty of care for the environment while accepting an interim operating procedure. Before this is done, the increased impact of the W-Class ferries on the river bed and banks must be assessed. In particular the requirement on the LHC to protect the Ramsar site, the Solent maritime special area of conservation as well as the national sites of special scientific interest must be fully taken into account before the W-class ferries are allowed to operate in the river.

Can you please confirm that you recognise the problems outlined in this letter, which go well beyond what has been included in the content of the Appropriate Assessment that you are seeking to expedite, in your recent statement to Stakeholders? Can you also please indicate what action you intend to take to ensure that LHC properly discharges their responsibilities for the environment.

Yours sincerely

Kenneth Hay
Lymington River Association

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cc Desmond Swayne MP
NFDC (Chris Treleaven, Chris Elliott)
Commodores, RLymYC, LTSC
Gus Lewis, RYA
Natural England (Claire Lambert, Chris McMullon, Wanda Fojt)
The Crown Estate (Iain Mills)
MFA (Geoff Bowles, Anna Sargeant)
BMT Seatech (Gwynne Lewis, Ian Dand)
Stephen Akester
Michael O'Flynn
Marc Malanaphy

Appendix 2 – Comments on the HRW Report

HR Wallingford Report EX 5937 - Consideration of Environmental Damage from Ferry Thrusters.

Release 3.0 of the HR Report "Shoreline Management & Geomorphological Advice to Natural England" makes passing reference to the likely effects of the ferry Voith Schneider thrusters but does not attempt to analyse these effects in any detail.

There are three important aspects of the thruster operation which will be expected to have a significant and potentially dominant role on the impact of the ferries on the river bed and bank sediments:

1. The practise of using the forward thruster for propulsion in the river
2. The effect of thruster side flows in cross winds, particularly as the ferry speed is reduced
3. Consideration of the effect of turbulent eddies which will persist in the wake of the thruster jet stream.

These omissions are recognised, at least in part, in Version 3 of Natural England's Advice document.

It is evident that the W-Class Ferries will be considerably more damaging than the C-Class:

1. The deeper forward thruster will force the jet stream under the box-like centre section of the hull, the C-Class forward thruster flow from the much reduced power will be along the hull side and waterline
2. The cross-wind forces on the W-Class ferries are about 2.5x the forces on the C-Class, as the ferry travels more slowly, the thrusters must provide approaching 100% of the balancing force as a sideways jet stream.
3. The "footprint" of the jet stream and the turbulent eddies that it decays into will be about 2.5x that of the C-Class, at a tide height of more than 0.4m higher for the W-Class vessels, considerably increasing the time when damage is expected to the river bed and banks.

It is probable that the omissions in the HR Report derive from the inadequate attention given to these matters in previous documents and from Wightlink's refusal to release the computational fluid dynamic (CFD) analysis of flows around the thrusters of both ferry designs carried out for them by Voith. This report has been available to ABPmer, some data is quoted in their report and has been quoted in a public presentation by Wightlink. However it is exceedingly difficult to use this in the absence of the reports to understand with any reliability the likely relative damage that the jet streams will have on the river bed and banks.

It is judged to be highly probable that one of the inferred conclusions of the HR report (that slower ferries will be less damaging) cannot be sustained; this will have a major impact on the ability of Wightlink to find a satisfactory Interim Safe Operating Profile. Slowing the ferries will increase the amount of time the thrusters will be damaging the river environment and this must be balanced against the reduced drawdown and backflow at lower speeds.

It is recommended that Natural England should ask HR Wallingford to review their report, and their answers to NE's Questions 3 & 4 (measurement and analysis of thruster flows) in the light

of the observations made above and that no consideration can be given to an ISOP until this work is completed.

Kenneth Hay
23 February 2009

Appendix 3 - Comparison of potential for environmental damage by Wightlink ferry thrusters

Comparison of Potential for Environmental Damage by Wightlink Ferry Thrusters

Summary

The thrusters on the W-Class Ferries are likely to be at least x10 more damaging to the river channel and its surroundings than the C-Class vessels. A quantitative assessment of the damage expected from the thrusters is required as a matter of urgency; this will require data which is in the possession of Wightlink, their naval architects or Voith, the manufacturer, together with in-situ measurements. This assessment can either be undertaken by Natural England's consultants or by the Lymington River Association. Until this is completed and as a very minimum, severe restrictions must be advised concerning the operation of the W-Class vessels.

C-Class Ferries

The potential for the Voith Schneider propulsion units (thrusters) on the C-Class ferries to damage river bed and bank sediments has not been quantitatively assessed. However historic observations going back to the introduction of these vessels and examples such as the trails of sediment evident from the aerial photograph used by LHC indicate that it is very likely that the thrusters have made a significant if not dominant contribution to the river sediment damage. This has been recognised for the C-Class vessels by HR Wallingford and Natural England.

It has not been possible to carry out a quantitative assessment as no relevant measurements have been asked for or carried out[8] and technical data on thruster slipstreams and turbulence has not been made available by Wightlink, Hart Fenton (their naval architects) or by Voith. Some data on slipstream velocities is known to exist from a presentation made by a Wightlink representative at a conference last year and from diagrams in the ABPmer report.

W-Class Ferries

HR Wallingford have recognised that the thrusters on the W-Class ferries are expected to be more damaging to the river channel than on the C-Class vessels, the extent to which this affects the intertidal region will depend on operating procedures, wind and tidal conditions.

Early observations of the W-Class ferries, particularly at low water conditions and probably in strong crosswinds, indicate that there is qualitatively very major differences between the slipstream and the turbulence created by C and W-Class vessels. Extensive areas, swirling with fresh sediment and weed, are evident behind the W-Class vessels when the tide is relatively low, even in benign weather conditions. Recently, a dense "slick" of weed and sediment was observed in Long Reach extending for 2-300m, about 10m wide in 25kt of crosswind when the sea level was above half tide. This was in a region where wave erosion is thought to dominate damage.

[8] the BMT data is largely irrelevant as it is concerned with near to surface effects, except it is noted that the flows 1m below the surface are much more persistent; the turbulence was too great for measurements to be made at any greater depth.

While, for the reasons given above, a quantitative comparison is not possible, an order of magnitude comparison of the damage attributable to the thrusters can be carried out.

Kenneth Hay
7 May 2009

Comparison of Damage Potential

A number of factors need to be taken into account when undertaking a comparison of sediment damage attributable to thrusters.

1. Power used by the vessels: The W-Class ferries have about 3x the engine power of the C-class vessels with proportionately much larger thruster units to handle the increase in power. The full engine power of either vessel will not usually be required in the river, however when the much greater windage, displacement and hull shape of the W-Class is taken into account, it is evident why the designers needed to specify this difference.

   It is concluded that the power to drive the W-class ferries in the river will be 2 to 3 times greater than that to drive the C-Class – nearer the higher value under adverse wind and tidal conditions.

2. Operating practises: The C-Class vessels are understood to use both thruster units equally in the river. On the W-Class, only the forward thruster is used for propulsion (the aft one steering at much lower power), it is understood that this is because the wash from the aft unit will be totally unacceptable (which is evident when the ferry leaves the river, when the aft unit is powered up). This choice is probably linked to by the decision of Wightlink to avoid using the aft thruster in medium and strong crosswinds to directionally stabilise the vessel when both will create a very strong side-wash (with the attendant slipstreams and turbulence). Instead the ferry is seen to "crab" up the river in crosswinds, considerably increasing the blockage ratio of the hull, and the blockage confronting other river users.

   The use of the forward thruster alone means that double the power is utilised through this unit, than would be the case if both were in use.

3. Thruster location: On C-Class vessels, the thrusters are located on the forward port side and the aft starboard side. Both are used for propulsion and it is evident that the flow from the forward unit appears to flow essentially along and under the port side of the vessel. The forward unit on the W-Class is centrally located, about 400mm closer to the bed of the river (the tips of the blades are at the same depth as the deepest part of the hull). The flow from it is forced under the barge-like central part of the hull and apparently part of the flow is split off by the second underwater "bow" and the slipstream apparently leaves both sides of the vessel about 1/3 aft from the bow at an angle to the hull (which is probably the cause of small motor and sailing vessels being turned around when the W-Class vessel has passed them).

   While the thruster flow diagrams in the ABPmer Report are difficult to interpret, it is

reasonable to conclude that the greater depth of the thruster on the W-Class will increase slipstream velocities by about a factor of 2 at the river bed.

The forward unit (probably on both ferry designs) will create greater flows in the depth of the river channel than the aft unit – when the flows are apparent on the surface. It is concluded, in the absence of any other information, that the decision by Wightlink to utilise the forward thruster for propulsion in the river will increase the damage caused by the W-Class ferry by a factor approaching x2.

It has been argued that, while the central location of the W-Class unit will increase damage to the river bed, it will damage the sides of the channel less. This will not be the case (even disregarding the slumping into a deeper channel may be expected) as there is flow from the forward unit has a component transverse to the direction of the river channel, that will impinge on the sides of the channel.

Implications of the Differences Between the Ferry Designs

The simple analysis of the differences between the two ferry designs above indicates that the contribution of the thrusters to the damage to the river sediments will be at least an order of magnitude greater for the W-Class vessels than it has been with the C-Class ones. This must be taken in the context that the thrusters have certainly been a major contributor to the damage created by the C-Class vessels and have probably been dominant.

It has been established by HRW that the C-Class ferries are dominating habitat loss in Short and Horn Reaches of the river. Natural England have accepted the proposal by LHC that hard walls should be built to protect these Reaches from the natural processes occurring in the Solent. The implication of the comparison carried out above is that the W-class vessels will very substantially increase the damage within the projected walls and the intended protection will be illusory.

It is often argued that slower is less damaging for vessels[9], this will be the case for the drawdown and backflow effects which have been analysed. It is not evident that it will be the case, particularly in adverse wind and tidal conditions, for damage caused by thruster slipstream and turbulence flows. Essentially, the longer spent in the river with the thrusters running, the longer there is to erode sediments and create damage. Therefore slower is expected to be worse, particularly for the W-class ferries and particularly as sediment laden flows will be more damaging than “clean” water flows .

It observed that the W-Class vessels are already regularly crossing in the river in Short Reach regardless of whether it is near to low water at spring tides; when this takes place, one of the vessels is often seen to stop, the LHC appear to be powerless to stop this.

The implications of the “order of magnitude” assessment carried out above is that the W-Class ferries are expected to be a factor of x10 more damaging to the river. As a matter urgency, a

[9] Wightlink and ABPmer argue that historic illegal speeds allowed by LHC for C-Class ferries will make slower river speeds by the W-Class no more damaging. While there is no doubt that both designs exceed the 6kt and 4kt limits, there is absolutely no evidence that the C-Class vessels exceeded the limit by the amounts claimed on more than an occasional basis. It is the experience of other river users that they usually kept reasonably close to the limits, at least when there was other traffic in the river. Moreover, it is understood that the alarm limit set by LHC for the W-Class ferry speed is 8kt, the same as claimed by ABPmer for the C-Class.

more quantitative assessment is required. Until this is undertaken every legal means possible must be found to stop the W-Class ferries operating in the Lymington River, certainly at or below half tide and never crossing. The C-Class ferries need to be restored to working condition (as we would need to do if we failed to maintain a vehicle to MOT standards) until an environmentally acceptable solution to the Lymington – Yarmouth service is developed.

K A Hay,
Lymington River Association, 7 May 2009

Appendix 4 – Significance of the Ferry Speed on the Potential for Thrusters to Damage the River

8 Knots or 6?

Wightlink's contractor for the MFA Appropriate Assessment, ABPmer have been informed (it is not clear whether by Wightlink or LHC) that it was commonplace for the C-Class ferries to travel at that 8 knots in the Lymington River which has a mandatory 6 knot speed limit. No evidence has been provided and other craft which travel in the river at 6 knots do not recollect ever being passed by ferries while travelling at 6 knots. Notwithstanding this, it appears that MFA, Natural England and LHC have accepted this as a fact and that they only need to prove (ignoring their legal responsibilities???) that the W-Class ferries will do no more damage to the river when travelling at 6 knots and can therefore avoid having to carry out a full Environmental Impact Assessment.

Whether or not this unsupported assumption and assessment eventually proves to be legally valid and acceptable to the regulatory authorities, it is fundamentally flawed from a technical point of view.

The Navigation Review[10] requested by LHC and carried out by ELP for Wightlink in 2006 found that an increased environmental impact form the W-Class ferries was inevitable (see Sections 5.9 and 5.10).

The Phase 1 Trials Report[11] carried out by BMT Seatech for LHC in early 2008 noted the tendency for a waiting vessel to set up long range water recirculation, by implication a slower vessel will tend to send the circulating slipstream further than one moving more quickly.

The Lymington River Association[12] has analysed the differences between the two designs of ferries. The greatly increased size of the W-Class superstructure requires 240% more force to resist a beam wind than the C-class ferries. In winds of Force 8-9, this essentially explains why the W-Class ferries require 3x the engine power of the C-class ones. Moreover, the more slowly the ferry travels, the less assistance is gets from the the form of the hull to the direction of travel, and the more force that is required from the thrusters to maintain station.

A slowly moving ferry, in a crosswind, will spend longer in the river channel than one moving quickly. The environmental impact of its thrusters will be consequently greater. Slowing the ferry may reduce the drawdown sediment damage from this, but it will make the damage from the thrusters worse. The change with the W-Class ferries is likely to be highly significant with the increase in energy being dissipated in the direct and indirect slipstreams and particularly in the turbulent eddies which persist long after the ferry has passed. Even if this increase by 240% was not enough to demonstrate that making the ferry travel more slowly is not the panacea promised, the much larger thrusters on the W-class ferries are up to 0.4 metres closer to the river bed, so that side flows in crosswinds and on turning will impinge much more directly on the river banks.

[10] ELP ReportELP-55272-1206-57219-Rev 1
[11] BMT Seatech Report C13537, Section 7.3
[12] http://www.lymingtonriver.co.uk/Ferry%20Dimensions%202.0.pdf , Section 4.3