
From: Simon Jones – Corporate Director Growth, Environment and Transport

To: Peter Osborne – Cabinet Member for Highways and Transportation

Subject: Chestfield Tunnel Ventilation Replacement

Decision no: 26/00051

Classification: Unrestricted

Future Pathway of report: Growth, Environment and Transport Cabinet Committee
– 9 September 2026

Electoral Division:

Electoral Division: Canterbury North

Local Member: Alex Ricketts

Is the decision eligible for call-in? Yes

Summary:

This report covers the background, need and renewal of the Chestfield Tunnel Ventilation system, which is a safety critical system that has reached the end of its serviceable life, with a history of failures causing significant disruption to the Thanet Way.

The report will provide a high-level outline of the scheme deliverables and costs to gain to approval to proceed.

Recommendation(s):

The Cabinet member for Highways and Transport is asked to approve the proposed decision as set out in Appendix A.

1. Introduction

- 1.1 The Chestfield Tunnel is a Highways asset, managed by the Programme Manager for Tunnels, Barriers and Data; sitting within the Structures and Tunnels Team. The Tunnel ventilation system replacement scheme addresses a safety-critical asset that has reached the end of its serviceable life. Replacing the ventilation system is necessary to maintain safety standards, to discharge the authority's duties as tunnel operator and to ensure that there is a tunnel system in place to reliably move pollutants and toxic gasses from the confined environment of a tunnel.
- 1.2 The tunnel is a fixed and irreplaceable link on the Resilient Highway Network, and a prolonged loss of the ventilation function would have a disproportionate effect on the resilience of the A299 Thanet Way. The project is therefore driven primarily by statutory and safety obligations, with additional benefits in asset life extension and reduced maintenance liability.

- 1.3 The outline design of this scheme has commenced with Consultants WSP appointed via the Professional Services Framework Contract in H&T.

2. Key Considerations

- 2.1 The renewal of the tunnel ventilation system is required at this time to enable the Council to meet its responsibilities to maintain a safe and resilient highway network. The existing system has reached the end of its serviceable life and presents an increasing risk of failure, with implications for tunnel users, maintainers, network resilience and the authority's duties as highway authority and tunnel operator.
- 2.2 The preferred design option has been selected because it offers the best balance of safety, efficiency, future maintainability and value for money.
- 2.3 The works will restore assured smoke control and extend the operational life of the tunnel's safety provision, reducing risk in the event of a tunnel fire. They will also reduce the burden, cost and disruption associated with unplanned reactive maintenance and help avoid further unplanned closures on the A299 Thanet Way.
- 2.4 Option 2B (see Section 4) is therefore considered the preferred approach, as it improves safety and maintainability while avoiding the significantly higher cost, construction complexity and delivery risk associated with other options.

3. Background

- 3.1 Chestfield Tunnel forms part of the A299 Thanet Way, a key strategic route linking east Kent communities with the wider highway network. Any prolonged closure or reduced operation would increase journey times, place pressure on local routes and reduce network resilience. Maintaining the ventilation system is therefore important for tunnel safety and the continued reliability of this strategically important route.
- 3.2 The ventilation fans are one of the primary safety systems in the tunnel, and outages of 3 or more fans in a single tunnel bore require the closure of that bore in line with the Tunnel's Minimum Operating Requirements. In June 2024, a safety critical failure with the ventilation system fans was uncovered during a routine inspection. This led to the Coastbound closure of the Whitstable to Herne Bay section of the A299 Thanet Way, while emergency works were undertaken to repair some of the fans and for the 40mph contraflow traffic management provision to be put in place. The contraflow traffic arrangement allowed the London bound bore to reopen with two-way traffic.
- 3.4 The ventilation fans are specialist pieces of equipment which are manufactured and reconditioned to order, and specialist teams are required to deliver and install them. The contraflow remained in place for 5 months while the team searched to procure any compatible fans and to inspect the failed fans for any parts that could be salvaged to remake an operational fan.

- 3.5 Chestfield Tunnel relies on 32 jet fans (16 per bore), 5 of these were refurbished following the 2024 failures and of the remaining fans, 22 are 27 years old. While the aged system has an increased maintenance and testing regime, the fans have exceeded their service life and are at risk of failure. This project will increase resilience to prevent another unplanned tunnel closure such as the event in 2024.

4. Options considered and dismissed, and associated risk

- 4.1 A longlist of 39 options was developed and evaluated in a scoring workshop, from which four were shortlisted for safety risk assessment by WSP (Designers). The shortlisted options were:

- Option 1 – like-for-like replacement. The 32 jet fans are replaced with units of the same size, thrust and rating on the existing mountings, in four banks of four. This is the do-minimum option. It offers no improvement in smoke control over the current situation, and the constraint on maintaining the lighting driver near Fan 2 persists.
- Option 2 – deflectors. As Option 1, but with angled louvre deflectors fitted to each fan to direct thrust away from the soffit, improve momentum transfer and increase the effectiveness of the airflow. This improves smoke control relative to the baseline and to Option 1, with minimal additional construction complexity.
- Option 2B – During design consultation, a hybrid of Option 2 was discussed and agreed, referred to as Option 2B. This comprises 32 jet fans of similar size, power and thrust to the existing units, arranged in four banks of four, each fitted with an angled louvre deflector. Fan 2 in each bank will be relocated to provide a minimum clearance of 400 mm between the lighting structure and the fan, recovering safe future maintenance access to both the lighting and the ventilation.
- Options 3 – larger fans. The 32 fans are replaced by 24 larger and heavier units, three per bank, with Fan 2 removed. These options resolve the lighting maintenance constraint but require significant electrical and control system redesign, structural works, and a long 24-hour bore closure of around 19 weeks.
- Option 4 – passive portal deflectors and wind walls. Like-for-like fans supplemented by passive deflectors and wind walls at the portals. This approach has no UK road tunnel precedent, is specifically discouraged by CD 352, requires extensive computational fluid dynamics analysis with an uncertain outcome, and introduces new hazards.

- 4.2 During the construction activities for all options, a temporary increase in safety risk was expected for all population groups due to the presence of Temporary Traffic Management, contraflow operations, traffic diversions, and construction activities. However, with the implementation of safety risk mitigation measures,

these risks can be managed by balancing the level of risk against the effort, time, and cost required to control them.

- 4.3 Post works, it was considered that options 2 and 3 manage risks to all populations in a balanced manner. Levels of safety risk for all populations are expected to see a slight positive change (improvement in system reliability and reduced unplanned maintenance activities) ensuring they are no worse than levels experienced prior to the works activities. Option 4 is the only option anticipated to introduce additional hazards to road users (e.g. visual flicker at the portal and the risk of falling ice from passive portal wind deflectors), making it less preferable. Conversely, Option 1 does not manage smoke as well as Options 2 and 3 and so cannot be considered to acceptably manage risk.
- 4.4 On this basis, Option 2B is preferred as it offers the best balance of safety, maintainability, deliverability, cost and low construction risk. It improves smoke control and resolves the Fan 2 maintenance access issue, while avoiding the limited benefits of Option 1 and the significantly higher cost, complexity and risks associated with Options 3 and 4.

5. Financial Implications

- 5.1 The estimated Capital cost for Option 2B arrangement is approximately £2.8M. The overall value will be refined as the design develops.
- 5.2 This estimated cost remains substantially below the larger fan options. Option 3 was costed at between £5.78M - £6.41M, and the portal deflector option was costed at £7.72M. Option 1, while costed at £2.31M, has limited enhancement to ventilation performance compared to the baseline. This option doesn't resolve the lighting driver maintenance issue caused by the proximity of Fan 2 to the lighting installation in each fan bank. Therefore, not proposed.
- 5.3 This decision will not impact financial requirements for maintenance of the new system going forward. As predefined scheduled maintenance rates are stipulated within the Highways Term Maintenance Contract.
- 5.4 The funding of the capital works is to be met from the annual grant that Highways & Transportation receive from the Department for Transport (DfT) and the Highways Maintenance Block allocation for asset management.

6. Legal implications

- 6.1 The A299 – Thanet Way is a highway maintainable at public expense, and KCC is the highway authority for the route. As such, KCC is subject to the section 41 duty under the Highways Act 1980 to maintain the highway and keep it reasonably safe for ordinary use.
- 6.2 KCC identify and comply with the legislation applicable to the ownership, operation, maintenance and management of tunnel assets. Relevant legislation applying directly to the Chestfield Tunnel Ventilation Scheme includes:
- Construction (Design and Management) Regulations
 - Regulatory Reform (Fire Safety) Order 2005
 - Civil Contingencies Act 2004

- Equality Act 2010
- Fire and Rescue Services Act
- Environmental and air quality legislation (including the Environmental Act, Clean Air Act and Air Quality Standards Regulations)

7. Equalities implications

- 7.1 The EQIA found no evidence that the scheme would result in a significant or disproportionate adverse impact on people sharing a protected characteristic.
- 7.2 The improvements to smoke control and system reliability benefit all tunnel users equally and represent a positive safety outcome. Construction-phase impacts are temporary and are managed through established traffic management practice, signed diversion routes and, where appropriate, additional temporary measures to protect vulnerable users on local roads.
- 7.3 No change to the scheme is required on equality grounds.
- 7.4 It is recommended that the mitigation measures identified in the safety risk assessment, including consideration of temporary provision for vulnerable users on diversion routes, are carried forward into delivery.

8. Data Protection Implications

- 8.1 A DPIA was submitted and confirmed as not required for this project.

9. Other corporate implications

- 9.1 It is not considered that this decision will have further corporate implications to other Directorates within KCC. .

10. Governance

- 10.1 Upon approval, delegated authority will sit with the Corporate Director of Growth, Environment and Transport.
- 10.2 Day-to-day delivery will continue to be led by the Programme Manager for Tunnels, Barriers and Data, supported by the relevant design, construction and highways teams.

11. Conclusions

- 11.1 The ventilation system at Chestfield Tunnel is a safety critical asset that has reached the end of its serviceable life and is presenting an increasing risk of failure.
- 11.2 The 2024 fan failures demonstrated the potential impact of further deterioration, including tunnel closures, disruption to the A299 Thanet Way and increased pressure on the wider highway network.
- 11.3 The recommended Option 2B provides the best balance of improved smoke control, future maintainability, deliverability, construction risk and value for money. It addresses the key safety and asset resilience issues while avoiding

the significantly higher cost and complexity associated with the larger fan and portal deflector options.

11.4 Formal approval is therefore required to progress the scheme and authorise expenditure above £1m, enabling the Council to replace the ventilation system and maintain the safe and resilient operation of this strategically important route. There is a continuing need to address the degraded ventilation system at Chestfield Tunnel.

11.5 As the scheme moves into the design phase, formal governance approval is now required to spend above £1m of the council's money.

12. Recommendation(s):

The Cabinet member for Highways and Transport is asked to approved the proposed decision as set out in Appendix A.

13. Background Documents

Chestfield Tunnel Ventilation System Replacement Definition of shortlisted options for safety risk assessment (revision 1)

14. Appendices

Appendix A Proposed Record of Decision
Appendix B Equality Impact Assessment

15. Contact details

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