Using VE Tools & Techniques to obtain Practical Design
Design must reflect the practical and aesthetic in business but above all... good design must primarily serve people.

Thomas J. Watson
TODAYS’ PRESENTATION

• Background

• What is Practical Design at WSDOT

• Who is involved

• How are we using the VE job plan to implement Practical Design

• Examples of our Peer Review Workshops

• Next Steps
WSDOT Practical Solutions Implementation

Least Cost Planning & Practical Design (E 1090 August 2014): Enables more flexible and sustainable transportation investment decisions

Legislative Direction (ESSB 6001): Implement Practical Design Strategy

Executive Order E 1096.00(July 2015): WSDOT 2015-17: Agency Emphasis and Expectations

- WSDOT shall fully implement Practical Design and any savings will go toward additional Safety and Preservation projects
Most cost-effective approach

Other states

- Idaho
- Missouri
- New Jersey
- Oregon
- Pennsylvania
- Utah
- New Mexico

FHWA launching: “performance-based practical design approach...”
Results WSDOT Goals

Goal 1 **STRATEGIC INVESTMENTS**
Effectively manage system assets and multimodal investments on corridors to enhance economic vitality

Goal 2 **MODAL INTEGRATION**
Optimize existing system capacity through better interconnectivity of all transportation modes

Goal 5 **COMMUNITY ENGAGEMENT**
Strengthen partnerships to increase credibility, drive priorities and inform decision making
OLD QUESTIONS

• How much will this project cost?
• How long will this project take?
• Why?
Today’s Questions

How much can you reduce the cost?

How much can you reduce the Schedule?

Why?
WSDOT Practical Design: is an approach that...

• focuses on the *need* for the project

• Engages local stakeholders early in the process to ensure their input is considered

• Empowers creative problem solving early and throughout the entire planning, programming and design process (remove obstacles)

• Maximizes safety *system* wide
WSDOT Practical Design – Cont.

• Considers needs of all modes
• Move from a standards-based to **performance-based design approach**
  – Traffic Demand Management strategies
  – Traffic System management strategies
  – Capital Improvements
    • Begin incrementally
• Empower engineers to be innovative
Design for all users

- Bikes
- Pedestrians
- Transit
- Freight
- Vehicles
- Maintenance operations

How you design for different users depends on context.
Engage Stakeholders
- Early and Often

• Cities
• Counties
• Transit
• Businesses
• Public
• Bike groups
Is the proposed design practical?

☐ There is a clear problem statement. The question was asked: “Why?” to target the specific problem that generated the project.
☐ Demand management strategies have been implemented.
☐ System management (operational) fixes have already been implemented.
☐ Incremental solutions were explored.
☐ The project scope refined, or there were elements eliminated, to reduce cost without compromising safety or operations.
☐ Need for additional Right-of-Way has been reduced or eliminated.
☐ Impact to utilities has been eliminated, avoided, or minimized.
☐ Project minimizes, or eliminates, impacts to existing structures and environment.
☐ Project considers and minimizes cost for materials, equipment, labor, and long-term maintenance.
☐ The design speed is same as posted speed.
☐ The design vehicle selected avoided over-design of intersections and segments.
☐ The Highway Safety Manual was used to evaluate design options.
☐ Design deviations and analysis were used to remove or optimize design elements to address the problem cost effectively.
USING THE VE JOB PLAN FOR PRACTICAL DESIGN
Practical Design Approach
Objective

Problem Statement/Context

Focus on the Need for the project

IDEAS!

Focus on:
Cost Reduction
Ease of Implementation

Describe

Workshop Summary Folio

Information

Function Analysis

Creative

Evaluate

Develop

Present

Workshop Report

Objective

Functions

Speculation

Performance Attributes

Describe, Verify and Quantify
Value Engineering & Practical Design have the same goals:

what stakeholders need

what is built

The right project, at the right time, for the right cost = Value
WSDOT developed a – Practical Design Peer Review Process

• Stakeholders
• Subject Matter Experts
• Project Team members
• Define project need
• Generate ideas
• Scoring/Evaluating
• Implementation
SR 28
WENATCHEE
Peer Review
<table>
<thead>
<tr>
<th>Time</th>
<th>AGENDA – discussion guide</th>
<th>OUTCOME</th>
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</thead>
<tbody>
<tr>
<td>PART I: BACKGROUND/ORIGINAL PLAN (CONVENTIONAL APPROACH)</td>
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<tr>
<td>8:00</td>
<td>Opening Comments - Welcome and Introductions</td>
<td>A good start…</td>
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<td>Concept of practical design – things we hope to discover – a word about the process and project</td>
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<td>Metrics - practical design principles; (performance)</td>
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<td>Introduction to today’s process - Agenda Review</td>
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<tr>
<td>8:10 to 9:10</td>
<td>Why does this project exist? – Project Requirements – PROBLEM STATEMENT</td>
<td>Understanding of project, context, purpose and function;</td>
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<td>PROJECT INFORMATION (Design Presentation) – Existing conditions</td>
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<td>Current concept</td>
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<td>Q &amp; A about the project</td>
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<td>MORNING BREAK</td>
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<tr>
<td>Innovate</td>
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<td>9:30 to 11:45</td>
<td>CREATE (innovation) Brainstorm</td>
<td>Innovative ideas generated and evaluated</td>
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<td>Lunch - Meeting leaders will group common ideas</td>
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<td>12:30 to 2:00</td>
<td>EVALUATE innovations with most potential Determine ideas with most merit Carry forward best ideas for more discussion/development</td>
<td>ideas with the most merit are developed further</td>
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<td>DEVELOP innovative strategies into specific ideas</td>
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<tr>
<td>BREAK</td>
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<td>2:30</td>
<td>PREPARE to present - Summarize findings and steps forward</td>
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<td>Cleanup, setup, final preparations/rehearsal for presentation</td>
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<tr>
<td>4:00 pm</td>
<td>PRESENTATION PHASE Present findings to management • Q &amp; A</td>
<td>PD Innovation Team Summary of findings</td>
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</table>
### Project Photos

Practical design is an approach to making project decisions that focus on the need for the project and looks for lowest cost solutions. It encourages flexibility, innovation and multimodal solutions by increasing the focus on project purpose and need.

### Project Team

**Project Design Peer Review and Innovation Team**

<table>
<thead>
<tr>
<th>Project Design Peer Review and Innovation Team</th>
<th>Subject Matter Experts</th>
<th>Management/Report Out</th>
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</thead>
<tbody>
<tr>
<td>Principal: Dan Wilkins</td>
<td>Mike Gobie, Mark harmonic, Bob Kominecky, Jeff Wilkins,</td>
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<td>Patrick Jonhson</td>
<td>John Corbin, Chris Simmons, Aaron Kiesing, David</td>
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<td>Sedgwick</td>
<td>Nick Zellor, Scott Phillips, Bruce Schwartz</td>
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<td>Subject Matter Experts</td>
<td>Mike Loan, Tony Phillips,</td>
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<td>Subject Matter Experts</td>
<td>Mark Emtz, Dan Wulkowski,</td>
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<td>Management/Report Out</td>
<td>Tony Emtz, David Reynolds,</td>
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* "Design must reflect the practical and aesthetic in business...good design...must serve a purpose." - T.J. Watson

## Existing Project Plan

**Existing Project Plan**

<table>
<thead>
<tr>
<th>Existing Design</th>
<th>As of April 2015</th>
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<tbody>
<tr>
<td>1. Roundabouts - evaluates roundabouts instead of signal, uses pedestrian-activated flashers and give attention to ADA requirements for crossing at roundabouts.</td>
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<tr>
<td>2. 5 ft sidewalk, 5 ft buffer, 5 ft shoulder; no bus pullout.</td>
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<tr>
<td>3. Design cross-section widths. Use 12 ft lanes; 12 ft median, 5 ft shoulder, 5 ft buffer (overall width 30 feet).</td>
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<tr>
<td>4. Lane configuration: 4 lanes from 9&quot; to 10&quot; with a drop at 11&quot; and add at 11&quot; 5, 5 lanes north of 12&quot; with a 30-foot left lane.</td>
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### Practical Design Approaches

<table>
<thead>
<tr>
<th>Practical Design Approaches</th>
<th>Innovative Ideas</th>
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</thead>
<tbody>
<tr>
<td>Transit Bike Pedestrian - Sidewalks</td>
<td>Provide bus stops/pullout to coordinate with Link B (intra-workout) - add school bus to possible re-route school buses to local road system.</td>
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<tr>
<td>Accommodate bike riderships/accessible pedestrian boards (strategically located) to connect communities and promote biking, biking and pedestrian use. Public campaign to use alternate modes.</td>
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### SR 28 East Wenatchee Corridor Improvements

**Project: Reason for Existing**

Problem Statement
As agreed to at peer review April 14, 2015
Balancing community accessibility with the state and local system needs to carry multimodal traffic through the corridor. Reduce conflicts and improve safety for all users.

Original description December 2, 2014
Complete a project that constructs mobility improvements along SR 28, including widening and intersection improvements along the corridor for improve mobility and safety.

This segment of SR 28, between Halley Street and 10th Street, has been identified as a high accident corridor by WSDOT. Development and growing traffic volumes are producing congestion and causing problems related to safety, access and mobility.

### Context

The project team identified several areas of interest for the project, including residential housing in the area, some mixed use, and the lack of bicycle pedestrian accommodations.

### Practical Design Innovations

The peer review team brainstormed about over 50 ideas. After initial screening, whose common ideas were combined, 5 ideas were carried forward and are summarized below. This is only a partial list of the ideas designed to work together or stand alone for implementation as funding RGB. Ideally all of the ideas would be implemented to some extent.

1. Roundabouts - evaluate roundabouts instead of signal, use pedestrian-activated flashers and give attention to ADA requirements for crossing at roundabouts.
2. 5 ft sidewalk, 5 ft buffer, 5 ft shoulder; no bus pullout.
3. Design cross-section widths. Use 12 ft lanes; 12 ft median, 5 ft shoulder, 5 ft buffer (overall width 30 feet).
4. Lane configuration: 4 lanes from 9" to 10" with a drop at 11" and add at 11"; 5 lanes north of 12" with a 30-foot left lane.
5. Other ideas: TDM, TSO, and modal considerations. Affirmative TBI signage and delineation, mobile effort to encourage traveling public to plan trips, mobile, and timing reduce public transportation to have congestion all of the time; it noted this alone would not solve the problem and would need to be part of the other ideas.
In the diagram to the left, each idea is plotted to convey the potential implement ideas offering reduced costs. Ideas in the upper right quadrant have the most effect on project costs and are judged to be easiest to implement.

<table>
<thead>
<tr>
<th>Performance Attribute</th>
<th>Lower costs</th>
<th>Implementation</th>
<th>Right-of-Way</th>
<th>Safety</th>
<th>Throughput Operations</th>
<th>Community Accessibility</th>
<th>Utilities</th>
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**Qualitative Review of Practical Design Ideas (in the judgment of peer review group of April 14, 2015) as compared to the base plan proposal.**

1. Roundabouts — reduce conflicts and enhance safety, reduce lifecycle costs, calm traffic, enhance opportunities to reduce lane and median widths which likely will reduce overall right-of-way requirements. Some challenges may include initial public acceptance, gap opportunities for local access and possible higher initial costs (which may be offset by cost savings of reduced right-of-way).
2. Transit, bicyclists, pedestrians — provisions for alternate modes in the form of bus stops/pullouts (coordinating with Link transit), recruiting school buses to local roads, supporting development of bike paths and providing strategically located accommodation opportunities for cyclists. Public campaign to use bikes and transit. Challenges may include the possible need for some additional right-of-way at some locations, cost of pedestrian overpasses/underpasses and increased maintenance.
3. Design cross-section widths (reduce) — will reduce construction and may lessen right-of-way costs, accommodates all modes, reduces environmental impacts, reduces impervious surfaces, reduced crossing distance for bicyclists, and potentially reduces conflicts in the segment with a 2-way left-turn lane.
4. Lane configuration revisions — will reduce right-of-way requirements, reduces capital and maintenance costs, reduces impervious surfaces, north of 10th there will be a shorter crossing distance. Challenges include additional conflicts in the segment with a 2-way left-turn lane.
5. TDW, TSW, freight — can be implemented in a short timeframe for little cost, this idea should be used with other ideas, and may hide reduced friction (roadway). Opportunity to enhance communications with the public. Challenges include the fact that it is not meant to be used as a stand-alone idea and it needs to be used in context with any of the other ideas to provide the highest benefit. Informing motorists of roadway incidents would be a significant benefit.

**Existing**

**Proposed**

**Concept of Idea 3 (reduced cross-section widths)**

Current Concept: 12 foot lanes, 12 foot median, 5 foot shoulders, 5 foot sidewalks with 3 foot buffers.

Innovative idea: Design cross-section widths (reduce) - use 11 foot lanes, 5 foot raised median with 2 foot barriers, 5 foot outside shoulders in each curb, 5 foot sidewalks.

Advantages:
- Reduced construction cost
- Accommodating all modes
- Reduced environmental impacts
- Reduced impervious surface
- Reduced crossing distances for bicycles and pedestrians

**Notes:**
- Potential for reducing costs and improving safety.
- Collaboration with transit and pedestrian services.
- Integration of bike paths and pedestrian walkways.
- Enhancement of visibility and communication with motorists.
Practical Design Peer Review Challenges

- Management/Leadership support
- Staff readiness – familiarity
- Modal sensitivities
- Context sensitive solutions
- Collaboration (internal and external)
- Existing projects (already in progress)
VE vs. Peer reviews

- PD peer review focuses heavier on reducing costs
- PD peer review does not develop the details of the recommendations
- VE is a tool, PD is a culture
Engage Local Stakeholders

SR 531 near Arlington Airport
Practical Design starts with ensuring the purpose and need for the project is clear – “Why” do we need this?

Southworth Ferry Terminal
Reduce or eliminate the need for additional Right-of-Way

SR 285 George Sellar Bridge West End Improvements Map
Minimize impacts to the built & natural environments

US 2 Tumwater Canyon – Bridge Replacement Project

It included three narrow, aged and decayed bridges, constructed between 1900 and 1936, to cross the Chiwaukum Creek, Wenatchee River and Drury Canyon Creek. These bridges were bound by a combination of waterways, wetlands, mountains and a U.S. Forest Service campground.

US 2 Chiwaukum Creek Bridge Replacement
Design for target speed – ensuring design speed is same as posted speed.
Select the right design vehicle to avoid over-designing

I-82 – Valley Mall Boulevard in Union Gap
Practical Solutions is expected to be fully implemented in October 2015.
Connecting Washington

- 11.9-cent gas tax increase phased in over next two years (7 cents August 2015, 4.9 cents July 2016)
- $16 billion package over 16 years
  - $9.7 billion on state and local road projects
  - $1.4 billion on maintenance, operations, preservation
  - $602 million on non-highway projects (bike paths, ped walkways, rail and transit)
  - $247 million for other agency costs (WSP, DOL)
  - $3 billion for debt service and contingency
Next Steps

• Continue to look at tools to assist with implementing Practical Design
  • Modifying VE tools to assist teams with small projects with evaluation of alternatives
  • Modifying VE tools to assist with the documentation of cost reductions for projects
• Establish Executive Review Team to ensure Practical design is implemented
Questions