

# West Gate Tunnel Project and CityLink tolls

Independent advice based on public information



Parliamentary Budget Office

Parliamentary Budget Office

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## Context

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The Parliamentary Budget Office (PBO) provides independent fiscal, economic and financial advice to members of parliament. Information about the PBO is located at [pbo.vic.gov.au](http://pbo.vic.gov.au).

### Requestor

On 27 February 2019, Mr Michael O'Brien, State Member for Malvern and Leader of Liberal Party and the Opposition, requested that the Parliamentary Budget Officer (the Officer) provide independent advice relating to the *West Gate Tunnel (Truck Bans and Traffic Management) Bill 2019* (the Bill).

### Scope of advice

The scope of this independent advice is to provide projections to 2044-45 of toll revenue to be received by Transurban Ltd (Transurban) resulting from:

- pre-existing CityLink tolling arrangements known as the CityLink concession
- the West Gate Tunnel Project
- changes to the CityLink concession.

The scope of this independent advice also includes:

- projected toll costs for road users based on likely trips
- an assessment of the bearer of revenue risk resulting from lower than projected traffic flows
- an estimate of the financial liability that would accrue to the Victorian government if changes to the CityLink concession are revoked.

### Security classification

Public release.

### Report structure

This report is structured around two main topics:

1. Projections of current and proposed road tolls.
2. Assessment of risk and financial liability.

This report also provides detailed analysis of each of CityLink and the West Gate Tunnel Project. For ease of reading, the detailed toll revenue modelling approach and key assumptions are contained in appendices but are important to the independent advice.

### Background

In 1995, the Victorian Government entered into an agreement with Transurban to build and toll CityLink, the terms of which are contained in the *Melbourne City Link Concession Deed*. CityLink was constructed between 1996 and 2000, and Transurban is authorised to collect toll revenue from road users to January 2035.

In December 2017, the government entered into the West Gate Tunnel Project Agreement (the Agreement) with Transurban to:

- design, construct and finance the West Gate Tunnel Project (WGTP)
- operate and maintain the WGTP over the period to January 2045
- toll the WGTP from construction completion in 2022 to 13 January 2045. A toll escalation regime of 4.25 per cent per annum from opening to 31 March 2029 would apply with toll escalation at the consumer price index (CPI) applying thereafter.

The *West Gate Tunnel (Truck Bans and Traffic Management) Bill 2019* (the Bill) was introduced into Parliament on 20 February 2019 and facilitates the collection of tolls relating to the WGTP by aligning the

WGTP and CityLink toll enforcement regime. If Transurban's WGTP toll revenue is affected because the Bill is not passed, the State may be required to compensate Transurban for the loss in revenue.

In February 2019, the government signed the *Melbourne City Link Thirty-seventh Amending Deed* (Amending Deed) which varies the *Melbourne City Link Concession Deed* by:

- extending the pre-existing CityLink concession from 14 January 2035 to 13 January 2045.
- increasing the current toll escalation rate applying to CityLink tolls from CPI to a fixed toll escalation rate of 4.25 per cent per annum. This rate applies from 1 April 2019 to 31 March 2029 with toll escalation of CPI thereafter.
- introducing a new high productivity freight vehicle truck toll class (large truck and trailer combinations) from the opening of WGTP.

The Amending Deed became operational on 18 February 2019 when notice of the amendment was published in the Government Gazette and was tabled in Parliament on 20 February 2019. The Amending Deed can be revoked by either house of Parliament in whole or in part by 20 March 2019. If the Amending Deed is revoked the State may need to provide compensation to Transurban.

### Limitations

This advice uses publicly available information and documents. The Officer did not use information and documents requested from public sector bodies or legal advice to form an independent judgement. A consequence is that the Officer is unable to accurately determine the value of the financial liability accrued by the Victorian government to Transurban in the event that the Amending Deed is revoked.

This independent advice is subject to uncertainty including projected growth in traffic volumes, discount rates, vehicle type splits subjected to toll revenue collection and the time of use of toll roads. Appendix E — Uncertainty and sensitivity analysis provides further information and the impact of changes in these factors to the independent advice.

## Combined projection

### In this section

Independent advice relating to revenue projections to 2044-45 to be received by Transurban resulting from:

- the pre-existing CityLink concession
- changes to the CityLink concession
- the West Gate Tunnel Project.

Appendix A — Assumptions and approach provides the assumptions and methodology used to prepare this independent advice.

Appendix B — Data sources lists the publicly available information and documents used to form judgement.

### Projected toll revenues

This section considers ongoing toll revenue from CityLink and the West Gate Tunnel for the following:

- **pre-existing CityLink concession** which reflects the concession prior to signing the Amending Deed
- **changes to the CityLink concession** resulting from signing the Amending Deed, specifically:
  - extending the concession to 2045
  - increasing the rate of indexation over the period 2019 to 2029
  - introducing a high productivity freight vehicle truck toll class
- **amended CityLink concession** which adds the changes to the CityLink concession to the pre-existing CityLink concession
- **the West Gate Tunnel.**

It also assesses the future impact of the combined toll revenue for the pre-existing and changes to the CityLink concession.

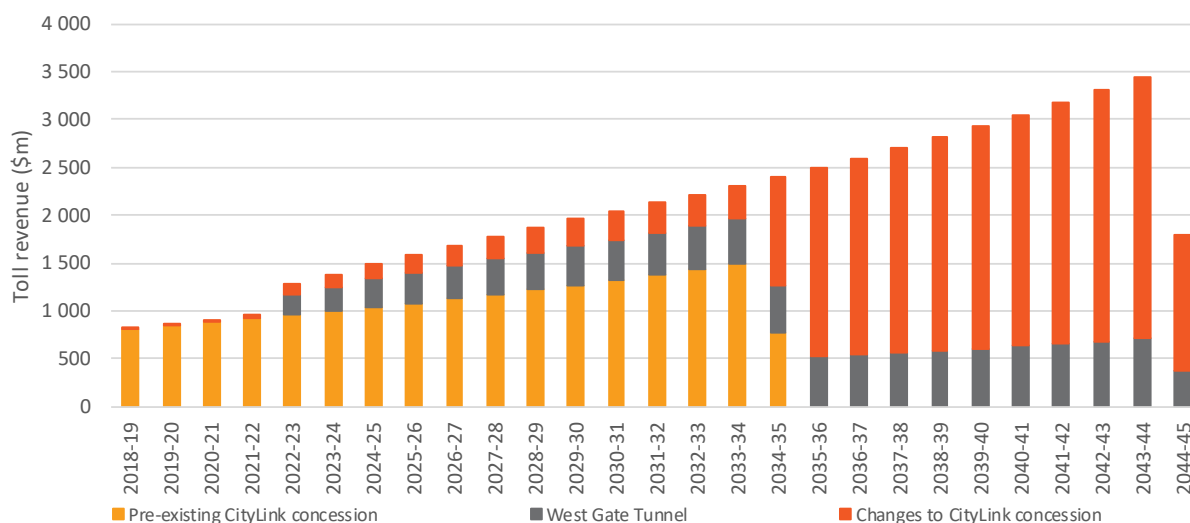
The pre-existing CityLink concession would be expected to generate toll revenue to 2034-35 of \$18 703.7 million in nominal terms. This reflects a present value of \$9 351.1 million in 2018-19 dollar terms.

The West Gate Tunnel would be expected to generate additional toll revenue of \$4 896.3 million by 2034-35 and \$10 759.8 million by 2044-45. In 2018-19 dollar terms, this reflects a present value of \$1 937.9 million to 2034-35 and \$2 792.3 million to 2044-45.

Changes to the CityLink concession would be expected to generate additional toll revenue of \$4 061.8 million by 2034-35 and \$26 524.3 million by 2044-45. In 2018-19 dollar terms, this reflects a present value of \$1 468.7 million to 2034-35 and \$4 741.7 million to 2044-45.

In nominal terms, the combined financial impact of the West Gate Tunnel and changes to the CityLink concession would be expected to generate additional toll revenue of \$8 958.1 million by 2034-35 and \$37 284.1 million by 2044-45. In 2018-19 dollar terms, this reflects additional present value of \$3 406.7 million to 2034-35 and \$7 534.0 million to 2044-45.

Figure 1 – Combined toll revenue projections shows the yearly financial impact of toll revenue collections under the pre-existing CityLink concession, changes to the CityLink concession, and the operation of the West Gate Tunnel.

**Figure 1 – Combined toll revenue projections**

Source: Parliamentary Budget Office.

The pre-existing CityLink concession will conclude on 13 January 2035 while changes to the CityLink concession and the West Gate Tunnel Project Agreement would conclude on 13 January 2045. These factors provide a part-year impact in projected toll revenue in 2034-35 and 2044-45 respectively.

### Projected toll costs for a single passenger car

This section estimates the toll costs for a single passenger car travelling on both the CityLink and West Gate Tunnel when operational. No consideration is given to the non-financial impacts associated with the toll costs such as changes in travel times. Two travel scenarios are considered:

- Full CityLink
  - The passenger car would enter CityLink from the Tullamarine Freeway, Bell Street or Moreland Road entrances and exit at the Bolte bridge. The car would then either travel the length of the West Gate Tunnel or use the Bolte bridge section of CityLink and exit at the West Gate Freeway.
- Partial CityLink
  - The passenger car would enter CityLink at Racecourse Road, either travelling the length of the West Gate Tunnel or using the Bolte bridge section of CityLink, exiting at the West Gate Freeway.

There would be no difference in the toll paid for using either route, as the toll for using the Bolte bridge section of CityLink or the West Gate Tunnel would be the same.

Figure 2 – Toll cost for a single passenger car in 2022-23 estimates the daily, weekly and annual cost of a partial and full CityLink trip for a passenger car once the West Gate Tunnel is operational in 2022-23.

**Figure 2 – Toll cost for a single passenger car in 2022-23**

Use	Pre-existing CityLink concession		Amended CityLink concession		Changes to CityLink concession (variance)	
	Partial CityLink	Full CityLink	Partial CityLink	Full CityLink	Partial CityLink	Full CityLink
Daily	12.2	17.7	13.0	18.8	0.8	1.2
Weekly	61.2	88.3	65.2	94.2	4.0	5.9
Annual	2 944.8	4 252.8	3 147.6	4 545.5	202.8	292.8

Notes: Daily assumes a return trip taken in the second quarter of the financial year. Weekly assumes five daily return trips taken in the second quarter of the financial year. Annual assumes five daily return trips each week for 48 weeks of the year.

Source: Parliamentary Budget Office.

Changes to the CityLink concession will increase the costs of making a partial or full CityLink trip:

- For a full CityLink return trip, a road user in a passenger car is estimated to pay \$18.80 in 2022-23, an additional \$1.20 when compared with the pre-existing CityLink concession.
- A frequent road user making return trips along the full CityLink route five times a week, 48 weeks a year, is estimated to pay an additional \$292.80 in 2022-23, an increase of around seven per cent.

The impact of the changes to the CityLink concession would increase over time, largely driven by the compounding effect of the increased indexation of tolls and the 10-year extension of the toll concession. The present value of tolls paid by the intensive user to 2044-45 would rise from \$36 227.8 to \$51 873.6, in 2018-19 dollar terms, an increase of \$15 645.9 or 43.2 per cent.

Appendix C — Projected toll costs of trips provides details of the nominal toll revenues and present values of trips described in this section.



## Revenue risk and financial liability

### In this section

Independent advice relating to:

- an assessment of the bearer of revenue risk resulting from lower than projected traffic flows
- discussion of the financial liability that would accrue to the Victorian government if changes to the CityLink Concession are revoked.

### Revenue risk

There are two main types of public private partnerships (PPP) between governments and the private sector:

- availability PPP
- economic PPP.

For either type the private sector partner provides funding to either partially or fully facilitate construction of the asset on which toll revenue is collected. Under an availability PPP, the government receives the toll revenue and provides a guaranteed payment to the private firm. Under an economic PPP, the private sector partner collects the toll revenue.

Both CityLink and the West Gate Tunnel Project are economic PPP. The risk related to changes in traffic flows resulting in changes to toll revenue collected is borne by Transurban.

### Financial liability

Revoking the changes to the CityLink concession would mean:

- the CityLink concession would not be extended from 2035 to 2045
- toll indexation rates would not increase
- there would not be a High-Productivity Freight Vehicles (HPFV) toll.

Transurban would be entitled to financial compensation from the Victorian government. The Officer is unable to accurately determine the value of the financial liability accrued by the Victorian government to Transurban from publicly available information and documents.

The quantum of financial liability that would accrue to the Victorian government would likely be the present value of lost revenue plus an amount to compensate Transurban for disengaging from the contract. As one component of this financial liability the present value of the Officer's independent estimate of toll revenue projections relating to changes to the CityLink concession is \$4 741.7 million to 2044-45.

Figure 3 – Publicly available estimates of financial liability provides other projections of the financial liability the Victorian government may accrue if the extension of CityLink tolls is not enacted or the Bill is not passed.

**Figure 3 – Publicly available estimates of financial liability**

Statement	Source	Date
JP Morgan estimated that compensation for not making changes to the CityLink toll agreement would be at least \$1.8 billion.	The Age	8 January 2019
Ian Woodcock from RMIT University's Centre for Urban Research estimated the payout could be between \$3.8 billion and \$5.7 billion in present value terms.	The Age	4 February 2018

Source: *Parliamentary Budget Office.*

## Individual projections

**In this section**

Independent analysis relating to each component used to prepare the toll revenue projections in the first section:

- Pre-existing CityLink concession
- Changes to the CityLink concession:
  - extension of CityLink concession from 2035 to 2045
  - change in toll indexation
  - introduction of a High-Productivity Freight Vehicles (HPFV) toll
- Amended CityLink concession
- West Gate Tunnel Project.

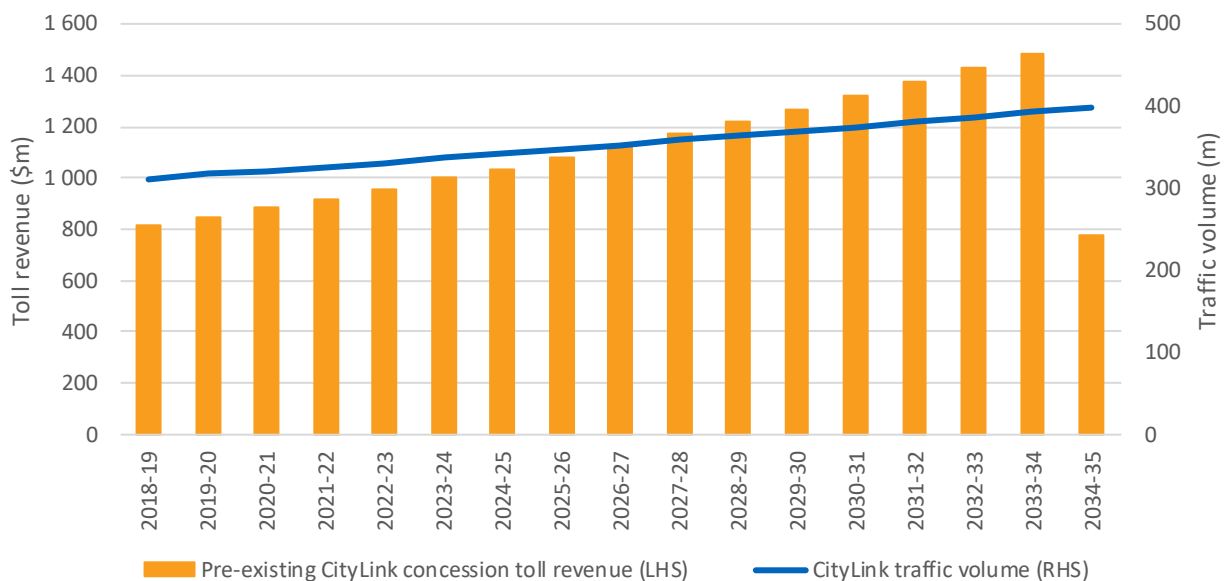
Appendix D — Annual toll revenue projections estimates toll revenue for the West Gate Tunnel project and changes to the CityLink concession individually as well as the combination of both components.

Appendix E — Uncertainty and sensitivity analysis identifies the key drivers of uncertainty in this independent advice and a range of plausible alternatives through sensitivity analysis.

### Pre-existing CityLink concession

CityLink toll revenue collection was \$780.0 million in 2017-18. The pre-existing CityLink concession would be expected to generate toll revenue for Transurban to 2034-35 of \$18 703.7 million in nominal terms, and a present value of \$9 351.1 million in 2018-19 dollar terms.

**Figure 4 – Toll revenue and traffic volume projections for pre-existing CityLink concession**



Source: Parliamentary Budget Office.

### Changes to the CityLink concession

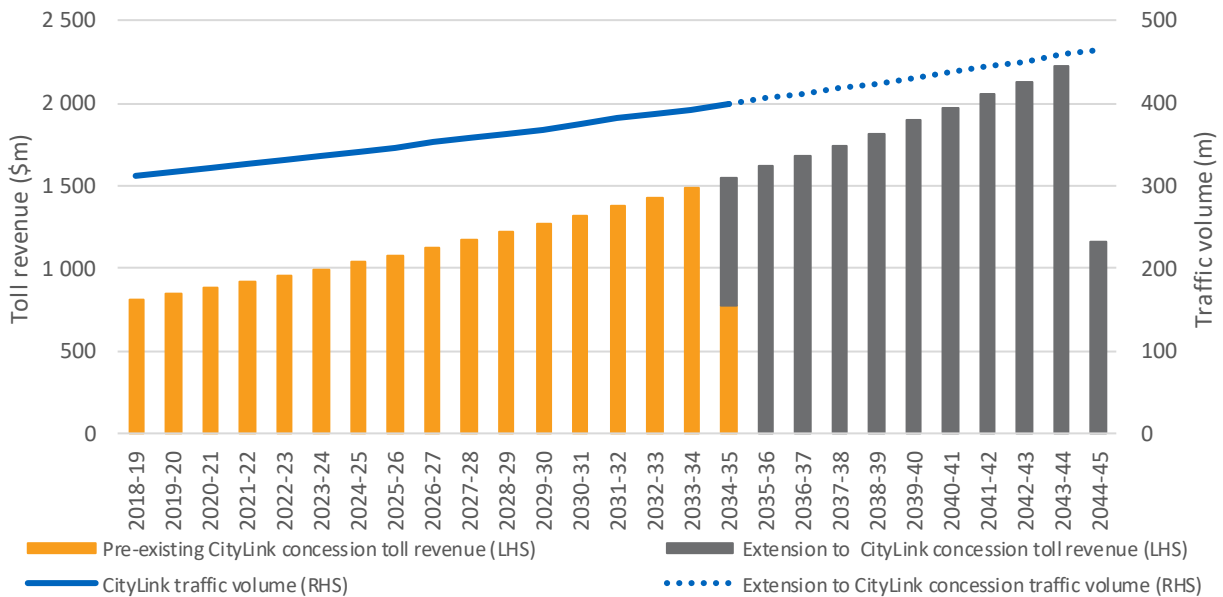
The Amending Deed makes three changes to the CityLink toll concession; a 10-year extension, increased toll indexation, and introduction of a HPFV toll. This section presents the financial impact of each of these changes in isolation, as if the other components of the Amending Deed are revoked. Specifically, this section presents the financial impacts of:

- a 10-year extension of the pre-existing CityLink tolls to 2044-45
- an increase in indexation of the pre-existing CityLink tolls over the period 2019 to 2029
- introduction of a HPFV specific toll to the pre-existing CityLink concession.

### Extension of the CityLink concession from 2035 to 2045

The Amending Deed extends the collection of tolls on CityLink until January 2044-45. By 2044-45, this would be expected to generate additional CityLink toll revenue of \$19 064.4 million in nominal terms, and a present value of \$2 846.1 million in 2018-19 dollar terms.

**Figure 5 – Toll revenue and traffic volume projections for extension of the CityLink concession**



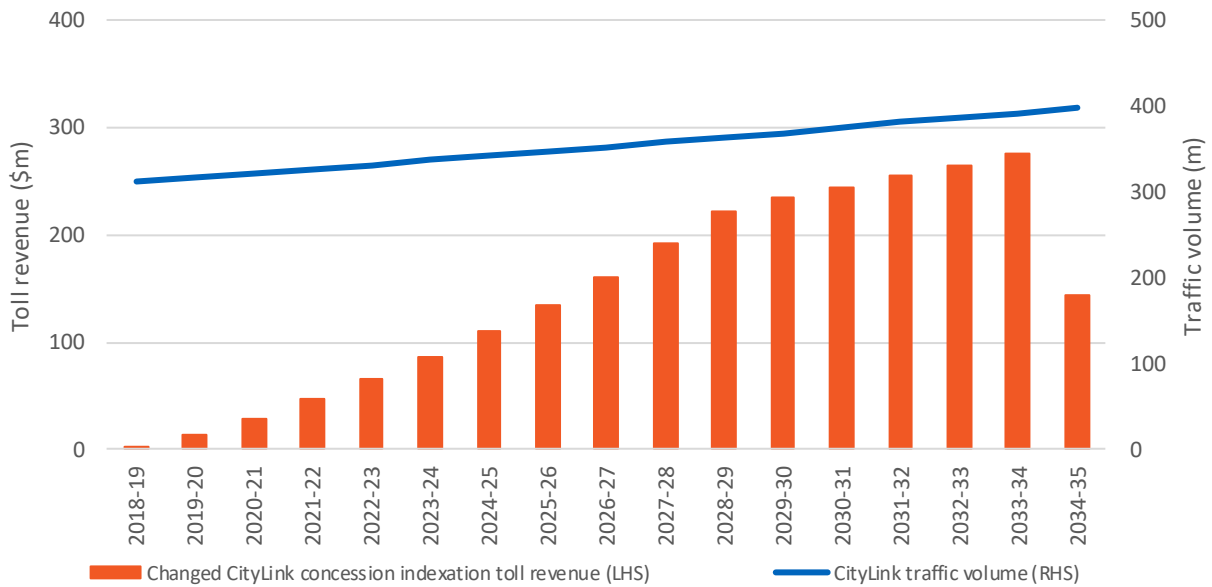
Note: This figure shows the impact of extending the pre-existing CityLink concession by 10 years in isolation. It does not include the change in toll indexation or the introduction of a HPFV toll, outlined in the Amending Deed.

Source: Parliamentary Budget Office.

### Change in toll indexation

Pre-existing CityLink tolls are scheduled to increase by the consumer price index (CPI). The Amending Deed increases the rate of indexation to 4.25 per cent from April 2019 to March 2029, after which indexation would revert to CPI. This would be expected to generate additional CityLink toll revenue of \$2 480.8 million in nominal terms, and a present value of \$987.1 million in 2018-19 dollar terms.

**Figure 6 – Toll revenue and traffic volume projections for change in toll indexation**



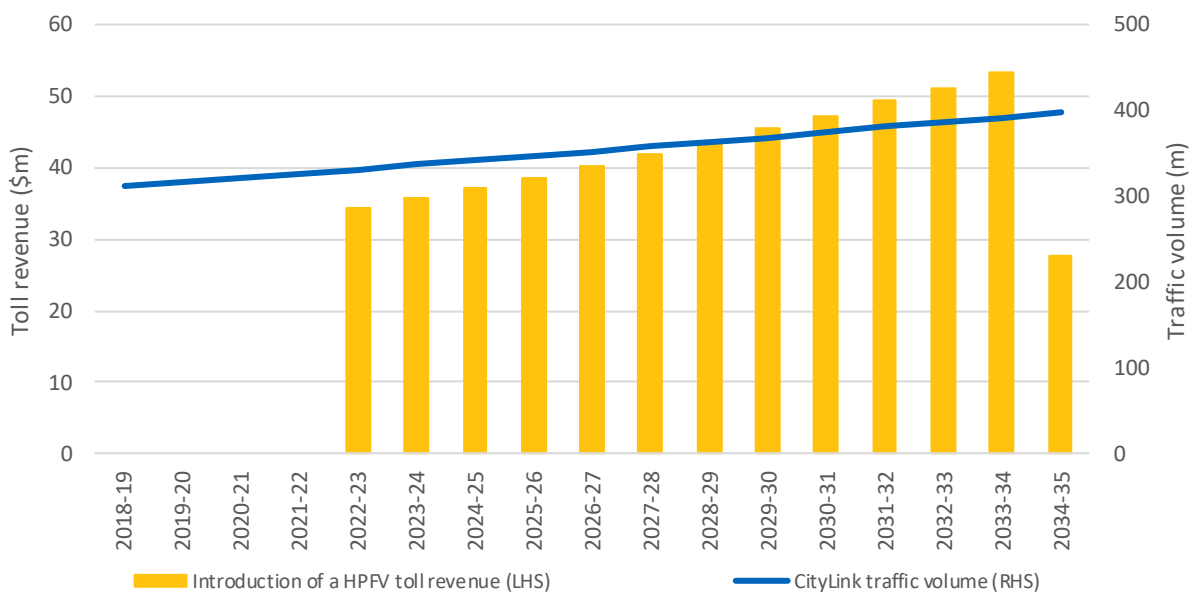
Note: This figure shows the impact of increasing the toll indexation rate to the pre-existing CityLink tolls in isolation. It does not include extension of the CityLink concession from 2035 to 2045 or the introduction of a HPFV toll, outlined in the Amending Deed.

Source: Parliamentary Budget Office.

### Introduction of a HPFV toll

At present High-Productivity Freight Vehicles (HPFV) are subject to the same CityLink toll as other heavy vehicles. The Amending Deed establishes a separate toll for HPFV. This commences at four and a half times the day rate (6am-8pm) and three times the night rate (8pm-6am) of passenger cars from the year the WGTP opens for operation. It then grows in line with other tolls. By 2034-35, this would be expected to generate additional CityLink toll revenue of \$546.2 million in nominal terms, and a present value of \$226.6 million in 2018-19 dollar terms.

**Figure 7 – Toll revenue and traffic volume projections for HPFV toll**



Note: This figure shows the impact of introducing an HPFV toll to the pre-existing CityLink concession in isolation. It does not include the extension of CityLink concession from 2035 to 2045 or the change in toll indexation outlined in the Amending Deed.

Source: Parliamentary Budget Office.

## Amended CityLink concession

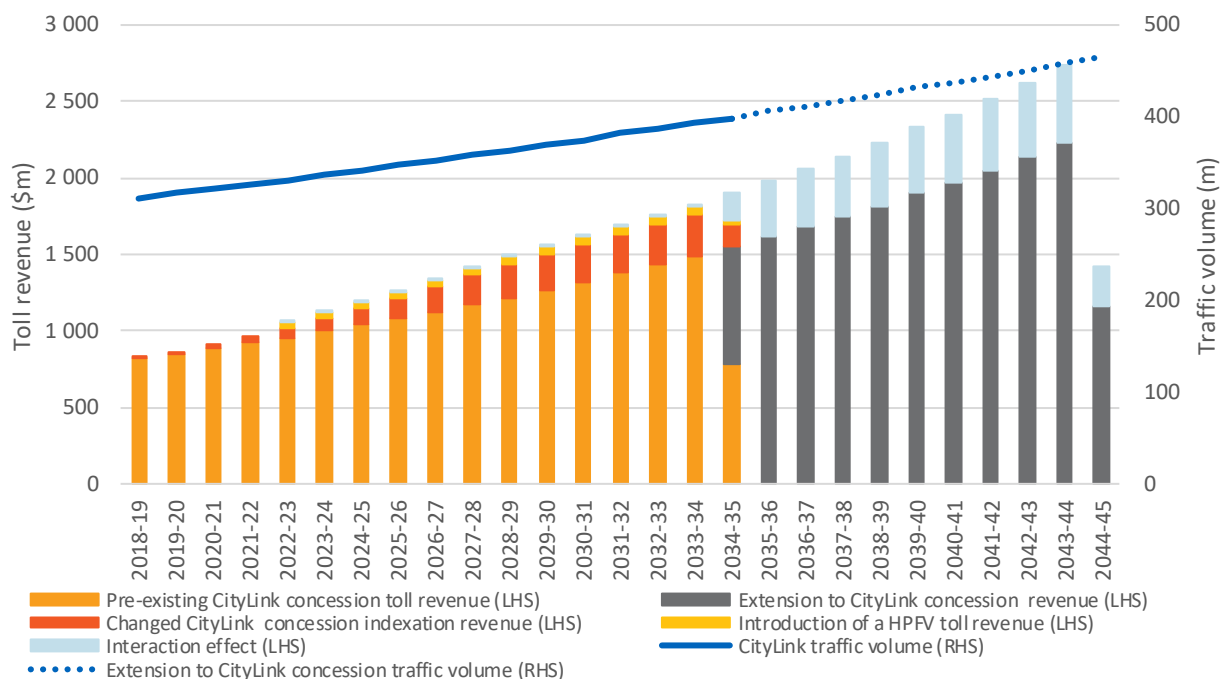
This section presents the combined impact of the three changes outlined in the Amending Deed. It combines the individual changes—described in the previous section—and includes an interaction effect between them. The interaction effect includes:

- extension of the HPFV toll to 2044-45
- indexation of the HPFV toll at the increased rate over the period 2019 to 2029
- extension of tolls, including the HPFV toll, already subject to the increased indexation.

Appendix A - Assumptions and approach explains how the financial impacts have been estimated and details why these interaction effects are combined.

In nominal terms, this would be expected to generate additional CityLink toll revenue of \$4 061.8 million by 2034-35 and \$26 524.3 million by 2044-45. In 2018-19 dollar terms, this reflects a present value of \$1 468.7 million to 2034-35 and \$4 741.7 million to 2044-45. Figure 8 – Toll revenue and traffic volume projections for the combined impact shows the year on year finance and traffic volume impact.

**Figure 8 – Toll revenue and traffic volume projections for the combined impact**



Source: Parliamentary Budget Office.

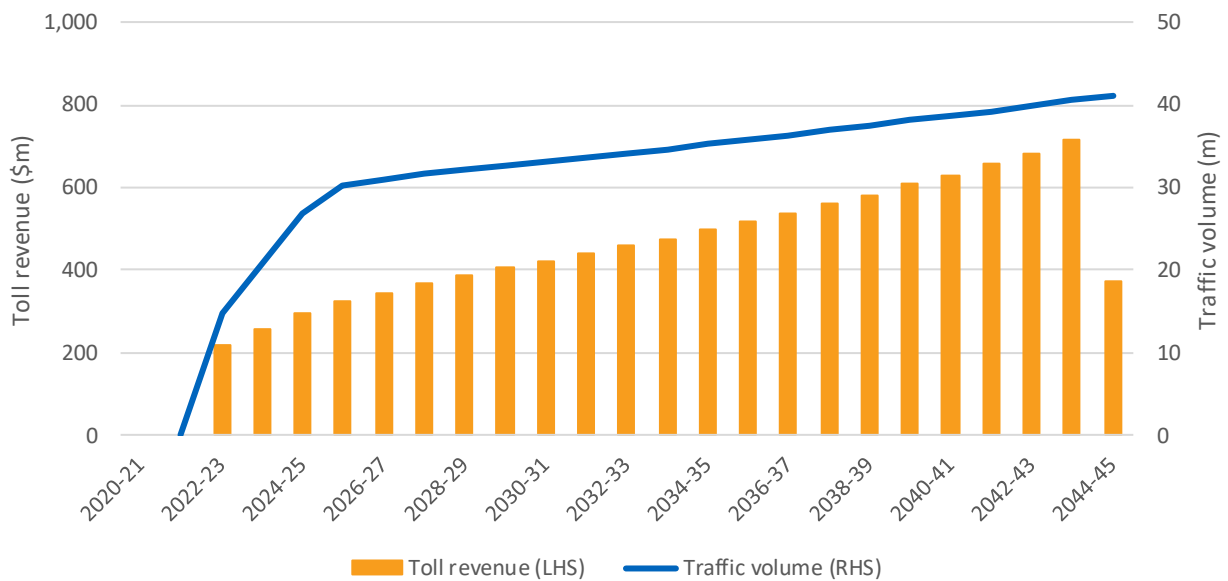
The financial impact of implementing the three concession changes simultaneously is greater than the sum of their financial impacts when implemented in isolation as the changes interact with each other. In 2018-19 dollar terms, the present value of the interaction effect is \$622.6 million to 2044-45. The cause of the interaction effect differs depending on the period considered:

- Over the period 2022-23 to 2033-34, this reflects increased indexation that would apply to the HPFV toll as well as the pre-existing toll types.
- Over the period 2035-36 to 2044-45, this reflects the extension of the toll concession with tolls that are higher than under the pre-existing concession reflecting the increased indexation.
- In 2034-35, this reflects a combination of the above two effects.

## West Gate Tunnel Project

In nominal terms the West Gate Tunnel Project would be expected to generate toll revenue of \$4 896.3 million by 2034-35 and \$10 759.8 million by 2044-45. In 2018-19 dollar terms, this reflects a present value of \$1 937.9 million to 2034-35 and \$2 792.3 million to 2044-45.

**Figure 9 – Toll revenue and traffic volume projections for West Gate Tunnel Project**



Source: Parliamentary Budget Office.

To 2025-26, traffic volumes for the West Gate Tunnel grow more rapidly than throughout the rest of the period. This reflects ramp up in usage of the new toll road following the completion of the West Gate Tunnel project.

## Appendix A — Assumptions and approach

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This appendix provides the key assumptions and approach to modelling the toll revenue projections used in this independent advice.

### Key assumptions

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#### West Gate Tunnel Project and CityLink

1. Traffic volumes using the West Gate Tunnel and CityLink would grow at the average quarterly growth rate over the past 5 years of road users on CityLink.
2. The proportion of vehicle types using the West Gate Tunnel and CityLink would be equivalent to the proportion of vehicle types in the Australian Bureau of Statistics' *2018 Motor Vehicle Census for Victoria*.
3. The split between trucks travelling in the day and night would be 50/50.
4. The consumer price index would grow in line with the Department of Treasury and Finance's 2018 budget update forecasts to 2021-22, then grow at 2.5 per cent per year to 2045.
5. The number of High Productivity Freight Vehicles (HPFV) in Victoria would be equivalent to the number of articulated trucks in the Australian Bureau of Statistics' *2018 Motor Vehicle Census Australia*.
6. A real discount rate of 7 per cent would be used for present value calculations. This is consistent with the 2013 Department of Treasury and Finance economic valuation guidance on the appropriate real discount rate applied for most public transport and road projects.

#### West Gate Tunnel Project

7. The West Gate Tunnel would open in the first quarter of 2022-23.
8. The use of 24-hour passes by road users would not materially impact toll revenue estimates.
9. Daily traffic flows for vehicles and trucks using the West Gate Freeway and Tunnel in 2030 including AM peak usage of the City Access toll point are based on the levels estimated in Western Distributor Authority's *West Gate Tunnel Transport Impact Assessment*.
10. The initial ramp up in cars, motorcycles and light commercial vehicles use of the West Gate Tunnel would be similar to the ramp up estimated in the East West Link business case.
11. There would be no ramp-up in trucks as these road users pay the West Gate Freeway toll to access the upgraded freeway's new tunnels and connections.

### Approach

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#### West Gate Tunnel Project

- Estimated toll rates to 2045 for the West Gate Freeway and Tunnel by indexing the current toll rates, outlined on the West Gate Tunnel project website, by the indexation arrangements outlined in the *West Gate Tunnel Project Agreement*.
- Projected traffic flows for trucks and vehicles to 2045 using the West Gate Freeway and West Gate Tunnel and the City Access Charge adjusted for:
  - assumed growth rates in traffic flows
  - proportion of vehicle types as per the different toll rates
  - the assumed initial ramp up in usage
  - the assumed split of trucks travelling at day and night.
- Estimated the total toll revenue to 2045 using the estimated toll rates and projected traffic flows.

## CityLink

### Pre-existing CityLink concession:

- Projected toll rate increases to 2035 based on consumer price index forecasts in the Department of Treasury and Finance's *2018 Budget Update*, then continuing at around 0.6 per cent per quarter (compounding to 2.5 per cent annually).
- Projected traffic flows on CityLink using assumed growth rates.
- Estimated the total toll revenue using the estimated toll rates and projected traffic flows.

### Changes to the CityLink concession (considered in isolation):

- Projected increases in toll rate indexation by increasing the toll growth rate to 4.25 per cent per year for a 10 year period (June quarter 2019 to March quarter 2029).
- Extended the CityLink concession from 2035 to 2045 by:
  - projecting traffic volumes a further 10 years using assumed growth rates
  - projecting toll rate increases based on the consumer price index continuing to grow by around 0.6 per cent per quarter (compounding to 2.5 per cent annually)
  - adjusting for the higher toll rate for HPFV.
- Estimated the additional toll revenue for each change to the CityLink concession and in combination.

### Amended CityLink concession:

- Estimated the combined impact of the changes to the pre-existing CityLink concession by simultaneously implementing the changes described in the Changes to CityLink concession approach.
- Derived the total interaction effect between the changes to the pre-existing CityLink concession as the combined impact of the changes less the sum of the impact of the changes when each is implemented in isolation.
  - The derived interaction effect is a combination of a number of interactions between some or all of the Amending Deed changes.
  - Separate identification of each of these interactions would depend on the order in which they are derived, and therefore cannot be reliably attributed to individual changes.



## Appendix B — Data sources

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- Australian Bureau of Statistics 2018 *Motor Vehicle Census Australia* cat. no. 9309.0 [ONLINE] available at <https://www.abs.gov.au/ausstats/abs@.nsf/mf/9309.0> [accessed 4 March 2019].
- Department of Treasury and Finance 2018 *Victorian Budget 2018-19*.
- Department of Treasury and Finance 2018 *2018-19 Budget Update*.
- Premier of Victoria 2014 *East West Link Files* [ONLINE] available at <https://www.premier.vic.gov.au/east-west-link-announcement/> [accessed 4 March 2019].
- PwC 2017 *West Gate Tunnel Project Transurban Final Offer: Summary Value for Money Assessment Report* [ONLINE] available at <https://www.dtf.vic.gov.au/sites/default/files/2018-01/West-Gate-Tunnel-Project-Summary-Value-for-Money-Report.pdf> [accessed 13 March 2019]
- Transurban 2017 *West Gate Tunnel Project: Transurban equity raising* [ONLINE] available at <https://www.asx.com.au/asxpdf/20171212/pdf/43q2rk9h2sk2cp.pdf> [accessed 7 March 2019]
- Transurban 2018 *Financial results (Excel)* [ONLINE] available at <https://www.transurban.com/investor-centre/reporting/financial-results> [accessed 4 March 2019].
- West Gate Tunnel Project 2017 *Western Distributor Authority - West Gate Tunnel Transport Impact Assessment* [ONLINE] available at <http://westgatetunnelproject.vic.gov.au/library/environment-effects-statement/ees-documents> [accessed 4 March 2019].
- West Gate Tunnel Project 2019 *Toll Prices* [ONLINE] available at [http://westgatetunnelproject.vic.gov.au/\\_data/assets/pdf\\_file/0015/340350/Tolls-for-driving-on-the-West-Gate-Tunnel-Project.pdf](http://westgatetunnelproject.vic.gov.au/_data/assets/pdf_file/0015/340350/Tolls-for-driving-on-the-West-Gate-Tunnel-Project.pdf) [accessed 4 March 2019].

## Appendix C — Projected toll costs of trips

This appendix estimates the toll costs for a passenger car travelling on both CityLink and the West Gate Tunnel when operational. In both nominal and present value terms, estimates are provided for annual use, weekly use and daily use. Daily assumes a return trip taken in the second quarter of the financial year, weekly assumes five daily return trips taken in the second quarter of the financial year, and annual assumes five daily return trips each week for 48 weeks of the year. In addition, nominal estimates are provided for a single one way trip taken in the second quarter of the financial year.

No consideration is given to the non-financial impacts associated with the toll costs such as changes in travel times. Two travel scenarios are considered:

- Full CityLink
  - The car would enter CityLink from any of the Tullamarine Freeway Bell Street or Moreland Road entrances and exit at the Bolte bridge. The car would then either travel the length of the West Gate Tunnel or use the Bolte bridge section of CityLink and exit at the West Gate Freeway.
- Partial CityLink
  - The car would enter CityLink at Racecourse Road. The car would then either travel the length of the West Gate Tunnel or use the Bolte bridge section of CityLink and exit at the West Gate Freeway.

There would be no difference in the toll paid for using either route as the incremental toll for the Bolte bridge and the West Gate Tunnel would be the same.

**Figure C1 – Present value of projected trip cost to 2044-45 in 2018-19 dollars**

Use	Pre-existing CityLink concession		Amended CityLink concession	
	Partial CityLink	Full CityLink	Partial CityLink	Full CityLink
Daily	105.9	152.9	150.0	216.6
Weekly	529.5	764.5	749.8	1 083.2
Annual	25 084.3	36 227.8	35 913.7	51 873.6

Note: All numbers are the estimated present value of tolls expressed in 2018-19 dollars.

Source: *Parliamentary Budget Office*.

**Figure C2 – Annual nominal projected trip cost**

Year	Pre-existing CityLink concession		Amended CityLink concession		Changes to CityLink concession	
	Partial CityLink	Full CityLink	Partial CityLink	Full CityLink	Partial CityLink	Full CityLink
2019-20	2 741.1	3 960.0	2 786.8	4 023.8	45.7	63.8
2020-21	2 803.2	4 048.8	2 895.6	4 183.1	92.4	134.4
2021-22	2 872.8	4 150.8	3 019.2	4 360.7	146.4	210.0
2022-23	2 944.8	4 252.8	3 147.6	4 545.5	202.8	292.8
2023-24	3 027.5	4 371.6	3 289.8	4 751.8	262.3	380.2
2024-25	3 096.0	4 468.8	3 421.2	4 940.3	325.2	471.6
2025-26	3 172.8	4 579.2	3 566.3	5 150.3	393.6	571.2
2026-27	3 249.6	4 694.4	3 716.4	5 368.7	466.8	674.4
2027-28	3 341.5	4 825.2	3 886.6	5 613.3	545.1	788.2
2028-29	3 415.2	4 932.0	4 035.5	5 829.5	620.3	897.5
2029-30	3 500.4	5 056.8	4 150.8	5 993.9	650.4	937.2
2030-31	3 588.0	5 182.8	4 252.8	6 143.9	664.8	961.2
2031-32	3 688.1	5 325.8	4 371.6	6 314.9	683.5	989.1
2032-33	3 770.4	5 445.6	4 468.8	6 454.7	698.4	1 009.2
2033-34	3 862.8	5 580.0	4 579.2	6 616.7	716.4	1 036.8
2034-35	2 139.0	3 089.5	4 694.4	6 782.3	2 555.4	3 692.8
2035-36	-	-	4 825.2	6 971.8	4 825.2	6 971.8
2036-37	-	-	4 932.0	7 125.5	4 932.0	7 125.5
2037-38	-	-	5 056.8	7 303.1	5 056.8	7 303.1
2038-39	-	-	5 182.8	7 485.5	5 182.8	7 485.5
2039-40	-	-	5 325.8	7 693.8	5 325.8	7 693.8
2040-41	-	-	5 445.6	7 864.7	5 445.6	7 864.7
2041-42	-	-	5 581.2	8 061.5	5 581.2	8 061.5
2042-43	-	-	5 720.4	8 263.1	5 720.4	8 263.1
2043-44	-	-	5 879.3	8 492.8	5 879.3	8 492.8
2044-45	-	-	3 246.1	4 688.5	3 246.1	4 688.5

Source: Parliamentary Budget Office.

**Figure C3 – Nominal projected trip cost for a single week of use**

Year	Pre-existing CityLink concession		Amended CityLink concession		Changes to CityLink concession	
	Partial CityLink	Full CityLink	Partial CityLink	Full CityLink	Partial CityLink	Full CityLink
2019-20	56.8	82.0	57.6	83.2	0.8	1.2
2020-21	58.2	84.1	60.0	86.7	1.8	2.6
2021-22	59.7	86.2	62.6	90.4	2.9	4.2
2022-23	61.2	88.3	65.2	94.2	4.0	5.9
2023-24	62.7	90.5	68.0	98.2	5.3	7.7
2024-25	64.3	92.8	70.9	102.4	6.6	9.6
2025-26	65.9	95.1	73.9	106.7	8.0	11.6
2026-27	67.5	97.5	77.0	111.3	9.5	13.8
2027-28	69.2	99.9	80.3	116.0	11.1	16.1
2028-29	70.9	102.4	83.7	120.9	12.8	18.5
2029-30	72.7	105.0	86.2	124.5	13.5	19.5
2030-31	74.5	107.6	88.3	127.6	13.8	20.0
2031-32	76.4	110.3	90.5	130.8	14.1	20.5
2032-33	78.3	113.1	92.8	134.1	14.5	21.0
2033-34	80.2	115.9	95.1	137.4	14.9	21.5
2034-35	82.3	118.8	97.5	140.9	15.2	22.1
2035-36	-	-	99.9	144.4	99.9	144.4
2036-37	-	-	102.4	148.0	102.4	148.0
2037-38	-	-	105.0	151.7	105.0	151.7
2038-39	-	-	107.6	155.5	107.6	155.5
2039-40	-	-	110.3	159.4	110.3	159.4
2040-41	-	-	113.1	163.3	113.1	163.3
2041-42	-	-	115.9	167.4	115.9	167.4
2042-43	-	-	118.8	171.6	118.8	171.6
2043-44	-	-	121.8	175.9	121.8	175.9
2044-45	-	-	124.8	180.3	124.8	180.3

Source: Parliamentary Budget Office.

**Figure C4 – Nominal projected cost of a return trip**

Year	Pre-existing CityLink concession		Amended CityLink concession		Changes to CityLink concession	
	Partial CityLink	Full CityLink	Partial CityLink	Full CityLink	Partial CityLink	Full CityLink
2019-20	11.4	16.4	11.5	16.6	0.2	0.2
2020-21	11.6	16.8	12.0	17.3	0.4	0.5
2021-22	11.9	17.2	12.5	18.1	0.6	0.8
2022-23	12.2	17.7	13.0	18.8	0.8	1.2
2023-24	12.5	18.1	13.6	19.6	1.1	1.5
2024-25	12.9	18.6	14.2	20.5	1.3	1.9
2025-26	13.2	19.0	14.8	21.3	1.6	2.3
2026-27	13.5	19.5	15.4	22.3	1.9	2.8
2027-28	13.8	20.0	16.1	23.2	2.2	3.2
2028-29	14.2	20.5	16.7	24.2	2.6	3.7
2029-30	14.5	21.0	17.2	24.9	2.7	3.9
2030-31	14.9	21.5	17.7	25.5	2.8	4.0
2031-32	15.3	22.1	18.1	26.2	2.8	4.1
2032-33	15.7	22.6	18.6	26.8	2.9	4.2
2033-34	16.0	23.2	19.0	27.5	3.0	4.3
2034-35	16.5	23.8	19.5	28.2	3.0	4.4
2035-36	-	-	20.0	28.9	20.0	28.9
2036-37	-	-	20.5	29.6	20.5	29.6
2037-38	-	-	21.0	30.3	21.0	30.3
2038-39	-	-	21.5	31.1	21.5	31.1
2039-40	-	-	22.1	31.9	22.1	31.9
2040-41	-	-	22.6	32.7	22.6	32.7
2041-42	-	-	23.2	33.5	23.2	33.5
2042-43	-	-	23.8	34.3	23.8	34.3
2043-44	-	-	24.4	35.2	24.4	35.2
2044-45	-	-	25.0	36.1	25.0	36.1

Source: Parliamentary Budget Office.

**Figure C5 – Nominal projected cost of a single trip**

Year	Pre-existing CityLink concession		Amended CityLink concession		Changes to CityLink concession	
	Partial CityLink	Full CityLink	Partial CityLink	Full CityLink	Partial CityLink	Full CityLink
2019-20	5.7	8.2	5.8	8.3	0.1	0.1
2020-21	5.8	8.4	6.0	8.7	0.2	0.3
2021-22	6.0	8.6	6.3	9.0	0.3	0.4
2022-23	6.1	8.8	6.5	9.4	0.4	0.6
2023-24	6.3	9.1	6.8	9.8	0.5	0.8
2024-25	6.4	9.3	7.1	10.2	0.7	1.0
2025-26	6.6	9.5	7.4	10.7	0.8	1.2
2026-27	6.8	9.8	7.7	11.1	1.0	1.4
2027-28	6.9	10.0	8.0	11.6	1.1	1.6
2028-29	7.1	10.2	8.4	12.1	1.3	1.9
2029-30	7.3	10.5	8.6	12.5	1.4	2.0
2030-31	7.5	10.8	8.8	12.8	1.4	2.0
2031-32	7.6	11.0	9.1	13.1	1.4	2.1
2032-33	7.8	11.3	9.3	13.4	1.5	2.1
2033-34	8.0	11.6	9.5	13.7	1.5	2.2
2034-35	8.2	11.9	9.8	14.1	1.5	2.2
2035-36	-	-	10.0	14.4	10.0	14.4
2036-37	-	-	10.2	14.8	10.2	14.8
2037-38	-	-	10.5	15.2	10.5	15.2
2038-39	-	-	10.8	15.6	10.8	15.6
2039-40	-	-	11.0	15.9	11.0	15.9
2040-41	-	-	11.3	16.3	11.3	16.3
2041-42	-	-	11.6	16.7	11.6	16.7
2042-43	-	-	11.9	17.2	11.9	17.2
2043-44	-	-	12.2	17.6	12.2	17.6
2044-45	-	-	12.5	18.0	12.5	18.0

Source: Parliamentary Budget Office.

## Appendix D — Annual toll revenue projections

**Figure D1 – Nominal projected toll revenue (\$ million)**

Year	Pre-existing CityLink Concession	West Gate Tunnel Project	Changes to CityLink concession	Combined toll revenue
2018-19	816.0	-	1.1	<b>817.1</b>
2019-20	850.5	-	13.5	<b>864.0</b>
2020-21	882.9	-	29.3	<b>912.2</b>
2021-22	919.0	-	46.7	<b>965.7</b>
2022-23	956.6	217.4	102.5	<b>1 276.5</b>
2023-24	998.5	255.3	125.8	<b>1 379.6</b>
2024-25	1 036.5	294.8	150.5	<b>1 481.8</b>
2025-26	1 078.9	325.0	177.8	<b>1 581.8</b>
2026-27	1 123.1	346.4	207.4	<b>1 677.0</b>
2027-28	1 172.3	368.1	240.2	<b>1 780.5</b>
2028-29	1 216.9	388.5	272.8	<b>1 878.1</b>
2029-30	1 266.7	406.0	288.9	<b>1 961.6</b>
2030-31	1 318.6	422.7	300.7	<b>2 042.0</b>
2031-32	1 376.3	441.2	313.8	<b>2 131.3</b>
2032-33	1 428.7	458.0	325.8	<b>2 212.5</b>
2033-34	1 487.2	476.7	339.1	<b>2 303.1</b>
2034-35	775.1	496.2	1 125.9	<b>2 397.3</b>
2035-36	-	518.0	1 984.3	<b>2 502.2</b>
2036-37	-	537.7	2 059.9	<b>2 597.6</b>
2037-38	-	559.7	2 144.2	<b>2 703.9</b>
2038-39	-	582.6	2 231.9	<b>2 814.5</b>
2039-40	-	608.1	2 329.6	<b>2 937.7</b>
2040-41	-	631.3	2 418.4	<b>3 049.6</b>
2041-42	-	657.1	2 517.3	<b>3 174.4</b>
2042-43	-	684.0	2 620.4	<b>3 304.4</b>
2043-44	-	714.0	2 735.0	<b>3 449.0</b>
2044-45	-	371.1	1 421.6	<b>1 792.7</b>

Source: Parliamentary Budget Office.

## Appendix E — Uncertainty and sensitivity analysis

This appendix identifies the key drivers of uncertainty associated with the toll revenue projections provided in this independent advice and how sensitive it is to changes in assumptions. This is a useful way of determining a plausible range against the result.

### Uncertainty

Variations in the following assumptions documented in Appendix A — Assumptions and approach would result in variations to projected toll revenue:

- growth in traffic volumes
- discount rates
- vehicle type splits
- time of use of toll roads.

Of these assumptions, growth in traffic volumes and the discount rate have the most significant impact on toll revenues. Sensitivity analysis is provided on these two assumptions.

### Sensitivity analysis

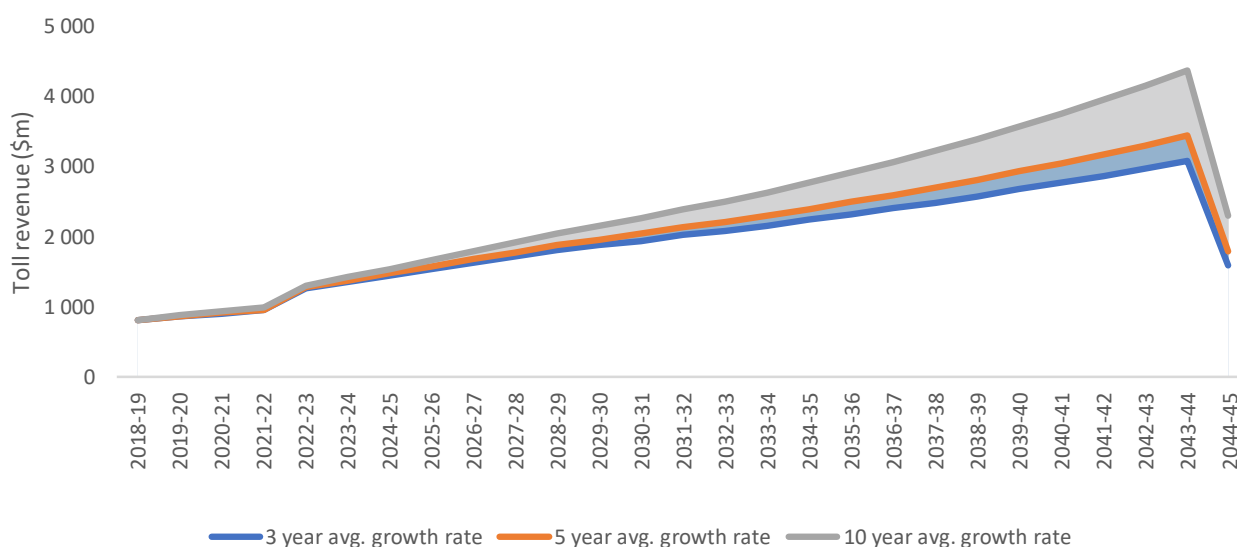
#### Growth in traffic volumes

Projected growth in traffic volumes for both the West Gate Tunnel and the CityLink are based on the five year average growth rate in CityLink traffic volumes. This translates to an average annual growth rate of 1.6 per cent.

The average growth rate is sensitive to the number of Victorian cars and drivers in Melbourne and changes to the traffic arrangements along CityLink over time. Varying the growth rate to a three-year average growth rate reduces the average annual growth rate of 1.1 per cent. Varying the growth rate to a ten-year growth rate increases the average annual growth rate to 2.6 per cent.

Figure E1 shows the impact of these alternate growth rates on the projected toll revenue streams for changes to the CityLink concession—pre-existing CityLink concession plus additional revenues from the changes to the CityLink concession—and the West Gate Tunnel Project.

**Figure E1 – Sensitivity analysis of traffic volumes on nominal toll revenue**



Source: Parliamentary Budget Office.



Using the five-year average growth rate used in this report the present value of toll revenues to 2044-45 would be \$16 237.2 million in 2018-19 dollar terms.

Varying from a five-year average growth rate to three years translates to a reduction in present value of projected toll revenue of 4.1 per cent to \$15 565.5 million in 2018-19 dollar terms.

Varying from a five-year average growth rate to 10 years translates to an increase in present value of projected toll revenue of 9.8 per cent to \$17 825.4 million in 2018-19 dollar terms.

## Discount rate

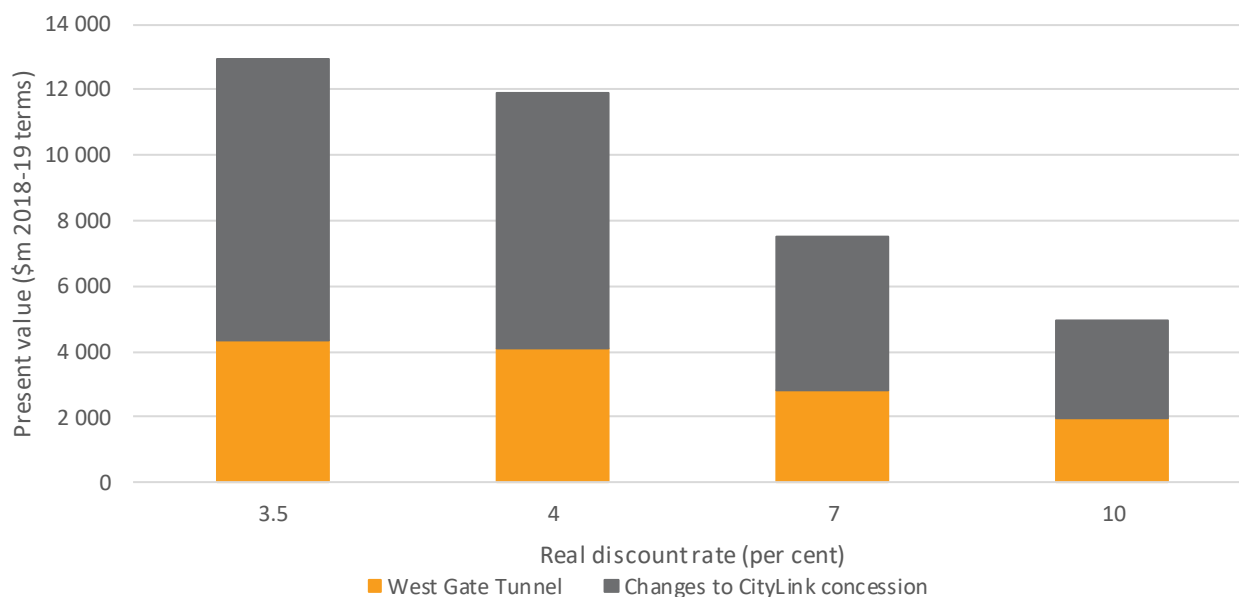
Nominal toll revenue flows are converted into present value terms using a discount rate of 7 per cent. This is consistent with the 2013 Department of Treasury and Finance economic valuation guidance on the appropriate real discount rate applied for most public transport and road projects.

The modelled estimates of discounted revenue presented in this report are sensitive to the discount rate applied. Determining an appropriate discount rate is crucial when it comes to valuing public investment projects. Low discount rate can overvalue a project while high discount rates can lead to undervaluation.

Infrastructure Australia conducts sensitivity testing at 4 per cent and 10 per cent. As the borrowing cost is historically low, Terrill and Batrouney (2018) from Grattan Institute also recommend the government lower the discount rate used for public transport infrastructure projects with low risks to 3.5 per cent.

Figure E2 shows the present value of revenue streams for both the West Gate Tunnel and changes to the CityLink concession using discount rates of 3.5 per cent, 4 per cent, 7 per cent, and 10 per cent.

**Figure E2 – Sensitivity analysis of discount rate on present value of future toll revenue**



Source: Parliamentary Budget Office.

A seven per cent real discount rate results in present value of projected toll revenue of \$7 534.0 million in 2018-19 dollar terms.

Applying a lower real discount rate than the central estimate of seven per cent would increase the present value of projected toll revenue. The present value of projected toll revenues in 2018-19 dollar terms would increase to \$12 913.3 million for a 3.5 per cent real discount rate, and \$11 913.8 million for a 4 per cent real discount rate. These represent increases of 71 per cent and 58 per cent respectively.

Varying from the central estimate of a seven per cent real discount rate to a ten per cent rate translates to a decrease in present value of projected toll revenue of 34 per cent to \$4 970.1 million in 2018-19 dollar terms.