

LRT AND STREETCAR SYSTEMS INTERFACE

Transportation Planning Board
Technical Committee Meeting

February 7,
2014

PROJECT OVERVIEW



BACKGROUND AND PURPOSE

- Numerous surface transit projects are being advanced around the region
- Metro is facilitating regional coordination among project sponsors and stakeholders to maximize potential compatibility of the proposed systems
- Goal is to ensure that the systems maximize compatible features across projects:
 - Provide most **convenient systems** for customers
 - Provide **predictability** to region's transit customers
 - Avoid future problems: **“Why didn't they think about this?”**
 - **Accountability to communities** for decisions/operations
 - Mitigate risks and enhance **cost effectiveness**

WMATA ROLE IN LRT AND STREETCAR PROJECTS

- Project Development
 - District of Columbia streetcar feasibility and concept design
 - Columbia Pike environmental documentation and concept design
- Design Coordination
 - Purple Line interface at existing Metrorail stations
 - District of Columbia streetcar vehicle procurement
 - Planning for operation of interlined/connecting rail and bus services
- Momentum Strategic Plan
 - Improve Regional Mobility and Connect Communities through enhancing access and intermodal connections, promote interoperability
- Regional Transit System Plan (RTSP)
 - 2040 Plan with recommendations for high-capacity transit corridors (incl. LRT, BRT, Streetcar) to pair with Metrorail core capacity improvements

CONTINUUM OF INTEROPERABILITY

More intensive coordination

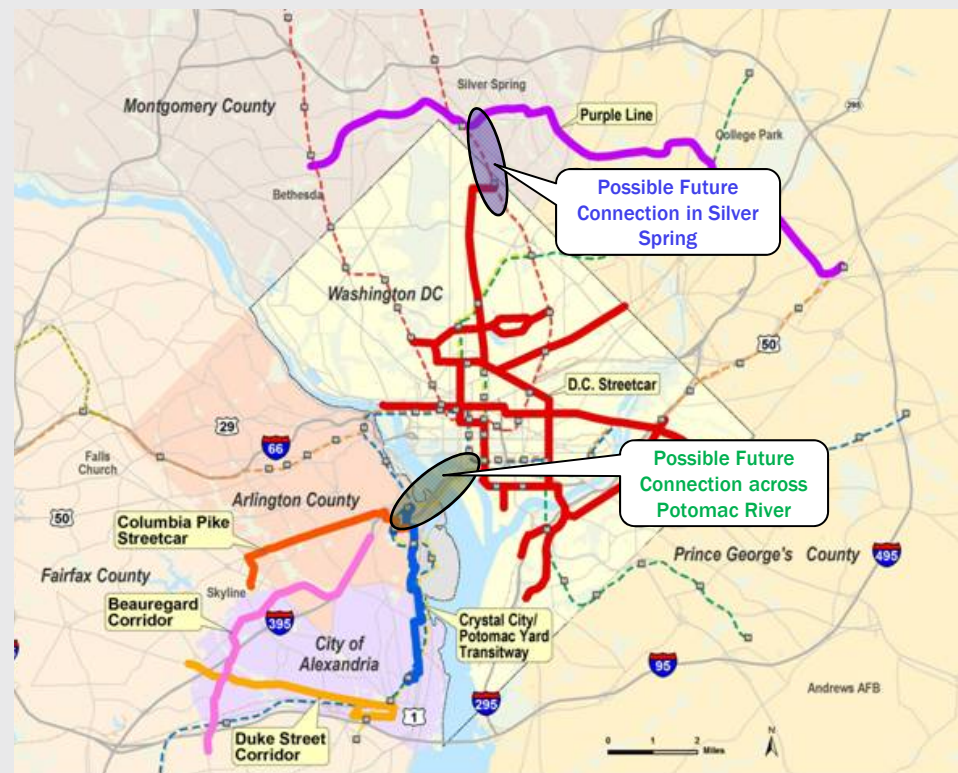


- Knowledge sharing
- Common criteria for common elements
- Services connect at common stations
- Shared staff and training
- Shared parts and equipment storage
- Joint vehicle procurement
- Shared specialized maintenance functions
- Service is interlinked

Most likely aspects
for coordination

POTENTIAL FUTURE CONNECTIONS

- Potential DC Streetcar connection into Silver Spring
- Streetcar alignment connections and common maintenance locations among proposed Northern Virginia streetcar systems



ASSESSMENT OF INTEROPERABILITY

- Key interoperability categories:
 - Power supply
 - Vehicle types and specifications
 - Guideway design
 - Communication Systems
- Survey of current design criteria (DDOT, Purple Line, Arl. Co., WMATA) shows that sponsors are not explicitly considering interoperability
- Assess benefits of individual interoperability actions

PASSENGER INFORMATION AND COMMUNICATION REVIEW

MTA On the Go! Travel Station

Bowling Green | 64 °F | 5:38 PM Monday, Sept. 18, 2011

Service Status

1 2 3	SERVICE CHANGE	1 2 3	SERVICE CHANGE
4 5 6	SERVICE CHANGE	5	trains are running on the 3 line to the New Lots Avenue Station.
7	GOOD SERVICE		Select downtown 2 and 5 trains are running on the 4 line to the Utica Avenue Station.
A C E	SERVICE CHANGE		Please expect delays in 2 and 3 train service at this time.
B D F H	SERVICE CHANGE		
G	GOOD SERVICE		
J Z	SERVICE CHANGE		
L	GOOD SERVICE		
N Q R	DELAYS		
S	GOOD SERVICE		
SR	GOOD SERVICE		

lenovo WE MAKE THE TOOLS YOU MAKE THEM DO.

schika Ruffles Through Layers, Millie Clues

Out of the Box Bakers
 Gluten Soy Rice Dairy Preservatives

TRIMET | October 11, 2009 4:22 pm

9 Powell to 98th Ave	5 min	
9 Powell to Gresham TC	23 min	
17 Holgate to 136th Ave	5 min	46 min
19 Woodstock to Mt Scott & 112th via 28th Ave	4:45 pm	
44 Capitol Hwy to PCC Sylvania	8 min	43 min

Let us know how we're doing. Email comments@trimet.org or call 503-238-RIDE. - Get service updates

OVERVIEW OF PASSENGER INFORMATION TOPICS

State of practice, customer expectations, and the DC area experience related to:

1. Visual Displays
2. Web-based Information
3. System branding & Wayfinding
4. Service Disruption Communication

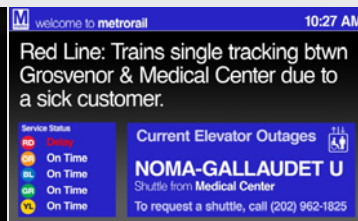
VISUAL DISPLAYS

Local Displays

Metrorail (PIDs)



Metrorail (Kiosk Information displays)



Real Time Transit Screens



Arlington County Commuter Services



Coffee shop in Courthouse



Metrorail Pylon



Columbia Pike Super Stop



Real Time Bus Stop Displays



Regional Bus Stop Flags

WEB-BASED INFORMATION

Trip Planning

The image shows a Google Maps interface with a search bar containing "2101 Wilson Blvd, Arlington, VA". Below the map, there are search results for "2101 Wilson Blvd, Arlington, VA" and "600 5th Street Northwest, Washington, DC".

Overlaid on the bottom right is the WMATA Trip Planner interface. The header includes the WMATA logo and navigation links: Home, Rail, Bus, Accessibility, Getting Around, Fares, Rider Tools, and About Metro. The Trip Planner section has a search bar and a "Submit" button. It includes fields for "From:" (5th & Mass Ave NW) and "To:" (Vienna Metro), and "Restrict To:" (All Jurisdictions). There are also links for "Popular Locations" and "Interactive Map".

Below the Trip Planner is a "Work Here" section with a target icon and a "View jobs" link. At the bottom left, there is a logo for "THE" with a blue arrow pointing right.

Real Time Arrivals

The image shows the WMATA Real Time Arrivals interface. The header includes the WMATA logo and the title "Gallery PI-Chinatown". Below the header, there is a "Next Bus Arrivals" section with a search bar and a "Go" button. The search results show "Route: 32 PENNSYLVANIA", "Direction: East to Southern Ave", "Stop: Wisconsin Ave NW", and "Destination: Wisconsin Ave NW".

Below the search results is a "Tracked vehicles for route" section with a "17 min" timer and a "For other routes" section with a "16 min (31 PENNSYLVANIA)" and "37 min (31 WISCONSINIA)" timer. There is an "Update page address" link.

On the right side, there is a "RECENT STOPS" section with a list of stops: "Stop 15348 @ Route(s) 18", "Stop 20806 @ Route(s) 18", and "Stop 23860 @ Route(s) 18". Below this is a "Find By Stop", "Find By Route", and "Find By Address" section with a dropdown menu for "Routes: 18 - Silver Spring Metro/Takoma -La, WEST" and a "Sort Stops Alphabetically" checkbox. There is also a "Last Refresh Time: 2:35:50 PM" and a note: "* - denotes scheduled time only".

At the bottom right, there is a "Map Legend" section with a map showing the location of the bus stop. The legend includes "Bus Stop", "Selected Bus Stop", and "Current Bus location". The map shows a street grid with a blue line indicating the bus route and a red dot indicating the current bus location.

SYSTEM BRANDING & WAYFINDING

Regional Transit Logos

metrobus

Purple Line

dc streetcar 

R
Ride On
Montgomery County Transit

circulator

M
metro



Sound Transit Wayfinding Symbols



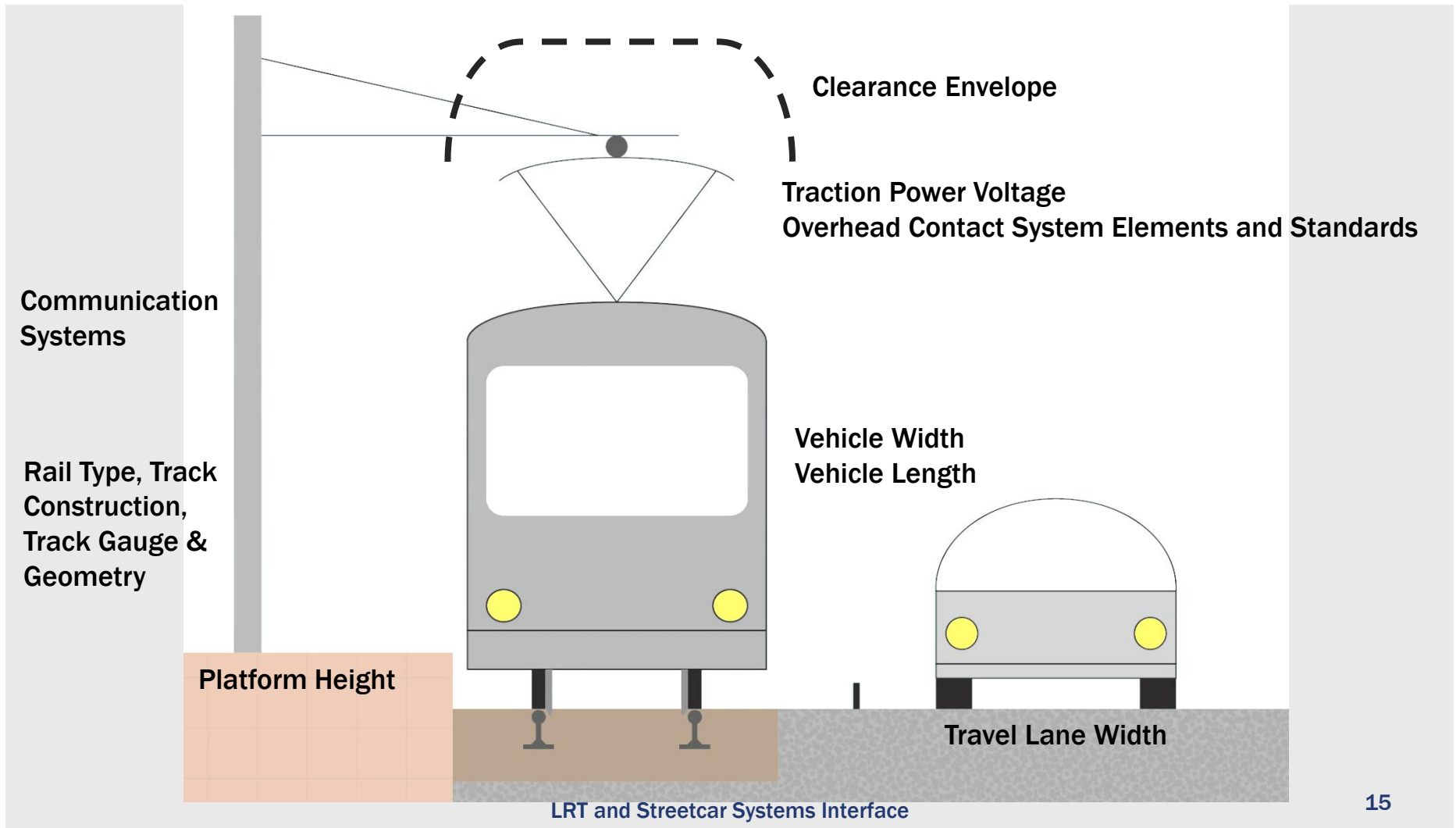
INFRASTRUCTURE REVIEW



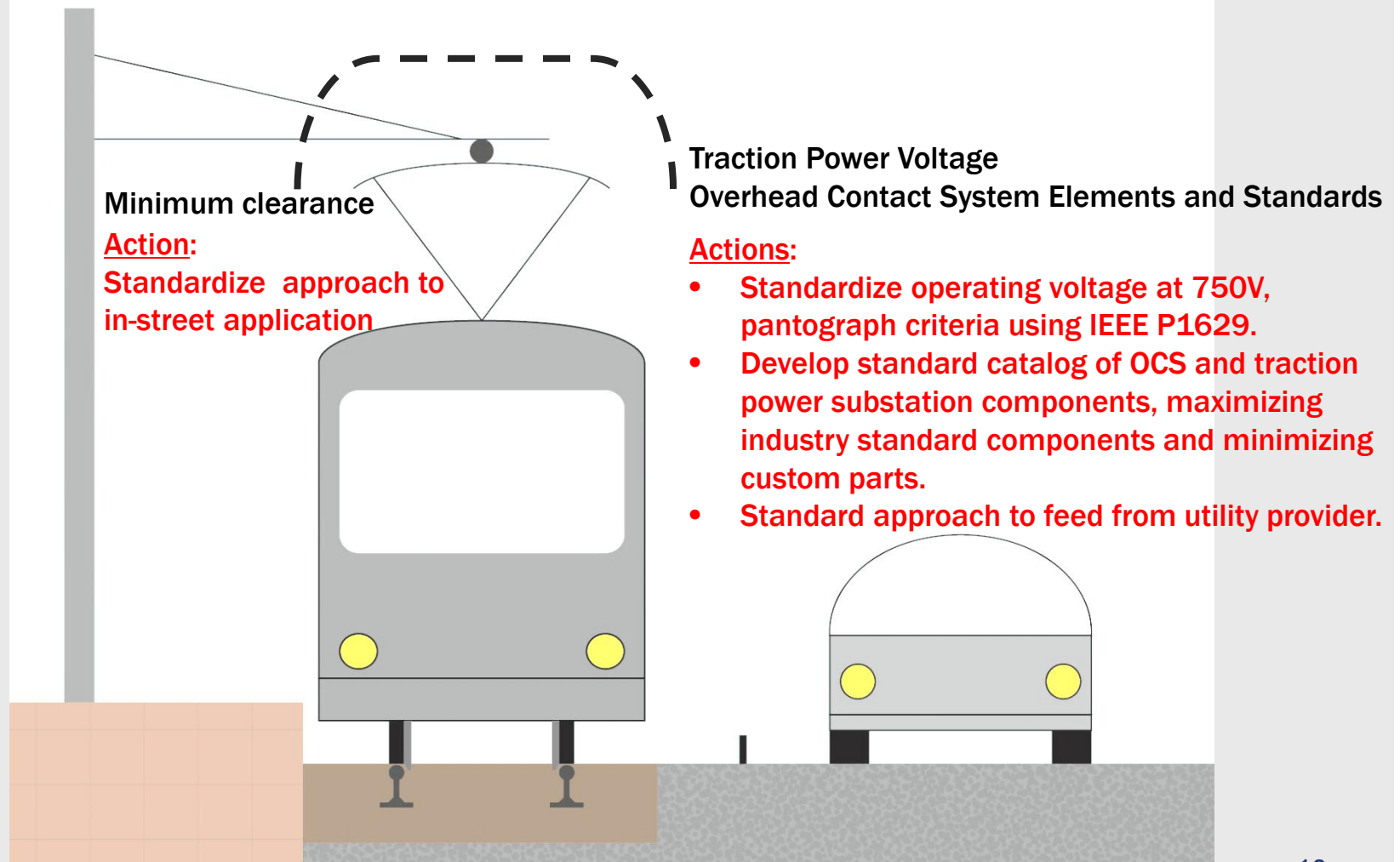
OVERVIEW OF INFRASTRUCTURE TOPICS

- **Power Supply**
 - Traction Power Voltage
 - Overhead Contact System Elements and Standards
- **Vehicle Characteristics**
 - Width
 - Length
 - Platform Height
 - Clearance Envelope
- **Guideway Design**
 - Route Geometry
 - Track Construction
 - Track Gauge & Geometry
 - Travel Lane Width
- **Communication Systems**

MINIMUM INFRASTRUCTURE REQUIREMENTS: TYPICAL ELEMENTS



POWER SUPPLY



LRT and Streetcar Systems Interface

VEHICLE CHARACTERISTICS

Vehicle Width

Action:
Standardize at 2.4 or 2.65m

Vehicle Length

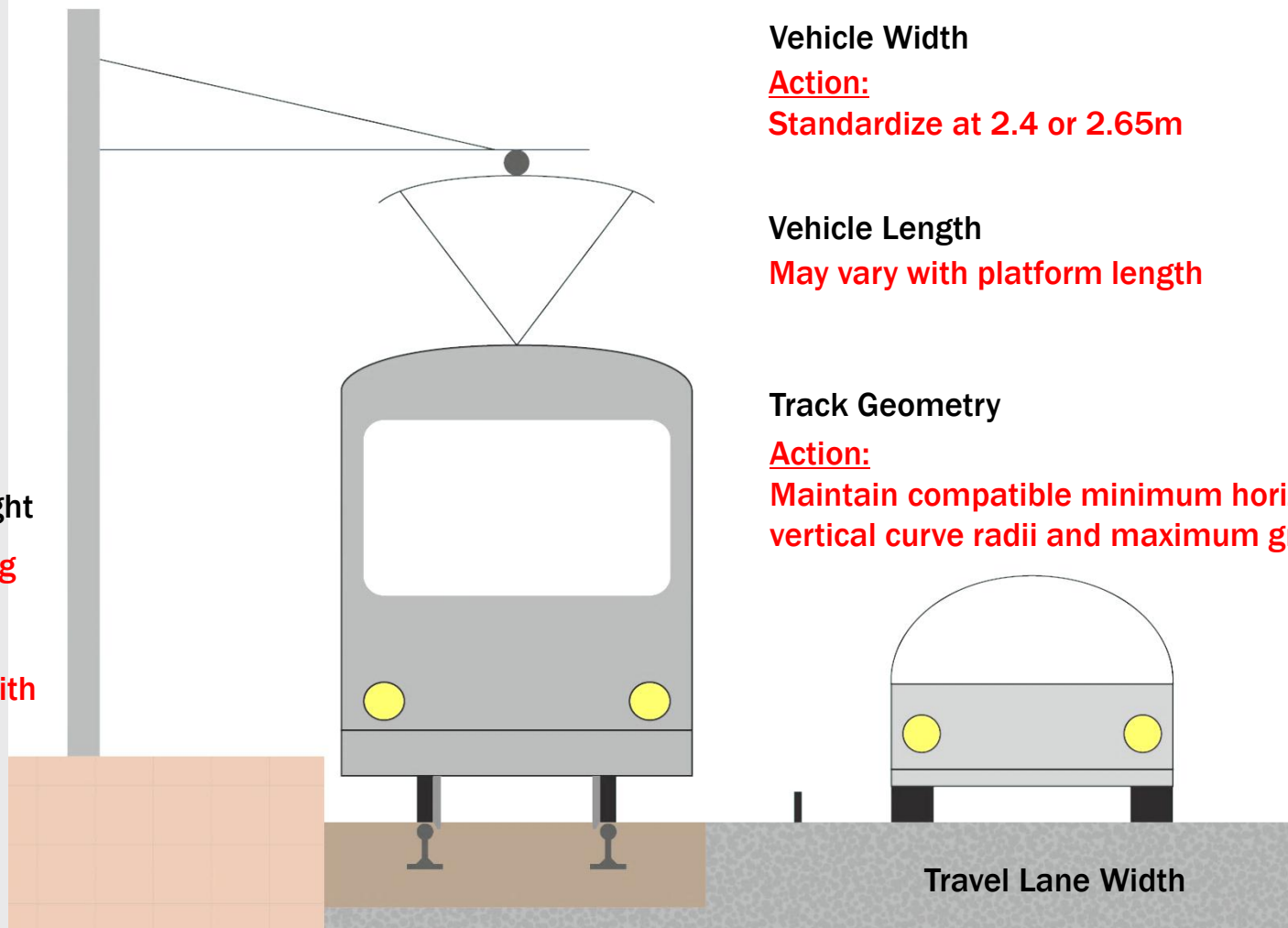
Action:
May vary with platform length

Track Geometry

Action:
Maintain compatible minimum horizontal and vertical curve radii and maximum grade

Platform Height

Action:
Level boarding platform not generally compatible with parallel bus service

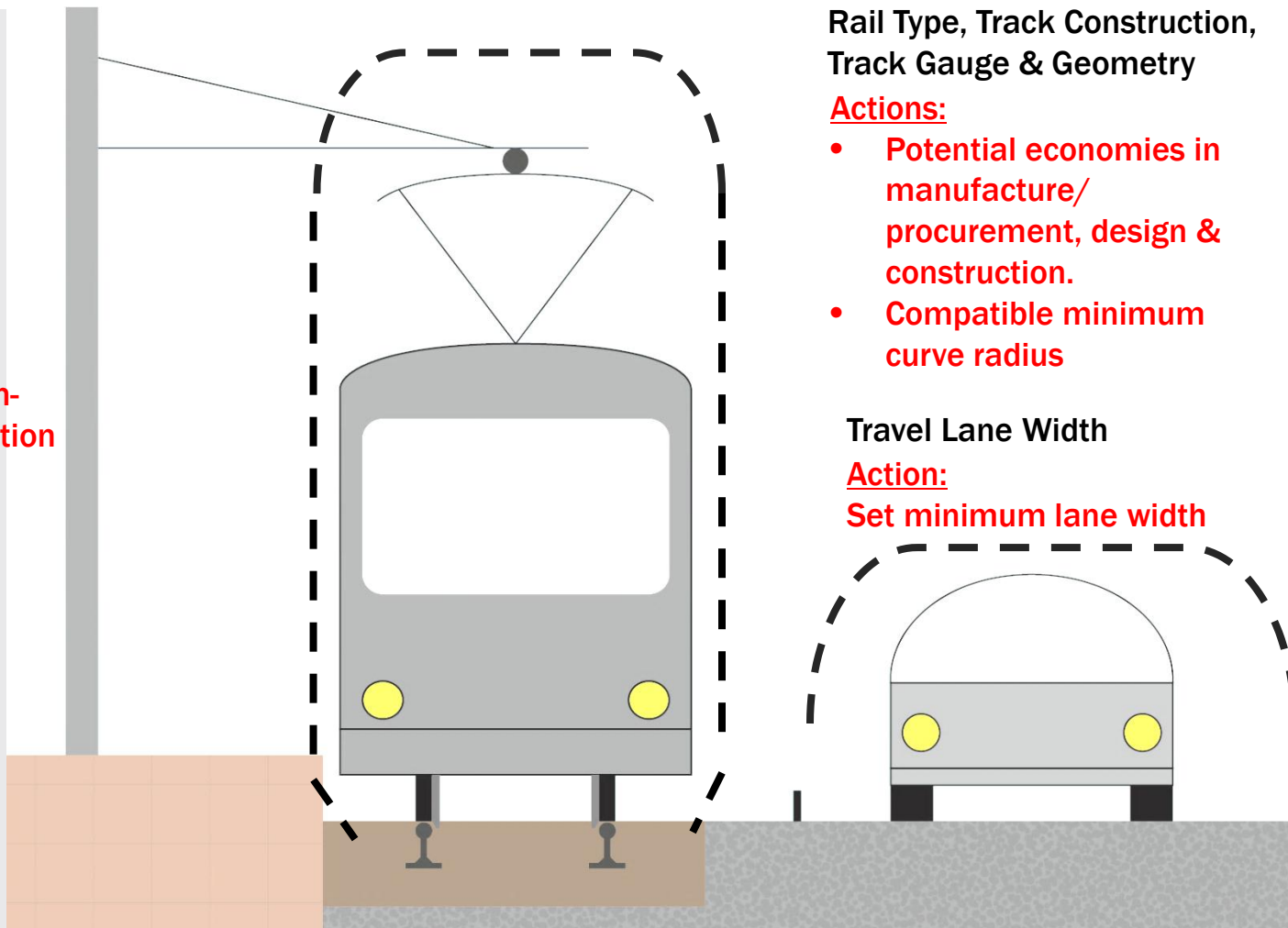


LRT and Streetcar Systems Interface

GUIDEWAY DESIGN

Clearance
Envelope

Action:
Standardize
approach to in-
street application



Rail Type, Track Construction,
Track Gauge & Geometry

Action:

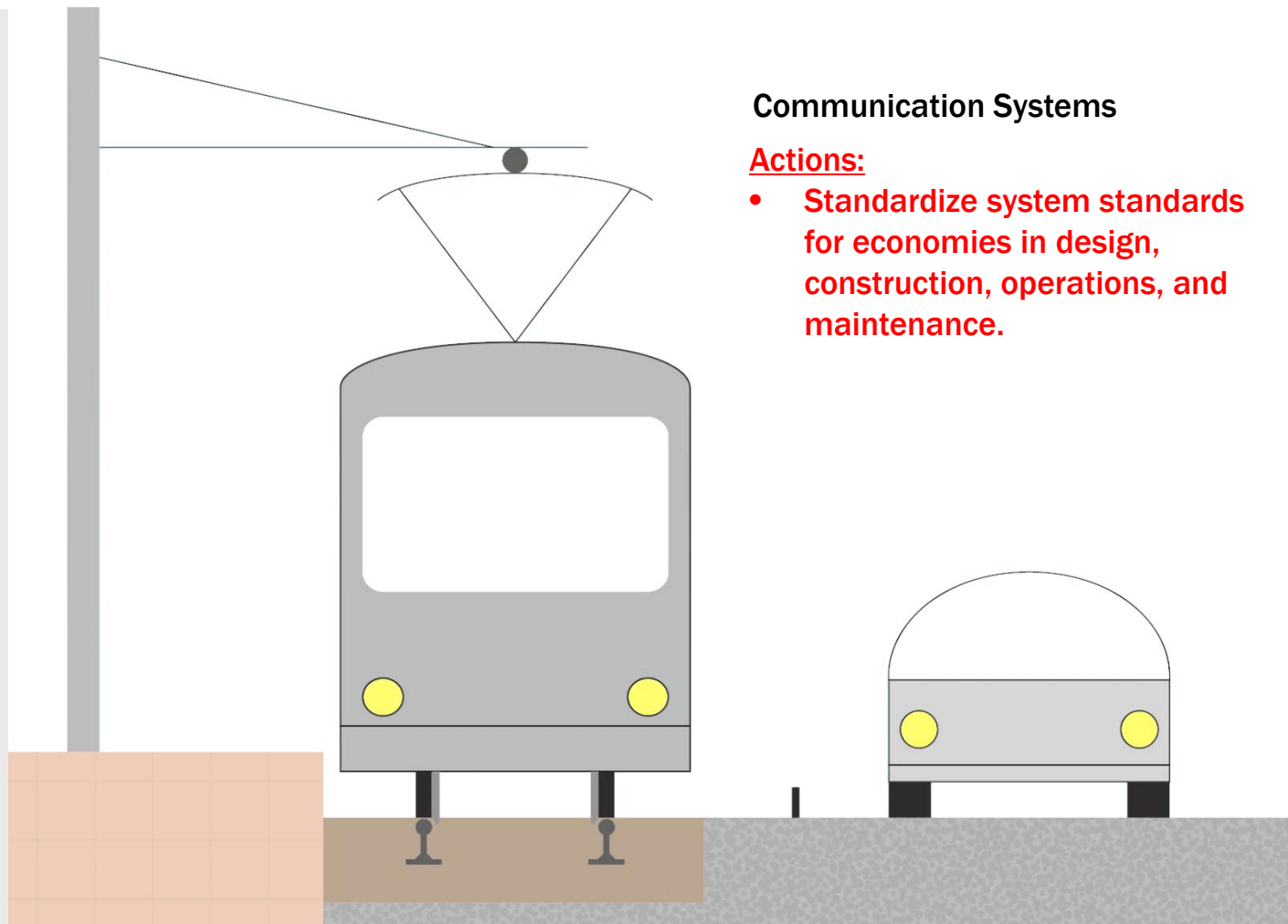
- Potential economies in manufacture/ procurement, design & construction.
- Compatible minimum curve radius

Travel Lane Width

Action:

Set minimum lane width

COMMUNICATION SYSTEMS



Communication Systems

Actions:

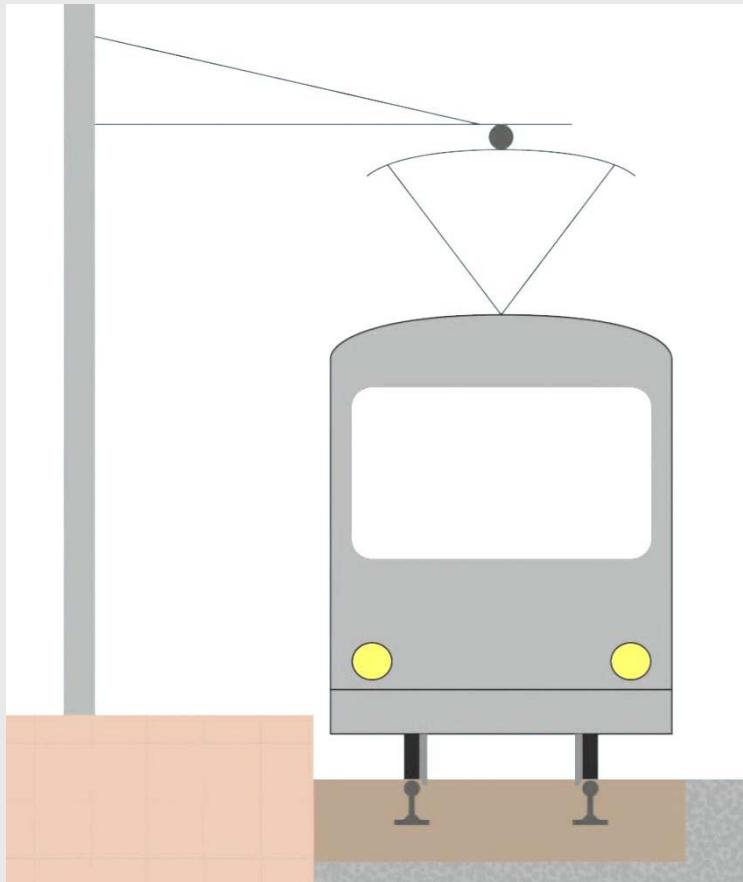
- Standardize system standards for economies in design, construction, operations, and maintenance.

LRT and Streetcar Systems Interface

VEHICLE DESIGN CRITERIA REVIEW



DESIGN CRITERIA STANDARDS: VEHICLE DIMENSIONS



Vehicle Width – **Standardize at 2.4 or 2.65m**
 Vehicle Length – **Variable with platform length**

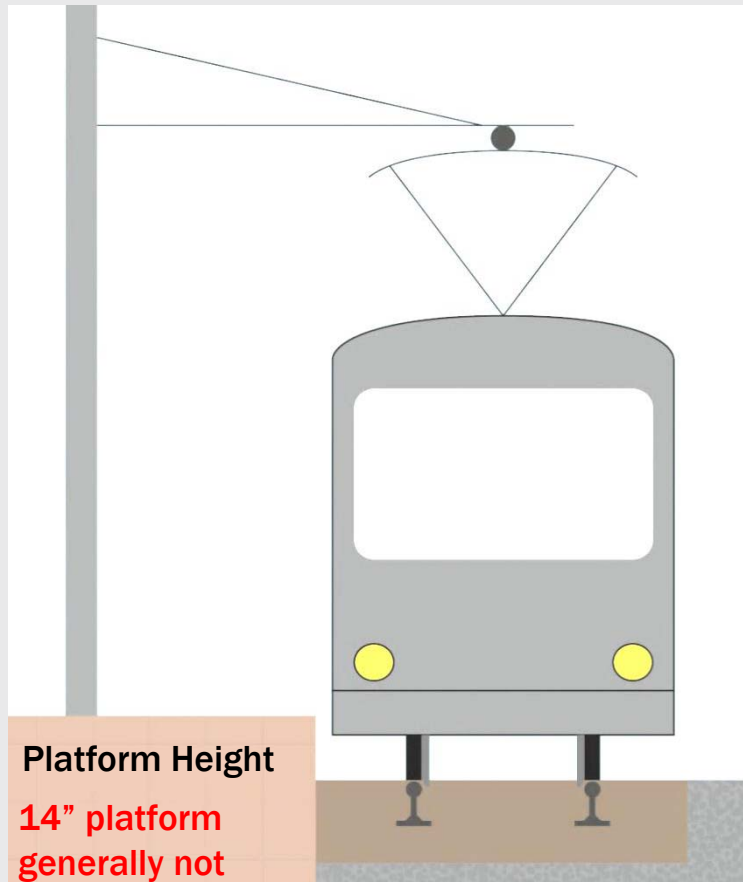
Vehicle Width

DC Streetcar	Arlington Co. Streetcar	MTA Purple Line
8 ft (2.44m)	7.9-8.7 ft (2.4-2.65m)	8.7 ft (2.65m)

Vehicle Length

DC Streetcar	Arlington Co. Streetcar	MTA Purple Line
66 ft (20.12m)	62-100 ft (20-30m)	97 ft (30m)

DESIGN CRITERIA STANDARDS: PLATFORM CONFIGURATION



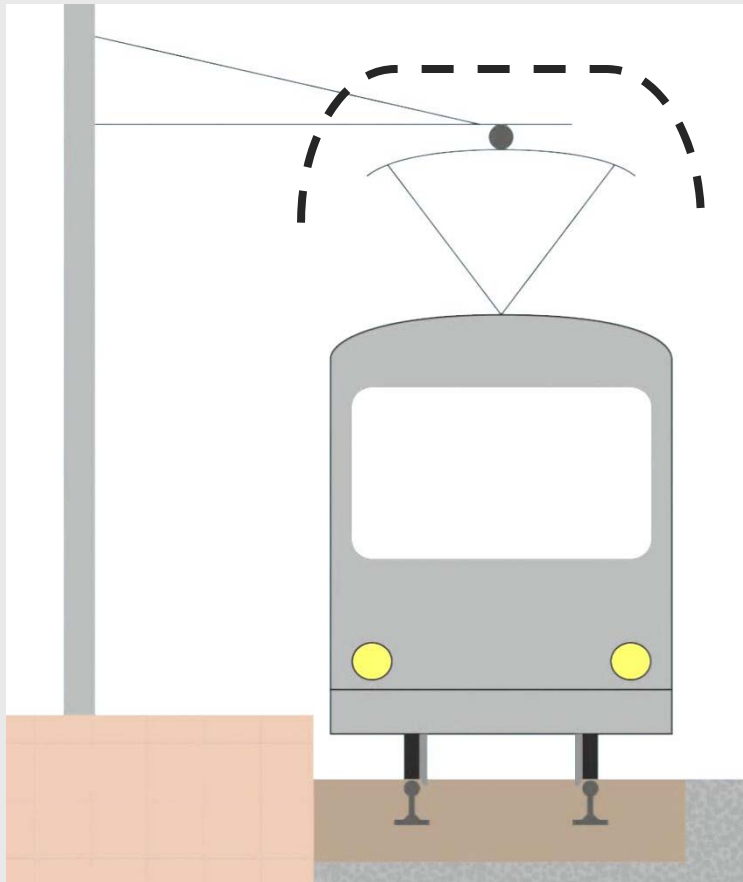
Platform Height

**14" platform
generally not
compatible with
buses**

Platform Configuration

DC Streetcar	Arlington Co. Streetcar	MTA Purple Line
14" platforms (fully level boarding), but separate platforms for buses	10" platforms (near level boarding) shared with buses	14" platforms (fully level boarding)

DESIGN CRITERIA STANDARDS: PANTOGRAPH DIMENSIONS



Overhead Contact System Elements and Standards

Standardize pantograph criteria using IEEE P1629. Develop standard catalog of OCS components, maximizing industry standard components and minimizing custom parts.

Pantograph Dimensions

DC Streetcar	Arlington Co. Streetcar	MTA Purple Line
Operating height between 13' min and 20.5' max.	22' desirable, with 13'6" min. In a shared guideway, no less than 18'.	Range between 13.1' min and 23' max.

CONCLUSIONS AND NEXT STEPS



CONCLUSIONS: PASSENGER INFORMATION

- Move ahead to study “back end” feasibility of:
 - Standardized passenger information displays
 - Compatible trip planning applications (e.g. through Metro website)
 - Other collaborations based on facilitated discussion
- Document goals and criteria

CONCLUSIONS: INFRASTRUCTURE

- Define physical/infrastructure interoperability elements that are worth pursuing regardless of the project delivery method
- Prioritize interoperability elements
 - Greatest cost savings
 - Greatest benefit to passengers
- Cost benefit analysis will assist in decision process
 - Quantifying long-term savings

CONCLUSIONS: VEHICLES

- 1. Define standard vehicle width or widths**
2.4 m (narrow) or 2.65 m (wide)
- 2. Coordinate decisions on vehicle length and capacity**
- 3. Apply standard minimum turning radius**
Use 25 m or require 18 or 20 m capabilities
- 4. Coordinate floor height and boarding method**
Partial or 100% low floor
Fully level or near level
- 5. Coordinate efforts toward off-wire capability**
Custom design based on duty cycle
- 6. Share lessons learned on procurement**



INTEROPERABILITY TECHNICAL SESSIONS

Session Date	Technical Session Topic	Agenda Items
September 19, 2013	Passenger Information and Communications	<ul style="list-style-type: none"> • Local transit provider perspectives • Information technology perspectives • Transit user and data user perspectives
November 19, 2013	Infrastructure (guideway, track, systems, passenger stations, control systems)	<ul style="list-style-type: none"> • Basic infrastructure compatibility • Construction and operations perspectives • Application to design-build contracts/concessionaires
January 16, 2014	Vehicle Specifications	<ul style="list-style-type: none"> • Vehicle procurement basics • Vehicle orders and economies of scale • Manufacturers perspectives
February 2014	Operations and Maintenance	<ul style="list-style-type: none"> • Coordinated maintenance activities • Workforce training • Improving operational efficiency
March 2014	Administrative Efficiencies	<ul style="list-style-type: none"> • Coordinated activities • Legal and institutional efficiency
April 2014	Fare Collection	<ul style="list-style-type: none"> • WMATA NEPP update • Pilot application and lessons learned

NEXT STEPS AND MORE INFORMATION

- Continue technical coordination sessions
 - Operations and Maintenance
 - Administrative Efficiencies
 - Fare Collection
- Develop technical memoranda
 - Detailed case studies
 - Quantifying benefits associated with interoperability actions

For more information, please contact:

Erik Dahlberg, AICP

Senior Transit Facilities Planner

WMATA Office of Real Estate and Station Planning

edahlberg@wmata.com