

SH6 Shotover River Bridge Capacity Analysis

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1. Introduction

There is the potential for more residential and mixed-use development to become available along the SH6 Ladies Mile corridor to the east of the Shotover River bridge. Queenstown-Lakes District Council (QLDC) have commissioned Abley Transportation Consultants to consider the implications of additional residential development on the Shotover River bridge. This technical note presents the methodology and outcomes of a high level capacity analysis focusing on when the existing structure will reach its theoretical capacity and how this would be affected by any additional development along the Ladies Mile corridor.

2. Calculating the bridge capacity

The capacity of the existing bridge has been calculated using the procedure specified in the NZ Transport Agency Economic Evaluation Manual (2016) for two-lane rural roads. Based on an approximate 65/35 directional distribution of traffic during peak hours, a total roadway width of eight metres, and 4% and 7% heavy vehicles in morning and evening peak hours respectively, the capacity is calculated as 1590 vehicles per lane per hour.

This figure has been validated using the methodology in Austroads Guide to Traffic Management Part 3 for uninterrupted flow facilities which equates to 1560 vehicles per lane per hour in the evening peak hour. For the purposes of this assessment a peak hour capacity of 1590 vehicles per lane (from the NZ Transport Agency methodology) has been applied.

3. Capacity analysis methodology

The capacity analysis considers traffic generated under a selection of future growth scenarios to determine the year at which the Shotover River bridge will reach its theoretical capacity. The scenarios consider the expected future growth under current zoning provisions as well as exploring the impact of any additional residential growth to the east of the bridge over and above the current QLDC growth projections.

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The following assumptions have been made in the technical analysis:

- the current traffic volumes on the bridge have been estimated based on NZ Transport Agency average weekday traffic counts from March 2016 at site 00600991 (SH6 to east of Lower Shotover Rd) and adjusted up based on the QLDC Tracks Transportation Model flows from Stalker Road and Lower Shotover Road.
- Background growth in traffic volumes out to 2045 have been assumed based on modelled growth in traffic from the QLDC Tracks Transportation Model and are informed by QLDC's Queenstown Lakes District Growth Projections 2018-2058 published by Rationale in 2016.
- Additional household growth is assumed to be medium density based on 0.55 trips per dwelling in peak hour which is consistent with the RTA Guide to Traffic Generating Developments Version 2.2. It is noted that if any development were low or high density, the trip generation rate would be higher or lower (respectively) than this.
- The assumed distribution of traffic growth from the additional households is informed by the QLDC Tracks Transportation Model.

4. Findings

The calculated capacity of the Shotover River bridge is 1590 vehicles per lane per hour and currently the highest hourly demand is in the eastbound direction during the evening peak hour (1181 vehicles). Based on current growth forecasts which are consistent with QLDC's Queenstown Lakes District Growth Projections 2018-2058 published in 2016, the bridge will reach capacity when operating during the evening peak in 2035 which will extend out to 2044 if 10% of vehicle drivers shift to public transport or other alternative modes. These results are graphically depicted in Attachment A.

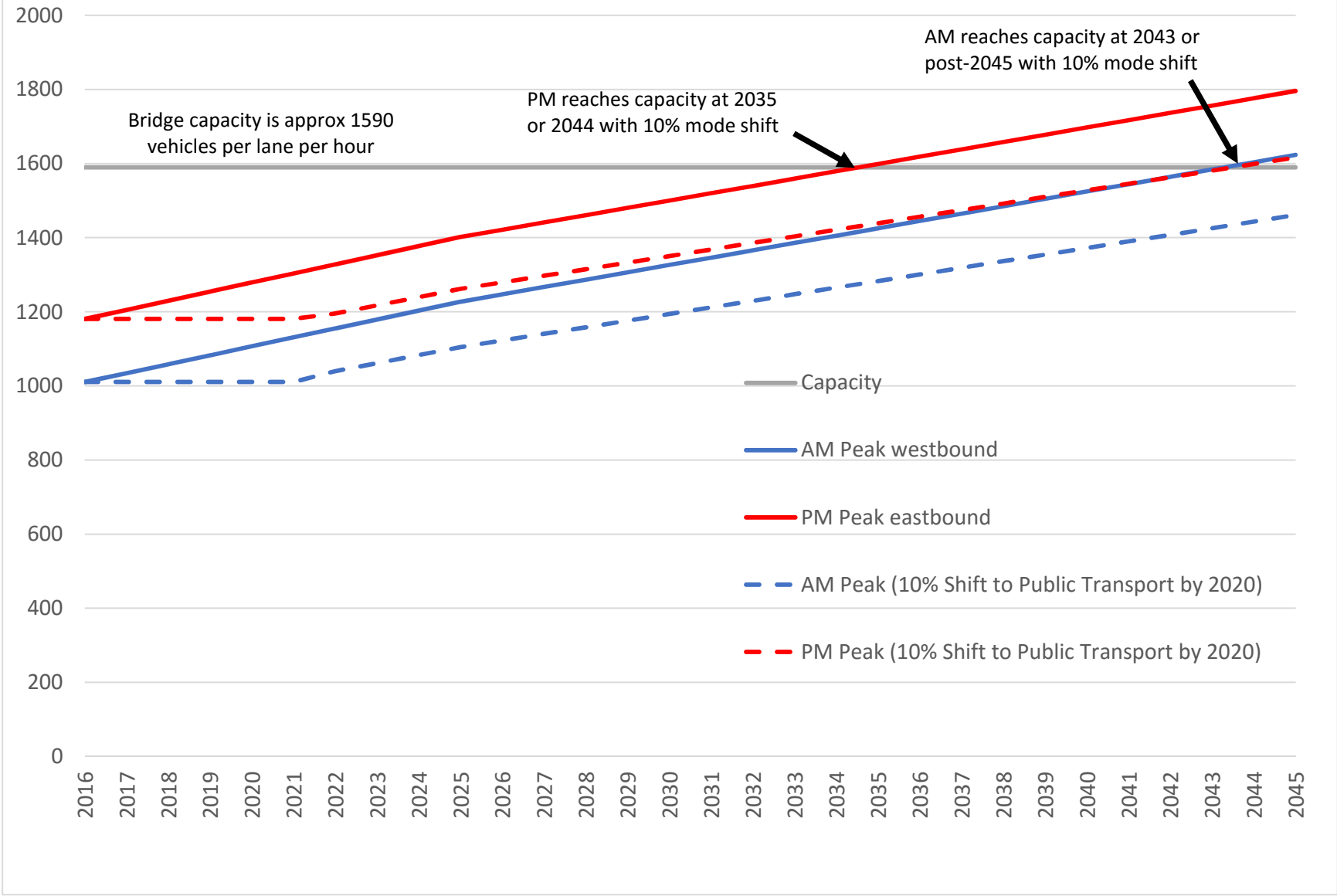
Additional growth in residential development to the east of the Shotover River bridge brings forward the time at which the bridge reaches capacity. If an additional 1000 medium density dwellings were developed by 2025 the bridge will reach capacity at 2025 (or 2032 if a 10% shift to alternative modes is achieved). A further scenario was assessed with 2000 medium density households developed by 2025 and it was concluded that the bridge would reach capacity well before the additional development was completed, irrespective of any additional uptake of alternative modes. These results are graphically depicted in Attachment B.

The year at which the evening peak hour flows exceed capacity are summarised in the below table.

Scenario	Current Mode Share	+ 10% Uptake of PT
Current growth	2035	2044
+ 1000 Households	2024	2032
+ 2000 Households	2022	2023

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Attachment A: Shotover River Bridge capacity analysis



Attachment B: Capacity analysis with additional development

