A personal insight to some of the issues with Tram Train

All Party Parliamentary Light Rail Group

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TramForward

What is a Tram Train

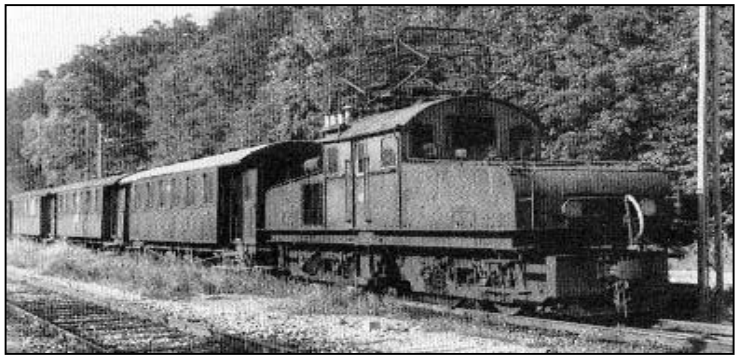
- Is it a Tram?

- Or is it a Train?

- Or is it both
- A general panacea to local transport problems
- An abomination that should not be let near “Real Railways”

Origins in Karlsruhe

- The City of Karlsruhe perceived that they had a problem with local transport and road congestion
- They had a tram system.
- They had a run down and failing main line commuter railway
- They came up with the concept of the Tram that could run on the main lines as well as on the city's tram network
- In 1961, they connected the Albtalbahn to the Karlsruhe tram network



Dramatic increase in passenger numbers!

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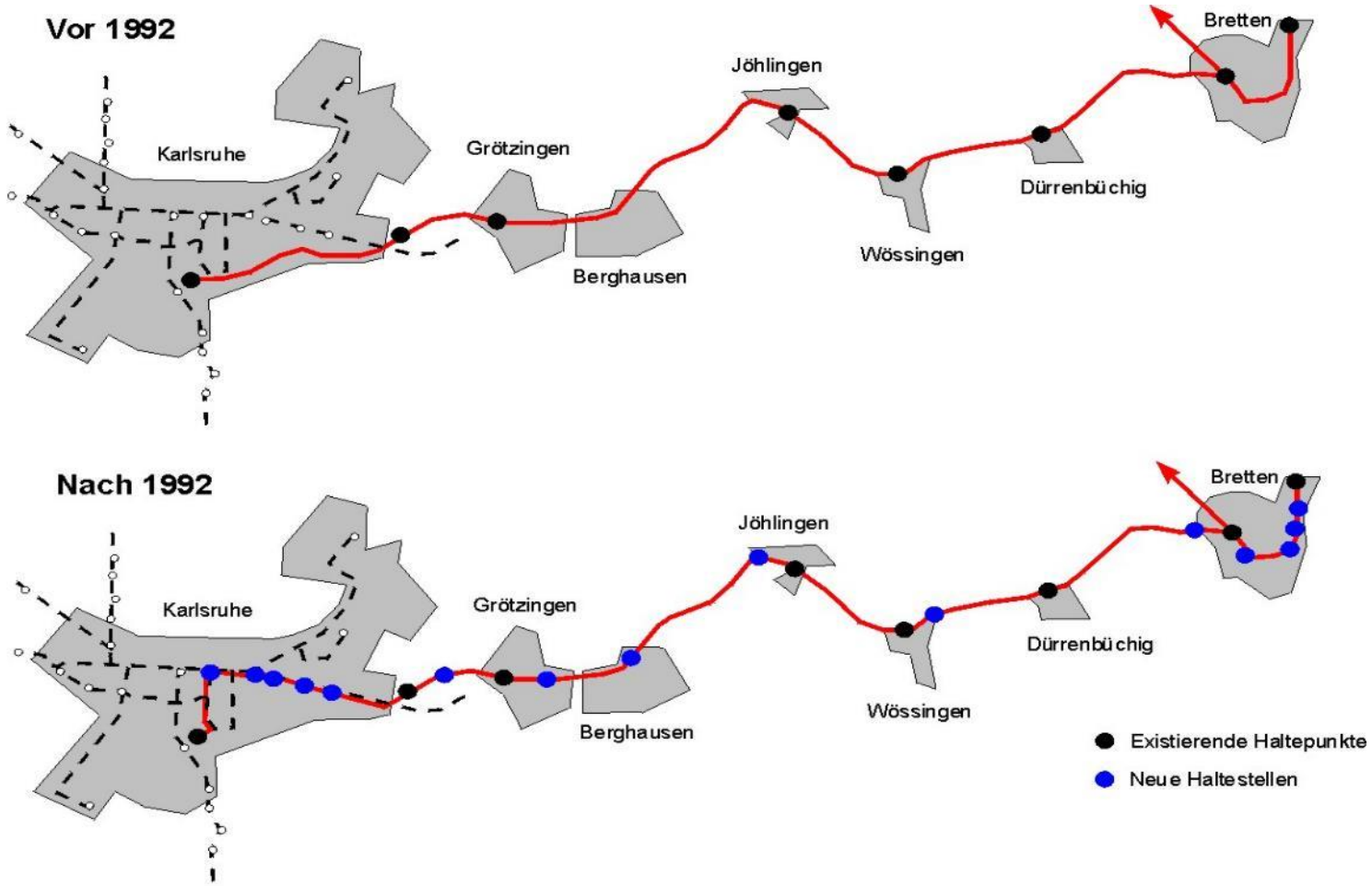
Pilot Line Karlsruhe – Bretten



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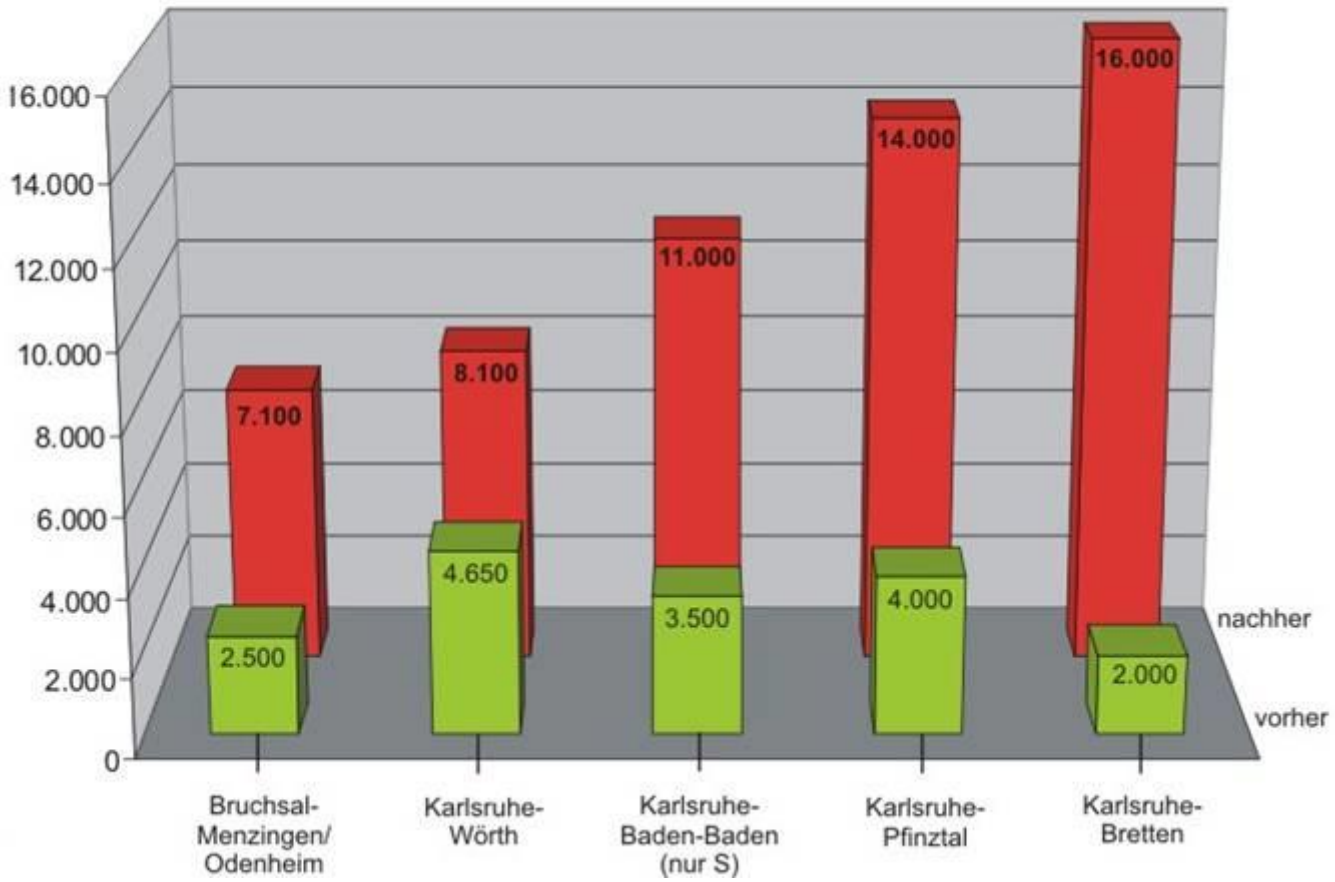
Karlsruhe - Outcomes



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European Experience

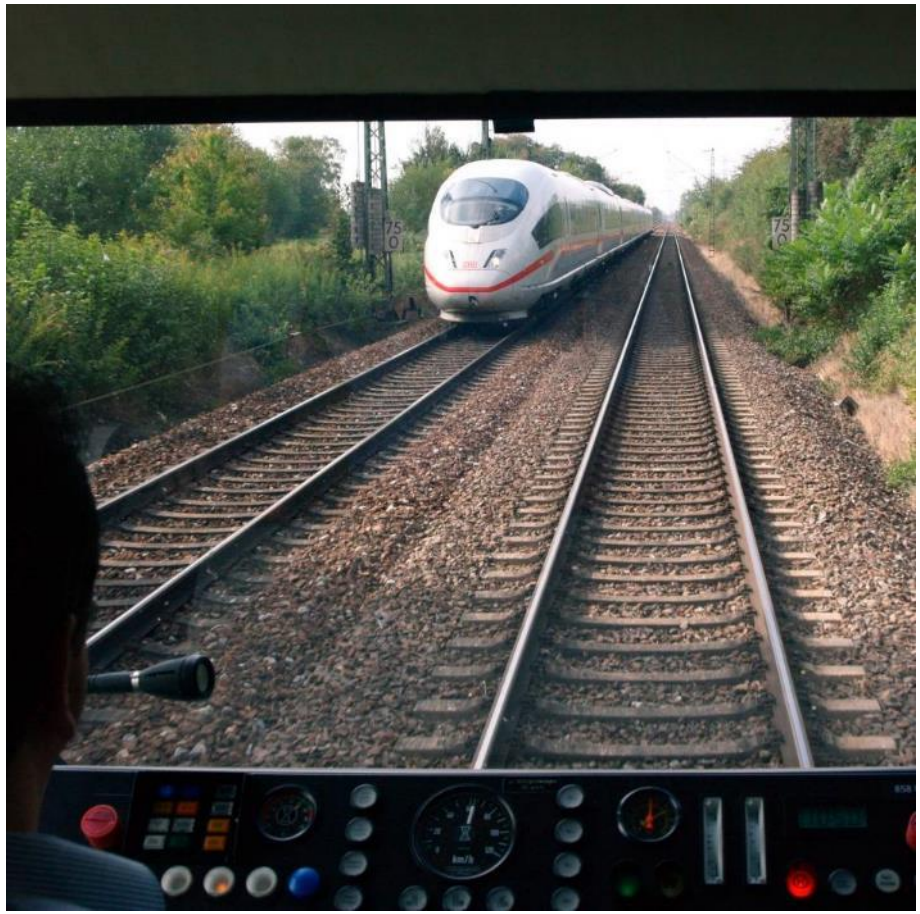
- Germany
  - Karlsruhe
  - Kassel
  - Nordhausen
  - Saarbrücken
- Netherlands
  - Alphen aan der Rijn
  - Randstat Rail
- Spain
  - Alicante
- France
- Leeds?

So What makes a Tram a Tram Train

- Can run on city tramways
  - Fitted for roads eg headlights, rear view mirrors/CCTV and directional indicators
  - transponders to activated tramway S&C
  - Tramway Comms Equipment
  - Track Brakes
  - 750/600V DC OLE traction
- Can run on the Main Line
  - Yellow front? & Rail headlights
  - AWS & TPWS (ERTMS)
  - GSM-R
  - Diesel/25kV AC OLE/other traction

So What makes a Tram Train Service

- It runs as a tram on city street tramway
- It uses the mainline for part of it's route
- It inter-operates with other main line trains
- If it doesn't run on the street it could be another form of light rail
- If it doesn't interoperate with mainline trains, it only needs to be a tram



What makes a Tram Train Special

- Crashworthiness
- Train detection and protection
- Wheel profile
- Vehicle end lighting
- Infrastructure Compatibility
  - Platform Heights
  - Track issues
  - Electrification
- TSIs
  - Vehicle exempted
  - 750 V dc exempted
  - Tram-Train specific equipment exempted

The Devil is in the Detail

- Crashworthiness
- Platforms
- Track standards
- Signalling immunisation
- Electrification
- EMC
- Telecoms
- Timetable planning
- Tramway mindset

- Wheel Profiles
- Tramway standards
- Signalling detection and protection
- Stray Currents
- Driver training
- Cost
- Heavy Rail mindset
- Trespass risk

You need to talk to NetworkRail and UK Tram

Infrastructure works

- Provision of low platforms
- Track modification and upgrade
- Any associated access improvements
- Structure gauge clearance
- Signalling modifications (e.g. Additional TPWS)
- 750V DC Electrification
- Future 25kV Electrification

Track Issues – Heavy Rail and Tramway

- Rail Inclination
  - Main line – 1 in 20
  - Tramway – 1 in 40
  - In road tramway – Vertical
- Wheel Profile
  - Tramway v Main line
    Flange thickness & depth
  - Protection at S&C with raised Check Rail
  - Ride up on main line switched
- Tramway Rails
  - City Centre rails with deeper flangeways

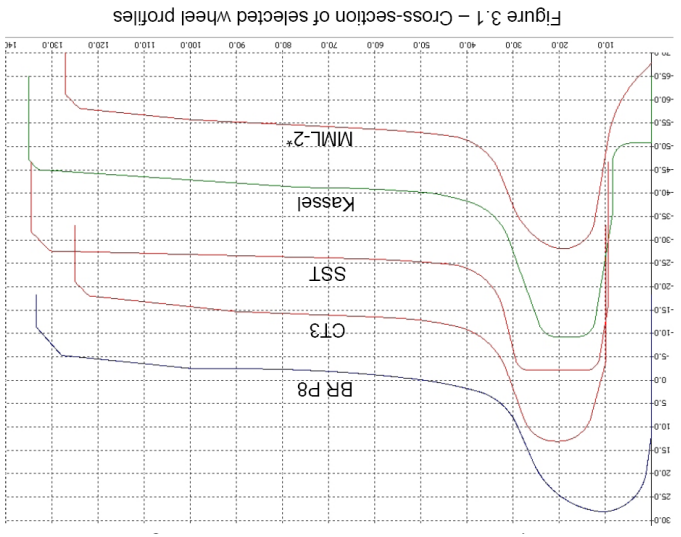


Figure 3.1 – Cross-section of selected wheel profiles

Isn’t Manchester already a Tram Train System ?

- It runs on former main-line railway lines
- It runs in the City Centre
- It runs on some Network Rail Infrastructure (Altricham)
- NOT in my view
- It does not inter-run with mainline trains
- The trams are not fitted with mainline systems
- It is much easier to manage – no external interfaces

Case Study – Leeds to Leeds Bradford Airport

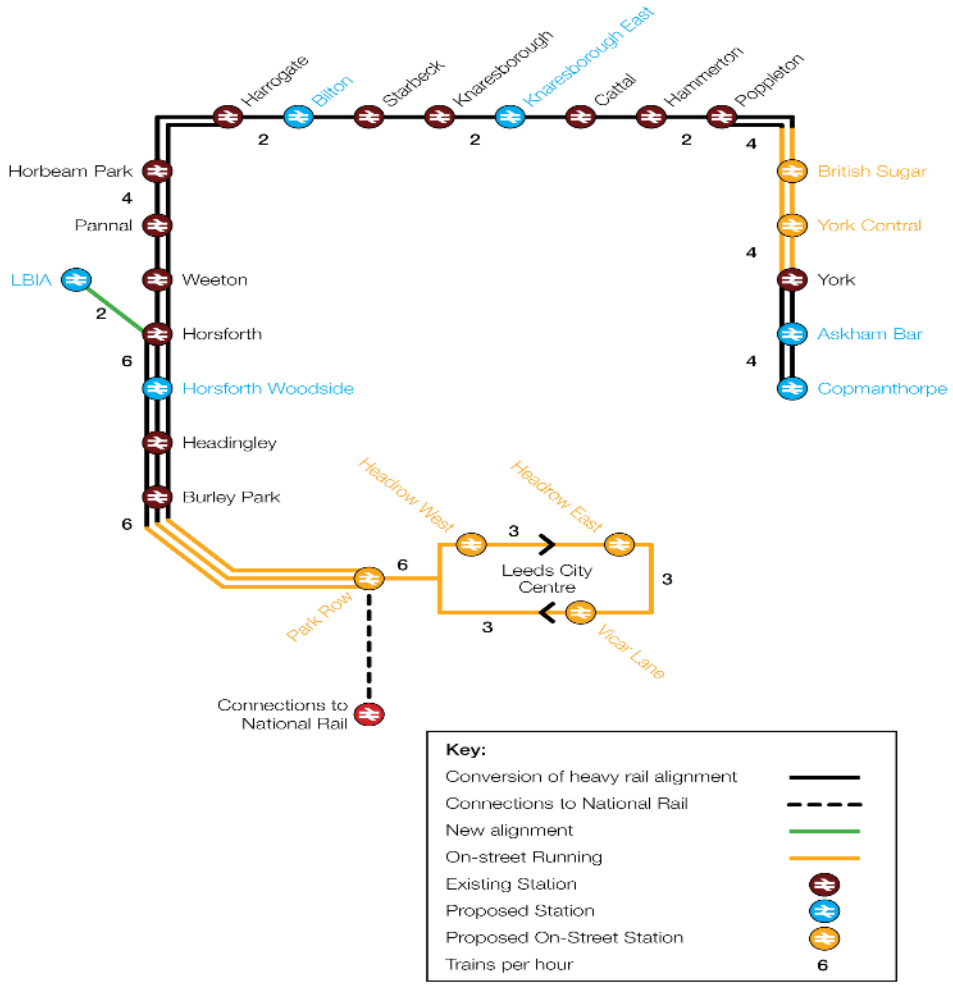
- Leeds City Centre
  - No Tram system
  - Some funding
- Leeds Bradford Airport
  - No rail connection
  - Relies on buses and taxis
- Suitable Mainline Exists
  - Leeds to Harrogate line

Leeds – York Metro

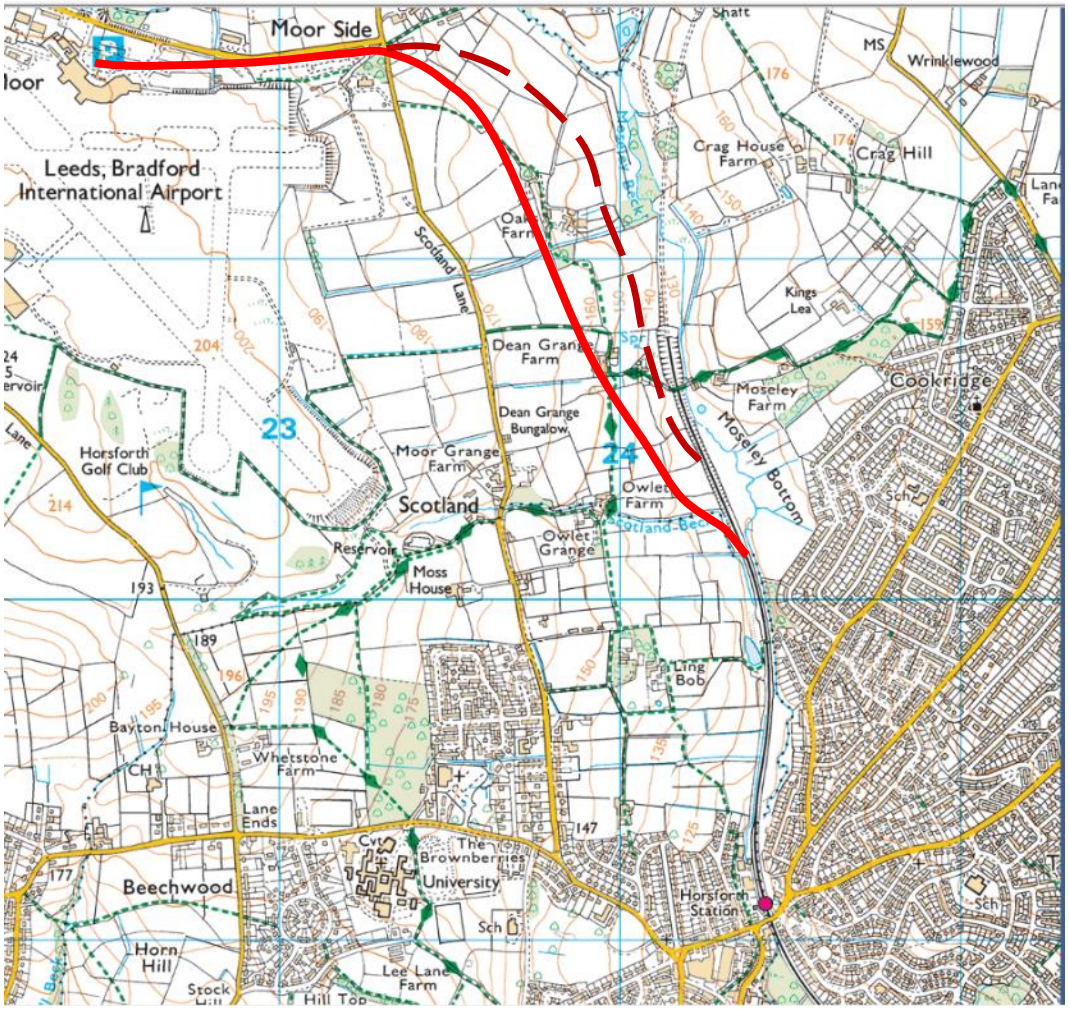
- Leeds City Centre
  - New Tramway
- Mainline capacity - consider
  - Headways

LN838 LEEDS ARMLEY JUNCTION TO YORK SKELTON JUNCTION VIA HARROGATE			
TIMING POINT	**DOWN**	**UP**	**NOTES**
Standard Headway	AB	AB	
Exceptions:			
Poppleton to Hammerton	Single line		ET
Cattal to Knaresborough	Single line		ET
Harrogate to Horsforth	6½ 8	6½ 8	Following Non-Stop service Following Stopping service
Horsforth to Armley Junction	5	4½	
Armley Junction to Leeds	2½	2½	A and B Lines Only. See also LN836 for other headways west of Leeds.

  - Junction Margins
  - Dwell Times
- Line Speed – 60 mph
- Low platform extensions
- Electrification
- Signalling
  - Additional TPWS
  - Traction Immune Track Circuits

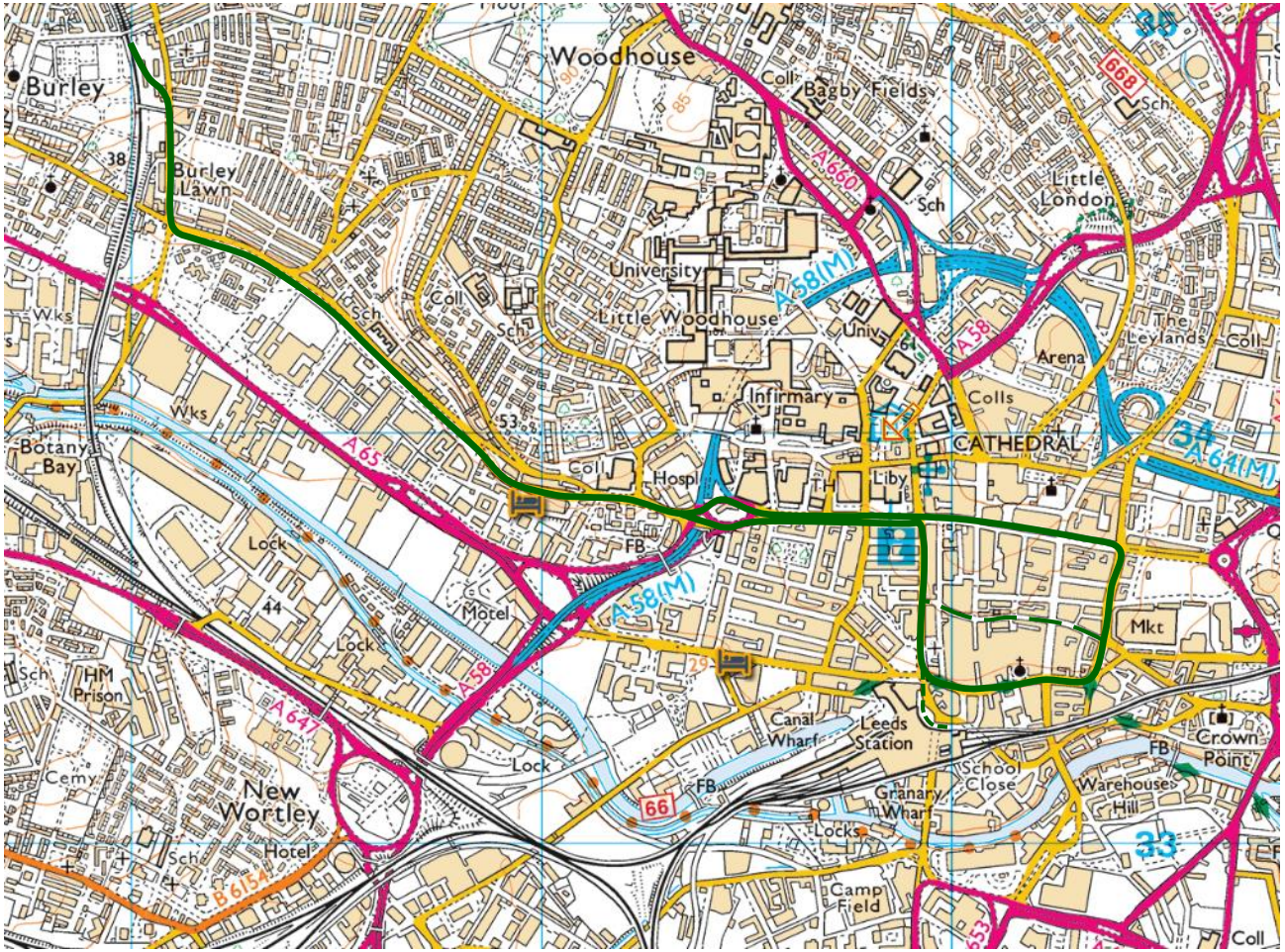


LBA Tram Train Option

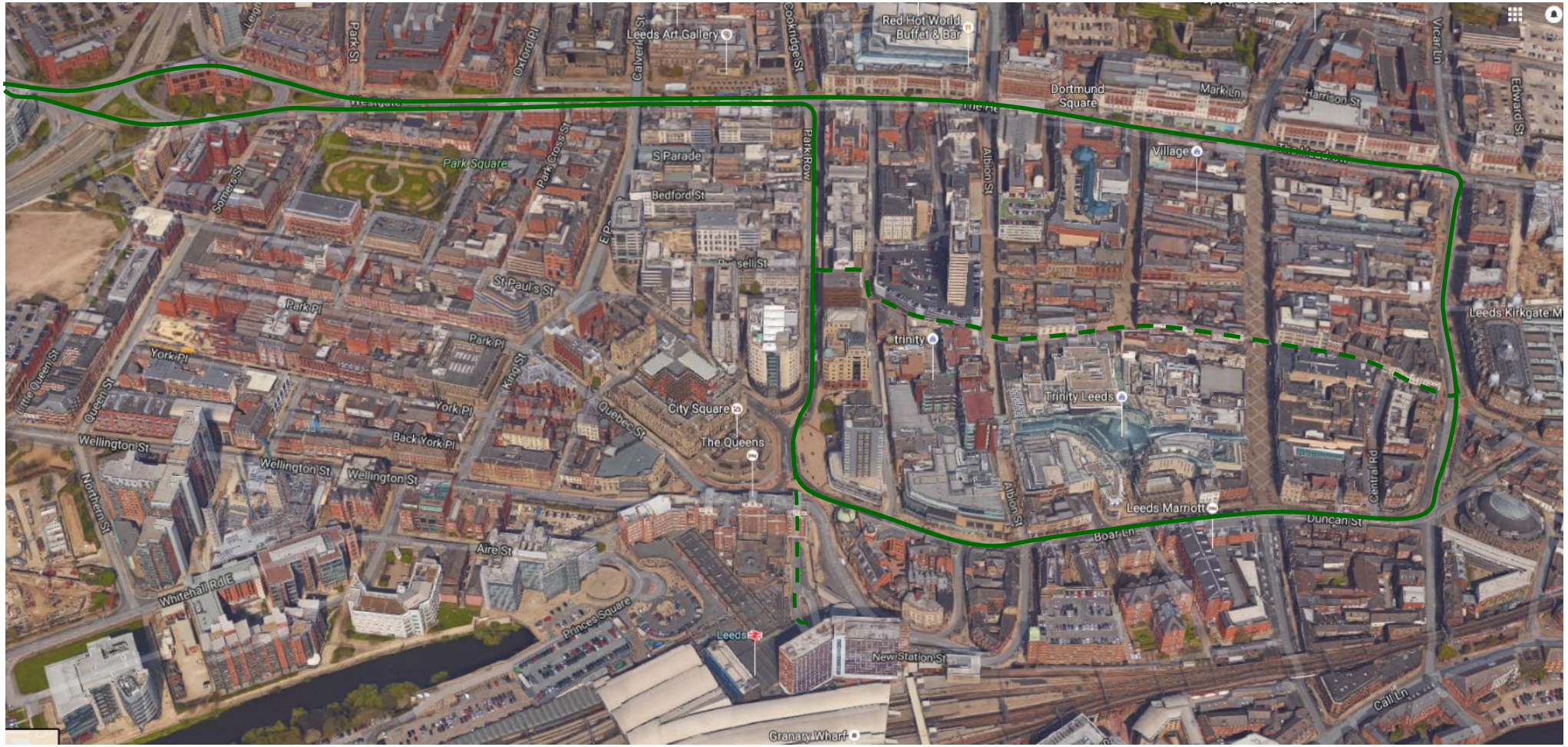


Leeds City Centre

- Leeds options
- Leave mainline south of Burley Park
- Route into city to be determined
- Should leave mainline before Armley Junction to avoid more intensive service and 25kV Electrifiction



Leeds City Centre



Why is there a Pilot? Just Get ON with it

…and not a desktop exercise?

- A physical pilot will identify the issues
- Appropriate standards need to be agreed with industry and tested in practice
- Available technologies should be trialled in UK to quantify benefits and identify barriers to development
- Policy will be evidence based
- Minds will be focused on real, not perceived risk

Objectives of Pilot

- Understand the changes to industry costs of operating a lighter weight vehicle with track brakes on the rail network.
- Determine the technical standards both to allow inter-running of lighter weight tram vehicles with heavy rail passenger and freight operation and to gain maximum cost benefit from tram-train operation.
- Gauge passenger perception and acceptability of the light rail tram-train service
- Determine the practical operational issues of extending tram-train from heavy rail to on street running

Conclusion

- Tram Train has the potential to provide a new passenger rail transport offering whilst reducing overall costs to UK plc
- May drive upfront costs but deliver lower whole-life costs
- It will only be delivered if the wider heavy and light rail industries work in partnership to make it happen

Tram Train Pilot

- Any Questions?