Light Rail (UK)

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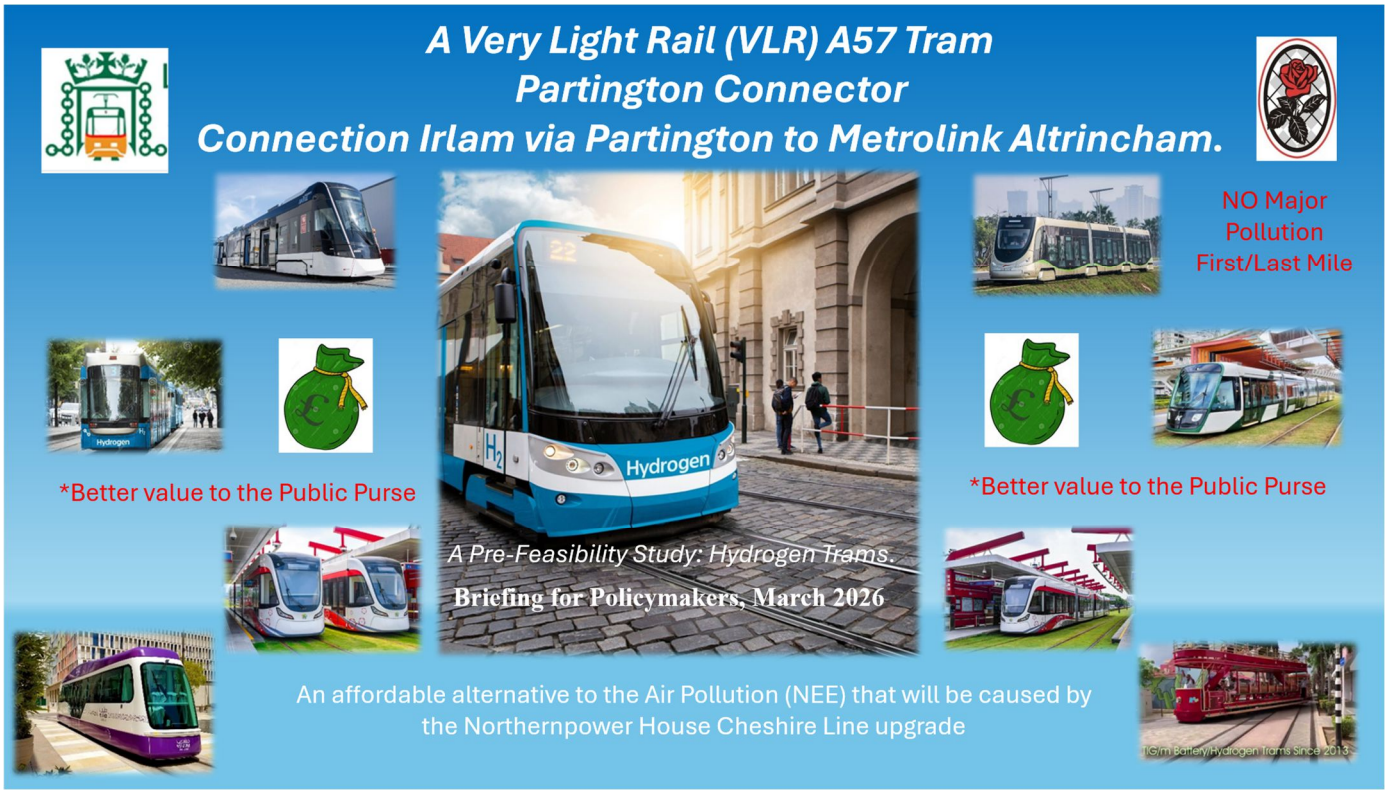
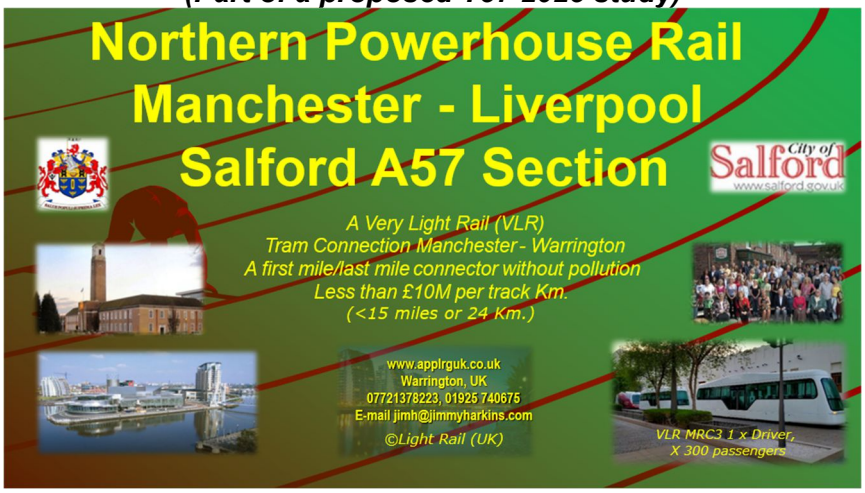
T57 VLR Hydrogen Tram Demonstrator



Irlam Partington Spur-Metrolink Connector Line

(Part of a proposed T57 2025 study)



Podcast @ https://www.railindustryconnect.co.uk/rail-industry-connected-hydrogen-trams-as-a-service-with-jim-harkins-light-rail-uk/

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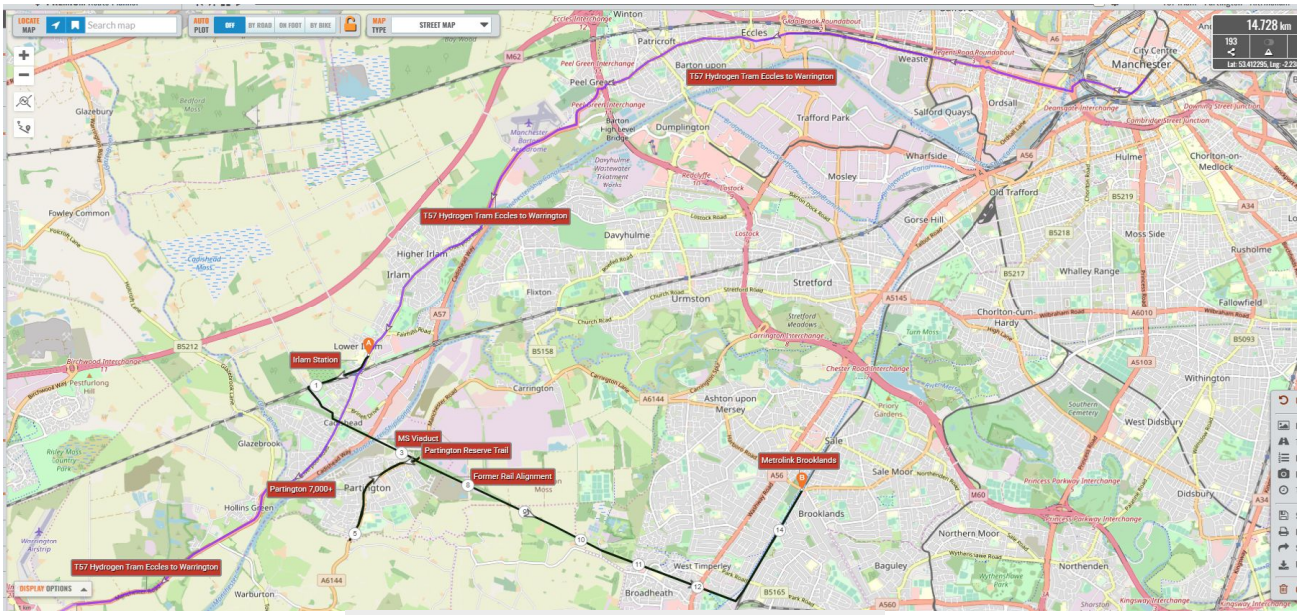
Light Rail UK T57 VLR Hydrogen Tram Extension Irlam Partington Spur-Metrolink Connector Line

The proposed T57 Hydrogen Tram route 9.151m/14.72m Km, connects Irlam Station with Partington Spur, culminating at Metrolink Brooklands and Altrincham. Beginning at Irlam Station, the tramline is envisioned to offer a sustainable, hydrogen-powered alternative for commuters, reducing environmental impact whilst improving connectivity.

The route proceeds through Partington, integrating with existing transit options, and then links directly to the Brooklands Metrolink stop, ensuring seamless transfers to Greater Manchester's established tram system. Ultimately, the line reaches Altrincham, providing efficient access for both residents and travelers heading into central Manchester.



https://www.plotaroute.com/route/3233653

Link to Eccles, Irlam railway stations, shares Manchester Metrolink stops and Bus Station, multiple Pedestrian Retail Centres and can cope with crowds from AJ Bell Stadium.
Frequent and Flexible Service and eventually a seamless through running on the Metrolink network,
A Clean and Green Western alternative to Irlam and Cadishead Warrington and Liverpool
Opens up the Western End of Cadishead for housing development with an alternative to the car
Eliminates LEZ Requirement along A57
No Road/Tyre/Brake Particulates (NEE)
(A genuine zero emission vehicle).
"High Street, Town Centre" Retail Access.
Mult stream revenue earnings for Salford City Council as part of Hydrogen trams as a Service Package

No Air Pollution at Point of Use!

City Cars (3) autonomously coupled, three hundred passengers.

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Why Green Hydrogen Trams?©

Trafford City Region, The Northwest showcase doorway

Artist impression VLR example.

Trams have a proven record of getting people out of their cars whilst producing zero emissions and particulates at point of use and that these very light rail (VLR) offers significant potential for enabling these benefits to be realised on a significant larger scale.*

* VLR trams are built to International Light Rail Standards and are a low cost starter line.

Less than £10 per track Kilometre and are a significant Public Transport Legacy**.**

The T57 Partington demonstrator presents a three-unit Very Light Rail set operating on a suburban street corridor, offering a high-capacity, low-emission option for local travel. The lead vehicle displays **T57 Partington** while platform signage and shelter panels carry the and doors are open across the set to support rapid boarding during a busy peak service. Accessibility is central to the design: deployable ramps are in use at the lead, middle, and rear units, and a wheelchair user is visible seated inside. Platform tactile paving.

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Project definition

T57 Partington Connector (starter line) — a hydrogen-powered Very Light Rail (VLR) sub-project linking **Irlam Railway Station → Altrincham Brooklands Metrolink via Partington**.

The immediate scope is a **starter return service from Irlam → Altrincham via Partington**, delivered as a demonstrator and anchor for the wider Partington connection and future through-running onto the Metrolink network.

Executive Summary

Deploying a hydrogen-powered Very Light Rail (VLR) along the **Irlam – Partington – Altrincham** corridor can deliver measurable reductions in local emissions, improved public transport connectivity, and targeted regeneration benefits for Partington and adjacent communities.

The corridor benefits from existing transport corridors and former rail land that can reduce construction complexity, but delivery will require early stakeholder engagement, targeted funding packages, and careful mitigation of utility and land-use constraints.

Key local planning documents and proposals already identify opportunities to repurpose highway and rail land for sustainable transport interventions.

Core intent

- **Prove the Hydrogen Trams as a Service (HTaaS) model** with an operational starter corridor.
- **Demonstrate technical and operational interfaces** required for through-running onto Metrolink.
- **Provide a credible, high-visibility transport alternative** that unlocks housing, retail, and employment opportunities in Partington and Cadishead and reduces car dependency along the A57 corridor.

Key parameters

- **Starter alignment:** Irlam Railway Station → Partington → Altrincham Brooklands Metrolink (Irlam → Altrincham via Partington as the initial service).
- **Indicative length:** dependent on final alignment; starter service designed as a single continuous route.
- **Vehicle:** VLR single units (battery-dominant with hydrogen fuel-cell range extender); option for articulated sets for event peaks.
- **Infrastructure:** EN 14811 grooved embedded rail for street running; shallow slab construction targeting **<£10M per track-km** for starter VLR.
- **Depot and hydrogen supply:** compact depot near Partington/Cadishead with Tritonex-coated pressurised storage and dispensers; local waste-to-H_2 or contracted green H_2 options.

- **Service pattern:** frequent shuttle service (target 6–10 minute daytime headways), twenty-hour operational window, event augmentation for AJ Bell Stadium and other peaks.
- **Standards and safety:** design and operation to follow EN 50126/8/9 and applicable rail safety standards; Tram-Train compatibility assessment for Metrolink interface.

Strategic benefits

- **Transport connectivity:** direct, frequent link between Irlam, Partington and Altrincham Brooklands Metrolink improving first/last-mile access.
- **Air quality and compliance:** zero tailpipe emissions; reduced local particulates and NOx exposure; supports local compliance objectives.
- **Regeneration:** unlocks western Cadishead/Partington housing and retail development; increases local employment access.
- **Financial model:** HTaaS bundles capex into a repayable service contract; byproduct revenues and H_2 rebates can contribute to servicing infrastructure costs.
- **Resilience:** local hydrogen production and storage reduce exposure to external fuel market volatility.

Principal risks and mitigations

- **Planning and highway disruption** — staged construction, early traffic modelling, and community engagement.
- **Hydrogen supply economics** — modular plant sizing, blended supply contracts, and contingency fuel arrangements.
- **Metrolink interface and signalling** — phased through-running plan, compatibility testing, and vehicle interface design.
- **Public acceptance** — clear air-quality evidence, event service guarantees, and community dividend framing.

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Corridor comparison table — Irlam Partington Altrincham

Attribute	Irlam – Partington – Altrincham corridor
Primary nodes served	Irlam; Partington; Carrington/New Carrington; Altrincham.
Existing rail/route assets	Former rail alignments and highway corridors suitable for repurposing.
Typical road geometry	Mixed: wide single/dual carriageway, former rail corridors, local streets.
Estimated capital intensity	Indicative: £9–12M per track km for VLR baseline (corridor-specific factors will vary).
Key benefits	Local connectivity, air quality, regeneration, inclusive access, employment+ Increase H2 Base.
Principal constraints	Utility diversion, land ownership, environmental designations, community acceptance.

Strategic Context

Corridor role and demand

- The corridor links residential communities with employment and retail centres and intersects planned development areas (e.g., New Carrington), making it strategically important for local access and regeneration. **Policy alignment**
- The proposal supports national and regional decarbonisation and active travel objectives by offering a low-emission alternative to car trips and buses. Local planning work has already considered repurposing road and rail land for sustainable transport.

Technical Feasibility

Infrastructure suitability

- **Route options:** The corridor contains a mix of wide roads and disused rail alignments that are potentially suitable for embedded VLR track with limited vertical profile changes. Early corridor mapping and utility surveys are required to confirm feasibility.
- **Track construction:** VLR track typically sits within a shallow depth of the road surface, reducing the need for deep excavation and major utility diversion in many locations; however, pinch points and junctions will need bespoke design.

Vehicle and systems

- **Hydrogen VLR vehicles** provide zero tailpipe emissions, flexible coupling for capacity scaling, and rapid boarding with low-floor accessibility. Onboard hydrogen storage and refuelling logistics must be planned with local hydrogen supply options and safety cases.

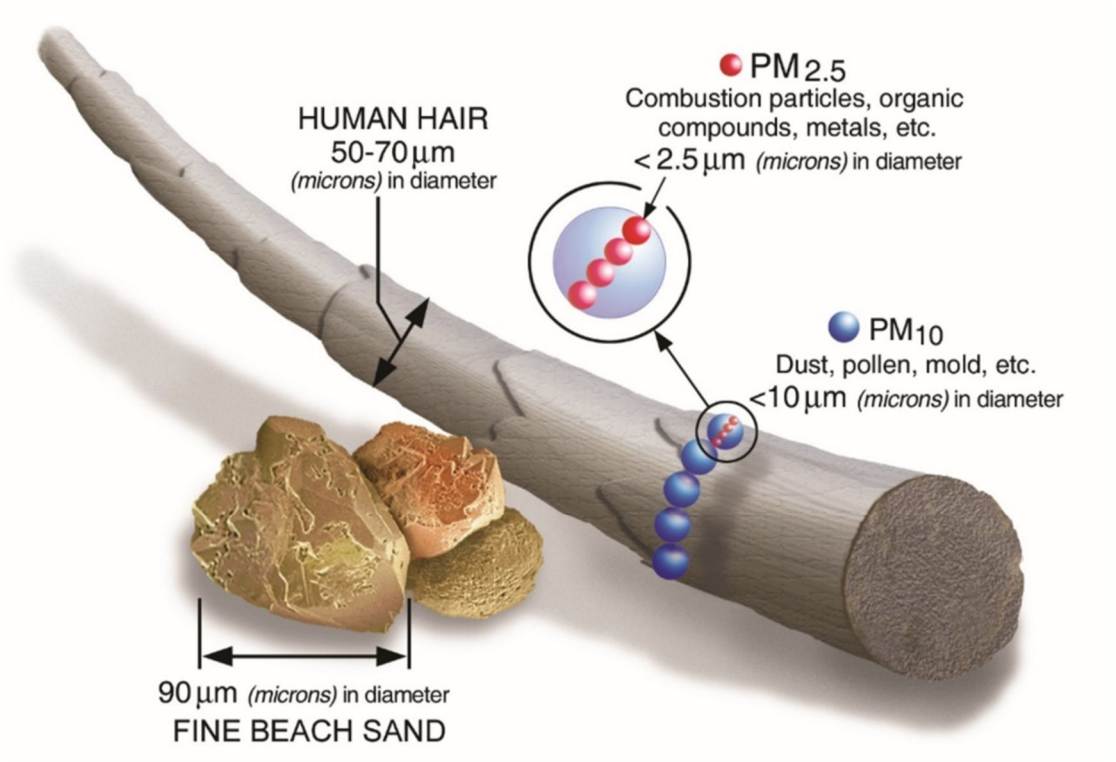
Interchange and integration

- **Interchange potential:** Design interchanges at Altrincham and Irlam to connect with existing rail, bus, and active travel networks; consider park-and-ride at strategic nodes to capture longer trips. Early integration with Metrolink and local bus timetables will maximise ridership.

Environmental Impact

Emissions and air quality

- Replacing a share of car and diesel bus trips with hydrogen VLR reduces local NOx and PM exposure and supports Clean Air objectives. The net carbon benefit depends on hydrogen production pathway; green hydrogen yields the strongest lifecycle emissions reductions. **Urban realm and regeneration**
- VLR corridors can be designed to improve public realm, increase pedestrian footfall, and catalyse investment in town centres and new development areas such as New Carrington. Local planning documents already identify transport interventions as enablers for regeneration.



Economic and Social Benefits

Capital and operating costs

- Indicative capital cost for VLR track is lower than heavy rail and comparable or favourable versus major road upgrades; lifecycle operating costs can be lower than diesel bus fleets when energy and maintenance savings are realised. **Estimate**: £9–12M per track km as a baseline; corridor specifics will change this figure. **Social equity and accessibility**
- Low-floor VLR vehicles with deployable ramps and level boarding improve access for wheelchair users, older people, and families. Routing through underserved neighbourhoods increases access to jobs, education, and services.

Short table of the headline estimates (illustrative)

Item	Conservative	Optimistic	Key assumption
New homes (corridor)	**~700**	**~5,000**	Committed consents → full New Carrington delivery.
Employment floorspace	**—**	**~3.5m ft² (325,160 m²)**	Planning aspiration for New Carrington.
Industrial / logistics jobs	**~4,100**	**~9,000**	B8 vs B2 employment density range (79 → 36 m²/employee).
Total corridor jobs (incl. local services)	**~4,450**	**~14,000**	Adds 0.5–1.0 jobs per new household to industrial jobs.
Partington households lifted from transport poverty (illustrative)	**~48**	**~193**	Scenarios based on 10–40% of transport-poor households benefiting; baseline prevalence must be measured locally.
Irlam households lifted from transport poverty (illustrative)	**~123**	**~493**	As above, depends on baseline TRSE/connectivity and catchment.

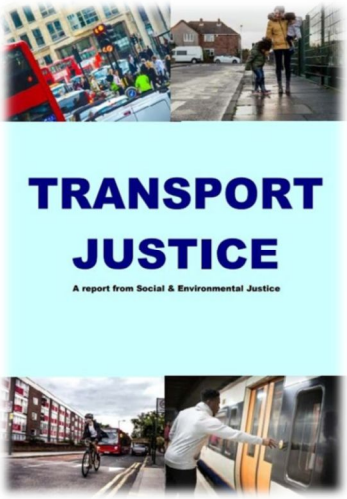
Funding and Delivery Strategy

Potential funding sources

- National transport funds, local growth and levelling up allocations, targeted hydrogen investment programmes, and private-sector financing (e.g., long-term leasing) are all viable components of a blended funding package. **Phased delivery**

1. **Phase 1 Demonstrator**: Irlam – Partington short demonstrator to prove operations, hydrogen refuelling, and community acceptance.
2. **Phase 2 Extension**: Partington – Altrincham full corridor build-out with interchange upgrades.
3. **Phase 3 Integration**: Network integration and capacity scaling, including potential links to wider Greater Manchester Metrolink services. **Enabling actions**

- Early statutory land searches, utility diversion plans, and a hydrogen supply feasibility study; secure planning and safety approvals in parallel with funding bids.



Metric comparison — Irlam–Partington–Altrincham (Routes B and C only)

Attribute	Route B — Rail-corridor / mixed alignment	Route C — Southern Carrington / New Carrington alignment
Primary corridor	Disused rail alignments + parallel local roads	Carrington / New Carrington strategic allocation → Altrincham
Approximate route length	~14 km	~22 km
Number of stops (800 m spacing)	~18 stops	~28 stops
Primary walking catchment (800 m)	~30,000 people	~55,000+ people
Indicative new homes uplift	1,500 → 3,000 homes	~6,000 → 7,000+ homes (includes New Carrington aspiration)
Indicative employment floorspace	Modest mixed-use redevelopment; local commercial floorspace (est. 50,000 → 300,000 m²)	Up to ~325,000 m² (3.5 million ft²) aspiration for New Carrington
Indicative jobs uplift (operational)	~2,500 → 6,000 jobs	~4,000 → 9,000+ jobs (depending on B-use mix)
Indicative capital cost (track only)	£126 → £168 million (14 km × £9–12M/km)	£198 → £264 million (22 km × £9–12M/km)
Major engineering constraints	Land assembly, remediation of former rail land, local junctions	Canal crossings, major infrastructure coordination, developer delivery phasing
Strategic advantage	Higher potential for compact, transit-oriented development; lower immediate road disruption	Captures strategic housing and employment allocation; largest transformational impact

Notes, assumptions and methodology

- **Stop spacing:** 800 m average used to estimate stop counts; actual spacing will vary by urban density and interchange needs.
- **Route lengths:** rough centre-to-centre estimates; require GIS alignment work to confirm.
- **Catchment populations:** aggregated built-up area estimates within typical 800 m walking isochrones; approximate and rounded.
- **Housing uplift:** conservative → optimistic ranges reflect committed consents versus full policy delivery (Route C includes New Carrington policy aspiration).
- **Employment floorspace → jobs:** converted using standard UK employment density ranges (industrial/logistics vs manufacturing) to produce job ranges; Route C uses the

published New Carrington aspiration of ~3.5 million ft² (~325,160 m²) as an upper bound.

- **Capital cost: £9–12 million per track-km** applied to route length; excludes crossings, bridges, depot, rolling stock, signalling, land acquisition, and contingency.
- **Constraints:** Route B requires land assembly and remediation; Route C requires major coordination for canal crossings and developer infrastructure delivery.

Commercial model:

HTaaS operator supplies hydrogen fuel, refuelling infrastructure, and operational fuel management under a service contract.

The transit operator pays a monthly service fee indexed to energy delivered and availability, with performance rebates and a staged repayment mechanism for capital contributions. Byproduct revenues (oxygen, heat, carbon credits, site services) partially offset service fees.

Pilot aims to de-risk technology, prove unit economics, and create a replicable contract template.

Stakeholders all – and voters

Risks and Mitigations

Risk	Mitigation
Land and utilities	Early utility mapping; use of former rail corridors where possible; targeted land acquisition strategy.
Funding shortfalls	Phased delivery; combine public grants with private leasing and developer contributions.
Community resistance	Proactive engagement, co-design workshops, and demonstrator operations to build trust.
Hydrogen supply and safety	Hydrogen supply study; adopt proven refuelling and storage standards; early safety case development.
Regulatory complexity	Early DfT and local authority engagement; align with existing VLR/Metrolink standards and precedents.

30-year nominal totals (ISO 14001 High) (Worked example (illustrative only))

Scenario	Construction GVA (5 yrs)	Ramp-up (yrs 6–10)	Steady-state (yrs 11–30)	30-yr nominal total GVA
Route B — Conservative	£44.1M	£325.3M	£2,602.5M	£2,971.9M
Route B — Optimistic	£58.8M	£1,128.8M	£9,030.0M	£10,217.6M
Route C — Conservative	£69.3M	£523.1M	£4,185.0M	£4,777.4M
Route C — Optimistic	£92.4M	£1,704.4M	£13,635.0M	£15,431.8M

Monetised carbon and air-quality add-ons (method + worked examples)

ISO 14001 High implies stronger emissions management, higher modal shift and therefore **additional monetised benefits** from avoided CO_2 and reduced PM pollution. Use government appraisal values and Defra damage-cost guidance to monetise — these are **add-ons** to the GVA totals above and should be modelled separately in the OBC.

Recommendations and Next Steps

1. **Commission a corridor-level feasibility study** that includes detailed route options, utility surveys, environmental baseline, and a hydrogen supply options appraisal. **Confirm sponsor and governance** — identify lead authority and form project board **Hydrogen options appraisal (parallel)** — evaluate local waste-to-H_2 vs contracted green H_2; shortlist depot/refuelling sites.
2. **Run a short demonstrator project** (Irlam–Partington) to validate vehicle operations, accessibility features, and community response before full corridor investment.
3. **Develop a blended funding strategy** combining national transport funds, local growth/levelling up bids, and private financing models.
4. **Initiate stakeholder and community engagement** immediately, including co-design workshops with residents, businesses, and accessibility groups.
5. **Prepare an outline business case** (OBC) aligned to DfT and local appraisal frameworks to unlock early funding and approvals.