To: Michael Moore, Director of Transportation, City of Raleigh
CC: Paul Black, Bicycle & Pedestrian Program Manager, City of Raleigh; Mary Persson, Bicycle & Pedestrian Outreach Coordinator, City of Raleigh
From: Fionnuala Quinn, Discover Traffic Gardens (DTG)
Re: Traffic Garden Feasibility Memo
Date: July 26, 2021

The purpose of this memo is to provide information to the City of Raleigh (City) to support a traffic garden project. The intent behind the Traffic Garden Feasibility Memo is to create a document that will provide useful background information and outline specific information to guide a near-term temporary traffic garden project. The memo has been prepared based on the latest available national information, local input and peer community experience. Information is presented through discussion, case examples and tables so as to create a resource for local temporary traffic gardens. Some additional information has been included about permanent installations which may also prove useful.

Introduction

There has been growing local interest to install a traffic garden in Raleigh. That interest led to the formation of a group who had already met several times prior to the initiation of this project. This group included local officials from City and regional agencies as well as biking organization representatives. The City has undertaken this memo project in response to this growing interest in installing Raleigh's first traffic garden as well as to address a specific recommendation from an adopted City plan.

The BikeRaleigh Plan was adopted by the City in May 2016 and included the following discussion in the program chapter of the plan:

RECOMMENDED SUPPORT PROGRAMS

BICYCLE SAFETY PROGRAMS & SAFETY TOWN

The City should lead and support partners through tailored direct outreach to people of all ages and abilities that encourages them to start and continue to ride a bicycle.

A safety education program for all elementary, middle, and high school-aged youth in Raleigh focused on bicycle and general traffic would offer a unique opportunity to reach this demographic in the formative years when they create lifelong transportation habits. Safety education programs can be an important part of Safe Routes to School (SRTS) programs as well.

One innovative way to support these educational programs is with a Safety Town, a simulated town complete with miniature buildings, sidewalks, roads and traffic signals, where children are taught the rules of street safety. It could be implemented as a pilot project. A permanent safety town could also be built with the cooperation and support of Wake County Public Schools and other stakeholders. In other cities, the costs of safety towns are partially offset by sponsorships and donations.

Note: 'Safety Town' is used as an alternative term for 'traffic garden' in this context.

In the time since the plan document was published, no permanent or temporary traffic gardens have been installed in the City or surrounding region. However, a pop-up traffic garden was included as part of a local event in May, a recent sign of on-going local interest in the concept. The memo is intended to assist in addressing this specific recommendation from the adopted bike plan and suggest some next steps to address the BikeRaleigh Plan recommendations.

This project was initiated in June of 2021 and involved the following steps:

- Creating a traffic garden vision statement
- Conducting background research and compiling information
- Gathering input from peers who have worked on installing traffic gardens
- Inviting local representatives to join the traffic garden working group

- Circulating traffic garden articles and videos to the working group
- Mailing hands-on traffic garden activity materials to the group
- Meeting with group members in a virtual work session
- Conducting phone interviews with additional group members
- Compiling local information and identifying possible partner organizations
- Preparing a draft memo for review
- Finalizing the feasibility memo for distribution (expected by mid-July 2021)

Early in the project, a Traffic Garden Vision Statement was developed in consultation with City staff:

"Create a safe and welcoming network of traffic gardens that enables children and adults from all backgrounds and abilities to learn how to safely walk and bike on streets while interacting with other traffic including motor vehicles."

The vision was presented to the working group and guided the development of this memo. On Monday June 21st, DTG hosted a 2-hour virtual session with the traffic garden working group to:

- Outline the range of traffic garden options for local applications
- Solicit information about local issues, concerns and preferences
- Learn about local interests and potential opportunities
- Address questions and technical information

City staff provided assistance in contacting attendees and organizing the meeting session itself which took place via Microsoft Teams. Attendees represented a range of expertise from parks, schools, institutions and cycling advocates. Several invitees were unable to attend, so follow-up phone interviews were conducted with them. Refer to Section III for a list of the work session participants and phone interviewees.

Throughout the project, additional information was compiled, including:

- Research information from available documents
- Examination of national best practices for traffic gardens
- Information from other traffic garden practitioners.

DTG has already created design, operations and features information through projects for several other jurisdictions and has established contacts with many of those working to add traffic gardens which helped informed the information preparation for the City.

The memo is organized as follows:

- Section I. Traffic Garden Essentials
- Section II. Traffic Garden Information: Case Examples and Tables
- Section III. Additional Examples and Suggestions

Section I: Traffic Garden Essentials

A traffic garden is a set of small-sized connected streets with scaled-down traffic features and other elements where children and their families learn about and practice using streets away from motor vehicles. Traffic gardens vary depending on what skills are being taught, the space available, and the resources available to construct one. Regardless of the type, all traffic gardens have one thing in common - they create a fun world for kids to safely and comfortably walk, roll, and ride bicycles.

This section covers considerations for taking on a local project. The intention is to cover the basics and point out various issues. Specific details are not covered in Section I: instead, there is a reference to where the more detailed information can be found in Section II.

Past and Recent History of Traffic Gardens

Although traffic gardens did not gain widespread popularity in the United States until the 1970s, they have existed in various forms since the 1930s. A local police officer created the first U.S. Safety Town in Mansfield, Ohio in 1937 and the idea was immediately popular, receiving national attention.

Practical PLAY

THEY'RE RAISIN' 'em right in Mansfield, O.

Last summer Traffic Patrolman Frend C. Boals and two assistants taught traffic rules to 500 pre-school age children through the use of toy automobiles and miniature signs and signals set up on the city's playgrounds.

The system of safety training was devised by Officer Boals and Mrs. Ruth Robbins, a kindergarten expert, to instruct children at an early age in the principles of road safety so that these principles eventually would become automatic with them.

The program, originated last summer, has been very successful and it's no wonder. What kid wouldn't get a kick out of playing in a toy automobile with real traffic signals to go by just like Mr. and Mrs. Grown-Up Driver?

"The children now have a thorough understanding as to the meaning of the 'stop,' 'caution' and 'go' signals of traffic, as the miniature streets were regulated by small lights," Officer Boals says.

"Although the children could not read—they were from 4 to 6 years old—they know now the meaning of traffic signals and white pedestrian lines.

"The program works along the same lines as the beginner in school learns to write. After he is taught the fundamentals, he practices until they are guided by his subconscious mind."

"SAFETY TOWN," as the project is called, was sponsored by the Mansfield Recreation Department and financed by the Richland County Automobile Club. Twenty-five toy automobiles were used.

"Safety Town" was operated for two hours each day for a period of two weeks at one playground and then it was moved to another playground. In this way, the entire city was covered.

Two of the best testimonials to the success of the program are: No "Safety Town" graduate has been in a traffic accident, and these youngsters on entering school this fall immediately wanted to build traffic lights out of their toy blocks.

Not one school age child has been killed in Mansfield traffic during the five years that Officer Boals has directed the schoolboy traffic patrol program at the city school buildings.

The lengthwise picture shows the children of Mansfield practicing traffic safety. At left Officer Frend C. Boals, of "Safety Town."

PUBLIC SAFETY for DECEMBER, 1938

The concept was relatively easy to replicate and safety towns started appearing in surrounding communities, other states, and even other countries. In the 1960s, the National Safety Town organization was established and they recorded 3,500 facilities worldwide by 2013[1]. Dozens of facilities remain in operation around the U.S., some having operated continuously since the 1970s[2]. With the renewed focus in recent years on biking skills and roadway safety education, as well as redesigns of streets in many communities, there has also been a rediscovery and reimagining of traffic gardens. Numerous new traffic gardens have been installed in the last five years around the U.S. with some communities building multiple installations. The District of Columbia public school system installed their first two traffic gardens in 2019[3] and has since added five additional traffic gardens with more in the works.

Community Benefits and Barriers to Traffic Gardens

Traffic gardens are a low-cost and easy-to-implement type of project that can provide a wide variety of educational, safety, and quality of life benefits. When combined with roadway safety and skills education, traffic gardens can provide the fundamental learning and confidence building that young roadway users need to build their understanding, skills and independence. Children love and remember these miniature worlds where they can play independently or with their friends or with direction from family members. While there are many benefits to having a traffic garden, as with any project, it is key to note the barriers to such a project also. Refer to Section II, Table A for a summary of traffic garden benefits and barriers.

Traffic Garden Design

Before embarking on a traffic garden project, defining the type and scale of traffic garden(s) and how the installation will operate is key to the planning process. Types of traffic gardens include:

- Pop-up traffic garden: in place from a few hours to several days.
- Temporary traffic garden: in place for 2 - 6+ months.
- Permanent traffic garden: installed with materials intended to last for 7-10 years.

See Section II Table B for further details about these traffic garden project types.

Traffic gardens are scaled-down streets assembled into a continuous network following real-world roadway configurations and traffic-style signs and markings. Features and elements are reduced-size versions of public street infrastructure that is simplified and sized for children. In addition, the principles of universal design [4]are applied so that the traffic garden is accessible to as many people as possible. The use of color and other artistic elements can help further create an attractive mini-world for children that represents the public street environment.

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[1] National Safety Town Center website
[2] Safety Town, Portsmouth, Virginia - 1975
[3] Two traffic gardens in Washington DC in 2019
[4] Principles of Universal Design, North Carolina State University

As a practical matter, traffic garden layouts vary in shape and size depending on the available space and surface. In general, a traffic garden should not have any steep riding surface slopes, and traffic garden streets should be free of significant dips. The paved surface should allow proper drainage of stormwater and should not feature areas where water pools. The most desirable traffic garden surface material is asphalt, as it allows for smooth and joint-free bicycle riding and use by other mobility devices. Visiting the site and gathering information is essential at several stages in any project to inform the design process. These and other aspects that contribute to creating a successful traffic garden are summarized in the following tables found in Section II:

- Selection of a suitable site (see Table C)
- Design details for how the streets are put together (see Table D)
- Inclusion of roadway educational elements (see Table E)
- Additional best practice considerations (see Table F)
- Field visit tips (see Table G)

The most visible part of a traffic garden project is the layout that is added to the hard surface. The process to prepare this layout for installation goes through the following general steps:

- Outline the existing site where the traffic garden is to be located (i.e., base drawing).
- Draw proposed traffic garden on the existing site (i.e., draft layout drawing).
- Solicit and incorporate review comments from a range of perspectives including team members plus those who will be operating the property or running the program.
- Finish up final traffic garden drawing set noting materials, colors and dimensions.
- Add any additional instructions related to traffic garden being installed at this site.
- Seek installation quotes or order and assemble supplies and equipment.
- If necessary, revise the layout (e.g., simplify, reduce pavement markings) to lower costs or level of work.

Traffic Garden Installation

The drawing set is intended to provide sufficient information to the contractor or volunteers so that they can locate and add the traffic garden striping lines and pavement markings on the hard surface. If installing using volunteers, create an event where community volunteers assist with labor involved in the installation. Valuable installation assistance may be available from local agencies such as the department of public works or transportation department also. Additional installation details are provided in the following tables which are included in Section II:

- List of suitable temporary surface materials (see Table H)
- Site preparation, marking and measuring tips (see Table I)
- Installation equipment resources (see Table J)

Volunteer Crew vs. Professional Installers

The question of whether or not to plan a project that relies on volunteer assistance or to instead engage a contractor to perform the installation work is related to the project budget as well as the type of traffic garden envisioned. By tapping into the large volunteer pool in the Raleigh region, it will likely be possible to gather plenty of people willing to perform the work to mark, measure and install the traffic garden lines and markings. This works well for **pop-up** or **temporary** traffic gardens that may use duct tape or temporary paint for the lines and markings.

While some **permanent** traffic gardens projects have been successfully installed by groups of volunteers (e.g., Rochester Bicycle Playground, Minnesota), these are challenging projects. If funds are available, it can be well worth the extra cost to have a skilled contractor team install a permanent traffic garden. These professionals are experienced in painting straight and consistent lines and markings that look great in a traffic garden and have the tools and equipment needed to do the work. They use wheeled/powered paint spraying devices with paint reservoirs so they can cover large areas quickly.

	Volunteer Installation Crew	**Professional Installation Crew**
Recommended Traffic Garden Type & Materials	Better suited for pop-up and temporary installations involving materials that are removable or that weather (e.g., duct tape, spray chalk, spray marking paint). Installation errors with these materials can be more readily addressed.	Best for permanent installations and for the application of permanently-applied surface materials.
Crew Experience	Crew will comprise of volunteers of varying skill, ability and commitment level. They are unlikely to have specific experience with this type of work.	Crews are skilled and experienced with tools, equipment and materials used in similar-type applications. Contractors with the necessary skills include parking lot striping teams, roadway striping teams, and sports court installation teams.
Management	Crew needs extensive management and instruction during the marking and	It's always best to stay onsite during installation to resolve small

	installation to ensure elements are added in the correct sequence and location.	issues of fit that will likely arise and to ensure quality work.
Marking Efficiency	Unfamiliarity with the marking up task may slow process.	Skilled at marking up sites for rapid material application.
Equipment	Need to acquire needed equipment for installation and transport to/from site. Performing tasks without professional equipment is more laborious.	Provide own equipment for installation. Use types of equipment that can perform tasks rapidly.
Appearance	The striping lines and pavement markings will not be consistently even or straight over a widespread area.	Contractors can produce straight and even striping lines and pavement markings of consistent quality.
Errors	May make measuring or materials application errors due to lack of knowledge and experience.	Anticipate and spot issues quickly and make necessary field adjustments. As errors can be difficult to fix once surface products have been applied so professional installers take a lot of care regarding accuracy and legibility of the markings and sequencing of steps.

Traffic Garden Project Team

Successful traffic garden projects are frequently the result of coalitions of organizations who help make the project a reality through collaboration. This is because the success depends on many factors ranging from the site selected to the people served to the programming implemented. Look for organizations and people who are representative of the community at large as well as those that make strategically good partners in finding sites and putting on events for short-term installations or putting programs in place for longer-term installations. See Table K for a listing of local organizations and possible partners and stakeholders.

Stakeholders

Local community networks and organizations can help identify stakeholders and how best to engage with them. The overall goal is meaningful stakeholder participation in the decision-making process. Project partners can help identify and access a range of methods and avenues to facilitate participation. Questions to consider in planning stakeholder engagement include:

- What impact could a traffic garden have on members of the broader community?
- How can those who could use the facility contribute to shaping it?
- Who represents these community stakeholders?
- Are there existing local communication networks already in place?
- What aspects of the traffic garden could be enhanced through local knowledge?

Volunteers

Volunteers who are willing to donate their time and help out with a traffic garden are invaluable to running community engagement events and helping perform project tasks. They are also key to getting projects accomplished on a low budget. Having a pool of volunteers to assist allows the project team to take on tasks including events and outreach. See Table L for suggestions for volunteer roles.

Many of the organizations involved in this project already have well-established outreach systems for contacting and organizing volunteers. The Parks Recreation and Cultural Resources department has extensive public outreach through the community recreation facilities, individual parks, summer camps, and the specialized recreation and inclusion services. Oaks and Spokes, the bike advocacy non-profit organization, reaches dedicated volunteers and supports many projects as well as organizing their own events. They maintain an updated message board so that volunteers can learn about upcoming opportunities to assist in the community.

Community Engagement

Planning a traffic garden lends itself to community engagement. Traffic gardens are a straightforward concept to explain and an idea that typically draws immediate and broad support. See Table M for a range of ideas for involving the community in traffic garden projects.

By working with local community organizations or an institution, it may be possible to put together more in-depth types of engagement using scale models and paper designs.

A traffic garden design charrette can make a fun addition to church events, health fairs, local libraries, food distributions, back-to-school nights, school STEM or science fairs, local festivals or farmer's markets. Children are creative thinkers so asking them how they would lay out the traffic garden will result in many ideas and suggestions. See Section II for an example of a project where children from the neighborhood engaged in the design process, saw the traffic garden being installed, were invited to the ribbon-cutting event and now get to use the facility.

Strategies for Kick-starting Traffic Gardens in the Community

Traffic gardens are a generally unfamiliar concept and it may be tricky to get a large-scale project going. However, community-led action is a powerful way to spark new projects and traffic gardens lend themselves to the strategies that are often used to introduce such new concepts locally. While permanent and large-scale traffic gardens can be difficult to get off

the ground and launch, communities have been deploying the following tactics to jump start easier-to-plan projects including:

- Pop-up traffic gardens
- Temporary traffic gardens
- DIY traffic garden kits
- Traffic garden library kit

Using these methods, communities have been getting installations on the ground quickly. See Section II for case examples of these types of projects in communities around the U.S.

Funding Possibilities

Even when starting with a low-cost traffic garden, funding is a key ingredient. Traditional funding sources often do not explicitly include traffic gardens as funders may be unfamiliar with the concept and the potential value to the community. Some examples of how communities have funded their projects include:

- Virginia DOT SRTS non-infrastructure grants list traffic gardens as an eligible program or activity and have provided funds to multiple communities.
- Maryland Department of Health funded the Bike Safe Play Court in Hagerstown, Maryland.
- A home and car insurance company funded the first traffic garden in Thurston County, Oregon.
- A Vision Zero grant through the Department of Transportation in the District of Columbia (DC) funded two elementary school traffic gardens.
- DC public school elementary schools install traffic gardens when they go through modernization at a minor cost relative to the large-scale expensive renovation project.[5]
- In Philadelphia, a Play Everywhere grant was awarded to fund a traffic garden.

As a consequence of the widespread community goodwill towards traffic garden projects, many projects have been successfully completed using donated services, sponsorship, or other donations to cover elements of their budget and help get the project done. The following types of contributions have been a significant part in accomplishing a number of projects nationwide:

- Pro-bono design services provided in-house (e.g., public works or transportation department) or by local design consultant.
- Contractor services including site preparation or striping installation services.
- Access to in-house striping equipment and/or supplies (e.g., public works department).

[5] There is a set of school system layout guidelines for architecture firms to refer to so that the installations are designed to serve the school biking program needs.

- Local businesses or service organizations ‘sponsoring’ elements of the projects such as buildings, sheds or signs.
- Donations from local businesses or service organizations willing to contribute funds, materials or equipment towards the project.
- Creative local makers assisting with crafting elements of the project such as signs.

Opportunities, Challenges and Recommendations

The following lists of opportunities, challenges, and recommendations are intended to help in proceeding with traffic garden projects, large and small. The summaries are presented without consideration of many practical details about funding and staffing nor in order of importance but the hope is that the ideas listed can assist with policy, planning and budgeting as the City and region looks ahead. Over the course of the preparation of the memo, we heard very positive support and enthusiasm from everyone who engaged with the project. This confirmed that there is support for traffic garden projects, which is necessary for the success of any new venture, and that the many local representatives and organizations can play valuable roles in navigating the process of creating this new community amenity.

The biggest opportunities for moving forward include:

1. **The Existing Traffic Garden Team** - The interest and ideas for partnerships and applications locally among this already established group.
2. **Pop-up or Temporary Traffic Gardens** - The low cost and short planning schedule for such installations as demonstrated by other communities.
3. **Local Organizations and Agencies** – The many groups already working collectively in the region and the strengths each bring to projects.
4. **Parks and Community Center System** – The large network has property, programming, missions and connections to the public that align with traffic garden projects.
5. **Wake County SRTS program** - The program's network of partners and access to resources are valuable tools. The goals of this program align closely with the traffic garden vision.
6. **Disability and Inclusion Network** – The established program partnering structure is a model for creative new programming.
7. **Lenoir Street Open Streets Event** – This event, already planned for October, will provide a valuable showcase and partnering opportunity.
8. **Existing Sites** – Several under-used sites have already been identified as possibilities and can serve as test cases to explore the needs of a local installation.
9. **All Kids Bike** - This balance bike fleet is already in the City and the existing plans for programming could have excellent synergy with new traffic gardens.
10. **Oaks & Spokes** – The well-established and developed efforts of supporting organizations and volunteers provides a framework for support, assistance and broad programming outreach.
11. **BikeRaleigh** – Existing recommendations in the City's bicycle and pedestrian plan recommend and support this type of educational programming and community outreach.
12. **Marbles Kids Museum** – The broad reach and scope of their valuable work with children, families and schools as well as their established partnership framework and work to date around biking.

13. **Volunteer Culture** – The many volunteer pools available through established organizations in the region could facilitate short-term model projects.
14. **Bike and Pedestrian Professionals** – The wealth of experienced professionals including consulting firms working in the region creates a pool of understanding, skills and services to tap into.

The biggest challenges to moving forward include:

1. **New Concept**: Limited official and public familiarity with the concept.
2. **Competition:** Established programs and more familiar concepts compete for space and support.
3. **Institutional Barriers:** City government and County schools are not formally connected, making projects through schools more difficult to execute.
4. **School System Size:** The large County school system, with a strong emphasis on schools providing similar offerings, makes partnerships with schools more difficult.
5. **Lack of a Responsible Agency for Traffic Gardens:** With no existing established agency or department handling traffic garden installation, maintenance, and programming, it is difficult for staff to take on these additional responsibilities.
6. **Lack of Traffic Garden Project Staff Person:** There is a need for a dedicated staff person with at least some of their time available to organize and plan new traffic garden projects including all of the coordination of partners.
7. **Lack of Maintenance Responsibility:** The responsibility for the management and cost of routine maintenance and wear or any vandalism that is taken on with the addition of a new facility needs to be assigned.
8. **Traffic Garden Experience:** There is a current lack of institutionalized traffic garden experience (design, installation and operation).
9. **No Dedicated Funding:** Traffic gardens projects are not included in any budgets and there is a lack of dedicated funding or readily available grants.
10. **Lack of Site(s):** It can be difficult and time-consuming to identify, select, and obtain the rights to a suitable site(s).
11. **Lack of Equipment:** Many with financial need and/or disabilities have limited access to biking devices, helmets, and other equipment that would allow them to make best use of traffic gardens.

The opportunities listed contribute in different ways to readily organizing and supporting anything from a single-day pop-up installation to a long-term permanent installation with a well-developed companion program. Meanwhile none of the challenges listed pose impossible obstacles to a traffic garden project and there are no unfamiliar technical issues to deal with. Instead, the challenges are of a type of that are already familiar to those championing new and innovative public sector projects and at a scale that is modest due to the size of these installations.

Recommendations for Planning New Traffic Gardens

Here are some general recommendations and discussion regarding ways to move forward with traffic garden projects:

Creating Partnerships: Partnerships between public agencies, non-profits and private organizations will play a key role in facilitating successful traffic garden projects. While the City is playing a leadership role in examining traffic gardens, creating working groups of agencies and organizations will help facilitate getting projects off the ground successfully as well as create a robust network of installations and companion programming.

Pop-up and Temporary Installations: Pop-up and temporary installations are both effective ways of introducing the traffic garden concept to those who are unfamiliar with the concept or who may be uncertain about how these facilities work in practice. They can be executed at a low cost and within a short time frame, yet they convey the big ideas and possibilities that come with a permanent installation. A local model for a pop-up installation project is the effort to bring permanent football facilities to Raleigh communities that has been initiated by the Health and Wellness Director. By working with the District Managers for the community centers and planning a number of pop-up football installations, the idea and the value of the additional neighborhood amenity is being demonstrated. The exposure assists in the process of gaining support from key decision makers to move forward on bigger plans.

Working with Community Centers: The Raleigh Parks, Recreation and Cultural Resources Department offers 27 community centers that include a variety of programs and services for families and residents of all ages throughout the City. Several locations including Marsh Creek and Dix Park have already been identified as having possible traffic garden pad sites that may be suitable for further consideration. It will be key to familiarize the District Managers for the community centers with traffic gardens and how they fit well with their mission and are a great new amenity for activating space and providing healthy accessible fun for the community. While some community centers have more space resources than others, it will also be important to keep in mind the communities that could benefit most from traffic gardens, which may mean being creative at sites with less space. Examples exist of traffic gardens added to small spaces through creative layouts such as alleys[6].

Create New Pathways to School Projects: It can be easier to work with individual schools or create pilots rather than working with the central administration to get projects accomplished. It may be easiest to get traffic gardens installed as part of a new school build or modernization or at a magnet school that is used to partnering on innovative programming (e.g. with Marbles Kids Museum). The growing school system means that there are many new schools where traffic gardens could become part of the site plan. For example, as part of school modernization in the District of Columbia, traffic gardens are routinely added as an element of the bigger project.

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[6] Cascade Bicycle Club traffic garden, Seattle, Oregon

Layout design: As a rule of thumb, layouts should follow recognized roadway intersection and pedestrian crossing configurations. This will allow participants to experience the key learning interactions correctly, reduce confusion and enhance the value of the installations.

Surfaces: The condition and integrity of the hard surfaces are a key part of how well a traffic garden functions for both temporary and permanent installations. Bike riders are more sensitive than other users to an irregular and cracked surface which can come from asphalt deterioration and structural failure. A good quality surface is key for users with mobility impairments and those using devices such as wheelchairs and walkers. However, for sites where surface coatings have been applied to the asphalt, they will need further evaluation to see whether they are suitable for use with a traffic garden application or need modification (e.g., cover with sealcoat).

Maintenance: Having the facility surface and equipment work well over time is key for protecting the investment and supporting the effort. Further, keeping everything serviceable will ensure that the maximum number of community members receive the benefits. How any site will be maintained should be part of the initial planning. Routine line and marking touch-up should be part of the commitment going forward with any permanent installation.

Central Organization: For long-term success, there is a need to create multi-layered integration of ownership and a schedule of maintenance responsibilities for local traffic gardens. This central organization could also be set up to include reporting, benchmarking and program support.

Create a Lead for Traffic Garden Project: With the many moving parts involved and the number of actions that may need to be coordinated, it will be useful to identify a person who has dedicated time and is assigned the lead role. A person that brings a passion to the project will be helpful in getting it executed and in coordinating the many details. This type of project could be a real career maker for someone early in their career.

Equity: To address the disparities in community access to safe transportation and acquisition of skills, equitable needs and site access for people of all social backgrounds and abilities need to be fundamental to selecting sites, inviting stakeholder participation and ensuring access to site and programming. This may also include providing the devices and meeting the equipment needs for being able to use a traffic garden.

Disability Needs: While traffic gardens by their nature are widely accessible, the needs of those with disabilities or using mobility devices should be incorporated into the planning and design of facilities. The knowledge that is available through disabilities communities and organizations should be solicited during planning and design. In addition, partnerships with organizations that provide accessible equipment and programming should be part of program plans.

Art Opportunities: Traffic gardens make a great base for community art projects whether decorative elements or by adding practical features like buildings. The installations can be creatively enhanced through partnerships with outside artists or school art programs plus volunteers. Public art can help elevate traffic gardens from practical facility to a space cherished by the community.

Create Funding Awards and Library Program: A small and flexible grants program could support and encourage local traffic garden projects and leverage the willingness of many groups or individuals to devote their energy to a local traffic garden project. The program could fund either installation or programming and could be an element of the central organization. In addition, the City could create a library of tools and equipment that is made available to community groups to assist and encourage them in installing their own traffic garden with volunteer labor.

Community Engagement: Public input works best where it is an ongoing intentional process that builds and strengthens relationships and trust over the course of the project development. Successful engagement finds creative ways for the full community to participate and for people to see themselves reflected in the plans and decisions that affect them. To better understand the challenges and ideas that traffic gardens can present to people with disabilities, public engagement should include representatives from a range of backgrounds and involve field meetings to examine specific issues. The redesigning of the Sassafras All Children's Playground is a model for inclusive engagement of people with a broad range of disabilities.

Collect Data and Benchmark Traffic Gardens:
Collecting data and tracking information about local traffic gardens will be important to assess whether the effort is meeting its goals. Keeping track of the basic information such as the number of events and programs plus number of attendees will create an expression of the value of the facility. Conducting surveys of users and caregivers (e.g., clipboard, on-line) will create a compilation of insights into the experience. More advanced data collection such as counting participants would be valuable also.[7] The collected information can also be reported as part of an annual benchmarking report that will let the community see the progress and learn about the work and benefits of this effort. This information could also be added to such documents as The State of Bicycling in Raleigh report.

Bikes, Equipment and Maintenance: The barrier for many children and families to using traffic gardens is access to a working bicycle and helmet. There are many reasons for children not having access to a bicycle and/or helmet including the cost, maintenance and storage of the device. For those with competing financial needs, a bike may be low on the household budget and bike storage may be problematic. Even families that have access to bikes may not be able to afford the additional cost of a helmet. For children with mobility needs, the bikes are specialized and more costly, which especially impacts these already burdened families.

[7] Montbello Bicycle Course in Colorado has added an Eco-Counter to collected participation data.

Encouraging and facilitating bike ownership by giving bikes and associated equipment like helmets away for free or by setting up free bike repair clinics can get more bikes into the hands of children and families. Creation of bike fleets, whether they include balance bikes, two-wheelers or adaptive bikes, will also facilitate access to those who may need it the most. Youth bike helmets can be given to youth who need them in conjunction with educational events. Partnering with organizations that provide specialized adaptive bikes, helmets, and related programs can also increase access.

Balance Bike Fleets: Traffic gardens and balance bikes offer a perfect pairing of facility and device. A balance bike is a bike with no pedals. Typically, this device gets kids biking independently much more quickly than the traditional method of pedal bikes with training wheels. There have already been several initiatives to create balance bike fleets and companion programming in the region. The Strider Foundation's All Kid's Bike initiative is a comprehensive program that includes equipment, facilitator training, and program curriculum. The Forest Ridge Park Manager has been working with a group from the City to purchase balance bikes and develop programming around the equipment. Progress was halted due to the 2020 shutdown but is ready to get back on track. The plan is to be able to offer balance bikes at street events and to loan fleets to various parks throughout the system for clinic styled programming. Note that there are also adult-sized balance bikes on the market for purchase that are used for teaching older learners and people with disabilities.

Creating an Inclusive Environment: Traffic gardens have low barriers to use and a lot of flexibility in how they can be designed and operated. By creating an inclusive environment where the installations are designed for all abilities, aspects of mobility needs are reflected in the painted design details, representatives of different disabilities are included in planning, and sites include programming and devices for those with extra mobility needs. By using inclusive language in all communications, these facilities can be a meaningful addition to the available amenities for local people with disabilities and organizations who wish to hold programming or field trips. The Raleigh region is a state hub for disability organizations and families. Examples of key educational institutions include the Frankie Lemmon School and the Governor Morehead School.

Educational Enhancement: School programming for traffic gardens can be enhanced through signs with additional lessons. Montbello Bicycle Park in Denver, Colorado makes use of signs with QR codes that link to online video demonstration lessons with six different provided lessons.

Traffic Gardens Target Users: There are many adults who have never learned to ride a bike for a range of reasons and they may be reluctant to learn later in life. Traffic gardens can be designed with adults in mind and then can become a comfortable place to hold adult biking lessons. Two examples of facilities that are designed for adult learners as well as children include Alexandria Bicycle Campus, Virginia and Fort Collins, Colorado.

Sponsorships and Donations Clarification: In many communities, the costs of traffic garden installation or ongoing operations are partially offset by sponsorships and donations. Sponsorships may involve displaying a logo or a name of the sponsoring entity at the traffic garden, for example on a miniature building front or equipment shed. A donation may be in the form of a contribution of funds, supplies or equipment towards the project. It would be useful to clarify local policies related to both sponsorships and donations and to consider amending local policies to allow for sponsorships and/or donations.

Conclusion

The future traffic gardens are relatively low-cost installations that can provide many local children and school groups valuable life-long biking and safe pedestrian skills. They have been popular in the communities where they have been installed and a number of communities are installing them at numerous locations within their jurisdiction so that their community reach can be wide. Traffic gardens have great potential to be a valuable part of the experience of learning biking skills and experiencing the everyday joy of biking.

Section II. Traffic Garden Information: Case Examples and Tables

This section collects detailed information for putting together a traffic garden project. The intention is to cover the specific details that are not covered in Section I and to provide assistance when planning or laying a project. It not intended to be a definitive guide to planning a traffic garden, but does cover many useful details that will assist in the process.

This section includes the following compiled case examples:

- Example A: Pop-up Traffic Gardens
- Example B: Temporary Traffic Gardens
- Example C: DIY Traffic Garden Kits
- Example D: Traffic Garden Library Kit
- Example E: Jefferson Playground Traffic Garden Community Engagement

This section includes the following compiled tables:

- Table A: Traffic Garden Benefits and Barriers
- Table B: Traffic Garden Types
- Table C: Aspects of Site Selection
- Table D: Traffic Garden Design Elements
- Table E: Roadway Educational Elements
- Table F: Additional Traffic Garden Best Practices
- Table G: Field Visit Tips
- Table H Temporary Surface Materials
- Table I. Installation Process Tips
- Table J. Installation Equipment Resources
- Table K: Potential Project Partners and Stakeholders
- Table L: Volunteer Assistance
- Table M: Community Engagement Events

Table A: Traffic Garden Benefits and Barriers

Benefits	**Details**
Traffic gardens can be set up to serve a range of purposes.	• A place to teach and practice biking skills and interactions (all ages and abilities). • An interactive course teaching walking and biking roadway safety. • A place for children to experience independence and fun on wheels. • A community amenity for family-friendly outdoor physical activity.
Traffic gardens are used for instruction by formal and informal instructors.	• Physical Education (PE) teachers for instructional programs. • Preschool teachers for outdoor active play and roadway lessons. • Local biking instructors to teach beginning learners and adaptive riding. • Families for outdoor fun and biking instruction.
Participants learn through fun and physical engagement.	• Develop confidence by navigating the mini-streets, intersections and crossings. • Practice skills while learning about safety. • Develop understanding of how street interactions work. • Experience success and achievement at a broad range of ability levels. • Engage in healthy outdoor activities that are fun and develop social skills.
Participants include a range of age and skill levels using many types of devices.	• Preschool students riding balance bikes • Elementary school students practicing biking and roadway skills on two-wheelers. • Children with a range of balance and mobility needs using recumbents, larger balance bikes and other adaptive bicycles. • New and adult beginner bike riders.
Barriers	
How to introduce traffic gardens into complex school network.	• City government and County schools not formally connected creating institutional barriers • The large size of the County school system with a strong emphasis on schools providing similar offerings.

	• With growing school system and many classes in trailers, the space limitations of adding any new programming.
Need for a dedicated staff person.	• To organize and plan new traffic garden project which involve many moving parts. • Coordination of partner organizations • Ability to creatively navigate around roadblocks to get projects done. • Lack of an existing home for traffic garden programming and additional responsibilities.
The question of who will take on maintenance burden for Parks and Schools system.	• Management and cost of routine maintenance and wear • Dealing with and making repairs from any vandalism
Limited familiarity and experience with the concept.	• The idea is not familiar although easily processed once demonstrated. • Will need educational effort to explain the projects and how they get used. • Lack of local direct knowledge of traffic garden planning and design. • No readily available program materials paired with traffic garden learning. • Unfamiliar installations for contractors that require them to modify their methods.
Lack of dedicated funding or readily available grants.	• Funders are also not familiar with traffic gardens. • Need to explain the value of project to new funders. • There is no dedicated funding for traffic gardens.
Availability of suitable site(s).	• Finding site that meets access and design criteria. • Location of the site relative to communities who could benefit most. • Obtaining the rights and agreement to use the site. • Ongoing ability to maintain the site.
Access to biking devices and equipment.	• Costs to obtain a bicycle for those with financial needs. • Access to maintenance repairs and supplies • Accessing suitable devices for those with disabilities and the associated higher costs.

Table B: Traffic Garden Types

Facility Type	Typical Set-Up	Typical Elements + Operation
Pop-up Traffic Garden Typically in place from a few hours to several days. .	• Temporary small street network on hard surface created from removable materials • Often installed as part of a larger event (e.g., Open Streets, bike rodeo, etc.) • May be created from portable kit or be assembled from hardware store materials and tools • Can be located on sites such as school, park, parking lot or closed-off street • May involve extensive volunteer assistance to install/remove/clean surface • Sized and designed based on program and available space • Cost to install is low especially with volunteer assistance (material costs: $200 - $500) • Overall size of layout is generally limited due to the extent of work involved	• Temporary street network with intersections, pedestrian crossings, and traffic features • Multiple methods and materials to create street outlines including • Usually features portable signs (standalone or hand-held) • May feature portable buildings • May supply pedal devices
Temporary Traffic Garden Typically in place for 2 - 6+ months	• Temporary set of street outlines on hard surface • Installed using materials that wear away over time (temporary marking spray paint, long-term spray chalk) • Spray painting marking wands assist in spraying lengthy lines • May be located on broad range of sites including school, park, parking lot or closed-off street • May involve extensive volunteer assistance to measure/mark/install/add decorative elements • The life of the installation varies from 2 – 6+ months depending on weathering • Sized and designed based on program and available space • Cost to install is low (material + installation tools costs: $300 - $1,000).	• Temporary street network with intersections, pedestrian crossings, and traffic features • Multiple methods and materials to create street outlines including • Portable signs (standalone or hand-held)

Facility Type	Typical Set-Up	Typical Elements + Operation
Permanent Traffic Garden Intended to stay in place permanently.	• Permanent surface-applied pavement markings that create set of street outlines on hard surface in outdoor space • Installed with permament surface-applied materials intended to weather and last for 7-10 years • Street outlines and markings created with products ranging from latex paint to thermoplastic materials • May be designed and scaled for use by children or adults • Typically located on school property, park site, or recreation center. Also found in church parking, daycare centers and other locations. • Cost to install is low to moderate. Cost is a function of the scale, materials selected, and services deployed to plan, design and install	• May include the following: street network with intersections * roundabouts * street pavement markings * • Traffic signs (permanent, portable or surface-applied) • May feature small-scale buildings, building outlines or building fronts • Available for use in conjunction with educational programs or active play • Users may provide own pedal devices • May act as dedicated educational facility or double as a playground

Table C: Aspects of Site Selection

Selection Criteria	Positive Factors	Negative Factors
Access	Good walking and biking sidewalk and trail connectivity	Poor pedestrian, bike, wheelchair, rolling connectivity between street and site.
Ownership	Part of existing community center/park facility/school site	Problematic permission to use or unclear ownership
Location	Natural center of neighborhood walking/biking area	Far-flung corner of community distant from population centers
Safety	Slow-speed comfortable street with safe crossings	High speed roadway with busy crossing(s) to access site
Community	Lower-income neighborhood many young people/young families/fewer amenities	Neighborhood with many available amenities and aging population
Site	Mostly flat surface, clear of fixed objects and structures	Overly steep surface/steep drop-offs with hard-edged fixed objects
Surface	Reasonable to excellent asphalt quality (some cracking is okay). Concrete is possibility depending on condition especially the location of joints	Severely cracked or potholed asphalt (unless funds available to repair/replace) Concrete with many joints/irregular levels at joints or where concrete connects to other materials

Table D: Traffic Garden Design Elements

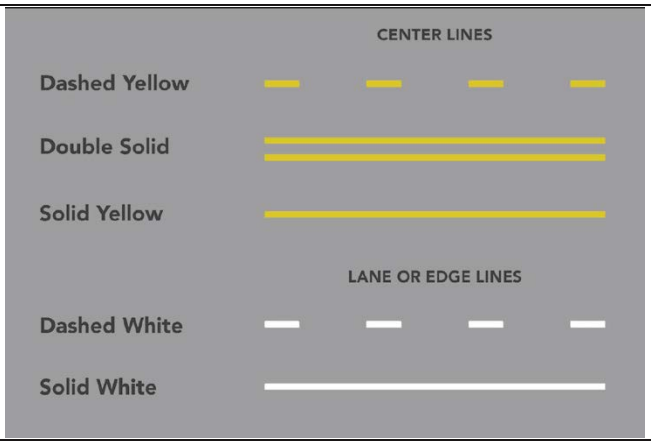
Traffic Garden Elements	Recommended Dimensions and Spacing
Streets	• Two-way street or multi-lane segment: 3′- 4′ wide travel lanes • One-way street (single through lane): 4′ wide travel lane (minimum)
Intersection Spacing	• Intersections with controls (e.g., ‘stop’, ‘yield’): at least 20′ apart • Intersections with no controls (free flowing): 12′ apart minimum
Crosswalks	• Crosswalk bar width: 6″ with 6″ space between bars • Space bars evenly across street
Roundabouts	• 3′-5′ (typical) but can be increased to create a larger roundabout • Roundabout travel lane width: 4′-5′ (as measured from outside edge of central circle)
Sidewalks	• Sidewalk: 2′-3′ wide (typical) • Buffer between travel lane and sidewalk (if present): 2′ wide
Pavement Markings	• ‘STOP’ + ‘Yield’ letter height: 6″ • ‘STOP’ word width: 21″ • ‘YIELD’ word width: 24″
Loose Parts (Signs)	• Sign head: 10″-12″ wide • Sign post: 48″ high • Portable base weight:15-25 pounds • Note: Edge of sign base should be positioned a minimum of 1′ clear of street lane edge or beyond painted sidewalk
Buffer	• All ridable and walkable elements should have a shoulder or buffer of not less than 6′ but preferably up to 9′, between the riding space and a vertical element such as a wall or fence.
Portable Roadway Signs	• Use scaled down versions of MUTCD signs • Approximately 12″ sign face height or width
Line Striping Colors	

Table E: Roadway Education Elements

Roadway Elements	Details
Stop Intersection	• Intersection featuring stop bars and STOP word (surface marked) plus stop signs (portable) on all approaches.
Yield Intersection	• Intersection featuring yield markings and yield word (surface marked) plus yield signs (portable) on all approaches.
Roundabout	• Single travel lane around circle, anti-clockwise direction. Yield markings and yield word on all approaches.
One-way Streets	• Lane striping and directional arrows.
Two-way Streets	• Lane striping and directional arrows.
Roadway Signs	• Stop sign (R1-1) • Yield sign (R1-2) • Pedestrian crossing sign (W11-2) • White/black regulatory – one way (R6-2), speed limit (R2-1) • Railroad crossing sign (R15-1) • Roundabout sign (R6-5P)
Pedestrian Crossing	• Pedestrian crossing parallel bars • Marked at intersection or mid-block
Other Pavement Markings	• 'STOP' word • 'YIELD' word • Stop bar • Arrows

Table F: Additional Traffic Garden Best Practices

Design Elements	Details
Accommodation of Devices	• Streets, storage, and assembly areas should accommodate use by students on foot or on balance bikes, two- wheelers, recumbent trikes, wheelchairs and/or walkers • Streets should be maneuverable for several device users at a time while also accommodating easy turns and well-spaced intersections; there should be no square corners or hairpin turns. • Design on streets and spacing should also consider adult instructors and supervisors within the traffic garden area.
Accessibility	• Best practices in accessible universal and barrier-free layout is required for students with extra mobility needs or those using other wheeled devices (e.g., wheelchair, recumbent trike).
Storage	• Storage may be needed for protection, security, and orderliness of any portable signs or other ancillary equipment that is part of the traffic garden.

Table G: Field Visit Tips

Design Elements	Details
Advance Preparations	• Print aerial view of site (Google Earth or Google Maps) • Print copies of any layout templates • Let appropriate people know you will be entering the site • Pre-arrange for gate unlocking (if necessary)

What to Wear and Bring Along	• Wear suitable outdoor clothing
	• Wear shoes suitable for muddy or rough surfaces
	• Bring the following:
	  ○ Clip board, pencil/marker, paper
	  ○ Aerial view of site (Google Earth or Google Maps)
	  ○ Long measuring tape, yard stick, short ruler, chalk
	  ○ Phone camera (plus optional measuring apps)
	  ○ Drone camera (optional, if available/permitted)

When to Field Visit	• Visit and record all physical details as part of base drawing preparation • Visiting site during or soon after a rain storm to see how well drainage is working and to observe water pooling on surface • Stop by in different seasons to see if seasonal conditions alter the site (e.g., excessive weed growth, leafed out trees, wind exposure) • Stop by occasionally to see if anything has been changed • Arrange tours of the site to get first-hand information from contributors with disabilities about their experience and suggestions

Table H. Temporary Surface Materials

Temporary Surface-Applied Products	Features and Attributes	Cost and Sources
Sidewalk Chalk + Railroad Chalk	• Better grades of sidewalk chalk have superior qualities (e.g., less stick breakage). • Railroad chalk is similar but stronger sticks than sidewalk chalk.	• Sidewalk chalk is cheap and widely available. • White and yellow sticks of railroad chalk can be purchased in bulk boxes from commercial suppliers.
Spray Chalk	• Spray chalk is costly compared to sidewalk chalk. • Has far superior appearance to sidewalk chalk and is much more durable. • When used with traffic-grade stencils, creates roadway striping and markings that have a 'real traffic' appearance. • Spray chalk is removable with a powerwasher (although it may need some additional scrubbing depending on how heavily applied). • It will wash away after a couple of rain events but can last longer depending on conditions. • The life can be extended by spraying touch ups, 'fixing' the product with hairspray or using artist-grade spray chalk.	• Can be purchased from hardware stores, local big box department stores and online. • Wide variation in cost for same product – check prices among sources.
Duct tape	• Tapes create vibrant and even striping lines. • Tapes are easily applied to surface and readily removed. • Recommend using lengthier rolls, higher grade tape (10 mil.). • Any remaining adhesive can be power-washed or removed with solvent.	• $9+/60 yd (10 mil.) • Widely available from hardware stores and online commercial suppliers.

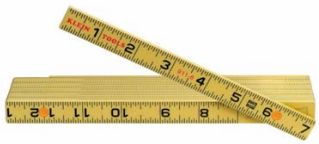
Temporary Surface-Applied Products	Features and Attributes	Cost and Sources
	• Tapes may become loose after heavy rains especially when applied to surface low points (that hold water).	
Tempera Paint	• Easy-to-work with washable product • Will wash away, especially with heavy rain	• Low-cost paint, available in craft stores, big box department stores and online. • Price varies widely. • 5-gallon bottles available at much better value online
Spray Marking Paint	• Marking spray paint is cheaper than the tapes. • Marking paint lasts for 2-6 month. • Marking paint cannot be easily removed before it wears away. • It's harder to fix errors during installation. • Double check that paint is labelled 'marking' for any non-permanent applications.	• $5-$10/spray can • Save costs with bulk can purchase • Available from hardware store, traffic supply stores, or online.
Artificial Turf Grass	• Adds more realism to the overall experience • Helps clearly defines the streets • Reduces the need to outline the streets • Use industrial-grade Velcro to keep materials in place.	• Cost and quality ranges widely. Available from hardware stores and artificial turf specialty suppliers • Low-cost materials available from hardware store but does not simulate grass appearance as well as the commercial materials • Low-cost materials do not stay flat and in place as well as the higher-grade materials

Table I. Installation Process Tips

Installation-Related Tasks	Steps & Tips
Preparing for Installation (volunteer or professional): Installing traffic gardens is generally unfamiliar to both volunteers and contractors. It is a good idea to send drawings to a potential contractor(s) to have them provide input. Contractors with experience of road striping, parking lot striping or sports court striping will have the most expertise and will be a good source of advice.	
Advance Preparation	• Gather quotes and sort out contracts • Double-check for Inaccuracies in drawings • Volunteer organizing and instructions • Identify staging areas and unloading spaces • Notify property owners • Arrange for access and keys • Determine whether watered is available/needed • Gather supplies, materials • Prepare media information • Watch weather • Set installation around daylight hours • Pick up key (if necessary)
Site Preparation	• Repair cracks • Remove/repair any hazards • If possible, sealcoat the surface • If not sealcoating, paint over any lines or markings (using paint mixed to match asphalt shade) • Powerwash surface
Installation Day(s): Laying out of the striping lines and markings is considerable work, even for professional contractors. Most installers use striping equipment to add the painted lines to the site so the surface needs to be completely marked up in advance for them to follow. Whether installing professionally or with volunteer assistance, the site is measured and pre-marked with chalk lines and spots which provide the guide the people adding the striping lines. Installations needs to be well-managed to prevent errors and keep project moving forward. Whatever measuring method is used, it is important to wait until marking is complete before adding permanent lines. Errors are difficult to fix once surface products have been applied so take a lot of care regarding accuracy and legibility of the markings.	
Before starting	• Have site opened up (if necessary) • Sweep leaves and debris off surface • Unload and stage all the supplies, tools and equipment • Set up direction signs and volunteer table (if necessary)

Marking and Measuring	• The most difficult elements to mark out are curved streets • Line striping can be tricky because of short runs and proximity of striping lines • Step back and check to see that layout markings make sense as you go • Watch for cumulative measuring errors
Adding Surface Lines and Pavement Markings	• Take care to wipe off stencils before moving to next spot • If using paint, keep bike riders off surface for at least a day (or more depending on product used)

Table J. Installation Equipment Resources

MEASURING THE SITE: Marking and measuring are key aspects of locating and laying out a traffic garden. A range of measuring tools are needed to locate, mark and install the striping lines and pavement markings.		
Tools	**Purpose + Use + Tips**	**Cost**
Yard stick 	• Straight measuring tool • Useful for drawing lines and crosswalk painting, etc. • Available at local hardware store and paint supply shops	$1 and up
6’ folding ruler 	• Measuring tool • Longer straight edge • Useful for spacing streets • Available at local hardware store and paint supply shops	$13 - $50
Open reel hand-wind measuring tape (100’) 	• Long tape for laying out boundaries or measuring street lengths • Tape is flexible so it follows surface irregularities • Useful for measuring angle or distance between two point to assist with geometric calculations • Easy rewinding and handle • Available at local hardware store and through sports courts suppliers	$15 and up
Retractable + locking measuring tape (6’-25’) 	• Useful for single person measuring without assistance • Locking feature allows repeated marking of same length • Tape usually rigid enough to remain stiff over a distance and provide useful approximations during layouts • Wide variety of sizes, longer is more useful • Compact and can be carried on person	Ikea 10’ tape (FIKA) = $1.49 Other tapes $6-$50 each

	• Available at local hardware store and big-box general merchandise store	
Measuring wheel 	• Handy for measuring site and setting up for layout marking • Elevation changes can alter accuracy • May be less versatile than long measuring tape • Available at local hardware store	$30 - $130
Drywall T-square 	• Useful tool for laying out and squaring off pedestrian crossings, measuring from midline • Find right angles easily and line up other measuring sticks • Double-sided blade allows measurements in both directions • Available at local hardware store	$12 and up
Chalk line + powder	• Creates crisp straight line on surface after measuring • Use **temporary** chalk powder • Available at local hardware store	$7 - $10
Chalk stick + string	• Easy method for measuring and marking circles of any diameter	NA
ASPHALT STRIPING + MARKING: There is a range of equipment for adding lines and markings to hard surfaces, varying widely in price and capabilities. Lower cost equipment is generally less complex to operate and easier for non-professionals to use. The quality of the finished lines is related to the equipment as well as operator skill level		
Equipment	**Purpose + Usage + Tips**	**Cost Range**
Line striping wand 	• Rolling handheld device • For use with inverted marking paint can • Trigger to apply paint • Adjustable line width • Difficult to control application rate and line width • Two-wheeled version provides better control for painting curves • Available in local hardware stores and traffic supply stores	$20 - $75

	Note: These devices are intended for use with temporary spray marking paint not permanent striping paint.	
Line striper (4-wheeled, walk behind) 	• Easy to operate (pull trigger and walk straight line) • Adjustable line width (2″ - 4″) • Paints straight lines • For use with cans of inverted striping paint • Can also paint on grass with water-based paints • Storage compartment holds extra cans (refills + empties) • May feature removable handle for storage • Needs modified handle/sprayer if painting directly at curb edge • Involves slow steady painting following chalk marking line • Large wheels for stability on uneven surface. • Available in local hardware stores, traffic supply stores **Note:** These devices are intended for use with <u>permanent striping paint</u> not temporary spray marking paint but versions are available that apply chalk lines from powder.	$100 - $150
OTHER SURFACE MARKING SUPPLIES: Striping lines and pavement markings may be applied permanently or for temporary applications using paints, chalk or tape. Manual painting may make sense for smaller sites and applications and can result in similar quality line striping. Spray chalk and tape can be applied manually also.		
Equipment	**Purpose + Usage + Tips**	**Cost Range**
Traffic stencils 	• Available through parking lot or traffic supply companies • Commercial grade, reusable stencils • Bike symbol, STOP sign + word, Yield word, shark's teeth (yield symbol)	$10 - $100 +

	• Allow paint or chalk to dry completely before moving to next location • Take care moving the stencil to prevent smearing • Clean stencil to prevent paint build up which will otherwise cause drips	
Custom-made stencils 	• Create design at required scale • Available through parking lot or traffic supply companies • Commercial grade or lesser grade reusable stencils • Bike symbol, STOP sign + word, Yield word, shark's teeth (yield symbol) • Allow paint or chalk to dry completely before moving to next location • Take care moving the stencil to prevent smearing • Clean stencil to prevent paint build up which will otherwise cause drips	$30 and up
Handmade stencils 	• Hand cut stencils for striping or pavement markings from cardboard, mylar, corrugated plastic sheets, gym mats • Low cost, light weight material • Place on the surface, spray paint or chalk, then re-position for the next stripe or marking • Stencil cutters and corrugated plastic cutters available • Useful making more-durable traffic sign faces • Can be cut to make longer-lasting stencils • Take care moving the stencil to prevent smearing • Clean stencil and prevent paint build up which will otherwise cause drips	NA
Handmade line- or crosswalk-striping frame	• Make painting frame with readily available materials including	NA

	carpet, plywood, dowels, corrugated plastic, etc. • Use paint roller to make striping lines within wooden frame	
Roller brushes (long pole, wide or narrow) + paint tray	• Narrow paint roller can be used to paint striping lines • Wide roller useful for painting large spaces • Roller makes it quicker to paint and handle reduces the need to bend	Roller sets: $13 - $30 Pole: $8 - $30 Tray: $2 - $19
Brushes (foam, stencil, various sizes)	• Foam brushes help spread paint or chalk into stencil corners • Stencil brushes designed to minimize paint or chalk seepage at edges	Foam: $1 + Stencil: $2 +
Chalk stick + string	• Easy method for drawing circles of any diameter	NA
Chalk line + powder	• Creates crisp straight line on surface • Use **temporary** chalk powder	$8 and up
Painter's/masking tape	• Can use painter's/masking tape to mark out sides of lines	$4/roll+
Cardboard sheets	• Rectangular sheets with straight edges • Use to prevent overspray when using spray paint	NA
Buckets	• For soaking and cleaning paint brushes and rollers	NA

Table K. Potential Project Partners and Stakeholders

Potential Project Partners	Local Organizations and Groups	Additional Suggestions
Governmental Agencies, Departments • Elected officials • Agency staff and representatives	• City of Raleigh City Council • Transportation Planning (bicycle and pedestrian) • Parks and Recreation (inclusion services, camps, nature service, community centers, district managers) • Housing/Neighborhoods • Police Department (RPD) • GoRaleigh (transit) • Special Events • Wake County Safe Routes to School program • Wake County Parks staff • Capital Area Metropolitan Planning Organization (CAMPO) • Regional municipalities • NC DOT	• Invite traffic garden speakers to present locally (e.g., Dick Winters of Charlotte Bike Park) • Plan or encourage field trip to visit traffic gardens (e.g., Charlotte Bike Park) • Distribute educational information and webinars • Officials or staff involved in health and wellness, health-in-all policies and active transportation
Local Commissions • Appointed representatives	• Bicycle & Pedestrian Advisory Commission (BPAC) • Mayors' Committee for Persons with Disabilities • Parks, Recreation and Greenway Advisory Board	• Conduct presentations to advisory commissions and other groups • Distribute educational information and webinars
Local Community • Local residents and families • Under-represented community members (socio-economic background, minority, age, neighborhood,	• Raleigh residents • City camp participants and their families	• Add fluent Spanish speaker to project team • Speak to local bike-riding/cargo-biking families • Speak to non-profits and pastors • Make inquiries locally seeking people • Seek out League Certified Instructors (LCIs) bicycling educators • Invite people who have spoken up or commented locally

Potential Project Partners	Local Organizations and Groups	Additional Suggestions
first generation immigrants)		• Host table at a community event or health fair
Local Organizations • Disability organizations • Local bike advocacy organizations • Active travel advisory committee members • Biking educators and volunteers • Local street safety non-profits and organizations • Adapted biking groups • Places of Worship • Local immigrant and refugee service organizations	• Oaks and Spokes • Bike Shops • REI • Black Girls Do Ride • Bike Meet Ups • Frankie Lemmon Foundation • SE Raleigh Promise • Kiwanis Club of Raleigh • Rotary Clubs & Junior Woman's Club League	• Look up pedestrian or transit advocacy groups • Seek out range or disability advocacy groups/organizations • Invite local appointed advisory committee or commissioners • Seek out roadway safety organizations (e.g., Families for Safe Streets) • Check for children's groups such as local KidicalMass
Educational and School Community • Museum programs and partnerships • School representatives (physical education, early childhood education, central office staff) • School facility staff • Magnet schools	• Marbles Children Museum • Wake County Public School System (WCPSS) • Charter schools • Colleges: WakeTech, NCSU, St. Aug, Shaw, Peace • Governor Morehead School for Blind • Powell Elementary (play magnet school) • Wake County Parent Teacher Association (PTA) • Boy and Girls Clubs • YMCA	• Contact school principal or other staff • Check for school transportation committees and groups • Identify active schools for Walk-to-School/Bike-to-School days • Contact teachers: PE, preschool, STEM and art teachers • Make connections with urban planning or design professors or students • Contact PTA, parent's art group and preschool parent-education programs • Contact sports programs

Potential Project Partners	Local Organizations and Groups	Additional Suggestions
• Safe Routes to School staff and committee members • Community college	• Poe Center for Health Education • WakeEd Partnership	
Other Community Businesses and Organizations • Health organizations • Bike and Pedestrian design consultants • Local artists and makers • Cultural groups • Community maker space • Service organizations • Scouting organizations • Local business	• John Rex Endowment • American Heart Association • Hospitals: WakeMed, Duke, Rex • Transportation & planning consultants such as Stantec, VHB, Alta, etc. • • Chamber of Commerce • Downtown Raleigh Alliance (DRA) • Crosby Garfield Center • Shopping Centers: North Hills, Hillsborough St • Developers: e.g., Kane	• Identify contacts through past events and local cultural happening • Contact local maker spaces and art spaces

Example A: Pop-up Traffic Gardens

Pop-up Traffic Gardens: A pop-up traffic garden can be designed as a low-cost and temporary installation that can transform a public space into a vibrant and active space for kids on wheels. Pop-up traffic gardens can be deployed as a fun activity at a larger event but also to demonstrate the concept in action to decision makers or local official.	
Materials: Removable materials such as duct table, spray chalk and artificial turf supplemented with tempera paint, vinyl tape, cardboard buildings, and portable street signs.	
Pop-up Traffic Garden Examples	• Open Streets DC, District of Columbia • Kensington Pop-up Traffic Garden, Maryland • George Mason University Pop-up Traffic Garden, Virginia • Roanoke Boys and Girls Club, Virginia

Example B: Temporary Traffic Gardens

Temporary Traffic Gardens: Similar in nature to a pop-up traffic garden, a temporary traffic garden can be installed to pilot the concept of a permanent traffic garden. Arlington County Virginia has been seeking to add a permanent traffic garden within its boundaries. A standing committee of officials representing local agencies has examined a number of sites but the location has not yet been selected. The local SRTS coordinator and a group With installations on the ground, local officials were invited to see the installations in action and many media pieces appeared including on local television. A page was added to the County website and the traffic garden committee was continues to work on	
Materials: Materials that weather/wear away over time such as spray marking paint, spray chalk and tempera paint. May also use duct tape and artificial turf affixed to surface with commercial-grade Velcro. Life of materials can be extended through regular maintenance and touch ups.	
Temporary Traffic Garden Examples	• 25 x Temporary Traffic Gardens (PBOT, Portland schools and other jurisdictions), Portland, Oregon • 2 x Temporary Traffic Garden, Arlington Public Schools, Virginia • 11 x Temporary Traffic Gardens, Boulder Valley School District, Colorado

Example C: DIY Traffic Garden Kit

DIY Traffic Garden Kit: A pop-up traffic garden can be designed as a low-cost and DIY Traffic Garden Kits: Local organizations and agencies have deployed DIY traffic garden kits. its to get small projects started. The kit bag contains all of the basic elements needell a pop-up traffic garden on the ground without having to gather supplies. The described kits will be fully assembled and delivered to a Philadelphia locatiIndividual kit contents are contained within a sturdy carrier ba. . It won't be the biggest traffic garden but the installation is all very doable especially with a group of pals to lend a hand. We created a 20-page guide with lots of tips and suggested layouts	
The kit contains: traffic sign and marking stencils, measuring tools, temporary road lanes marking material, DIY traffic signs, DIY traffic garden guide including layout templates.	
Pop-up Traffic Garden Examples	• Open Streets DC, District of Columbia • Kensington Pop-up Traffic Garden, Maryland • George Mason University Pop-up Traffic Garden, Virginia • Roanoke Boys and Girls Club, Virginia

Example D: Traffic Garden Library Kit

Traffic Garden Library Kit: An organization or agency could put together a traffic garden lending library kit. The library kit is a set of resources which can be loaned out to community groups, program organizers or local SRTS coordinators when they are putting together their own traffic garden, whether permanent, temporary or pop-up. With the kit in hand, they will have a selection of tools, equipment and materials for creating their own local traffic garden and this can be supplemented with companion guidance on installation and program information. Such a lending library has been launched by Metro Portland, the regional metropolitan planning organization, to serve SRTS coordinators and others in the community to assist them in getting traffic garden projects off the ground and support them in the work. Local officials or community members go through an application process to initiate use of the traffic garden lending library kit. This process would involve two rounds of soliciting information about the planned project, the first round as they establish their project and the second after they complete all of the work needed prior to starting installation.	
Lending library Kit: Walk-behind paint striper, spray painting wants, reduced-scale traffic stencils, tapes and paints; measuring tools, guidance documents and tip sheets.	
Traffic Garden Lending Library Example	Metro Portland, Portland, Oregon

Table L: Volunteer Assistance

Aspects of Volunteering	Roles and Organization
Traffic garden roles for volunteers	• Graphic design services (base drawing, layout, revisions) • Staffing tables at community events • Setting up and staffing pop-up demonstrations • Making supplies for activities • Speaking other languages and translation services • Collecting comments from community • Working with children on traffic garden design projects
Building volunteer organizations	• Build contact lists for organizations and individuals • Let people know that you are seeking volunteers • Connect with schools and other organizations • Award service hours to teens • Maintain volunteer contact information list • Stay in touch with volunteers on an ongoing basis
Volunteers during community engagement events	• Provide advance details of what to expect • Provide brief training and go over expectations • Provide extra tips and direction for working with children • Create a team with vests, t-shirts or buttons • Let them know where to direct people with more detailed questions or concerns
Taking care of volunteers	• Take photos of volunteers in action and pass along with follow up thank you messages • Keep volunteers informed on project progress • Let them know when project is successfully completed • Invite past volunteers to celebratory events • Include in awards and recognition

Table M: Community Engagement Events

Event	Format	Potential Locations or Partner
Conduct a pop-up traffic garden event or demonstration	Set up a small-scale temporary traffic garden as a demonstration project and allow local young children to have fun biking and playing in the pop-up. Such pop-ups work well as part of a larger event such as open streets or bike rodeos. Host adjacent activities table for older children asking them how they would have designed the traffic playground. Gather the designs for use in project team layout meetings.	• Planned traffic playground site • School playground • Preschool playground • School parking lot • School gym/auditorium • Recreation center parking lot • Recreation center sports courts
Hold a walking tour or biking at or to the site	Conduct a community walking tour to the traffic garden project site or hold a bike rodeo. Invite a range of people with different abilities and chalk out ideas on the asphalt. Display proposed plans and have participants write in their comments. Have children bring along bikes and scooters and chalk out sample streets to scale. Host a sign-making craft table and add the signs to the temporary streets for the duration.	• Planned traffic garden site • Walking route from some other community destination
Hold a visioning event or listening exercise	Invite community members to an indoor event where they can add their ideas to a model or drawings. Invite them to tell their stories of playing as a child and how they learned to ride a bike. Record these oral history submissions for use in programming.	• Farmers market • Back-to-school night • Recreation center parking lot • Before a community running event
Host a community arts event	Team with arts events or organizations or school art teachers to create an event that taps the power of art to foster engagement	• Local schools • Local arts center • Arts festival

Event	Format	Potential Locations or Partner
	and design ideas. Create models, collages, posters, or mosaics.	
Involve local children or school class groups in the design process	Hold a 'design charrette' where children can cut out street elements and other parts and lay them out on a base drawing of the traffic garden site.	• STEM teacher at school • Local library community room
Hold a design contest	Have local community members or students submit their dream traffic garden designs or models. Announce winners and display submissions at subsequent event and in local media. Incorporate design and model elements into the project layout.	• School art or STEM teachers • Through scouting or other children's groups • Local library

Example E: Jefferson Playground Traffic Garden Community Engagement

Information	Project: Jefferson Playground Traffic Garden, Alexandria, Virginia
Project Plans	The City planned their first traffic playground installation on an existing asphalt court next to a playground and a community trail.
Stakeholders	A central part of installing traffic gardens in the City has been involving local children in the planning and design of the facilities. The City held a community workshop for children at the local library close to the site to provide design input for the new traffic garden. Children from age 2-10 attended with family members.
Type of Engagement	Design charrettes were set up that involved child-friendly learning materials and input methods, scaled elements and engineering base drawings. The room was set up with an array of booths, tables and floor activities where participants could engage in one or all of the traffic garden design hands-on activities. The children were introduced to key ideas about the traffic garden and the design brief. They were provided with base drawings and scaled street elements to lay out their streets and other features. They were facilitated by volunteers and staff who guided them through the process.
Outcome	City officials held a design workshop where they considered all of the children's submissions. The children's designs formed the basis of the final design layout for each site. Children were invited to the ribbon-cutting/bike rodeo event for the new traffic playground and have seen the site go into everyday use.

Section III. Additional Examples and Suggestions

This section provides more information from other traffic gardens as well as suggestions from local representatives as well as traffic garden practitioners elsewhere. The intention is to provide additional information that illustrates the range of options and topics that may be useful for any Raleigh projects.

This section includes the following photos and case studies:

- Traffic Garden Examples – a set of case studies, photos and listing of installations
- Traffic Garden Team Representatives – information about project participants
- Lessons From Traffic Garden Projects – input from other traffic garden projects
- Traffic Garden Project Timelines – Sample for pop-up and permanent installations

This section includes the following tables:

- Table O: Permanent Traffic Garden Examples
- Table P: Traffic Garden Team Participants
- Table Q: Lessons from Traffic Garden Projects
- Table R: Pop-up Traffic Garden Fall 2021 Possible Timeline
- Table S: Permanent Traffic Garden Possible Timeline
- Table T: Actual Timeline for Sample Installed Project

Traffic Garden Examples

Examples of different types of traffic gardens are included to showcase the range of options and how they have been implemented in various communities. The following pages includes summaries and photos for the following traffic gardens:

Pop-up Traffic Gardens:

- Example F: Green Streets Rutland, Rutland, Vermont
- Example G: Open Streets DC, District of Columbia

Temporary Traffic Gardens:

- Example H: Arlington Traditional School traffic garden, Arlington, Virginia
- Example I: Portland Bureau of Transportation traffic playgrounds, Oregon
- Example J: Boulder Valley School District traffic gardens, Colorado

Permanent Traffic Gardens:

- Example K: Charlotte Bike Park, Charlotte, North Carolina
- Example L: Jefferson Playground Traffic Garden, Alexandria, Virginia

Pop-up Traffic Garden
Green Streets Rutland, Rutland, Vermont

Example F: Green Streets Rutland Pop-up Traffic Garden, Vermont

Traffic Garden Type	Pop-up Traffic Garden
Location + Site Conditions	Green Streets Rutland, Held on Center Street, Rutland, Vermont Public street: asphalt including existing roadway markings
Description	Center Street was closed off to vehicles for the day for the Rutland Green Streets event. A pop-up traffic garden was installed in the road travel lanes next to the farmers' market. The installation was highly visible and attracted onlookers in addition to participating families. The traffic garden was open from 8:00am to 2:00pm.
Traffic Garden Features + Size	• Street blocks were created by laying live sod turf on asphalt • Mini-streets were striped around turf using removable tape • Roundabout created using grass outdoor rug • Crosswalks /arrows added with spray chalk using templates • Portable signs and cardboard buildings were added • Site size: 25' x 65'
Team + Staffing	• Local Motion bicycle advocacy group (designed/managed, pop-up trailer, supplies) • Rutland Regional Planning Commission (funder) • Rutland Parks and Recreation (provided bikes) • Come Alive Outside (Green Streets organizer) • Vermont Energy Education Program (organized volunteers) • 3-5 volunteers/staff at a time assisting traffic garden • 2-3 volunteers/staff helping with equipment + forms
Installation and Removal	• Installation after street closed to vehicles (early same day) • Supplies and equipment were transported in pop-up trailer • Removal performed by staff and volunteers immediately after end of event (i.e., tape lifted, spray chalk washed off street, turf and other items packed away)
Access & Equipment	• Parents signed photo and release waivers • Children fitted for helmets (required) at registration table • Not more than 8-10 kids in the traffic garden at a time • Parents were allowed into site to join child if needed • 10 x balance bikes and other children's bikes of varying sizes (provided by Parks & Rec) plus helmets for participants • Held E-bike demonstrations at set times for adults • Mini-fire truck periodically set siren off

Pop-up Traffic Garden
Open Streets DC, Washington DC

Example G: Open Streets DC, District of Columbia

Traffic Garden Type	Pop-up Traffic Garden
Location + Site Type	Open Streets DC Pop-up Traffic Garden on Kansas Avenue NW. Located on public street asphalt including existing roadway markings.
Description	Georgia Avenue NW was closed to vehicle traffic for Open Streets DC. The traffic garden was installed on Kansas Avenue NW, a contiguous public street within the closed off area. One side of Kansas Avenue was kept open for emergency vehicles and the traffic garden was installed on the other side. The highly visible site attracted many onlookers in addition to families. The traffic garden was open from 10:00am – 2:00pm.
Traffic Garden Features + Size	• Artificial turf blocks were installed and mini-streets were created using white and yellow duct tape and spray chalk. • Decorative fence kept public out of the biking areas • Fence bases were weighted to prevent blowing over • Site size: 20' x 98' (plus hands-on design activities space)
Team + Staffing	• Funded by the District Department of Transportation (DDOT) • Contractor planned, installed, operated and removed • Twenty-five volunteers assisted over course of day • Volunteers a mix of DDOT staff plus Open Streets volunteers • Two volunteers managed entrance/exit at all times
Installation and Removal	• Police shut roadways early in the morning with tow trucks removing remaining vehicles • Team unloaded supplies and equipment onto sidewalk • Installation took 2 hours and 10 volunteers • Team removed everything in under an hour • Spray chalk markings were scrubbed off of street
Access & Equipment	• Free access for children ages 2-6 with balance bike, bike with training wheels or scooter and wearing helmet • Children screened for age, equipment, helmets plus provided with roadway safety instruction prior to using traffic garden • Site busy with 4-10 children at all times • Children supplied their own bikes and helmets • Sign specifically permitted balance bikes, bicycles with training wheels, scooters and wheelchairs

Temporary Traffic Garden
Arlington Traditional School, Arlington, Virginia

Example H: Arlington Traditional School, Arlington, Virginia

Traffic Garden Type	Temporary Traffic Garden
Location + Site Type	Located on Arlington Traditional School, Arlington, Virginia property. Site is asphalt area with basketball hoops at one end and in good condition. Site had no basketball line marking and is next to the school playground.
Description	This temporary traffic garden was planned and organized by a volunteer team on an open asphalt space at an elementary school playground.
Traffic Garden Features + Size	• The traffic garden was created using spray temporary marking paint to create roadway striping (white and yellow lines) plus stenciled roadway stop and yield signs and pavement markings • Site size: 80′ x 80′
Team + Staffing	• Arlington County SRTS Coordinator (grant, coordination) • Phoenix Bikes (rounded up volunteers, youth + supporters) • Potomac and Chesapeake Biking (design and layout) • Discover Traffic Gardens (layout, supplies, equipment) • Bike advocate leader (site, organized family volunteers) • Virginia Department of Transportation SRTS grant funding
Installation & Removal	• Team members unloaded and set up an hour beforehand • Installation took four hours and 20 volunteers • Volunteers included several parent/child groups • Temporary marking paint will weather and wear away over a period of about 3-5 months
Access & Equipment	• Free access for children • Children supply their own equipment and devices

Temporary Traffic Gardens
Portland, Oregon

Example I: Portland, Oregon

Traffic Garden Types	Temporary Traffic Gardens
Description + Site Conditions	Portland Bureau of Transportation (PBOT) installed seven temporary traffic gardens starting in summer 2020. They used SRTS funding at a cost of around $1,500-$5,000 per location. As PBOT typically teach bike safety education during the spring and could not do so because of school closures, they pivoted and installed temporary no-contact traffic gardens to support the school community and families. Traffic gardens were installed on available hard surfaces and created with temporary paint that was expected to last from a few months with the possibility of lines being visible for up to year.
Traffic Garden Features + Size	• Sites were located in parks, church parking lots and on apartment building and school properties. • Traffic garden sizes varied based on location.
Team + Staffing	• PBOT Safe Routes to School program staff planned, and installed the temporary traffic gardens • They received additional support from Metro Portland SRTS (technical assistance) • They also invited SRTS coordinators from adjacent jurisdictions to 'apprentice' at installations
Installation + Removal	• Lines and markings were added using spray marking paint • Installation was performed by untrained??? PBOT staff using walk-behind spray striping equipment and striping wands • Staff spray painted decorative items including houses, buildings, food cart pod with tables, bike racks, bus stops, trees, track and pool. • Temporary marking paint will weather and wear away over a period of months
Access + Equipment	• Open access for children and local families

Temporary Traffic Gardens
Boulder Valley School District, Colorado

Example J: Boulder Valley School District Traffic Gardens, Colorado

Traffic Garden Types	Temporary Traffic Gardens
Locations + Sites	All of the traffic gardens are located at Boulder Valley School District schools: Aspen Creek K8, Birch Elementary, Coal Creek Elementary, Columbine Elementary, Douglass and Centennial Middle schools, Emerald Elementary, Heatherwood Elementary, Lafayette Elementary, Meadowlark Middle, and Mesa Elementary schools.
Description	Boulder Valley School District installed 11 temporary traffic gardens in summer 2020. They used SRTS funding to purchase supplies at a cost of around $150 – $250 per location. They were created with temporary paint that was expected to last a few months although it lasted through the winter snows and the markings are still in place (June 2021).
Traffic Garden Features + Size	The size of the traffic gardens varied depending on the available space at the sites.
Site Conditions	• The traffic gardens are located on school playgrounds and basketball courts.
Team + Staffing	• The SRTS contacted the principals seeking permission and then directed the crew that installed the traffic garden • The traffic gardens were installed by crews of school bus drivers • All the school bus drivers were offered a choice of school maintenance tasks while students were schooled at home and these drivers opted for the traffic garden installation
Installation + Removal	• Traffic gardens were installed using spray marking paint, walk-behind line stripers and stencils. • Each traffic garden features 4' travel lanes and various elements they may encounter on their way to school, such as stop signs, crosswalks, one-ways, and roundabouts. • Installation took approximately two hours and 10 volunteers
Access + Equipment	• Each school principal sent a message out to the school families after installation to encourage use. • Free access for local children and families using their own devices.

The Bike Playground
Charlotte, North Carolina

Example K: Charlotte Bike Playground, North Carolina

Traffic Garden Type	**Permanent Traffic Garden**
Location + Site Conditions	The Charlotte Bike Playground, Arbor Glen Outreach Center, 1520 Clanton Road, Charlotte, NC 28208 Traffic garden mostly installed on the asphalt around the edges of a set of basketball courts plus includes some additional existing asphalt. Most of the asphalt had been recently renovated so it was in good shape plus an additional area with some abandoned structures
Description	Opened in 2018, this popular facility is located in the grounds of a Mecklenburg County recreation center, next to a greenway trail and adjacent to a residential community. The traffic playground course was installed around the edges of an existing set of basketball courts which are still in active use. The irregularly shaped site encompasses approximately 400' x 70'.
Project Background	• Dick Winters, SRTS coordinator with Mecklenburg County Public Health, pursued traffic garden concept with focus on bicycling safety • Project was the result of established relationships between the county, the school system and biking organizations built up through many previous years of biking and healthy activity programs • School system had already created a portable program but there was interest in an outdoor facility also • Opportunity came about because of a community grant from the Knight Foundation
Design + Installation	• Facility was designed in-house by a staff person who coordinated with transportation department on roadway design details • Installed by sports courts contractors under contract with county • Encountered weather delays so it was finished up a few months later
Partnerships	• Mecklenburg Parks and Recreation, the city/county school system plus local non-profits, Learn to Ride, Safe Kids Coalition have worked together in various roles on the facility • Recreation center staff assist in scheduling bike programming at the site

Jefferson Playground Traffic Garden,
Alexandria, Virginia

Example L: Jefferson Playground Traffic Garden, Alexandria, Virginia

Traffic Garden Type	Permanent Traffic Garden
Location + Site Condition	Jefferson Playground Traffic Garden, Hume Avenue, Alexandria, Virginia. The site was an asphalt court with a green surface-coating. While it was a bit shabby, the surface was in good condition and free of cracks and the site was very well located.
Description	The City of Alexandria installed a traffic garden on an existing court next to a playground in 2019. Paths connect the site to the playground, trail and neighborhood sidewalks. Local children helped design the layout features which features bright colors and a painted set of streets. Now it is part of the open playground area and can be reserved by local groups for events such as bike rodeos. This is a flat rectangular asphalt court: 55′ x 75′.
Project Background	• Complete Streets Coordinator was interested in adding traffic gardens to the City toolbox to supplement SRTS projects. • She identified Parks Department site and got permissions. • Hired traffic garden consultant to hold children's public input session, design and preparation of installation drawings.
Previous Use	• Unused asphalt pad that had previously been a sports court. • Site had been identified in a parks master plan to be turned into a soccer court but that plan was altered to traffic garden.
Design + Installation	• Local children were invited to a Saturday morning workshop at a local library close by the site. • Children were introduced traffic playground ideas and provided materials to propose their own designs. • Children submitted designs at a model City Hall. • At a follow-up work session with City staff, a conceptual design for the traffic playground was prepared using layout and artistic elements from three of the children's submissions. • Paint and markings installation was performed through a combination of in-house staff and on-call contractor. • Installation was performed over several weeks due to weather.
Partnerships	• Local volunteer biking groups use facility for community bike rodeo events. • There is no charge to these organizations.

There are many additional traffic gardens around the U.S. that can be researched on line or examined on Google Earth. The following table locates permanent traffic gardens that offer a range of design styles and facility sizes.

Table O: Permanent Traffic Garden Examples

Permanent Traffic Garden	Site Address	Site Location
Mountain View Good Neighbor Bicycle Community. Washington	Mountain View Elementary School, 1900 College St SE, Lacey, WA 98503	Located in front of elementary school between bus unloading and front entrance
Westlake Safety Town, Ohio	27300 Hilliard Boulevard Westlake, OH 44145	Located in front of police station, next to parking area and other facilities.
MAK Town Safety Village, Ohio	Dayton Life Enrichment Center 425 N Findlay St, Dayton, OH 45404	Located behind community center, next to bike hub
Oceano Bicycle Playground, California	Oceano Elementary School 1551 17th Street Oceano, CA 93445	Part of elementary school playground
Warminster Safety Town, Pennsylvania	Warminster Community Park 300 Veterans Way Warminster, PA 18974	Located within a park next to playground on a repurposed airplane landing strip
Alexandria Bike Campus, Virginia	Jones Point Park Jones Point Drive Alexandria, VA 23242	Located on unused asphalt pavement under interstate bridge (used for firework event parking 1-2 times/year)
Fort Collins Walk and Wheel Skills Hub, Colorado	1601 W Drake Rd, Fort Collins, CO 80526	Located on overflow church parking lot directly next to trail network
Montbello Bicycle Course, Colorado	Montbello Recreation Center 5555 E 53rd Ave, Denver, CO 80239	Located behind recreation center in area that was used for occasional food truck parking/event

Traffic Garden Team Representatives

Contributions were made to this project by representatives from a range of departments and organizations. A traffic garden team was assembled and members provided suggestions and information through the work session and interview calls.

Table P: Traffic Garden Team Participants

Name	Title and Affiliation	Highlighted Topics
Traffic Garden Work Session Attendees		
Joel Bateman	Forest Ridge Park Manager City of Raleigh Parks, Recreation and Cultural Resources Department	• All Kids Bikes initiative • Balance bike equipment/programs/partnerships • Established partnerships for bike programming • Ways to get people outside and pedaling
Paul Black	Bicycle and Pedestrian Manager City of Raleigh Transportation Department	• Support for traffic gardens • Bike facility expertise
Jennifer Delcourt	Wake County Safe Routes to School Coordinator Wake County	• Partnerships with schools • Access to central sites • Contact other traffic gardens (e.g., Fort Collins)
Mary-Jo Gellenbeck	Bicycle and Pedestrian Advisory Commission (BPAC) member	• Biking vision • Partner organizations • Volunteer pools
Bee Persson	City of Raleigh Bicycle and Pedestrian Outreach Coordinator	• Lenoir Street Open Streets • Sponsorships and donations
Madison Pharr	Marbles Children's Museum Guest Experience Director	• Successful events with biking • Partnerships going into schools
Mary Sell	Oaks and Spokes (Bike Advocacy) Executive Director	• Volunteer pool • Support for programs
Traffic Garden Phone Interviewees		
Ainsley Worrell	City of Raleigh Parks and Rec Health & Wellness Director	• Balance bike fleets/programs/partnerships

		• Pop-up football model as path to permanent installations • Network of community centers • District Managers – key decision makers • Partner with local institutions such as Marble Museum • As well as meeting kid's basic needs, need to create opportunities • Biking unlocks lifetime of skills and healthy activity
Dave Jones	PE Specialist Mentor Coordinator Southeast Raleigh Elementary School	• Adding traffic garden instruction through schools PE • Needs to meet the state standards • Becoming approved curriculum • Present to health advisory committees • Engage with Brian Glendenning, Healthful Living at Wake County Schools
Nikki Speers	Program Director City of Raleigh Parks, Recreation and Cultural Resources Department	• Inclusivity in design • Following best practices in universal design • Involving disability representatives in engagement • Using representative language and photos • Use of the partnership model for programing • Need for access to devices • Pairing with summer camps (field trips, on-site)

Lessons from Traffic Garden Projects

Contributions were made to this memo by representatives from other traffic garden projects around the U.S. Project participants were contacted and solicited to submit information about project benefits and barriers based on their experience.

Table Q: Lessons from Traffic Garden Projects

Name, Title and Affiliation	Traffic Garden Role	Highlighted Topics
Lauren Hassel Safe Routes to School Coordinator Arlington Public Schools, Arlington, Virginia	• Received SRTS grant to fund projects from Virginia Department of Transportation • Installed temporary Traffic Gardens at the Woman's Club, Arlington Traditional School and Hoffman-Boston Elementary School in 2020-21.	• Internal concerns about liability were addressed using volunteer waivers and change of materials • Delineating use during school hours and opening to community during non-school hours • Traffic garden on shared campus via shared use agreement • Working inside school system requires multiple approvals • Temporary traffic garden installation is a good compromise to allay concerns
Charlie Denney President Potomac and Chesapeake Cycling, Arlington, Virginia	• Planned and installed three temporary traffic gardens in Arlington, Virginia	• Having committed and enthusiastic partners is key • Working with partners who can navigate through issues collaboratively to find solutions • If more than one entity involved, giving thought to which partner should be lead applicant
Dr. Ellen Rodgers Associate Dean, College of Education & Human Development George Mason University, Fairfax, Virginia	• Project Coordinator for Aiton Elementary Traffic Garden and Thomas Elementary Traffic Garden, District of Columbia	• Including students, school personnel, and the community in planning provides sense of belonging, ownership, safety, and agency that are essential to community well-being • Key to student learning is engagement in authentic tasks that are appropriately challenging,

Name, Title and Affiliation	Traffic Garden Role	Highlighted Topics
		relevant to their lives, and imitate real situations.
Sam Murrey Leads Working Traffic Garden Committee for Arlington County, Virginia	• Prepared student thesis on Traffic Gardens. Has assisted in temporary traffic garden installations.	• Identify good site with landowner who is a willing and able partner. • There are challenges to finding site so trade-offs may be necessary. • Much work in organizing the particular people with the power to make or influence decisions. • Sites limited and in demand, so involves balancing needs.
Brenden Paradies Transportation Planner, Department of Transportation & Infrastructure Denver, Colorado	• Project manager for planning and installation of Montbello Bicycle Course, Colorado	• Being mindful of seasons and weather when planning work • Recommend preparing good base information (e.g., survey) of the area. • Having a permanent installation allows a consistent approach to teaching bicycle education.
Dick Winters Charlotte Bike Advocate, Charlotte, North Carolina	• Champion behind installation of Charlotte Bike Playground. Held numerous biking events at traffic garden.	• Being in a public place, site can be used by anyone any time the park is open.
Amy Thompson SRTS Coordinator, Boulder Valley School District, Colorado	• Led project and successfully installed 11 temporary traffic gardens on school properties using SRTS funds.	• Figuring out the design for each different site is a challenge.

Traffic Garden Project Timelines

Traffic garden projects differ in their nature and scale which makes a significant difference in how long they take. Each project starts with taking initial steps and making a plan that can take the project to completion. Sample possible timelines have been included showing the steps involved and sequencing including:

- Table R: Pop-up Traffic Garden Fall 2021 Possible Timeline
- Table S: Permanent Traffic Garden Possible Timeline
- Table T: Actual timeline for Sample Installed Project

Table R: Pop-up Traffic Garden Fall 2021 Possible Timeline

Date	Task
July – Event	• Create workplan • Hold planning team meetings • On-going emails and communication
July	• Confirm event details including date, time, rain date • Contact partners • Pick/confirm site location • Field assess site, measure and photo details
August	• Prepare sketch (base + layout) • Gather input on layout • Plan traffic garden operational details
By August 30th	• Finalize layout and installation details • Identify volunteer pool • Prepare draft media content or flyers
Early September	• Prepare materials & equipment supplies list • Send out volunteer request • Contact local interested organizations to let them know about traffic garden at event • Make portable sign set
Mid-September	• Acquire/store/stage materials + equipment • Confirm access, unloading, removal information with event • Stay in communication with event organizers • Meet organizers at site to go over details of installation and surrounding activities/closures • Confirm volunteers and send out additional requests if needed • Acquire/store/stage materials + equipment • Confirm access, unloading, removal information with event • Communicate details to volunteers • Make signs for site entrance and users
Late-September	• Prepare installation plan & volunteer instructions • Key site owner informed
October 1	• Send out messages to volunteers, team and partners • Send out invites to officials and elected representatives to stop by • Gather any missing supplies and equipment • Pick up any last-minute elements or contributions (e.g., parking passes, free giveaway items, etc.)

	• Pack supplies and equipment for delivery to installation site
October Event Date	• Clean site before starting • Measure and mark site • Install lines and markings • Add signs and other features • Hold community event • Take photos • At end of event remove all lines and markings
Immediately after event	• Send out notes of appreciation • Clean tools and equipment • Return any borrowed items • Send notes about project to the owner • Invite interested parties to see site • Gather photos from installation and event
Rest of October	• Follow up with media articles and newsletters • Follow up on enquiries and suggestions • Prepare lessons learned/suggestions document • Hold a team meeting or celebration

Table S: Permanent Traffic Garden Possible Timeline[8]

Date	Task
Month 1	• Agencies or champions identify idea • Identify possible funding • Assemble core team • Decide to proceed • Create workplan and timeline
Month 2	• Planning team meetings • On-going emails and communication • Apply for funding
Month 3 + ongoing	• Identify stakeholders • Identify partners • Identify possible sites
Month 3	• Examine sites • Select site location • Contact owner and request permission • Draft use agreement • Plan programming needs • Gather programming input from organizations/schools
Month 4	• Gather information about site • Field assess selected site • Take before photos • Prepare base information about site (aerial, add details) • Prepare draft layouts • Circulate and comments on draft layouts • Meet and discuss layouts • Select layout • Make arrangements for site repairs if needed • Identify possible contractors and initiate conversations
Month 5 - 7	• Prepare detailed layout drawings • Circulate and solicit comments on final layout • Finalize layout • Prepare companion installation drawings • Plan community engagement • Prepare community engagement materials and methods • Hold community engagement

[8] Assumes professional installation and funding.

	• Determine storage needs associated with site and make any arrangements • Seek sponsorship and donations
Month 7 - 9	• Prepare material lists • Seek quotes and bids • If bids come in high, may need alterations and rebid • Review quotes, call references and select contractor • Go through contracting qualification process and sign • Meet with contractor and plan installation process • Prepare installation plan and information package
Month 10 - 12	• Gather materials and supplies (non-contractor items) • Schedule installation and notify all parties • Prepare contact list for all parties involved • Make staging and access arrangements for installation • Watch weather and make contingency plans • Confirm any additional needs (e.g., access to water) • Arrange to have site prepared and cleaned for installation • Visit site prior to installation and confirm everything is ready
Month 13	• Conduct installation • Final details and any finishing touch up • Take photos of installation • Inform site owner and invite to visit • Send thank-you messages to team and other partners
Month 14	• Pick date and plan celebratory event • Invite special guests and volunteers • Prepare media information and flyers • Hold ribbon-cutting community event • Celebrate

Table T: Actual Timeline for Sample Installed Project[9]

Date	Task
September 2018	• Client attends the Walk Bike Places Conference and sees presentation about traffic gardens
January 2019	• Client mentions interest in creating a traffic garden to funder
February 2019	• 2/6 – Funder offers $20,000 SRTS funding for traffic garden project through September 30, requests a workplan • 2/7 - Begin gathering partners • 2/8 - Scope out potential locations • 2/14 - Partners phone call, City lot identified as location • 2/15 - Workplan drafted • 2/25 - Original design created internally • 2/28 - Apply to State DOT for $51,000 funding (includes rodeo)
March 2019	• 3/4 - Send letter to City Council requesting permission to use City lot • 3/6-3/12 - Research bicycle education curricula for camps • 3/14 - Reach out to Agency about using part of larger lot • 3/29 - Meet with State DOT about grant application
April 2019	• 4/4 - Updated design for City lot • 4/9 - Finalized design for City lot • 4/9 - Request contract with City • 4/16 – Client presents at City Council meeting • 4/26 – Local Department expresses opposition to City lot location as they use it for access to equipment, City unable to contact Local Organization for permission to remove their parking spaces
May 2019	• 5/23 - Scope out potential locations • 5/23 – Client attends a meeting with Hospital Staff and mentions project, Hospital Staff brings it up to Hospital Leadership • 5/31 – Hospital agrees to lease large lot
June 2019	• 6/3 - Updated contract to City to sign • 6/6 - Design created for Hospital lot • 6/13 - Design finalized for Hospital lot • 6/14 - Begin looking for volunteers

[9] Permanent traffic garden installed in Maryland

July 2019	• 7/8 - Start to plan bike rodeo grand opening • 7/15 - Meet with Community Organization to plan bike rodeo • 7/19 - Set date (9/7) and design flyer for grand opening bike rodeo • 7/22 - Receive draft contract from Hospital for review, start looking into liability insurance • 7/25 - Begin looking into sealcoating
August 2019	• 8/2 - Approve draft contract with Hospital • 8/2 - Create website page for Bike Safe Play Court • 8/6 - Discover State liability insurance limitations • 8/7 - Design signage • 8/9 - Request updated contract from Hospital including the City • 8/12 - Ask Funder for extension to complete work in November, funder indicates funding must be spent by September 30 but work can continue after and future funding will be available after October 1 • 8/14 – Client sends updated contract for approval • 8/16, 8/19, 8/29 – Client pulls weeds out of cracks on Hospital lot • 8/23 - Ask Hospital to update the contract with clarification regarding returning the lot to its original condition • 8/27 - Receive helmets • 8/28 – Client sends us updated contract for approval • 8/28 - Funder gives us extension to complete the work after September 30 • 8/28 - Ask City if they can hold liability insurance
September 2019	• 9/4 - Postpone grand opening bike rodeo • 9/5 - City attorney rejects M. contract • 9/9 – Hardware store offers to donate sealcoating • 9/10 - City administrator rejects leasing lot from Hospital • 9/18 - Cancel project • 9/20 - Inform partners project has been cancelled • 9/23 – Non-profit offers parking lot section for traffic garden
October 2019	• 10/4 - City and non-profit meet to discuss new location • 10/11 - Funder agrees to fund project for $20,000
November 2019	• 11/7 - Meet with partners at location to discuss plans
December 2019	• 12/27 - Design created
January 2020	• 1/24/2020 - Funder funds traffic garden for $10,000, offers additional funding for FY21
April 2020	• 4/7 - Design finalized • 4/24 - Quotes for painting and sealcoating

August 2020	• 8/19 - Discuss implementation plans and bike camps with non-profit • 8/24 - Request contracts for sealcoating/painting and non-profit programs
September 2020	• 9/9 - Contracts sent to contractor and non-profit • 9/11 – Sealcoating contract signed • 9/21 – Non-profit programming contract signed • 9/29 - Sealcoating completed
October 2020	• 10/6 - Painting mostly completed • 10/7 - Painting finished • 10/8 - Plan virtual grand opening ribbon cutting ceremony • 10/13 - Pick date (10/29) for ribbon cutting ceremony • 10/20 - Announce and invite partners and community to ribbon cutting