pennsylvania
DEPARTMENT OF TRANSPORTATION

2009 PA APA Annual Conference
"Investing in a Sustainable Future"
October 5, 2009

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Bureau of Design
PennDOT

Smart **Transportation**
it starts with me

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1

What is Smart Transportation?

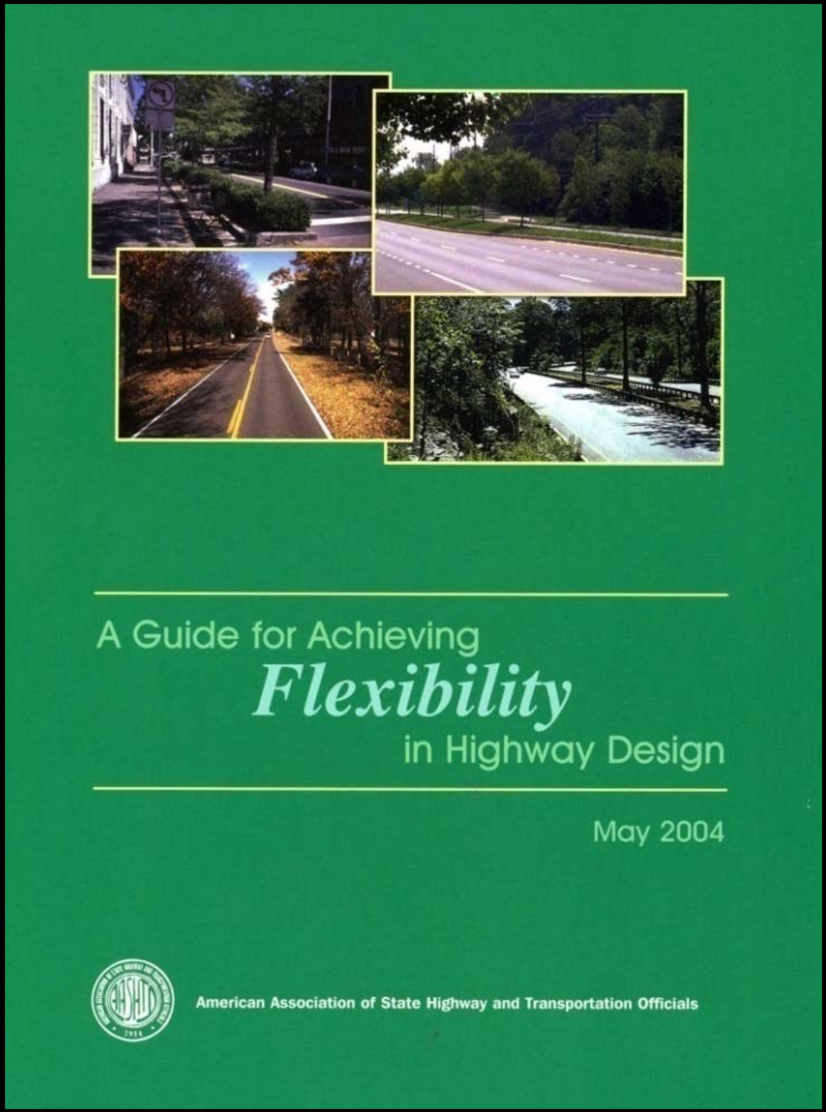
Smart Transportation
is partnering to build great
communities for future
generations of Pennsylvanians
by linking transportation
investments and land use
planning and decision making.

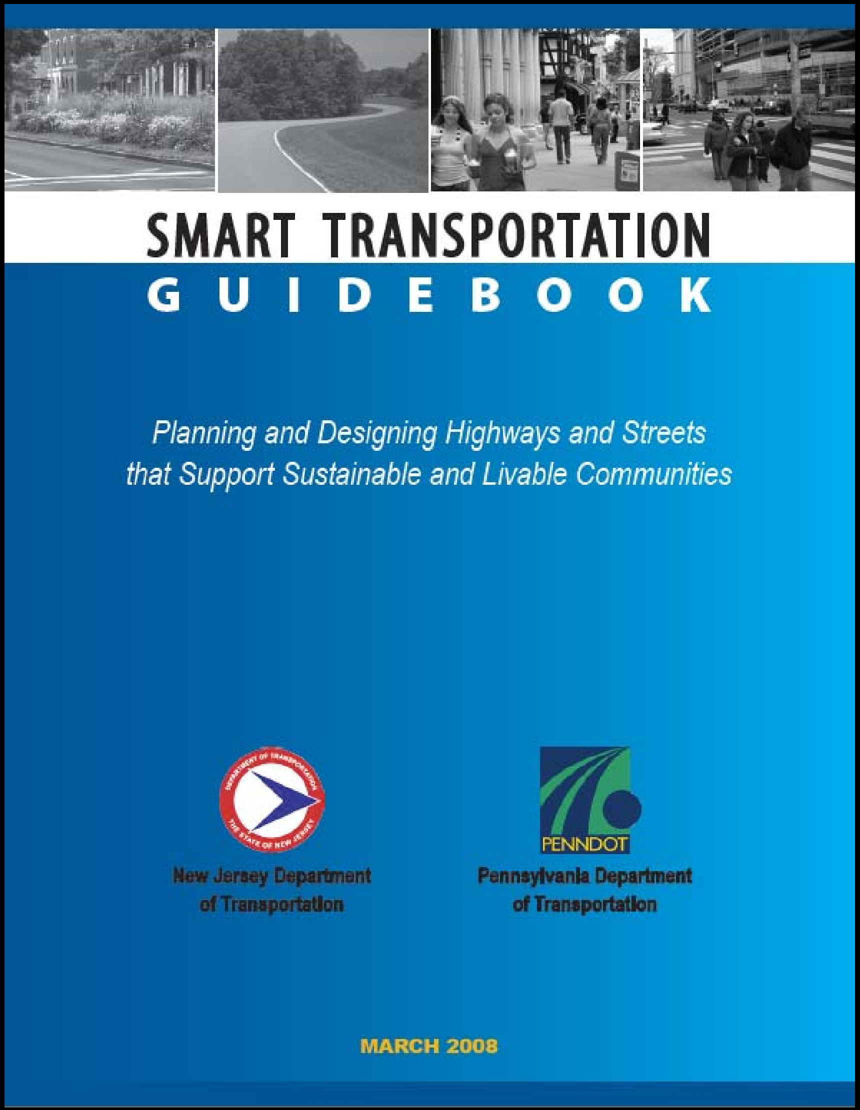
Smart Transportation Means Listening

Smart Transportation Means Choice

Smart Transportation Means Safety

Smart Transportation Means Flexibility





Fundamentally,
smart transportation is about
linking land use & transportation
decisions and investments.

2

How will PennDOT do this?

SMART TRANSPORTATION GUIDEBOOK

Planning and Designing Highways and Streets that Support Sustainable and Livable Communities

New Jersey Department of Transportation

Pennsylvania Department of Transportation

MARCH 2008

Integrating Smart Transportation

Understand the Context

Must be determined in Planning – Pre TIP

Context **MUST** consider:

- ❑ Land Use
- ❑ Community
- ❑ Environment
- ❑ Transportation
- ❑ Financial

Smart Transportation Strike-Off Letter

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

DATE: September 18, 2008 432-08-12

SUBJECT: Smart Transportation Interim Policy

TO: **District Executives**

FROM: Brian G. Thompson, P.E. /s/ David J. Azzato, P.E.
Director
Bureau of Design

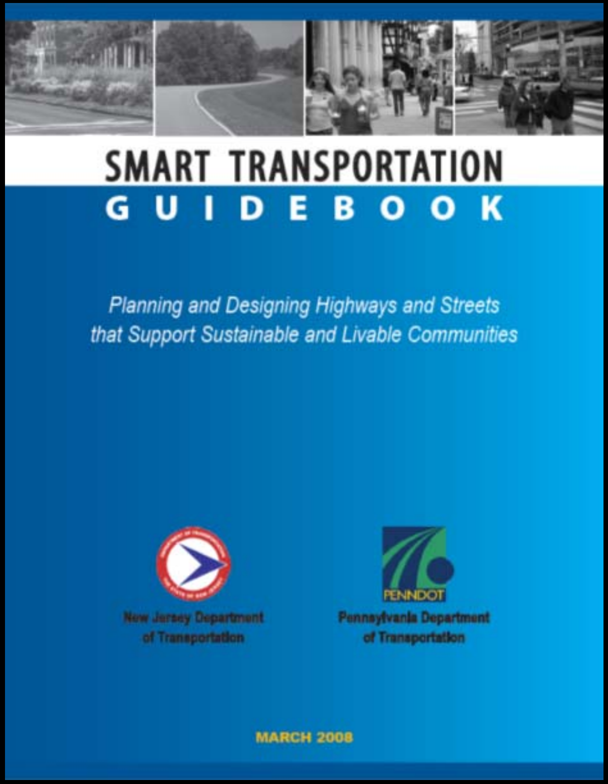
The recent release of PennDOT's Smart Transportation Guidebook is intended to guide the design of roadways and bridges that fit within the existing and planned contexts of the communities through which they pass, and to develop the best and most affordable transportation solutions.

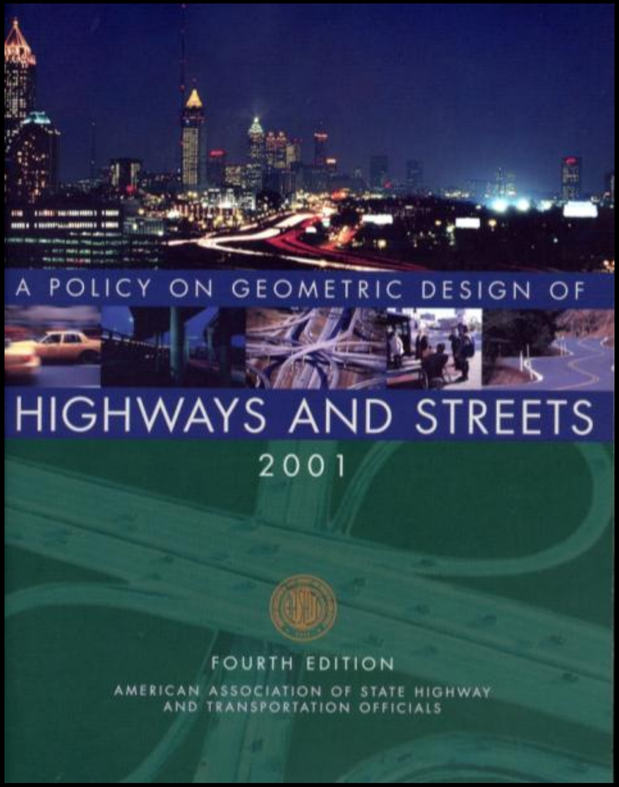
The purpose of this Strike-Off Letter is to implement policy for the design of roadways that better reflect their context within the larger transportation network. These changes immediately implement the recommended design values from the Smart Transportation Guidebook into our design policy, and provide more flexibility for our designs. This time-

Revisions to Design Manuals

- Interim Design Policy – Issued September 18, 2008
  - Roadway/Context Typologies
  - Expanded Bridge Width Criteria
  - Design Speed
  - Highway Occupancy Permit Policy
- Design Manuals Under Revisions
  - Design Manual Part 1
  - Design Manual Part 2

The Smart Transportation Guidebook is fully compatible and consistent with AASHTO.





Defining the Contexts

	RURAL	SUBURBAN			URBAN		
							
	Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town Center	Urban Core
DENSITY UNITS	1 DU/ac - 8DU/ac	1 DU/ac – 8DU/ac	2 – 30 DU/ac	3 – 20 DU/ac	4 – 30 DU/ac	8 – 50 DU/ac	16 – 75 DU/ac
BUILDING COVERAGE	NA	<20%	20% - 35%	35% - 45%	35% - 50%	50% - 70%	70% - 100%
LOT SIZE/AREA	20 acres	5,000 – 80,000 sf	20,000 - 200,000 sf	25,000 – 100,000 sf	2,000 – 12,000 sf	2,000 – 20,000 sf	25,000 – 100,000 sf
LOT FRONTAGE	NA	50 to 200 feet	100 to 500 feet	100 to 300 feet	18 to 50 feet	25 to 200 feet	100 to 300 feet
BLOCK DIMENSIONS	NA	400 wide x varies	200 wide x varies	300 wide x varies	200 by 400 feet	200 by 400 feet	200 by 400 feet
MAX. HEIGHT	1 to 3 stories	1.5 to 3 stories	retail-1 story; office 3-5 stories	2 to 5 stories	2 to 5 stories	1 to 3 stories	3 to 60 stories
MIN./MAX. SETBACK	Varies	20 to 80 feet	20 to 80 feet	20 to 80 feet	10 to 20 feet	0 to 20 feet	0 to 20 feet

Roadways in Context

The photos enclosed in a yellow box indicate the Town Center and Core City streets that also operate as a local or regional Main Street.

Figure 5.1 Roads in Context

Conventional Functional Classification

Arterial

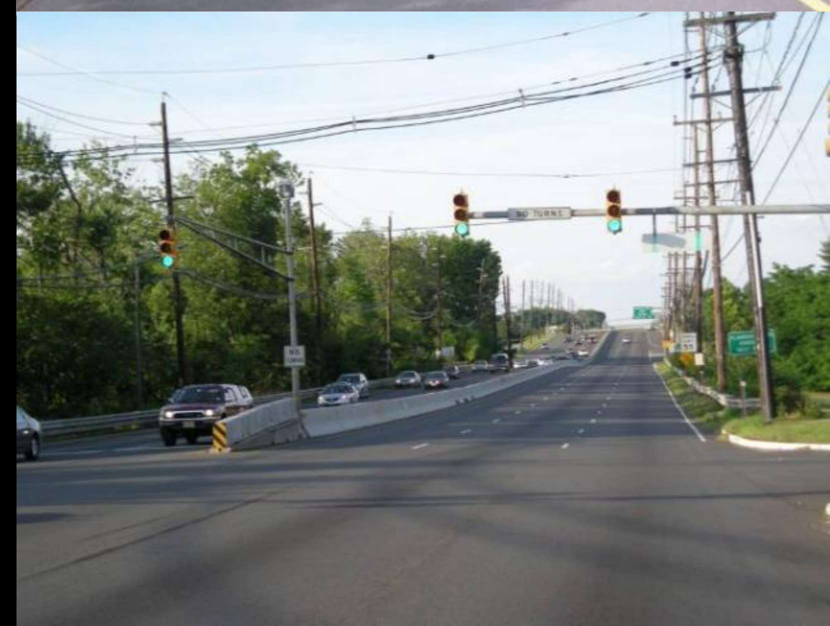
Collector

Local

Why rethink functional classification?

Just a few reasons…

- Some arterials carry predominantly local traffic and have many access points
- The design speed for the arterial class can be too high for an arterial serving as the "Main Street" of a community
- As land uses change, so should roadway design



Both of these roadways are principal arterials

Solution: New Roadway Type "Overlay"

Roadway Class	Roadway Type	Desired Operating Speed (mph)	Average Trip Length (mi)	Volume	Intersection Spacing (ft)	Comments
Arterial	Regional	30-55	15-35	10,000-40,000	660-1,320	Roadways in this category would be considered "Principal Arterial" in traditional functional classification.
Arterial	Community	25-55	7-25	5,000-25,000	300-1,320	Often classified as "Minor Arterial" in traditional classification but may include road segments classified as "Principal Arterial."
Collector	Community	25-55	5-10	5,000-15,000	300-660	Often similar in appearance to a community arterial. Typically classified as "Major Collector."
Collector	Neighborhood	25-35	<7	<6,000	300-660	Similar in appearance to local roadways. Typically classified as "Minor Collector."
Local	Local	20-30	<5	<3,000	200-660	

Regional Arterial

Regional Arterial		Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town/Village Center	Urban Core
Roadway	Lane Width[1]	11' to 12'	11' to 12' (14' to 15' outside lane if no shoulder or bike lane)	11' to 12' (14' to 15' outside lane if no shoulder or bike lane)	11' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)
	Paved Shoulder Width[2]	8' to 10'	8' to 10'	8' to 12'	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)
	Parking Lane[3]	NA	NA	NA	8' parallel	8' parallel; see 7.2 for angled	8' parallel; see 7.2 for angled	8' parallel
	Bike Lane	NA	5' to 6' (if no shoulder)	6' (if no shoulder)	5' to 6'	5' to 6'	5' to 6'	5' to 6'
	Median	4' to 6'	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only
	Curb Return	30' to 50'	25' to 35'	30' to 50'	25' to 50'	15' to 40'	15' to 40'	15' to 40'
	Travel Lanes	2 to 6	2 to 6	4 to 6	4 to 6	2 to 4	2 to 4	2 to 6
Roadside	Clear Sidewalk Width	NA	5'	5' to 6'	5' to 6'	6' to 8'	6' to 10'	6' to 12'
	Buffer[4]	NA	6'+	6' to 10'	4' to 6'	4' to 6'	4' to 6'	4' to 6'
	Shy Distance	NA	NA	NA	0' to 2'	0' to 2'	2'	2'
	Total Sidewalk Width	NA	5'	5' to 6'	9' to 14'	10' to 16'	12' to 18'	12' to 20'
Speed	Desired Operating Speed	45-55	35-40	35-55	30-35	30-35	30-35	30-35

1 12' preferred for regular transit routes, and heavy truck volumes > 5%, particularly for speeds of 35 mph or greater.
2 Shoulders should only be installed in urban contexts as a retrofit of wide travel lanes to accommodate bicyclists.
3 Buffer is assumed to be planted area (grass, shrubs and/or trees) for suburban neighborhood and corridor contexts; street furniture/car door zone for other land use contexts. Min. of 6' for transit zones.
4 Curb return radius should be as small as possible. Number of lanes, on street parking, bike lanes, and shoulders should be utilized to determine effective radius.

Community Arterial

Community Arterial		Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town/Village Center	Urban Core
Roadway	Lane Width[1]	11' to 12'	10' to 12' (14' outside lane if no shoulder or bike lane)	11' to 12' (14' to 15' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)
	Paved Shoulder Width[2]	8' to 10'	4' to 8' if no parking	8' to 10'	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)
	Parking Lane[3]	NA	7' to 8' parallel	NA	8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled
	Bike Lane	NA	5' to 6' (if no shoulder)	5' to 6' (if no shoulder)	5' to 6'	5' to 6'	5' to 6'	5' to 6'
	Median	4' to 6'	12 to 18; for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians only
	Curb Return	25' to 50'	25' to 35'	25' to 50'	20' to 40'	15' to 30'	15' to 35'	15' to 40'
	Travel Lanes	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4
Roadside	Clear Sidewalk Width	NA	5'	5' to 6'	6'	6' to 8'	6' to 10'	8' to 14'
	Buffer[4]	NA	6'+	5' to 10'	4' to 6'	4' to 6'	4' to 6'	4' to 6'
	Shy Distance	NA	NA	NA	0' to 2'	0' to 2'	2'	2'
	Total Sidewalk Width	NA	5'	5' to 6'	10' to 14'	10' to 16'	12' to 18'	14' to 22'
Speed	Desired Operating Speed	35-55	30-35	35-50	30	25-30	25-30	25-30

1 12' preferred for reguar transit routes, and heavy truck volumes > 5%, particularly for speeds of 35 mph or greater.
2 Shoulders should be installed in urban contexts only as part of a retrofit of wide travel lanes, to accommodate bicyclists.
3 7' parking lanes on this roadway type to be considered in appropriate conditions.
4 Buffer is assumed to be planted area (grass, shrubs and/or trees) for suburban neighborhood and corridor contexts; street furniture/car door zone for other land use contexts. Min. of 6' for transit zones.

Sources for values in matrix: AASHTO Green Book (2001), and ITE "Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities" (2006).

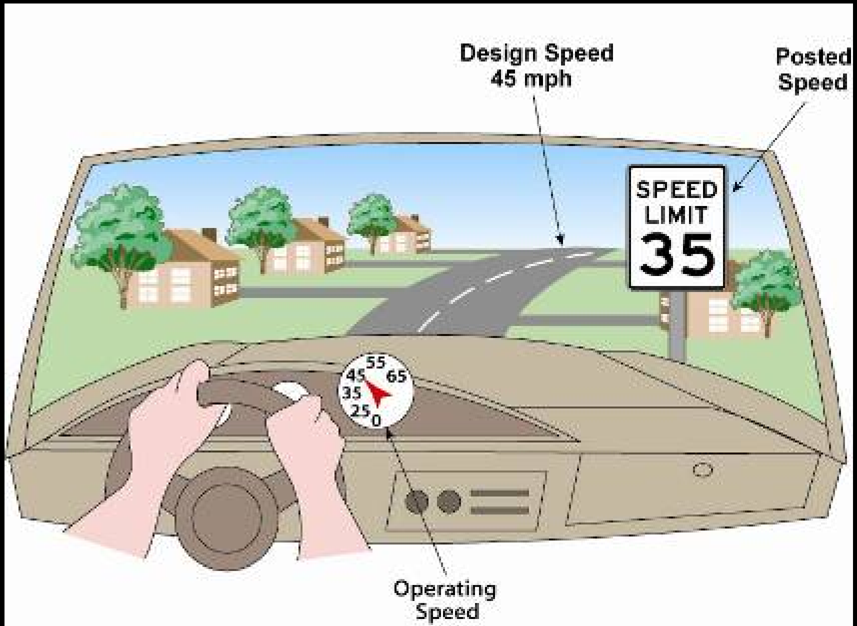
Desired Operating Speed

Also Known as "Design To" or "Target Speed"

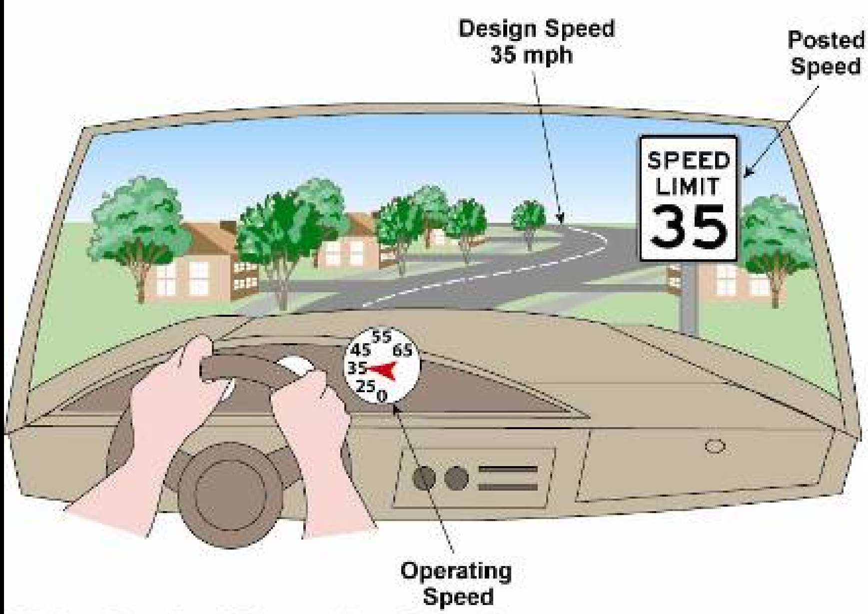
Definition: The speed of traffic that, in the expert judgments of the highway engineer and community planner, best reflects the function of the roadway and the surrounding land use context.

Simple Definition: The speed at which we would like vehicles to travel.

Desired Operating Speed



Conventional Design



Using Desired Operating Speed

Which Type of Network is Best?

- *Hint: One network offers more flexibility in designing individual roadways, and gives more choices to motorists, bicyclists and pedestrians alike.*

Bicycle Facilities

What is the best means of accommodating bicyclists?

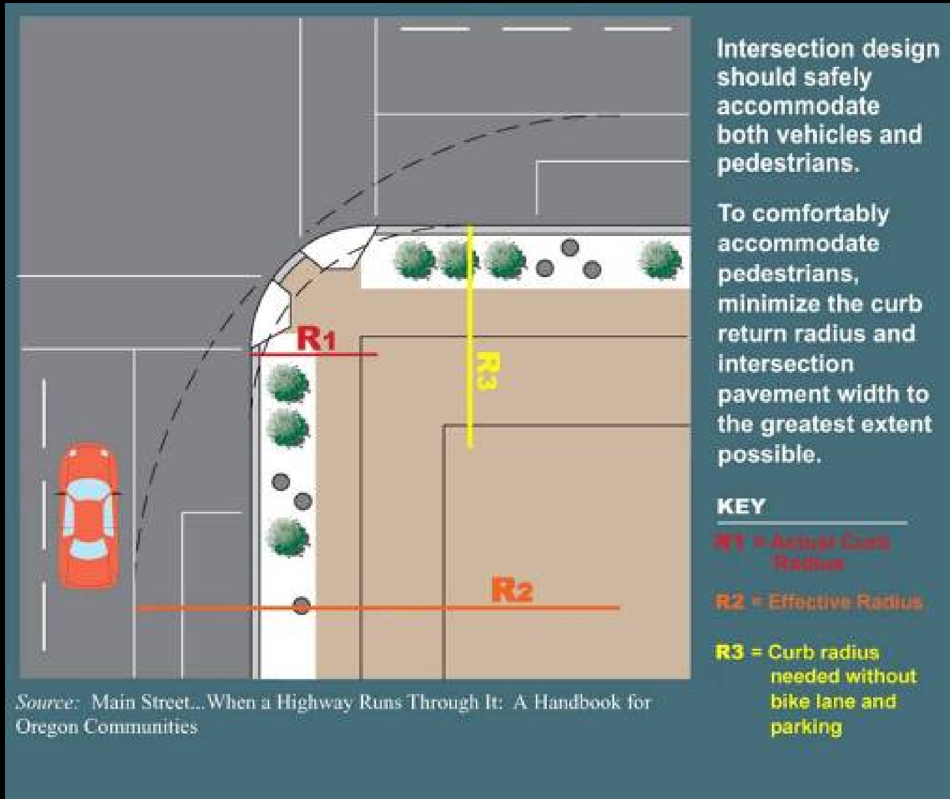
Bike lane

Wide curb lane

Roadway with shoulders

Intersections

- In urban contexts, choose the smallest curb radius that can accommodate the design vehicle
  - Balance the need to accommodate truck turning movements with the benefit of smaller crossings for pedestrians
- Add width of parking and bike lanes when determining effective curb radius



Pedestrian Facilities

- Sidewalk network is the best gauge of community's "walkability"
- Provide sidewalks along both sides of all roadways in commercial areas, and along all arterials and collectors in residential areas
- Strive for "clear sidewalk width" of 5 to 8 ft.
- Provide more intensive crosswalk treatments for major roadways

Public Transit

- "Farside" bus stops are preferred to "nearside" bus stops
  - Pedestrian crashes at bus stops are more associated with nearside stops
  - Farside bus stops are shorter, giving more room for on-street parking
- Be prepared for greater interest in public transit!

Access Management

- Encourage municipalities to pass access management ordinances, focusing on arterials.
- Preserves the taxpayers investment in their transportation system.

Poor access management on suburban corridor

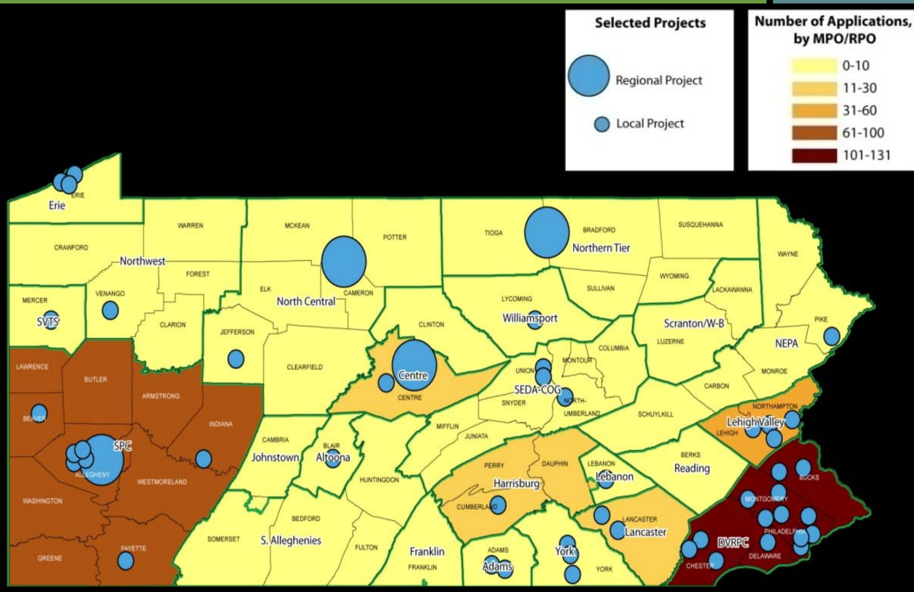
Design Using the Principles

- Understand the surrounding and future land uses
- Consider the role of the roadway within the network
- Know the roadway type and users
- Set the desired operating speed
- Refer to the Matrix for the starting design values

Requisite for process: understand the flexibility provided by the AASHTO Green Book

Pennsylvania Community Transportation Initiative

- **Applications received:**
  403 requesting $600 million
- **Applications selected:**
  50 granting $59.3 million



Type of Project	# of Selections	% of Total Selections	Total Funding for Selected Projects	% of Total Funding
Bicycle/Pedestrian	9	18%	$9,230,405	16%
Roads/Intersections/Local Network	6	12%	$9,937,000	17%
Intermodal/Transit-oriented Development	13	26%	$14,007,200	24%
Land Use & Transportation Planning/Redevelopment	13	26%	$7,666,500	13%
Streetscape/Traffic Calming	8	16%	$18,158,887	31%
Regional Planning	1	2%	$285,000	0%
TOTAL	***50***	***100%***	***$59,284,992***	***100%***

PCTI Project Example

Bike Path - Altoona and Penn State Altoona Campus ($300,000)

- Good bike trail project
- Connections to town/campus
- Enhance local network
- Bike lanes added as part of a larger DOT project

TRANSPORTATION PROJECT DELIVERY PROCESS

revised draft 09.28.09

LRTP Documentation (Step 2) — TIP/STIP Documentation (Step 5)

Preservation Projects Advance to the TIP/STIP (from Step 1 to Step 5)

	1	2	3	4	5	6	7
STEPS	Problem Assessment	Problem Identification in LRTP	Problem Initiation	Problem Definition	Project Identification in TIP/STIP	Preliminary Engineering/ NEPA Decision	Final Design/ Construction
PRODUCTS	• Level 1 Screening Form	• List of Candidate Problems and Programs • Level 2 Screening Form	• Shortlist of TIP • Recommendations • Level 3 Screening Form	• Draft TIP/STIP • Proposal Definition Addendum	• TIP/STIP • List of Prioritized Projects	• Level 4 Scoping Form	
OWNERS	• Sponsor	• MPO/RPO • Central Office • Districts	• MPO/RPO • Central Office • Districts	• MPO/RPO • Central Office • Districts	• MPO/RPO • Central Office • Districts	• Districts/FHWA	• Districts
CHANGES	• Focus on and define the problem, not the solution	• Determine the priority of the problem within the region • Use an asset management methodology to understand the program available for new problems • Use evaluation criteria that are consistent with the Mobility Plan to determine and prioritize problem	• Identify potential range of land use and multi-modal transportation solutions • Enhance coordination with municipalities, resource agencies and stakeholders	• Identify range of potential solutions, costs and schedules for implementation • Understand the surrounding future land use and transportation context	• Develop more definitive costs and schedules for projects • Use evaluation criteria that are consistent with the Mobility Plan to determine which projects are funded	• Use planning decisions and better-defined project need to streamline this phase	• More accurate schedules and costs will increase predictability and streamline this phase

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