Timing and Phasing for Tight-Urban Diamond Interchanges

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VASITE Annual Meeting – June 30, 2016
Agenda

- What is a Tight Urban Diamond
- Traditional Diamond Interchange Phasing
- Tight Urban Diamond Phasing
- Route 250 / McIntire Road Project
- Lessons Learned
- Guidance
- Conclusions
What is a Tight Urban Diamond Interchange

• Defined by Federal Highway as an interchange with typical intersection spacing between 200 and 400 feet

• Utilized in constrained, urban areas and requires retaining walls

• From the Alternatives Intersections/Interchanges: Informational Report:

“The key operational aspect of a TUDI is signal coordination to ensure efficient progression of traffic and minimum storage of vehicles between the terminals.”
Traditional Diamond Interchange – Three Phase Strategy

- Equal Ramp Phases
- Balanced Demand
- Sufficient Storage
Traditional Diamond Interchange – Four Phase Strategy

- Conforms to Drivers’ Expectancy
- Minimizes Internal Queuing
- Progression

**Left Side**

**Phase 1**

**Phase 1 Overlap**

**Phase 2**

**Phase 3**

**Phase 3 Overlap**

**Phase 4**

**Right Side**
Traditional Diamond Interchange – Separate Intersection
Tight Urban Diamond Phasing

Timing and Phasing for Tight Urban Diamond Interchanges
Route 250 / McIntire Road Project - Charlottesville

• 2 Tight Diamond Interchanges (McIntire Road and Park Street)

• Design Challenges
  • Directional Flow
  • Lack of Integrated Network
  • Original vs. Constructed Design
  • Sight Distance

• Timings
  • Storage Distance
  • Grades
  • Clearance Intervals
  • Number of Phases
Route 250 at Park Street - Simulation

Timing and Phasing for Tight Urban Diamond Interchanges
Lessons Learned

- Single Controller
- Driver Expectations
- Storage Distance
- Permissive v. Protected Phasing
Guidance

Conclusions

• Avoid Internal Stacking
• Balanced Timings
• Combine Engineering Approaches
• Single Controller Operation
• Understand Driver Expectancy
• Evaluate Network Impacts
Thank you!

Questions?