

CVLR Stage Gates (WMCA /DfT Version)

8th May 2024

Evidence highlighted in red will be subject to Independent Panel Review

Stage Gate Description and outcome	Documentation required to release funding and when documentation can be submitted	Outputs from phase once Funding released	Evidence of output Pass/ fail	Requirement from WMCA, DfT and / or Independent Review Panel at end of Stage Gate	Funding Required and Status
<p>1a CVLR Vehicle and Track Testing, Route Design and stage 1 preliminary traffic management works implemented.</p> <p>Outcome: Performance tested vehicle with an appropriate safety case and gap analysis that demonstrates the vehicle can be adapted for City Centre Operation</p> <p>Performance tested track with no visual cracking and CCC Director for Highways sign off for next stage</p> <p>A viable route with sufficient evidence (from surveys and utilities) that</p>	<p>WMCA SOBC submitted by CCC/TfWM DfT SOBC submitted by CCC/TfWM DfT Proforma completed by CCC/TfWM DfT Below the Line Paper to Investment Portfolio Decision Committee (IPDC)</p> <p>Above documentation has been submitted</p>	<ol style="list-style-type: none"> 1. Installation of 3 Track Test Sites (WMG, Whitley Depot and Dudley Loop) 2. Evidence from vehicle and track testing, including gap analysis for the vehicle and latest safety case assessment 3. Design and partial implementation of the City Centre Traffic Management Plan 4. Design for City Demonstrator Route from Rail Station to Former Ikea Building (800m) 5. Concept design for CVLR route 1 from Rail Station to University Hospital 6. Baseline accident data on the City Demo route across all modes. 7. Baseline air quality exhaust and non-exhaust emissions data of the City Demo route. 8. Evidence illustrating Coventry's understanding of the regulatory regime to implement the CVLR City Demo route 9. Evidence of potential market for CVLR 10. Baseline data indicating local travel attitudes to public transport 	<p>Evidence for WMCA:</p> <ol style="list-style-type: none"> 1. Photos 2. Report on FATS/ SATS evidence for vehicle testing and gap analysis evidenced by the Hazard records. Case for safety consultants engaged working towards City Demonstrator compliance. HV system & battery commissioned by competent persons. Evidence from Whitley Test Track that the track is performing as expected under loadings (see Appendix 1) 3. Design drawings and photos 4. Design drawings 5. Design drawings 6. Baseline data report 7. Baseline data report 8. Planning Process Report 9. WMG Report/ Soft Market testing report and Spreadsheet detailing interested parties 10. Baseline data report <p>Evidence for DfT: Assurance from WMCA that the evidence of outputs in Stage Gate 1a has been fully assessed to meet their requirements and recommendation from the SRO to progress to the next stage gate as set out in the report summarising findings from review of evidence.</p>	<p>WMCA assurance team required to assess evidence of outputs in Stage Gate 1a and recommend or otherwise progression to next stage gate to DfT via a report summarising findings from review of evidence. Report to be submitted alongside a Consideration Paper and an updated VLRRP DfT Innovation Proforma</p> <p>DfT to submit Consideration Paper to IPDC to propose the process, stage gates and governance arrangements for the VLRRP programme.</p>	<p>£8.9m (original value)</p> <p>£6.4m released on 18.4.23</p> <p>£2.5m released at IPDC on 3rd July 2023</p> <p>Change Control approved by WMCA DSO on 22nd April 2024 for final cost for Stage Gate 1 of £7.9m</p>

enables CCC Director for Highways sign off for next stage			<p>Updated proforma (signed off by WMCA) with a CA report that summarises:</p> <ol style="list-style-type: none"> 11. Key learnings (and where learnings have been published) and risks from deliverables in Stage 1a (including CCTMP) 12. High Level Risk Register and Mitigations 13. Latest Case for Safety for Vehicle and Track and recommendations for Stage 2a 14. Independently verified cost estimate for City Demonstrator Construction that confirms City Demonstrator can be delivered within funding envelope. 15. Report outlining work to be undertaken in phase 2a to develop Commercialisation Strategy 		
<p>2a. CVLR Continued Vehicle and Track Testing, City Centre Demo pre-construction preparation, procurement of long lead items and completion of preliminary traffic management works.</p>	<p>Report documenting outputs from CVLR Stage 1a which contains evidence of outputs from Stage 1a as appendices.</p>	<p>Items in red to be reviewed by IRP</p> <ol style="list-style-type: none"> 1. Priced schedule for construction of City Demo Route 2. Track performance data from Whitley (from embedded telemetry) 3. Noise and vibration data from Vehicle Testing on Dudley Test Track (from embedded telemetry) 4. Programme outlining works to provide a Gen 1.5 vehicle that is 	<p>Evidence for WMCA (items in red to be reviewed by IRP)</p> <ol style="list-style-type: none"> 1. Priced schedule with market evaluation for City Demo construction demonstrating it can be delivered within cost estimate for Stage 3a 2. Whitley and Dudley Data as detailed in Appendix 1 3. Dudley Data as detailed in Appendix 1 4. Draft Case for Safety in place for City Centre vehicle operation. Vehicle delivery 	<p>IRP to examine technical evidence, assess the Case for Safety, cost forecasts, programme and risk, before Stage Gate 3a is authorised. In order to meet the stage gate requirement, the IRP will determine if specific technical parameters (Set by CVLR Delivery Team – appendix 1) have been</p>	<p>£6.1m (Original value)</p> <p>Approved – IPDC 11th Dec</p> <p>WMCA DSO approved Change Control 22nd April 2024 to reprofile Stage Gate 2 to</p>

<p>Outcome: Track ready to be installed on a fully designed route and a vehicle ready to be operated on the route once installed, within the cost envelope agreed for stage 3.</p>	<p>Documentation can be submitted in +3 months¹</p> <p>VLRRP DfT Proforma – to be updated and submitted</p>	<p>fit for City Demo operation² supported by ICP</p> <ol style="list-style-type: none"> 5. A plan for the development of a Safety Management System (for City Demonstrator) and initial Road Safety Audits completed, with integration of Safety Requirements into the Case for Safety. 6. Operator appointment strategy and scope of works defined with provisional costing supported by external organisation providing operational support. 7. Evidence of engagement discussions and agreements in principle with utilities (C3's & where provided C4s) in respect of required changes being deliverable within £2m/km average allowance 8. Council approvals in place to authorise City Demo construction 9. Implementation of the City Centre Traffic Management Plan that are not integrated with the CCD construction. 10. Long lead items (slab and rail) procurement strategy with evidence of viability and cost from market 11. WMCA approval to proceed 	<p>strategy and programme for engineering works.</p> <ol style="list-style-type: none"> 5. Draft integrated case for Safety for system implementation 6. Operator scope of works incl. concept of operations document & outline cost estimate to operate CCD 7. Utility status updates, C3's, C4s Engineering counter arguments to challenge diversionary activity and alternative mitigation proposals. 8. Highways, planning and Council consents 9. Photos 10. Evidence of industry support for the viability of procurement and price 11. WMCA report <p>Additional evidence for DfT: Assurance from WMCA and the IRP that the evidence of outputs in Stage Gate 2a has been fully assessed to meet their requirements and recommendation from the SRO to progress to the next stage gate as set out in the report summarising findings from the review of evidence.</p>	<p>met, the Case for Safety is robust and confirm the programme is on target to meet its objectives, within the CRSTS allocated funding envelope.</p> <p>IRP specialists to set out recommendations in a report. WMCA to submit summary report and recommendations to DfT</p> <p>DfT governance (Roads Investment Committee) to determine whether allocated Stage Gate 3a funding to be released. Date tbc – anticipated Sept. 24</p>	<p>deliver outputs listed at a cost of £8.3m (incl. contingency of £1.5m)</p>
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¹ Indication of time it will take to submit documentation once process / stage gates have been agreed

² Gen 1 vehicle was designed to be tested in an offline environment. The vehicle requires modifications to ensure it is fit for purpose for the City Demo operation under manual driver operation. This vehicle will be known as Gen 1.5.

			<p>Updated proforma (signed off by WMCA) with a CA report that summarises:</p> <ul style="list-style-type: none"> • Independent assurance report from WMCA appointed panel • Key learnings (and where learnings have been published) and risks from deliverables in Stage 2a (including CCTMP) • High Level Risk Register including Mitigations. • Outline steps to finalise Draft Cases for Safety for Vehicle and integrated system for operation in Stage 3a • Priced schedule following procurement of City Centre Demo construction partner (demonstrating City Demonstrator can be built within cost envelope for 3a) and long lead items can be procured to support programme. Outline Cost estimate for Operations and Maintenance of City Centre Demo for 12 months. • Draft commercialisation strategy and outline of steps to be taken in phase 3a to finalise commercial strategy. 		
<p>3a.CVLR City Centre Demo construction and commissioning, including attitudinal research. Costs</p>	<p>Report documenting outputs from Stage 2 which contains evidence of outputs from Stage 2 as appendices.</p>	<ol style="list-style-type: none"> 1. Evidence that construction and utilities costs were within budget 2. Initial testing and trialling evidence from commissioning of constructed system. evidence of accident data from City Demo 	<p>Evidence for WMCA:</p> <ol style="list-style-type: none"> 1. Construction cost evidence (invoices) and cost forecast illustrating how construction costs in future could be reduced (economies of scale) 	<p>IRP to examine technical evidence, assess the Case for Safety, cost forecasts, programme and risk, before Stage Gate 3a is authorised. In order</p>	<p>£11.4m (original value)</p> <p>Funding requirement increased to</p>

<p>validation for next stages.</p> <p>Outcome: An operational City Centre Demonstrator of CVLR technology, with costs and time to construct data available, to showcase the benefits of urban VLR mass transit to interested parties.</p> <p>The City Demonstrator will enable the commercialisation strategy to be implemented.</p>	<p>Documentation can be submitted in +15 months</p> <p>VLRRP DfT Proforma – to be updated and submitted</p>	<p>route compared with the baseline across all modes.</p> <ol style="list-style-type: none"> 3. Evidence of air quality exhaust and non-exhaust emissions from City Demo route. Data captured and compared with baseline data. 4. Evidence of engaging with the public during demonstrator construction and commissioning to understand their views on vehicle appearance and installation process. 5. Initial indication whether CVLR would encourage model shift from cars 6. Update of a report comparing CVLR with guided mass transit systems i.e. Light Rail and BRT. 7. City Centre Segregated cycleway 8. Central Six Link Rd (aka Western Link Rd) 9. City Centre Demonstrator Insurance 10. Operations and Maintenance contract 11. Evidence of achieving necessary consents to construct and operate City Centre Demonstrator 	<ol style="list-style-type: none"> 2. Data from City Demo construction and commissioning (quantitative assessment criteria TBC) 3. Report 4. Report 5. Survey data/ Report 6. Report 7. Photos and usage data 8. Photos and usage data 9. Insurance document 10. O&M Contract 11. Report detailing Consents required and achieved <p>Additional evidence for DfT: Assurance from WMCA and the IRP that the evidence of outputs in Stage Gate 3a has been fully assessed to meet their requirements and recommendation from the SRO to progress to the next stage gate as set out in the report summarising findings from review of evidence.</p> <p>Updated proforma (signed off by WMCA) with a CA report summarising the following:</p> <ul style="list-style-type: none"> • Independent assurance report from WMCA appointed panel • Key learnings (and where learnings have been published) and risks from deliverables in Stage 3a • High Level Risk Register including Mitigations 	<p>to meet the stage gate requirement, the IRP will determine if specific technical parameters (Set by CVLR Delivery Team – appendix 1) have been met, the Case for Safety is robust and confirm the programme is on target to meet its objectives, within the CRSTS allocated funding envelope.</p> <p>IRP specialists to set out recommendations in a report. WMCA to submit summary report and recommendations to DfT.</p> <p>DfT governance to determine whether allocated Stage Gate 4 funding to be released.</p>	<p>£16.5m (incl. contingency of £1.8m) approved via WMCA DSO Change Control on 22nd April 24</p> <p>Subject to DfT's RIC Approval (Date tbc)</p>
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			<ul style="list-style-type: none"> • Operational Case for Safety for Vehicle and Track and integrated system • Final costs of City Demo construction • Forecast costs for a First Route construction in Coventry • Commercialisation Strategy <ol style="list-style-type: none"> 6. Data from City Demo operation (quantitative assessment criteria tbc) 7. Report 8. Report 9. Survey data 10. Report 11. Updated Strategic Case 		
<p>4. VLRRP Business case development for Line 1 commercial service. CVLR Vehicle and Track design for manufacture, investor exploitation and technology roadmap to commercialisation</p>	<p>Report documenting combined outputs from all stage gates above which contains evidence of outputs as appendices.</p> <p>Documentation can be submitted in +24 months</p> <p>VLRRP DfT Proforma – to be updated and submitted</p>	<ol style="list-style-type: none"> 1. Production of OBC for the Line 1 route (subject to outcome from CVLR Route 1, City Centre Demonstrator and TfWM Mass Transit optioneering work), comparing different modes (including LRT and BRT), using real data from a live environment about CVLR. The objective of this report would be to satisfy the DfT that CVLR, along with other modes, can go forward to assessment in the OBC for the Line 1 route. 2. Gen 2 Design strategy for Manufacture of CVLR Vehicle 3. Design and Manufacture process documented for CVLR Track 	<ol style="list-style-type: none"> 1. OBC 2. CVLR Vehicle future design strategy 3. CVLR Track Design and Manufacture process report 4. O&M Strategy 5. Report detailing further R&D requirements 6. CVLR CCD Testing data 7. Accident data 8. Air quality data 9. Survey data 10. Survey data 11. Updated Staregic case for CVLR 		<p>£8.5m</p> <p>Yet to be approved</p>

		<ol style="list-style-type: none"> 4. Operation and Maintenance Strategy for Route 1 5. Further R&D work packages defined following City Demo trials 6. Evidence from testing and trialling the elements in a live environment. 7. Evidence of accident data from City Demo route compared with the baseline across all modes. 8. Evidence of air quality exhaust and non-exhaust emissions from City Demo route. Data captured and compared with baseline data. 9. Evidence of engaging with the public during demonstrator trials to understand their views on ride quality and vehicle appearance. 10. Evidence indicating whether CVLR would encourage modal shift from cars 11. Update of Strategic Case for CVLR innovation to account for any changes as a result of the innovation (led by BCIMO VLRNIC and TfWM Track R&D) and any external changes, e.g. new legislation. 			
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