Practical Design: Minimizing Safety Impacts While Reducing Project Costs

Consultant’s Perspective
In the “Old Days”
In the “Old Days”
Lots of Hands in the Cookie Jar!

- Parking
- Livable Community
- Complete Streets
- Bikes
- Peds
- Vehicles
- Transit
- HOV
AASHTO Green Book (2011)
Flexibility in Design

- **Revisions for 2011 Edition**
  - Designer consideration of the context of the project area
  - Highlights the flexibility available to encourage choosing design criteria
    - *Consistent with the context of the project*
    - *Understand the needs and value of the community*
    - *With respect to economic limitations*

Source: AASHTO Technical Committee
Flexibility in Design

- From ODOT L&D Volume 1
  - “This manual is neither a textbook nor a substitute for engineering knowledge, experience or judgment.....it must be recognized that the practices suggested may be inappropriate for some projects because of fiscal limitations or other reasons.”

Source: ODOT L&D Volume 1, Page I (Application section)
Flexibility in Design

GUIDELINES  TRADE-OFFS
Flexibility in Design

- Balances Design Guidelines and Trade-offs
  - Understand why a guideline exists
  - Understand impacts of trade-offs
  - Evaluation tools
  - Documentation
    - *Design Exceptions*
  - Determine Value
  - Maintain SAFETY
Creativity
Looking at better options isn’t in my scope!

Manage your expectations!
I don’t have enough budget to look at better options!

“Modification” is not a bad word!
We don’t have the schedule available to investigate alternatives!

Let’s discuss the schedule
Scope and Fee

Maybe we should WORK TOGETHER....

WE SHOULD WORK TOGETHER!

Consultant

Client
## Identifying Trade-offs

### Purpose and Need of the Project

1. Improve north-south mobility
2. Provide more reliable operations and connections between key transit hubs/routes
3. Enhance transit accessibility/connectivity to local and regional destinations
4. Provide additional transit options in a largely transit dependent area
5. Encourage mode shift to transit
Evaluation of Alternatives

Pedestrian and Bicycle Information Center

IHSDM
"Safer Roads Through Better Design"

SaA
AASHTOWare Safety Analyst

AASHTO

GIS Crash Analysis Tool
GCAT

Highway Safety Manual
HSM

Highway Safety Information System
HSIS

Transportation Information Mapping System
TIMS

Safety Audit
B&N
Hypothetical Cost-Effectiveness Graph of Four Alternatives

Interpreting Value

Performance Measure
i.e. Intersection Delay

Cost

Alt A
Existing Condition

Desirable LOS

Alt D
Alt C
Alt B

Δ Benefit

Δ Cost
Documentation
Documentation
Process – work with the owner
Successful Practical Design
Practical Design – Example #1
### Practical Design – Example #1

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Practical Design – Example #2

- Existing At-Grade Intersection
- BNSF Railroad
Practical Design – Example #2

- Existing At-Grade Intersection
- BNSF Railroad
- $48 Million (Est. Construction Cost)
- $40 Million (Est. R/W Cost)
- PE Phase – Pref Alt Chosen
$34 Million (Est. Construction Cost)

Significant Less R/W Impacts

Trade-offs
- Left side “ramps”
- Shoulder width
- Weaves
- Physical separation
- Sidewalk placement
$34 Million (Est. Construction Cost)

- Significant Less R/W Impacts

- Trade-offs
  - Left side “ramps”
  - Shoulder width
  - Weaves
  - Physical separation
  - Sidewalk placement
Practical Design – Example #3
Practical Design – Example #3

Potential Design Changes Studied

- Elimination of Curb
- Elimination of Underdrains
- Reduce Lighting Standards
- Reviewed Unit Costs
- Reduce Grading Requirements
- Relocate Access
- Low-speed Ramp Diverges
- Reduce Turn Lane Length
- Loop Detection in lieu of Video Detection
Identified 13 Potential Design Changes

Three changes adopted immediately

Four changes were modified and then adopted

Reduced Construction Cost by nearly $1M!
When there is a need......
...which option will you choose?
Questions?

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