

Executive Summary

Background

This report provides analysis, summary and transport modelling outputs to assess the needs, benefits and impacts of providing a bypass of Kenmore within the Kenmore-Moggill transport network.

Main Roads is investigating the feasibility of providing a bypass of Kenmore, using a section of the preserved Moggill Pocket Arterial corridor, as a potential solution to address the long-term transport needs for the Kenmore-Moggill area that would:

- Alleviate traffic congestion and to improve traffic safety, particularly on Moggill Road; and
- Accommodate future transport growth in the Kenmore-Moggill area.

Objectives

The objectives of the KBSTI commission are to:

- Establish the need for a bypass of Kenmore utilising the (Kenmore Bypass) section of the preserved Moggill Pocket Arterial corridor between Moggill Road at Pullenvale and the Centenary Highway at Fig Tree Pocket, for 2006, 2016 and 2026;
- Establish the benefits and impacts that a bypass of Kenmore would have on:
 - Moggill Road (west of the Indooroopilly interchange);
 - Centenary Highway (from the Centenary Bridge to Toowong roundabout); and
 - The local road network within Kenmore
- Inform (as appropriate) the timing for provision of a bypass of Kenmore
- Inform (as appropriate) the form and function of a bypass of Kenmore

Overview of Report

Need for a Kenmore Bypass

- Maximum daily traffic demand (both directions) on Moggill Road is currently slightly more than 48,500 vpd, (immediately west of the Indooroopilly on ramp to the Western Freeway / Centenary Highway). This is expected to grow to nearly 52,400 vpd by 2026. If capacity constraints were removed then maximum traffic demand on Moggill Road could be around 54,100 vpd east of Marshall Lane.
- Traffic demand on Moggill Road is projected to experience a relatively low total growth between 2006 and 2026 (up to 8% along the 6km section of Moggill Road that would be bypassed by the Kenmore bypass. Projected growth for the AM and PM peak flows is lower (up to 6.5% increase).
- Sections of Moggill Road (east of Marshall Lane – Indooroopilly ramps) are already operating at or near capacity. By 2026, with the exception of the Brookfield Road – Marshall Lane section of Moggill Road, all sections of Moggill Road from the Indooroopilly Ramps to Kenmore Road would be operating at capacity for both AM and PM peak hour (peak direction) movements.

- AM inbound and PM outbound travel speed is generally LOS F between Marshall Lane and the Centenary Highway. PM outbound traffic experiences slightly worse travel speed conditions. Non-peak direction travel speed is generally LOS B. By 2026 Travel speed is projected to decrease by around 10% east of Marshall Lane. AM inbound travel times could increase by nearly 10%, adding an additional minute for travel from Pullenvale Road to the Centenary Highway on ramps.
- Capacity constraints on Moggill Road appear to suppress demand (with local roads experiencing some 'rat-running'). Projected demand if Moggill Road was not capacity constrained could produce an increase up to 13% between 2006 and 2026. Peak flows could increase up to 30%, if capacity constraints were removed.
- Unless additional capacity (either through an upgrade to Moggill Road, an alternative route, and/or through increased utilisation of corridor capacity (that is, public transport or transit) it is likely that congestion will increase, traffic conditions will deteriorate further and local roads will carry an increased volume of 'rat-running' traffic. It is possible that the increased traffic on Moggill Road could impact on safety as well as local amenity.
- Approximately 81 percent of all trips that pass south of Pullenvale Road (in either direction) are 'through trips' with an origin or destination beyond the Indooroopilly ramps to the Centenary Highway. A bypass could capture approximately 75% of these 'through trips'.

Kenmore Bypass Investigations

Bypass options were developed as different scenarios to test the following:

- Number of lanes: Bypass options with either 1 lane or 2 lanes each way have been tested. All scenarios assume (where provided) single lane ramps to the Centenary Highway.
- Posted speed: 60, 70 and 80 km/h bypass options have been included as part of speed sensitivity analysis.
- Interchange arrangement with Centenary Highway: A number of configurations for the connection of a bypass with the Centenary Highway have been modelled, including:
 - Indirect access to Centenary Highway via service road connections to Fig Tree Pocket Road
 - Partial interchanges – north facing ramps only, south facing ramps only, bifurcation (½Kenmore Bypass, ½ Fig Tree Pocket interchange); and
 - Full interchange, with and without (closure) of Fig Tree Pocket interchange.
- Connections with Moggill Road: An additional bypass scenario with the Moggill Road connection to the Kenmore Bypass moved north to Rafting Ground Road was assessed.
- Additional access locations: Additional bypass scenarios with connections at Kenmore Road or Kenmore Road and Gem Road have been tested.

A total of 11 bypass option scenarios were investigated. Table E1 provides a summary of features of the bypass options scenarios that have been analysed as part of the KBSTI.

Table E1: Summary of Kenmore Bypass modelling scenarios

Model Scenario	Description	Modelled Years			No. of Lanes	Road Network Connections					Speed
		2006	2016	2026		Moggill Road alternative connection	Local Roads	Centenary Highway			
								Direct – Kenmore Bypass interchange	Indirect – service roads to Fig Tree Pocket Road	Change to Fig Tree Pocket Interchange	
Sing.	Single lane bypass, indirect connection to Cent. Hwy via service road to Fig Tree Pocket Road.		X	X	1				X		60
SK	As above – with access at Kenmore Road	X	X	X	1		Kenmore		X		60
SKG	As above – with access at Kenmore and Gem Road	X	X	X	1		Kenmore, Gem		X		60
xFTP	2 lane bypass with direct access to Cent. Hwy - Closure of Fig Tree Pocket Interchange	X	X	X	2			All movements		Closed	60
BIF	2 lane bypass with direct access to Cent. Hwy - Bifurcation: partial interchanges – Kenmore bypass, Fig Tree Pocket Road	X	X	X	2			Partial (north on, south off)	X	Partial (north off, south on)	60
NR	2 lane bypass with direct access to Cent. Hwy - North facing ramps only (existing planning)	X	X	X	2			Partial (north on, north off)			60
SR	2 lane bypass with direct access to Cent. Hwy - South facing ramps only	X	X	X	2			Partial (south on, south off)			60
60kmh	2 lane bypass with direct access to Cent. Hwy - Full interchanges – 60 km/h speed	X	X	X	2			All movements			60
70kmh	2 lane bypass with direct access to Cent. Hwy - Full interchanges – 70 km/h speed	X	X	X	2			All movements			70
80kmh	2 lane bypass with direct access to Cent. Hwy - Full interchanges – 80 km/h speed	X	X	X	2			All movements			80
RGR	2 lane bypass with direct access to Cent. Hwy - Alternative connection at Rafting Ground Road	X	X	X	2	Rafting Ground Road		All movements			60

Key findings

Demand on Kenmore Bypass

- **Model outputs suggest a current (2006) demand for a Kenmore bypass of between approximately 10,500 – 22,000 vehicles per day (vpd).** By 2026 demand for a bypass could increase to between 11,000 – 23,500 vpd.
- The variation in daily demand for bypass options is a reflection in the relative performance of the bypass scenarios:
 - **Provision of direct access to the Centenary Highway attracts a higher bypass demand;**
 - Single lane bypass options linking indirectly with the Centenary Highway via a service road to Fig Tree Pocket Road, attract about 70% of the demand for 2 lane direct access options;
 - **Provision of additional access points at either Gem Road or Kenmore Road results in about 33% increase in demand above the single lane no access option.**
 - **Demand for the bypass is lower if the bypass connection to the Centenary Highway does not provide for all movements.** North facing ramps only (current planning) attracts the least daily demand. South facing ramps only attracts slightly more demand;
 - A bifurcation option with a half interchange at the Kenmore bypass (north on ramp, south off ramp) and half interchange at Fig Tree Pocket Road (north off ramp, south on ramp) with service road connections between the interchanges, attracts about 10-15% less demand than full interchange options;
 - Closure of the Fig Tree Pocket interchange produces the highest demand for any bypass interchange configuration;
 - A bypass option (scenario RGR) with a more northern connection to Moggill Road (for example, Rafting Ground Road) would increase demand slightly;
 - Demand on the bypass increases with posted speed, but the increase is more significant from 60 km/h to 70km/h (8%) than from 70km/h to 80 km/h (2%);
 - **For both peak hour periods demand is generally slightly less than one lane’s capacity at around 1200 vehicles per hour (vph).** Single lane options with access to either Gem Road or Kenmore Road would approach saturation for both the AM and PM peak hours in 2026.

Impacts on Moggill Road

- **All bypass scenarios significantly reduce traffic volumes on Moggill Road between south of Rafting Ground Road and east of Centenary Highway.** In most instances the traffic volumes at these locations would be less in 2026 with a bypass, than the current (2006) volumes.
- **All bypass scenarios result in increased traffic on Moggill Road south of where a bypass would connect,** although the increase is not a result of increased through trips, but redirection of trips away from Ipswich Motorway.
- Moggill Road daily traffic volumes would decrease by up to 16,500 vpd (32% reduction) west of Fig Tree Pocket Road compared to the 'do nothing' scenario. **The average reduction for all scenarios in 2026 across these sections of Moggill Road is 9500 vpd or a 28% reduction compared to the do nothing scenario.**

- Bypass options with partial (north facing or south facing ramps) interchange, tend to have the least impact on Moggill Road.
- Single lane, indirect access bypass options (Sing, SK, SKG) have as much impact on daily traffic volumes on Moggill Road, as 'higher order' bypass options, and have a higher impact than options with partial interchanges or closure of the Fig Tree Pocket interchange.
- Almost all options reduce traffic at both Colleges Crossing and Moggill Ferry.
- All bypass scenarios have a positive impact on volume-capacity for Moggill Road for both AM and PM peaks.
 - **All Moggill Road sections west of Marshall Lane through to south of Rafting Ground Road would operate well under capacity for almost all bypass options**, with only a few scenarios demonstrating any capacity strain in the PM peak outbound direction.
 - **Provision of any form of bypass does not remove the capacity strain east of Marshall lane for both peak hr periods, with volume/capacity remaining above 0.9 saturation for all scenarios.**
 - **A major upgrade to Moggill Road would not provide a significantly better capacity performance outcome than providing a Kenmore bypass.** (i.e additional lanes the length of Moggill Road between Pinjarra Road to the Indooroopilly ramps, with a further additional lane between Kenmore Road to Brookfield Road)
- Provision of any form of bypass would improve travel speed:
 - Between south of Rafting Ground Road to Marshall Lane from generally LOS C in 2026 to LOS B for both peak travel directions,
 - East of Marshall Lane to east of Fig Tree Pocket Road from LOS F in 2026 to LOS D (with the exception of north ramps only and south ramps only scenarios).
 - A major upgrade to Moggill Road (if possible) would provide similar or better travel speed outcomes.
- For all bypass scenarios travel time along the 6km length of Moggill Road would reduce compared to the 'do nothing' scenario.
 - **AM inbound and PM outbound travel time on Moggill Road would improve by an average of 25% for all bypass scenarios (or an average of 3.3 minutes).**
 - Travel time for trips using the bypass would be on average 4 minutes less than using Moggill Road an average reduction in travel time of 33%.
 - The minimum travel time improvements for trips that use a bypass compared to the do nothing scenarios would be 20% for outbound trips from the north in the AM peak. The maximum travel time improvement compared to the do nothing scenario would be 80% for outbound trips from the south in the PM peak. **The average improvement would be 43% or 6 minutes reduced travel time for trips using a Kenmore bypass compared to trips on Moggill Road in 2026 without a bypass.**
 - A Moggill Road upgrade would not provide better travel times for competing trips than any of the bypass options.

Impacts on Centenary Highway

- **All bypass scenarios increase traffic volume on Centenary Highway by an average of 5.1% or 3172 vpd** along the section of Centenary Highway from north of the Indooroopilly ramps to the Centenary Bridge.
 - **Traffic volume north of the Indooroopilly ramps at Moggill Road would increase less than 1% (up to 575 vpd),**
 - **Traffic volume on the Centenary bridge would increase up to 7% (up to 5766 vpd).**
- Traffic volume traffic between the Indooroopilly ramps at Moggill Road and the Centenary Bridge would increase up to 11% (around 5000vpd) due to 'lead loss'. The only bypass scenario which does not demonstrate lead loss is the bypass scenario with south facing ramps only (scenario SR), which demonstrates lead gain and a reduction of up to 4% in daily volumes between the Kenmore Bypass and Indooroopilly ramps.
- All scenarios result in increased total volumes accessing / exiting the Centenary Highway for the three interchanges. The increases are more significant for options which provide additional Kenmore Bypass interchange ramps.
 - Whilst bypass scenarios do not improve the Centenary Highway, **the bypass would cause only minor further deterioration of already saturated volume/capacity.**
- Impacts on the Centenary Highway ramps, including total volume and relative distribution across the three interchanges would depend on the particular bypass scenario were adopted, as there are no uniform effects.
 - Provision of a bypass would provide some benefit to ramp volume/ capacity for the Indooroopilly ramps, and a slight deterioration for the Fig Tree Pocket ramps.
 - In the non-peak direction, single lane bypass options connecting to Fig Tree Pocket road would significantly impact upon on ramp volume capacity at Fig Tree Pocket, suggesting that additional ramp capacity may be required.
- **No bypass scenario or the Moggill Road upgrade scenario significantly improves travel speed in the section immediately west of the Centenary Highway**

Impacts on Local Roads

- Impacts on local roads vary, with some feeder roads, such as Kenmore Road, demonstrating a significant reduction. Further, more detailed analysis is required for conclusive results.

Conclusions

The investigations undertaken as part of this commission have:

Established the need and impacts of a bypass of Kenmore:

- Moggill Road is currently the only major arterial servicing the outer western suburbs of Brisbane. The road is currently experiencing significant congestion and safety concerns and the local road network experiences 'rat-running' during peak periods. Analysis indicates that the road is approaching capacity, and future demands, whilst low, will put further capacity pressure on the road.

Provision of any Kenmore bypass configuration would:

- Improve traffic conditions on Moggill Road. However provision of a bypass would not alleviate congestion along the most eastern section of Moggill Road between the Alkira exit and the Centenary Highway.
- Provide surplus capacity west of Marshall Lane that could be applied to transit or public transport enhancements. However provision of a bypass would not release any capacity along the most eastern section of Moggill Road between the Alkira exit and the Centenary Highway for such enhancements.
- Provide significant travel time benefits for trips using the bypass and trips using Moggill Road.
- Provide similar traffic performance outcomes as upgrading Moggill Road (which is not known to be feasible) and would provide an alternative route for through trips in the Kenmore area (that is, provide network redundancy)

However provision of a bypass would increase traffic volumes on Centenary Highway, particularly for the section between the Centenary Bridge and Indooroopilly ramps. Provision of additional lane capacity on this section of Centenary Highway could be required as a result of providing a bypass of Kenmore.

A bypass would only attract about a single lane volume of trips during the AM and PM peak hour and would reduce demand on Moggill Road by less than a full lane of demand volume.

Timing of need for a Kenmore Bypass

The analysis undertaken for this commission indicates that there is sufficient current demand to warrant provision of the bypass immediately. Demand on the bypass over the next 20 years is expected to only grow by a further 6.1%.

Form of bypass

The analysis indicates that all forms of bypass would provide benefits to Moggill Road, however options with only partial interchange arrangements tended to perform least well.

Current capacity need on a bypass is only one lane each way, although by 2026, additional capacity may be required if additional access points were to be provided.

Provision of a full interchange with the Centenary Highway increases the impacts on Centenary Highway, but removes the most volume of traffic from Moggill Road.

The results of the analysis would suggest that a staged delivery of a bypass could be warranted. Initially a single lane bypass connecting to Fig Tree Pocket Road may be sufficient. Part of this staged delivery would require upgrading the Fig Tree Pocket interchange to provide additional ramp throughput capacity.

An upgrade to a 2 lane each direction bypass, with direct access to the Centenary Highway could be delivered subsequently, when additional lane capacity is made available on the Centenary Highway.