

THE MERSEY GATEWAY PROJECT

NAVIGATION

CHAPTER 18.0

NAVIGATION

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18. NAVIGATION

18.1 Introduction

- 18.1.1 The Mersey Gateway Project (the “Project”) will require the construction of a New Bridge across the River Mersey (the “River”). This will require the placement of structures and required infrastructure in and over a number of waterways. Such activities have the potential to temporarily or permanently affect the existing navigation of these waterways. In addition, the Project is located within Liverpool John Lennon Airport’s controlled airspace (which encompasses all airspace from ground level to 2500 feet) as defined under the Air Navigation Order (Ref 1). Therefore, the Project has the potential to affect flights navigating within its vicinity.
- 18.1.2 As such, this Chapter has been prepared to assess the potential significant effects associated with the construction and operation of the Project on navigable waterways and aviation interests.
- 18.1.3 For the purposes of this Chapter a ‘navigable’ waterway has been defined as one that is controlled by an Act of Parliament for the purpose of navigation.
- 18.1.4 For those waterways which are not covered by an Act of Parliament, the definition for a navigable waterway provided by the Association of Inland Waterways has been adopted. This states that:
- 18.1.5 *“All navigable channels, navigable rivers and lakes, and all associated land and assets such as towpaths¹ and amenity areas² - in other words any land which has an effect on, or relationship with the waterway. Some areas may be in public ownership, have public access, or be privately owned but have the potential to be part of the navigation effect zone”.*

¹ Effects on Public Rights of Ways (PRoW) and desire lines have been taken into consideration in Chapter 16 (Transportation).

² Effects on amenity areas are considered in Chapter 12 (Landscape and Visual Amenity).

18.2 Purpose of the Study

- 18.2.1 The purpose of the navigation assessment is to determine whether the Project will have any significant effects on navigable waterways and aviation interests within a defined study area. The study area for the navigation assessment is outlined in Section 18.3 below.
- 18.2.2 In line with the Mersey Gateway Project Orders and Applications Environmental Impact Assessment (EIA) Scoping Report (as discussed in Chapter 3, Section 3.3), this chapter examines potential construction and operation effects on both commercial and recreational waterway users and aviation interests.
- 18.2.3 The structure of this chapter is as listed below:
- a. Section 18.3 provides a detailed outline of the navigation assessment study area;
 - b. Section 18.4 provides an overview of legislation and planning policy which is relevant to navigational and aviation interests in the study area and an outline of the main tests which apply to this Project;
 - c. Section 18.5 sets out the methodology which has been followed for the navigation assessment;
 - d. Section 18.6 summarises the results of the baseline data upon which the effect assessment has been based; and
 - e. Sections 18.7 to 18.9 provide an assessment of effects on navigation, identifying significant effects on navigational and aviation interests, outlining mitigation measures for adoption and summarising the residual effects following mitigation.

18.3 Study Area

- 18.3.1 The study area for the navigation assessment was determined by reference to the location of navigable waterways and aviation interest within or surrounding the Estuary and an assessment of the detailed Project proposals.
- 18.3.2 As set out in Chapter 1 and shown on Figure 1.3 (Chapter 1, Appendix 1.1) the scope of the Project is as listed below:
- The delivery of a new road crossing of the River in Halton, known as the Mersey Gateway Bridge (referred to as the “New Bridge”);
 - Incorporation of the New Bridge into the existing highway network. These works are known as the Remote Highway Works;
 - Modification and de-linking of the SJB (excluding the asset management of the SJB works);
 - Integration of the revised route networks with public transport, cycle and pedestrian links across Halton;
 - Integration with the surrounding environment through landscaping;
 - Implementation of tolling and development of associated infrastructure; and
 - Letting a concession contract for the construction, operation and maintenance of the Project.
- 18.3.3 The alignment of the New Bridge and associated highways works cross a number of navigable waterways. In addition the Project will be located within Liverpool John Lennon Airport’s controlled airspace. The Construction Methods Report (CMR) (Chapter 2.0, Appendix 2.1) considers in detail the construction methods for the Project. A review of these methods (Table 18.1) has highlighted a number of elements of the Project which have the potential to affect waterway navigation and aviation interests in the immediate and surrounding area. Table 18.1 relates to the CMR and associated construction areas (i.e. A to I).

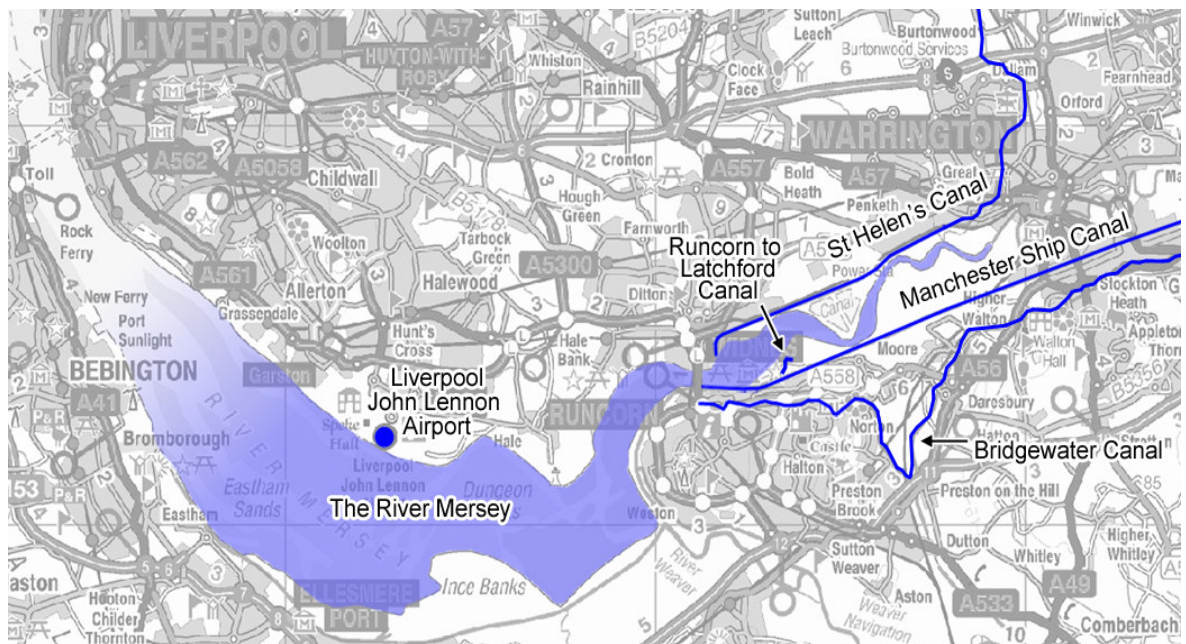
Table 18.1 – Relevant Aspects of the Project in relation to Waterway Navigation and Aviation Interests

| Element of Project | Relevance to Navigational and Aviation Interests |
|--|---|
| Area C – Freight Line to St Helens Canal | The new carriageway will be taken over the St Helens Canal on a reinforced concrete structure integral with the north abutment of the New Bridge. During the construction of the New Bridge it is anticipated that the St Helens Canal area will form the main reception / transit area for the New Bridge units. As such, it is assumed that it will be necessary to temporarily infill the canal to provide a working area. On completion, the canal will be reinstated with some minor changes to the alignment. The St Helens Canal Bridge will be founded on piled foundations. |
| Area D – New Bridge | <p>The New Bridge will be supported by three towers in the River which will be approximately 10m wide at water level. The overall height of the towers will be around 120 to 140m Above Ordnance Datum (AOD) but no higher than 150m AOD. These towers will be constructed within working areas around cofferdams. Aircraft warning lights will be provided on the elevated items of permanent or temporary works at the tower locations.</p> <p>There will be 30 piers on the saltmarshes to support the New Bridge. The depth of the pier foundations will become progressively shallower as they near the Manchester Ship Canal. It is envisaged that access to the saltmarsh will be via a stone haul road approximately 5m wide. Working areas at each pier location will be created at approximately 15m by 15m. It is assumed that the stone haul roads will be in place for a period of two to three years.</p> <p>Access to the intertidal zone will be obtained through two methods depending on construction requirements. The first method will require construction of two piled jetties from the end of the stone haul roads on each of the saltmarshes</p> |

| Element of Project | Relevance to Navigational and Aviation Interests |
|-------------------------------|--|
| | <p>(refer to Figure 3, CMR, Chapter 2, Appendix 2.1 for an illustration) and the second through use of air cushioned plant (Figure 6, CMR, Chapter 2, Appendix 2.1). During the period when this temporary jetty is in place, navigation along this stretch of the Estuary will only be possible in the gap between the centre and south towers. Following completion of the works, the jetties will be removed.</p> <p>It is anticipated that the River and Manchester Ship Canal will be used for the delivery of materials where possible.</p> <p>The New Bridge will cross the Manchester Ship Canal. It is estimated that this will take approximately two years to construct.</p> |
| Area F – Bridgewater Junction | <p>New slip roads will be provided over the Bridgewater Canal requiring the removal of the existing bridges at this location. Construction in this location can be phased to coincide with routine winter closures of the canal. High abutments will be required at both ends of the New Bridge. The south abutment will be on the south bank of the Bridgewater Canal. Special access arrangements will be made for the works adjacent to and at the level of the Bridgewater Canal. A temporary closure of the Bridgewater Canal or temporary local narrowing scheme will be required to allow the construction of below ground works adjacent to the canal. Where possible these works will be carried out in the winter months when canal traffic is at its lowest and to coincide with routine canal maintenance.</p> <p>Construction of the New Bridge deck and ongoing maintenance of the deck during operation will require a temporary reduction in navigational clearance for short periods (up to two hours).</p> |

- 18.3.4 The navigation study area encompasses all navigable waterways and aviation interests which are likely to be affected by the Project. This study area is shown on Figure 18.1 and described below.

Figure 18.1 – Navigation Study Area



- 18.3.5 Based on the proposed structures and modifications which are required to the existing road network (as outlined in Table 18.1) the navigable waterways considered to have the potential to be physically affected by the Project are:
- a. The St Helens Canal;
 - b. The River Mersey;
 - c. The Manchester Ship Canal;
 - d. The Runcorn to Latchford Canal; and
 - e. The Bridgewater Canal.
- 18.3.6 The Ports of Liverpool, Birkenhead and Garston are located downstream of the Project, and at approximately 18.5km to the west of the Runcorn Gap³. Consultation with the MDHC, the statutory harbour authority for the Port of Liverpool, indicated that they have no objection to navigation clearances specified for the Project.
- 18.3.7 The hydrodynamic assessment (Chapter 7) indicates that there will be no significant changes to the hydrodynamic or morphological patterns within the Estuary as a result of the construction and operation of the Project. It is therefore considered that the Ports of Liverpool, Birkenhead and Garston will not be affected by the Project and are therefore not considered further in this assessment.
- 18.3.8 The three towers which are required for the construction of the New Bridge will be located within Liverpool John Lennon Airport's controlled airspace. Their construction and presence has the potential to present a physical obstruction to aircraft flight and / or an interruption to aviation radar control systems. This is considered further later in this chapter.

³ Measurements are approximate and taken 'as the crow flies' from the SJB to the southern tip of Princess Dock.

18.4 Relevant Legislation and Planning Policy

- 18.4.1 A review of relevant legislation and planning policy guidance was undertaken as part of the navigation assessment as discussed below.

Legislation

The Future of Air Transport White Paper and Civil Aviation Bill (Department for Transport, 2003 and 2005 respectively) (Ref 2 and 3)

- 18.4.2 The Civil Aviation Bill was submitted to the Government in 2005 and builds upon the Aviation White Paper which was published in 2003 (this is known as the “White Paper”). The White Paper sets out a policy framework to inform decisions on future airport related planning applications, against which the relevant public bodies, airport operators and airlines can plan ahead over the next 30 years.
- 18.4.3 The White Paper acknowledges significant growth at the airports in the north of England and therefore supports the development of the additional terminal capacity, runway extensions and improved taxiway systems needed to cater for this.
- 18.4.4 The White Paper outlines key issues for Liverpool John Lennon Airport acknowledging recent rapid growth at this airport. Forecasts suggest that by 2030 throughput could be two or three times current levels, and the airport’s masterplan (paragraph 18.4.34) caters for up to 12 million passengers per year.
- 18.4.5 The Government therefore endorses the long-term growth of the Airport, including expansion of its passenger and cargo facilities and the extension of the runway. The White Paper acknowledges that expansion of the airport will be achieved through continued work with regional and local partners and surface transport providers in order to bring forward surface access enhancements that are required to cater for increased passenger numbers.
- 18.4.6 The Project will contribute to regional road infrastructure improvements connecting to the Airport’s surface transport links. This will cater for the predicted future increase in passenger numbers at the Airport.
- 18.4.7 The White Paper (Chapter 12, Section 12.4) also outlines the Government’s position regarding the protection of airports from future development activities and states that:
- 18.4.8 *“At airports where development may occur, early arrangements are being made to update current CAA safeguarding maps to reflect the relevant proposals. This will ensure that the airport operator is consulted by the local planning authority over any planning applications which might conflict with safe operations at the airport, or nearby. The safeguarding map identifies areas by reference to the land height around the airport and its operational requirements, and describes the circumstances in which the local planning authority is required to consult the airport operator. The maps are produced and revised by the airport operators, and certified by the CAA”.*
- 18.4.9 Liverpool John Lennon Airport has been a key consultee throughout the development of the Project, informing the design and ensuring that height restrictions specified are maintained to allow the continued safe operation of the Airport during its construction and operation of the Project.
- 18.4.10 The Civil Aviation Bill provides no specific tests to which the Project must adhere regarding aviation interests.

Acts of Parliament

- 18.4.11 Various Acts of Parliament have been passed to either construct navigable waterways (such as the Manchester Ship Canal) or to outline measures to make existing waterways 'navigable' (as was the case with the Upper Mersey Estuary). Acts of Parliament which apply to those waterways located within the navigation study area are noted below and discussed further in Section 18.6 of this Chapter:
- a. The Mersey and Irwell Navigation Act 1721;
 - b. The Bridgewater Canal Act 1766;
 - c. The Sankey Brook Navigation Act 1830 (also known as 'An Act to consolidate and amend the Acts relating to the Sankey Brook Navigation, in the County of Lancaster; and to make a New Canal from said Navigation at Fidler's Ferry, to communicate with the River Mersey at Widness, in the said county);
 - d. The Mersey Conservancy Act 1842; and
 - e. The Manchester Ship Canal Act 1885.
- 18.4.12 The Project has the potential to affect the measures prescribed for and protection afforded to waterways covered by these Acts of Parliament, for example through the restriction of navigable rights by reduced vertical clearance. As such the measures and protection afforded these Acts have been considered in this assessment, and subsequently the Project design in order to ensure their navigation and function is maintained.

National Planning Policy Guidance

Modern Ports: A UK Policy (Ref 4)

- 18.4.13 'Modern Ports: A UK Policy' sets out the state of shipping and ports in the UK and lists objectives to improve the industry. These objectives include the improvement of efficiency, standards of shipping, safety and environmental standards. As noted above at paragraph 18.3.7 it is not considered that ports within the Estuary will be affected by the Project. Therefore it is considered that the Project will not have an effect on those objectives set out within this policy in respect to ports.
- 18.4.14 This policy also discusses the use of inland waterways (i.e. canals) but acknowledges that they are not a significant method for carrying freight except in a small number of cases. Aside from the Manchester Ship Canal no waterways which are located within the navigation study area currently carry freight. The effects of the Project on the Manchester Ship Canal are considered later in this Chapter.
- 18.4.15 This policy does not contain any specific objectives for any inland waterways located within the Estuary or navigation study area. However, through informed design, the navigation potential of the Manchester Ship Canal for movement of freight goods has been maintained.

Ports Policy Review (Ref 5)

- 18.4.16 No specific issues with regard to the Project were identified in this document. As detailed above in paragraph 18.3.7 it is considered that no ports located within the Estuary will be affected by the construction and operation of the Project.

Planning Policy Guidance (PPG) 17: Planning for Open Space, Sport and Recreation (Ref 6)

- 18.4.17 Guidance with regard to recreation and development near to water is found in Planning Policy Guidance (PPG) 17: *Planning for Open Space, Sport and Recreation*. Under PPG17 it is considered that Policy 31 should be taken into consideration as part of the Project design. This states that:
- 18.4.18 “...In considering planning applications for development near water local authorities should ensure that access for sport and recreation purposes is not restricted and should, where possible, be enhanced”.
- 18.4.19 The design of the Project should therefore ensure that access for recreational purposes is maintained during its construction and operation. For example access to towpaths associated with those waterways located within the navigation study area, such as the Trans Pennine Trail which follow the banks of the St Helens Canal, should be maintained and where possible enhanced. These effects have been considered in Chapter 16 of the ES (Transportation) and subsequently incorporated into the Project design. Temporary / permanent diversions have been put in place for affected PRoW and desire lines to ensure pedestrian access is maintained at all times and hence ensure compliance with PPG17.

Planning Policy Guidance (PPG) 13: Transport (Ref 7)

- 18.4.20 PPG 13: *Transport* sets out a number of transport policies which apply to navigation interests within the study area. PPG 13 contains a number of key objectives designed to integrate planning and transport at the national, regional, strategic and local level to promote more sustainable transport choices both for carrying people and for moving freight. The following policies have the potential to affect the construction and operation of the Project.
- 18.4.21 Policy 45 of PPG13 sets out the Governments policy framework to promote movements of freight by sustainable modes of transport which include water. The Manchester Ship Canal is the only navigable waterway located within the study area which currently transports freight. It is therefore essential that its capability to undertake this is not permanently compromised by the Project. In addition, future transport of freight by other navigable waterways within the navigation study area has been considered in this navigation assessment.
- 18.4.22 Annex B 10 of PPG13, in combination with Modern Ports (detailed above), notes that “developments which are incompatible with any nearby port operations should be avoided”. As noted in paragraph 18.3.7 above, it is not considered that the Project will have any effect on ports located within the Estuary and therefore such interactions are not considered further within this assessment.
- 18.4.23 Annex B 12 of PPG13, in compliance with the Government’s policy on the transport use of inland waterways, notes that Local Authorities should work with all those concerned in the inland waterway industry to develop their potential. It is therefore important that the construction and operation of the Project does not permanently compromise existing or future uses of those waterways located within the navigation study area. Consideration is given to this in this assessment.
- 18.4.24 Annex B 13 of PPG13 notes that all development proposals, local plan policies, or new and improved infrastructure, such as road proposals, should not adversely affect inland waterways. This policy therefore applies to the development of the Project.
- 18.4.25 The Project has been designed to ensure its construction and operation does not permanently compromise existing or future users of those waterways which are navigable in the study area.

This will ensure the continued movement of freight along the Manchester Ship Canal and prevent effects on users of other waterways.

Regional Planning Policy Guidance

Regional Planning Guidance for the North West (RPG 13) (March 2003) (Ref 8)

- 18.4.26 Prior to adoption of the North West's Regional Spatial Strategy (RSS), RPG13 (2003) sets out regional planning policy for the region.
- 18.4.27 RPG13 (2003) sets out a number of transport proposals of regional significance for delivery in 2021 which include the Project:
- 18.4.28 *"regional significant proposals arising from the various multi-modal, freight and road based studies, including potentially a Mersey crossing in Halton Borough".*
- 18.4.29 RPG13 recognises the importance of the Manchester Ship Canal and adjoining land to support sustainable development and connectivity between the North West Metropolitan Area's key towns and gateways (e.g. Liverpool John Lennon Airport).
- 18.4.30 Policies EC1 (*Strengthening the Regional Economy*) and T6 (*The Region's Ports and Strategic Inland Waterways*) recognise the importance of the Manchester Ship Canal for increasing future water based freight transport to encourage a modal shift from road to water goods transport.
- 18.4.31 As set out in this navigation assessment, the Project has been designed to maintain navigation rights along the Manchester Ship Canal and therefore ensures compliance with these policies.

The North West Plan – Submitted Draft Regional Spatial Strategy for the North West of England (January 2006) (Ref 9)

- 18.4.32 The North West RSS (which will replace Regional Planning Guidance 13 (RPG13)) aims to *"promote sustainable patterns of spatial development and physical change"* in the North West of England.
- 18.4.33 In line with RPG13, the North West Plan provides a list of the region's priorities for major transport investments which include the Project.
- 18.4.34 Policy RT5 10.22 promotes the capability of the Manchester Ship Canal to play a greater role in the internal transportation of freight and to a lesser degree some small waterways and navigable rivers. The Project therefore ensures that navigation rights of the Manchester Ship Canal and other used waterways are maintained.

Local Planning Policy Guidance

Liverpool John Lennon Airport Masterplan to 2030 (Liverpool John Lennon Airport, 2007) (The "Airport Masterplan") (Ref 10)

- 18.4.35 The Airport Masterplan was prepared in 2007 in accordance with the Government's White Paper setting out goals and objectives through to 2030. These goals and objectives primarily concern the business and economic growth of the airport through the expansion of passenger and cargo services.
- 18.4.36 Chapter 9 of the Airport's Masterplan '*Surface Access*', provides detail on access to the Airport. Access from the east of the region to the Airport is currently via a crossing of the River at the

SJB. The eastern approach to the Airport, to the east of the A5300 Knowsley Expressway, will connect with the Project once operational and will be signposted between the Airport and both the M6 (south) and M56 (north). The Airport Masterplan recognises that the Project will improve opportunities for public transport access to the Airport from Cheshire, North Wales and Wirral (as discussed at paragraph 18.4.5).

- 18.4.37 In addition the Airport Masterplan sets out safeguarded areas around the Airport, where planning applications will be the subject of consultation with the Airport and where restrictions on the height of structures or on development which might create a bird hazard may apply. This policy has been taken into consideration through consultation with the Airport and the Project has subsequently been designed to ensure compliance with height restrictions and safeguarded airspace is respected.

Halton Unitary Development Plan (April 2005) (Ref 11)

- 18.4.38 The Halton Unitary Development Plan (UDP) was adopted in April 2005 and superseded the planning policies of the Halton Local Plan and the Cheshire Structure Plan 2001. The Council is in the process of considering high level documents that will form the Local Development Framework (LDF). Until these are complete, consideration of navigation policies will remain as identified in the UDP, which continues to be in effect until 2011. The policies in the UDP which have implications on navigation are summarised below.

Regeneration

- 18.4.39 A number of policies and proposals for regeneration (Chapter 1 of the UDP, Policies 1, 2, 3, 11 and 12) in Halton centre on those waterways located in the navigation study area. The construction and operation of the Project in the vicinity of these waterways must therefore ensure their protection to allow for future regeneration. Those regeneration areas which will be affected are:

- a. RG1 Action Area 1 Southern Widnes;
- b. RG3 Action Area 3 Widnes Waterfront; and
- c. RG4 Action Area 4 Runcorn and Weston Docklands.

- 18.4.40 RG4 also requires the safeguarding of navigation opportunities of the Bridgewater Canal for future waterway use. This is considered within this assessment.

The Green Environment

- 18.4.41 The policies listed under Chapter 3 of the UDP 'the Green Environment' concern the protection and enhancement of open land in Halton Borough including open countryside, green spaces and features of nature conservation and landscape importance. Policy GE29 requires the protection of waterways located within the navigation study area from development which may have an adverse effect. This policy notes that any development, which includes the Project, must have no effect on the following criteria. These criteria have been taken into consideration in this navigation assessment:

- a. "Recreation or tourism opportunities presented by the canal, river or their environs;
- b. Important amenity, landscape and ecological characteristics of the canal, river and their environs;
- c. The viability of important landscape and wildlife resources;
- d. Attractive views along, onto or from the canal's towpath or river's edge;
- e. The provision or improvement of access points onto the canal's towpath or river's edge;
- f. The establishment of 'The Greenway Network', in conflict with Policy TP9; and

g. The maintenance of a clean, healthy and pleasant canal or river environment.”

- 18.4.42 Policy 2 of GE29 also notes that any development on or close to the Manchester Ship Canal should not affect its ability to operate as a navigable waterway. This has been taken into consideration in the navigation assessment.
- 18.4.43 Policy PR10 of Chapter 4 of the UDP '*Pollution and Risk*' provides details regarding height restrictions at Liverpool John Lennon Airport. This states that development will only be permitted if it is below the height notified by the Council (150m AOD) and would not cause a hazard to air travellers. The height of the New Bridge is a key consideration in this navigation assessment and in turn has informed the Project design. In addition this policy requires consultation with the CAA for certain types of development. Consultation with the CAA has been undertaken throughout this navigation assessment to ensure that the Project is constructed and operated within no harm to air travellers.
- 18.4.44 Policy TP13 of Chapter 6 of the UDP '*Transport*' sets out the Council's policy on the promotion of waterways for the transport of goods. Opportunities for freight transport are noted on the Manchester Ship Canal. The navigation assessment therefore provides an assessment of the effect of the Project on the Manchester Ships Canal to ensure its navigation function is not significantly affected.
- 18.4.45 Policy LTC8 of Chapter 7 of the UDP '*Leisure, Tourism and Community Facilities*' sets out the Council's policy for the protection of key tourism and recreational facilities within Halton. These include the historic canals within Halton. The navigation assessment provides a consideration of the effects of the Project on recreational users of the waterways located within the study area and importance to minimise effects on these users in line with this policy.
- 18.4.46 The Project has been designed to ensure that regeneration, leisure, conservation and transport policies relating to navigable waterways are not compromised and that navigation function is retained. In addition, the Project design takes into consideration requirements set by the Council and CAA on structure heights to ensure no harm to air travellers. This has been achieved through extensive consultation and an iterative design process.

Halton Borough Council Local Development Scheme (LDS) 2007 (Ref 12)

- 18.4.47 The LDS provides a summary of the emerging LDF for Halton which will replace the UDP. This includes transitional arrangements for all existing UDP policies and information on those that will be deleted and replaced by new policies contained within the Local Development Documents (LDD).
- 18.4.48 The LDF indicates that a Supplementary Planning Document (SPD) will be produced to provide more detailed guidance on a number of policy areas including Policy PR10 of the UDP which is set out above. This policy is likely to be replaced by the Generic Development Control Policy Development Plan Document (DPD) on adoption of the LDF.
- 18.4.49 In addition policies regarding Regeneration Action Areas (RG1, 3 and 4) will be retained, with a SPD developed to provide detailed guidance on RG1 and 4 and the Widnes Waterfront SPD covering RG3.
- 18.4.50 Widnes Waterfront Regeneration Area SPD was adopted in 2005 (Ref 13) and sets out aims and objectives for Regeneration Action Area 3. Development at this location will take advantage of its situation beside the St Helens Canal and the River.

- 18.4.51 Policies GE29, TP13 and LTC8 of the UDP will be replaced by the Generic Development Control Policy DPD on adoption of the LDF.
- 18.4.52 As set out at paragraph 18.4.45 the Project has been designed to ensure the navigation function of waterways in the study area is not permanently affected and that emerging policy requirements considered (Chapter 6, Planning).

Halton Borough Council Local Transport Plan (LTP2) 2006/07 to 2010/11 (July 2005) (Ref 14)

- 18.4.53 LTP2 recognises the regional role of the Manchester Ship Canal in the delivery of sustainable freight distribution. This important role played by the canal has been conserved as part of the Project through sensitive design and extensive consultation with the Manchester Ship Canal Company.

18.5 Assessment Methodology

- 18.5.1 This section outlines the key methods followed for the assessment of navigation and aviation interests as a result of the construction and operation of the Project.

Baseline Assessment Methodology

- 18.5.2 Navigation and aviation receptors, likely to be affected by the construction and operation of the Project, were identified through a review of specific Project design and construction method details in combination with an examination of relevant literature and Ordnance Survey (OS) mapping data for the local area. A list of all literature sources reviewed is contained within Section 18.10 of this Chapter. In addition, a comprehensive consultation exercise was undertaken with navigation and aviation stakeholders as listed below to determine specific requirements within the study area. The results of this consultation exercise are set out in Section 18.6 and provided in Appendix 18.1.

- a. British Waterways Board ("British Waterways");
- b. Liverpool John Lennon Airport;
- c. The Manchester Ship Canal Company (MSCC);
- d. The Acting Mersey Conservator;
- e. The Mersey Dock and Harbour Company (MDHC);
- f. Civil Aviation Authority (CAA);
- g. National Air Traffic Services (NATS);
- h. Maritime and Coastguard Agency;
- i. Ministry of Defence - Defence Estates;
- j. Trinity House;
- k. Marine Consents and Environment Unit;
- l. Chamber of Shipping; and
- m. Fiddlers Ferry Sailing Club.

- 18.5.3 This desk based research exercise subsequently informed the study area for the navigation assessment, as set out in Section 18.3 and shown on Figure 18.1, and helped to establish the baseline data which formed the basis on the effect assessment (Section 18.6).

Effects Assessment Methodology

- 18.5.4 Potential effects on those receptors identified were characterised through an assessment of the following factors (as discussed in detail in Chapter 3):

- a. Status of the effect, positive or negative;
- b. Duration of the effect (short/medium/long term);
- c. Permanent or temporary effect;
- d. Direct or indirect effect;
- e. Magnitude of the effect (low/moderate/high);
- f. Importance of the receptor (low/moderate/high); and
- g. Significance (low/moderate/high or not significant).

- 18.5.5 In addition, due to the seasonal use of navigable waterways located within the study area, consideration was given to periods of use i.e. during the 'low season' navigation use of waterways is low but increases during the 'high season'. This pattern of use specifically relates to recreational uses of the navigable waterways.

- 18.5.6 The British Waterways website⁴ describes the 'low season' as the period when annual canal maintenance is undertaken through the enforcement of restrictions or stoppages for such works. The MSCC (paragraph 18.6.31) confirmed that winter maintenance is undertaken between 1 November and 28 February. This period is therefore considered to be the 'low season' for the purposes of this assessment. The 'high season' is considered to encompass the remaining period and extends from 1 March to 31 October.
- 18.5.7 The following section sets out the methodology followed to determine magnitude of effect, importance of receptor and significance of effect within this assessment.

Magnitude of the Effect

- 18.5.8 A description has been provided as to whether the magnitude of the effect is high, moderate or low, with regard to its potential for causing either negative or positive effects. The criteria used to determine magnitude of the effect are shown in Table 18.2.

Table 18.2 - Criteria to Determine the Magnitude of Effects

| Rating | Criteria Threshold – Navigable Waterway Interests | Criteria Threshold – Aviation Interests |
|----------|--|--|
| Low | Low positive / negative effect on navigation receptors as a result of the Project. For example a low negative effect would result from the temporary closure of a waterway used by recreational craft during the low season (November to February). | Not Applicable. Due to the scale of effects that would be experienced should aviation interests be affected by the Project it is not appropriate to assign an effect of low magnitude. All effects are therefore considered only to be of moderate or high magnitude. |
| Moderate | Moderate positive / negative effect on navigation receptors as a result of the Project. For example a moderate negative effect would result from the temporary closure of a waterway used by recreational craft during the high season (March to October). | Moderate positive / negative effect for users of controlled airspace. For example temporary intrusion into controlled airspace for the duration of the Project's construction phase and / or temporary interruption of air traffic navigational / control radar with no change to standard operating procedures / routes. |
| High | High positive / negative effect on navigation receptors as a result of the Project. For example a high negative effect would result from a permanent closure of a waterway used by recreational or commercial craft or a temporary closure of a waterway used by commercial craft during the high season (November to February). | High positive / negative effect for users of controlled airspace as a result of the Project. For example a high negative effect would result from a permanent physical obstruction to aircraft and / or interference with aircraft and their navigational / control radar resulting in a change to standard operating procedures / routes. |

Importance of the Receptor

- 18.5.9 The criteria used to assess the importance of receptor with regard to navigational interests are shown in Table 18.3.

⁴ www.waterways.org.uk (accessed 2007).

Table 18.3 - Criteria to Determine the Importance of the Receptor

| Rating | Criteria Threshold – Navigable Waterway Interests | Criteria Threshold – Aviation Interests |
|----------|---|--|
| Low | Waterway is currently disused or has obstructions in the waterway preventing navigation along its length. | Not Applicable – controlled airspace is considered to be of high importance. |
| Moderate | Waterway is currently navigable but is used no more than weekly by commercial or recreational users. | Not Applicable – controlled airspace is considered to be of high importance. |
| High | Waterway is currently used on a daily basis by commercial and/or recreational users. | All users of the controlled airspace over the Project. |

Significance

- 18.5.10 There is no formal guidance detailing specific criteria to be used for the assessment of effects with regard to navigation. Therefore, the significance of those effects identified within this assessment has been determined through reference to the baseline data collected, stakeholder consultation, relevant legislation, professional judgment and evaluation against the effect assessment criteria as detailed above.
- 18.5.11 The following phases of the Project have been considered as part of this assessment:
- Do nothing scenario;
 - Construction phase; and
 - Operational phase.

Mitigation and Enhancement Measures

- 18.5.12 Appropriate mitigation measures have been identified to reduce the significance of negative effects associated with the construction and operation of the Project following the mitigation hierarchy outlined in Chapter 3 (Table 3.2).

18.6 Baseline and Results

Navigable Waterways

18.6.1 A review of OS mapping, desk based research and consultation has indicated that there are five navigable waterways located within the study area. These comprise:

- a. The St Helens Canal;
- b. The River Mersey;
- c. The Manchester Ship Canal;
- d. The Runcorn to Latchford Canal; and
- e. The Bridgewater Canal.

18.6.2 The following section provides a description of each of these waterways and key requirements for their maintenance in relation to the Project.

The St Helens Canal

Baseline Data

18.6.3 The St Helens Canal, also known as the Sankey Canal, is a canal linking St Helens in Lancashire to the River at Spike Island, Widnes. The section of the St Helens Canal in Widnes is owned by the Council and is currently disused.

18.6.4 An Act of Parliament to make the St Helens Canal navigable was passed in 1755. An amendment to this Act in 1830 enabled this canal to be extended to Widnes and it was navigable by 1833.

18.6.5 The canal gradually became disused before finally closing in 1963. Currently the canal is not navigable due to the presence of a series of low fixed bridges spanning its width (one is located to the east and one to the west of the proposed New Bridge) and due to the presence of dense vegetation, siltation and pulverised fuel ash which has historically been dumped in the canal by the operators of Fiddlers Ferry Power Station.

Outcome of Consultations

18.6.6 At this time there are no known plans to restore this section of the canal. The Sankey Canal Restoration Society (known as "SCARS"), an organisation established in 1985 with an aim to restore the canal, have requested the maintenance of a navigational clearance at 5m to allow the passage of sailing vessels under the New Bridge, should the canal reopen in the future. This has also been sought by British Waterways (paragraph 18.6.8).

18.6.7 Following consultation, Fiddlers Ferry Sailing Club stated that they would like to be able to use the St Helens Canal in the future if it were to be restored in order to use the locks at Spike Island and bypass part of the Upper Mersey. For this to be achieved, following restoration a sufficient mast height (as defined in paragraph 18.6.22) at the point where the New Bridge crosses the canal would need to be maintained.

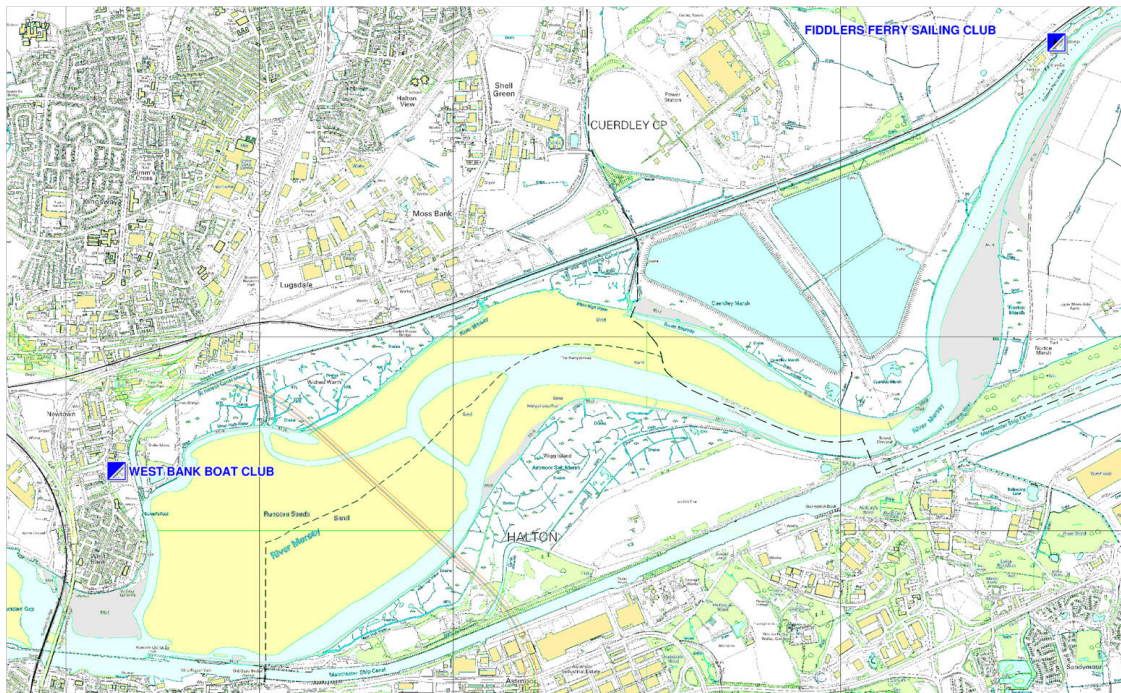
18.6.8 Consultation with British Waterways (October 2001) indicated that whilst they do not have ownership of the St Helens Canal they would prefer to see the 'line of the canal protected' and the width of the Canal not reduced below 4.87m during construction.

The River Mersey (the “River”)

Baseline Data

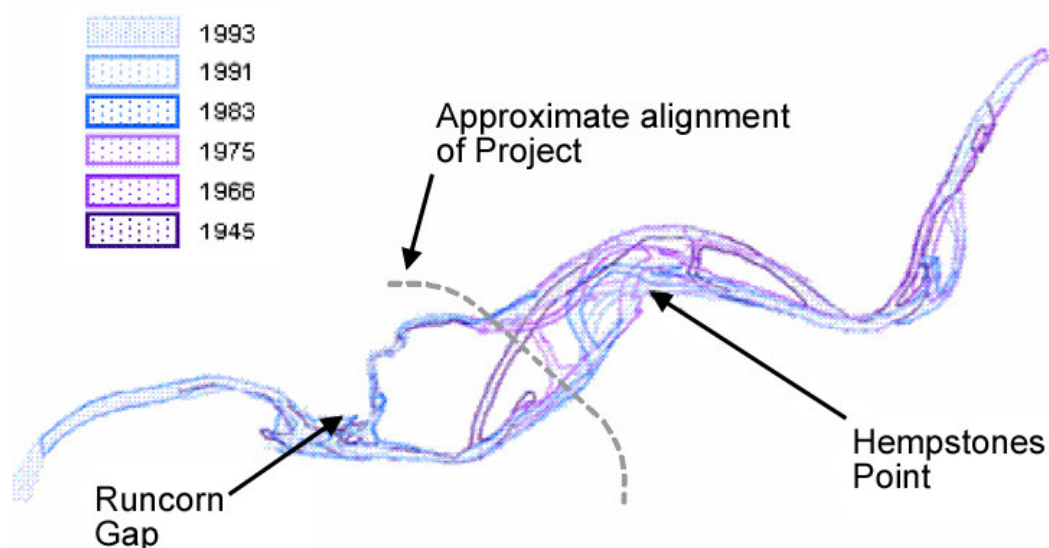
- 18.6.9 The River has a total length of some 110km from the confluence of the River Tame and the River Goyt in Stockport in Greater Manchester to Liverpool Bay in the west. The River is tidal downstream of Howley Weir in Warrington, where the area known as the Upper Mersey begins. The Upper Mersey extends from this point to the Runcorn Gap which is the start of the Middle Mersey. The Middle Mersey ends at the Narrows beyond which lies the Outer Mersey which flows into Liverpool Bay and the Irish Sea. These areas within the River are shown on Figure 4.3 (Chapter 4).
- 18.6.10 Two bridges are located within the Upper Mersey Estuary (the “Upper Estuary”), both of which are situated at Runcorn Gap. These are the A533 Silver Jubilee Bridge (SJB) and the Runcorn to Widnes Aethleflada Railway Bridge (the “Railway Bridge”).
- 18.6.11 The Railway Bridge at the Runcorn Gap restricts the current navigational air draft over the River to 23.5m above Mean High Water Springs (MHWS) (i.e. 28.6m AOD).
- 18.6.12 The Upper Mersey (as a navigable waterway) has a history of navigation being used by vessels including wooden flats, iron ships and more recently pleasure craft such as yachts and dinghies (Ref. 16).
- 18.6.13 In 1842 the Mersey Conservancy Act was passed and the Mersey Conservancy Commission established. The Commission was initially comprised of the First Commissioner of the Admiralty, the Chancellor of the Duchy of Lancaster and the Chief Commissioner of Her Majesty’s Office of Woods and Forests. As part of the Commission the role of “*Mersey Conservator*” was established. The role of the Mersey Conservator was to “*survey and inspect the Mersey within the limits of the Commissioner’s jurisdiction and to report to the Commissioner’s upon the state of navigation thereof, specifying all the impediments, encroachments, nuisances and annoyances in, upon, or affecting the same, and when and by whom and from what cause such impediments, encroachments, nuisances and annoyances have been created, or have arisen*”. The Secretary of State for Transport is the Conservator; the Acting Mersey Conservator is responsible for daily responsibilities. The navigation authority for the River is the MDHC.
- 18.6.14 The River has a right of navigation on it and the Act of Parliament has not been repealed.
- 18.6.15 The River is now used by pleasure craft but this is dependent on tidal conditions and the location of the navigable channels. As shown in Figure 18.2 two sailing clubs are located in the Upper Mersey; Fiddlers Ferry Sailing Club and West Bank Boat Club. These are located at Ordnance Survey National Grid Reference (OSNGR) 356105E 386484N and OSNGR 351348E 384337N respectively. The pleasure craft operated at both these clubs comprise dinghies and yachts.

Figure 18.2 – Locations of Sailing Clubs in Upper Mersey Estuary



- 18.6.16 The Upper Mersey has a tidal regime unlike that found elsewhere in the Estuary because of the effect of the Runcorn Gap. The tide in the Upper Mersey is semi-diurnal but comprises a two hour flood tide followed by a ten hour ebb tide as opposed to the more common six hour flood tide and six hour ebb tide found in open waters in the UK. This is a result of the throttling effect of the Runcorn Gap. This effect is explained in Chapter 7 of this ES in detail. This area consists of a highly mobile sand/mudflat area, parts of which are exposed in all but the highest tides. The water level in the Upper Mersey is relatively shallow and is dominated by a number of low flow channels.
- 18.6.17 The main channel splits into two just north of Hempstones Point (as shown on Figure 18.3) and converges just upstream of Runcorn Gap. The two channels are variable in position, and while they tend to be located along the south and north banks of the saltmarsh, they are not permanently fixed to the banks. At times, between 1945 and 1993 the position of the southern channel has meandered in the vicinity of Hempstones Point and changed location from east to west. Extensive flats of mud or sand surround the channel, with some displaying more stability than others. For example, the flats between Hempstones Point and the Old Quay Swing Bridge that lie on the southern bank were reworked several times between 1945 and 1993; but Runcorn Sands, which lie to the northeast of Runcorn Gap, have been relatively stable over the same period.

Figure 18.3 - Location of the Navigation Channels between 1945 and 1993



- 18.6.18 The channels discussed above are the navigation channels in the river. These can be navigated by vessels dependent on the tidal height and vessel design. As a bench mark, typical boat dimensions provided by Fiddlers Ferry Sailing Club at paragraph 18.6.22 have been assumed.
- 18.6.19 The Admiralty Chart for the area, 'Manchester Ship Canal and Upper River Mersey' Chart Number 3478 (Ref 16) (1:25,000 scale), shows the mean tidal levels for the Upper Mersey. The mean tidal levels as shown on the Admiralty Chart for Hale Head, Widnes, Fiddlers Ferry and Warrington are shown in Table 18.4 below. The Project is located at Widnes but the tidal information for Hale Head (located downstream of the Project in the Middle Mersey) and Fiddlers Ferry (located upstream of the Project) are shown for comparison. Based on the tidal information given on the Admiralty Chart the spring tide range at the location of the New Bridge (Widnes) is 4.5m.

Table 18.4 - Tidal Information for Widnes, Hale Head and Fiddlers Ferry Obtained from the Admiralty Chart

| Place | Distance from Mouth (km) | Lat. | Long. | Height in m above Chart Datum | | Height in m above Chart Datum | | Datum relative to ODN |
|-------------------------|--------------------------|--------|-------|-------------------------------|------|-------------------------------|------|-----------------------|
| | | N | W | MHWS | MHWN | MLWN | MLWS | |
| Gladstone Dock | 0 | 53°27' | 3°01' | 9.2 | 7.3 | 2.9 | 0.8 | - 4.93m |
| Liverpool (Alfred Dock) | 5 | 53°24' | 3°01' | 9.3 | 7.4 | 2.9 | 0.9 | - 4.90m |
| Eastham | 12 | 53°19' | 2°57' | 9.6 | 7.5 | 2.8 | 0.6 | - 4.93m |
| Hale Head | 21 | 53°19' | 2°48' | 6.9 | 4.9 | - | - | - 2.00m |
| Widnes | 26 | 53°21' | 2°44' | 5.1 | 3.0 | 0.4 | 0.6 | 0.00m |
| Fiddler's Ferry | 31 | 53°22' | 2°39' | 3.4 | 1.1 | 0.5 | 0.5 | 2.00m |
| Warrington | 38 | 53°23' | 2°36' | 2.7 | - | - | - | 2.90m |

- 18.6.20 It should be noted that the Chart does not give any reference to the vertical clearance for vessels wishing to navigate the Upper Mersey beneath the Railway Bridge or the SJB.

- 18.6.21 Strong currents and flows are also evident in the Upper Mersey. These are discussed in detail in Chapter 7 of the ES.

Outcome of Consultation

- 18.6.22 Consultation with Fiddlers Ferry Sailing Club has shown that the club would require a vertical clearance no less than that of the Railway Bridge. They also stated that larger yachts can only navigate the River at high water and are typically 12m from keel to the top of mast and have a keel draft of 1.9m. Therefore, based on this vessel specification Fiddlers Ferry Sailing Club has requested maintenance of a vertical clearance of 10.1m above MHWS.
- 18.6.23 At the time of assessment West Bank Boat Club had not responded to consultations.
- 18.6.24 No quantitative data regarding users of the River was available at the time of assessment. However, a survey undertaken in January 2008 recorded approximately 40 vessels moored at Fiddlers Ferry Sailing Club and 25 at West Bank Boat Club. Consultation with the Council's Parks and Countryside Officer indicates that many of the vessels at West Bank Boat Club move to moorings in Wales and Liverpool during the summer months. These moorings are then rented out to other users (such as Fiddlers Ferry Sailing Club) who moor here on their way down the River to Liverpool. It is therefore considered that there will be no net change in the number of moored boats during the summer months.
- 18.6.25 Consultation with the Acting Mersey Conservator (October 2001) notes his concerns regarding the presence of towers associated with the New Bridge within the River and their potential to impede navigation. The Acting Mersey Conservator noted in consultation that the current air draft of the SJB over the River should be maintained at the New Bridge.
- 18.6.26 MDHC are the Local Lighthouse Authority and act as agents for Trinity House for the requirements for navigation aids. They stated that the towers of the New Bridge should be floodlit in accordance with the International Association of Lighthouse Authorities (IALA) document '*Recommendation for the Marking of Fixed Bridges over Navigable Waters*', O-113 (Ref 17), to '*flood light the towers that are situated within the River to give a satisfactory indication of the navigable area*'. The MDHC have stated that no requirements for any other navigation aids are required as part of the New Bridge design.

The Manchester Ship Canal

Baseline Data

- 18.6.27 The Manchester Ship Canal is 56km long and flows between Eastham in Wirral and Salford in Greater Manchester. The Manchester Ship Canal provides deep water access for commercial shipping from the Estuary to Manchester. The Deputy Harbour Master has confirmed that the Canal is used by both recreational and commercial vessels. With an average of 5 to 6 commercial vessels (large vessels, coasters, barges and work boats) passing up the Canal each day. During the summer months (March to September) the Deputy Harbour Master confirmed that approximately 30 recreational boats (narrow boats and yachts) use the Canal per year with the Mersey Ferry making approximately four trips per year along the Canal during this summer period.
- 18.6.28 The Manchester Ship Canal Act was passed by Parliament in 1885 with construction starting in 1887. The Manchester Ship Canal was opened to shipping in 1894. It is understood that the Act of Parliament for the navigation of the Manchester Ship Canal has not been repealed and the right to navigation remains.

- 18.6.29 The Manchester Ship Canal is operated by the MSCC which is a subsidiary of Peel Holdings plc. The Manchester Ship Canal can accommodate sea-going vessels of 19.31m beam and 7.31m draught up to Salford Quays in Manchester.

Outcome of Consultation

- 18.6.30 Consultation with the MSCC identified that the minimum existing vertical clearance over the canal is set by the Runcorn to Widnes Railway Bridge at Runcorn Gap. This structure has a navigational clearance of 24.25m above the normal water level of the Manchester Ship Canal. Normal water level at this part of the Manchester Ship Canal is defined as 4.38m AOD. The MSCC noted that this clearance (28.63m AOD) must be maintained to allow the continued navigation of this watercourse.
- 18.6.31 In addition, the MSCC also noted that no piers or obstructions should be placed in the Manchester Ship Canal as a consequence of any works. The MSCC stated that temporary structures (such as mobile gantries for construction and maintenance purposes) would be allowed within the canal between the 1 November and 28 February subject to the following criteria (during the remainder of the year closures would be limited to two hours):
- a. Specified soffit levels are provided as detailed in paragraph 18.6.30;
 - b. Appropriate permission has been granted by the Deputy Harbourmaster; and
 - c. Gantries are capable of being moved within a short period of time (e.g. 30 minutes) to allow the safe movement of shipping.
- 18.6.32 The MSCC noted that navigation lighting and signage would be required and confirmed that highway lighting on the New Bridge must not affect the navigation of vessels in the canal.
- 18.6.33 The MSCC were supportive of the use of the canal for the transport of plant and materials.

The Runcorn to Latchford Canal

Baseline Data

- 18.6.34 An Act of Parliament to construct the Mersey and Irwell Navigation was granted in 1721. The Runcorn to Latchford Canal (the "Latchford Canal") was the name given to one of the cuts dug as part of the Mersey and Irwell Navigation, which allowed navigation between Runcorn and Manchester.
- 18.6.35 The Runcorn to Latchford cut was completed in 1803 and its main purpose was to bypass part of the Upper Mersey between Runcorn Gap and Warrington to minimise delays caused by vessels grounded on sandbanks or neaped by the tide in the Estuary.
- 18.6.36 By 1894 most of the Mersey and Irwell Navigation had been replaced by the Manchester Ship Canal. Large sections of the Mersey and Irwell Canal were used in the construction of the Manchester Ship Canal, leaving spurs where the Manchester Ship Canal deviated.
- 18.6.37 A small section of the Latchford Canal is located to the north of the Manchester Ship Canal as shown on Figure 18.1, and is considered to be of such a short length (approximately 400m) that it is not feasible to be used for navigation.

Outcome of Consultation

- 18.6.38 No consultation responses were received relating to the Latchford Canal.

The Bridgewater Canal

Baseline Data

- 18.6.39 The Bridgewater Canal is a 65km long broad beam canal that links Runcorn in Cheshire to Leigh in Lancashire, with a spur to Castlefield in Manchester.
- 18.6.40 Five Acts of Parliament were passed to authorise the construction of the Bridgewater Canal. The Act for the length of canal within the navigation study area was passed in 1766, construction of the Bridgewater Canal started in 1759 and was completed in 1795. It is understood that the Act of Parliament for the Bridgewater Canal has not been repealed and there is a right to navigation.
- 18.6.41 The Bridgewater Canal is now owned by Peel Holdings plc, and operated and managed by the MSCC in conjunction with the Bridgewater Canal Trust, who govern the amenity use of the canal.
- 18.6.42 The Bridgewater Canal is currently used by both recreational craft and maintenance craft (the latter which belong to the MSCC). Consultation with the Bridgewater Manager (February 2008) indicates that approximately 1000 boating licences are issued to recreational craft for the use of the Bridgewater Canal on an annual basis. The Cheshire Ring Canal network joins the Bridgewater Canal in order to join the Trent and Mersey Canal at Preston Brook. Previously the Bridgewater Canal continued through Runcorn to join the River / Manchester Ship Canal system but it is now closed by access roads to the SJB at Waterloo Bridge in Runcorn Old Town. The length of the Bridgewater Canal from Preston Brook to Runcorn (i.e. the area affected by the Project) is now a spur of this canal network. Due to the absence of locks on this canal the movement of this boating traffic is not recorded. However, discussions with the Bridgewater Manager have confirmed that approximately 3 to 5 recreational craft use the canal daily during the high season.

Outcome of Consultation

- 18.6.43 During consultation (Appendix 18.1) the MSCC indicated that the largest vessel using the canal is the maintenance boat. This requires a navigational clearance of 5.0m above the normal water level of 25.26m AOD.
- 18.6.44 The MSCC stated during consultation that temporary closures of the canal could be undertaken by prior arrangement between the 1 November and 28 February which corresponds to their winter maintenance period. Outside of this period temporary closures would be limited to a maximum of two hours per day. The MSCC noted that during all closures, measures must be undertaken to ensure that water can continue to flow along the canal, for example through the use of large diameter pipes.

Aviation Interests

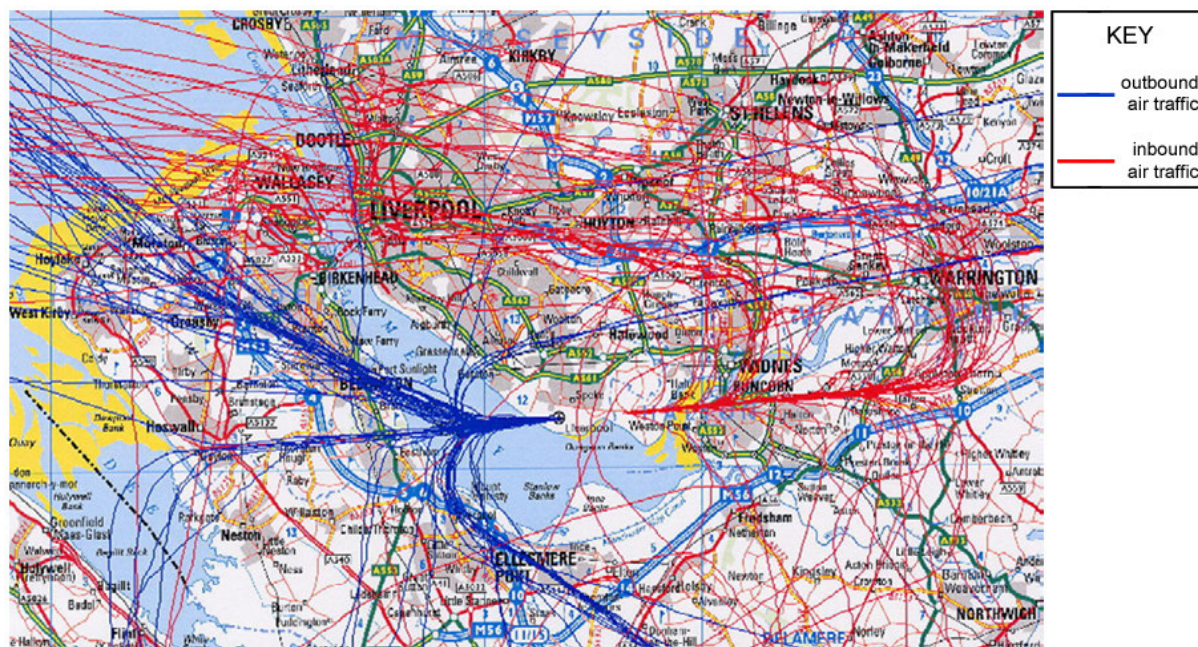
Baseline Data

- 18.6.45 In addition to the waterways discussed above the Project is located close to Liverpool John Lennon Airport and within its controlled airspace.
- 18.6.46 Liverpool John Lennon Airport is located approximately 8.2km from of the New Bridge⁵ on the north bank of the Middle Mersey (as shown in Figure 18.1). The Airport has seen rapid growth and flight numbers have *"quadrupled in the last five years, mainly as a result of expansion by*

⁵ Measurements are approximate and 'as the crow flies' from the southern tip of the Airport's runway to the New Bridge

'no-frills' airlines and are now approaching 3.5 million passengers per annum" (Ref 10). As noted at paragraph 18.4.4 the Airport's Masterplan caters for up to 12 million passengers per year. As shown in Figure 18.4 a number of flight paths pass over the Project.

Figure 18.4 - Flight paths in and out of Liverpool John Lennon Airport



- 18.6.47 Liverpool John Lennon Airport's controlled airspace encompasses all airspace from ground level to 2500 feet. It is classified as 'Class D' and as such all flights are under the control of an air traffic controller (Ref 18).

Outcome of Consultation

- 18.6.48 Following consultation, Liverpool John Lennon Airport (Appendix 18.1) confirmed that the maximum height of any obstruction during the construction and operation of the Project would need to be restricted to no more than 150m AOD. Above this height the Airport considered that physical obstructions would pose a risk to aviation and / or interfere with navigation radar.
- 18.6.49 The Airport noted that aircraft warning lights must be incorporated into the design of the New Bridge towers and will be required on cranes used for their construction in accordance with 'CAP 168' (Ref 19). The Airport confirmed that there would be no effect on Airport navigational equipment. In addition, the Airport noted that the New Bridge would require 'bird proofing' to prevent potential hazards associated with excessive bird movements, i.e. bird strike to aircraft, and therefore such measures should be incorporated into the Project design.
- 18.6.50 NATS were unable to provide a response to the consultation at the time of this assessment. However, their requirements have been assumed to be no more restrictive than those of the Airport.

18.7 Effect Assessment

- 18.7.1 Following analysis of the baseline data it is considered that the following receptors have the potential to be affected by the construction and operation of the Project. These receptors therefore form the focus of the navigation assessment.
- Potential future waterway users of the St Helens Canal;
 - Recreational users of the River Mersey;
 - Recreational and commercial users of the Manchester Ship Canal;
 - Recreational and maintenance users of the Bridgewater Canal; and
 - Users of the controlled aviation airspace located in the proximity of the Project.
- 18.7.2 As the Latchford Canal is not currently navigable and there are no plans for its re-instatement as a navigable watercourse it is not considered further in this assessment.
- 18.7.3 For the purposes of this assessment the following elements of the Project are considered to be fundamental aspects of its design and integral to its construction (Table 18.5).

Table 18.5 - Key Aspects of the Project Design and Construction

| Feature within Study Area | Key aspects of Project Design / Construction Methods |
|---------------------------|---|
| St Helens Canal | Navigational clearance (5.0m) has been provided for future navigation. The canal width has not been reduced below 4.87m. |
| River Mersey | Temporary and permanent structures will be lit in accordance with IALA requirements. |
| Manchester Ship Canal | No structures will be placed within the Canal during construction unless between 1 November and 28 February subject to MSCC requirements: Specified soffit clearances are provided; Appropriate permission is obtained from the Deputy Harbourmaster; and Structures are capable of being removed within 30 minutes. During the remainder of the year closures will be limited to two hours. MSCC navigational lighting and signage requirements will be incorporated into the Project design. Navigational clearance (24.25m) has been provided. |
| Bridgewater Canal | Temporary closures will coincide with the canal's winter maintenance period and be agreed in advance with the MSCC (1 November to 28 February). Outside this period temporary closures will be limited to a maximum of 2 hours through prior agreement with the MSCC. Navigational clearance (5.0m) has been provided. |
| Aviation Interests | Temporary and / or permanent structures will not exceed 150m AOD. Aircraft warning lights will be compliant with CAP 168. |

Do Nothing Scenario

- 18.7.4 It is considered that a 'do nothing' scenario will have no effects on those receptors detailed above in addition to those identified in the Baseline and this scenario has therefore not been assessed further in this Chapter.

Construction Phase

The St Helens Canal

- 18.7.5 During the construction of the New Bridge it is anticipated that the St Helens Canal area will form the main reception / transit area for the New Bridge units. As such, it is assumed that it will be necessary to temporarily infill the canal to provide a working area. On completion, the canal will be reinstated with some minor changes to its alignment.
- 18.7.6 There are two fixed bridges upstream and downstream of where the New Bridge crosses the St Helens Canal. This prevents recreational craft navigating this section of the canal and its importance is therefore assessed as low.
- 18.7.7 No receptors to construction phase effects have been identified and therefore it is considered that the construction of the Project in this area will have no effect on users of the St Helens Canal.

The River

- 18.7.8 Users of the River comprise recreational craft predominantly from the sailing clubs of Fiddlers Ferry Boat Club and West Bank Boat Club. These have been identified as receptors during both the construction and operation phases of the Project. As this waterway is used no more than weekly by recreational users and based on the criteria provided in Table 18.3 it is considered that this receptor is of moderate importance.
- 18.7.9 Construction phase activities likely to affect users of the River are listed below:
- a. Reduced air clearance over the Upper Mersey during the construction as a result of temporary structures placed beneath the soffit level of the approach viaducts;
 - b. Cofferdams in the Estuary presenting a physical obstacle to navigation; and
 - c. Intertidal Access - air cushioned plant causing interference with pleasure craft using the Upper Mersey and a piled jetty presenting a barrier to navigation.
- 18.7.10 Each of these effects is dealt with in turn below.

Reduced Air Clearance from Temporary Structures

- 18.7.11 The vertical air clearance over the River will be reduced during construction due to the presence of temporary structures which are required for the completion of the New Bridge deck. The presence of the New Bridge itself and associated implications for waterway navigation is assessed in the operational phase assessment at paragraph 18.7.44.
- 18.7.12 Reduced air clearance due to construction activities and the presence of materials beneath the main bridge deck will be short term and temporary in nature and is therefore considered to be of low magnitude. Based on the importance of receptor (moderate) and the magnitude of effect (low) it is considered that this effect will be of low negative significance.

Cofferdams

- 18.7.13 Cofferdams will be placed in the Estuary for the construction of the three towers upon which the New Bridge will be supported, presenting an obstruction to navigation in these areas. It is acknowledged that masters of vessels will need to take appropriate action to safely negotiate these structures.

- 18.7.14 In line with MDHC requirements the towers and structures required for their construction (cofferdams) will be lit in accordance with the IALA requirements.
- 18.7.15 The hydrodynamic assessment (Chapter 7 of this ES) describes the natural process of channel migration within the Estuary. It also considers the potential for these channels to 'attach' or become fixed in location by the presence of a circular structure such as a cofferdam. No evidence was found that attachment would occur. There will be localised scour in the vicinity of the cofferdam and this would affect water velocities in the same area. However, the natural pattern of channel movement should remain unaltered and there would be no effect on navigation within the Estuary. In addition, the cofferdams will be removed on completion of construction leaving three towers in the Estuary.
- 18.7.16 Based on the design of construction methods, the incorporation of IALA requirements and the temporary nature of the works, it is anticipated that there will be a low negative effect on users of the River due to the presence of cofferdams within the channel. Based on the importance of the receptor (moderate) and the magnitude of effect (low) it is considered that the significance of this effect will be low.

Intertidal Access

- 18.7.17 Construction access to the intertidal zone will be obtained through two methods dependent on the construction method adopted by the Contractor (CMR, Chapter 2, Appendix 2.1).
- 18.7.18 The first method of access will involve the placement of two piled jetties from either end of the stone haul roads on each of the saltmarshes (refer to Figure 3, CMR, Chapter 2, Appendix 2.1 for an illustration). The jetty will be used for the transportation of construction materials, plant and workers to construction areas in the River for the construction of the foundations and towers.
- 18.7.19 During the period when the piled jetties are in place, navigation along this stretch of the Estuary will be restricted to a gap between the centre and south towers. The hydrodynamic study (Chapter 7) indicates that channel migration is a natural process within this part of the Estuary and that, from analysis of historic information of channel positions, channels frequently exist at this location. The hydrodynamic study also indicates that an element of channel movement will be accommodated due to the size of the gap retained between the piled jetties, allowing continued navigation of the Estuary. Following completion of the works, the jetties will be removed.
- 18.7.20 It is considered that the presence of piled jetties will negatively affect users of the River on a short term and temporary basis. The magnitude of this effect is considered to be low as, although an obstruction will be placed within the River which will require negotiation by masters of vessels, a navigation channel will be maintained at all times. On consideration of the importance of this receptor (moderate) and the magnitude of the effect (low) it is anticipated that the significance of this effect will be low.
- 18.7.21 The second method of access will be obtained via the use of air cushioned plant (Figure 6, CMR, Chapter 2, Appendix 2.1). Amphibious craft will be used for the transportation of construction materials, plant and workers to the tower locations during construction of the superstructure.
- 18.7.22 Air cushioned plant have the potential to interfere with other users of the River and the potential to cause congestion.

- 18.7.23 Due to the temporary and short term nature of this affect and the limited possibility for disturbance to vessel navigation it is considered that the magnitude of this effect will be low. On consideration of the importance of this receptor (moderate) it is anticipated that the significance of this effect will be low.

The Manchester Ship Canal

- 18.7.24 Users of the Manchester Ship Canal comprise both recreational craft and commercial vessels. These have been identified as receptors during both the construction and operation phases of the Project. Based on the criteria provided in Table 18.3 and the use of this waterway on a daily basis, it is considered that this receptor is of high importance.
- 18.7.25 The New Bridge will cross the Manchester Ship Canal at 28.63m AOD, which is equivalent to 24.25m above normal water level (when 4.38m AOD represents normal water level), which retains existing clearances of the Manchester Ship Canal currently provided at the Railway Bridge.
- 18.7.26 As noted at paragraph 8.6.31 the MSCC has requested that no piers or obstructions are placed within the Manchester Ship Canal as part of the Project's construction. Methods for the construction of the New Bridge over the Manchester Ship Canal will therefore use techniques which avoid the need for the placement of structures in the canal.
- 18.7.27 A gantry will be used to fix lighting to the underside of the New Bridge. This element of the construction phase will be compliant with the MSCC criteria as set out in paragraph 8.6.31.
- 18.7.28 It is therefore considered that, as the MSCC criteria will be met, there will be no construction related significant effects on users of the Manchester Ship Canal.

The Bridgewater Canal

- 18.7.29 Users of the Bridgewater Canal comprise pleasure craft and maintenance vessels used by the MSCC. These have been identified as receptors during both the construction and operation phases of the Project. As this waterway is used daily and based on the criteria provided in Table 18.3 it is considered that this receptor is of high importance.
- 18.7.30 The CMR indicates that the Project will require the provision of new slip roads over the Bridgewater Canal requiring the removal of the existing bridges at this location. Construction in this location will be phased to coincide with routine winter closures of the canal.
- 18.7.31 A temporary closure of the Bridgewater Canal or temporary local narrowing scheme will be required to allow the construction of below ground works adjacent to the canal. Where possible these works will be carried out in the winter months when canal traffic is at its lowest and to coincide with routine canal maintenance. All temporary closures will be agreed through prior consultation with the MSCC.
- 18.7.32 These construction activities will be short term and temporary in nature. The MSCC requirements set out earlier in this Chapter (paragraph 18.6.44) have informed the design and scheduling of construction activity. It is therefore not considered that the construction works proposed will significantly affect users of this canal.

Aviation Interests

- 18.7.33 Consultation with Liverpool John Lennon Airport (as noted at paragraph 18.6.48) indicates that the maximum height of any obstruction during the construction and operation of the Project would need to be restricted to no more than 150m AOD.
- 18.7.34 The design for the Project has taken this into account and the tower heights are 133.13m AOD, 114.35m AOD and 137.10m AOD for the north, central and south towers respectively.
- 18.7.35 During the construction phase of the Project there will be a requirement to erect a tower crane adjacent to each tower location which will need to be a maximum of 5m above the reference design height for each tower (resulting in maximum heights for the cranes of 138.13m AOD, 119.35m AOD and 142.10m AOD for the north, central and south towers respectively). In line with Airport requirements (paragraph 18.6.49) aircraft warning lights will be provided on the cranes in accordance with 'CAP 168' requirements.
- 18.7.36 No effects will be experienced by users of the controlled airspace above the Project due to the design of the New Bridge and design of construction methods at this location in accordance with the Airport's requirements. Consultation with the CAA and MOD has not identified any additional requirements for consideration in the Project's design.

Operational Phase

Navigable Waterways

The St Helens Canal

- 18.7.37 Consultations indicate that SCARS aim to restore the St Helens Canal for future navigation use (paragraph 18.6.6). The assessment of operational effects associated with the Project on the St Helens Canal therefore takes into consideration the potential for its reopening and thus potential effects on future users of this waterway. Based on Table 18.3, the importance of this receptor is considered to be low.
- 18.7.38 Based on an assumption that the St Helens Canal will re-open in the future, the operation of the Project has the potential to permanently reduce air clearance for vessels navigating along the St Helens Canal and result in a reduction in its width.
- 18.7.39 The design for the New Bridge shows the crossing over the St Helens Canal at OSNGR 351739E 384760N, providing a minimum of 5m vertical clearance for future navigation and in line with clearances provided on the Bridgewater Canal. The Project design requires that the canal be narrowed from 14m to 10m in width in order to construct an abutment for the approach viaduct.
- 18.7.40 It is acknowledged that Fiddlers Ferry Sailing Club have requested an aspirational vertical clearance to be maintained on the canal for a typical yacht (paragraphs 18.6.7 and 18.6.22), which will not be achieved by the Project.
- 18.7.41 Although there are no plans in place for the restoration of the canal, the clearance provided by the design will however satisfy the navigational requirements set by SCARS and British Waterways (paragraph 18.6.6 and 18.6.8) allowing future navigation of the canal. It is therefore not anticipated that there will be any significant future effects of the Project on users of the St Helens Canal.

The River

- 18.7.42 It is anticipated that those activities listed below have the potential to have a significant effect on users of the River during the operation of the Project:
- Reduced air clearance for the navigation of vessels due to the presence of the New Bridge;
 - Reduced air clearance due to the presence of temporary structures required for maintenance activities; and
 - Physical obstruction due to the presence of the three towers.
- 18.7.43 Each of these effects is dealt with in turn below.
- Reduced Air Clearance due to the presence of the New Bridge
- 18.7.44 As noted at paragraph 18.6.11 the Railway Bridge is the structure which currently restricts the vertical clearance over the Upper Mersey Estuary to 23.5m above MHWS (28.6m AOD).
- 18.7.45 The New Bridge design shows that the following vertical clearances for navigation along the River will be provided. These measurements have been based on MHWS at Widnes.
- North tower: 15.46m above MHWS (20.56mAOD);
 - Central tower: 17.35m above MHWS (22.45mAOD); and
 - South tower: 19.2m above MHWS (24.30mAOD).
- 18.7.46 It can be seen that the New Bridge will reduce the vertical clearance currently available to navigational craft.
- 18.7.47 As the New Bridge is located between Widnes and Fiddlers Ferry the vertical clearances for the New Bridge using the data for Fiddlers Ferry have also been calculated, to address the difference in MHWS at this location which is 0.3m above MHWS at Widnes. This is shown in Table 18.4. Based on this information the proposed vertical clearances in the River above MHWS at Fiddlers Ferry will be as follows:
- North tower: 15.16m above MHWS;
 - Central tower: 17.05m above MHWS; and
 - South tower: 18.90m above MHWS.
- 18.7.48 As noted at paragraph 18.6.22 Fiddlers Ferry Sailing Club requested that a clearance of 10.1m above MHWS be maintained to allow the navigation of a typical craft along the River. This is based on a vessel height of 12m from top of mast to keel with a depth of 1.9m. This clearance is potentially available at all towers locations for the New Bridge as shown above. The minimum vertical clearance over the Upper Mersey in the Project design is at the north tower.
- 18.7.49 Based on this data and the vertical clearance of the New Bridge will be sufficient to allow navigation of the larger vessel specified by Fiddlers Ferry Sailing Club in paragraph 18.6.22 beneath the New Bridge.
- 18.7.50 It is therefore considered that there will be no significant effect on users of the River due to the operation of the Project in terms of air clearance.

Reduced Air Clearance due to Maintenance Activity

- 18.7.51 During regular maintenance of the New Bridge structure there will be a temporary reduction in vertical clearance due to the requirement for temporary structures beneath the final soffit level. This will be short term and temporary in nature and of low magnitude. Based on the importance of the receptor (moderate) and the magnitude of this effect (low) it is therefore considered that there will be a low significant effect for users of the River due to maintenance activity.

Towers

- 18.7.52 The Project will result in the presence of three towers within the River. These will present a permanent obstruction to navigation.
- 18.7.53 As part of the design process, and in line with MDHC requirements, the towers will be lit in accordance with the IALA requirements. In addition the hydrodynamic assessment (Chapter 7 of this ES) indicates that, should channels within the Estuary coincide with the tower position, there will be localised scour resulting in an increased depth and channel width in the tower vicinity. These changes would have no effect on navigation within the channel except the requirement that the master of any vessel takes appropriate action to safely navigate passed the structure. It is therefore considered that their physical presence will have an effect of moderate magnitude on users of the River as they would be affected during both the high and low season. Based on the importance of the receptor (moderate) and the magnitude of effect (low) it is considered that the effect will be of low significance
- 18.7.54 It is acknowledged that the New Bridge may be influenced by wind effects due to the nature of such a structure within the exposed expanse of the Estuary. The effect of the wind on the bridge itself has been considered as part of the iterative design and through inclusion of wind shielding along the bridge deck to shield high sided vehicles and minimise disruption.
- 18.7.55 Localised elevated wind speeds around the New Bridge towers have the potential to present a hazard to craft navigating the Upper Estuary. Should small craft pass close to the towers during high wind conditions they would experience elevated wind speeds. This effect would be felt in the immediate vicinity of the towers. It is considered that this effect will be of low magnitude as navigation would only be affected in a localised area. Based on the importance of this receptor (moderate) and the magnitude of effect (low) it is considered that there will be an effect of low significance on users of the River due to the presence of towers and localised elevated wind speeds.

The Manchester Ship Canal

- 18.7.56 As noted in paragraph 18.6.30 a minimum vertical clearance over the Manchester Ship Canal of 24.25m above the normal water level is set by the existing Railway Bridge. Normal water level at this point of the Manchester Ship Canal is 4.38m AOD.
- 18.7.57 The New Bridge has therefore been designed to maintain a clearance no less than the minimum clearance provided at the Railway Bridge. A minim soffit level of 28.63m AOD is therefore maintained to ensure this clearance where it crosses the Manchester Ship Canal.
- 18.7.58 As noted at paragraph 18.6.32 the MSCC requires navigation lighting and signage to be incorporated into the design. It is also a requirement that highway lighting on the New Bridge must not affect the navigation of vessels in the canal. Such requirements have been taken into consideration in Project design, the detail of which will be designed in consultation with the MSCC.

- 18.7.59 Due to the design of the Project in line with the MSCC requirements it is considered that there will be no operational phase effects on users of the Manchester Ship Canal during the standard operation of the Project.
- 18.7.60 Use of a gantry (assumed to be approximately 2m in height for the purposes of this assessment) will be required to maintain lighting on the underside of the New Bridge. This will reduce navigational clearance on a short term, temporary basis having a negative effect on users of the Manchester Ship Canal which is considered to be of a low magnitude. Based on the importance of this receptor (high) it is considered that the significance of this effect will be moderate.

Bridgewater Canal

- 18.7.61 The Project will span the Bridgewater Canal at the present interchange between the Daresbury and Central Expressways (located at OSNGR 353325E 382843N), where it is proposed to upgrade the junction and change the traffic priority of the existing interchange. This is shown in Appendix 2.1 (Chapter 2). The crossing of the Bridgewater Canal will comprise three roads; the road from the New Bridge and the two slip roads onto the Bridgewater Expressway.
- 18.7.62 Currently two bridges cross the Bridgewater Canal at the Bridgewater Interchange. These provide an operational clearance of 4m for navigation. These bridges will be demolished during the construction of the New Bridge.
- 18.7.63 Based on consultation with the MSCC and baseline research (Section 18.6) the soffit level where the New Bridge crosses the canal has been designed to be no less than 30.26m AOD. The main span over the Bridgewater Canal will have a vertical clearance of 12.0m whilst the two slip roads will have vertical clearances of between 5.4m and 6.4m AOD.
- 18.7.64 The construction of the Project over the Bridgewater Canal will therefore not reduce the permanent air clearance over the canal below that specified by the MSCC giving an operational headroom in excess of 5m.
- 18.7.65 It is therefore considered that there will be no significant effects associated with the standard operation of the Project on users of the Bridgewater Canal.
- 18.7.66 Ongoing maintenance of the New Bridge deck during operation will require a temporary reduction in navigational clearance for short periods (up to two hours) by approximately 2m (as set out in paragraph 18.7.60). This will reduce navigational clearance by approximately 1m below existing levels and therefore have a short term, temporary negative effect on users of the Bridgewater Canal of low magnitude. Based on the importance of this receptor (high) it is considered that the significance of this effect will be moderate.

Aviation Interests

- 18.7.67 To ensure compliance with Airport requirements the New Bridge towers have been designed to be equipped with aircraft warning lights in accordance with CAA document 'Cap 168 Licensing of Aerodromes' (Ref 19). This states that "*Where obstacle lights are used on a tower supporting overhead wires or cables they should be located at three levels:*
- On the top of the tower;*
 - On the tower at the lowest level of the catenary of the wires or cables; and*
 - At approximately mid-way between these two levels".*

- 18.7.68 The design of the New Bridge towers is such that there will be no structures above 150m AOD. As requested by the Airport the design of the towers will incorporate aircraft warning lights in accordance with 'CAP 168'. In order to comply with the Airport's requirements regarding bird proofing (paragraph 18.6.49), the New Bridge deck's bracing members will be designed to minimise roosting opportunities. It is therefore considered that there will be no effect on users of Liverpool John Lennon Airport's controlled airspace.

Table 18.6 – Summary of Potentially Significant Navigation Effects

| Effect | Receptor and Importance | Nature of Effect (Permanent / Temporary and Magnitude) | Significance (High, Moderate, Low and Positive / Negative) |
|---|--|---|--|
| Construction Phase | | | |
| Temporary reduction in air clearance for navigational craft due to presence of construction equipment within watercourses / below existing soffit levels. | Users of the River Moderate importance | Negative Short Term Temporary Direct Low magnitude | Low negative significance |
| Temporary obstruction to navigation due to presence of cofferdams | Users of the River Moderate importance | Negative Short Term Temporary Direct Low magnitude | Low negative significance |
| Obstruction to navigation caused by presence of piled jetty | Users of the River Moderate importance | Negative Short Term Temporary Direct Low magnitude | Low negative significance |
| Operational Phase | | | |
| Temporary reduction of air clearance for navigational craft due to required maintenance and presence of structures below existing soffit levels. | Users of the River Moderate importance | Negative Short Term Temporary Direct Low magnitude | Low negative significance |
| Presence of towers within the Estuary presenting an obstruction to navigation. | Users of the River Moderate importance | Negative Long Term Permanent Direct Low magnitude | Low negative significance |
| Presence of towers within the Estuary causing localised elevated wind speeds affecting users. | Users of the River Moderate importance | Negative Long term Permanent Indirect Low magnitude | Low negative significance |
| Temporary reduction of air clearance for navigational craft due to required maintenance and presence of structures below existing | Users of Manchester Ship Canal. High Importance | Negative Short Term Temporary Direct | Moderate negative significance |

| Effect | Receptor and Importance | Nature of Effect (Permanent / Temporary and Magnitude) | Significance (High, Moderate, Low and Positive / Negative) |
|--|--|--|--|
| soffit levels. | | Low magnitude | |
| Temporary reduction of air clearance for navigational craft due to required maintenance and presence of structures below existing soffit levels. | Users of Bridgewater Canal. High Importance | Negative Short Term Temporary Direct Low magnitude | Moderate negative significance |

18.8 Mitigation, Compensation, enhancement and Monitoring

- 18.8.1 This section sets out measures to mitigate, compensate, enhance and monitor those significant negative effects identified in Section 18.7. Where effects were considered in Section 18.7 to be not significant no further recommendations have been made. Table 18.7 below provides a summary of all mitigation recommended.

Construction Phase

The St Helens Canal

- 18.8.2 Although the St Helens Canal will be altered with regard to its navigable width and vertical clearance, as there are no established plans to reopen the canal, it is considered that no mitigation measures will be required as part of the Project.

The River Mersey

- 18.8.3 No mitigation can be recommended to reduce the significance of reduced navigational air clearance along the River during the construction of the New Bridge. It is however noted that a vessel of 'typical' dimensions will be able to use this watercourse throughout the construction phase.
- 18.8.4 It is recommended that signage be installed to notify masters of vessels to the presence of cofferdams, piled jetties and air cushioned plant within the Estuary during the construction phase. In addition the MDHC should be notified of the duration and nature of all works in order to inform River users through issue of a 'notice to mariners'. A navigation route along the River will also be maintained at all times and appropriate consideration will be given to Health and Safety issues associated with the operation of air cushioned plant.

The River, the Manchester Ship Canal and the Bridgewater Canal

- 18.8.5 No construction phase effects have been identified for users of the Manchester Ship Canal and the Bridgewater Canal. However, both of these canals and the River are the subject of existing Acts of Parliament, which provide rights of navigation on these waterways. The construction of the New Bridge is likely to interfere with these rights of navigation. However, protective provisions will be offered to reduce the effect of this on users of these canals.

Aviation Interests

- 18.8.6 To ensure compliance with aviation law during construction the CAA will be informed of all temporary obstacles which exceed 300feet (ft) (or 91.4m) above ground level. This will then be communicated to all pilots via Notices to Airmen (NOTAM) as 'Temporary Navigation Warnings'.
- 18.8.7 No construction phase significant negative effects have been identified for users of the controlled airspace in which the Project is located and therefore recommendations for mitigation are not required.

Operation Phase

The St Helens Canal

- 18.8.8 As there are no current / proposed users of the St Helens Canal no mitigation measures have been recommended for the operation of the Project.

The River Mersey

- 18.8.9 Air clearance for a typical vessel navigating the River, as specified by Fiddlers Ferry Sailing Club, will be accommodated by the design of the New Bridge and therefore no mitigation is recommended.
- 18.8.10 All users of the River (Fiddlers Ferry Sailing Club and West Bank Boat Club) will be notified in advance of any proposed maintenance work on the New Bridge which may require a reduction in navigational air clearance. This will be achieved by notifying the MDHC who will then be able to inform users where necessary via a 'notice to mariners'.
- 18.8.11 Signage will be provided close to the New Bridge towers to warn craft navigating this section of the River of possible hazards that may be experienced due to increased local wind speeds around the towers.
- 18.8.12 No mitigation is recommended to reduce the significance of effects associated with the presence of the towers within the Estuary which will present an obstacle to navigation.

The Manchester Ship Canal

- 18.8.13 The use of a gantry will be required to maintain lighting on the underside of the New Bridge during operation. This work will comply with the MSCC's requirements as set out in paragraph 18.6.31.
- 18.8.14 The MSCC indicated that lighting implemented as part of the Project must not affect navigation of vessels in the canal. Highway lighting must therefore be screened using cut off lights to prevent light spill into the canal.

The Bridgewater Canal

- 18.8.15 Maintenance of the New Bridge over the Bridgewater Canal will be scheduled during the winter period when the canal is closed for maintenance in order to reduce effects on both recreational and maintenance users of this watercourse.

Aviation Interests

- 18.8.16 To ensure compliance with aviation law during operation the CAA will be informed of all permanent structures which exceed 300ft above ground level. These will then be communicated to all pilots via NOTAMs and will be included on future editions of all relevant aeronautical charts.

18.9 Residual Effects

- 18.9.1 Residual effects associated with the construction and operation of the Project are summarised in Table 18.7 below.

Construction Phase

The St Helens Canal

- 18.9.2 It is considered that there will be no residual construction phase effects on users of the St Helens Canal as it is currently not navigable.

The River

- 18.9.3 Mitigation, including signage and advanced warnings, has been proposed to reduce the significance of effects associated with the following activities within the navigable channels:

- a. Reduced air clearance;
- b. Presence of cofferdams;
- c. Use of piled jetties; and
- d. Use of air cushioned plant.

- 18.9.4 Due to the presence of structures within the Estuary and the requirement for masters of vessels to negotiate these structures the effect of the above construction activities following mitigation is considered to be of low negative significance.

The Manchester Ship Canal

- 18.9.5 There will be no significant negative effects for users of the Manchester Ship Canal during the construction phase due to compliance with MSCC requirements during construction and as part of the Project design.

The Bridgewater Canal

- 18.9.6 There will be no significant negative effects for users of the Bridgewater Canal during the construction phase due to compliance with stakeholder requirements during construction and as part of the Project design.

Aviation Interests

- 18.9.7 Due to the design of the New Bridge and compliance with the airport requirements it is not considered that there will be any significant negative effects on aviation interests associated with the construction of the Project.

Operation Phase

The St Helens Canal

- 18.9.8 It is considered that the Project will have no negative significant effects on users of the St Helens Canal during its operation.

The River

- 18.9.9 It is considered that due to its temporary and short term nature and the issue of advanced warnings for navigational users, further reductions in navigational air clearance under the New Bridge for maintenance activities will not result in a negative effect for users of the River.
- 18.9.10 It is considered that, based on hydrodynamic findings and the installation of signage close to the New Bridge towers warning vessels of potential risks associated with localised increased wind speeds, navigation along the River will be undertaken with no effect to users.
- 18.9.11 Masters of vessels will be required to negotiate the New Bridge tower structures located within the Estuary. The effect of their presence following mitigation is therefore considered to be of low negative significance.

The Manchester Ship Canal

- 18.9.12 All maintenance work will be agreed in advance with the MSCC and will be compliant with their requirements resulting in no significant negative effects on users of this canal for navigation during maintenance activity.

Bridgewater Canal

- 18.9.13 Maintenance of the New Bridge over the Bridgewater Canal will be scheduled during the winter period when the canal is closed for maintenance in order to reduce effects on both recreational and maintenance users of this watercourse. This will result in no significant negative effects on users of this canal for navigation during maintenance activity.

Aviation Interests

- 18.9.14 Due to the design of the New Bridge and compliance with the airport requirements it is not considered that there will be any significant negative effects on aviation interests associated with the operation of the Project.

Table 18.7 – Navigation Residual Effects

| Effect | Receptor and Importance | Nature of Effect (Permanent / Temporary and Magnitude) | Significance (High, Moderate, Low and Positive / Negative) | Mitigation & Enhancement Measures | Significance of Residual Effects (High, Moderate, Low and Positive / Negative) |
|---|---|---|---|--|---|
| Construction Phase | | | | | |
| Temporary reduction in air clearance for navigational craft due to presence of construction equipment within watercourses / below existing soffit levels. | Users of the River Moderate importance | Negative Short Term Temporary Direct Low magnitude | Low negative significance | Mitigation is not possible. | Low negative significance |
| Temporary obstruction to navigation due to presence of cofferdams | Users of the River Moderate importance | Negative Short Term Temporary Direct Low magnitude | Low negative significance | Signage to be installed to notify users to the presence of cofferdams. MDHC to be notified of all works. | Low negative significance |
| Obstruction to navigation caused by presence of piled jetty | Users of the River Moderate importance | Negative Short Term Temporary Direct Low magnitude | Low negative significance | Signage to be installed to notify users to the presence of piled jetties. MDHC to be notified of all works. Navigational channel will be maintained at all times along the River | Low negative significance |

| Effect | Receptor and Importance | Nature of Effect (Permanent / Temporary and Magnitude) | Significance (High, Moderate, Low and Positive / Negative) | Mitigation & Enhancement Measures | Significance of Residual Effects (High, Moderate, Low and Positive / Negative) |
|--|---|---|--|--|---|
| Obstruction to navigation caused by presence of air cushioned plant | Users of the River Moderate importance | Negative Short Term Temporary Direct Low magnitude | Low negative significance | Signage to be installed to notify users to the presence of air cushioned plant. MDHC to be notified of all works. Health and Safety requirements will be adhered to during operation of the amphibious craft | Low negative significance |
| Operational Phase | | | | | |
| Temporary reduction of air clearance for navigational craft due to required maintenance and presence of structures below existing soffit levels. | Users of the River Moderate importance | Negative Short Term Temporary Direct Low magnitude | Low negative significance | Advanced warning to users of the River will be issued prior to any maintenance activity. | Not significant |
| Presence of towers within the Estuary presenting an obstruction to navigation. | Users of the River Moderate importance | Negative Long Term Permanent Direct Low magnitude | Low negative significance | Mitigation is not possible. | Low negative significance |
| Presence of towers within the Estuary causing localised elevated wind speeds affecting users. | Users of the River Moderate importance | Negative Long term Permanent Indirect Low magnitude | Low negative significance | Signage around towers to warn users of possible high wind speeds. | Not significant |

| Effect | Receptor and Importance | Nature of Effect (Permanent / Temporary and Magnitude) | Significance (High, Moderate, Low and Positive / Negative) | Mitigation & Enhancement Measures | Significance of Residual Effects (High, Moderate, Low and Positive / Negative) |
|--|--|---|---|--|---|
| Temporary reduction of air clearance for navigational craft due to required maintenance and presence of structures below existing soffit levels. | Users of Manchester Ship Canal. High Importance | Negative Short Term Temporary Direct Low magnitude | Moderate negative significance | Scheduling of maintenance activities on the Manchester Ship Canal will be agreed with MSCC and will be compliant with requirements set out in paragraph 18.6.13. | Not significant |
| Temporary reduction of air clearance for navigational craft due to required maintenance and presence of structures below existing soffit levels. | Users of Bridgewater Canal. High Importance | Negative Short Term Temporary Direct Low magnitude | Moderate negative significance | Maintenance activities will be scheduled during the canal's winter maintenance period where possible to prevent effects on users of this canal. | Not significant |

18.10 References

- Ref 1 Civil Aviation Authority, 2008. *CAP393 Air Navigation Order, Amendment 1*
- Ref 2 Department for Transport, 2003. *The Future of Air Transport – White Paper*.
- Ref 3 Department for Transport, 2005. *Civil Aviation Bill*.
- Ref 4 Department for Transport, 2000. *Modern Ports: A UK Policy*.
- Ref 5 Department for Transport, 2007. *Ports Policy Review*.
- Ref 6 Department for Communities and Local Government, 2001. Planning Policy Guidance 17: Planning for Open Space, Sport and Recreation’.
- Ref 7 Department for Communities and Local Government, 2001. *Planning Policy Guidance 13: Transport*.
- Ref 8 Government Office for the Deputy Prime Minister, 2003. *Regional Planning Guidance for the North West* (RPG 13).
- Ref 9 Government Office for the North West, 2003. *Regional Planning Guidance for the North West* (RPG13).
- Ref 10 Liverpool John Lennon Airport, 2007. *Liverpool John Lennon Airport Masterplan to 2030*.
- Ref 11 Halton Borough Council, 2005. *Halton Unitary Development Plan*.
- Ref 12 Halton Borough Council, 2007. *Local Development Scheme*.
- Ref 13 Halton Borough Council, 2005. *Widnes Waterfront Regeneration Area Supplementary Planning Document*.
- Ref 14 Halton Borough Council, 2006. *Halton Borough Council Final Local Transport Plan 2006/07 to 2010/11*.
- Ref 15 Starkey, H.F, 1983. *Schooner Port – Two Centuries of Upper Mersey Sail*.
- Ref 16 UK Hydrographic Office, 2001. Manchester Ship Canal and Upper River Mersey. Chart Number 3478.
- Ref 17 International Association of Marine Aids and Navigation to Lighthouse Authorities (IALA), 1998. *Recommendation for the Marking of Fixed Bridges over Navigable Waters O-113*.
- Ref 18 Civil Aviation Authority, 2007, Aeronautical Chart Southern England and Wales, Edition 33, Sheet 2171CD
- Ref 19 Civil Aviation Authority, 2007. *CAP168 Licensing of Aerodromes*.