Measuring Quick and Creative Street Projects

An evaluation toolkit for practitioners and partners

February 2023
Cities and towns have realized the power of quick and creative projects as tools to address long-standing challenges like climate change, traffic safety, and transit equity. This toolkit provides practitioners and partners with guidance on carrying forward the important work of measuring projects using low-cost and repeatable evaluation methods.

During the COVID-19 pandemic, cities and towns across Massachusetts rapidly responded to transportation infrastructure and public space needs to help people socially distance. In 2021, we published *Quick and Creative Street Projects: Measuring the Impact in Mass*, a report that showcases rapid response projects and their impacts on people, businesses, and communities.

This follow-up report shares evaluation methods to help you measure the impact of your project and communicate them to your community. Most metrics are applicable to short-term demonstrations, quick-build projects meant to pilot a longer-term idea, and permanent reconstruction alike. Some metrics require longer-term data collection and are thus better suited to enduring projects. These evaluation tools can help you generate support for a project, refine project designs, understand changes in your community, and inform decisions on other projects.
For any project type:

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Use this toolkit to evaluate projects that:

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Start with the fundamentals

**Data Collection Fundamentals**

Evaluating a project is easiest and most effective when data collection is planned from the beginning. If you’re interested in demonstrating project impact, you will need to establish a baseline using data from before project installation. While some types of data can be obtained after a project is installed—such as travel data from cell phone applications or ridership data from automatic collection devices on board buses—often data must be collected before a project is installed to effectively demonstrate changes.

Even without a baseline for comparison, collecting post-installation data can still demonstrate the value of your project.

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**Scheduling Data Collection**

Selecting appropriate days and times for your data collection is essential for completing reliable and sound evaluations. When scheduling data collection, be sure to consider the following items that could impact your data:

- Seasonal changes including school schedules
- Holidays and festivals
- Roadway detours and construction
- Transit route closures
- Seasonal effects on travel and extreme weather events
- Other major events or disruptions

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**Taking Impactful Photos**

Photos are a powerful tool for communicating the benefits of your project, even without other data. Photos can quickly communicate how a project changed a street and can show the project in use by members of the community. When taking photos as part of your project evaluation, consider the following:

- Anticipate how you will use a photo ahead of time. Consider what locations will best demonstrate the project impacts.
- When taking photos—both before and after—pay attention to the photo’s composition and framing so that you will be able to create effective comparisons, create simple graphics with annotations, and see the surrounding context.
- Take photos during times of day with good lighting and when people are likely to be out and about.
- Include people in your photos. Take photos that avoid people’s faces, or ask for their consent to be featured.
Evaluation Process

1. Create a survey. Examples are provided via the links below in this toolkit. Keep the questionnaire brief—one page or at most two pages double-sided. It should be easy to fill out and available in the range of languages spoken in your community (and consider providing interpretation). Ensure online surveys are mobile compatible.

   - Pedestrian intercept survey templates are provided for crossing and walkway projects
   - Bike intercept survey templates are provided for bike lane projects
   - Transit intercept survey templates are provided for bus lane and bus shelter projects

2. Schedule survey collection. Surveys should be scheduled for a time when the most users will be using the project (typically morning or afternoon rush hours or busy times on weekends). Consider coordinating with local organizations to expand survey collection time periods.

3. Collect intercept survey responses. Intercept surveys can be collected through direct-surveying on-site or by directing people to an online survey through on-site advertising:
   - Collect intercept surveys at the project site. Collect intercept surveys at the project site. Choose a location to observe people where their behavior will not be influenced by your presence. Develop a quick (one sentence) pitch that invites people to stop and speak with you. Consider incentives—like a gift card raffle—to generate more responses.
   - Direct people to an online survey. Develop flyers or lawn signs to post at the project site. Ensure text is large enough to be read quickly. Consider using shortened URLs and QR codes to make it easy for people to find the online survey.

4. Analyze and share results. Download online survey data or translate written responses from the survey into a spreadsheet to create charts, summary statistics, and, if responses are sufficient, cross-tabulations by demographic groups.

Intercept Survey Primer

Intercept surveys (ask questions of people using the project) rely on getting the attention of people on-site to complete a brief survey about the project. In addition to asking people to complete surveys in real time, intercept surveys may be completed by directing people to an online survey via on-site signs, flyers, or other promotional material.

Start with the fundamentals

Incorporating Public Feedback

LEVEL OF EFFORT/COST

- Staff time
- Translation services (~$0.20 per word or $50 per page)
- Printed materials

SPECIALIZED SKILLS

- Basic data processing
- Online survey tools

Community feedback is an important qualitative and quantitative data source for evaluating your projects. For quick and creative projects, intercept surveys can be effective for collecting feedback from people who use a new street project the most.

KEY METRICS

Key metrics to evaluate using intercept survey data include:

- User perception of safety, enjoyment, convenience etc.
- General favorability of the project
- Opinion on future project scenarios (for example, making a demonstration project permanent)
- Differences of opinion across demographic indicators

BARNSTABLE, MA

90% of people surveyed like the project

75% want more projects like this

Photo credit: Jill Eshelman
Data Considerations
Though results from small sample sizes may be reported anecdotally, the higher the number of survey responses, the more credible the results. Be transparent about the number of responses for each question when sharing results. Without applying statistically rigorous methods to survey design, intercept survey results should not be described as representative. The tools provided in this toolkit will help you capture a non-representative sample, with a focus on obtaining responses from respondents who have interacted with the project.

Additional Resources
- The National Association of City Transportation Officials (NACTO) offers a Bike Share Intercept Survey Toolkit that includes templates, a question bank, Spanish translations, data entry spreadsheets, and a guidance document that contains best practices applicable to all types of intercept surveys.
- For detailed guidance on transit survey techniques, refer to TCRP Synthesis 63: On-Board and Intercept Transit Survey Techniques (2005)

PITTSFIELD, MA

"I like the North Street bike lane."

"I like the design of North Street."

AGREE
NEUTRAL
DISAGREE
I DON'T KNOW

"North Street feels..."

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<th></th>
<th>Safer</th>
<th>More comfortable</th>
<th>Easier to get to places</th>
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<td>% of Respondents</td>
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<td>Walking</td>
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58% of respondents confirmed they felt safe traveling on North Street;
74% of respondents confirmed they felt comfortable traveling on North Street.

Source: Adapted from City of Pittsfield North Street Pilot Project Evaluation Report (June 2022)
**Make streets safer**

**Vehicle Speeds**

**LEVEL OF EFFORT/COST**
- Staff time
- Data vendor costs ($200–$500 per location)

**SPECIALIZED SKILLS**
- Basic data processing

As one of the key predictors of severity in the event of a crash, measuring vehicle speeds can help demonstrate the safety impact of a project.

**KEY METRICS**

Key metrics to evaluate using vehicle speed data before and after project installation include:

- Percentage of vehicles speeding or traveling at high speeds
- Average, median, 85th percentile speed

**Why Speeds Matter**

Higher vehicle speeds lead to worse safety outcomes. In the event of a crash with a car traveling 20 mph, a person walking has a 13% chance of being seriously injured or killed. At 30 mph, the chance of death or serious injury increases to 40%. At 40 mph, the chance increases to nearly 75%.

**Evaluation Process**

1. **Select count locations.** Count locations should be collected along mid-block segments of a street. Locations that are too close to signals or intersections may show artificially low speeds. Be sure to consider the role topography plays in speeds when selecting locations for speed data collection. If adjacent land uses change throughout the project area, consider collecting counts at multiple locations.

2. **Determine count collection method.** Traffic and speed counts can be collected by contracting services with a traffic count provider or by using municipally-owned automatic count technology. Traffic count vendors can collect speed data relatively inexpensively. The range for speed data is about $200 to $500 per location for 24 hours depending on vendor travel needs and location complexity.

3. **Schedule data collection.** Ideally, data should be collected both before and after project installation. Consider the following factors when scheduling speed data collection:
   - Pre- and post-installation data should be collected during similar days of the week and times of day
   - Weekday counts should be collected on consecutive weekdays (Tues-Thurs).
   - Weekend counts should be collected during the day/time that you expect the most traffic.
   - Avoid collecting counts on days with active rain or snow events.

**BEFORE-AFTER SPEED STUDY OF SALEM ROAD DIET WITH SEPARATED BIKE LANES**

**ARLINGTON, MA**

25% drop in average vehicle speeds

Driving over the speed limit dropped 65%

*Photo credit: Erin Clark*
Vehicle Speeds

4. **Analyze and share results.** Using the provided speed study worksheet or your own spreadsheet, evaluate and illustrate speeds before and after project installation. If no pre-installation data is available, compare post-installation data to the street’s posted speed limit and/or speed thresholds that are safer, such as 25 mph. For easier data processing, communicate with your data collection provider to ensure data are tabulated and organized to suit your needs.

**Data Considerations**
- To improve data quality and reliability, collecting data over the course of several days is preferred over collecting only one day of data.
- For post-installation counts, allow adequate time (at least two weeks) after project installation for travel patterns to adjust.
- These metrics are meant to measure the impact of a project, not to establish speed limits. An engineering study to establish speed limits must follow MassDOT procedures.

**Additional Resources**
- NACTO’s guide, *City Limits: Setting Safe Speed Limits on Urban Streets*, provides a comprehensive overview of applying a safe systems approach to speed management across contexts. For additional information on conducting evaluations, see pages 82-89.

Photo credit: Erin Clark

SALEM, MA

- 8% drop in average vehicle speeds
- 61% drop in people driving over 40mph
Make streets safer

Crash Trends

LEVEL OF EFFORT/COST
• Staff time

SPECIALIZED SKILLS
• Basic data processing

At their core, all projects on our streets should share a common goal: to eliminate serious and fatal crashes. Monitoring crash trends is essential for measuring progress toward that goal.

KEY METRICS
Key metrics to evaluate using crash data include:
• Total number of severe and fatal crashes before and after project installation
• Percent of severe and fatal crashes before and after project installation
• Comparison of crash trends at a project site compared to a control sample
• Disaggregation of total crashes and crash severity by mode

Crash Course in Crash Trends

The design of our streets and public spaces have a strong impact on crash outcomes. Though it can take time to fully understand the traffic safety impacts of a project, evaluating post-installation crash outcomes can help demonstrate the importance of life-saving measures like traffic calming and other safety-focused investments and identify areas for continued improvement.

Evaluation Process

1. Identify evaluation time periods. To ensure your evaluation is based on a representative spread of crash data, crash trend analyses should be based on 3–5 years of data.

2. Collect crash data. Crash data may be collected through local files, often maintained by a police department, or through state data. The MassDOT Crash Data Portal contains data based on crash reports submitted by state and local police. The Data Query and Visualization dashboard allows for location-specific queries to be made and is the most useful for project-specific evaluations. When querying data ensure key fields of interest, such as manner of collision, crash severity, non-motorist type, crash time, date, and year are included in your results.

3. Analyze and share results. Using your own spreadsheet, evaluate and illustrate crash trends before and after project installation. You may also consider comparing trends to a control sample, such as a similar location where no street changes were made or municipal-wide trends.

Data Considerations

• Crashes involving people walking and biking tend to be underreported.
• Crash metrics should only be used for projects installed for multiple consecutive years.
• Your evaluation should consider whether the project location saw a dramatic increase or decrease in activity after installation and normalize to account for those changes.
• Comparing crash trends to a control sample can also be an effective way to evaluate the impact of your project if appropriate pre-installation data is not available. Data may be considered inappropriate to use for a before and after comparison if major disruptions to travel patterns occurred on or near your project site in the years leading up to the project (for example, a major construction project, global pandemic, or major land use changes, etc.).

Additional Resources

FHWA’s Road Diet Informational Guide report provides pre- and post-installation case studies from around the country.
Make streets safer

Allocation of Space

LEVEL OF EFFORT/COST

- Staff time

SPECIALIZED SKILLS

- Basic data processing

The allocation of space to different uses within our streets communicates a lot about our priorities. This metric often reveals the little or complete lack of street space allocated to people walking, biking, or riding the bus before a project is implemented—and how a project makes for more equitable use of street space.

KEY METRICS

Key metrics to evaluate using space allocation data include:

- Percentage of street space allocated to each use
- Carrying capacity of the street before and after project installation

Giving Space to What Matters

Illustrating street space allocation can show how changes to a street support safety and modal goals. In addition to highlighting how a project creates dedicated spaces for vulnerable users like people walking and biking, this simple analysis can also help describe carrying capacity impacts of prioritizing space-efficient modes, such as buses.

Evaluation Process

1. Select a location for evaluation. If your project has a relatively consistent right-of-way width and design throughout, any location may be appropriate. If there are variabilities in the right-of-way or the design changes throughout the project area, select a location that is most typical of the project or consider completing this evaluation for multiple locations.

2. Take cross section measurements. Using either in-field measurement, online tools (like aerial imagery), or construction plan drawings, record the cross-sectional width dedicated to different uses (walking, biking, transit, car, buffer, vegetation or landscaping, etc.). Ensure measurements are taken from the same spot for accurate before and after comparisons.

3. Analyze and share results. Using the sample street space allocation and carrying capacity worksheet or your own spreadsheet, evaluate and illustrate the share of space dedicated to each mode before and after project installation. While a simple chart—like a bar chart or pie chart—provides simple visual aids to communicate the results, consider other creative ways of communicating about space allocation, such as cross section illustrations with annotations or other diagrams.

Data Considerations

Consider noting whether your project area has temporal elements, such as time-restricted bus lanes.

Additional Resources

Streetmix is a free online tool that allows you to quickly create and download scaled cross-section images for your street. The tool also provides estimates of each lane’s carrying capacity.

BEFORE-AFTER COMPARISON OF STREET SPACE ALLOCATION FOR MALDEN’S BUS LANE PROJECT

MALDEN, MA

Reallocated 44% of street space to people riding the bus and biking

Serves 1,000 bus riders every day

Photo credit: Erin Clark
Support people who walk

Pedestrian Volumes

**LEVEL OF EFFORT/COST**
- Staff time
- Data vendor costs

**SPECIALIZED SKILLS**
- Basic data processing

Pedestrian volumes can show how many people walking are served by a project and changes in the number of people walking before and after project installation.

**KEY METRICS**
Key metrics to evaluate using pedestrian volume data include:
- Total pedestrian volumes
- Pedestrian volumes by time of day
- Change in pedestrian volumes before and after project
- Pedestrian volumes as a percentage of all person throughput

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### The Value of Pedestrian Data

For projects that fill gaps in the pedestrian network, highlighting pedestrian volumes can be a powerful metric and one that is not often collected. Especially in areas with high levels of pedestrian activity—such as near schools, trails, and main streets—pedestrian volumes can help quantify how important pedestrian access is to a transportation system.

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### Evaluation Process

1. **Select count locations.** For projects that add a new pedestrian crossing, selecting a count location will be straightforward. If you are interested in counting pedestrians along a new pedestrian walkway, like a sidewalk or path, ensure the locations selected for your count program take into consideration access points to the new facility, adjacent land uses that promote walking activity, and clear desire lines between destinations. The location type (intersection/crossing or segment) for your evaluation program may impact the data collection methods that are most suitable for your project.

2. **Determine count collection method.** You may gather pedestrian count data using either manual or automated methods:
   - For short-duration, manual counts provide a low-cost method for collecting pedestrian count data. Manual counts have higher labor costs and may require basic data collector training.
   - Automated counts commonly rely on video with image recognition software, infrared devices, radio beams, or pressure/acoustic pads. The cost for collecting automatic pedestrian counts ranges from around $25 to $75 per hour. If using automated count technology, ensure the software used can accurately and dependably capture pedestrian counts for all movements affected by your project. Automated counts are generally a better option for longer count durations.
   - If your project is on a trail or along another high-activity location, consider whether permanent counters are preferable to standalone volume counts. Permanent counters that provide separate counters for pedestrian and bicycle volumes cost approximately $10,000 including installation.

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### MODE SHARE BY STREET ALONG MAIN STREET IN NORTHAMPTON, MA

![Mode Share Chart](chart.png)

Source: City of Northampton, MA
3. **Schedule data collection.** Ideally, data should be collected both before and after project installation. All-day counts will provide you with more options for analyzing your data and will better show how people who travel outside of typical peak hours use the street. However, if you are constrained by time or budget, you may consider scheduling your count program around the hours of the day when activity is concentrated. Consider the following factors when scheduling pedestrian volume data collection:

- Pre-installation and post-installation data should be collected during similar days of the week and times of day.
- Pedestrian counts should be scheduled to capture peak pedestrian volumes. Consider how nearby destinations—like schools, restaurants, transit stops, etc.—are likely to impact pedestrian volumes on specific days of the week or times of day.
- Avoid collecting counts on days with active rain or snow events.

4. **Analyze and share results.** Using a spreadsheet, evaluate and illustrate key pedestrian volume metrics. Though pedestrian counts are powerful on their own, you may also choose to combine pedestrian volume data with other modal counts (like vehicle and bike counts) to demonstrate how pedestrian volumes relate to other modal volumes. This can be especially effective on streets where pedestrian volumes are high.

**Data Considerations**
To improve data quality and reliability, collect several days’ worth of data.

**Additional Resources**
- National Academies of Science, Engineering, and Medicine provides a *Guidebook on Pedestrian and Bicycle Volume Data Collection*.
- The *National Bicycle and Pedestrian Documentation Project* provides additional resources for extrapolating manual counts.
Limiting Pedestrian Exposure

With shorter crossings, pedestrians spend less time exposed to potential conflicts within the street. In addition, shorter crossings are far easier for people with mobility challenges to navigate. Shorter crosswalks can also improve crosswalk visibility by bringing people crossing the street within the field of vision of those traveling along the street in cars or on bikes.

Evaluation Process

1. **Measure crossing distances.** Crossing distance should be measured to provide an understanding of the total distance a pedestrian must navigate while potentially exposed to conflicts with motor vehicles. Crossing distance can be measured using a range of collection methods:
   - Distances may be collected using a measuring wheel or other measurement device in the field.
   - If you are confident that your project was installed according to prepared plans, you may also use concept or construction plans to measure crossing distances both before and after a project is installed.
   - Depending on the availability of aerial imagery before and after your project was installed, you may also measure crossing distance in Google Earth, Google Earth Pro, and/or an ESRI ArcGIS program.

2. **Analyze and share results:** The results of this analysis can be shown using words, charts, annotated images, and more. Though your measurements will likely be collected in feet, you should consider the best way to describe data for a general audience. Because a crossing distance in feet may not be meaningful to some people, you may wish to convert your crossing distance to walking time. To convert crossing distance to walking time, assume a person can cover 3 feet per second (based on national research).

Data Considerations

Because the purpose of this metric is to show pedestrian exposure, crossing distances should be measured to include all crossing space outside of a protected pedestrian area. In this case, bike lanes, parking lanes, and any other active travel spaces are included in the crossing distance. Buffer spaces and pedestrian refuge areas should not be included in the crossing distance.
When to Measure Yielding Rates

Whether your project installs a crosswalk at a high-demand location where no crosswalk existed before, reduces the number of travel lanes to help slow vehicles and improve visibility, or otherwise makes a crosswalk more visible, driver yielding rates can be a great way to describe the effectiveness of your project. This metric should only be used at unsignalized locations.

Evaluation Process

1. **Determine count collection method.** You may gather driver yielding data using either manual, on-site counts or by watching videos provided through automated methods and recording driver behavior:
   - For short-durations, manual counts provide a low-cost method for collecting driver yielding data. Manual counts have higher labor costs and may require basic data collector training.
   - For longer durations, it may be preferable to collect data using video. The cost for collecting these ranges from around $25 to $75 per hour. Ensure the service provider is aware that the camera must be set up to capture the edge of the crosswalk and approaching lanes. Once video has been collected, driver behavior must be documented by watching the videos and noting whether drivers yielded to people attempting to cross the street.

2. **Prepare data collection material.** Because all methods of identifying driver yielding behavior require some level of manual data entry, it is important to establish clear data collection sheets. A sample data collection sheet is provided. If preparing your own data collection sheet, ensure the following factors are accounted for:
   - Ensure the date and time of day for each crossing entry is recorded.
   - Ensure yielding behavior is only recorded when pedestrians are actively attempting to cross the street.
   - Ensure driver yielding behavior in all travel lanes and from all directions is documented.

**Key metrics**

- Percentage of drivers who yield to pedestrians before and after project installation
- Average and median number of drivers that yield to pedestrians before and after project installation

**Example driver yielding rate trend**

- 2017: 25% (Pedestrian crossing safety program launched)
- 2018: 35% (Portable message signs installed)
- 2019: 44% (Pedestrian hybrid beacons installed)
- 2020: 47% (Speed feedback signs installed)
- 2021: 
- 2022: 

Support people who walk

**Driver Yielding Rate at Crosswalks**

**Level of effort/cost**

- Staff time
- Data vendor costs

**Specialized Skills**

- Basic data processing

At unsignalized crosswalks, pedestrians rely on drivers yielding to safely and comfortably cross the street. Driver yielding rates help describe the experience pedestrians have as they attempt to cross the street.

**Key metrics to evaluate using crossing yielding rate data include:**

- Percentage of drivers who yield to pedestrians before and after project installation
- Average and median number of drivers that yield to pedestrians before and after project installation
3. **Schedule data collection.** Ideally, data should be collected both before and after project installation. All-day video counts will provide you with more options for analyzing your data and will better show how behavior changes throughout the day. For driver yielding behavior, nighttime observations may be especially important. However, if you are constrained by time or budget, you may consider scheduling your on-site data collection or reviewing video around the hours of the day when pedestrian activity is concentrated or when pedestrian risk is highest. Consider the following factors when scheduling driver yielding data collection:

- Pre-installation and post-installation data should be collected during similar days of the week and times of day.
- Collect data for a period of at least two hours.
- Avoid collecting counts on days with active rain or snow events.

4. **Analyze and share results.** Using the provided [driver yielding worksheet](#) or your own spreadsheet, evaluate and illustrate key driver yielding metrics.

**Data Considerations**

To improve data quality and reliability, collecting data over the course of several days is preferred over collecting only one day of data.

**Additional Resources**

[SFMTA Safe Streets Evaluation Handbook](#) (see page 21 for driver yielding behavior data collection procedure)
Make biking possible for more daily trips

**Bicycle Volumes**

**LEVEL OF EFFORT/COST**
- Staff time
- Data vendor costs ($25-$75 per hour)

**SPECIALIZED SKILLS**
- Basic data processing

Bicycle volumes can show how many people biking are served by a project and may demonstrate changes in ridership after a project is installed.

**KEY METRICS**
Key metrics to evaluate using bicycle volume data include:
- Total bike volumes
- Bike volumes by time of day
- Bike volumes before and after project installation
- Bike volumes as a percentage of all person throughput

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**Safer Bicycle Facilities Can Grow Ridership**

Nationwide research emphasizes the importance of bikeway quality for growing the share of people who travel by bike. Without feeling safe from vehicle traffic, most people will not consider biking for daily trips, even if they would otherwise be interested. After installing a high-quality biking connection, evaluating bicycle volumes can help demonstrate the connection between infrastructure investments and growing ridership.

**Evaluation Process**

1. **Select count locations.** When selecting locations for a bike count program along a new bike lane or path, ensure the locations take into consideration access points to the new facility and adjacent land uses that promote biking. If land uses change throughout the project area, consider collecting counts at multiple locations.

2. **Determine count collection method.** You may gather bike count data using either manual or automated methods:
   - For short durations, manual counts provide a low-cost method for collecting bicycle count data. Manual counts have higher labor costs and may require basic data collector training.
   - Automated counts commonly rely on video with image recognition software, infrared devices, radio beams, or pressure/acoustic pads. The cost for collecting automatic bicycle counts ranges from around $25 to $75 per hour. If using automated count technology, ensure the software used can accurately and dependably capture pedestrian counts for all movements affected by your project. Automated counts are generally a better option for longer count durations.
   - If your project is on a trail or along another high-activity location, consider whether permanent counters are preferable to standalone volume counts.

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**ESTIMATED MONTHLY BICYCLE RIDERSHIP SINCE IMPLEMENTATION OF DOUBLE-BUFFERED BICYCLE LANE**

Source: Adapted from City of Pittsfield North Street Pilot Project Evaluation Report (June 2022)
3. **Schedule data collection.** Ideally, data should be collected both before and after project installation. All-day counts will provide you with more options for analyzing your data and will better show how people who travel outside of typical peak hours use the street. However, if you are constrained by time or budget, you may consider scheduling your count program around the hours of the day when activity is concentrated. Consider the following factors when scheduling bicycle volume data collection:

- Pre-installation and post-installation data should be collected during similar days of the week and times of day. For post-installation counts, allow adequate time (at least two weeks) after project installation for travel patterns to adjust.
- Bicycle counts should be scheduled to capture peak bicycle volumes. Consider how nearby destinations—like schools, restaurants, transit stops, etc.—are likely to impact bicycle volumes on specific days of the week or times of day.
- Avoid collecting counts on days with active rain or snow events.

4. **Analyze and share results.** Using your own spreadsheet, evaluate and illustrate key bicycle volume metrics. Though bicycle counts can be powerful on their own, you may also choose to combine bicycle volume data with other modal counts (like vehicle and pedestrian counts) to demonstrate how bicycle volumes relate to other modal volumes. This can be especially effective on streets where bicycle volumes are high.

**Data Considerations**

To improve data quality and reliability, collect several days’ worth of data.

**Additional Resources**

- National Academies of Science, Engineering, and Medicine provides a [Guidebook on Pedestrian and Bicycle Volume Data Collection](#)
- The National Bicycle and Pedestrian Documentation Project spreadsheet provides resources to automatically convert manual counts into estimated weekly, monthly, and daily counts
- For information on how to set up a more comprehensive bicycle count program (including manual and automated counts), see NACTO’s working paper, [Making Bikes Count: Effective Data Collection, Metrics, & Storytelling](#)
Making Use of Available Data

Most bikeshare providers collect a wide range of data about total trips, trip patterns, user characteristics, and more. Depending on the level of detail available, bikeshare trip data can be used to describe many project impacts or trends, from general trip trends to location-specific patterns.

Evaluation Process

1. **Identify metrics to evaluate.** Because bikeshare data is often comprehensive, it can be important to determine what metrics you are most interested in exploring before digging into data. Depending on what metrics you are most interested in, you may only need to download and work with a small subset of the available data.

2. **Collect bikeshare data.** Currently, there are two major bikeshare systems in Massachusetts: Bluebikes, which serves communities in Greater Boston and ValleyBike Share, which serves communities in western Massachusetts. Both Bluebikes and Valleybike have a data dashboard that is available to member municipalities, which can help automate some analyses. Additionally, Bluebikes data is available through their System Data webpage. Publicly-available Bluebikes data includes time-stamped trip history data, user information, and station information which can be used in both data processing and GIS programs for more advanced spatial analyses.

3. **Identify relevant trips.** Within bikeshare data, you will need to filter trips to include only those trips that are relevant to your project evaluation. Trip data should be filtered by location to include origins and destinations that are impacted by your project. Use each trip’s start or end point to filter by location.

4. **Set evaluation periods.** Because bikeshare data tend to be continuous, there is no need to focus on a singular day or hour for your evaluation. In general, month-by-month or week-by-week comparisons offer reliable sources for data comparisons over time. When comparing changes in volume for bikeshare trips, use comparable pre- and post-installation times of year to account for seasonal variability.

5. **Analyze and share results.** Using your own spreadsheet, evaluate and illustrate key bikeshare metrics. For more advanced spatial analyses, data may be loaded into GIS applications and further analyzed in many ways. Though you may share results solely based on trips impacted by your project, it may be helpful to compare your project-specific results to system-wide or municipality-wide bikeshare trip data to account for other trends that may impact trips.

SALEM, MA

Over 1,200 bikeshare trips taken in October

Visitors make up over 75% of Salem’s rides

Photo credit: Scott Eisen
Data Considerations

- Large data sets, like those provided by bikeshare providers, often contain anomalies or outliers that should be cleaned. Before completing analyses, data should be reviewed for any major outliers (for example, excessively long trip durations). You may also consider filtering out any trips that may have been impacted by construction or other disruptions.

- Ensure all analyses account for systemwide bikeshare expansions, which can impact ridership even where stations already exist.

- Though other micromobility providers (like e-scooters) are not common in Massachusetts, these bikeshare metrics could be adapted for other shared micromobility modes.

- Today, bikeshare in Massachusetts is predominately operated through docked systems, whereby users must pick up and return bikeshare bikes to a specific location at the start and end of each trip. Dockless bikeshare systems—which allow a user to start and end rides anywhere—provide different types of data and can be especially helpful for measuring unmet demand.

Additional Resources

- For more advanced analysis support, real-time bikeshare data for systems around the globe are provided via the General Bikeshare Feed Specification (GBFS).

- A research paper, Estimating the Effect of Protected Bike Lanes on Bike-Share Ridership in Boston, provides an example of using bikeshare data as a proxy for general ridership.
Make the bus a better option

Key Bus Priority Metrics

**LEVEL OF EFFORT/COST**
- Staff time

**SPECIALIZED SKILLS**
- Basic data processing

Hundreds of thousands of people take the bus in Massachusetts every day. As investments in bus service performance and comfort are made, evaluating key bus metrics help tell the story of how changes to our streets make the bus a better option for all riders.

**KEY METRICS**
Key metrics to evaluate using bus trip data include:
- Route travel times
- Bus delay and variability
- Ridership
- Crowding

**MBTA Bus Priority Evaluation Support**
Because the MBTA operates service across many municipal boundaries, it is important for evaluation methods to be consistent from place to place. In recognition of this—and the complexity of bus performance data analysis methods—the MBTA is available for evaluation support to municipalities that install a bus priority project such as:
- Dedicated bus lanes
- Transit signal priority
- Queue jumps
- In-lane stops
- Stop relocation
- Stop consolidation
- Route change

To request data analysis support, fill out the MBTA Bus Priority Project Evaluation Request Form, available through the MBTA Open Data Portal. The MBTA can provide the following types of analyses:

- **Run times**: Analysis of the difference between median and 90th percentile travel times to show service reliability
- **Delay and variability**: Analysis of on-time performance compared to scheduled runs
- **Ridership**: Analysis of passenger load or the number of passengers on a bus upon leaving a stop and overall changes in ridership
- **Crowding**: Analysis of passenger load compared to seat capacity

**Guidance for Projects in Other Regions**
Municipalities outside of the MBTA service area should work with their Regional Transit Authority and/or regional planning commissions to obtain data for evaluation and/or request support for specific data analyses.

**Additional Resources**
- Before diving into large transit datasets, review this Transit Data Primer to understand where transit data comes from and how it can be used.
- Transit Matters provides an additional resource for MBTA data through their Data Dashboard, which shows rapid transit (subway and frequent bus lines) performance data, including travel times between stations, headways, and dwell times by day.

**BEFORE–AFTER BUS TRAVEL TIME COMPARISON IN EVERETT**

Traffic: continued to rebound (3%) after project installation

Bus Travel Time: 35% drop in median bus travel time after bus lane installed

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Light-touch Business Evaluation

Depending on project type and location, local businesses may be key stakeholders served by the project. Full-scale economic analyses can often feel out of reach as part of a project evaluation, or simply may not be feasible or appropriate given a project’s scale. However, lighter-touch approaches to measuring business activity near a project site can be completed using quick and creative evaluation methods.

Evaluation Process

1. **Identify data sources.** In most cases, business data at the project-level scale is not readily available. While it would be ideal to measure business impacts using data collected from sales receipts or sales tax data, these data sources are not readily available in Massachusetts. However, many metrics that speak to local impacts can be estimated through on-site observations and surveys targeted at business owners, managers, and patrons.

2. **Create surveys.** Keep the questionnaire brief—one page or at most two pages double-sided. It should be easy to fill out and prepared in a format or multiple formats that are easy to distribute (for example paper versions and online versions):
   - **Business owner survey sample questions** are provided to help you create surveys for estimating business revenue, changes in employment, and changes in seating capacity.
   - **Consider creating a patron survey** to capture a range of customer perceptions.

- **57%** of businesses interviewed across the state reported an increase in revenue because of their new outdoor spaces.

- **61%** of businesses interviewed across the state reported that space for outdoor commerce allowed them to keep themselves and their employees working.

For projects with a concentration of businesses nearby, evaluating local business indicators and perceptions can show measured, estimated, or perceived economic impacts of a project. These metrics can help draw a connection between the design of our streets and the health of our businesses.
3. **Schedule data collection.** Before beginning data collection, allow for an adjustment period to pass after project installation. The length of time needed to allow for adjustment and measurable changes will likely range based on the project type. A parklet project may see impacts fairly immediately, while bike lane or walkway projects may see impacts on a longer time frame (months or seasonally). Completing the same outreach at different intervals after project installation (for example, at one months, six months, two years, etc.) can help demonstrate changing perceptions and impacts over time.

4. **Distribute surveys.** Once surveys are developed, distributing them to target audiences is key. In some cases, door-to-door outreach to business owners/managers during times of the day that are not too busy will result in the best uptake rate. Consider reaching out ahead of time to determine what time of day is best. If there is a business district or other organized group that operates within the area, consider coordinating with them to help distribute the survey. Targeting patrons to complete surveys can be more challenging. Partnerships with local businesses to distribute and post flyers, provide on-table QR codes at cafes and restaurants, and otherwise spread the word can be effective for generating patron responses. On-site intercept surveys or handing out flyers to passersby during high-activity times may also help turn out responses from patrons.

5. **Analyze and share results.** Results from an evaluation of business indicators are often able to be quickly and clearly expressed through charts and graphs. In addition to sharing quantitative results, consider sharing quotes from business owners and patrons that provide a representation of project perceptions. Because your sample size for this work will likely be relatively small, ensure the sample size is noted, or describe your results in terms of absolute values instead of percentages.

**Data Considerations**

- Using a brief survey may mean you lack enough information to compare results between different businesses. How long the business has been open, its longer-term financial trajectory prior to the installation of the project, how long it has experienced the impacts of the project, and other factors can all have wide ranging and different impacts on businesses. Acknowledge that your data is more likely to be a snapshot of perception.
- Though results from small sample sizes may be reported anecdotally, the higher the number of responses, the more credible the results. Be transparent about the number of responses for each question when sharing results.
- Without applying statistically rigorous methods to survey design, survey results should not be described as representative. The tools provided in this toolkit will help you capture a non-representative sample, with a focus on obtaining responses from respondents who have interacted with the project.
Acknowledgments

This toolkit was made possible thanks to the generous support and guidance of the Barr Foundation.

To view more photos of quick and creative projects across Massachusetts, visit the Shared Streets and Spaces Photo Library at flickr.com/groups/sharedstreets/.

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Photo credit: Erin Clark