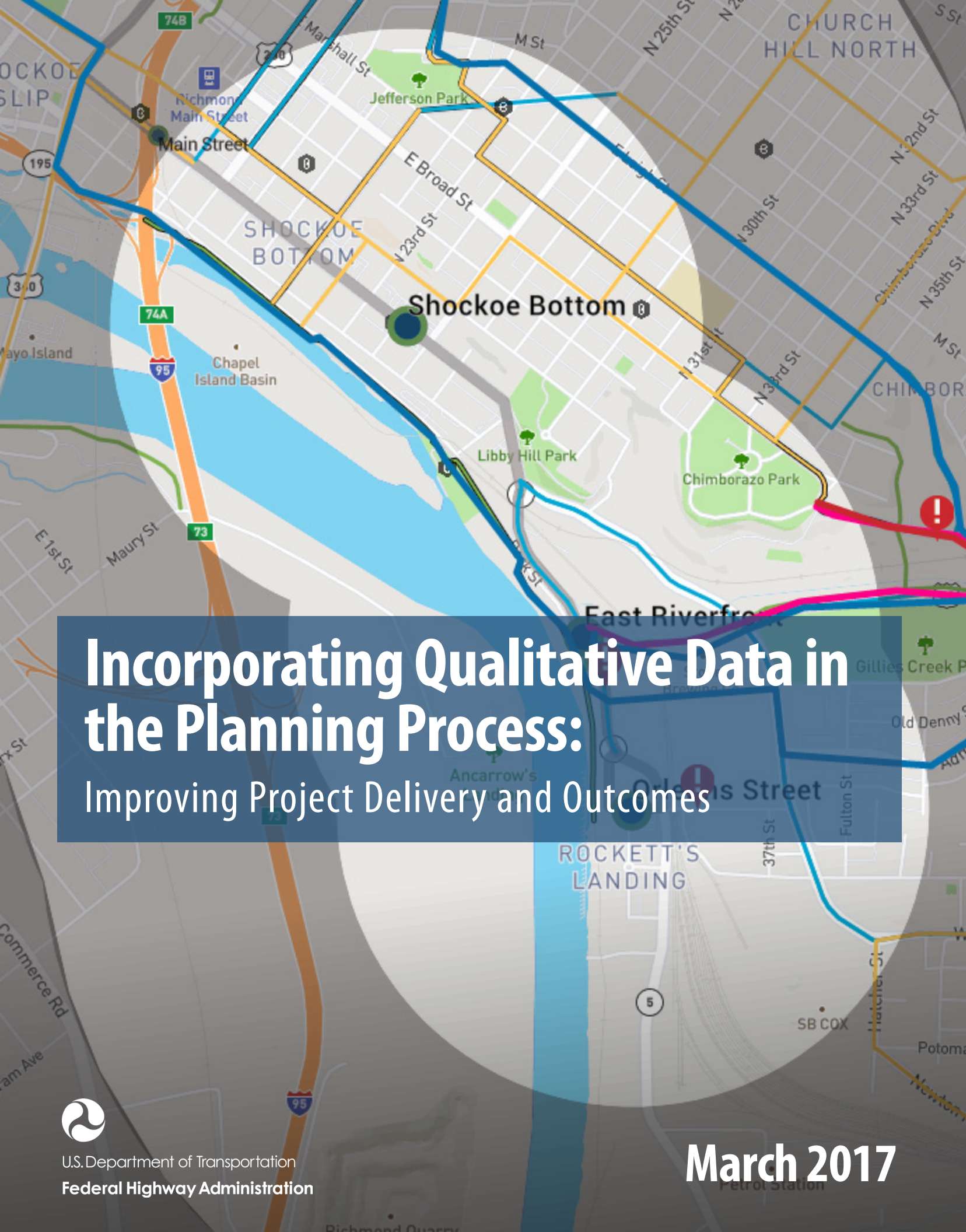

Incorporating Qualitative Data in the Planning Process:

Improving Project Delivery and Outcomes

U.S. Department of Transportation
Federal Highway Administration

March 2017

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Cambridge Systematics: Jay Evans, Nicole Waldheim.

Toole Design Group: Andy Clarke, Mauricio Hernandez, Wendy Phelps, Eli Glazier, Megan McCarty.

Sabra Wang and Associates: Brian Laverty, Mathew O'Connell, Jessica Hardway, Stephanie Maniwang, Lynn Shenk.

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Cambridge Systematics, Inc.
4800 Hampden Lane, Suite 800
Bethesda, MD 20814

Toole Design Group
8484 Georgia Avenue, Suite 800
Silver Spring, MD 20910

Sabra, Wang & Associates
7055 Samuel Morse Dr. #100

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13. ABSTRACT

This report highlights emerging tools, techniques, and resources for gathering qualitative public and stakeholder input to inform the planning process, improve project outcomes, and contribute to streamlining project delivery.

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Introduction

Public agencies are always looking for meaningful public and stakeholder input into the planning process. An ongoing challenge in this process is to engage the community in a relevant, ongoing conversation about change in a way that is focused, respectful, constructive, and intentional. This process should also be iterative, i.e. providing appropriate feedback loops, without being redundant. Planners have to balance the unique knowledge of community members who care deeply about the future of their street, neighborhood and local area with the technical expertise of transportation professionals, developers, interest groups, and others. This report highlights techniques for gathering qualitative data and incorporating it into the local planning process in order to provide local transportation benefits and reflect community needs in projects, while at the same time reducing project delay and streamlining project delivery.

The field of public involvement is one that is dynamic and rapidly evolving: new technologies, the advent of social media, and availability of more interactive techniques for gathering input into a transportation project, or community development initiative, have opened a number of exciting opportunities for public engagement. At the same time, if not used mindfully, these new tools can create their own challenges by gathering unmanageable volumes of data that may trivialize or dissipate valuable insights.

Similarly, while a well-executed planning and public involvement process can intentionally include voices that have traditionally been ignored or undervalued, such a process can inadvertently lead to fatigue and frustration in communities that are suddenly over-burdened with requests for participation. This is particularly true in economically disadvantaged communities (e.g. rural areas, communities of color) that are asked to host and participate in extensive outreach activities, often without relevant incentives. The lack of appropriate feedback, status updates, and relatable results can also heighten frustration and discourage future participation, and this can lead to project delays.

Furthermore, many communities are experiencing rapid redevelopment as urban areas continue to attract more people and jobs. The volume and interconnectedness of so much community development can result in a potentially confusing array of public meetings, listening sessions, charrettes, and surveys from multiple agencies and jurisdictions. While both agencies and jurisdictions all strive for a level of participation, they often only reach a similar and quite small sample of people and organizations.

Many public involvement tools and resources have been developed and catalogued within the library of articles, case studies, and best practices for practitioners provided by the **Federal Highway Administration (FHWA)** and other Federal agencies. This report provides a suite of emerging tools, techniques and resources for public and stakeholder input that, through a more iterative process, can complement existing tools. This report highlights tools and techniques that are applicable to three distinct types of public and stakeholder input. These supplement existing techniques to make the process

Too Much Data?

The Data-Information-Knowledge-Wisdom hierarchy – sometimes referred to as a pyramid, and often with "understanding" inserted between Knowledge and Wisdom – can help planners appreciate the many different inputs they must weigh before recommending a course of action. For example, crash data may provide ample evidence of a traffic safety problem but more information (e.g. location, contributing causes, etc.) is needed before a knowledgeable assessment of potential countermeasures, cost and impacts can be made. Wisdom, the only future-oriented level in the hierarchy, enables the practitioner to recommend a course of action that takes into account the potential for unintended consequences as well as local political realities, community values and other less tangible factors.

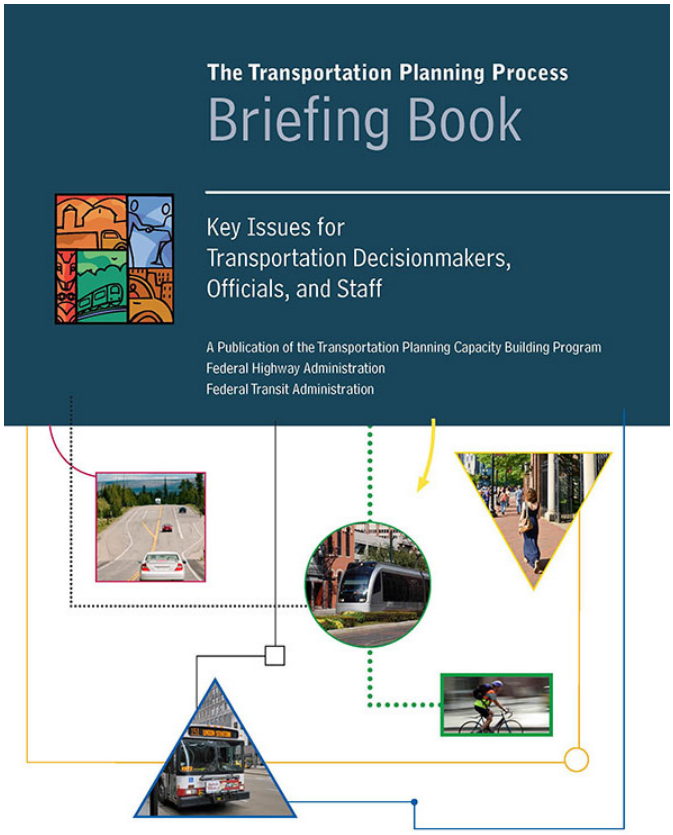

Figure 1: Transportation Planning Process Briefing Book (Source: FHWA)

of gathering input more accessible, engaging, productive and rewarding. More specifically, this report is intended to supplement FHWA's Transportation Planning Process Briefing Book available at: **https://www.fhwa.dot.gov/planning/publications/briefing_book/.**

The three types of input are:

1. Generating ongoing dialogue through focused public and stakeholder meetings (Dialogue).
2. Providing experiences through which those directly affected by change can better understand the options and potential outcomes of particular projects (Experiential).
3. Interactive opportunities to capture voices and input from people that may not want or be able to participate in traditional public meeting formats (Interactive).

Generating an Ongoing Dialogue

An effective public and stakeholder involvement process in a planning project tends to generate genuine dialogue among and between the interested parties and affected communities. During the course of a planning project, the nature of that dialogue might cover several distinct phases, each potentially using different techniques to generate input and provide feedback.

In the initial phase of a planning project, the focus is typically on listening and discovery, as the big picture goals, concerns, challenges and opportunities are identified from the perspective of all stakeholders. This may be followed by a more informative discussion of potential options for achieving those goals, to determine which solutions are worth further exploration. Tools and techniques used in this stage should confirm that the goals set by the community have been understood. Stakeholders also need a clear understanding of where, when and how their input is to be requested, and how it will help shape the project or plan in question.

The next phase, identifying and determining the appropriate solutions, often requires more detailed, technical and/or site specific knowledge from particular groups of people or stakeholders, e.g. technical experts, community representatives, end users, or customers. Dialogue throughout this phase may be with small groups or individuals – much more qualitative in nature than earlier in the process.

The dialogue continues as the recommendations are presented back to the stakeholders. At this stage, those recommendations should reflect the goals of the community, be firmly grounded in local knowledge, and be technically feasible. At this point, the dialogue shifts to matters related to implementation. Techniques for effective ongoing dialogue include:

Pop-up meetings

Pop-up meetings are used in an increasing number of regional and state planning efforts to expand the reach of the public engagement components of those plans. Project resources are effectively leveraged by engaging and empowering key partners to play an active role in outreach activities. Partners may include local community-based organizations, planning staff in smaller jurisdictions, church boards, neighborhood associations, advocacy groups, and other civic organizations who are authorized to collect public input at a wide range of community events and meetings. Venues may include Farmer's Markets, school events, cultural fairs, sporting events, and neighborhood/ homeowner meetings among others. Examples of tools to support pop-up meetings include, but are not limited to:

- A Presenter Guide with a user-friendly explanation on how to use the event to collect community input.
- A short, compelling power point presentation with speakers' notes outlining the goals of the plan and soliciting input on safety, access and connectivity needs.
- A poster-sized map that asks participants about their transportation habits/practices and any potential safety hazards they've encountered.
- A flier summarizing additional opportunities for engagement.

Pop-up meetings often include engagement activities for both kids and adults, for example asking them to provide input about their transportation choices and preferences. Each activity is designed to be simple, easily replicable, and cost effective. They are also designed to allow the boards to be stationed, un-staffed, at a variety of locations (e.g., libraries, community centers, and schools). The goal is to enable participants to provide input, for the partners to gather and record the input, and to use that input in the development of the [transportation] plan.

In the examples shown (Figure 2 and Figure 3), community members were asked to provide

Figure 2: Public providing input at pop-up meeting

information about the destinations that are most important to them. Feedback was also requested related to particular characteristics of streets that make them easy and enjoyable places to walk or bike in. Following this exercise, partners tallied the votes in the different categories and captured the experiences from the activities before submitting the final information via online form. This allowed planners working on the project to easily aggregate and understand opinions gathered about the different built environments and facilities.

Public Meetings

Public meetings are the foundation of most public and stakeholder outreach strategies. The Federal Highway Administration describes them as "widely used to achieve a basic level of community input and to exchange information with a range of residents. Public meetings are optional and are tailored to agency and community needs. The public usually prefers meetings over formal hearings because meetings do not have a public transcript and there is

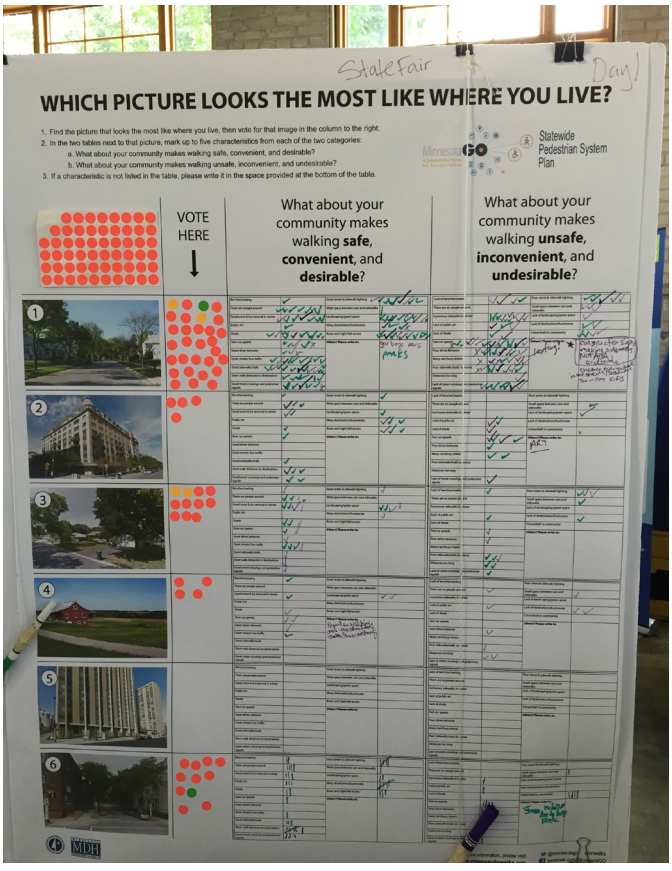

Figure 3: Feedback received at pop-up meeting

less pressure to speak in front of a large audience."[1] Successful public meetings typically allot sufficient time for a presentation, a public discussion (or question and answer session), and a summary of outcomes.

It is important however, to determine what purpose a public meeting serves at different stages of the planning process, prior to conducting each public meeting. This can help guide the choice of format for the meeting. Options include:

1. Inspirational: establishing a vision, mission and goals for a plan or project. An inspirational speaker or presentation followed by activities that elicit powerful emotions, desires, and long-term goals is a great way to initiate a project
2. Informational: longer planning projects with multiple phases and numerous moving parts can benefit from a clear explanation of the overall process, the points at which the public and other stakeholders are involved, and the dates for major milestones and deadlines
3. Influential: public meetings often involve the public and stakeholders in choosing between different options, establishing priorities, or approving recommendations.

Stakeholder Meetings and Focus Groups

Stakeholder meetings and focus groups are also common techniques to gauge public opinion, concerns, needs, wants and expectations. These are often smaller group discussions allowing participants to engage in a more specialized discussion about specific issues as well as confirming goals and objectives. Focus groups are best run by a facilitator trained in keeping groups to an agenda and eliciting opinions from all participants. These meetings tend to be shorter than public meetings as topics and the discussion period tends to be more focused.

1 Public Involvement Techniques for Transportation Decision-making. U.S. Department of Transportation. Federal Highway Administration. Obtained from **https://www.fhwa.dot.gov/planning/public_involvement/publications/pi_techniques/fhwahep15044.pdf** on December 15, 2016.

New Resource

Intercept surveys—a selection of questions asked to a random sampling of bike share riders or passersby about their current trip, travel patterns, or attitudes and beliefs —are a tried-and-true method of gathering transportation information.

They are especially effective at reaching casual bike share users, people on their own bikes, and people who aren't riding; linking behavior and perceptions to demographics; and targeting specific geographic areas. Intercept surveys' unique characteristics make them well suited to capture data missed by other methods and are better at reaching members of lower-income communities.

NACTO's Bike Share Intercept Survey Toolkit gives detailed instructions and a bank of over 100 pre-tested questions for creating and carrying out methodologically sound on-the-street surveys, allowing you to learn more about the needs and attitudes of all members of your community. The time and cost savings mean that you can reach more people, ask more questions, and perform more in-depth analyses.

The NACTO intercept Survey Toolkit can be downloaded from: **http://nacto.org/interceptsurveytoolkit/.**

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Creating Experiential Public Engagement Opportunities

While pilot, experimental, and demonstration projects have been used for decades in the field of transportation planning and engineering, the advent and emergence of experiential public engagement opportunities such as those put forth by **PlaNYC** and the Dallas-based **Better Block Project**, have heralded a resurgence in temporary experiential place-making in American communities.

One of the advantages of experiential techniques that temporarily demonstrate what changes are possible or proposed, is that stakeholders (e.g. residents, retailers, etc.) can experience first-hand the effects of changes in roadway design, without anything being done permanently. This type of public engagement helps to inform perceptions, increase knowledge, and shape perspectives in a way that a presentation or display boards can rarely manage. Capturing the emotional responses of participants is more challenging, and also considerably more rewarding and informative than raw data from a survey or poll.

Dramatic projects like the large-scale **pedestrianization of Times Square** in New York, and the creative "**Putting a New Face on Old Broad**" in Memphis, Tennessee opened the eyes of residents and visitors alike to new possibilities in the life of their communities – on a temporary basis. Similarly, people who have never driven or ridden on streets with bike lanes, roundabouts, or speed humps can get that experience for a few days with the help of temporary applications such as tape, chalk, plastic cones and movable rubber ramps.

In the Virginia town of Warrenton, for example, conversations about the future growth and development of the community and its historic downtown have been intensifying in recent years. There is a general consensus on a "vision" for the community that embraces walkability, complete streets, and an active lifestyle for all ages – while simultaneously wanting to ensure continued economic vitality and historic preservation. When it came time to translate that vision into action, the town hosted a series of Walking Audits (see below) to help residents and key stakeholders better understand what choices and decisions lay in front of them as they balance livability, economics, and preservation. As the town writes a new Comprehensive Plan to guide them through 2040, they will have a more informed conversation and be better equipped to grapple with parking issues, pressure for new housing and retail development, heavy traffic on a busy regional bypass, and implementation of a trails plan and complete streets policy.

Walking Audits/Assessments

A walking audit or walk assesment is an opportunity for community stakeholders to experience walking and bicycling conditions, share perspectives, and build consensus around potential solutions. Walking audits provide a focused assessment of the existing active transportation network at specific locations (e.g. schools), corridors or neighborhoods. Planners and designers use the information collected during the assessment to provide a list of recommended infrastructure improvements that can help a community address the gaps in its bicycle and pedestrian infrastructure. In turn, the recommendations can be used to seek funding for specific infrastructure improvements.

Organizers of a walking audit have to balance the safety of participants with the desire to provide an authentic experience of walking along streets that are often not very walkable. A police escort, for example, can assist in getting people across a busy intersection or along a stretch of roadway with no sidewalk – and at the same time can dramatically improve driver behavior and create a false sense of what really happens under normal conditions. Similarly, it is important to consider holding walking audits at night or in dusk conditions. The walking environment changes dramatically when lighting is poor.[2]

2 **https://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa12018/** and **http://www.pedbikeinfo.org/data/library/details.cfm?id=3955**.

Figure 4: Walk audit in Warrenton, VA

Open Streets / Better Block events

Open Streets events temporarily open a street or small network of streets to let people walk, run, bike, skate or even dance and socialize in public space that is ordinarily allocated exclusively for motor vehicles. Open Streets events effectively promote awareness of the benefits of active transportation and build support for the implementation of more comfortable and connected facilities for all users.

Better Block events also use street space that is temporarily reallocated from car traffic. Planners and designers install temporary or "pop-up" facilities such as separated bike lanes, parklets and protected intersections using chalk paint, traffic cones, planters, and duct tape to construct the temporary facilities. These pop-up infrastructure demonstrations help test concepts and different facilities, enabling planners and designers to learn from the behavior of participants in a controlled and fun environment. They can also engage with participants to gather direct feedback on their experiences and perceptions.

Indoor Facility Demonstrations

Indoor demonstrations allow the public to experience the engineering treatments in an even more controlled environment. Unlike open streets events, indoor facility demonstrations tend to focus more on experiencing and gauging the public's opinion about particular facilities rather than building support for complete streets. Because these events are held indoors, they can be implemented year round.

Figure 5: Volunteer Installing Temporary Facility in Open Street Event in Howard County, MD

Figure 6: Open Streets Event in Howard County, MD

Figure 7: Indoor Facility Demo in Montview, CO

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Increasing Engagement Through Interaction

Rapidly changing technology and competing demands for the attention of people, have increased the challenges inherent in encouraging people to attend public meetings and contribute to a community planning initiative over an extended period of time. In recent years, Millennials or Generation Y (defined as those born after 1980 and reaching adulthood at the turn of the 21st Century) are frequently cited as the target audience for City policies on transportation, housing, development, recreation, etc. However, persuading this demographic to participate in a traditional public meeting to share their preferences or views on a topic is challenging.

Public involvement techniques are evolving to take advantage of new technology so people can express their views, share their local knowledge, and contribute to community conversations in their own way, and on their own schedule. These new tools and techniques can also better serve people with disabilities, or economic challenges, which prevent their participation in more static, traditional public outreach programs.

A simple example is the online interactive crowdsourcing map (see below), often used in bicycle and pedestrian plan development in communities across the country. Such maps are digital, on-line maps of a particular project area which can be accessed at any time of the day or night, throughout the life of the project. The map prompts users to identify roadways and intersections of concern, favorite routes, crash locations, bike share locations, and even possible improvements. Such maps allow users to also comment on other users' comments, and the data is easily assembled to identify patterns, themes, and specific recommendations. Users can readily be updated on progress, and invited to participate in subsequent phases of the work – without ever having to travel to attend an in-person meeting.

Using interactive techniques to gather input from sources who might otherwise be left out is important, and it is also critical to keeping people engaged and involved throughout a longer planning process. Online surveys and games can continue a conversation, constantly checking that approaches and recommendations are valid and that issues have been properly understood. Target audiences

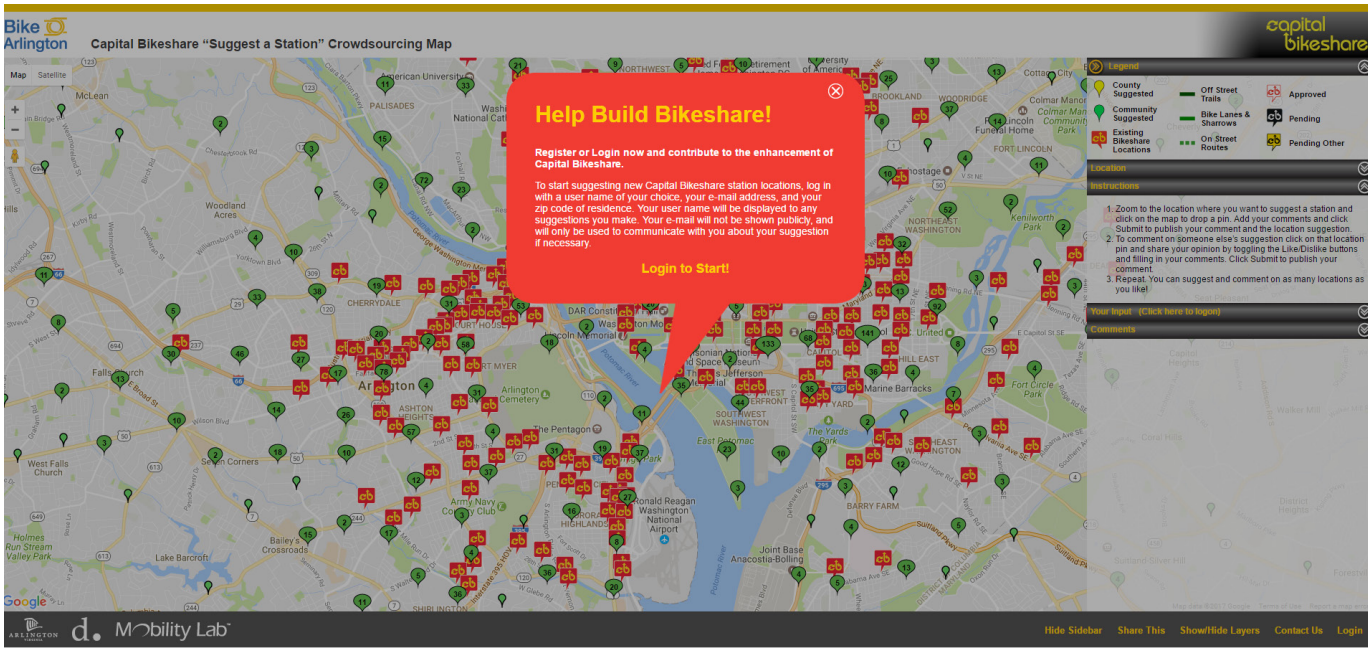

Figure 8: Online interactive crowdsourcing map for Capital Bikeshare (Source: Capital Bikeshare)

can be refined to maximize response rates and gather information that is unique and site specific, as well as capturing overall public sentiment. It should be noted however, that because accessibility to new technologies through the use of computers or cell phones can present a barrier for some, transportation planners and officials should continue to identify ways to gather public feedback from all sectors of the community.

A number of interactive resources to enhance the planning process have been identified:

Wikimaps

A wikimap is an online interactive crowdsourcing map designed to both inform and gather feedback from stakeholders and the general public. A wikimap serves as an additional tool to engage the public, particularly those who might not usually attend traditional public meetings or provide project feedback via a traditional online survey. Wikimaps allow planners to gather both point and linear public feedback on opportunities and issues related to a transportation network. It also affords a space for the general public to provide opinions on specific recommendations and plans for corridors and points alike. Wikimaps are versatile and can be used in a number of different ways to collect the following information from the public:

- Types of user (i.e., bicyclist, pedestrian, transit user, etc.)
- Socio-economic and demographic information
- Walking, biking and transportation practices
- Preferred routes for transportation and recreation
- Gaps in the bicycle, pedestrian and general transportation network
- General barriers to walking and biking
- General roadway hazards
- Destinations
- General opinions about the recommended improvements
- Prioritization of recommended improvements
- Rate the importance of this recommendation

Following the data gathering process, project planners are able to organize it in a GIS format and can help to inform how an area of study is determined, what corridor treatments to prioritize, specific intersections in need of further study, and many more issues.

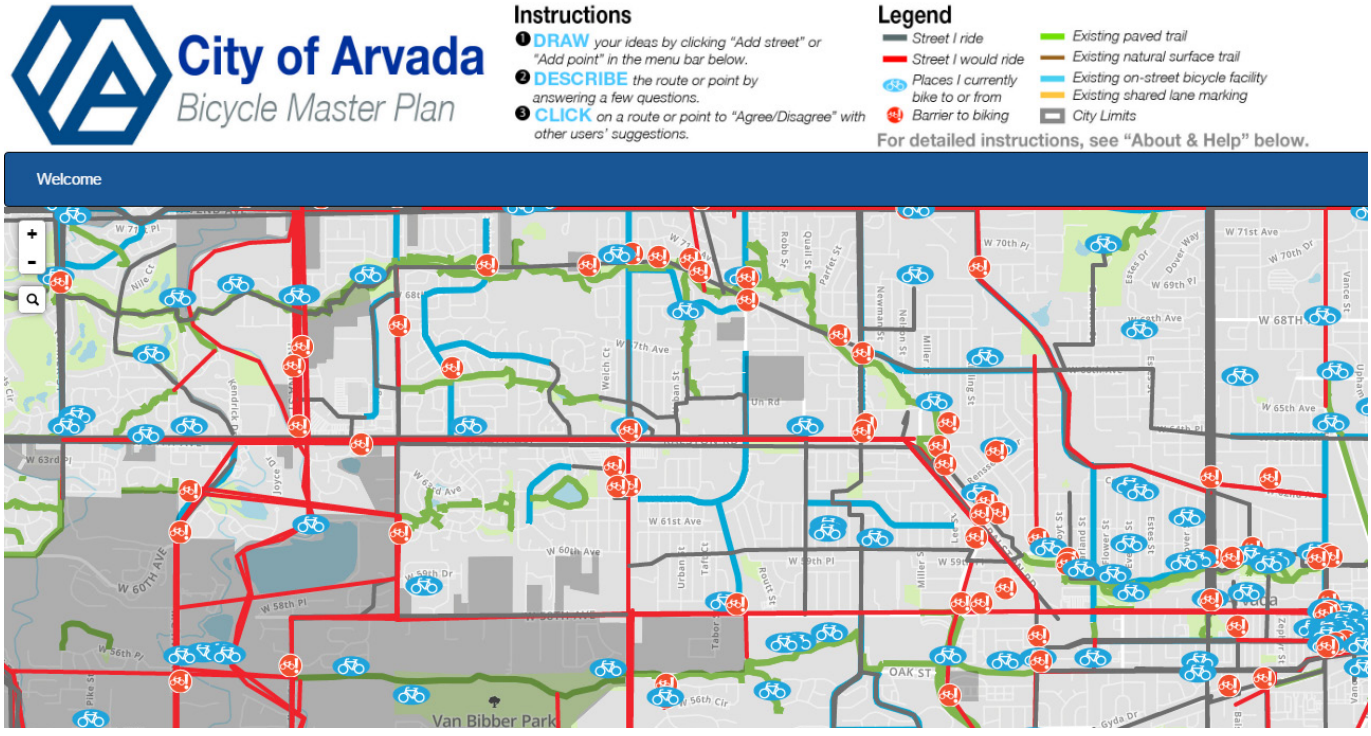

Figure 9: City of Arvada, CO Wikimap

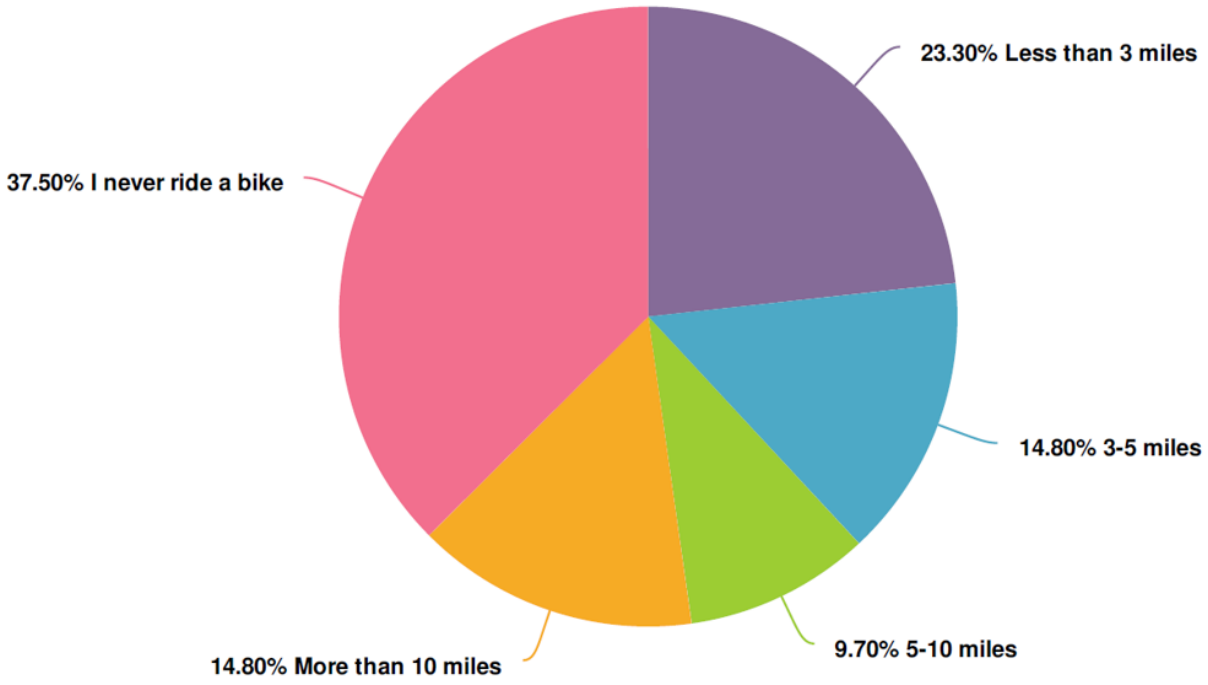

Figure 10: Summary Result for online survey in Austin, TX region

Online Surveys

Online surveys provide a space to assess public opinion on particular topics. Usually agencies administer such surveys to a sample group which can be representative of the larger group. Such surveys give insight into public reactions or options to particular topics. Online surveys can test opinions about particular elements of plans and can help identify community concerns.

Informal online surveys are relatively inexpensive as they can be developed and disseminated by project staff as part of the larger public meeting efforts. Scientific surveys tend to be expensive because of the need to draw a representative sample of the population. They can also be more time consuming to administer and analyze because of the structure of the questions. Furthermore, incentives may need to be created to generate enthusiasm for completing the survey.

Some of the drawbacks of surveys include the lack of dialogue or discourse with the community as the public only has to answer a few questions to generate feedback. Additionally, questions in informal surveys can contain unintended biases that can have negative effects on the feedback provided. Should a more comprehensive scientific survey be preferred, such surveys can be more time consuming and may divert some resources away from the transportation planning process.

Video feedback

There are a number of concepts in the transportation planning process that can be difficult for the public to confidently understand, and provide feedback on. One such concept is the Bicyclist Level of Traffic Stress and how it relates to the perception of safety. To help illustrate and explain the concept of traffic stress, transportation planners and designers have used video feedback surveys. Through these video surveys, participants are asked to watch a number of videos filmed from a bicyclist's point of view in various traffic

Figure 11: Level of Stress video capture for Charlotte, NC

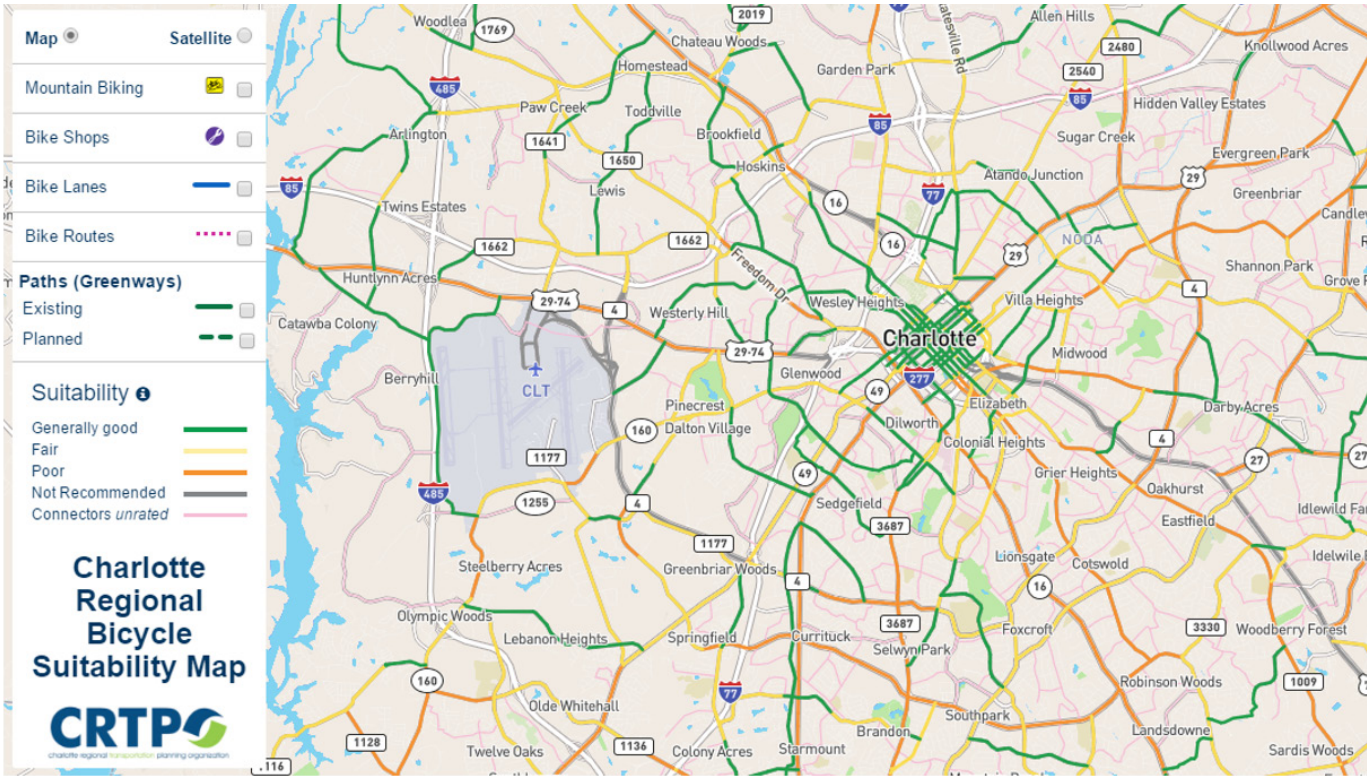

Figure 12: Screenshot of interactive online map providing information about level of stress

conditions. The videos can also be used to help build consensus about what each stress level may represent for different types of cyclists (ex. experienced versus novice), and allows the public to aid planners in tailoring their level of traffic stress analysis to the local context.

Feedback received from the public can also help planners and designers develop interactive maps that help the general public select the most appropriate and comfortable bicycling routes. Such maps can also help the transportation planning process by informing facility improvements that create a network based on level of comfort.

For example, in Charlotte, North Carolina, video feedback surveys were used to ask the public if they agreed or disagreed with planners' determination of bicycle stress on local roadways. The public was also asked to indicate whether they thought the stress level of a particular roadway should be higher or lower and why. The feedback received helped project

Figure 13: Screenshot of streetscape created with Streetmix (Source: Streetmix)

Figure 14: Live 'analog' version of Streetmix

planners make appropriate changes to the level of traffic stress model to account for local perceptions.

Streetmix

Streetmix is an online interactive tool that allows users to design and experience a street cross-section using a computer. This online resource allows users to add various facilities and amenities including trees, bicycle lanes, traffic lanes and sidewalks among others to the streetscape. The tool also allows users to widen or narrow each of the facility types based on the right of way dimensions and constraints. This tool has successfully been used by planners to demonstrate how different Right-of-Way constraints may affect the implementation of a number of facilities. Additionally, it has allowed the public to be engaged in the evaluation of facilities based the local priorities and goals as well as the budgetary constraints.

More recently, based on feedback received by community members, the project team constructed an "analog" version which included scaled down printouts of a number of facilities (ex. Bike lanes, sidewalks, buffers, trails, etc.) and allowed the public to construct their dream street cross section. This in turn provided planners feedback about the public's preferences for different types of facilities.

Data Hacks

Data hacks are events that encourage people to use their skills in digital technology, analysis and design, to help visualize data in ways that is easily understandable by many people. Such events also focus on building solutions to real world problems. Such solutions may include online and mobile applications, analyses using open public data and even increase support for particular issues or projects.

In 2012 for example Hubway (Boston's bike share company) challenged the public to visualize its

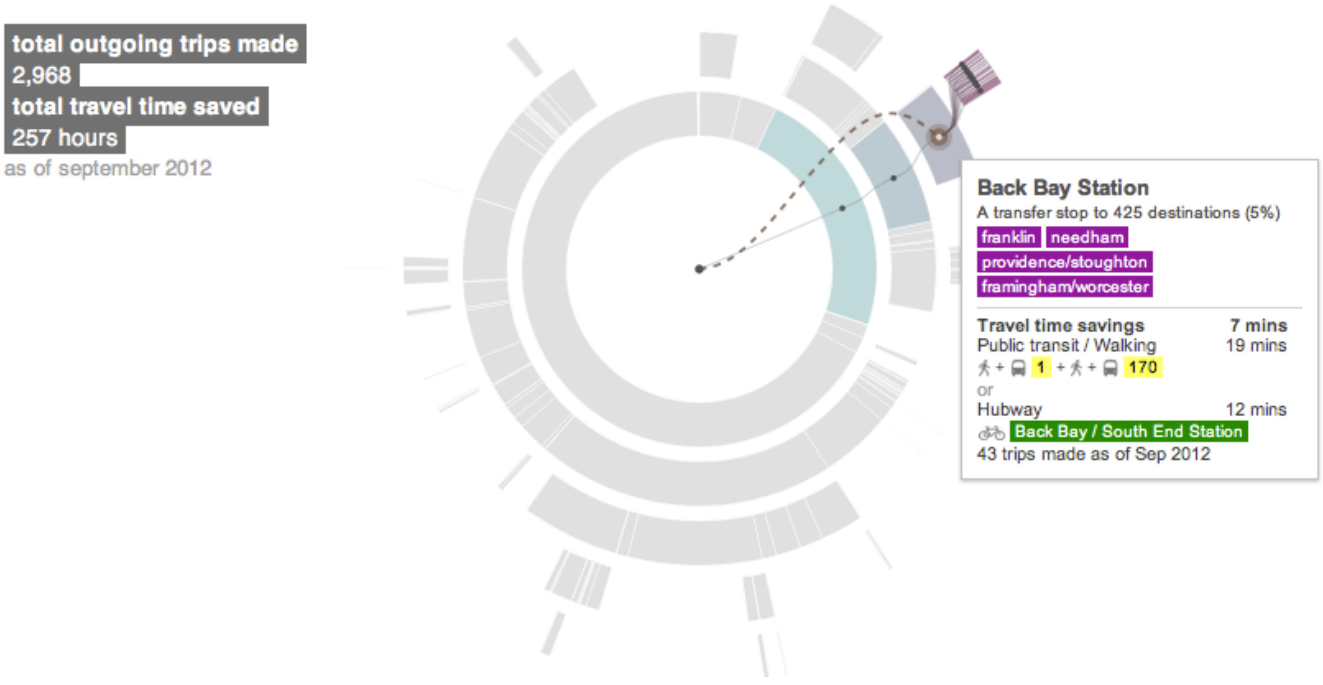

Figure 15: Hubway Data Challenge visualization (Source: Hubway Data Challenge)

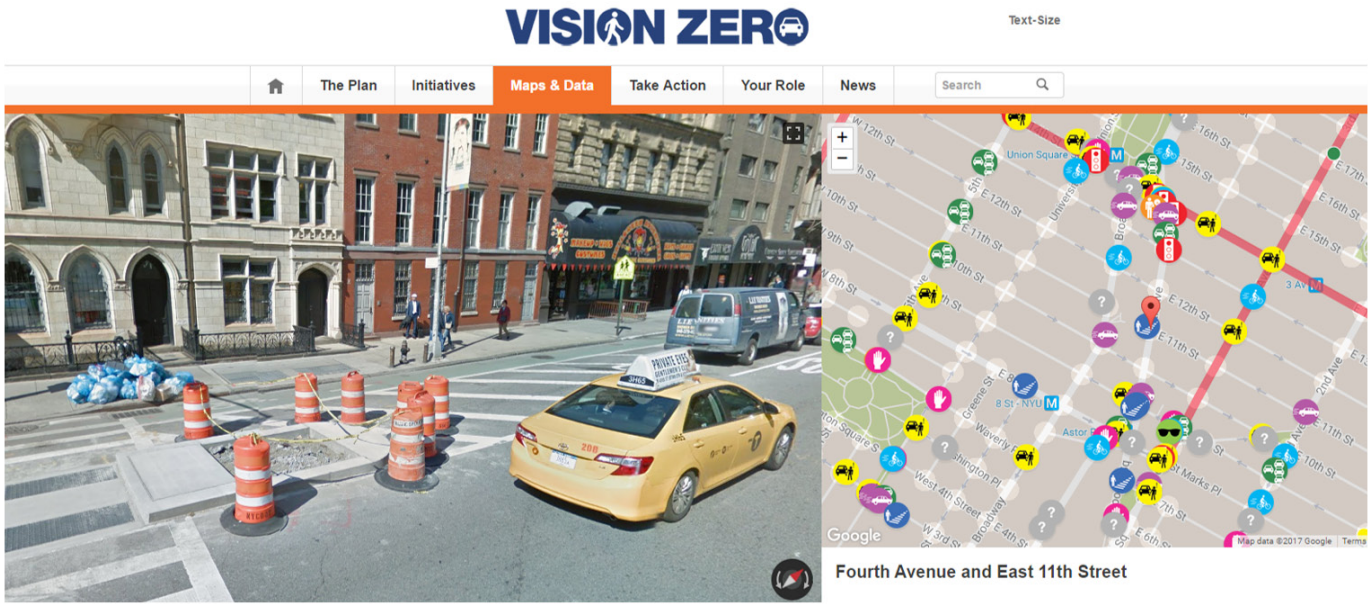

Figure 16: Screen capture of NYC; s Vision Zero interactive tool (Source: NYC Vision Zero)

ridership data to help explain ridership patterns, bike share usage, and even the relationship between the built environment and savings in transportation costs. More information can be found at: **http://hubwaydatachallenge.org/**.

More recently the city of New York developed an online map that aggregates information from the City's Department of Transportation to display detailed information on traffic injury and fatality crashes in New York City and highlights how the city is responding every day to making its streets safer. The map includes information on bicycle, pedestrian and motorist crashes throughout the five boroughs and provides updates on infrastructure projects designed to make streets more comfortable and safer for all users.

This map also has a complementary tool that allows residents to add commentary and let city staff know where issues still exist. The map allows each user to drop a pin on the map and add comments depending on the issue they may have. This data is then analyzed by city planners and engineers and used to develop countermeasures to address each issue. More information can be found under: **http://www1.nyc.gov/site/visionzero/maps-data/maps-data.page**.

Conclusion

This document is intended to help practitioners better match public involvement tools and techniques to the appropriate phase(s) of a planning process so that input is mindfully gathered and effectively used to inform the process and deliver results.

These tools and techniques can be used to engage the public and stakeholders in an iterative planning process that keeps people informed, continuously improves the quality of "the plan", and ensures the final recommendations accurately reflect the original vision and goals of the project.

In doing so, agencies can identify and provide higher quality local transportation benefits and better reflect community needs as part of their projects. This will help to reduce project delay and streamline project delivery.

Richmond, Virginia Case Study

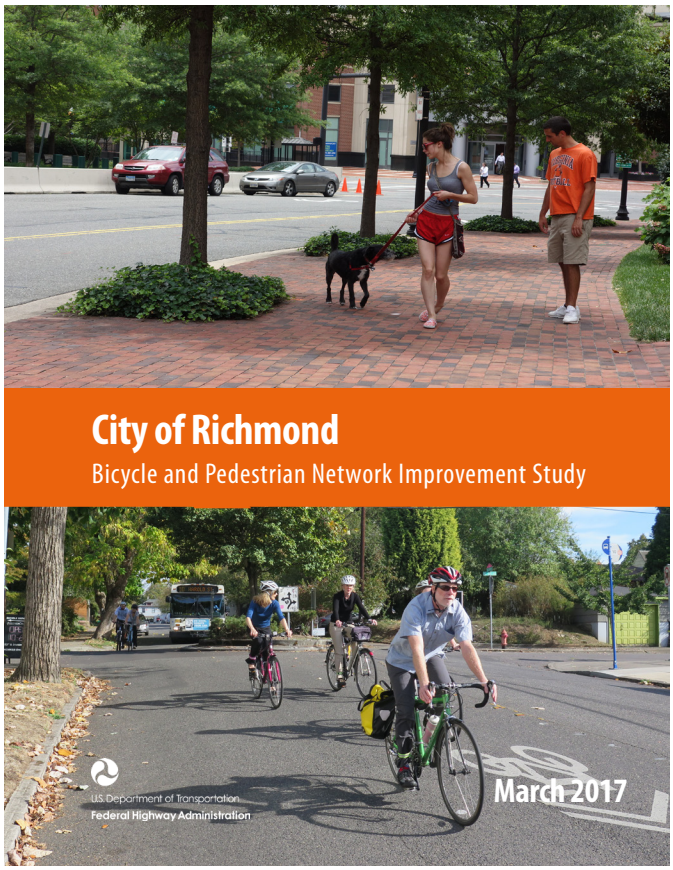

Figure 17: City of Richmond Bicycle and Pedestrian Network Improvement Study

In September, 2016 the Federal Highway Administration, in partnership with the Federal Transit Administration and the City of Richmond, undertook an effort to develop recommendations for improving bicycle and pedestrian access to seven stations along a new Bus Rapid Transit corridor in Richmond, VA.

Early in the review of existing plans it was apparent that extensive public outreach had already informed the selection and development of the BRT corridor, known as The Pulse, and was continuing through the implementation phases of the project. The Greater Richmond Transit Corporation (GRTC) had built support for a higher-speed and more frequent bus service along key corridors in and around the core city of Richmond. BRT was identified as one solution to achieve this goal and several potential BRT corridors were identified. A two-year dialogue with the community helped to select the first route (The Pulse) and identify station locations.

There was no need to duplicate that outreach, especially as "improving pedestrian and bicycle access and safety" along the corridor was already a topic of considerable interest. However, there was still a need to translate that general expression of interest into specific, actionable recommendations. In turn, those recommendations needed to be fed back into the final planning and implementation of The Pulse BRT service.

During the course of the Richmond BRT project, stakeholders expressed some confusion about the need for a study of pedestrian and bicycle access to stations along The Pulse corridor. In addition to the extensive outreach for the Pulse corridor itself, the city had recently completed a bicycle master plan with extensive public input; a study was already underway to evaluate Transit Oriented Development (TOD) opportunities along the corridor. Richmond neighborhoods such as the historic Greater Fulton area had their own existing area plans and were already working with the FHWA to improve accessibility through their Ladders Transportation Empowerment Pilot (LaddersTEP) initiative.

As a result, a conscious decision was made not to hold traditional public meetings but instead to focus on more qualitative and targeted outreach activities to gather the necessary input into the station area studies. The study team developed a set of detailed station-area recommendations for improving pedestrian and bicycle access to the proposed BRT stations, using several of the techniques described in this report, including a wikimap, targeted stakeholder meetings, and innovative data collection tools.

Wikimap

Prior public outreach had established a general sense that residents along The Pulse corridor wanted to be able to bicycle safely to the BRT line – both to use the service and to access Broad Street and Main Street through the heart of the City. A wikimap was used to gather specific information from people with first-hand

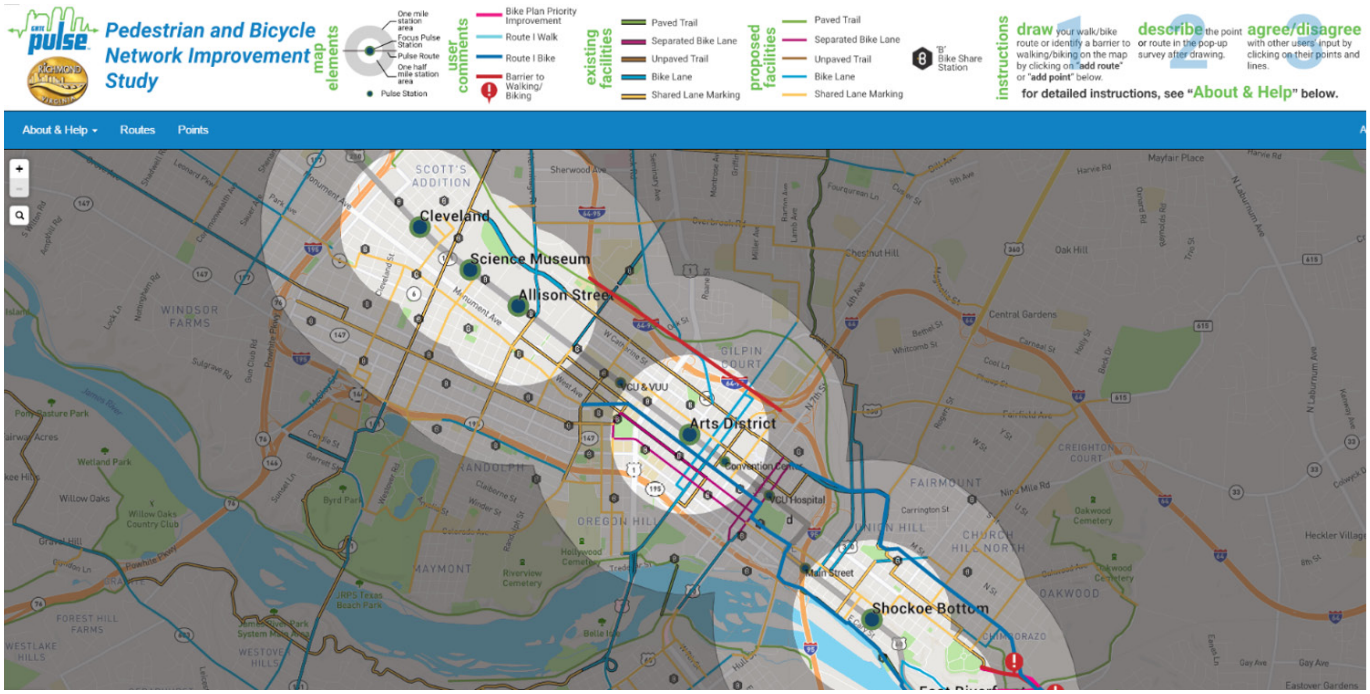

Figure 18: Screenshot of the Richmond project Wikimap

experience of biking and walking along Richmond's streets. Specifically, information was requested on preferred routes, areas of concern, barriers to accessibility, and potential improvements around the proposed station areas. The wikimap also provided the opportunity to suggest connections between the BRT station areas and proposed citywide bicycle network that was shown on the basemap.

Targeted Stakeholder Meetings

The study team identified a number of opportunities to complement, reinforce and enhance ongoing local planning activities without duplicating efforts. For example, midway through the project, the City hosted a public meeting to look at detailed design options for six key bike network corridors that were central to the Bicycle Master Plan. More than 150 people attended, and were effectively engaged by a process that prompted them to share their reaction to various types of bicycle facilities offering different levels of protection from motor vehicle traffic. The BRT study team staffed a table at the public meeting, promoted the wikimap, and engaged residents in specific conversations about bicycling to and from the BRT corridor.

The feedback gathered during the public meeting informed the recommendations for improved bicycle access to The Pulse stations and highlighted two additional issues. First, the City hasn't yet developed an equivalent pedestrian master plan from which to draw project recommendations and therefore help address pedestrian access issues. Second, the proposed bicycle network corridors predominantly run parallel to the BRT line and have limited connections to the Broad Street or Main Street corridor along which the buses run. This was particularly evident in the historic Greater Fulton neighborhoods.

Similarly, the recommendations of the TOD study (**The Pulse Corridor Plan**), a concurrent plan to improve the James River waterfront (**The Richmond Riverfront Plan**), and the preparation of a new transit route network (**The Richmond Transit Network Plan**) address overlapping issues – including better access to the BRT corridor – and yet don't always explicitly connect with each other. Further, the recommendations in these plans are not designed to provide the level of detail necessary to ensure that a general commitment to "better walking and biking access to The Pulse" translates into the physical environment and level of safety that actively encourages people to walk and bike to the stations.

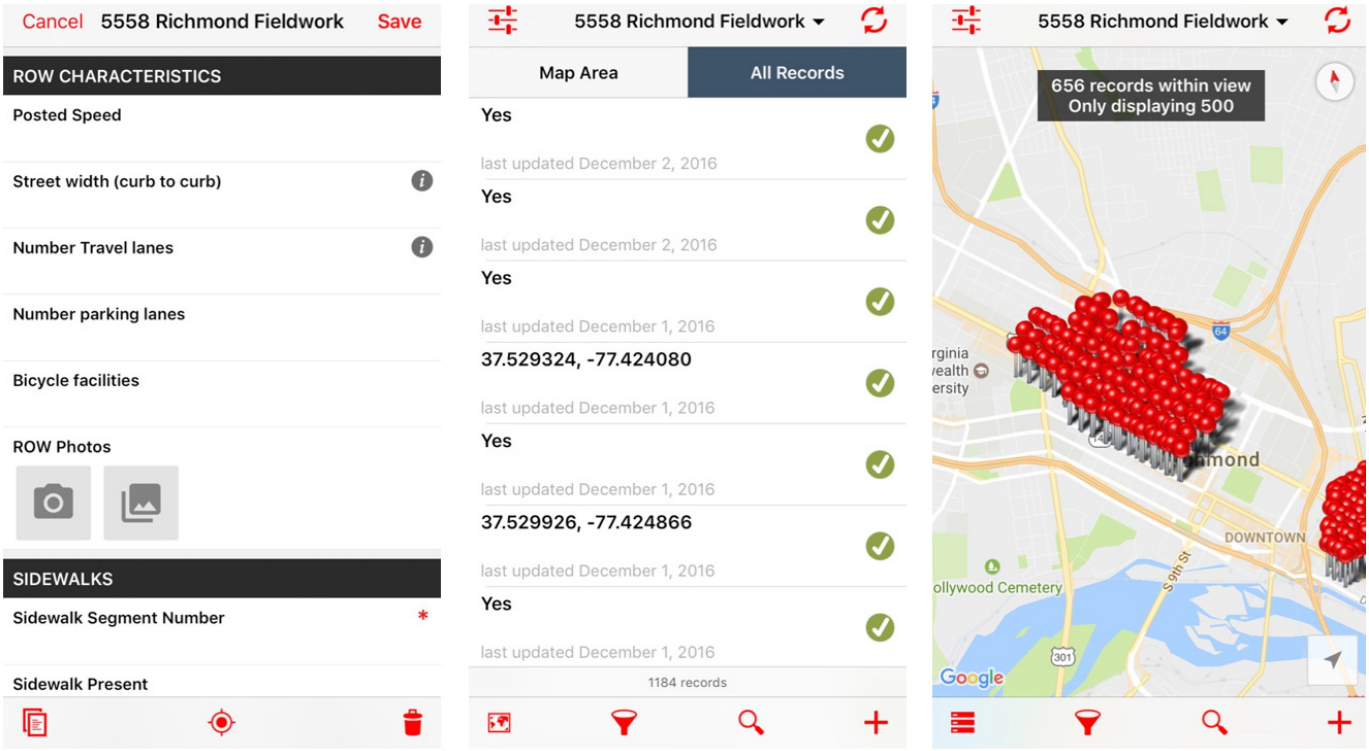

Figure 19: Screenshots of Fulcrum data collection tool for the City of Richmond (Source: Fulcrum)

Innovative Data Collection

To complete that task, the study team used a cloud-based data-gathering tool (**Fulcrum™**) to quickly and efficiently document sidewalk conditions, accessibility issues, and potential bicycling improvements within a half-mile of each of seven selected stations along The Pulse corridor. These field observations, together, with hundreds of connected photos, resulted in more than 300 specific recommendations – with planning-level cost estimates – that were delivered to the City for them to integrate into their ongoing programs and planning.

The wikimap for the Richmond project can be found under: **http://wikimapping.net/wikimap/Richmond-Pedestrian-and-Bicycle-Network-Improvement-Study.**

U.S. Department of Transportation

Federal Highway Administration