State Smart Transportation Initiative

Practical Solutions to Move America Forward

A guide for complete transportation: Arizona's new HDM

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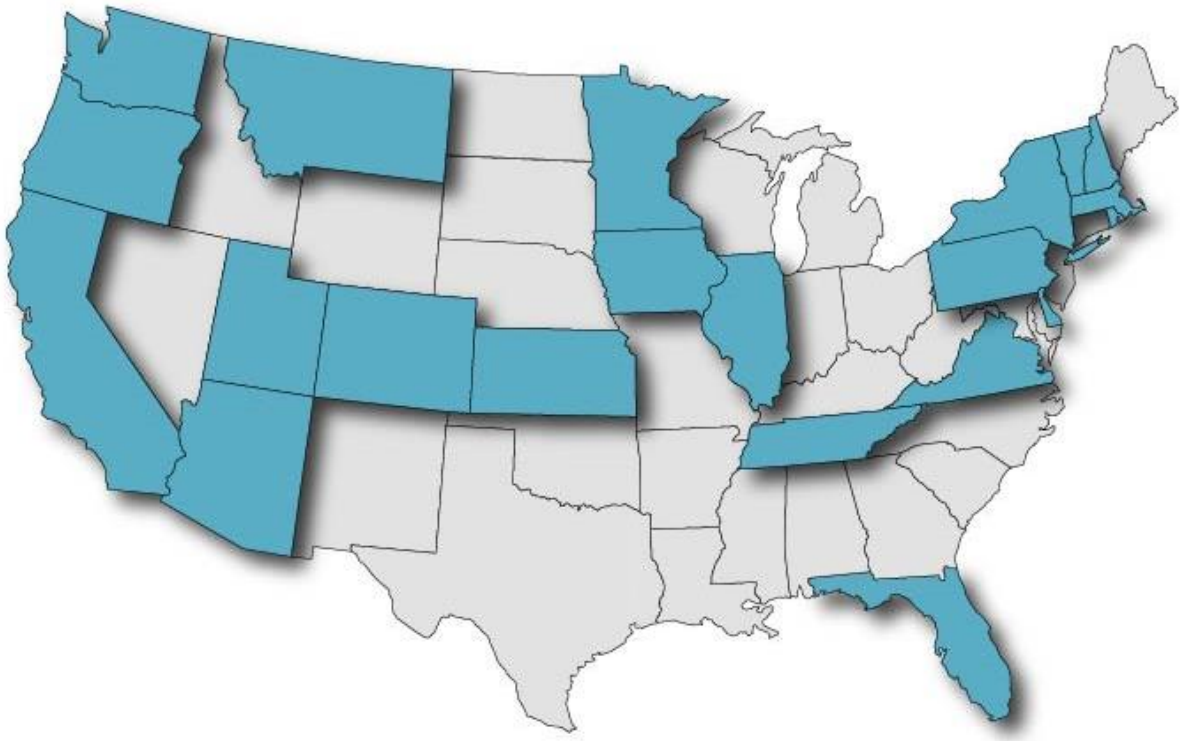
State Smart Transportation Initiative

A network of reform-oriented state DOTs, founded in 2010 and housed at the University of Wisconsin.

- Executive-level Community of Practice
- Technical assistance
- Resource for the transportation community



A Guide for Complete Transportation
The 2016 Arizona DOT
Complete Transportation Guidebook

State Smart Transportation Initiative Webinar
Tuesday, September 20, 2016
Steven Olmsted - Arizona DOT

Arizona Universe

Arizona	
Population estimate July 1, 2015	6,828,065
Population, percent change since April 1, 2010	6.8%
Maintenance lane miles	140,000
International border	1
Square miles	114,000
Arizona Department of Transportation	
Maintenance lane miles	30,000
System operates	Sea level to 6,000’
Temperatures	0°F to over 120°F
Long range transportation need est.	$100 billion
Long range transportation revenue est.	$25 billion

ADOT Long-Range Transportation Plan

- ***What Moves You Arizona*** is ADOT's Long-Range Transportation Plan
- The LRTP defines visionary, yet pragmatic, investment choices Arizona will make over the next 25 years to maintain and improve its multimodal transportation system
- It is part of a continuous process of planning, implementation, operation, and preservation and will evolve over time to reflect and be responsive to future changes in needs, resources, and priorities
- Incorporates the comprehensive land use and 2050 vision developed in ***Building a Quality Arizona*** **(bqAZ)** as a framework for the State's desired future
- The Plan is not rigid or fixed
- Documents existing conditions with an eye toward future trends

ADOT Multimodal Planning Division

- Planning responsibility for a statewide transportation network that can compete in the global marketplace while keeping up with population growth, and future economic and quality of life needs
- Includes multimodal forms of transportation — such as public transit, pedestrian, bicycling and aviation — to complement Arizona's roadways
- Includes developing a Five-Year Transportation Facilities Construction Program
- Phase One planning process — the vision — the sky is the limit If money was no object, what would Arizona's transportation future look like? ***Building a Quality Arizona*** **(bqAZ)**
- Phase Two — must take revenues and funding into account - ***What Moves You Arizona***

ADOT

ADOT's Sustainable Transportation Program

- ADOT initiated a comprehensive program in 2013
- ADOT recognizes the critical need to plan and prioritize resources more efficiently in order to maintain and operate a robust, economically beneficial transportation network
- Through continuous improvement practices, ADOT strives to strategically invest resources to achieve the highest possible return
- ADOT also recognizes, in relation to investment and return dynamics, the importance of delivering transportation solutions in a sustainable manner to achieve economic, social, and environmental goals
- ADOT has moved from the early stages of identifying sustainable strategies to operationalizing a sustainable transportation program into core administrative, planning, design, construction, operations and maintenance activities

Framework

More on the Program and Framework in May/June 2016 issue of *Public Roads Magazine*

ADOT's Sustainable Transportation Program: 13-Milestone Framework

- First Annual Sustainability Report
- Relevant University Links
- National Conferences
- Develop Case Studies
- Local Public Agencies/Metropolitan Planning Organizations/Councils of Governments Collaboration
- Design Excellence Award Program
- Begin State Engineer's Office Activity Journal
- INVEST Project Development Rollout
- Establish Working Group
- FHWA Support/INVEST
- Executive Management
- Universe of Variables
- Champion(s)

Source: Emily Lester and Steven Olmsted, ADOT.

The Missing Link – Project Scoping & Design

Develop a Guidebook

- Designed to complement existing ADOT initiatives, processes, and standards that guide technical and operational areas presents a set of strategies and tools to improve the Arizona transportation system's level of sustainability
- Draws on transportation practices such as complete streets, context-sensitive design, land use integration
- And attempts to answer for internal users and external stakeholder four questions
    - What is complete transportation?
    - Why should we invest in it?
    - How do I plan/design/build complete transportation solutions?
    - When should I apply complete transportation concepts?

ADOT

ADOT Planning, Design & Sustainability

Pragmatic Approach – leverage what ADOT did well – layer in new goals

Mainstreet

Complete Transportation

GUIDEBOOK

ADOT

ADOT Planning, Design & Sustainability

Pragmatic Approach – leverage what ADOT did well – layer in new goals

U.S. Route 60 (Grand Avenue) and Thunderbird Road / Thompson Ranch Road

Mainline – local urban

ADOT Planning, Design & Sustainability

Pragmatic Approach – leverage what ADOT did well – layer in new goals

But it is also about context

Plan/Design/Build Complete Transportation

Seven Core Strategies

- Understand the context
- Establish and cultivate partnerships
- Define wide-ranging measures of success
- Establish a full spectrum of project needs and objectives
- Consider a full set of alternatives
- Plan for all users and modes of travel
- Exercise available flexibility in design

Chapter 5 provides guidance when considering the design choices available in a complete transportation approach during the planning, scoping and design of transportation improvement projects. The flexibility in existing ADOT and federal design guidelines is used to illustrate available choices.

Plan/Design/Build Complete Transportation

Plan/Design/Build Complete Transportation

Complete Transportation Realm	Complete Transportation Elements
TRAVELED ROADWAY REALM	◆ Design speed, number and width of travel lanes, paved shoulders, medians, bicycle facilities, on-street parking, design for large vehicles, intersection vehicular capacity, urban design features
PEDESTRIAN REALM	◆ Sidewalks, pedestrian buffer areas, curb ramps, mid-block pedestrian crossings, mid-block treatments such as pedestrian hybrid beacons, pedestrian refuge islands, pedestrian lighting, wayfinding, landscaping, shared use paths
INTERSECTIONS	◆ Intersection spacing to facilitate pedestrian connectivity; curb extensions; marked crosswalks; signs, lighting, and accessibility features; pedestrian push-buttons; effective access management, use of roundabouts
TRANSIT	◆ Bus shelters, pullouts, bus-only lanes, park and ride lots

The design elements presented in this chapter are not limited to ADOT projects. Local government and regional agencies can also implement complete transportation within their communities by partnering with ADOT and initiating and managing their own projects, including locally funded projects and programs. The list of potential elements is also not intended to be exhaustive. For example, intelligent transportation systems (ITS) and other technology solutions provide benefits in managing travel demand that positively impact the triple bottom line.

ADOT

Figure 28: Complete transportation design elements and applicability or level of focus matrix

	Design Element	Context Area		
		Urban	Suburban	Rural
Traveled Roadway Realm	Design Speed	H	M	L
	Number and Width of Travel Lanes	H	M	L
	Intersection Vehicular Capacity	M	H	L
	Interconnected Street System	H	M	L
	Design Vehicle Selection	H	M	M
	Medians	M	H	L
	Bicycle Facilities			
	» Bicycle lanes	H	H	L
	» Paved shoulders	-	-	H
	» Shared roadway	M	L	-
	On-Street Parking	H	L	L
Pedestrian Realm	Sidewalks			
	» Standard sidewalks	L	H	L
	» Wide sidewalks	H	M	L
	» Shared-use paths	L	H	H
	Pedestrian Buffer Areas	H	M	L
	Pedestrian Refuge Islands	H	H	L
	Pedestrian Hybrid Beacons	H	H	M
	Urban Design Features/Landscaping	H	M	L
Intersections	Intersection Spacing	H	M	L
	Access Management	H	H	H
	Intersection Crosswalks	H	H	L
	Curb Extensions	H	M	L
	Curb Return Radii	H	M	L
	Roundabouts	M	M	M
	Traffic Signal Coordination	H	H	L
Transit	Pedestrian Access to Transit Facilities	H	H	-
	Bus Shelters	H	H	-
	Bus Pullouts	M	M	-
	Park-and-Ride Lots	L	M	M

Legend: H = High M = Medium L = Low

TRAVELED ROADWAY REALM

Design Speed

Design speed is one of the most important design criteria. Roadway geometry is dependent on the design speed and other criteria. The design elements are then assembled to develop the roadway cross section.

In many agencies, the selected design speed is often 5 to 10 mph greater than the anticipated posted speed limit, or the 85th percentile speed may be used. ADOT's Roadway Design Guidelines (RDG) identify a range of 30 to 60 mph for arterial streets and urban highways (ADOT 2014).

The Institute of Transportation Engineers' *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach* (ITE 2010) recommends replacing design speed with "target speed." The target speed, or desired operating speed, is the highest speed at which vehicles should operate on a roadway within the specific context area. This speed is consistent with the level of multimodal activity and reflects the roadway function and surrounding land use context. To improve safety for bicyclists, motorists, and pedestrians, the target speed is intended to be used as the posted speed limit.

Lower target speed is an essential characteristic of walkable, multimodal communities. Figure 29 illustrates how a driver's peripheral vision decreases as speed increases. The bar graphs also show that stopping distance increases with speed. These factors indicate that crash risk increases with speed.

Identification of the target speed allows the designer to select the design speed and appropriate roadway and roadside features, many of which can contribute to speed reduction. These include:

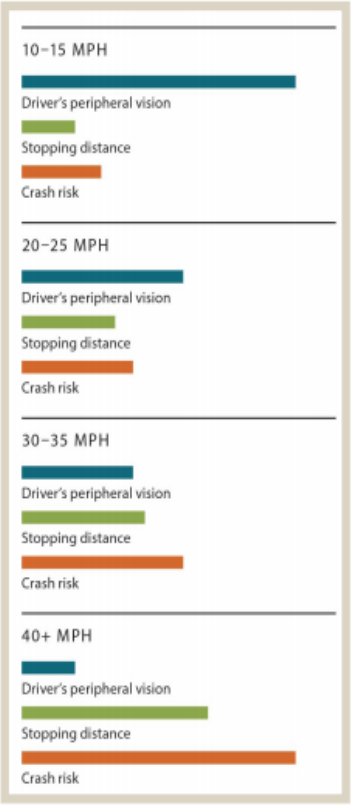
- Horizontal and vertical roadway geometry
- Narrower travel lanes
- Using on-street parking to create side friction
- Eliminating shoulders, except for bicycle lanes
- Using smaller curb radii
- Eliminating channelized right-turn lanes

Within a complete transportation design approach, the roadway engineer works collaboratively with stakeholders to look toward the future and consider land uses that represent a departure from existing patterns.

- Within urban activity centers, target (and design) speeds should generally range between 25 and 35 mph.
- In a suburban context, design speeds may be slightly higher, in the range of 35 to 45 mph.
- In rural areas, higher speeds may be appropriate.

Travel Lanes

Figure 29: Safety effects at different target speeds



Source: NACTO Urban Street Design Guide, page 140 (NACTO 2013).

Plan/Design/Build Complete Transportation

SUMMARY

A summary of design elements for the context areas discussed in this chapter is provided in Table 12.

Table 12: Summary of design elements by context area

		ACTIVITY CENTERS		
	Design Option	**Urban**	**Suburban**	**Rural**
TRAVELED ROADWAY REALM	Design Speed (Lower Speeds Preferable)	25-35 mph	35-45 mph	35-55 mph
	Travel Lanes	2-4 lanes	2 to 6 lanes (preferred maximum is 4 lanes)	2 to 4 lanes (community arterial) 2 to 6 lanes (regional arterial)
	Lane Widths	10'-12' wide (outside lanes preferred for transit and/or truck routes)	10'-12' (outside lanes preferred for transit and/or truck routes)	12' wide
	Paved Shoulders	4'-6' wide (if bike lanes or parking not present)	4'-6' (if bike lanes or parking not present)	5'-6' wide minimum, match adjacent sections
	Medians	12'-18' wide for left turn lane, 8'-10' for landscaping	12'-18' for left turn lane, 8'-10' for landscaping	Not typically provided
	Bicycle Facilities/Lanes	5'-6' wide	5'-6' wide	Typically use paved shoulders
	On-Street Parking	7'-8' wide	Not typically provided	Not typically provided
PEDESTRIAN REALM	Standard Sidewalk	Wide sidewalk desirable	5'-6' wide	Not typically provided
	Wide Sidewalk	5'-8' wide (higher end of range preferred)	5'-8' wide (higher end of range preferred)	If provided, 5'-8' wide (higher end of range preferred)
	Shared-Use Path	Not typically provided	Not typically provided	If provided, 12'-14' wide
	Sidewalk Buffer Area	4'-6' wide	4'-6' wide	Provide if warranted
	Pedestrian Refuge Island	Minimum 6' wide for pedestrian refuge	Minimum 6' wide for pedestrian refuge	Minimum 6' wide for pedestrian refuge, if provided
	Mid-Block or Signalized Pedestrian Crossings (PHB)	Provide if warranted	Provide if warranted	Provide if warranted
	Landscaping	Shade, low-impact landscaping, pedestrian-scale lighting	Not typically provided	Not typically provided

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ADOT's Future with Sustainable Transportation

ADOT developed a roadmap for its 2016–2017 program development initiatives to set the entire Sustainable Transportation Program into operation. The roadmap consists of operational focus areas identifying 36 reasonable entry points. The focus areas identify candidate projects and activities that cumulatively reflect the current program goals.

ADOT chose each focus area for one or all of three reasons: (1) it addresses a true operational need, (2) it aligns with the strategic focus areas in ADOT's mission statement, and (3) it could contribute to both Arizona's and the national state of the practice in connection to sustainable transportation. It aligns with ADOT's strategic focus areas of innovation and financial resources, as well as solidifies a documentable approach to reach a level of sustainable outcome.

Questions?

Arizona Department of Transportation

Sustainable Transportation Program

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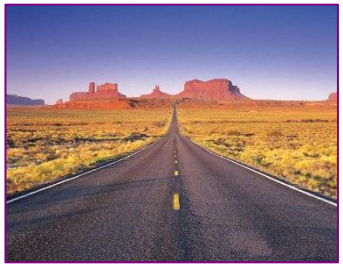



Complete Transportation at the Maricopa County Department of Transportation

Jennifer Toth, PE
Director/County Engineer

MCDOT's Complete Transportation Approach

- Protect past and future transportation investments
- Encourage a seamless regional transportation network
- Provide a system that is safe and efficient for all modes of travel
- Promote quality of life and economic vitality

Establishing Our Approach

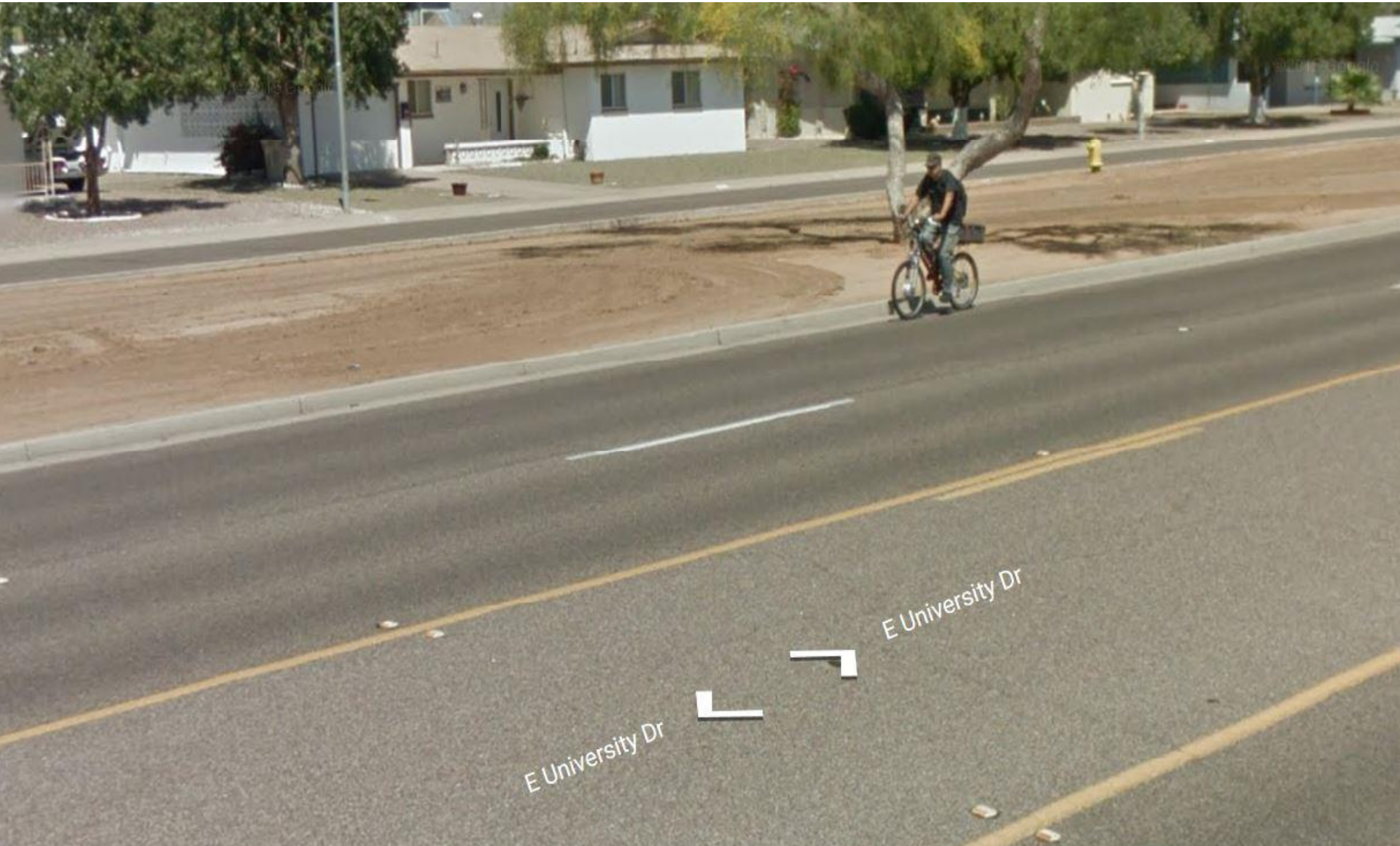
- Transportation System Plan 2035
- Project Rating System
- State of the System
- Active Transportation Plan

MCDOT Active Transportation Plan

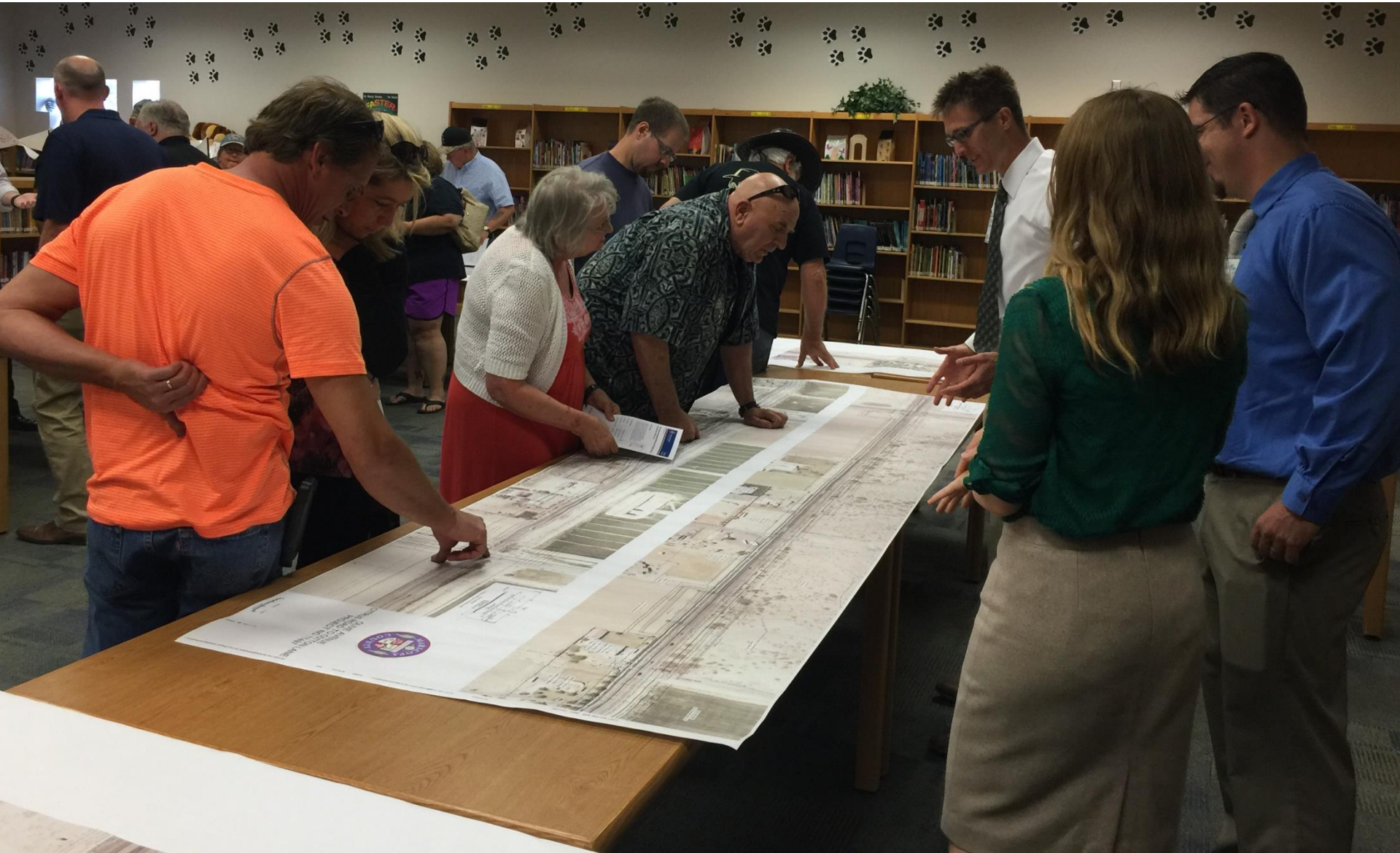
Connecting people of all ages and abilities from one location to another, using active modes such as **walking**, **bicycling** and **public transit**.

Existing Facilities

Gap Analysis



Public Outreach



Project Identification and Prioritization

Summary

- Currently using these strategies
  - Establish and cultivate partnerships
  - Establish a full spectrum of needs and objectives
  - Consider a full set of alternatives
  - Plan for all users and modes
- Next Steps:
  - Exercise flexibility in design

THANK YOU!

A recording of this webinar will be on the SSTI web site tomorrow.

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