Investment WP1I1
‘Adaptation of Blackpool Tramway for tram-train operation’

Investment WP1I2
‘Foundation investments to link Blackpool Tramway to preferred tram-train/tram-rail option’
Sustainable transport for North-West Europe’s periphery

Sintropher is a five-year €23m transnational cooperation project with the aim of enhancing local and regional transport provision to, from and within five peripheral regions in North-West Europe.

INTERREG IVB

INTERREG IVB North-West Europe is a financial instrument of the European Union’s Cohesion Policy. It funds projects which support transnational cooperation.
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Introduction

The Sintropher project has enabled the following investments that will future-proof the Blackpool tramway system for the sustainable transport challenges that the coming years will bring:

- WP1I1 – Adaptation of Blackpool Tramway for tram-train operation
- WP1I2 – Foundation investments to link Blackpool Tramway to preferred tram-train/tram-rail option

Over Sintropher’s lifetime, the Blackpool Tramway project has turned an obsolete coastal line into a state-of-the-art transport system, an asset for the entire Fylde Coast.

This report considers the background to these investments, also referring to Sintropher Work Package 2’s option appraisal work to identify a preferred system extension model, which will rely on the project investments.
The Fylde Coast has been privileged to be a Sintropher project partner, helping establish and benefiting from best practice. The project team now looks forward to promoting and seeking funding to implement the preferred option.
Part 1
Background: building on the Blackpool Tramway project

The resort of Blackpool is the Fylde Coast peninsula’s largest settlement and economic centre. This area tends to be geographically isolated from its associated UK region, with settlements within it being relatively small and disparate. Although the M55 motorway connects Blackpool to the national motorway network, main north-south arterial routes bypass the peninsula, including the West Coast Main Line railway line and the M6 motorway. Thus the Fylde Coast is truly a peripheral EU area with clear issues in maintaining its competitive position within a globalised economy, beyond providing a dormitory for Preston as a regional centre.
The Blackpool Tramway system opened in 1885 and is one of the world’s oldest electric tramways. Previously an extensive system served the resort’s hinterland, but closures and replacement with motor buses reduced it in the present day to an 18km seafront system running between Starr Gate and Fleetwood. The current layout of light and heavy rail links is shown as figure 2.
Figure 2: The current layout of light and heavy rail links
The surviving system’s increasing obsolescence and maintenance burden threatened its closure. Furthermore, the system has operated with a dispensation from disability access legislation based on its continuous operation. However, Rail Vehicle Accessibility Regulations designed to meet the Disability Discrimination Act 1995’s requirements will be mandatory from the end of 2019. Despite these factors the system has carried 4m passengers per annum, 85% of which were in the tourism season between Easter and November (end of the Illuminations event), up to its renewal. The following graph (figure 3) shows ridership of the Blackpool Tramway since 1989.

Figure 3: Ridership of the Blackpool Tramway since 1989


The Fylde Coast is heavily dependent upon tourism and leisure businesses. Local resorts have suffered from competition from package holidays to foreign destinations. Blackpool in particular has suffered heavily with severe socio-economic consequences. The resort has a resident population of 140,000, within a Fylde Coast total of 300,000. It enjoys 13 million tourism visits per annum. Blackpool is the sixth most deprived local authority area in the country and first in terms of deprivation concentration, according to the 2010 Indices of Deprivation. Car ownership is low, the 2011 census showing 36.7% of households without car access. The tramway is both a tourist attraction in its own right (hence the need to maintain the heritage fleet) and an essential mass transit system between settlements and attractions.
Following a rigorous option appraisal and business planning process, the UK’s Department for Transport (DfT) approved a major scheme bid in January 2008, enabling £101m to be invested in a near total renewal securing the tramway’s future contribution to sustainable transport and the Fylde Coast’s regeneration.

The renewal has provided the following:

- 16 new Bombardier Flexity 2 low-floor, fully disabled access trams
- 73 new raised tram platforms with ramped access
- 8km of replaced track
- 13 traffic-signalised highway junctions and five road closures to provide tram priority and improve the journey time
- Highway separation works past the Metropole Hotel to address traffic safety issues
- A new tram depot at Starr Gate to stable and service the new trams
- Refitting of seven existing tramway substations with new transformer equipment and the construction of two new substations at both ends of the tramway
- Overhead line renewed (around 44km total length) and 250 traction poles replaced
- 5km of trackside fencing replaced.

The new system has reduced end-to-end running time by 15 minutes.

Additionally ten double-deck ‘heritage’ vehicles have been modified to use the new platforms and will supplement the peaktime service between the Pleasure Beach theme park and the town of Cleveleys. Further retained vehicles offer a summer ‘heritage’ service and the illuminated ‘western-train’, ‘frigate’ and ‘trawler’ trams operate during the Illuminations event.

The Blackpool Tramway’s renewal has provided the foundation for Sintropher’s work to consider extending the system further and to assess the role that tram-train technology might play in facilitating such extensions. This will effectively future-proof the system by enabling it to use Fylde Coast metals and to connect to other public transport systems, particularly heavy rail.

Prior to the Sintropher project, work completed for the Fylde Coast Light Rail scheme identified a number of possible extensions to the Blackpool Tramway. The Tramway renewal scheme formed phase 1 of these proposals, which included:

- Blackpool North railway station: this would provide close to seamless rail access for holidaymakers and other visitors to all seafront hotels and
attractions including the Pleasure Beach Resort, and to Cleveleys and Fleetwood. The latter two towns would have effective access to the national heavy rail network for the first time in generations.

- South Fylde Line railway line: this single-track railway line provides an increasingly inadequate service to the developing South Fylde corridor, which conversion to light rail operation has the potential to improve.

The Sintropher project has also enabled the concept of a Fylde Coast sub-regional light rail network to be considered, including unused heavy rail alignments between Poulton-le-Fylde and Fleetwood, and the Carleton Curve connecting Blackpool with Fleetwood.

In line with the two investment commitments, the Blackpool Tramway system has been adapted to accommodate tram-train vehicles. Additional infrastructure to enable future light rail access to Blackpool North railway station has been provided.
Complete system renewal has enabled the Blackpool Tramway’s specification to be reviewed to ensure that it will provide the service that the Fylde Coast community and its visitors require for the foreseeable future. And as part of this overall upgrade, the Sintropher project has enabled investments in two specific areas:

- WP1I1 – Adaptation of Blackpool Tramway for tram-train operation
- WP1I2 – Foundation investments to link Blackpool Tramway to preferred tram-train/tram-rail option.

**Adaptation of Blackpool Tramway for tram-train operation**

Under Investment WP1I1, Sintropher funding has enabled the system to be prepared for possible tram-train vehicles and further extensions. Modern vehicles tend to be 2.65m wide as they will run from the mainline railway. Prior to modernisation the tramway was not able to deliver appropriate clearances, so the system now incorporates clearances for larger vehicles, crossings, compatible platforms and
power supply capacity, including upgraded and new transformers. The 2.65m wide Flexity 2 vehicle selected was used to help define the theoretical tram envelope, which has underpinned the design process. Thus the tramway has been adapted for tram-train operation should this be adopted in the future. These investments underpin any geographical system extensions that might be pursued, corresponding with feasibility work establishing business cases under Actions 15, 16 and 17. These are considered in this document’s sister report.

Figure 4: Illustration of the step change in the quality of provision of tram services.

Pre-Tram upgrade
Post-tram upgrade

Foundation investments to link Blackpool Tramway to preferred tram-train/tram-rail option

To address Investment WP112, 'Foundation investments to link Blackpool tramway to preferred tram-train/tram-rail options', track infrastructure in the form of a delta junction has been installed at Talbot Square enabling future access to terminus platforms at the Blackpool North station, in line with the preferred extension option that has been identified under Work Package 2. The top panel of figure 5 provides an indicative alignment of how this will look. Further investment and track modifications at the Bispham and Thornton Gate location increase track capacity and offer turnback facilities or potential tram-train operation to Bispham and Cleveleys.
Figure 5: indicative alignment
This new trackwork is easily visible to the public at a very prominent junction in Blackpool, as figure 6 shows.

Figure 6: New delta junction at Talbot Square looking southbound

Siting platform interchange facilities within Talbot Square has also been considered, to improve north-south journeys when trams are serving the railway station. Although the facilities proposed would be sited in Blackpool, the project reference group recognises the sub-regional benefits that would be achieved. The reference group includes the tramway upgrade’s co-sponsor, Lancashire County Council.

The wider scheme as joint-funded with the UK Department for Transport is detailed below:

The tramway upgrade

The resulting system is easily able to accommodate the further developments that are foreseen. As further options achieve a viable business case in response to the growing societal need to move towards sustainable transport patterns, the future-proofed Blackpool system with its high-quality and versatile vehicles, has the potential to underpin a sub-regional light rail network programme.

Maintaining a flexible structure that will allow future extensions has been an important consideration within the upgrade strategy. Principal scheme components are:
• Track – 8km relaid to the theoretical vehicle envelope (2.65m wide vehicles)
• Overhead Line Equipment – 44,000m replaced to Network Rail (heavy rail) standards, in view of Blackpool’s severe climatic conditions
• Electrical infrastructure – two new sub-stations at each end of the line provide capacity for intense modern vehicle operation
• Platforms – DDA-compliant, 280mm high and 42m long
• Priority crossings – 16 signalled crossings incorporating tram detection to provide priority.

In summary, the following has been achieved:

• The Blackpool Tramway can accommodate larger light rail or tram-train vehicles in respect to:
  o Track clearances and load-bearing
  o Platform height, access and disabled accessibility
  o Power supply
  o Depot facilities including:
    ▪ Underfloor wheel lathe
    ▪ Tram vehicle-lifting
    ▪ Tram wash
    ▪ Sanding facility
• Point turnouts have been provided at Talbot Square to facilitate later extension to the railway station
• Track modifications at Bispham and Thornton Gate to enable tram-train operation to Bispham and Cleveleys
• The sixteen-unit Flexity 2 fleet can accommodate extensions in the medium term, including potential running onto the South Fylde Line

The vehicles

The Bombardier Flexity 2 tram is a versatile and robust vehicle, designed in partnership with the Blackpool project team and now being marketed worldwide. It is 2.65m wide, 32m long and accommodates 74 seated passengers with 150 standing. The vehicle is 100% low-floor and provides for two wheelchairs. The fleet purchased provides the ride quality and versatility needed to provide light rail rapid transit in a tourism-resort context. These vehicles have been designed with the capacity to serve
over an extended network, the fleet size being sufficient to provide competitive frequencies.

This document’s sister report, summarising Actions WP2A15, WP1A16 and WP1A17, lays out a programmer of appraisal options, a de facto sub-regional light rail network available to implement as demand for sustainable transport increases and business cases are established.
The Blackpool Tramway renewal and its links to Sintropher offers a best practice case study of some transnational significance. This is principally that an existing system can provide a foundation for later system expansion, with forward planning and careful design.

**Building on an existing system**

Blackpool's tramway refurbishment has been criticised on the ground that the system acts principally as a summer season tourism attraction rather than a 'proper' mass transit system. Higher than predicted ridership fuelled by local patronage has disproved this negative view, and anecdotally the tramway is now recognised as transport rather than a moving museum. The chart (figure 7) below provides a ridership profile from the system’s reopening in April 2012:
The Blackpool Travel Team is providing individualised travel planning services to families and will be able to provide information on the passenger profile as the system ‘beds in’.

The seafront alignment once lost with the system’s closure, would have been redeployed for other transport or public realm purposes making it unavailable for future light rail investment. The potential loss of such alignments should be a key consideration within business planning systems. Although the alignment does not enter Blackpool’s urban core, it does enter Cleveleys village centre providing vital retail access, running on-street into Fleetwood providing door-to-door public transport between homes and shops.

The system has potential for a number of extension options in addition to that identified as a preferred option under WP2A15 and the South Fylde Line conversion options also appraised. Considered under the Fylde Coast Light Rail scheme, Sintropher has allowed further appraisal of these options. Sintropher investments provide for the first extension to Blackpool North railway station to be achieved.

Further option implementation depends upon the need to increase sustainable transport provision and the national resources available to meet these needs. The Blackpool system is prepared to accommodate tram-train vehicles should resources be brought forward, providing potential to share heavy rail alignments and penetrate urban cores.

The UK’s new Local Enterprise Partnerships might consider ways of safeguarding former heavy rail alignments for light rail investment. The Sintropher project places this issue in an international resourcing and decision-making context.
Preparing for the future
Blackpool’s project demonstrates that using careful design, controlling costs and effective procurement it is possible to future-proof a public transport system within cost and a defined design envelope.

The system can be extended and can easily adopt bulkier tram-train vehicles. However, the existing fleet is flexible, with the capacity to provide appropriate service frequencies for an effective mass transit system. It provides a potential foundation for the sub-regional light rail system vision, increasing access to Preston as a significant economic centre and national rail hub (including possible high-speed rail access).

Making the case for funding
The sub-regional commitment to the existing system’s expansion that has been established strengthens the case for further funding. This will be taken forward under Action WP4A18. The Blackpool North railway station extension, facilitated by investment in necessary track infrastructure, has been proposed for entry into the new UK devolved major schemes funding system.

Proposals for the South Fylde Line are also compatible with the UK’s Network Rail infrastructure management organisation’s ‘Alternative Solutions – Route Utilisation Strategy’, which foresees light rail conversion as a solution to re-providing obsolete equipment currently operating branch lines.

The investment that has been made underpins the preferred business case outlined in this report’s sister document.

Supporting regeneration
Improved connectivity, particularly to the knowledge-led economy, is essential to effective regeneration. The proposed railway extension would dramatically improve rail access to Preston from the Fylde Coast. Although work under WP2A15 has identified a very low benefit cost ratio (BCR) for South Fylde Line tram-train conversion at this time, such conversion would provide connectivity with Preston for both North and South Fylde.

The Blackpool Tramway’s enhanced specification enables its potential role as a regeneration agent. Other work within the Sintropher project demonstrates light rail’s potential regeneration catalysing role and it is reasonable to consider that this pattern might be repeated along the South Fylde corridor as high-quality public transport provision supports mixed-use development.
Light rail’s ability to operate within a public realm environment makes it ideal to provide public transport within constrained regeneration sites where highway capacity also needs to be improved. Such sites require public transport connectivity within the local urban form and to the national rail network.
The investments made and the vehicle fleet available offer cost-effective system development options without purchasing new trams or tram-trains. WP2 work outlines feasibility work on possible extensions that might be implemented, which will enable resources to allow the preferred option to extend the system to Blackpool North railway station to be pursued.

Funding for the preferred option will initially be pursued through the emerging local transport board structure; this process will take place throughout 2013.

Future preferred option promotion will take place in line with WP4A18. This may overlap with marketing initiatives relevant to WP4AP26. Progress towards further satisfactory business cases will also be pursued in line with the Sintropher project’s initial sub-regional focus, with reference to the Network Rail Alternative Solutions RUS’s development.
In the meantime, the Blackpool Tramway will continue to operate, growing its ridership as local commuters make further use of it. The investment will stand ready until resources to develop the system and realised its full potential become available.
Part 5
Further information

Detailed findings - Main Report

This is available from David Simper, Blackpool Council or online at www.sintropher.eu/reports
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What is Sintropher?

Sintropher is a transnational cooperation project bringing together five regions in North-West Europe. The project is due to last five years, with 14 partner agencies in five EU Member States. With a budget of €23m, it is part-financed by the EU INTERREG IVB programme, and involves a series of 36 feasibility evaluations, pilot investment and demonstration projects, as well as comparative analysis of EU best practice. The Lead Partner is University College London.

All our work is motivated by one overarching aim: to develop sustainable, cost-effective solutions to improve accessibility to, from and within peripheral regions in North-West Europe. As part of this, we have four specific objectives:

- Promote best possible cost-effective technology-based solutions
- Assess the appraisal procedure for regional tram systems and improve the business case development process
- Achieve high-quality, seamless interchange between regional tram systems and regional rail and air hubs
• Promote and market the benefits of regional tram-based systems to users and stakeholders

We have a particular focus on tram-train systems which allow local trams to run on to national rail networks, pioneered in Karlsruhe and developed in Kassel (Germany), which allow urban tram systems to extend over national rail tracks to serve extensive city regions. Additionally we are looking at high-quality interchanges at key rail or air hubs.

In all, project partners from five demonstration regions in five EU Member States are working together: Valenciennes (France); the Fylde Coast (UK); West Flanders (Belgium); North Hesse (Germany); and Nijmegen-Kleve (The Netherlands). Participants include public transport operators, local authorities, regional management bodies and universities.

Each region will implement a programme of technical and economic feasibility evaluations for new systems, pilot investment projects, and demonstration projects, of which the present findings report is one such document. This will be complemented by a set of comparative analyses of EU best practice.

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