

# Safety at Intersections

## Filtered Right Turns Protocol

### At Signalised Intersections



March 2020

# Introduction

- 25% of Intersections' Fatal and Serious injury crashes were reported at signalised intersections between 2013 and 2017
- 46% of Auckland's Top 100 High Risk Intersections were at Signalised Intersections
- 27% of the Signalised Intersections' fatal and serious crashes were related to filtered right turn movements

14 Fatal &  
204 Serious

46%  
TRAFFIC  
SIGNALS

MAKING  
TURN





## What is a filter right turn?

- A filter right turn is where drivers are allowed to turn right on a full green (disc) signal display
- Historically implemented for intersection optimisation, reducing delays and increasing efficiency
- Reliant on drivers to make judgement and inherent safety risk



# AT's Filtered Right Turns Protocol

- Provide guidance for reviewing filtered right turn phasing at existing intersections
- Recognises there are benefits to allow filter right turn movements
- Prohibits filter right turns in situations where drivers are more likely to make a mistake
- Acknowledges **VISION ZERO** principle that human make mistakes and some drivers will inevitably fail to give way

Crash Type		Impact speed
	head on	70 km/h
	side-impact	50 km/h
	side impact with tree	30 km/h
	pedestrian	30 km/h

# AT's Filtered Right Turns Protocol

## NOT Allowed if:

- > 1 right turn lane
- 3 injury crashes or more than 5 total crashes in a 5-year period attributed to filtering
- Level of Safety Service (LoSS)  $\geq$  IV
- Potential of a lagging right turn phase in the opposite approach
- Proposed phase makes filtering unsafe
- Posted speed limit or 85<sup>th</sup> percentile operating speed  $\geq$  70 km/h
- Two or more through lanes where posted speed limit or 85<sup>th</sup> percentile operating speed  $\geq$  60 km/h

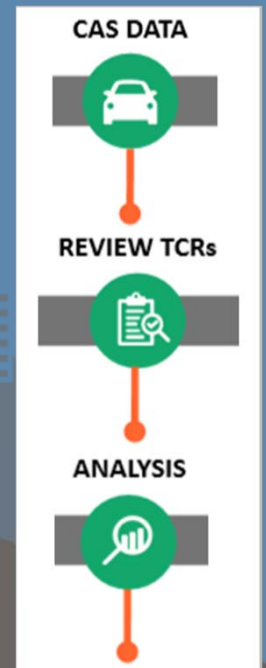
## Requires Approval if:

- Posted speed limit or 85<sup>th</sup> percentile operating speed  $\geq$  60 km/h
- 3 through lanes where posted speed limit or 85<sup>th</sup> percentile operating speed  $\geq$  50 km/h
- ASD and MGSD is less than required
- Product of right turn volume and opposing through and left turn volume exceed:
  - 50,000 veh/hr for one lane approach
  - 100,000 veh/hr for 2 or 3 lane approach



# Filter Right Turn Removal Evaluation

- Study period: from 1 Jan 2012 to 30 Sept 2019
- **Treatment Group: 29 sites** removed for filter right turn operation
- **Control Group: 23 sites** of similar signalised intersections where the right turn permitted
- **All Signalised Intersections Group: All** signalised intersections in Auckland



# Filter Right Turn Removal Evaluation

- **Treatment Group** measures:

- Number of LB-Type crashes
- Actual number of Fatal and Serious injury crashes for LB-Type crashes
- Death and Serious injury equivalent for LB-Type crashes
- Total number of crashes
- Number of Red light running crashes



# Preliminary Key Results – Treatment Group

## Annual Average LB-Type Crashes per Intersection

Indicator	Before	After	% Change
Crashes	1.69	0.19	↓ 89%
Actual F+S	0.07	0.00	↓ 100%
DSIe	0.13	0.01	↓ 89%

## Annual Average Total Crashes per Intersection

Indicator	Before	After	% Change
Actual F+S	0.14	0.09	↓ 38%
DSIe	0.24	0.10	↓ 58%
D+S Casualties	0.15	0.09	↓ 43%

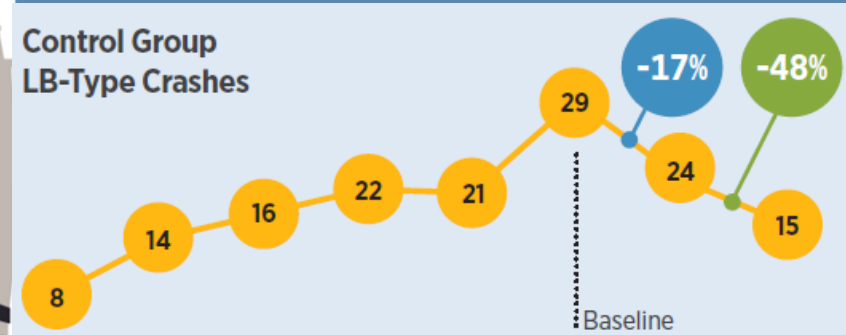
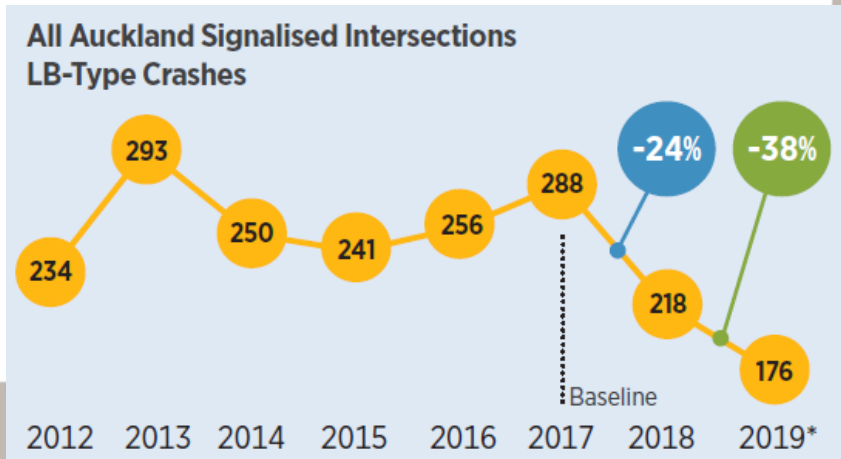
## Annual Average Red Light Running Crashes\* per intersection

Indicator	Before	After	% Change
Crashes	0.72	0.80	↑ 10%
DSIe	0.044	0.023	↓ 47%

\*The increase in red light running crashes may not be statistically significant given the small number of recorded crashes in the after period



# Comparison of all groups



# Thank you.

