

# Transportation Modeling for Toll Facilities

## North Carolina Model Users' Group

David R. Danforth  
Vice President  
Wilbur Smith Associates

October 24, 2007



# Today's Presentation

---

- What is a toll road financial feasibility study?
- Why is it necessary?
- What is the modeling process?
- What are the next steps?

# Toll Facility Financial Feasibility Study Elements

---

- Expected toll facility revenue over project life
  - Traffic and Revenue Consultant
- Expected Capital Costs
  - Engineering Consultant
- Expected Operations and Maintenance Cost
  - Engineering Consultant/Traffic and Revenue Consultant
- Financial Structure
  - Financial Consultant

# Reasons for Considering Toll Facilities

---

- Use of Tolls Becoming Increasingly Popular Throughout U.S.
  - Growing shortage of transportation funding from traditional sources
  - Need to manage demand and congestion
- Most New Projects in Urban Areas
  - Especially in high growth areas
  - Urban tollways
  - HOT and managed lanes
- Electronic Toll Collection Reduces Cost and Increases Efficiency
  - Fully cashless Open Road Tolling (ORT) – the wave of the future
- Synergies Between Tolls and Transit
  - Especially managed lanes and BRT

# North Carolina Projects

---

- Throughout the State
  - Triangle Expressway
  - Gaston East-West Connector
  - Monroe Connector and Bypass
  - Cape Fear Skyway
  - Mid-Currituck Bridge
  - I-74 in Brunswick County
  - Yadkin River Bridge on I-85
- Completing Investment Grade Study of Triangle Expressway



# NCTA Candidate Toll Road Screening Criteria

---

- The road must have full control of access.
- The road must have a "free" alternate route.
- The road must have a high probability of being able to start construction within a reasonable time frame.
- The road should have demonstrated local support or a reasonable expectation of support for development as a toll facility.
- The road should be deemed to be financially feasible using available data and commercially reasonable assumptions.
- Special consideration should be given to those projects that would play a significant role in the statewide or regional highway system or serve major economic generators.

# Toll Facility Traffic & Revenue Modeling

---

- How much travel demand is in the corridor?
  - **Passenger vehicles**
    - Cars, HOV, Transit
  - **Commercial vehicles**
    - Light, medium, heavy
- How much are people willing to pay to use the toll facility?
- How much will total demand grow?

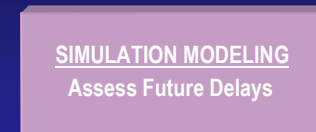
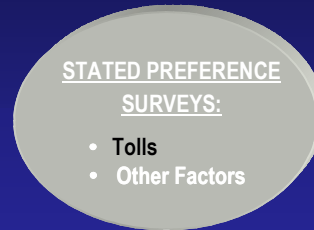


# Toll Modeling Overview

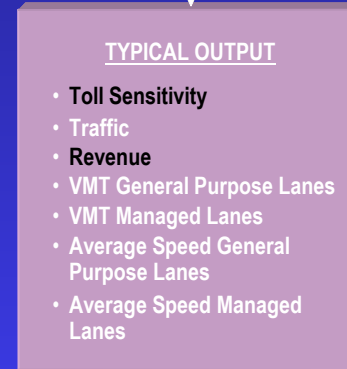
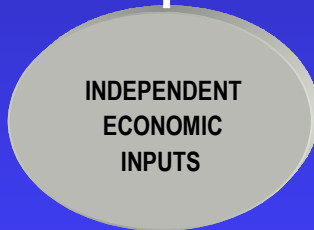
## How Much Demand Exists?



## How Much Are People Willing To Pay?



## How Much Will Demand Grow?

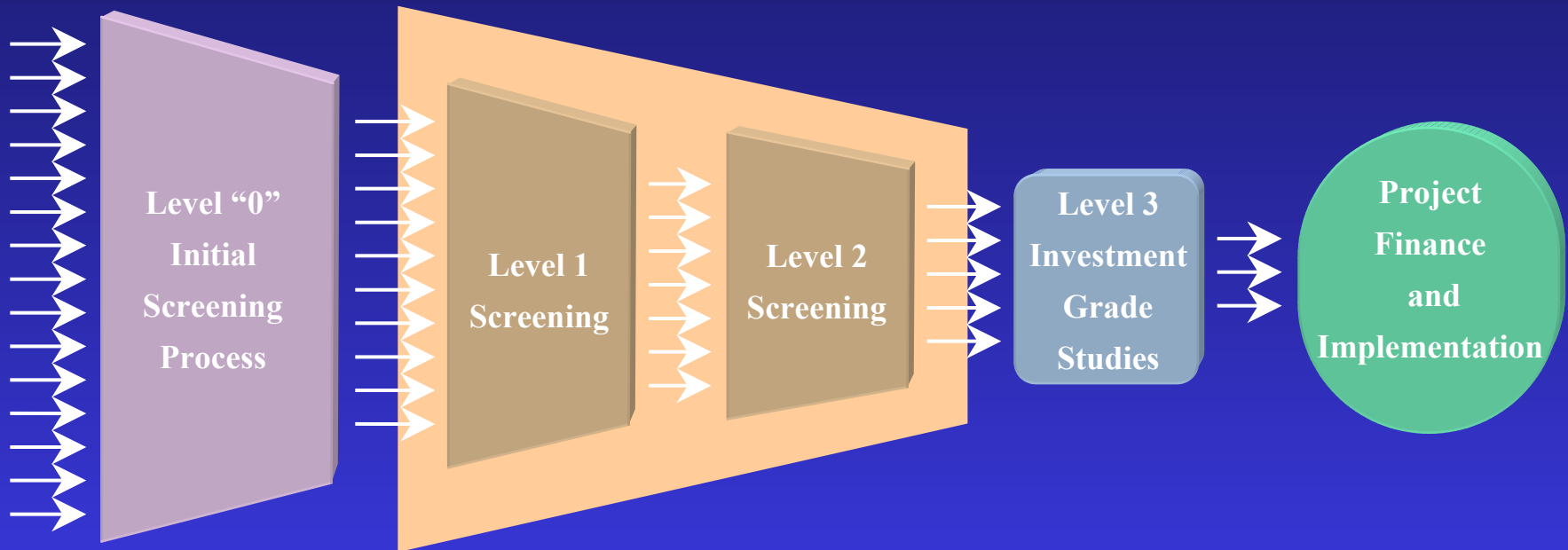


# Levels of Toll Studies

---

- Level 1 – Sketch level
  - Project screening
- Level 2 – Preliminary Study
  - Indicative toll traffic, revenue, and feasibility
- Level 3 – Investment Grade
  - “Certified” revenue, used by bond rating agencies and investors to evaluate financial return on the project

# Toll Candidate Screening and Study Process



# Level 1 – Sketch Level Traffic & Revenue Study

---

- 1 – 2 months
- Existing Data Sources – traffic counts, socioeconomic parameters
- Limited Travel Demand Modeling using Existing Models
- Used for Screening

# Level 2 Preliminary Traffic & Revenue Study

---

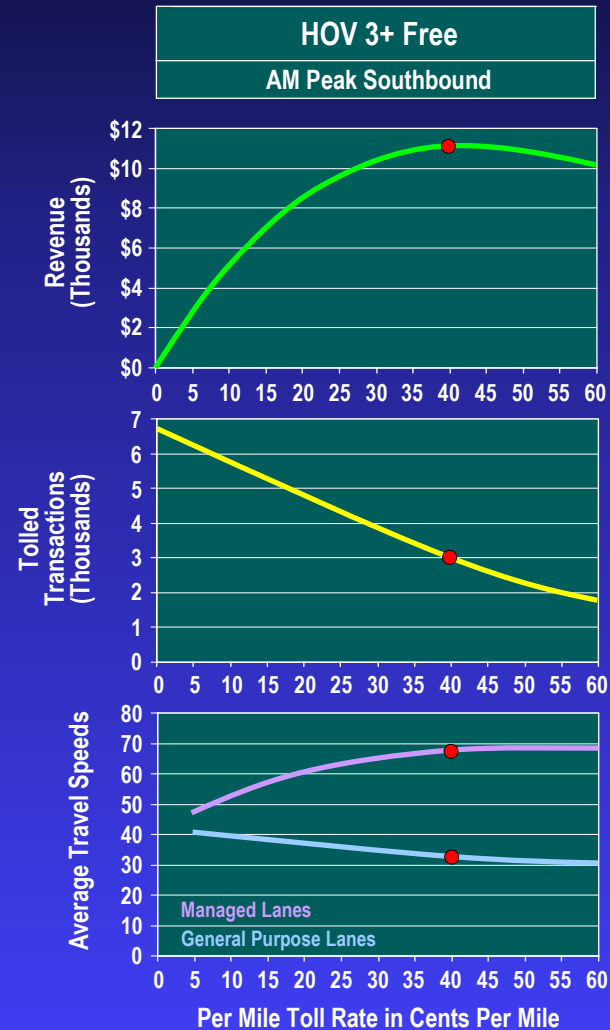
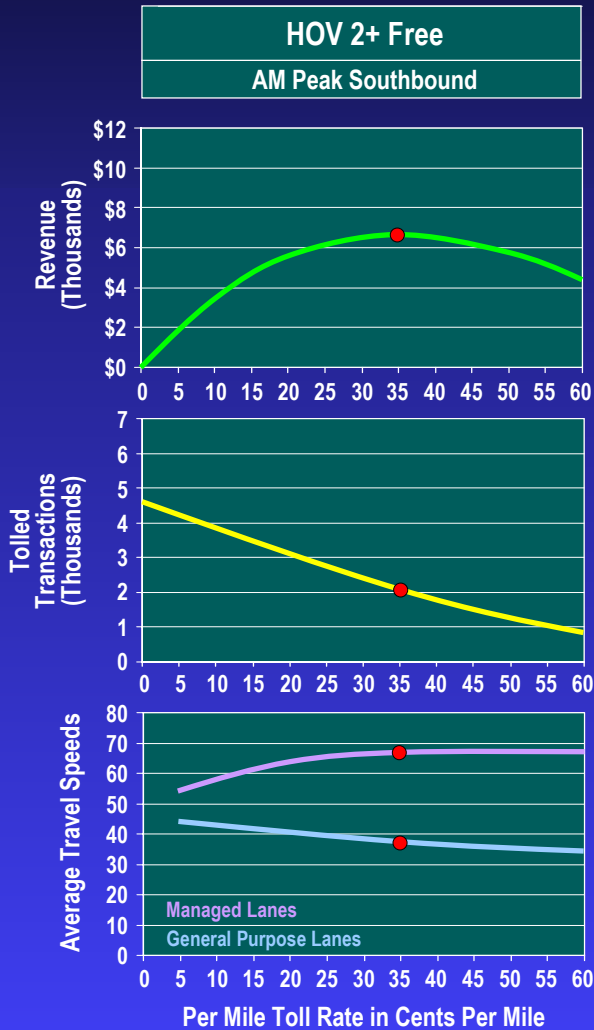
- 3 – 6 months
- Existing Travel Demand Models – limited refinements
- New Traffic Counts
- Speed & Delay Studies
- Model Calibration in the Corridor
- Socioeconomic Review with Limited Adjustments
- Value of Time from Census Statistics
- Toll Sensitivity
- Total Corridor Demand
- Diversion to Toll Facility – Toll Revenue
- Input to Preliminary Financial Analysis

# Level 3 – Investment Grade Traffic & Revenue Study

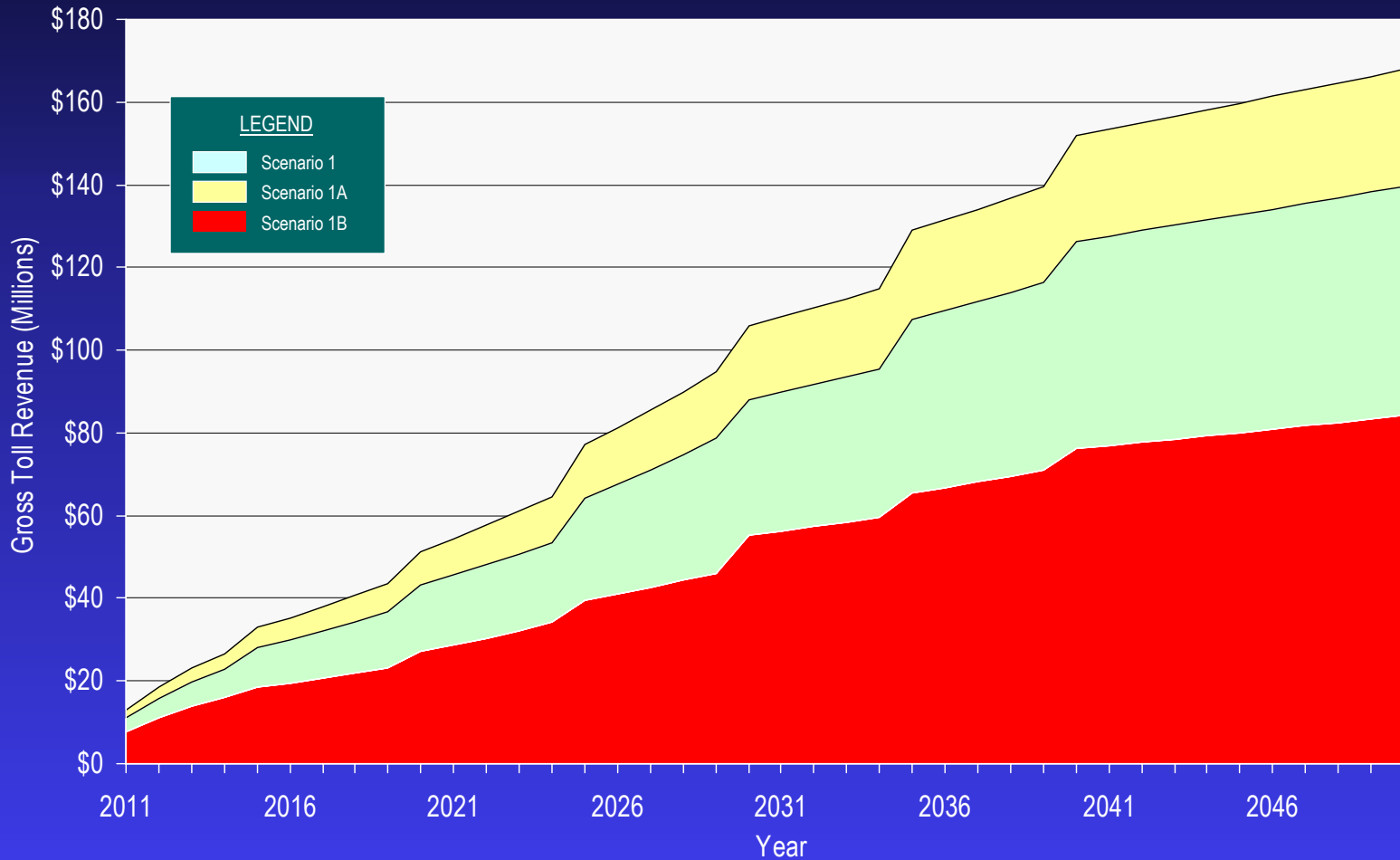
---

- 8 – 12 months
- Existing Travel Demand Models with Adjustments
- New Counts and Speed/Delay Studies
- Origin-Destination Surveys
- Stated Preference Surveys
- Independent Economic Review and Adjustments
- Operational Analysis and Toll Technology
- New Travel Demand Forecasts Including Transit
- Toll Sensitivity
- External Sensitivity Tests
- “Certified” Revenue Forecasts to Bond Rating Agencies and Investors

# Example Toll Sensitivity

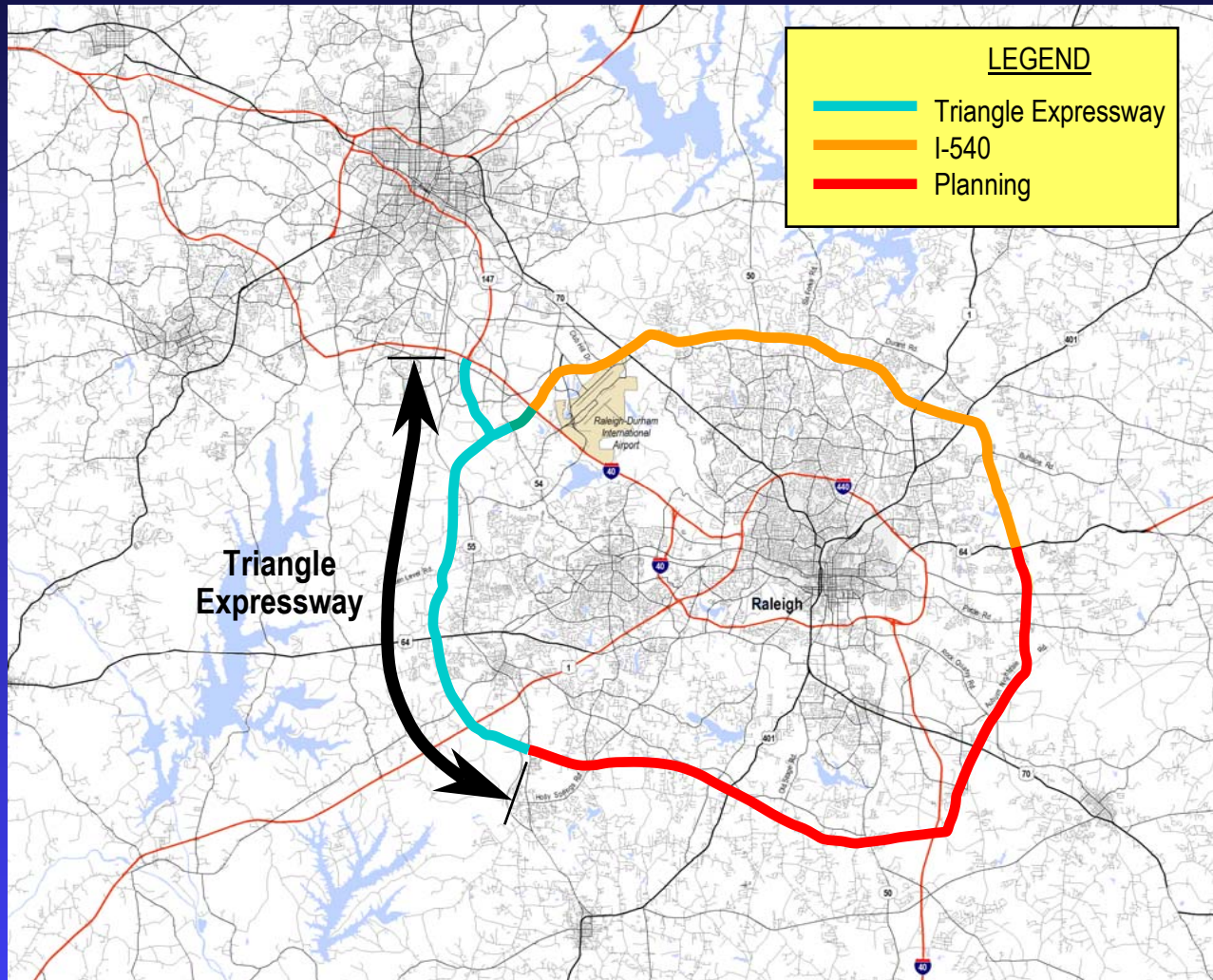


# Example Toll Revenue Forecast



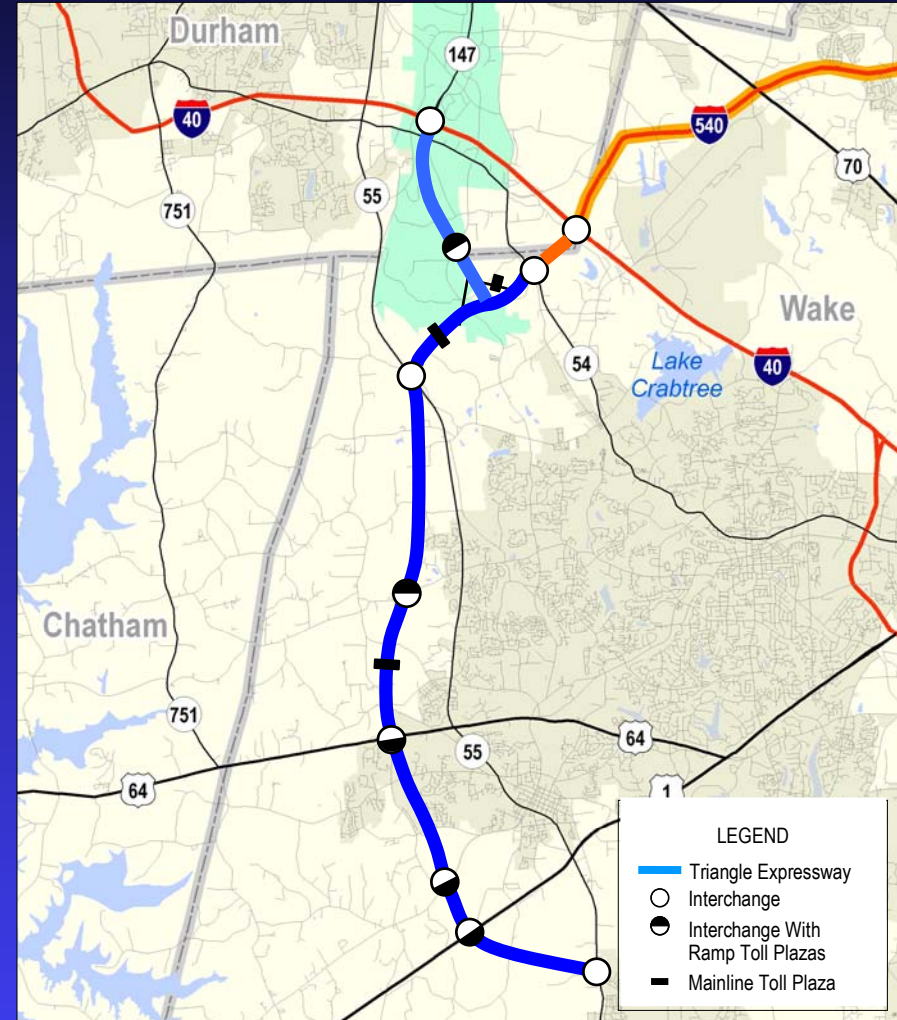


# Triangle Expressway Location Map



# Triangle Expressway

- First Project to Move to Investment Grade Study
- Important New Access to RTP and Other Employment
- Preliminary Studies Show Strong Revenue Potential
  - But additional funding beyond tolls will be needed



# For More Information:

David R. Danforth  
Vice President  
Wilbur Smith Associates  
900 Chapel Street, Suite 1400  
New Haven, CT 06510-2802

Phone: (203) 865-2191  
Fax: (203) 624-0484  
E-mail: [ddanforth@wilbursmith.com](mailto:ddanforth@wilbursmith.com)  
Web: [www.wilbursmith.com](http://www.wilbursmith.com)