ACCESS MANAGEMENT COMMUNICATION TOOLKIT

NCHRP RESEARCH REPORT 1032

How to Measure and Communicate the Value of Access Management

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National Cooperative Highway Research Program
Transportation Research Board

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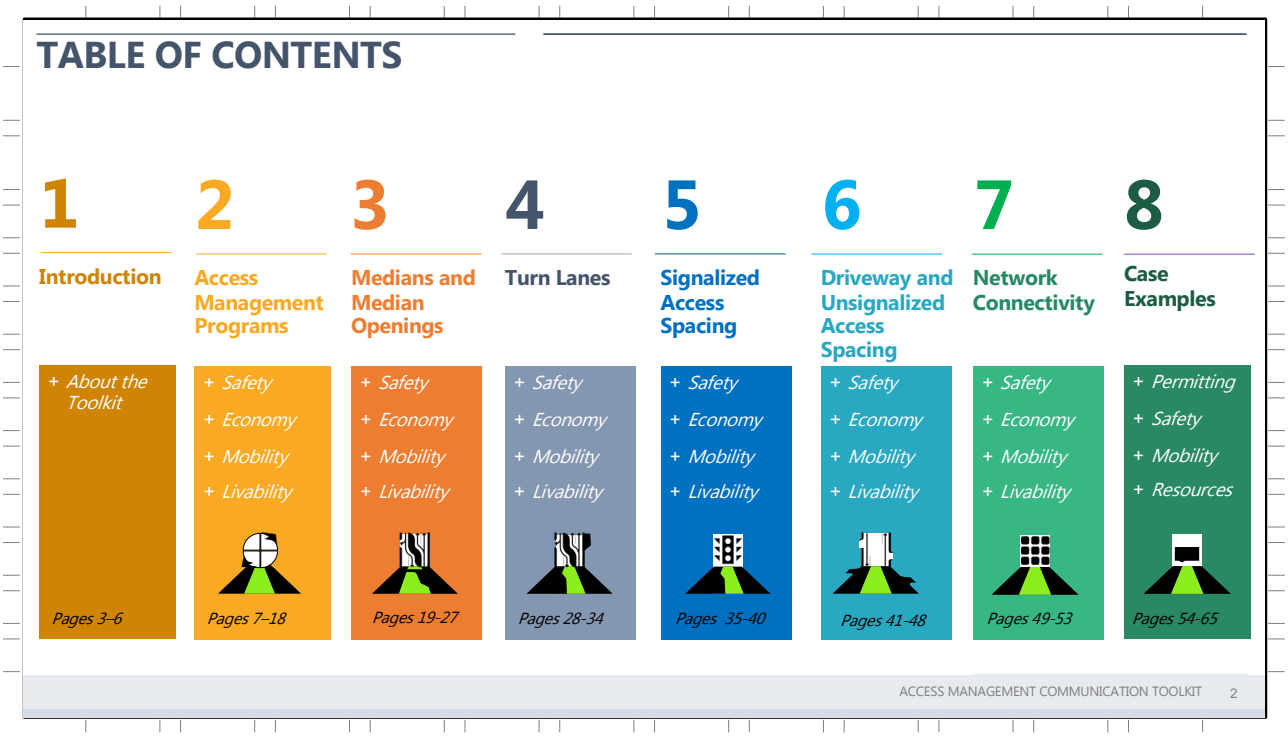
Transportation Research Board
NAS-NRC
LIMITED USE DOCUMENT

Purpose: Our purpose with this project is to gather the research on access management that pertains to benefits and costs to society and distill it in a way that helps you, the user, clearly communicate those benefits and costs.

Key Message: Access to the transportation system takes the form of driveways, intersections, medians, signals and turn lanes. All of these have attributes that can be expressed in terms of benefits or costs (B/C). Some can be quantified, whereas others are more qualitative or cannot yet be quantified.

Outcomes: By the time you complete this presentation you will:

1) Understand the topics covered by the toolkit.
2) Be able to locate the tools you want to use.
3) Understand the basis, application and limitations of the tools.
4) Communicate the results of those tools in terms of B/C.

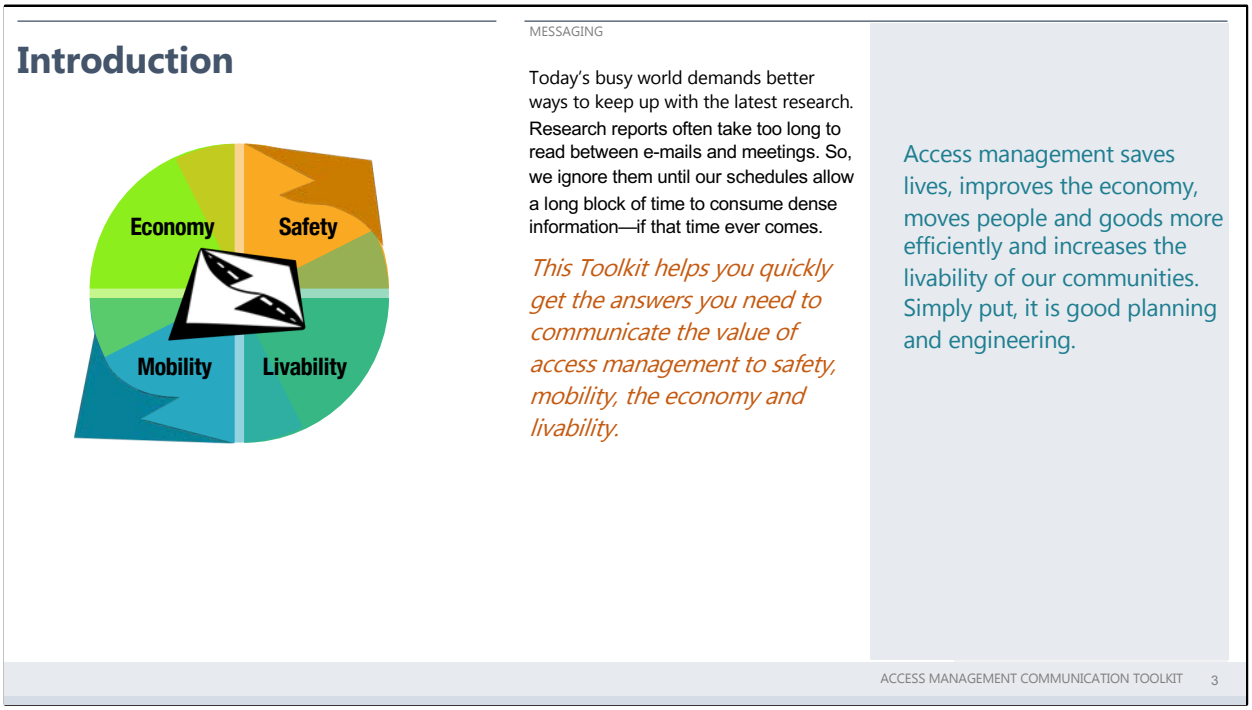


Purpose: The purpose of this slide is to introduce the contents of the toolkit.

Key Message: The various tools have been developed separately through many research efforts. In this training you will learn how to tie them together into one compelling conversation.

Outcomes: Recognize that –
1) There are 8 sections in the Toolkit.
2) Section 1 covers the organization and use of the Toolkit.
3) Sections 2 – 7 cover the various components for which research exists and each component is explained as B/C and in terms of Safety, Economy, Mobility, and Livability.
4) Section 8 presents case studies that tie together the contents of Sections 2 – 7.

Suggestion: This would be a good place to point out that each of these sections include both quantitative and qualitative elements of B/C. Often it's the qualitative examples and messages that are most compelling to non-technical audiences and quantitative measures that are most compelling to technical audiences.

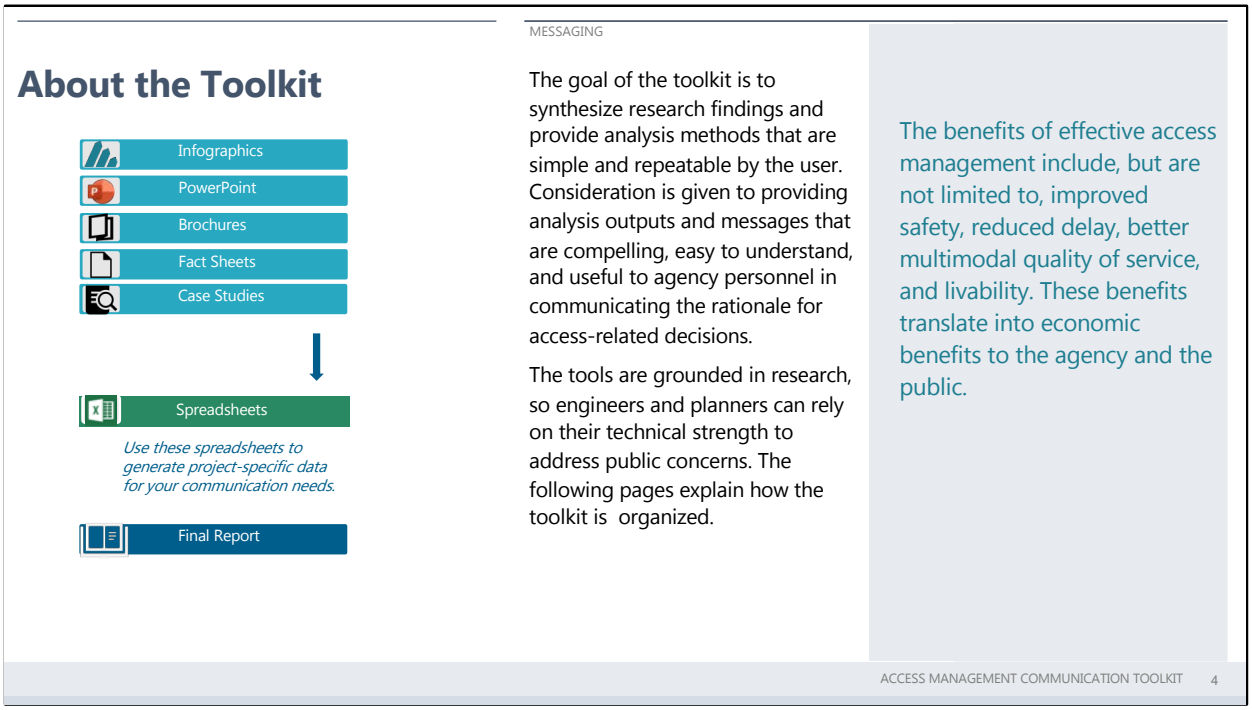


Purpose: The purpose of this slide is to tie ALL of the various research papers and reports into one easy-to-use guide.

Key Message: The goal of this guide is to give the user tools that tie the four pillars of safety, economy, mobility, and livability together, and discuss both the qualitative and quantitative B/C with an audience.

Outcomes: Recognize that –
1) The goal of this Toolkit is to provide the user with graphical visualizations of complex concepts.
2) The goal of this slide-deck is to provide the user with targeted messages focused upon B/C.
3) No two situations or audiences will be the same, and no two audiences will respond to the same messaging.

Suggestion: It is suggested that you highlight the need for target audience analysis so that messaging will be meaningful to the audience you're addressing. Keep in mind that answering "what's in it for me" is on the mind of the target audience.

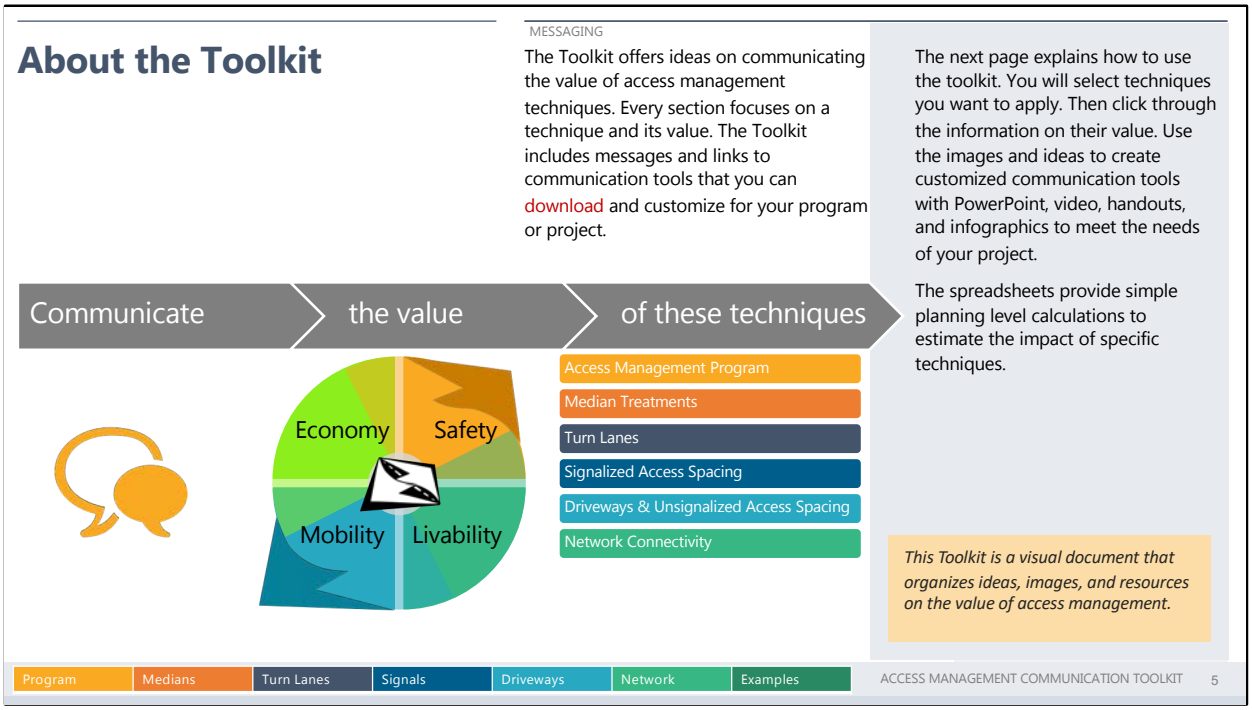


Purpose: The purpose of this slide is to explain the various resources within the toolkit available to the user.

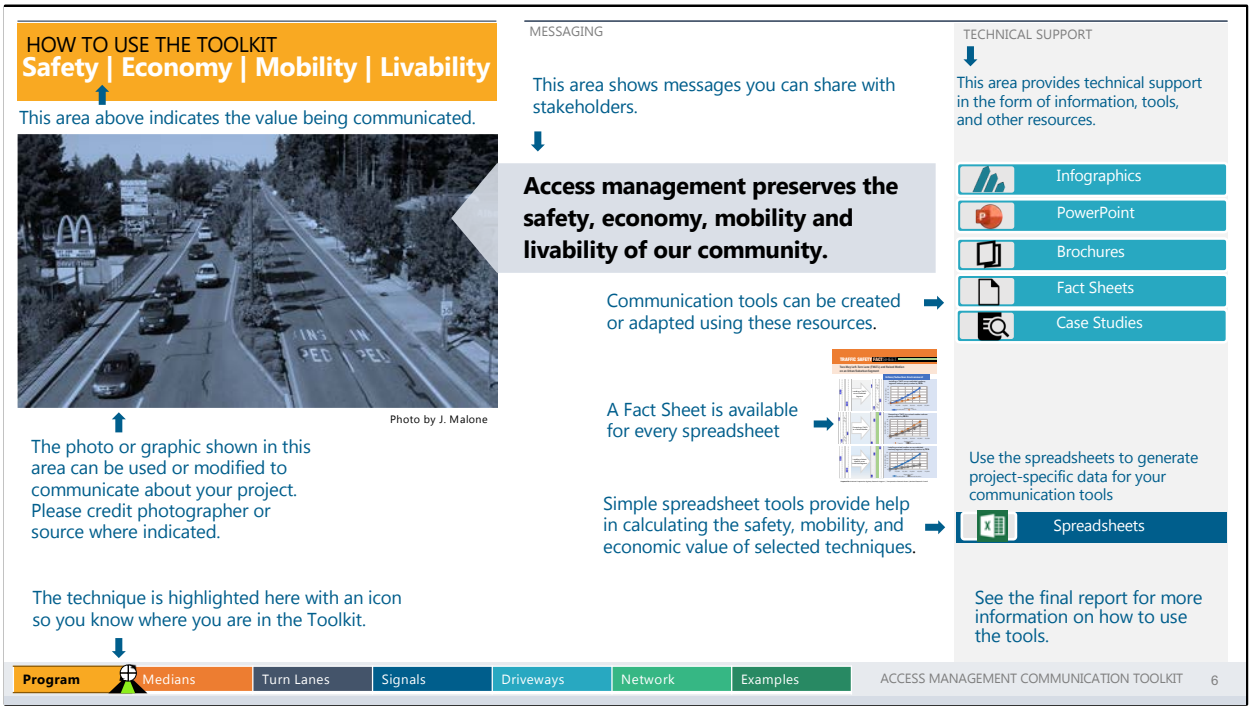
Key Message: The various resources available to the user (shown on the left side of the screen). These tools and resources may be selected as appropriate to serve the target audience.

Outcomes: Recognize that –
1) Resources such as Infographics and Brochures may be more suitable to non-technical audiences.
2) Resources such as the report, fact sheets and spreadsheet tools are more suitable to technical audiences.
3) The spreadsheet tools are, by their very nature, keyed to the quantitative research.

Suggestion: An explanation that the resources are all intended to convey the B/C elements of access management and are intended to be adaptable to any audience or situation might be appropriate.



No Trainer/Speaker Notes Required

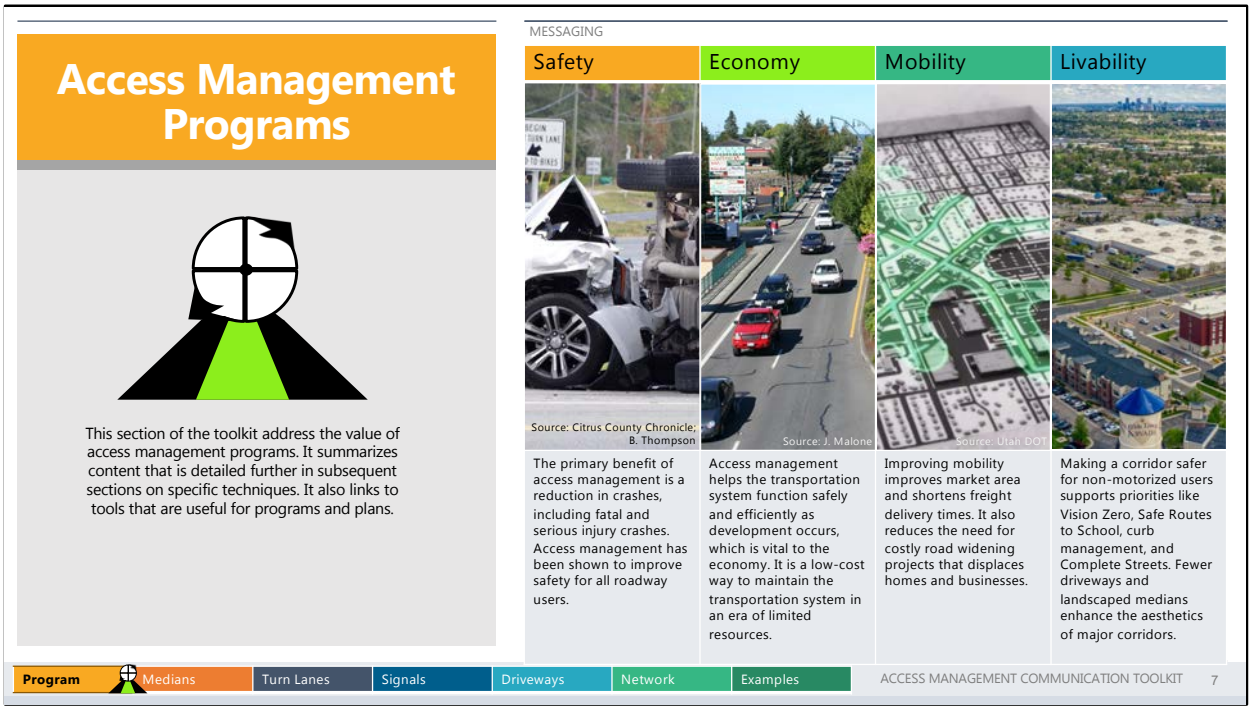


Purpose: The purpose of this slide is to walk through how the document pages are organized.

Key Message: There are links throughout the Toolkit that will allow you to access the platforms associated with that material.

Outcomes: Recognize that –
1) Where a technique is highlighted the value is shown in the middle.
2) A graphic is shown that supports the message you can share using the communication tools that are linked.
3) Where spreadsheets are available you can use them to customize the tools to your situation and the references are shown to supporting research.

Suggestion: It is advisable to play with the links and demonstrate the interoperability of the toolkit.

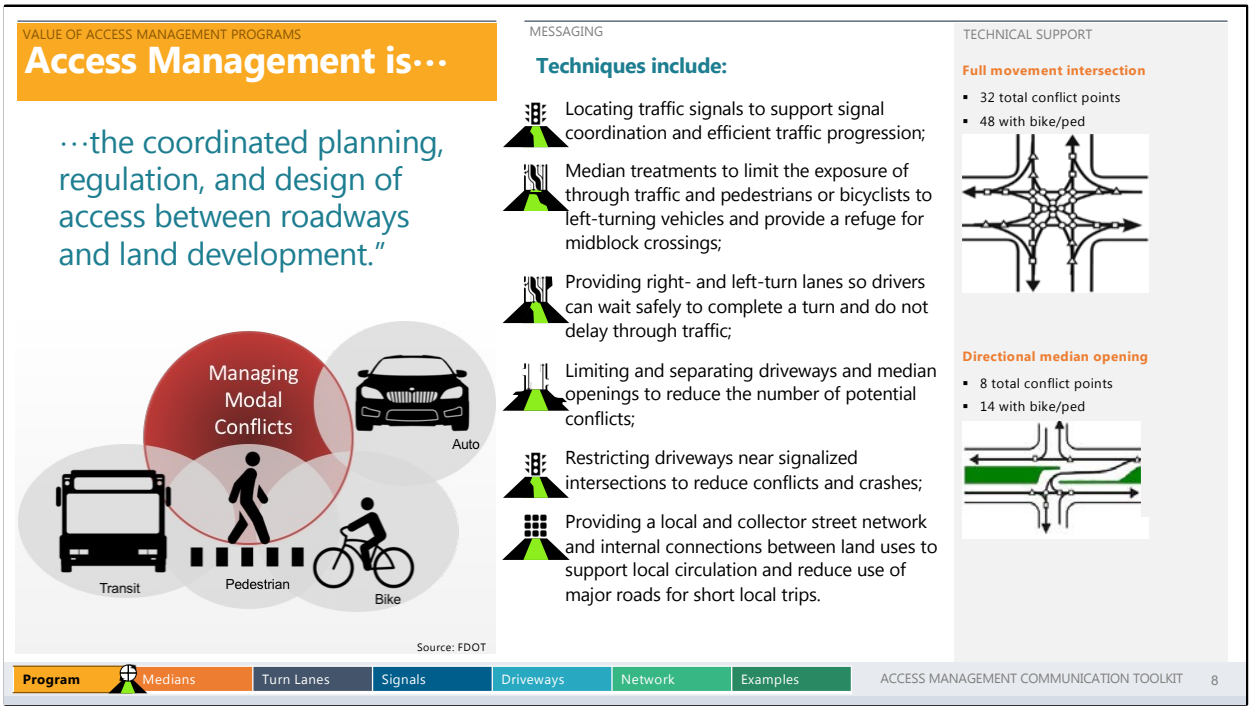


Purpose: The purpose of this slide is to introduce the four pillars of the Toolkit.

Key Message: There are elements of safety, economy, mobility, and livability that are a combination of qualitative and quantitative factors and are all applicable in most any scenario.

Outcomes: Recognize that –
1) Implementation of good access management produces benefits
2) Implementation of poor access management produces costs
3) This Toolkit gives the user a large number of alternatives to explore comparing relative benefits.

Suggestion: Explain that there are very few aspects of surface transportation or property development that do not incorporate access management in some way. Point to the section on Comprehensive Access Management Programs in the final report. Highlight the communication strategies mentioned for freight, retail businesses and other stakeholders.

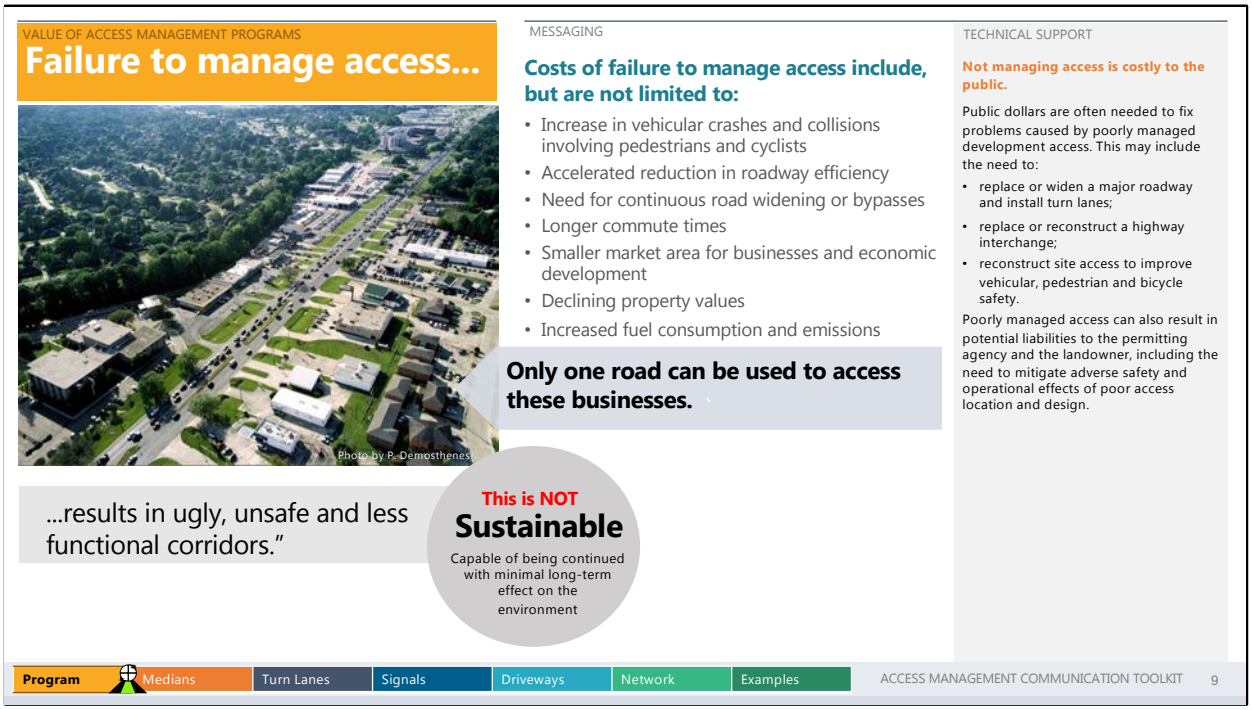


Purpose: The purpose of this slide is to define access management and list some of the primary examples of access management that will result in benefits to the public.

Key Message: The three foundational purposes of access management are to: reduce conflict points, separate conflict areas, and manage speed differential.

Outcomes: Recognize that –
1) Reduction of conflict points is behind managing the number of intersections and driveways, but also the configuration of medians.
2) Separation of conflict areas is behind managing the location of intersections and driveways, but also applied to network and separation of motorized and non-motorized users.
3) Management of speed differential is behind turn lanes, but also applies to the breaking of medians, control of intersections, and provision of supporting network.

Suggestion: Ask participants for examples of access management and its value.



Purpose: The purpose of this slide is to introduce the concept that failure to implement access management results in costs to the public.

Key Message: One of the most common sources of resistance to implementing access management is that it often shifts more costs to private developers by making access to a property less convenient or more expensive to construct.

Outcomes: Recognize that –
1) Opting for the least expensive/most convenient access will have costs to the public.
2) Research shows that the number of driveways has no measurable impact on sale price of property.
3) Balancing the private costs of development with the public costs of poor access management is situationally specific.

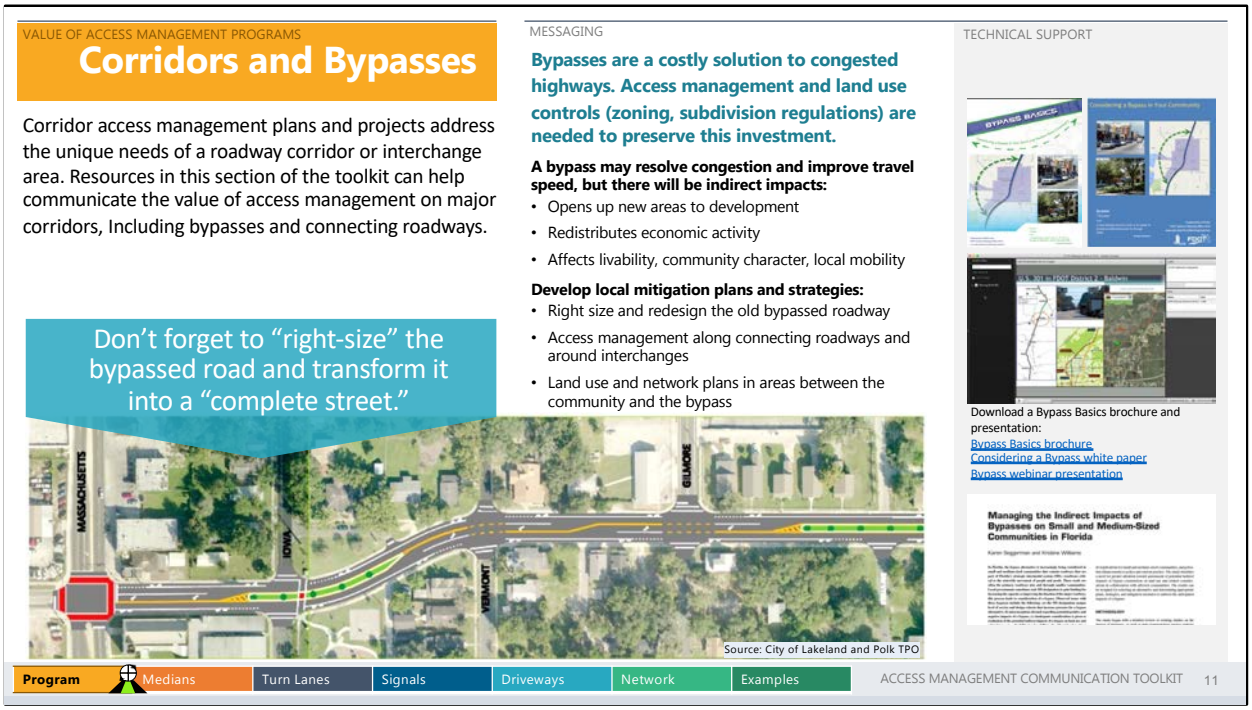
Suggestion: None.

Purpose: The purpose of this slide is to introduce the importance of a comprehensive approach to access management.

Key Message: There are few elements of surface transportation that do not touch upon access management. Full value of benefits to the public will not be realized without a comprehensive approach.

Outcomes: Recognize that –
1) Access management on the margin of the roadway depends in part upon completeness of network that provides multiple vectors of approach.
2) Access management in the median promotes safe and efficient flow of traffic, but it also provides refuge for non-motorized users and space to improve livability.
3) Management of not only the number of intersections, but also their design and control is vitally important.

Suggestion: Explain that the brochure can be downloaded and edited for use in explaining the rationale for access management programs to businesses.

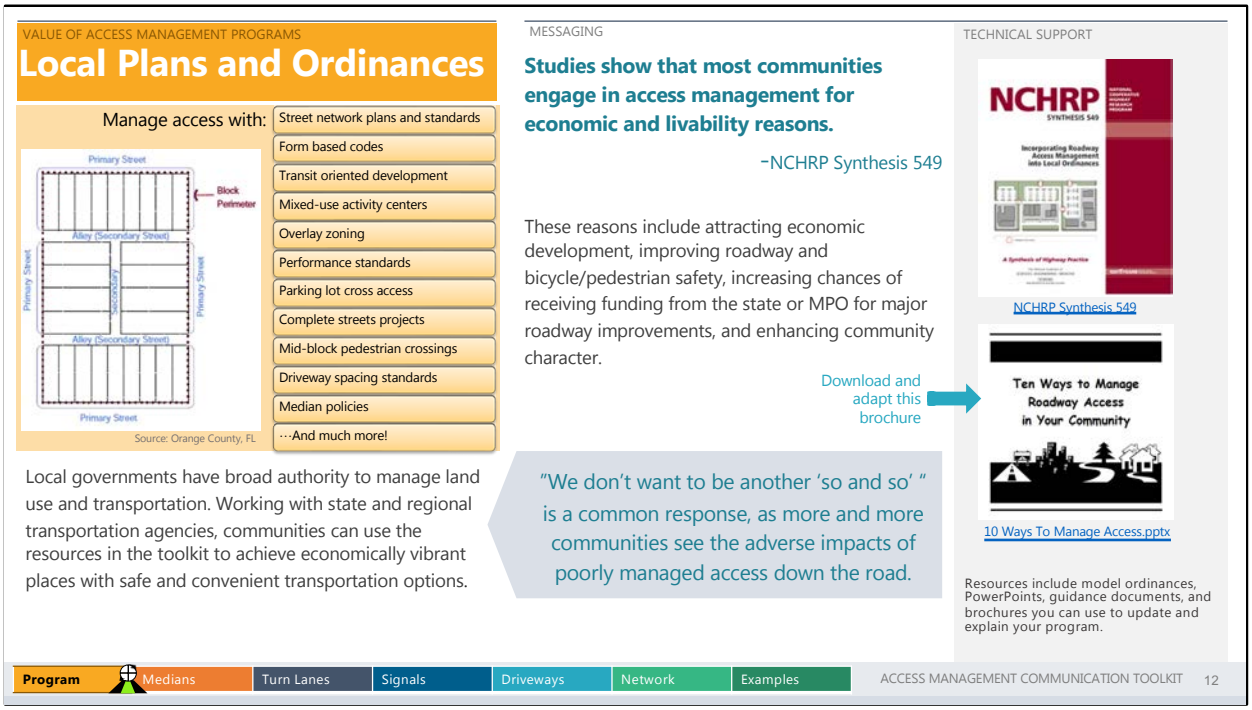


Purpose: The purpose of this slide is to highlight the concept that major capacity improvements and construction of bypasses are very costly to the public.

Key Message: Projects to restore functional losses as a result of poor access management are akin to angioplasty or heart bypass operations: they are invasive, expensive, and painful and full function can never be completely restored.

Outcomes: Recognize that –
1) Loss of function due to poor access management is also bad for business.
2) Transportation function is difficult and expensive to install, yet can be destroyed very quickly.
3) Transportation and land use exist in a supply and demand relationship just like any economic system. Unless they are balanced together neither can succeed.

Suggestion None

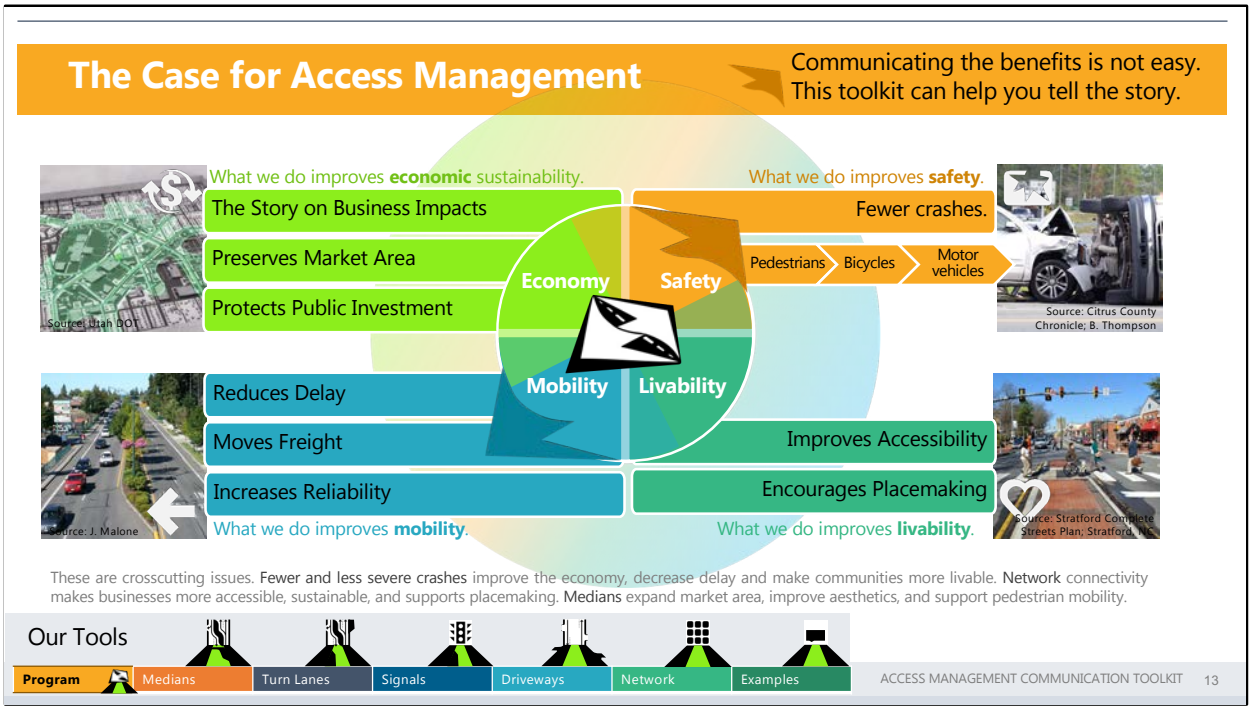


Purpose: The purpose of this slide is to highlight the value of access management to local agencies that have implemented it.

Key Message: Adopting ordinances and developing access management plans and projects is a low-cost way to improve the transportation system, and protect the livability and economy of local communities.

Outcomes: Recognize that –
1) Good planning and access management can attract investment, both public and private.
2) Driveway-ridden commercial strips are neither livable nor walkable.
3) Preventing these problems before they occur can save money.
4) Access management can support many different local planning objectives, including complete streets and placemaking.

Suggestion This would be a good time to explore some of the resources for local governments.



Purpose: The purpose of this slide is to introduce the idea that we should tie safety, mobility, livability, and economy and we should consider the quantitative and qualitative together in access management.

Key Message: The goal of this guide is to bring together the variety of research on access management and express the concept in terms of sustaining economic activity in a safe and efficient way that recognizes the public's investment in transportation infrastructure.

Outcomes: Recognize that –
1) While the costs of crashes and loss of mobility may be indirect, they are real.
2) While often difficult to monetize, costs in terms of livability are real.
3) Management of access connections does not have a measurable impact upon property value but failing to manage access does have a measurable and negative impact upon economic value.

Suggestion: It is suggested that you highlight the distinction between SPENDING money (often for immediate gratification) and INVESTING money (often sacrificing immediate gratification for longer term returns. Access management is an INVESTMENT.

Purpose: The purpose of this slide is to underscore the fact that the body of research on the link between access management and roadway safety is indisputable.

Key Message: There is no such thing as a "safe" access connection. Anywhere conflict points and speed differential are introduced there is risk introduced along with them.

Outcomes: Recognize that –
1) The link between safety and access management is undeniable.
2) The associated costs of access/intersection driven crashes are enormous.
3) The surface transportation system is one of the most dangerous public infrastructures in the country.

Suggestion: It is suggested that you explain that crashes arising from intersections and access connections are predicable and can be monetized. Methods for doing so are explained in the final report for the research.

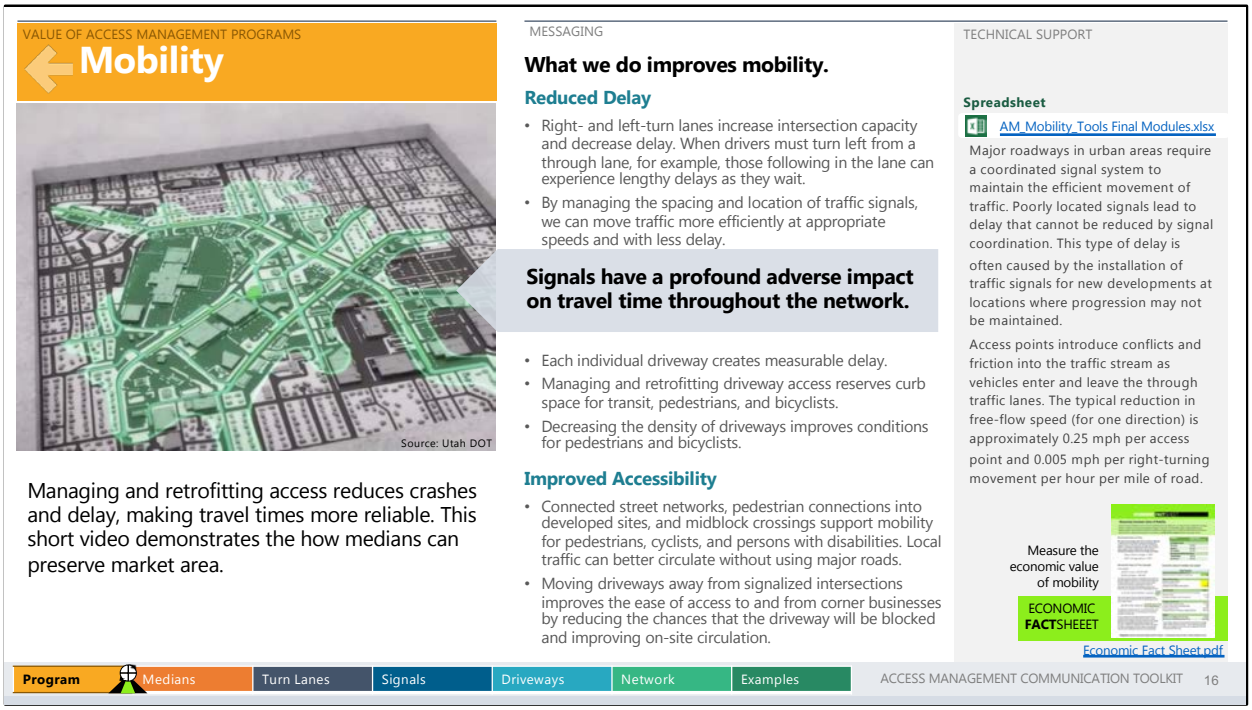
NHTSA reports that an estimated 36,120 people lost their lives in motor vehicle crashes in the U.S. in 2019 – an average of 99 people per day. Millions more people were injured or had property damage only. Many of these crashes could have been prevented through access management.

Purpose: The purpose of this slide is to introduce the fact that the costs of failing to manage access do not fall exclusively upon the public.

Key Message: In the immediate and short term the going-in costs of good access management can be much higher than direct, convenient access connection to an abutting highway. However, these benefits are ultimately outweighed by loss of mobility and market area.

Outcomes: Recognize that –
1) The goal of a property developer is sometimes to build the project as inexpensively as possible to realize the maximum profit when the property is "flipped".
2) The going-in costs of developing a property with good access management can sometimes price smaller owners out of the market.
3) Unclear or inconsistently applied access management requirements introduce risk to the development process. Risk means higher costs.

Suggestion: None



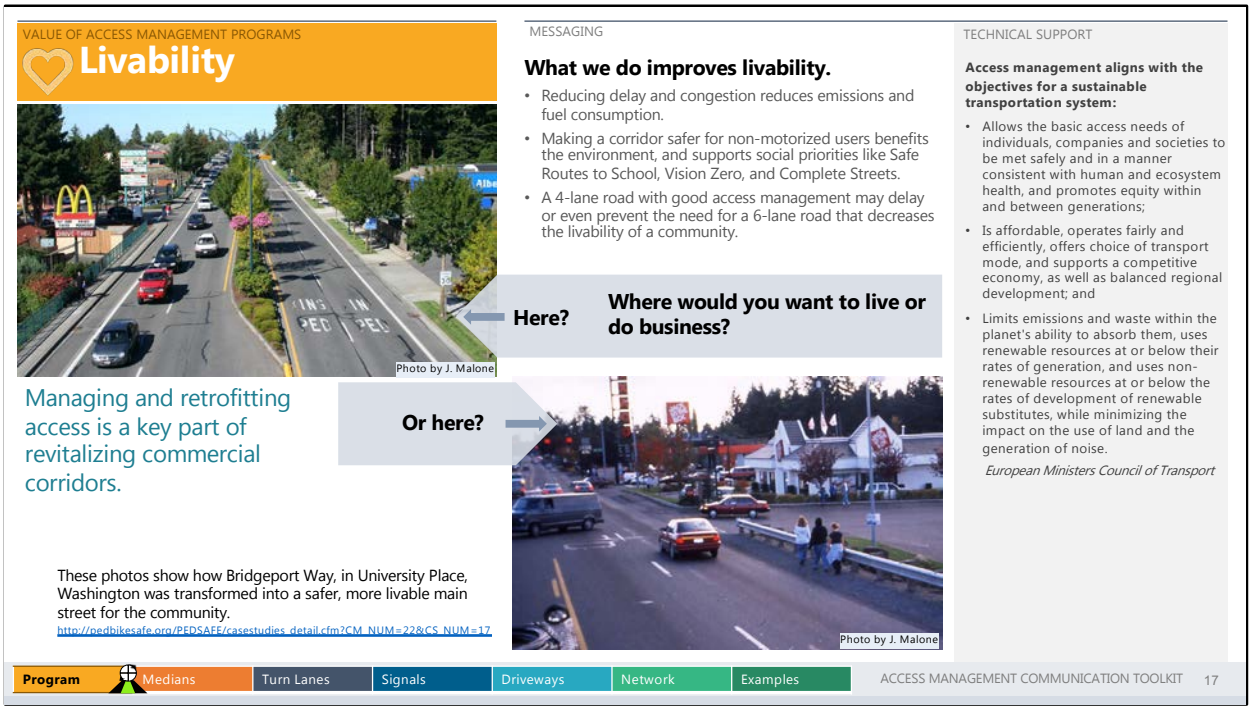
Spreadsheet

Purpose: The purpose of this slide is to introduce the fact that inefficient traffic flow with many delays and disruptions can also be monetized as a cost.

Key Message: Our goal with this guide is to give the user tools that tie the four pillars of safety, economy, mobility, and livability together, and discuss both the qualitative and quantitative B/C with an audience.

Outcomes: Recognize that –
1) The goal is not always to drive faster, but rather to get to one's destination with less delay.
2) Often our goal, therefore, is to reduce delay and manage the introduction of speed differential.
3) Often even driving a few seconds slower can get you there faster and also have a positive effect upon market area AND safety for ALL users.

Suggestion: It is suggested that you highlight the need for recognizing the functional purpose of the roadway. It is possible to realize an ideal speed AND serve the purposes of mobility and safety through good access management.

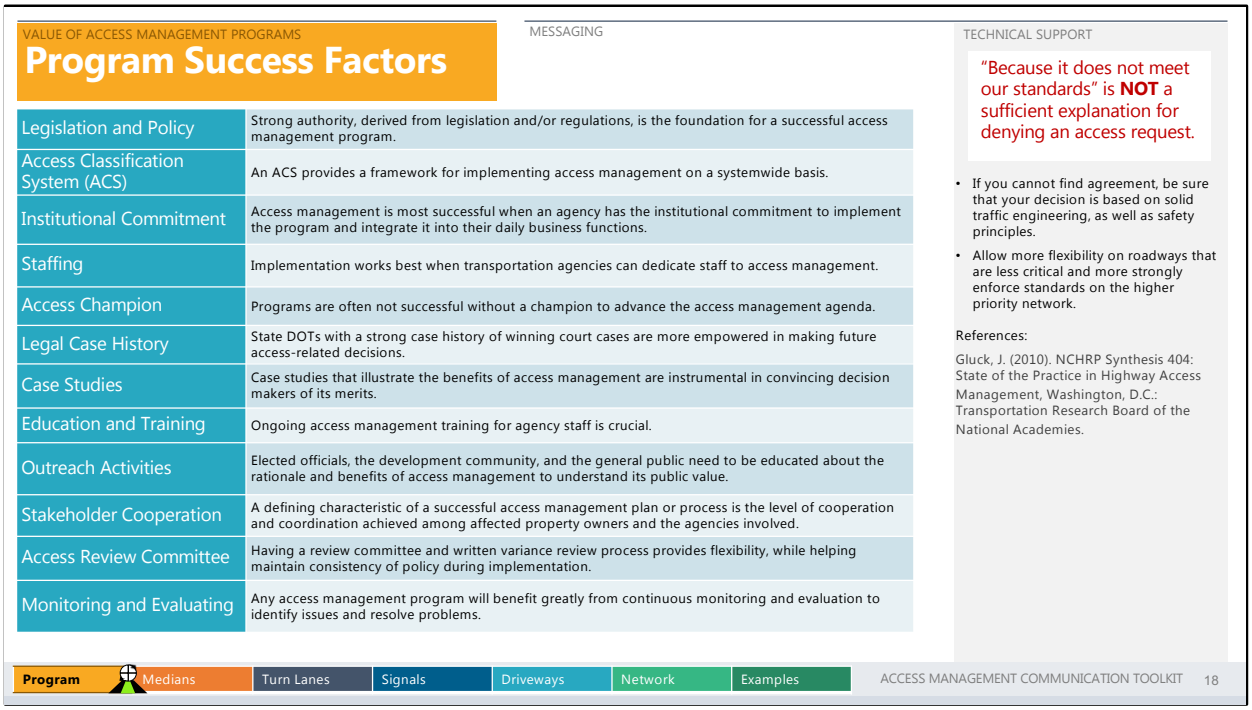


Purpose: The purpose of this slide is to acknowledge the importance of livability to many stakeholder groups. Good access management supports livability goals.

Key Message: Though often very difficult to quantify or monetize, goals, such as accommodating non-motorized facilities, architectural features, and green space, can be advanced by access management. These benefits can be compelling for local stakeholder groups.

Outcomes: Recognize that –
1) Every place you have an access connection you have declared that space for motor vehicles.
2) Every place you have an access connection you have removed ALL separation between motorized and non-motorized users of the facility.
3) Raised medians may introduce U-turns and more indirect routes, but they also provide opportunity to accommodate bicycle/pedestrian refuge and landscaping.

Suggestion: Discuss the Bridgeport Way case study.



Purpose: The purpose of this slide is to point out success factors for access management programs to be most effective in accomplishing benefits and reducing costs.

Key Message: Access management is a process, and benefits from well thought-out procedures. If access management is not properly implemented, it can lead to legal action or legislative changes that increase costs to the public.

Outcomes: Recognize that –
1) Regulatory standards, with written procedures for flexibility from those standards provide a strong foundation for success.
2) If access requests are denied or approved with changes, a clear rationale for that decision is important to acceptance. Not just because it doesn't meet standards.
3) Staff training is essential, as is ongoing monitoring for problem areas and a willingness to improve the process.

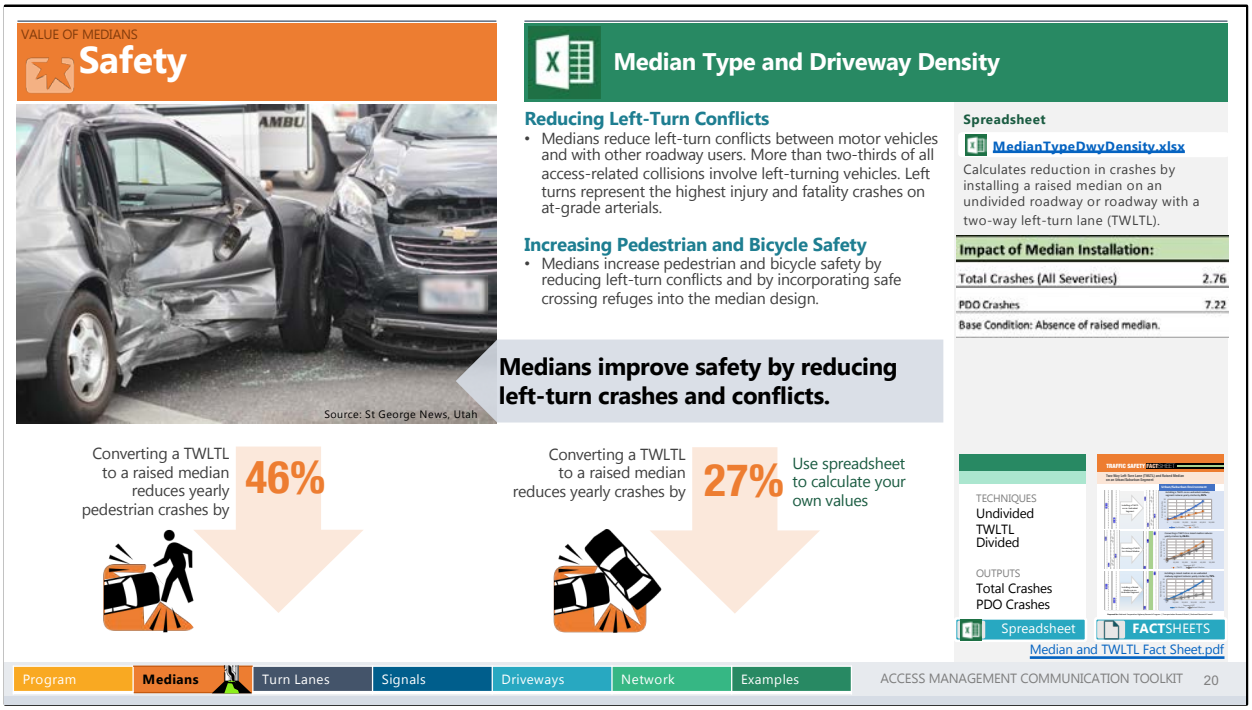
Suggestion: Discuss how to provide flexibility and consistency in application of standards. Consider why inconsistent application can create liability for the agency and/or undermine an entire program.

Purpose: The purpose of this slide is to introduce the topic of medians and median openings.

Key Message: This is one of the topic areas to be analyzed by the four pillars of safety, mobility, economy, and livability. The spreadsheets (where available) are included in the Toolkit.

Outcomes: Recognize that –
1) Medians afford a variety of benefits to the public.
2) Non-traversable medians are often opposed and/or openings demanded for convenience of access.
3) This convenience costs a great deal more in terms of delay and crashes than the small cost of adverse travel.

Suggestion: Point to the section on Medians in the final report that discusses the tools and their application.

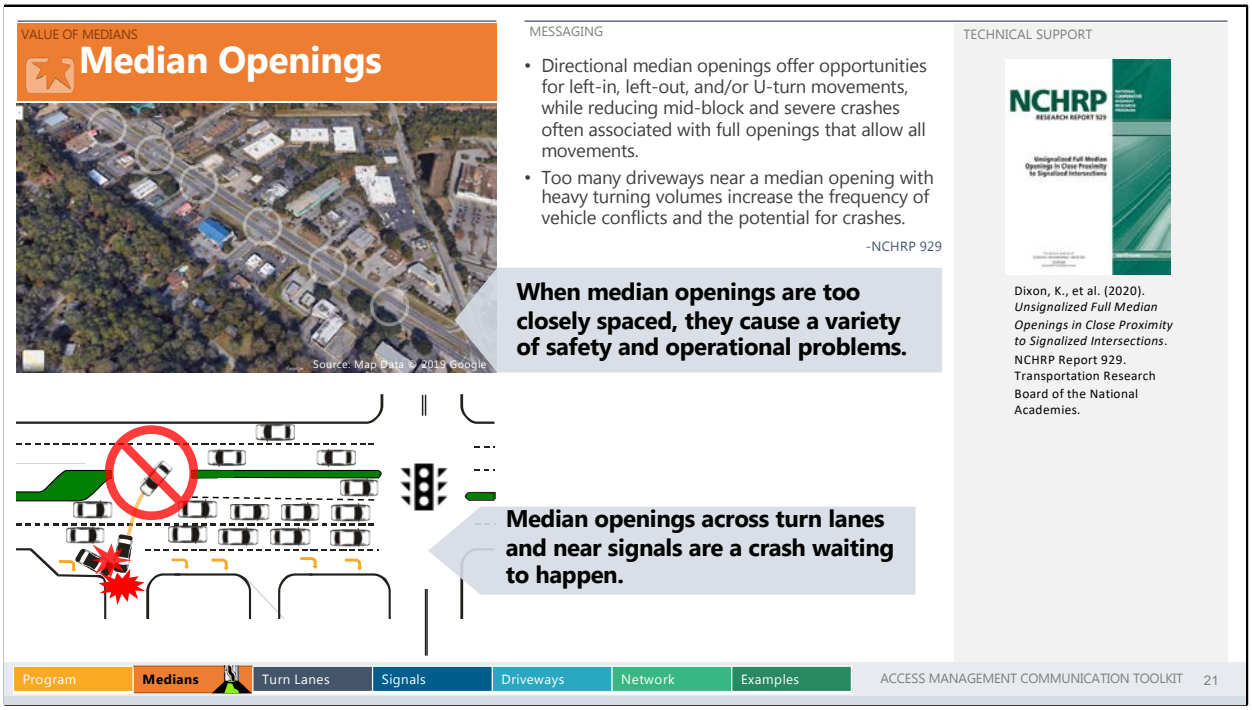


Purpose: The purpose of this slide is to introduce the spreadsheet tool for medians.

Key Message: The spreadsheets are included in the Toolkit and their use is detailed in the final report.

Outcomes: Recognize that –
1) The spreadsheet tools are based on research and users should understand their basis and any limitations (see final report).
2) A Fact Sheet is provided in the Toolkit that illustrates tool outputs.
3) The outputs show how medians benefit safety performance and the infographics in this slide and PowerPoint on the Value of Medians can be used to communicate about your project.

Suggestion: Demonstrate the MedianType.xlsx safety tool.

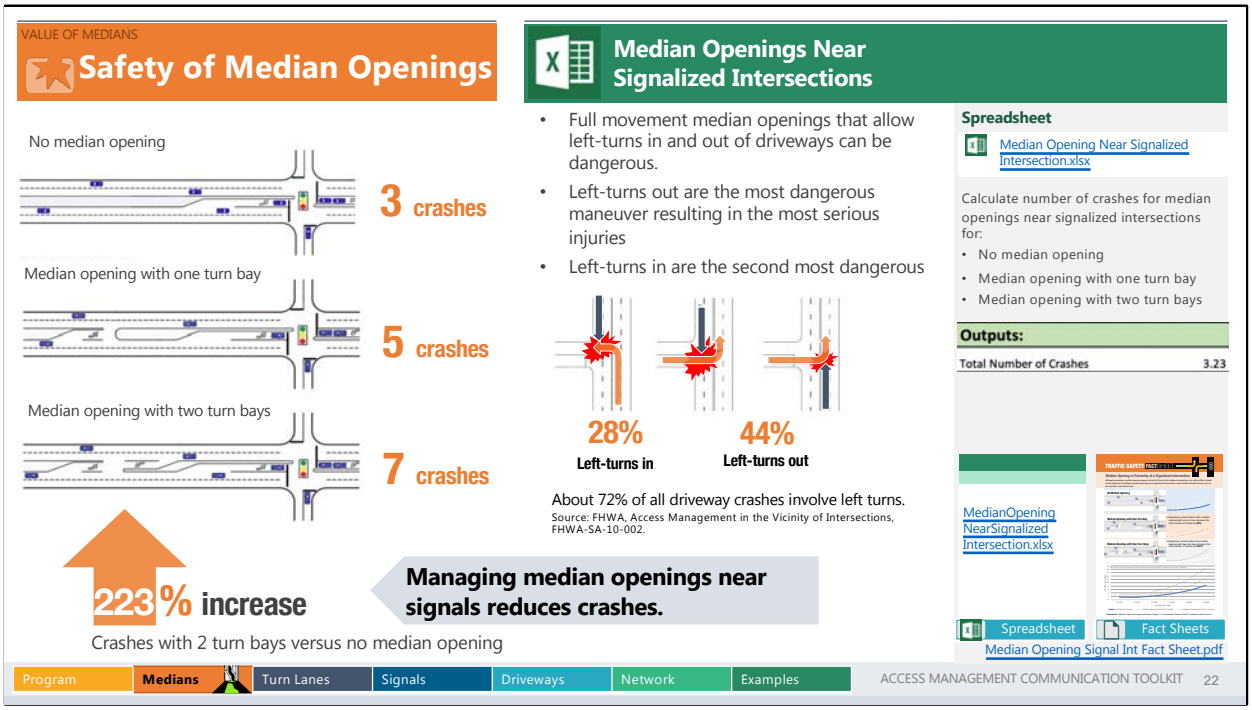


Purpose: The purpose of this slide is to introduce the safety and operational issues associated with unsignalized full median openings.

Key Message: Medians openings need to be managed or the safety performance of the medians can be compromised for the reasons shown.

Outcomes: Recognize that –
1) Research has been done to document the problems with unsignalized medians openings close to signalized intersections.
2) The results of this research are integrated into a spreadsheet tool.

Suggestion: See next slide.

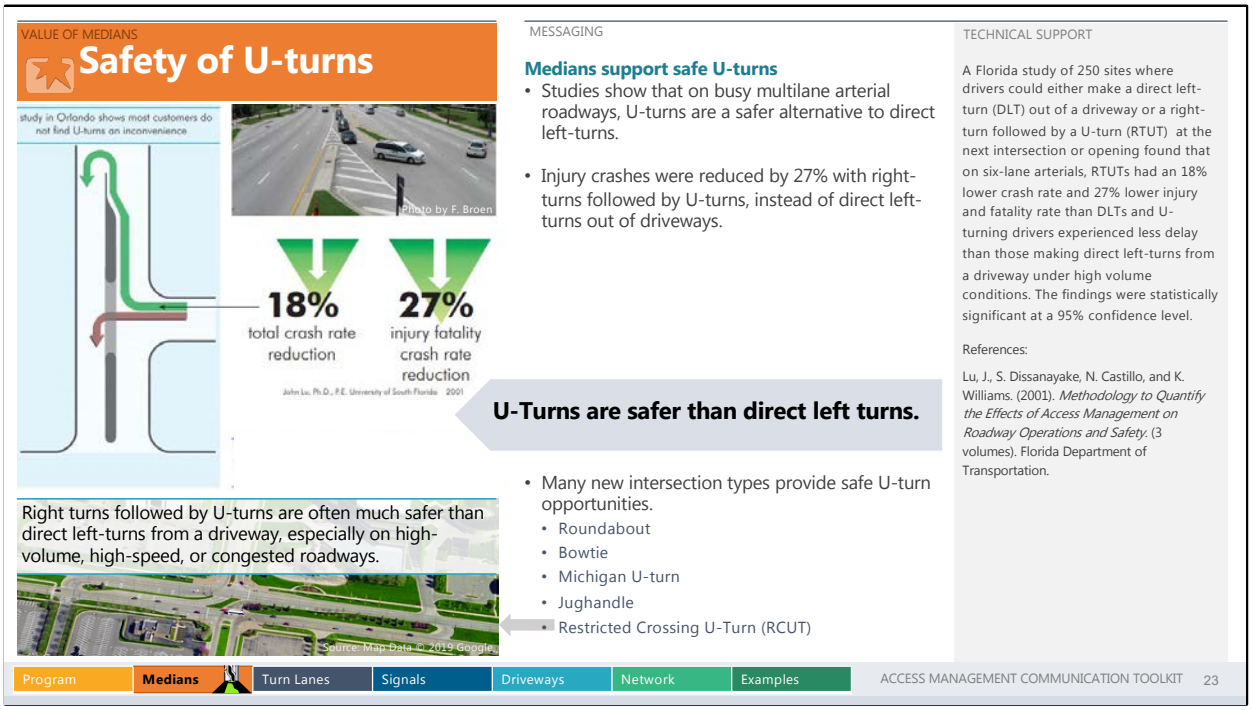


Purpose: The purpose of this slide is to introduce the spreadsheet tool for median openings near signalized intersections.

Key Message: The spreadsheets are included in the Toolkit and their use is detailed in the final report.

Outcomes: Recognize that –
1) The spreadsheet tools are based on research and information on their basis and limitations is provided in the final report.
2) A Fact Sheet is provided in the Toolkit that illustrates tool outputs.
3) The outputs show how median openings and turn bays too close to signalized intersections adversely impact safety performance.
4) The infographics in this slide and PowerPoint on the Value of Medians and Median Openings can be used to communicate this issue.

Suggestion: Demonstrate the MedianOpeningNearSignalizedIntersection.xlsx tool.



Purpose: The purpose of this slide is to introduce the topic of U-turn safety.

Key Message: Opponents of medians may question the safety of U-turns. Research shows the safety value of U-turns over direct left turns from driveways.

Outcomes: Recognize that –
1) U-turn safety is a topic that often needs to be communicated.
2) This slide and the research it references can help communicate that U-turns are often safer than direct left turns from driveways.
3) Unsafe U-Turn locations will be signed no U-turn.
4) The information in this slide and PowerPoint on the Value of Medians and Median Openings can be used to communicate this issue.

Suggestion: Mention that many new intersection types can accommodate U-turns safely, including roundabouts and Restricted Crossing U-turn openings.

Purpose: The purpose of this slide is to introduce the economic value of safety associated with medians.

Key Message: The cost to society of crashes is a metric that can help demonstrate the economic value of median projects to society.

Outcomes: Recognize that –
1) A spreadsheet tool is included in the Toolkit for this purpose and is detailed in the final report.
2) The spreadsheet tools are based on research and users should understand their basis and any limitations.
3) A Fact Sheet is provided in the Toolkit that illustrates the tool calculations and outputs.
4) The value of human life and limb is much more than that of the convenience of or desire for a direct left turn into one's business.
5) The tool outputs and messages can be used to communicate the value of medians.

Suggestion: Demonstrate the Safety and Mobility Economic Value.xls spreadsheet tool. Use of the tool to estimate the cost of delay will be discussed in the signal spacing module.

Purpose: The purpose of this slide is to introduce users to the mobility benefits of medians.

Key Message: Medians do improve mobility for both drivers and cyclists or pedestrians.

Outcomes: Recognize that –
1) Raised medians have mobility benefits to through traffic and to pedestrians or cyclists needing to cross a major road.
2) More advanced tools like simulation or Highway Capacity Manual methods are needed to measure the changes in vehicular delay.
3) The safety value of medians further increases their value to mobility, as crashes can cause lengthy delays.

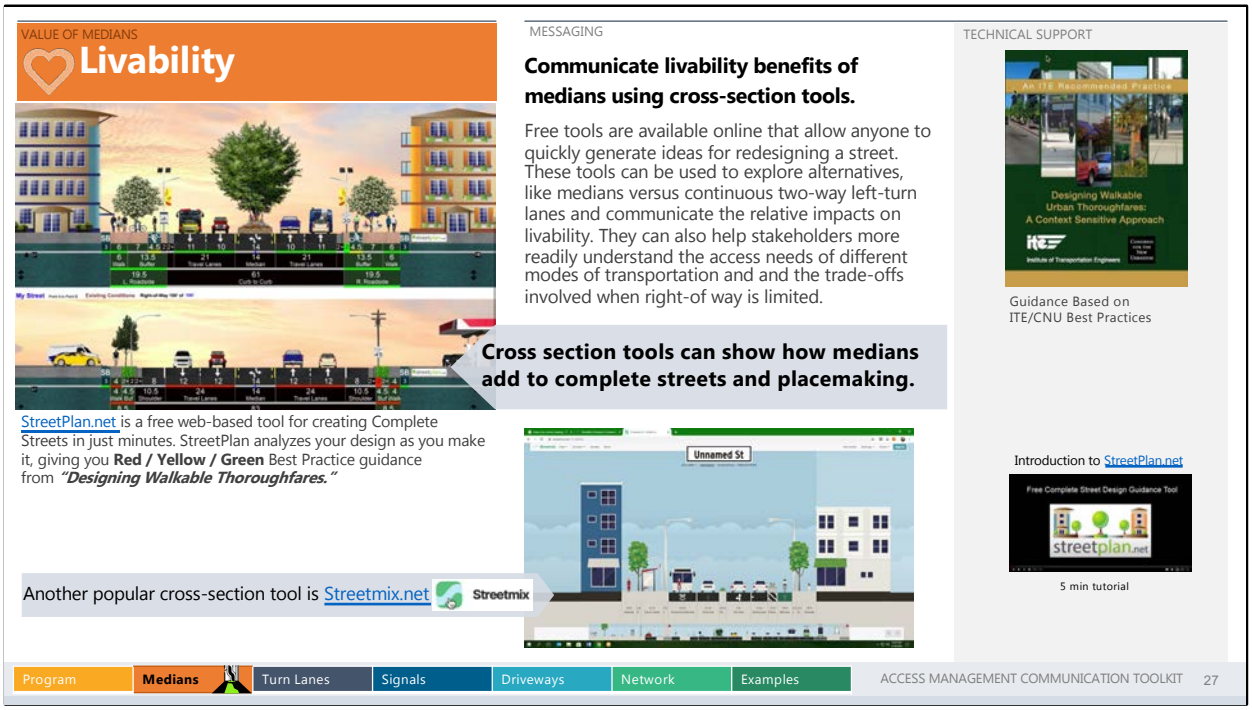
Suggestion: Refer to the final report for more details on how to measure the mobility impacts of medians.

Purpose: The purpose of this slide is to introduce users to the livability benefits of medians.

Key Message: Medians can enhance the aesthetics of any corridor or district.

Outcomes: Recognize that –
1) Raised medians have aesthetic, safety, and related indirect economic benefits, that can increase the livability of a corridor or district.
2) The livability benefits of medians can be helpful in obtaining public support for these projects.
3) A livability Fact Sheet is provided with the Toolkit to convey the benefits of medians and other access management strategies to livability.

Suggestion: Explore the contents of the Livability Fact Sheet.



Purpose: The purpose of this slide is to highlight online cross-section tools that can be used to easily visualize medians and other treatments.

Key Message: Cross-section tools can be helpful in demonstrating how medians can enhance the aesthetics of a corridor or district and contribute to Complete Streets.

Outcomes: Recognize that –
1) Easy to use tools are available online that generate conceptual cross-section designs.
2) These simple visualizations can be helpful in obtaining public support for median projects by showing their aesthetic value.
3) The tools are not provided in the toolkit, but can be accessed at the websites noted in the slide.

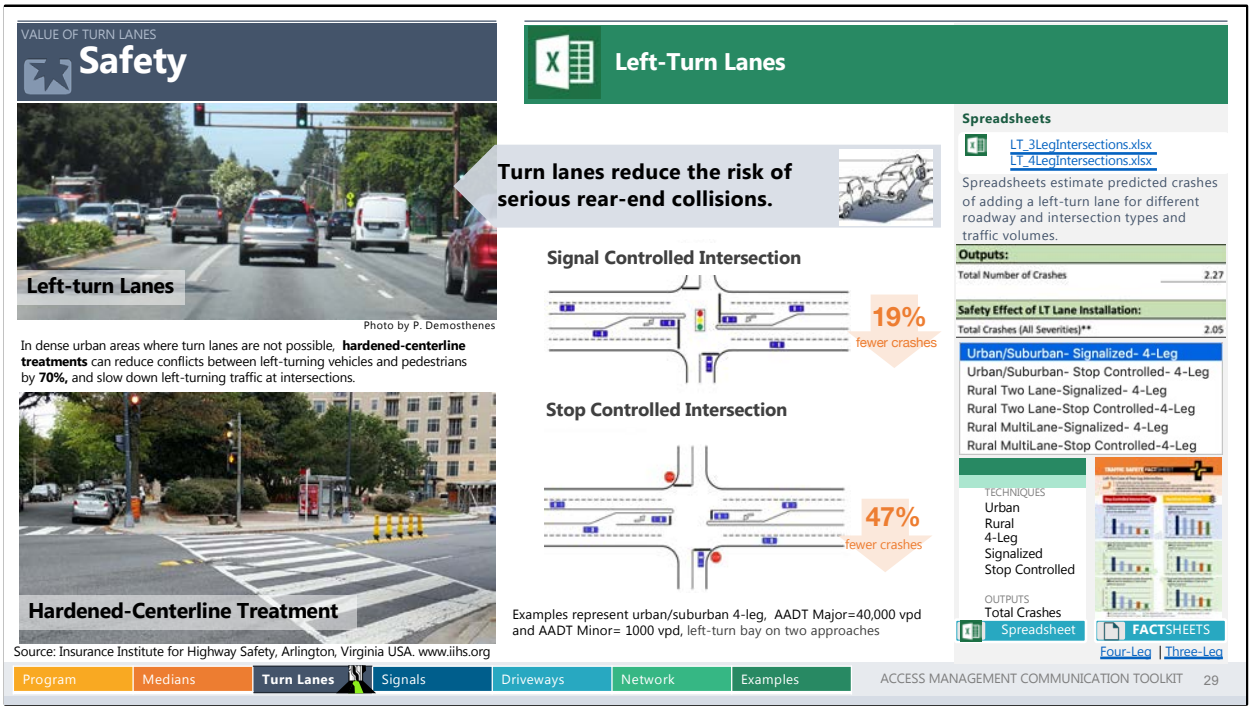
Suggestion: Demonstrate the cross-section tools.

Purpose: The purpose of this slide is to introduce the topic of turn lanes.

Key Message: This is one of the techniques to be analyzed by the four pillars of safety, mobility, economy, and livability. The spreadsheets in the Toolkit for turn lanes are discussed in this section.

Outcomes: Recognize that –
1) There are cautions and limitations to any research. The user is strongly cautioned to review the discussion of limitations found in the documentation.
2) Turn lanes can be very expensive to install but are very effective at reducing speed differential, which ties safety and mobility together.
3) Turn lanes can pose issues for bicyclists and pedestrians, and these effects should be weighed against benefits to motor vehicles.

Suggestion: None.



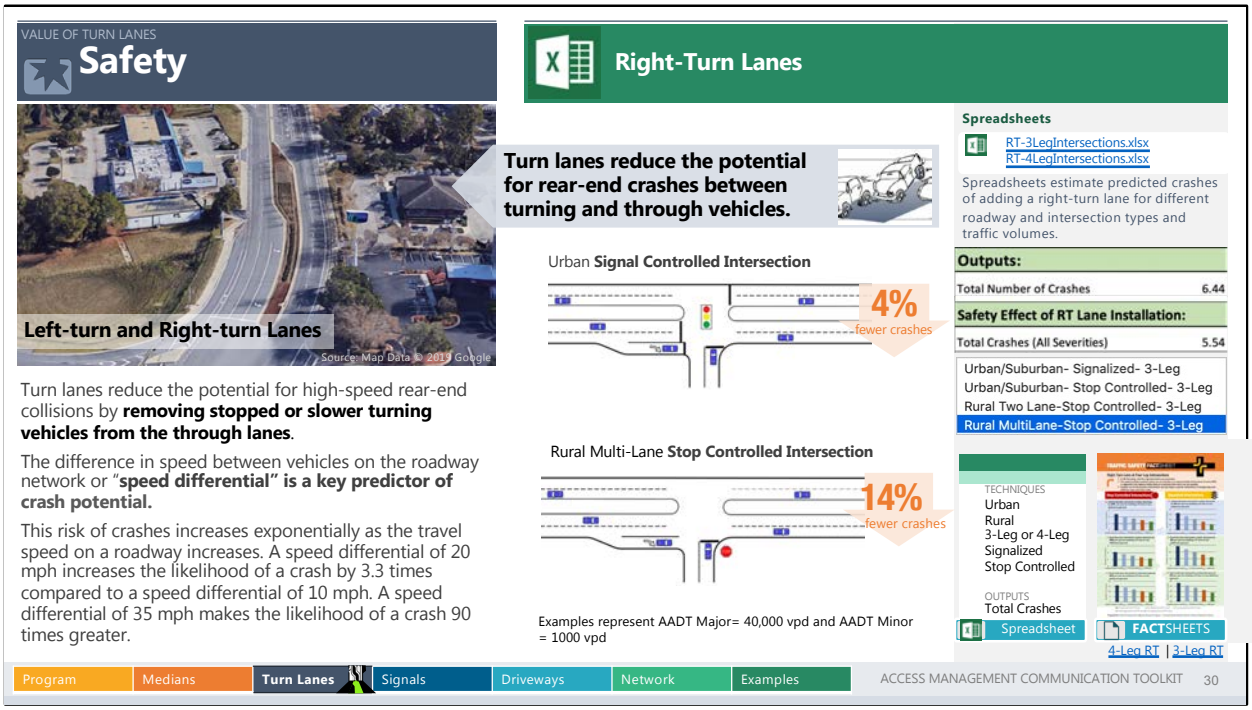
Purpose: The purpose of this slide is to introduce the safety implications of turn lanes and the left-turn lane safety spreadsheet tools.

Key Message: The difference in speed between turning and through vehicles creates a crash risk that can be moderated by installation of left-turn lanes.

Outcomes: Recognize that –

1) The spreadsheet tools are based on research and users should understand their basis and any limitations (see final report).
2) Two tools are included in your Toolkit (LT-3LegIntersections.xlsx, LT-4LegIntersections.xlsx) for use in estimating crash reduction of providing a left-turn lane(s) at three-leg intersections or four-leg intersections.
3) Two Fact Sheets are provided in the Toolkit that illustrate the tool calculations and outputs.
4) The tool outputs and messages here can be used to communicate the value of turn lanes.

Suggestion: Demonstrate the spreadsheet tools.



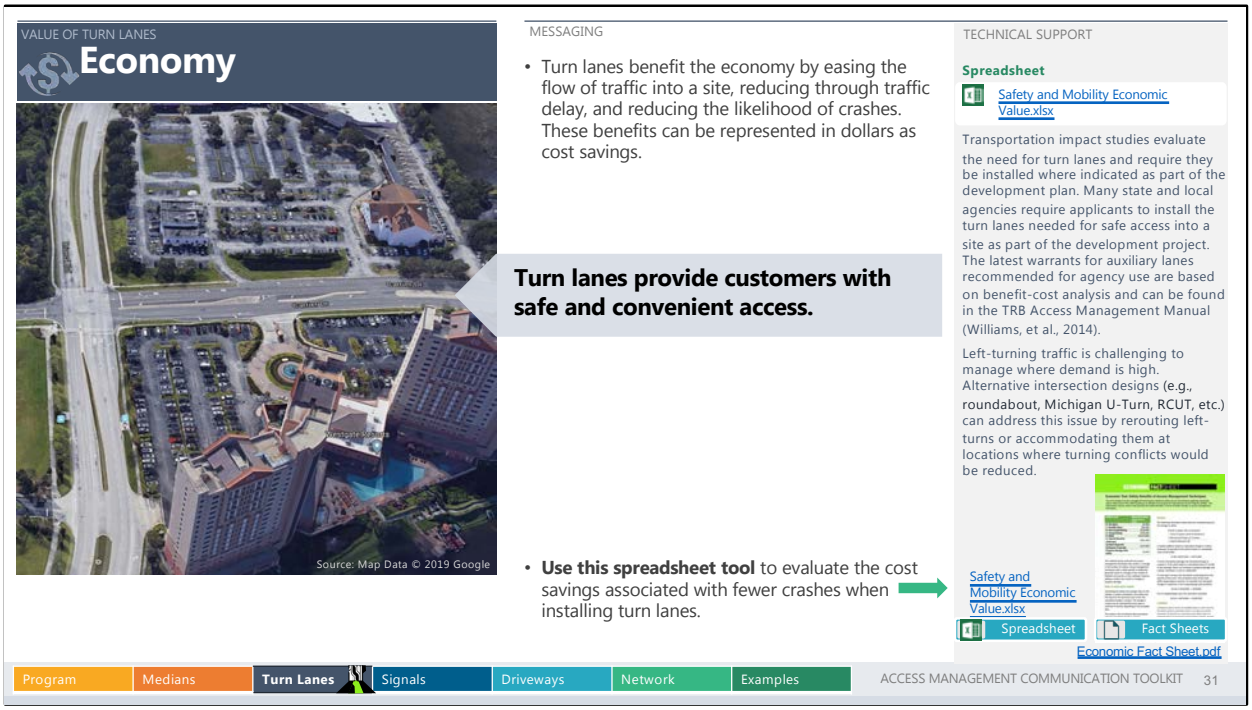
Purpose: The purpose of this slide is to offer additional details on the safety implications of turn lanes and introduce the right-turn lane safety spreadsheet tools.

Key Message: The difference in speed between turning and through vehicles creates a crash risk that can be moderated by installation of right-turn lanes.

Outcomes: Recognize that –

1) The spreadsheet tools are based on research and users should understand their basis and any limitations (see final report).
2) Two tools are included in your Toolkit (RT-3LegIntersections.xlsx, RT-4LegIntersections.xlsx) for use in estimating crash reduction of providing a right-turn lane(s) at three-leg or four-leg intersections.
3) Two Fact Sheets are provided in the Toolkit that illustrate the tool calculations and outputs.
4) The tool outputs and messages here can be used to communicate the value of turn lanes.
5) More details on the tools are provided in the final report.

Suggestion: Demonstrate the spreadsheet tools. Discuss their application and limitations.

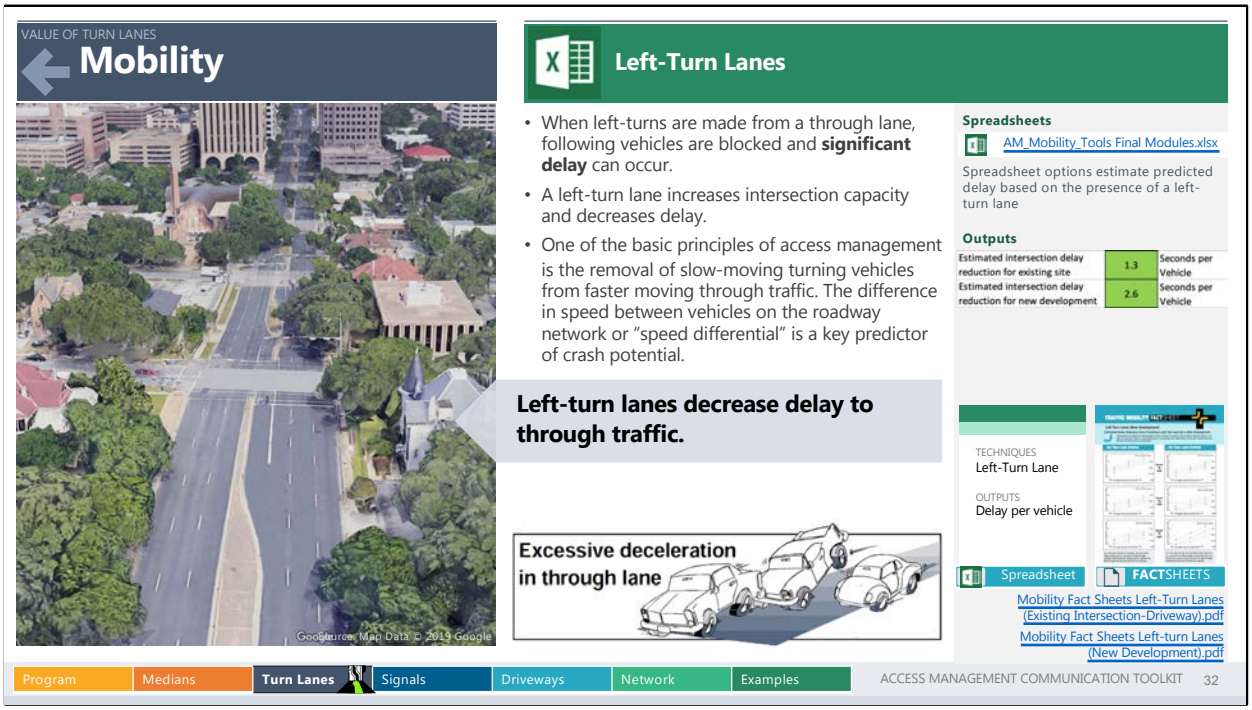


Purpose: The purpose of this slide is to introduce the economic value of turn lanes.

Key Message: The cost to society of crashes is a metric that can help demonstrate the economic value of turn lane additions to society.

Outcomes: Recognize that –
1) The spreadsheet tools are based on research and users should understand their basis and any limitations (see final report).
2) A spreadsheet tool is included in the Toolkit for this purpose and is detailed in the final report.
3) A Fact Sheet is provided in the Toolkit that illustrates the tool calculations and outputs.
4) The tool outputs and messages can be used to communicate the value of turn lanes.

Suggestion: Demonstrate the Safety and Mobility Economic Value.xls spreadsheet tool.

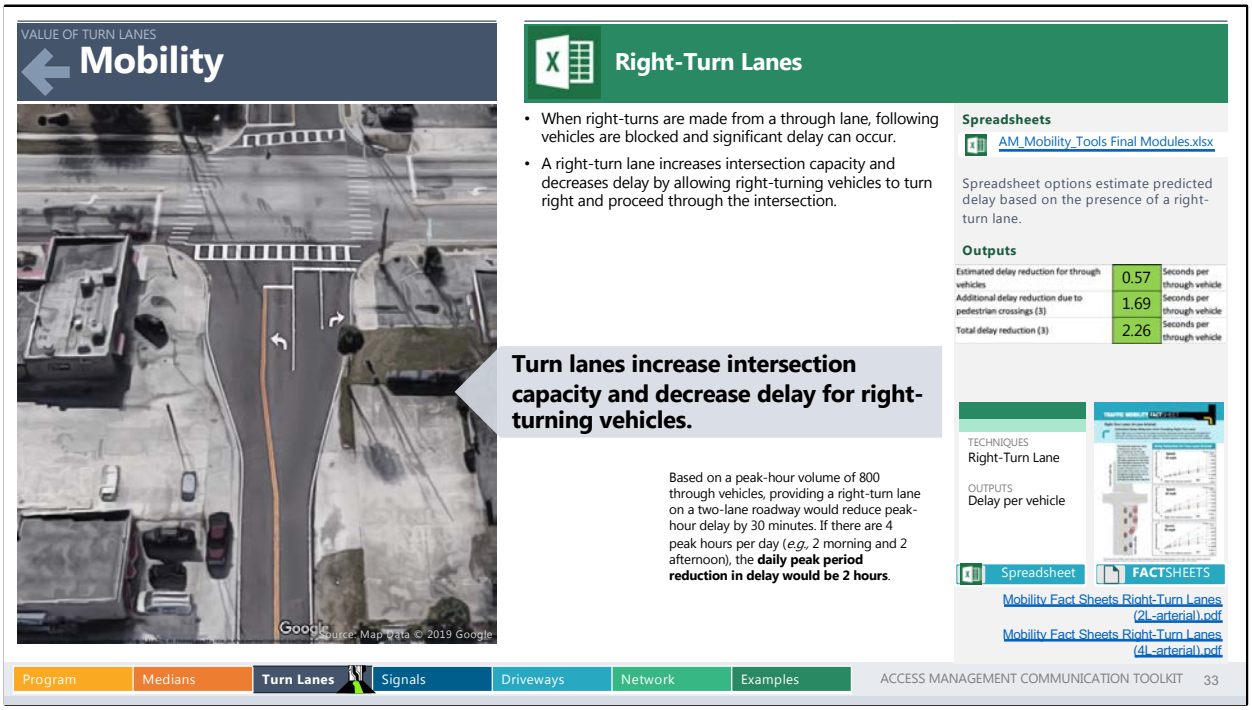


Purpose: The purpose of this slide is to introduce the mobility implications of turn lanes and the left-turn lane spreadsheet tool in the mobility module.

Key Message: Installation of left-turn lanes can increase intersection capacity and decrease delay.

Outcomes: Recognize that –
1) The spreadsheet tools are based on research and users should understand their basis and any limitations (see final report).
2) The Left-turn Lane mobility module estimates reduction in delay from adding a left-turn lane at an unsignalized intersection at an existing site and at a new development site on four-lane and two-lane arterial roadways.
3) Two Traffic Mobility Sheets are provided in the Toolkit that illustrate the tool calculations and outputs.
4) The tool outputs and messages here can be used to communicate the value of turn lanes.

Suggestion: Demonstrate the spreadsheet tools.

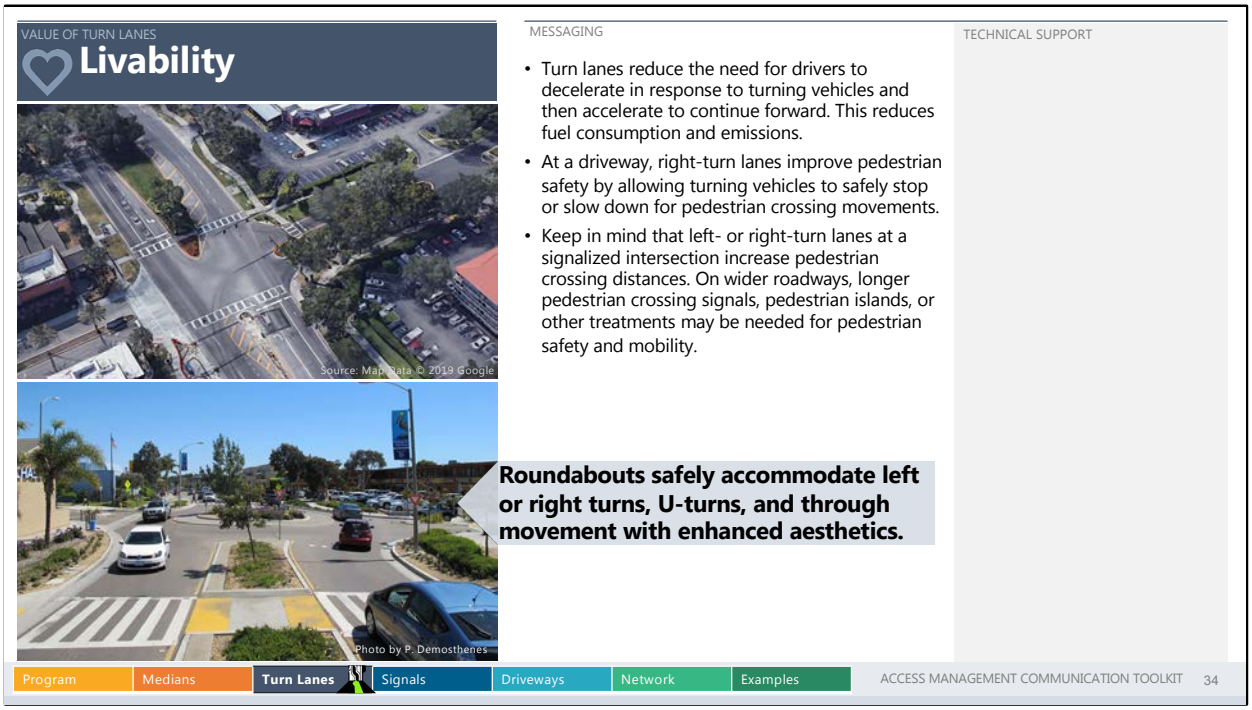


Purpose: The purpose of this slide is to introduce the mobility implications of turn lanes and the right-turn lane spreadsheet tool in the mobility module.

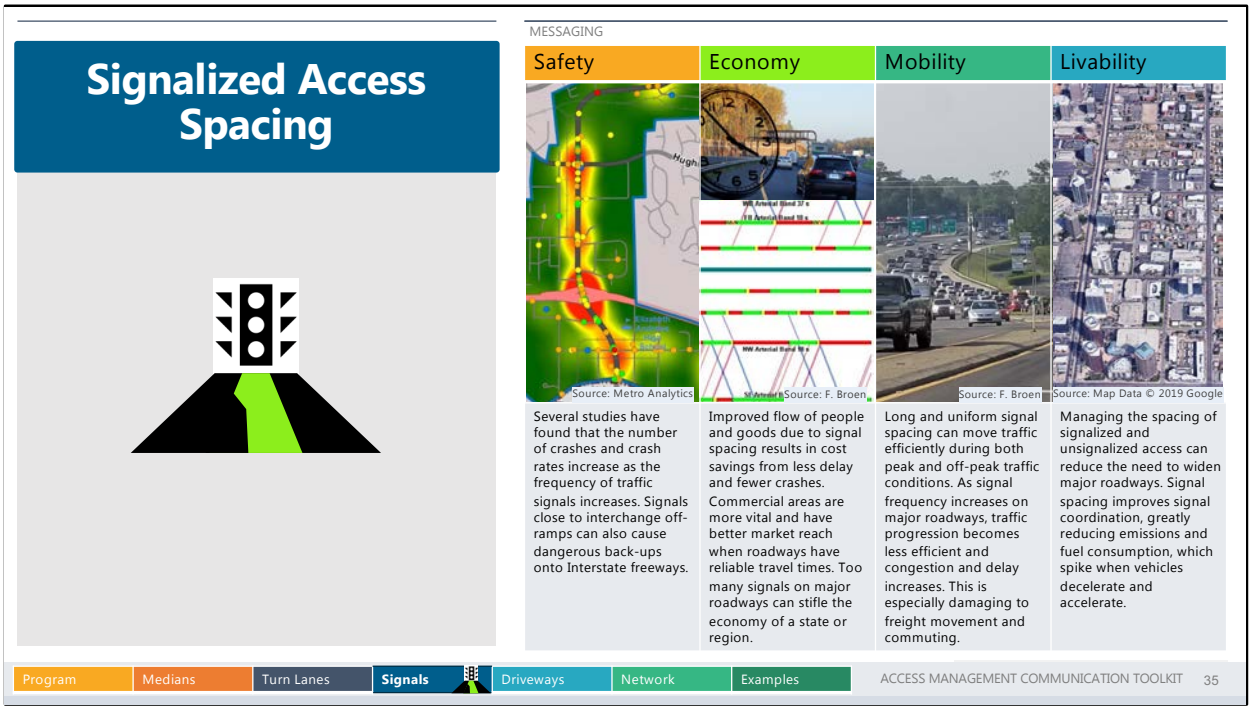
Key Message: Installation of right-turn lanes can increase intersection capacity and decrease delay.

Outcomes: Recognize that –
1) The spreadsheet tools are based on research and users should understand their basis and any limitations (see final report).
2) The Right-turn Lane mobility module estimates reduction in delay from adding a right-turn lane at an existing unsignalized intersection or one at a new development site on four-lane and two-lane arterial roadways.
3) Two Traffic Mobility Sheets are provided in the Toolkit that illustrate the tool calculations and outputs.
4) The tool outputs and messages here can be used to communicate the value of turn lanes.

Suggestion: Demonstrate and discuss the spreadsheet tools.



No Trainer/Speaker Notes Required

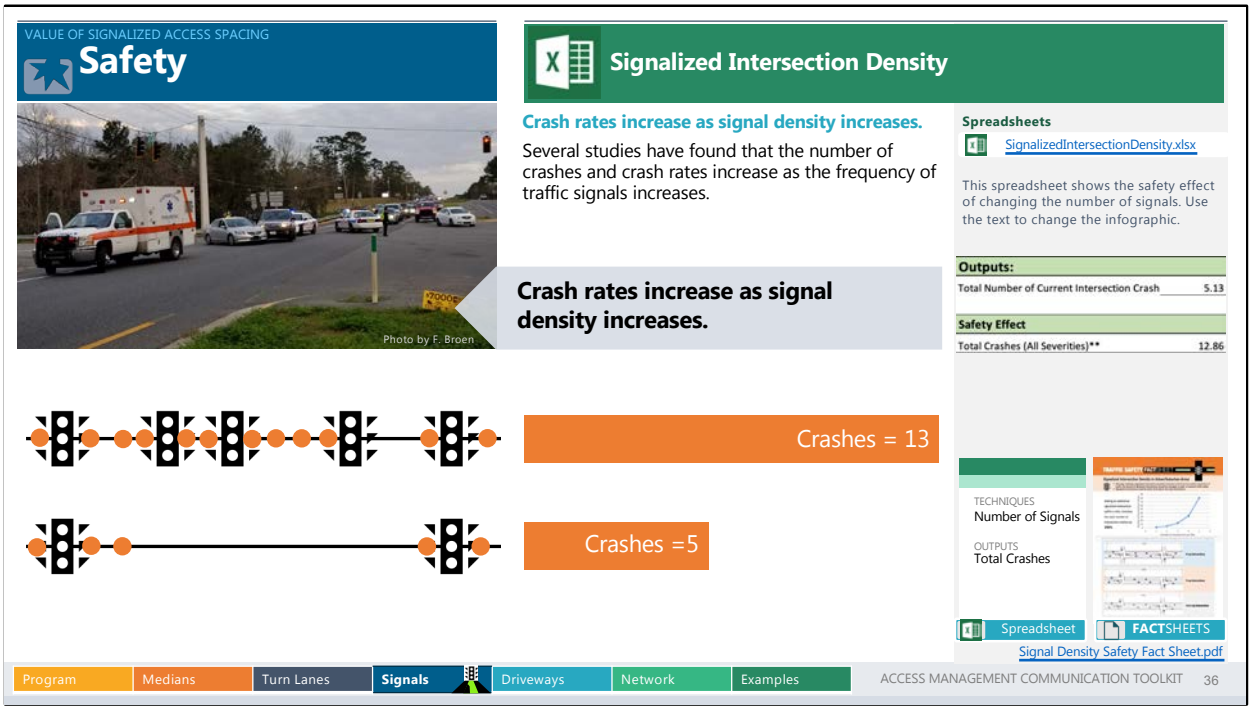


Purpose: The purpose of this slide is to introduce the topic of signalized intersection control.

Key Message: This is one of the topic areas to be analyzed by the four pillars of safety, mobility, economy, and livability. The spreadsheets (where available) are included in the Toolkit.

Outcomes: Recognize that –
1) The spreadsheet tools are based on research and users should understand their basis and any limitations (see final report).
2) There are numerous options available for controlling flow of traffic at intersections. Signals are not always a good option.
3) Signals profoundly impact delay and safety at an intersection and along a corridor. The costs of installing signals are much greater than the hardware included.

Suggestion: None.



Purpose: The purpose of this slide is to introduce the safety implications of signalized intersection density and the safety spreadsheet tools.

Key Message: Signals are often perceived as a safety device, but several studies show that crash rates increase as signal density increases.

Outcomes: Recognize that –
1) The SignalizedIntersectionDensity.xlsx tool estimates the number of crashes that may be expected when increasing the density of signalized intersections per mile from a base condition of two per mile for urban/suburban three-leg and four-leg intersections.
2) It is based on research and users should understand its basis and any limitations (see final report).
3) Outputs demonstrate that adding an additional signalized intersection within a mile, increases the total number of intersection crashes by 150%.
3) A Fact Sheet is provided in the Toolkit that illustrates the tool calculations and outputs.
4) The tool outputs and messages here can be used to communicate the value of turn lanes.

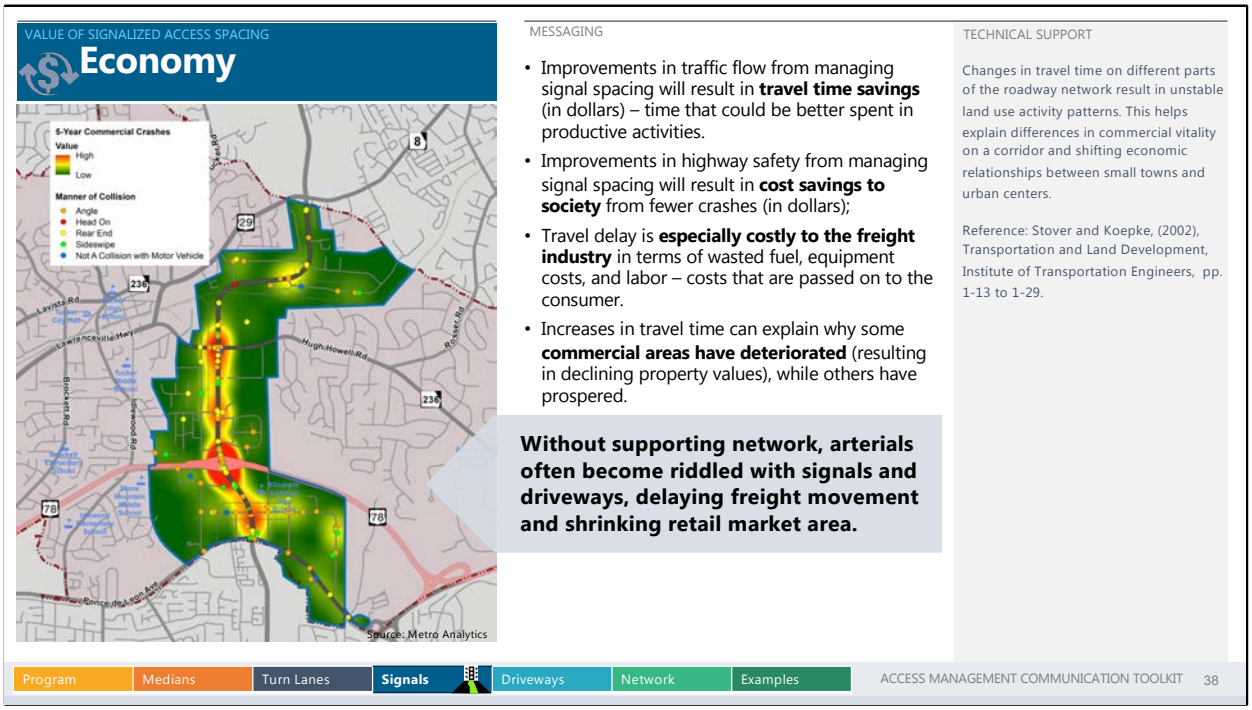
Suggestion: Demonstrate and discuss the spreadsheet tool.

Purpose: The purpose of this slide is to introduce the safety implications of signalized intersections too close to interchange off ramps.

Key Message: Signals too close to interchange ramps can result in a number of safety and operation problems, as shown in the slide.

Outcomes: Recognize that –
1) Signalized intersections need to be separated from interchange off ramps.
2) The photos and messages here can be used to communicate the value of this strategy.

Suggestion: Point out that the photo illustrates a signalized intersection near an off-ramp where traffic frequently queues causing backs up onto the interstate. Discuss similar situations in your area.

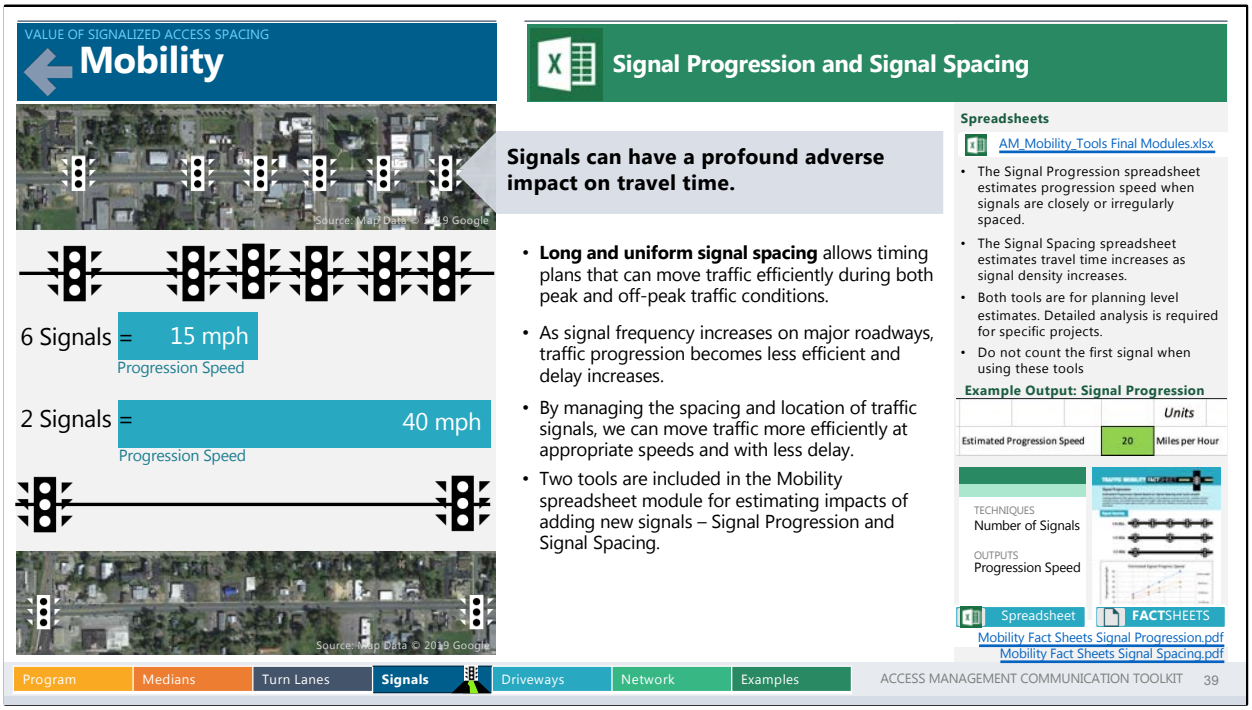


Purpose: The purpose of this slide is to introduce the economic value of travel time savings associated with effective management of signal location and spacing, including signalized access.

Key Message: The cost to society of delay is a metric that can help demonstrate the economic value of signal spacing.

Outcomes: Recognize that –
1) A spreadsheet tool is included in the Toolkit for this purpose and is detailed in the final report.
2) The spreadsheet tools are based on research and users should understand their basis and any limitations.
3) A Fact Sheet is provided in the Toolkit that illustrates the tool calculations and outputs.
4) Delay is especially costly to freight movers.
5) The tool outputs and messages can be used to communicate the value of managing signal location and spacing.

Suggestion: Demonstrate use of the Safety and Mobility Economic Value.xls spreadsheet tool to estimate the cost of delay. Review the calculations in the final report.

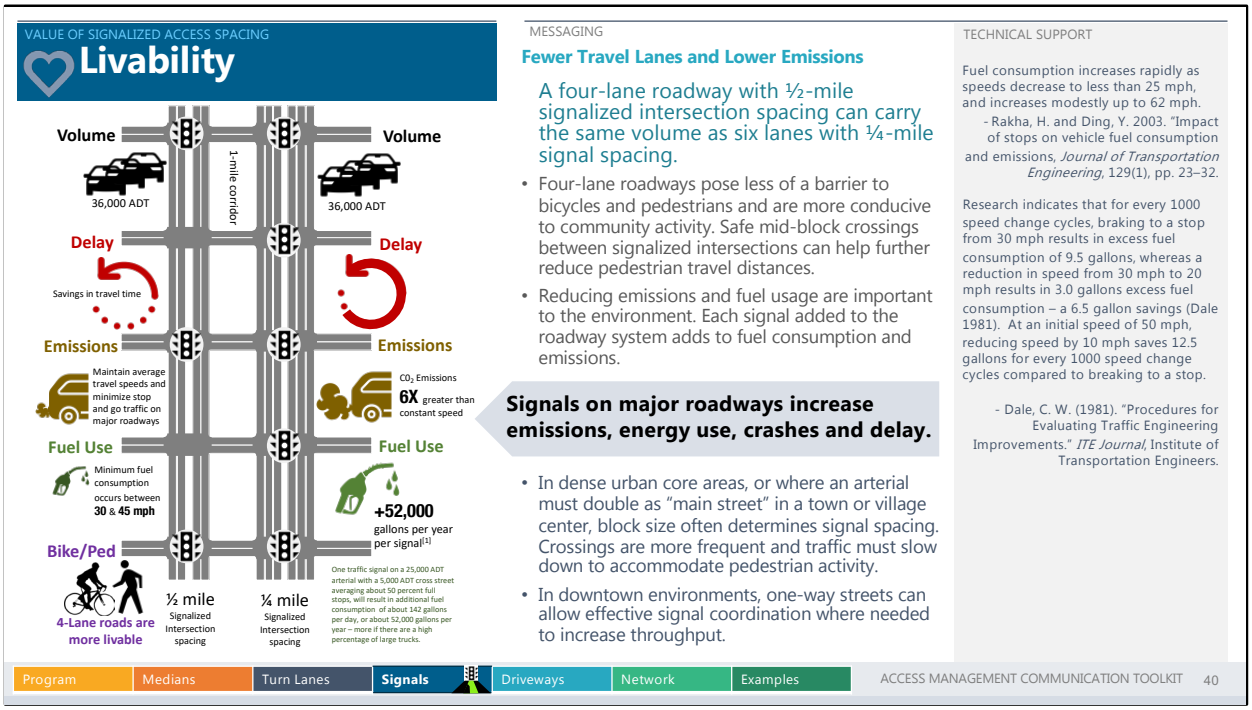


Purpose: The purpose of this slide is to introduce the mobility implications of adding signals on travel time and the two spreadsheet tools for measuring these impacts in the mobility module.

Key Message: As the frequency of signals increases, the progression efficiency of major arterial roadways can be seriously compromised.

Outcomes: Recognize that –
1) The spreadsheet tools are based on research and users should understand their basis and any limitations (see final report).
2) The Signal Progression tool in the mobility module estimates the impact of installing additional traffic signals on progression speeds using the relationship between cycle length, signal spacing, and progression speed. The Signal Spacing spreadsheet estimates travel time increases as signal density increases. Both tools are for planning level estimates. Detailed analysis is required for specific projects.
3) Traffic Mobility Fact Sheets are provided in the Toolkit to illustrate the tool calculations and outputs.
4) The tool outputs and messages here can be used to communicate the value of managing signal location and spacing.

Suggestion: Demonstrate and discuss the spreadsheet tools.

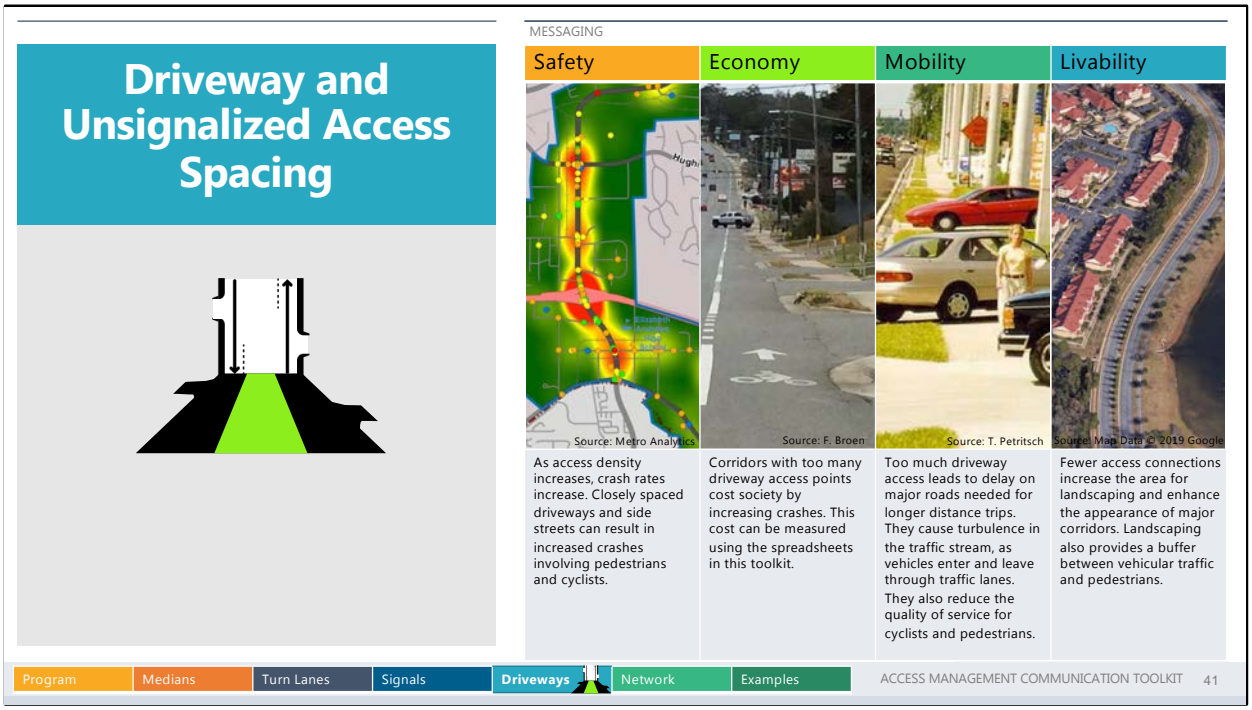


Purpose: The purpose of this slide is to explain how signal spacing can benefit livability from a variety of perspectives.

Key Message: Signal spacing must be context sensitive and for major roadways can reduce emissions, fuel usage, crashes and delay.

Outcomes: Recognize that –
1) Adding signals to a major regional arterial will adversely impact not only safety, but also the environment and the economy.
2) There are numerous options available for controlling flow of traffic at intersections. Signals are not always a good option.
3) Research shows that signals increase fuel consumption and emissions.
4) The infographic can be printed and used to explain these issues.

Suggestion: None.

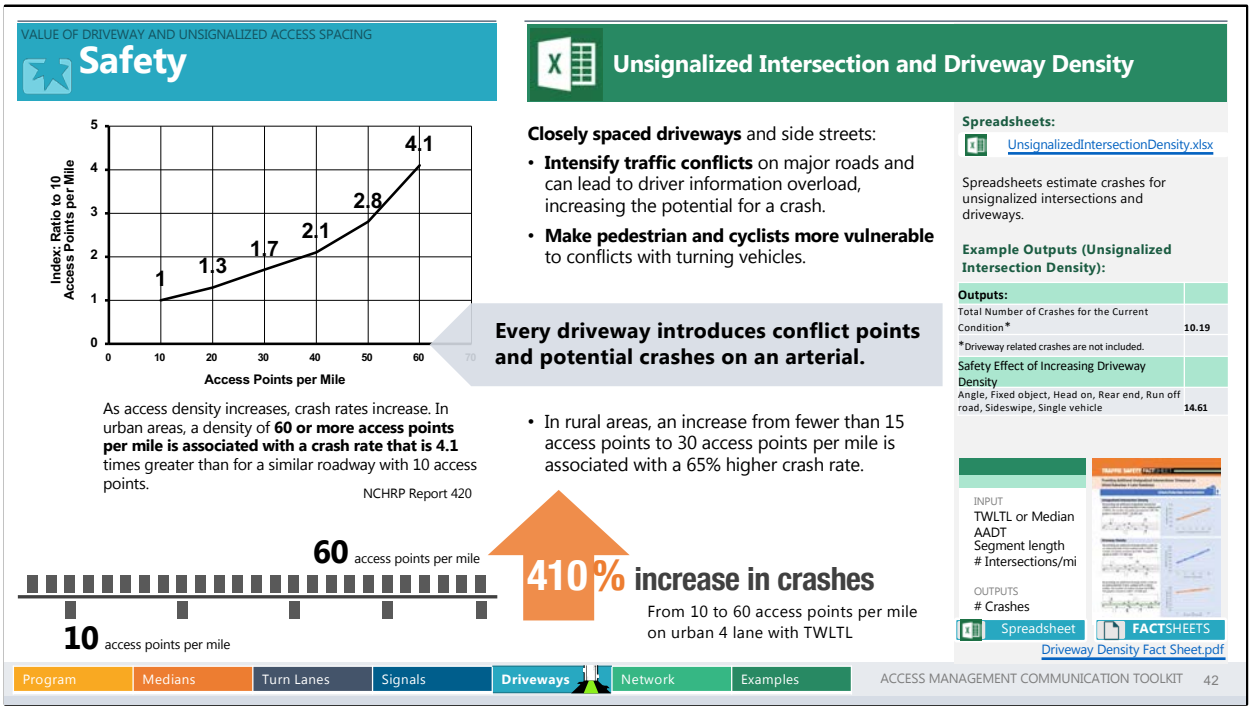


Purpose: The purpose of this slide is to introduce the topic of unsignalized intersection and driveway control.

Key Message: This is one of the topic areas to be analyzed by the four pillars of safety, mobility, economy, and livability. The spreadsheets are included in the Toolkit.

Outcomes: Recognize that –
1) The spreadsheet tools are based on research and users should understand their basis and any limitations (see final report).
2) As access density increases, so do crashes and the adverse impact on safety affects all modes.
3) Too many driveways and unsignalized intersections damage both the transportation system and the character of the built environment.

Suggestion: None.



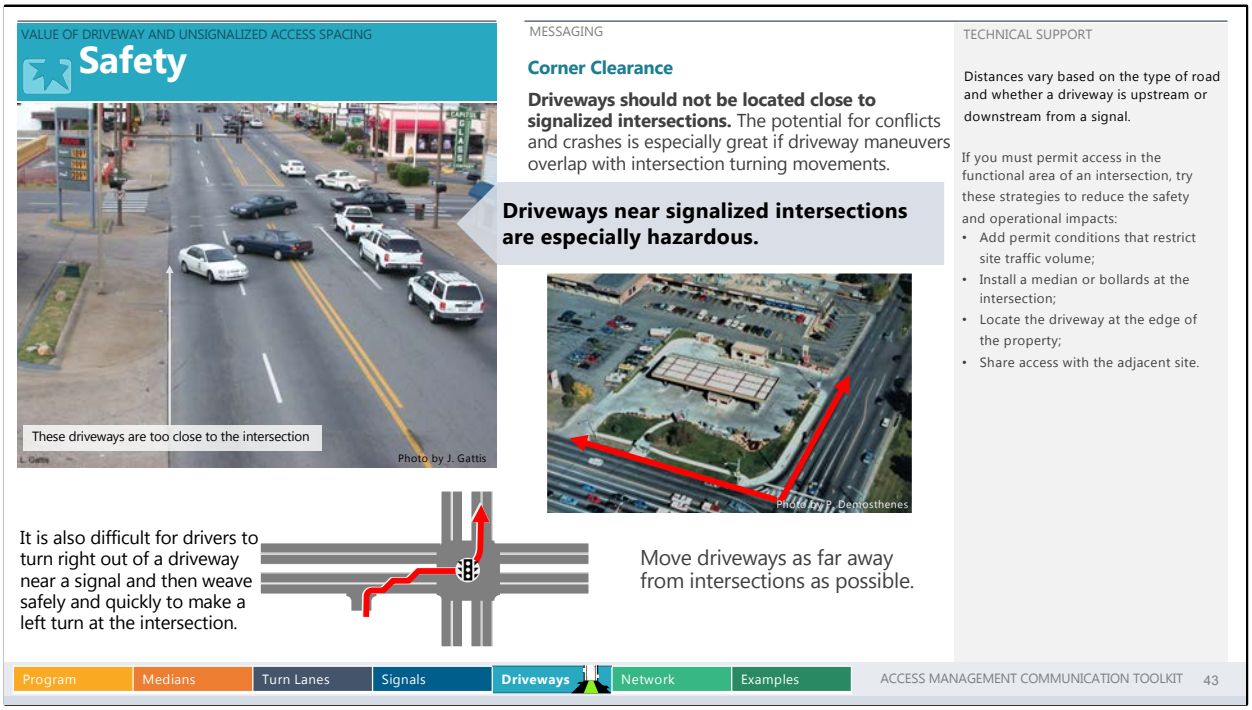
Purpose: The purpose of this slide is to introduce the safety implications of unsignalized intersection and driveway density and the safety spreadsheet tools.

Key Message: Decades of research has demonstrated the safety implications of unsignalized access density. These impacts relate to the number of traffic conflicts.

Outcomes: Recognize that –

1) Two tools are provided in the toolkit to estimate the safety performance of facilities under different intersection and driveway conditions.
2) It is based on research and users should understand its basis and any limitations (see final report).
3) Outputs vary depending on AADT and whether the facility has a TWLTL or raised median.
3) A Fact Sheet is provided in the Toolkit that illustrates the tool calculations and outputs.
4) The tool outputs and messages here can be used to communicate the value of turn lanes.

Suggestion: Demonstrate and discuss the spreadsheet tool.

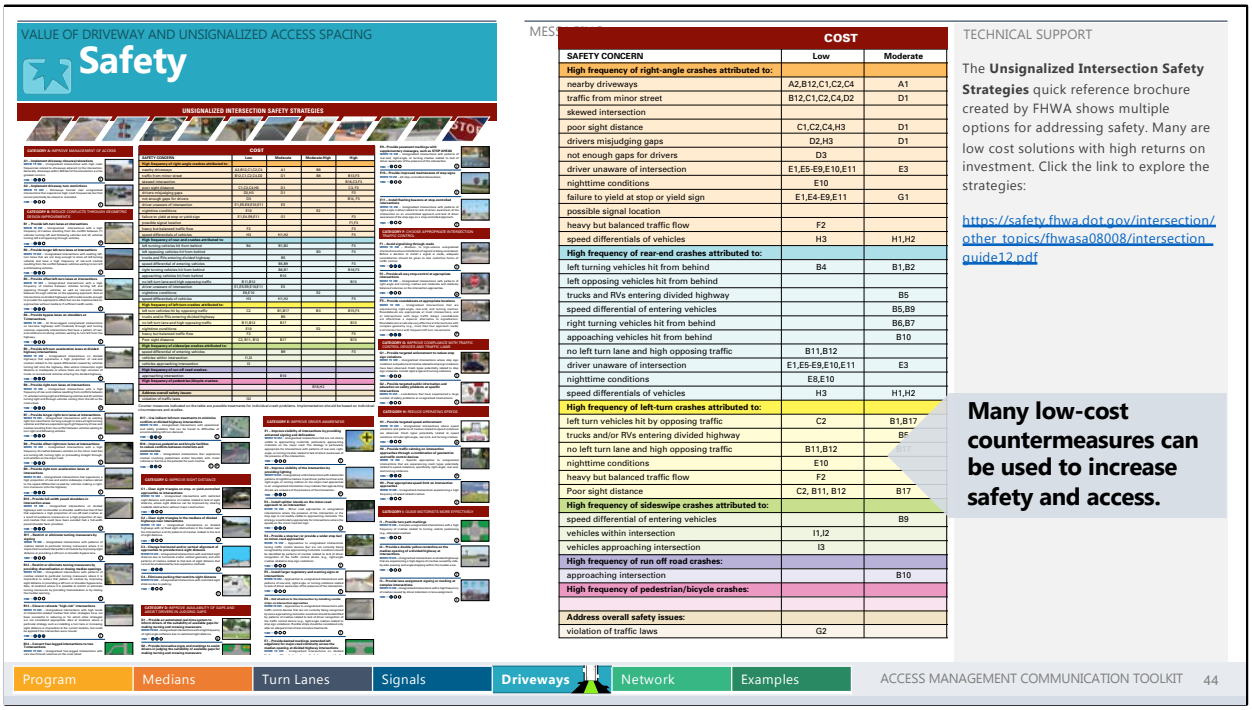


Purpose: The purpose of this slide is to introduce the safety implications of driveways in the functional area of intersections.

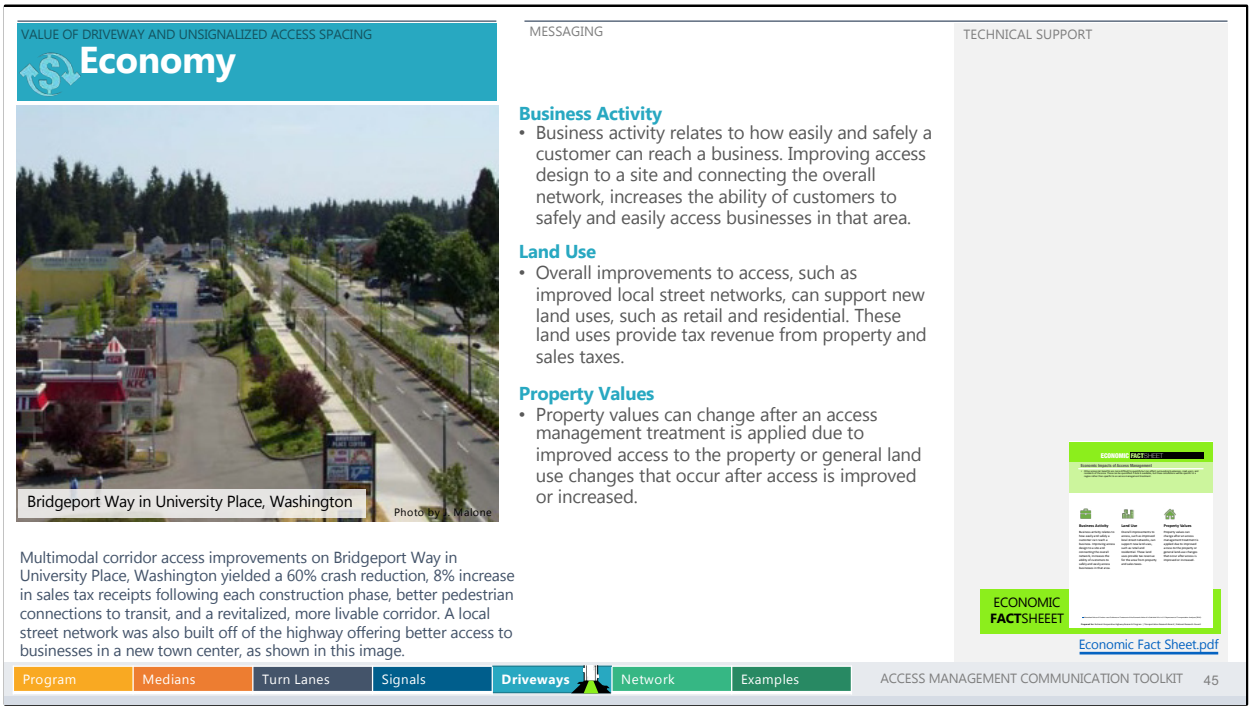
Key Message: Driveways too close to signalized intersections can lead to hazardous conflicts and crashes between turning vehicles.

Outcomes: Recognize that –
1) Corner clearance is important to access management for safety reasons.
2) More research is needed to create safety performance functions and crash modification factors on this topic.
3) Photos and diagrams like those shown can help communicate this issue.
4) Methods to improve safety where access must be provided in the functional intersection area are shown under technical support.

Suggestion: None.



Click on these useful resources for easy viewing.

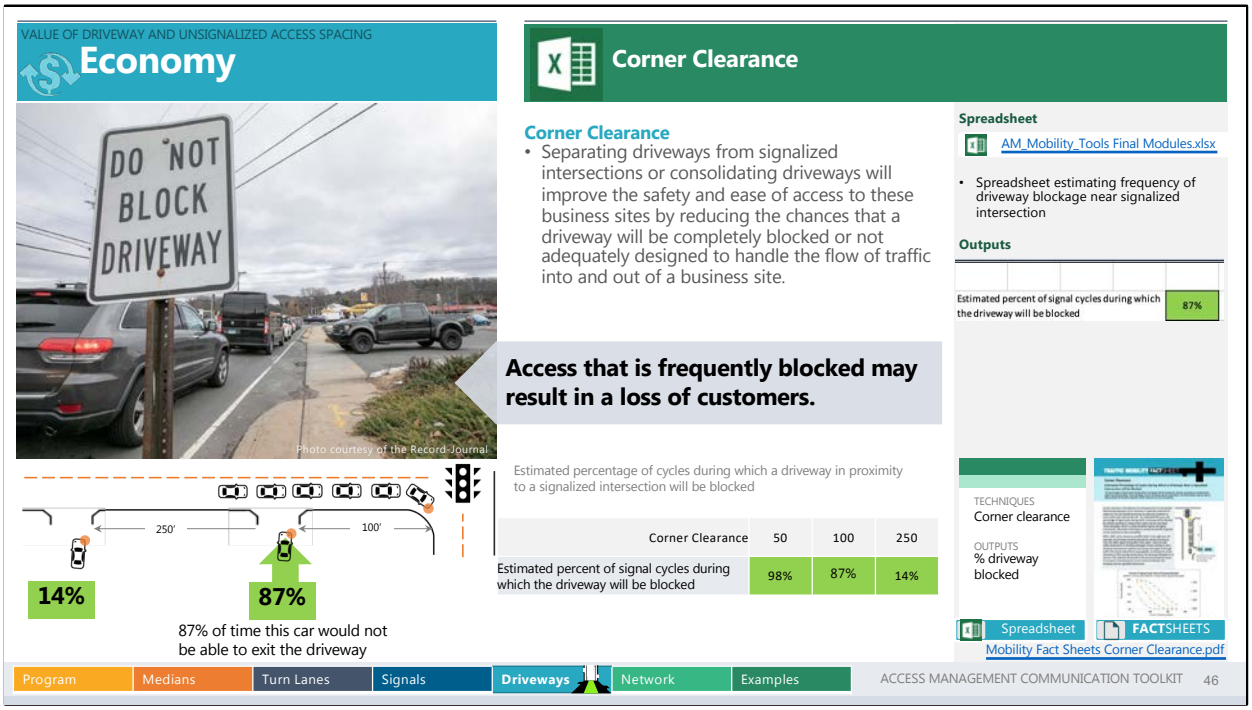


Purpose: The purpose of this slide is to introduce the economic value to businesses of access management planning.

Key Message: Improving site access design through street networks benefits the transportation system by reducing driveway-related conflicts and benefits businesses by making them easier and safer to access for all modes of transportation.

Outcomes: Recognize that –
1) A single well-designed driveway can often provide better access from a highway than many "curb cuts".
2) Relocating site driveways onto local street networks offers safe, low speed access to businesses and improves sidewalk safety.
3) The Economic Fact Sheet provides additional information and methods that can be used to measure economic activity.

Suggestion: Consider the Bridgeport Way case example shown here. The economic value is improved by increased sales activity, safety and livability of the corridor and business district.

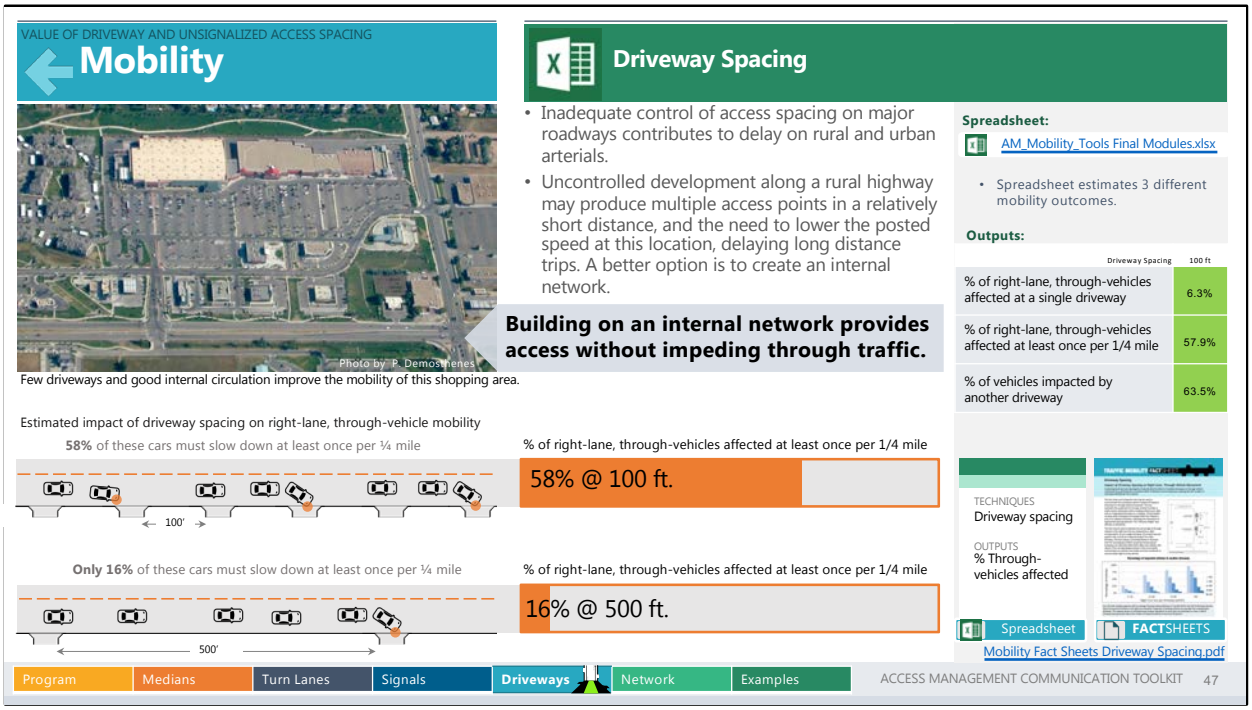


Purpose: The purpose of this slide is to introduce the mobility implications of access in the functional area of signalized intersections and the spreadsheet tool for measuring these impacts in the mobility module.

Key Message: Corner access on busy highways is not only less safe, it is often less functional and may ultimately result in a loss of customers.

Outcomes: Recognize that –
1) The spreadsheet tools are based on research and users should understand their basis and any limitations (see final report).
2) The Corner Clearance tool in the mobility module estimates the percentage of signal cycles during which a driveway near a signalized intersection will be blocked.
3) A Traffic Mobility Fact Sheet is provided in the Toolkit to illustrate the tool calculations and outputs.
4) The tool outputs and messages here can be used to communicate the value of managing signal location and spacing.

Suggestion: Demonstrate and discuss the spreadsheet tools.



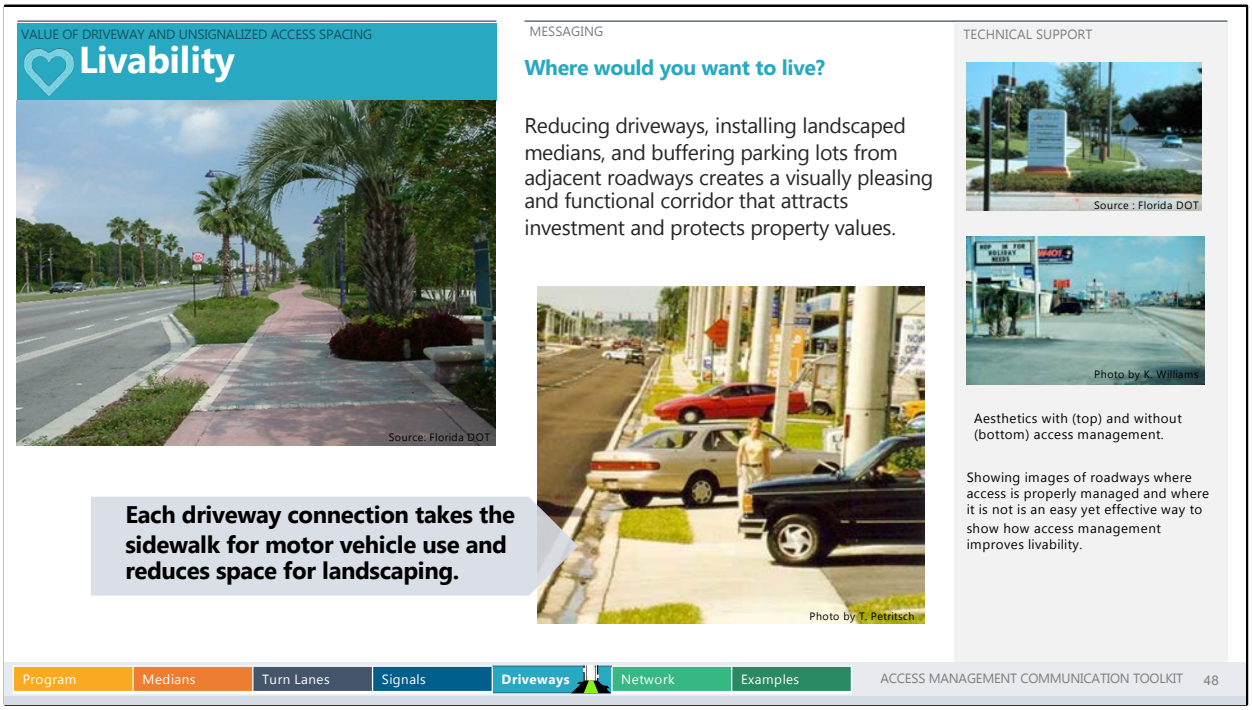
Purpose: The purpose of this slide is to introduce the mobility impacts of driveway density and the spreadsheet tool for measuring these impacts.

Key Message: Experience shows that as driveways accumulate on major roadways, they gradually reduce the efficient flow of traffic and contribute to delay. This impact is real, but difficult to measure.

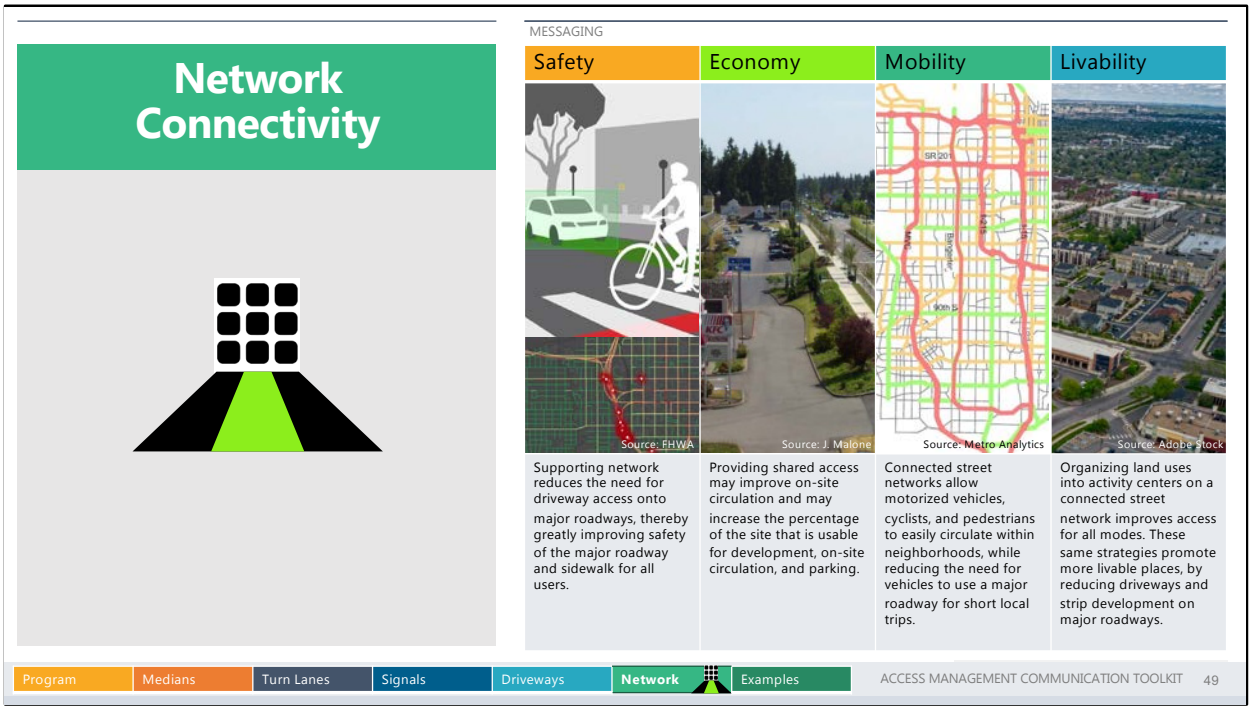
Outcomes: Recognize that –

1) The Driveway Spacing tool in the mobility module estimates the the proportional impact of turning traffic on the traffic stream. This provides insight into how driveways impact the flow of traffic.
2) The spreadsheet tools are based on research and users should understand their basis and any limitations (see final report).
3) A Traffic Mobility Fact Sheet is provided in the Toolkit to illustrate the tool calculations and outputs.
4) The tool outputs and messages here can be used to communicate the value of managing signal location and spacing.

Suggestion: Demonstrate and discuss the spreadsheet tools.



No Trainer/Speaker Notes Required



Purpose: The purpose of this slide is to introduce the topic of network connectivity.

Key Message: This is one of the topic areas to be analyzed by the four pillars of safety, mobility, economy, and livability. A connected supporting network is the solution to arterial access management problems.

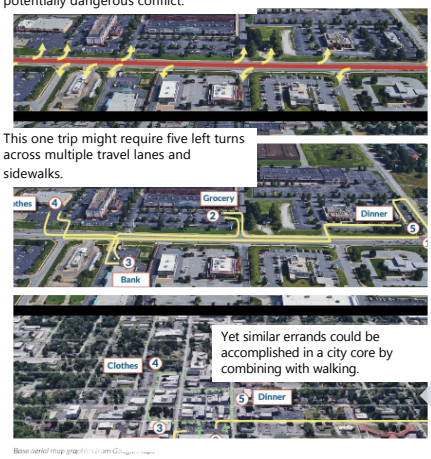
Outcomes: Recognize that –
1) Without connections available to collector and local roadways all pressure for access connections falls to the arterial roadways.
2) Less need for driveway access onto major roadways greatly improves safety of the major roadway for all users.
3) Bicycle and pedestrian connections from sidewalks and other pathways to development sites, transit stops, and midblock crossing locations are non-auto access management techniques.
4) Organizing land uses on a dense, connected street network is a placemaking strategy that advances access management principles.

Suggestion: None.

VALUE OF NETWORK CONNECTIVITY

Safety

New development produces more traffic and requires more left turns, each one a potentially dangerous conflict.



This one trip might require five left turns across multiple travel lanes and sidewalks.

Yet similar errands could be accomplished in a city core by combining with walking.

MESSAGING

- **Supporting street networks** reduce the need for driveway access onto major roadways, greatly improving safety of both the major roadway and the sidewalk.
- Local street networks allow safe access to major roadways at traffic signals and well-planned side street locations.
- Interconnected commercial development can give even small businesses access to a traffic signal and safer left-turns.
- Local streets and alleys have less traffic and lower speeds than major roadways and can provide a safe travel alternative for bicyclists, including potential locations for bicycle boulevards.
- Signalized mid-block crossings support safe pedestrian movement across suburban corridors with higher speed traffic and improve pedestrian access to transit stops.

Well-planned networks provide safer travel options for all users.

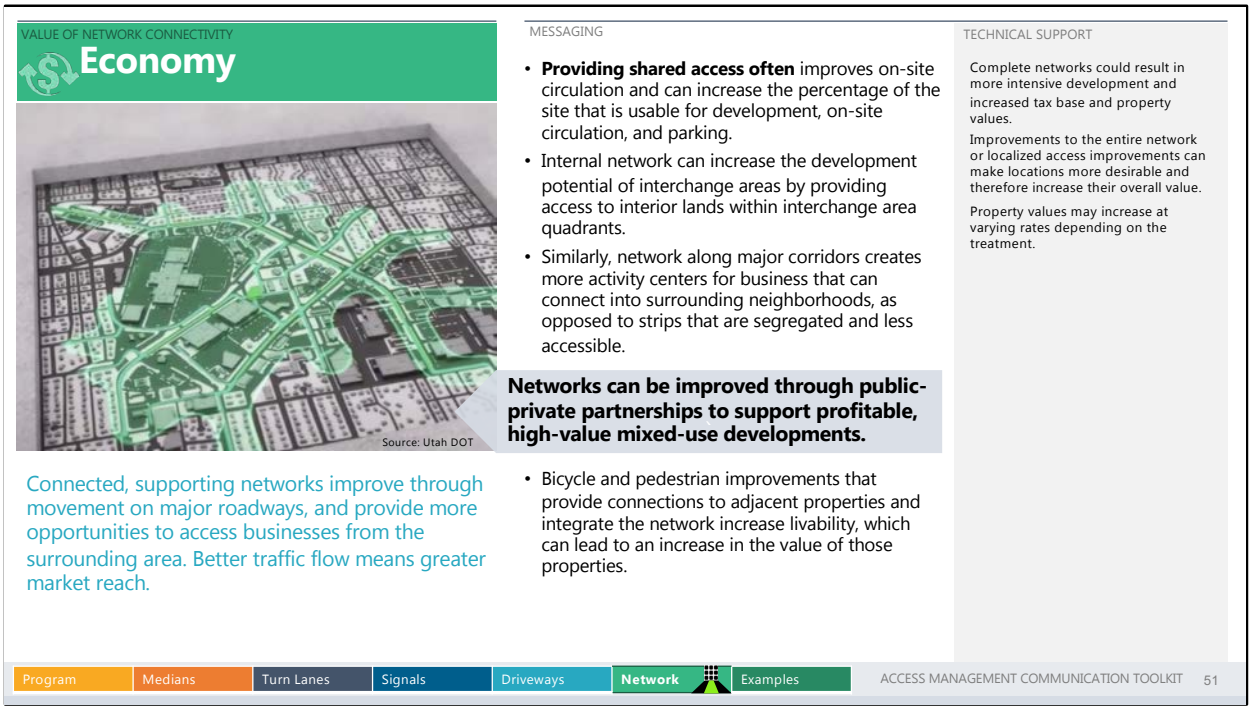
TECHNICAL SUPPORT

Connected street networks provide options for all modes to travel safely.

Program | Medians | Turn Lanes | Signals | Driveways | **Network** | Examples

ACCESS MANAGEMENT COMMUNICATION TOOLKIT 50

No Trainer/Speaker Notes Required

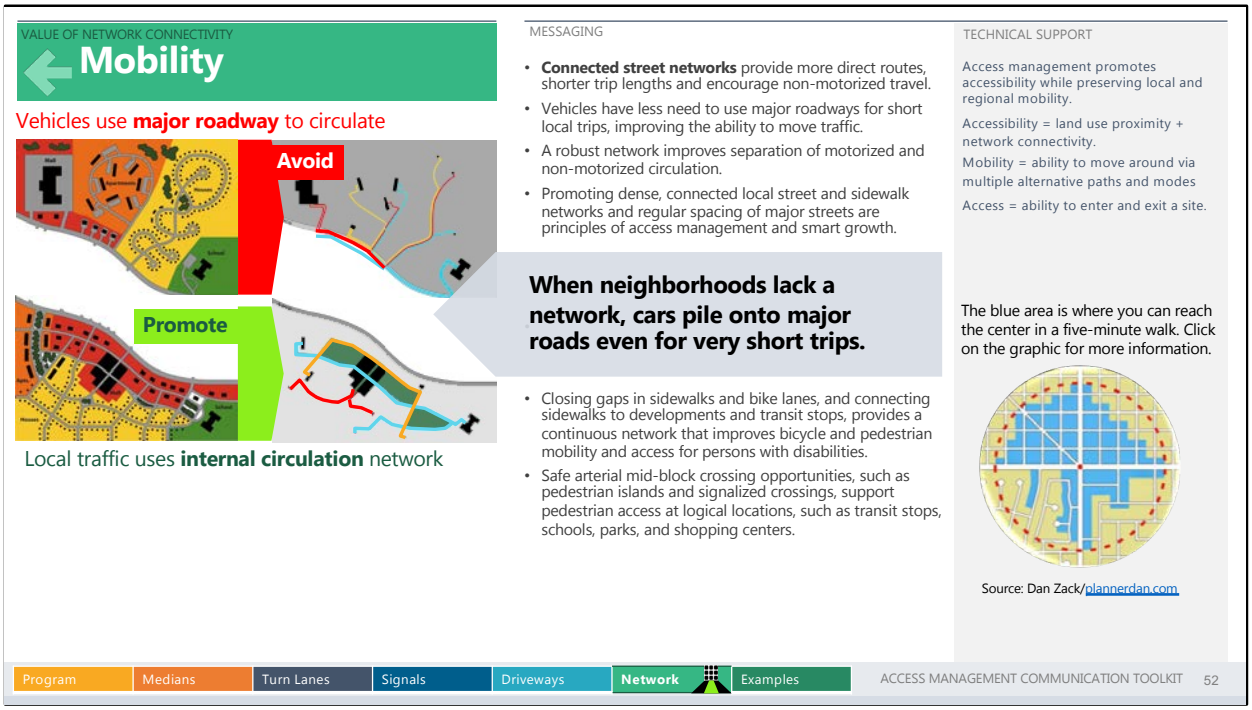


Purpose: The purpose of this slide is to introduce the value of network connectivity to the economy.

Key Message: A connected network of local and collector streets along arterials provides access to businesses, with improved accessibility, while protecting the transportation and economic functions of major roadways.

Outcomes: Recognize that –
1) Accessibility is more important to business and the economy than an individual access point.
2) The ability to gain access to a business from the surrounding area is greatly improved where access is provided on a side street and local street network.
3) This slide has several messages on the value of network connectivity to the economy.

Suggestion: Watch the video by clicking on the image.

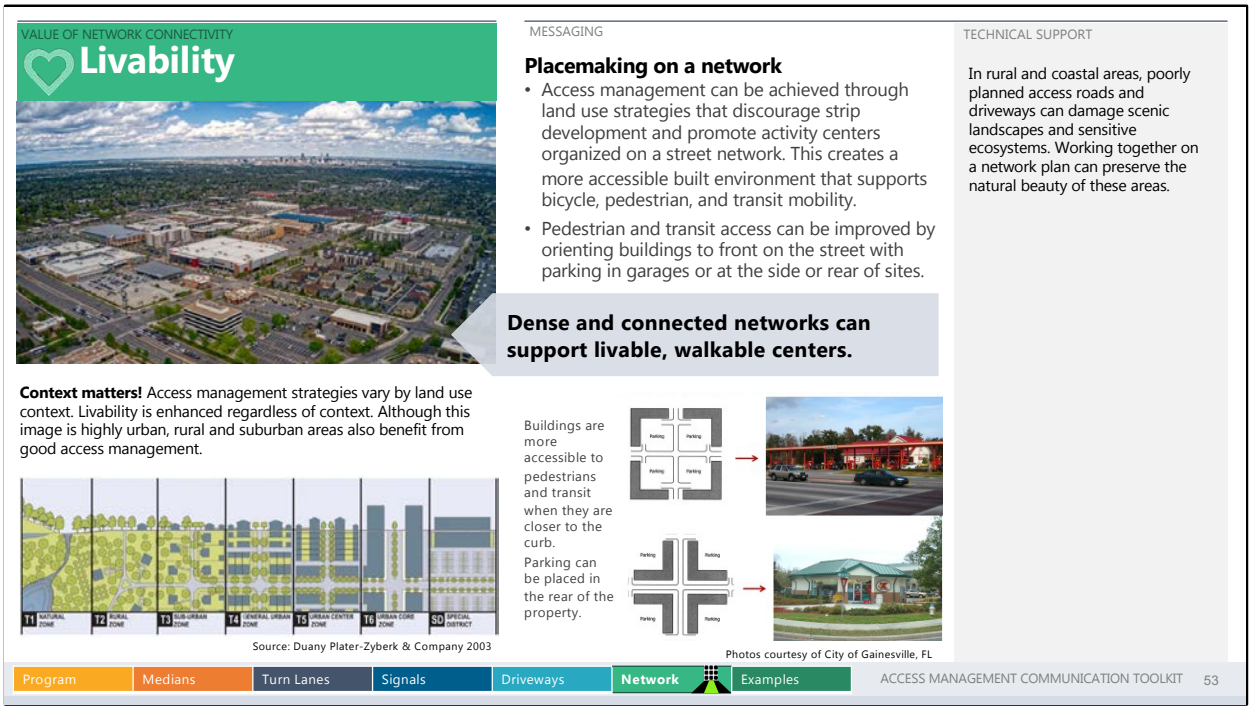


Purpose: The purpose of this slide is to introduce the value of network connectivity to mobility.

Key Message: Local traffic is best accommodated on a lower-speed network of local and collector streets, preserving major roadways for longer trips.

Outcomes: Recognize that –
1) Connected street networks reduce access problems and improve mobility for all modes.
2) Access, accessibility, and mobility are not the same thing, but they are interrelated.
3) This slide has several messages on the value of network connectivity to mobility.

Suggestion: Discuss the implications of network shown in the figure.

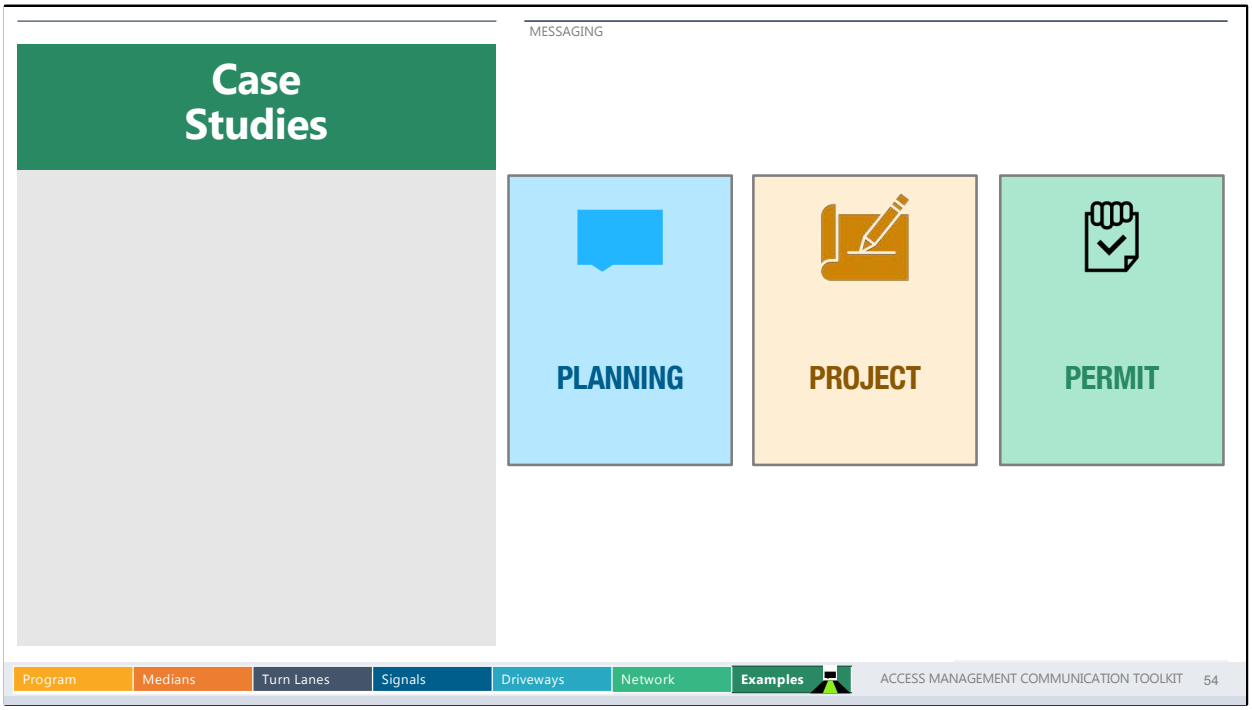


Purpose: The purpose of this slide is to introduce the value of network connectivity to livability and access.

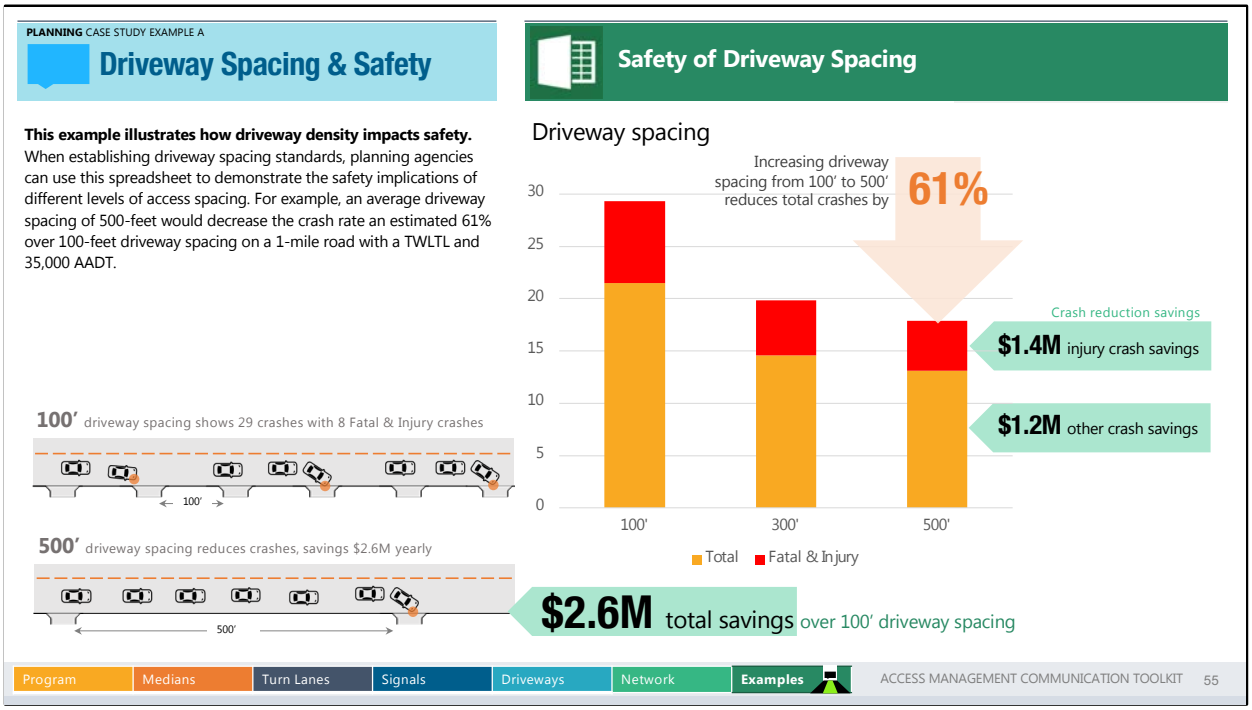
Key Message: Placemaking is best advanced by organizing land uses onto a network. Doing so also increases accessibility of the developed area for all modes, while reducing access problems on major roadways.

Outcomes: Recognize that –
1) Access management is a placemaking and smart growth strategy.
2) Different modes have different access needs that must be carefully managed.
3) Like street design, access management standards and strategies must be appropriate to land use context.
4) This slide has several messages on the value of network connectivity to livability and access.

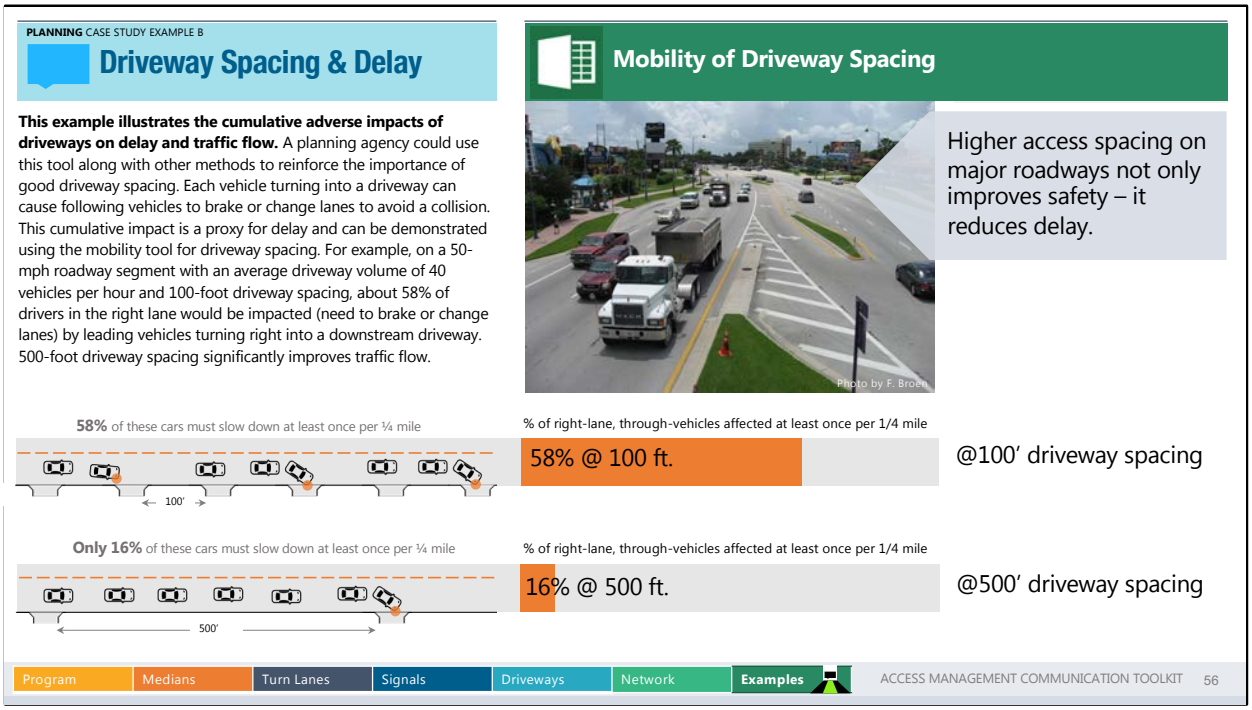
Suggestion: Consider how the design of access differs by mode and how that can impact livability.



No Trainer/Speaker Notes Required



No Trainer/Speaker Notes Required (see final report for written summaries)



rainer/Speaker Notes Required (see final report for written summaries)

PLANNING CASE STUDY EXAMPLE C

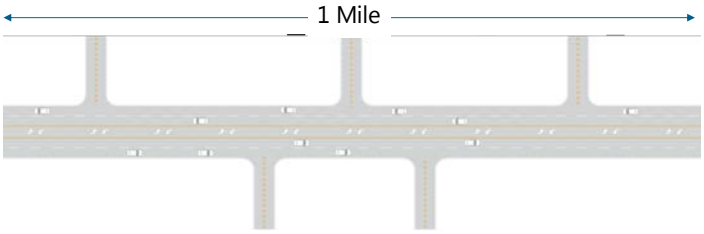
Unsignalized Intersections

The density of unsignalized street intersections directly impacts roadway safety. When developing an access management plan for a corridor, an agency can use the safety tool for unsignalized intersections to demonstrate the safety performance of different levels of unsignalized intersection density. This example is for a one-mile urban/suburban corridor segment with four through lanes and a continuous two-way left-turn lane (TWLTL,) a 35-mph speed limit, and average annual daily traffic (AADT) of about 60,000 vehicles per day. This example illustrates how five unsignalized intersections would influence safety performance (in contrast to none).

For an urban/suburban corridor similar to the study site, the agency can anticipate 10.86 or about 11 crashes in comparison to no unsignalized intersections. The affected crash types include angle, fixed object, head-on, rear-end, sideswipe, and other single vehicle crashes. The monetized value of these crashes is $1.5 million per year.

UnsignalizedIntersectionDensity.xlsx
Safety Economic Value case studies.xlsx

Safety of Unsignalized Street Intersections



Safety Effect of Increasing Unsignalized Intersection Density	
Angle,Fixed object,Head on,Rear end,Run off road,Sideswipe,Single vehicle	10.86

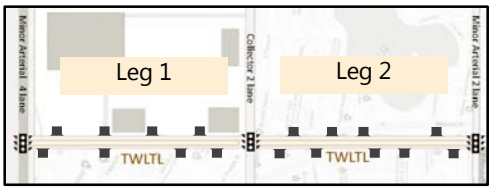
These 5 intersections would experience **11 crashes**

The affected crash types include angle, fixed object, head-on, rear-end, sideswipe, and other single vehicle crashes. The monetized value of these crashes is **$1.5 million per year**

No Trainer/Speaker Notes Required (see final report for written summaries)

PROJECT CASE STUDY

TWLTL TO MEDIAN



Configuration	AADT (vpd)	Length – Leg 1 (mi)	Length – Leg 2 (mi)
Existing TWLTL Section	35,000	0.25	0.25
Proposed Continuous Median	35,000	0.25	0.25
Number of Driveways:		2 major commercial 6 minor commercial	9 minor commercial

A five-lane suburban arterial has two lanes in each direction and a two-way left-turn lane (TWLTL). The segment is ½-mile long with traffic signals at the beginning, middle (¼-mile point), and end.

Medians vs TWLTL (Two-Way Left-Turn Lane)

	Segment #1 (crashes / yr)	Segment #2 (crashes / yr)	Total Roadway Segment (crashes / yr)	Total Number of Crashes	Number of Fatal and Injury Crashes	% Reduction
Existing TWLTL Configuration						
Total crashes:	5.50	5.04	10.54	10.54		
Fatal and Injury Crashes:	1.46	1.33	2.79		2.79	
Proposed Continuous Median						
Total crashes:	2.21	2.13	4.34	– 4.34		
Fatal and Injury Crashes:	0.61	0.58	1.19		– 1.19	6.20/ 10.54
Predicted Reduction in Crashes (replace TWLTL with Raised Median)						
Reduction in total crashes:	3.29	2.91	**6.20**	= 6.20		
Reduction in fatal + injury crashes:	0.85	0.75	**1.60**		= 1.60	=58.82%

Summary of Findings: Converting a TWLTL to a continuous raised median for each ¼ mile segment shown can reduce total crashes by about 6 crashes per year and reduce the number of fatal and injury crashes by about 2 serious crashes per year.

The monetized value of these crashes is **$1.5** million per year.

Converting the TWLTL to a raised median reduces yearly crashes by **59%**

Program | Medians | Turn Lanes | Signals | Driveways | Network | **Examples**

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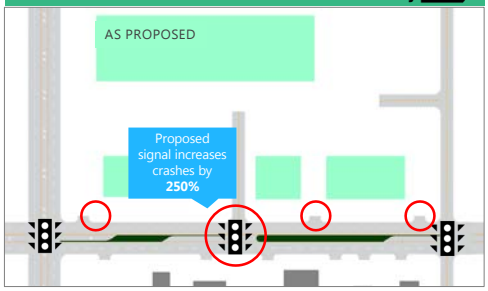
No Trainer/Speaker Notes Required (see final report for written summaries)

PERMIT CASE STUDY EXAMPLE

Permit Review

Permit Case Study



Objective:

Communicate the safety and mobility impacts of this permit request and propose alternatives that represent good access management practices, using the tools in the toolkit.

Initial Request:

A developer has requested an access permit for a major retail development with several outparcels, each with a driveway connection. The request is to add a median opening for a signalized driveway and three additional unsignalized driveways on a major arterial.

Safety Impacts of Traffic Signal Spacing

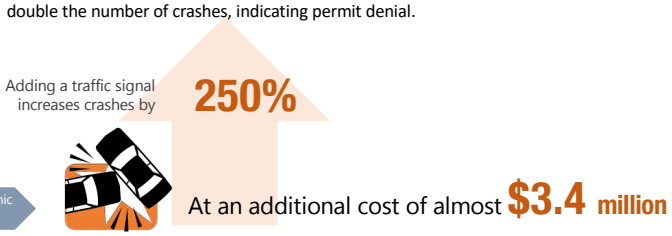
- **Signal Spacing:** For a half-mile segment, the addition of a traffic signal can be expected to **increase the number of crashes by 250%.**

Outputs:		
Total Number of Current Intersection Crashes per year	16.61	70 sec Cycle length 1320 ft spacing
Safety Effect of Changing the Number of Signalized intersections per Mile		
Total Crashes (All Severities)**	**41.65**	70 sec Cycle length 660 ft spacing

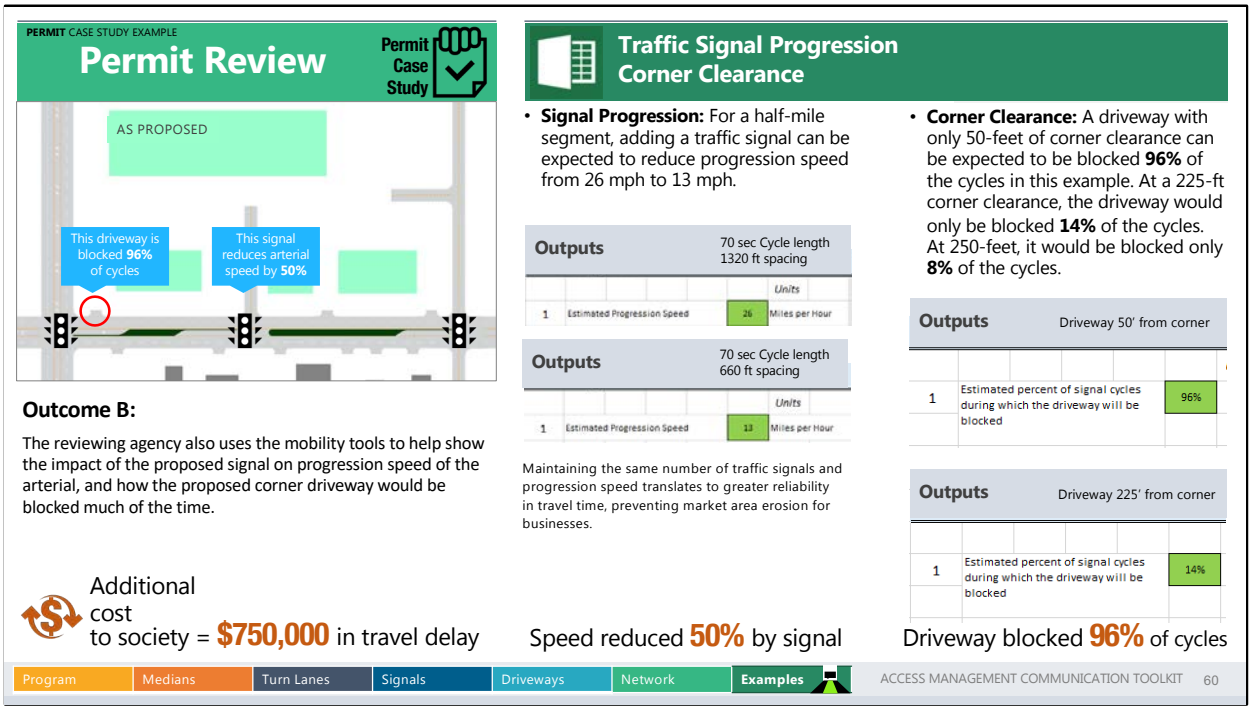
Outcome A:

Using the safety tool to assess the signal request, the reviewing agency demonstrates that the proposed signal would more than double the number of crashes, indicating permit denial.

Example infographic for this scenario



No Trainer/Speaker Notes Required (see final report for written summaries)



Purpose: The purpose of this slide is to demonstrate use of the mobility tools in a permit review scenario.

Key Message: Access decisions that accommodate the desires of an individual developer can have a high cost to the broader public and may not be beneficial for the development either.

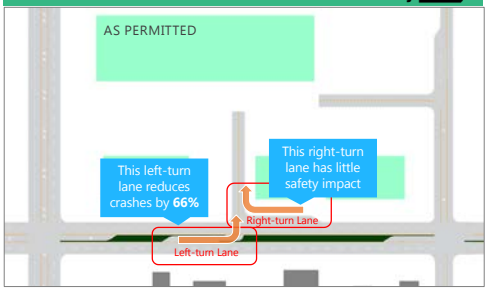
Outcomes: Recognize that –
1) A spreadsheet tool is included in the Toolkit that monetizes the cost of delay to society and is detailed in the final report.
2) Delay also erodes market area, which adversely impacts retailers.
3) Corner access is not only unsafe for customers; it is less functional.
4) The tool outputs and messages can be used to communicate the value of access decisions to officials and permit applicants.

Suggestion: Demonstrate use of the Safety and Mobility Economic Value.xls spreadsheet tool to monetize the dollar value of delay.

PERMIT CASE STUDY EXAMPLE

Permit Review

Permit Case Study



Outcome C:

The applicant next requests a median opening instead of a signal. After a traffic analysis study verified the planning assumption shown by the tools, the agency decides to allow a directional opening with a left-turn lane into the site based on the safety benefits. A right-turn lane is also encouraged.

Safety Impacts for Installation of a Right-Turn Lane
Safety Impacts for Installation of a Left-Turn Lane

- **Right-turn Lane**: In this scenario, installing a right-turn lane had only a slight safety benefit.

Safety Effect of RT Lane Installation:	
Total Crashes (All Severities) w/Right-Turn Lane	3.55
Total Crashes (All Severities) w/o Right-Turn Lane	4.12

Base Condition: Intersection without right-turn lanes on major-road approaches.

The right-turn lane has little safety impact in this example.

- **Left-turn Lane:** In this scenario, a new development with no existing left-turn demand, installing a left-turn lane can be expected to **reduce crashes by 66%.**

Safety Effect of Left-Turn Lane Installation	
Total Number of Crashes w/ Left-turn lane	2.76
Total Number of Crashes w/o Left-turn lane	4.12

The values shown are for a single driveway. If the applicant requested 5 driveways, then the total would be about 5 crashes (one per driveway) for similar traffic volume conditions, each with an estimated value of $137,600

Example infographic for this scenario

Adding a left-turn lane reduces crashes by **66%**

Saving almost **$.3 million**

Program | Medians | Turn Lanes | Signals | Driveways | Network | **Examples**

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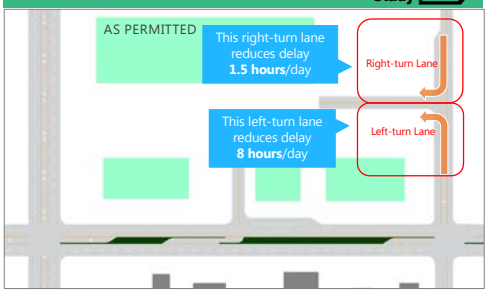
No Trainer/Speaker Notes Required

PERMIT CASE STUDY EXAMPLE

Permit Review

Permit Case Study



Outcome D:

Encouraged to provide better alternative access, the permit applicant was asked to add a driveway on the collector road with a right-turn lane and left-turn lane into the site at that location, as the collector was a two-lane road with a high volume of pedestrian traffic. On the arterial, only one primary driveway was approved for safety reasons.

Mobility Impacts for Installation of a Right-Turn Lane
Mobility Impacts for Installation of a Left-Turn Lane

Right-turn lane: The installation of a right-turn lane can be expected to reduce delay by as much as **1.5 hours/day**.

Adding a right-turn lane reduces delay by **1.5 hrs**

Outputs:

			Units
1	Estimated delay reduction for through vehicles	0.6	Seconds per through vehicle
2	Additional delay reduction due to pedestrian crossings (3)	1.0	Seconds per through vehicle
3	Total delay reduction (3)	1.6	Seconds per through vehicle

The delay reduction per vehicle is multiplied by the through volume in the direction of the right-turn movement where a right-turn lane would be provided to estimate the delay reduction for the peak hour. Based on a peak-hour volume of 800 through vehicles, providing a right-turn lane would reduce peak-hour delay 30 minutes. If there are 4 peak hours per day (e.g. 2 am and 2 pm), the daily peak period reduction would be 2 hours.

Left-turn lane: The installation of a left-turn lane can be expected to reduce delay **about 8 hours/day**.

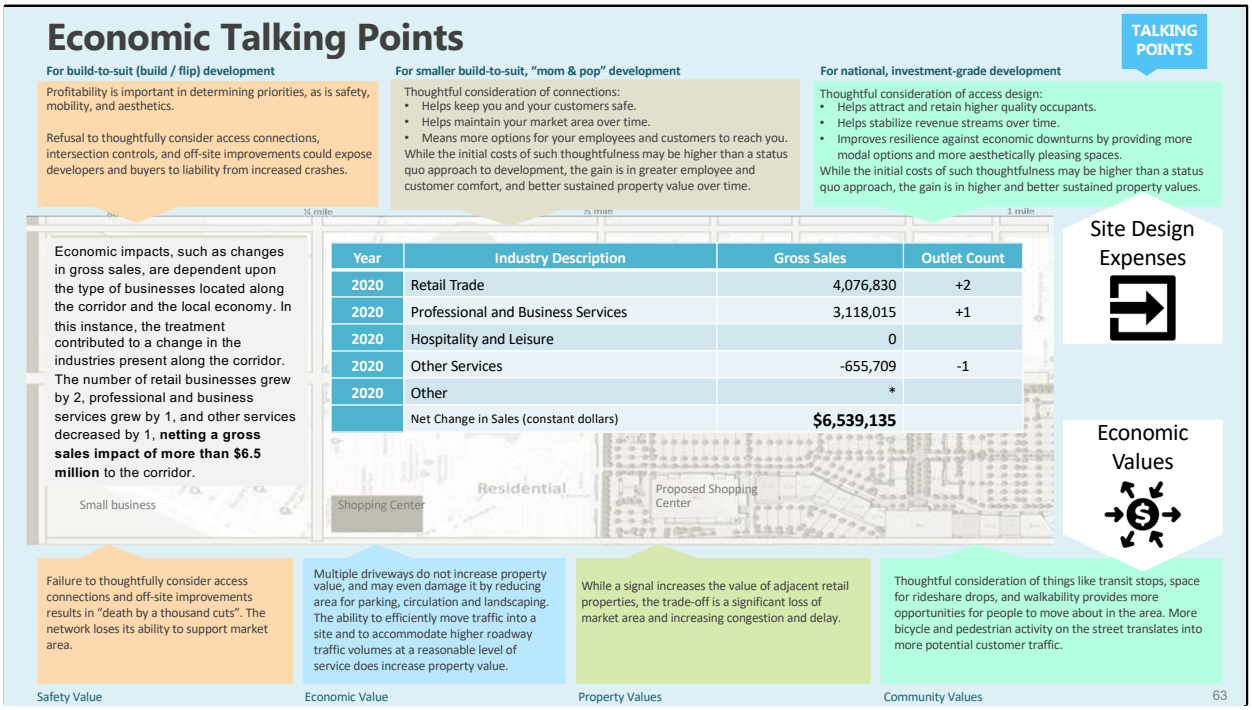
Adding a left-turn lane reduces delay by **8 hrs**

Outputs:

			Units
1	Estimated intersection delay reduction for existing site	2.5	Seconds per Vehicle
2	Estimated intersection delay reduction for new development	4.7	Seconds per Vehicle

The estimated peak-hour total intersection volume is 1,640 vehicles (700 northbound through, 800 southbound through, and 140 southbound right turns). For a new development with no existing left-turn demand, providing a left-turn lane would result in a peak-hour delay reduction of about 2 hours. If there are 4 peak hours per day (e.g. 2 am and 2 pm), the daily peak period reduction would be about 8 hours.

No Trainer/Speaker Notes Required



Purpose: The purpose of this slide is to present some of the major talking points regarding economic effects in one place that ties all four pillars together.

Key Message: When access management, be it in the form of intersection control or spacing, turn lanes, or median openings is constructed for the sake of convenience or profit, the resulting costs to the public far outweigh the short-term gains of the development.

Outcomes: Recognize that –

1) When demands for inadvisable signals or direct access connections are made, or when demands are made to waive turn lane requirements or median openings, these are demands to indulge profit motives at the public expense.
2) Choosing short-term cost savings over longer term investments is ultimately self-defeating for both the public and the adjacent owners.
3) When major investments have to be made to recapture lost function it means that both public investments in transportation infrastructure and private investments in property development have already been lost.

Suggestion: It is advisable to carefully consider your target audience, their background, training, and their goals in customizing these talking points to any given situation.

Additional Resources

National Manuals and Guidelines

- Williams, K., Stover, V.G. Dixon, K., Demosthenes, P., Broen, F., Brown, L., Huntington, D. Layton, R. & Seggerman, K. (2014). Access Management Manual, 2nd Edition. Transportation Research Board of the National Academies, Washington D.C.
- Dixon, K., Layton, R., Huntington, D., Gattis, J. L. Brown, L., Butorac, M., & Ryus, P. (2016). Access Management Application Guidelines. Transportation Research Board of the National Academies, Washington D.C.
- Butorac M., Bonneson J., Connolly K., Paul Ryus; Schroeder B., Williams K., Wang Z., Ozkul S., Gluck, J., National Academies of Sciences, Engineering, and Medicine. 2018. Guide for the Analysis of Multimodal Corridor Access Management. Washington, DC: The National Academies Press.

Federal Highway Administration

- FHWA. (2018). Safety Evaluation of Access Management Policies and Techniques. Publication No. FHWA-HRT-14-057
- FHWA. Proven Safety Countermeasures. https://safety.fhwa.dot.gov/provencountermeasures/
- FHWA. "Access Management: Driveways." n.d. Local and Rural Road Safety Briefing Sheets. FHWA-SA-14-080.
- FHWA, Technical Summary: Access Management in the Vicinity of Intersections, FHWA-SA-10-002 (Washington, DC: 2010).

NCHRP Reports

- Bonneson, J. and P. McCoy. (1997). NCHRP Report 395: Capacity and Operational Effects of Mid-block Left-turn Lanes. Transportation Research Board, National Research Council, Washington, D.C.
- Duncan, C. et al. (2019). NCHRP Report 917: Right-Sizing Transportation Investments: A Guidebook for Planning and Programming. Transportation Research Board of the National Academies, Washington, DC.
- Fitzpatrick, K., et al. (2013). NCHRP Report 745: Left Turn Accommodations at Unsignalized Intersections. Transportation Research Board of the National Academies, Washington, D.C.
- Gluck, J. & Lorenz, M. (2010). NCHRP Synthesis 404: State of the Practice in Highway Access Management. Transportation Research Board of the National Academies, Washington, D.C.
- Gattis, J., et al. (2010). NCHRP Report 639: Guide for the Geometric Design of Driveways, Transportation Research Board of the National Academies, Washington, D.C.
- Gluck, J., H. Levinson, and V. Stover. (1999). NCHRP Report 420: Impacts of Access Management Techniques, Transportation Research Board of the National Academies, Washington, D.C.
- Potts, I.B., et al. (2004). NCHRP Report 524: Safety of U turns at Unsignalized Median Openings, Transportation Research Board, Washington, D.C.
- Williams, K. (2004). NCHRP Synthesis 337: Cooperative Agreements for Corridor Management, Transportation Research Board, Washington, D.C..
- Williams, K (2002). NCHRP Synthesis 304: Driveway Regulation Practices, Transportation Research Board, Washington, D.C.

Local Government Programs

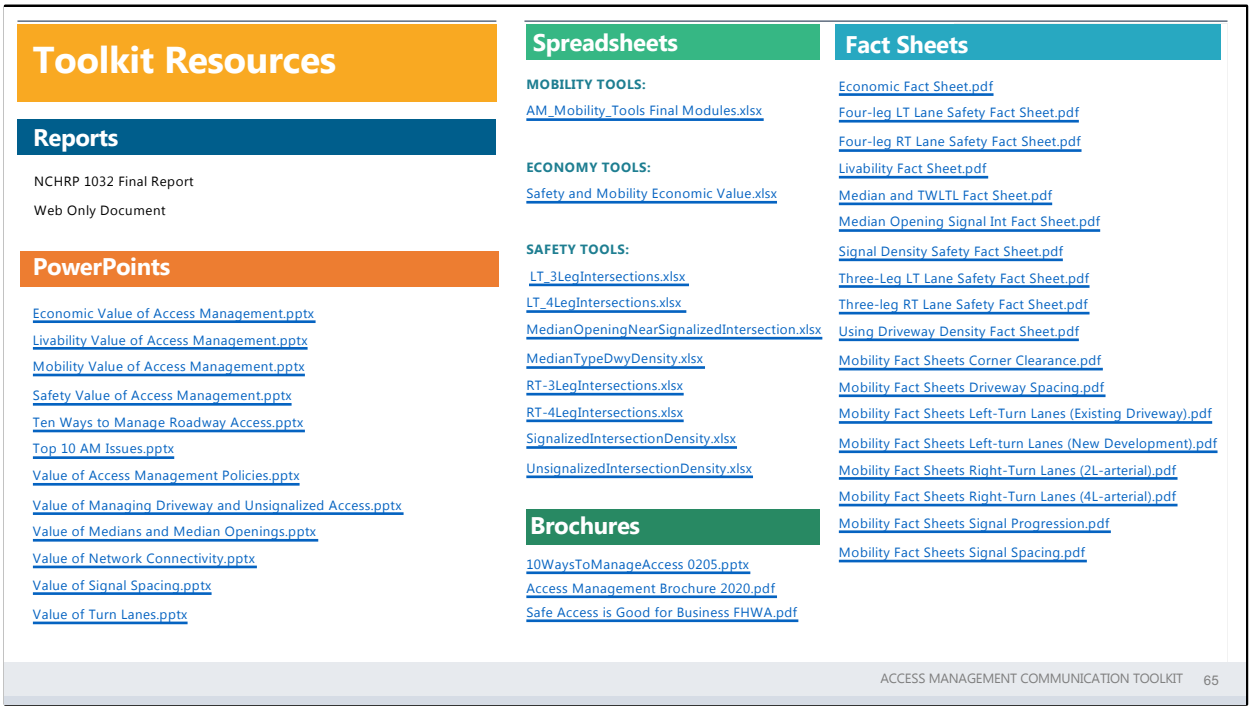
- Williams, K. (2020). NCHRP Synthesis 549 Incorporating Roadway Access Management into Local Ordinances. Washington, D.C.: Transportation Research Board of the National Academies.
- Williams, K. & Barber, J. (2017). Model Access Management Policies and Regulations for Florida Cities and Counties, 2nd Edition. Center for Urban Transportation Research.

State Manuals (recently updated)

- Florida Department of Transportation. (November 2019). Access Management Guidebook.
- Minnesota Department of Transportation. (March 2016). MnDOT Access Management Manual.
- Nevada DOT. (2017). Access Management Systems and Standards.

Go to www.accessmanagement.info for more resources and helpful information!

No Trainer/Speaker Notes Required



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