

NORTH CAROLINA

Department of Transportation

I-5701: Auxiliary Lanes or Not?

I-40 from I-440/US1/US64 to Lake Wheeler

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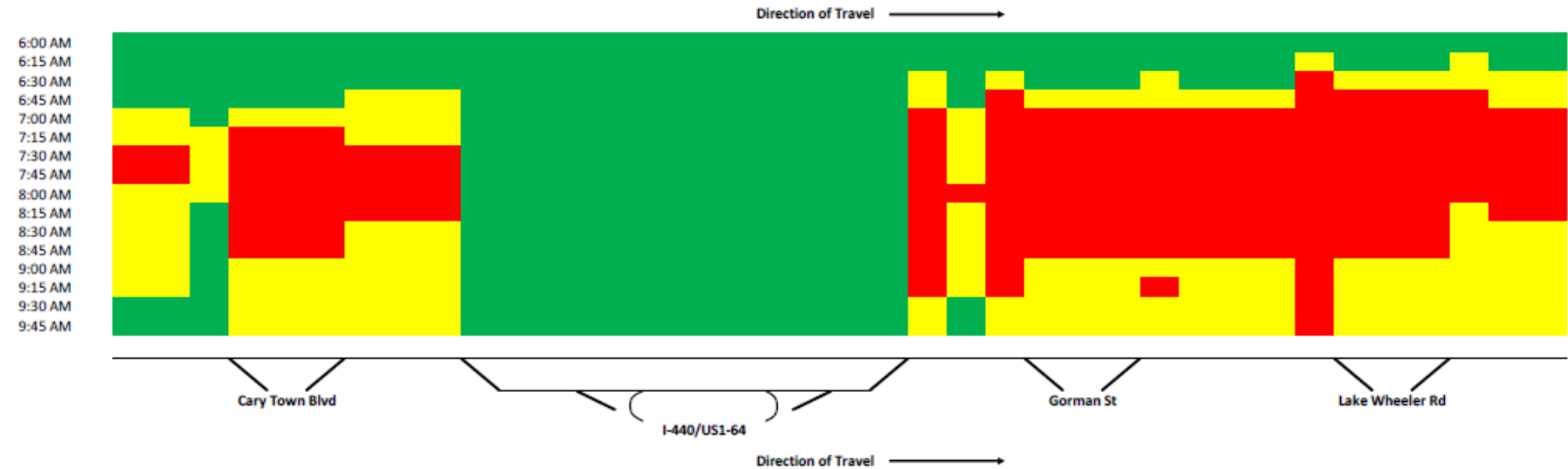
Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina

Agenda

- Traffic Operations
- Consistency
- History
- Future Capacity - Managed Freeway
- Safety and Other Considerations
- AQ effects

Traffic Operations

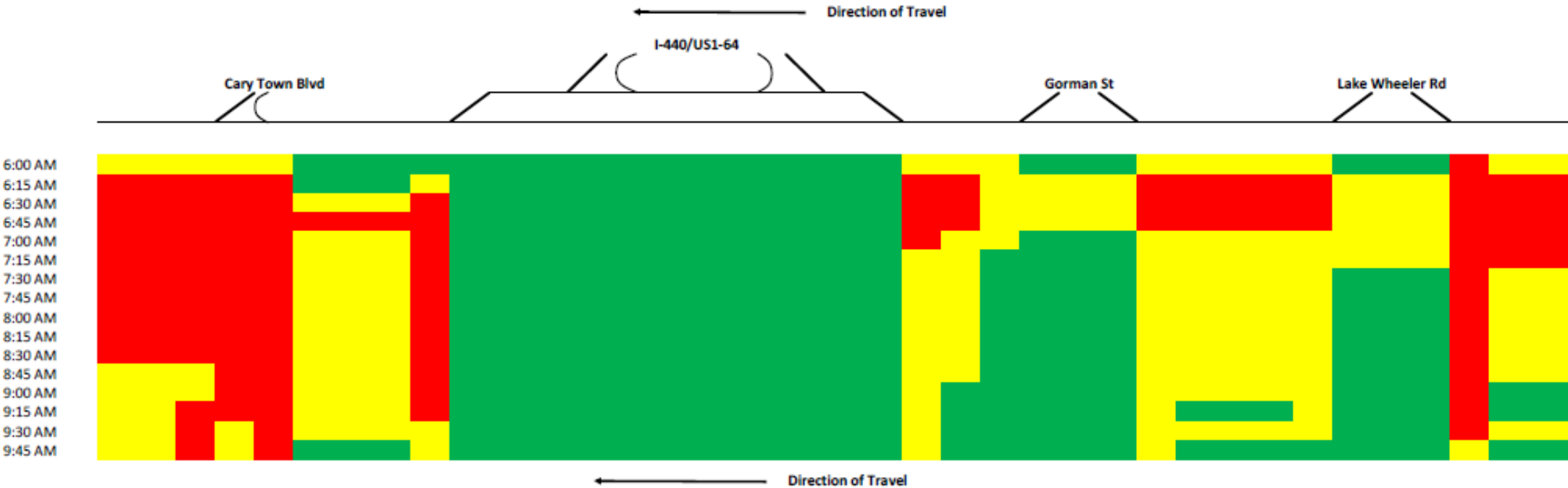
2035 Build Alternative 2 I-40 Eastbound AM Peak Period Density



Source: I-5703 Traffic Operations Technical Memorandum; VISSIM

Traffic Operations

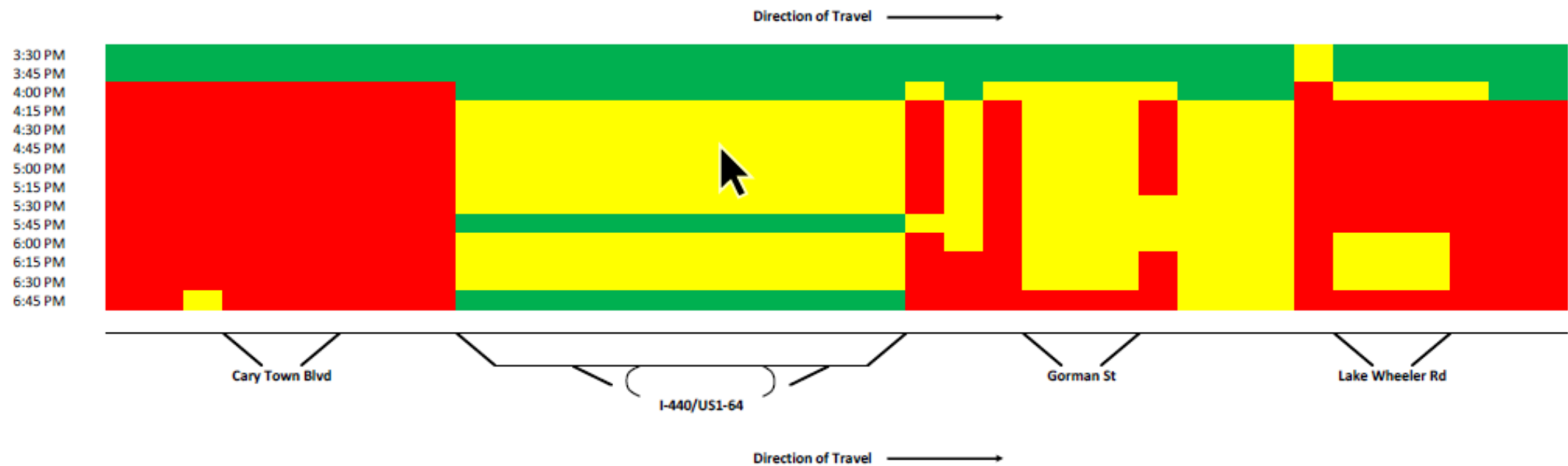
2035 Build Alternative 2 I-40 Westbound AM Peak Period Density



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Traffic Operations

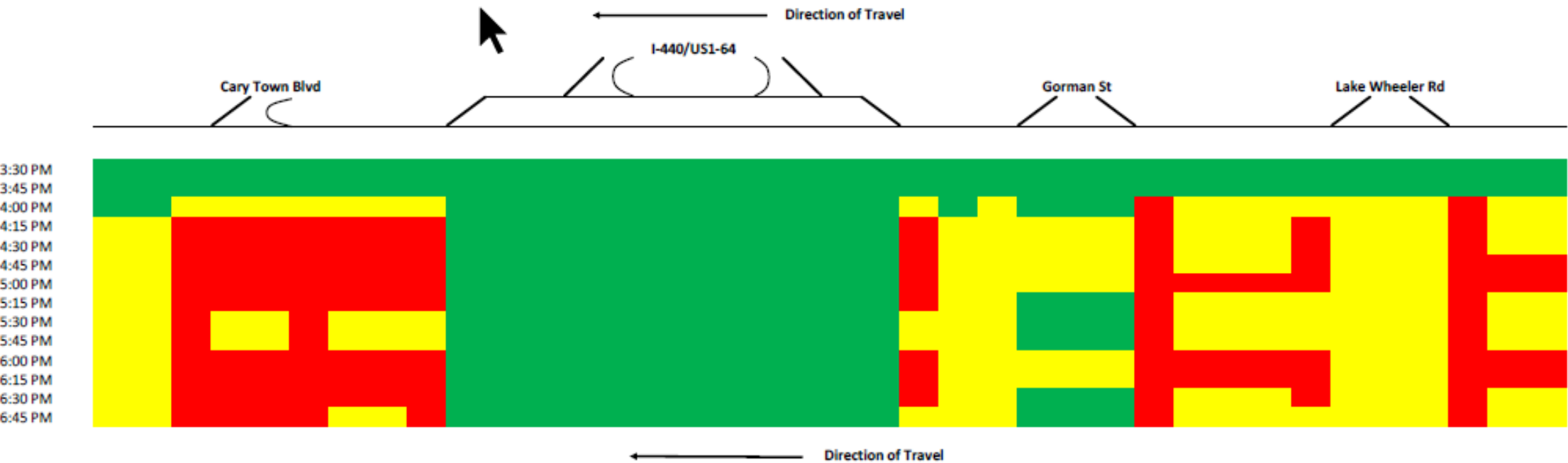
2035 Build Alternative 2 I-40 Eastbound PM Peak Period Density



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Traffic Operations

2035 Build Alternative 2 I-40 Westbound PM Peak Period Density



Consistency - Aux Lanes in other Sections

(existing or coming in committed projects)

- I-540 to Airport Blvd: EB + WB (4+1)
- Airport Blvd to Aviation Pkwy: EB + WB (4+1)
- Aviation Pkwy to Harrison Ave: EB + WB (4+1)
- Harrison Ave to Wade Ave: EB + WB* (4+1)
- Wade to NC 54: EB (3+1)
- NC 54 to Cary Towne: EB + WB (3+1)
- Cary Towne to I-440: EB + WB (3+1)
- I-440 to Gorman: EB + WB (3+1)
- Gorman to Lake Wheeler: EB, WB* (3+1)
- Lake Wheeler to S. Saunders: EB + WB (4+1)
- S. Saunders to Hammond: EB + WB (4+1)
- Hammond to Rock Quarry: WB* (4+0, 4+1)
- Rock Quarry to I-440 split: WB* (4+0, 5+1)

* Could be considered a lane drop.

History

- MTP: Widen from 6 lane to 8 lane
- SPOT submittal/carryover in P3/4: Widen 6-Lane Freeway to 8 Lanes
 - Existing Cross Section: 6 Lane with Median - Full Control
 - Project Cross Section: 8B - 8 Lane Divided (27' Median with Jersey Barrier with Paved Shoulders)
- STIP description: I-440 to Lake Wheeler Road. Add Lanes.
- Public meeting map (May 2019): 4 + 1
- Public meeting handout (May 2019)
 - The project will convert the existing 6-lane facility to an 8-lane facility; new auxiliary lanes will also be constructed.
 - The CE will identify the selected alternative for each project.
- I-5703 capacity analysis (2021) assumed I-5701 was 4 + 1

Capacity as Managed Freeway

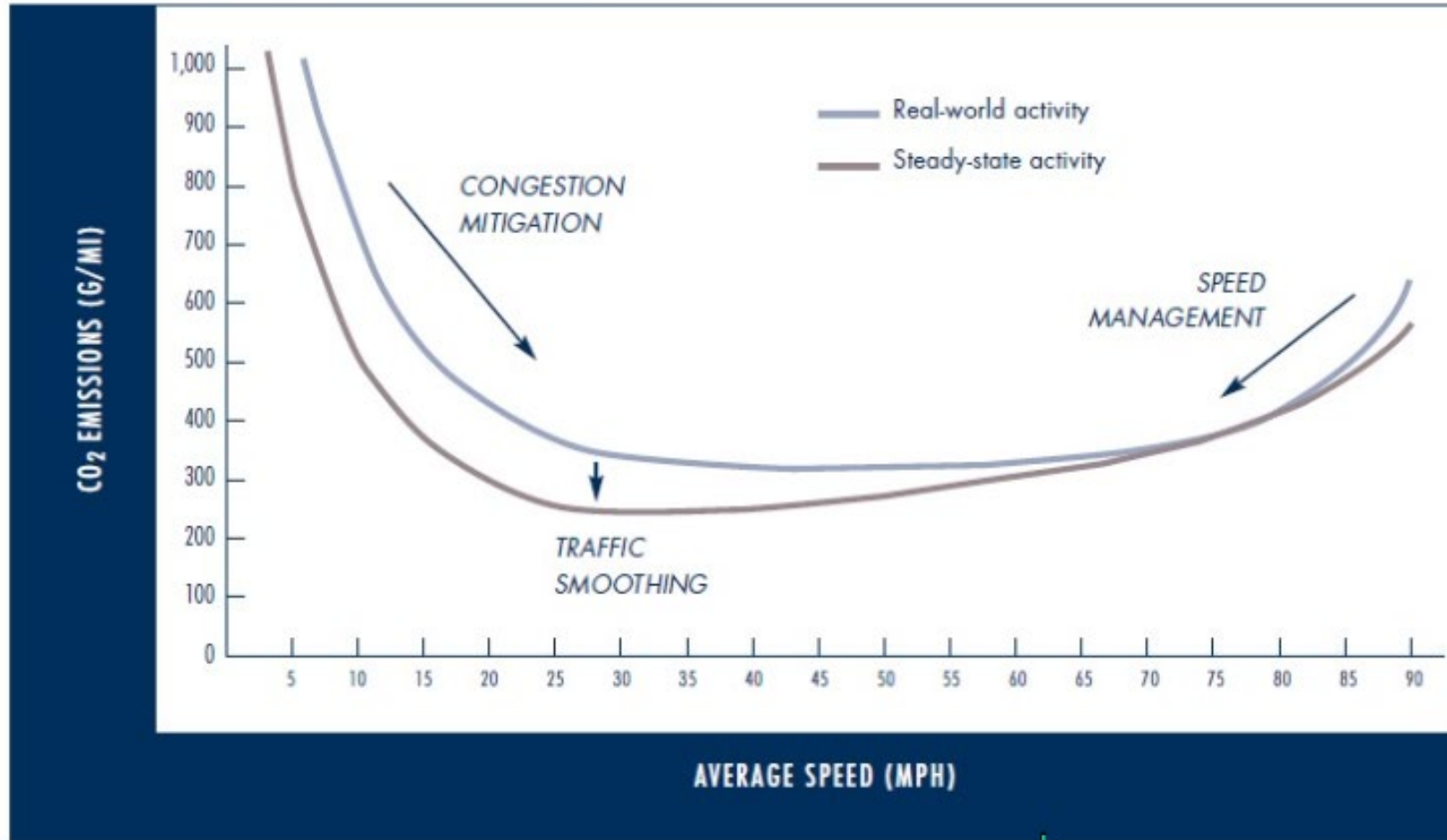
- Maximum Sustainable Flow Rates (Vicroads)
 - 4 lanes per direction, 5% trucks, grade $\leq 2\%$: 7,450 vph
 - 5* lanes per direction, 5% trucks, grade $\leq 2\%$: 8,875 vph
- 2045 forecast peak hour: ~9,000 – 11,000 vph

* Auxiliary lane isn't counted as a through lane in Vicroads capacities.

Safety & Other Considerations

- Congestion - crashes
- Secondary crashes
- Non-recurring congestion
- Recurring & non-recurring – all users
 - BOSS

Air Quality Considerations



Source: ACCESS, Fall 2009, Prof. Matthew Barth, College of Engineering - Center for Environmental Research and Technology, UC Riverside
Suggested further reading: <https://www.nrdc.org/onearth/speed-sweet-spot>


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