Evacuation and Protective Actions Planning

Automobile and HOV Analysis

Prepared for

MWCOG

Evacuation & Protective Action Working Group

By:

BMI

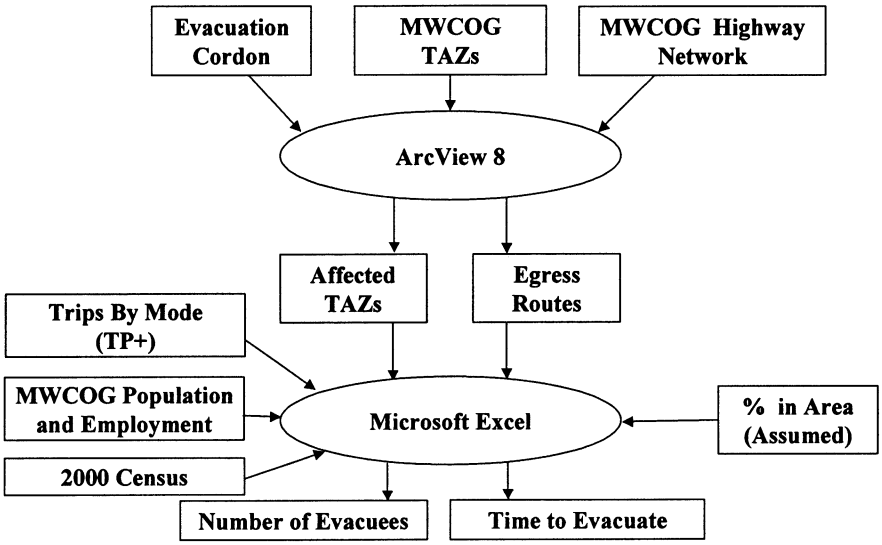
Under Subcontract to LBG

May 27, 2003

Objectives

- Preliminary Analysis of Scenarios
- Determine:
  - Evacuees in Evacuation Area
  - Vehicle Capacity at Evacuation Boundary
  - Time to Evacuate Via Automobile
- Prototype Procedure For Further Analysis

Methodology



Scenario Characteristics

- **Scenario 1: Union Station**
  - **Conventional Explosion**
  - **9 A.M. on a Weekday**
  - **One Mile Evacuation Radius**
- **Scenario 2: Woodrow Wilson Bridge**
  - **Explosion of Truck Carrying Liquefied Chlorine**
  - **Sunday Afternoon, July 6th, 2003**
  - **Evacuation Area Defined by Chlorine Gas Plume**

Scenario Characteristics (cont.)

•Scenario 3: West Falls Church Metro Station

- Conventional Explosion
- 2 P.M. on a Weekday
- One Mile Evacuation Radius

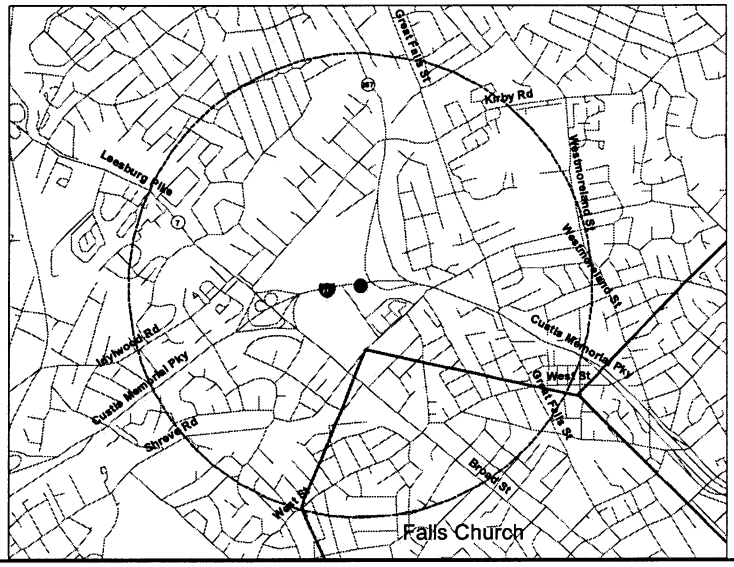
•Scenario 4: Greenbelt

- Explosion of Truck Carrying Liquefied Chlorine
- 1:30 P.M. on a Weekday
- Evacuation Area Defined by Chlorine Gas Plume

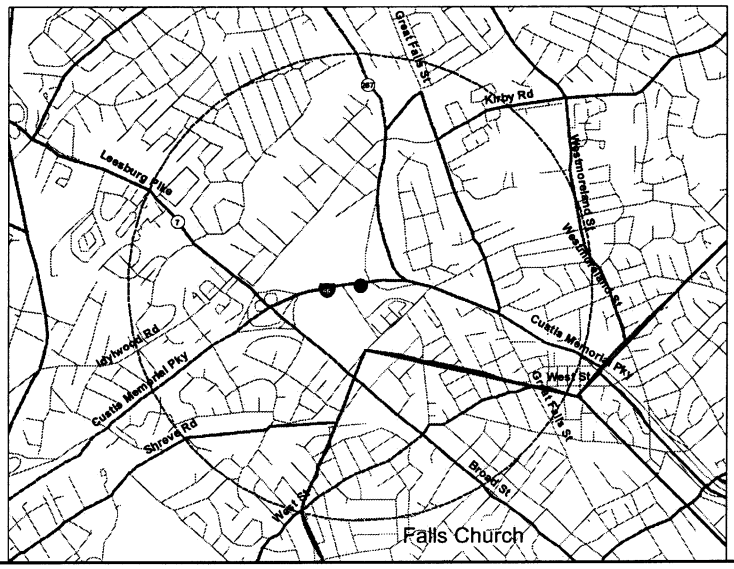
Tools and Data

- Software Already Used By MWCOG
  - ArcView
  - TP+
  - Microsoft Excel
- Data
  - MWCOG Zonal Data
    - Population
    - Employment
    - Trips By Purpose
  - 2000 Census
- Professional Judgment

Identify Evacuation Area



Determine Zones In Area

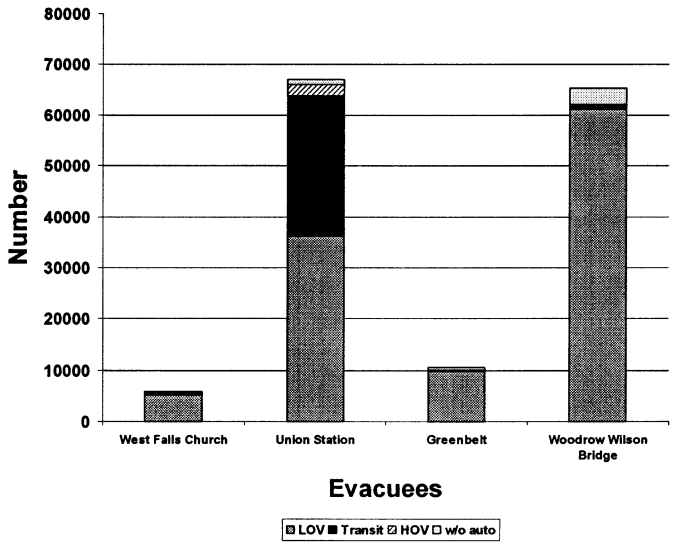


Assumed in Evacuation Area (Percent of Weekday Trips)

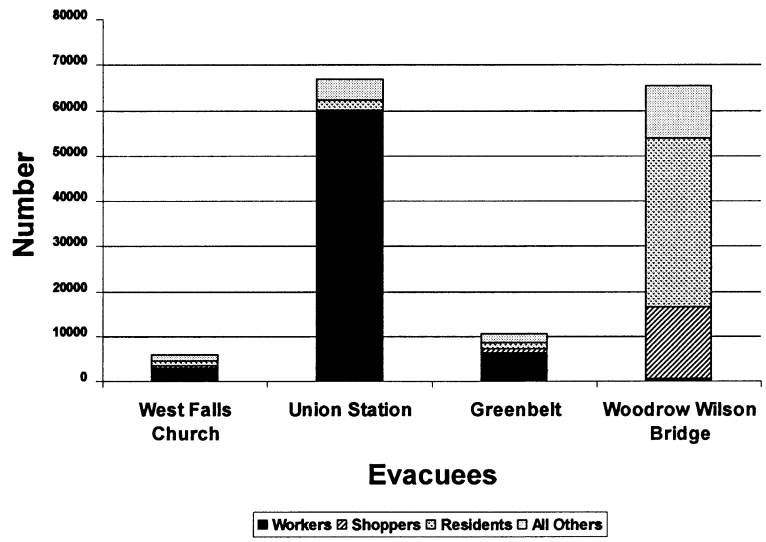
	West Falls Church	Union Station	Greenbelt	Woodrow Wilson Bridge*
Workers	85%	80%	85%	5%
Shoppers	20%	5%	20%	150%
Others	5%	5%	5%	5%
Trucks	15%	5%	15%	10%
Students	0%	80%	0%	0%
Visitors	20%	5%	20%	150%

* Assumed 1.5 times average weekday shop & other trips WWB on holiday weekend

Evacuees by Mode of Arrival



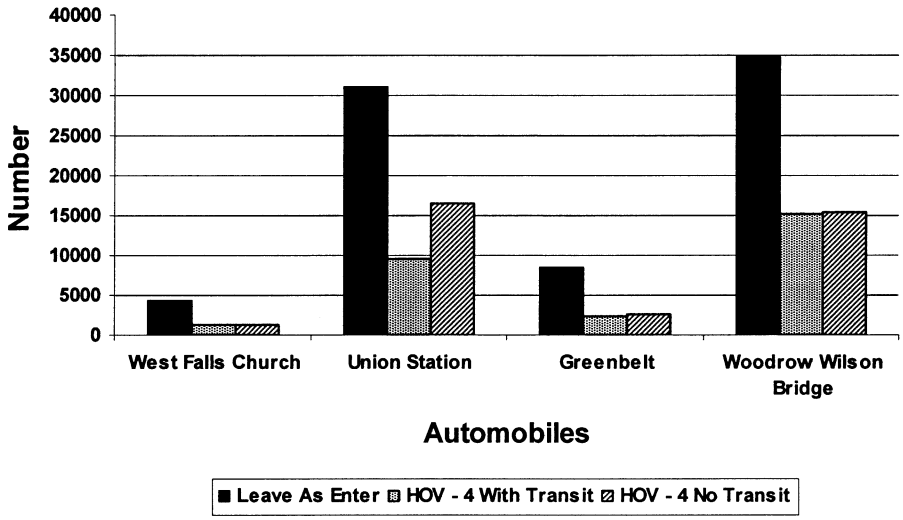
Evacuees By Purpose



Evacuation Transportation Scenarios

1. Leave Same Way As Arrived
2. Auto Users Must Form HOV 4 (Transit is Available)
3. Evacuees Must Form HOV 4 (No Transit Available)

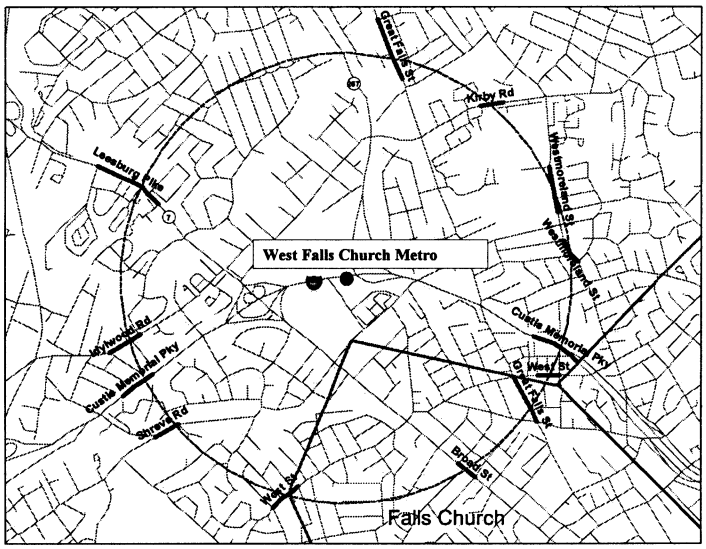
Evacuating Vehicles



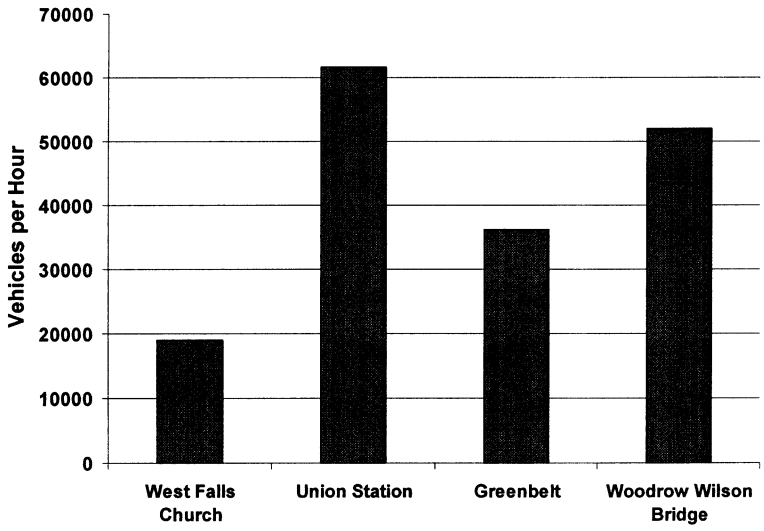
Evacuation Assumptions

- Assume All Exit Capacity at Evacuation Boundary Available to Evacuees
  - Vehicles Stopped From Entering Area
  - Vehicles on Street Have Exited Area
- Ignore Internal Bottlenecks
- Evacuation Traffic Continues to Flow After Leaving Area

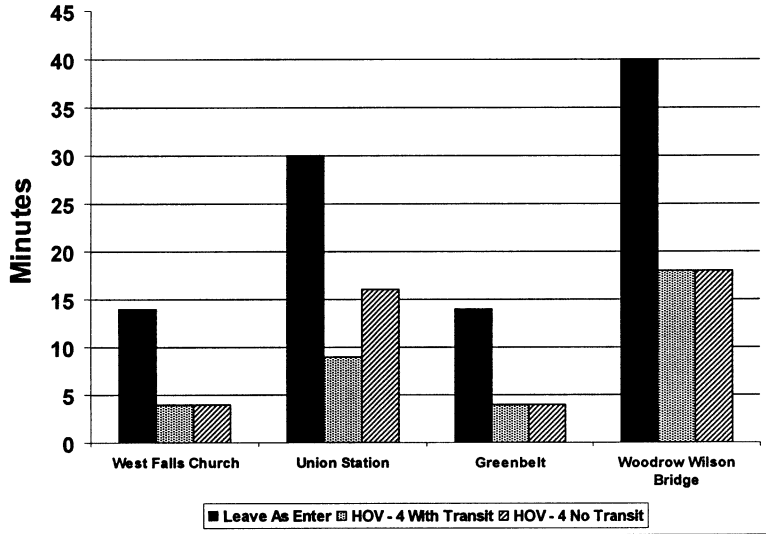
Roads at Evacuation Boundary



Vehicle Capacity at Evacuation Boundary



Time To Evacuate By Auto



Conclusion

Sufficient Capacity to Evacuate All Areas in Less Than 1 Hour If:

- No Internal Bottlenecks Impede Flow
- All Vehicles Stopped From Entering Area within Minutes of Incident
- Vehicles On Evacuation Area Roads Leave Immediately
- Abandoned Vehicles – None or Immediately Moved
- Once Outside Area Vehicles Do Not Queue Back

Refinements

- Streamline Process to Analyze New Areas in Minutes
- Use Area Specific Occupants By Time of Day
  - Work
  - Residents
  - Other
- Determine Travel Time To Cordon
- Determine Time to Evacuate Vehicles on Evacuation Area Roads at Time of Incident
- Account For Bottlenecks in Evacuation Area
- Identify Locations to Control Traffic

Next Steps?