

# Competing Risks Designing Work Zones

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Safety and Mobility on a Fast Track Project

# I:5 Woodburn to Salem

- I-5: Milepost 259.1 to 271.5
- 1R Paving – 2” grind and inlay
- Bridge Membrane Work
- Bridge Overlay Work
- AADT 87,500-97,900
- 18% Heavy Vehicles



# Pilot Project

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- **Region 2 Quick Design Team Pilot Project**
  - Stream line project team that completes projects on an accelerated schedule
  - Chosen due to poor pavement condition
- **Work Zone Safety Pilot Project**
  - Provide additional Safety Features for Workers
  - Constructability Review

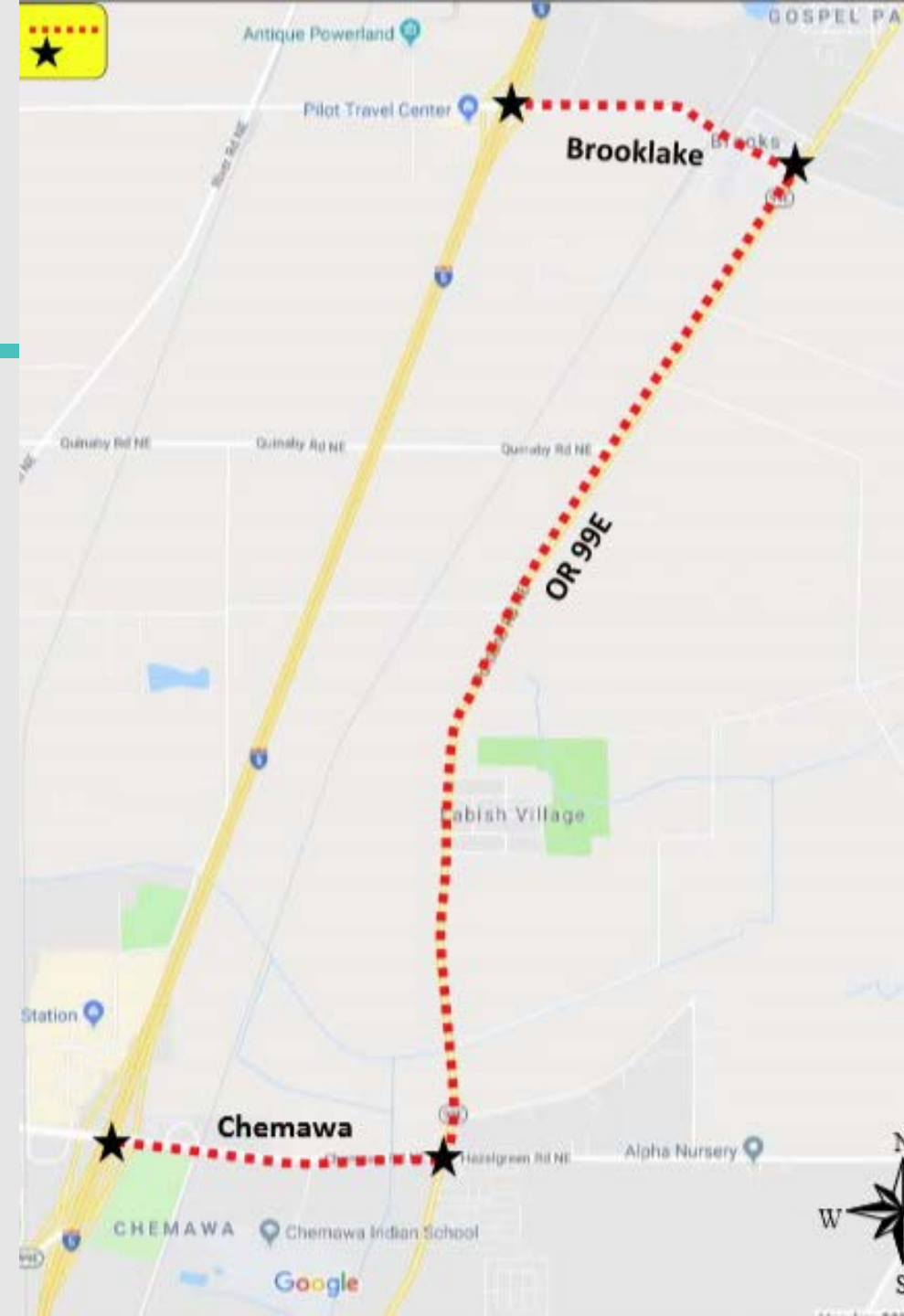
# Work Zone Traffic Impacts

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- Lane Closure Analysis
  - Based on volumes
  - Allows 20 mins average travel time delay
  - Recommended 9:00 p.m. to 5:00 a.m.
- Work Shift is too Short

## Detour onto OR99E

- Required Flagging at Signals
- Excessive Delays (1 hour +)
- Concept was eliminated since it did not decrease worker exposure to traffic



# Crossovers

- Build Crossovers Brooks Interchange and Woodburn Interchange
- Limit Paving Activities to Two Separate 1 Week Periods



# Crossovers

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- Benefits
  - Worker Separation from Traffic
  - Optimal Conditions for Paving
  - Paving could be completed in two weeks
- Risks
  - Average travel time delay of 1 hour
  - Opposing traffic separated by channelization devices
  - No room for emergency services or disabled vehicle

# Crossovers

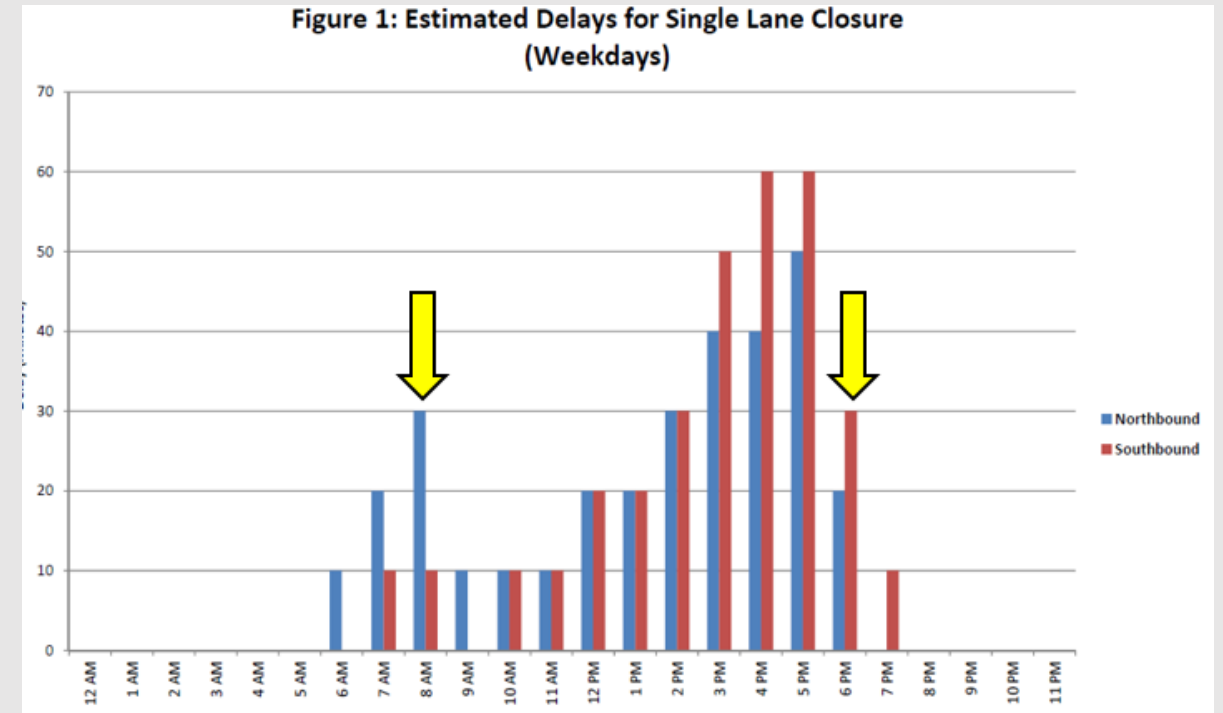
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- Mitigation of Risks
  - Safety Investigation Rigid Barrier v. Channelization
  - Pullouts and Emergency Turnarounds
  - Coordinated use of work zone during emergencies



# Extended Lane Closures

- Allow 30 Mins Average Delay
  - 7:00 p.m. – 9:00 a.m.



# Extended Lane Closures

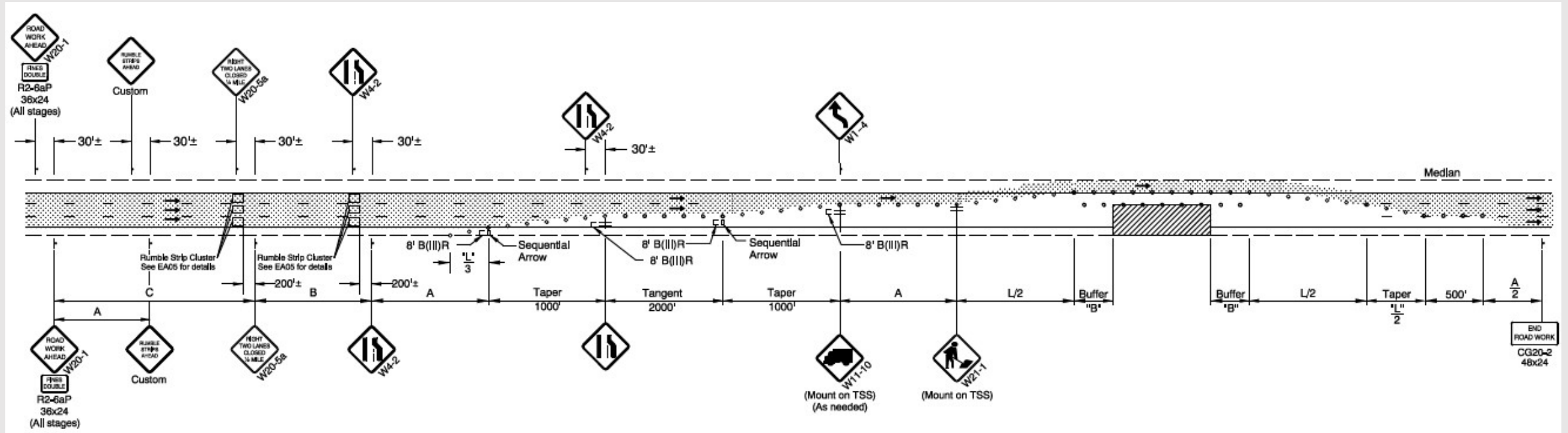
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- Benefits
  - Longer Work Window = More Efficient Paving
  - Decreased Hours Workers were Exposed to Traffic
- Risks
  - No Separation Between Workers and Traffic



# Additional Work Zone Safety Features

- More Buffer Space



# Additional Work Zone Safety Features

- Smart Work Zone Dynamic Late Lane Merge
- Temporary Transverse Rumble Strips
- Rolling Slow Downs for Set-up and Removal of Devices
- Work Zone Speed Reduction
- Enforcement Hours



# Lessons Learned in Construction

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- Extended Lane Closures
  - Beneficial when extending hours to the end of shift in which traffic volumes are decreasing





# Lessons Learned in Construction

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- Traffic on Shoulder
  - Drivers had trouble merging from the shoulder back into the lanes
- Smart Work Zone Queue Warning
  - Sensors need to be adjusted with queue length



# Lessons Learned in Construction

- Temporary Transverse Rumble Strips
  - Rutting caused rumble strips to move
  - Suspended Use
- Rolling Slow Downs for Set-up and Removal of Devices
  - Took up a lot of time
  - Not as essential without rumble strips



# Future Work Zone Considerations

- Challenge “The Way We’ve Always Done It”
- Analyze the Risks and Find Mitigation Strategies
- Several “Small” Safety Improvements Can Add Up
- Engage Stakeholders





# Recognitions

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- Project Development Team
- Area 3 Construction Office
- Participants in Constructability Review



## Recognitions

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- “Project Baby” Mathieu Emery LaFleur
  - Born March 9, 2019