

GUIDEBOOK:

# Guideway Performance Restriction Calculation

Federal Transit Administration  
U.S. Department of Transportation



U.S. Department  
of Transportation  
**Federal Transit  
Administration**

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## 1.0 Introduction

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### 1.1 Background and Purpose

The objective of this guidebook is to detail the methodology for measuring and reporting guideway under performance restrictions to the National Transit Database (NTD). This information is intended to supplement other guideway-related information entered in the NTD Service Module.

### 1.2 Document Organization

This guidebook is organized into four main sections:

- **Section 1** describes the scope of this document and provides a brief policy background, linking this guidance to the requirements of the NTD.
- **Section 2** outlines data requirements and definitions relating to reporting guideway performance restriction data.
- **Section 3** details procedures for calculating guideway under performance restrictions.
- **Section 4** presents a set of appendices, including a glossary of terms, example forms and references.

### 1.3 Legislative Background

The guidance presented here is intended to help agencies fulfill data requirements outlined by Title 49, §5335 of the U.S. Code (U.S.C.): National Transit Database. As described in 49 U.S.C. §5335, the NTD serves to gather uniformly categorized financial, operating, and asset condition information from transit agencies to assist with public transportation service planning and investment. The resulting information and organization of the NTD is intended to help any level of government make investment decisions. Any organization receiving funds under §5307 or §5311 must report data consistent with the uniform requirements for inclusion in this database.

The FTA uses NTD data to apportion funding to transit agencies across the country, with separate funding programs for transit agencies that operate in urbanized and rural areas. Agencies that operate in both urban and rural areas may receive or benefit from both funding programs. In order to receive funding from the FTA, transit agencies must report to the NTD in a compliant manner.

The transportation reauthorization legislation Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21) contains several provisions impacting 49 U.S.C. §5335. Section 20025 of MAP-21 specifically adds “asset condition information” to the scope of the NTD. Section 20019 clarifies the need for this information. It includes a definition of a “transit asset management plan” to be required of grant recipients, and a requirement that Secretary of Transportation develop a definition of “state of good repair” (SGR) that includes “standards for measuring the condition of capital assets of recipients, including equipment, rolling stock, infrastructure, and facilities.”

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Given that the NTD did not previously include data on guideway conditions, MAP-21 effectively created a new requirement that this data be added to the NTD to support requirements for transit asset management plans and calculation of SGR-related measures. This guidebook offers a methodology for defining, gathering, and reporting this new data with respect to fixed guideway.

## 2.0 Reporting and Data Requirements

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### 2.1 Reporting Procedures

The NTD Policy Manual lists requirements regarding collecting and reporting financial data, service data, and safety data, collected annually from all transit agencies receiving or benefiting from §5307 or §5311 formula grants. The NTD Policy Manual defines several types of reporters depending on the size of the agency in question and whether they fall into the category of Urban or Rural. All agencies that operate fixed guideway and/or high intensity busways are classified as full reporters and must submit annual and monthly reports.

Agencies required to submit an Annual Report must do so four months after the end of that agency's fiscal year end date; following this deadline, there is a four-month revision period during which the report can be revised by agency reporters and NTD analysts to ensure that the report is compliant. For more detail, refer to the NTD Policy Manual Introduction, which further defines agency categories and reporting requirements.

The NTD Policy Manual details how to determine what guideway to report, and how to measure the extent of guideway. The primary measure of guideway extent is directional route miles (DRM), the measurement of which is detailed further below. This measure is reported into the FTA's Service Module.

Performance restrictions are reported by mode and type of service as an average length of directional route mileage operating under performance restriction. To determine this measure agencies are required to calculate the DRM (measured to the nearest hundredth of a mile) under performance restrictions as a result of all causes at the same time each month: 9:00 AM local time on the first Wednesday of each month. The values calculated each month must be averaged, and the average annual value is required to be reported in the Annual Report.

### 2.2 Data Requirements

This section defines what data must be collected in order to report length of guideway performance restrictions. Agencies must first establish their Directional Route Miles (DRM) for Fixed Guideway (FG) modes. Then the agency must calculate the length of fixed guideway subject to performance restrictions.

#### 2.2.1 Data Definitions

##### **Directional Route Miles**

Directional route miles (DRM) is the total mileage in each direction that public transportation vehicles travel during revenue service, measured to the nearest hundredth of a mile and specified for each combination of mode and service with fixed guideway. To measure DRM it is necessary to both measure the route path and establish the direction of service.

DRM includes:

- A measure of the route path over a facility or roadway (which does not include any data

*The definition of Directional Route Mileage and Fixed Guideway are based on the 2014 NTD Policy Manual and are included here for completeness.*

related to the service carried on the facility, such as number of routes, vehicles, or vehicle revenue miles); and

- A measure with regard to direction of service (which does not include the number of traffic lanes or rail tracks existing in the right-of-way (ROW)).

DRM does not include staging or storage areas at the beginning or end of a route. Agencies count each path once. DRM is not affected by the frequency of service or the number of traffic lanes or rail tracks. Agencies are not required to count mileage for temporary detours.

### **Fixed Guideway (FG)**

FG is a facility that uses and occupies separate right-of-way (ROW) or rail for the exclusive use of public transportation. FG may also be a fixed catenary system useable by multiple forms of public transportation (e.g., trolleybus, light rail, etc.). Transit agencies must not report shoulder lanes as FG.

By the above definition, all rail modes operate exclusively on FG. Further, due to Federal statute, the NTD considers aerial tramway (TR) and ferry service (FB) DRM fixed guideway. The FTA considers all trolley bus (TB) and bus rapid transit (RB) DRM as FG for the purpose of funding eligibility. For Commuter Bus (CB) and Motor Bus (MB) modes, roadways that agencies reserve at all times (24 hours / 7 days per week) for public transportation vehicles and that do not permit non-public transportation vehicles are considered FG. This type of ROW must meet safe operations and have strict enforcement. Please see the glossary for definitions of each mode.

### **Fixed Guideway Directional Route Miles (FG DRM)**

FG DRM is the mileage in each direction that public transportation vehicles travel in revenue service on fixed guideway. FG DRM does not include staging or storage areas at the beginning or end of a route. Note that in the Asset Inventory Module, reporters operating rail service must also detail FG DRM and track miles separately.

### **Performance Restriction**

A performance restriction is defined to exist on a segment of fixed guideway when the maximum permissible speed of transit vehicles is set to a value that is below the guideway's design speed. The performance restriction can be communicated through operating instructions, route signage, flaggers or an agency's dispatch system.

Performance restrictions may result from a variety of causes, including defects, signaling issues, construction zones, maintenance work, or other causes. Note the following regarding the definition of performance restrictions:

- Generally the design speed for a section will be the same as the maximum allowable speed established for the section at the time of system opening.
- For rail modes the maximum speed for the guideway's track class can often be used to establish the design speed of the track. However, this speed may be lower than the design speed if the track class has been lowered since the track went into operation, and it may be higher than the design speed in the vicinity of curves or stations where safe operations require lowering vehicle speed.
- For bus modes the posted speed limit at the time the service went into operation may be

assumed to represent the design speed.

- In cases where it is not practical to determine the design speed of the guideway and no maximum operating speed (absent temporary speed restrictions) has been established, the maximum speed scheduled historically may be used as a proxy for the design speed.

### 2.2.2 Data Items

The basic data item required for characterizing the extent of performance restrictions is the length of guideway directional route miles with performance restrictions. This measure is required for each combination of mode and type of service with fixed guideway. Calculating the annual measure requires tabulating the measure on a monthly basis, then reporting the annual average. Although not required for NTD reporting, agencies may also choose to track length of guideway directional route miles with performance restrictions by cause.

## 2.3 Summary

The following summarizes the guideway performance restriction requirements described above.

### ***Guideway Performance Restriction Requirements***

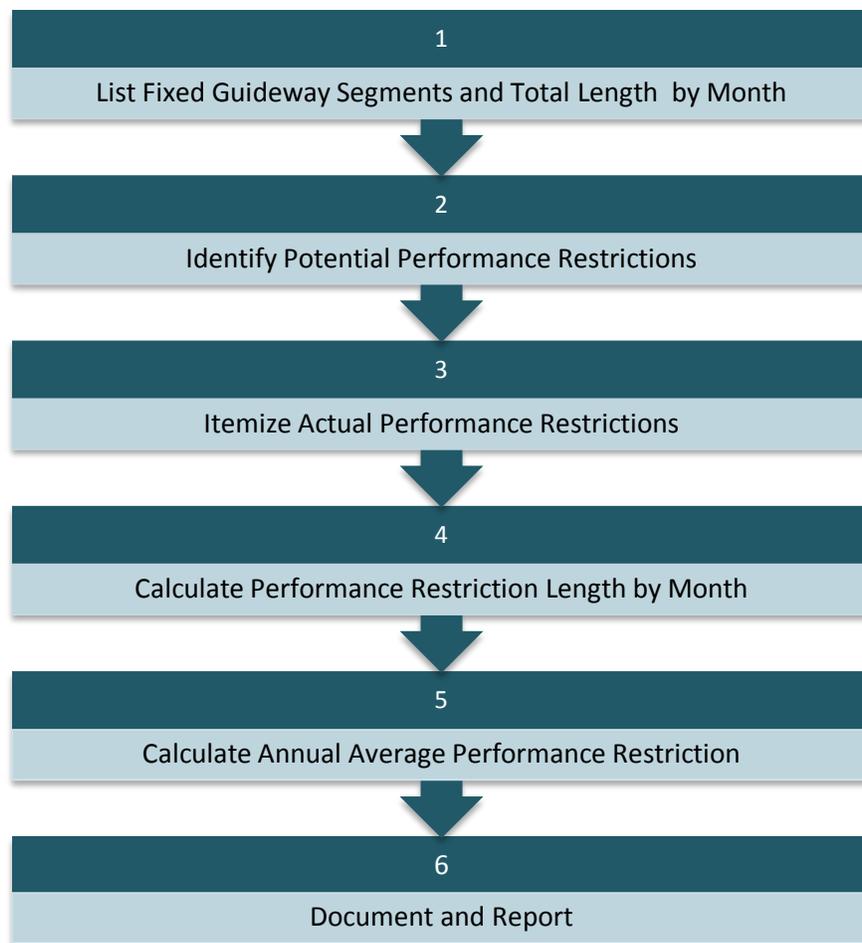
- A performance restriction is defined to exist on a segment of fixed guideway when the maximum permissible speed of transit vehicles is set to a value that is below the guideway's design speed.
- Agencies must measure the **length of guideway directional route miles under performance restrictions** each month based on a snapshot of conditions that existed as of 9:00 AM local time on the first Wednesday of the month. This calculation must be performed separately for each combination of fixed guideway mode and type of service.
- All performance restrictions are required to be included in the calculation, regardless of cause or duration, including temporary speed restrictions placed due to maintenance activity.
- Agencies are required to report an annual value for length of guideway directional route miles under performance restrictions to FTA by averaging the values calculated each month over the course of the year.
- The NTD definition of DRM is **the mileage in each direction over which public transportation vehicles travel while in revenue service**. DRM are a measure of the route path over a facility or roadway, not the service carried on the facility; e.g., number of routes, vehicles, or vehicle revenue miles. This is computed with regard to direction of service, but without regard to the number of traffic lanes or rail tracks existing in the right-of-way (ROW). DRM do not include staging or storage areas at the beginning or end of a route.
- For further details on the definition of modes, types of service, and calculation of

### 3.0 Performance Restriction Calculation Procedure

This section describes the recommended calculation procedure for establishing length of fixed guideway directional route mileage under performance restrictions. Section 3.1 describes the calculation procedure. Section 3.2 provides additional guidance on various special cases that agencies may encounter.

#### 3.1 Calculation Approach

Figure 1 below illustrates the basic steps in calculating fixed guideway directional route miles under performance restrictions. The steps illustrated in the figure must be performed for each combination of mode and type of service with fixed guideway operated by an agency. The following paragraphs detail each step.



#### List Fixed Guideway Segments

The first step is to prepare a list of guideway segments for each combination of mode and type of service with fixed guideway operated by the agency. An example form for use in this step is included in Section 4.2.

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An agency typically will have a guideway inventory prepared to support other required NTD reporting (e.g., calculation of fixed guideway directional route mileage). The additional detail required to support calculating performance restrictions is to determine the design speed of each segment.

As noted in Section 2, generally the design speed is the same as the maximum allowable speed established for a guideway section at the time of system opening. For rail, the maximum permissible speed for the guideway's track class can generally be used as the design speed. However, if the track class has been lowered since the track went into operation then the track class at the time the track went into operation must be used instead. Also, near curves or stations the design speed of the track is lower than the maximum speed for the track class. Further, rail systems not subject to regulation by the Federal Railroad Administration (FRA) generally do not have defined track classes.

For bus modes with fixed guideway, the posted speed at the time the system went into operation may be assumed to be equal to the design speed. For instance, a high occupancy vehicle (HOV) lane that satisfies the criteria for fixed guideway might technically have been designed for operation at up to 70 miles per hour (mph), but have a posted speed of 55 mph. In this case, the design speed must be assumed to be 55 mph.

Given that the purpose of preparing the list of guideway segments is to help identify where performance restrictions occur, an agency may wish to start by identifying segments at a summary level, using the maximum design speed over a long section of guideway, and then later segment the list further if a potential speed restriction is identified in the next step.

Table 1 shows an example list of guideway segments.

**Table 1 - Example List of Guideway Segments**

Segment ID	Description	From	To	DRM	Design Speed (MPH)
1	Track 1 West Station	0.00	0.10	0.10	10
2	Track 1 West-Park	0.10	2.90	2.80	40
3	Track 1 Park Station	2.90	3.10	0.20	10
4	Track 1 Park-East Station	3.10	7.90	4.80	40
5	Track 1 East Station	7.90	8.00	0.10	10
6	Track 2 West Station	0.00	0.10	0.10	10
7	Track 2 West-Park	0.10	2.90	2.80	40
8	Track 2 Park Station	2.90	3.10	0.20	10
9	Track 2 Park-East Station	3.10	7.90	4.80	40
10	Track 2 East Station	7.90	8.00	0.10	10

### Identify Potential Performance Restrictions

The next step is to identify potential performance restrictions. This step is required to be performed on a monthly basis for each combination of mode and type of service with fixed guideway, using a snapshot of conditions in effect as of 9:00 AM local time on the first Wednesday of the month as the basis for the calculation.

As discussed in Section 2, a performance restriction may result from a variety of causes, including defects, signaling issues, construction zones, maintenance work, or other causes. All performance restrictions that can be localized to a specific guideway section is required to be included in the reporting, including temporary restrictions placed during maintenance activities, restrictions on speeds for vehicles immediately following completion of maintenance, and restrictions due to events. Performance restrictions are typically identified through operating instructions provided daily to vehicle operators. However, they may also be entered directly into a dispatching system and enforced through signage or flaggers. Also, some performance restrictions may take the form of blanket restrictions, such as when the speed of a track is systematically lowered to reflect deteriorated conditions. Particularly when restrictions are imposed through such blanket conditions it may require additional analysis to determine whether a performance restriction effectively exists on a given segment of guideway.

In this step the agency would make an initial list of potential performance restrictions, then confirm which actually restrict performance over what segments of guideway in the next step. Note performance restrictions are not reported by cause, but tracking causes is recommended for supporting review of the calculations, as well as for potential use of the performance restriction data for other purposes besides NTD reporting. Table 2 below shows an example of potential performance restrictions by cause. Note that this and subsequent tables show supplemental data that is not specifically required for NTD reporting, but that may facilitate calculation and tracking of performance restriction length.

**Table 2 – Example List of Possible Performance Restrictions By Cause**

Performance Restriction Cause	From	To	Tracks	Performance Restriction Cause	Max Speed Under Performance Restriction (MPH)
Temporary speed restriction due to rail defects	0.00	0.35	1, 2	Temporary speed restriction due to rail defects	10 mph
ROW maintenance	2.75	2.90	1	ROW maintenance	20 mph
Temporary speed restriction due to improper elevation	4.00	5.08	2	Temporary speed restriction due to improper elevation	20 mph
East Station Improvement Project	7.67	8.00	1, 2	East Station Improvement Project	10 mph

**Itemize Actual Performance Restrictions**

In this step the agency would review each potential performance restriction identified in the previous step to determine which are actual restrictions, and if so over what directional route mileage they apply. For each potential restriction it is necessary to compare the restricted speed to the speed listed for the corresponding segment of guideway based on the initial step of the process, at a minimum further subdividing a segment where required to delineate the start and end of the restriction. If a restriction cannot be localized to a specific track segment then it may be removed from consideration at this stage. For example, instructions to reduce speeds during wet weather or, alternatively, during extremely hot or cold weather would not generally be included in the calculations unless they could be localized to specific track segments.

The form included in Section 4.2 can be used to assist in this step. Table 3 shows an example of this form completed based on the data in Table 1 and 2.

**Table 3 – Example Form Showing Sample Monthly Performance Restriction Calculation**

Segment ID	Description	From	To	DRM	Design Speed (MPH)	Performance Restriction	Performance Restriction Cause	Speed Restriction (MPH)
1	Track 1 West Station	0.00	0.10	0.10	10			
2.1	Track 1 West-Park A	0.10	0.35	0.25	40	Y	Temporary speed restriction due to rail defects	10
2.2	Track 1 West-Park	0.35	2.75	2.40	40			

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Segment ID	Description	From	To	DRM	Design Speed (MPH)	Performance Restriction	Performance Restriction Cause	Speed Restriction (MPH)
	B							
2.3	Track 1 West-Park C	2.75	2.90	0.15	40	Y	ROW maintenance	20
3	Track 1 Park Station	2.90	3.10	0.20	10			
4.1	Track 1 Park-East Station A	3.10	7.67	4.57	40			
4.2	Track 1 Park-East Station B	7.67	7.90	0.23	40	Y	East Station Improvement Project	10
5	Track 1 East Station	7.90	8.00	0.10	10			
6	Track 2 West Station	0.00	0.10	0.10	10			
7.1	Track 2 West-Park A	0.10	0.35	0.25	40	Y	Temporary speed restriction due to rail defects	10
7.2	Track 2 West-Park B	0.35	2.90	3.55	40			
8	Track 2 Park Station	2.90	3.10	0.20	10			
9.1	Track 2 Park-East Station A	3.10	4.00	0.90	40			
9.2	Track 2 Park-East Station B	4.00	5.08	1.08	40	Y	Temporary speed restriction due to improper elevation	20
9.3	Track 2 Park-East Station C	5.08	7.67	2.59	40			
9.4	Track 2 Park-East Station D	7.67	7.90	0.23	40	Y	East Station Improvement Project	10
10	Track 2 East Station	7.90	8.00	0.10	10			

Note that in some cases a potential restriction may be removed from the list in this step, or the length over which it applies may be shortened. This may result from:

- Overlapping performance restrictions; and/or

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- A performance restriction specified over a long segment that does not actually reduce speeds below design speeds over a portion of the segment (e.g., on curves or near stations).

### Calculate Performance Restriction Length by Month

The next step in the calculation process is to sum the length of directional route mileage under performance restrictions, simply adding the direction route mileage for each restriction identified in the prior step.

**Table 4 – Example Form Showing Sum of Length of Performance Restrictions**

Segment ID	Description	From	To	DRM	Performance Restriction Cause
2.1	Track 1 West-Park A	0.10	0.35	0.25	Temporary speed restriction due to rail defects
2.3	Track 1 West-Park C	2.75	2.90	0.15	ROW maintenance
4.2	Track 1 Park-East Station B	7.67	7.90	0.23	East Station Improvement Project
7.1	Track 2 West-Park A	0.10	0.35	0.25	Temporary speed restriction due to rail defects
9.2	Track 2 Park-East Station B	4.00	5.08	1.08	Temporary speed restriction due to improper elevation
9.4	Track 2 Park-East Station D	7.67	7.90	0.23	East Station Improvement Project
<b>Total</b>				<b>2.19</b>	

### Calculate Annual Average Performance Restriction Length

The final step in the calculation process is to calculate an annual average value for length of fixed guideway directional route mileage under performance restrictions. The values calculated each month over the agency's fiscal year must be used for the calculation (in the same manner as other NTD reporting), and the agency must report the resulting value for each combination of mode and type of service with fixed guideway. Table 5 shows an example of monthly values, tabulated by cause, and the resulting value reported to the NTD.

**Table 5 - Example Breakdown and Calculation of Yearly Average of Guideway Under Performance Restriction, Tabulated By Cause.**

		Month												YTD AVG
		1	2	3	4	5	6	7	8	9	10	11	12	
Restriction Causes (Examples)	Maintenance	0.15	2.05	2.45	1.78	1.50	0.57	1.50	1.05	1.25	0.40	0.15	0.15	1.08
	Rail Defect	0.50	0.15	0.91	0.91	0.91	0.25	0.44	0.25	0.44	0.15	0.50	0.50	0.49
	Signal, Controls Issue	0.00	0.50	0.53	0.53	0.53	0.11	0.11	0.00	0.20	0.20	0.00	0.00	0.23
	Bridge Conditions	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.50	0.02	0.10	0.10	0.00	0.14
	Track Geometry	1.08	0.25	0.00	0.00	0.00	0.75	0.70	0.75	0.75	0.25	0.08	0.08	0.39
	Construction	0.46	0.00	0.00	0.00	0.00	1.20	1.20	3.00	2.00	0.00	0.00	0.46	0.69
	Other	0.00	0.31	0.31	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
	<b>TOTAL Under Performance Restriction (miles)</b>	<b>2.19</b>	<b>3.26</b>	<b>4.20</b>	<b>3.53</b>	<b>2.94</b>	<b>3.38</b>	<b>4.45</b>	<b>5.55</b>	<b>4.66</b>	<b>1.10</b>	<b>0.83</b>	<b>1.19</b>	<b>3.11</b>

### 3.2 Guidance on Special Cases

This section describes a variety of special cases that may arise in evaluating guideway performance restrictions, and provides guidance on resolving them.

#### Establishing Design Speed

Determining the design speed of a guideway segment is one of the major challenges in evaluating performance restrictions. The intent of comparing maximum allowable speed to the design speed is to identify cases where a given guideway segment is no longer operating as designed. As discussed previously, generally the design speed is the same as the maximum allowable speed at the time the system opened. Further, as noted in Section 2, in cases where it is not practical to determine the design speed of the guideway and no maximum operating speed (absent temporary speed restrictions) has been established, the speed implied by the operating schedule may be used as a proxy for the design speed.

In establishing the design speed for the purpose of measuring length of directional route mileage under performance restrictions key additional points to consider are:

- If a guideway section is operating as designed, without slow orders, restrictions from maintenance work, or other issues, then no performance restrictions are required to be reported for it regardless of its specific design speed or how this value was determined.
- It is only necessary to evaluate the design speed if there is a question regarding the existing of a performance restriction. If it is clear there is no performance restriction – or clear there is definitely one in place – it is not strictly necessary to evaluate the design speed.
- In some cases an agency may operate at a higher speed than the original design due to improvements in equipment design or other factors.

- In the event the design speed is unclear, the default is to use the highest speed from the set of reasonable values to avoid underestimating the extent of performance restrictions.

### Identifying When Performance Restrictions Occur

#### *Examples: Establishing Design Speed*

**Question:** A given segment of commuter rail track was historically classified as Class 3 track (with a maximum operating speed of 60 mph), but ten years ago was reclassified as Class 2 track (maximum operating speed of 30 mph). What is its design speed for the purpose of measuring length of guideway under performance restrictions?

**Answer:** The design speed is considered to be 60 mph, except near curves, grade crossing or stations where the maximum allowable operating speed is presumably lower.

**Question:** A bus tunnel is signed with a speed limit of 15 mph. Information about the tunnel's design speed is not readily available, but the speed limit has apparently been in effect since the tunnel was opened. What is the design speed for the purpose of measuring length of guideway under performance restrictions?

**Answer:** 15 mph.

Often, performance restrictions are straightforward to identify. For rail systems, operators are given daily bulletins identifying these, including cases where speeds are restricted due to track conditions, signaling issues, maintenance work, or other issues. Also, for commuter rail systems under FRA jurisdiction agencies must document changes to the class, and thus the maximum allowable speed, to a track segment. Further, for rail systems operating under automatic train control, any speed changes are explicitly entered into a dispatching system.

But there are some types of restrictions that are more difficult to identify. These include:

- Systematic reductions in allowable speed relative to the original design of the track made due to deteriorated track conditions.
- Restrictions established through blanket operating instructions. These must be included in the calculations if they can be localized to specific track segments.
- Performance restrictions applied to fixed guideway on non-rail modes, for which identification and management of performance restrictions may be more informal than for rail systems.

In cases such as those listed above, positively establishing whether a performance exists may require review of historic data, such as scheduled speeds initially established for a system or information on how track was classified in the past. Agencies are encouraged to carefully document their assumptions regarding design speeds and approaches for handling cases where it may be hard to determine whether a restriction is in effect based on the definition provided in this document.

***Examples: Identifying When Performance Restrictions Occur***

**Question:** An agency's rail schedule implies trains will run at an operating speed less than the design speed of the track. Does this imply a performance restriction is in effect?

**Answer:** No. In this case vehicles are not specifically restricted from traveling at design speed – they simply are not required to do so to meet the schedule.

**Question:** An agency has issued operating instructions with a system-wide maximum train speed applicable when tracks may be wet during fall months. Does this imply a performance restriction is in effect?

**Answer:** The instructions imply a performance restriction, but the instructions are system-wide and cannot be localized to a specific track segment. Thus, this does not impact the length of directional route miles under performance restrictions reported to the NTD.

**Measuring the Length of a Performance Restriction**

There are two basic factors that complicate measurement of the length of a performance restriction. First, the length must be specified in terms of directional route mileage. This measure is well established and used elsewhere in the NTD. However, evaluating the measure for rail is complicated by the fact that it is based on consideration of route path and direction of service but not number of tracks. In other words, a given one-mile guideway section is considered to be one directional route mile if all traffic travels over it in one direction, and two directional route miles if all traffic travels over it in two directions. But how does this apply to the individual tracks on a guideway section?

To resolve this, it is recommended that the directional route mileage be divided by the number of tracks for the purpose of reporting performance restrictions for multi-track guideway.

A second complicating factor is that a performance restriction may be established over a large extent of guideway without actually reducing speeds over the entire extent. For instance, the maximum allowable speed for a curve, through a grade crossing, or at a station may have been less than a speed-restricted value suggested by a given performance restriction. Ideally agencies would evaluate design speed to determine the length over which any restriction actually results in reduced speeds.

***Example: Measuring the Length of a Performance Restriction***

**Question:** An agency operates single track guideway in two directions. A speed restriction of 20 mph is placed over one mile of track due to maintenance work. The track has a design speed of 40 mph. What is the length of directional route mileage under performance restrictions?

**Answer:** Two directional route miles are under performance restrictions.

## 4.0 Appendices

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### 4.1 Glossary

*Note: Definitions are based on those in FTA's NTD Glossary.*

**Aerial Tramway (TR):** A transit mode that is an electric system of aerial cables with suspended powerless passenger vehicles. The vehicles are propelled by separate cables attached to the vehicle suspension system and powered by engines or motors at a central location not on-board the vehicle.

**Alaska Railroad (AR):** In recognition of the special Federal relationship with the Alaska Railroad (AR), the passenger service portion of the Alaska Railroad (AR) is considered eligible for certain FTA funding under the Fixed Guideway Modernization program. The service encompasses only car miles for passenger cars; car miles for freight cars are specifically excluded.

**Bus (MB):** A transit mode comprised of rubber-tired passenger vehicles operating on fixed routes and schedules over roadways. Vehicles are powered by:

- Diesel
- Gasoline
- Battery
- Alternative fuel engines contained within the vehicle.

**Bus Rapid Transit (RB):** Is a fixed-route bus mode where:

1. The majority of each line operates in a separated right-of-way dedicated for public transportation use during peak periods; and
2. Features are included that emulate the services provided by rail fixed guideway public transportation systems, including:
  - a. Defined stations
  - b. Traffic signal priority for public transportation vehicles
  - c. Short headway bidirectional services for a substantial part of weekdays and weekend days
  - d. Pre-board ticketing, platform level boarding, and separate branding

This mode may include portions of service that are fixed-guideway and non-fixed-guideway.

**Cable Car (CC):** A transit mode that is an electric railway with individually controlled transit vehicles attached to a moving cable located below the street surface and powered by engines or motors at a central location, not onboard the vehicle.

**Commuter Bus (CB):** Fixed-route bus systems that are primarily connecting outlying areas with a central city through bus service that operates with at least five miles of continuous closed-door service. This service may operate motorcoaches (aka over-the-road buses), and usually features peak scheduling multiple-trip tickets and limited stops in the central city.

**Commuter Rail (CR):** A transit mode that is an electric or diesel propelled railway for urban passenger train service consisting of local short distance travel operating between a central city and adjacent suburbs. Service must be operated on a regular basis by or under contract with a

transit operator for the purpose of transporting passengers within urbanized areas (UZAs), or between urbanized areas and outlying areas. Such rail service, using either locomotive hauled or self-propelled railroad passenger cars, is generally characterized by:

- Multi-trip tickets
- Specific station to station fares
- Railroad employment practices
- Usually only one or two stations in the central business district

It does not include:

- Heavy rail (HR) rapid transit
- Light rail (LR)/streetcar transit service

Intercity rail service is excluded, except for that portion of such service that is operated by or under contract with a public transit agency for predominantly commuter services. Predominantly commuter service means that for any given trip segment (i.e., distance between any two stations), more than 50 percent of the average daily ridership makes a return trip on the same day. Only the predominantly commuter service portion of an intercity route is eligible for inclusion when determining commuter rail (CR) route miles.

**Controlled Access High Intensity Bus:** Guideway segments that may be exclusive to transit or function as HOV or HO/T for a certain number of hours, but are open to general traffic at some times.

**Directional Route Miles (DRM):** The mileage in each direction over which public transportation vehicles travel while in revenue service. Directional route miles (DRM) are:

- A measure of the route path over a facility or roadway, not the service carried on the facility; e.g., number of routes, vehicles, or vehicle revenue miles.
- Computed with regard to direction of service, but without regard to the number of traffic lanes or rail tracks existing in the right-of-way (ROW).

Directional route miles (DRM) do not include staging or storage areas at the beginning or end of a route.

**Directly Operated (DO):** Transportation service provided directly by a transit agency, using their employees to supply the necessary labor to operate the revenue vehicles. This includes instances where an agency's employees provide purchased transportation (PT) services to the agency through a contractual agreement.

**Exclusive Fixed Guideway:** Synonymous with fixed guideway.

**Exclusive High Intensity Bus:** High intensity bus lanes that are not open to general traffic at any time. This includes 24-hour HOV or HO/T lanes, and lanes that are HOV or HO/T at some times and transit exclusive at all other times.

**Ferryboat (FB):** A transit mode comprised of vessels carrying passengers and / or vehicles over a body of water that are generally steam or diesel powered. Intercity ferryboat (FB) service is excluded, except for that portion of such service that is operated by or under contract with a public transit agency for predominantly commuter services. Predominantly commuter service means that for any given trip segment (i.e., distance between any two piers), more than 50 percent of the average daily ridership travels on the ferryboat on the same day. Only the

predominantly commuter service portion of an intercity route is eligible for inclusion when determining ferryboat (FB) route miles.

**Fixed guideway (FG):** A public transportation facility using and occupying:

- A separate right-of-way (ROW) or rail for the exclusive use of public transportation; or
- A fixed catenary system useable by other forms of transportation.

**Fixed guideway directional route miles (FG DRM):** The mileage in each direction over which public transportation vehicles travel while in revenue service on fixed guideway (FG). Fixed guideway directional route miles (FG DRM) include directional route miles (DRM) for:

- Rail modes (heavy rail (HR), light rail (LR), commuter rail (CR), inclined plane (IP), cable car (CC) and Monorail/Automated guideway (MG))
- Ferryboats (FB)
- Aerial tramways (TR)
- Bus (MB)
- Trolleybus (TB)
- Commuter Bus (CB)
- Bus Rapid Transit (RB); and
- Other modes on exclusive right-of-way (ROW) and controlled access right-of-way (ROW).

Fixed guideway directional route miles (FG DRM) do not include staging or storage areas at the beginning or end of a route.

**Heavy Rail (HR):** A transit mode that is an electric railway with the capacity for a heavy volume of traffic. It is characterized by:

- High speed and rapid acceleration passenger rail cars operating singly or in multi-car trains on fixed rails
- Separate rights-of-way (ROW) from which all other vehicular and foot traffic are excluded
- Sophisticated signaling, and
- High platform loading.

**High Intensity Motorbus:** A new category of guideway distinct from fixed guideway, defined by MAP-21. High Intensity Motorbus (Or bus; HIB) comprises lanes that are exclusive to transit vehicles at some, but not all, times, and lanes that are restricted to transit vehicles, HOV, and HO/T. HIB lanes do not have their own funding tier under UAFP, but do receive State of Good Repair funding once they reach seven years of age.

**High Occupancy / Toll (HO/T) Lanes:** A concept that allows single occupancy vehicles (SOVs) to gain access to high occupancy vehicle (HOV) lanes by paying a toll. For formula purposes, FTA recognizes HO/T lanes as fixed guideway if the following conditions are met:

- A State agency with jurisdiction over the HOV facility certifies to the US Secretary of Transportation that they have established a program to monitor, assess, and report on the operation of the facility and the impact of high occupancy / toll vehicles and other low

emission and energy efficient vehicles.

- That there is an adequate enforcement program and provision made for limiting or discontinuing the exemptions if the facility becomes seriously degraded.
- The State agency's certification is submitted to the NTD.

If a transit agency has stricter requirements for high occupancy vehicle (HOV) facilities than the prohibition of SOVs, for example, 3 or more persons per vehicle, then those requirements apply to the HO/T lane, i.e., one and two-person vehicles would pay tolls.

**High Occupancy Vehicle (HOV) Facility:** Exclusive or controlled access right-of-way (ROW) that is restricted to high occupancy vehicles (HOV) (buses, passenger vans, and cars carrying one or more passengers) for a portion or all of a day.

**Hybrid Rail (YR):** Rail System Primarily operating routes on the National system of railroads, but not operating with the characteristics of commuter rail. This service typically operates light rail-type vehicles as diesel multiple-unit trains (DMU's). These trains do not meet Federal Railroad Administration standards, and so must operate with temporal separation from freight rail traffic.

**Inclined Plane (IP):** A transit mode that is a railway operating over exclusive right-of-way (ROW) on steep grades (slopes) with powerless vehicles propelled by moving cables attached to the vehicles and powered by engines or motors at a central location not onboard the vehicle. The special tramway types of vehicles have passenger seats that remain horizontal while the undercarriage (truck) is angled parallel to the slope.

**Light Rail (LR):** A transit mode that typically is an electric railway with a light volume traffic capacity compared to heavy rail (HR). It is characterized by:

- Passenger rail cars operating singly (or in short, usually two car, trains) on fixed rails in shared or exclusive right-of-way (ROW);
- Low or high platform loading; and
- Vehicle power drawn from an overhead electric line via a trolley or a pantograph.

**Monorail/automated guideway (MB):** Transit mode operating on exclusive guideway without using steel wheels on rails

**Performance Restriction:** A performance restriction is defined to exist on a segment of fixed guideway when the maximum permissible speed of transit vehicles is set to a value that is below the guideway's design speed. The performance restriction can be communicated through operating instructions, route signage, flaggers or an agency's dispatch system. Performance restrictions may result from a variety of causes, including defects, signaling issues, construction zones, maintenance work, or other causes.

**Purchased Transportation (PT):** Transportation service provided to a public transit agency or governmental unit from a public or private transportation provider based on a written contract. The provider is obligated in advance to operate public transportation services for a public transit agency or governmental unit for a specific monetary consideration, using its own employees to operate revenue vehicles. Purchased transportation (PT) does not include:

- Franchising;
- Licensing operations;

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- Management services;
- Cooperative agreements; or
- Private conventional bus service.

**State of Good Repair Program:** The FTA State of Good Repair Program is a formula program that replaced the Fixed Guideway Modernization program. It provides capital assistance to maintain fixed guideway and high intensity bus systems in a state of good repair. It is further defined in 49 U.S.C. Section 5337.

**Streetcar Rail (SR):** Transit mode operating predominantly on streets in mixed-traffic, typically single-car trains powered by overhead catenaries and with frequent stops.

**Transit Asset Management Plan:** An inventory of all transit system assets and a plan for their preservation using lowest life cycle cost methodologies.

**Trolleybus (TB):** A transit mode comprised of electric rubber-tired passenger vehicles, manually steered and operating singly on city streets. Vehicles are propelled by a motor drawing current through overhead wires via trolleys, from a central power source not onboard the vehicle.

### 4.2 Sample Performance Restriction Calculation Form

The following is an example form an agency can use to implement the calculation approach described in Section 3. Note that to follow the recommended procedure an agency would complete the attached form each month for each combination of mode and service with fixed guideway directional route miles, and then report the annual average length of directional route mileage under performance restrictions by mode and type of service to the NTD.

### Sample Performance Restriction Calculation Form

*Note: the following is an example form and includes data items not strictly required for NTD reporting.*

Mode:	Type of Service:
Date Data Collected:	Time Data Collected:
Completed By:	Date Completed:

Segment ID	Description	From	To	DRM	Design Speed (MPH)	Performance Restriction in Effect (Y/N)	Performance Restriction Cause	Speed Restriction (MPH)