

## Preliminary Design of a New Crossing of the River Mersey

### Andrew Paul MARGINSON

Associate  
Gifford LLP  
Chester, UK

*Andy.Marginson@gifford.uk.com*



Andy Marginson, born 1966, received his civil engineering degree from the University of College of Wales Swansea, UK. He has worked for Gifford LLP Consultant Engineers UK since graduating and currently leads their bridge design team in the Chester office. His main area of interest is bridge design.

### Summary

The Mersey Estuary stretches approximately 35km inland and forms a major obstacle to North-South communications in the North West of England. The existing road bridge at Runcorn Gap opened in 1961 and was designed for 10,000 vehicles a day - it now carries over 80,000. Gifford were appointed by Halton Borough Council in 2001 to develop proposals for a new crossing. Various options were considered and compared in terms of traffic flows, economic benefit, environmental impact and objective satisfaction. The preferred option was for a route upstream of the existing bridge connecting the existing highways either side of the river. It crosses the estuary where it is approximately 1km wide. A 4-span cable stayed structure was chosen to reduce the effects on the tidal flows and the environment. The Scheme has been through a Public Inquiry, the results of which are expected during the first half of 2010.

**Keywords:** Preliminary Design, Environment, Estuary, Route Selection, Cable Stayed.

## 1. Introduction

### 1.1 The Mersey Estuary

The Mersey Estuary stretches some 35km in land from the North West coast of England and forms a major obstacle to North South communications.

The River Mersey is formed from three main tributaries: the Rivers Etherow, Goyt and Tame. The accepted start of the Mersey is at the confluence of the Goyt and the Tame in Stockport, Greater Manchester. From Stockport it flows into the Manchester Ship Canal, which is the canalised River Irwell to this point. It joins the Canal from the south but leaves it to the north before meandering through Warrington where it is tidal up to Howley Weir. The Manchester Ship Canal follows the general line of the Mersey and runs parallel to it in many places before finally joining it again at Eastham Locks, on the south bank of the river east of Liverpool.

West of Warrington the Mersey widens into a large estuary approximately a kilometre wide before narrowing to pass through the Runcorn Gap, a naturally occurring rock formation between the towns of Runcorn and Widnes. Downstream of Runcorn Gap it widens into a large estuary some 5km wide. The eastern part of this estuary is much affected by silting and has formed natural habitats for wildlife where it has been designated a Special Protection Area (SPA), Site of Special Scientific Interest (SSSI) and a wet land designated under the Ramsar convention. As it approaches the ports at Liverpool and Birkenhead, the river narrows to a width of 1.2km. It then flows into Liverpool Bay and the Irish Sea.

The conurbation either side of the outer estuary, known as Merseyside, comprises Liverpool on the north side and Birkenhead on the south. The docks on both sides of the river stretch some distance upstream, with the 12km length of Liverpool docks forming the largest interconnecting dock system in the world. During the industrial revolution the land either side of the river was developed all the way to Warrington and includes several major manufacturing facilities, all of which take advantage of the ports at Liverpool which are known as the "Gateway to the Atlantic". Many of these