March 6, 2018

New Interchange
I-69 and 106th Street
Fishers, Indiana
Need

Why a new interchange?

- Identified in 1999 and 2008 Thoroughfare Plans
- Additional east/west corridor through Fishers
- Additional interstate access (grow commercial tax base)
- Heavy congestion at 96th and 116th
- Help defer improvements at other interchanges
- Provide additional options for emergency responders
Need

Why a new interchange?
Solution

How to start the project?

Traffic Study
- Confirm need
- Spacing of interchanges worked (barely)
- Little impact to interstate operations
- Improvement to adjacent interchanges

Funding
- INDOT approved with local support
- City of Fishers: $8 million
- Hamilton County: $2 million
- Overall budget: $25 million
How to start the project?
Solution

Interstate Access Document

- Land Use
- Counts

Legend

Property Use

- Ag - Vacant lot
- Comm. - Vacant land
- Res - Vacant Platted lot

Legend

- Study Area
- Freeway Counts
- Arterial Segment Counts (06/2013)
- Arterial Segment Counts (11/2013)
- Intersection Turning Counts (06/2013)
- Intersection Turning Counts (11/2013)
Interchange Access Document

Modeling
- MPO TransCAD travel demand model
- Transmodeler Traffic Simulation Model
- Capacity Analysis (HCS and SIDRA)

Results
- Tight Diamond: $31.3 million
- Single Point: $36 million
- Roundabout: $33.9 million
- Diverging Diamond: $35 million
Selected Interchange

Oval Roundabout
- Roundabouts at Crosspoint and USA Parkway
- INDOT, FHWA Indiana, FHWA Resource Center
- Gateway feature for City
- Most cost effective roundabout option

Still Budget Concerns!!
Cost Reduction

How to reduce costs?

- Reduce span length over I-69
How to reduce costs?

- Maximize ramp grades
Cost Reduction

How to reduce costs?

- Reconfigure detention
Cost Reduction

How to reduce costs?

- Reduce ramp shoulders
- Tighten up bypass lane geometry
- Pedestrian Path on north side only
- 11 foot lanes on 106th Street
- Eliminate center curb
- Close 106th Street during construction

Budget reduced by $3.0 million. Final costs $30.9 million.

Inter-governmental agreement amended. INDOT and Fishers provided additional funding.
How to reduce costs?

- Signage and CD without barrier
Cost Reduction

How to reduce costs?

- Signage and CD without barrier
Challenges

What had to be overcome?

- Pond interaction w/ wall
- Pond mitigation
Challenges

What had to be overcome?

Utilities:
- Duke Transmission
- AT&T
- Water Main
- Sanitary Sewer Force Main Relocation
Challenges

What had to be overcome?
Challenges

What had to be overcome?

Utilities:

- Duke Transmission Line Relocation
Challenges

What had to be overcome?

Utilities:
- AT&T Duct in MSE Wall Fill
Challenges

What had to be overcome?

- Water Main Under Pier Foundation
  - Foundation designed so piles could be located around from the ex water main
Roundabout

Orientation and Design Considerations
Roundabout

Dimensions
Fastest Path

\[ R_1 = 226.8 \text{ ft} \]
\[ V_1 = 3.4415 \times R_1^{0.3861} \]
\[ V_1 = 27.9 \text{ mph} \]

\[ R_2 = 266.4 \text{ ft} \]
\[ V_2 = 3.4614 \times R_2^{0.3673} \]
\[ V_2 = 26.9 \text{ mph} \]

\[ R_3 = 343.7 \text{ ft} \]
\[ V_3 = 3.4415 \times R_3^{0.3861} \]
\[ V_3 = 32.8 \text{ mph} \]

\[ R_4 = 83.3 \text{ ft} \]
\[ V_4 = 3.4614 \times R_4^{0.3673} \]
\[ V_4 = 17.6 \text{ mph} \]
Fastest Path

\[ R_4 = 105.0 \text{ ft} \]
\[ V_4 = 3.4614 \times R_4^{0.3673} \]
\[ V_4 = 19.1 \text{ mph} \]

\[ R = 335.8 \text{ ft} \]
\[ V = 3.4415 \times R^{0.3861} \]
\[ V = 32.5 \text{ mph} \]

Average Speed at Crosswalk = 27.8 mph

\[ R = 174.6 \text{ ft} \]
\[ V = 3.4614 \times R^{0.3673} \]
\[ V = 23.1 \text{ mph} \]

\[ R_4 = 100.1 \text{ ft} \]
\[ V_4 = 3.4614 \times R_4^{0.3673} \]
\[ V_4 = 18.8 \text{ mph} \]
Roundabout

Fastest Path

- $R_1 = 201.9$ ft
- $V_1 = 3.4415 \times R_1^{0.3861}$
- $V_1 = 26.7$ mph

- $R_2 = 242.1$ ft
- $V_2 = 3.4614 \times R_2^{0.3673}$
- $V_2 = 25.0$ mph

- $R_3 = 275.6$ ft
- $V_3 = 3.4415 \times R_3^{0.3861}$
- $V_3 = 30.1$ mph

- $R_4 = 83.2$ ft
- $V_4 = 3.4614 \times R_4^{0.3673}$
- $V_4 = 17.6$ mph

- $R_5 = 216.2$ ft
- $V_5 = 3.4415 \times R_5^{0.3861}$
- $V_5 = 27.4$ mph
Roundabout

Speed differential
Path overlap

The departure radius is 200'. Over a 30' section the path deviates from tangent by no more than 6°.
Sight distance
How does it work? – Only 3 accidents in 15 months of operation
I-69 and 106th Street

In Operation
Thank You!
For additional questions, please contact:

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