SB1140 Performance Based Operating Funding Allocation

Phase 3 – 2016 and Beyond

Working Group Meeting

February 20, 2014

Agenda

- Progress to Date
- Funding Options
- Exceptional Performance Measures
- Other Possible Performance Measures & Grant Opportunities
  - Congestion Mitigation
  - Fulfillment of Transit Dependent Outcomes
- Data Collection Practices
- Next Steps

Progress to Date

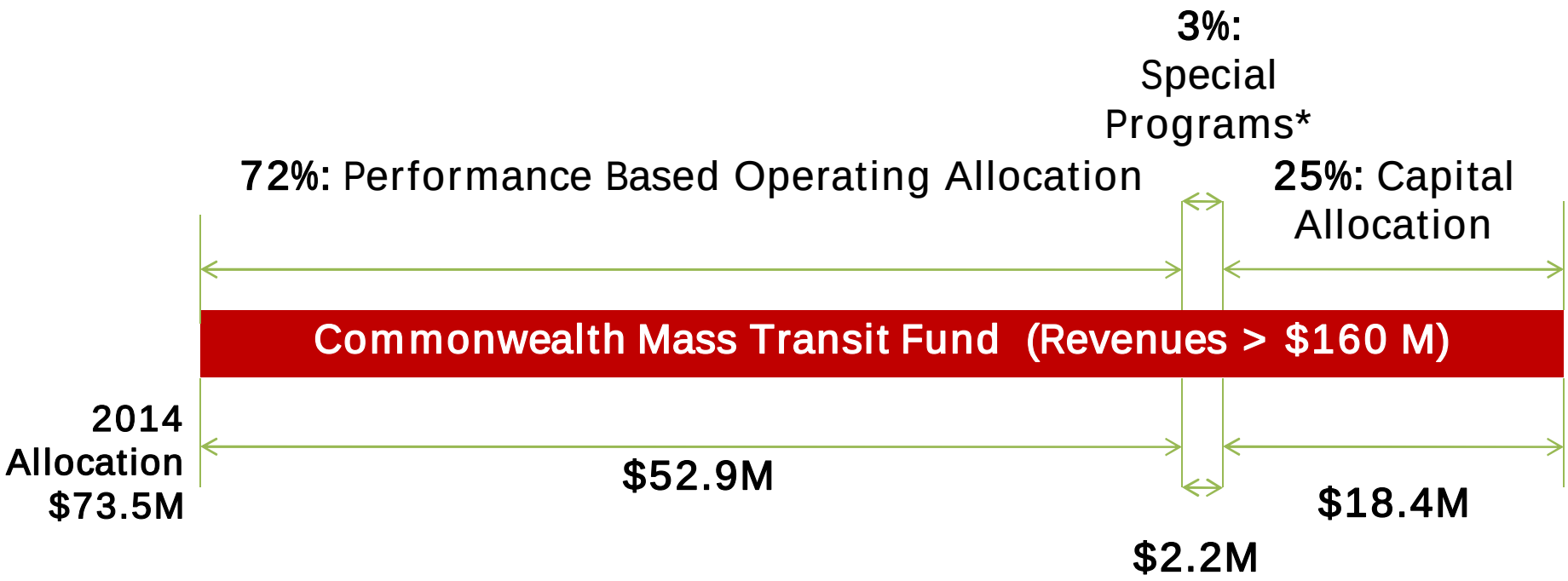
- Items discussed in the last Working Group meeting:
  - **Data Collection:** Presented survey and interview results. Discussed key takeaways and next steps
  - **Congestion Mitigation Measures:** Discussed research on congestion measures
  - **Fulfillment of Transit Dependent Outcomes:** Discussed research on transit dependent measures
- Sizing Transportation Systems Memorandum
  - Sent to Working Group on January 27
  - Comments were due to DRPT February 14

Funding Options

Funding Allocation Approach

- Consider similar funding model for Other Outcomes and Exceptional Performance measures
- Funding options:
  - Apply current operating funding allocation
  - Carve out from existing funding to address targeted purposes
  - Funding through new/other revenues
- Allocation options:
  - Incorporate into existing operating allocation formula
  - Fund performance above certain thresholds
  - Allocate on a discretionary basis
- Consider match and other requirements

SB1140 CTB Funding Allocation



*Special Programs (3%):

- **Uses:** Ridesharing, TDM, experimental transit, public transit promotion, operation studies, technical assistance
- **Recipients:** local governing body, planning district commission, transportation district commission, public transit corp., DRPT

Funding Options

- Apply current operating funding allocation
  - Pros: Can be addressed through changes to the current formula. No requirement for additional funding
  - Cons: All measures not applicable to all systems. Common formula program does not address targeted nature of measures
- Carve out from existing funding to address targeted purposes
  - Pros: With legislative approval, can be implemented relatively quickly without waiting for additional funding
  - Cons: Reduces funds available for formula allocation. Can be seen as penalizing all for the benefit of a few
- Funding through new revenues
  - Pros: Does not negatively affect current formula funding levels
  - Cons: No additional fund source is currently identified. With recent new funding, additional funding in near term is unlikely

Allocation Options

- Formula-based funding may not be suitable because:
  - Targeted purposes are not applicable across the board (e.g., all transit agencies do not have to deal with congestion mitigation)
  - Targeted purpose funds should be allocated to address specific issues identified by agencies rather than broadly distributed
- Discretionary programs provide:
  - Funding for new, innovative, or special services that address targeted purposes
  - Means to address specific policy goals not captured in the formula program
  - Agency discretion to determine whether new service is warranted

Allocations Options (continued)

- Thresholds based formula
  - Could apply to Exceptional Performance
    - e.g. all rural agencies with Passengers/ Revenue Mile > “X” eligible for EP incentive based on formula
  - Inappropriate for Congestion Mitigation or Transit Dependent Persons measures since these are not applicable to all agencies

Discussion

- What funding options are most suitable?
  - Apply current operating funding allocation
  - Carve out from existing funding to address targeted purposes
  - Funding through new revenues
- Should all measures use the same funding option?
- How much funding should be dedicated to each measure?
- What allocation option is best suited for each measures?

Exceptional Performance

Approach

- Qualitatively review approaches for rewarding exceptional performance
  - Short list of exceptional performance measures
  - Evaluate methods for implementation of incentive
- Assess quantitative impact of shortlisted measures and implementation methods
  - Run scenarios, variance analysis to inform final selection of metrics
- Recommend implementation of preferred exceptional transit performance incentive

Issues to Consider

- High performing agencies have a relatively small window for improvement over time
- A short time horizon for performance evaluation is shortsighted given temporary shocks from external factors that mask true agency performance
  - Current formula rewards year-over-year improvement in performance within each agency, relative to statewide average trend, graduating to a 3-year rolling average.

Goals

- Avoid penalizing high-performing agencies
- Reward exceptional performance and innovation
- Evaluate a longer time horizon for exceptional performance measurement

Interview Responses

- There are no true peers in case of transit systems
  - Different markets, demographics, geographic areas
- Year-to-year measurement of performance is too short sighted. Should have a longer time horizon (5 years?)
- Performance measurement shouldn’t penalize those top performers
- Reward increase in passengers each year
- Difficult to measure exceptional performance for Demand Response systems
- Comparing nationally may be more appropriate
- Hard to measure performance without adequate data

Suggested Metrics from Interviews

- Customer complaints/satisfaction surveys, secret riders
  - Provide financial incentive to contractors for excellent ratings in customer surveys; Costly to implement
- Cost per Passenger, Cost per Passenger Mile
  - “You get what you pay for”
- Vehicle Passenger Hour
  - Ridership surges can throw this off
- Ridership/Incremental increase in ridership
  - Yearly fluctuation where serving unpredictable “captive” riders
- Load Factor during peak periods
- Farebox Recovery Ratio
- Park & Ride Lot Capacity and Bus Capacity/Occupancy

Exceptional Performance
Discussion Questions

- How to structure the incentive?
  - Discretionary:
    - Peer benchmarking of performance
    - Different measures for different types of agencies
  - Formula-Based:
    - Threshold measures
    - Statistical modeling
- What measures to use?
  - What defines exceptional performance?

Exceptional Performance
Discussion Questions

- **How to structure the incentive?**
  - Discretionary:
    - Peer benchmarking of performance
    - Different measures for different types of agencies
  - Formula-Based:
    - Threshold measures
    - Statistical modeling
- What measures to use?
  - What defines exceptional performance?

How to Structure the Incentive?
Discretionary

- DRPT provides
  - A list of state-identified peers for each agency
  - Guidelines for performance measurement including:
    - Measures to use for qualifying as “exceptional performers”
    - Number of years of performance data to consider and methods to compute
    - Data sources to use
- Agencies determine whether they qualify and whether to apply for funds
- To apply, agencies submit
  - Required analysis per guidelines to demonstrate exceptional performance
- Agencies use these measures for ongoing performance evaluations internally

How to Structure the Incentive? Discretionary

- Peer benchmarking (National v/s Statewide)
  - Is there an appropriate peer for WMATA within the Commonwealth?
- One measure for all agencies?
  - Are we structuring the process to be biased towards certain typed of agencies that are already being favored in the formula and other measures?
- Different measures for different types of agencies?
  - How does this approach overlap with the Other Outcomes measures (Congestion Mitigation and Transit Dependent Outcomes?)
  - What about overarching regional goals (Mobility, Ridership, and Productivity?)

How to Structure the Incentive?
Peer Benchmarking of Performance

Benefits:

- Can foster competition and innovation and motivate agencies to improve performance
- Good diagnostic tools for agencies to monitor and target improvement efforts
- Ideal to support requests for more resources
- Serves as a reminder of overarching regional goal(s) (e.g.“Mobility” or “Congestion Reduction”)

Challenges:

- No two agencies are exactly the same. Differing agency structures, service area characteristics, and sub-regional goals
- Execution of peer selection process
- Data-related challenges
- Resource intensive determination process

How to Structure the Incentive?
Formula based

- DRPT provides
  - A list of state-identified peers for each agency
  - Puts in place a formula based on statistically or otherwise quantitatively derived thresholds to measure agency performance
  - The thresholds could be revisited periodically
- Agencies qualify for the bonus funding based on the formula and on how much they exceed their established thresholds.

How to Structure the Incentive?
Threshold Measures

- Develop threshold measures for each VA agency or peer group for all performance metrics in operating formula
  - Base on national-level peer analysis. (e.g. Passengers/Revenue Hour > “X” indicates exceptional performance for Y agency)
- Pros:
  - Can be set up as an automatic, transparent, formula-based process
  - Funds for each measure divided by all “exceptionally performing agencies” based on how much they exceed defined threshold
- Cons:
  - Resource intensive to determine thresholds for each agency/ group

How to Structure the Incentive?
Statistical Measures

- Using samples of peer agencies for each VA transit agency, derive statistical measures (range, median, mean) for measures that qualify agency as exceptional performer
- Pros:
  - Can be set up as an automatic, transparent, formula-based process
- Cons:
  - Resource intensive
  - Need to identify a large number of peer agencies in order to have appropriate sample sizes

How to Structure the Incentive?
Summary

- Should exceptional performance use a discretionary or formula-based approach?
- What level of effort is reasonable for agencies and DRPT to determine eligibility on an annual basis?
- Are there other potential structures? If so, what are they and what are their relative pros and cons?

Discussion Questions

- How to structure the incentive?
  - Discretionary: Peer benchmarking of performance
    - National versus Statewide benchmarking
    - Different measures for different peer groups
  - Formula-Based:
    - Threshold measures
    - Statistical modeling
- **What measures to use?**
  - What defines exceptional performance?

What Measures to Use?
Performance Measures in Literature

- Cost Efficiency
- Cost Effectiveness
- Productivity
- Service Utilization
- Not consistently reported by NTD or other sources
  - Resource Utilization
  - Perceived Service Quality
  - Safety and Security

- ***TSDAC Insight: "Exceptional Performance is not a "cost-based" but a "productivity-based" concept.***

What Measures to Use?
Cost Efficiency

- Measures how efficiently a system is run irrespective of demand
  - Operating cost/Revenue hour (mile)
  - Operating cost/Peak vehicle in service
- Pros:
  - Commonly used measure to evaluate system-wide performance
- Cons:
  - Do not measure transit agency's ability to meet needs of passenger
  - Only measure system efficiency, regardless of where service is going or how it is being utilized

What Measures to Use?
Cost Effectiveness

- Compares the cost of providing service to outcomes resulting from service provision.
  - Farebox recovery ratio
  - Operating cost/Boarding (Passenger mile) (Service area pop.)
- Pros:
  - Commonly used by transit agencies
- Cons:
  - Only measures effectiveness by cost incurred/revenue generated, not how service is being utilized
  - Non-farebox sources of revenue make farebox recovery ratio an imperfect measure to use

What Measures to Use?
Productivity

- Measures how many passengers are served per unit of service
  - Boardings/Revenue hours (miles) (FTE employees)
- Cons
  - Not ideal measures for service for transit dependents
  - Does not answer “at what cost?”

What Measures to Use?
Service Utilization

- Examines how passengers use service
  - Annual unlinked trips
  - Annual passenger miles
  - Average trip length
  - Annual boardings (linked trips) per service area population
- Pros:
  - Commonly used and reported measures
- Cons:
  - Cannot be used to measure performance between “unlike” systems/service areas. Need to group agencies in like peers
  - Service area measures are reported inconsistently

What Measures to Use?
Other Measures

- Resource Utilization
  - Vehicle hours/ vehicle operated in peak service
  - Revenue hours per employee FTE
  - Vehicle miles per gallons of fuel consumed
- Perceived Service Quality
  - Average system speed
  - On-time performance
  - Excess wait time
- Safety and Security
  - Casualty and liability cost per vehicle mile

What Measures to Use?
Rating: Good/ Average / Poor

Category	Metric	Data Source	Relevance to TSDAC goals	Ease of Data Collection	Consistency of definition	Comments
Productivity	Boardings/ revenue hour	NTD	A	G	G	
	Boardings/ revenue mile	NTD	A	G	G	
	Passenger mile/ revenue mile					
Perceived Service Quality	Average System Speed	Agency	P	A	A	Not translate-able across modes
	On-Time Performance	Agency	A	P	P	Not defined consistently across agencies
	Excess Wait time	Agency	A	P	A	Dependency upon archived AVL data
	Customer complaints/ Satisfaction Surveys/ Secret Rider surveys	Agency	A	A	P	Process of submitting complaints and conducting satisfaction surveys may differ at agencies
	Passenger load factor	Agency	A	A	A	Dependency on APC data

Exceptional Performance

What Measures to Use?
Rating: Good/ Average / Poor (continued)

Category	Metric	Data Source	Relevance to TSDAC goals	Ease of Data Collection	Consistency of definition	Comments
Other/ Agency Suggested	Park and Ride lot occupancy/ Bus Occupancy	Agency	A	A	A	
	Load Factor During Peak Periods	Agency	A	A	A	Dependency on APC data
	Vehicle Passenger Hour	Agency	A	A	A	
	Increase in Ridership	Agency	A	A	A	

Discussion

- What metrics are most suitable to measure exceptional performance relative to TSDAC goals?
- What metrics will be least burdensome for agencies to collect?
- Do agencies anticipate applying any of these metrics to internally track performance on an ongoing basis?

Congestion Mitigation

Key Takeaways
2nd Working Group Meeting

- This objective is not likely to be addressed through changes in the operating funding formula
- Need to address:
  - How to allocate funding to alleviate transit system congestion, and provide transit in congested corridors
  - Develop measures that address these objectives

Key Takeaways
2nd Working Group Meeting

- **Potential Goal:** Address transit system congestion by providing additional transit service in congested corridors
- Takeaways from suggested implementation strategy of using population threshold for large areas
  - Funds should be available to all transit services operating in congested conditions regardless of UZA size
  - Analysis should be based on congested corridors, specifically aimed at fixed-route transit services
  - Consider roadway congestion measures as well as transit service congestion measures

Implementation Strategy

- Address transit system congestion
  - Provide operating assistance on existing transit routes for improvements such as running additional peak vehicles, reducing headway, etc.
  - Potential transit Level of Service (LOS) measures
- Address roadway congestion
  - Enhance existing transit service OR operating new service along congested corridor
  - Potential corridor roadway Level of Service (LOS)

Implementation Strategy
Discretionary Pilot Program

- Participation open to all transit agencies in the Commonwealth
- Application process for fixed-route transit service
  - Qualitative analysis for operating assistance in congested corridor
  - Include transit LOS measures and roadway LOS analysis
- Multi-year pilot program
  - State funding would decrease over time, requiring plan for long-term local funding of proposed improvement
  - Assess annual increase in ridership

Implementation Strategy
Proposed Application Components

- Establish congested conditions and need for transit enhancements
  - Location of corridor and surrounding areas
  - Peak hour transit LOS (from transit agency/NTD data)
  - Peak hour roadway LOS (from VDOT)
- Proposed operating solutions
  - Describe how proposed service will alleviate congestion
  - Scope, schedule and budget, including sources for local match and long-term funding (if applicable)
    - Is capital investment required?
  - Project readiness

Potential Transit LOS Measures
Productivity

- Ratio of passengers traveled to transit service provided
  - Average Weekday Boardings per Revenue Hour
  - Average Boardings per Revenue Mile
  - Average Annual Boardings per Route Mile
  - Passenger Miles per Revenue Mile
- Pros:
  - Most data is already collected. May need to parse out corridor-/ route-level data to make the case for congestion
- Cons:
  - Need to determine a benchmark to evaluate congestion, e.g., how many Boardings or Revenue Miles indicate congestion for each mode/ vehicle type?
  - Does not indicate latent demand

Potential Transit LOS Measures
In-Vehicle Crowding

"Passenger loading affects availability when passengers are unable to board the first vehicle that arrives, due to overcrowding. LOS "F" indicates crush loads where additional passengers would be unlikely to board."

-- *Transit Capacity and Quality of Service Manual (TCQSM)*

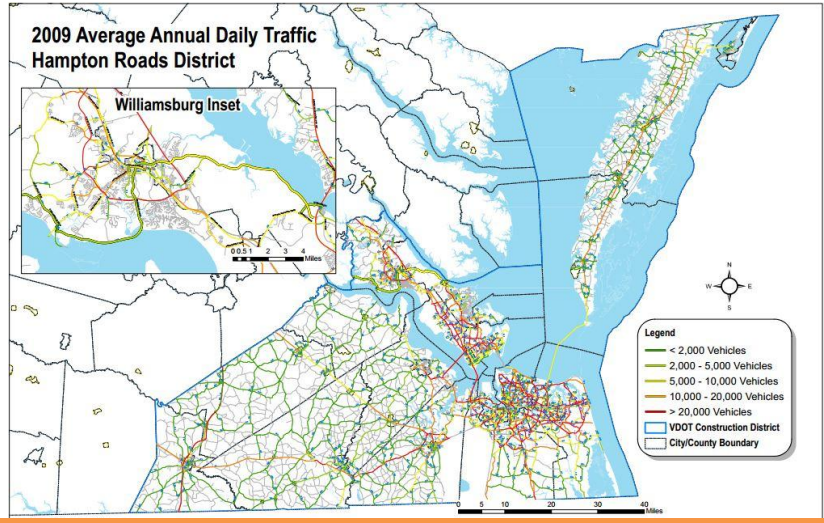
- Measure in-vehicle crowding
  - Load Factor (passengers per seat)
  - Standing Passenger Area (space [m^2] per passenger)
- Pros:
  - Provide a clear picture of in-vehicle congestion on system/route
- Cons:
  - May impose a data collection burden if data not already collected

Potential Transit LOS Measures
Others

- Measures indicating crowding on a transit service or facility
  - Park and Ride lot demand exceeding capacity
  - Bus stop crowding- Dwell Times
  - Wait times
- Pros:
  - Accommodate different types of congestion experienced over the transit system
- Cons:
  - Are more difficult to measure and quantify than in-vehicle or general corridor congestion

Potential Roadway LOS Measure
AADT and LOS from VDOT Regional Model

- VDOT collects and estimates annual average daily traffic (AADT) in the Commonwealth on the corridor-level
  - Virginia Traffic Monitoring System (TMS) database
- VDOT maintains capacity information, such as number of lanes, on the corridor-level
  - Virginia Statewide Planning System (SPS) database
- Volume over capacity (v/c) LOS can be calculated using AADT and capacity
  - Peak hour estimated using K factor



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Roadway LOS Defined

LOS	Description	Congestion Level	
A	Free traffic flow with low volumes and high speeds. Speeds controlled by driver desires, speed limits, and physical roadway conditions. Vehicles almost completely unimpeded in their ability to maneuver within the traffic stream.	Low	
B	Stable traffic flow, with operating speeds remaining near free flow. Drivers still have reasonable freedom to maneuver with only slight restrictions within the traffic stream.	Low	
C	Stable flow, but with higher volumes, more closely controlled speed and maneuverability that is noticeably restricted.	Moderate	
D	Approaching unstable flow with tolerable operating speeds maintained, but considerably effected by changes in operating conditions. Freedom to maneuver within the traffic stream is more noticeably limited.	Moderate	
E	Unstable flow with low speed and momentary stoppages. Operations are at capacity with no usable gaps within the traffic stream.	Severe	
F	Forced flow with low speed. Traffic volumes exceed capacity and stoppage for long periods are possible.	Severe	

Applying Roadway LOS

- Peak hour LOS of identified corridor
- GIS map of peak hour LOS in the corridor
- Comparison of peak hour LOS data in corridor relatively to metropolitan area
- Pros:
  - Provide a clear picture of roadway corridor congestion
  - Address legislative concerns with roadway congestion
- Cons:
  - May impose a data collection burden if data is not already collected, calculated, and analyzed

Implementation Strategy
Issues to Consider

- Should this objective be addressed as a discrete funding program?
- What should be the maximum duration of the grant?
- What level of funding should be provided each year?
- What else should be addressed in the application?
- How should grant program be linked to necessary capital investments?
- Should there be a hold harmless provision?
- What is the data collection burden?

Fulfillment of Transit Dependent Outcomes

Key Takeaways
2nd Working Group Meeting

- This objective is not likely to be addressed through changes in the operating funding formula
- Research the impacts of Title VI requirements on programs to fund service to transit dependent persons
- Consider methodologies for allocating funding, potentially as a discretionary pilot program supporting:
  - Transit service improvements
  - User-based Subsidies
  - New transit services in underserved areas

Title VI and Environmental Justice

- **Title VI of Civil Rights Act of 1964:** Federal statute that prohibits discrimination by recipients of federal financial assistance on the basis of:
  - Race
  - Color
  - National Origin, including denial of meaningful access for limited English proficient persons
- **Environmental Justice (EJ):** Executive Order 12898 requires agencies identify, address disproportionately high and adverse health or environmental effects on minority populations and low-income persons

Title VI Objectives

- Ensure the level, quality of transit service is provided in a nondiscriminatory manner
- Promote full, fair participation in public transit decision-making without regard to race, color, or national origin
- Ensure meaningful access to transit-related programs and activities by persons with limited English proficiency (LEP)

Title VI General Requirements

- Provide Title VI assurances
- Develop Title VI program
- Notify beneficiaries of Title VI protection
- Develop Title VI complaint procedures and forms
- Record and report investigations, complaints, lawsuits
- Prepare Public participation plan, including LEP outreach
- Provide for minority representation in governance
- Assist and monitor sub-recipients
- Apply Title VI equity analysis to locate facilities
- Provide additional information upon request

Title VI Fixed-Route Requirements

Requirement	Fixed-Route Transit Providers	Fixed-Route Transit Providers Operating 50 or more peak vehicles located in UZA of 200,000 or more
Set systemwide standards and policies	Required	Required
Collect and report data	Not required	Required: • Service profile maps/charts • Survey data of demographics, travel patterns
Evaluate service and fare equity changes	Not required	Required
Monitor transit service	Not required	Required

Transit Dependent Population

Title VI
Service Standards Requirements

"No person or group of persons shall be discriminated against with regard to the routing, scheduling, or quality of service of transportation service furnished as a part of the project on the basis of race, color, or national origin."

"Frequency of service, age and quality of vehicles assigned to routes, quality of stations serving different routes, and location of routes may not be determined on the basis of race, color, or national origin."

Required Fixed-Route Service Standards and Service Policies

Service Standards:

- Vehicle load by mode
  - Ratio of passengers to total seats per vehicle
- Vehicle headway by mode
- On-time performance
- Service availability
  - General distribution of routes within service area

Service Policies:

- Distribution of transit amenities
- Vehicle assignment by mode

Title VI
Evaluating Service and Changes

- Develop written procedures to determine any discriminatory impacts of major service and fare changes
  - Define threshold for major service changes and disparate impact
- Compare impact on persons in protected class proportional to persons not in protected class
  - Race, color, national origin monitored for disparate impact
  - Low income riders are not protected class, but disproportionate burden may be reviewed for EJ compliance
- Examine alternatives to minimize disparate impact
  - If modification of service changes, re-do analysis
- Equity analysis to be reviewed, approved by board
- Applies to agencies >50 peak vehicles, UZA >200,000

Impact of Funding Expiration

- Agencies may need to review impact of service, fare changes on protected classes if grant-funded service cannot be sustained after state funds expire
  - Applies only to larger agencies
  - Defined by agency thresholds for major service change and disparate impact
- If no disparate impact, service may be changed
- If disparate impact, must analyze alternate service plans
  - Seek to mitigate impact on protected classes, low-income persons

State Requirements under Title VI

- Comply with Title VI general requirements
- Comply with Title VI in state transit planning and program administration activities
- Prepare maps comparing distribution of state, federal funds to minority populations
- Analyze disparate impacts of fund distribution on basis of race, color, or national origin
- Describe planning process, fund distribution procedures and engagement of minority populations

Title VI Conclusion

- Targeted funding programs could help state improve service to Title VI protected classes, low-income persons, and other transit dependent populations
- Analysis of service, fare impacts may be required by some agencies depending on scope of changes
- Title VI does not prevent targeted funding programs as long as required analysis is completed

Implementation Strategy

- Multiple strategies could be explored that need not be mutually exclusive
- Discretionary Multi-Year Pilot Program
- Three potential approaches:
  - Transit service improvements
  - User-based Subsidies
  - New transit services in underserved areas

Implementation Strategy
Discretionary Multi-Year Pilot Program

- Participation open to all transit agencies within the Commonwealth
- Application process for all transit services
  - Qualitative analysis for operating assistance to better serve transit dependent persons
  - Include measures to identify transit dependent populations
- Multi-year pilot program:
  - State funding would decrease over time, requiring plan for long-term local funding of proposed improvement
  - Assess annual increase in ridership
  - Title VI considerations

Fulfillment of Transit Dependent Needs
Transit Service Improvements

- Establish need for enhanced transit service
  - Identify target population (location, demographics, socioeconomics, etc.)
  - Establish need to provide targeted service to population
  - Provide comparison between the target population location and the service area or region
- Describe proposed operating solutions
  - How proposed service will better serve target population
  - Scope, schedule and budget, including sources for local match and long-term funding (if applicable)
    - Is capital investment required?
  - Project readiness

Fulfillment of Transit Dependent Needs
User-Based Subsidies

- User-based subsidies for existing services
  - Reduced transit fare
  - Taxi vouchers
- Individual application for program based on eligibility
  - Zero car household
  - Disabled
  - Income level
  - Elderly or youth
  - Others?
- Transit agency Application process/considerations similar to transit service improvements

Fulfillment of Transit Dependent Needs
New Transit Service in Underserved Areas

- Many localities do not presently provide transit service
- Expansion of transit service in underserved areas of the state is a DRPT priority
- Providing funding to establish, maintain servce

Fulfillment of Transit Dependent Needs
Suggested Measures

- ACS Census Data (census tract level)
  - Percent of households without a vehicle
  - Percent of persons taking transit service to work
  - Percent of persons having difficulty doing errands alone because of a physical, mental, or emotional condition
  - Percent of persons total income below 50% of median family income level
  - Percent of persons below the driving age
  - Percent of persons over the age of 65
- NTD/ACS Census Data
  - Number of passenger trips for transit dependent
  - Transit service level per capita

Potential Transit Dependent Measures
Zero Vehicle Households - ACS Data

- Percent of households without a vehicle
- Pros:
  - Data already collected down to the individual census tract
- Cons:
  - Provides percent of households but not necessarily percentage of zero vehicle persons
  - Measure transit dependent and transit choice population
  - May impose a data collection burden if data is not already collected, calculated, and analyzed for targeted area

Potential Transit Dependent Measures
Disability - ACS Data

- Disability Identifiers:
  - Percent identifying as deaf or having serious difficulty hearing
  - Percent identifying as blind or having serious difficulty seeing even when wearing glasses
  - Percent having difficulty doing errands alone because of a physical, mental, or emotional condition
  - Percent having difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional condition
  - Percent having serious difficulty walking or climbing stairs
  - Percent having serious difficulty dressing or bathing

Potential Transit Dependent Measures
Disability - ACS Data (continued)

- Pros:
  - Data already collected down to the individual census tract
- Cons:
  - Measures all disabilities that may not accurately represent transit dependent disabled population
  - May impose a data collection burden if data is not already collected, calculated, and analyzed for targeted area

Potential Transit Dependent Measures
Income Level - ACS Data

- Percent of persons total income below 50% of median family income level
- Pros:
  - Data already collected down to the individual census tract
- Cons:
  - Measures all persons below level regardless of actual transit dependent status
  - May impose a data collection burden if data is not already collected, calculated, and analyzed for targeted area

Potential Transit Dependent Measures
Elderly and Youth - ACS Data

- Percent of persons over the age of 65
- Percent of persons below the driving age
- Pros:
  - Data already collected down to the individual census tract
- Cons:
  - Measures all persons below or above age range regardless of actual transit dependent status
  - May impose a data collection burden if data is not already collected, calculated, and analyzed for targeted area

Potential Transit Dependent Measures
Passenger Trips - ACS/NTD data

- Number of passenger trips for transit dependent
- Pros:
  - Referenced in 2035 VTrans Update
- Cons:
  - Requires further analysis and combination of two data sets
  - May impose a data collection burden if data is not already collected, calculated, and analyzed for targeted area

Potential Transit Dependent Measures
Transit Service Level Per Capita - ACS/NTD data

- Transit service level per capita
- Pros:
  - Data already collected by NTD
- Cons:
  - Requires further analysis and combination of two data sets
  - May impose a data collection burden if data is not already collected, calculated, and analyzed for targeted area

Fulfillment of Transit Dependent Needs
Issues to Consider

- Should this objective be addressed as a discrete funding program?
- What should be the maximum duration of grants?
- What level of funding should be provided each year?
- What else should be addressed in the application?
- How should the program be linked to necessary capital investments?
- Are there Title VI considerations to address?
- Should there be a hold harmless provision?
- What is the data collection burden?

Data Collection

Data Collection Task Timeline

- Data Collection Technical Memo (draft March 7th):
  - Literature review on all topics
  - Comprehensive agency survey and interview findings
  - Peer interview findings
  - Takeaways from today's meeting
- Next Steps:
  - Working Group comments on draft Technical Memo
  - OLGA system evaluation
  - Final Data Collection Technical Memo (March 31)
  - Development of data standards: definitions, processes, verification, accountability policy (April-May)

Today: Ridership Data Collection Practices and Potential Standards

- Review ridership data collection practices from survey responses
- Review ridership data collection findings from agency interviews
- Review industry practices for ridership data collection
- Review NTD data definitions and data collection processes
- Review peer state data collection processes
- Use stand-out findings and practices to discuss possible Virginia data collection standards

Ridership Data Collection Methods
Large, Regional – 3 Agencies

Agency	Collection Method
2	Combination of APC, ERF, Manual Click Counter, Manual Entry Log
1	Manual Entry Log from conductor-collected tickets

Agency	Processing Technique
3	Assembled by mode and route (frequency unspecified)

Agency	Verification Technique
2	Data monitored by analyst, compared to historical data
1	Manual logs compared to contractor database to confirm data entry accuracy; count is checked against random, on-board NTD counts as well as annual survey boarding counts

Ridership Data Collection Methods
Large, Urban – 6 Agencies

Agency	Collection Method
1	APC, ERF
3	ERF
2	ERF, Manual Click Counter, Manual Entry Log

Agency	Verification Technique
2	Random ride checks used to verify farebox data
4	Staff monitoring for anomalies
1	Paratransit verified through call center and Trapeze

Agency	Processing Technique
4	Farebox software data is extracted and then assembled by route and fare type (frequency unspecified)
1	Farebox software data is extracted daily and then assembled by route and fare type
1	Electronic farebox reports are reconciled with operator logs from click counters (commuter bus)
1	Operator creates reports from operator click counters (local bus)

Ridership Data Collection Methods
Small Urban or College Town – 8 Agencies

Agency	Collection Method
3	ERF
1	ERF, Manual Click Counter
1	APC, Manual Entry Log, Electronic Ranger Unit
1	APC, Manual Click Counter, Para Plan
1	Manual Click Counter, Manual Entry Log
1	Manual Click Counter

Agency	Processing Technique
1	Staff aggregates and audits the data
1	Aggregated by routes and entered into WMATA monthly reports
1	Collected by route daily for both fixed route and paratransit
2	Farebox software data is extracted and then assembled by route
1	Farebox software data is extracted and then assembled by route and passenger type
2	Aggregated by route, stop and shift from operator logs

Ridership Data Collection Methods
Small, Urban, or College Town – 8 Agencies

Agency	Verification Technique
1	Fare counts verified with APC data
1	Paratransit count verified with Route Match
1	Cashbox data verified with "sales and use transactions"
1	Driver sheets are checked daily and verified with historical data
3	Staff monitoring for anomalies
1	Ridership data cross checked with revenue counts

Ridership Data Collection Methods
Rural – 12 Agencies

Agency	Collection Method
6	Manual Entry Log
1	Manual Click Counter
1	Manual Entry Log, Manual Click Counter
1	Para Plan
1	Mobile Data Terminal
1	Manual Entry Log, Route Match

Agency	Processing Technique
5	Ridership counts processed daily and aggregated for monthly reports
1	Ridership counts processed and aggregated for monthly reports (frequency unspecified)
3	Ridership counts processed by route/driver/vehicle and aggregated for monthly reports (frequency unspecified)
1	Ridership collected by route and ridership broken down based on fare
1	Trips come from electronic scheduling system
1	Invoices are tallied

Ridership Data Collection Methods
Rural – 12 Agencies

Agency	Verification Technique
1	Ridership data cross checked with revenue counts
3	Staff monitoring for anomalies
1	Monthly reports are run for anomalies
1	Cross check manual data with electronic scheduling software
1	Passenger logs matched to “deposit slips”
1	Dispatcher crosschecks ridership category totals with driver counts
1	“Verified by the driver that collects it”
1	“Reports are added daily and then totaled at the end of each month for each driver and shift”

Ridership Data Collection Methods
Small Rural – 3 Agencies

Agency	Collection Method
1	Manual Click Counter, Manual Entry Log
2	Manual Entry Log

Agency	Verification Technique
1	“Once the tally sheets are verified the data is entered into Microsoft Excel”
2	Driver count verified by farebox revenue collected

Agency	Processing Technique
1	Driver log sheets are tallied daily and aggregated monthly for counts
1	Driver ridership counts entered into database for monthly counts
1	Entry logs crosschecked with revenue on weekly basis

Data Collection Findings (Interviews)

- Data collection involves a system of techniques
- Verification process usually includes checking one source against another
  - The greater access one has to more data sources, the more robust the verification process
- Technology improves data accuracy and verification
  - Ongoing expenses—training, maintenance, upgrades
- Positive cost-benefit of obtaining electronic fareboxes or APCs not a given for some agencies
  - Some manual techniques, software systems work better than others based on agency goals, staff capabilities, vehicles

Industry Practices (Literature): Electronic Ridership Data Collection

Fixed Route	
Electronic Registering Fareboxes (ERF)	• Pros: Can record every fare transaction including time of day, fare category, fare medium and route; can increase ability to collect fares; more accurate data • Cons: Cannot measure mileage or hours; need regular maintenance
Automatic Passenger Counters (APC)	• Pros: Provide data to calculate passenger miles; provide route- and stop-specific ridership data • Different types of APCs have different strengths and weaknesses depending on bus environment; need regular maintenance
Smart Cards	• Cons: Implementation period may be long (6-24 months); agencies that use a smart card without ERFs would need operators to record cash transactions

Industry Practices (Literature): Electronic Ridership Data Collection

Demand Response	
Mobile Demand Terminals	• Can supplement dispatching software • Pros: Record vehicle location, passenger information, mileage, etc.; can completely replace driver note-taking • Con: Only as good as wireless coverage in area

Industry Practices (Literature): Manual Ridership Data Collection

Fixed Route & Demand Response	
Operator Trip Cards/Trip Sheets/Manifests Farebox Revenue Counts	• Pro: Does not require extensive capital costs or special technological knowledge • Con: Errors tend to be random; accuracy in both data collection and transcription is an issue
Operator Click-Counters (or Hand Held Units)	• Pro: Eliminates data transcription • Con: Portability can lead to loss or damage

Industry Practices (Literature): Data Validation

Common Techniques:

- Compare previous counts to check order of magnitude
- Compare ridership and revenue totals of trip level data
- Random sampling of trips to gauge overall data accuracy
- Algorithms can flag outlier data for staff monitoring

NTD Interview Summary

Reporting	Verification Process	Technical Assistance
• Defines reporting categories/measures: much less detailed for rural/5311 systems (filed by states) • Provides mandated guidance on sampling and verification methods for urban systems • Reporting deadlines staggered 3x/year	• Automated validation pre-submission - Flags data for issues - Agency must correct or explain flagged data • Analyst reviews data post-submission - Many iterations of data correction may follow • Goal is reconcile data within 3 months of submission	• Analyst assigned to every reporting agency • On-site training • Manuals; webinars • Regional NTI 2-day training on how to report data

NTD Data Definitions

"Ridership Activity" defined as:

- Unlinked Passenger Trips (UPT)
- Vehicle Revenue Hours (VRH), Vehicle Revenue Miles (VRM) and Vehicle Operating Miles (VOMS)
- Collected by mode and type of service
  - Frequency: monthly and annually

"Service consumed" defined as:

- UPT ("boardings") and Passenger Miles Traveled (PMT)

NTD Methods of Quantifying Ridership

For UPT, 100% counts if available and reliable

- Collection Methods: APCs, fare box counts, manual counts, other automated systems
- Use of APCs for NTD reporting requires prior FTA approval; in 1st year APCs must be run parallel to traditional manual sampling for one year; then calibrated and validated annually thereafter
- If some vehicle trips missed because of personnel or equipment problems, can “factor up” data if 2% or less of total; if greater than 2%, qualified statistician must approve methodology for factoring up data

NTD Methods of Quantifying Ridership (continued)

- UPT and PMT can be estimated
  - Statistical sampling procedure proscribed by FTA/NTD for urban systems to produce
    - Minimum confidence of 95 percent and minimum precision level of ±10 percent (for annual counts)
    - 3 NTD-approved sampling procedures, or alternative technique approved by a qualified statistician
    - FTA C 2710.4A Revenue Based Sampling Procedures for Obtaining Fixed Route Bus (MB) Operating Data as required under the Section 15 Reporting System is another alternative technique if reviewed by statistician
  - Farebox revenues – provided correction factor for "free" trips, or "when large number of intra-modal transfers skews trips-revenues relationship"

NTD Methods of Quantifying Ridership (continued)

- In addition, sampling on a fixed 3-year cycle is mandated for all agencies
- UPT methodology (100% counts, sampling) is proscribed for Urban systems, but not for Rural. Rural reporting began under SAFETEA-LU (2006). Recognizing the increased burden to states, FTA did not impose accuracy requirements for the UPT data, but requested that agencies provide the best data possible.

Kansas & New York Practices Summary

	Allocation Formula	State Verification Process	Technical Assistance
Kansas	• Urban: - service area population (40%) - ridership (40%) - revenue miles (20%) • Rural (5311): performance measures via TRACK	Staff regularly reviews data for anomalies	Staff provides assistance where needed
New York	• Large: state budget line item • Small: - Ridership ($0.41/passenger) - Passenger vehicle miles ($0.69/ passenger mile)	• Agencies submit data quarterly; state runs "exception reports" to flag anomalies •Large agencies' budgets reviewed in detail; cost increase may not be supported by state •State has rescinded funding for inaccurate data	• Audit program for agencies with repeating issues • Hosts data summit to review standards and processes

Ohio Practices Summary

Allocation Formula	State Verification Process	Technical Assistance
• Rural: past year allocation; formerly: -Trips per hour (20%) -Cost per mile (20%) -Number of trips (30%) -Cost per trip (15%) -Subsidy per trip (15%) • Elderly/Disabled: subsidy reimbursement • Urban (awarded as capital grant): -50%: ridership, service miles, farebox revenue -50% :cost per hour, passengers per mile, farebox recovery rate	• Urban agencies submit "Certification of Data" form; state staff reviews for anomalies before "signing-off" • Small, rural agencies submit data on quarterly basis; verification by state via driver and software manifests	• Technical review for smaller agencies occurs once every 3 years • Technical reviews can also be triggered by frequent missed or late data submissions or invoices, agency request for assistance, change in transit manager

Pennsylvania Practices Summary

Allocation Formula	State Verification Process	Technical Assistance
• Urban: -Total passengers(25%) -Senior premium (10%) -Total revenue hrs(35%) -Total revenue vehicle miles (30%) • Programs of State Significance	•Submitted quarterly, annually through online database (dotGrant) • Use of spreadsheets mandated by state • Cross check spreadsheets annually with dotGrant data and NTD trends • Verification methods certified with submission • Funds rescinded if pattern of unsubstantiated data	• Technical assistance with spreadsheets, processing data •Performance reviews for all agencies on 3-yr cycle •Training • Information and reports

NTD and Other States Practices for Discussion

- What agencies perform 100% counts annually?
- What is the merit, if any, of the following practices?
  - Explicitly providing for different data collection process standards for rural and urban systems?
  - Calculating the Virginia allocation with one year lag in data to assure consistency with and shift some verification to NTD?
  - Regularly-scheduled periodic state audits, performance reviews, technical reviews, program for organizational development/capacity building?
  - State facilitated regular peer-to-peer data practices exchange?
  - Inclusion of a certification form with verification process guidance/mandate for large urban agencies?
  - Use of one or more of the TRACK performance measures?

Kansas Department of Transportation

TRACK

Transportation *for* Regionally Accessible Communities *in* Kansas

2012 Scorecard

Safety

Preventive Maintenance	8.0
Inspection Deficiencies per Vehicle	7.0
Preventable Accident Rate	7.0
Operators Eligible	3.0
Total	**30.0**

Customer Satisfaction

Customer Satisfaction	7.0
On-time Performance	7.0
Distance Between Failures	7.0
% of Population Served	9.0
Total	**30.0**

Fiscal Efficiency

Cost Recovery	10.0
Cost per Mile	8.0
Customers per Mile	5.0
Contracted Service Revenue per Mile	2.0
Total	**30.0**

Customer and Operations Information

Trip Purpose	3.0
Customer Demographics	4.0
Reported Fuel Cost	3.0
Total	**10.0**
Overall Total	**100.0**

Regional Accessibility

If you offer regional service, please provide the following information

- Cost per Mile for Regional Routes
- Regional Miles/Total Miles

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Ridership Data Collection Methods: Best?

	Manual	Electronic	Both	Daily by Route	Weekly by Route	Monthly by Route	By Driver/Vehicle	Excel/Access	Software database	Pen & Paper	Staff review	Algorithms/formal anomaly trigger	Cross check btwn 2 electronic methods	Cross check btwn electronic & manual	Cross check btwn manual & ride check/survey
Collection Methods	F	B	B/G												
Processing Data				B	G	F	B/G								
Tracking Data								G	G	F					
Verifying/Validating Data											G	B	B	G	G

F – Fair G – Good B - Best

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Potential Ridership Data Collection Standards: Fixed Route, Urban

Primary Data Collection Method	Which Systems Now Have?	Potential Standards	Discussion Topics
ERF	Large/Regional Rail (2 of 3) Large Urban (all 6) Small Urban, College (4 of 8)	Daily by Route, Fare Type? Weekly by Route, Fare Type? By Driver/Vehicle?	• Daily might be too often to spot anomalies; monthly might allow too much time to go by without review.
APCs	Large/Regional Rail (2 of 3) Large Urban (1 of 6) Small Urban, College (2 of 8)	Daily by Route, Fare Type? Weekly by Route, Fare Type? By Driver/Vehicle?	

Potential Ridership Data Collection Standards: FR, DR; Urban, Rural

Primary Data Collection Method	Which Systems Now Have?	Potential Standards	Discussion Topics
Manual (e.g. cash farebox, manual entry in log, manual click-counter)	Large Regional/ Rail (1 of 3) Small Urban, College (2 of 8) Rural (9 of 12 – 1 uses Mobile Data Terminal;1 didn't report; 1 appears to use only scheduling software) Small Rural (3 of 3)	• Daily by Route, Fare Type? Weekly by Route, Fare Type? • Mandating hand held devices that drivers click – or Mobile Data Terminals?	• Are hand held devices more accurate than manual entry?

Potential Ridership Data Standards Assembling/Tracking Methods

Current Methods	Discussion Topics
Software/Database	• Are pen & paper acceptable for tracking data over time? • Should minimal standard be basic spreadsheet/database for all systems – that can be checked against OLGA entries? • Internal databases up to agency discretion as long as modeled to maintain accurate data?
Microsoft Excel/Access	
Pen and Paper	

Potential Ridership Data Standards Verification Methods

Methods	Discussion Topics
Staff Review	• Should there be formal checks/process for staff review within each agency? Should they be documented?
Cross check of data between 2 or more collection methods	• Should cross-checking verification process be required to be documented?
Ride check sampling	• Is use of one of NTD's statistical sampling methods sufficient? Should ride checking be mandated?
Automated Trigger (e.g., algorithm in database)	

Next Steps

- Data collection practices
  - Draft Report: Findings on data collection methods and technology: March 7, 2014
  - Final Report: March 31, 2014
- Sizing of transit systems – generally complete
- Exceptional transit performance
  - Draft Report: Funding allocation scenarios: March 2014
  - Final Report: April 2014
- Other Possible Performance Measures
  - Draft Report: Assessment of potential measures: March 7, 2014
  - Final Report: March 31, 2014

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