Evaluating the Auckland Cycling Model

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IF YOU BUILD IT, THEY WILL COME
OR THEY WON'T. HARD TO SAY.
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Estimating Cyclist Demands

- Previous methods for estimating cyclist demands:
  - Simplified Procedures 11 (SP11) from the Economic Evaluation Manual
  - NZ Transport Agency's Research Report 340: "Estimating Demand for New Cycling Facilities in New Zealand"
- Need for better forecasting practice highlighted in the NZ Transport Agency's National Cycle Network Design Guidance Stage 1 Report – Best Practice Review (2015)

Image courtesy NZ Transport Agency

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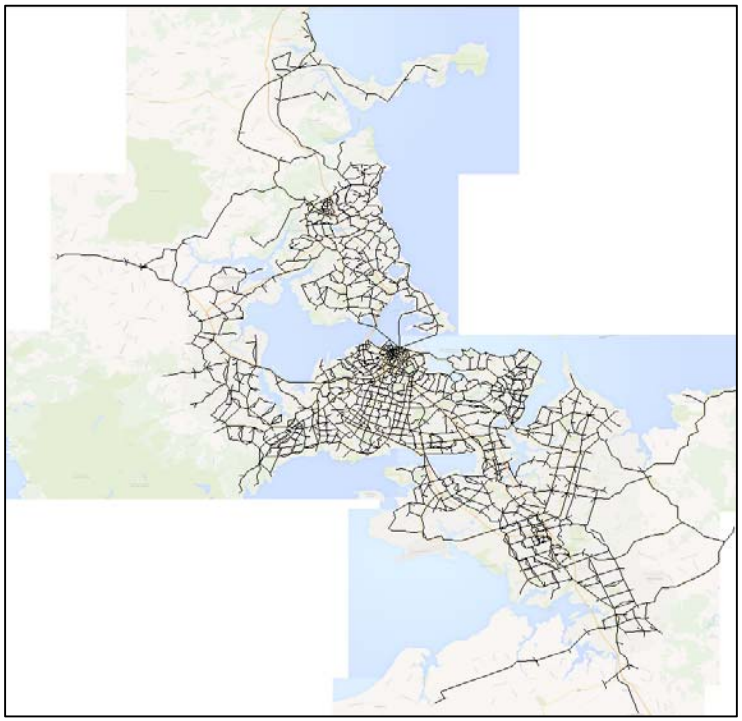
Auckland Cycle Model

- Forecasts cyclist demands
- Covers all urban Auckland, all significant cycle routes
- 2013 Base year
- 2016 and 2026 “forecast” years
- Two-hour morning and evening peak period models
- Daily estimates by factoring
- Assignment in SATURN
  - Uses “Relative Attractiveness” to represent cyclist preference for quality/safe routes



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Auckland Cycle Model – Challenges

- Significant variability of cyclist numbers on routes
  - Weather
  - School terms and university semesters
  - Seasonal variations
  - Typically ±65% daily variation from annual average in 2016
  - Often conflicting count data
  - Use of Annual Average Daily Cyclists (AADC) to average out variability
- Rapid growth in cyclist numbers in recent years (+1,000% growth in 3 years on Nelson St!)
- More variability than traffic (car) volumes

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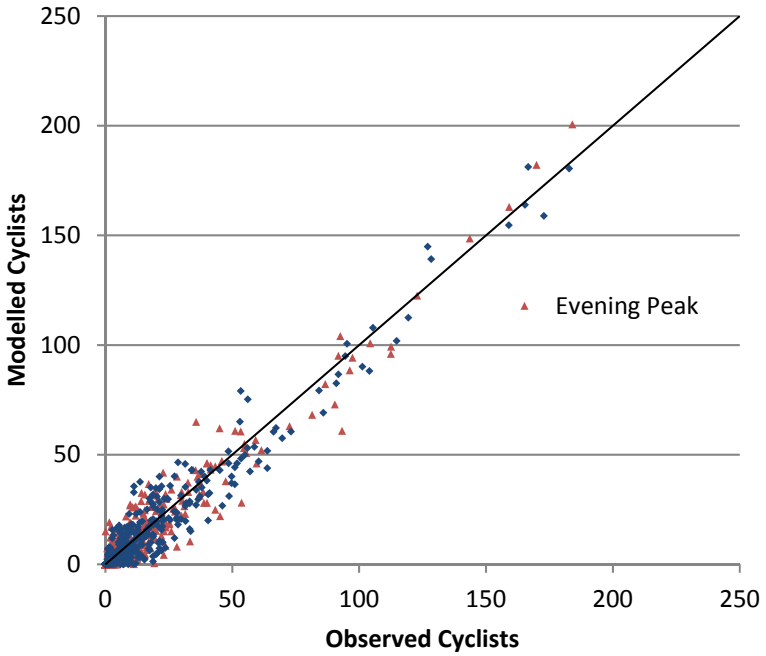
Auckland Cycle Model – 2013 Base

- Starting point: 2013 Census travel to work data
- Factored up to consider non-work trips
- Collection of over 700 survey data points
- Traditional matrix estimation and model validation processes

- Validation criteria footnote:
  - Lack of existing guidance
  - R^2 and RMSE stats = Useful
  - Link counts (±50) and GEH stats = Not so much



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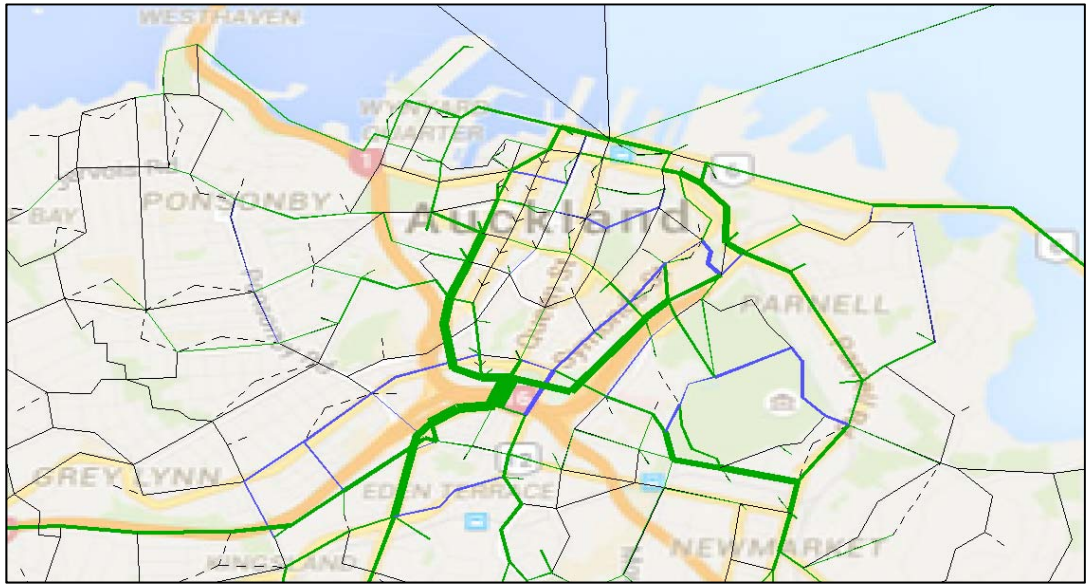
Auckland Cycle Model – Forecast Process

- Applies demand elasticities
- Model is responsive to:
  - Changes in land use
  - Changes in infrastructure
- Model reflects:
  - Cycle-able trip lengths
  - Cycle-able trip types

Cycle Trip Origins/Destinations (SkyPath)



Growth in modelled morning period cyclists, 2013 to 2016

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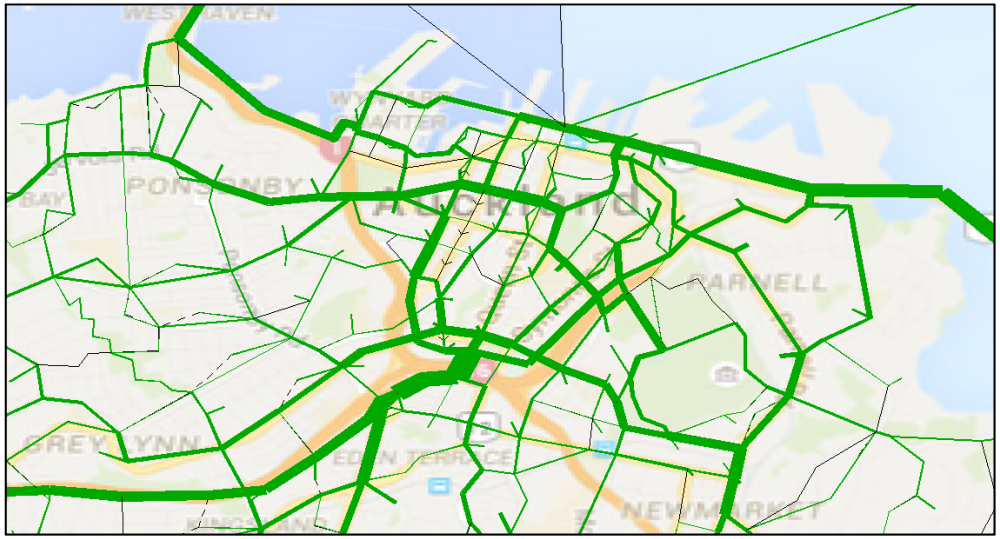
Auckland Cycle Model – Applications

- Estimates future cyclist demands
- Used for project evaluations, economic assessments, etc
- Recent uses include:
  - Auckland Urban Cycleways Programme
  - NZTA's Northern Corridor Improvements project
  - Links to Glen Innes & New Lynn
  - Quay Street Cycleway
  - Otahuhu cycle improvements



Forecast morning period cyclists, 2026

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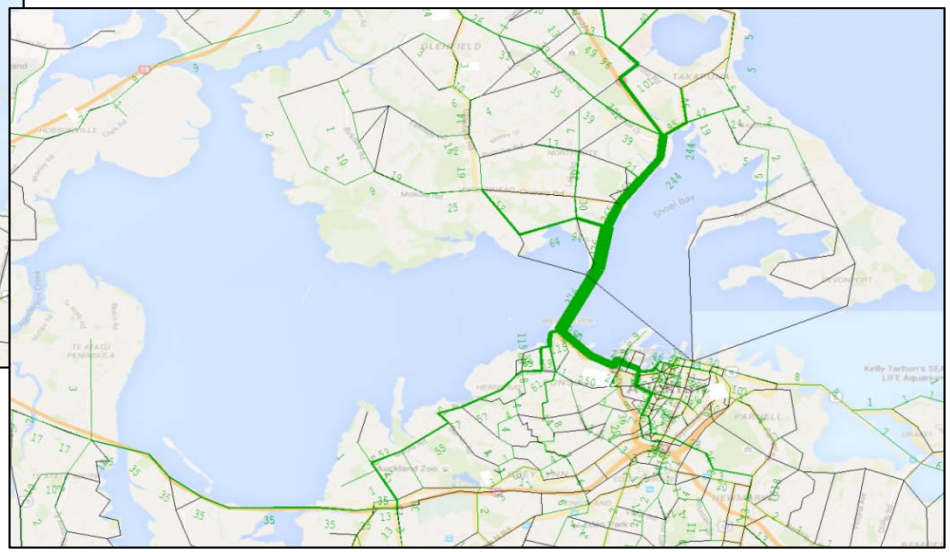
Auckland Cycle Model – Applications

Car Trips Removed from Network
(Cycle Links to Glen Innes Project)



Cycle Trip Origins/Destinations (SkyPath)

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But is it any good?

Have we just made up this figure?

Evaluation

Significant investment in Auckland cycle infrastructure from 2013 to 2016:

- Grafton Gully and Beach Road cycleways
- Nelson Street cycleway and LightPath
- Quay Street cycleway
- Improvements to Northwestern cycleway
- Carlton Gore Road

Auckland Transport has automated counters on the above routes, and others

Idea! – How about we compare the 2016 “Forecast” to actual data?

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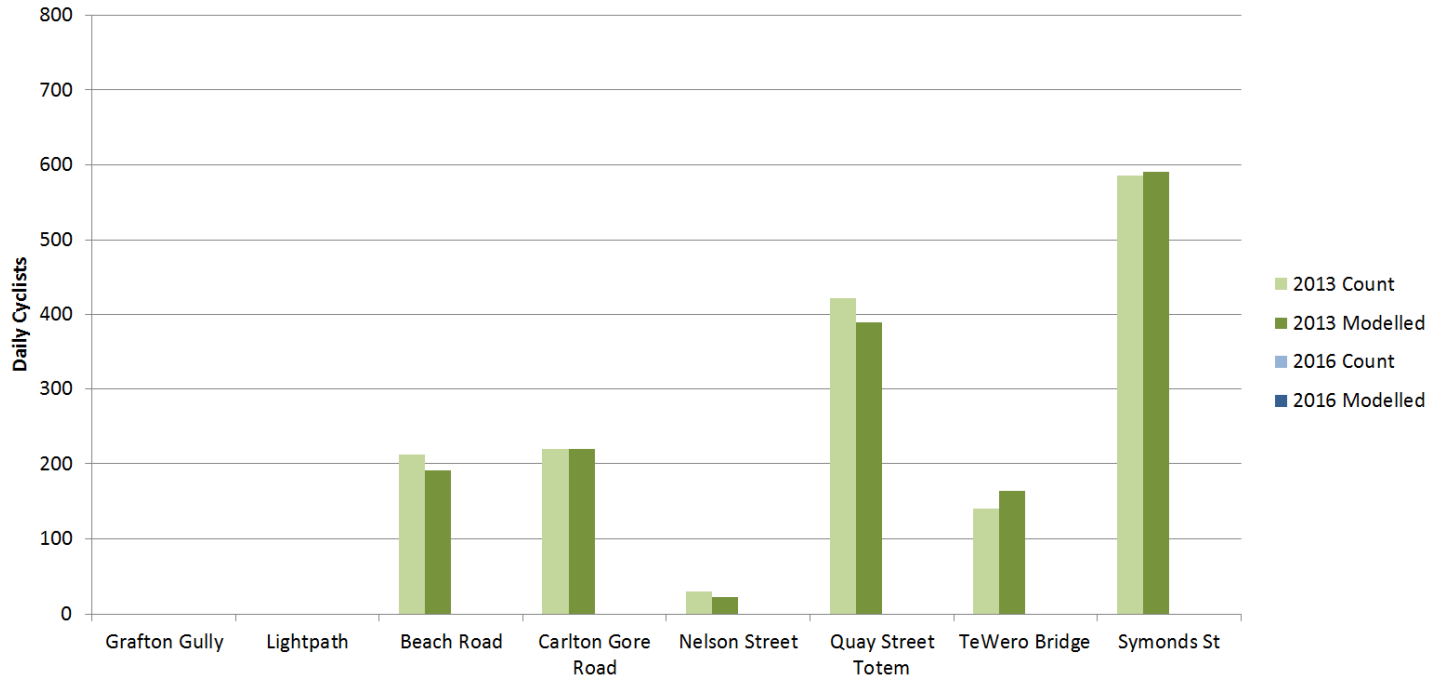
Evaluation – Routes showing Change



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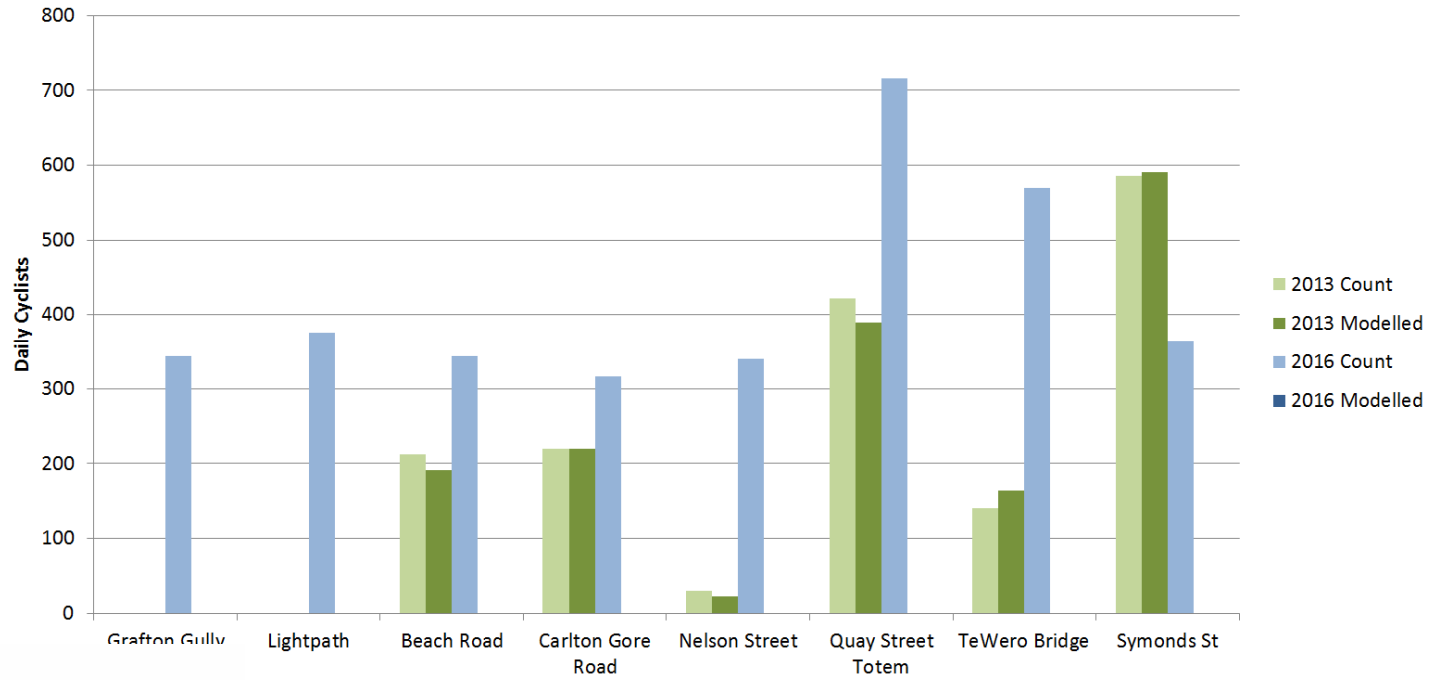

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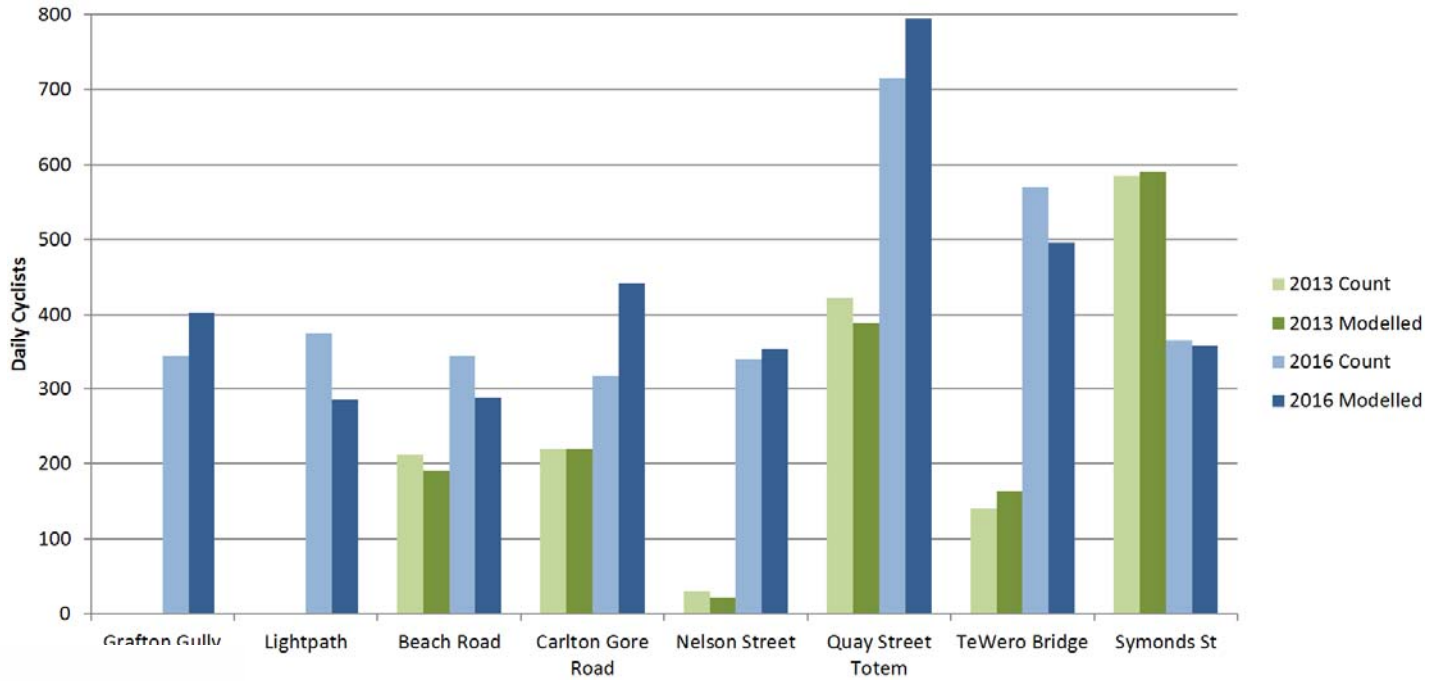

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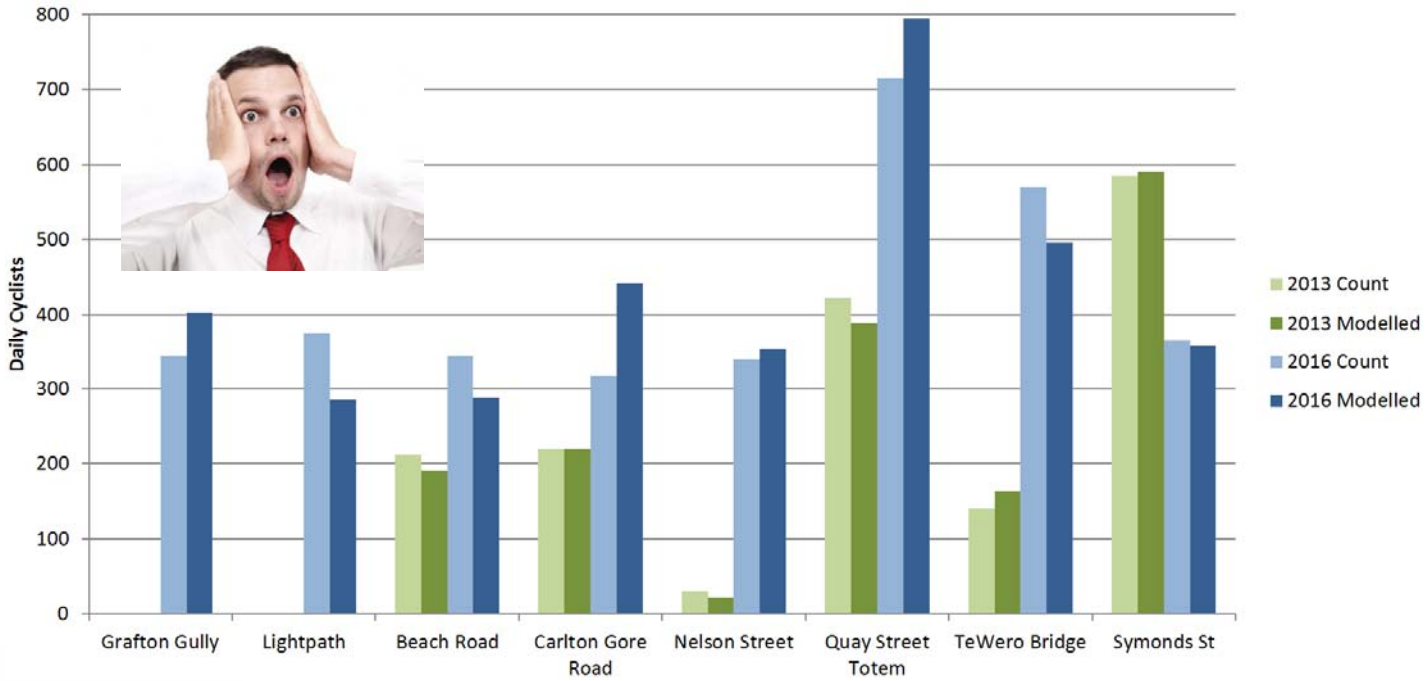

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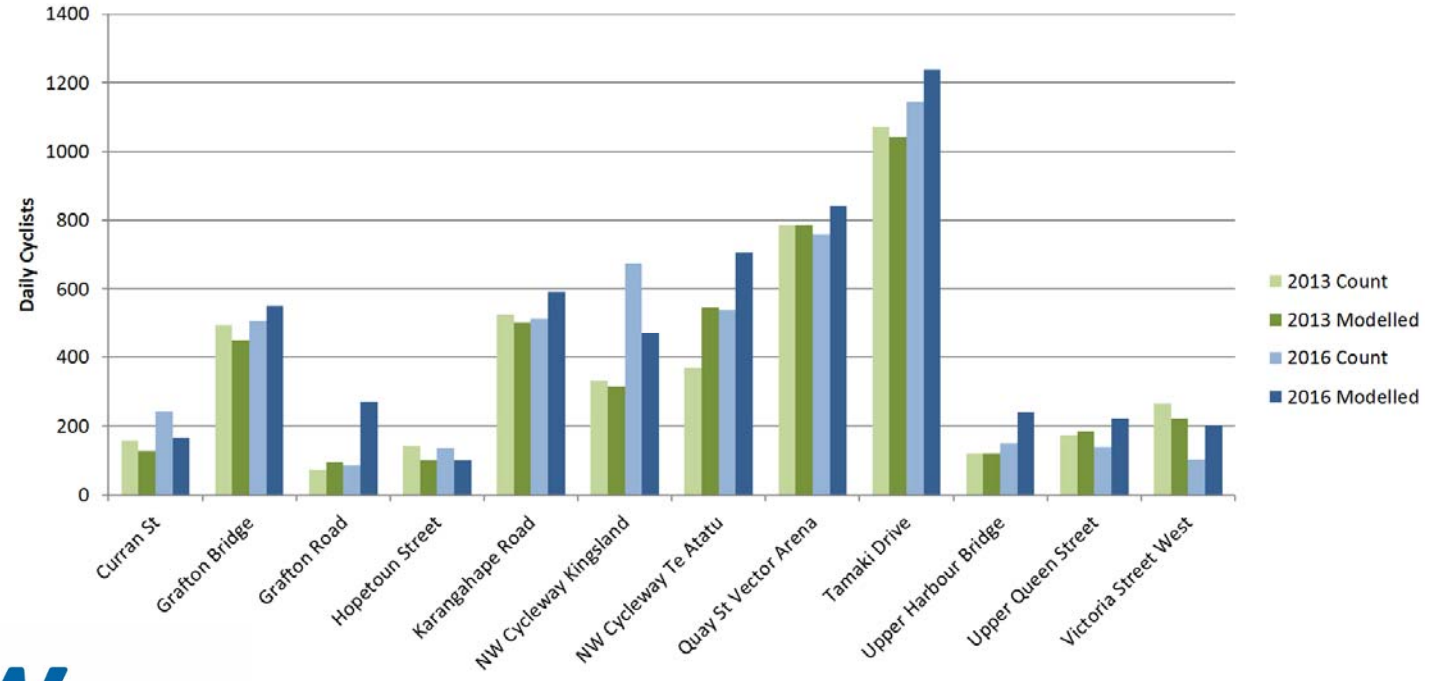
Evaluation – Static Routes



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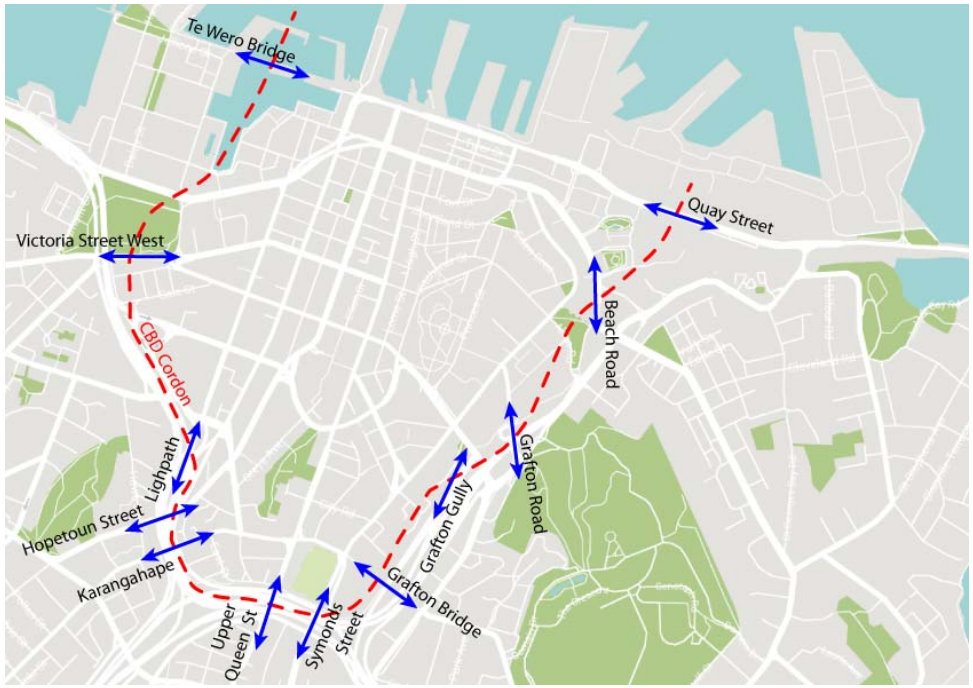
Evaluation – CBD Cordon



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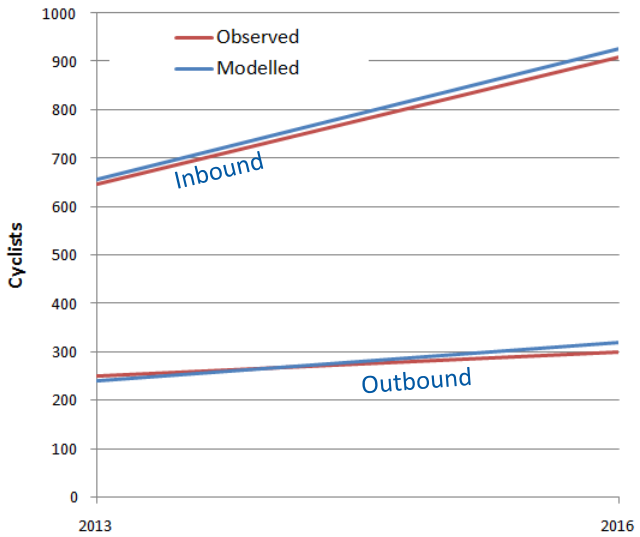
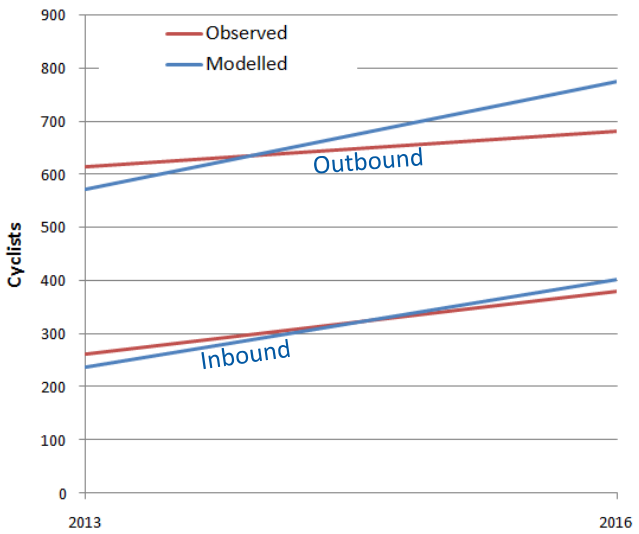
Evaluation – CBD Cordon

Morning Peak



Evening Peak



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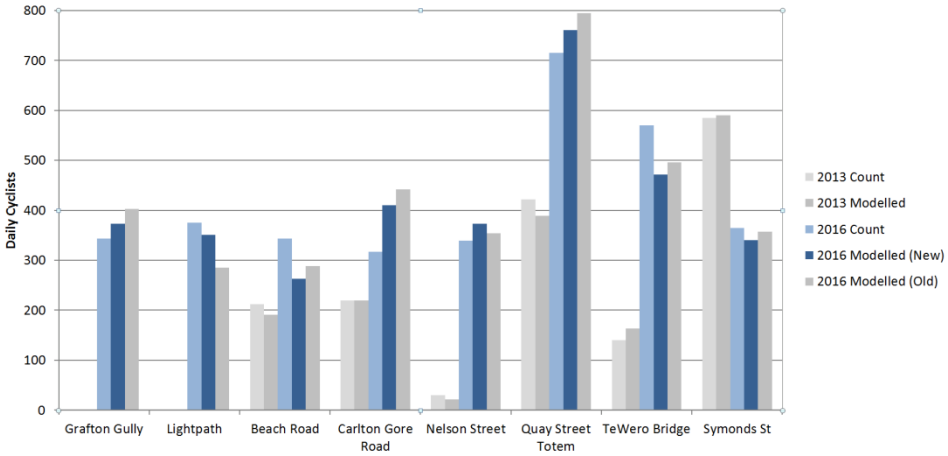
Model Refinements

- Evening peak growth dampened down
- Reduced demand elasticities
- Higher “Relative Attractiveness” applied to LightPath

Model Refinements

- Slightly improved overall statistics (R^2 and RMSE values)
- Better agreement with:
  - Overall observed growth (2013 to 2016)
  - Observed evening peak growth (2013 to 2016)
  - Observed LightPath data



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Comparison with Other Methods

- Research Report 340
- EEM Simplified Procedures 11

Route	Observed Daily Cyclists (2016)	2016 Auckland Cycle Model		Research Report 340		EEM Simplified Procedures 11	
		Cyclists	Error	Cyclists	Error	Cyclists	Error
Beach Rd	343	263	-23%	392	+14%	1,158	+237%
Carlton Gore Rd	317	410	+29%	423	+33%	1,067	+237%
Grafton Gully	344	373	+8%	465	+35%	1,660	+383%
Nelson St	340	373	+10%	64	-81%	1,535	+352%
LightPath	375	351	-6%	248	-34%	1,594	+325%
Quay Street	715	761	-6%	628	-12%	956	+34%
Average Error			**± 14%**		**± 35%**		**± 261%**

Conclusion

Auckland Cycle Model Approved