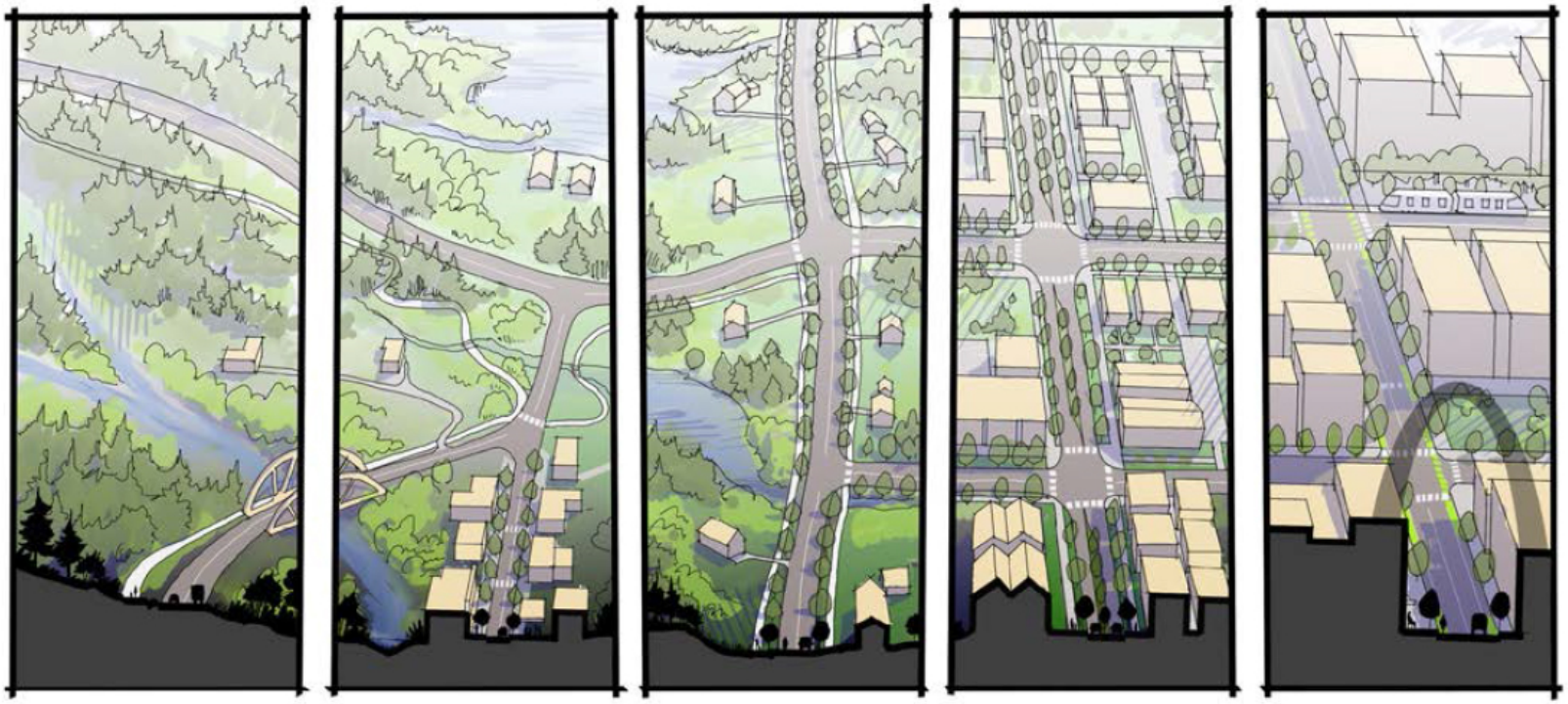


ARTERIAL DESIGN CONSIDERATIONS RESOURCE:

THE BLUEPRINT FOR ARTERIALS

East-West Gateway Council of Governments

MoDOT

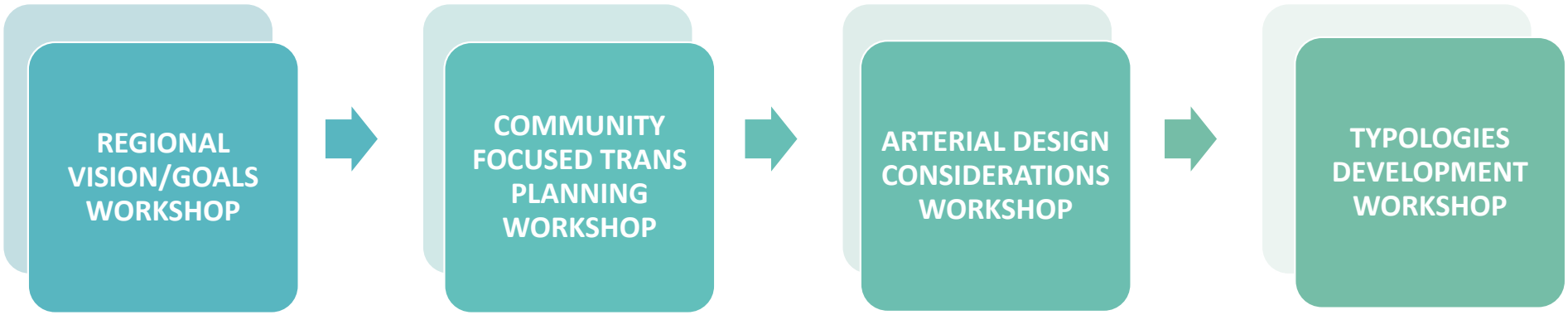
WHY and for WHOM?

Current design guidance is derived from rural highway design *(Challenging in developed areas)*

Flexibility to accommodate community goals and vulnerable users is inconsistent

The focus is on practitioners – not the public

ENGAGEMENT for our study:



And periodic MoDOT leadership meetings

the INTENT :

IS:

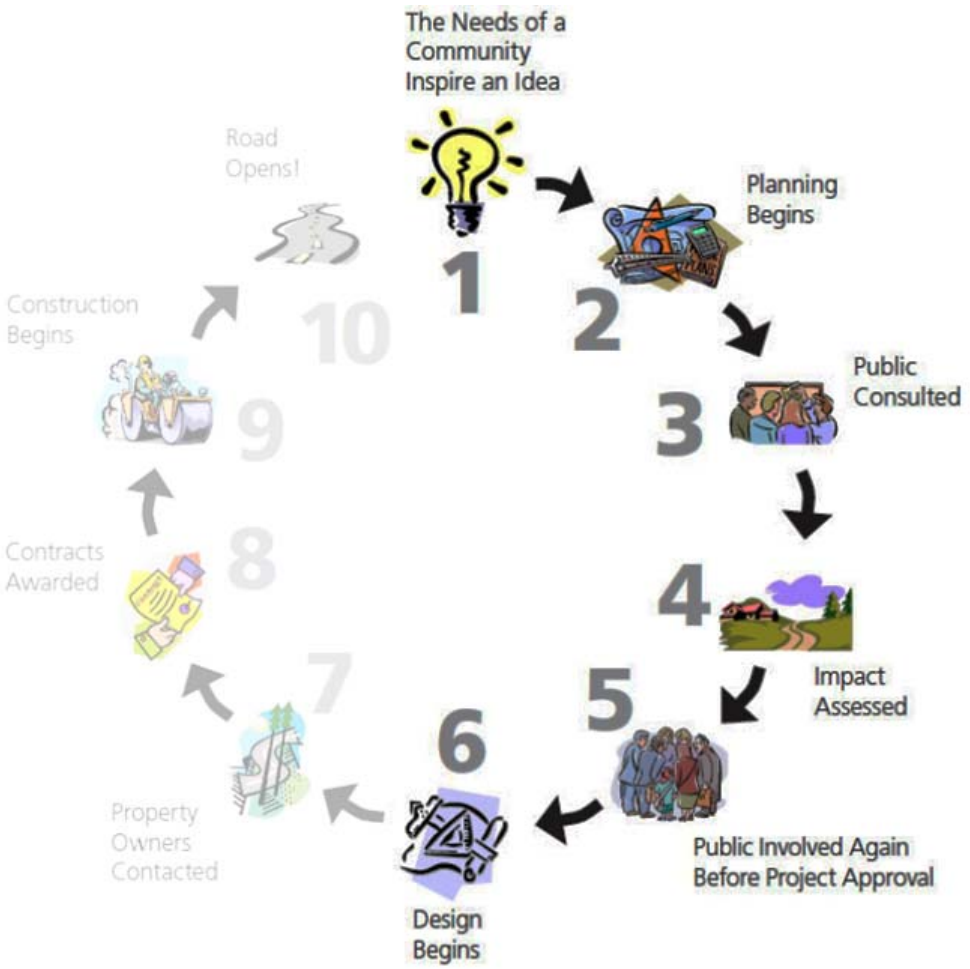
- To incorporate **considerations for all modes and users** on arterials
- To **align land use and place with roadways and use**
- To identify **who needs to be involved & when** during the process
- To develop a **consistent process to provide design flexibility**

IS NOT:

- To make every arterial look and be the same
- To incorporate bike lanes into every road
- To be used for every project on arterials
- To add complexity to the design process

DEFINE PROJECTS

Aligning with MoDOT's Engineering Policy Guide (EPG)



PROJECT INITIATION - GETTING TO THE STIP

This new process will lay out steps to identify project type, and who to engage before a budget and scope are developed for the STIP.

EPG STEPS 1-5 - IDEA TO DESIGN

This part of project development involves some definition and clarity for arterials to better incorporate the context of arterials.

Step 1: Define project purpose and project needs; identify levels of engagement and collaboration needed

Step 2: Discover and analyze existing conditions; follow steps to typology and tools; coordinate with agnecies

Step 3: Engage public; share discovery and options; summarize input

Step 4: Refine and analyze options based on input; cooordinate with maintenance

Step 5: Gather input on preferred concept, options, and tools; collaborate with other agency partners, as needed; prepare final ARTERIAL PLANNING MEMO

TOOLS

TYPE A

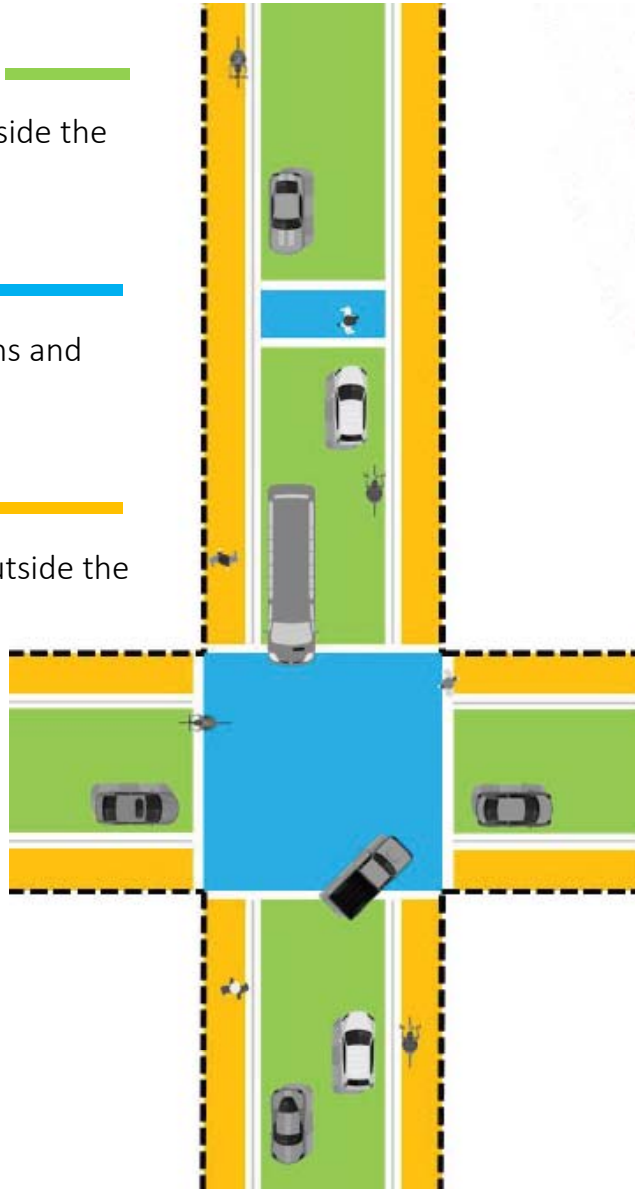
Features inside the Curb

TYPE B

Intersections and Crossings

TYPE C

Features outside the Curb



Type A: Features Inside the Curb	
Lowering Design Speed (Restriping or Moving Curbs)	Road Diets
Access Management (Relocation or Consolidation of Driveways)	On-Street Parking
Narrowing Lanes	Transit Mobility Hubs / Protected
Segment Lane Reconfiguration / Curb Relocation	Traffic / Movable Bollards
Traffic Diverters / Forced Turns	Green Infrastructure / Inside Curb
Transit Lanes / Pull-Outs / Queue Jumps	Enhanced Pavement Markings
Shared Traffic Bike Lanes	Rumble Strips
Dedicated Bike Lanes (including Green)	Varying Curb Types
Center Medians	Bike Lane Separation

Type B: Intersections and Crossings	
Intersection Control Types	Median Islands
Intersection Lane Configuration / Curb Relocation	Traffic Diverters (for Side Streets)
Protected Bike Intersections	Raised Intersections / Crossings
Standard / Floating Island Curb Extensions	Midblock Crossings / Extensions
Pedestrian and Bike-Prioritized Signal Operations	High-Visibility Crosswalks
Intersection Turn Modifications (Radii/Channelized Right Removal)	High-Visibility Bike Crossings
Rectangular Rapid-Flashing Beacons (RRFB)	Floating Transit Islands
HAWK Pedestrian Signals / Hybrid Beacons	Signal Pre-emption
ADA Curb Ramps and Pedestrian Signals	

Type C: Features Outside the Curb	
Enhanced / Widened Sidewalks	Changing Site Distance Triangles
Transit Mobility Hubs	Relocation of Signals / Cabinets
Protected Bike Lanes (Cycle Tracks)	Separate Bike Lanes
Vulnerable Road User Barriers	Vertical Amenities
Posted Speed Limits / Lowering	Street Signage (MUTCD)
Street / Sidewalk Lighting	Right-of-Way Purchase
Green Infrastructure / Outside Curb	Street Trees / Landscaping

NARROWING LANES

WHAT IS IT?

Like road diets, narrowing lanes reconfigures existing roadway for vehicular traffic by reducing travel lane width; this provides additional space and increase safety for other road users such as bicycles, pedestrians, or transit users.

WHEN TO USE?

Lane width reductions should be considered for roadways in areas with a history of speeding, as well as insufficient, lacking, or outdated pedestrian and bicyclist infrastructure. Lane width reductions provide opportunities to strength transit routes. Lane width reductions can also be done during roadway improvement projects or resurfacing projects.

GUIDANCE FOR USING

Similar to road diets, space removed through the reduction can be repurposed into infrastructure and facilities to support active modes of transportation with improved sidewalks, bicycle lanes, and crossings. Specials considerations should be taken for streets with school bus routes, emergency services, nontypical vehicles, and impacts on nearby local streets. Lane width reductions can be used in combination with road diets, which would allow for a lane to be converted to a dedicated transit lane.

BENEFITS:

- Slows vehicular traffic speed and movements
- Doesn't reduce vehicular capacity of a roadway
- Can improve multimodal access to a given area
- Reduces pedestrian and cyclist crossing time

TOOLS TO USE THIS WITH:

- Dedicated Transit Lanes / Bus Pull-Outs
- Dedicated / Protected Bike Lanes
- Green Bike Crossings
- Standard / Floating Island Curb Extensions
- Midblock Crossings
- Pedestrian Refuge Islands
- Lowering Design Speed
- Street Trees / Landscaping
- Road Diets

*Lane Narrowing / Diet from **New Jersey Complete Streets Design Guide** (WSP)*

FLOATING TRANSIT ISLANDS / MOBILITY HUBS

WHAT IS IT?

Floating transit islands are dedicated waiting and boarding areas for passengers that streamline access to transit and eliminate or reduce conflicts with cyclists by moving bike facilities behind waiting areas. Often combined with mobility hubs that provide additional space for transit, personal mobility, rideshare, information and other amenities.

WHEN TO USE?

Floating transit islands are best on streets with high pedestrian volume, bicycling volume, transit ridership, or moderate to high transit frequency.

GUIDANCE FOR USING

Platforms should be high enough to provide near-level or level boarding with an accessible boarding area. Platforms must, at minimum, accommodate the front door to rear door span; platforms can be longer to increase platform capacity. If a streetcar accesses the floating transit island, the platform must be aligned with the tracks. Platform access ramps must be ADA compliant. Every crossing over the bike lane must have detectable warning strips on both sides.

BENEFITS:

- Elevates visibility of bikes and transit riders
- Provides safe, separate waiting space for transit riders
- Reduces conflict points between different modes
- Reduces transit dwell times and congestion

TOOLS TO USE THIS WITH:

- Dedicated / Protected Bike Lanes

*Examples of Mobility Hubs and Floating Transit Islands courtesy of **NACTO Transit Street Design Guide***

TYPOLOGIES

The FORM of the Road *(existing AASHTO designations)*

Urban Core

Urban

Suburban

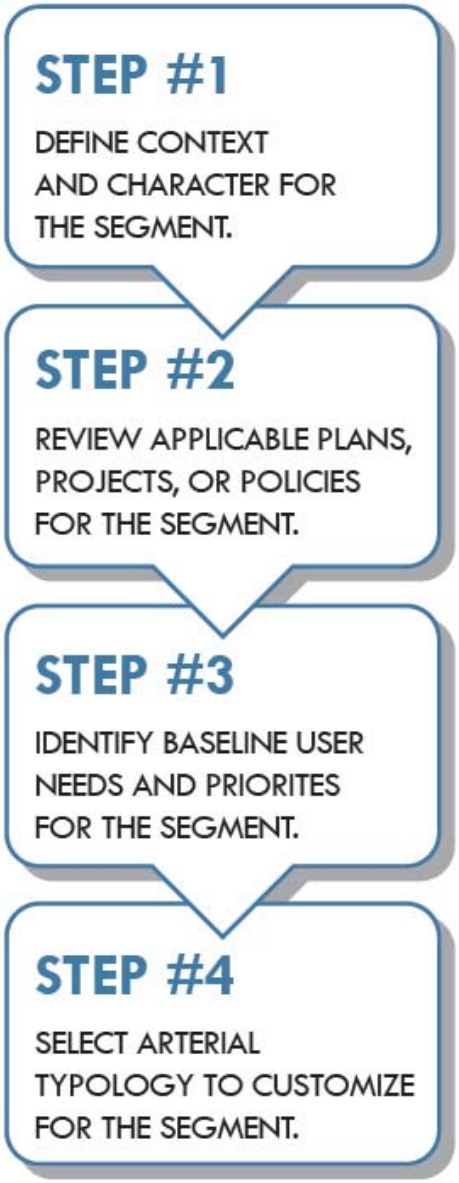
Rural Town

Rural

These contexts are defined based on

development density, **land uses**, and **building setbacks**

(Credit: AASHTO Contextual Classification for Geometric Design and the NCHRP Research 855: An Expanded Functional Classification System for Highways and Street 2018)


STEP #1
DEFINE CONTEXT AND CHARACTER FOR THE SEGMENT.
STEP #2
REVIEW APPLICABLE PLANS, PROJECTS, OR POLICIES FOR THE SEGMENT.
STEP #3
IDENTIFY BASELINE USER NEEDS AND PRIORITES FOR THE SEGMENT.
STEP #4
SELECT ARTERIAL TYPOLOGY TO CUSTOMIZE FOR THE SEGMENT.

The Function of the Road :

DOWNTOWN STREET (DTS)

A typology for the region's major downtown areas and dense population / employment centers where development forms communities with the highest densities, tallest buildings, and most intense mixture of uses.

MAIN STREET (MNS)

A typology for the region's smaller, active and walkable commercial districts that build communities around neighborhoods, create unique suburban experiences, and foster unique local character in small towns through sensitive density, height, and uses.

COMMERCIAL CORRIDOR (CMC)

A typology for the region's extensive network of radial and traversing commercial thoroughfares that link to major centers and between communities with a wide range of densities, heights and uses.

MIXED-USE STREET (MUS)

A typology for the region's larger, active mixed commercial and residential communities that support employment and entertainment centers or create a destination experience in suburban areas with increased densities, heights, and mixture of uses.

RESIDENTIAL STREET (RES)

A typology for the region's extensive network of diverse neighborhoods that that create connections and walkability between, through, and along communities and provide local access for single and multi-family areas with lower densities and heights.

BUSINESS INDUSTRIAL CORRIDOR (BIC)

A typology for the region's major employment and industrial communities that support lower density areas and focus improvements around freight, loading, service, and access for the area and to the regional transportation network.

TRANSIT CORRIDOR (TRC)

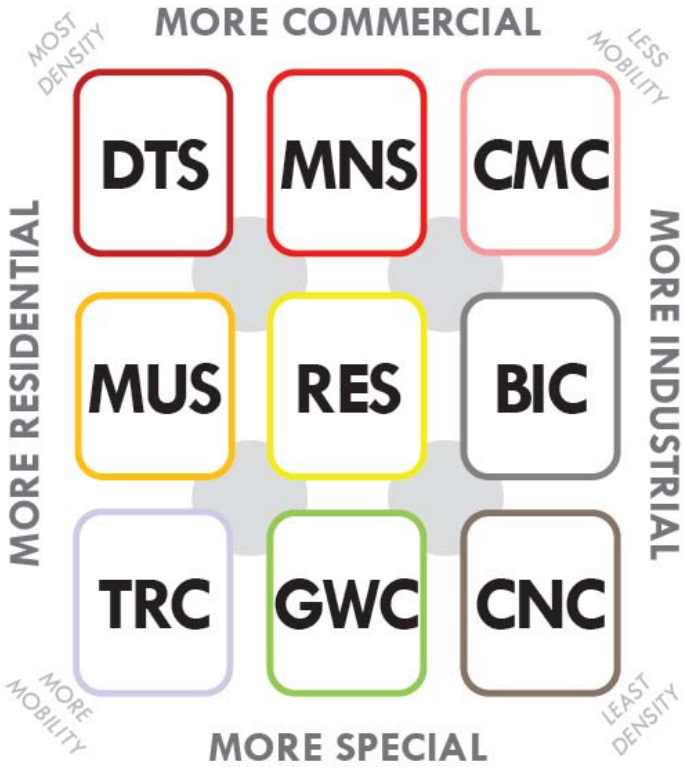
A typology for the region's major existing and planned transit and transportation alignments on wider rights-of-way that link urban cores to population / employment centers through medium to high density communities with a wide range of building heights and uses.

GATEWAY CORRIDOR (GWC)

A typology for the region's iconic and unique streets that link through and adjacent to urban cores and population / employment centers to foster special moments, create gateway experiences, and establish signature focal points for the community.

CONNECTOR CORRIDOR (CNC)

A typology for the region's network of roadways that are "between places" and serve primarily to create a safe conduit between a wide range of communities with varying desities and land uses.



Form + Function

	URBAN			RURAL	
NCHRP	Urban Core	Urban	Suburban	Rural Town	Rural
Downtown Street (DTS)	STL, SLC				
Transit Corridor (TRC)	STL	STL	SLC		
Gateway Corridor (GWC)	STL	SLC	SLC, SCC		
Mixed-Use Street (MUS)	STL, SLC	SLC	SLC		
Main Street (MNS)		STL, SLC, SCC	SLC, SCC	SCC, J/FC	
Commercial Corridor (CMC)		STL, SLC, SCC	SLC, SCC	SCC, J/FC	
Residential Street (RES)		STL, SLC, SCC	SLC, SCC	SCC, J/FC	
Business Industrial Corridor (BIC)		STL	SLC, SCC		
Connector Corridor (CNC)		SLC	SLC, SCC, J/FC		SCC, J/FC

Legend: Jefferson/Franklin (J/FC); St Charles (SCC); St Louis County (SLC); City of St Louis (STL)

the MANY FACES of MANCHESTER: (Big Bend to Vandeventer)

Main Street

Commercial Corridor

Business Industrial Corridor

Mixed-Use Street

MIXED-USE STREET
URBAN CORE

MUS-UC

DESCRIPTION AND INTENTION:

A typology for the region's larger, active mixed commercial and residential communities that support employment and entertainment centers or create a destination experience in suburban areas with increased densities, heights, and mixture of uses. An urban core Mixed-Use Street is characterized by its provision of wide sidewalks and amenities that support transit riders and active ground floor businesses. Bicycle facilities may be considered when space is available and on-street parking may be acommodated when critical to ground floor businesses.

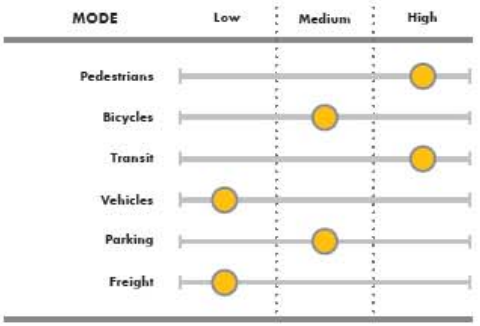
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Urban Core (UC)	STL; SLC

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	> 3 Stories typical; often much taller heights; and parcels are fully built out.
Land Uses	Mostly vertical mixing of land uses within buildings with some areas of concentrated, single land use areas.
Building Setbacks	Almost exclusively zero lot line / 0' / no setbacks relative to front setbacks and minimal, consistant side setbacks relative to adjacent buildings.
Parking Location	> 20% On-street parking. < 20% Off-street parking. > 60% in buildings / structures.

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

Pedestrians	Recommended: Wide sidewalks with amenities.
Bicycles	Preferred: If included, protected facilities preferred.
Transit	Recommended: LRT, STC, BRT, or BUS facilities and amenities.
Vehicles	Optional: If needed, turn lanes or medians.
Parking	Preferred: On-street parking and curbsharing.
Freight	Optional: Provisions for larger design vehicles.

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	80'-100' TYP
Vehicle Lanes (one way)	0-2 TYP
Posted Speed (MPH)	25-30 MAX
AADT (#)	10,000-20,000 TYP
Intersection / Crossing Density (#/LF)	250'-500' TYP

APPLICABLE TOOLS:

Type A: Features inside the Curb

- (Y) Lowering Design Speed (Restriping or Moving Curbs)
- (Y) Road Diets / Narrowing Lanes
- (Y) Dedicated Transit Lanes / Bus Pull-Outs
- (M) Dedicated / Protected Bike Lanes
- (N) Traffic Calming Bollards

Type B: Intersections and Crossings

- (Y) Roundabout Intersections
- (Y) Protected Bike Intersections
- (M) Raised Intersections / Crossings
- (Y) Floating Transit Islands / Mobility Hubs
- (Y) Queue Jump Lanes / Transit Signal Priority (TSP)
- (M) Green Bike Crossings / Left Turn Boxes
- (M) Standard / Floating Island Curb Extensions
- (M) Midblock Crossings
- (Y) Pedestrian Refuge Islands
- (Y) Intersection Turn Modifications
- (M) Protected-Only Left Turns

Type C: Features outside the Curb

- (Y) Shared-use Path / Elevated Bike Lane
- (Y) Pedestrian / Hybrid Sidewalk Lighting
- (Y) Street Trees / Landscaping
- (Y) Vertical Amenities (A variety of items)

LEGEND

- (Y) *Yes, the tool should be considered.*
- (M) *Maybe, the tool could be utilized.*
- (N) *No, the tool is not ideal.*

SEE PAGE X FOR FULL TOOL DETAILS

TRANSIT CORRIDOR SUBURBAN

TRC-S

DESCRIPTION AND INTENTION:

A typology for the region's major existing and planned transit and transportation alignments on wider rights-of-way that link urban cores to population / employment centers through medium to high density communities with a wide range of building heights and uses. A suburban Transit Street is characterized by its provision of transit facilities and amenities, as well as is higher volumes of traffic and necessity for access management. Where possible, on-street parking can be accommodated and design vehicle type should be supportive of freight.

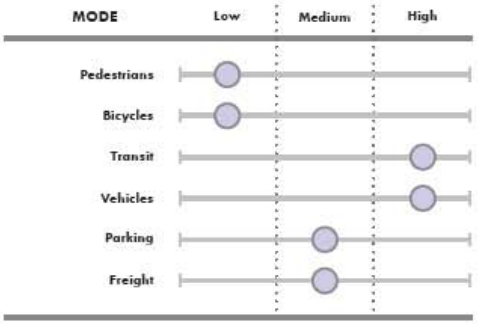
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Suburban (S)	SLC

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	1-3 Stories typical; heights often much shorter; and parcels are often less built out.
Land Uses	Mostly horizontal separation of uses with limited areas that have vertical mixing of land uses within buildings.
Building Setbacks	> 25' front and side setbacks with a wide range of distances and low consistency.
Parking Location	< 20% On-street parking. > 60% Off-street parking. < 20% in buildings / structures

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

Pedestrians	Optional: Wide sidewalks with amenities.
Bicycles	Optional: If included, protected or separate facilities preferred.
Transit	Recommended: LRT, STC, BRT, or BUS facilities and amenities.
Vehicles	Recommended: Turn lanes or medians.
Parking	Preferred: On-street parking and curbsharing.
Freight	Preferred: Provisions for larger design vehicles.

OTHERS DESIGN CONSIDERATIONS:

Right-of-Way (LF)	100'-140' TYP
Vehicle Lanes (one way)	2-4 TYP
Posted Speed (MPH)	30 MAX
AADT (#)	10,000-25,000 TYP
Intersection / Crossing Density (#/LF)	300'-800' TYP

APPLICABLE TOOLS:

Type A: Features inside the Curb

- Y — Lowering Design Speed (Restriping or Moving Curbs)
- Y — Road Diets / Narrowing Lanes
- Y — Dedicated Transit Lanes / Bus Pull-Outs
- Y — Dedicated / Protected Bike Lanes
- N — Traffic Calming Bollards

Type B: Intersections and Crossings

- N — Roundabout Intersections
- Y — Protected Bike Intersections
- N — Raised Intersections / Crossings
- Y — Floating Transit Islands / Mobility Hubs
- Y — Queue Jump Lanes / Transit Signal Priority (TSP)
- M — Green Bike Crossings / Left Turn Boxes
- M — Standard / Floating Island Curb Extensions
- M — Midblock Crossings
- Y — Pedestrian Refuge Islands
- M — Intersection Turn Modifications
- M — Protected-Only Left Turns

Type C: Features outside the Curb

- M — Shared-use Path / Elevated Bike Lane
- Y — Pedestrian / Hybrid Sidewalk Lighting
- Y — Street Trees / Landscaping
- Y — Vertical Amenities (A variety of items)

LEGEND

- Y — *Yes, the tool should be considered.*
- M — *Maybe, the tool could be utilized.*
- N — *No, the tool is not ideal.*

SEE PAGE X FOR FULL TOOL DETAILS

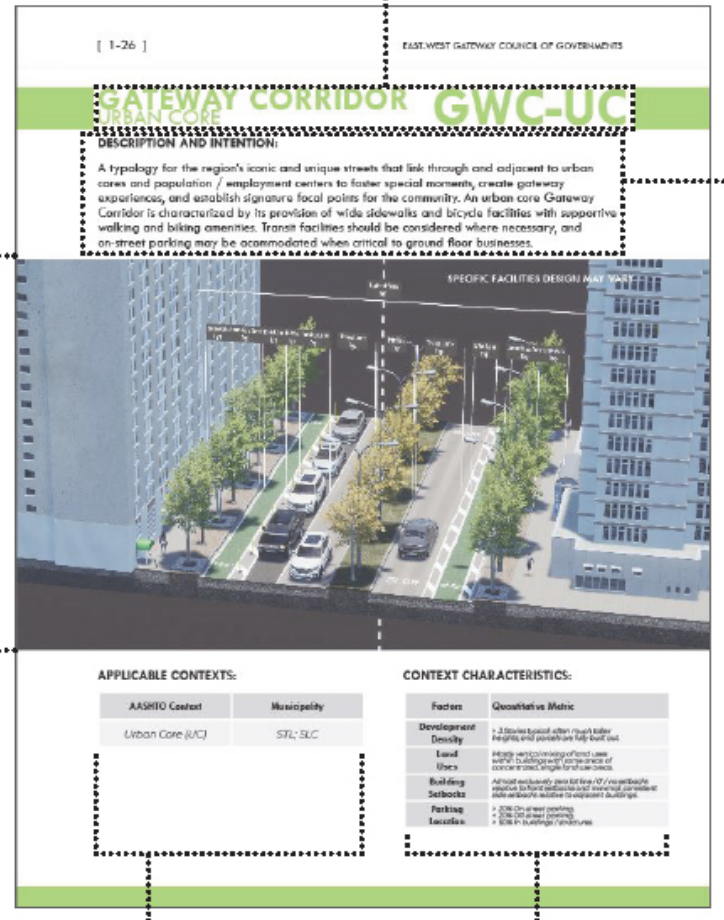
HOW TO USE THE ARTERIAL TYPOLOGIES

This page helps designers confirm which arterial typology applies to their project.

This graphic exemplifies how the arterial typology may be designed, and specific facilities design may vary by community.

This section provides the name and shorthand for the arterial typology.

This section names and describes the typology's main attributes, intention, and role within the larger street network.

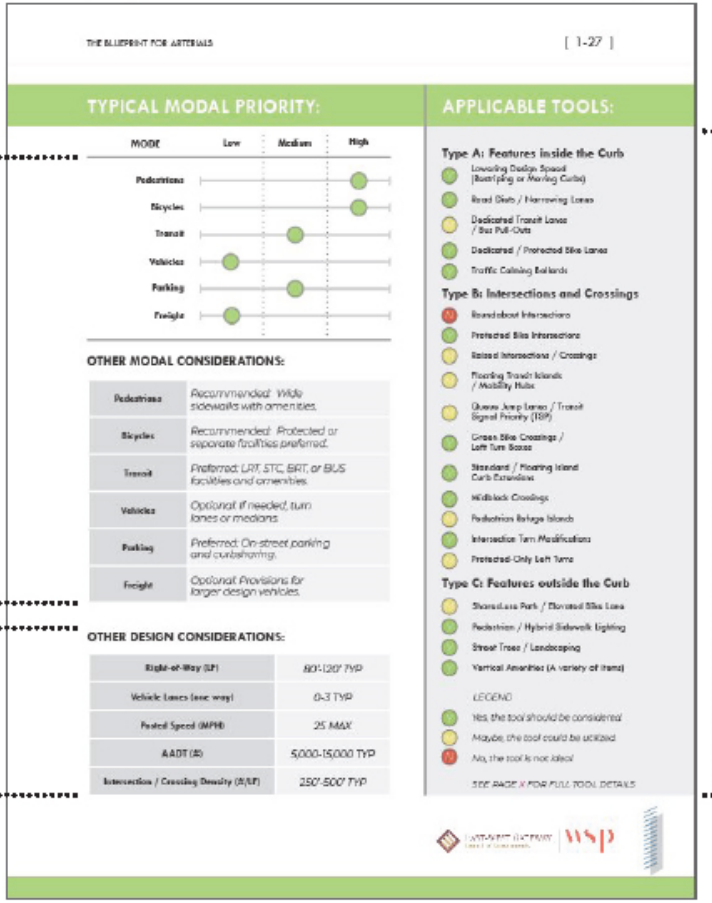


This table helps designers confirms the applicable AASHTO Context Classification and municipality.

This list serves to provide the generally quantitative physical factors that help to identify AASHTO Context Classification.

The modal priorities and considerations identify elements that should be tailored to the specific community in which the arterial typology is located.

The applicable tools is a list of countermeasures that should be considered, may be considered, or are not ideal for the use on the arterial typology.



The design considerations represent a range of typical engineering considerations for geometric and operational design for the proposed typology.

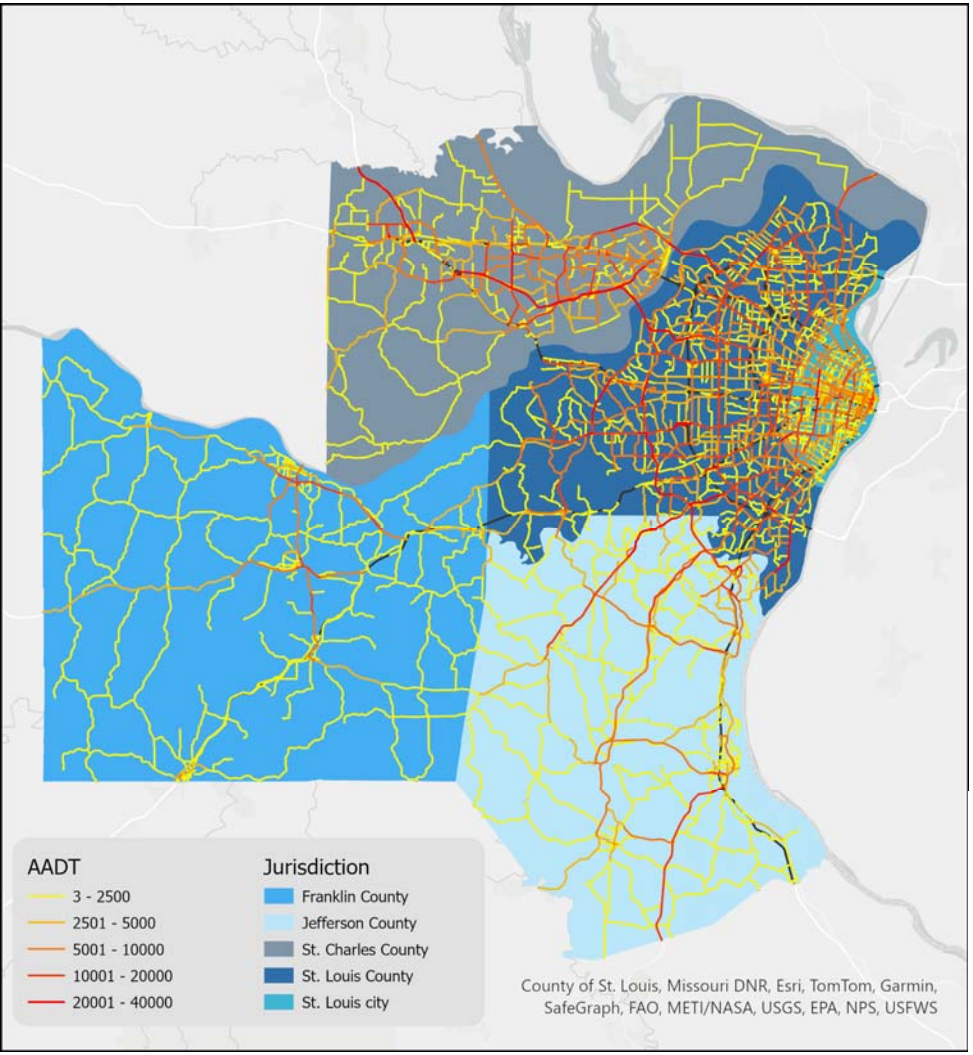
TRAINING CURRICULUM

For MoDOT and peer agency / County / City staff

A combination of content videos and in-person workshops

Includes a “train the trainers” module

ARTERIALS (Missouri)



HIGH INJURY NETWORK (SS4A)