

Transit Capacity Constraint

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Outline

- Origins of Metrorail capacity constraint
- Recent revision of constraint
- Application of constraint in Ver. 2.1 Model
- Concerns/Issues about use of constraint

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Introduction

- Metrorail capacity constraint introduced in 2000 to address funding shortfalls that restricted future rail fleet expansion
 - Capacity limits restricted capacity growth beyond 2005
- Recently proposed Metrorail capacity constraint to be extended to 2010 due to new funding availability for railcars

Origins of Metrorail Capacity Constraint

Metrorail Core Capacity Study (2001)

- Core of Metrorail system serves:
 - 60% of customers
 - 90% of transfer activity
 - 100% of train trips
- Ridership forecasts through 2025
- Determined when ridership demand will exceed system capacity at various service levels and strategies
- Identified needed improvements to provide necessary system capacity to meet forecasted ridership demand



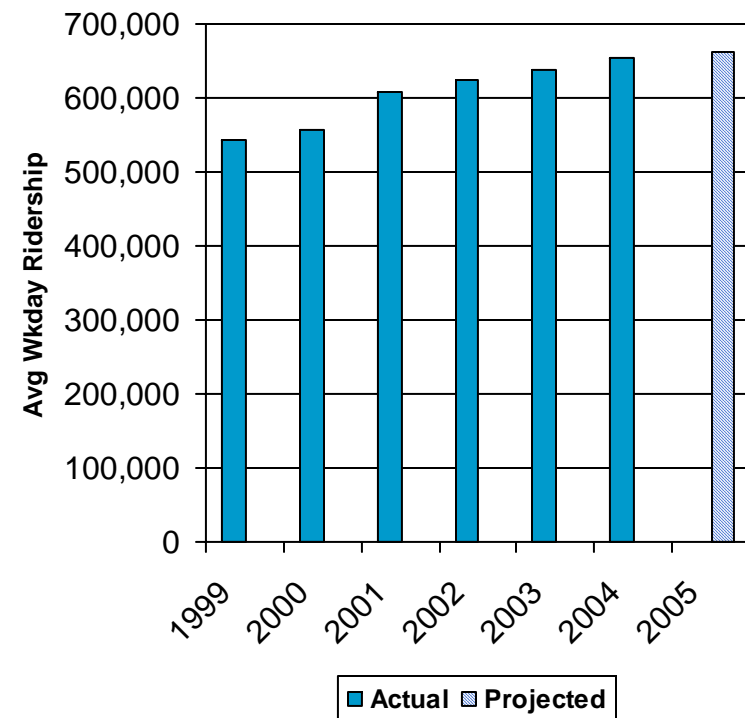


Origins of Metrorail Capacity Constraint

Metrorail Ridership

- Average weekday ridership in June 2004 was 706,600 passenger trips, the first time in Metro history that average weekday ridership exceeded 700,000 passenger trips per weekday.
 - Average 2004 daily ridership was 653,000
- Metrorail ridership has grown steadily and has increased by more than 30% over the past 8 years for an average annual growth of 3.8%
- 42% of all person trips to the core during the AM peak period use transit

Average Weekday Ridership

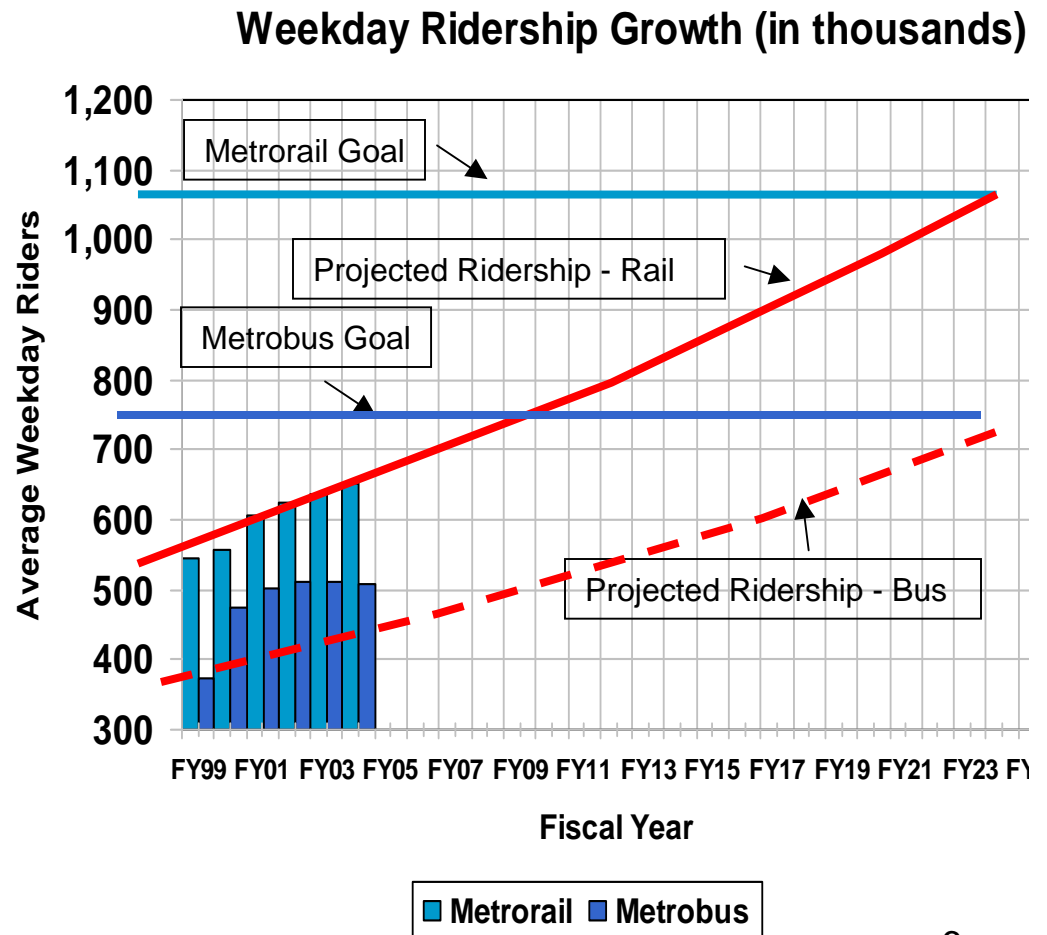




Origins of Metrorail Capacity Constraint

Projected Metrorail Ridership

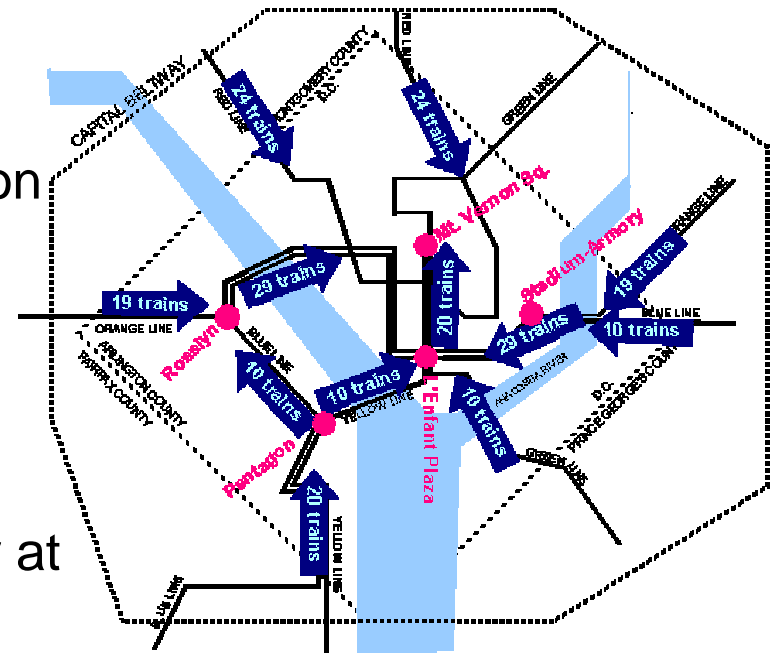
- In 1999, WMATA Board adopted goal to double bus and rail ridership by 2025.
- Metrorail ridership expected to grow at average annual rate of approximately 3% based on COG forecasts.
- Growth curves illustrate:
 - **3% regional growth on 2001 base doubles ridership by 2022**
 - **If current growth rates continue, ridership will double sooner**
- More than 70% of ridership occurs in AM and PM peak periods
- Peak one-hour ridership accounts for approximately 43% of peak period ridership



Origins of Metrorail Capacity Constraint

Factors Affecting System Capacity

- Maximum capacity determined by:
 - Number of trains per hour
 - Number of cars per train
 - Number of passengers per car
- Occurs at the maximum load points on each line
- Occurs at the peak one hour of each peak period
- WMATA considers line to be overcrowded when the average passenger load during the peak hour at a maximum load point exceeds 120 passengers per car.



Origins of Metrorail Capacity Constraint Rail Fleet



Step	Cars	Timeframe
Existing Fleet	950	2004
Begin 8-car train operation with 62 Alstom cars	1012	2006
Blue Line Split, no additional cars	1012	2006
Expand 8-car trains with 120 additional cars	1132	2009
Rail to Wiehle with 64 additional cars	1196	??

Fleet Size
When First
Capacity
Constraint
Imposed

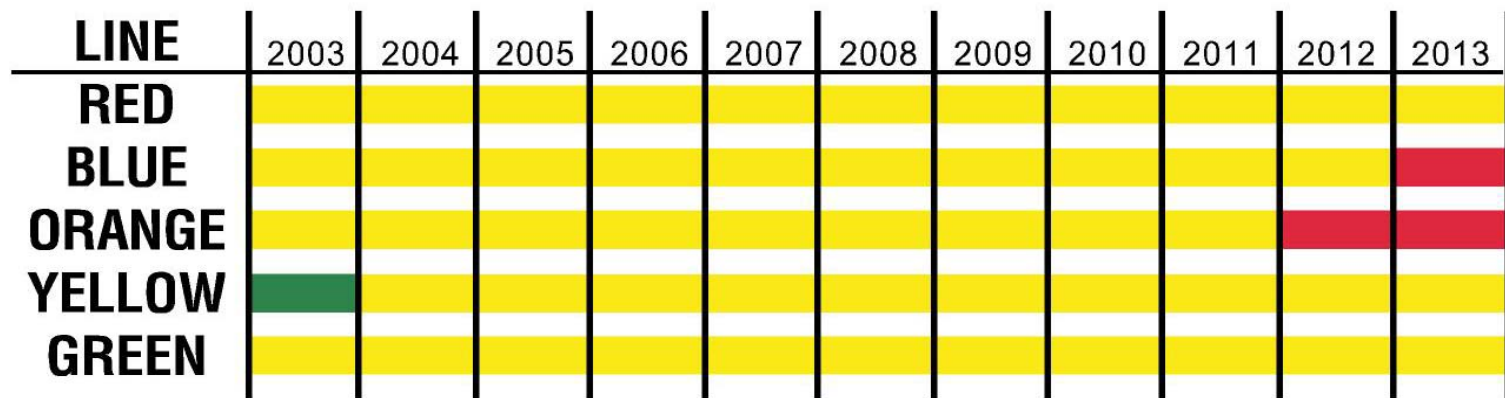
Second
Capacity
Constraint
Imposed



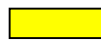
Revised Metrorail Capacity Constraint

Revised Capacity Constraint

- Capacity constraint was implemented assuming 950 cars which limited ridership growth to 2005
- New capacity constraint implemented including 182 additional cars (includes cars to be ordered with recently approved Metro Matters funding)



Congested: 80-100 people per car



Highly Congested: 100-120 people per car



Unmanageable: 120+ people per car



Application of Transit Capacity Constraint **Version 2.1 D Model Approach**

- MWCOG model currently implements a transit capacity constraint on all forecast years beyond 2010
- Applied to all transit trips: Metrorail, bus and commuter rail
- Assumes that core capacity will not exceed 2005 level for peak transit trips to/thru the core
- Daily transit trips are factored to peak trips with temporal, orientation, and trip purpose distribution
- Displaced transit trips are re-allocated to auto mode at the zone level



Application of Transit Capacity Constraint

Version 2.1 D Model Results

Transit Trips

	2005 Peak	2005 Daily	2030 Peak	2030 Daily
Total	596,881	960,300	770,735	1,239,815
To/Thru Core	217,690	526,971	247,797	591,926
Trips Constrained (2030 Peak - 2005 Peak)			30,107	
Percent Reduction in Peak Transit Trips			12.1%	
2030 Daily Trips After Applying Constraint				561,819

Ver 2.1D Model (April 2004, Release 16X2)

Concerns/Issues with Transit Capacity Constraint

- Methodology:
 - Applies to all transit trips, not just Metrorail
 - Not all transit trips would shift to auto mode during congested conditions
- Constraint should not be used in long-range project planning studies where unconstrained transit demand is used