

TAMING THE TIDES FOR GREEN-GROWTH ACROSS THE THAMES ESTUARY

For the economic benefits of the Thames Estuary growth corridor to be realised, it is widely recognised that the conurbations of North Kent and South Essex need to be connected. At the same time, climate change and rising sea levels are threatening to divide them, with over 110sq.km of the lower estuary exposed to flood risk. Improving connectivity and reducing flood risk are very costly, if considered as separate infrastructure projects. A single system of integrated infrastructure would save substantial costs, reduce the risks and increase the economic benefits.

London is fortunate in that the tidal range at Tower Pier is over 7m, so London is 3.5m above mean sea level and not immediately at risk, if the tides can be tamed. The Thames Estuary acts as a funnel, causing the tides to increase. From Southend Pier to Tower Pier they double in height. A barrier upstream across the tideway would be shorter but requires longer and higher sea walls around the estuary downstream to the sea. A barrier at Long Reach, just upstream from the Dartford Crossing requires a 106km system of subsidiary flood gates, sluices and sea walls downstream to the sea. In contrast a barrier between Southend and Allhallows across the Lower Thames Estuary would be just 8km long and faces lower tides. Should sea levels rise faster than currently projected the problem would be solved by raising 8km rather than 106km of flood datum, from a lower level.

The Metrotidal Thames Orbital integrates the next generation of London's flood defences with a rail orbital, floating solar array, data storage and distribution to provide a robust TE2200 system with substantial green-growth across the Lower Thames Estuary for a lower cost and environmental impact than the current TE2100 proposals for managed retreat. The green growth is achieved through the generation of renewable energy for the 100,000 new homes already planned around the estuary, along with improved transport connectivity and efficient data storage and distribution.

The integrated infrastructure consists of a throttle, formed by extending sea walls across Sea Reach, which reduces the tidal range upstream in the event of a storm surge, thereby providing all landward areas to London with flood defences through the 21st century, while leaving the tideway open for navigation to all existing wharves and docks. The system can then become a full barrier, when required in the 22nd century, with the 8km flood datum raised as necessary to meet rising sea levels.

A 3km tunnel formed within the sea walls links existing rail lines to complete two new twin-track rail orbitals, around the Lower Thames Estuary and around Greater London and the Southeast:-

- The Metrotidal Thames Orbital incorporating the eastern limbs of Crossrail serves all areas of the Thames Estuary from Central London to the sea. Just 12km of new railway line creates a 132km orbital of the Thames Estuary from Central London.
- The Metrotidal R25 Orbital connecting southeast and northeast rail quadrants around Greater London completes a rail orbital for the East and Southeast passing through Oxford and Cambridge, Southend and Maidstone, Redhill and Reading. Just 23km of re-opened line and 26km of additional new line in Essex, combined with existing twin-tracks and the forthcoming East West Rail link between Oxford and Cambridge completes a 454km twin-track R25 rail orbital of Greater London, East and Southeast of England.

The Metrotidal Thames Orbital, including a 4sq.km floating solar array and cycle superhighway, with data storage and distribution, provides sustainable connectivity for over a million households, generating green-growth across the Lower Thames Estuary into Essex and Kent. The Metrotidal R25 Orbital provides better transport and data connectivity for the 20m people of London, East and Southeast England.

Construction undertaken in the tideway makes use of a rail head from concrete casting facilities at an aggregates wharf nearby on the Isle of Grain. Spoil from the tunnel excavations is reused locally for embankments and flood bunds, to minimise the embodied energy and environmental impacts of construction. The sea walls protect the estuary from tidal squeeze, preventing the loss of over 800 hectares of saltmarsh and intertidal habitat.

In summary, a policy of managed retreat that sacrifices land to the sea and increases the flood defence line is replaced by an integrated Metrotidal Urban Orbital that protects existing assets and habitats, reduces the flood defence line and provides green growth. The orbital flood defence system developed for the Thames is applicable to urban estuaries around the UK including Tyneside, Teesside, Humberside, Haven Ports, Medway, Southampton, Bristol, Belfast and Glasgow. Further details of the Metrotidal Thames Orbital and other urban orbitals are provided on the webpage www.metrotidal.com.

Managed Retreat: -

- Loss of land and assets
- Loss of existing habitats
- Higher flood defences
- Longer flood defence line
- Isolation of coastal and riparian settlements
- Higher costs and carbon audit

Metrotidal Urban Orbital: -

- Protects landward land and assets
- Protects landward habitats
- Lower flood defences
- Shorter flood defence line
- Unites the estuary economy
- Provides green growth with lower costs and carbon audit