

A decorative header section featuring a repeating pattern of light gray, wavy, scalloped lines that resemble water ripples or a textured surface. This pattern covers the top portion of the page, extending across its entire width.

**APPENDIX B**  
**EVALUATION CRITERIA**  
**MEMO**

# Oregon Coast Bike Route Evaluation Process

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**DATE:** May 31, 2018

**PROJECT NUMBER:** 20194

## Needs Identification and Evaluation

This memorandum documents direction from the PMT and other ODOT staff from the April 30, 2018 workshop, including the methodology to be applied during the Needs Identification and Evaluation phases, as shown in Figure 1. Presentation materials from the April 30 workshop are included as Attachment A.

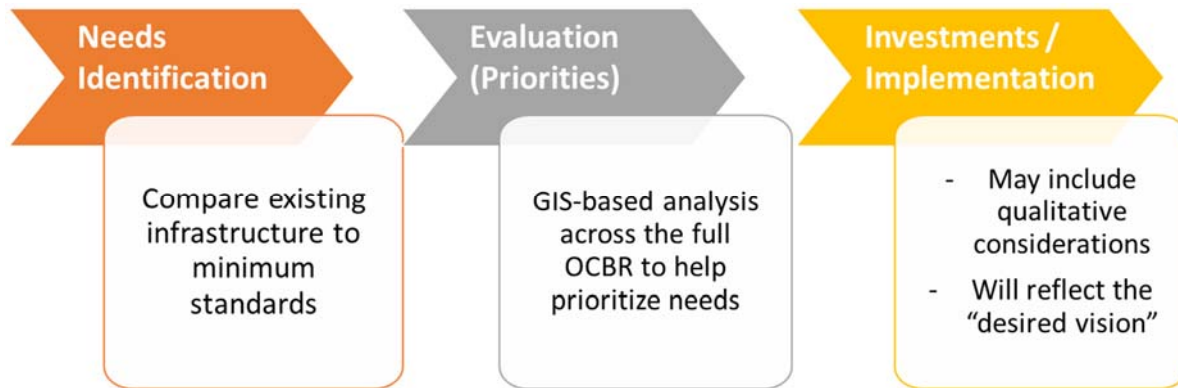


Figure 1: OCBR Project Phases

## Needs Identification

To identify needs on the OCBR, the project team is following an overall process as shown in Figure 2. Initial steps include compiling, verifying, and augmenting ODOT’s existing data. The project team is currently working to develop up-to-date data indicating the bicycle facility type and width along the full OCBR corridor, as well as identifying barriers and potentially challenging intersections. Following the data collection, the project team will compare the existing facilities to an agreed-on “minimum standard” to identify areas not meeting that standard.

This process mirrors that of the Active Transportation Needs Inventories that ODOT has conducted in Regions 1, 4, and 5; however, the OCBR “minimum standards” is customized to fit the primary purpose of the OCBR Plan.

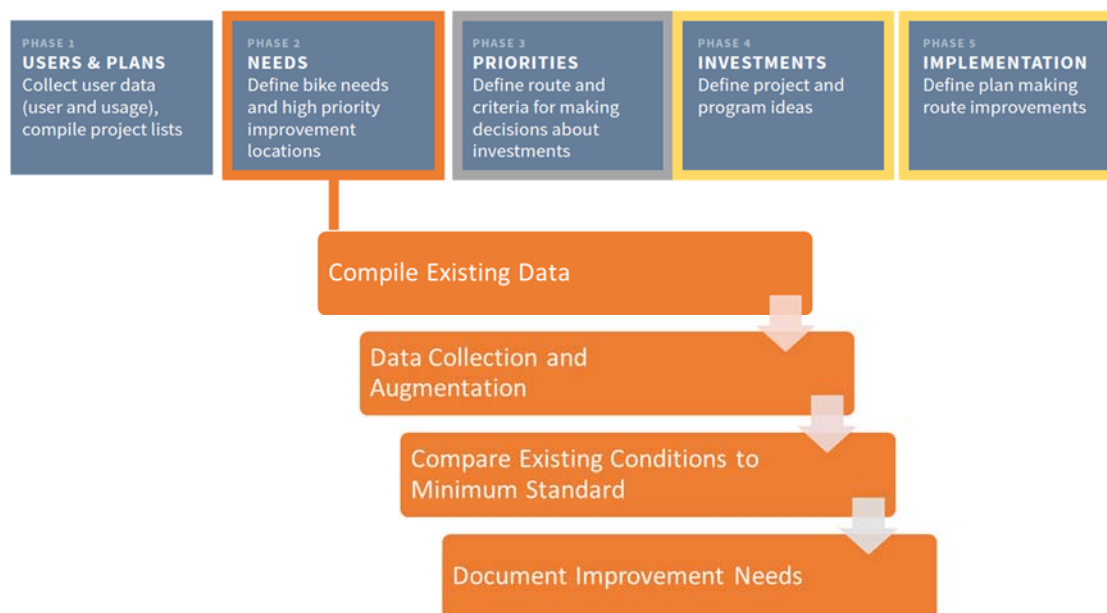


Figure 2: Process for Identifying Needs on the OCBR

## Primary Purpose and Design Rider

The primary purpose of the OCBR Plan is to define a vision for the Oregon Coast Bike Route that will serve bicycle tourists from Oregon and around the world, bringing economic development to coastal communities and enhancing access to Oregon’s coastline. The OCBR Plan will set direction for future investments, including both near-term incremental investments and investments needed to reach the long-term vision.

To determine the vision for the OCBR, the project team first discussed the “design rider.” Per this discussion, the design rider is a “competent recreational rider.” This rider likely has some experience and/or training with bicycling in a roadway environment, but may also include young people or less confident adults. The group discussed the desire to ultimately provide a route that could be used by a 12-year-old child with training and experience in bicycling.

In future phases of the project, the PMT will define the envisioned facility type that will meet the needs of this design rider. The “envisioned facility” will likely exceed the threshold set as a minimum standard.

## Minimum Standards

In setting the minimum standard, the project team considered existing guidance from ODOT’s Highway Design Manual for both 3R (resurfacing, restoration, and rehabilitation) and 4R (major reconstruction) projects, guidance from FHWA for rural and small towns, and upcoming guidance from AASHTO on bicycle facility design. The team also considered input from local jurisdictions along the OCBR. The proposed minimum standards for identifying needs are as follows:

- In “urbanized” locations (identified with Federal Urban Aid Boundaries), the minimum standard will be a 6-foot shoulder or bike lane. This standard will apply in all speed zones including in areas with a speed limit of 25mph or lower (where ODOT’s Highway Design Manual currently allows for a shared lane to serve as the bicycle facility).
- In “rural” locations between towns, the minimum standard will be a 4-foot shoulder. This standard is in alignment with ODOT’s existing minimum standard for 3R projects.

- For consideration: The project team is also considering setting a 6-foot shoulder minimum standard for locations adjacent to a guardrail in rural areas, to account for the reduced operating space.

## Evaluation

Following the identification of needs on the OCBR, the project team will conduct a GIS-based evaluation process to help identify the highest-priority needs, also based on the primary project purpose. Figure 3 shows the steps of the evaluation process.

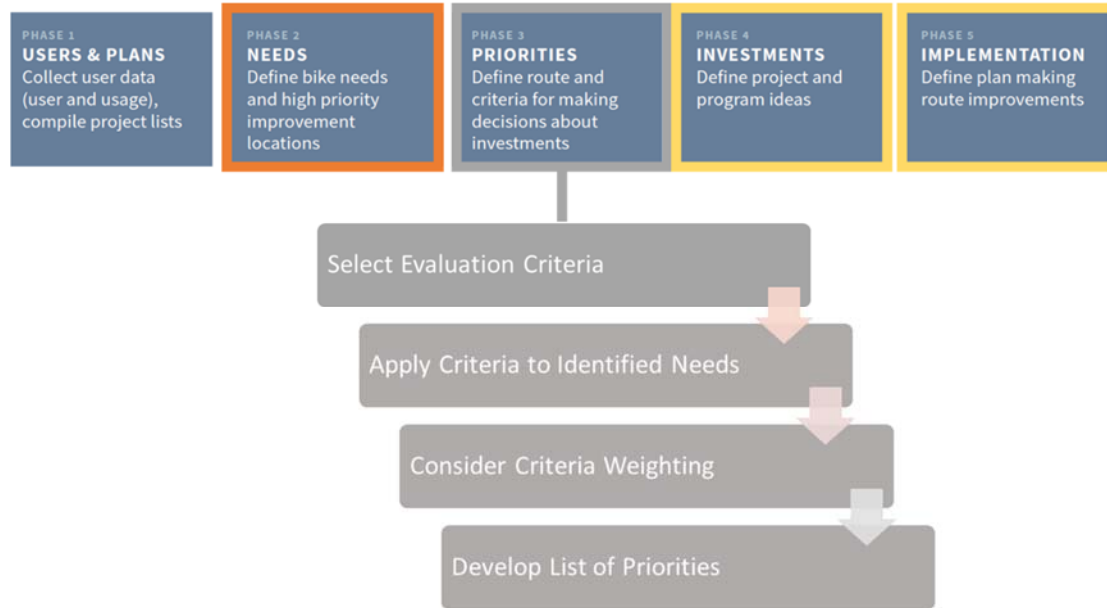


Figure 3: Evaluation Process to Prioritize OCBR Needs

### Proposed Evaluation Categories and Criteria

The proposed evaluation categories and criteria draw on those from the Active Transportation Needs Inventories; however, they provide a greater focus on the specific goals of the OCBR Plan. In selecting the evaluation criteria, the project team considered:

- how to best serve the design rider
- input from the local jurisdictions along the route
- the need to have objectively measurable criteria along the entire route

As a result of the discussion, the PMT opted to move forward with the evaluation categories shown in Table 1. Potential specific criteria are also shown in Table 1; however, further discussion is needed to finalize the criteria to be applied. Finally, weighting of the different evaluation categories will need to be determined and will be applied in the assessment of the overall prioritization of needs.

Table 1: Proposed Evaluation Categories and Potential Criteria

Weight	Category	Potential Criteria
	Existing Conditions	Width of existing bike facility
		Other existing roadway characteristics (such as lane widths, slope, curvature)
	Safety	5-year crash history analysis
		Level of traffic stress? Modified?
		Risk factors (speeds, # of lanes, AADT, driveways)
	Addressing Barriers/Short gaps	Barriers/intersections identified in data collection
		Bridges, tunnels, guardrails encroaching on shoulder
	Overlap with Oregon Coast Trail (OCT)	Shared segment with OCT gaps

### Other Evaluation Categories Considered

The project team considered other evaluation categories that are not proposed to be used as prioritization factors. Those categories include:

- **Bicycle Demand / Volumes:** not included due to difficulty uniformly assessing latent demand that may not be using the OCBR due to existing infrastructure.
- **Community Access to Destinations:** not included due to the primary focus of the OCBR project. Improvements in access to destinations will be a likely outcome of this project, and is indeed desirable and in alignment with ODOT’s agency goals.
- **Transportation Disadvantaged Communities:** not included due to the primary focus of the OCBR project. Improvements to benefit transportation disadvantaged communities will be a likely outcome of this project, and is indeed desirable and in alignment with ODOT’s agency goals.
- **Partnerships / Local “Readiness” / Locally Identified Projects:** not included in the evaluation/prioritization phase, because it is not possible to quantify and apply in a uniform way throughout the OCBR corridor. This factor may play a role in determining investments and in the implementation phase of the OCBR project.

### Next Steps

This memorandum summarizes the results and direction from ongoing discussions among the Project Management Team. Next steps are as follows:

1. Complete data collection and compilation effort.
2. Prior to initiation of the minimum standards mapping, confirm minimum standards to be applied in this project.
3. Prior to the initiation of the evaluation phase, confirm desired evaluation categories.
4. Prior to the initiation of the evaluation phase, determine evaluation criteria to be applied within each category and establish methodology.
5. During the evaluation phase, establish desired weights to be applied to each evaluation category.

# Attachment A: April 30 Workshop Presentation Materials

# Oregon Coast Bike Route Minimum Standards Work Session

April 2018



# Today's Agenda

- Minimum standards and Desired vision / standards
  - How will we use “minimum standards” in OCBR?
  - How will use “desired vision”?
  - Options for setting minimum standards – discussion
- Initial discussion on evaluation criteria
- Direction for project team



# Identifying Project Needs



Compile Existing Data

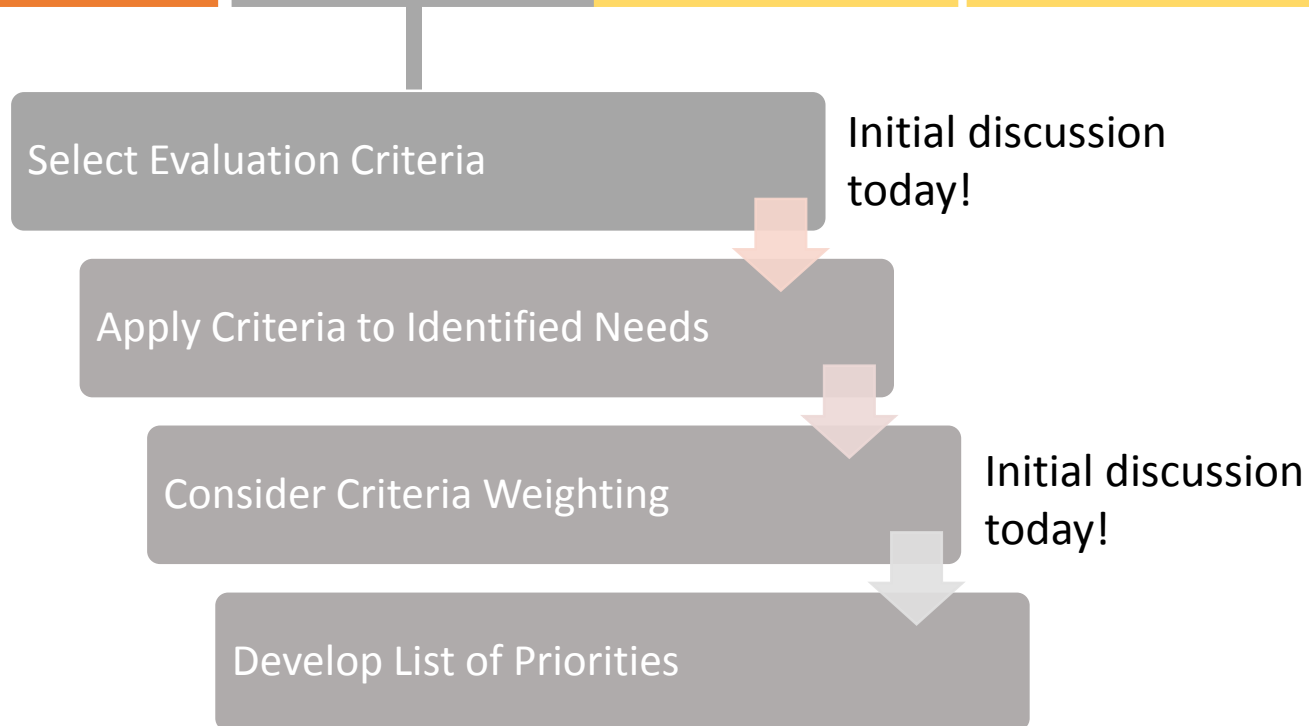
Data Collection and Augmentation

Compare Existing Conditions to Minimum Standard

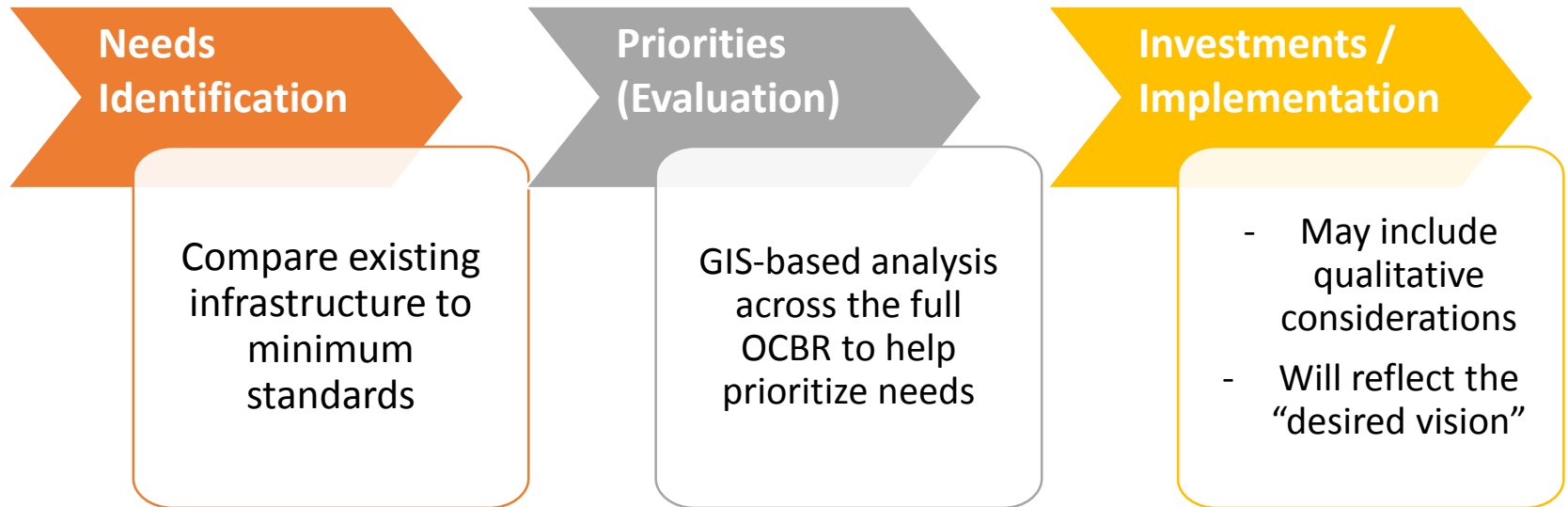
Focus of today!

Document Improvement Needs

# Evaluation Process



# Needs Identification, Evaluation, and Investments/Implementation



# Who is the OCBR Design Rider?

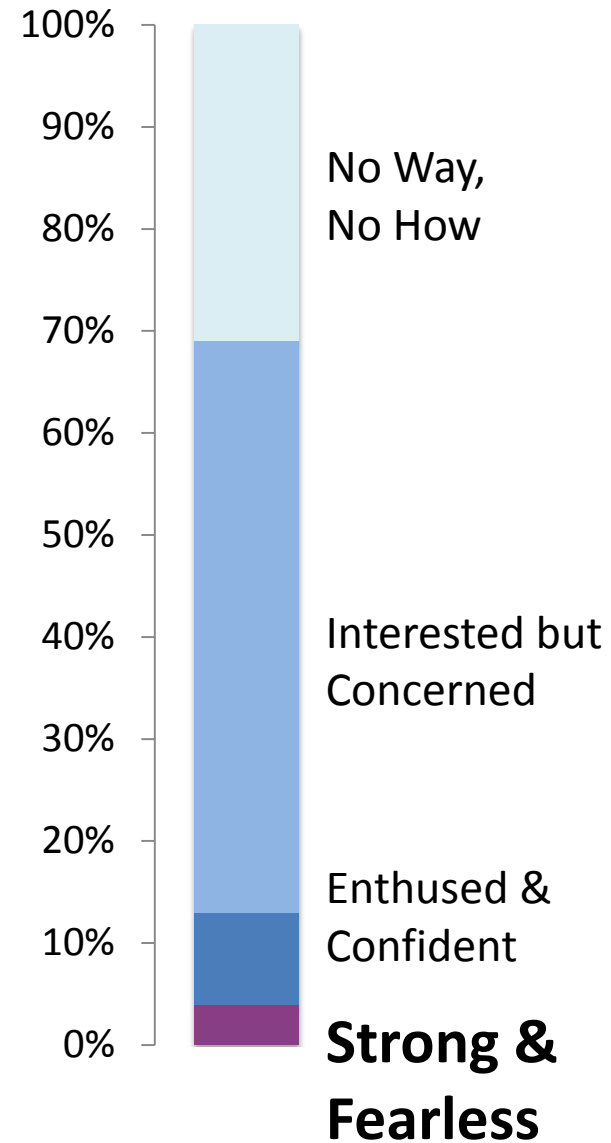


Credit: Kevin Burrett, Bicycle Touring Pro



Flickr User: Ewan Gronkowski

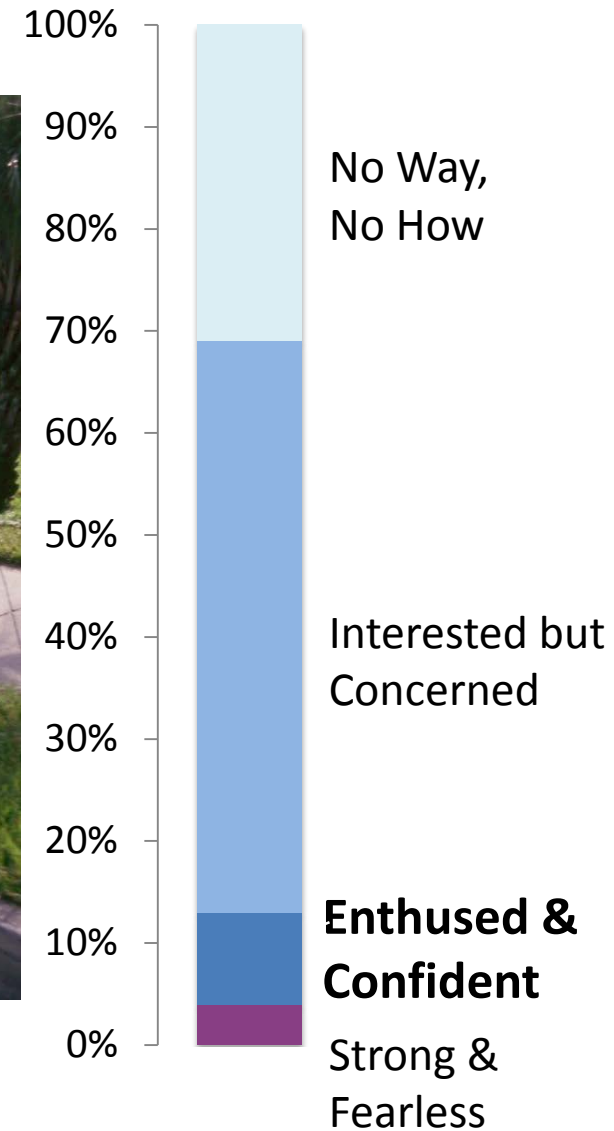
# Who is the Design Rider?



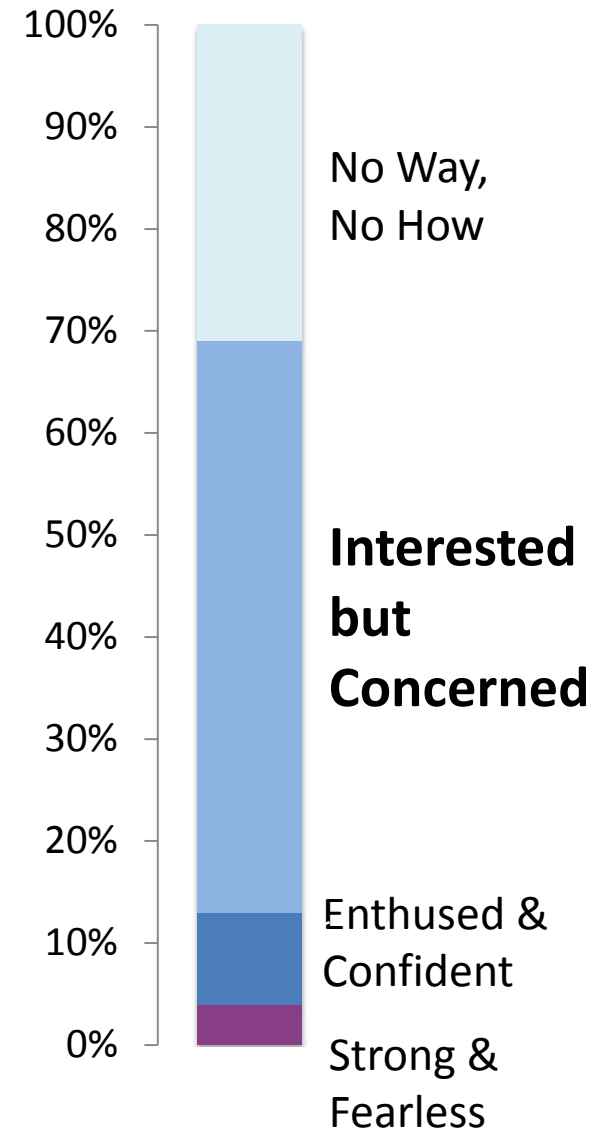
# Who is the Design Rider?



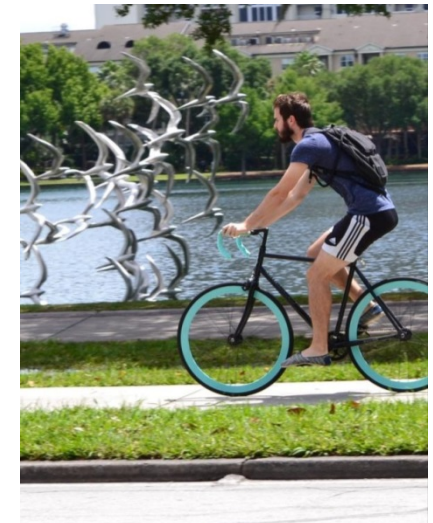
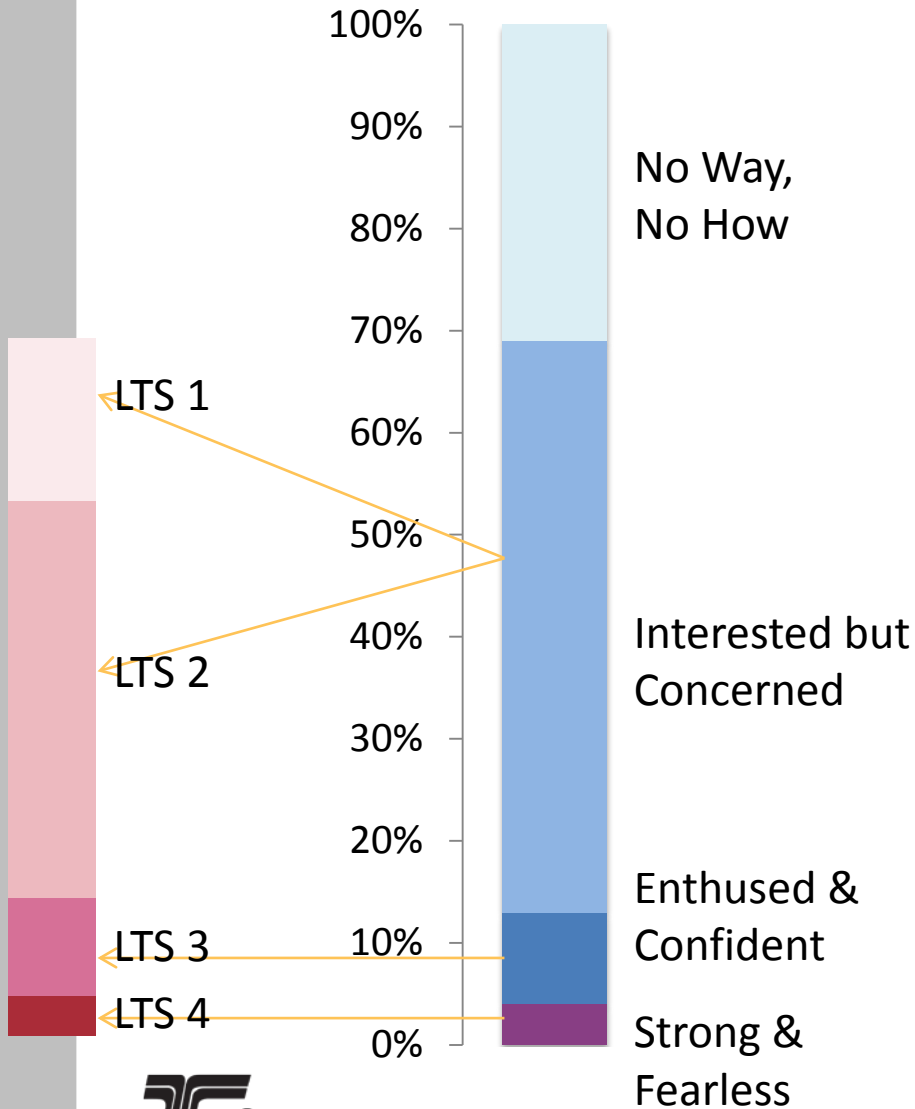
Photo: John Iwanski



# Who is the Design Rider?



# Level of Traffic Stress – Explained





# Level of Traffic Stress (Design User)

**Exhibit 14-3 Bike Lane with Adjacent Parking Lane Criteria**

1 Lane per direction				≥2 lanes per direction	
Prevailing or Posted Speed	≥ 15' bike lane + parking	14' – 14.5' bike lane + parking	≤ 13' bike lane + parking or Frequent blockage <sup>1</sup>	≥ 15' bike lane + parking	≤ 14.5' bike lane + parking or Frequent blockage <sup>1</sup>
≤25 mph	LTS 1	LTS 2	LTS 3	LTS 2	LTS 3
30 mph	LTS 1	LTS 2	LTS 3	LTS 2	LTS 3
35 mph	LTS 2	LTS 3	LTS 3	LTS 3	LTS 3
≥40 mph	LTS 2	LTS 4	LTS 4	LTS 3	LTS 4

<sup>1</sup>Typically occurs in urban areas (i.e. delivery trucks, parking maneuvers, stopped buses).

**Exhibit 14-4 Bike Lane without Adjacent Parking Lane Criteria**

1 Lane per direction					≥2 lanes per direction	
Prevailing or Posted Speed	≥ 7' (Buffered bike lane)	5.5' – 7' Bike lane	≤ 5.5' Bike lane	Frequent bike lane blockage <sup>1</sup>	≥ 7' (Buffered bike lane)	<7' bike lane or frequent blockage <sup>1</sup>
≤30 mph	LTS 1	LTS 1	LTS 2	LTS 3	LTS 1	LTS 3
35 mph	LTS 2	LTS 3	LTS 3	LTS 3	LTS 2	LTS 3
≥40 mph	LTS 3	LTS 4	LTS 4	LTS 4	LTS 3	LTS 4

<sup>1</sup>Typically occurs in urban areas (i.e. delivery trucks, parking maneuvers, stopped buses).

**Exhibit 14-5 Urban/Suburban Mixed Traffic Criteria**

Prevailing Speed or Speed Limit (mph)	Unmarked Centerline	1 lane per direction	2 lanes per direction	3+ lanes per direction
≤ 25 <sup>1</sup>	LTS 1	LTS 2	LTS 3	LTS 4
30	LTS 2	LTS 3	LTS 4	LTS 4
≥ 35	LTS 3	LTS 4	LTS 4	LTS 4

<sup>1</sup>Presence of “sharrow” markings may reduce the LTS by a level for 25 mph or less sections depending on overall area context.

**Exhibit 14-11 Rural Segment Criteria with posted speeds 45 mph or greater<sup>1,2,3</sup>**

Daily Volume (vpd)	Paved Shoulder Width			
	0 – <2 ft	2 - <4 ft	4 – <6 ft	≥ 6 ft
<400	LTS 2	LTS 2	LTS 2	LTS 2
400 - 1500	LTS 3	LTS 2	LTS 2	LTS 2
1500 - 7000 <sup>4</sup>	LTS 4	LTS 3	LTS 2	LTS 2
> 7000	LTS 4	LTS 4	LTS 3	LTS 3

# Intersections

- Level of traffic stress?

Exhibit 14-6 Right Turn Lane Types

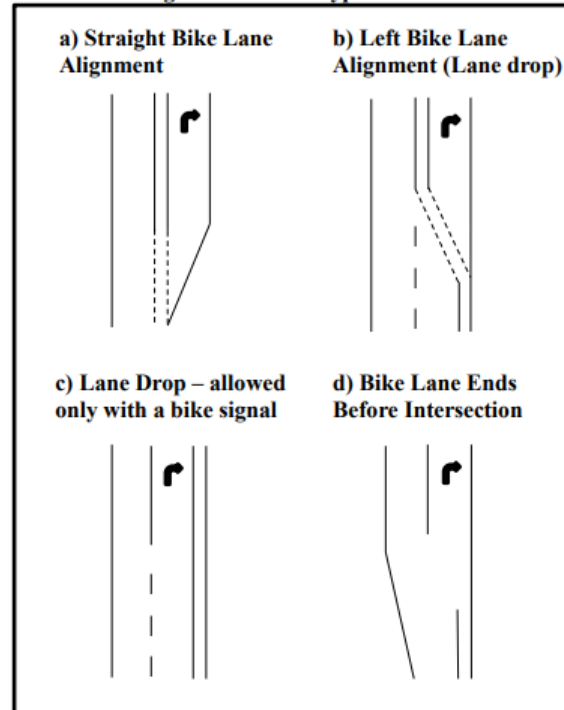


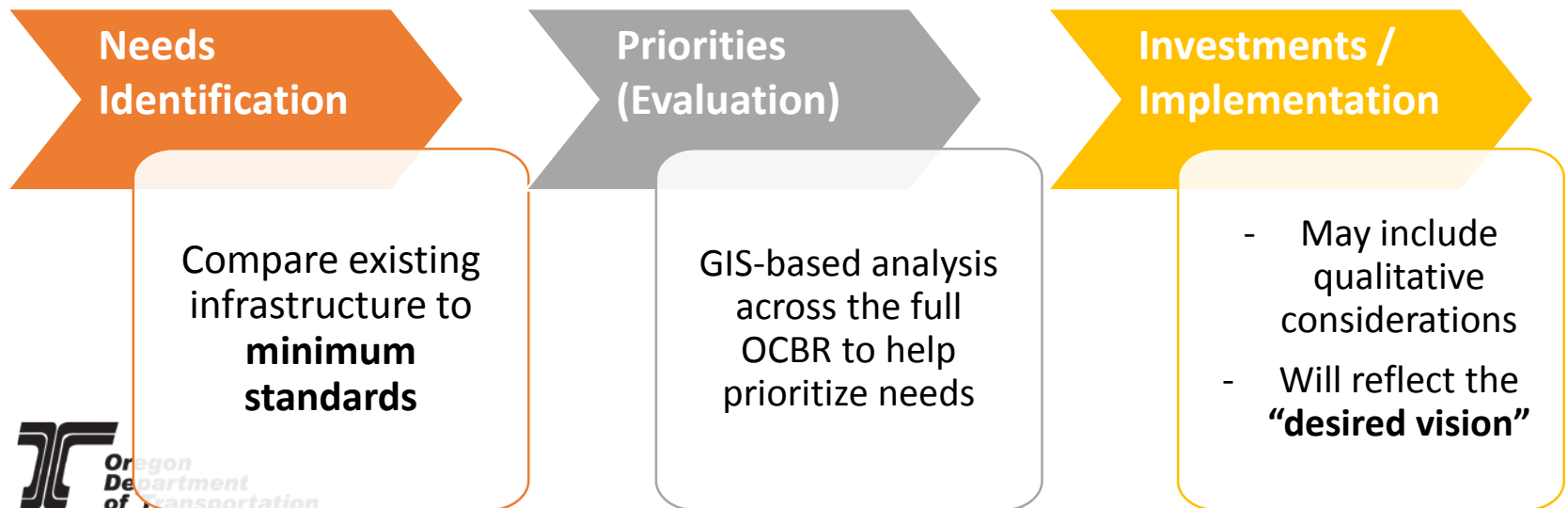
Exhibit 14-7 Right Turn Lane Criteria

Right-turn lane configuration	Right-turn lane length (ft)	Bike Lane Approach Alignment	Vehicle Turning Speed (mph) <sup>2</sup>	LTS
Single	≤ 150	Straight	≤ 15	2
Single	>150	Straight	≤ 20	3
Single	Any	Left	≤ 15	3
Single <sup>1</sup> or Dual Exclusive/ Shared	Any	Any	Any	4



# How are we using “Minimum Standards?”

- Application in Region 4 / Region 5 ATNI [example](#) using Highway Design Manual standards
- For OCBR, we will define a “minimum standard” and “desired condition”
  - Minimum standard: will allow us to compare to the existing conditions and determine where there are “project needs”.
  - Desired condition: will guide us in developing projects.



# Input from Jurisdiction Stakeholders

Highway Design Manual provides standards, BUT the vision for the OCBR could be different.

Does your community have a vision for what the standards should be?


- *Not a lot of specific input in terms of facility widths.*
- *Frequent desire for separated shared use paths*
- *Some sense that a 25 mph shared lane environment is not desirable*
  - *unclear policy on sharrow use on ODOT facility*
  - *feeling that bikes were “in the way”*

# Options for defining standards

- ODOT's Highway Design Manual
- Guidance from AASHTO Bicycle Design Guidance
- FHWA Small and Rural Community Guidance
- CROW Guidance (Netherlands)
- Other?



Needs  
Identification



Compare existing  
infrastructure to  
**minimum  
standards**

Table 13-1: 4R Shoulder Widths and Bicycle Accommodations

# ODOT Highway Design Manual (Chapter 13 – Pedestrian and Bicycle)



Highway Characteristics		Shoulder Min. Width	Bike Facility	
			Accommodation	Std. Width
Urban	Special Transportation Area (STA) or traditional downtown	5'	Bike Lanes	6'
			Buffered Bike Lanes (buffered from parking)	8'
			Shared travel lane (25 mph)	Included in travel lane width
	UBAs, commercial centers & other developed areas	6'	Bike Lanes	6'
			Parallel streets *	NA
	Urban Fringe: 35-45 mph	6'	Bike Lanes	6'
	Urban Fringe: 50-55 mph or Expressway: 45 mph	8'	Shoulder	8'
			Cycle Track	6' **
			Buffered Bike Lanes (buffered from vehicles)	8'
			Raised bike lane	7'
	Expressway: 50-55 mph	8'	Separated Path	10' **
			Shoulder	8'
Separated path			10' **	
Freeway	10'	Parallel streets *	NA	
		Shoulder	10'	
		Separated path	10'	
Rural	Collector <400 ADT	2'	Shoulder	Same as shoulder width
	Arterial <400 ADT	4'		
	Collector 400 -1500 ADT	5'		
	Arterial 400-1500 ADT	6'		
	1500-2000 ADT	6'		
	>2000 ADT	8'		
	Mountainous 4-lane Expressway	8'		
	Other expressways	10'		

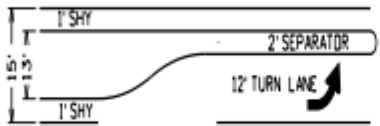
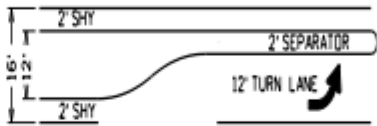
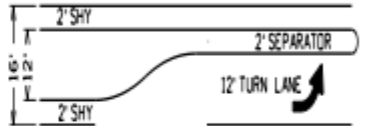
# ODOT Highway Design Manual (Chapter 6 – Urban Highway)

Table 6-2: ODOT 4R/New Urban Standards - STAs

Design Elements	Design Speed	
	25 mph	30 mph
Travel Lane	10'-12' <sup>1</sup>	10'-12' <sup>1</sup>
Right Turn Lane	10'-12' plus 1' shoulder	10'-12' plus 1' shoulder
Left Turn Lane		
Right Side Shoulder/Bike Lane	5' <sup>2</sup>	5' <sup>2</sup>
Left Side Shy Distance <sup>3</sup>	1'	1'
Median		
Striped Median (Turn Lane)	12'-14'	12'-14'
Raised Curb Median	13'-15' Travel lane to travel lane	13'-15' Travel lane to travel lane
Maximum Superelevation	4%	4%
Maximum Degree of Curve	28°	19°
Maximum Grade	8%	8%
Curbside Sidewalk	10'	10'
Separated Sidewalk <sup>4</sup>	8'	8'
On-street Parking	7'-12' <sup>5</sup>	7'-12' <sup>5</sup>
Vertical Clearance	See <a href="#">Chapter 4, Section 4.5.1</a>	

# ODOT Highway Design Manual (Chapter 6 – Urban Highway)

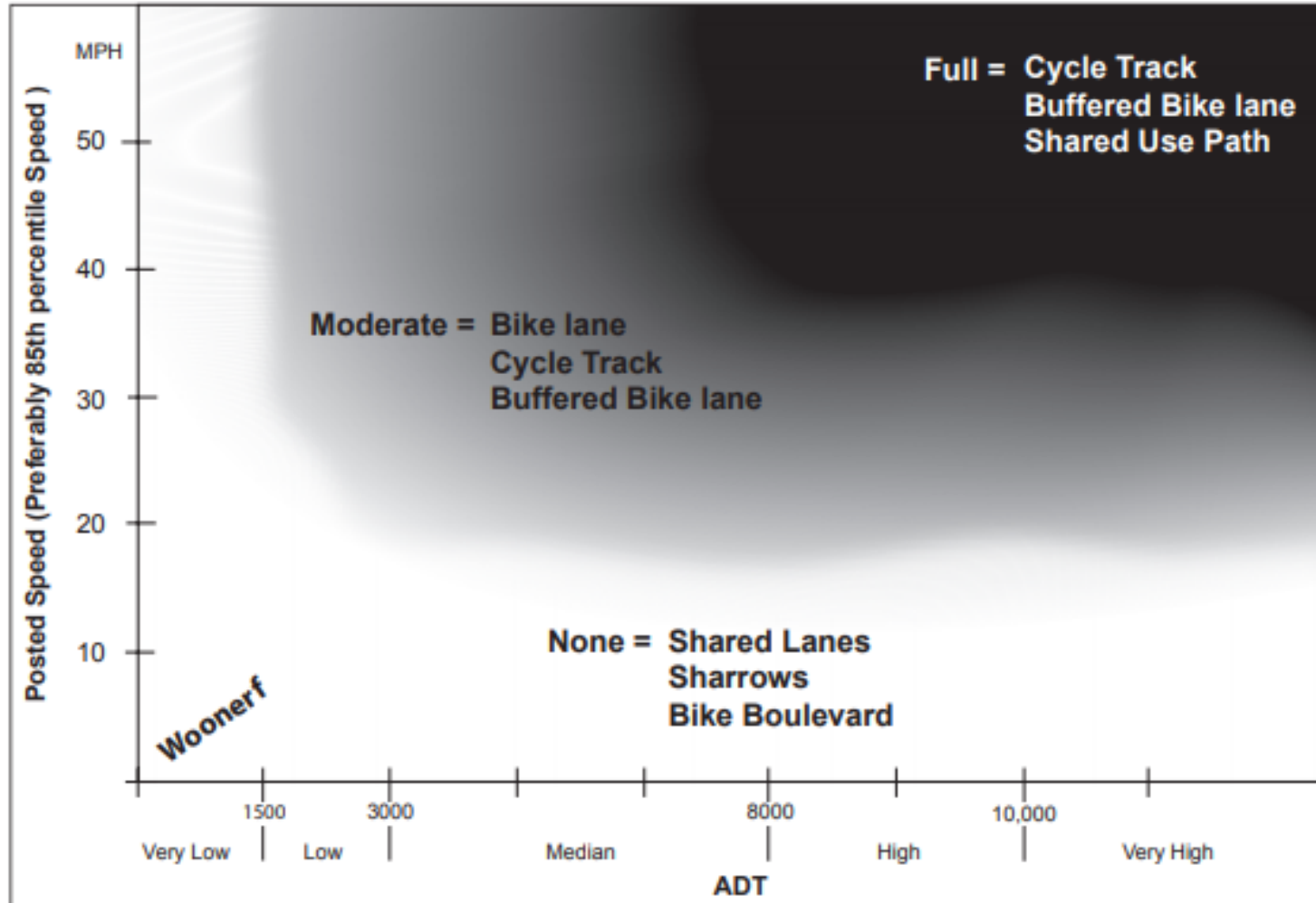
Table 6-3: ODOT 4R/New Urban Standards - UBAs

Design Elements	Design Speed			
	30 mph	35 mph	40 mph	45 mph
Travel Lane	12' <sup>1</sup>	12' <sup>1</sup>		12'
Right Turn Lane	12' plus shoulder <sup>2</sup>		12' plus shoulder <sup>2</sup>	
Left Turn Lane				
Right Side Shoulder/Bike Lane	6'	6'	6'	
Left Side Shy Distance <sup>3</sup>	1'	2'	2'	
Median				
Striped Median(Multi-Lane)	2'	2'	2'	
Continuous Left Turn Lane	14'	14'	14'	
Raised Curb Median	15' Travel lane to travel lane	16' Travel lane to travel lane	16' Travel lane to travel lane	
Maximum Superelevation <sup>4</sup>	4%	4%	6%	
Maximum Degree of Curvature	19°	13°30'	10°00'	8°
Maximum Grade	8%	7%		6%
Curbside Sidewalk	6' <sup>5</sup>	6' <sup>5</sup>		6' <sup>5</sup>
Separated Sidewalk <sup>6</sup>	6'	6'		6'
On-street Parking	N/A <sup>7</sup>	N/A <sup>7</sup>		N/A <sup>7</sup>
Vertical Clearance	See <a href="#">Chapter 4, Section 4.5.1</a>			



# ODOT Bicycle and Pedestrian Design Guide (Appendix L)

Urban/Suburban Recommended Separation Matrix



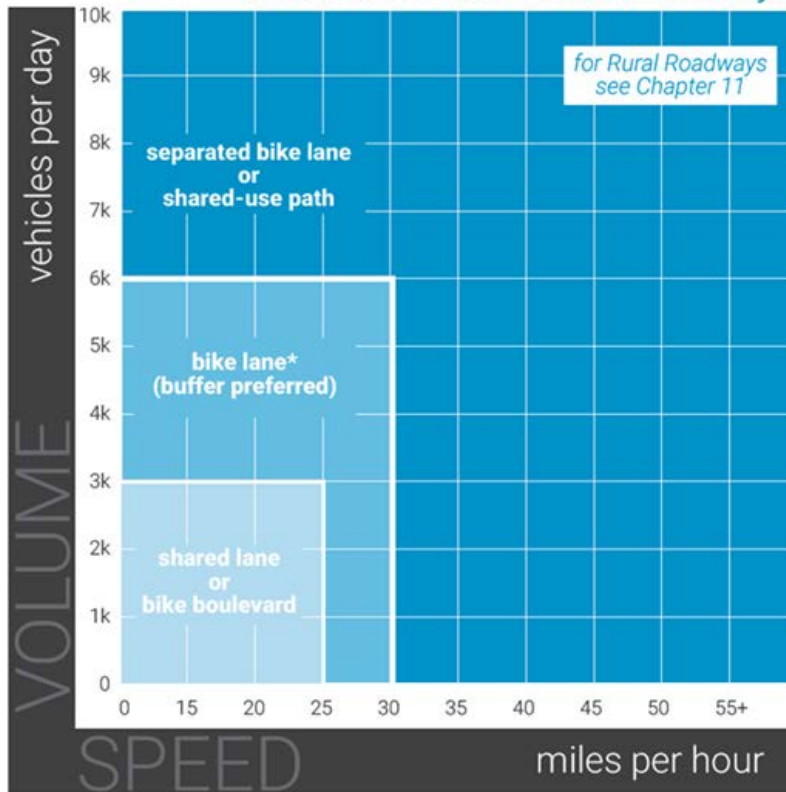
# ODOT Bicycle and Pedestrian Design Guide (Appendix L)

Context	Need for Separation
<b>1. Land Use indicators</b>	
Urban Center, CBD	Decreases
Suburban	Increases
Buildings at back of sidewalk	Decreases
Buildings set back from roadway (parking lots front street)	Increases
On Street Parking	Decreases
Short block length	Decreases
Long block length	Increases
<b>2. Traffic speed/volume indicators</b>	
Signal coordination timed at higher than posted speeds	Increases
Signal coordination timed at lower than posted speeds	Decreases
Peak Hourly Traffic Volume greater than 10%	Increases
<b>3. Roadway characteristics</b>	
Wide roadway / multiple travel lanes	Increases
Steep grades: uphill	Increases
Steep grades: downhill	Decreases
<b>4. Bicycling demand indicators</b>	
Popular Route to School	Increases
Provides continuity of bike lanes, routing or trail	Increases
Other high-use indicators	Increases

Table 1-1: Separation Context matrix

# DRAFT AASHTO Bicycle Design Guidance (2018)

## Bicycle Facility Selection Chart Urban and Suburban Roadways



\*advisory bike lanes may be an option where traffic volume < 4K ADT

## Recommended Minimum Shoulder Rural Roadways



# Small Town and Rural Multimodal Networks Guide (FHWA)

*Table 3-1. Recommended Minimum Paved Shoulder Widths by Roadway Conditions<sup>(iii)</sup>*

Functional classification	Volume (AADT)	Speed (Mi/h)	Recommended Minimum Paved Shoulder Width
Minor Collector	up to 1,100	35 (55 km/h)	5 ft (1.5 m)
Major Collector	up to 2,600	45 (70 km/h)	6.5 ft (2.0 m)
Minor Arterial	up to 6,000	55 (90 km/h)	7 ft (2.1 m)
Principal Arterial	up to 8,500	65 (100 km/h)	8 ft (2.4 m)

# CROW Bicycle Design Manual (Netherlands) – Urban Areas

Table 5-2. Selection plan for cycle facilities in the case of road sections in built-up areas

Road category	Speed limit motorized traffic (km/h)	Volume of motorized traffic (PCU/24-hour period)	Cycle network category		
			Basic structure ( $I_{\text{bicycle}} < 750/24\text{-hour period}$ )	Main cycle network ( $I_{\text{bicycle}} 500\text{-}2,500/24\text{-hour period}$ )	Bicycle highway ( $I_{\text{bicycle}} > 2,000/24\text{-hour period}$ )
Residential road	walking pace or 30	< 2,500	mixed traffic	mixed traffic or bicycle street	bicycle street (with right of way)
		2,000-5,000		mixed traffic or cycle lane	cycle path or cycle lane (with right of way)
		> 4,000	cycle lane or cycle path		
Distributor road	50	2x1 lane	not relevant	cycle path	
	70	2x2 traffic lanes		cycle/moped path	

# CROW Bicycle Design Manual (Netherlands) – Rural Areas

Table 5-3. Selection plan for cycle facilities in the case of road sections outside of built-up areas

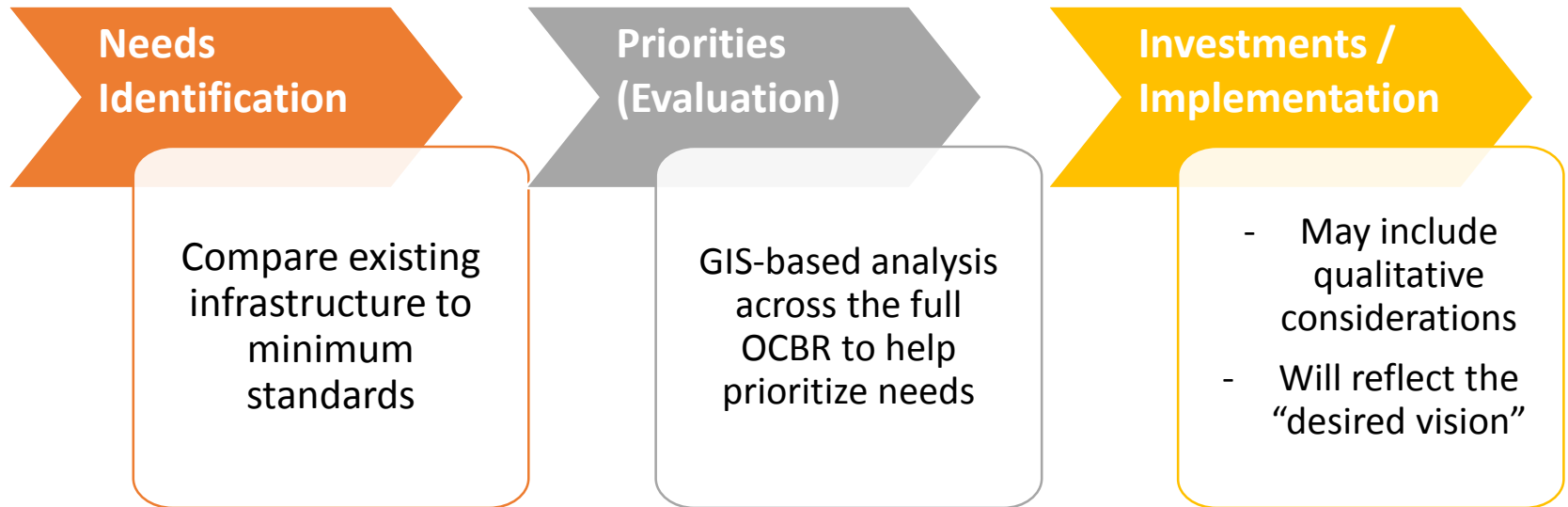
Road category	Speed limit motorized traffic (km/h)	Volume of motorized traffic (PCU/24-hour period)	Cycle network category	
			Basic structure	Main cycle network or bicycle highway ( $I_{\text{bicycle}} > 500$ /24-hour period)
Residential road	60 (or 30)	< 2,500	mixed traffic	bicycle street if $I_{\text{car}} < I_{\text{bicycle}}^1$ ; cycle path or mixed if $I_{\text{car}} > I_{\text{bicycle}}$
		2,000-3,000	cycle path, possibly cycle lanes	
		> 3,000	cycle path	
Distributor road	80	not relevant	cycle/moped path	

1) plus any additional requirements in terms of speed

# Manual Comparison – OCBR Scenarios

	ODOT Highway Design Manual Chapter 13	ODOT Highway Design Manual Appendix L	FHWA Small/Rural	AASHTO Bike Design Guidance	CROW Manual*
Urban, 25mph, ~5,000 AADT	Shared Lane	Bike lane, cycle track, buffered bike lane	NA	Bike Lane, buffer preferred	Cycle path, possibly lanes
Urban, 25mph, >10,000 AADT	Shared Lane	Bike lane, cycle track, buffered bike lane	NA	Separated Bike Lane or Path	Cycle path
Urban, 35mph, >10,000 AADT	6' Bike Lane	Bike lane, cycle track, buffered bike lane	NA	Separated Bike Lane or Path	Cycle path
Rural, 45mph, ~2,500 AADT	8' Shoulder	8' Shoulder	7' Shoulder	4' Shoulder	Cycle path, possibly lanes
Rural, 55mph, ~8,000 AADT	8' Shoulder	8' Shoulder	8' Shoulder	5' Shoulder	Cycle path

# Needs Identification, Evaluation, and Investments/Implementation





# Evaluation Criteria

- More criteria = less impact per criterion
- Must be objectively measurable
- Data available throughout the corridor
- Be aware of “double-counting”
- Need to differentiate



Priorities  
(Evaluation)

GIS-based analysis  
across the full  
OCBR to help  
prioritize needs

# Evaluation Categories and Criteria

	Category	Potential Criteria
Recommended categories:	Existing Conditions	Width of existing bike facility
		Other existing roadway characteristics
	Safety	5-year crash history analysis
		Level of traffic stress? Modified?
		Risk factors (speeds, # of lanes, AADT, driveways)
	Addressing Barriers / Short gaps	Barriers/intersections identified in data collection
Potential categories:	Overlap with Oregon Coast Trail	Shared segment with OCT gaps
	Demand / Volumes	Strava data to approximate OCBR cyclists
Potential investment decision categories?	Additional Community Access	Proximity to schools, transit, other destinations
	Transportation Disadvantaged Communities	Census data index (under 18, over 64, LEP, vehicle access, ethnic/racial minority, poverty)
	Partnerships / Local "Readiness"	
	Locally Identified Projects	

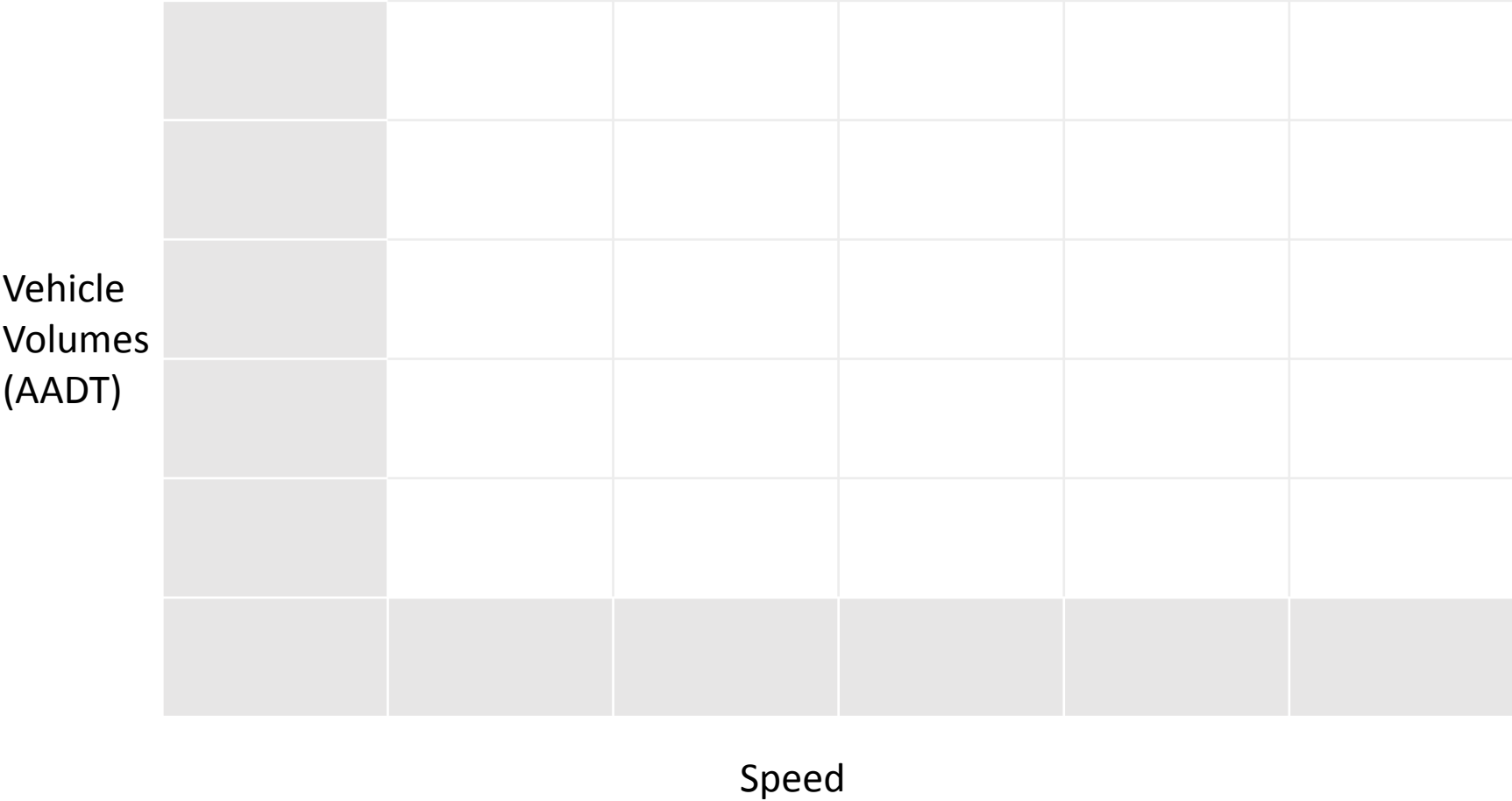
# How to Weight

Which factors are most important for the OCBR?

Category	Weight?
Existing Conditions	
Safety	
Addressing Barriers / Short gaps	
Overlap with Oregon Coast Trail	
Demand / Volumes	
Additional Community Access	
Transportation Disadvantaged Communities	
Partnerships / Local "Readiness"	
Locally Identified Projects	

# Urban (inside City Limits) - minimum

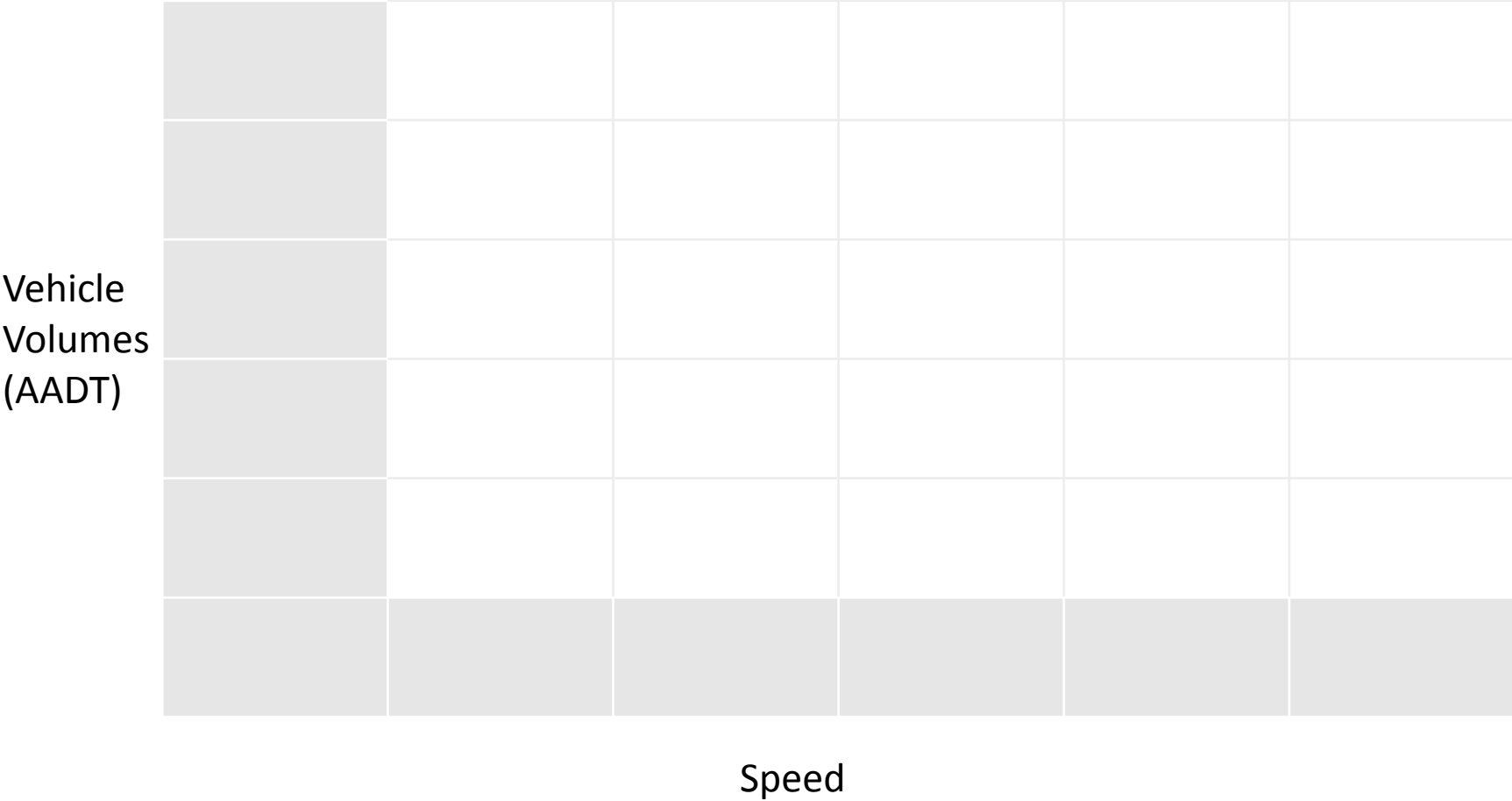
Bicycle facility type and width



Other factors to include in standard? \_\_\_\_\_

# Urban (inside City Limits) - desired

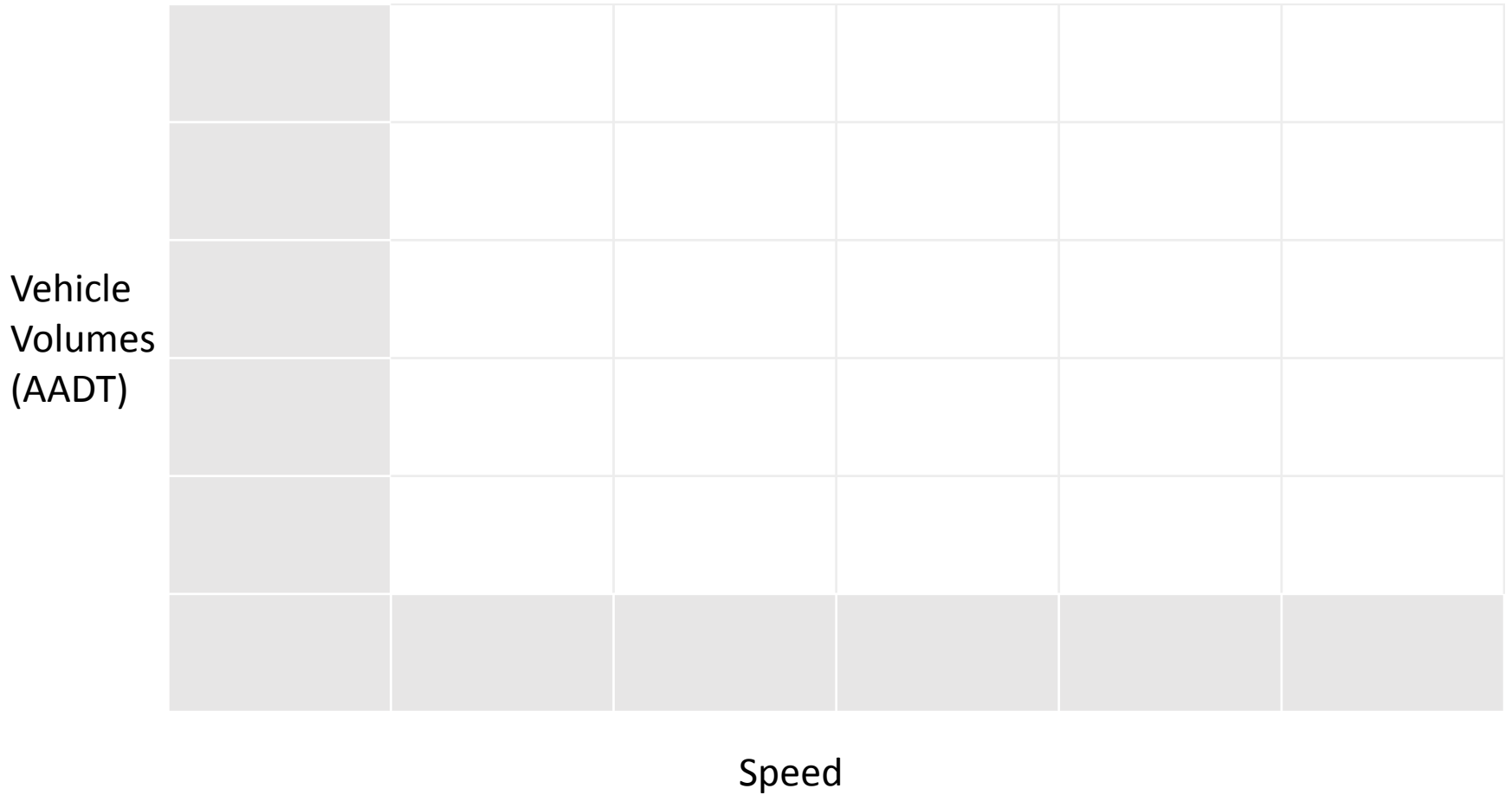
Bicycle facility type and width



Other factors to include in standard? \_\_\_\_\_

# Rural (outside City Limits) - minimum

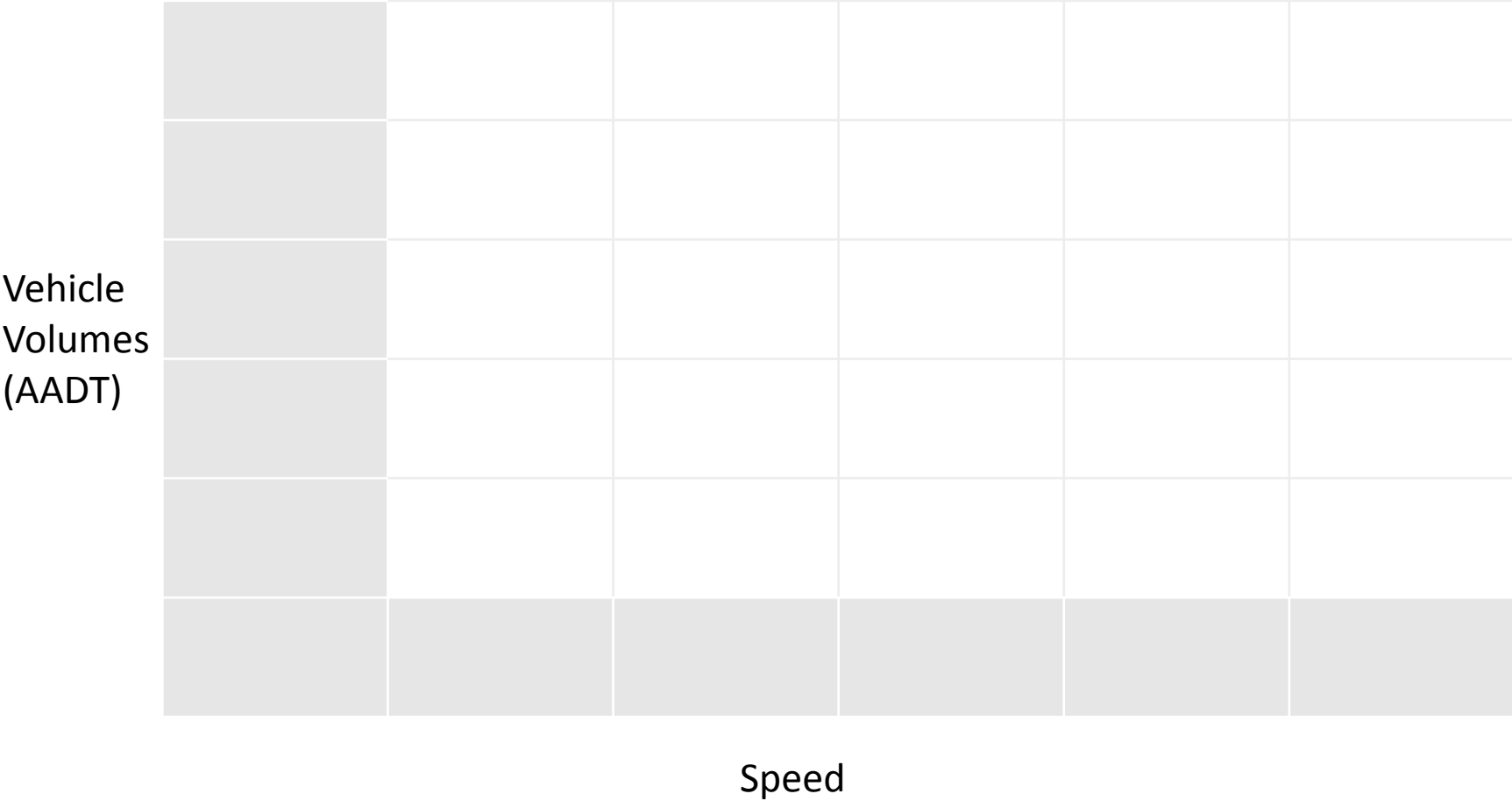
Bicycle facility type and width



Other factors to include in standard? \_\_\_\_\_

# Rural (outside City Limits) - desired

Bicycle facility type and width



Other factors to include in standard? \_\_\_\_\_