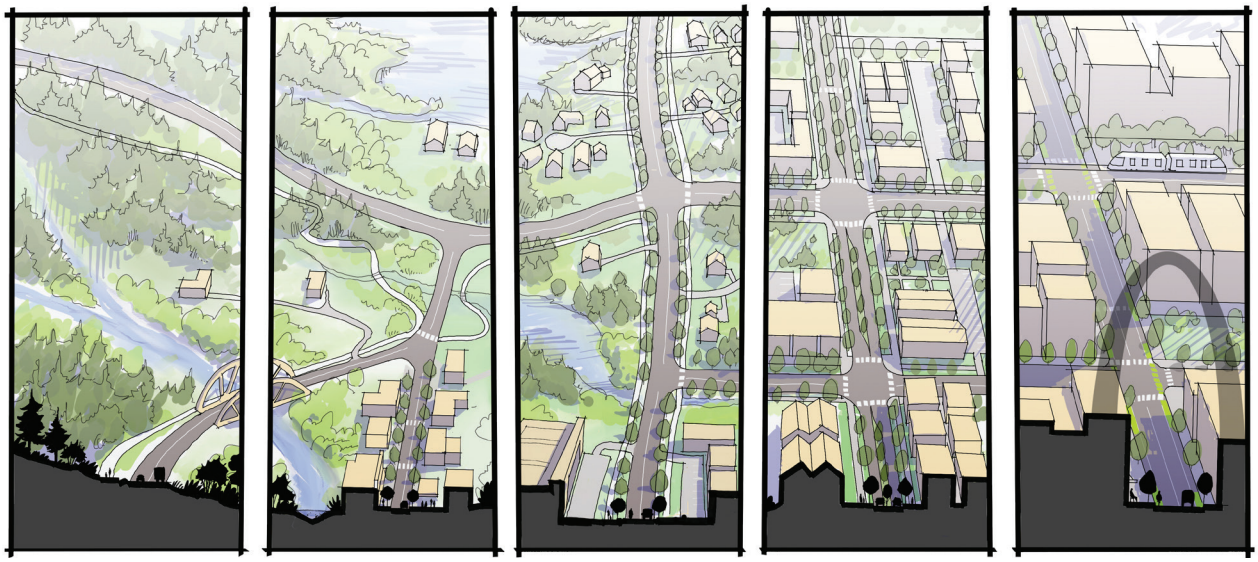

ARTERIAL DESIGN CONSIDERATIONS RESOURCE

THE BLUEPRINT FOR ARTERIALS

EAST-WEST GATEWAY
Council of Governments

MoDOT

WSP

ACKNOWLEDGMENTS

PHOTO CREDITS: All Photos by East West Gateway Council of Governments (EWG), Missouri Department of Transportation (MoDOT), or consultant team, unless otherwise noted.

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Revised Date: ~*Future Date*~

LETTER FROM LEADERSHIP

June 15, 2024

We are excited to share the significance of the paradigm shift developed with this Blueprint for Arterials. This Blueprint lays out the process and design considerations that extends its impact to all users across various modes, aiming to elevate the overall safety and experience for everyone involved on our regional arterials.

Our focus on consistency within this paradigm shift serves as a tool which leads us to a flexible and adaptive design framework. We are building on successful work implemented over the decades in Missouri for vehicles and combining those with important programs like Safe Systems and the newly updated MUTCD. With this Blueprint, we are poised to continue delivering exceptional results across all transportation modes on our arterials. The Blueprint builds on the great work we are doing and brings more to the tool chest for Missouri. We have included training videos for the future implementors of arterials that can be found via links in the appendix.

A key aspect of this paradigm shift is the emphasis on partnerships among agencies and fostering a collective commitment to prioritizing safety for all users. We want to express our sincere appreciation for the remarkable dedication and contributions of our team and partner agencies. Your efforts do not go unnoticed, and they are integral to the success of this transformative shift to dive deeper in supporting Missouri residents.

This paradigm shift is more than a change in methodology: it is a belief in the impactful improvements we can make in people's lives, safety, and community connectivity. We are confident that, together, we can create lasting and positive change. We are committed to using this Blueprint to identify how things are going, what changes are needed, and how do we continue improving arterials for all users.

Thank you for your commitment to this important work.

Sincerely,

Tom Blair, District Engineer, MoDOT

Jim Wild, Executive Director, EWGCOG

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I. EXECUTIVE SUMMARY

This Blueprint is a comprehensive framework that better aligns and defines the process and framework for planning, designing, and implementing St. Louis regional arterials to incorporate all modes. This Blueprint is intended to be the resource for multiple agencies in the St. Louis region to utilize to provide consistency on arterial projects that then allows for more flexibility with design tools and outcomes.

- ***Chapter II. Introduction to the Blueprint*** lays out the intent of the Blueprint and the value it brings to different user groups. This chapter identifies how the national movement of Complete Streets aligns with the tools and process identified in later chapters. This chapter starts to identify the value of aligning with the Engineering Policy Guide (EPG) and defines design flexibility and balancing factors for arterials. Lastly, this chapter lays out the stakeholder input utilized through the development of the Blueprint. This input helped guide the process and design elements found in later chapters.
- ***Chapter III. Arterial Vision + Goals*** narrates the vision statement for arterials that emerged from the stakeholder input. The goals for arterials were created based on similar feedback and utilized to guide design tools and typology development.

Embracing the principles of safe systems, the Blueprint lays out substeps to the EPG specifically geared for arterials to facilitate clarity and consistency for all project types. The substeps include engagement tools and intention to gather input from the general public and stakeholders at crucial points in the process to incorporate feedback.

- ***Chapter IV. Aligning Arterials to EPG Process*** lays out the substeps to the EPG for arterials. In this chapter, the substeps identify who should be engaged and when, how to incorporate previous planning and input, how to align characteristics of the roadways, and how to best consider safety to make design decisions. This chapter lays out a detailed Project Initiation process to better define projects before they receive funding. This chapter includes a checklist of typical project elements by project type. The checklist shown on page 7 is the guide for project teams to process through for any project type. It highlights all substeps for arterials.

The Blueprint equips stakeholders with a suite of design tools tailored to address the diverse needs of users and communities specific to arterials. From pedestrian-friendly infrastructure to cyclist-oriented facilities to tools to slow vehicle speeds where needed, these tools empower planners and designers to create arterials that prioritize safety, accessibility, and placemaking.

- ***Chapter V. Design Considerations and Tools*** defines design flexibility and provides resources to users on how and when to use it. This chapter lays out the design tools identified as feasible for arterials in the St. Louis region and gives guidance for use and provides benefits for each tool. The design tools identified also include additional hyperlinks to resources online.

The Blueprint identifies 24 typologies that offer a nuanced understanding of arterial contexts and functions that align with AASHTO transects and characteristics of arterials in the St. Louis region. By categorizing arterials based on their characteristics and usage patterns, stakeholders gain insights that inform decision-making and foster innovation in design options.

- ***Chapter VI Arterial Typologies*** defines typologies for the St. Louis based on characteristics developed and analyzed during the development process. The typologies are aligned with the AASHTO

EPG Project Development STEP		Asset Management	Minor Capital Projects	Major Capital Projects
	Project Initiation	*Identified during this step*		
STEP 1: Inspire and Idea	Develop PIP	X	X	X
	Collaborate with communications	X	X	X
	Develop purpose and goals		X	X
	Define high level issue		X	X
	Public Touchpoint (and ENGAGEMENT MEMO)			X
	ARTERIAL CHECKLIST	X	X	X
STEP 2: Planning Begins	Discover existing conditions		X	X
	Identify typology and tools		X	X
	Develop options/alternatives		X	X
	Collaborate with Planning and Safety and Traffic		X	X
	Collaborate with other Agency partners		X	X
	Meet with Budget Team			X
	DRAFT PLANNING CHECKLIST		X	X
STEP 3: Public Consulted	Public Touchpoint (and ENGAGEMENT MEMO)		X	X
STEP 4: Impact Assessed	Collaborate with Safety and Traffic		X	X
	Collaborate with Maintenance		X	X
	Refine preferred concept		X	X
STEP 5: Public Involved Again Before Project Approval	Public Touchpoint (and ENGAGEMENT MEMO)		X	X
	FINAL PLANNING CHECKLIST (15% concept)		X	X
	Collaborate with other Agency partners		X	X
	Public Touchpoint (INFORM)	X		

transect and given quantitative metrics for project teams to identify the right context related to development density, land uses, building setbacks, and parking arrangement. This section lays out four steps for project teams to help them identify the right typology and provides questions to walk through to guide the user. This chapter then provides typology information for project teams that gives visual graphics, aligns modal priorities, and provides guidance on design tools to consider.

In summary, this Blueprint for St. Louis Regional Arterials serves as a comprehensive resource, providing users with the process, design tools, and typologies needed to effectively design arterials to be more inclusive of all users and needs.

II. INTRODUCTION TO THE BLUEPRINT

PROJECT PURPOSE

The primary purpose of this Blueprint is to better align and define the process and framework for planning, designing, and implementing St. Louis regional arterials.

Emphasizing the principles of safe systems, this Blueprint serves as a roadmap. It offers consistency in the process for every arterial that improves clarity on design flexibility to support the range of engineering judgment to better provide space for pedestrians, cyclists, motorists, and public transit users alike. Throughout this Blueprint, the commitment for all agencies was clear – establish a design considerations resource that gives us consistency in the process and flexibility in the design and tools. This Blueprint provides the next level of detail needed to support innovation in problem solving and decision making – in a seamless integration of safety, accessibility, and place.

RESOURCE 101

WHY IS THIS RESOURCE NEEDED?

This Blueprint is timely and desired, responding to the demand from local agencies for a consistent and adaptable approach to designing St. Louis region's arterials. Tailored to diverse local needs and transportation modes, it aligns with federal and state guidelines, enhancing eligibility for funding opportunities. Prioritizing safety, efficiency, and community engagement, it directly addresses local agencies' requests in that it provides professionals and stakeholders with a streamlined framework. Its significance lies in meeting community needs while supporting local agencies in arterial roadway development.

THIS INTENT OF THIS BLUEPRINT IS TO:

- Incorporate considerations for all modes and users on arterials
- Develop contextual typologies and a toolkit of design elements for arterial design
- Develop a process/tool to provide process consistency and design flexibility
- Align land use and place with roadways and use
- Identify data sources for evaluations
- Identify who needs to be involved and when during the process
- Better align community and stakeholder coordination

THIS BLUEPRINT IS NOT INTENDED TO:

- Provide a descriptive solution for every arterial to look and be the same
- Incorporate bike lanes into every road
- Be used for every project on arterials
- Create a new process that is time consuming

WHAT IS THIS RESOURCE FOR?

This Blueprint is crafted as a concise resource specifically tailored to aid St. Louis agencies and designers in navigating the project development process with consistency and informed decision-making. It provides a structured framework for integrating community needs into projects, ensuring early community support during the crucial stages of project development.

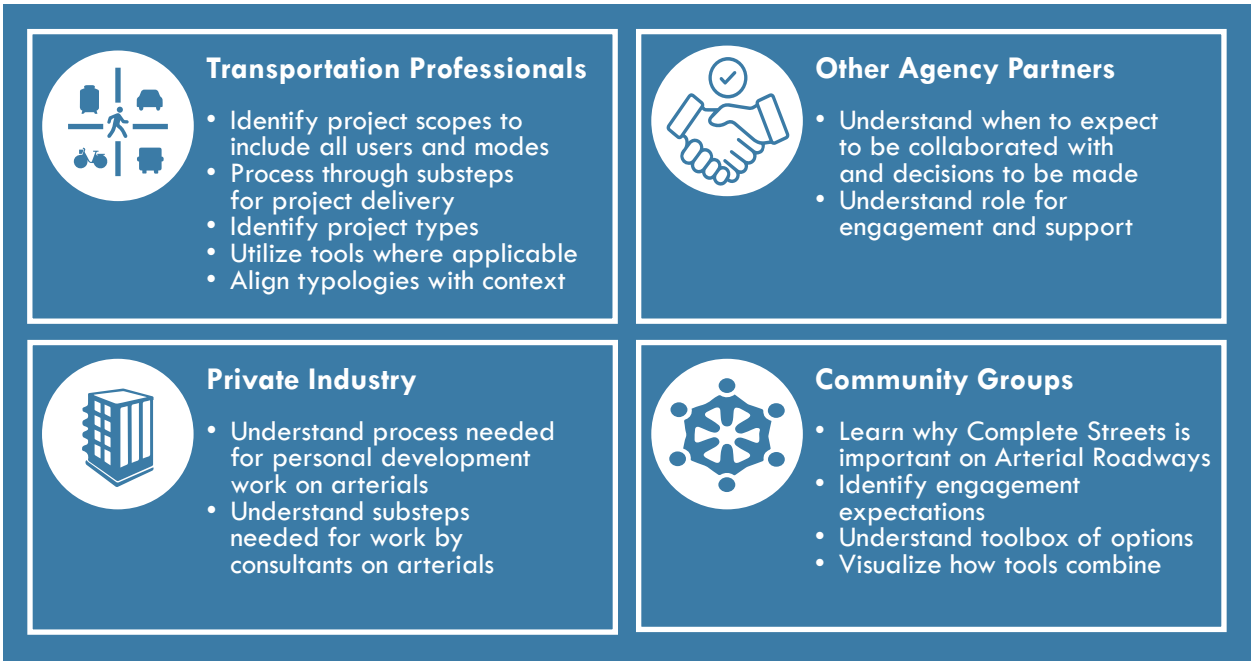


FIGURE 1-1: *Audiences for this Guide*

VALUE OF THIS RESOURCE.

This Blueprint serves as a strategic resource for enhancing the design and functionality of the St. Louis region's arterials. By providing a comprehensive framework that aligns with federal and state guidelines, it not only facilitates safer and more efficient transportation but also ensures mobility for all users and modes. Importantly, it positions our region favorably for federal funding opportunities, as it meets the criteria and standards set by national authorities. This Blueprint is a valuable resource for transportation professionals, engineers, and stakeholders, offering practical insights that transcend conventional practices. Overall, the Blueprint stands as a cornerstone for fostering a resilient and accessible transportation network that meets the evolving needs of the community while optimizing access to federal funding avenues.

HOW TO USE THIS RESOURCE.

This Blueprint serves as a resource to the EPG on how to identify and process through Steps 1-5 for any project on an arterial in the St. Louis region. Tailored to meet the specific needs of its audience, including the Missouri Department of Transportation (MoDOT) and other regional counties and municipalities, this comprehensive resource serves as a valuable tool. It offers step-by-step assistance through the process and presents design choices for projects on regional arterials.

The Blueprint includes the following chapters:

1. Executive Summary
2. Introduction to the Blueprint
3. Arterial Vision and Goals
4. Aligning Arterials to EPG Process
5. Design Considerations and Tools
6. Arterial Typologies

WHAT ARE COMPLETE STREETS? AND HOW DO THEY ALIGN WITH THIS BLUEPRINT?

Complete Streets is the process of creating and maintaining roads that serve people of all ages and abilities no matter how they use the public right-of-way. At one time, the road design process focused on moving people and goods as fast as possible, usually in a car. The Complete Streets process recognizes that roads are our most valuable public asset not only because they move people via many modes, but because they are the places in which we all live and socialize, form the backdrop of business and commerce, and shape our health and wellbeing.

Complete Streets produce comprehensive outcomes and benefits extending beyond mobility. There are three main principles of Complete Streets:

- Prioritizing people walking, taking transit, and biking while emphasizing safety, comfort, and convenience for users of all travel modes, regardless of age or ability;
- Center people and place by considering the surrounding context such as buildings, activities, and community needs; and
- Incorporate robust community engagement.

There is no singular design for a Complete Street: an arterial that connects residential streets may already function well for all people and activities, whereas a busy commercial corridor may require wider sidewalks, curb extensions, and protected bike lanes. Since the land uses, activities, and ways people get around change, a Complete Street changes over time. That's why Complete Streets is referred to as a process, one that integrates people and place into all phases of a project, from planning and design through construction. This is why it should be judged based on its outcomes implemented through the life cycle of the process.

The principles of Complete Streets harmonize seamlessly with the objectives outlined in this Blueprint, as both emphasize a holistic approach to transportation planning. By prioritizing safety and mobility for all modes of transportation, including pedestrians, cyclists, and public transit, Complete Streets principles are inherently integrated into the comprehensive framework provided by this guide for designing St. Louis region's arterials.

FIGURE 1-2: *Complete Streets Graphics, courtesy of Smart Growth America*

ALIGNMENT WITH THE EPG PROCESS

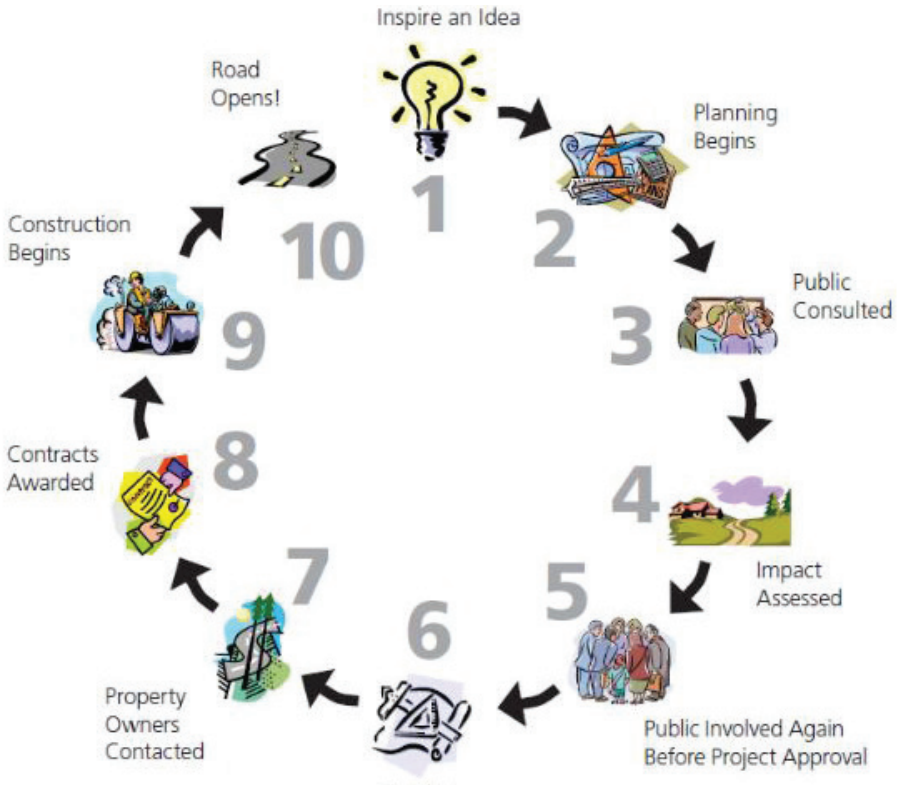


FIGURE 1-3: *Current MoDOT EPG Process (2024)*
https://epg.modot.org/index.php/Category:138_Project_Development_Chronology

VALUE OF THIS GUIDE ALIGNING TO THE EPG.

This Blueprint serves to build out more multimodal arterials in the region, by aligning substeps within the existing Engineering Policy Guide (EPG) process, adhering to the guidance of not creating new processes. It integrates with the established framework, ensuring a seamless workflow for planning and designing the St. Louis region's arterials with a focus on a consistent, efficient, and effective approach to the decision-making process. This alignment works within the parameters of the current EPG guidelines.

The EPG as set forth by MoDOT accommodates all projects within the MoDOT system, and was designed for NEPA, therefore, substeps were identified to be more beneficial for users.

The substeps identified in this Blueprint were developed with input from MoDOT, St. Charles County, Jefferson County, Franklin County, St. Louis County, City of St. Louis, and transportation partner agencies.

Step 6 is when design starts in the project development process. Ideally, any project on an arterial would be at 15% concept design going into Step 6. Using that information, this Blueprint functions as the strategic tool to navigate to 15% design.

WHAT DO WE MEAN BY FLEXIBILITY?

The concept of flexible design in transportation and roadways strives to establish resilient, adaptable, and efficient transportation networks capable of evolving alongside communities, while also minimizing environmental impact and enhancing safety and accessibility. Such a framework is essential for guiding discussions and decision-making processes regarding the flexibility of roadway designs, ensuring that infrastructure maintains adaptability and resilience amidst evolving circumstances. This resource also helps identify when it is appropriate to adjust design criteria to integrate additional tools and accommodate all users within the roadway design.

The EPG allows flexibility to modify design criteria that is beneficial on arterials, however, designers requested more support resources and benefits to be included in this Blueprint. In the **Design Considerations + Tools Chapter**, more guidance on the benefits and when to use each tool will be included.

FHWA: ***Flexibility, such as that afforded by performance-based practical design, is crucial for engineers to develop solutions that balance the needs of all roadway users and meet the goals of the greater community. It facilitates a connected network of both motorized and non-motorized transportation infrastructure that enhances access to jobs, schools, and essential services in a cost-effective manner.***

https://highways.dot.gov/public-roads/marchapril-2016/toward-more-flexible-design

AASHTO: ***The 2011 AASHTO Green Book recognizes that functional classification of highways can lead to roadway facilities that do not account for the local context and that design has impacts beyond traffic service.***

https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/multi-modal_networks/fhwahep16055.pdf

DESIGN FLEXIBILITY TO CAPTURE ARTERIAL CONTEXT

When setting design criteria, the needs of the roadway users and community should be considered:

- Designers make decisions about these criteria early in project development, and these decisions should reflect the desired purpose and function of a street and prioritize the safety of all users.
- Community character, adjacent land uses, and safety for all users should dictate the design criteria for a highway that serves as a main street
- Designers have flexibility in selecting design criteria and are not always required to choose the most conventional. Understanding the local context of the roadway, needs of the community, and desired function of the roadway will help the designer identify the appropriate design criteria.

The following design criteria were explored to ensure the vision for arterials could be achieved:

LANE WIDTHS | OPERATIONAL ANALYSIS THRESHOLDS | DESIGN SPEED | SAFETY DESIGN VEHICLE | BICYCLE FACILITIES | SIDEWALK FACILITIES | CLEAR ZONES

BALANCING FACTORS FOR ARTERIAL DESIGN

The collaborative consensus among group members resoundingly emphasized the need for a comprehensive strategy to accommodate all users and modes on roadways. Complete Streets, as endorsed by the National Complete Streets Coalition, stands as a transformative approach where the entire transportation network is planned, designed, and maintained to ensure safe mobility and access for pedestrians, cyclists, motorists, and transit riders of all ages and abilities. Multiple other state departments of transportation have adopted the Complete Streets approach to address safety on arterial roadways.

Moreover, it is crucial to recognize that Complete Streets is not merely a set of guidelines but a comprehensive tool and process to achieve safety for all roadway users. The Federal Highway Administration (FHWA) has recognized the potential of Complete Streets in enhancing safety outcomes and initiated a thorough review, resulting in the report *"Moving to a Complete Streets Design Model."* This report identifies strategic areas of opportunity for FHWA and its stakeholders to:

- Influence roadway safety.
- Improve data collection.
- Conduct rigorous safety assessment during project development.
- Accelerate adoption of safety standards.
- Reinforce safety in design interpretation.
- Integrate Complete Streets as the default approach for funding and designing non-access-controlled roadways.

As a powerful instrument for fostering safety, equity, and sustainability, Complete Streets emerges not only as a policy but as a dynamic process to reshape how roadways are conceived and developed to prioritize the well-being of all users.

Definition of BALANCING FACTORS

Ignoring or compromising on these factors can result in potential legal and safety issues, public backlash, and costly redesigns or modifications. Engineers have discretion during design decisions to apply flexibility to achieve performance and project goals, referred to as engineering judgment. The balancing factors are significant items to weigh between when designing projects and applying engineering judgment.

BALANCING FACTORS discussed by the group: While all agreed Safety was a priority for every arterial, the remaining factors were discussed in how they impacted the character and context of different arterials and places in the region and should be considered during project development.

- Safety
- Existing sidewalks
- Right-of-way
- Budget
- Regulatory compliance
- Maintenance commitment
- Utilities / drainage
- Lanes to accommodate traffic volumes
- Driveway and side street access
- Truck accessibility

When to Identify BALANCING FACTORS

LOCAL balancing factors important to the community along an arterial should be identified early in the process.

STAKEHOLDER AND PARTNER AGENCY INPUT

The Blueprint was created with the assistance of variety of local, regional, and state agencies and organizations. Participants met five times: vision and goals workshop, community focused transportation workshop, arterial design considerations workshop, four typology meetings with county governments, and at a workshop and training to test out the draft of the Blueprint.

The first workshop in this comprehensive series, the Regional Vision and Goals Workshop, played a pivotal role in shaping the trajectory of the project. Grounded in a thorough SWOT analysis, participants collaboratively developed the vision for the regional arterials and established key goals. This initial step provided a solid foundation for subsequent decision-making processes and laid the groundwork for a unified and strategic approach.

The Community Focused Transportation Planning (CFTP) Workshop focused on project development. The workshop asked participants to evaluate existing processes and tools and asked participants for their perspectives on how to enhance the process and tools for planning and designing arterial roadways. Importantly, it also served as a platform to identify performance metrics and characteristics that resonated with participants.

The Arterial Design Considerations Resources (ADCR) Workshop took a deep dive into the nuances of design flexibility and non-negotiables. The workshop provided space to discuss different design tools and two site visits to problem solve improvements. It also provided a space for stakeholders to articulate their priorities and expectations, contributing valuable insights that would guide the development of the arterial blueprint.

The Typology meetings were held in four of the five counties of the St. Louis region with two counties combined into one meeting. These meetings involved walking participants through the process of defining arterial typologies specific to their areas. The smaller setting better enabled interaction and specific feedback about the arterials in each county. This level of depth enhanced the Blueprint to be adaptable and responsive to the diverse needs of each county. Each meeting helped inform the creation of a thoughtful decision-making process for planning and designing arterial roadways in the St. Louis region.

PROCESS FOR INPUT DURING STUDY

REGIONAL VISION AND GOALS WORKSHOP

MAY 2023

Defined the Regional Vision/ Goal and identified areas of focus for arterial process and design. Incorporated each stakeholder's values into vision and goals.

COMMUNITY FOCUSED TRANSPORTATION PLANNING (CFTP) WORKSHOP

AUGUST 2023

Verified the vision/goals, explored concerns and developed a focused consensus on a process/ tool that could deliver a positive and equitable transportation system for each arterial.

Help us rank the steps in order of which needs the most clarity and definition for the substeps?

FIGURE 1-4: *(Top to bottom) Participants scoring the existing EPG steps that need more definition for arterial projects; participants discussing strengths of regional arterials; field visit on Route 340*

ARTERIAL DESIGN CONSIDERATIONS RESOURCES (ADCR) WORKSHOP

SEPTEMBER/OCTOBER 2023

Created a comprehensive and flexible design tool and applied it to specific arterials in workshops to demonstrate and refine its use.

TYPOLOGY DEVELOPMENT MEETINGS

JANUARY 2024

Discussed existing and desired conditions on arterials, developed potential needs and constraints for all modes, and created typologies for arterials and how to use the typologies going into practice.

SUMMARY OF INPUT

During the Visioning Workshop the stakeholders acknowledged that the existing process is established and accepted, but is not serving the full vision of MoDOT or the St. Louis Region for arterials in the future. There is a desire for a multi-modal system that incorporates good transit, bike and pedestrian facilities. The vision for the region focuses on ensuring that safety is incorporated into the process to protect the most vulnerable users aspiring for a zero-fatality network of arterials.

The Community Focused Transportation Planning Workshop agreed that the goal for the process was to be collaborative and inclusive. The process should give the opportunity to incorporate community and stakeholder input during scoping to allow the community goals to become part of the guiding basis for the project. The community and local governments have insights into issues, potential use, and level of openness to potential project options. This information will be beneficial to the project team to better scope the project study, such as the level and types of community engagement. This input is also useful for adapting the project study to the known challenges of the community, such as businesses being receptive or opposed to access management opportunities. Involving third parties early in the process offers the ability to set expectations on the cost implications of the anticipated range of project improvements. It may open the door to potential co-investment and give the partnering community or organization a head start. Since allocating funds for a local match, from a capital program, or applying for funds from a variety of competitive sources takes time, this head start is vital to developing the partnership.

The Arterial Design Considerations Workshop concluded that there is a desire to involve planning, traffic, and safety professionals prior to scoping the engineering design and identifying funding sources. Participants agreed that the decision-making process for projects should be flexible in design and consistent in process within and across agencies. Design should be safe, place-based, and contextual. Communities should inform what future modes might be designed for along arterials. Participants recognized that the quality of rural components for Jefferson and Franklin Counties in the Blueprint would not only serve the region better but also be a model for rural communities statewide.

Overwhelmingly positive response was received from the stakeholders on The typologies received overwhelmingly positive responses from stakeholders, and stakeholder comments were incorporated into the project.

All workshop materials can be found in **Appendix A**.

How would you rate the importance of the metrics categories to your projects?

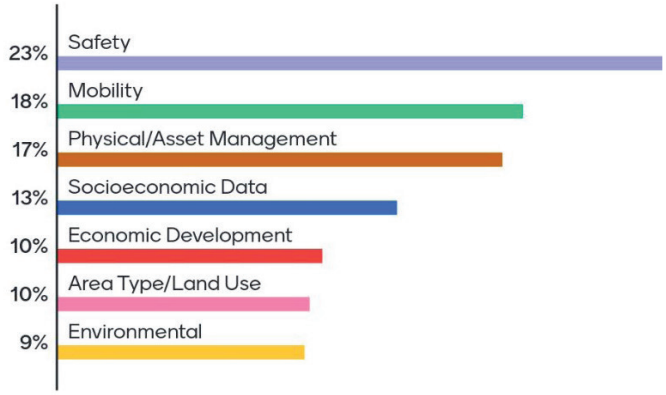


FIGURE 1-5: *Participants scoring of performance metrics*

Agencies Involved During Blueprint Development
Board of Public Service City of St. Louis
City of St. Louis Planning
East West Gateway
Franklin County
Great Rivers Greenway
Jefferson County
Metro
MoDOT Admin
MoDOT Department Head
MoDOT Design
MoDOT Design Liaison Engineer
MoDOT District Leadership
MoDOT Franklin and Jefferson County Design Engineer
MoDOT LPA and Planning
MoDOT North St. Louis County Design Engineer
MoDOT North St. Louis County Traffic Engineer
MoDOT South St. Louis County Area Engineer
MoDOT Southwest St. Louis Design Engineer
MoDOT Southwest St. Louis Traffic Engineer
MoDOT St. Charles County Area Engineer
MoDOT St. Charles County Traffic Engineer
MoDOT St. Louis City Area Engineer
MoDOT St. Louis City Design Engineer
MoDOT St. Louis City Traffic Engineer
MoDOT Traffic Engineer
St. Charles County Engineer
St. Louis County Planning
St. Louis County Transportation
Trailnet

FIGURE 1-6: *Participants during process*

III. ARTERIAL VISION AND GOALS

THE VISION STATEMENT FOR ARTERIALS

This Vision Statement emerged through the collaborative and dynamic stakeholder process, developed by the collective input from our Regional Vision and Goals Workshop in May 2023. Through meaningful discussions and shared insights, participants contributed their perspectives and aspirations. This input laid the foundation for a vision that encapsulates the shared values and objectives of our region for arterials. This collaborative approach ensured that all partner agency voices were heard and considered, fostering a sense of inclusivity and ownership among stakeholders. The resulting vision statement not only reflects the collective aspirations of the group but also serves as a guiding beacon, aligning our efforts towards a common and purposeful future.

The vision statement was then scored by the same group in August 2023, with the group strongly agreeing that it captured their input for the future of arterials.

"Moving forward into the future, all arterials in the St. Louis Region should emphasize the safety of the most vulnerable users, advance a wide range of community contexts and goals, and provide for users of all modes. This can only be accomplished through a collaborative process that provides each community with flexible solutions to fit their unique needs."

Do you feel this vision statement aligns with the feedback from the last meeting and is what we should be striving to accomplish?

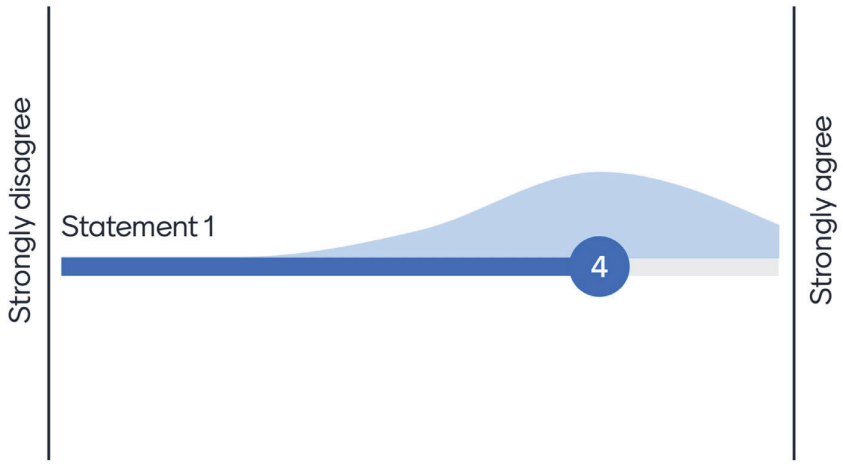


FIGURE 1-7: *Mentimeter survey results showing how workshop participants scored the vision statement*

GOALS FOR ARTERIALS

COLLABORATIVE + INCLUSIVE

Define collaboration by identifying key agencies, stakeholders, and the public to shape the project and incorporating input in a meaningful, inclusive, and equitable manner.

FLEXIBLE + CONSISTENT

Provide flexibility and support for contextual design, decision making and design negotiation using a consistent project development process.

MULTIMODAL + PLACE-BASED

Optimize multimodal improvements for arterials by balancing the design with technical constraints, user needs, local context, place, and community goals/strategies/priorities.

SAFE + CONTEXTUAL

Prioritize safety for all vulnerable roadway users while aligning levels of service to community strategies/ priorities and aspiring to achieve a zero-fatality network of arterials.

The goals for the future of arterials and the process to get there were developed through a collaborative process similar to the creation of the vision statement. All discussions and elements in this Blueprint were carefully filtered through these goals, ensuring a seamless alignment between the vision and tools, design elements, and substeps needed.

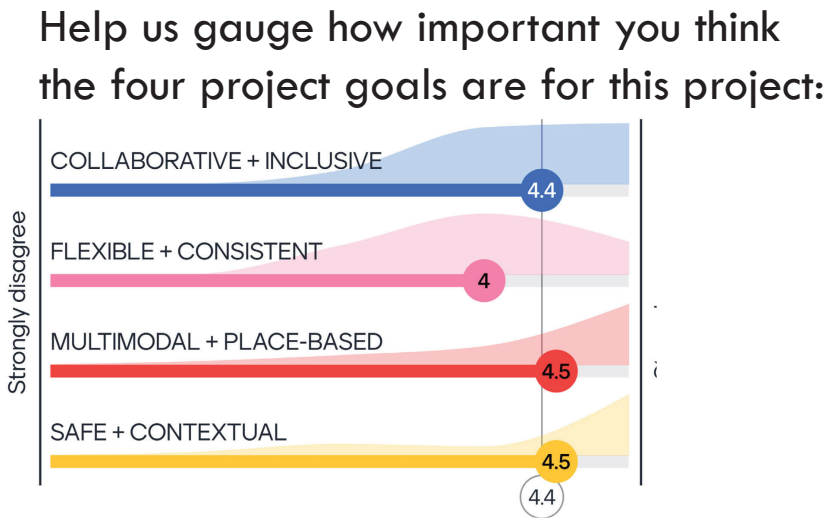


FIGURE 1-8: *Mentimeter survey results showing input on goals*

IV. ALIGNING ARTERIALS TO EPG PROCESS

THE EPG

This Blueprint is strategically designed to align consistently with the Engineering Policy Guide (EPG). It offers detailed substeps intentionally tailored for arterial projects. This intentional alignment ensures a comprehensive approach to address the unique needs and complexities associated with arterials - with a focus on achieving the vision statement for the future of arterials.

The following details on pages 22-42 walk through the process from identifying projects and scope and budgets for the STIP to project development and design. Through the incorporation of substeps within each step in the EPG, this section provides a nuanced and detailed framework, enhancing clarity and precision in the implementation of the EPG for arterials.

These substeps help project managers identify:

- Who should be engaged and when in the process.
- How to best consider other planning and engineering efforts.
- How to align important characteristics and available data.
- How to best consider safety to make design decisions - all with a context that is focused on different project types.

This Blueprint aligns to the EPG process because most local agencies follow the EPG formally or informally and identified it as the best guidance for project development for the region.

PROJECT INITIATION - GETTING TO THE STIP/TIP

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

EPG STEPS 1-5 (see Figure 1-3) - 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 agencies

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

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

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

EPG STEPS 6-10 - DESIGN TO CONSTRUCTION

This part of project development stays the same - while continuing to align to the vision and goals for arterials in the region.

	MoDOT Department / Groups	Local Agency Departments / Groups
Project Manager / Project Team Lead	MoDOT Area Engineer, MoDOT Project Manager	Project Development
Planning	MoDOT Planning	Planning Department, Director of Planning, Board of Public Service
Safety and Traffic	MoDOT Traffic, Safety, and Operations	Board of Public Service, Streets Department, Public Works, Planning Department
Operations	MoDOT Traffic, Safety, and Operations	Department of Public Works, Streets Department
Maintenance	MoDOT Maintenance	Streets Department
Administration	MoDOT Regional Leadership	Local Administration, Local City Leadership,
Communications	MoDOT Communications and Public Relations, TMC Staff	Public Relations, Public Affairs, Government Affairs
Project Estimate / Budget Team	MoDOT SET Team / Core Team	Project Management, Planning, & Programming
Consultant Designer	Consultant for MoDOT	Consultant for Local Agency
Design	MoDOT Design Team	Department of Public Works, Board of Public Service, Design Department

FIGURE 1-9: *Departments and Groups*

IMPORTANT TERMINOLOGY FOR DEPARTMENTS / GROUPS

In the course of the project life cycle, spanning from Project Initiation through Project Development/EPG Process to implementation, various departments, groups, and agencies play integral roles. Figure 1-9 delineates the generic mentions of these departments and/or groups within Section IV, specifically addressing the alignment of arterials to the EPG Process.

PROJECT INITIATION | GETTING TO THE STIP/TIP

St. Louis area agencies, including MoDOT and local partners, are dedicated to collaborating with local officials, citizens, and stakeholders to discern optimal transportation options for their communities. Identifying projects on arterials requires an added layer of oversight and review. This is needed to effectively synchronize asset management and cater to the diverse needs of all users and modes in alignment with the vision statement. The procedural steps outlined in Figure 1-10 serve as a guide - for project managers, local agencies, area engineers, and other partners to follow in developing or enhancing arterial scopes of work.

IMPORTANT CONSIDERATIONS FOR PROJECT INITIATION

The following bullets provide important insight towards identifying and initiating projects on arterials. This is a crucial step that can lead to the success of the vision and goals for arterials in the region.

- ***Focus on Safe, Multimodal Arterial Development***: The project initiation phase emphasizes a conscious approach to create roadways that prioritize inclusivity for all users and modes, encompassing pedestrians, cyclists, motorists, and transit riders.
- ***Utilize Guiding Flowchart Steps***: Illustrated in Figure 1-10 are four essential steps that serve as the foundation for the identifying projects on arterials; essentially this is the roadmap for strategic decision making going into project development.
- ***Utilize High-Level Cost Estimates***: Recognizing the significance of financial considerations, the Budget Team plays a central role by incorporating high-level cost estimates for essential network tools into the budgetary framework.
- ***Integrate Early Considerations:*** The project initiation flowchart depicts a high level scoping process that places emphasis on a variety of influential factors and participants early in the decision-making process. This approach is aligned with the vision of the Blueprint and improves both efficiency and effectiveness for developing quality transportation projects.
- ***Unfunded Needs:*** If additional project elements cannot be covered in the current project they should be added to the unfunded needs. These elements should be considered during the design process for future phased implementation.

PROJECT TYPES

The key to enhancing safety and mobility for all users and modes is to identify opportunities early during selection of project type and scope elements. Not all projects require the same level of project development. Based on project impacts, scope, and funding, the project manager/team needs to determine the level of project development needed and what substeps should be processed through, as defined on Figure 1-12 on page 23.

USEFUL NOTE: Use Figure 1-11 to determine your Arterial Project Type.

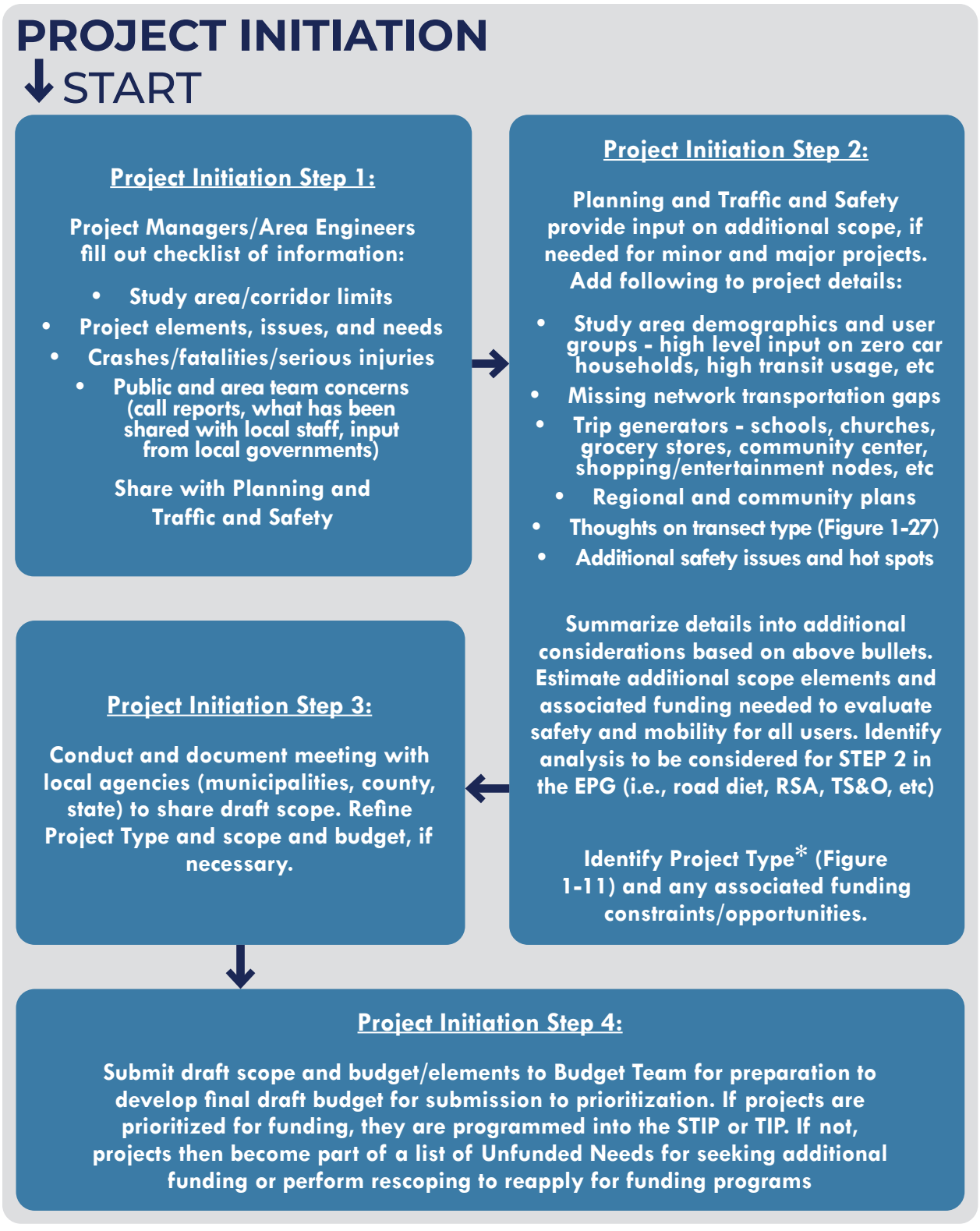


FIGURE 1-10: *Project Initiation Flowchart*

**If a MAJOR Project is identified, there needs to be a secondary discussion with administration and leadership to discuss the proposed scope, analysis, and budget before submitting to the STIP, TIP, and/or unfunded needs list.*

Typical Scope Elements	Typical Impacts	Typical Project Name / Funding Stream
Asset Management (Routine Maintenance, Operations, Bridges)		
-Emergency Resurfacing -Traffic signal upgrade and/or retiming -ADA ramp upgrades -Bridge Repairs/structural work -Bridge Inspection -Bridge Deck Resurfacing -Spot safety improvements -Traffic Optimization	No/minor impacts to traffic capacity and parking No/minor impacts to vehicular/pedestrian/cycling ways No impacts to utilities or drainage No changes to curb lines/drainage impacts No impacts to other jurisdictions assets or roads No ROW acquisition No excavation below sub-base Rehabilitation work on or around an existing bridge Maintaining existing safety features Minimal coordination needed with other jurisdictions No access management changes	-CMAQ signal optimization -RSAs -Safe Streets Implementation -Safety Funding
Minor Capital Projects		
-Overlay -Lane reallocation -Full resurfacing with impacts to intersections -Restriping / Road diets -Expansion of cycling network on-road -First / Last mile projects to schools, transit, parks, trip generators -Painting new midblock crossings -Intersection improvements (turn lanes add/remove) -Streetscape improvements -Green Infrastructure	Minor parking impacts Minor impacts to traffic signals No ROW acquisition Minor improvements of traffic calming and network tools Changes to curb lines at intersections (mostly for traffic calming) Minor to moderate impacts to traffic capacity and parking Minor to moderate stormwater and drainage Minor to moderate impacts to utilities with no/moderate utility coordination Minimal to moderate coordination needed to other jurisdictions Safety improvements to address crashes No/minor access management changes Minor to moderate changes at intersection Minor to moderate below grade space (root zone) infrastructure needs	-STP -Developer led -Safe Streets Implementation -Complete Streets -Safety Funding
Major Capital Projects		
-Corridor improvements -Replacing bridges -Roadway reconstruction -Roundabouts -Expansion of cycling network with protection or separated facilities -Reclamation of roadway for other public uses -Streetscape improvements -Green Infrastructure	Moderate/major coordination need with other jurisdictions Moderate/major stormwater and drainage Moderate/major parking impacts and/or roadway capacity Moderate/major impacts to utilities with possible extensive utility coordination Changes to curb lines along corridor with drainage impacts Major impacts to traffic signals that greatly impact traffic operations in addition to traffic capacity Excavation below sub-base ROW acquisition Moderate/major below grade space (root zone) infrastructure needs	-STP -Corridor Studies -PEL -Bridge Replacement -Federal Funding -Major Development led -Great Streets / Local Roadway Plan Implementation -Complete Streets -Other major federal funding

FIGURE 1-11: *Arterial Project Types*

EPG Project Development STEP		Asset Management	Minor Capital Projects	Major Capital Projects
	Project Initiation	*Identified during this step*		
Step 1: Inspire and Idea	Develop Public Involvement Plan (PIP)	X	X	X
	Collaborate with communications	X	X	X
	Develop purpose and goals		X	X
	Define high level issue		X	X
	Public Touchpoint (and ENGAGEMENT MEMO)			X
	ARTERIAL CHECKLIST	X	X	X
Step 2: Planning Begins	Discover existing conditions		X	X
	Identify typology and tools		X	X
	Develop options/alternatives		X	X
	Collaborate with Planning and Safety and Traffic		X	X
	Collaborate with other Agency partners		X	X
	Meet with Budget Team			X
	DRAFT PLANNING CHECKLIST		X	X
Step 3: Public Consulted	Public Touchpoint (and ENGAGEMENT MEMO)		X	X
Step 4: Impact Assessed	Collaborate with Safety and Traffic		X	X
	Collaborate with Maintenance		X	X
	Refine preferred concept		X	X
Step 5: Public Involved Again Before Project Approval	Public Touchpoint (and ENGAGEMENT MEMO)		X	X
	FINAL PLANNING CHECKLIST (15% concept)		X	X
	Collaborate with other Agency partners		X	X
	Public Touchpoint (INFORM)	X		

FIGURE 1-12: *Typical Elements for Project Development by Project Type*

DETERMINE PROJECT-DEPENDENT STEPS

To best achieve the vision and goals for all users, in safe ways that provide mobility for all modes, arterial project development needs some additional items to be processed through in a consistent manner. These project development items are shown in Figure 1-12 and aligned to show prompts for the EPG steps by Project Types. Figure 1-12 highlights that projects with fewer opportunities to add or modify facilities for all users and modes in the existing ROW have fewer steps.

STEP 1: NEEDS OF A COMMUNITY INSPIRE AN IDEA

FROM THE EPG

At the completion of project scoping, all items that could possibly affect the scope of the project will have been discussed by the core team. Decisions with regard to how each of these items will be handled shall be documented for future reference. Most importantly, the project manager and core team should ensure that the need has been satisfied.

DEFINE HIGH LEVEL ISSUES

Using narrative from Project Initiation, a brief definition of the project and its issues should be included in the ARTERIAL CHECKLIST. This narrative will inform the most impactful ways to engage the community.

DEVELOP PURPOSE AND GOALS

Building upon the narrative from Project Initiation and identifying high-level issues, a project purpose statement should be crafted to articulate the project's overarching aim. Simultaneously, the agency's project goals will be established to guide the initiative. This purpose-driven approach will ensure alignment with the community's needs and the organization's objectives, setting a clear direction for successful project implementation. It will be essential to include these elements in the ARTERIAL CHECKLIST for comprehensive project documentation and reference.

For Minor and Major Projects, goals should be considered draft until shared with the public for collective input.

COLLABORATE WITH COMMUNICATIONS

A meeting will be conducted with Communications to gather their input in the development and key messaging for the Public Involvement Plan (PIP) and project steps.

SUBSTEPS FOR ARTERIALS

1. Public Involvement Plan (PIP)
2. Agency Collaboration
3. ARTERIAL CHECKLIST
4. Step 1 Engagement Memo for Major Capital Projects

SUMMARY OF WHAT WE HEARD WAS IMPORTANT FOR ARTERIALS IN STEP 1:

- The public wants to weigh in before concepts are created on more transformative projects.
- Consistent engagement is needed and should be inclusive for any project in some way.
- The opportunity for different communities to give input (i.e., online, in person, time of day, etc.) should be considered.
- A roadmap is needed for arterial projects to get to design and incorporate the needs of the community - both design and process.
- Agency coordination is needed early on during Step 1. This is when a community advisory or other stakeholder committee should be formed. Their input should guide input, goals, and needs.
- Some projects are so impactful that it is critical to have the discussion during the scoping phase before any ideas are attached to the design to gain community input.
- Need a checklist that helps align all the pieces for arterials early in the process.

DEVELOPING STRATEGIC PUBLIC INVOLVEMENT PLANS AND ALIGNING ENGAGEMENT EXPECTATIONS AND IMPACTS

Meaningful, effective, and intentional community engagement begins with a public involvement plan (PIP) tailored to the project scope, impacts, and location. The PIP should cover all engagement from Step 1 to 10 on the EPG. EPG 129 gives guidance for public involvement and public engagement plans. The EPG can be used as a starting point for this PIP. Engagement during Steps 1, 3, and 4 should align at minimum with the Project Type identified during Project Initiation.

There is no one size fits all strategy for engagement. The depth of community engagement should reflect previous engagement, the extent of project impacts, and the people living within and near the project area. Some projects may have limited opportunities for engagement, while others may need extensive engagement. Understanding the impacts of engagement activities on budget and timeline, project managers should consider when engagement will be most efficient and effective in determining project outcomes while integrating the community's voice into the project in a dignified, respectful, and meaningful manner.

The PIP should identify goals for project engagement, consider the community, and align participation to strategy. Figure 1-13 is the IAP2 "Spectrum of Public Participation" [1]chart that aligns impact from the engagement with setting expectations in the PIP. The PIP should state what level of participation from Figure 1-13 is warranted for each touchpoint to appropriately set the expectations up front of how people will be engaged. Define how their feedback will inform the project.

The PIP should be developed for all Project Types. In Asset Management projects, overall engagement might only be to INFORM the public about the work. In contrast, a Major Project will start with more of an INVOLVE/ COLLABORATE style and end the engagement touchpoints with a focus on INFORM.

The PIP should include a list of stakeholders. The PIP is separate from agency collaboration, though there might be overlap in participation.

More information for the PIP can be found on MoDOT's EPG and some tips for inclusion in the PIP can be found in Appendix B.

INCREASING IMPACT ON THE DECISION

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

FIGURE 1-13: *IAP2 Spectrum of Public Engagement*

[1] *IAP2* is an international leader in public participation (P2), IAP2 developed three pillars for effective P2 processes. Developed with broad international input, these pillars cross national, cultural and religious boundaries, and they form the foundation of P2 processes that reflect the interests and concerns of all stakeholders.

DEVELOP PIP

A PIP (see Figure 1-14) should be developed for every project type. If a public involvement plan or public engagement plan is already being developed as part of the current study, just involve the key points needed for engagement on arterials as noted in Figure 1-14.

The PIP should be created in collaboration with agency Planning and Communications professionals. The PIP should develop a variety of strategies for engagement. The PIP should be thoughtful and intentional and include the outcomes and ways the public will be engaged.

The key components of the PIP should include the who, how, when, why, and what. The PIP should align the engagement tools and options to what information is trying to be gathered, as shown in the table below. The PIP should include a list of stakeholders for minor and major projects.

The project team should consider which demographic groups may require targeted engagement, such as limited English-speaking populations who may need an interpreter or persons with disabilities who may need accommodations.

FILL OUT ARTERIAL CHECKLIST

The ARTERIAL CHECKLIST should be filled out by the Project Team Lead, see Figure 1-15. This is a new tool designed to serve as the roadmap for project teams, guiding them through steps 1 to 6. This checklist will prove invaluable in aligning with the Blueprint and assisting teams in navigating each stage of the project efficiently. A sample ARTERIAL CHECKLIST can be found in Figure 1-15 and Appendix C.

DEVELOP ENGAGEMENT MEMO FOR STEP 1 (MAJOR CAPITAL PROJECTS)

The first touchpoint for engagement for Major Capital Projects should be a concise and informative record that summarizes activities, input received, and outcomes to carry forward. It should include a list of engagement activities; their intent, objectives, steps involved, and who was engaged.

The memo should detail the contents of the table displayed on Page 29 alongside a concise overview of the collected input. This input should be condensed into actionable insights aimed at informing future design options and decision-making processes. The guiding principle is to enhance transparency and clarity regarding the utilization of input in arterial design projects.

DELIVERABLES AT END OF STEP 1

- Public Involvement Plan (PIP)
- ARTERIAL CHECKLIST
- ENGAGEMENT MEMO (MAJOR CAPITAL PROJECTS)

NOTE: Some studies and plans (i.e., examples shown in Figure 1-16) already summarize engagement. This ENGAGEMENT MEMO could be pulling the summary from these existing studies and plans to document what was heard and what is being taken action on.

EPG STEP 1 ENGAGEMENT | ENGAGEMENT FOR MAJOR PROJECTS

Early engagement in arterial projects is pivotal when considering projects that warrant three touchpoints with the public. The purpose is to foster collaboration between project managers and the community to shape transportation options and design for all users. This involves developing a shared understanding of high-level issues and study areas, co-creating goals with the community, and actively listening to input through the discovery process. By embracing diverse perspectives from the start, Major Projects or transformative arterial projects can seamlessly integrate community context and elevate priorities such as safety, mobility, and community well-being. The following are some ideas for this engagement:

STEP 1: ENGAGEMENT FOR MAJOR PROJECTS	Title of engagement: ***'PROJECT NAME' DISCOVER PHASE***
PURPOSE OF TOUCHPOINT	The goal is to obtain early input to define project issues, gather public consensus on problems and options before embarking on option development, and solicit feedback on the project goals.
PUBLIC PARTICIPATION IMPACT	INVOLVE / COLLABORATE
ENGAGEMENT TYPE	Interactive public meeting, workshop, pop-up event, survey, verbal discussions
MATERIALS	Ways to share out and gather input | maps of study area | interactive activity for participants | survey for public ideas (virtual and in person) |comment forms
LOCATION	As close to or on arterial as possible. Look for location with a agency partner, community center, place that people participate at an existing community event(s).
INPUT TO GATHER	The purpose of this early touchpoint for a transformative project is to co-create the goals, consensus on issues, and potential options together. For Major Capital Projects, this step allows the public to evaluate the baseline conditions generating the need for the project and give input that adds clarity to the big picture problems the project aims to address during design. Input can then be used to marry with data and analysis to provide for the best options to fit all needs.
NOTES for this step	It should be shared early on that not all problems and options can be funded. Early engagement can support future needs by being phased as multiple projects. It also presents the opportunity to develop flexible design options that consider the needs of all users
WHAT GOES IN MEMO	Summarize what was done and include any details from this table that are relevant. The memo should include a summary of input and if any action is being taken on what was heard. Specifically it should include a summary of issues, potential options, and goals identified through the engagement. The memo might also reference engagement summaries in other existing studies per Figure 1-16.

In summary, the engagement plan framework is a critical design tool to serve as a guide to systematically involve stakeholders in a meaningful way, leading to better decisions, stronger community relationships and more successful project outcomes. Key Elements of the PIP should address and support:

- Enhance Communication and Transparency
- Build Trust and Foster Relationships
- Ensure Inclusivity and Diversity
- Improve Project Outcomes
- Identify and Mitigate Risks
- Inform, Validate, and Legitimize Decisions
- Identify Key Messaging

See Appendix B for more information on the PIP and the Community Engagement Framework.

WHAT: Engagement Type to Align with Problem

Define the problem and what level of engagement is needed from Figure 1-12. This ties in closely with the WHY.

WHO: Audience Types

Agency Staff, Public, Stakeholders, and Elected Officials
Create a comprehensive database of all audiences and how they should be informed through the process. This should include key messaging co-created with the Communications Team.

HOW: Engagement Tools

Identify the tools to best align with the community and input needed. Notify Communications of engagement.

Advisory Groups, Briefings, Connecting with Trusted Community Leaders, Internet Blogs, Newsletters, Project Announcement, Project Reports/Updates, Website, Workshops, In-person Polling and Creating Together, Focus Groups, Direct Mail, Design Charettes, Meetings, Media Outreach, Walk Audits, Podcasts, Surveys, Language Translation, Surveys, Fact Sheets, Webinars, Advertising, Telephone Hot Lines, Social Media, Partner Satisfaction Surveys, Safety Demonstration Projects

WHEN: Schedule for Engagement

Develop a time for engagement to align with the EPG Steps. This should be flexible based on project findings.

WHY: Purpose and Intent of Engagement

Specify the input desired and how it can impact the project so that the purpose of each touchpoint is intentional and can be transparently shared with participants.

Share Information	**Awareness Campaigns** | Telephone Hotlines, Information Kiosks, Fairs and Events
	Information/Education Programs | Project Offices, Briefings, Website, Social Media and other Internet Tools, Key Messaging /Talking Points
	Feedback Mechanisms | Project Updates/Reports, Newsletters and Direct Mail
Collect and Compile Input	**Individual Inquiries** | Comment Forms, Interviews, Social Media and other Internet Tools
	Social Science Research | Surveys and Questionnaires
	Voting, Polling
Bring People Together	**Open Public Forums** | Public Meetings, Open Houses, Tours and Field Trips, Virtual Meetings and Workshops
	Specialized Processes | Charrettes, Forums, Focused Conversations
	Representative Participation | Focus Groups
	Advisory Groups

FIGURE 1-14: *SAMPLE COMPONENTS AND STRATEGIES FOR THE PIP*

For ALL PROJECTS	
Study Area / Project Limits	< list / map >
Project Type	< Routine Maintenance / Minor Capital / Major Capital >
Crashes Collected	< confirm received; yes/no >
Traffic Volumes Collected	< confirm received; yes/no >
Are there sidewalks?	< yes sufficient/ none / missing gaps / not to code >
Is there transit?	< yes / no >
Are there bike facilities on corridor?	< yes / no / no but identified in previous plan / no and desired by community >
Are there bike facilities crossing corridor?	< yes / no / no but identified in previous plan / no and desired by community >
Previous Public Concerns	< yes / no >
Project Purpose and Goals	< list >
High Level Issue Fixing	< list >
PIP Developed with Communications Approval	attach
For Minor and Major Capital Projects	
Study Area Demographics	< census outputs/EWG Map >
Trends Noted in Project Initiation Process, if applicable	< list >
Analysis Types Being Performed*	< list >
Meeting with Local Partners	< yes / no >
Other Known Partner Plans	< list >

*
- Roadway Safety Audit
- Corridor Study
- Conceptual Study
- Traffic Study/Traffic Impact Assessment
- Location Study
- Corridor Signal Optimization
- Road Diet Analysis
- SAFER Document
- Great Streets Study

FIGURE 1-15: *SAMPLE ARTERIAL CHECKLIST*

STEP 2: PLANNING BEGINS

FROM THE EPG

Project Scoping is a process that is used to clearly define transportation needs and to determine the appropriate means to address them. Project scoping begins with the delivery of the need to the project manager and continues until the elements and limits of a project become so well-defined that accurate costs and project delivery schedules can be forecast. Project scoping should not be thought of as a separate, stand-alone process from the project development process. It is, instead, the initial stage of the project development process where the details of appropriate solutions are developed.

The purpose of project scoping is to develop the most complete, cost-effective solutions, as is practical, early in the project development process. This is foundational to avoiding major design changes, large estimate adjustments, and last minute project changes later in the project development process. With proper project scoping, such changes will be minimized and will have reduced impacts on the overall project. Proper project scoping of all needs leads to a more balanced, consistent construction program. Scoping involves determining the root causes of the need, developing a range of high-level possible solutions to study to address the need, setting the physical limits of the project, accurately estimating the cost of the project, and forecasting the delivery schedule of the project. Project scoping is inclusive of identifying the appropriate analysis type and what mechanism for documentation is necessary. There are a number of existing processes that can be used for Step 2 to process analyses appropriately.

SUBSTEPS FOR ARTERIALS

1. STEPS for Typologies
2. Agency Collaboration
3. DRAFT PLANNING CHECKLIST

SUMMARY OF WHAT WE HEARD WAS IMPORTANT FOR ARTERIALS IN STEP 2:

- Engagement should be aligned to the type of project.
- Need guidance on the report type for arterials that is inclusive of project type and needs and goals developed.
- Step 2 is written for NEPA but can be used for Arterials to encompass the evaluation and documentation of existing conditions, trends, public input, and developing options and tools to include.
- Think through the design for multi-modal users including safety for every mode from freight to pedestrians.
- Create a checklist, guidebook, and tools to show what is possible/practical.
- Process can improve by including more input. Traffic/Safety/ Maintenance needs to be at the table for scoping meetings. Make sure the process communication doesn't get lost in email. Find ways to transfer institutional knowledge.
- Knowing which design features are best practices for which contexts. Would be good to have some guidance on which technologies are useful in which situations based on metrics and engineering judgment.

EVALUATE AND MAP EXISTING CONDITIONS AND TRENDS

An evaluation and spatial mapping of existing conditions of the study area should include all transportation infrastructure, safety data, and other pertinent data identified in Project Initiation and Step 1 that is pivotal to the needs identified. Other trends in the industry, region, and study area that might impact the transportation options should be considered. The analysis should examine demographic trends, especially for equity populations.

Include a detailed analysis and mapping of existing conditions, issues, and trends to ensure that development of transportation options are data driven. The results are useful during engagement in Step 3 to inform the public about the issues and involve them in the development of options to address the issues. The results should be included into the DRAFT PLANNING CHECKLIST.

Document any public input and include it in the existing conditions mapping and trends. This could be call reports, documented concerns, or input from agency partners.

COLLABORATE WITH SAFETY, PLANNING, TRAFFIC AND OTHER AGENCY PARTNERS

Conduct a meeting with Planning, Safety and Traffic, and Operations where relevant. This meeting should focus on data and analysis needs. Ideally groups who participated in project initiation give further input into safety needs.

A collaboration meeting with other agency partners will identify opportunities for community plans, needs, and additional scoping opportunities through partner's funding streams. At minimum partner projects should be considered when developing options, tools, design, and construction phasing. Potential Design Flexibility should be identified, see page 45 for more detail.

PROCESS THROUGH TYPOLOGY IDENTIFICATION

Project teams should walk through the four part process to identify typologies and tools for the project. These four parts guide project teams through a systematic evaluation of arterial characteristics for context in any area of the region, integrate input from other plans and projects in the area, and considers the needs of existing and future users and modes. Through this four part process, the right typology(s) and tools can be identified. These can help provide guidance and insight in developing options to take to the public in Step 3.

See page 86 for the four part Typology Process.

CONDUCT INITIAL ANALYSIS AND DEVELOP OPTIONS

Develop options systematically, drawing upon existing conditions, thorough analysis, public and agency input, the typology and tools process, and project needs. These options and examples, shown on page 35, serve as the foundation for presenting information to the public in Step 3 and constitute a crucial component of the data incorporated into the 'DRAFT PLANNING CHECKLIST.' These elements provide bigger picture context to align with the vision and goals for regional arterials.

BUDGET TEAM MEETING

For Major Capital Projects, conduct a meeting with the Budget Team to revisit any options and needs before taking to the public. This meeting should review options and determine what is possible within existing budget so expectations are clear during public engagement in Step 3.

This meeting should document if additional funding is needed, potential phasing options for asset management concerns, and prepare the project team for additional financial requests.

WHAT SHOULD BE INCLUDED IN THE PLANNING CHECKLIST:
USING EXISTING STUDY TYPES AND ANALYSIS TOOLS

For Minor and Major Capital Projects	
ARTERIAL CHECKLIST	< copy in data >
Existing Conditions	< summarize existing issues and the study area > OR < paragraph form - refer to report/study as needed >
Analysis Findings*	< summarize analysis type and findings > < paragraph form - refer to report/study as needed >
TYPOLOGY(S)	< step 1: sentence on context and character > < step 2: list of projects, plans, policies reviewed > < step 3: identify current and future users and modes > < step 4: arterial typology and tools >
Summary of Options	< brief paragraph on options - refer to report/study as needed> < summary of design elements and tools desirable but not in current design and added to unfunded needs list >

*No specific analysis is recommended for arterials. The analysis, study, plan, and design should align with the needs of the arterial and context as identified in Project Initiation/Getting to the STIP and Step 1. These analysis, study, plans, and design could include, but are not limited to:

- Roadway Safety Audit
- Corridor Study
- Conceptual Study
- Traffic Study/Traffic Impact Assessment
- Location Study
- Corridor Signal Optimization
- Road Diet Analysis
- SAFER Document
- Great Streets Study

FIGURE 1-16: *What could be included in a PLANNING CHECKLIST or incorporated into existing study*

DRAFT PLANNING CHECKLIST

This information summarizes everything from Steps 1 and 2.

This memo expands on the ARTERIAL CHECKLIST to summarize the existing conditions and study area analysis. This analysis should be a summary and can be pulled from whatever analysis report was created.

It should also include documenting the four steps to identify the TYPOLOGY(S) and associated potential tools considered in the options.

Options should be developed systematically, drawing upon existing conditions, thorough analysis, public and agency input, the typology and tools process, and project needs. These options serve as the foundation for presenting information to the public in Step 3 and constitute a crucial component of the data incorporated.

DELIVERABLES AT END OF STEP 2

- Draft PLANNING CHECKLIST

***NOTE: The PLANNING CHECKLIST was determined the best way to marry all existing study, planning, and technical analyses for arterials.**

This PLANNING CHECKLIST is intended to be simple and unformatted to support the needs for arterials. If this information exists in the existing study for analysis, creating this simple table is all that is needed for consistent documentation.

A sample PLANNING CHECKLIST can be found in Appendix C.

GUIDANCE ON ASSESSING IMPACTS & EVALUATING TOOLS ON ARTERIALS:

An initial estimation of potential impacts of the preferred / best option should be performed to provide useful information to evaluate the proposed project and support the decision-making process. These questions are ideas for collaboration with Safety, Planning, and Traffic.

Impacts to perform include a desktop identification of environmental resources. This is the first milestone for submitting a Request for Environmental Services (RES) for MoDOT projects. Although this step is not required in EPG for local government projects, it is recommended in order to identify potential issues for further analysis or permits.

The development of the preferred / best option also offers the opportunity to perform an initial, high-level assessment of right-of-way needs, including number of parcels and general estimation of square footage and costs. It is helpful to break up the preferred / best option into at least two scenarios for comparison: one that estimates the least amount of impact to properties, and the second that estimates the highest impact to properties. The differences generally include evaluating the space inside the right-of-way line and what opportunities exist to reallocate space, facilities, and features. For example, removing and relocating the curb line and associated drainage, sidewalks, and utilities increases project costs. In contrast, adding features and facilities within the existing curb line likely means zero to minimal impact to drainage, utilities, and sidewalks.

Studies have demonstrated that adding or improving facilities for safe and comfortable walking, biking, and transit use benefits businesses and fosters economic development. Public health is also improved as people adopt healthier lifestyles from increased physical activity using the new or improved active transportation facilities and features. Although these benefits may be difficult to measure for individual projects, other community impacts should be measured or estimated:

- **Equity populations: Persons 65+, persons under age 16, persons with disabilities, households who do not own a vehicle, persons in poverty, low income households, limited English speaking populations, and minority populations.**
- **Transit: How will the project impact access to transit? Does the project support improved transit use through creating bus stop pads for boarding, alighting, and waiting? Does the project support improved transit travel times and reliability such as signal priority or dedicated lanes?**
- **Active transportation: Will changes to facilities for walking and biking improve network connectivity and mobility? Will the changes reduce level of traffic stress or improve comfort for people walking and biking? Will the project support mode choice and attract more people to walk or bike? Do the changes improve the quality of service of facilities and features that support walking and biking?**
- **Trip generators: Will the project improve access to destinations such as businesses and services for daily needs, employment centers or major employers, and community facilities for gathering, recreation, and well-being?**
- **Safety: How does the preferred / best option improve safety such as estimation of reduction in conflict points, crashes, and/or crash severity?**
- **Traffic: What are the impacts to vehicular traffic movement and operations? What are the impacts to the total movement of people in the corridor?**
- **Parking: If relevant, how does the project impact on-street parking?**
- **Visibility: Did the project improve visibility of pedestrians to motorists through lighting, pavement marking, signage, and other features?**
- **Exposure: Did the project reduce physical exposure of people walking and biking to vehicles?**
- **Previous planning: Did the study incorporate the needs, input, and recommendations from previous planning and process this information further to develop the preferred option? Does the project implement recommendations from local or regional planning studies?**

STEP 3 PUBLIC CONSULTED

FROM THE EPG

Another important element of effective project scoping is the inclusion of the appropriate type and amount of public involvement and outreach early in the process and specifically prior to the determination of the solution. Proper public input can be an effective tool to help verify that the correct need has been identified and an appropriate solution is being developed for it. Comments from the general public, land owners, local elected officials, other state and federal agencies, local planning agencies, etc may influence the direction that the core team is taking with regard to the scope of the project.

DEVELOP ENGAGEMENT MEMO

The first touchpoint for engagement for Minor Capital Projects and second touchpoint for Major Capital Projects should be a concise and informative record that summarizes activities, input received, and outcomes to carry forward. It should include a list of engagement activities: their intent, objectives, steps involved, and who was engaged. The memo will contribute to transparency and effective communication, ensuring that all relevant information is documented and accessible for further project development steps and decision-making.

DELIVERABLES AT END OF STEP 3

- ENGAGEMENT MEMO

NOTE: Some studies and plans (i.e., examples shown in Figure 1-16) already summarize engagement. This ENGAGEMENT MEMO could be pulling the summary from these existing studies and plans to document what was heard and what is being taken action on.

SUBSTEPS FOR ARTERIALS

1. Engagement Memo

SUMMARY OF WHAT WE HEARD WAS IMPORTANT FOR ARTERIALS IN STEP 3:

- Engagement is crucial to develop trust with community and agency partners.
- Engagement on arterials should be different and more inclusive because needs of users vary.
- There is concern about the time and effort that could be wasted if community scoping is done early and funding isn't available. But early engagement is needed for a funding partnership to be successful/possible.
- Deciphering what the right information to take to the public will be helpful for arterials because of the varying needs.
- There is a balance needed for arterial projects to include all modes and gather public input, while staying within the project budget and timeline.

EPG STEP 3 ENGAGEMENT | MINOR AND MAJOR PROJECTS

Public engagement stands as a pivotal stage within the Blueprint process, as outlined in the EPG. It is imperative that all engagement efforts undertaken during this phase align with federal and state laws. However, what distinguishes this stage is its applicability to both minor and major projects. Particularly for arterial projects encompassing various modes of transportation and communities, the engagement approach may vary from traditional methods. At the heart of this engagement is the sharing of analysis and the gathering of input on the range of options under consideration. The insights gathered during this crucial phase are instrumental in finalizing the analysis for Step 4 and in shaping the definition of the preferred option.

STEP 3: ENGAGEMENT	Title of engagement: ***'PROJECT NAME' DEVELOP PHASE***
PURPOSE OF TOUCHPOINT	The aim is to communicate the purpose and objectives of the project, outline existing conditions, identify known issues and needs, and enable the project team to present the options developed thus far. It should be emphasized that these options are in draft form and open for input, clarifying areas where feedback and contributions are welcome.
PUBLIC PARTICIPATION IMPACT	CONSULT / INVOLVE
ENGAGEMENT TYPE	Interactive public meeting, workshop, pop-up event, survey, verbal discussions
MATERIALS	Ways to share out and gather input | maps of study area | graphics showing options and tools | polling/voting input | interactive activity for participants | survey for public ideas (virtual and in person) |comment forms
LOCATION	As close to or on arterial as possible. Look for location with a agency partner, community center, place that people gather in the study area, or participate at an existing community event(s).
INPUT TO GATHER	The overarching goal of this step for minor and major capital projects is to share and gather consensus on the goals, understanding of existing issues, garner input on the potential options, and consider their potential trade-offs: benefits and impacts. This step allows the public to share their concerns and give input on the range of options.
NOTES for this step	Options should be clear about what can be accomplished in this phase and what could be future phases. Options should be inclusive of all modes and developed using tools in alignment with the typologies.
WHAT GOES IN MEMO	Summarize what was done and include any details from this table that are relevant. The memo should include a summary of input and if any action is being taken on what was heard. Specifically, it should include newly identified issues and options and a summary of input. The memo might also reference engagement summaries in other existing studies per Figure 1-16.

STEP 4: IMPACT ASSESSED

FROM THE EPG

Teams of MoDOT specialists evaluate the improvement's impact on wetlands, wildlife, homeowners, businesses, etc. The proposed improvement is also sent to the Federal Highway Administration (FHWA) for approval. The EPG highlights other federal agencies that coordination and approvals could occur if warranted. This step identifies what (if any) environmental documentation is needed and engagement requirements associated with that. This step occurs after scoping and public input so that the project is defined enough to determine what is needed for impacts and approvals to abide with federal and state laws.

IMPORTANT TO NOTE FOR ARTERIALS

While this step is geared towards NEPA, it is an integral step during Minor and Major Capital Projects on arterials to determine the impacts, if any, for the preferred option. This will help determine other agency coordination, approvals, if ROW is needed, and finalize the input needed in Step 5 to move into Step 6. During this step, the preferred option can be refined to 10-15% design and any additional analysis needed can be finalized.

SCREEN AND REFINE OPTIONS AND DEVELOP PREFERRED CONCEPT

This step includes screening and refining the preferred/best option and completing any necessary analysis in coordination with Planning and Safety and Traffic. This entails scrutinizing the available data and ensuring that the problems are addressed, input and community needs are considered in evaluation, and the tools are used appropriately. If needed, additional evaluation may be conducted to bolster the analysis. The preferred concept represents the culmination of the analysis and incorporates the most viable tools to address the needs identified in Step 1. This concept will then be taken back to the public in Step 5 for further feedback and validation.

SUBSTEPS FOR ARTERIALS

1. Agency Collaboration
2. Final PLANNING CHECKLIST
3. Definition of 15% (MIN) CONCEPT

SUMMARY OF WHAT WE HEARD WAS IMPORTANT FOR ARTERIALS IN STEP 4:

- To enter into design, 10-15% concept design should be created.
- Need the right performsance metrics to evaluate options
- Maintenance staff should give input before moving into design.

COLLABORATE WITH MAINTENANCE

Conducting a meeting with Maintenance and Operations is necessary to determine how best to maintain and operate the preferred option. If additional discussions and/or equipment and/or maintenance plans are needed, they should be identified and elevated to leadership at this point.

FINALIZE PLANNING CHECKLIST AND DEVELOP 10-15% MINIMUM CONCEPT PLAN

This includes finalizing the Planning Checklist and aligning it to the 10-15% concept plan with any refinements based on public input or analysis. These two deliverables document and prepare the project to move into Step 6: Design.

DELIVERABLES AT END OF STEP 4

- FINAL PLANNING CHECKLIST
- 10-15% CONCEPT DESIGN

EPG STEP 4 IMPACT AND FEASIBILITY SCORING

A project impact and feasibility scoring system can help provide clarity when choosing between many alternatives, alignments, or phases. Metrics should be flexible depending on the goals of the project and availability of data. Planners and project managers can develop a scaled and/or weighted rating system based on the relative importance of these factors for the project.

CATEGORY	METRICS	HOW TO MEASURE
LAND USE	School Access	# of schools, parks, and commercial/activity centers within a 1/2 mile (10 min walk) of proposed alignment/phase
	Parks Access	
	Commercial Centers	
	Population & Job Density	Average number of jobs and people within a 1/2 mile of each proposed alignment or phase
SAFETY	Crash Reduction	Using crash modification factors and multiple years of crash history, compute the reduction in injury crashes by injury severity for the alternative. Apply an injury severity scale and comprehensive crash costs for a single weighted comparison between alternatives
	Speeds	Use data from spot speed studies or big data sources to understand where high speeds can be reduced. Consider using USLIMITS2 to understand the appropriate speed limit.
EQUITY	% in Disadvantaged Tracts	Number of Households/Population in a USDOT Disadvantaged Census Tract
	Low Income Population	Number of lower income residents (income less than 2x poverty level) within a 1/2 mile of proposed alignment
MOBILITY	Improved Sidewalks	Miles of new sidewalk proposed in alternative
	New Pedestrian Crossings	Number of new pedestrian crossings in alternative
	Improved Curb Ramps	Number of new ADA curb ramps in alternative
	All Ages & Ability Bike Facilities	Presence/quality of separated, off-street, or low-stress bicycle facility in alternative
	Transit Improvements	Presence/quality of a transit improvements in the alternative, including stop improvements, bus priority infrastructure, or increased service spans and frequencies
FEASIBILITY	Capital Cost	Estimated capital cost of alternative
	O&M Cost	Estimated annualized operating and maintenance cost of alternative versus existing condition
	ROW Impacts	Number of parcels and square feet of temporary and permanent right-of-way required for alternative
	Driveways	Number of driveway crossings that would impact a proposed bike/ped facility in alternative
	Major Barriers	Presence of significant barriers (i.e., railroads, major roads, waterways, if they pose a project risk) in alternative

STEP 5 PUBLIC INVOLVED AGAIN BEFORE PROJECT APPROVAL

FROM THE EPG

MoDOT holds additional public meetings to gather public comments during development of the improvement. The Commission gives final approval for the project's location and design details.

DEVELOP ENGAGEMENT MEMO

The second touchpoint for engagement for Minor Capital Projects and third touchpoint for Major Capital Projects should be a concise and informative record that summarizes activities, input received, and outcomes to carry forward. It should include a list of engagement activities: their intent, objectives, steps involved, and who was engaged. The memo will provide feedback on the final concept design.

CONDUCT AGENCY COLLABORATION

Before advancing into the design phase, it is imperative to prioritize agency collaboration and coordination during Step 5, when applicable. This collaborative effort ensures that all partner agencies involved have a comprehensive understanding of the final concept, anticipated timeline, and subsequent phases of the project. By engaging in thorough collaboration at this stage, potential conflicts or discrepancies can be addressed proactively, leading to smoother transitions and more effective implementation of the project. This collaboration not only fosters transparency and accountability but also enhances overall project success by aligning all stakeholders with a unified vision and strategy.

PUBLIC TOUCHPOINT (INFORM)

The public should be informed at this point in project development for Asset Management/ Routine Maintenance projects. The PIP identifies how this will occur. Per the PIP, informing the public could be accomplished via news releases, email blasts, updates on the project website, social media, and other informative forms.

NOTE: Some studies and plans (i.e., examples shown in Figure 1-16) already summarize engagement. This ENGAGEMENT MEMO could be pulling the summary from these existing studies and plans to document what was heard and what is being taken action on.

SUBSTEPS FOR ARTERIALS

1. Engagement Memo
2. Agency Collaboration

SUMMARY OF WHAT WE HEARD WAS IMPORTANT FOR ARTERIALS IN STEP 5:

- Defining what successful engagement is will be helpful for this final step when trying to achieve consensus.
- There may be additional coordination needs with local agencies before moving into design.
- Before going into design, Asset Management projects should inform the public about the project. This should happen before any design occurs.
- This step should be strategic in gathering input and sharing what was heard in previous outreach, especially focused on sharing an understanding of the problems/issues people have with the existing system.

DELIVERABLES AT END OF STEP 5

- ENGAGEMENT MEMO
- FINAL CONCEPT

EPG STEP 5 ENGAGEMENT | MINOR AND MAJOR PROJECTS

To fulfill the need for transparent public engagement in alignment with the goals and vision for arterials, this final step in the engagement process is essential. Public engagement is crucial, ensuring alignment with federal and state laws and gathering input from communities, users, and partner agencies. This stage applies to both minor and major projects, particularly for arterial projects that have multiple users beyond vehicles. Traditional engagement methods may vary based on improvements being proposed. The primary focus is on sharing analysis and gathering input on the final preferred option. This input is pivotal for gathering consensus on the preferred option in Step 5. Additionally, this step involves sharing back with participants what was heard and demonstrating how their input contributed to the development of options.

STEP 5: ENGAGEMENT	Title of engagement: ***'PROJECT NAME' DESIGN PHASE***
PURPOSE OF TOUCHPOINT	The aim is to communicate the input received so far, demonstrate how this input has influenced the proposed options, and present these options. Additionally, the project team should share the tools and options outlined within the budget, along with discussing any potential future opportunities that may not be encompassed in the current phase.
PUBLIC PARTICIPATION IMPACT	INFORM / CONSULT
ENGAGEMENT TYPE	Open house, public survey, informative session
MATERIALS	Presentation | maps showing options and tools | comment forms | survey for final input
LOCATION	As close to or on arterial as possible. Look for location with a agency partner, community center, place that people gather in the study area, or participate at a community event(s). To reach a larger audience project teams could record a presentation video and/or visualization video of before and after for posting to the project website.
INPUT TO GATHER	The purpose of this step for minor and major capital projects is to share the input to date and how it has molded and developed into the preferred option being presented. This step allows for the public to give final input on the preferred option for the arterial and future phases (if needed).
NOTES for this step	Preferred options should be considered draft until final input is gathered. Project teams should be clear about what is being designed with the current project. If the project did not incorporate all phases or demand was for more extensive improvements than available funding, then the project team could identify future opportunities and next steps for the community.
WHAT GOES IN MEMO	Summarize what was done and include any details from this table that are relevant. The memo should include a summary of input and if any action is being taken on what was heard. Specifically it should include a summary of participants input on the concept plan and proposed tools. The memo might also reference engagement summaries in other existing studies per Figure 1-16.

STEP 6: DESIGN

At the end of Step 5, all arterials should have gone through Project Initiation that helped define the project type, process, and budget needed to start design. All projects will have created a PIP plan and filled out an ARTERIAL CHECKLIST for documentation and context for that project and finalized the PLANNING CHECKLIST. Engagement identified in the PIP plan would have identified the who, what, when, how, and why for engagement:

- Asset Management projects should have informed the public in Step 5.

- Minor Capital Projects should have had at least two public touchpoints in Steps 3 and 5.

- Major Capital Projects should have had at least three public touchpoints in Steps 1, 3, and 5.

Minor and Major Capital Projects should have documented the context through the ARTERIAL CHECKLIST and PLANNING CHECKLIST that clearly depicts the typology and design tools that could be incorporated in conceptual design. At the end of Step 5, it is assumed that 10-15% concept design is completed to start the EPG Step 6: Design.

The key with the consistency and newly identified substeps and documentation in this Blueprint is be able to clearly hand over the ARTERIAL CHECKLIST and PLANNING CHECKLIST and ENGAGEMENT MEMOS to the Design Lead in Step 6. These new substeps and documentation will help ensure that the needs and arterial design tools will be carried forward through implementation. The intent is to carry forward the important tools and design through any value engineering and final design. In Steps 6 to 10, the vision and goals for arterials and the context of each corridor should be continuously reviewed.

NOTE: Some design elements and tools might not be able to be built within the budget constraints. These elements should be considered during Step 6: Design for future implementation and phasing. The elements should be documented in the PLANNING CHECKLIST.

V. DESIGN CONSIDERATIONS AND TOOLS

DESIGN CONSIDERATIONS

This sections details the design tools used to plan multimodal arterials. In this chapter, the roadway has been divided into three basic components: Features Inside the Curb, Intersections and Crossings, and Features Outside the Curb. The following pages further introduce the chapter and available design tools. For each of the three arterial elements, several design tools are detailed further in this chapter. For each detailed design tool, the following information is provided:

- ***What is it?*** - a brief description of what the tool is and introductory considerations of its use and design.
- ***When to use?*** - situations and roadway characteristics where the design tool is most appropriate
- ***Guidance for using*** - additional guidance in using the design tool
- ***Benefits*** - how use of the design tool can benefit multimodal transportation
- ***Tools to use it with*** - other identified design tools that can be used to complement the design tool under discussion

Acronym	
AADT	Average Annual Daily Traffic
ADA	Americans with Disabilities Act
ANPRM	Advance Notice of Proposed Rulemaking
LOS	Level of Service
MUTCD	Manual on Uniform Traffic Control Devices
NACTO	National Association of City Transportation Officials
PHB	Pedestrian Hybrid Beacons
PROWAG	Public Rights-of-Way Accessibility Guidelines
RRFB	Rectangular Rapid Flashing Beacons
TSP	Transit Signal Priority

FIGURE 1-17: *List of Relevant Acronyms*

VULNERABLE ROADWAY USERS

Vulnerability is defined here in terms of health and safety and applies to a transportation user group's relative susceptibility to severe injuries or death when involved in a vehicle related crash. Due to the relative safety provided to drivers by vehicles (e.g., seatbelts, airbags), speed, and mass, people walking and biking are the most vulnerable. Vulnerable users could include people of all ages and abilities walking and biking, older adults, and children. Defining the range of users in the Hierarchy Tool sets the design parameters of needs or a project. Understanding the vulnerability of each user group helps create a baseline understanding of the expected users. The typical user groups on Missouri arterials and their relative vulnerability are summarized below, courtesy of *MnDOT Complete Streets Guide*.

USER	DESCRIPTION	RELATIVE VULNERABILITY
	People who walk, people who use a mobility assistance device such as a walker or a wheelchair. Inclusive of all ages and abilities.	***High.*** Due to the speed and mass of vehicles, people walking are the most vulnerable.
	People who bike or roll, including people who use scooters, skateboard, etc. Inclusive of all ages and abilities.	***Medium-high.*** Less vulnerable than people walking, but more vulnerable than people driving due to their speed and mass. The range of age and experience for bicyclists varies broadly, which affects the needs and designs for projects.
	People who ride transit. Transit users often walk or bike to get to a transit stop.	***High.*** People taking transit have a similar level of vulnerability as people walking or biking.
	People who drive. Inclusive of all drivers and trip types.	***Low.*** Because of the relative safety provided by a vehicle (e.g., seatbelts, airbags), people driving are less vulnerable than people walking and biking.
	People who drive freight vehicles.	***Low.*** Because of the relative safety provided by a vehicle, people driving freight vehicles are less vulnerable than people walking and biking.

DESIGN CONSIDERATIONS

DESIGN FLEXIBILITY

Most design criteria included in this chapter has flexibility within the MoDOT EPG. However, it can be challenging to find the right resources and navigate how and when to use flexibility. Design flexibility is introduced earlier in this document and explored in more depth in the following areas, which often have the greatest impact for context and all users on arterial roadways:

- Lane Widths
- Operational Analysis
- Design Speed
- Design Vehicle
- Clear Zones
- Bicycle Facilities
- Safety for all Users

LANE WIDTHS

Lane width is an important design criteria. Narrower lanes can improve comfort and safety for vulnerable users. By narrowing lanes, designers can create space for a separated bike lane, a widened sidewalk with buffer distances and reduced crossing, or a standard bike lane and widened buffer. Narrower lanes, as an element of an integrated urban street design, can contribute to lower operating speeds. EPG 231.3 provides guidance for determining the appropriate lane width, shown below:

- In urban areas where pedestrian crossings, right-of-way, or existing developments become stringent controls, the use of 10-11' lanes is acceptable
- In rural areas with low traffic volumes, the use of 10' lanes is acceptable
- Auxiliary lanes are to be not less than 10'
- Where continuous two-way left-turn lanes are provided, a lane width of 10-16' provides optimum design
- 12' lane widths should be considered as a starting point but not always as the ending point

While the EPG identifies lanes widths to start at 12', narrower lanes at 10-11' are should be considered on arterials where the context includes multiple modes and there is a desire to slow vehicles and provide space for other street needs.

Additionally, the AASHTO Green Book offers substantial flexibility regarding lane widths, allowing a range of 9-12' depending on desired speed, capacity, and context of a roadway (2011, p. 4-7). Road diets can be an outcome of lane width discussions - not always reducing lanes, but narrowing lanes to accommodate other users or design elements. An example benefit of lane width flexibility is shown in Figure 1-19.

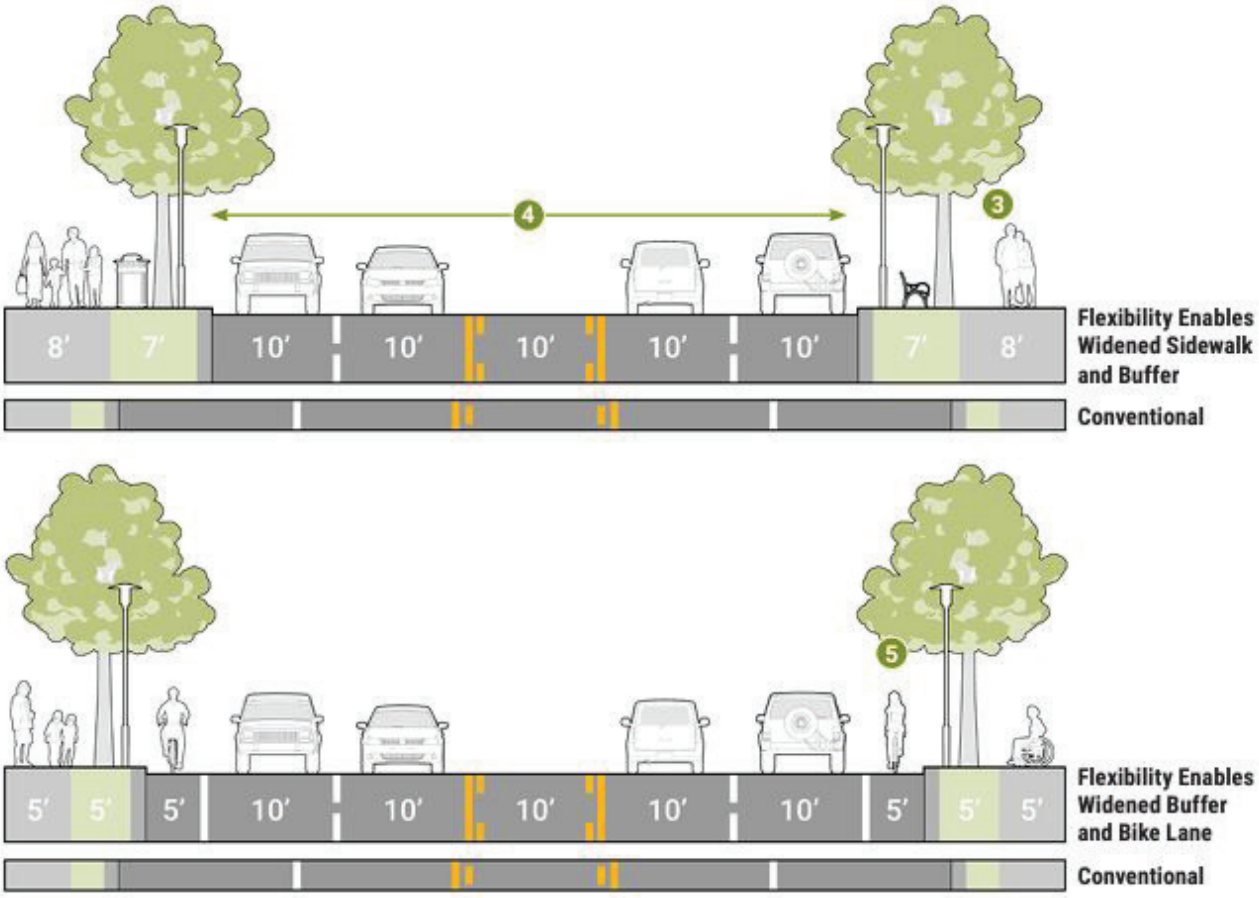


FIGURE 1-18: *Example Offered by Lane Width Flexibility, courtesy of Achieving Multimodal Networks: Applying Design Flexibility & Reducing Conflicts*

OPERATIONAL ANALYSIS

There are multiple operational analyses that can provide flexibility for streets. These metrics can be in addition to or in lieu of traditional LOS analyses to better meet the vision for arterials.

- LOS Thresholds
- Level of Traffic Stress
- Time of Day and Travel Time
- Traffic Projections
- Throughputs for all Modes

LOS Thresholds: Level of service (LOS) for motor vehicles has historically been the most commonly used metric for operational analysis. This tool measures vehicle throughput and associated delay for vehicles. While the Highway Capacity Manual provides LOS thresholds for calculations, it does not set standards for roadway types. Local jurisdictions have flexibility in the use of motor vehicle LOS standards. The USDOT Memorandum, Level of Service on the National Highway System (2016) states that designers should take several factors into account in addition to traffic projections—such as land use, context, and agency transportation goals—when planning and designing projects. Comparing demand-to-capacity ratios can be analyzed on arterials as an alternative LOS according to the NCHRP 1036 Cross-section Reallocation Report.

The FHWA Flexibility in Highway Design says, "the selection of a level of service that is lower than what is usually recommended may be appropriate" to achieve

safety goals or to support adjacent land uses and place-based context. Some states and jurisdictions are prioritizing other factors above motor vehicle LOS and relying on LOS less often as a measure of roadway effectiveness.

Level of Traffic Stress (LTS): A rating of the overall level of comfort (or stress) to people walking and biking on a roadway. The rating is typically based on speed limit or prevailing speed, AADT, ped/bike proximity to vehicles and the presence of parking/loading. LTS can often be used to help determine what type of bicycle or pedestrian facility is desired based on other roadway characteristics. LTS is a good analysis to consider in addition to LOS.

# of Auto Lanes	Average Daily Traffic	Posted Speed (Actuals When Available)						
		20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50+ mph
2-Way Street (No Centerline)	0-750	LTS 1	LTS 1	LTS 2	LTS 2	LTS 3	LTS 4	LTS 4
	751-1500	LTS 1	LTS 2	LTS 2	LTS 3	LTS 3	LTS 4	LTS 4
	1501-3000	LTS 2	LTS 2	LTS 2	LTS 3	LTS 4	LTS 4	LTS 4
	3000+	LTS 2	LTS 3	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4
1-3 (With Centerline)	0-750	LTS 1	LTS 1	LTS 2	LTS 2	LTS 3	LTS 4	LTS 4
	751-1500	LTS 2	LTS 2	LTS 2	LTS 3	LTS 3	LTS 4	LTS 4
	1501-3000	LTS 2	LTS 3	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4
	3000+	LTS 3	LTS 3	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4
4-5	0-8000	LTS 3	LTS 3	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4
	8000+	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4
6+	Any ADT	LTS 3	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4

FIGURE 1-19: *Example of Table Rating ADT VS Posted Speed and LTS, courtesy of Ada County, Idaho*

Level of Traffic Stress	Type of Rider	Example Facility
LTS 1	The level that most children can tolerate	Separated bike lane; off-street trail; bike boulevard on a neighborhood street
LTS 2	The level tolerated by most adults, the "interested but concerned"	Buffered bike lane on a low-speed street
LTS 3	The level tolerated by cyclists who are "enthused and confident" but prefer having their own dedicated space	Marked bike lane or shoulder on a busy street
LTS 4	The level tolerated only by "strong and fearless" cyclists	No facility on a busy street

FIGURE 1-20: *LTS Threshold considerations to bicycle facility*

Time of Day and Peak Hour/Design Hour: The times of day evaluated for operational and vehicular analysis usually only consider peak hours during commuting traffic times. There is flexibility to calculating operationally analysis beyond traditional peak hours. These considerations are really important when evaluating intersections. Street utilization varies throughout the day and some communities are implementing Road Diets because off-peak needs and potential safety benefits outweigh the potential increases in delay or travel time during the peak hour. The TRB Highway Capacity Manual 2010 provides for flexibility when considering analysis results. Specifically, it states that "the existence of a LOS F condition does not, by itself, indicate that action must be taken to correct the condition" and goes on to say that other issues should be considered, such as safety and pedestrian and bicyclist needs (TRB Highway Capacity Manual 2010, p. 8-5)[1]. Travel patterns and peak hour travel should be questioned with more remote/hybrid working modifying time of day and peak hour/design hour implications.

Traffic Projections: In past practices, design included vehicle traffic forecasts that could occur during the design life of the a facility, however, in many roads and streets, the projected volume never materialized. This has led to roads with additional capacity and pavement and more to maintain for agencies and may not support community goals. In addition, designers traditionally relied on data from suburban, automobile-centric developments to formulate trip generation estimates. However, the newer versions, since 2012, of ITE Trip Generation Manual introduced updated methodologies tailored to estimate trip generation across diverse transportation modes and mixed-use developments. Continuing research endeavors are dedicated to refining best practices for trip generation estimates to encompass a broader spectrum of land uses and modes of travel. Realistic traffic projects, if warranted in alignment with land use, should be considered. Mode Shift should be considered when setting traffic projects. Maximum vehicle thresholds and capacity can be considered to align with land use and surrounding places.

Throughputs for all Modes: Consider public transit, walking, and cycling alongside automobile traffic to gain a more holistic understanding of transportation patterns. This approach supports the development of sustainable, efficient, and equitable transportation systems, promoting multimodal options, reducing congestion, enhancing safety, and mitigating environmental impacts. Ultimately, it leads to the creation of healthier, more livable cities that cater to diverse community needs. Calculating throughputs can be more challenging than traditional traffic counts. Theoretical capacity of sidewalks, bike facilities, public transit, and vehicle lanes should be considered.

DESIGN SPEED

Design speed is a fundamental factor in roadway design and is used to establish design features. It affects horizontal alignment, vertical alignment, and cross section features. Higher design speeds can result in streets that are less comfortable for vulnerable users and adjacent land uses. As speeds increase, crash severity and fatality rates increase significantly for all users: pedestrians, bicyclists, and people in motor vehicles. Designers have the flexibility to set design speeds lower than the posted speed limit[2].

1 *FHWA Achieving Multimodal Network Guide*
2 *FHWA Achieving Multimodal Network Guide*

The 2011 AASHTO Green Book provides flexibility when selecting appropriate design speeds given the context of a particular roadway. Motor vehicle operating speed has a strong correlation with crash severity and fatality rates. **When designing streets, a "target speed" should be used instead of "operating speed".** Target speed refers to the speed drivers are intended to drive while operating speed refers to actual, observed speeds.

As defined in the ITE Designing Walkable Urban Thoroughfares, "target speed is the highest speed at which vehicles should operate on a roadway consistent with the level of multimodal activity and adjacent land uses to provide both mobility for motor vehicles and a safe environment for pedestrians, bicyclists, and public transit users." There are great resources on speed management and setting design speeds and even debunk some myths in design speeds, including:

- *FHWA Methods and Practices for Setting Speed Limits*
- *City Limits, NACTO*

DESIGN VEHICLE

Design vehicle refers to the size and necessary turn radii for a given vehicle. Lane widths, channelized right turns, turning vehicle speeds, and curb radii all provide flexibility based on what design vehicle is chosen. A design vehicle is a good opportunity to provide flexibility to arterials by picking a vehicle that aligns with the use of the roadway, but then adding in features to accommodate larger vehicles without compromising safety for more vulnerable users.

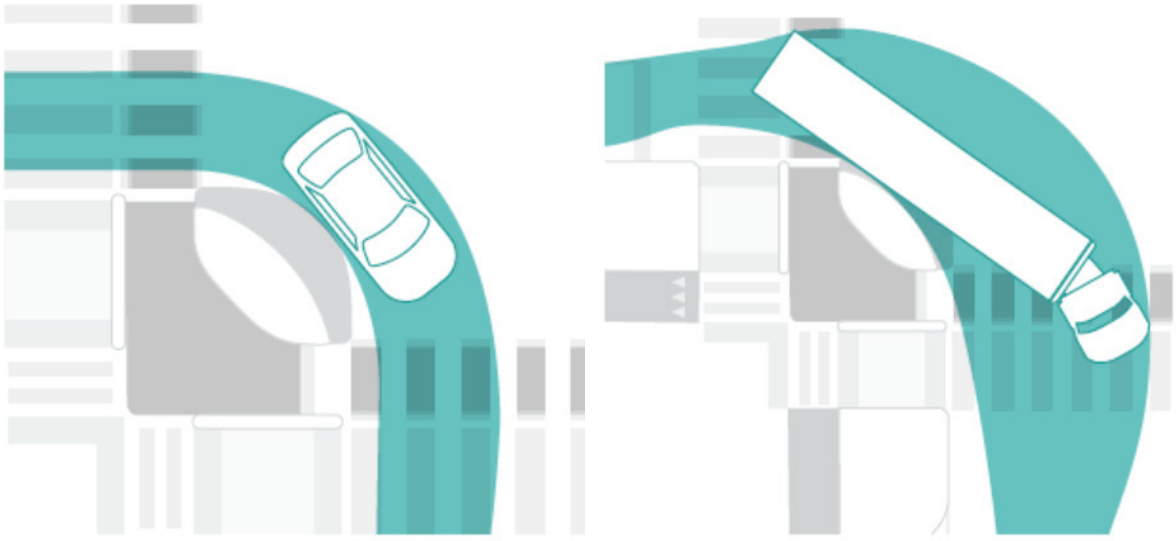


FIGURE 1-21: *Design Vehicle Turn Examples*

A design can include a truck apron or mountable features to accommodate a larger vehicle while channelizing smaller vehicles. As per the AASHTO Green Book, "if turning traffic is nearly all passenger vehicles, it may not be cost effective or pedestrian friendly to design for large trucks. However, the design should allow for an occasional large truck to turn by swinging wide and encroaching on other traffic lanes without disrupting traffic significantly." Two examples of design vehicles' turning radii are shown in Figure 1-22.

CLEAR ZONE

The Federal Highway Administration defines a clear zone as an unobstructed, traversable roadside area that allows a driver to stop safely, or regain control of a vehicle that has left the roadway. The AASHTO Roadside Design Guide recognizes that there are practical limitations to clear zones on low-speed curb streets. In settings where pedestrian and bicycle activity is expected, roadway design can incorporate street trees, furnishings, and plantings to create a sense of enclosure. This provides a traffic calming effect, which may increase comfort and safety for vulnerable road users.

Many times clear zone designs and acceptance of what can be in the space has been applied equally to all streets. While clear zones are appropriate for interstates and freeways and high speed roadways, they can provide safety benefits for other modal users in lower speed and built environments. The AASHTO Roadway Design Guide recognizes the practical limitations for clear zones, especially in urban, suburban, and small town rural settings. This AASHTO Guide goes on to note that roadway design on arterials may incorporate street trees, furnishings, lighting, wayfinding, plantings, and other features. These elements can create a sense of place, safety, and help slow vehicle speeds to align with the context of the roadway facility.

BICYCLE FACILITIES

Incorporating bicycle facilities into roadway design is crucial for promoting sustainable environments. By including wide paths, sharrows, dedicated bicycle lanes, separated paths, and bike parking facilities, agencies can encourage cycling, reduce congestion, and improve safety for cyclists and motorists. These facilities not only support active transportation but also contribute to other community goals.

On arterials, bicycle facilities can be a trade-off evaluated when considering reducing vehicular travel lanes due to excess capacity, narrowing lanes to slow cars, address network connectivity, and aligning facility design to modal priorities. EPG 641.1 provides bicycle facilities details and references:

- Bicycle Lanes; Wide Shared Lanes; Bike Lanes on Shoulder
- AASHTO 2012 Guide for the Development of Bicycle Facilities
- FHWA Selecting Roadway Design Treatments to Accommodate Bicycles
- FHWA Memo Refers to the NACTO Urban Bikeway Design Guide

EPG 620.4 provides guidance for Markings for Preferential Lanes and EPG 903.20 provides guidance for Signing for Bicycle Facilities.

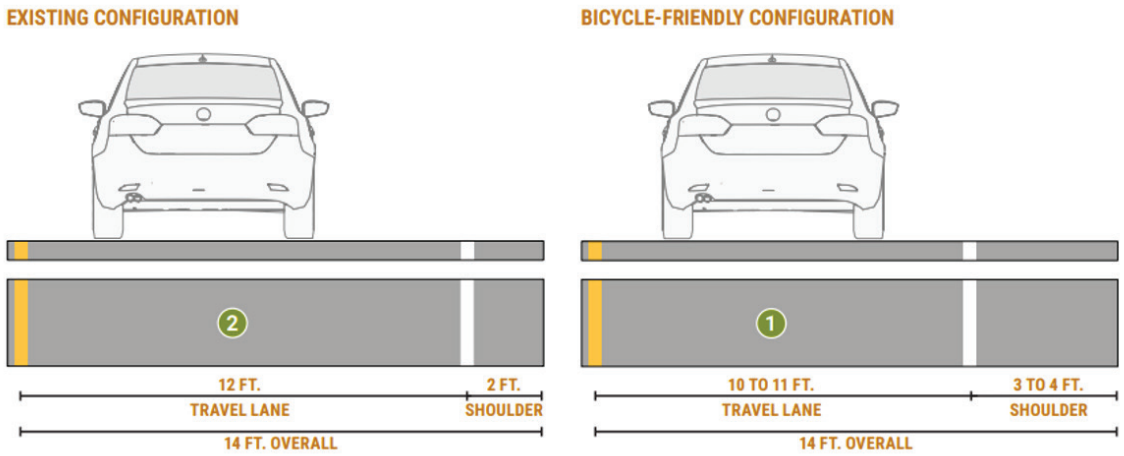


FIGURE 1-22: *Example design where narrowing lane provided a wide shoulder for cyclists in more suburban and rural conditions, courtesy of the AASHTO Green Book and Achieving Multimodal Network Applying Design Flexibility & Reducing Conflicts Guide*

SAFETY FOR ALL USERS

Safety should be regarded as a cornerstone of flexible street design, evaluating safety for all modes of transportation. This approach aligns with the principles of Vision Zero and safe systems which strive to eliminate traffic fatalities and severe injuries. By adopting adaptable design strategies that prioritize the safety of pedestrians, cyclists, motorists, and public transit users, roadway designers can create streets that prioritize human life over speed or convenience. Incorporating crash modification factors, which adjust crash prediction models to estimate the impact of safety treatments, is integral to this approach. These factors enable roadway designers to assess the potential reduction in crash risk associated with specific design interventions, facilitating informed decisions to enhance safety.

Many of the design tools in this Blueprint can be used to slow vehicles, enhance safety for all users, and are tools used for reducing serious and fatal injury crashes. Other tools can be found in:

- *MoDOT Safety Assessment for Every Roadway (SAFER) Document*

ARTERIAL NETWORK TOOLS

Arterial designs should be contextual to the communities in which they are located and be supportive of all modes of transportation. Each design is a like a puzzle, as each tool needs to fit the needs of the arterials. Therefore, we need the right tools at the right place and time to aid in the accomplishment of increasing safety. This study introduces three different types of arterials network tools:

- Type A: Features inside the Curb
- Type B: Intersections and Crossings
- Type C: Features outside the Curb

A full list of tools are provided in Figure 1-25. More than twenty tools within the three categories are defined, followed by the best time and general guidance for how and when to use them. These types are highlighted in Figure 1-25 and further illustrated in Figure 1-24. As there are currently other manuals and best practice resources that provide dimensions and design standards, this document instead aims to focus on the description, outcomes, and benefits of each of these tools.

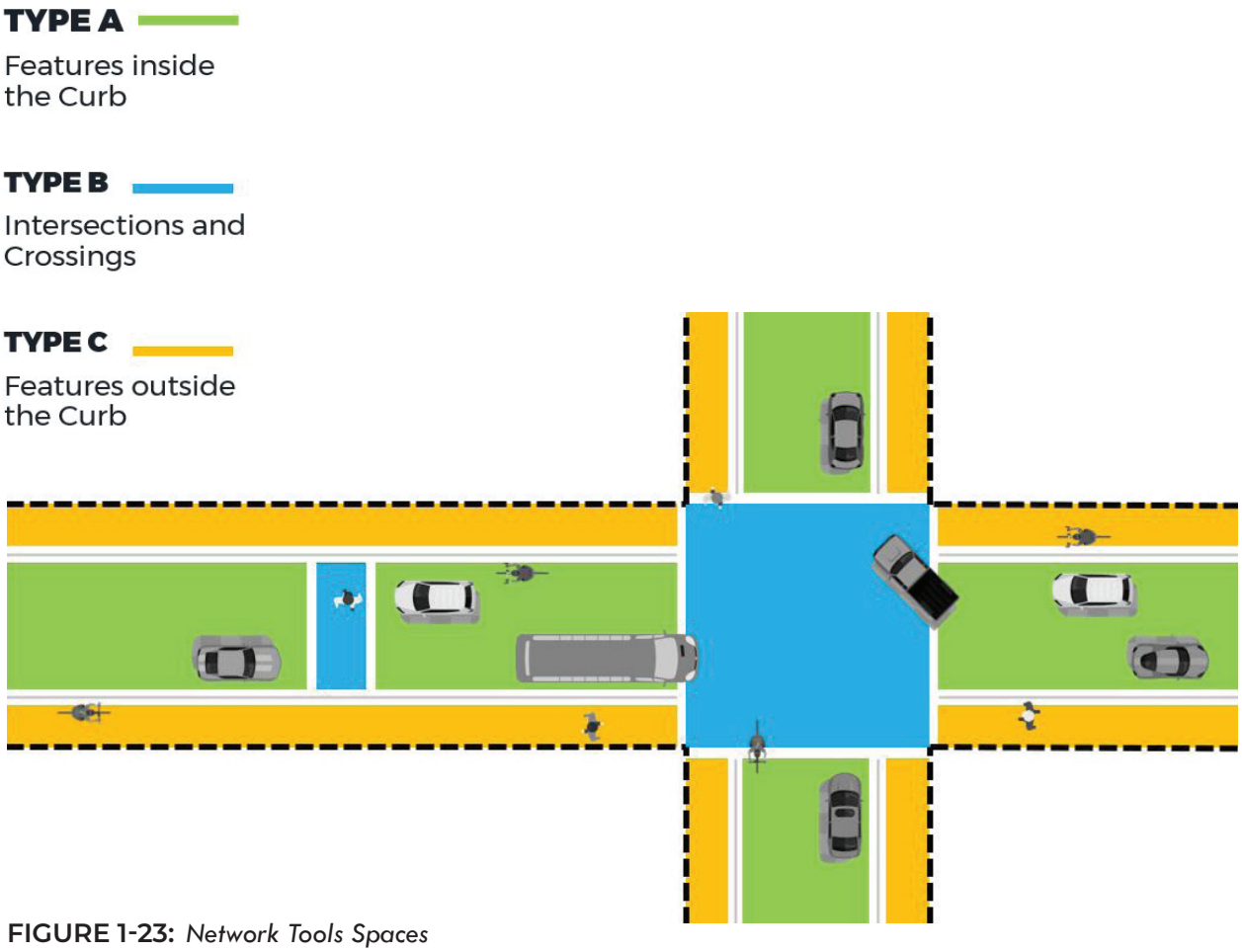


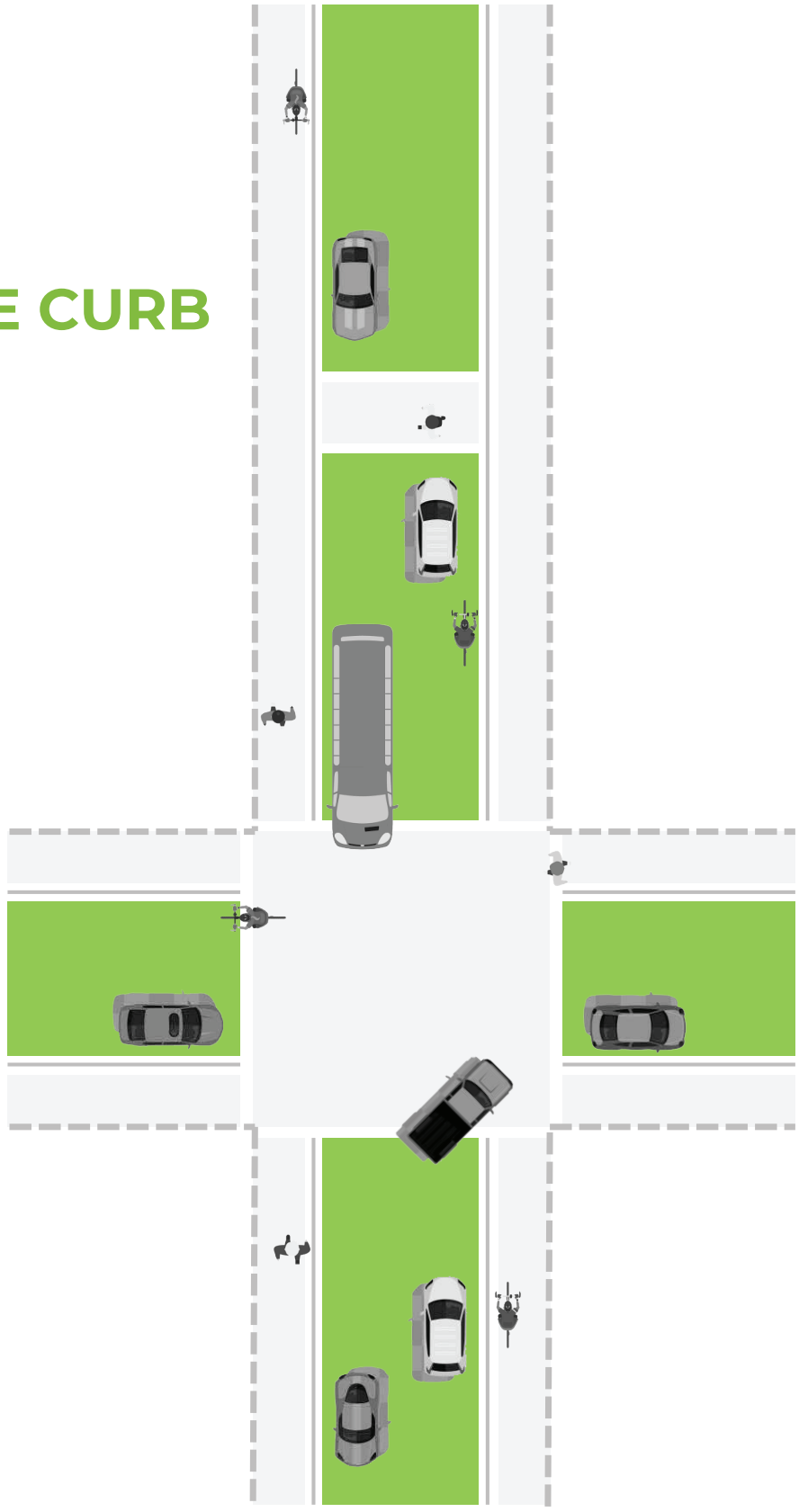
FIGURE 1-23: *Network Tools Spaces*

Type A: Features inside the Curb	
Lowering Design Speed (Restriping or Moving Curbs)	Road Diets / Road Reconfiguration
Access Management (Relocation or Consolidation of Driveways)	On-Street Parking
Narrowing Lanes	Transit Mobility Hubs / Protected
Segment Lane Reconfiguration / Curb Relocation	Traffic Calming / Movable Bollards
Traffic Diverters / Forced Turns	Green Infrastructure / Inside Curb
Transit Lanes / Pull-Outs	Enhanced Pavement Markings
Shared Traffic Bike Lanes	Rumble Strips
Dedicated / Protected Bike Lanes	Varying Curb Types
Center Medians	Bike Lane Vertical Separation
Type B: Intersections and Crossings	
Intersection Control Types	Pedestrian Refuge Islands
Intersection Lane Configuration / Curb Relocation	Traffic Diverters (for Side Streets)
Protected Bike Intersections	Raised Intersections / Crossings
Standard / Floating Island Curb Extensions	Midblock Crossings
Green Bike Crossings / Left Turn Boxes	Transit Signal Priority (TSP)
Median Noses	Intersection / Median Hardening
Pedestrian and Bike-Prioritized Signal Operations	High-Visibility Crosswalks / Crosswalk Visibility Enhancements
Intersection Turn Modifications (Radii/Channelized Right Removal)	Reconfiguring Channelized Right-Turn Lanes
Rectangular Rapid-Flashing Beacons (RRFB)	Floating Transit Islands / Bus Pads / Mobility Hubs
HAWK Pedestrian Signals / Hybrid Beacons	Roundabout Intersections
ADA Curb Ramps and Pedestrian Signals	Protected-Only Left Turns
Type C: Features outside the Curb	
Enhanced / Widened Sidewalks	Changing Site Distance Triangles
Shared Use Path / Elevated Bike Lanes	Relocation of Signals / Cabinets
Protected Bike Lanes (Cycle Tracks)	Continuous Sidewalks
Vulnerable Road User Barriers	Vertical Amenities
Posted Speed Limits / Lowering	Street Signage (MUTCD)
Pedestrian / Hybrid Sidewalk / Street Lighting	Right-of-Way Purchase
Green Infrastructure / Outside Curb	Street Trees / Landscaping

FIGURE 1-24: *Full List of Network Tools - highlighted ones are shown on pages 52-82. More information on the other Network Tools can be found in the resources provided in Figure 1-26.*

TYPE A:

FEATURES INSIDE THE CURB



LOWERING DESIGN SPEED

WHAT IS IT?

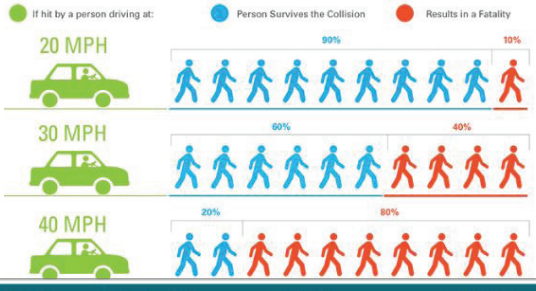
The design speed is a selected speed utilized to determine a variety of geometric features on a roadway (such as curb radii, travel lane width, on-street parking restrictions, guardrails, and clear zones for example) which can affect the actual speeds. Lowering the design speed can also inform decisions during restriping or moving of curbs during redesign.

WHEN TO USE?

Design speeds can be lowered network-wide or in sections. Lowering design speeds should be considered on high-crash corridors (typically identified in a high-injury network) and areas of higher-risk (typically identified in a high-risk network).

GUIDANCE FOR USING

NACTO's Safe Speed Study identifies whether to lower speed considering operating speed, maximum safe speed, and the existing posted speed. However, lowering speeds does not always slow down drivers, as drivers will drive the speed limit that they feel comfortable to drive. Therefore, it is encouraged to pair lowered speeds with traffic calming and speed management countermeasures.



SPEED (MPH)	STOPPING DISTANCE (FT)*	CRASH RISK (%)†	FATALITY RISK (%)†
10–15	25	5	2
20–25	40	15	5
30–35	75	55	45
40+	118	90	85

* Stopping Distance includes perception, reaction, and braking times.

† Source: Traditional Neighborhood Development: Street Design Guidelines (1999), ITE Transportation Planning Council Committee 5P-B.

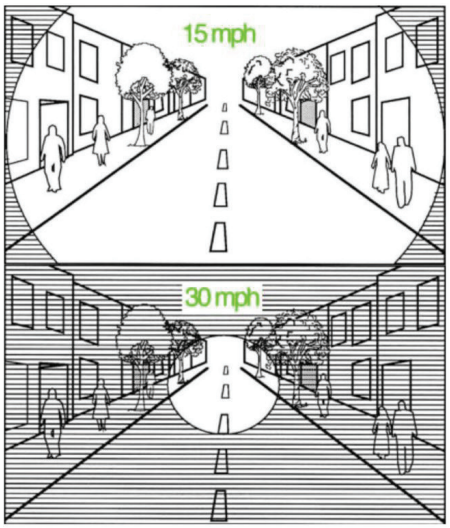
Speeds Relation to Safety
FHWA Safe Speed / Risk Chart

BENEFITS:

- Lowering design speed can reduce intended speeds for cars
- Allows reduction in lane width and tighter turning radii
- Can allow shorter cycle lengths and pedestrian-priority for crossings
- Reduces injuries and fatalities for pedestrians and cyclist and overall crash severity

TOOLS TO USE THIS WITH:

- Curb Extensions
- Islands / Medians
- Narrowing Lanes
- Raised Crosswalks
- Road Diets
- Roundabouts
- Street Trees / Landscaping



Speed, Tunnel Vision, and Reaction Time Cone of Sight Distance from America Walks

DEDICATED / PROTECTED BIKE LANES AND VERTICAL SEPARATION

WHAT IS IT?

These are areas (often painted green) that are dedicated to bicycle travel only and do not mix with traffic. They are typically separate and buffered (at minimum) with striping and delineators or "armadillos". Separation of the bicycle lane can be provided in multiple forms, including on-street vehicle parking. Bicycle tracks can be one-way (i.e., one track on each side of the road) or two-way (i.e., cycle tracks are together on one side).

WHEN TO USE?

Protected bike planes are best used on streets with parking lanes, streets with areas planned for on-street bicycle lanes or estimated to have good demand for bike lanes, high vehicle volumes and vehicle speeds, and with high parking turnover. There are minimum bicycle facility widths necessary to safely accommodate cyclists. The width varies based on context; including traffic volumes, speeds, and any horizontal or vertical separation.

The following guidance is provided in the AASHTO Green Book as to where bike lanes are encouraged:

- On streets with >3,000 motor vehicle average daily traffic
- On streets with a posted speed of >25 mph
- On streets with high transit vehicle volume
- On streets with high traffic volume, regular truck traffic, high parking turnover, or speed limit >35 mph, consider treatments that provide greater separation between bicycles and motor vehicle traffic.
- Vertical separation is preferred

GUIDANCE FOR USING

Width varies between one-way track and two-way tracks to accommodate for opposite flows of traffic; additional space may be needed for passing. A small buffer is preferred between on-street parking and the bike lane to avoid door collisions and allow for passenger loading. Pavement markings (e.g., bicycle lane word, symbol, and/or arrow markings) must be used at the beginning of a track and periodically throughout the track.

BENEFITS:

- Provides a safe, separate space for cyclists to travel
- Reduces risk of accidents or serious injuries for cyclists
- Makes cyclist more visible to all other modes
- Provides traffic calming benefits and slows adjacent vehicles
- Encourages mode choice and potentially reduces congestion

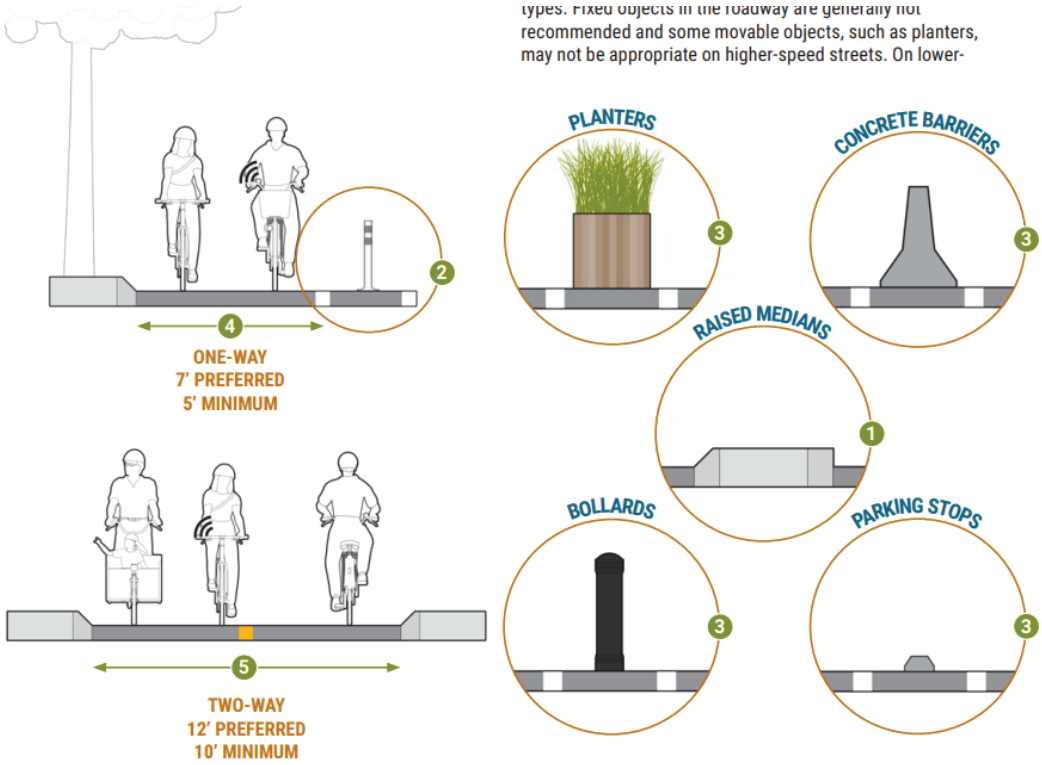
TOOLS TO USE THIS WITH:

- Green Bike Crossings / Left Turn Boxes
- Vertical Planter Boxes
- Protected Bike Intersections
- Protected Bike Lanes

NACTO BIKEWAY DESIGN GUIDE:

NACTO's Urban Bikeway Design Guide online is a great resource for determining bike lane width and design. Further consideration for which type of bike lane to include on a roadway can be determined using the LTS Figures shown on page 47.

Examples of Dedicated Bike Lanes (Green, buffered, protected, etc.) courtesy of NACTO Bike Design Guide and recycled armadillo dividers courtesy of Inhabit



Examples of vertical separation for bike facilities courtesy of FHWA Achieving Multimodal Networks Guide

DEDICATED TRANSIT LANES / BUS PULL-OUTS

WHAT IS IT?

These tools provide exclusive space to transit use during all or most of the day. An exception is occasionally sharing a turn lane with vehicles or allowing bike to traverse intersections. Pull-outs are dedicated spaces for boarding/alighting, often near intersections or midblock crossings. The lanes are often painted red and may or may not be physically separated by a vertical element.

WHEN TO USE?

Bus pull-outs are best used on streets with curbside parking and sufficiently wide sidewalks; additionally, they should be used on streets with low-frequency bus service or with speeds of 35 mph or more[1]. Dedicated lanes are typically used for frequent bus routes (15 minutes or better) and to improve travel time reliability and ridership

GUIDANCE FOR USING

Sidewalks for potential bus pull-out stops must provide enough width to prevent conflicts between through-moving pedestrians and alighting passengers. The width must be wider to accommodate for bus sheltered pull-out stops. Boarding areas must be ADA compliant.

1 *NACTO Transit Design Guide*

BENEFITS:

- Improves safety by increasing visibility of bus and reducing collisions
- Improves visibility of transit vehicles
- Reduces delays for transit vehicles
- Increased ridership and more frequent service in some cases
- Can be used by emergency vehicles
- Improves travel time reliability and ridership
- Supports mode choice

TOOLS TO USE THIS WITH:

- Bus/Transit-Waiting Pads

Examples of Dedicated Lanes and Bus Pull-Out Infrastructure courtesy of NACTO Transit Street Design Guide

NARROWING LANES

WHAT IS IT?

Like road diets, narrowing lanes reconfigures existing roadway for vehicular traffic by reducing travel lane widths. Narrowing lanes improves safety for all users by calming traffic speeds.

WHEN TO USE?

Lane width reductions should be considered for roadways in areas with a history of speeding and aggressive or risky motorist behavior. Lane width reductions often happen during roadway improvement projects or resurfacing projects.[1]

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. Special consideration should be taken for streets with emergency services, overweight and oversized trucks, and impacts on nearby local streets[2]. Lane width reductions can be used in combination with road diets and other traffic calming features.

1 *Maryland DOT*
2 *FHWA Safer Document*

BENEFITS:

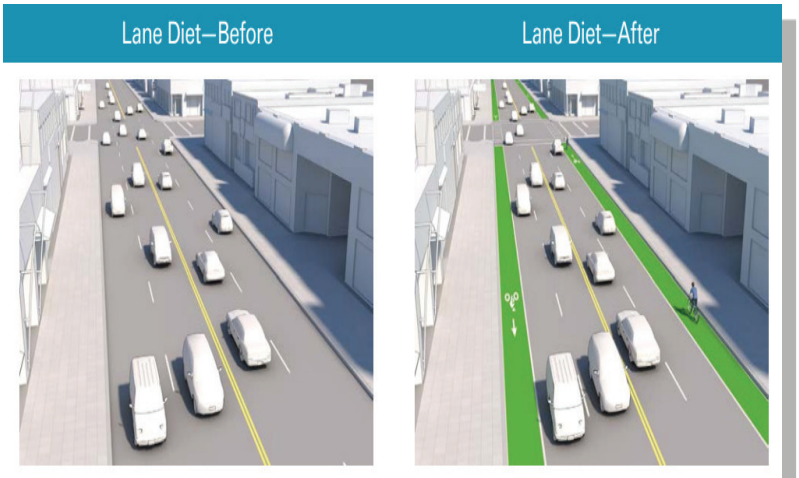
- Slows vehicular traffic speed and movements
- Doesn't reduce vehicular capacity of a roadway
- Can improve multimodal access to a given area
- Reduces pedestrian and cyclist crossing time

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

A Johns Hopkins study found that the number of crashes does not significantly change in streets with a lane width of 9 feet compared to streets with lane widths of 10 to 11 feet, after controlling for cross-sectional and street design confounding factors such as posted speed limit, traffic volume, on-street parking, median type, number of lanes, bus stops, and similar sense of visual motions, most likely because the difference in lane width is not noticeable to drivers.[1]

1 *Johns Hopkins Study*



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

ROAD DIETS / ROAD RECONFIGURATION

WHAT IS IT?

Road diets are the reconfiguration of an existing roadway by reducing the number of lanes for vehicular and gives dedicated space for left-turn movements. Road diets adjust the number of travel and turn lanes to support safer and calmer movement of traffic.

WHEN TO USE?

Road diets are used to reduce the number of mid-block conflict points, speed differentials between drivers, reduce crossing distance, and separate left-turning vehicles. Road diets should be considered for roadways with a history of crashes and speeding, especially in areas with frequent angle and rear end crashes.

GUIDANCE FOR USING

Road diet designs should consider multiple factors, including road context, design controls, intersection design, pedestrian intensity, and other existing traffic control devices[1]. The space removed from travel lanes can be reallocated to create dedicated spaces for pedestrians and bicyclists, such as improving/establishing sidewalks and creating bicycle lanes. Pedestrian crossing distance can be shortened with curb extensions and pedestrian refuge islands paired with midblock crossings.

1 *FHWA Road Diets*
Seattle Road Diet Guidance
FHWA Safety Countermeasures

BENEFITS:

- Slows vehicular traffic speed and movements
- Reduces traffic-related incidents
- Increases better safety for non-vehicular modes
- Improves multimodal access to a given area
- Reduces pedestrian and cyclist crossing time
- Can provide a boost to the local economy
- Improves community health through alternative transportation
- Encourages more consistent speeds and traffic calming
- Improve throughput of vehicular traffic

TOOLS TO USE THIS WITH:

- Dedicated / Protected Bike Lanes
- Green Bike Crossings
- Standard / Floating Island Curb Extensions
- Narrowing Lanes
- Midblock Crossings
- Pedestrian Refuge Islands

OTHER NOTES ABOUT ROAD DIETS:

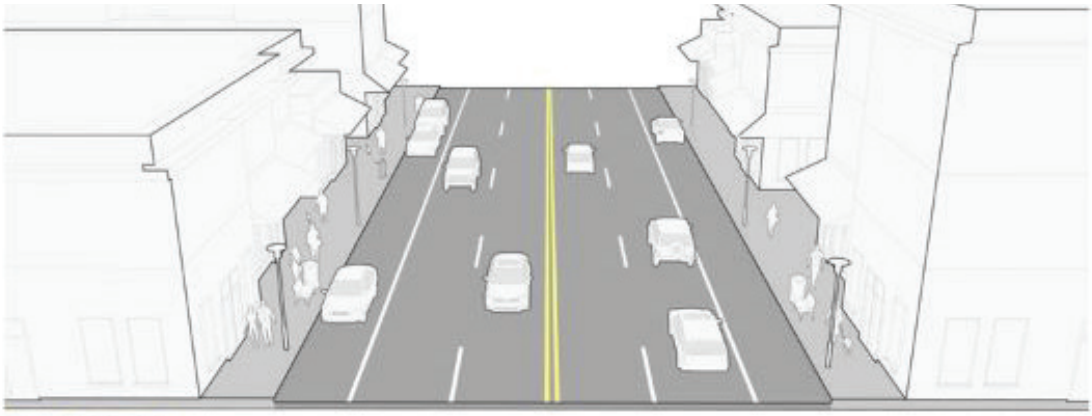
The common four- to three-lane Road Diet has proven safety benefits with "a 19 to 47% reduction in overall crashes" (FHWA Road Diet Guide 2014, p. 7). For a four-lane section, the impacts of eliminating a through lane in each direction and replacing them with a two-way turn lane (TWTL) will not always have a significant impact since the inside through lanes already perform as left turn lanes. Added two-way left-turn lanes reduce the number of potential conflict points, while slower operating speeds typical of this type of Road Diet reduce the severity of crashes that do occur. In addition to the reduction of speed, pedestrian safety benefits include potentially reduced crossing distances, space for refuge islands, and elimination of multiple threat crashes (FHWA Road Diet Guide 2014, p. 7). Road Diets often result in a dedicated space for standard or separated bike lanes.

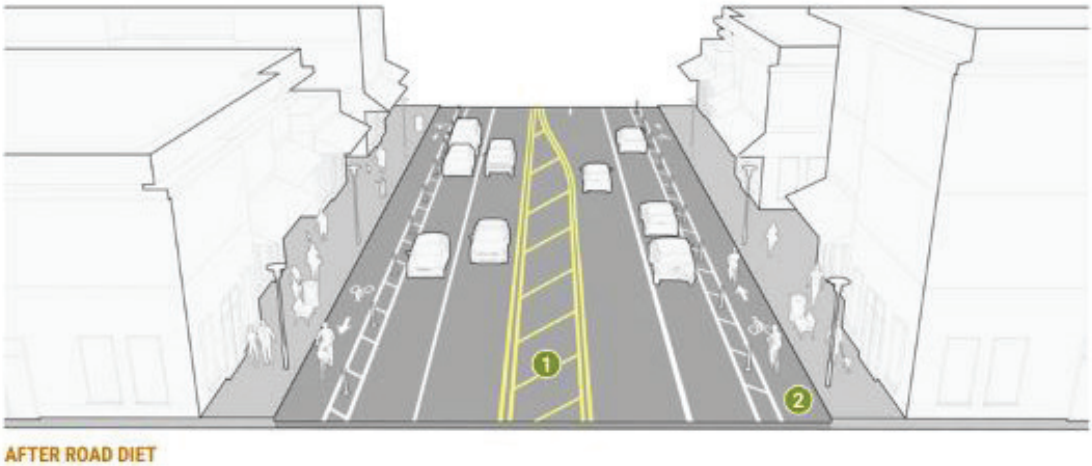
EPG AND AASHTO GUIDANCE:

EPG 231.3 provides guidance as to determining the appropriate land width, shown below:

12' lane widths should be considered as a starting point but not always at the ending point
In urban areas where pedestrian crossings, right-of-way, or existing development become stringent controls, the use of 10-11' lanes is acceptable
In rural areas with low traffic volumes, the use of 10' lanes is acceptable
Auxiliary lanes are not to be less than 10'
Where continuous two-way left-turn lanes are provided, a lane width of 10-14' provides optimum design

Additionally, the AASHTO Green Book offers substantial flexibility regarding lane widths, allowing a range of 9-12' depending on desired speed, capacity, and context of a roadway (2011, p. 4-7). Road diets can be an outcome of land width discussions - not always reducing lanes, but narrowing lanes to accommodate other users or design elements.





*Road diet example courtesy of FHWA Road Diet Guide and **FHWA Achieving Multimodal Networks Guide***

TRAFFIC CALMING BOLLARDS

WHAT IS IT?

These are tools that are typically used within the curb lines (and often at intersections or major entrances) to create a vertical barrier, slow traffic, and slow vehicular movements while creating spaces for pedestrians or cyclist, signifying crossing points, or limiting access to local streets.

WHEN TO USE?

Traffic calming bollards are useful when there is excess roadway space that can be narrowed to calm traffic movement. These bollards can also be used to prevent access to pedestrians and bicyclists only spaces by motorized modes of transportation. Additionally, bollards can be implemented to calm turning traffic[1]. Mixed-used areas, commercial zones, and downtown areas would also benefit from traffic calming bollards.

GUIDANCE FOR USING

Two important factors to consider when implementing bollards are material and installation. Different material types result in different intensity of crash impact and the installation methods of bollards. Emergency vehicles may need to access spaces separated by bollards. Spacing of bollards is also important. They should be wide enough to comfortably allow pedestrian and bicycle access while preventing motorized access.

BENEFITS:

- Calms traffic and slows speeds of turning movements
- Adds visual cues and brings attention to conflict points with pedestrians and bicycles
- Guides traffic to appropriate areas and creates safer pedestrian environments
- Limits vehicular movements while retaining access for bicycles and pedestrians
- Provides aesthetic benefits and contributes to character

TOOLS TO USE THIS WITH:

- Intersection Turn Modifications
- Midblock Crossings
- Public / Structural Artwork
- Raised Intersections / Crossings
- Shared Use Path / Elevated Bike Lane

1 *NYCDOT Traffic Calming*

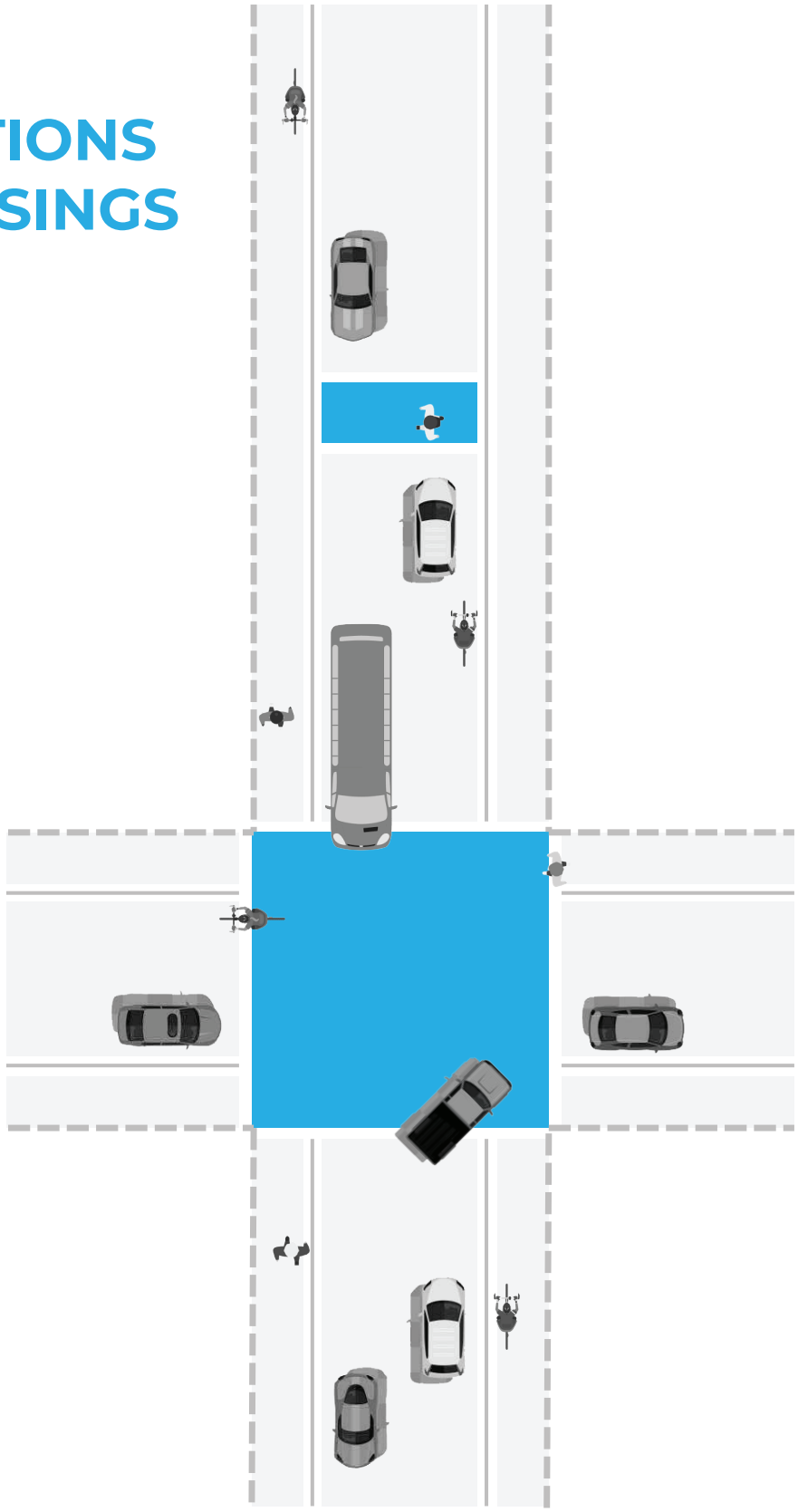
OTHER NOTES ABOUT BOLLARDS:

There are different types of bollards: fixed, retractable, and removable. Fixed bollards are permanently installed and provide a robust traffic management and security solution. These bollards are typically made of stainless steel, cast iron, or concrete. Removable bollards offer flexibility in managing access control. These bollards can be easily installed and removed as needed, thanks to mechanisms like key locks or quick-release systems. Retractable bollards provide the ultimate flexibility in access control. These bollards can be raised or lowered with the push of a button or controlled remotely. Bollards can also add to placemaking, support social life, and add to community pride of the public space.

*Examples of Traffic Calming Bollards at Forest Park Parkway and Skinker Boulevard; Traffic Calming Bollards courtesy of **SF Better Streets**, courtesy of google image from **Minnesota Traffic Calming Demonstration Projects** and the Landing in the City of St. Louis.*

TYPE B:

INTERSECTIONS AND CROSSINGS



FLOATING TRANSIT ISLANDS / BUS PADS / 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. The islands can be 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 moderate to high transit frequency, transit ridership, pedestrian volume, or bicycling volume can utilize boarding islands to maintain in-lane stops and provide separation to more users.[1].

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

1 *NACTO Transit Street Design Guide*

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

GREEN BIKE CROSSINGS / LEFT TURN BOXES

WHAT IS IT?

A separate crossing designated for cyclists is often striped or solid green and combined with bike lanes. A turn box can also be used to provide a safe, two-stage movement for cyclists turning left across on-coming traffic. Turn boxes are typically located adjacent to the parallel crosswalk to position the cyclist in front of stopped vehicular traffic allowing time and space for cyclists to safely cross.

WHEN TO USE?

Left turn boxes are best used as signalized intersections, roadways with high left turn bike counts and on roadways where a left turn is required to follow/access bike facilities, bike routes, and shared use paths. Green bike crossings and left turn boxes should be implemented with other existing bicycle infrastructure for consistency.

GUIDANCE FOR USING

Left turn boxes are typically solid green, while bike crossings have gaps in coloring to demarcate crossing areas[1]. Bike boxes are typically paired with "no right turn on red" restrictions to prevent conflict between the bike box and vehicle movements[2].

BENEFITS:

- Creates a separate, marked space for cyclist
- Removes conflict points between cyclist and motorist
- Discourages cyclist from illegally crossing or taking risks
- Makes cyclist more visible to motorist
- Increases bicyclist comfort through clearly delineated space
- Increases motorist yielding behavior

TOOLS TO USE THIS WITH:

- Floating Transit Islands
- Dedicated / Protected Bike Lanes
- Protected Intersections
- Road Diet
- Standard / Floating Curb Extensions

1 *NACTO Urban Bikeway Design Guide*
2 *Arlington Vision Zero Tools*

Examples of Green Bikes crossing at Skinker and Forest Park Parkway courtesy of WSP and "Copenhagen Left" turn boxes courtesy of ***Salt Lake City***

INTERSECTION TURN MODIFICATIONS

WHAT IS IT?

Includes changes in the geometry of an intersection such as tightening turning radii or removing a channelized right / slip-lane turn movements to slow turning movements, limit conflict points between modes, and bring greater awareness to bicycles and pedestrians.

WHEN TO USE?

Intersection turn modifications should be used for intersections that have wider or complicated crossings, visibility issues, motorists that speed when turning, do not meet ADA regulations with curb ramps, and have low compliance of "no turn on red" regulations.[1]

Reducing or removing channelized right turns can improve pedestrian safety and shorten crossing distances. Tightening turning radii provides better line-of-sight to pedestrians in the crossing zone for vehicles.

GUIDANCE FOR USING

While tightening turning radii, it is important to considered what type of vehicles are going to use the intersection and how frequently. Special considerations will need to be taken for intersections that serve as truck routes, especially for overweight and oversized loads. When making turn lane modifications, geometric changes should be designed to slow turning vehicles to 14-16 mph and better visibility of pedestrians and on coming vehicles in travel lane.

1 *NACTO Urban Street Design Guide*

BENEFITS:

- Reduces speed and increases safety at intersections
- Reduces crossing distance and simplifies crossing movements
- Improves visibility for pedestrians and cyclists
- Eliminates conflict points between pedestrians and motorists
- Increases motorist yielding behavior

TOOLS TO USE THIS WITH:

- Protected Bike Intersections
- Standard / Floating Island Curb Extensions
- Traffic Calming Bollards

*Example of a truck aprons that reduce turning radii for vehicles in Ohio and New Jersey, courtesy of **FHWA Achieving Multimodal Networks Guide***

MIDBLOCK CROSSINGS

WHAT IS IT?

Creates a designated crossing point for pedestrians that is in-between major intersections. Midblock crossings improve access to destinations and connectivity of the pedestrian network. They facilitate pedestrians crossing at predictable locations where pedestrians can be visible to motorists.

WHEN TO USE?

Midblock crosswalks should be installed where there is a significant pedestrian desire line.[1] Locate crossings at key access points to parks, schools, frequent community destinations and businesses, and at intersections with local streets. Crossings should be used to break up long distances between signalized intersections.

GUIDANCE FOR USING

Several characterizes should be considered when selecting the location of the crossing, such as the number of lanes, the classification of the roadway, and posted speed limit. Additional countermeasure tools are necessary for multi-lane crossings. Midblock crossings must be stripped to ensure visibility by motorists. Stop lines should be set back 20-50 feet from the crossing.[2] Use daylighting features in advance of a crosswalks to make pedestrians more visible. This may be accomplished by restricting parking and/or installing curb extensions. Midblock crossings can be signalized or unsignalized, depending on safety and context.

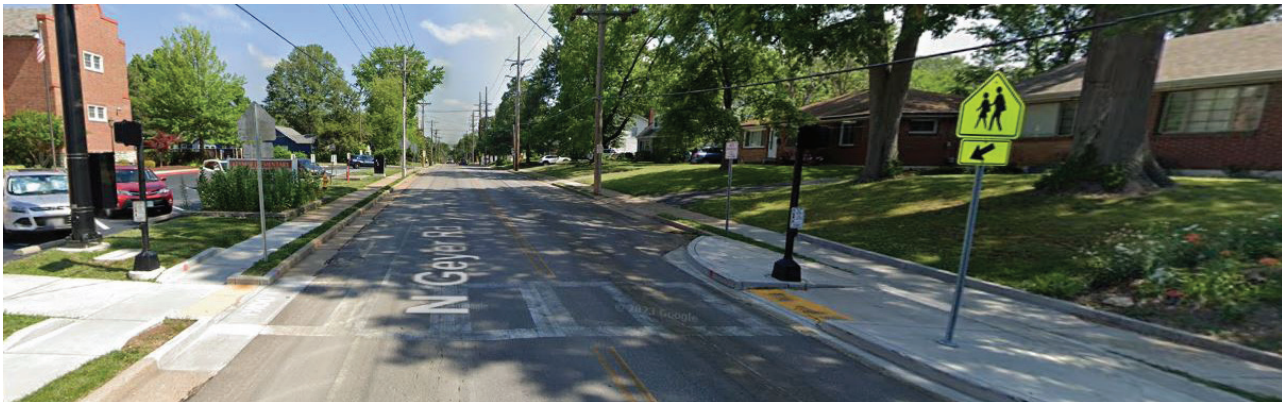
1 *NACTO Urban Street Design Guide*
2 *FHWA Safety for Bike Ped*

BENEFITS:

- Clearly designates and identifies pedestrian crossing point
- Increases the predictability of pedestrian movements
- Increases street network connectivity and walkability
- Narrows roadway width and shortens pedestrian crossing
- Increases visibility of pedestrians to motorists
- Improves pedestrian access to destinations
- Slows down vehicles and calms traffic

TOOLS TO USE THIS WITH:

- Curb Extensions
- Pedestrian / Hybrid Sidewalk Lighting
- Pedestrian Refuge Islands
- Raised Crosswalks
- Pedestrian Hybrid Beacon (PHB) or Rectangular Rapid Flashing Beacon (RRFB)
- Road Diet



Example of Mid Block Crossing with curb extension on Geyer Road courtesy of Google Earth

PEDESTRIAN REFUGE ISLANDS

WHAT IS IT?

Provides a protected space for pedestrians with a raised median which allows pedestrians to wait for gaps in traffic before crossing and focus on one direction of traffic at a time as they cross. May be landscaped and include other vertical elements that identify pedestrian movements.

WHEN TO USE?

Pedestrian refuge islands can be paired with midblock pedestrian crossings. They are highly desirable for roads with four or more travel lanes, especially where speed limits are 35 mph+ and/or where annual average daily traffic (AADT) is 9,000+. Additionally, they can be used at uncontrolled pedestrian crossings across 2 or 3-laned roads with high volumes or high vehicle speeds.[1]

GUIDANCE FOR USING

Pedestrian refuge islands must provide enough width and length to house the anticipated number of pedestrians at the crossing and to accommodate pedestrians with disabilities. Additionally, the design must include detectable warnings at the cut-through if island width is at least six feet. The island should be supplemented with a marked high-visibility crosswalk

BENEFITS:

- Provides safe space while crossing
- Allows pedestrians to cross one lane of traffic at a time
- Increases visibility of pedestrians to motorists
- Slows down vehicles and calms traffic

TOOLS TO USE THIS WITH:

- Curb Extensions
- Midblock Crossings
- PHB or RRFB

1 *FHWA Pedestrian Refuge Islands*

Example of a Pedestrian Refuge Island at Kingshighway and Forest Park Parkway

PROTECTED BIKE INTERSECTIONS

WHAT IS IT?

These types of intersections prioritize bikes and pedestrians by providing a separate, clear space for cyclists and pedestrians to navigate all directions at an intersection. Bike lanes are often set back from the street, protected by curbs and other physical features, not forced to mix with traffic, and may be stop or signal controlled.

WHEN TO USE?

Protected bike intersections can be implemented to further enhance bike comfort on any street, especially for streets with dedicated / protected bike lanes.[1]

GUIDANCE FOR USING

NACTO recommends eight key features of protected intersections. Corner islands separate bikes from motor vehicles and creates a protected queuing area for cyclists waiting to turn. Other key features include pedestrian islands between the bike lane and vehicle lane with detectable warnings; no stopping / no standing zone separate bikes and pedestrians from parked vehicles; and intersection crossing markings to guide cyclists in the intersection.

BENEFITS:

- Calms traffic and slows turning movements due to prominence
- Makes crossings shorter, simpler, and more predictable
- Elevates bicycles and makes them more visible to motorists by improving sightlines
- Safer crossing for cyclist due to "setback" points
- Reduces physical exposure to vehicle

TOOLS TO USE THIS WITH:

- Green Bike Crossings / Left Turn Boxes
- Dedicated / Protected Bike Lanes

1 *NACTO Protected Intersections*

Example of a Protected Intersection courtesy of People for Bikes

PROTECTED-ONLY LEFT TURNS

WHAT IS IT?

Refers to signal operations and phasing where oncoming traffic is stopped to allow left turning drivers safe passage through an intersection. A green arrow is provided rather than yield movements, which allow motorists to cross at-will when there is no oncoming traffic.

WHEN TO USE?

Protected-only left turns are suited for locations with relatively high left-turn volumes, sight distance limitations, or a history of crashes involving left turns. They are used with more than one left-turn lane, when crossing more than two lanes, and when other safety measures occur like crossing bike lanes and high pedestrian crossings.[1]

GUIDANCE FOR USING

Protected-only left turns should be supported by left-turn arrow signals and exclusive left-turn lanes. Protected-only left turns may impact intersection capacity and signal system coordination, and may potentially require longer cycle lengths.

BENEFITS:

- Eliminate conflict points between motorists
- Can be combined with dedicated pedestrian crossing intervals to increase pedestrian safety
- Reduce risky behavior and resulting crashes
- Can reduce delay and enhances operational efficiency
- Reduce conflicts with pedestrians crossing parallel to vehicle traffic

TOOLS TO USE THIS WITH:

- Bike Lanes / Protected Bike Lanes
- Protected Bike Intersections

1 *Pedbikesafe.org and Federal Highway Operations*

OTHER NOTES ABOUT PROTECTED TURNING MOVEMENTS - RIGHT TURNS:

There are benefits of protecting right-turning vehicles to reduce conflicts between vehicles, pedestrians, and cyclists at signals. Limiting right turns on red are beneficial where there is high pedestrian traffic, restricted sight distance, and a history of turn related crashes. Signal timing can be modified to include overlaps where feasible to help with traffic flow.

TRANSIT SIGNAL PRIORITY (TSP)

WHAT IS IT?

TSP is a modification of signal timing or phasing when transit is present (typically in dedicated lanes) that will provide priority to transit movements. TSP can be combined with transit lanes to allow transit a separate space and allow transit vehicles to proceed through the intersection prior to any other vehicular traffic. TSP can be a powerful tool to improve both reliability and travel time, especially on corridor streets with long signal cycles and distances between signals.

BENEFITS:

- Improves reliability and efficiency of transit
- Reduces collisions between transit and other modes
- Incentivizes mode-shift from personal vehicles to transit

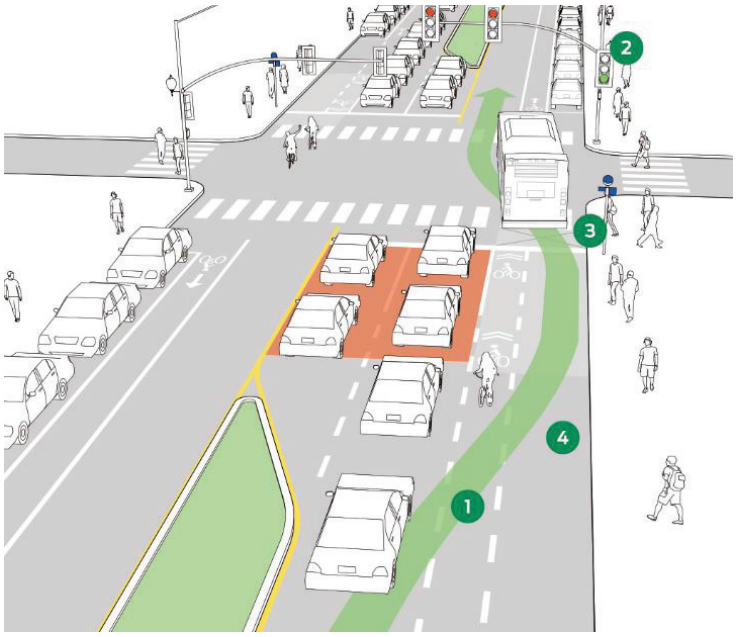
WHEN TO USE?

Where signals are a major source of delay for transit, particularly when signal delay is a significant portion of transit delay even at times or locations when traffic congestion is not a primary issue. TSP is effective at intersections with routinely long queues, long signal cycles, or on commonly delayed transit routes

GUIDANCE FOR USING

Signal priority usefulness depends on both geometric and operational factors like transit facility type, general traffic volume and capacity, signal spacing, and cycle length. Where transit routes turn, active TSP can extend turn phase time or reservice a turn phase to provide a clear turn lane and additional phase time for slow maneuvers. Active TSP can reduce transit delay significantly. In some cases, bus travel times have been reduced around 10%, and delay was reduced up to 50% at target intersections.[1]

1 *NACTO Transit Guide*



*Example rendering of what queue jump lanes and TSP can look like courtesy of **NACTO Transit Street Design Guide**.*

RAISED INTERSECTIONS / CROSSINGS

WHAT IS IT?

An intersection that has been raised in elevation such that the crosswalks and ramps are all level on each approach with the roadway sloping up on each side of the intersection. Similarly, a raised crosswalk has been elevated to slow vehicles and prioritize visibility of pedestrians.

WHEN TO USE?

Raised intersections are typically installed at all-way stop or signalized intersections with a posted speed limit of 35 mph or less, especially in dense urban areas.[1] Raised crosswalks are typically installed across two- or three-lane roads with an AADT less than 9,000 and a maximum posted speed limit of 30 mph. This use is recommended for local and collector streets, shopping centers, campus settings, pick-up/drop off zones. Careful consideration is needed for roads with special routing needs: freight routes, emergency routes, bus routes, snow plows, etc.[2]

GUIDANCE FOR USING

Raised intersections and raised crosswalks must be flush with the height of the sidewalk. Raised intersections should have vertical or colorful elements to define edge of roadway and sidewalk. Raised crosswalks typically have a crosswalk table width of ten feet, with curb ramps and truncated domes installed at the edge of the street for vision-impaired pedestrians.[3] Raised intersections and crossings should not be used for areas with limited sight distance or if the grading is steep.[4]

BENEFITS:

- Provides a safe and level crossing for pedestrians on all corners (enhancing ADA accessibility)
- Increases visibility of pedestrians to motorists
- Slows down vehicles and calms traffic
- Encourages motorist to yield to pedestrians (due to sloping)
- Reduces or eliminates the need for curb ramps

TOOLS TO USE THIS WITH:

- Curb Extensions
- Midblock Crossing
- Traffic Calming Bollards

1 *Traffic Calming Fact Sheet and USDOT Traffic Calming Primer*
2 *FHWA Traffic Calming*
3 *NACTO Bicycle Design Guide*
4 *FHWA SAFER Document*

Example of a Raised Crossing courtesy of the New York City DOT Street Design Manual

ROUNDABOUT INTERSECTIONS

WHAT IS IT?

A roundabout is a type of circular intersection used to control traffic without signals through yield controls and one-way continuous movement for vehicles, with traffic flows traveling at low speeds around a central island. Roundabouts can be single-laned or multi-laned

WHEN TO USE?

Roundabouts can be implemented at the intersection of an arterial street with a collector street or at the intersection of two arterial streets, serving as a transition from higher-speed operations to lower-speed operations. [1] However, they can be appropriate for a variety of other conditions, such as locations with a history of crashes, frequent left-turn movements, complex geometry (e.g., more than four approaches), and intersections with large traffic delays. Careful consideration should be taken when considering roundabouts at intersections surrounded by traffic signals or at highly unbalanced intersections where there is very high traffic volume on the main street and very light traffic on the side street.[2] Roundabouts are not ideal in areas with intense pedestrian volumes.

GUIDANCE FOR USING

A variety of site-specific factors can influence roundabout design and should be accounted for in the design of a roundabout, including grading and topography, oversized trucks and other non-typical vehicles, high volumes, utilities, bottlenecks, heavy pedestrian and bicyclist volumes, and the existing signal network.[3] Multi-lane roundabouts can create blind spots for pedestrians when large vehicles are traveling through them. Care should be taken for safety of all users.

BENEFITS:

- Increases safety for all modes by reducing conflict points between modes
- Makes vehicular traffic movements more apparent to crossing pedestrians
- Promotes slower speeds and traffic calming
- Reduces the likelihood of fatal crashes and serious injuries
- Improves traffic flow / operations and reduces delays due to continuous movements
- Versatile in size, shape, and design to accommodate a variety of contexts
- Increases likelihood of motorists yielding to pedestrians at crosswalks

TOOLS TO USE THIS WITH:

- Hardscaping / Landscaping
- Lowering Design Speed
- Reduce turning radii / Truck aprons
- Pedestrian Refuge Islands
- Public / Structural Artwork
- Shared Use Path / Elevated Bike Lane
- Road Diets

1 *USDOT Traffic Calming*
2 *IIHS Roundabouts*
3 *FHWA Safety*

Example of a Roundabout ***LINK***

According to the Insurance Institute for Highway Safety The traffic calming benefits of roundabouts when implemented on arterial roads and how they support multimodal transportation:

- **Improved Safety:** Roundabouts are a safer alternative to traditional traffic signals and stop signs. Their circular design forces drivers to slow down, reducing the likelihood of severe intersection crashes such as right-angle, left-turn, and head-on collisions. Research shows that converting traditional intersections to roundabouts leads to better safety outcomes.
- **Enhanced Traffic Flow:** Roundabouts promote continuous movement of vehicles, minimizing delays and congestion. Unlike stoplights, which cause frequent stops and starts, roundabouts allow smoother traffic flow. This benefit extends to all road users, including pedestrians and cyclists.
- **Environmental Benefits:** By reducing idling time, roundabouts decrease vehicle emissions and fuel consumption. This positive impact on the environment is especially relevant for busy arterials.
- **Pedestrian Safety:** Pedestrians benefit from roundabouts as well. They walk on sidewalks around the perimeter and cross only one direction of traffic at a time. Shorter crossing distances and lower traffic speeds enhance pedestrian safety.
- **Multimodal Considerations:** Roundabouts can accommodate various travel modes, including bicycles. Proper design ensures safe and efficient movement for pedestrians, cyclists, and motorists. Features like crosswalks, bike lanes, and clear signage contribute to a multimodal-friendly environment.

STANDARD / FLOATING ISLAND CURB EXTENSIONS

WHAT IS IT?

Expansion of the curb to physically and visually narrow the roadway to make the crossing shorter for pedestrians and increase space for pedestrian amenities and other tools.

WHEN TO USE?

Curb extensions are best implemented in areas with wide distances to cross, unsignalized crossings, near pedestrian areas of interest (e.g., parks and schools), and a history of crashes involving pedestrians and turning motorists. They also are good at helping slow vehicles and identify a place where conflict with cross-traffic and other modes could be expected.[1]

GUIDANCE FOR USING

The dimensions of curb extensions are dependent on the location in which they are being installed (e.g., the mouth of an intersection, midblock, etc.). For midblock crossings, the curb extension must provide protection to pedestrians on at least one side of the crosswalk but ideally both sides. If curb extensions are implemented as a floating island, a 1- to 2-foot gap between the island and the curb is recommended.

BENEFITS:

- Narrows roadway width and shortens pedestrian crossing
- Increases visibility of pedestrians to motorists
- Expands space for pedestrian, bicycle, and transit amenities
- May included tightening of radii to slow turning speeds
- May help to improve operational safety for pedestrians
- Slows down vehicles and calms traffic
- Reduces physical exposure to vehicles

TOOLS TO USE THIS WITH:

- Dedicated / Protected Bike Lanes
- Green Bike Crossings
- Intersection Turn Modifications
- Midblock Crossings
- Road Diets / Narrowing Lanes
- Shared-Use Path

1 *NACTO Transit Street Design Guide*

Example of Bumpouts / Extensions on Manchester Road courtesy of Google Maps

TYPE C:

FEATURES OUTSIDE THE CURB

SHARED-USE PATH / ELEVATED BIKE LANES

WHAT IS IT?

These are separate, off-street paths for cyclists and pedestrians (when shared use) that provide a safe space for commuting and recreation that is protected from vehicular traffic. Typically, they are non-motorized, often have limited crossing points for other modes of travel and may be designed as one-way or two-way.

WHEN TO USE?

Shared-use paths can be implemented in a variety of locations, including along abandoned or active railroads, rivers, lake and ocean fronts, canals, utility rights-of-way, college campuses, and roadway corridors (AKA sidepaths), to serve as recreational routes, commuting routes, off-street residential connections, or to provide school access.[1] Shared use paths are best for cyclists traveling at lower speeds and volumes due to mixing with pedestrians.

GUIDANCE FOR USING

Several requirements must be met, such as ADA, PROWAG, and ANPRM on Accessibility Guidelines for Shared Use Paths. Shared-use paths are typically 10 to 14 feet wide. For paths near roadways, separation through land space or barriers and rails is recommended.[2]

BENEFITS:

- Separate and safe spaces for cyclists and pedestrians
- Limited the number of conflict points between motor vehicles and cyclists and pedestrians

TOOLS TO USE THIS WITH:

- Midblock Crossings
- Pedestrian / Hybrid Lighting
- Standard / Floating Island Curb Extensions

1 *Pedbikeinfo.org*
2 *FHWA Operations*

Example of a shared use path courtesy of Great Rivers Greenway

PEDESTRIAN / HYBRID SIDEWALK / STREET LIGHTING

WHAT IS IT?

This type of lighting is used along streets or public spaces to illuminate the sidewalk and other areas where pedestrians or cyclists are traveling. In some cases, this can be combined with vehicular lighting to also illuminate the roadway. The height of the lamps should be scaled differently for pedestrians than vehicles.

WHEN TO USE?

This type of lighting should be installed on both sides of streets in commercial districts, wide streets, pedestrian/bicyclist heavy segments, and at midblock crossings.[1] Pedestrian scaled lighting is important to reduce nighttime fatal and serious injuries, since 76% of pedestrian fatalities occur at night.[2]

GUIDANCE FOR USING

Lighting can be installed in the pavement or as streetlights. Lighting levels should be uniform. Instead of a light being installed directly over a crossing, it is recommended to have two lights close to the crosswalk (one on each side of the approach and on each side of the street).[3]

1 *Pedbikeinfo.org*
2 *FHWA Nighttime Visibility Guidance*
3 *FHWA Operations*

BENEFITS:

- Improves visibility of pedestrians to motorists
- Makes facilities safer for all ages and abilities
- Improves the comfort and experience for people walking and biking
- Encourages walking and biking during non-commute hours

TOOLS TO USE THIS WITH:

- Midblock Crossings
- Shared-Use Path / Elevated Bike Lane

Examples from Skinker Boulevard courtesy of Google Maps

VERTICAL AMENITIES

There are a variety of vertical amenities such as bus/transit-waiting pads, planter boxes, wayfinding signage, public art, and other elements that occur outside of the curb as part of the streetscape. The following are some examples anticipated on arterials.

BENEFITS:

- Supports transit use
- Provides visual cues that change motorist's habits
- Removes conflicts between sidewalk and transit users
- Creates visual queues to where other vehicles can anticipate to see more pedestrian activity
- Helps with wayfinding and placemaking
- Creates a welcoming character and a sense of place

BUS/TRANSIT-AMENITY PADS

WHAT IS IT?

Bus/Transit-Amenity Pads are concrete pad for transit amenities at the bus stop like benches, shelters, trash cans, etc for use by waiting transit passengers.[1]

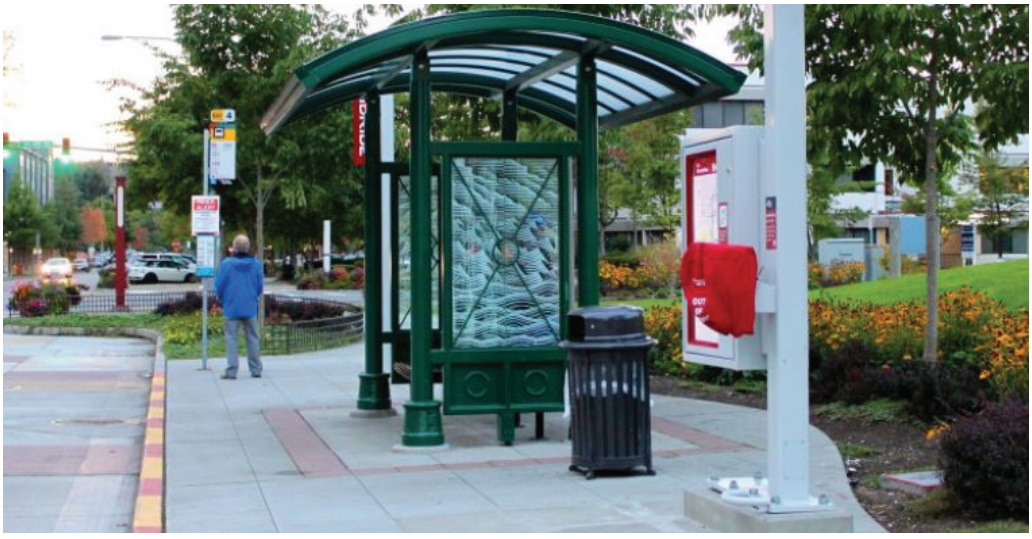
WHEN TO USE?

Project teams should coordinate with transit agencies about location of bus stop landing and amenity pads, and which routes are the best candidates for adding waiting pads. The pads should be paired on opposite sides of the street with a crosswalk connecting them.

GUIDANCE FOR USING

The landing section of the bus stop pad should meet ADA requirements. For frequent and/or high ridership routes the pads should extend between front and rear doors to give riders safe and sturdy access on and off the bus. An unobstructed path must connect between the curb and sidewalk and meet ADA standards. Additional space for shelters, benches, and other bus stop amenities should be coordinated with transit agencies.

1 *NACTO Transit Street Design Guide*



*Example of Bus Waiting Pad with vertical elements courtesy of **NACTO Transit Street Design Guide***

VERTICAL PLANTER BOXES

WHAT IS IT?

Vertical planter boxes are above-ground containers, hosting plant life that are not directly planted in the ground directly planted into the ground. These boxes provide vertical and color differences that catch the attention of all modes of transportation, encouraging slower speeds while improving the character of the environment.

WHEN TO USE?

Vertical planter boxes should be used in locations where existing sidewalk space prevents landscaping, such as basements or major utilities under the ground.

GUIDANCE FOR USING

Sidewalks must be of a sufficient width to accommodate pedestrian thoroughfare alongside planter boxes. Additionally, a portion of walkway should exist between planters and the curbside to host signposts and access to parking.[2]

Examples of Sidewalks in Downtown Lexington courtesy of Louisville Complete Streets Guide

2 *NACTO Urban Streets Design Guide*

WAYFINDING SIGNAGE

WHAT IS IT?

Wayfinding signage provides directions to desired destinations, such as key civic, cultural, visitor, and recreational attractions, within a city or local urbanized/downtown area.

WHEN TO USE?

Wayfinding signage furnishings should be implemented in areas of high pedestrian use, areas of high bicycle use, near transit stops/transit hubs, and in commercial districts.

GUIDANCE FOR USING

Wayfinding signs shall not be installed where they obscure the visibility of other road users view of other traffic control devices. A wayfinding guide system should be established to create a continuous, cohesive system of signs.[1]

1 *MUTCD*

STREET TREES AND LANDSCAPING

WHAT IS IT?

Refers to a variety of green infrastructure elements that can be included along a street outside the curb such as street trees, tree lawn, low-level landscaping, raingardens, and other items.

WHEN TO USE?

Street trees and landscaping can be used to distinguish spaces for active modes of transportation and motorists, to improve the street environment, and to encourage slower speeds. Street trees can provide natural traffic calming for vehicles and support shade for sidewalks and bike lanes.

GUIDANCE FOR USING

Street trees and other natural landscaping elements should not obscure sight distance, traffic control devices, or motorists' and pedestrians' views of each other. When selecting plants, the local climate, character, and maintenance requirements and responsibility should be considered to ensure the plants will survive and not disturb physical infrastructure (e.g., sidewalks, roadways) as they mature.[1]

On roadways over 40 mph, street trees should be more than six feet from the edge of curb or follow local guidance for size and width.

BENEFITS:

- Provides traffic calming and reduces speeds
- Creates a sense of safety and protection for sidewalk users
- Enhances character and experience for pedestrians
- Contributes to economic and environmental improvements

TOOLS TO USE THIS WITH:

- Lowering Design Speed
- Pedestrian Refuge Islands
- Shared Use Path
- Standard / Floating Transit Islands / Mobility Hubs

1 *Pedbikeinfo.org*

Examples of Street Trees and Landscape courtesy of City of Toledo

DESIGN RESOURCES BEYOND THIS GUIDE

Agency	Document	Year
American Association of State Highway and Transportation Officials	A Guide for Achieving Flexibility in Highway Design	2004
American Association of State Highway and Transportation Officials	A Policy on Geometric Design of Highways and Streets	2011
American Association of State Highway and Transportation Officials	Guide for Geometric Design of Transit Facilities on Highways and Streets	2014
American Association of State Highway and Transportation Officials	Guide for Planning, Design, and Operation of Pedestrian Facilities	2004
American Association of State Highway and Transportation Officials	Guide for the Development of Bicycle Facilities	2012
American Association of State Highway and Transportation Officials	Roadside Design Guide	2011
Federal Highway Administration	Achieving Multimodal Networks	2016
Federal Highway Administration	Bikeway Selection Guide	2019
Federal Highway Administration	Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations	2018
Federal Highway Administration	Incorporating On-Road Bicycle Networks into Resurfacing Projects	2016
Federal Highway Administration	Livability in Transportation Guidebook	2011
Federal Highway Administration	Manual on Uniform Traffic Control Devices for Streets and Highways	2009
Federal Highway Administration	Measuring Multimodal Network Connectivity	2018
Federal Highway Administration	Review of State Geometric Design Procedures or Design Criteria for Resurfacing, Restoration, and Rehabilitation on the National Highway System	2023
Federal Highway Administration	Road Diet Informational Guide	2014
Federal Highway Administration	Separated Bike Lane Planning and Design Guide	2015
Federal Highway Administration	Small Town and Rural Multimodal Networks	
Institute of Transportation Engineers	Designing Walkable Urban Thoroughfares: A Context Sensitive Approach	2010
National Association of City Transportation Officials	Transit Streets Guide	2016
National Association of City Transportation Officials	Urban Bikeway Design Guide	2014
National Association of City Transportation Officials	Urban Street Design Guide	2013
Transportation Research Board	NCHRP 1036 cross section reallocation	
Transportation Research Board	Highway Capacity Manual	2010
United States Access Board	Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way	2011
United States Access Board	Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way	2023

FIGURE 1-25: *Table of Additional Design Resources*

DESIGN TOOL MYTHS

The following are some design myths regarding tools and elements frequently utilized on arterial streets.

MYTH: Roundabouts are Not Safe for Pedestrians

Roundabouts prioritize pedestrian safety, emphasizing the significance of vehicles entering them at reduced speeds. Splitter islands offer designated areas for pedestrians at the center of each crossing. Consequently, pedestrians only need to navigate one direction of traffic at a time. Furthermore, pedestrian crosswalks are positioned at least one full car length behind the yield line. This arrangement ensures that pedestrians do not have to cross in front of drivers who are searching for a gap in traffic. It's crucial to design the roundabout and turning movements and diameter with the right dimensions so that vehicles enter the roundabout at slower speeds, as this allows drivers to be more vigilant about pedestrian presence and enhances overall safety for all road users. Empirical evidence suggests that vehicles stopped one car length behind the yield line are more attentive to pedestrians, underscoring the importance of cautious entry into roundabouts.

MYTH: Road Diets Lead to Slow Emergency Response Times

Road Diets do not degrade response times for law enforcement and emergency services, in fact, many times this design tool can improve response times. Multi-lane undivided roads can be problematic for police and EMS responders, as drivers may not be aware of protocols for allowing emergency vehicles to pass. While drivers in the outside travel lane are typically able to pull over to the right edge, drivers in inside lanes often seem uncertain about where to go. Emergency responders may struggle to pass through traffic as they thread a path somewhere along the center of the roadway, leading to longer response times and increasing the opportunity for secondary incidents during response.

In contrast, three-lane roadways (including those in Road Diets) provide clarity in the event of an emergency. Road Diets can significantly improve response times by allowing emergency vehicles to bypass traffic by using the two-way left turn lane (TWLTL). Drivers in through lanes can remain in place, leaving the TWLTL solely for emergency response vehicles. A Road Diet design opens a more predictable and practical path for emergency responders.

Road Diet Myth Busters

MYTH: Access Management Limits Business Access and Economic Prosperity

Safe access is good for business. Access management not only enhances roadway safety but also aids in alleviating the escalating issue of traffic congestion. As congestion rises, so does delay, which negatively impacts the economy and frustrates customers. Properly managed arterial roads can operate at speeds significantly higher than poorly managed ones—up to 15 to 20 mph faster. This results in increased traffic passing by your establishment and enhanced visibility for your business. Moreover, it ensures a more convenient shopping experience for your customers.

Studies conducted by State and local agencies, national organizations, and transportation trade associations consistently show that access management improves traffic flow and safety for travelers. In addition, evidence shows that access management can improve business in many cases. Business owners along a corridor may fear that access management improvements will disrupt or otherwise impact their businesses, but studies over many years have dispelled this myth. When surveyed after an access management project, most property owners do not report any adverse effects on their property value or business. In fact, making locations easier and safer to access can have positive effects.

USDOT Safe Access is Good for Business

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VI. ARTERIAL TYPOLOGIES

BACKGROUND

Arterial design has traditionally centered on cars and personal vehicles. This blueprint recognizes the role of vehicles on roadways and does not suggest that this mode of travel is any less important. However, this blueprint does suggest that balancing the variety of modes to give transportation users more choice is necessary. A growing body of evidence demonstrates that improving safety for vulnerable roadways users also improves safety for motorists. This blueprint provides a range of typologies that incorporate safety and mobility for bicycles, pedestrians, and transit riders to more appropriately support all modes of travel. The arterial typologies and the process for determining context and customizing a typology seek to provide guidance on how best to integrate multimodal facilities that increase safety for the roadways most vulnerable users.

THE PROCESS TO IDENTIFY AN ARTERIAL TYPOLOGY

The process for determining the appropriate arterial typology is defined by four (4) basic steps which are shown on this page for reference. Initially, the AASHTO context classification is defined through a brief analysis of physical conditions affecting the segment under study. This is followed by a desktop review of any plans, projects, or policies that would impact planning and design of the arterial, along with the identification of baseline needs for users of each mode along the segment. With an informed understanding of context and future user needs in place, an arterial typology is selected for customization with the specific community. The contextual classification process can be completed by the authority having jurisdiction as a starting point for discussions with the community or in tandem with the community to help build consensus around the preferred arterial design.

STEP #1 *PAGE 87*

DEFINE CONTEXT AND CHARACTER

STEP #2 *PAGE 94*

REVIEW APPLICABLE PLANS, PROJECTS, OR POLICIES

STEP #3 *PAGE 97*

IDENTIFY ANTICIPATED USER NEEDS AND PRIORITIES

STEP #4 *PAGE 98*

SELECT ARTERIAL TYPOLOGY TO CUSTOMIZE

STEP #1

HOW TO DEFINE CONTEXT AND CHARACTER

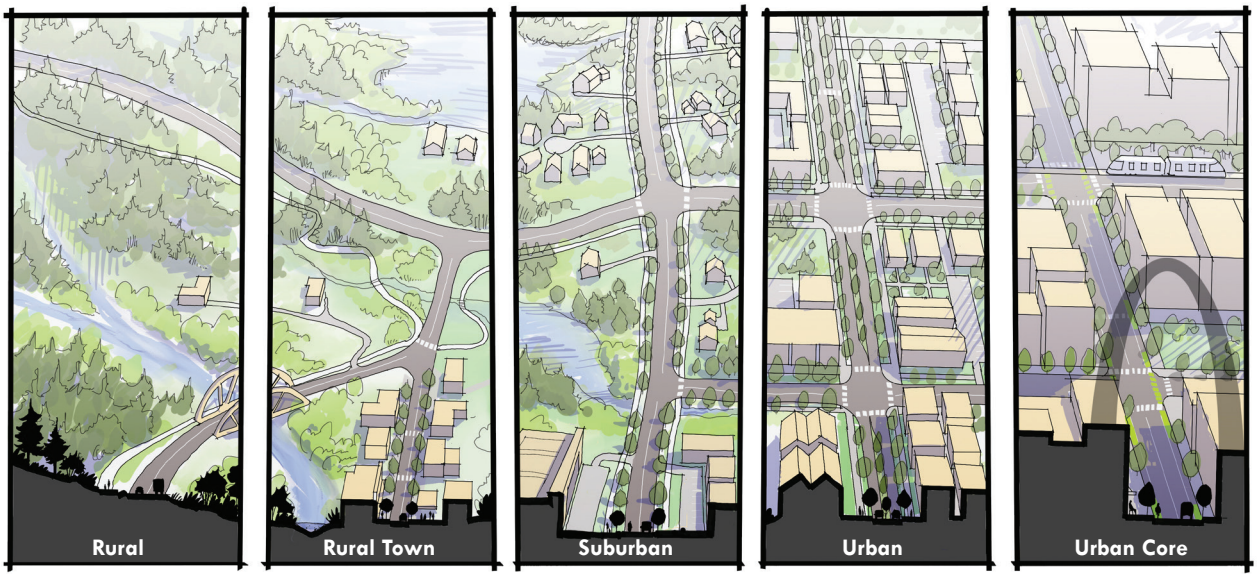


FIGURE 1-26: *The AASHTO Contextual Classification Transect*

THE TRANSECT

Contextual classification for arterials has previously been limited to two contexts - urban and rural. With the seventh addition of AASHTO's Policy on Geometric Design of Highways and Street, often referred to as the "Green Book", AASHTO has developed initial guidance relative to the five context classifications. This blueprints builds upon and expands this initial guidance.

The expanded AASHTO contextual classification system is rooted in the principles of the "transect". In urban planning, the term "transect" refers to a conceptual model that has been used to categorize and understand the varying characteristics and intensity of development across the urban to rural continuum. The transect context illustrates a gradient of land use intensity, building density, and urban form as it transitions from most density to least density. The St. Louis Regional transect is shown above for reference.

HISTORY OF THE TRANSECT:

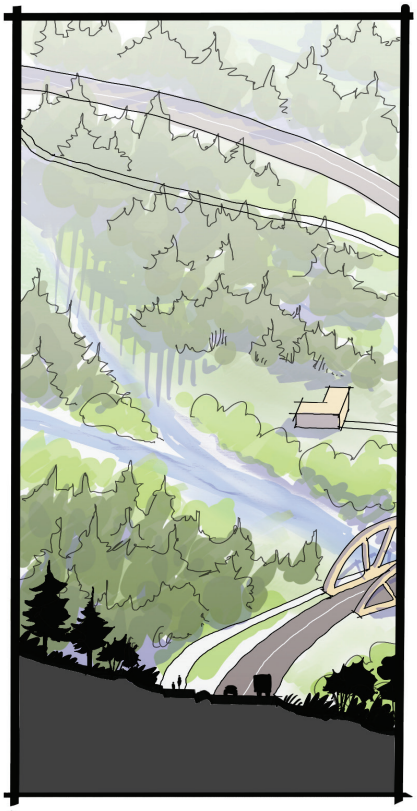
Historically, ecologists of the late 19th Century utilized the transect concept to describe the characteristics of ecosystems and the transition of one ecosystem to another. At the time, the purpose was to study and understand the changes in biological communities, environmental factors, and species habitat to better understand the nuances and relationships over ecologies. The transect quickly became a critical tool to environmentalist and scientists around the world.

Regional planners of the early 20th Century such as Geddes and Mumford emphasized the importance of understanding cities within their broader regional contexts. The New Urbanism movement formalized the urban transect methodology and has applied it as a fundamental tool for the last forty years.

AASHTO CONTEXTUAL CLASSIFICATIONS

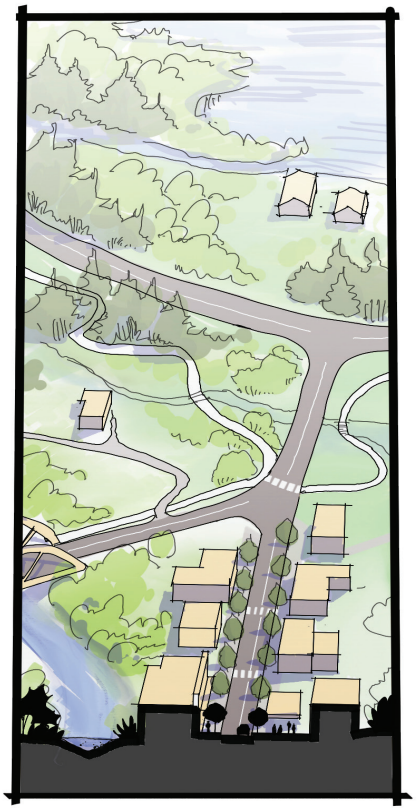
The guidance provided by AASHTO on contextual classification in the Green Book is a work in progress and is often interpreted by the jurisdiction having authority. However, practitioners anticipate that AASHTO will release more detailed guidance to manual updates in the future. This blueprint provides communities with the additional guidance to contextually classify arterials. A character sketch and AASHTO description of each of the five contexts is provided on this page for illustrative purposes.

In general, the context for any given arterial can be determined through a review of basic physical factors that influence community character. These characteristics include development density, land uses, building setbacks, and parking arrangement. More details on these physical factors and qualitative and quantitative measures are provided in this Blueprint to help agencies and communities determine the appropriate context classification and subsequent arterial typology that should be considered during planning and design.



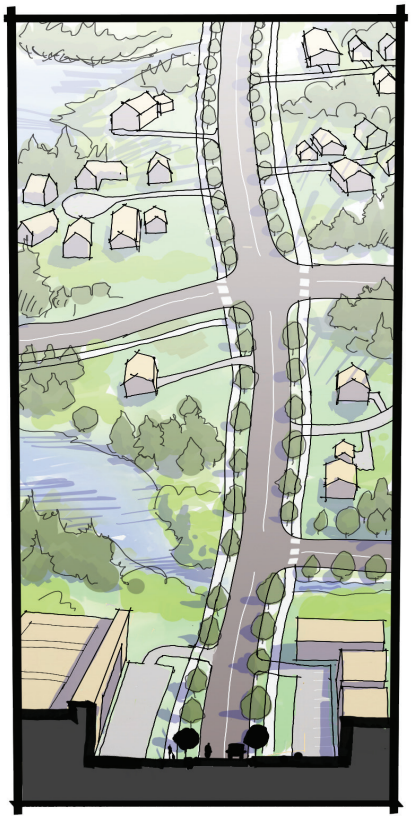
RURAL (R)

The rural context applies to roads in rural areas that are not within a developed community. These include areas with the lowest development density; few houses or structures; widely dispersed or no residential, commercial, and industrial land uses; and usually large building setbacks. The rural context may include undeveloped land, farms, outdoor recreation areas, or low densities of other types of development. Most roads in rural areas fit the rural context and should be designed in a manner similar to past design criteria for rural facilities.



RURAL TOWN (RT)

The rural town context applies to roads in rural areas located within developed communities. Rural towns generally have low development densities with diverse land uses, on-street parking, and sidewalks in some locations, and small building setbacks. Rural towns may include residential neighborhoods, schools, industrial facilities, and commercial main street business districts, each of which present differing design challenges and differing levels of pedestrian and bicycle activity. The rural town context recognizes that rural highways change character where they enter a small town, or other rural community, and that design should meet the needs of not only through travelers, but also the residents of the community.



SUBURBAN (S)

The suburban context applies to roads and streets, typically within the outlying portions of urban areas, with low to medium development density, mixed land uses (with single-family residences, some multi-family residential structures, and nonresidential development including mixed town centers, commercial corridors, big box commercial stores, and light industrial development). Building setbacks are varied with mostly off-street parking. The suburban context generally has lower development densities and drivers have higher speed expectations than the urban and urban core contexts.

URBAN (U)

The urban context has high-density development, mixed land uses, and prominent destinations. On-street parking and sidewalks are generally more common than in the suburban context, and building setbacks are mixed. Urban locations often include multi-story and low- to medium-rise structures for residential, commercial, and educational uses. Many structures accommodate mixed uses: commercial, residential, and parking. The urban context includes light industrial, and sometimes heavy industrial land use. In small- and medium-sized communities, the central business district may be more an urban context than an urban core context.

URBAN CORE (UC)

The urban core context includes areas of the highest density, with mixed land uses within and among predominantly high-rise structures, and with small building setbacks. This context is found predominantly in the central business districts and adjoining portions of major metropolitan areas. On-street parking is often more limited and time restricted than in the urban context. Substantial parking is in multi-level structures attached to or integrated with other structures. Sidewalks are present nearly continuously, with pedestrian plazas and regional destination spaces for gathering.

PHYSICAL FACTORS INFORMING CONTEXT

The context classification for any given segment of an arterial can be determined through a review of physical factors that influence community character, which generally all relate to the shape and form of development. These physical factors are often drawn from available GIS information and databases, existing planning documents, online mapping software, and on-site observations. The four (4) factors influencing context are as follows:

DEVELOPMENT DENSITY

Development density is typically described as the existence and types of structures including height, bulk, and density of development on parcels of land. The development density along a segment can range from areas in Downtowns with lots of height that is fully built out with regular sized blocks (such as in Urban Core context classification) to areas with larger, amorphous shaped lots having few if any structures at all (such as the Rural classification). Urban and Suburban context classifications are often located adjacent to the regions urban cores and exhibit a range of different densities in terms of heights and lot build out. While Urban classifications typically exhibit the more historic and dense fabric of the region, suburban classifications will often have much larger lots that are less built out with lower heights. Rural Town classifications tend to be smaller overall geographically and may exhibit smaller, denser built-out lots with more height than the surrounding areas. The most common ways to measure and understand development density is to determine the low, high, and average range of building heights (in stories) and the percentage (%) of a typical lot coverage along the segment using mapping software or site observations.

LAND USES

Land uses are typically described using base categories such as residential, commercial, industrial, and agricultural for taxation purposes; however, these base categories do not necessarily describe all of the potential land uses along a given segment. Other land use categories include uses such as office, civic, institutional, or special uses such as educational, hospitals, and religious uses. These categories will vary based on the classification system utilized by the local authority having jurisdiction over land use. In many cases, land use is a mixture of these base categories within buildings either vertically (in taller buildings) or horizontally (within multiple buildings) on a lot or across multiple lots adjacent to a segments right-of-way. While Urban Core and Urban classifications tend to exhibit an increased mixture of uses (particularly commercial, residential, and office) in a vertical configuration, Suburban classifications tend to include areas of singular uses that are more horizontally mixed. Rural Town classifications can exhibit additional height and vertical mixing of the base land uses and Rural classifications often contain areas of larger lot residential and agricultural uses separated horizontally by large distances. The most common ways to measure land uses are to observe those land uses in field (by parcel or area) or within existing conditions documents / GIS data.

UNDERSTANDING FUTURE PHYSICAL CONTEXT:

As part of Step #1, the identification of context classification is only the first step to identify an arterial typology for customization with a local community or authority having jurisdiction. It is important to acknowledge that context can change over time and is often dependent upon future land use plans, zoning overlays, and other local policies and plans that capture the community's preferred vision and direction for growth. Future physical context may also be influenced by a variety of on-the-ground conditions such as development projects and street or infrastructure improvement projects that can alter the character of the built environment and opportunities for contextual change. This process for contextual classification should be viewed as starting point in the process and future steps (i.e., Step #2 and Step #3) may reveal these types of influencing factors and the final AASHTO contextual classification should be confirmed with the community and authority having jurisdiction during planning stages.

BUILDING SETBACKS

Perhaps a less common point for context discussions, building facade (or exterior walls) setbacks are typically described as the distance of structures on adjacent roadways and buildings. This is often a reference to front setbacks from the street and side setbacks from other buildings or streets, depending upon building and lot orientation and the language in local zoning codes. Urban Core, Urban, and Rural Town classifications tend to have front and side building facades that are both closer to the street and adjacent buildings. This may range from zero lot line (or no setback) in very dense downtowns / historic areas to some setbacks (varying, up to 25' for example) in the residential land uses of Urban and Rural Town classifications. Suburban classifications will often have extremely larger setbacks that vary over a wide range (in excess of 25' or more) for most land uses. Due to historic development patterns and incremental decisions, setbacks may vary widely across a singular context classification as well. The most common ways to understand building setbacks is to determine the most common and consistent dimensions (in feet) along the segment's adjacent right-of-way by measuring it in field or with online mapping software.

PARKING ARRANGEMENT

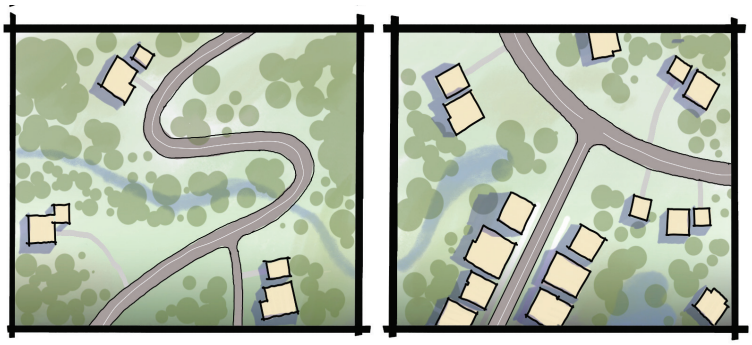
Parking arrangement is typically described as the type of parking available and its location relative to the buildings and streets. A high-level review of parking can provide insights into contextual classification. Generally, parking can be categorized as on-street (parking within the public right-of-way in some fashion along the arterial) or off-street (such as surface lots or parking garages). Urban Core and Urban classifications tend to have more on-street parking and off-street parking garages due to more intense land uses and development densities. Off-street surface lots can also be important to serve local commercial and business zones. Suburban classifications will often include a wide range of parking options and often depend primarily on off-street surface parking lots for most land uses. Rural Town classifications rarely involve off-street parking garages due to low densities. Rural classifications rarely use any of these and rely exclusively on private land for parking. The location of parking relative to buildings is also a clue for context. More Suburban and Rural classifications will include parking that is located in front of buildings and between the buildings and streets. The most common way to understand parking arrangement is through on-site observation and online mapping software.

PHYSICAL FACTORS INFORMING CONTEXT

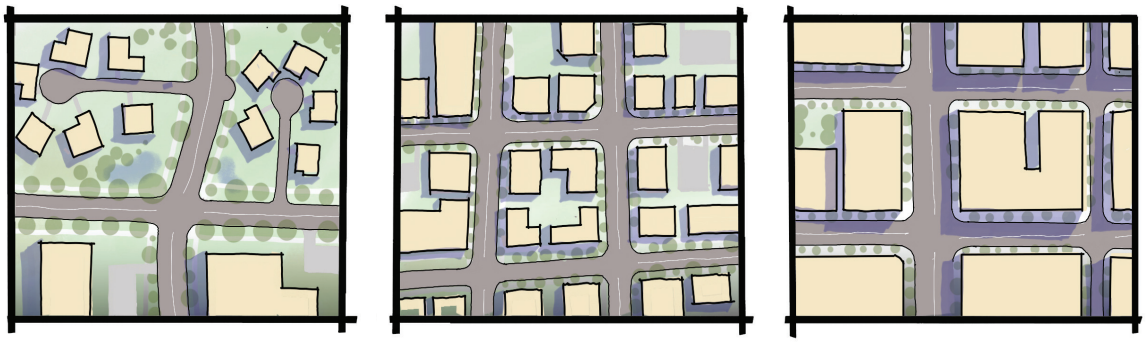
To provide clearer guidance on defining context through the review of physical factors, this blueprint includes both qualitative and quantitative information that may be observed in field, measured on mapping software, or drawn from existing planning documents and GIS information available to the community at the time of project initiation.

While qualitative measures provide a general description of the physical characteristic, quantitative measures provide a clearly discernible metric for use during observation. Context and place can be difficult to quantity, so it is important to acknowledge that these measurements may vary in practical application. This variation is dependent upon the community, its built environment, and the unique characteristics of place.

The qualitative and quantitative measures contained in this section are a general guide and should be viewed as a starting point for identifying the appropriate AASHTO contextual classification. The final contextual classification should be identified between the authority having jurisdiction and the community through discussion during planning and design.



	RURAL (R)	RURAL TOWN (RT)
DEVELOPMENT DENSITY	**Qualitative:** Low density areas with few structures, limited multi-story, and limited tall heights. **Quantitative:** < 3 Stories typical; heights often much shorter; and parcels are rarely if ever built out.	**Qualitative:** Medium destiny areas with some structures, occasional multi-story, and limited tall heights. **Quantitative:** 1-3 Stories typical; heights may vary widely; and parcels are often built out.
LAND USES	**Qualitative:** Residential, commercial, industrial, or agricultural land uses; with limited other uses land uses such as office, civic, institutional, or special uses. **Quantitative:** Almost exclusively horizontal mixing of land uses within buildings.	**Qualitative:** Primarily residential, commercial, and occasionally the mixture of these land uses; sometimes includes other land uses such as office, civic, institutional, or special uses. **Quantitative:** Mostly vertical mixing of land uses within buildings with some areas of concentrated, single land use areas.
BUILDING SETBACKS	**Qualitative:** Buildings mostly located very far from the street and adjacent buildings regardless of land use and mixture. **Quantitative:** > 50' front and side setbacks with limited or no consistency.	**Qualitative:** Buildings mostly located closer to the street and adjacent buildings depending up on the land use and mixture. **Quantitative:** Ranging from 0' to 25' front setbacks, consistently and some consistent side setbacks relative to adjacent buildings.
PARKING LOCATION	**Qualitative:** Parking almost exclusively located off-street (lots) and no parking on-street or within buildings / structures. **Quantitative:** ~ 0% On-street parking. ~100% Off-street parking. ~ 0% In buildings / structures.	**Qualitative:** Parking often located on-street and off-street (lots) with almost no parking within buildings / structures. **Quantitative:** > 60% On-street parking. < 40% Off-street parking. ~ 0% In buildings / structures.



	SUBURBAN (S)	URBAN (U)	URBAN CORE (UC)
DEVELOPMENT DENSITY	**Qualitative:** Medium and low density areas with some structures, limited multi-story, and limited tall heights. **Quantitative:** 1-3 Stories typical; heights often much shorter; and parcels are often less built out.	**Qualitative:** High and medium density areas with many structures, occasional multi-story, and limited tall heights. **Quantitative:** 1-5 Stories typical; heights may vary widely; and parcels are often built out.	**Qualitative:** Highest density areas with many structures, multiple stories, and tall heights. **Quantitative:** > 3 Stories typical; often much taller heights; and parcels are fully built out.
LAND USES	**Qualitative:** Residential, commercial, industrial or a mixture of these land uses; often includes other land uses such as office, civic, institutional, or special uses. **Quantitative:** Mostly horizontal separation of uses with limited areas that have vertical mixing of land uses within buildings.	**Qualitative:** Residential, commercial, industrial or a mixture of these land uses; often includes other land uses such as office, civic, institutional, or special uses. **Quantitative:** Horizontal separation of uses with many areas that have vertical mixing of land uses within buildings.	**Qualitative:** Primarily residential, commercial, and commonly the mixture of these land uses; often includes other land uses such as office, civic, institutional, or special uses. **Quantitative:** Mostly vertical mixing of land uses within buildings with some areas of concentrated, single land use areas.
BUILDING SETBACKS	**Qualitative:** Buildings mostly located further from the street and adjacent buildings depending up on the land use and mixture. **Quantitative:** > 25' front and side setbacks with a wide range of distances and low consistency.	**Qualitative:** Buildings mostly located closer to the street and adjacent buildings depending up on the land use and mixture. **Quantitative:** Ranging from 0' to 25' front setbacks, consistently and some consistent side setbacks relative to adjacent buildings.	**Qualitative:** Buildings located very close to the street and very close to adjacent buildings regardless of land use and mixture. **Quantitative:** Almost exclusively zero lot line / 0' / no setbacks relative to front setbacks and minimal, consistent side setbacks relative to adjacent buildings.
PARKING LOCATION	**Qualitative:** Parking mostly located off-street (lots); occasional parking on-street; and almost no parking within buildings / structures. **Quantitative:** < 20% On-street parking. > 60% Off-street parking. < 20% In buildings / structures.	**Qualitative:** Parking often located on-street and off-street (lots) with occasional parking within buildings / structures. **Quantitative:** > 40% On-street parking. > 40% Off-street parking. < 20% In buildings / structures.	**Qualitative:** Parking mostly located on-street or within buildings / structures with limited off-street parking lots. **Quantitative:** > 20% On-street parking. < 20% Off-street parking. > 60% In buildings / structures.

FIGURE 1-27: *Table of Physical Factors Affecting Context Cross-Referenced with AASHTO Context Classification*

STEP #2

REVIEW APPLICABLE PLANS, PROJECTS, AND POLICIES

WHY ARE THESE ITEMS IMPORTANT TO REVIEW?

The existing context can be interpreted by the body of existing planning and development work that has been completed or is underway within a given community. For example, a struggling commercial area within an urban neighborhood is expecting higher-frequency bus services and has long-term plans that suggest it would like to transition into a transit corridor within the next ten years. Or a rural community has decided that it would like to transition some of its existing commercial and lesser valuable industrial uses into a main street to foster more economic development and regional tourism. Or in another example, an existing commercial corridor has seen significant redevelopment over the years and is anticipating additional redevelopment projects that suggest it may be moving organically toward a mixed-use corridor. These typical situations are representative and demonstrate the role of interpretation in contextual classification for arterials.

In this step, it is important that Blueprint users build an informed understanding of the plans, policies, or overlays and determine if they should change or shape the context classification in any substantial manner. This step also helps to makes sure that the community's work-to-date and investment in planning and infrastructure are aligned with the intention and purposes of the project.

To support this step in the contextual classification process, this blueprint provides a list of questions to serve as a guide for communities and authorities having jurisdiction on collecting documentation.

WHAT ARE THE RIGHT QUESTIONS TO ASK?

- Are there any existing plans or policies that **establish a vision for the area or provide community direction** on the future of the area?
- **What context classification does the community prefer** for its future? Does this direction contrast with what exists today?
- Are these **visions or plans adopted and approved** by local and regional agencies? Or have these efforts been more informal?
- How can this project **help the community achieve their vision** for the future? Are there opportunities for the community to leverage its assets or funds to participate in this project?
- Are there **infrastructure projects** (either current or in the pipeline) **that might affect the context** for the segment? Are they funded?
- Do any current or planned land use **development projects align with the identified context**? Where are they within their processes and **can this project influence them**?
- What **influence do these land use development projects have on our project**? Increases in traffic? Additional modes of transportation? Opportunities to leverage improvements?
- Are there any **overlay zones, special taxing districts, or key population groups** which may influence the design of the project and shape its context?
- What **public or community engagement** has already taken place in the study area and what results from this engagement can inform this project? How has the community described the existing problems with how the infrastructure is working?

HOW DO WE BUILD A STRONG UNDERSTANDING OF ENGAGEMENT TO DATE?

Good projects often include some level of engagement. Great projects often leverage community and stakeholder engagement to make collective decisions, drive the momentum for implementation, and build the case for federal and state funding. Every community is different, and thus, the needed engagement can vary from place to place. Some communities may not have access to resources to fund public engagement, or leadership may have chosen to conduct only internal engagement. There are a whole variety of variables that may have informed a particular community's logic for engagement or the methods and means by which engagement was conducted.

Typically, if projects are included in planning documents such as comprehensive plans, long range transportation plans, or corridor plans, there may be very valuable input that was collected that can inform project specifics. In some cases, the project may already be funded or included within a capital improvement program that has received public input. When reviewing a project with respect to current plans, projects, and policies, its important to build understanding of this record to prepare for discussions with the community and understand project scoping moving forward.

To support this step, the questions on this page provide guidance to understand how engagement has informed a project to date, what input and concerns stakeholders and the community in general have already shared, and help to build upon that input as you proceed into the next planning and design stages.

WHAT ARE THE RIGHT QUESTIONS TO ASK?

- Who were the **influential groups or leaders involved in the decision-making process?** (Such as internal agency leaders and departments, political leadership, or external engagement with community leaders.)
- Who were the **individuals or groups engaged**? (The general public, area stakeholders, specific neighborhoods, businesses, advocacy groups, community partners, non-profits?)
- Did the project **build community and political support** through engagement? If so, what ways were used to engage them? Over what time period? **If not, why**?
- Were a **variety of agencies involved in this process**? Which agencies at the local, regional, or state level?
- Were the **implementation partners engaged**? (Such as local public works, regional trails, transit agencies, the Metropolitan Planning Organization.)
- What were the **results of the engagement and is there a record** of that documents that input including key issues, concerns, project needs, or priorities?
- Were **equity populations involved in the process**? What were the ways? What concerns did they share? How did the process incorporate their input and gain their support?
- Did the **public have an opportunity to evaluate their problems with the existing system**, as well as their opinion on impacts and benefits of the proposed project? How was their input incorporated into decisions? Are there any outstanding issues or concerns that may impact the project moving forward?

WHAT TYPE OF DOCUMENTS ARE IMPORTANT TO REVIEW?

A variety of adopted and informal documents may be important to review. Though these types of documents are generally available to the public, it may be important in some cases to request this information from the community in order to be sure which documents are most relevant and up to date. Documents may include:

- Community plans that address a variety of issues and have included public engagement;
- Comprehensive plans (that include future land use plans and transportation elements);
- State, regional, and local transportation projects and improvement programs (such as STIP, etc);
- Subarea (or topical) plans that make specific recommendations for land use development and infrastructure;
- Transportation or corridor-specific plans that designate improvements or modes of travel;
- Economic or redevelopment authority projects such as development projects;
- Zoning code or form-based overlays that describe the characteristics of development;
- Information on Justice 40 / equity populations whose input may require targeted outreach to obtain or have special funding opportunities.
- Safe Streets for All, Vision Zero, and/or other safety plans

This information may also include a range of publicly available data such as GIS information, public surveys, and other sources and content collected for the community. The community and authority having jurisdiction will often have and know which of these items are most critical for context.

WHAT SHOULD BE THE RESULT OF THIS STEP?

At this point, project teams should have a strong understanding of the future context for the segment and any impacts that should be considered during planning and design. This may include the following:

- The final proposed AASHTO context classification (should there be any impacts that suggest revising the original context classification);
- A general sense of what place type that is intended, such as a main street, residential district, mixed-use area, or special street with unique considerations that may help to determine an arterial typology;
- Inputs for the next step in this process, such as future modes of travel like a transit corridor, a new greenway project, and potential metrics such as traffic increases or freight route considerations; and
- A list of agencies that may be needed for coordination during planning or design, and more specific questions for inquiry.

The overall goal of this step is to help confirm the goals and purpose of the project while bringing the land use and transportation aspects of the project into alignment. The result should be communicated to and discussed with the community and authority having jurisdiction to ensure that the final selected arterial typology is appropriate and most beneficial.

STEP #3

IDENTIFY ANTICIPATED USER NEEDS AND PRIORITIES

HOW ARE USER NEEDS AND PRIORITIES IDENTIFIED?

With a developed understanding of the context and applicable plans, projects, and priorities, the segment under study would then undergo the appropriate analysis identified during scoping relative to the EPG (i.e., road diet, road safety audit [RSA], traffic signal and operations, etc.). The purpose is to perform due diligence, identify the factors influencing how to customize typologies for the project area, and verify these factors and customizations with the authority having jurisdiction for the community. Regardless of which analysis is undertaken, it is important that it considers all modes of transportation including bicycles, pedestrians, vehicles, parking, transit, and freight. Of particular importance, the analysis should focus priorities on the most vulnerable users and ensure that proposed design and integration of multimodal facilities is the safest possible for these users.

WHAT SHOULD BE THE RESULT OF THIS STEP?

With the completion of this step, the project team should have developed an understanding of the anticipated user needs and priorities. This may take the form of quantitative information (such traffic or pedestrian and cyclist volumes) or as narrative (such as community preferences on inclusion of a separate bicycle trail). Other design considerations on-hand should include:

- Right-of-way (in linear feet);
- Vehicular lanes required (number and needed in each direction);
- Posted Speed (miles per hour);
- Annual Average Daily Traffic (AADT); and
- Intersection / Crossing Density (number per typical linear feet range).

WHAT ARE THE RIGHT QUESTIONS TO ASK?

- What are the **known safety issues** along the segment? Are some modes that need safety prioritized? Do crashes indicated specific areas to focus efforts?
- What **modes of transportation are on the segment now and what are the preferences** for the future? Is there estimated demand for other modes and users unmet by the roadway today? Do the plans in the previous step emphasize a desire for other modes? How is safety addressed?
- Are pedestrian facilities included? Is there a **need for sidewalks or safe crossings** for pedestrians? Are pedestrians facilities appropriate for the context? Wide and safe enough?
- Is the segment part of an existing or planned regional greenway, local bike network, or neighborhood greenway? Have **these facilities been incorporated**? What is the safest way to incorporate bicycle facilities?
- Is the segment part of a **frequent or local bus route**? Did the project evaluate and incorporate improving transit facilities, transit use, and reliability? Safe pedestrian access to bus stops and bus stop amenity pads?
- How **will freight be operated on the route**? Is the segment on a state or national truck route? How were the needs for freight movement balanced with safety for vulnerable road users? How were conflict locations mitigated for safety for all users??
- How **should loading and service be addressed**? Is there frequent loading needs and how often? Is it safe to share this space with other modes?
- How **should parking be addressed**? Is on-street parking preferred, needed, or required for adjacent land uses? What is the best way to configure parking to make it safe for other modes?

STEP #4

SELECT ARTERIAL TYPOLOGY TO CUSTOMIZE

WHAT IS AN ARTERIAL TYPOLOGY?

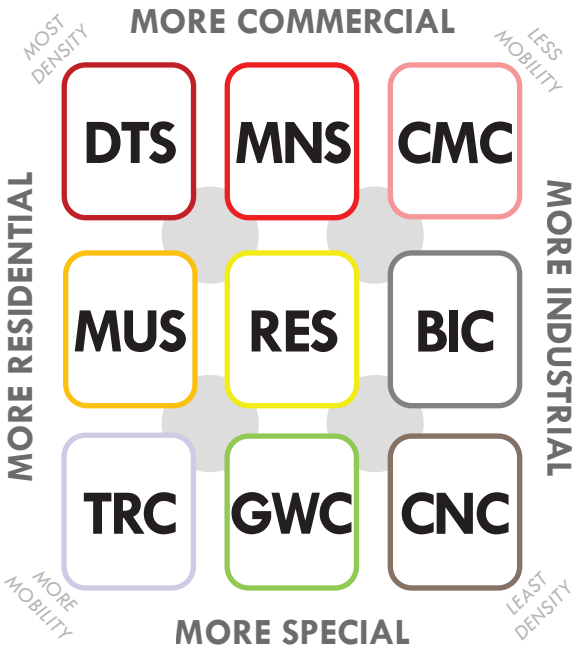
An arterial typology refers to the categorization of an arterial based on various characteristics such as their function, design elements, traffic volumes, modes of travel, land uses, and other contextual elements that help shape its role within the transportation network and urban fabric. Each arterial typology was developed to address a unique condition and character and provide guidance on the best ways to incorporate and prioritize multimodal facilities and tools that will improve safety for the most vulnerable users. For the purposes of this document, a typology is a starting point for discussions between the community and authorities having jurisdiction that may serve as a basis for planning and design.

OVERVIEW OF THE TYPOLOGIES

The following arterial typologies were developed during this process through discussion amongst the design team, field observations, and a review of the regional context. Each typology represents a unique quality and character for arterials, and can be customized to context by using the transect.

The arterial typologies include:

1. **Downtown Streets** (DTS)
2. **Mixed-Use Streets** (MUS)
3. **Transit Corridors** (TRC)
4. **Main Streets** (MNS)
5. **Residential Streets** (RES)
6. **Gateway Corridors** (GWC)
7. **Commercial Corridors** (CMC)
8. **Business Industrial Corridors** (BIC)
9. **Connector Corridors** (CNC)



A SYSTEM OF TYPOLOGIES FOR BALANCING THE ELEMENTS OF MOBILITY, LAND USE, AND DENSITY

Illustrated above, the typologies are structured within a conceptual framework that seeks to balance land use, context, use, options, and individual communities desires and goals. For example Downtown streets are often located within the most dense areas, and connector corridors in the least dense areas. Downtown, mixed-use areas, and areas along transit corridors can both house more people and give access to daily needs within walking distance.

ARTERIAL TYPOLOGIES

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 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 frequent and/or high capacity transit that links urban cores to population / employment centers 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 densities and land uses.

FIGURE 1-28: *The Nine (9) Arterial Typologies*

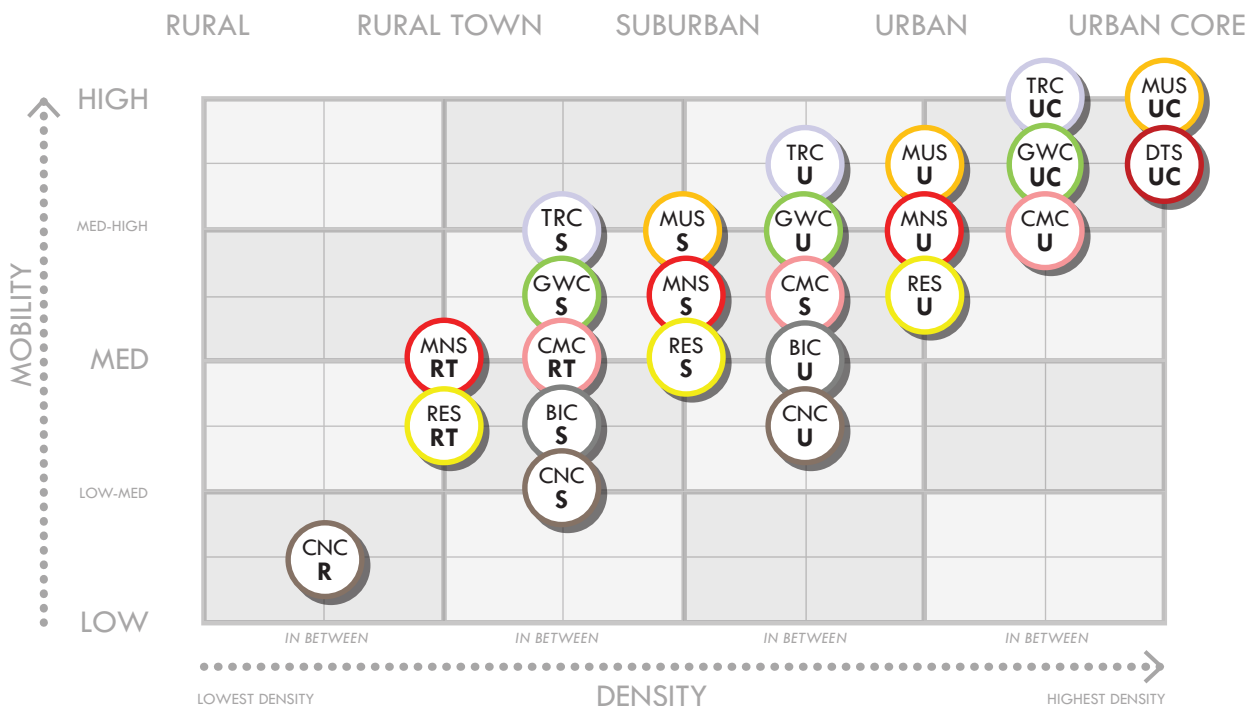


FIGURE 1-29: *Understanding Typology, Mobility, and Context*

UNDERSTANDING THE TYPOLOGIES AND CONTEXT CLASSIFICATION

Across the rural to urban transect some streets and corridors serve as the center of context and other serve to connect contexts. The scatter diagram shown on this page illustrates this concept and relates the general level of mobility of a specific typology. As an example, in an urban environment mixed-use streets, main streets, and residential streets are the destinations and places where people live, work, and play. These types of areas are typically centers, major nodes of activity, or final evening destinations that need good access to multimodal facilities and transit, but don't necessarily need to incorporate high mobility facilities into the design of each street.

Conversely, transit corridors, gateway corridors, and commercial corridors tend to serve as the high mobility conduit for reaching mixed-use corridors and downtown streets within the urban core. These streets and corridors that are "in between" spaces are important to the success of the transportation system because they provide transit, regional bike connectivity, and support the movement of freight around our region and across a variety of contexts. It is important that these types of facilities are incorporated into the design of each corridor.

This relationship between land use type and intensity, density, and mobility is foundational to the development and application of these arterial typologies. Typically, the more density anticipated within a given area, the more mobility is needed and recommended due to the intensity of land uses the transportation network will need to serve. Furthermore, the street and corridor typologies should be customized and adjusted to the appropriate AASHTO contextual classification and needs brought forth during the planning and design process.

ARTERIAL TYPOLOGY	RURAL	RURAL TOWN (RT)	SUBURBAN (S)	URBAN (U)	URBAN CORE (UC)
Downtown Street (DTS)	*N/A*	*N/A*	*N/A*	*N/A*	**DTS-UC** *STL; SLC* SEE PAGE 108
Mixed-Use Street (MUS)	*N/A*	*N/A*	**MUS-S** *SLC* SEE PAGE 114	**MUS-U** *SLC* SEE PAGE 112	**MUS-UC** *STL; SLC* SEE PAGE 110
Transit Corridor (TRC)	*N/A*	*N/A*	**TRC-S** *SLC* SEE PAGE 120	**TRC-U** *STL* SEE PAGE 118	**TRC-UC** *STL* SEE PAGE 116
Main Street (MNS)	*N/A*	**MNS-RT** *SCC; JEF; FRK* SEE PAGE 126	**MNS-S** *SLC; SCC* SEE PAGE 124	**MNS-U** *STL; SLC; SCC* SEE PAGE 122	*N/A*
Residential Street (RES)	*N/A*	**RES-RT** *SCC; JEF; FRK* SEE PAGE 132	**RES-S** *SLC; SCC* SEE PAGE 130	**RES-U** *STL; SLC; SCC* SEE PAGE 128	*N/A*
Gateway Corridor (GWC)	*N/A*	*N/A*	**GWC-S** *SLC; SCC* SEE PAGE 138	**GWC-U** *SLC* SEE PAGE 136	**GWC-UC** *STL* SEE PAGE 134
Commercial Corridor (CMC)	*N/A*	**CMC-RT** *SCC; JEF; FRK* SEE PAGE 144	**CMC-S** *SLC; SCC* SEE PAGE 142	**CMC-U** *STL; SLC; SCC* SEE PAGE 140	*N/A*
Business Industrial Corridor (BIC)	*N/A*	*N/A*	**BIC-S** *SLC; SCC* SEE PAGE 148	**BIC-U** *STL* SEE PAGE 146	*N/A*
Connector Corridor (CNC)	**CNC-R** *SCC; JEF; FRK* SEE PAGE 154	*N/A*	**CNC-S** *SLC; SCC; JEF; FRK* SEE PAGE 152	**CNC-U** *SLC* SEE PAGE 150	*N/A*

FIGURE 1-30: *Table Cross-Referencing Street Typology with AASHTO Context Classification*

The table shown above identifies which context classification and jurisdiction that can be applied to the arterial typologies. For instance, a Main Street (MNS) arterial typology would be appropriate in an Urban (U), Suburban (S), and Rural Town (RT) context. A Rural Town Main Street (MNS-RT) would be appropriate in St. Charles County (SCC), Jefferson County (JEF), or Franklin County (FRK). This table is a starting point and guide for communities and authorities having jurisdiction during the planning and design stages. Developing the final typology is part of the process and involves customizing the typology for the project area.

LEGEND:

Jurisdiction
St. Louis City (STL)
St. Louis County (SLC)
St. Charles County (SCC)
Jefferson County (JEF)
Franklin County (FRK)

CONTEXT AND DESIGN CONSIDERATIONS	Downtown Street (DTS) SEE PAGES 108-109	Mixed-Use Street (MUS) SEE PAGES 110-115	Transit Corridor (TRC) SEE PAGES 116-121	Main Street (MNS) SEE PAGES 122-127
AASHTO Context Classification	*UC*	*UC; U; S*	*UC; U; S*	*U; S; RT*
Right-of-Way (LF)	*60'-120' TYP*	*80'-100' TYP*	*100'-140' TYP*	*60'-80' TYP*
Vehicle Lanes (#, one way)	*0-3 TYP*	*0-2 TYP*	*2-4 TYP*	*0-2 TYP*
Posted Speed (MPH)	*25 MPH MAX*	*25-30 MPH MAX*	*30 MPH MAX*	*25-30 MPH MAX*
AADT (#)	*5,000-15,000 TYP*	*10,000-20,000 TYP*	*10,000-25,000 TYP*	*5,000-10,000 TYP*
Intersection / Crossing Density (#/LF)	*< 300'-325' TYP*	*250'-500' TYP*	*300'-800' TYP*	*250'-500' TYP*

UNDERSTANDING TYPOLOGY DESIGN CONSIDERATIONS

In many cases, the proposed typology may already be clear to the community or authority having jurisdiction. However, to help augment the selection of an appropriate arterial typology for planning and design, the table shown above provides key design considerations for evaluation. These design considerations are fairly common attributes associated with a segment of study and would have been collected during the previous contextual classification step, along with other preferences on modes and facilities for vulnerable users. These design considerations represent a typical range and may vary based on the actual physical context and relationship to the local and regional transportation network.

LEGEND:

- LF = Linear Feet
- # = Number
- MPH = Miles Per Hour
- TYP = Typical
- MAX = Maximum

Residential Street (RES) SEE PAGES 128-132	Gateway Corridor (GWC) SEE PAGES 134-139	Commercial Corridor (CMC) SEE PAGES 140-145	Business Industrial Corridor (BIC) SEE PAGES 146-149	Connector Corridor (CNC) SEE PAGES 150-155
U; S; RT	*UC; U; S*	*U; S; RT*	*U; S*	*U; S; R*
50'-100' TYP	*80'-120' TYP*	*80'-120' TYP*	*60'-100' TYP*	*50'-80' TYP*
1-4 TYP	*0-3 TYP*	*2-4 TYP*	*1-2 TYP*	*2-3 TYP*
25-35 MPH MAX	*25 MPH MAX*	*30-45 MPH MAX*	*30-50 MPH MAX*	*55 MAX*
5,000-10,000 TYP	*5,000-15,000 TYP*	*> 15,000 TYP*	*> 5,000 TYP*	*> 15,000 TYP*
300'-800' TYP	*250'-500' TYP*	*300'-800' TYP*	*> 800' TYP*	*800'-1,600 TYP*

FIGURE 1-31: *Table Cross-Referencing Street Typology with Context and Design Considerations*

DESCRIPTION OF TYPICAL DESIGN CONSIDERATIONS

- **Vehicle Lanes:** Refers to the individual number (#) of lanes intended for the movement of vehicles, often referred to as a travel lane or common lane. Maybe be one-way or two-way.
- **Posted Speed:** Refers to the maximum legal speed limit in miles per hour (MPH) for any given roadway that is displayed on signage at regular intervals and enforced by law.
- **Annual Average Daily Traffic:** Refers to the volume of traffic (AADT) for a particular segment of roadway as averaged over the course of an entire year, representing the number of vehicles that pass a specific point in both directions.
- **Intersection / Crossing Density:** Refers to the average distance in feet (LF) between intersecting streets or other crossings points over the course an entire segment of study. While denser areas will have smaller and more consistent lengths, more suburban or rural areas will have less consistency and larger distances between.
- **Right-of-Way:** Refers to the legal right granted by a government authority to use a specified area of land for the construction, operation, and maintenance; including areas beyond the pavement such as sidewalks, utilities, and landscape buffers. Typically measured in linear feet (LF) and may vary over a range. At times ROW can be constrained and should be considered last when picking a typology.

FIGURE 1-32: *Manchester Road / Route 100 Context Example in the City of St. Louis and St. Louis County*

ARTERIAL TYPOLOGY	EXAMPLE
Downtown Street (DTS)	*Washington Ave. (4th St. to Jefferson Ave.); Forsyth Blvd. (in Clayton).*
Mixed-Use Street (MUS)	*Brentwood Boulevard (I-170 to Antler Ave.); Delmar Blvd. (Trinity Ave. to DeBaliviere Blvd.); Washington Ave. (Tucker Blvd. to N 18th St.).*
Transit Corridor (TRC)	*Natural Bridge Ave. and Grand Blvd. (City of St. Louis); Jefferson Ave. (Chouteau Blvd. to South Broadway).*
Main Street (MNS)	*N Florissant Rd. (Hereford Ave. to Suburban Ave.); Hwy K / Main St. (Pitman St. to Civic Park Dr.).*
Residential Street (RES)	*N Ballas Rd. (Clayton Rd.to Route 100); Lake St Louis Blvd. (Technology Dr. to Bent Oak Dr.).*
Gateway Corridor (GWC)	*Market St. (Jefferson Ave. to the Arch Grounds); Tucker Blvd. (I-40 / 64 to Cass Avenue).*
Commercial Corridor (CMC)	*Wentzville Pkwy. (I-70 to THF Dr.); Route 47 (near Route 100).*
Business Industrial Corridor (BIC)	*Elm Point Industrial Dr. (south of 370); North Hanley (north of I-70).*
Connector Corridor (CNC)	*Route K (Route 30 / Gravois Rd.to Hwy. FF); Hwy 94 (south of Route D).*

FIGURE 1-33: *Examples of Context Classification*

UNDERSTANDING THE CHANGING CONTEXT

The context classification for an arterial may change over its span from rural to urban core, thus the typology and resulting design of that arterial may also vary. This variation can most often be attributed to the changing of the previously described physical factors affecting the form of the built environment. Shown above, the character of Manchester Road / Route 100 varies from a mixed-use typology in the urban classification in St. Louis City to a main street typology in the suburban classification of St. Louis County. In between those areas, the arterial also illustrates all the characteristics of a commercial corridor and a business industrial corridor. Across these variations, it is important that designers consider the consistency of pedestrian, bicycle, and transit facilities within the multimodal transportation network. The illustrations on these pages provide a few simple examples of how the same arterial may have multiple typologies.

FIGURE 1-34: *North Main Street / Route 47 Context Example in the City of St. Clair in Franklin County*

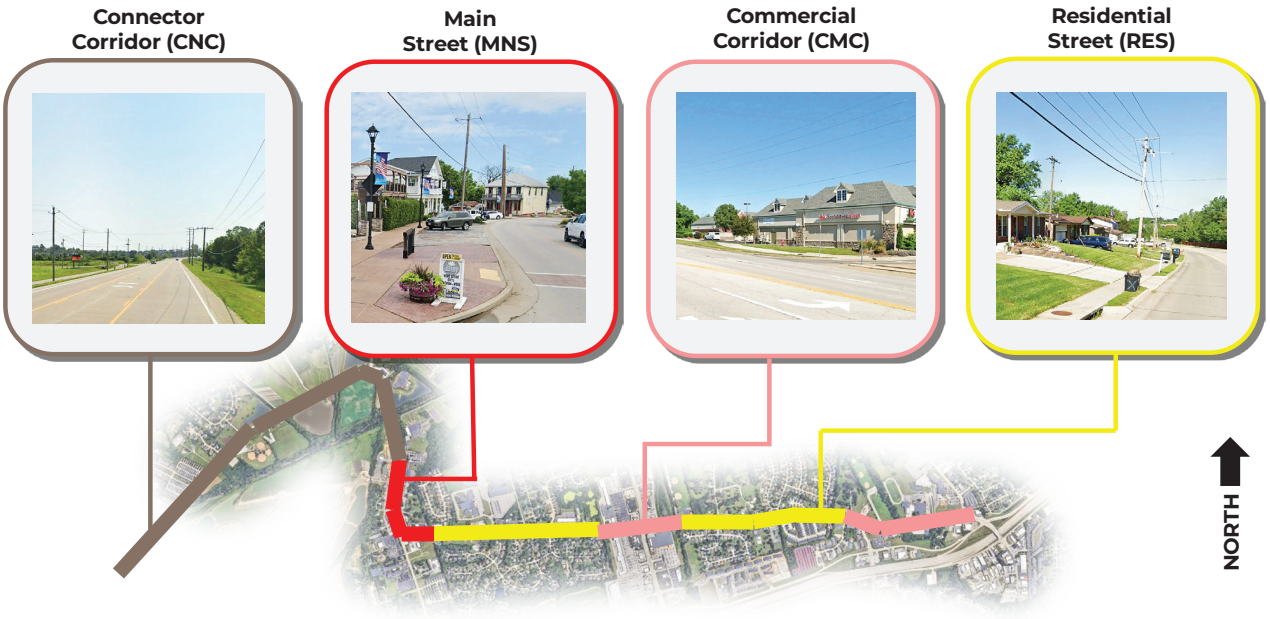


FIGURE 1-35: *Central School Road / Route N in the City of Cottleville in St. Charles County*

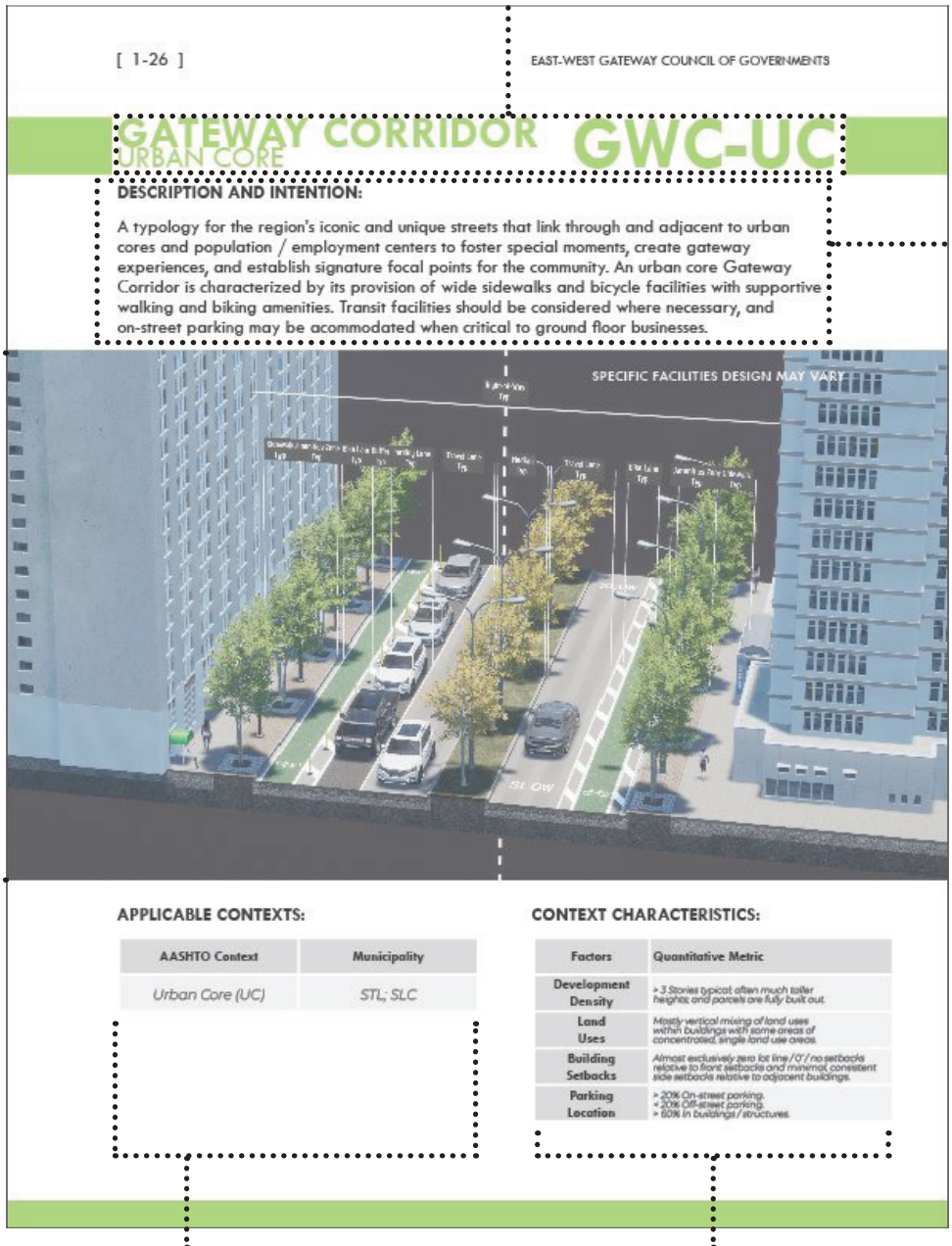
HOW TO USE THE ARTERIAL TYPOLOGIES

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.

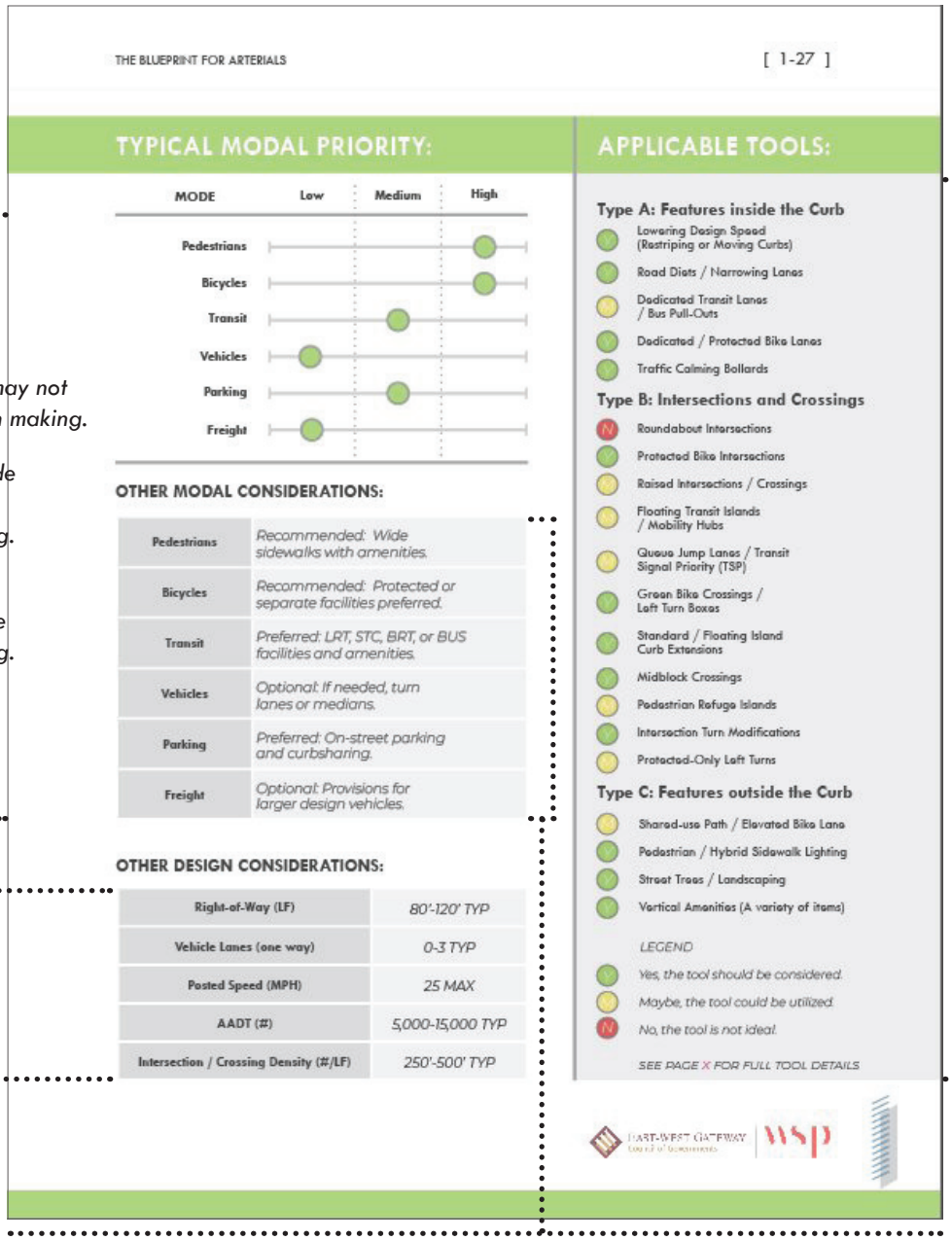
This list serves to provide the generally quantitative physical factors that help to identify AASHTO Context Classification.

HOW TO USE THE ARTERIAL TYPOLOGIES

This page provides designers guidance on priorities and tools that apply to the arterial typology.

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.



LOW *- Mode may not impact decision making.*

MEDIUM *- Mode could influence decision making.*

HIGH *- Mode should influence decision making.*

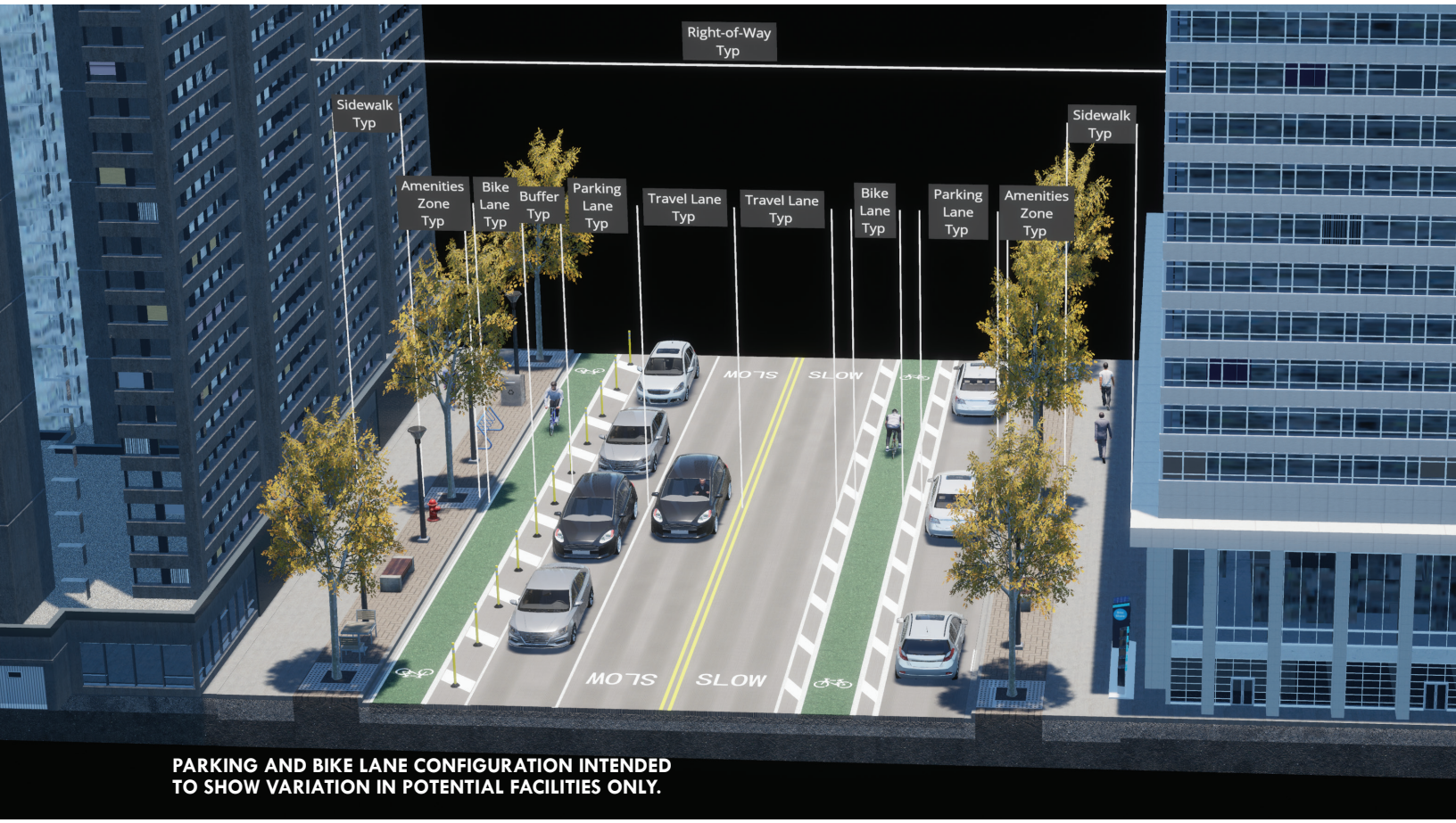
The design considerations represent a range of typical engineering considerations for geometric and operational design for the proposed typology.

RECOMMENDED *- This should be done to align with the typology and needs of the community.*
PREFERRED *- This should be considered but there might be recognized constraints.*
OPTIONAL *- This could be considered.*

DOWNTOWN STREET *URBAN CORE* DTS-UC

DESCRIPTION AND INTENTION:

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. An urban core Downtown Street is characterized by its provision of wide sidewalks with amenities and on-street parking that supports ground floor businesses. Where rights-of-way are more generous, dedicated bicycle and transit facilities are ideal to support the urban core context.



PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY.

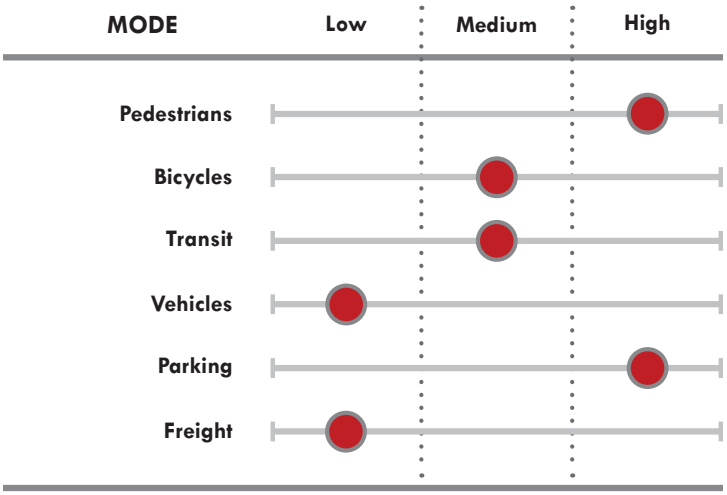
APPLICABLE CONTEXTS:

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, consistent 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: Protected or separate facilities preferred.
Transit	Preferred: LRT, STC, BRT, or BUS facilities and amenities.
Vehicles	Optional: If needed, turn lanes or medians.
Parking	Recommended: On-street parking and curb space for loading and pickup.
Freight	Optional: Provisions for larger design vehicles.

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	60'-120' TYP
Vehicle Lanes (one way)	0-3 TYP
Posted Speed (MPH)	25 MAX
AADT (#)	5,000-15,000 TYP
Intersection / Crossing Density (#/LF)	< 300'-325' TYP

APPLICABLE TOOLS:

Type A: Features inside the Curb

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

Type B: Intersections and Crossings

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

Type C: Features outside the Curb

- N — 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

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 accommodated when critical to ground floor businesses.

PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY.

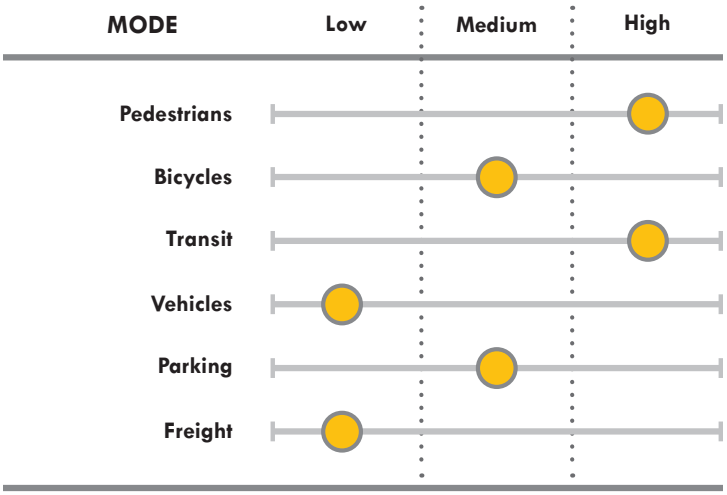
APPLICABLE CONTEXTS:

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, consistent 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 curb space for loading and pickup.
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

MIXED-USE STREET URBAN MUS-U

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 Mixed-Use Street is characterized by its provision of bicycle facilities and amenities and on-street parking to support ground floor businesses, and where possible wide sidewalks with amenities and design vehicle type should consider freight when critical.

PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY.

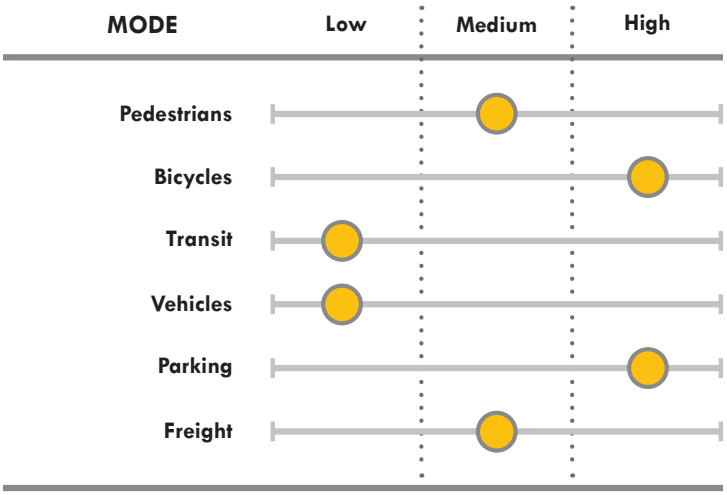
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Urban (U)	STL; SLC

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	1-5 Stories typical; heights may vary widely; and parcels are often built out.
Land Uses	Horizontal separation of uses with many areas that have vertical mixing of land uses within buildings.
Building Setbacks	Ranging from 0' to 25' front setbacks, consistently and some consistent side setbacks relative to adjacent buildings.
Parking Location	> 40% On-street parking. > 40% Off-street parking. < 20% In buildings / structures.

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

Pedestrians	Preferred: Wide sidewalks with amenities.
Bicycles	Recommended: Protected or separate facilities preferred.
Transit	Optional: LRT, STC, BRT, or BUS facilities and amenities.
Vehicles	Optional: If needed, turn lanes or medians.
Parking	Recommended: On-street parking and curb space for loading and pickup.
Freight	Preferred: 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
- Y — Dedicated / Protected Bike Lanes
- M — Traffic Calming Bollards

Type B: Intersections and Crossings

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

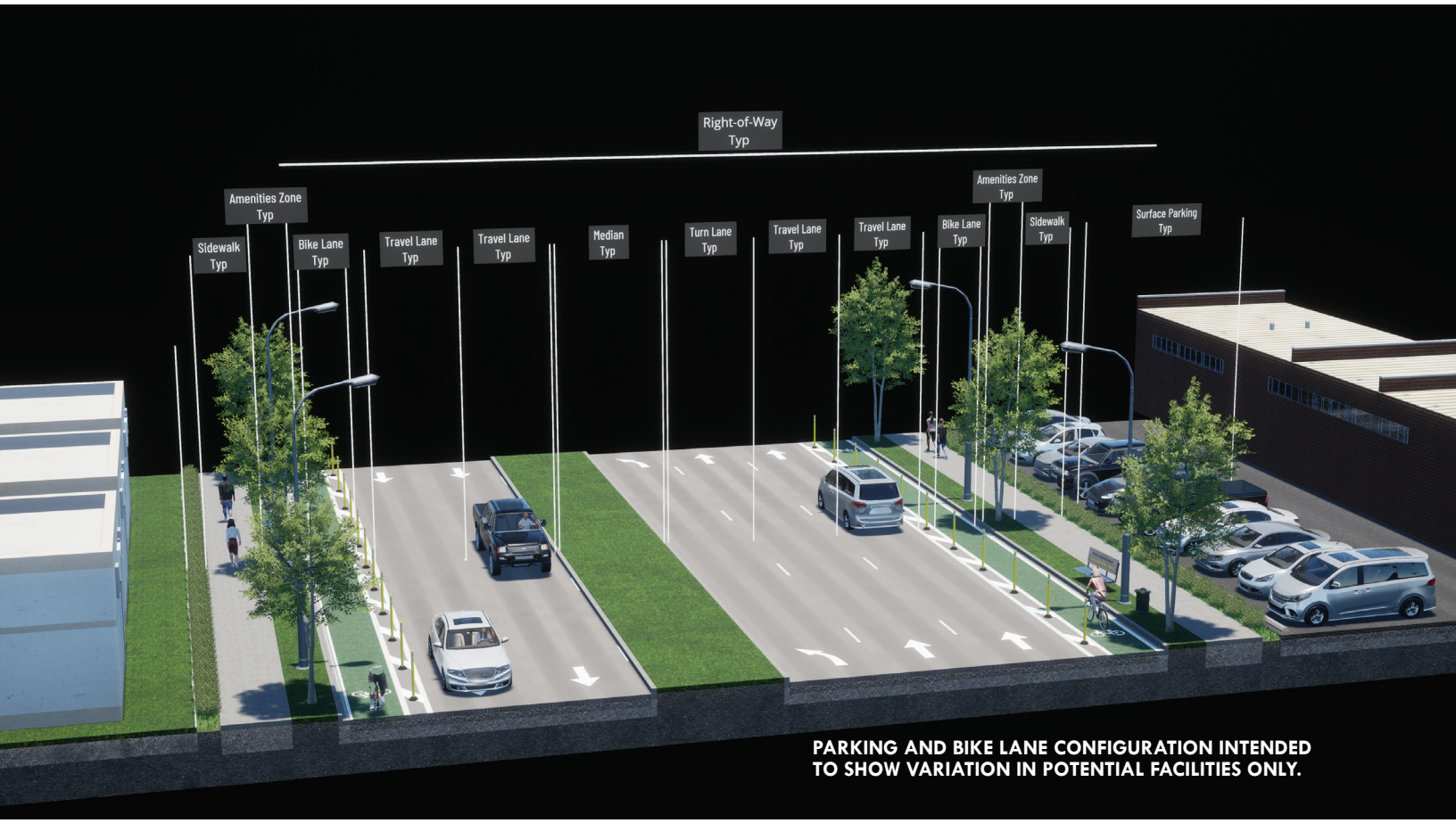
- Y — *Yes, the tool should be considered.*
- M — *Maybe, the tool could be utilized.*
- N — *No, the tool is not ideal.*

SEE PAGE X FOR FULL TOOL DETAILS

MIXED-USE STREET *SUBURBAN* MUS-S

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. A suburban Mixed-Use Street is characterized by its provision of on-street parking areas to serve businesses and consideration of design vehicle type to accommodate deliveries, and where possible wide sidewalks and bicycle facilities.



PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY.

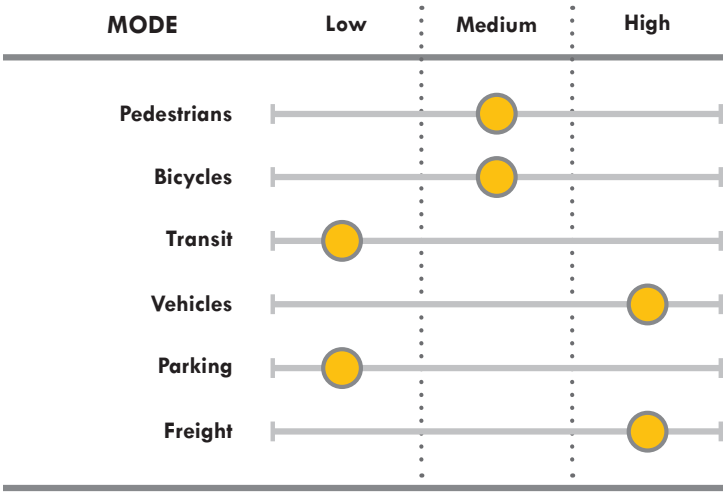
APPLICABLE CONTEXTS:

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	Preferred: Wide sidewalks with amenities.
Bicycles	Preferred: If included, protected facilities preferred.
Transit	Optional: LRT, STC, BRT, or BUS facilities and amenities.
Vehicles	Recommended: Turn lanes or medians.
Parking	Optional: On-street parking and curb space for loading and pickup.
Freight	Recommended: 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
- Y — 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
- N — 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
- N — 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 URBAN CORE TRC-UC

DESCRIPTION AND INTENTION:

A typology for the region's major existing and planned frequent and/or high capacity transit that links urban cores to population / employment centers through medium to high density communities with a wide range of building heights and uses. An urban core Transit Street is characterized by its provision of wide sidewalks with amenities and transit facilities and amenities. Where these streets interact with the bicycle network, dedicated bicycle facilities are ideal; and design vehicle considerations should be given to freight when part of the freight network.

PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY.

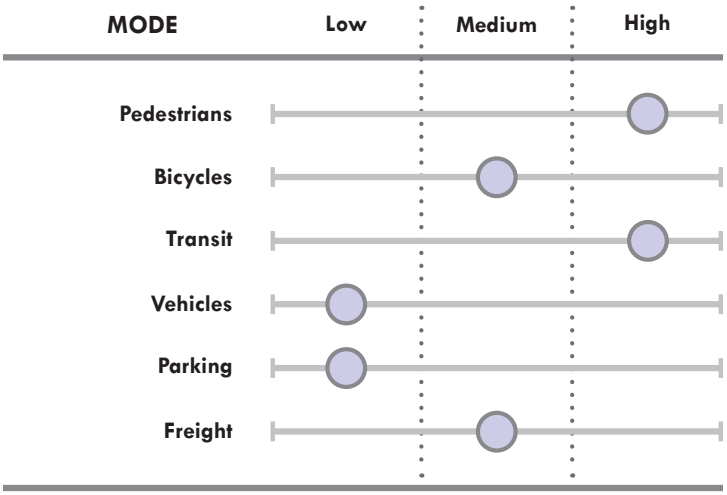
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Urban Core (UC)	STL

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, consistent 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: Protected or separate facilities preferred.
Transit	Recommended: LRT, STC, BRT, or BUS facilities and amenities.
Vehicles	Optional: If needed, turn lanes or medians.
Parking	Optional: On-street parking and curb space for loading and pickup.
Freight	Preferred: Provisions for larger design vehicles.

OTHER 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
- M — Dedicated Transit Lanes / Bus Pull-Outs
- M — Dedicated / Protected Bike Lanes
- Y — Traffic Calming Bollards

Type B: Intersections and Crossings

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

Type C: Features outside the Curb

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

LEGEND

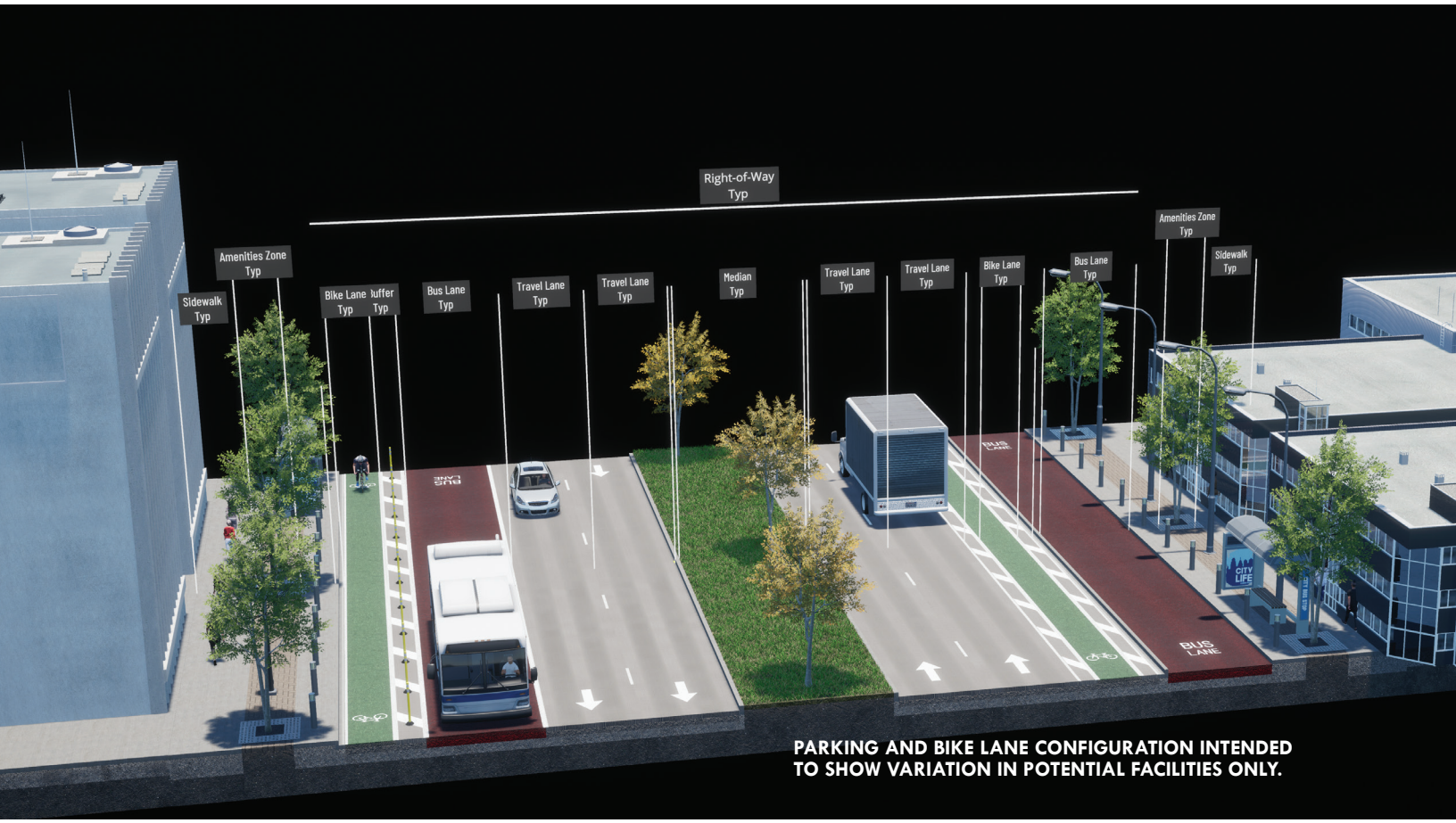
- Y — *Yes, the tool should be considered.*
- M — *Maybe, the tool could be utilized.*
- N — *No, the tool is not ideal.*

SEE PAGE X FOR FULL TOOL DETAILS

TRANSIT CORRIDOR URBAN TRC-U

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. An urban Transit Street is characterized by its provision of both transit and bicycle facilities and amenities, and where possible wide sidewalks and medians/turn lanes are ideal to support walkability and local land access through access management.



PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY.

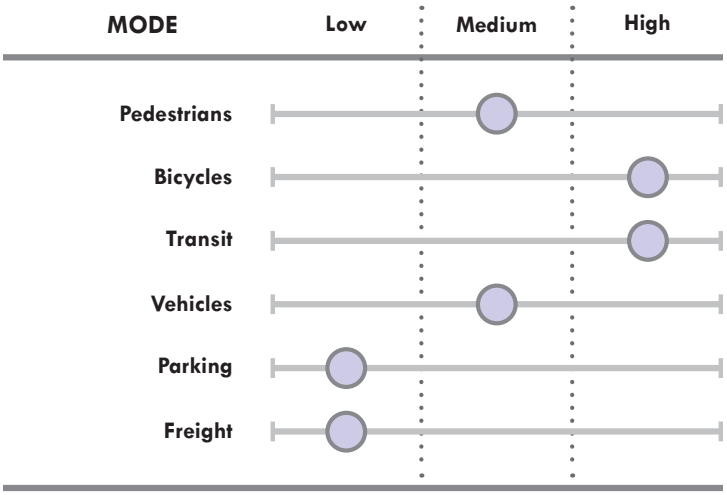
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Urban (U)	STL; SLC

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	1-5 Stories typical; heights may vary widely; and parcels are often built out.
Land Uses	Horizontal separation of uses with many areas that have vertical mixing of land uses within buildings.
Building Setbacks	Ranging from 0' to 25' front setbacks, consistently and some consistent side setbacks relative to adjacent buildings.
Parking Location	> 40% On-street parking. > 40% Off-street parking. < 20% In buildings / structures.

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

Pedestrians	Preferred: Wide sidewalks with amenities.
Bicycles	Required: Protected or separate facilities preferred.
Transit	Recommended: LRT, STC, BRT, or BUS facilities and amenities.
Vehicles	Preferred: Turn lanes or medians.
Parking	Optional: On-street parking and curb space for loading and pickup.
Freight	Optional: Provisions for larger design vehicles.

OTHER 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
- M — 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)
- Y — Green Bike Crossings / Left Turn Boxes
- Y — 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

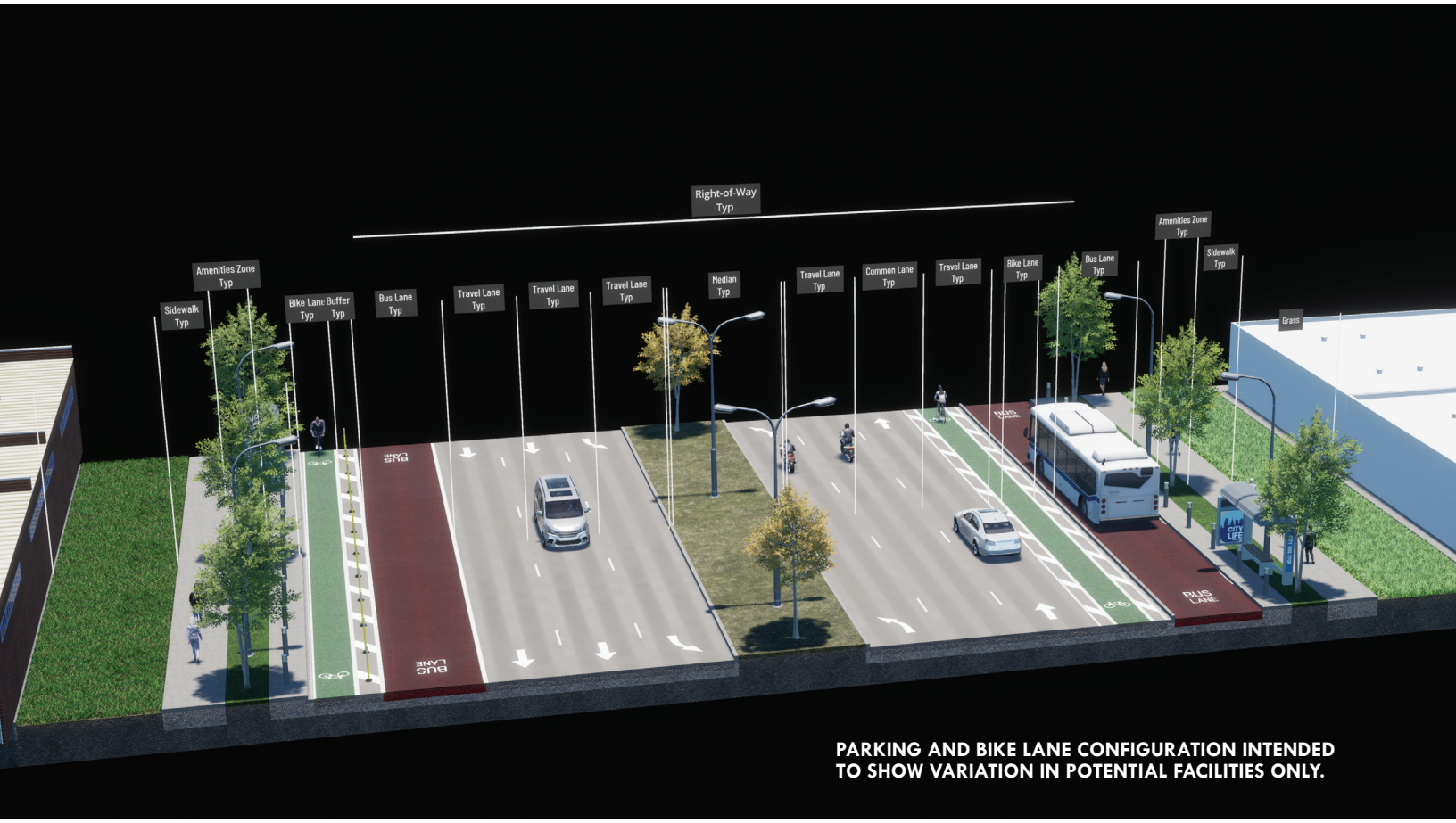
- Y — *Yes, the tool should be considered.*
- M — *Maybe, the tool could be utilized.*
- N — *No, the tool is not ideal.*

SEE PAGE X FOR FULL TOOL DETAILS

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.



PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY.

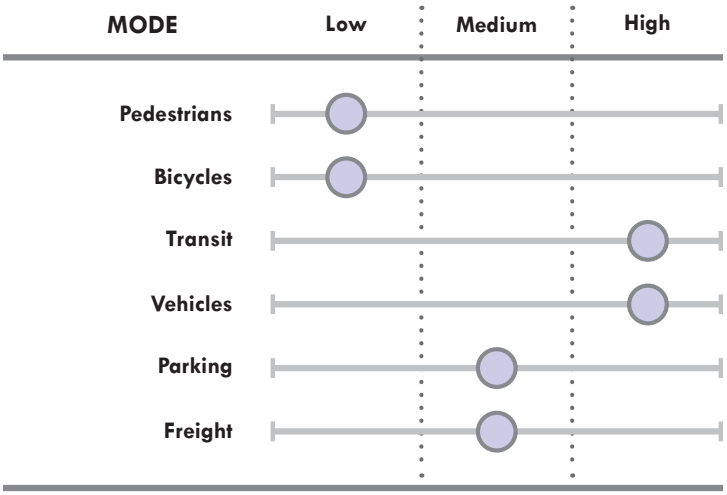
APPLICABLE CONTEXTS:

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 curb space for loading and pickup.
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

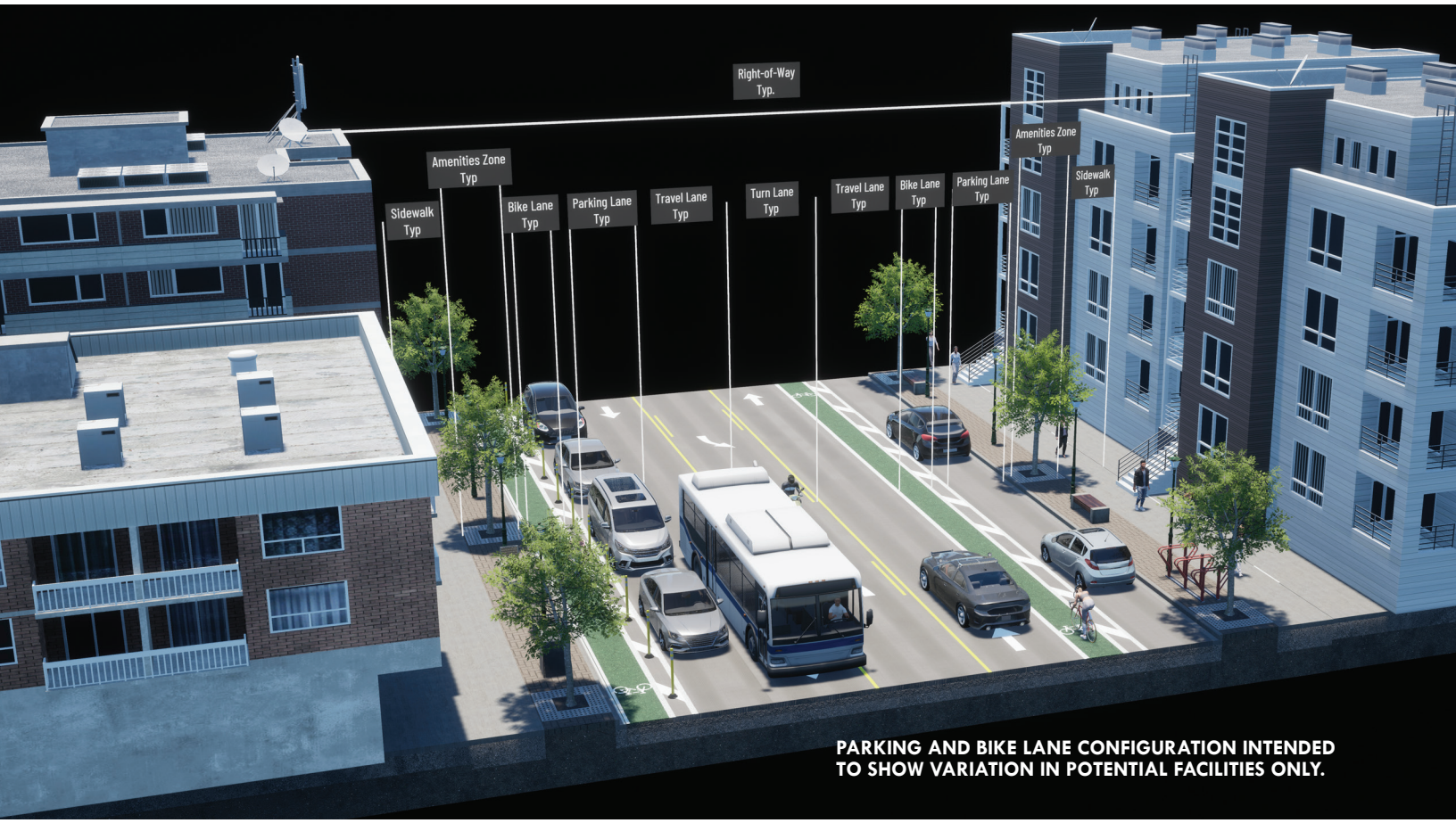
- Y — *Yes, the tool should be considered.*
- M — *Maybe, the tool could be utilized.*
- N — *No, the tool is not ideal.*

SEE PAGE X FOR FULL TOOL DETAILS

MAIN STREET *URBAN* MNS-U

DESCRIPTION AND INTENTION:

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. An urban Main Street is characterized by its provision of wide sidewalks and amenities and on-street parking that serves local businesses. Where possible bicycle facilities and medians / center turn lanes should be considered.



PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY.

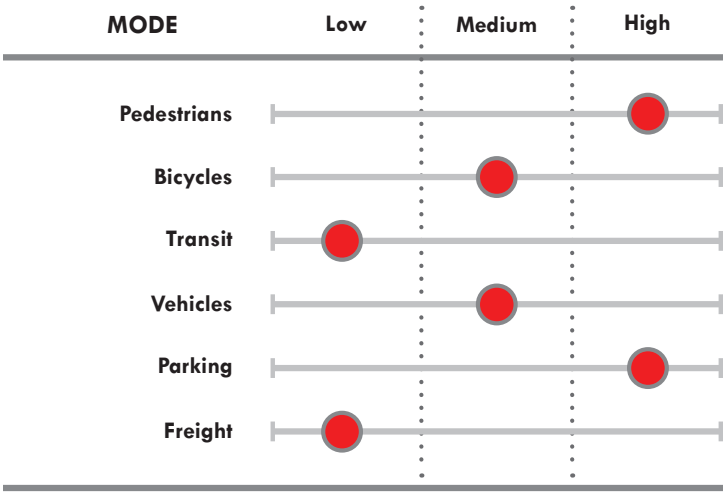
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Urban (U)	STL; SLC; SCC

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	1-5 Stories typical; heights may vary widely; and parcels are often built out.
Land Uses	Horizontal separation of uses with many areas that have vertical mixing of land uses within buildings.
Building Setbacks	Ranging from 0' to 25' front setbacks, consistently and some consistent side setbacks relative to adjacent buildings.
Parking Location	> 40% On-street parking. > 40% Off-street parking. < 20% In buildings / structures.

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

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

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	60'-80' TYP
Vehicle Lanes (one way)	0-2 TYP
Posted Speed (MPH)	25-30 MAX
AADT (#)	5,000-10,000 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
- N — Dedicated Transit Lanes / Bus Pull-Outs
- M — Dedicated / Protected Bike Lanes
- Y — Traffic Calming Bollards

Type B: Intersections and Crossings

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

Type C: Features outside the Curb

- N — 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

MAIN STREET *SUBURBAN* MNS-S

DESCRIPTION AND INTENTION:

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. A suburban Main Street is characterized by its provision of wide sidewalks and amenities and bicycle facilities and amenities that support regional connections. If space is available, on-street parking may be included, along with consideration for freight by design vehicle.

PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY.

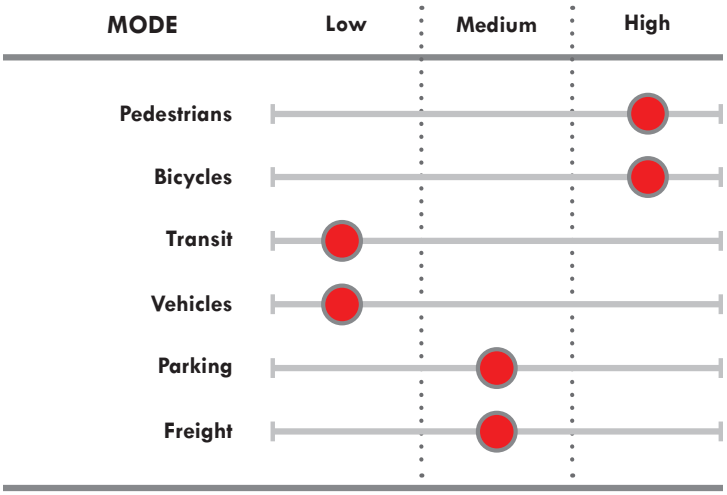
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Suburban (S)	SLC; SCC

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	Recommended: Wide sidewalks with amenities.
Bicycles	Recommended: Protected or separate facilities preferred.
Transit	Optional: LRT, STC, BRT, or BUS facilities and amenities.
Vehicles	Optional: If needed, turn lanes or medians.
Parking	Preferred: On-street parking and curb space for loading and pickup.
Freight	Preferred: Provisions for larger design vehicles.

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	60'-80' TYP
Vehicle Lanes (one way)	0-2 TYP
Posted Speed (MPH)	25-30 MAX
AADT (#)	5,000-10,000 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
- N — Dedicated Transit Lanes / Bus Pull-Outs
- Y — Dedicated / Protected Bike Lanes
- M — Traffic Calming Bollards

Type B: Intersections and Crossings

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

MAIN STREET
RURAL TOWN

MNS-RT

DESCRIPTION AND INTENTION:

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. A rural town Main Street is characterized by its provision of wide sidewalks and amenities and on-street parking that serves local businesses. Where possible bicycle facilities and medians / center turn lanes should be considered.

PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY.

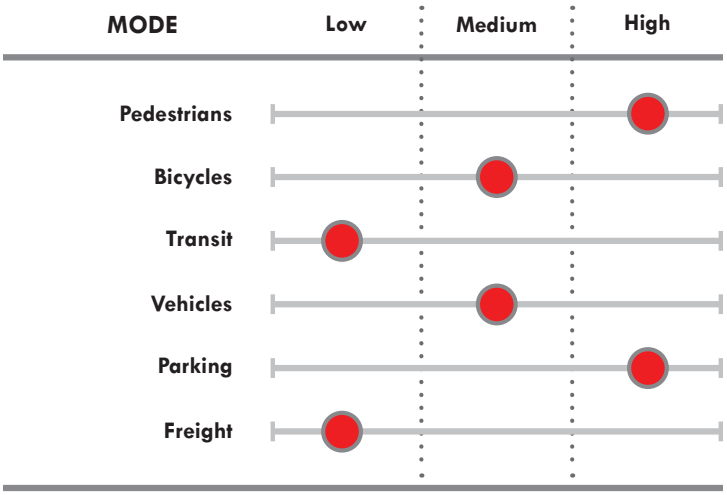
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Rural Town (RT)	SCC; JEF; FRK

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	1-3 Stories typical; heights may vary widely; and parcels are often built out.
Land Uses	Mostly vertical mixing of land uses within buildings with some areas of concentrated, single land use areas.
Building Setbacks	Ranging from 0' to 25' front setbacks, consistently and some consistent side setbacks relative to adjacent buildings.
Parking Location	> 60% On-street parking. < 40% Off-street parking. ~ 0% In buildings / structures.

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

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

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	60'-80' TYP
Vehicle Lanes (one way)	0-2 TYP
Posted Speed (MPH)	25-30 MAX
AADT (#)	5,000-10,000 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
- N — Dedicated Transit Lanes / Bus Pull-Outs
- M — Dedicated / Protected Bike Lanes
- Y — Traffic Calming Bollards

Type B: Intersections and Crossings

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

Type C: Features outside the Curb

- N — 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

RESIDENTIAL STREET URBAN RES-U

DESCRIPTION AND INTENTION:

A typology for the region's extensive network of diverse neighborhoods 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. An urban Residential Street is characterized by its provision of wide sidewalks and amenities and on-street parking to create a neighborhood feel. Where possible or necessary, bicycle facilities and amenities should be considered along with center turn lanes / medians to facilitate access management and local land access.

PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY.

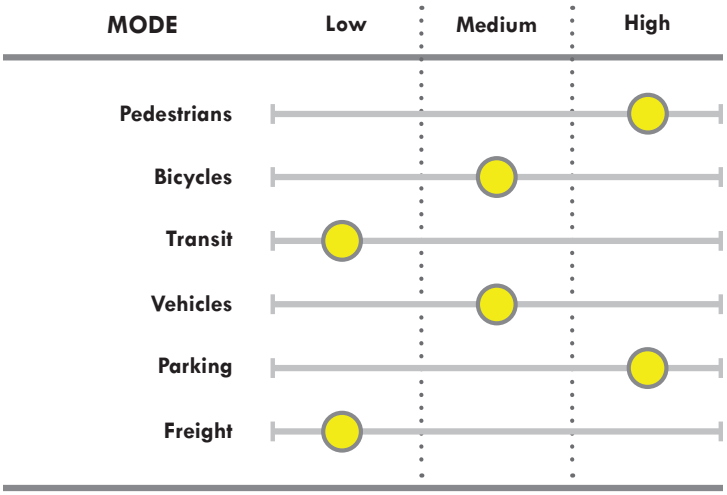
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Urban (U)	STL; SLC; SCC

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	1-5 Stories typical; heights may vary widely; and parcels are often built out.
Land Uses	Horizontal separation of uses with many areas that have vertical mixing of land uses within buildings.
Building Setbacks	Ranging from 0' to 25' front setbacks, consistently and some consistent side setbacks relative to adjacent buildings.
Parking Location	> 40% On-street parking. > 40% Off-street parking. < 20% In buildings / structures.

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

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

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	50'-100' TYP
Vehicle Lanes (one way)	1-4 TYP
Posted Speed (MPH)	25-35 MAX
AADT (#)	5,000-10,000 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
- N — Dedicated Transit Lanes / Bus Pull-Outs
- Y — Dedicated / Protected Bike Lanes
- Y — Traffic Calming Bollards

Type B: Intersections and Crossings

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

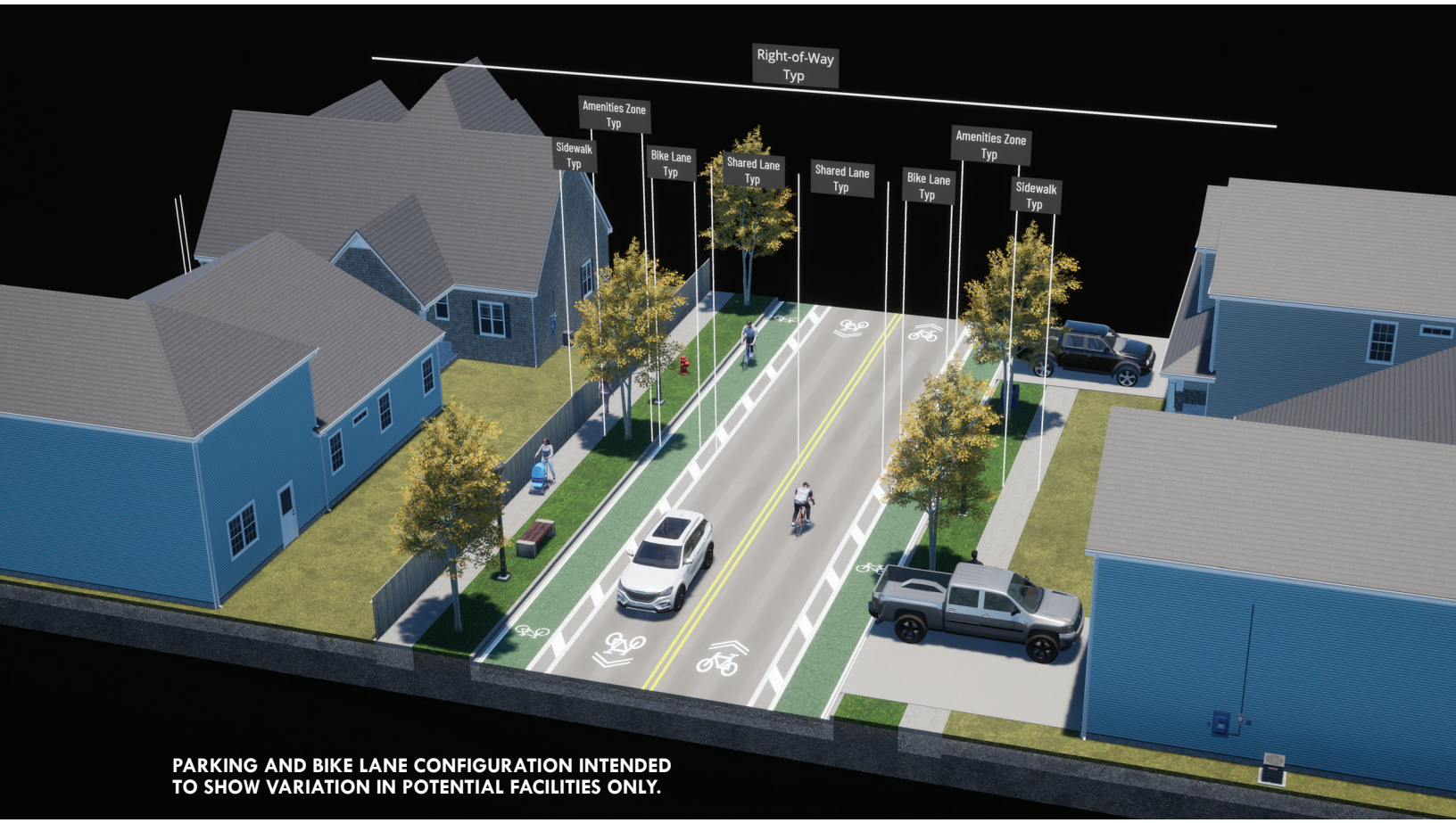
SEE PAGE X FOR FULL TOOL DETAILS

RESIDENTIAL STREET SUBURBAN

RES-S

DESCRIPTION AND INTENTION:

A typology for the region's extensive network of diverse neighborhoods 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. A suburban Residential Street is characterized by its provision of wide sidewalks and amenities, and facilities and amenities for biking. Additional consideration may be given to on-street parking and center turn lanes / medians to support local land access and access management.



PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY.

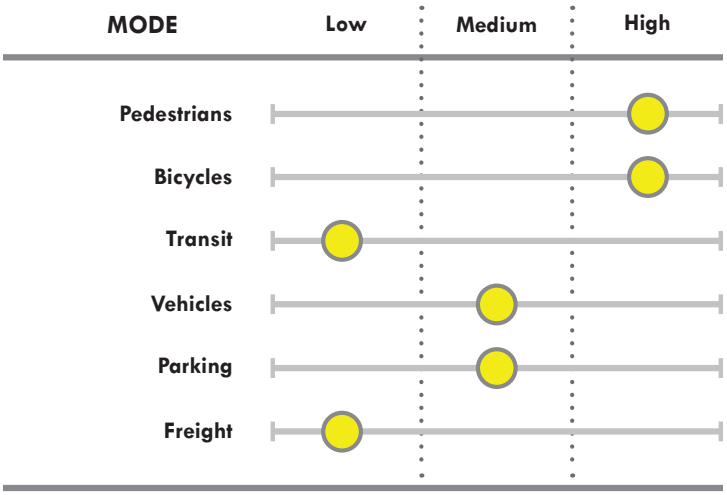
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Suburban (S)	SLC; SCC

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	Recommended: Wide sidewalks with amenities.
Bicycles	Recommended: Protected or separate facilities preferred.
Transit	Optional: LRT, STC, BRT, or BUS facilities and amenities.
Vehicles	Preferred: Turn lanes or medians.
Parking	Preferred: On-street parking and curb space for loading and pickup.
Freight	Optional: Provisions for larger design vehicles.

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	50'-100' TYP
Vehicle Lanes (one way)	1-4 TYP
Posted Speed (MPH)	25-35 MAX
AADT (#)	5,000-10,000 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
- N — Dedicated Transit Lanes / Bus Pull-Outs
- Y — Dedicated / Protected Bike Lanes
- M — Traffic Calming Bollards

Type B: Intersections and Crossings

- Y — Roundabout Intersections
- Y — Protected Bike Intersections
- M — Raised Intersections / Crossings
- N — Floating Transit Islands / Mobility Hubs
- N — 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.*

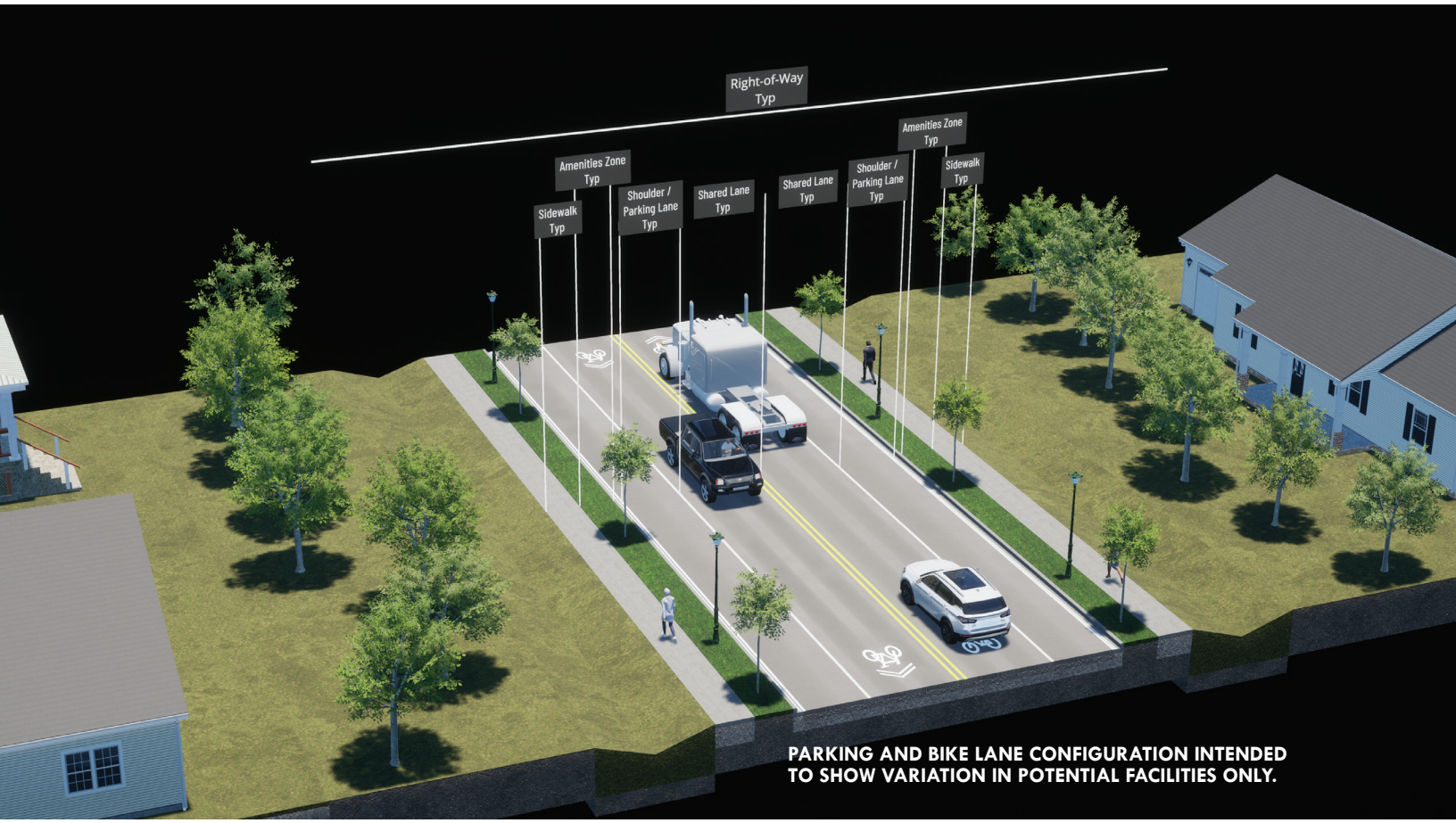
SEE PAGE X FOR FULL TOOL DETAILS

RESIDENTIAL STREET
RURAL TOWN

RES-RT

DESCRIPTION AND INTENTION:

A typology for the region's extensive network of diverse neighborhoods 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. A rural town Residential Street is characterized by its provision of wide sidewalks and amenities and on-street parking to create a neighborhood feel. Where possible or necessary, bicycle facilities and amenities should be considered along with consideration for freight traffic.



PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY.

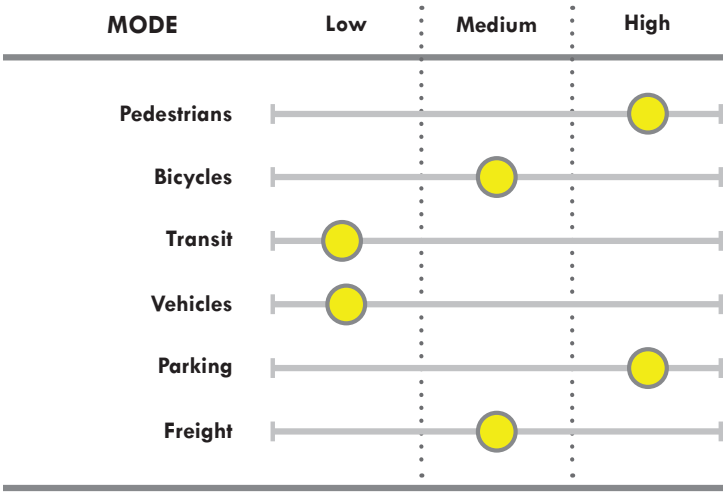
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Rural Town (RT)	SCC; JEF; FRK

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	1-3 Stories typical; heights may vary widely; and parcels are often built out.
Land Uses	Mostly vertical mixing of land uses within buildings with some areas of concentrated, single land use areas.
Building Setbacks	Ranging from 0' to 25' front setbacks, consistently and some consistent side setbacks relative to adjacent buildings.
Parking Location	> 60% On-street parking. < 40% Off-street parking. ~ 0% In buildings / structures.

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

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

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	50'-100' TYP
Vehicle Lanes (one way)	1-4 TYP
Posted Speed (MPH)	25-35 MAX
AADT (#)	5,000-10,000 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
- N — Dedicated Transit Lanes / Bus Pull-Outs
- M — Dedicated / Protected Bike Lanes
- Y — Traffic Calming Bollards

Type B: Intersections and Crossings

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

GATEWAY CORRIDOR *URBAN CORE* GWC-UC

DESCRIPTION AND INTENTION:

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. An urban core Gateway Corridor is characterized by its provision of wide sidewalks and bicycle facilities with supportive walking and biking amenities. Transit facilities should be considered where necessary, and on-street parking may be accommodated when critical to ground floor businesses.

PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY; AND AVAILABILITY AND LOCATION OF TREES WILL BE BASED ON FINAL SPEEDS.

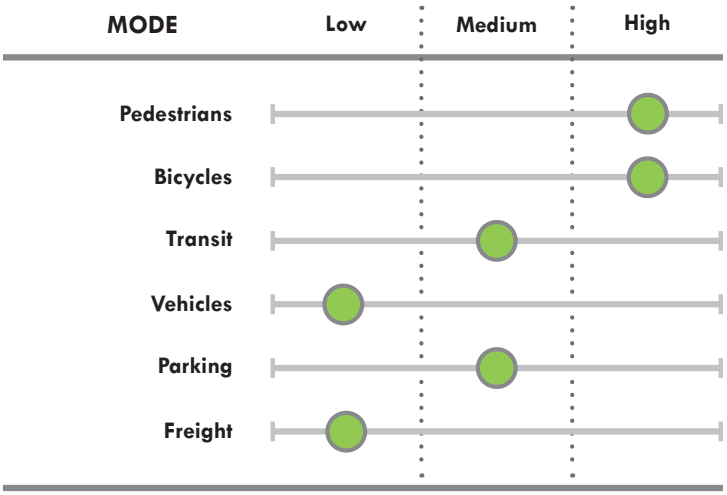
APPLICABLE CONTEXTS:

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, consistent 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	Recommended: Protected or separate facilities preferred.
Transit	Preferred: LRT, STC, BRT, or BUS facilities and amenities.
Vehicles	Optional: If needed, turn lanes or medians.
Parking	Preferred: On-street parking and curb space for loading and pickup.
Freight	Optional: Provisions for larger design vehicles.

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	80'-120' TYP
Vehicle Lanes (one way)	0-3 TYP
Posted Speed (MPH)	25 MAX
AADT (#)	5,000-15,000 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
- M — Dedicated Transit Lanes / Bus Pull-Outs
- Y — Dedicated / Protected Bike Lanes
- Y — Traffic Calming Bollards

Type B: Intersections and Crossings

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

GATEWAY CORRIDOR *URBAN* GWC-U

DESCRIPTION AND INTENTION:

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. An urban Gateway Corridor is characterized by its provision of both transit and bicycle facilities and amenities, and where possible wide sidewalks with amenities and design vehicle type should consider freight when critical.

PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY; AND AVAILABILITY AND LOCATION OF TREES WILL BE BASED ON FINAL SPEEDS.

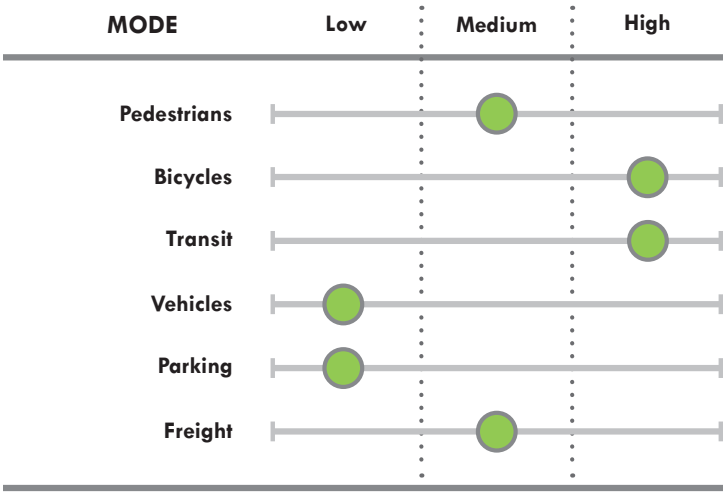
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Urban Core (UC)	STL; SLC; SCC

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	1-5 Stories typical; heights may vary widely; and parcels are often built out.
Land Uses	Horizontal separation of uses with many areas that have vertical mixing of land uses within buildings.
Building Setbacks	Ranging from 0' to 25' front setbacks, consistently and some consistent side setbacks relative to adjacent buildings.
Parking Location	> 40% On-street parking. > 40% Off-street parking. < 20% In buildings / structures.

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

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

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	80'-120' TYP
Vehicle Lanes (one way)	0-3 TYP
Posted Speed (MPH)	25 MAX
AADT (#)	5,000-15,000 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
- Y — Dedicated / Protected Bike Lanes
- M — Traffic Calming Bollards

Type B: Intersections and Crossings

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

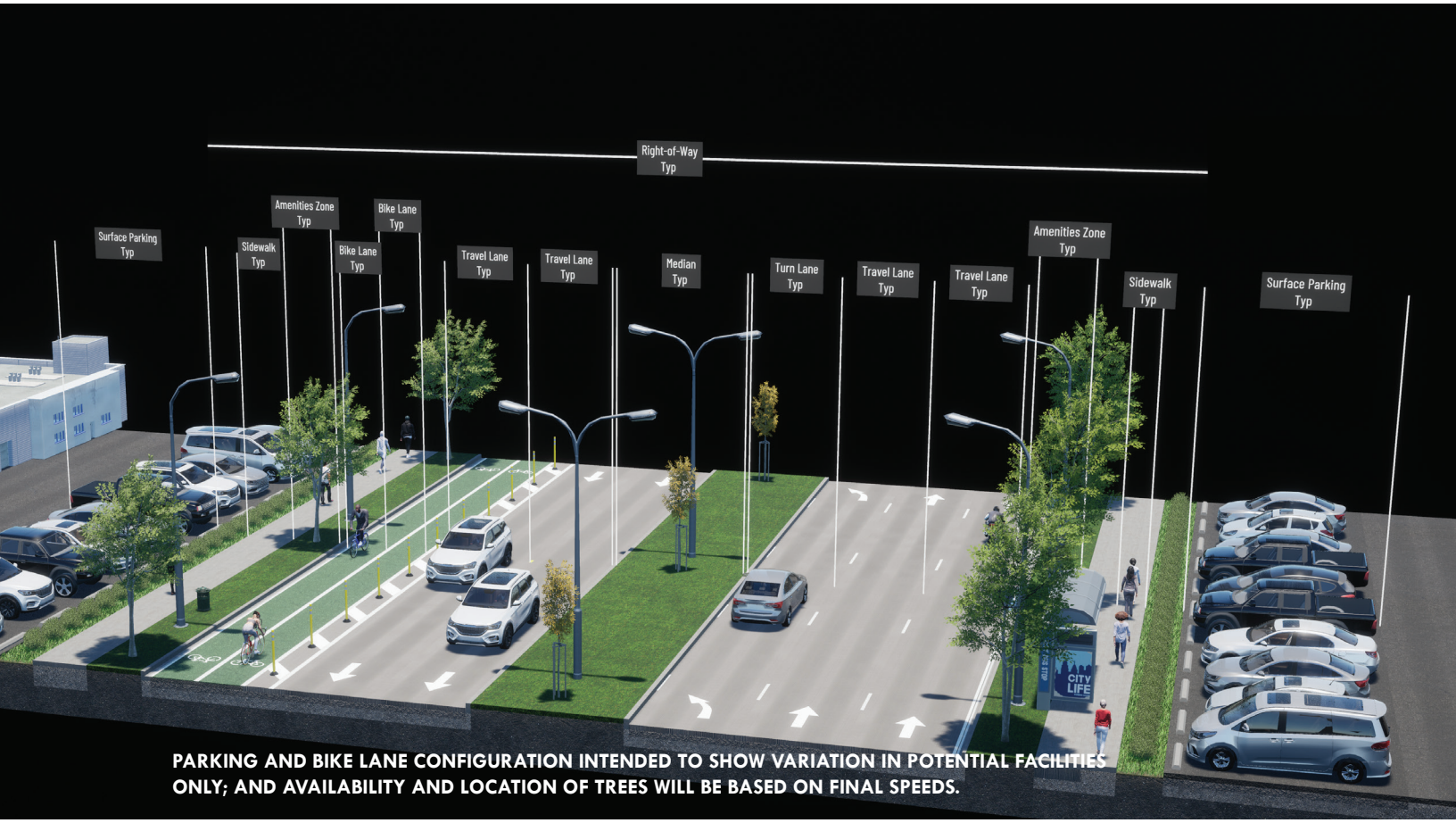
- Y — *Yes, the tool should be considered.*
- M — *Maybe, the tool could be utilized.*
- N — *No, the tool is not ideal.*

SEE PAGE X FOR FULL TOOL DETAILS

GATEWAY CORRIDOR *SUBURBAN* GWC-S

DESCRIPTION AND INTENTION:

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. A suburban Gateway Corridor is characterized by its provision of transit facilities and amenities, as well as its consideration for local land access and access management. Bicycles and freight should be considered where applicable.



PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY; AND AVAILABILITY AND LOCATION OF TREES WILL BE BASED ON FINAL SPEEDS.

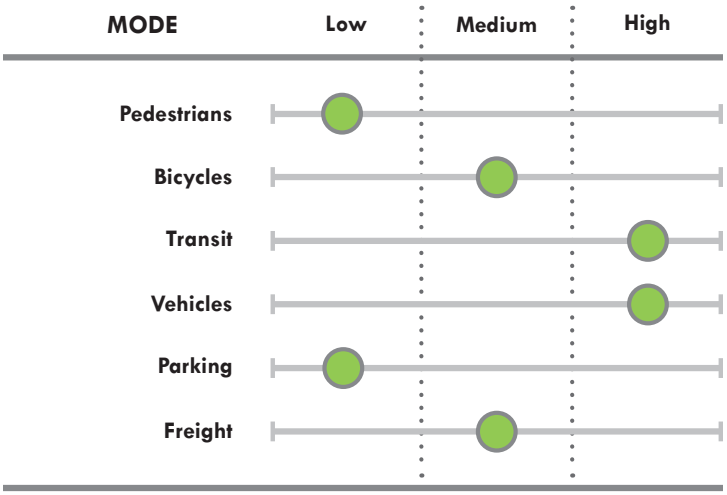
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Suburban (S)	SLC; SCC

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

OTHER DESIGN CONSIDERATIONS

Right-of-Way (LF)	80'-120' TYP
Vehicle Lanes (one way)	0-3 TYP
Posted Speed (MPH)	25 MAX
AADT (#)	5,000-15,000 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
- M — 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

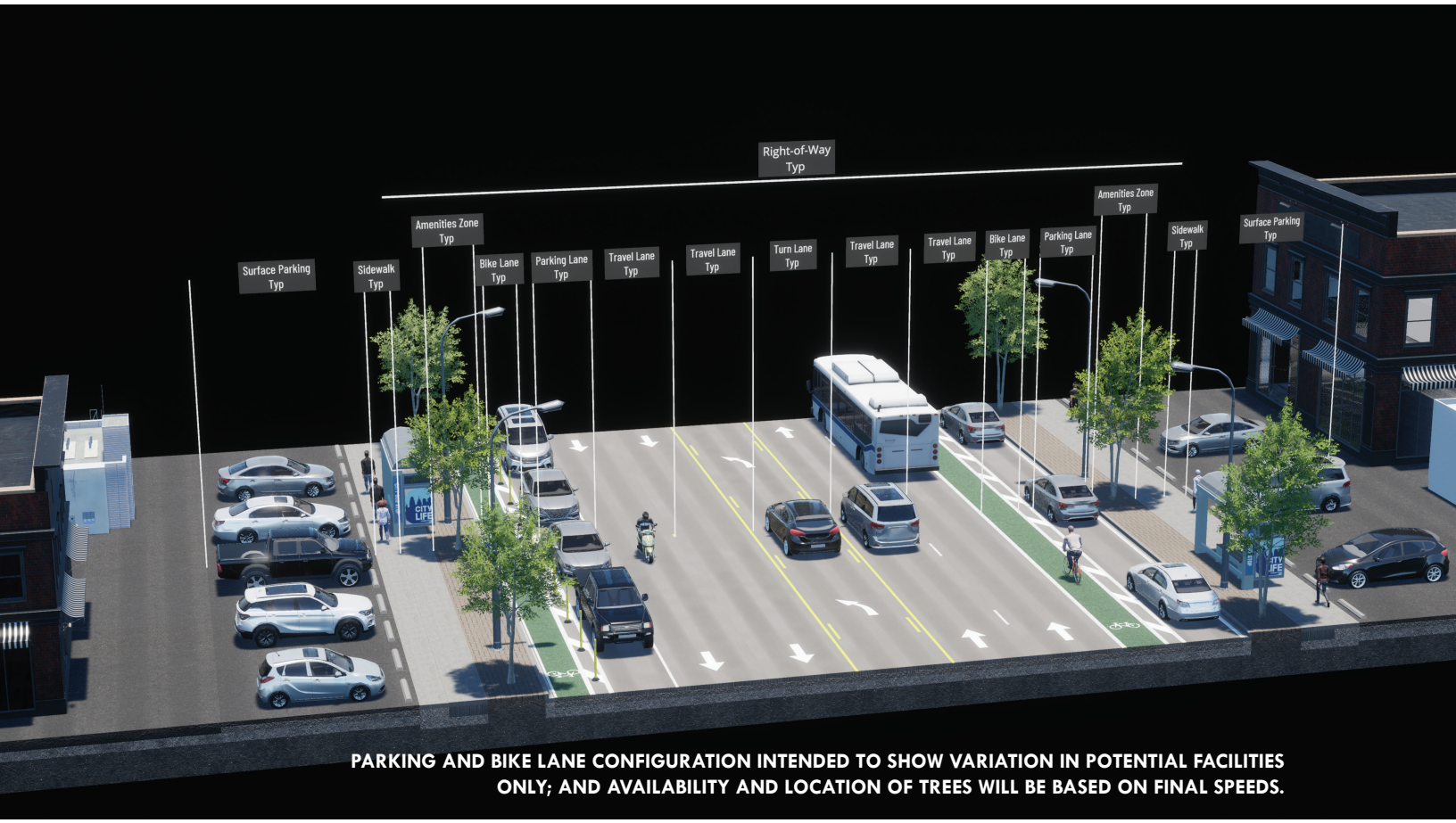
- Y — *Yes, the tool should be considered.*
- M — *Maybe, the tool could be utilized.*
- N — *No, the tool is not ideal.*

SEE PAGE X FOR FULL TOOL DETAILS

COMMERCIAL CORRIDOR *URBAN* CMC-U

DESCRIPTION AND INTENTION:

A typology for the region's extensive network of radial and traversing commercial thoroughfares that link urban cores to population / employment centers through and between communities with a wide range of densities, heights and uses. An urban Commercial Corridor is characterized by its provision of bicycle facilities and amenities and the inclusion of on-street parking to support local businesses. Design vehicle type should consider freight, and center turn lanes / medians may be utilized for access management and facilitate local land access.



PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY; AND AVAILABILITY AND LOCATION OF TREES WILL BE BASED ON FINAL SPEEDS.

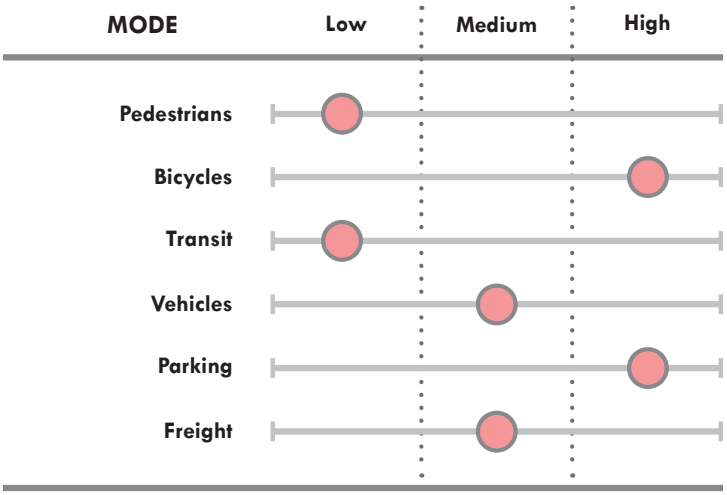
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Urban (U)	STL; SLC; SCC

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	1-5 Stories typical; heights may vary widely; and parcels are often built out.
Land Uses	Horizontal separation of uses with many areas that have vertical mixing of land uses within buildings.
Building Setbacks	Ranging from 0' to 25' front setbacks, consistently and some consistent side setbacks relative to adjacent buildings.
Parking Location	> 40% On-street parking. > 40% Off-street parking. < 20% In buildings / structures.

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

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

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	80'-120' TYP
Vehicle Lanes (one way)	2-4 TYP
Posted Speed (MPH)	30-45 MAX
AADT (#)	> 15,000 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
- M — Dedicated Transit Lanes / Bus Pull-Outs
- M — Dedicated / Protected Bike Lanes
- M — Traffic Calming Bollards

Type B: Intersections and Crossings

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

COMMERCIAL CORRIDOR *SUBURBAN* CMC-S

DESCRIPTION AND INTENTION:

A typology for the region's extensive network of radial and traversing commercial thoroughfares that link urban cores to population / employment centers through and between communities with a wide range of densities, heights and uses. A rural town Commercial Corridor is characterized by its provision of local land access and access management, and consideration for freight. Where possible and needed to support local businesses, they should include wide sidewalks and amenities, as well as on-street parking.

PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY; AND AVAILABILITY AND LOCATION OF TREES WILL BE BASED ON FINAL SPEEDS.

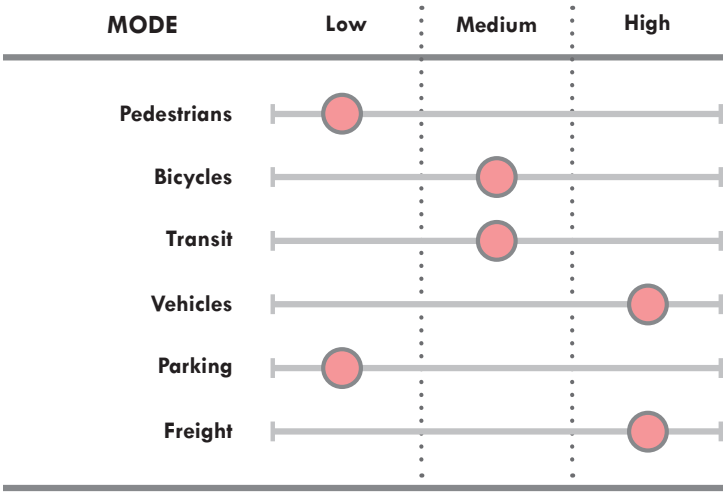
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Suburban (S)	SLC; SCC; JEF; FRK

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	Preferred: If included, protected facilities preferred.
Transit	Preferred: LRT, STC, BRT, or BUS facilities and amenities.
Vehicles	Recommended: Turn lanes or medians.
Parking	Optional: On-street parking and curb space for loading and pickup.
Freight	Recommended: Provisions for larger design vehicles.

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	80'-120' TYP
Vehicle Lanes (one way)	2-4 TYP
Posted Speed (MPH)	30-45 MAX
AADT (#)	> 15,000 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
- M — Traffic Calming Bollards

Type B: Intersections and Crossings

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

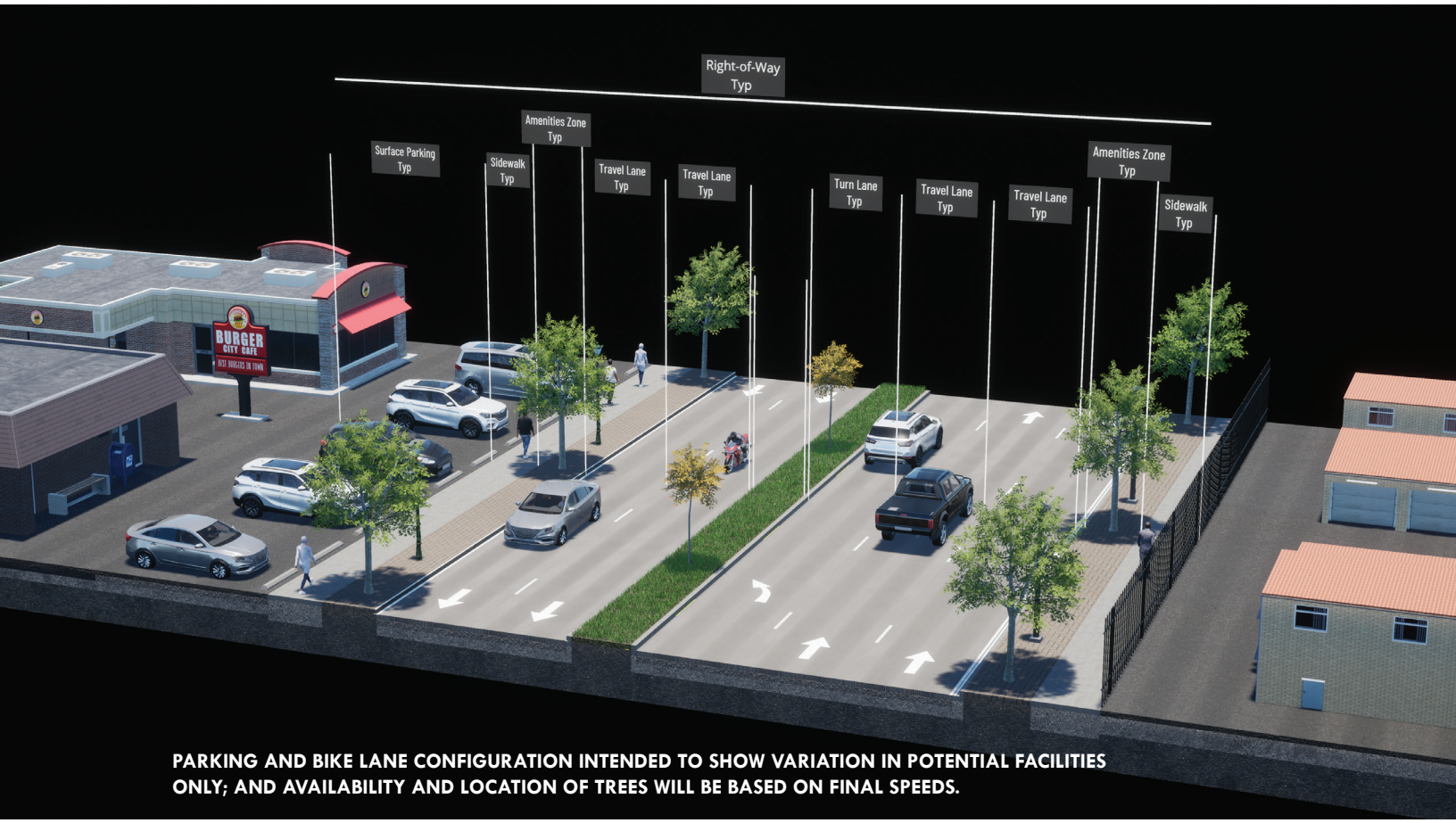
- Y — *Yes, the tool should be considered.*
- M — *Maybe, the tool could be utilized.*
- N — *No, the tool is not ideal.*

SEE PAGE X FOR FULL TOOL DETAILS

COMMERCIAL CORRIDOR *RURAL TOWN* CMC-RT

DESCRIPTION AND INTENTION:

A typology for the region's extensive network of radial and traversing commercial thoroughfares that link urban cores to population / employment centers through and between communities with a wide range of densities, heights and uses. A rural town Commercial Corridor is characterized by its provision of local land access and access management, and consideration for freight. Where possible and needed to support local businesses, they should include wide sidewalks and amenities, as well as on-street parking.



PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY; AND AVAILABILITY AND LOCATION OF TREES WILL BE BASED ON FINAL SPEEDS.

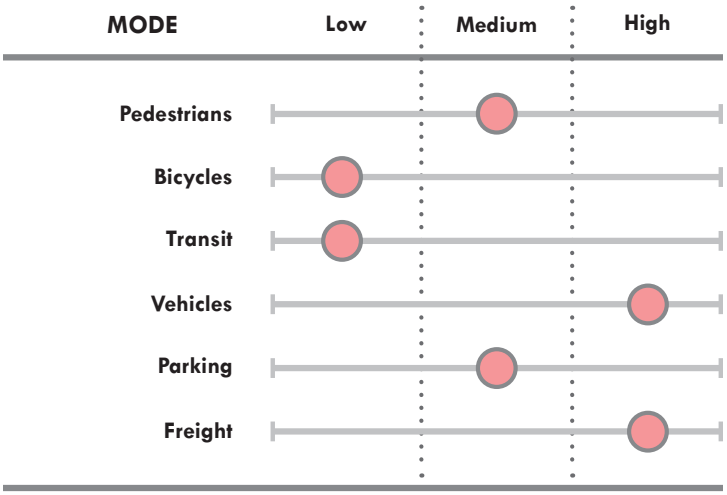
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Rural Town (RT)	SCC; JEF; FRK

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	1-3 Stories typical; heights may vary widely; and parcels are often built out.
Land Uses	Mostly vertical mixing of land uses within buildings with some areas of concentrated, single land use areas.
Building Setbacks	Ranging from 0' to 25' front setbacks, consistently and some consistent side setbacks relative to adjacent buildings.
Parking Location	> 60% On-street parking. < 40% Off-street parking. ~ 0% In buildings / structures.

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

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

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	80'-120' TYP
Vehicle Lanes (one way)	2-4 TYP
Posted Speed (MPH)	30-45 MAX
AADT (#)	> 15,000 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
- N — Dedicated Transit Lanes / Bus Pull-Outs
- M — Dedicated / Protected Bike Lanes
- Y — Traffic Calming Bollards

Type B: Intersections and Crossings

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

BUSINESS INDUSTRIAL CORRIDOR *URBAN* BIC-U

DESCRIPTION AND INTENTION:

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. An urban Business Industrial Corridor is characterized by its support for freight traffic and provision of sidewalks an amenities due to proximity to neighborhoods and other commercial districts. Where possible, safe bicycle facilities and amenities may be provided, along with center turn lanes / medians to facilitate access management.

PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY; AND AVAILABILITY AND LOCATION OF TREES WILL BE BASED ON FINAL SPEEDS.

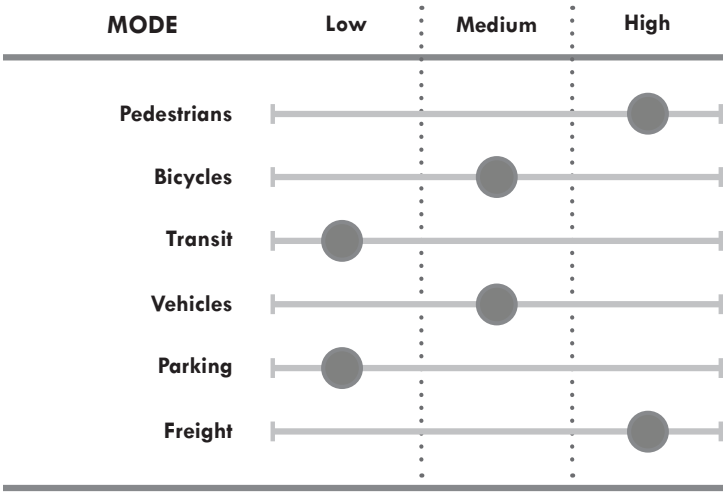
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Urban (U)	STL

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	1-5 Stories typical; heights may vary widely; and parcels are often built out.
Land Uses	Horizontal separation of uses with many areas that have vertical mixing of land uses within buildings.
Building Setbacks	Ranging from 0' to 25' front setbacks, consistently and some consistent side setbacks relative to adjacent buildings.
Parking Location	> 40% On-street parking. > 40% Off-street parking. < 20% In buildings / structures.

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

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

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	60'-100' TYP
Vehicle Lanes (one way)	1-2 TYP
Posted Speed (MPH)	30-50 MAX
AADT (#)	> 5,000 TYP
Intersection / Crossing Density (#/LF)	> 800' TYP

APPLICABLE TOOLS:

Type A: Features inside the Curb

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

Type B: Intersections and Crossings

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

Type C: Features outside the Curb

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

LEGEND

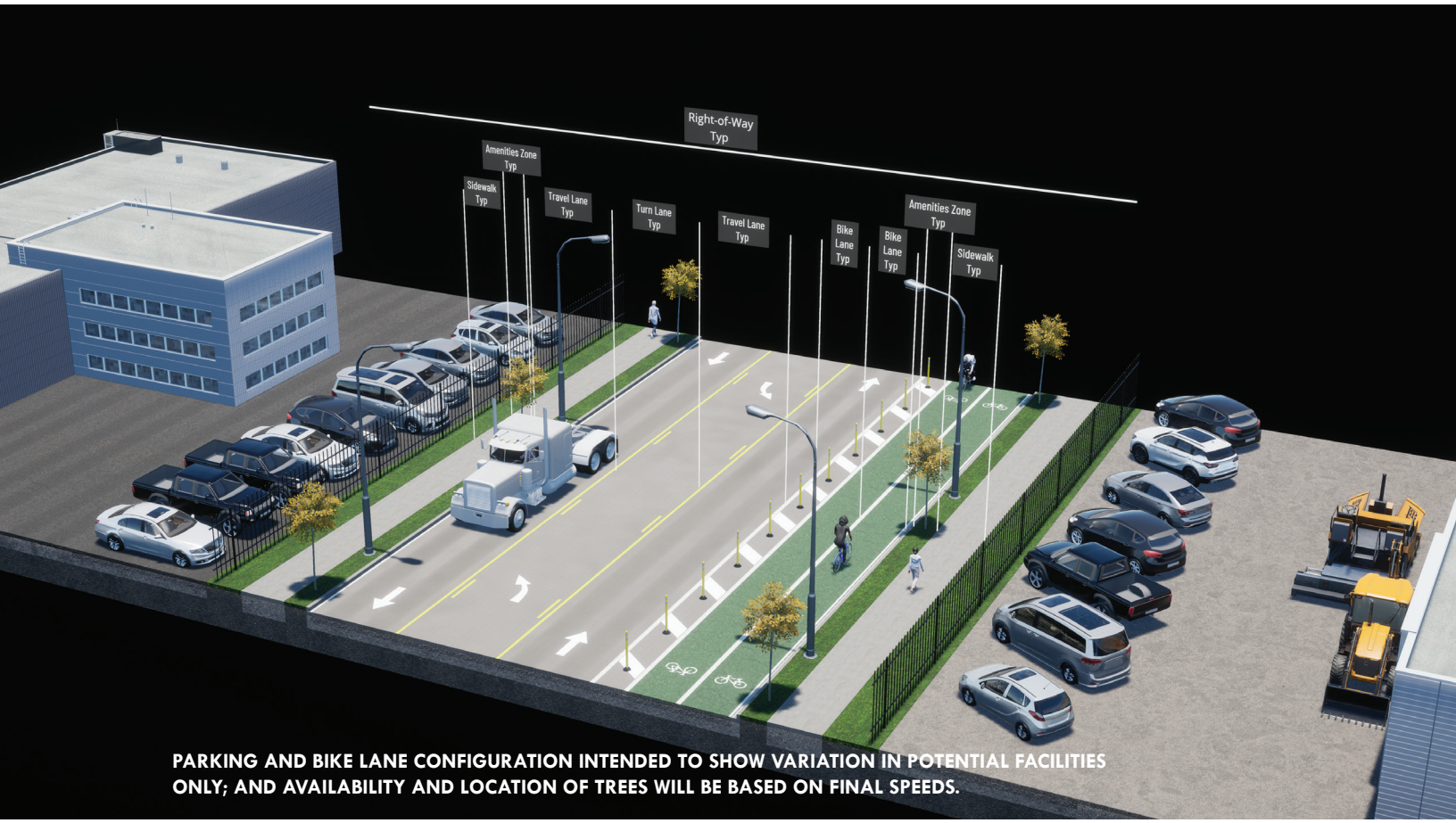
- (Y) *Yes, the tool should be considered.*
- (M) *Maybe, the tool could be utilized.*
- (N) *No, the tool is not ideal.*

SEE PAGE X FOR FULL TOOL DETAILS

BUSINESS INDUSTRIAL CORRIDOR *SUBURBAN* BIC-S

DESCRIPTION AND INTENTION:

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. A suburban Business Industrial Corridor is characterized by its focus on freight traffic and provision of safe bicycle facilities and amenities. Where needed and possible, consideration for on-street parking and center turn lanes / medians for access management may be important.



PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY; AND AVAILABILITY AND LOCATION OF TREES WILL BE BASED ON FINAL SPEEDS.

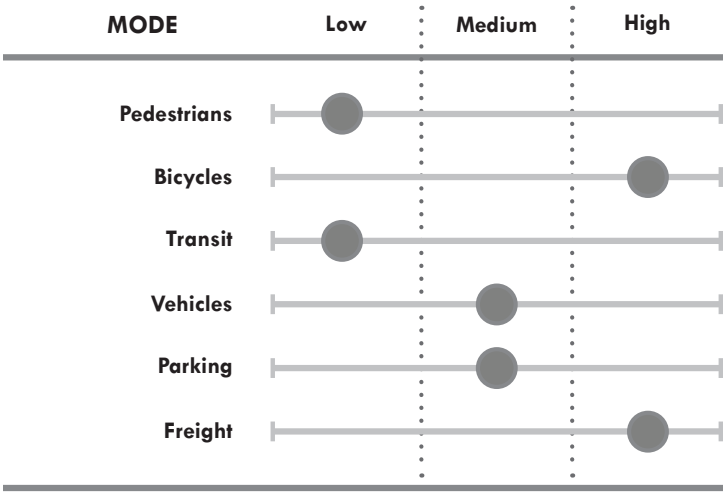
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Suburban (S)	SLC; SCC

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	Recommended: Protected or separate facilities preferred.
Transit	Optional: LRT, STC, BRT, or BUS facilities and amenities.
Vehicles	Preferred: Turn lanes or medians.
Parking	Preferred: On-street parking and curb space for loading and pickup.
Freight	Recommended: Provisions for larger design vehicles.

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	60'-100' TYP
Vehicle Lanes (one way)	1-2 TYP
Posted Speed (MPH)	30-50 MAX
AADT (#)	> 5,000 TYP
Intersection / Crossing Density (#/LF)	> 800' TYP

APPLICABLE TOOLS:

Type A: Features inside the Curb

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

Type B: Intersections and Crossings

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

Type C: Features outside the Curb

- Y — Shared-use Path / Elevated Bike Lane
- N — Pedestrian / Hybrid Sidewalk Lighting
- M — Street Trees / Landscaping
- N — 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

CONNECTOR CORRIDOR *URBAN* CNC-U

DESCRIPTION AND INTENTION:

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 densities and land uses. An urban Connector Corridor is characterized by its provision of wide sidewalks and amenities, as well as safe bicycle facilities and amenities. Considerations should also be given to freight traffic and design vehicle type, as well as center turn lanes / medians to facilitate access management.

PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY; AND AVAILABILITY AND LOCATION OF TREES WILL BE BASED ON FINAL SPEEDS.

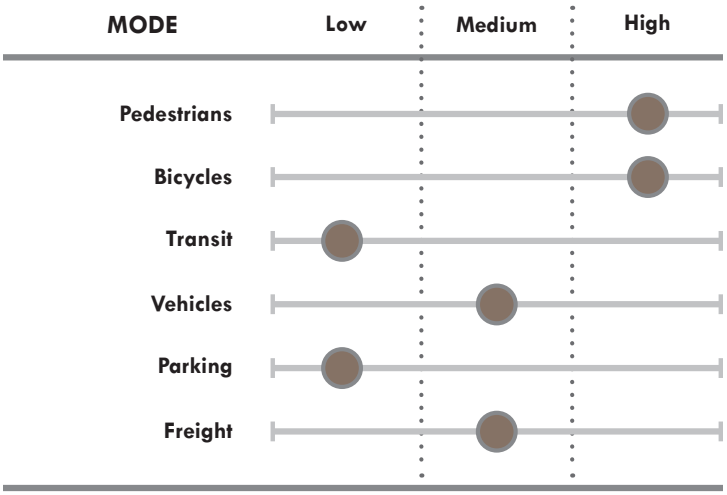
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Urban (U)	SLC

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	1-5 Stories typical; heights may vary widely; and parcels are often built out.
Land Uses	Horizontal separation of uses with many areas that have vertical mixing of land uses within buildings.
Building Setbacks	Ranging from 0' to 25' front setbacks, consistently and some consistent side setbacks relative to adjacent buildings.
Parking Location	> 40% On-street parking. > 40% Off-street parking. < 20% In buildings / structures.

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

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

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	50'-80' TYP
Vehicle Lanes (one way)	2-3 TYP
Posted Speed (MPH)	55 MAX
AADT (#)	> 15,000 TYP
Intersection / Crossing Density (#/LF)	800'-1,600 TYP

APPLICABLE TOOLS:

Type A: Features inside the Curb

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

Type B: Intersections and Crossings

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

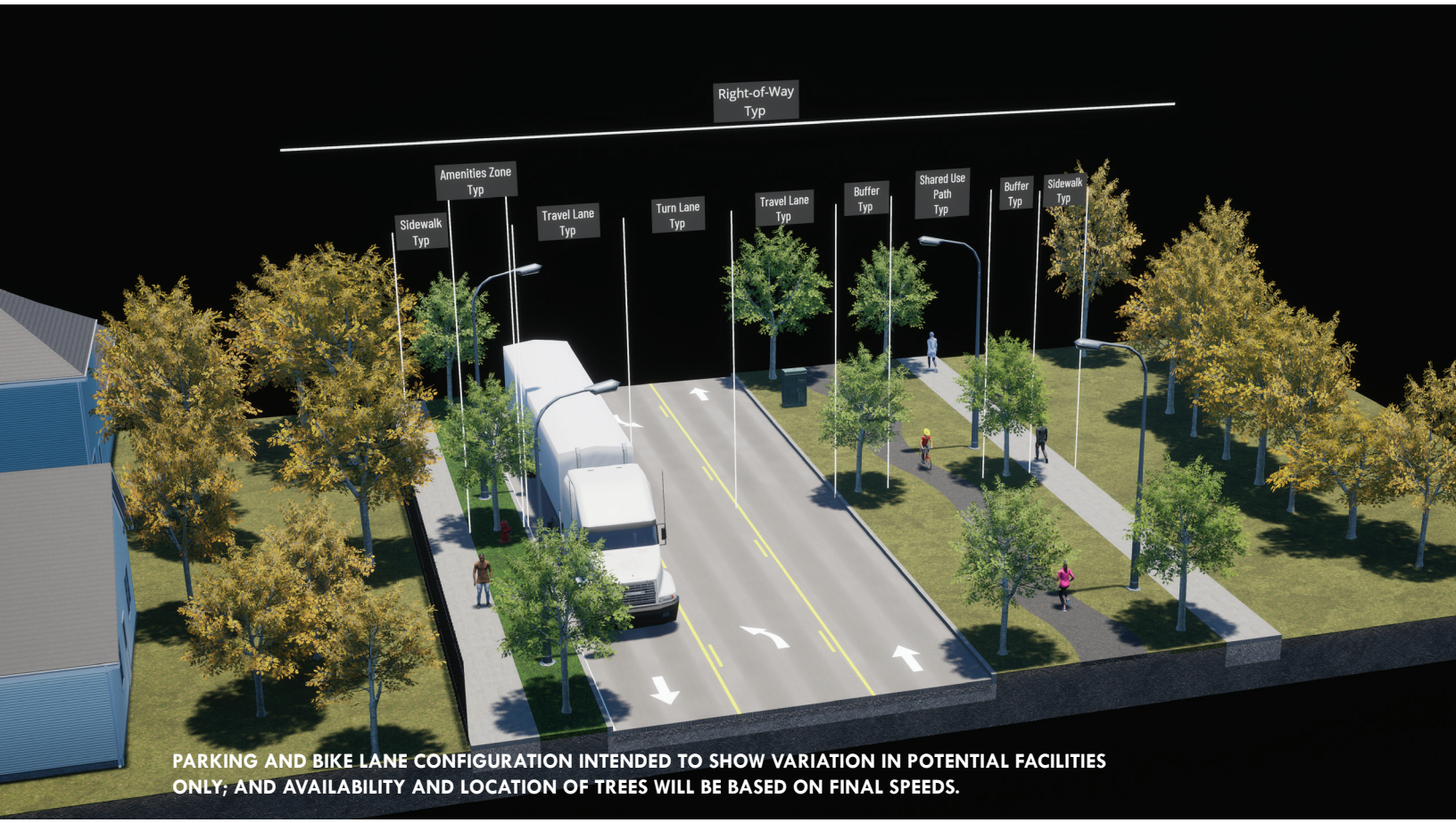
- Y — *Yes, the tool should be considered.*
- M — *Maybe, the tool could be utilized.*
- N — *No, the tool is not ideal.*

SEE PAGE X FOR FULL TOOL DETAILS

CONNECTOR CORRIDOR *SUBURBAN* CNC-S

DESCRIPTION AND INTENTION:

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 densities and land uses. A suburban Connector Corridor is characterized by its accommodation of freight traffic and larger design vehicles, as well as safe, separate biking facilities. Wider pedestrian facilities and medians / turn lanes may be utilized where needed.



PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY; AND AVAILABILITY AND LOCATION OF TREES WILL BE BASED ON FINAL SPEEDS.

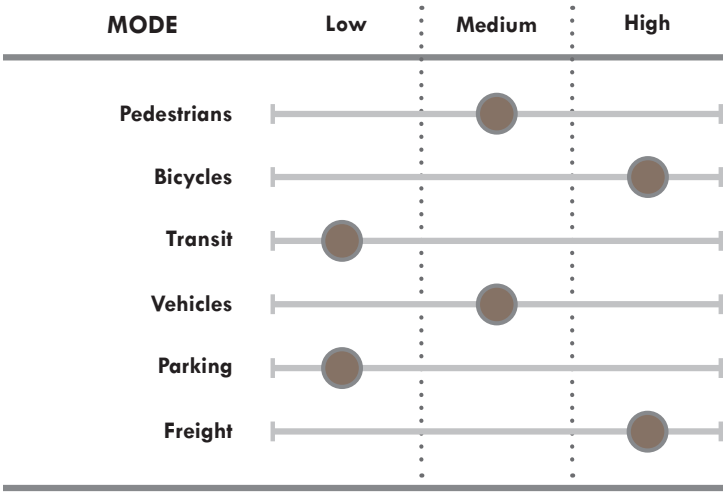
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Suburban (S)	SLC; SCC; JEF; FRK

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	Preferred: Wide sidewalks with amenities.
Bicycles	Recommended: Protected or separate facilities preferred.
Transit	Optional: LRT, STC, BRT, or BUS facilities and amenities.
Vehicles	Preferred: Turn lanes or medians.
Parking	Optional: On-street parking and curb space for loading and pickup.
Freight	Recommended: Provisions for larger design vehicles.

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	50'-80' TYP
Vehicle Lanes (one way)	2-3 TYP
Posted Speed (MPH)	55 MAX
AADT (#)	> 15,000 TYP
Intersection / Crossing Density (#/LF)	800'-1,600 TYP

APPLICABLE TOOLS:

Type A: Features inside the Curb

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

Type B: Intersections and Crossings

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

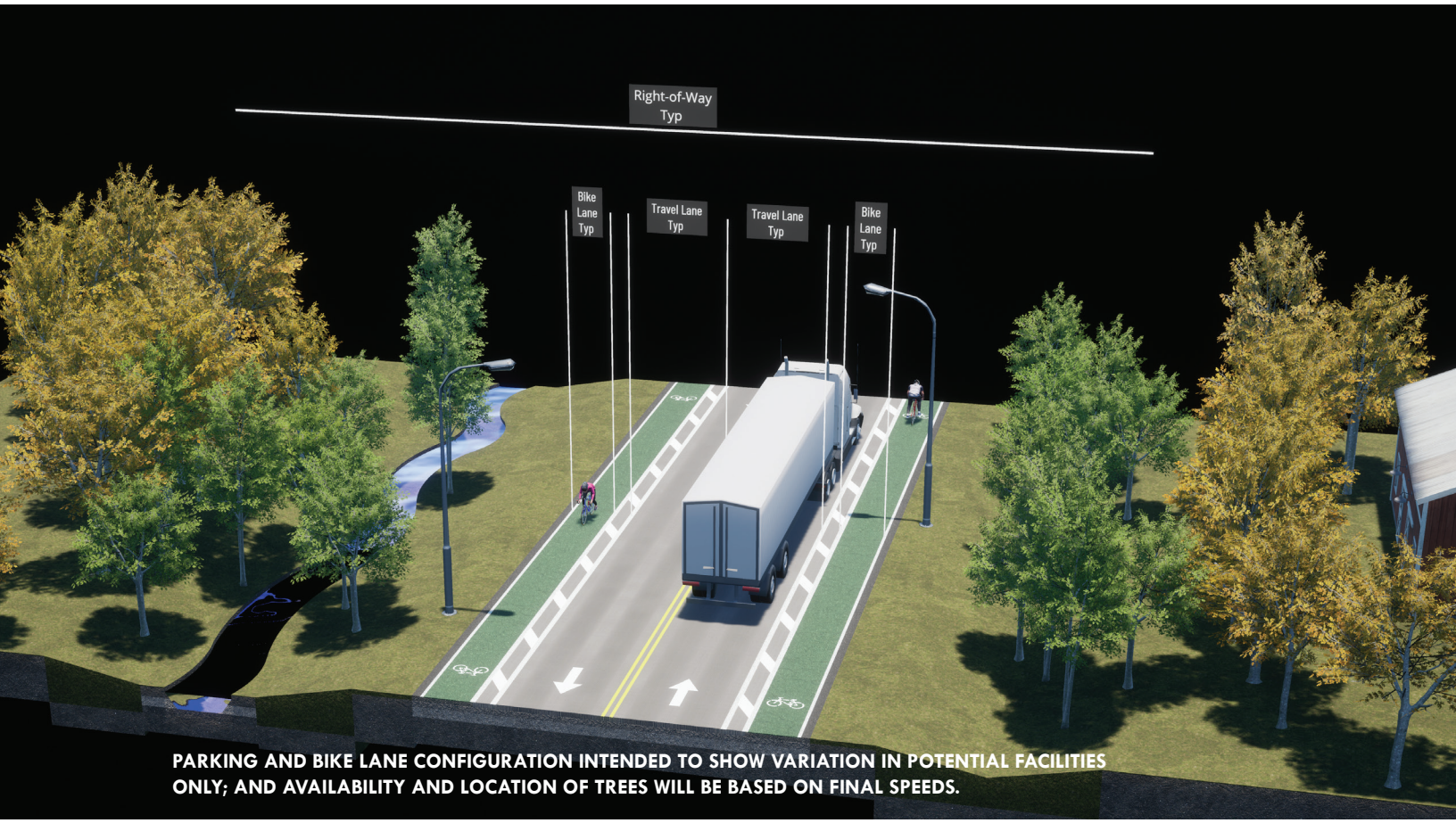
- Y — *Yes, the tool should be considered.*
- M — *Maybe, the tool could be utilized.*
- N — *No, the tool is not ideal.*

SEE PAGE X FOR FULL TOOL DETAILS

CONNECTOR CORRIDOR *RURAL* CNC-R

DESCRIPTION AND INTENTION:

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 densities and land uses. A rural connector corridor is characterized by its accommodation of freight traffic and larger design vehicles, as well as limited, safe bicycle facilities. Wider pedestrian facilities and medians / turn lanes may be utilized where needed.



PARKING AND BIKE LANE CONFIGURATION INTENDED TO SHOW VARIATION IN POTENTIAL FACILITIES ONLY; AND AVAILABILITY AND LOCATION OF TREES WILL BE BASED ON FINAL SPEEDS.

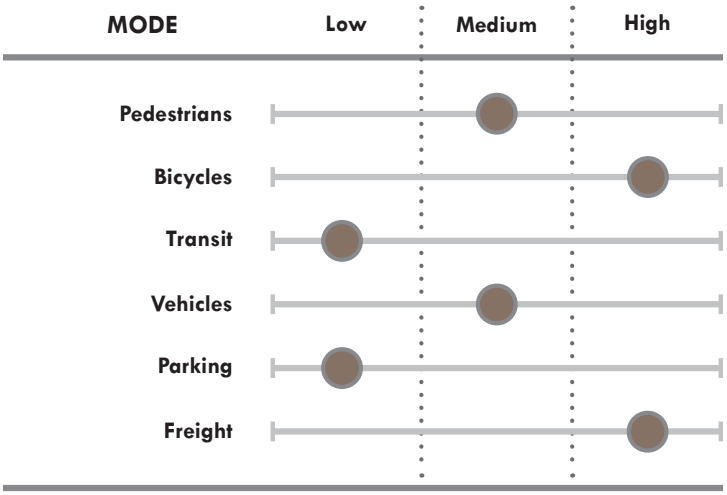
APPLICABLE CONTEXTS:

AASHTO Context	Municipality
Rural (R)	SCC; JEF; FRK

CONTEXT CHARACTERISTICS:

Factors	Quantitative Metric
Development Density	< 3 Stories typical; heights often much shorter; and parcels are rarely if ever built out.
Land Uses	Almost exclusively horizontal mixing of land uses within buildings.
Building Setbacks	> 50' front and side setbacks with limited or no consistency.
Parking Location	~ 0% On-street parking. ~100% Off-street parking. ~ 0% In buildings / structures.

TYPICAL MODAL PRIORITY:



OTHER MODAL CONSIDERATIONS:

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

OTHER DESIGN CONSIDERATIONS:

Right-of-Way (LF)	50'-80' TYP
Vehicle Lanes (one way)	2-3 TYP
Posted Speed (MPH)	55 MAX
AADT (#)	> 15,000 TYP
Intersection / Crossing Density (#/LF)	800'-1,600 TYP

APPLICABLE TOOLS:

Type A: Features inside the Curb

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

Type B: Intersections and Crossings

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