

2015 California Trails & Greenways Conference  
Safety and Sustainability

WHY THINK ABOUT SAFETY AND SUSTAINABILITY? HOW ARE  
THESE “PARTNERS”?



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# 2015 California Trails & Greenways Conference

## Safety and Sustainability

### PURPOSE



The purpose of this presentation is to provide the audience with a variety of reference perspectives and general information for planning and designing shared-use bicycle paths. The information provided is an advisory set of design principles aimed at developing safe and easily maintained pathways. Every path project is unique in terms of its setting and site circumstances. As such, the application of information presented herein is only a guide to be referenced by a qualified professional in the design of any project.

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## Safety and Sustainability

# OVERVIEW

- **Perspectives**
- Design Standards, Guidelines, and Design Exceptions
- Planning and Space
- Design for Safety
- Design for Sustainability
- Summary



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ACCIDENTS HAPPEN



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### NEVER TRY TO STEREOTYPE THE USER



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### WHO ARE THE USERS

- Bicyclist (with and without spandex)
- Bicyclists in packs
- Bicyclist with attachments
- Pedestrians (all ages)
- Pedestrians in packs
- Pedestrians with attachments
- People using other mobility devices (wheelchairs, skateboards, rollerblades, razors)
- Dogs with and without leashes
- Sometimes equestrians



## THE CYCLIC NEXUS

- Accidents happen
- Weak design can be contributory to accidents
- Accidents cost someone and that affects budgets
- Weak design can create maintenance needs and affect operating budgets
- Deferred maintenance can be contributory to accidents
- Accidents happen



## DESIGN CONSIDERATIONS

- Design implies intent
- Minimizing unintended consequences – there is rarely a perfect bicycle path
- Designing a shared-use bicycle path is like herding cats
- Using “Design Guidelines” involves tradeoffs
- Sometimes the confusion is clear
- Safety, safety, safety

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### TERMINOLOGY

Vertical Clearance Design Exception on the 42 000 km Priority Network  
Appendix BB - Exceptions to Design Standards

### Fact Sheet Exceptions to Mandatory Design Standards

Prepared by: \_\_\_\_\_  
Registered Civil Engineer

Submitted by \_\_\_\_\_ (Name), Design Engineer \_\_\_\_\_ Date \_\_\_\_\_ Telephone \_\_\_\_\_

Recommended for Approval \_\_\_\_\_ (Name), Project Manager \_\_\_\_\_ Date \_\_\_\_\_ Telephone \_\_\_\_\_

Concurrence by \_\_\_\_\_ (Name), Branch Chief or DDC, Design \_\_\_\_\_ Date \_\_\_\_\_ Telephone \_\_\_\_\_

Approved by \_\_\_\_\_ Project Development Coordinator for DLP \_\_\_\_\_ Date \_\_\_\_\_

\* Required if the Project Manager is not a Supervising T.E. or above.



The seal is circular with the text 'REGISTERED PROFESSIONAL ENGINEER' around the top and 'STATE OF CALIFORNIA' around the bottom. In the center, it reads 'REGISTRANT'S NAME', 'NUMBER', 'Exp. (Date)', and 'BRANCH'.

- **Mandatory Standards (bold type)\***
- Advisory Standards (underline)
- Permissive Standards (should or may)
- Guidelines (everything else – also referred to as “Permissive Standards”)

\* CALTRANS HDM and CAMUTCD

## TERMINOLOGY

- **MANDATORY DESIGN STANDARDS:** those considered most essential to achievement of overall design objectives. Many pertain to requirements of law or regulations and shall govern trail design.
- **ADVISORY STANDARDS:** also important, but allow greater flexibility in application to accommodate design constraints or be compatible with local conditions.
- **PERMISSIVE STANDARDS:** or guidelines, are those that “may” be used and allow greatest flexibility.

*Source: HDM Chapter 1000*

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### TERMINOLOGY

- Class I Bicycle Path
- Bicycle Path
- Bicycle Trail
- Shared-use Path (Trail)
- Multiple-use Path (Trail)
- Trail Bikeway
- Greenway Trail



23a. Bicycle Path – A "bicycle path" or "bike path" is a Class I bikeway, as defined in subdivision (a) of Section 890.4 of the Streets and Highways Code. Refer to CVC 231.5. See Class I Bikeway.

Source: CA-MUTCD

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### TERMINOLOGY

- Adequate width and/or design
- Open hours • 24/7
- Intersection Design
  - Two Bicycle Paths
  - Bicycle Path and Street



Must not only be viewed as essentially a one lane road with associated grading and site distance requirements driving the design.

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### TERMINOLOGY

- Paths are NOT Class IV Bikeways that are for exclusive bicycle use

Assembly Bill No. 1193— Cycle tracks or separated bikeways, also referred to as “Class IV bikeways,” which promote active transportation and provide a right-of-way designated exclusively for bicycle travel adjacent to a roadway and which are protected from vehicular traffic. Types of separation include, but are not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking. (September 2014)



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### TERMINOLOGY

#### **Streets and Highway Code Section 890.4.**

As used in this article, "bikeway" means all facilities that provide primarily for bicycle travel. For purposes of this article, bikeways shall be categorized as follows:

(a) Class I bikeways, such as a "bike path," which provide a completely separated right-of-way designated for the exclusive use of bicycles and pedestrians with crossflows by motorists minimized.

#### **Streets and Highway Code Section 887.**

As used in this chapter, "nonmotorized transportation facility" means a facility designed primarily for the use of pedestrians, bicyclists, or equestrians. It may be designed primarily for one or more of those uses.

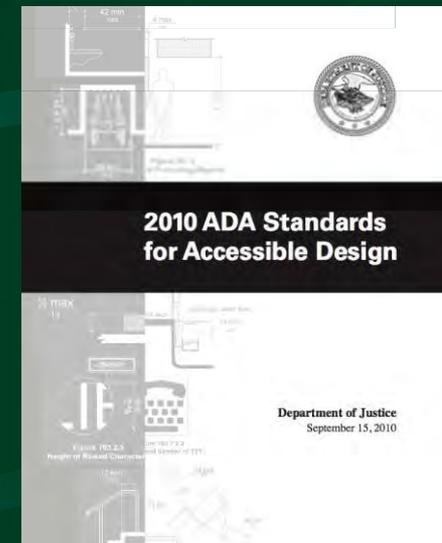
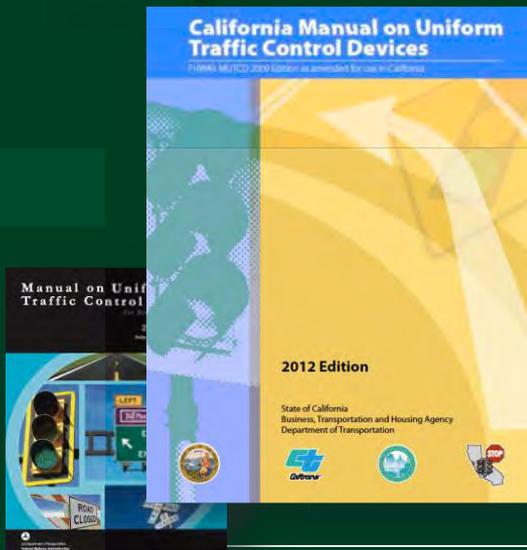
**HDM- Chapter 1000.** Trails are generally, unpaved multipurpose facilities suitable for recreational use by hikers, pedestrians, equestrians, and off-road bicyclists. While many Class I facilities are named as trails (e.g. Iron Horse Regional Trail, San Gabriel River Trail), trails as defined here do not meet Class I bikeways standards and should not be signed as bicycle paths.

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### PRIMARY DESIGN REFERENCES

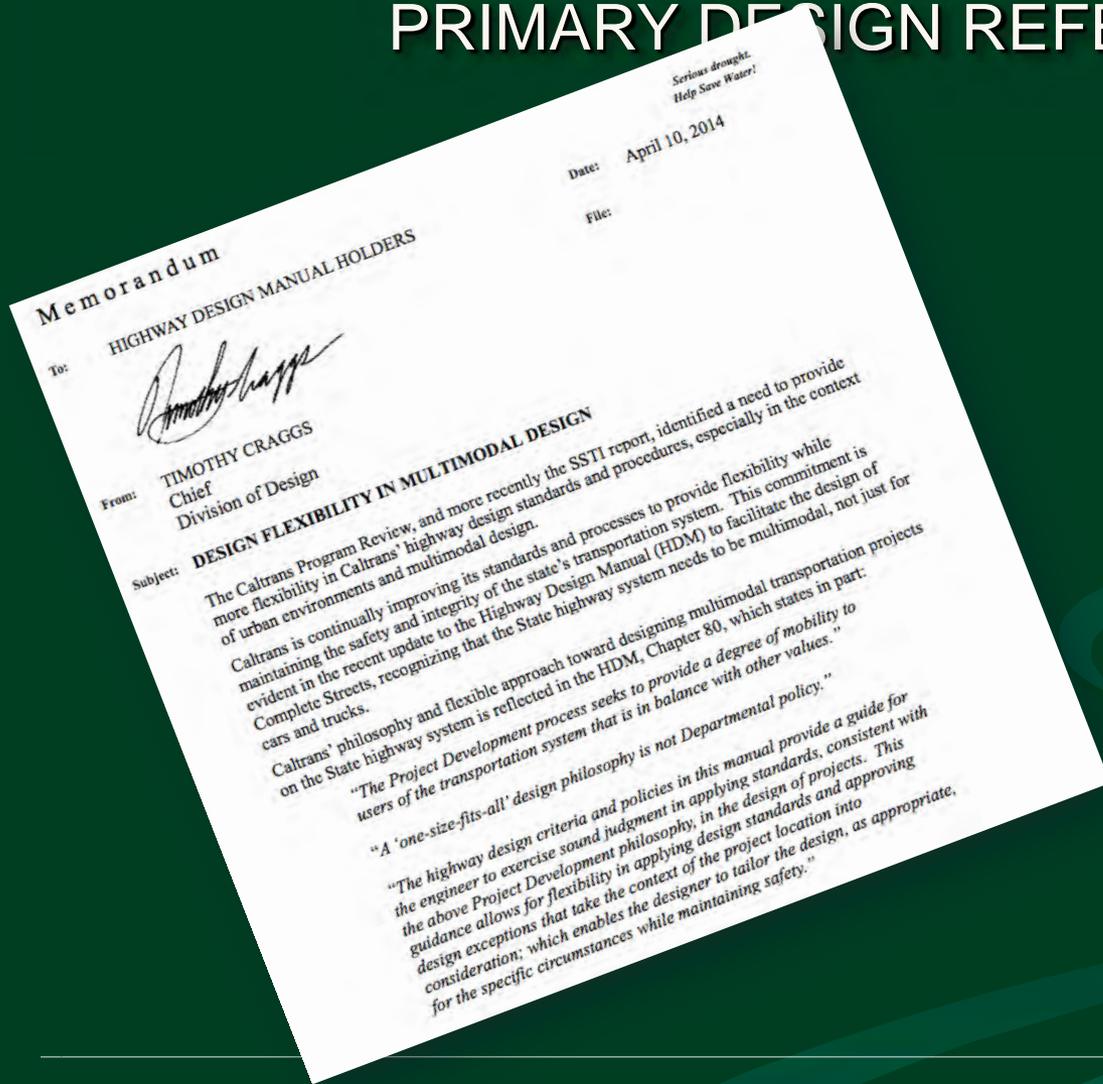
- CALTRANS: *California Highway Design Manual, Chapter 1000 — Bikeways* (May, 2012; Updated September 22, 2014)
- *California Manual on Uniform Traffic Control Devices* (2012)
- FHWA: *Manual of Uniform Traffic Control Devices*
- U.S. Department of Justice: *2010 ADA Standards for Accessible Design*



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### PRIMARY DESIGN REFERENCES



*“A ‘one-size-fits-all’ design philosophy is not Departmental policy.”*

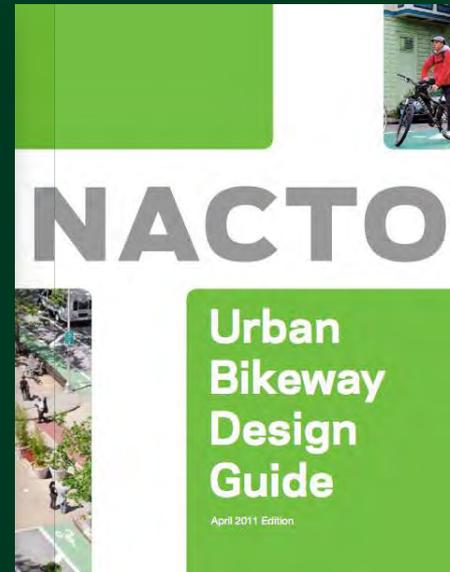
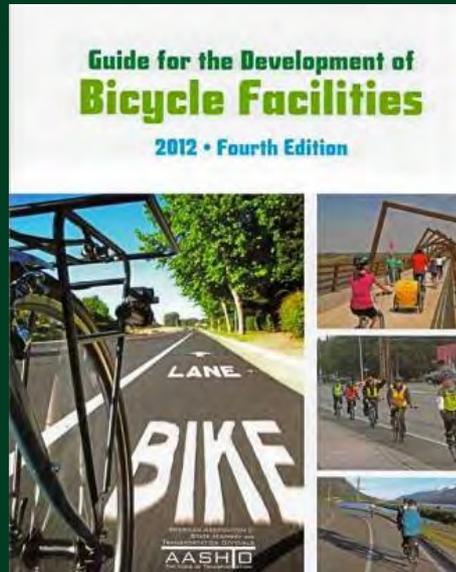
For example, AASHTO’s “Guide for the Development of Bicycle Facilities” a.k.a. AASHTO Bike Guide, provides information on how to accommodate bicycle travel and operations in most riding environments.

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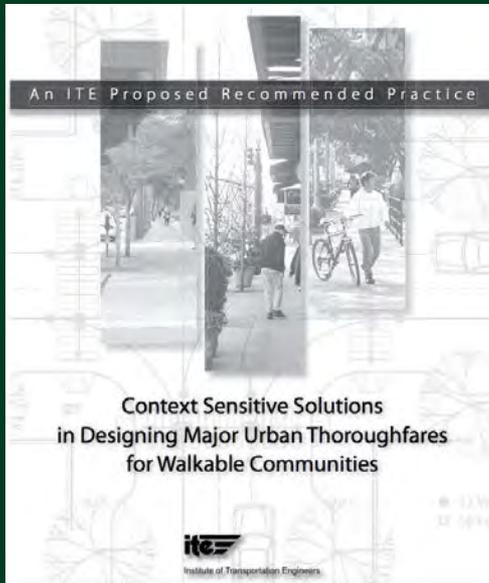
- *AASHTO: Guide for the Development of Bicycle Facilities (2012)*
- *National Association of City Transportation Officials (NACTO): Urban Bikeway Design Guide*



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### ■ RELATED DESIGN REFERENCES



Source: ITE



Designing Walkable Urban Thoroughfares:  
A Context Sensitive Approach

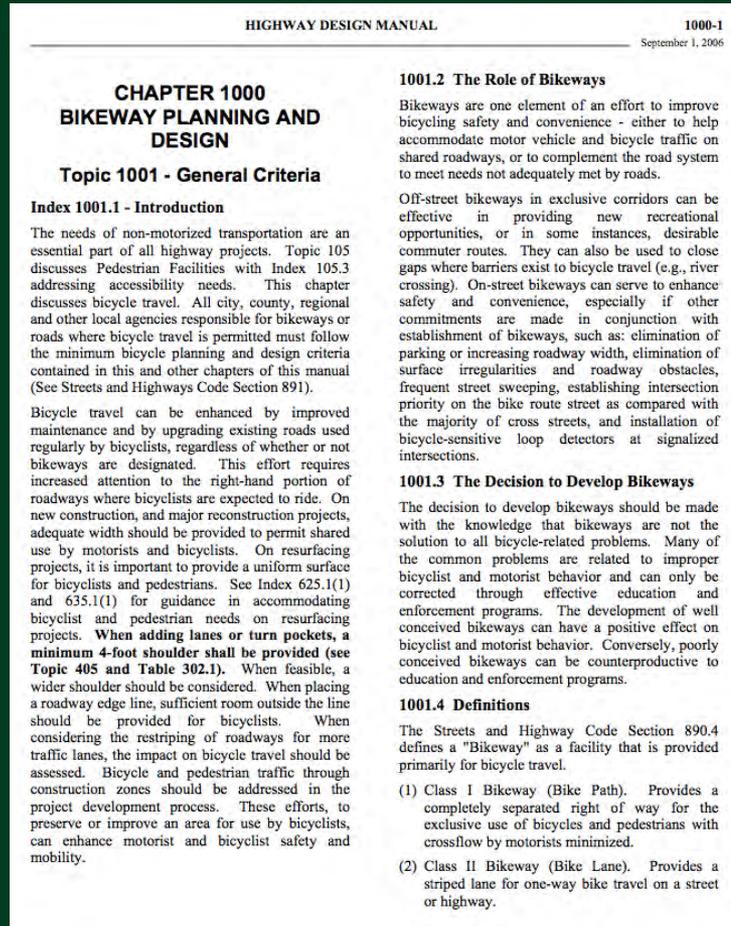


Source: NACTO  
<http://nacto.org/usdg/>

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### MANDATORY DESIGN STANDARDS • HDM CHAPTER 1000

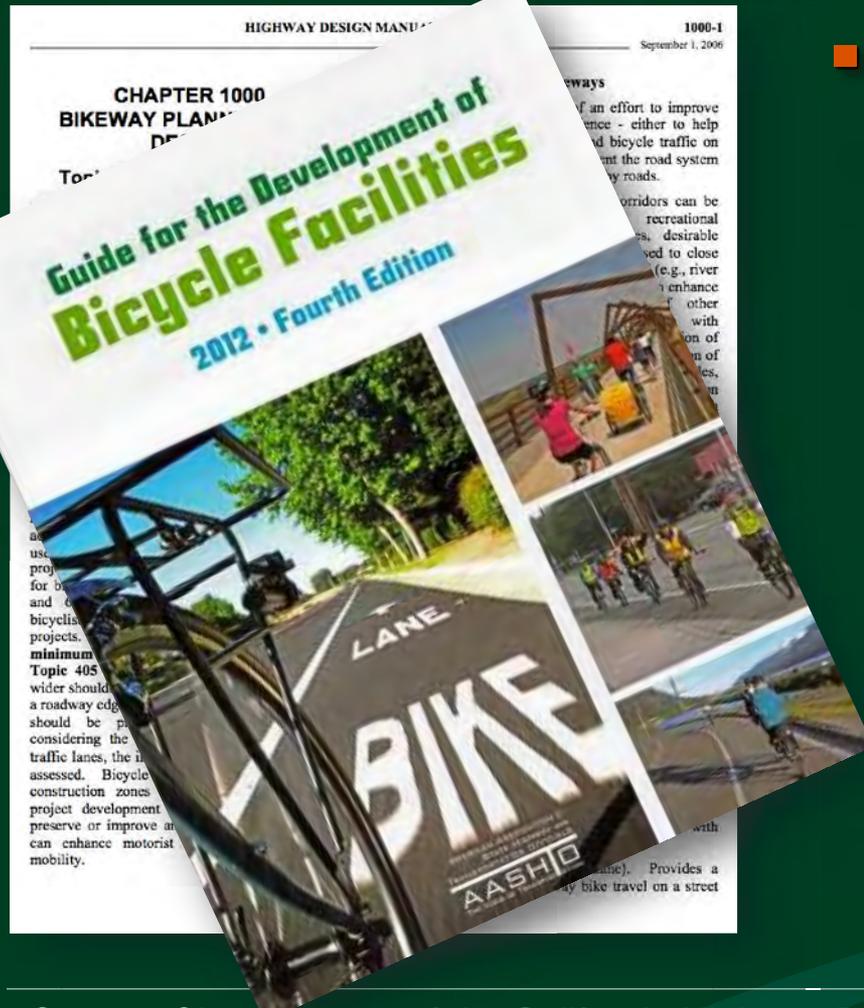


- Establishes minimum safety design criteria for the planning and construction of bikeways including but not limited to:
  - Design speed of the facility
  - Minimum widths and clearances
  - Speed, grade, radius of curvature, pavement surface
  - Actuation of automatic traffic control devices, drainage, and general safety

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### MANDATORY DESIGN STANDARDS • HDM CHAPTER 1000



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## Safety and Sustainability

# OVERVIEW

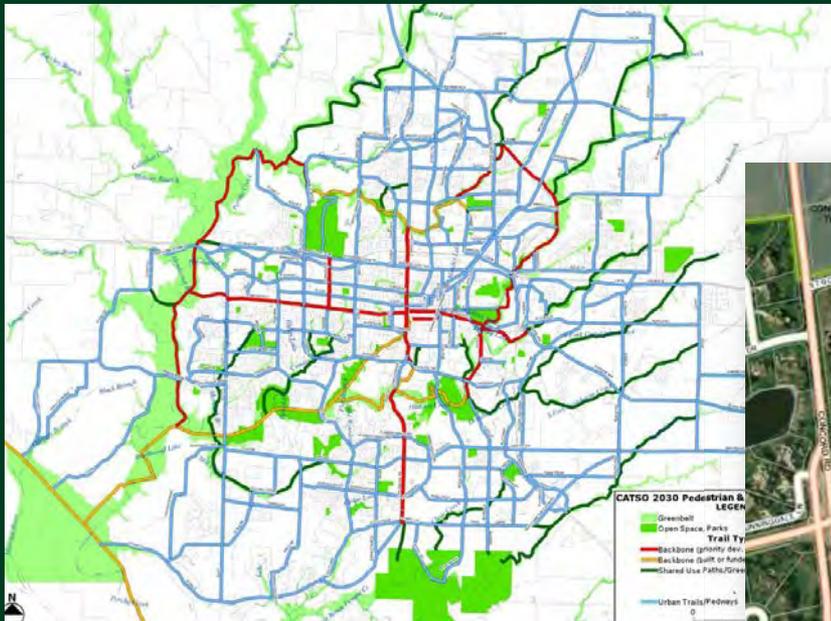
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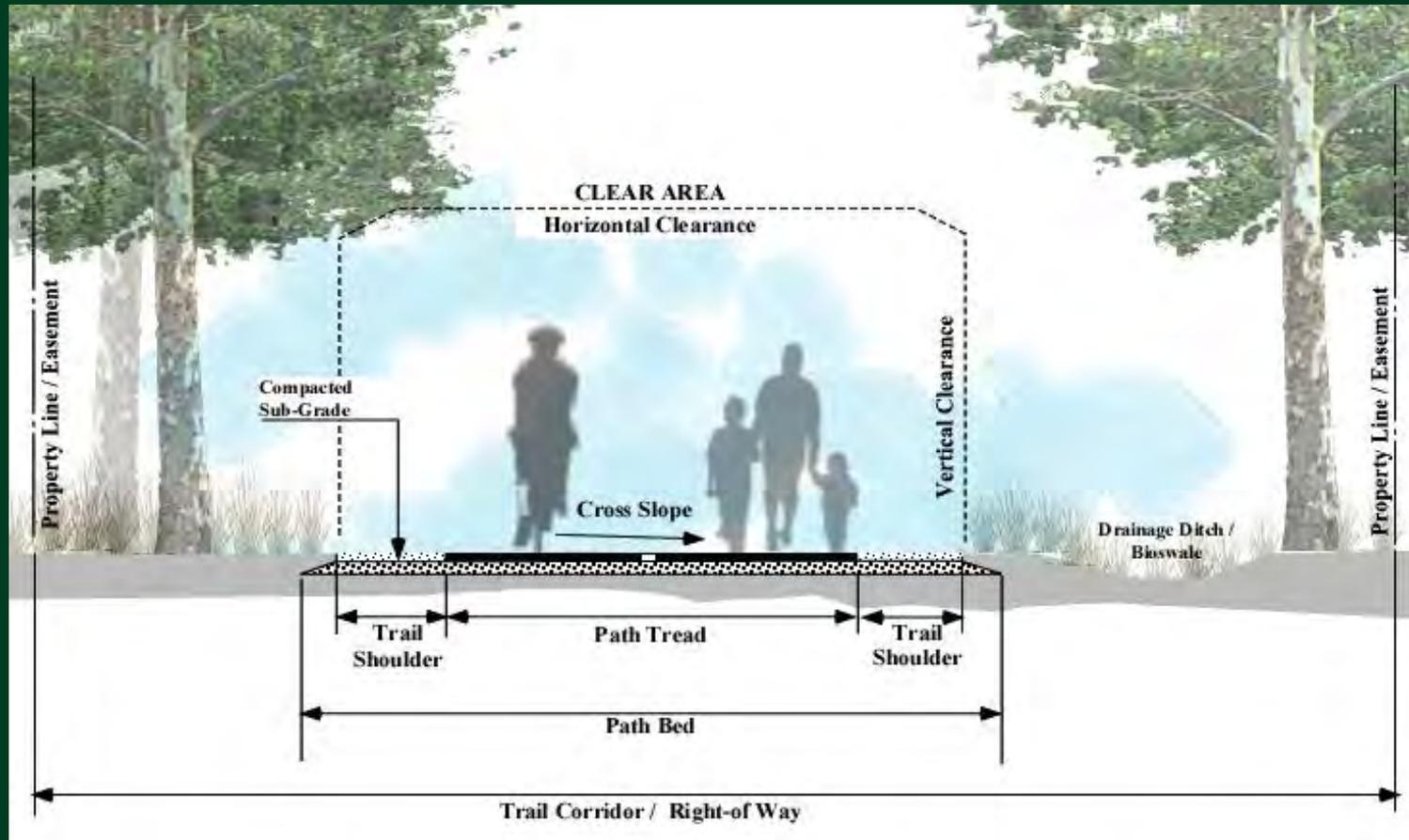
### DEFINING THE OPTIMUM RIGHT-OF-WAY WIDTH SQUEEZING TOO MUCH IN TOO NARROW A CORRIDOR?



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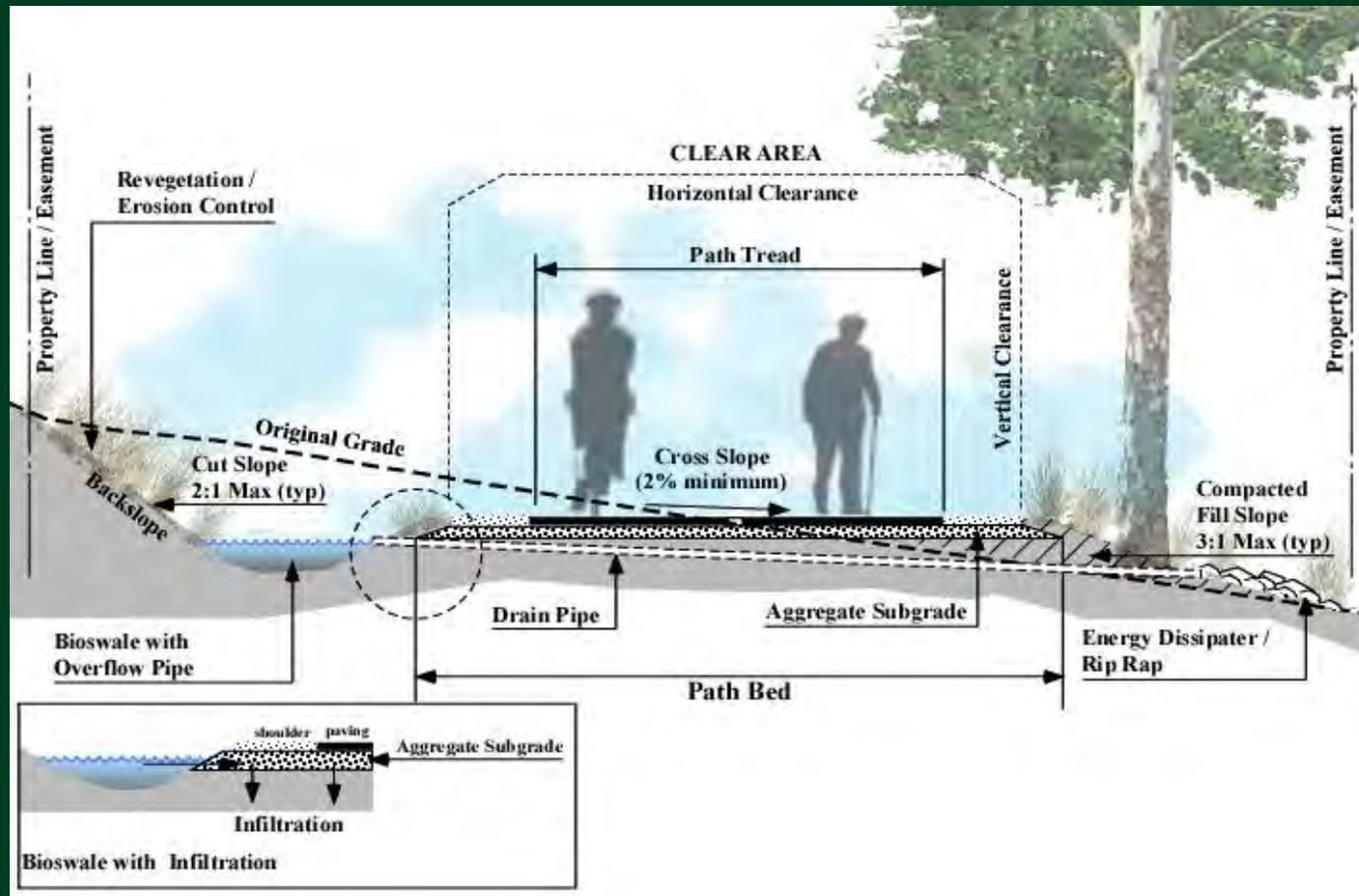
### DEFINING THE OPTIMUM RIGHT-OF-WAY WIDTH



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### DEFINING THE OPTIMUM RIGHT-OF-WAY WIDTH



## DEFINING THE OPTIMUM RIGHT-OF-WAY WIDTH

### ADD:

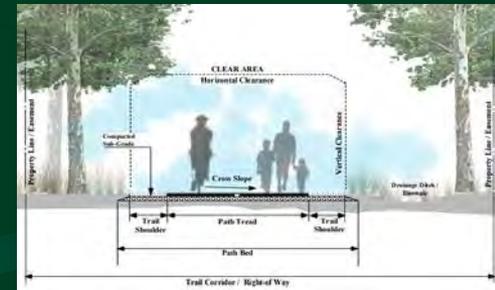
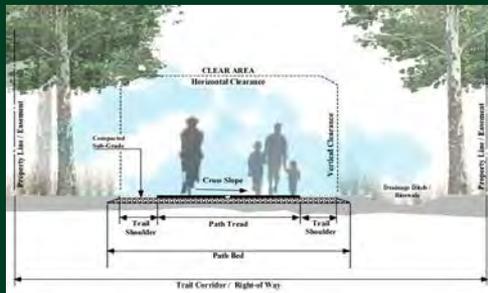
- Grading requirements for both horizontal and vertical control
- Horizontal requirements for erosion control and water quality management features
- Horizontal requirements for landscaping that recognizes path barrier setbacks and horticultural (growth) requirements. Vegetation uses include:
  - Shade
  - Adjacent land use screening
  - Habitat mitigation
- Space for other path / greenway amenities (interpretive signs, lights, bicycle parking, benches, etc.)

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### WHAT IS AN OPTIMUM RIGHT-OF-WAY WIDTH ?

- 12' – 20'
- 21' – 30'
- 31' – 40'
- 41' – 50'
- More than 50'



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### DESIGN FOR SAFETY

