



BETTER TRANSPORT • BETTER PLACES • BETTER CHOICES

# LoS-LESS PLANNING: VKT for EQUITABLE OUTCOMES

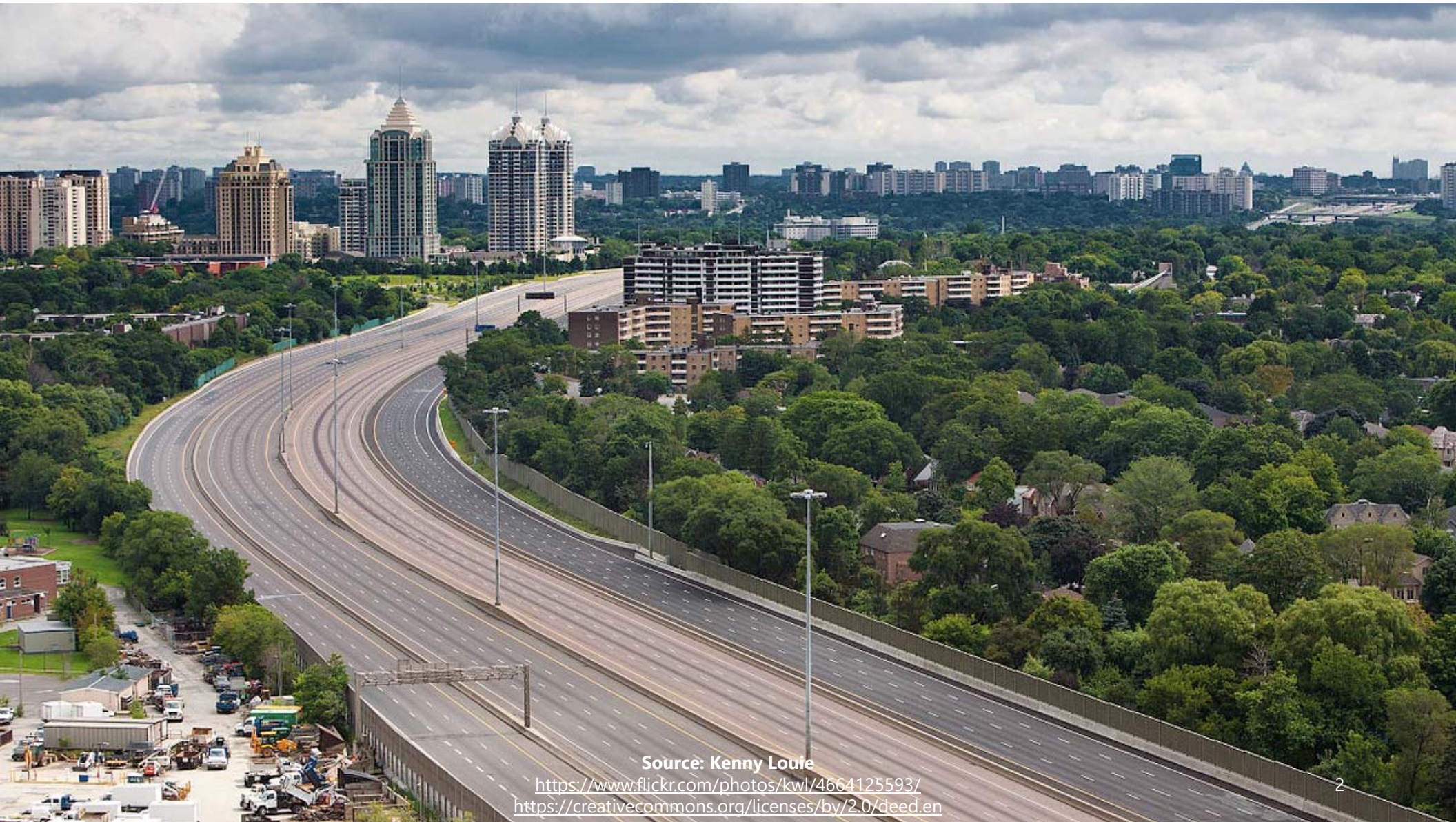
**Lewis Thorwaldson**

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Transportation Group New Zealand

Transportation Conference: Equity in Transportation

11 March 2020  
Christchurch Town Hall



Source: Kenny Louie

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# D'OH!!



Source: Kenny Louie  
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# Induced Demand Quickly Erodes Travel Time Benefits

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- Diverted traffic (no increase in Vehicle-km Travelled – VKT)
  - Shifting travel time
  - Changing route
  - Changing destination
- Induced travel (increasing VKT)
  - Mode shift to car
  - Driving further
  - Longer route
  - New vehicle trips

# Impacts of Driving (Currey, et al., 2015)

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- Increasing Vehicle-Kilometres Travelled (VKT) leads to:
  - Increased traffic DSIs
  - Increased GHG / pollutant emissions
  - Reduced physical activity
  - Mental health impacts

# Impacts of Road Capacity Projects

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- New barriers to non-car modes

- W i d e r streets => more difficult / dangerous to cross
- More continuous traffic flow => fewer gaps for crossing
- Bus stops pushed away from intersections => reduced walking catchment
- Increased traffic across network => Impacts to PT, walking, cycling elsewhere

# Impacts and Equity

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- Disproportionate benefits for the wealthy
- Disproportionate negative externalities
  - Lower income communities
  - People who are unable to drive



# Build for traffic...

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# Housing for cars...

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Source (public domain): Derek Jensen





**Source: Miguel Vera León**

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Image Source: <https://at.govt.nz/media/1980686/urban-street-and-road-design-guide.pdf>

A meme featuring Steve Moss from the TV show 'The Office'. He is standing in a cubicle, leaning on the edge with a serious expression. He is wearing a light-colored striped shirt, a patterned tie, and suspenders. He has a ring on his finger and is holding a white mug. The background shows office cubicles and a window with blinds.

**UMM YEAHH  
THE MODEL SHOWS DELAY.**

**I'M GONNA NEED YOU TO GO AHEAD  
AND MITIGATE THAT. THAAAANKS...**

# Mitigating General Traffic Delay (LoS)



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# Mitigating General Traffic LoS



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# Mitigating General Traffic LoS

Increasing capacity

More driving

Less PT, walking & cycling

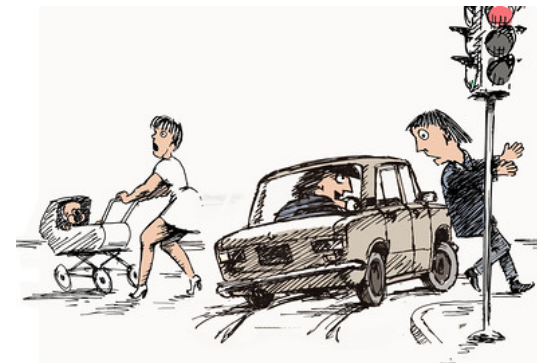


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# D'OH!!



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# But It's the Driving!!

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## VKT is the environmental impact!

### NOT

### Delay to:

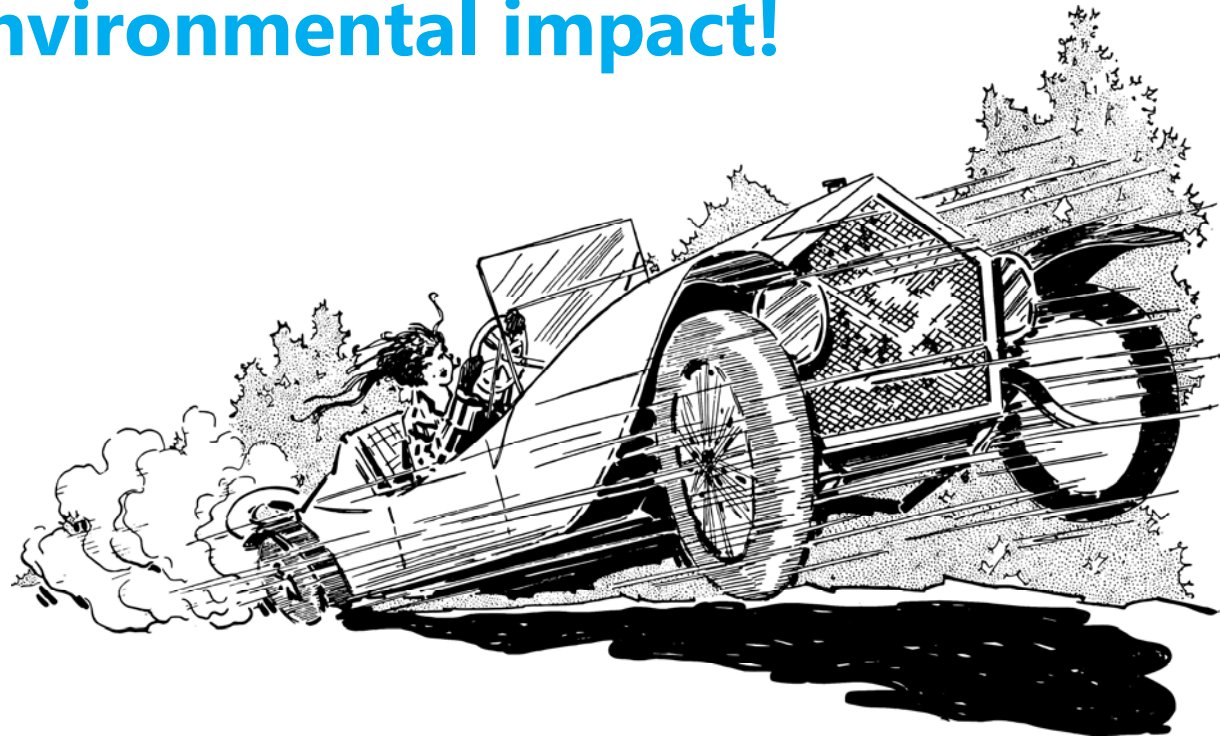


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By User Minesweeper on en.wikipedia - Minesweeper, CC BY-SA 3.0,  
<https://commons.wikimedia.org/w/index.php?curid=1302402>

# What's the solution?


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## STREETS BLOG CAL

State Capitol Updates / Active Transportation Program / Transportation Funding  
Cap-And-Trade / Legislation / Climate Change / Bicycling

### California Planners Have Already Been Swapping VMT for LOS

"Level of Service may not be as ingrained in local planning practice as generally assumed"

By Melanie Curry | Dec 4, 2019 |  5 COMMENTS

THIS POST IS SUPPORTED BY GJEL



# What's the solution?

## STREETS BLOG CAL

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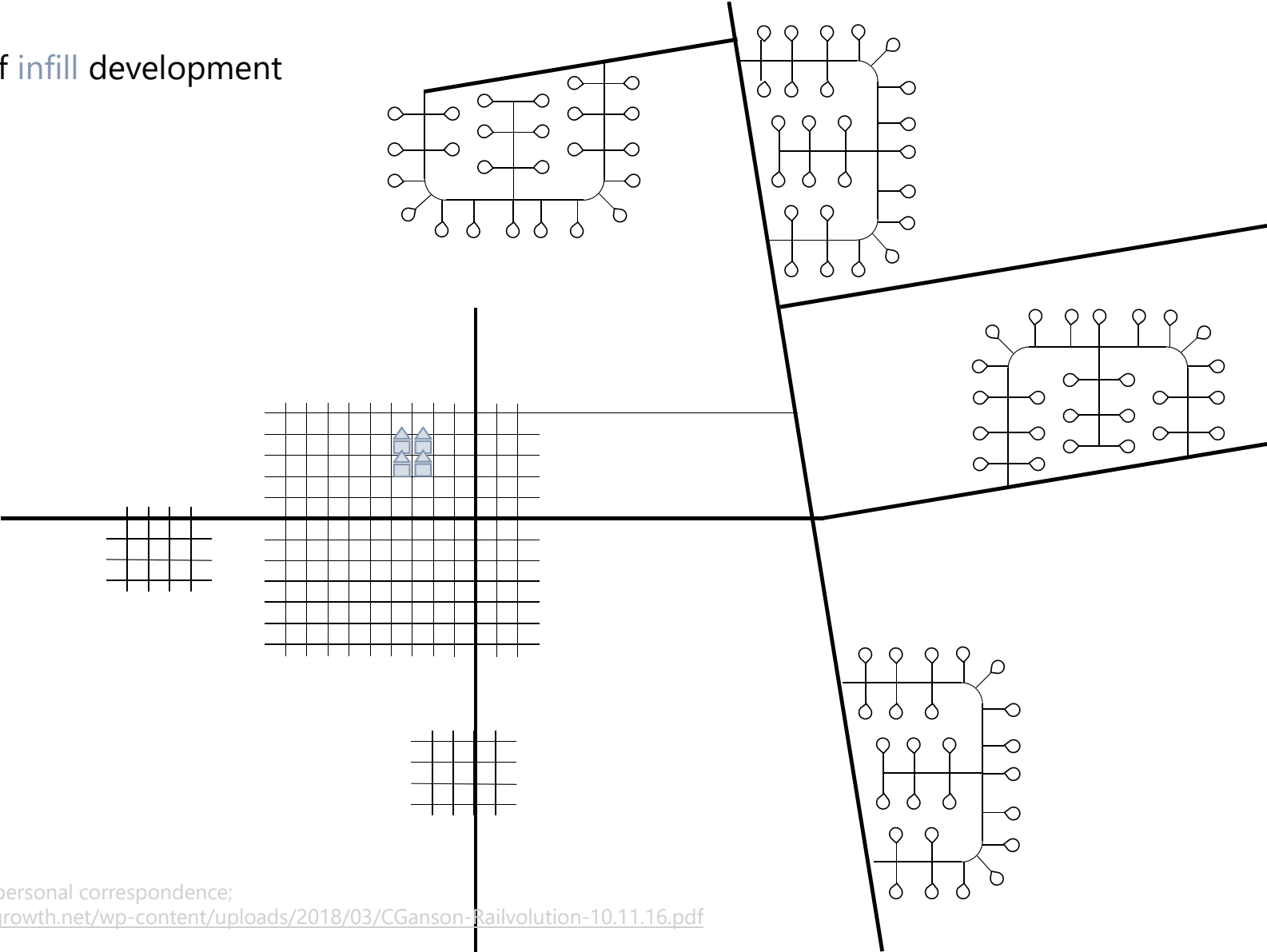
### California Planners Have Already Been Swapping ~~VMT~~ for LOS

VKT "Level of Service may not be as ingrained in local planning practice as generally assumed"

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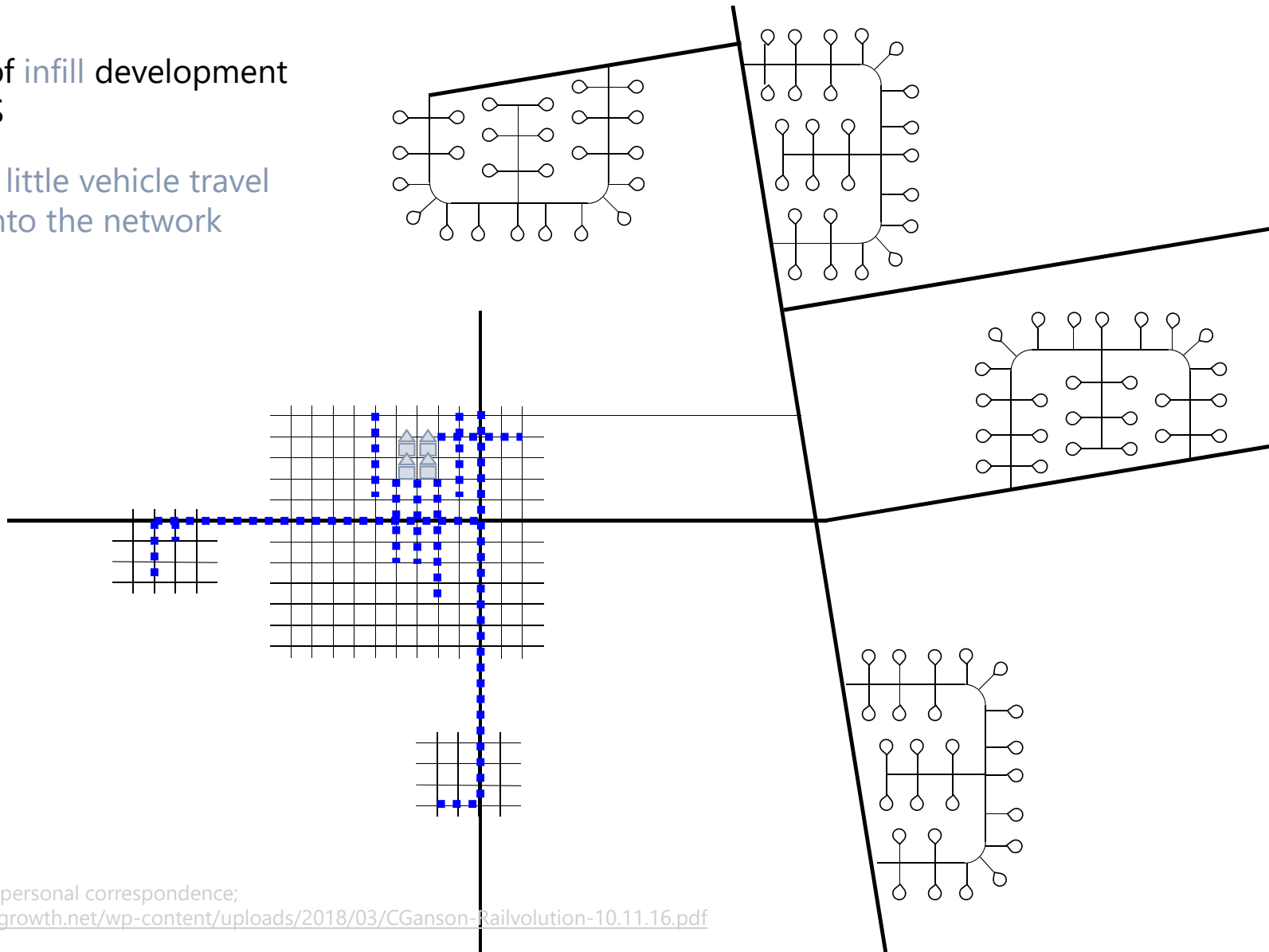
Analysis of **infill** development using LOS



Source: Ganson, C. personal correspondence;  
<http://www.smartergrowth.net/wp-content/uploads/2018/03/CGanson-Railvolution-10.11.16.pdf>

## Analysis of infill development using LOS

Relatively little vehicle travel loaded onto the network

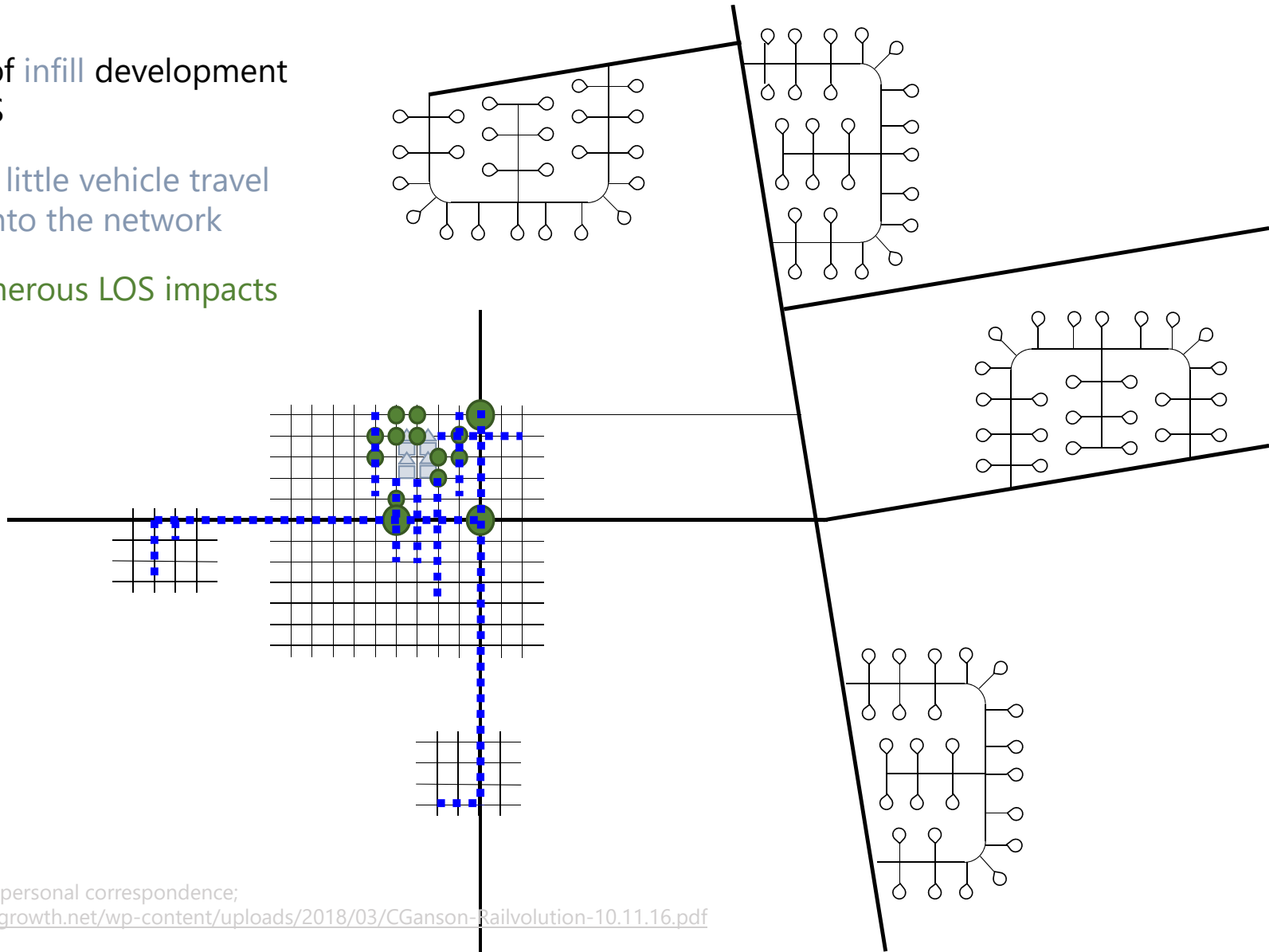


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Analysis of **infill** development  
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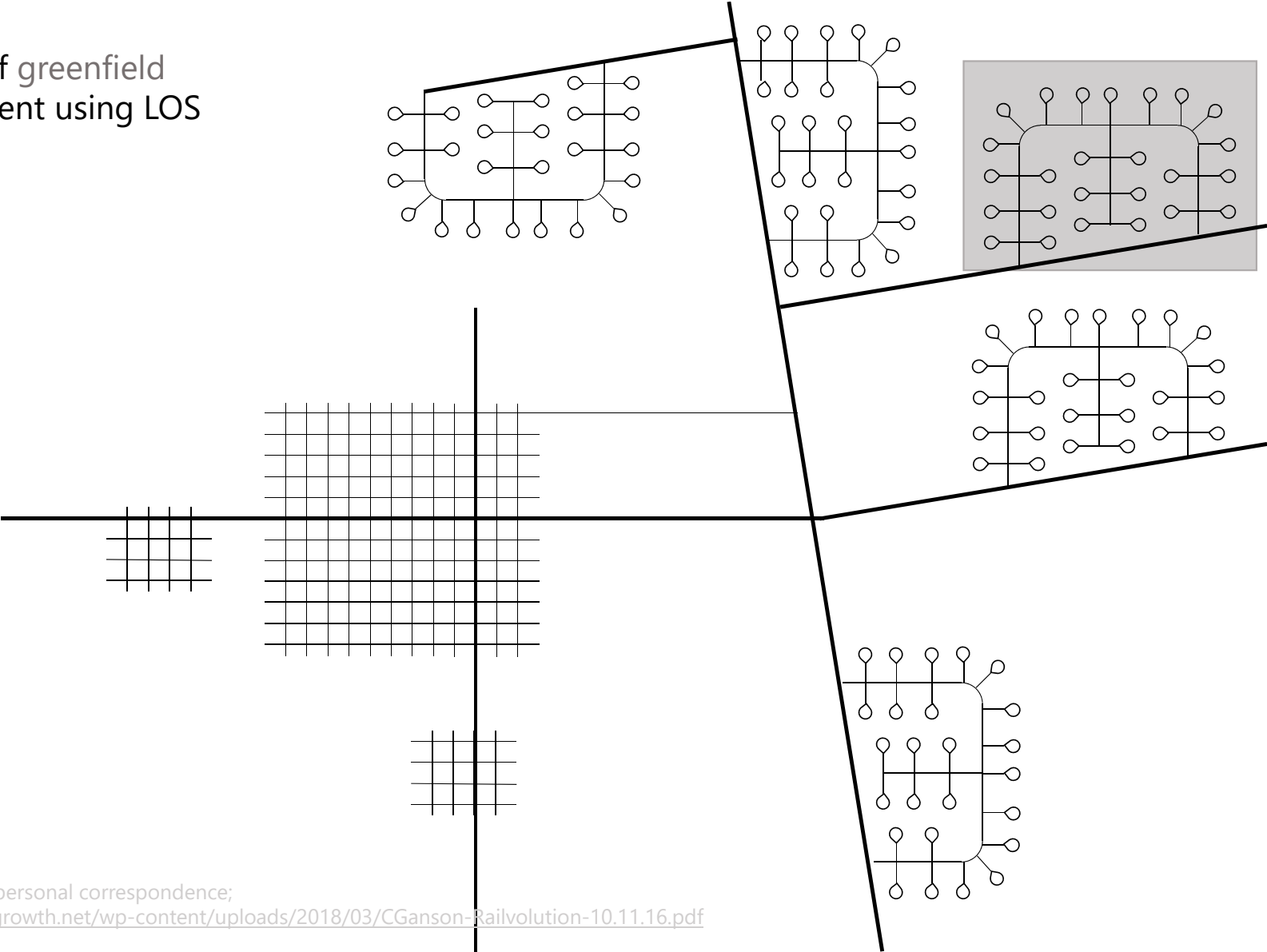
Relatively little vehicle travel  
loaded onto the network

...but numerous LOS impacts





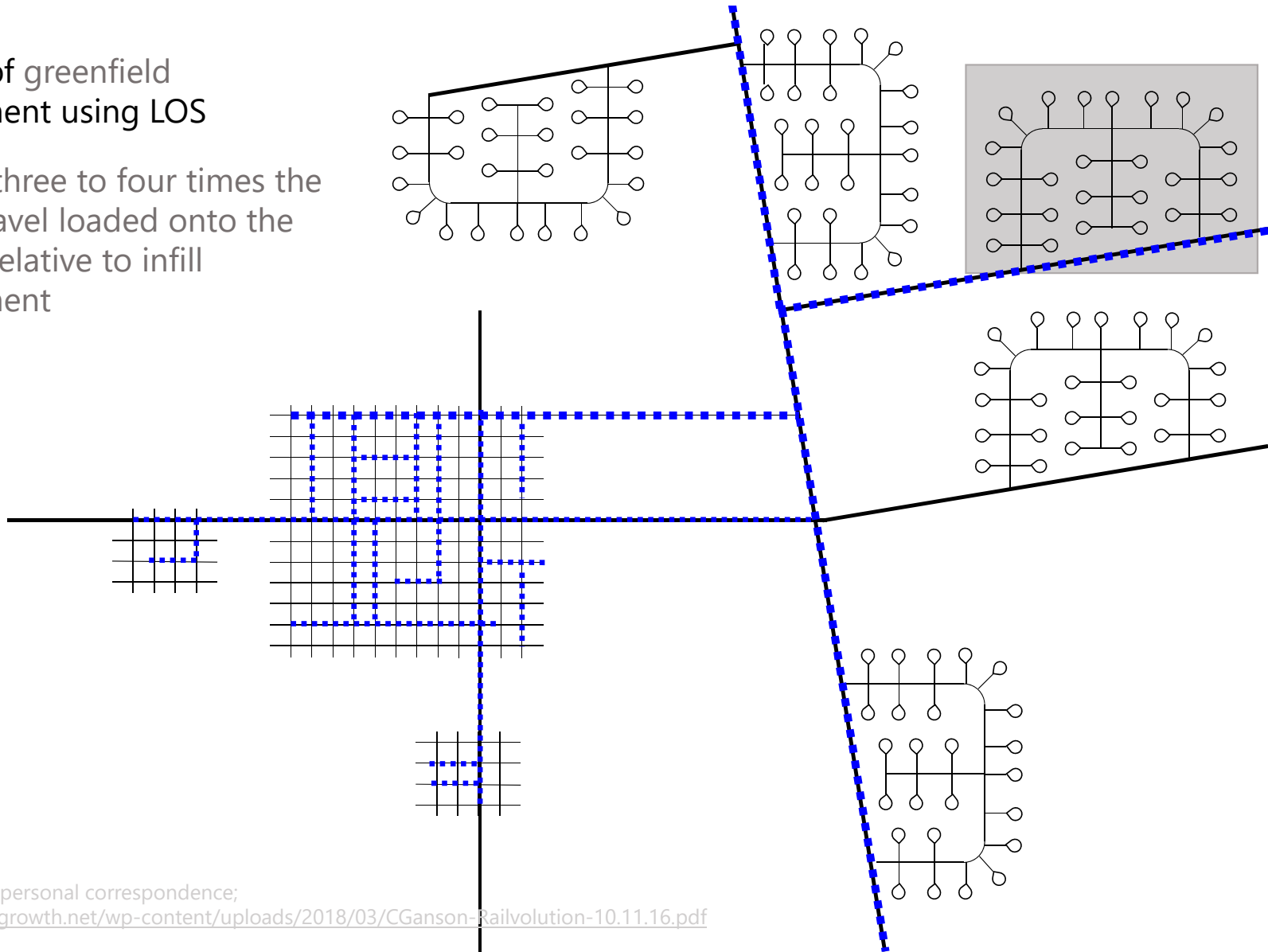
Analysis of greenfield development using LOS



Source: Ganson, C. personal correspondence;  
<http://www.smartergrowth.net/wp-content/uploads/2018/03/CGanson-Railvolution-10.11.16.pdf>

## Analysis of greenfield development using LOS

Typically three to four times the vehicle travel loaded onto the network relative to infill development

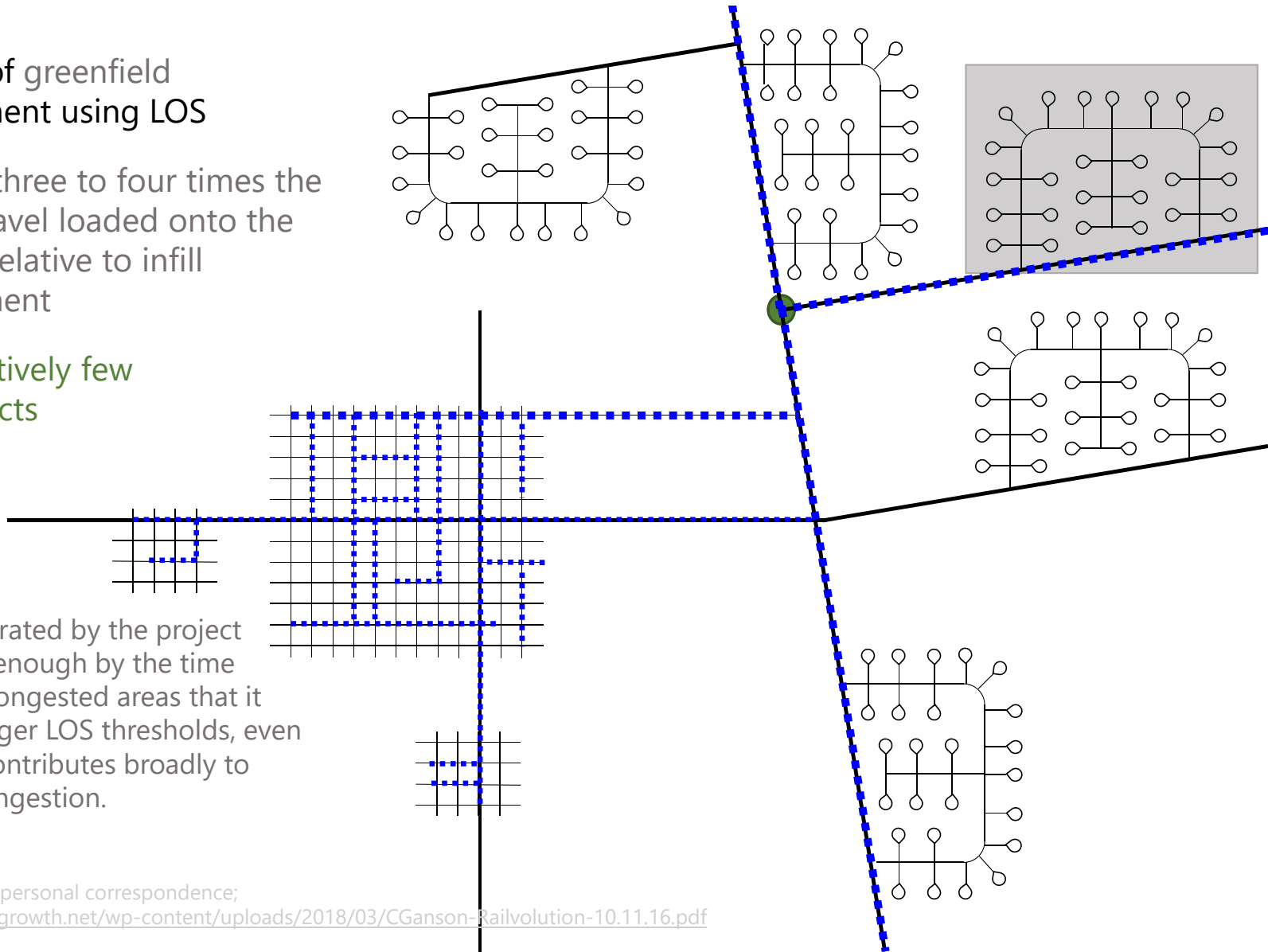


## Analysis of greenfield development using LOS

Typically three to four times the vehicle travel loaded onto the network relative to infill development

...but relatively few LOS impacts

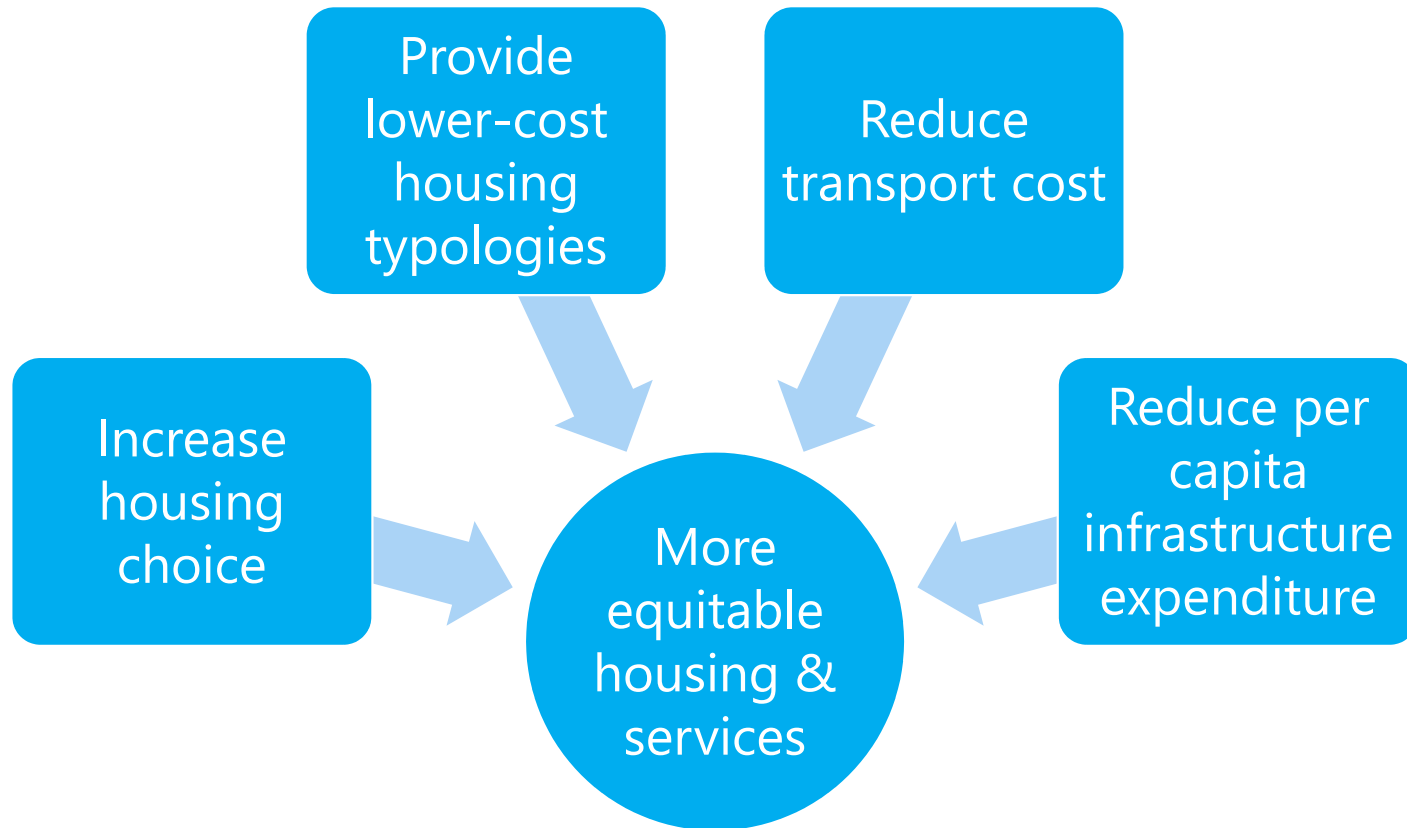
Traffic generated by the project is disperse enough by the time it reaches congested areas that it doesn't trigger LOS thresholds, even though it contributes broadly to regional congestion.





# Favouring Higher Density Infill Developments that:

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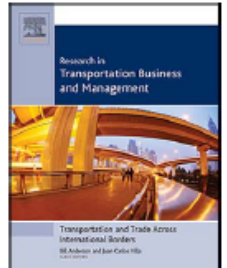
# Lee & Handy (2018)



Contents lists available at [ScienceDirect](#)

## Research in Transportation Business & Management

journal homepage: [www.elsevier.com/locate/rtbm](http://www.elsevier.com/locate/rtbm)



## Leaving level-of-service behind: The implications of a shift to VMT impact metrics

Amy E. Lee\*, Susan L. Handy

*Institute of Transportation Studies, University of California at Davis, 1 Shields Avenue, Davis, 95616 CA, United States*

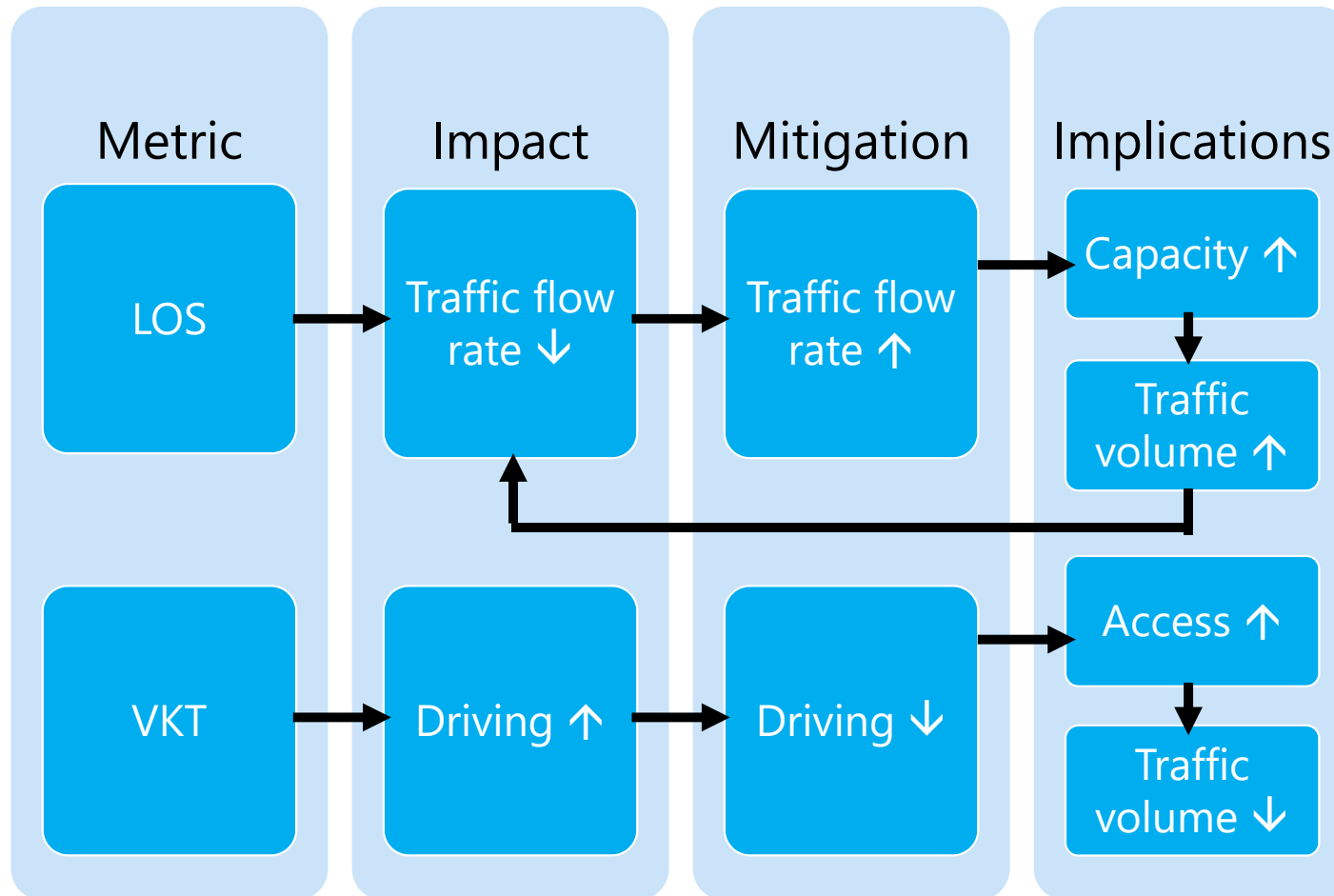
# Lee & Handy (2018)

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- Compared 3 developments using VKT & LoS metric
  - LoS metric → \$\$\$ roadway capacity mitigations
    - Further encourage driving
    - More barriers to PT, walking & cycling
  - Possible outcomes (developer):
    - Reduce number of units
    - Increase \$\$
    - Abandon project

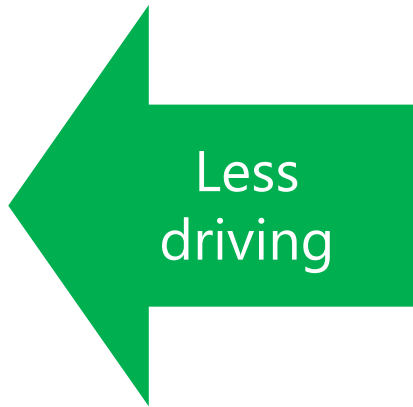


# Outcomes of Using VKT



# “VKT-generation manual”

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- Denser / mixed use / walkable
- Infill development
- Frequent public transport
- Access to cycling network
- Limited parking



- Low-density / single use / indirect walking
- Greenfield
- Minimal public transport
- Disconnected cycling
- Abundant parking

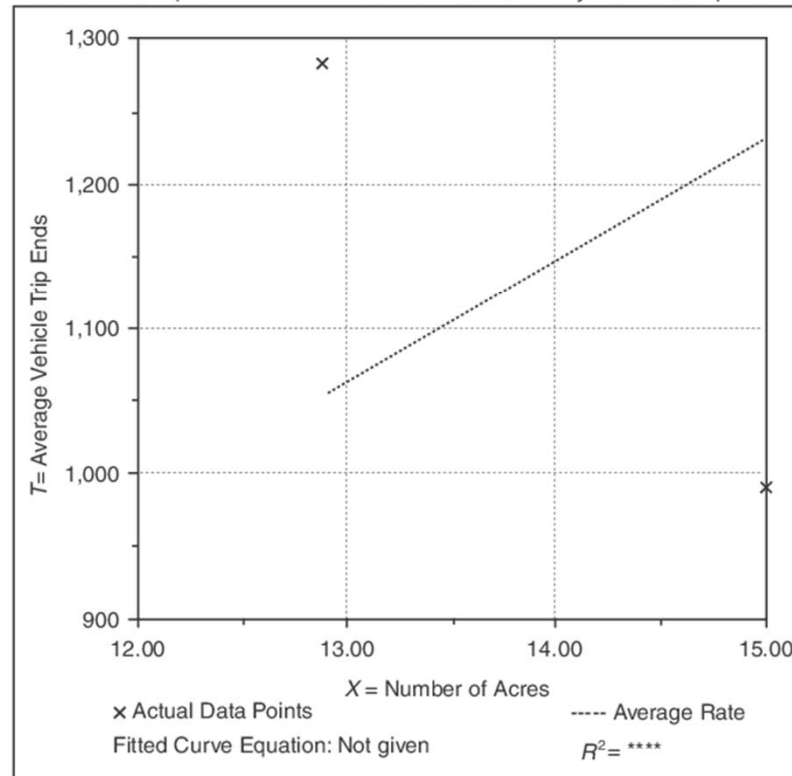
Number of Studies: 2  
 Average Number of Acres: 14  
 Directional Distribution: 50% entering, 50% exiting

Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
81.90	66.27–100.08	*

Data Plot and Equation

Caution—Use Carefully—Small Sample Size



Institute of Transportation Engineers, *Trip Generation*, 6<sup>th</sup> edition (Washington, DC: 1997), p. 66.



# Would NOT Preclude Capacity Projects

- Benefits would need to be assessed against impacts of induced traffic

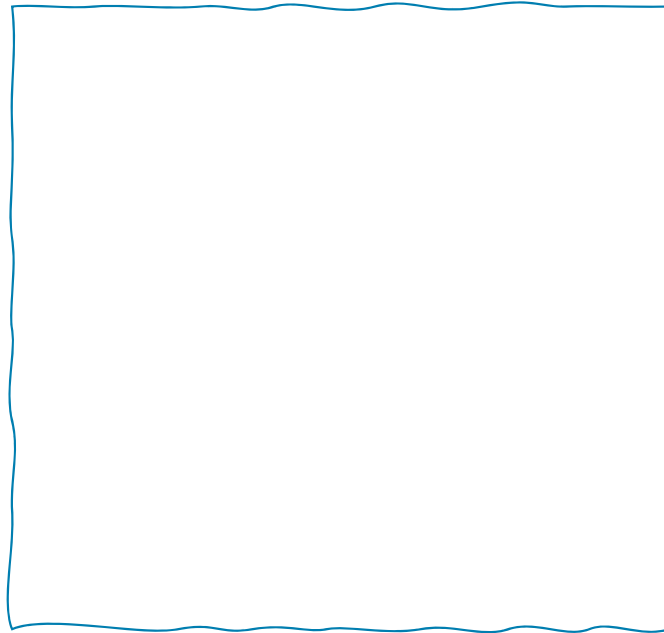


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# Conclusion

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INSERT INSPIRATIONAL IMAGE OF SOME COOL  
FARAWAY CITY



# WE Are IT

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## Auckland Unitary Plan Operative in Part

Further provisions of the Auckland Unitary Plan (Operative in part) be made operative due to appeals being resolved

THE COMMON SEAL of the AUCKLAND COUNCIL was hereby affixed under the authority of council :



Mayor / Deputy Mayor / Chief Executive / Chief Officer

Deputy Mayor / Chief Executive / Chief Officer / General Counsel





# Turn It Up

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# LoS-LESS PLANNING: VKT for EQUITABLE OUTCOMES

THANK YOU!

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**Lewis Thorwaldson**

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# Additional Resources

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- California Governor's Office of Planning & Research: Transportation Impacts <http://www.opr.ca.gov/ceqa/updates/sb-743/>
- GANSON, C. (2016). Shifting from LOS to VMT in California presentation <http://www.smartergrowth.net/wp-content/uploads/2018/03/CGanson-Railvolution-10.11.16.pdf>
- Victoria Transport Policy Institute. (2020). Generated Traffic & Induced Travel <https://www.vtpi.org/gentraf.pdf>
- Braess' Paradox (when adding roads to congested network slows traffic) [https://en.wikipedia.org/wiki/Braess%27s\\_paradox](https://en.wikipedia.org/wiki/Braess%27s_paradox)
- LEE, A.E. and HANDY, S.L. (2018). Leaving level-of-service behind: The implications of a shift to VMT impact metrics <https://doi.org/10.1016/j.rtbm.2018.02.003>
- DURANTON, G. and TURNER, M.A (2011). The Fundamental Law of Road Congestion: Evidence from US Cities, *American Economic Review*, 101 (6): 2616-52.

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