CHAPTER FIVE

Transportation, Green Infrastructure, Energy, and Water

TRANSPORTATION - VISION

Every Carrboro resident, with particular attention to Black, Indigenous, People of Color (BIPOC) populations, has increased safe and quality access to multimodal transportation options for efficient connections to jobs, recreation, and services.

TRANSPORTATION - KEY FINDINGS

1. **Since the 1970s, the Town has committed to a transportation system that serves all users by improving its walkability, bikeability, sidewalks, bike facilities, and greenways.**

2. **For nearly 50 years, Carrboro has partnered with Chapel Hill and UNC on a local transit system that serves almost 7 million bus trips per year and on average nearly 8,000 boardings and alightings per day in Carrboro alone, spending over $2 M annually to provide free bus rides and EZ rider.** Service is also available from GoTriangle (regional service) and Orange County Transit (smaller bus/van service and on demand service). 12.7 percent of commuters travel to work by transit.

3. **Carrboro is committed to addressing disparate impacts of transportation decisions and prioritizing investments in racial minority and lower-income communities.**

    a. Much of Carrboro's more affordable housing stock, consists of apartment complexes, which are located along the NC 54 corridor or other nearby arterial roads. The "NC 54 Pedestrian and Bicycle Corridor Safety Study of 2019" assessed that several characteristics of the corridor (high speed and volume of roads, lack of sidewalks and paths, wooded areas) create a challenging environment for safe pedestrian crossings, connection to the downtown area, and access to transit. Conducting targeted outreach to these residents will help the Town prioritize and implement policies and projects with equity at the center.

4. **The Town has been recognized for its outstanding commitment to bicycling by the League of American Bicyclists since 2006.** As the first NC community to receive Silver-level designation, Carrboro's bicycle commuter's share of 4.72 Percent places it just below the first and second highest communities (Portland, Oregon and Washington, D.C.) nationally in this metric. The closest North Carolina community, neighboring Chapel Hill, has a bike commute share of 1.94 percent. All of the other 13 NC cities (out of a total of 532 municipalities) recognized by the League have well below 1 percent of bicycle commuters.

5. **The Town's FY 2021 Capital budget is an indication of the Town's commitment to improving transportation access, including projects such as Morgan Creek Greenway, Jones Creek Greenway, S. Greensboro Sidewalk, and Sidewalk Bond Projects that include Rogers Road sidewalk repairs and bus shelter replacement.** Until planning began related to partnering on a new town building and county library in the downtown (the 203 Project), investments in these types of infrastructure outpaced all other capital planning the Town undertakes.

6. **Advisory board members, residents and Town officials continue to express interest in expanding active transportation and transit options, while ensuring equity and sustainability remain top priorities.** Despite packed sidewalks and large numbers of walkers, strollers, runners, and others every day, Carrboro's largely residential land use pattern yields a "car-dependent" label from WalkScore (a way of measuring how walkable a municipality is, due to its land use and infrastructure), with a walkability score of 28 and bike-ability score of 59 out of 100.

7. **Carrboro has easy access to regional transportation networks such as Interstates 85 and 40, the Raleigh-Durham International Airport, Research Triangle Park, two major health care complexes and other municipalities in the Triangle region**. It is close to large employment centers like UNC Chapel Hill and Duke University, an outstanding primary and secondary public education system, and open space/recreation, and approximately mid-way between the State's mountain and coastal regions. The different transportation modes have contributed to its desirability and are well-recognized aspects of the Town's identity.

RACE AND EQUITY AND CLIMATE ACTION

Race and Equity:

Transportation and Infrastructure strategies and projects have been designed to advance race and equity in the town through:

- Modifying Town community engagement practices to reduce barriers for BIPOC and low-income residents' participation.
- Increasing mobility options for BIPOC and low-income communities with an iterative and incremental approach to also avoid displacement.
- Reducing financial barriers or home ownership barriers to access energy efficient, renewable energy, water conservation, and green infrastructure projects.

Climate Action:

The Transportation and Infrastructure strategies and projects aim to advance the Town's Climate Action Plan and Energy and Climate Action Plan through:

- Increasing fossil-free/low fossil-fuel use mobility options to travel from residences to various destinations while reducing emissions from automobile use.
- Creating a more thorough and safer sidewalk/bike path/trail/greenway network to ensure access to fossil-free mobility options.

- Incorporating green stormwater infrastructure to streets and roadways to reduce impervious surfaces.

TRANSPORTATION - DRAFT METRICS:

1) Increase the participation of racial minorities and low-income residents in transportation decision-making by increasing targeted outreach opportunities by x% and funding dedicated to that outreach by $xx.
2) Decrease Vehicle Miles Travelled (VMT) by xx%.
3) Increase bus revenue hours and revenue miles by x%.
4) Increase 5.6 miles of protected bike lanes by 80% by 202x.
5) Increase x amount of sidewalk, greenways, and pedestrian lane installation by 202x.
6) X% of downtown car trips replaced with micro-mobility trips.

TRANSPORTATION - GOALS, STRATEGIES, AND PROJECTS

Goal 1: Address disparate impacts of transportation decisions and investments in Carrboro's BIPOC, lower-income, and non-abled populations.

Develop solutions with marginalized communities to increase mobility options from where they live, work, and generally spend time. Work with Carrboro's BIPOC, lower-income, and non-abled populations to know how they are currently not being served by the current transportation system and if and how this is a different experience for white, higher-income, and abled populations, and find a funding source to offer payment for advisory board members.

Strategy 1.1: Center equity in transportation planning processes (2050 Metropolitan Transportation Plan).

Equitable mobility should be the goal of any transportation planning process in order to repair past processes that have limited mobility of marginalized populations.

Projects:

a) Continue to promote the inclusion of equity as a weighing factor in the selection of local and regional transportation projects.

   - Currently, Durham-Chapel Hill-Carrboro Metropolitan Planning Organization is working on including equity in its prioritization process. In the past, there was a mismatch for projects that prioritize equity versus other components like safety.

b) Develop an advisory group of disabled residents to inform accessibility needs in transportation infrastructure and service design (Carrboro Vision 2020).

   - Assess the opportunities for residents with disabilities to participate in advisory group roles or as members of the Transportation Advisory Board (TAB). Ensure that all transportation infrastructure decisions include people with disabilities as meaningful advisors, not as tokenized individuals.

     "Paratransit mini bus system is helpful but needs to be expanded for those who are wheelbound" – Community member

c) Use a community engagement process to identify barriers to using alternative forms of transportation instead of automobiles (Community Meeting 2020, Community Climate Action Plan (CCAP) 2020).

   - The CCAP survey included this question in 2019 and the results were shared as part of an ongoing education effort. The question will continue to be asked every 2 years.

     "Introduce recreation in transportation planning […]. Bikeways and sidewalks start to get to that [by connecting to recreation and amenities]." – Community member

d) Identify a funding source to pay for resident expertise on boards to reduce the barrier of participation for low-income residents.

Group of Carrboro youth participating in 'Around Carrboro Pop-Ups' outreach event: "Draw YOUR Carrboro".

Strategy 1.2: Improve transportation options for all communities, with a focus on incrementally shifting transit stops to denser areas to serve as connections between residences and points of interests while limiting displacement impacts on marginalized populations.

Research across the nation has shown that improving mobility options in an area tends to raise property values and thus forces low-income populations to move out because they can no longer afford to live there.[1] At community meetings, some residents have recommended incremental change because they do not want development to happen quickly without intentional thought. In Carrboro, there are no fixed-transit routes since the public transit system is by bus. Bus routes can be shifted incrementally, with a community process that centers on keeping people in their homes. Carrboro can improve mobility options to those who are marginalized, while helping to mitigate displacement. Refer to the Land Use chapter for more detail.

Projects:

a) Locate additional public transit routes along current and future high-density development (Carrboro Vision 2020) to serve denser areas, and BIPOC residents in collaboration with anti-displacement policies.

[1] Miguel Padeiro, Ana Louro & Nuno Marques da Costa (2019) Transit-oriented development and gentrification: a systematic review, Transport Reviews, 39:6, 733-754, DOI: 10.1080/01441647.2019.1649316

- Identify future public transit routes in collaboration with regional partners, ensure that these routes serve BIPOC and low-income residents and connect them to high-density developments. Co-plan with residents and/or advisory member representatives of these residents to envision changed routes; productive, high-density development uses; and create anti-displacement policies to keep land values affordable. Do so incrementally, so that there is appropriate time to plan with marginalized populations.

Example of existing bus service along a denser corridor in Downtown Carrboro.

b) Identify job centers and commercial hubs and conduct a racial equity impact analysis on current transportation options to these locations, prioritize transportation projects that fill in service gaps (Community Meeting 2020).

- Identify benefits and problems with mobility to job centers and commercial hubs with a specific focus on the impact on BIPOC communities. Use this analysis to prioritize multimodal transportation projects to highly desired destinations. Work with BIPOC and low-income populations to find out what types of transportation modes would best serve them to these locations.

Goal 2: Continue to expand a multimodal transportation system that includes prioritizing walking, biking and transit as viable means of transportation and physical activity. (2045 Metropolitan Transportation Plan, 2018)

A multi-modal transportation system means that individuals do not have to have access to a single-occupancy vehicle to travel around Carrboro. Rather, individuals feel safe and can afford

to walk, bike, or take public transit to easily travel around, into, and out of town for work, study, errands, and recreation.

Strategy 2.1: Encourage non-automobile use in the community, reduce vehicle miles travelled through land use decisions and pursue or enhance existing developments that lends itself to public transit use (such as denser mixed-use nodes).

Most towns and cities, since the 1950s, have been planned with automobiles as the default transportation method, thus land use decisions led to more sprawl. Transportation is a significant source of greenhouse gas emissions. In order to encourage multi-modal transportation systems, Carrboro needs to develop without displacement. Consider how to increase density and create more mixed-use spaces so that people, including low-income households, do not have to travel far to address their multiple needs, which could reduce community emissions due to transportation.

Projects:

a) Identify funding to expand free public transportation service to low- and moderate-income households, populations who cannot walk without assistance, and the Extraterritorial Jurisdiction (ETJ) transition area throughout the week, including weekends, by considering different passenger vehicle types. (Community Workshop/ Energy and Climate Protection Plan (ECPP) 2020)

    - Chapel Hill Transit trips are 100% subsidized. The free public transportation service with Sunday service has been welcomed by the community; however, many still find it difficult to travel to their destinations without a personal vehicle. Particularly, those employed outside of 9-5 working hours. Increasing the level of service through expanded hours of operation, and providing a more comprehensive bus network, will help overcome these barriers. Residents can call Orange County public transportation services to address some of these needs. Additionally, the Town should work with transit partners to provide service on lower volume days, e.g., by using a van or smaller bus and prioritize those who cannot easily access other forms of mobility based on location, ability and income.

      "I know the bus routes really well. Why not create new circulation routes that are wider, the cover more area? Like the hospital, business, and retail areas? Help people make trips to popular destinations more easily via transit/but…. why spend time looking for parking if it's easier to take the bus?" – Community member

Bus service is important to residents and workers who do not have access to a personal vehicle. Residents have expressed a need to explore an expanded network with service routes and times to serve all segments of the population, for example those who work the third shift.

b) Seek to increase funding from the Triangle Transportation Demand Management (TDM) Program and partner with surrounding transit authorities. (CCAP/ECPP).

- The Triangle Transportation Demand Management Program links state policy and funding with local and regional transportation providers to reduce dependence on automobiles. The Town of Carrboro provides an annual grant to promote Transportation Demand Management and travel options. As of 2020, there is a new grant in place to help educate residents about diverse transportation options (previously on hold due to the pandemic). Carrboro has partnered with Chapel Hill with Triangle JCOG/NCDOT for several years and is also working with the Duke Center for Advanced Hindsight and Orange County to design welcome packets for new residents on how to create a transportation routine that does not consist of driving. The Town should continue to pursue funding in partnership with Chapel Hill Transit and Orange County transit to improve transportation options in Carrboro.

c) Include multiple languages in public transit signage and wayfinding. (Community Meeting)

- Many residents of Carrboro's linguistically diverse population do not have access to personal vehicles and depend on public transit. However, current signage is mostly in English, making it difficult to use the public transit system. Public transit usage would benefit from signage in multiple languages, so that those who are most comfortable

reading another language can easily access public transportation and get around town.

"Taking the bus is hard when [there is a] language barrier […] and [people] may not be able to read the sign or when to get off" – Community member

Strategy 2.2: Create safe streets and trail networks for pedestrians, bike riders, and transit riders (Residential Management Traffic Plan for Speed and Traffic Control, 1996, Comprehensive Bicycle Transportation Plan Update, 2020).

Most roads built in the United States in the post-war period were designed to improve drivers' safety which ultimately have left pedestrians and cyclists at a higher risk for injury. Complete streets practices reduce pedestrian accidents through comprehensive safety improvements that prioritize pedestrians, cyclists and transit users in the right-of-way (ROW).

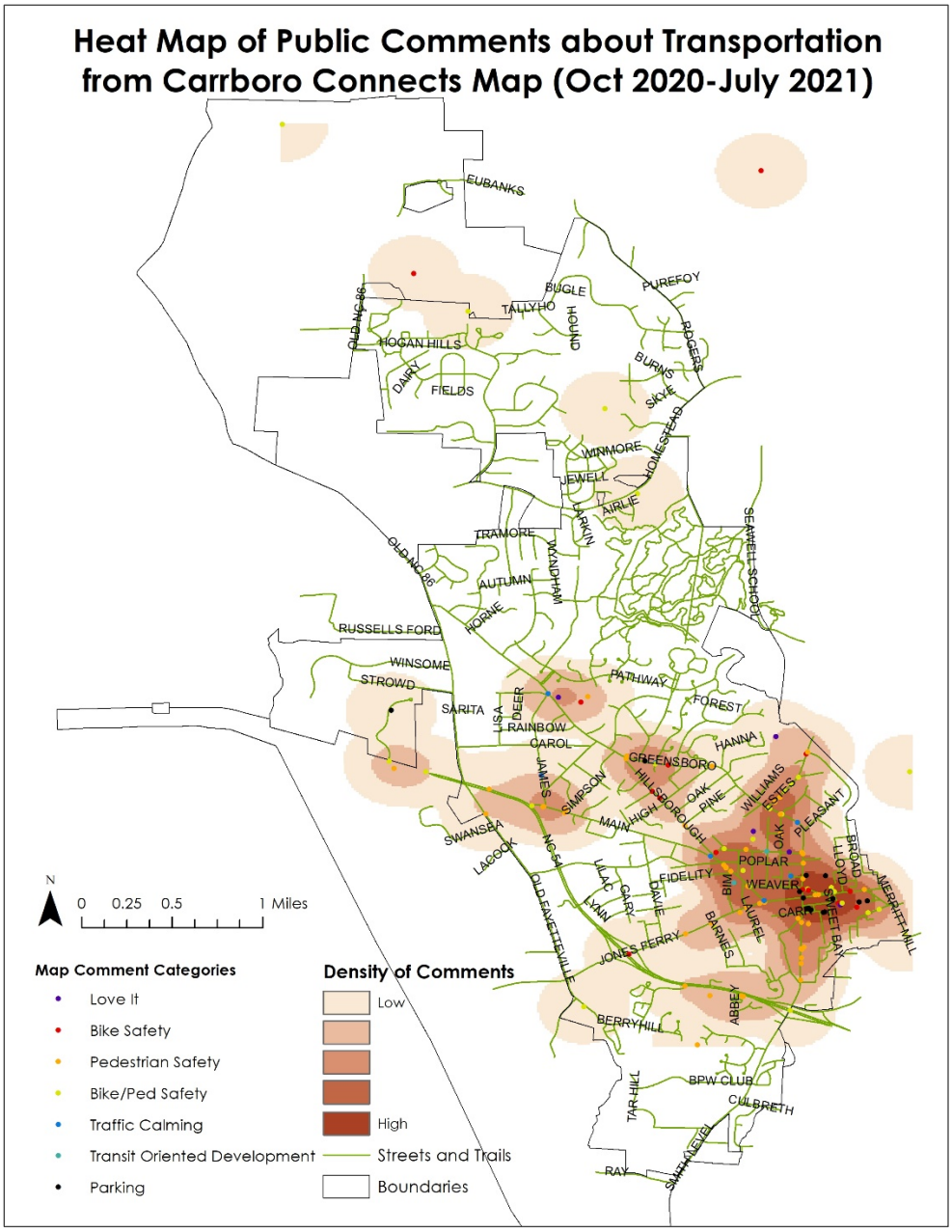


Figure 5-1. Public comments collected throughout the comprehensive planning process identified areas that should continue being prioritized for bike and pedestrian improvement. Priority locations include Downtown Carrboro and the surrounding area, Hillsborough Road and Greensboro Street, Main Street and NC-54/Henry Anderson III Community Park, and the Martin Luther King Jr. Park/Carolina North Forest area. Town staff have been working continuously on in these locations and continue to prioritize and seek funding to address residents' concerns.

Projects:

a) Include more visible pedestrian markings and signals at sidewalk-road intersections and bike lanes (South Greensboro Street Sidewalk Project, 2020).

- If pedestrians and cyclists cannot cross the street safely, then mobility is severely limited and walking/biking as a travel mode is discouraged. Visible pedestrian markings and clear bike lanes make pedestrian actions predictable/visible as possible and slow vehicular traffic down.

Example of a visible crosswalk sign in front of the Carrboro Century Center.

b) Ensure that restriping plans include bike lanes, bike boxes, intersection bike markings, center turn lanes, additional crosswalks, maintain parking (East Main Street Operational Analysis and Restriping Plan, 2020).

- Restriping bike lanes, intersection markings, turn lanes, crosswalks, and parking lot lines have several benefits aside from promoting safe use of streets: they improve the curb appeal of businesses due to the improved aesthetics; they reduce liability by decreasing accidents, they provide better accommodations for people with disabilities, and also comply with laws such as fire codes.

c) Follow bike plan recommendations and identify streets to include bike lanes physically separated from automobile traffic to increase biker safety.

- Protected bike lanes offer benefits to more than just the safety of cyclists: once installed, they encourage more diverse users to bike (female users in particular increase), reduce accidents, and they increase storefront sales (more traffic from cyclists equates to more potential business). The Bicycle Plan Update identifies the best streets for protected bike treatments: N Greensboro Street, Hillsborough Road, W Main Street, Jones Ferry Road, and Poplar Avenue.

Jones Ferry Road Protected Bike Lane design in phases (from Main Street to Davie Road), Carrboro Bike Plan 2020.

d) Create safe transition for pedestrians from pedestrian access ways to bus stops (NC 54 Pedestrian and Bicycle Corridor Safety Study, 2019).

- Continue engaging residents, especially BIPOC and low-income, to design the best approaches to enhance pedestrian safety and access to bus stops. Potential modifications to improve access and safety include moving bus stops to shorten walking distances, improving signage/seating/shelter/lighting, and increasing maintenance.

e) Work with Chapel Hill Transit to continuously improve public transit access, with a particular eye to moderate-income homeownership communities and developments with an affordability component (Source: Goals & Strategies). Coordinate with Chapel Hill Transit on scheduling and route updates that meet the needs of workers, particularly low-income households that may have weekend, night hours or are commuting to employment in less dense, car-dependent locations.

f) Continue to increase sidewalk quantity and quality designed to increase safety and decrease traffic speed. (Community Workshop)

- The Town has been actively adding and improving sidewalks through bond referenda, state transportation prioritization and ADA transition work. The Town should conduct a gap analysis/audit of existing sidewalk infrastructure, access for high priority populations (e.g., non-ambulatory residents, low-to-moderate income households), and existing and projected development patterns, and update its framework for prioritizing sidewalk projects accordingly. The installation of sidewalks can be designed to help increase drivers' cautiousness around residents. Vehicle speeds can be managed by infrastructure, with most attention paid to arterial roads and the downtown.

  "To improve walkability repair/widen existing narrow sidewalks and install sidewalks in areas without them, especially to access green spaces" – Community member

This street next to the 203 project is an opportunity to create a shared street that can be used by pedestrians, micro mobility users, and drivers.

g) Continue to implement the Safe Routes to Schools Action (SRTS) plan in coordination with schools. (CCAP, Community Workshop)

- Implement plans that support safety for all age groups of children, especially those who have less opportunities due to location, ability, and income. Explore and develop partnerships with community organizations seeking to provide healthy and safe transportation options for youth and continue working to establish the SRTS Implementation Committee.

h) Encourage people to "leave their cars behind" by continuing to coordinate biking and walking tours in different parts of Town (Community Workshop 2020).

- Continue educating the public on options to "leave their car behind" to feel better, save money on gas and parking, and reduce carbon emissions. Walking tours and coordinated biking tours should include routes that residents are most in interested in

traveling and/or those that connect to major education/employment centers, recreational opportunities, and commercial areas. Targeted marketing and tour dates/times should be planned to target BIPOC and low-income residents who do not traditionally sign-up for these activities.

Programming such as Carrboro's Biking and Running groups encourage residents to "leave their cars behind" and engage in active transportation recreation.

i) Work with Chapel Hill Transit to develop longer-range plans for Bus Rapid Transit (BRT), improved connectivity, connections to regional transit services, park-and-ride facilities, and

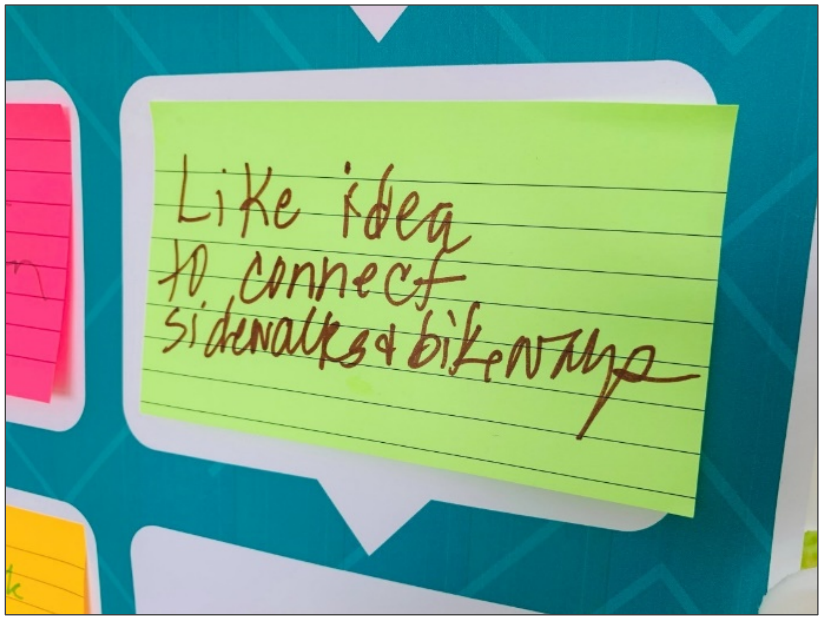
transit-supportive land use development such as pedestrian-friendly, high-density, and mixed use (Chapel Hill /Carrboro/UNC 2035 Long Range Transit Plan, 2009).

"Create a transportation hub system where smaller vehicles are picking people up in neighborhoods and going to downtown Carrboro to pick up Chapel Hill Transit" – Community Member

j) Develop a connected system of on- and off-road facilities to accommodate varying level of bicyclists (Comprehensive Bicycle Transportation Plan Updated, 2020).

- As biking and walking becomes more important to Carrboro, improvements that create more opportunities for residents to walk and bike should increase in volume and distance. On- and off- street bikeway facilities offer opportunities to reduce congestion, improve air quality, and improve personal health.

  "Finish greenways and bikeways so we can bike into town from the Northern Transition Area." – Community Member



Carrboro resident suggestion for connecting sidewalks and bikeways in town.

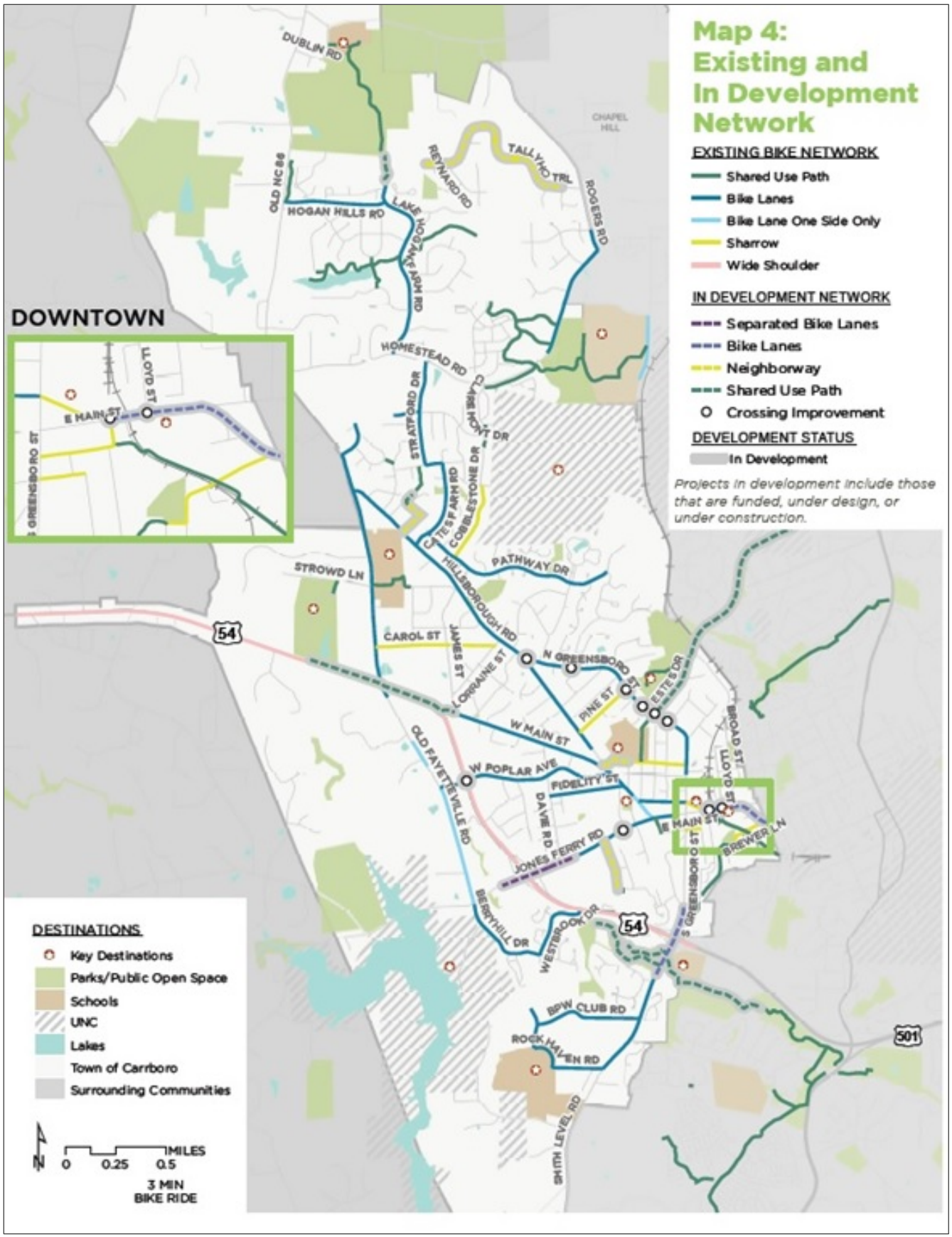


Figure 5-2. Updated 2020 Bike Plan Existing and In Development Network.

k) Develop programming and financial support (for relevant initiatives) to increase youth education and opportunities (Carrboro Vision 2020) for walking and biking.

- Youth overwhelmingly depend on walking and biking for transportation needs, understanding their viewpoints and collaborating to improve the modes will protect and mobilize our youngest, and one of our most vulnerable populations. Intentional outreach should be conducted to understand the needs and challenges faced by BIPOC and low-income youth as they travel about the town.

Youth on a bike attending a Carrboro Comprehensive Plan Outreach event.

Carrboro's Kidical Bike Mass

l) Encourage and support increasing ridership on public transit by enabling access for transit mode shifts from pedestrians, bicyclists, and drivers at public transit stops and stations (Chapel Hill Transit Short Range Plan, 2020).

m) Explore and implement engineering solutions to reduce motor vehicle speeds in the downtown.

- The Town of Carrboro has already begun conducting this work to some extent and acknowledges that lowering the speed limits won't do much to reduce actual speeds since they do not want to place emphasis on enforcement.

n) Explore different micro-mobility options that consider equitability, accessibility, and help address first-last mile efforts.

- First-last mile is defined as the portion of a commuter's trip (usually the trip's origin and destination) that is completed on their own, while the bus or rail service used composes the majority of the trip. An example of this includes when someone must first walk, bike, or drive themselves to and from the nearest transit station. Micro-mobility options can be used to help aid in scenarios where transit is not adjacent to someone's home or intended destination. First-last mile is a particularly significant problem for residents that work in places without strong transit connections during non-traditional work hours. Micro-mobility options may result in safer and more efficient connections for those in most need of safe access to their place of employment. Options can include micro-transit shuttles, electric bike share programs, carpool, and adaptive scooters for people with disabilities.

- The Town of Carrboro is exploring the process of releasing a contract for a bike share system in conjunction with Gotcha, Chapel Hill, and UNC Transportation & Parking. Staff is hoping to implement a program that addresses equitability, accessibility (non-smart phone users, non-credit card holders, disabled users), and optimal locations for stations (about 10-20 bike share hubs) and use.

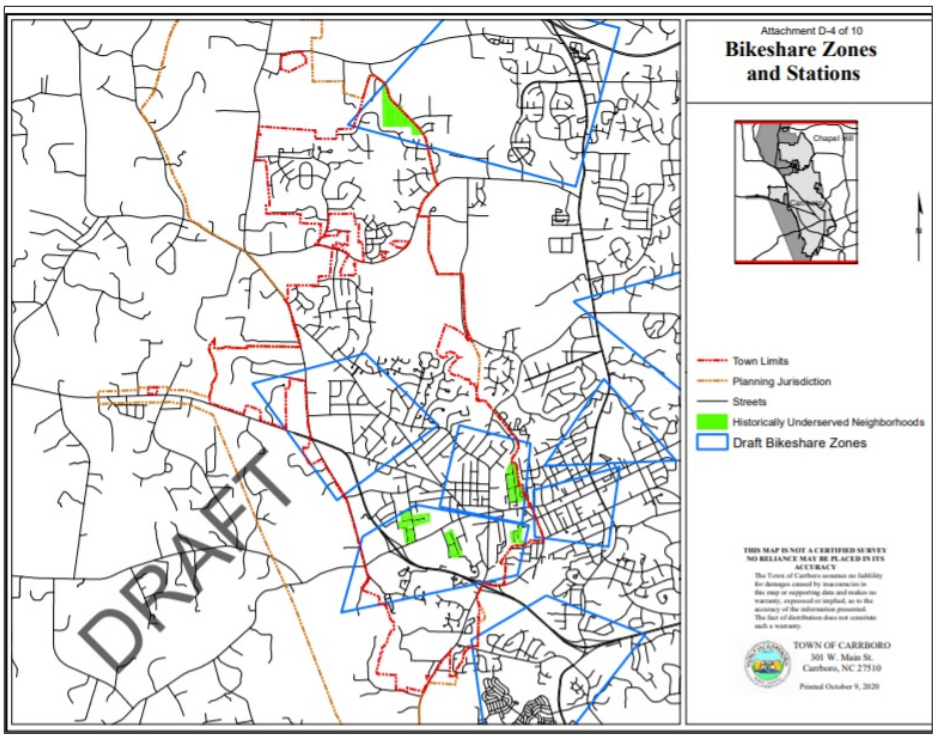


Figure 5-3. Draft Bikeshare Zones and Stations Map, October 2020.

- Carrboro will continue exploring the integration of e-scooters, while assessing their accessibility, safety (including helmet use), and affordability.

Goal 3: Reduce greenhouse gas emissions from motor vehicle use by 80% by 2030. (CCAP 2020, 2045 Metropolitan Transportation Plan, 2018)

Burning fossil fuels such as gasoline and diesel releases carbon dioxide (a greenhouse gas) into the atmosphere, which is causing the earth to warm, resulting in changes to the climate. Different strategies to reduce emissions from vehicles include driving less (increasing active transportation options), choosing fuel efficient vehicles, and updating transportation fleets to include electric vehicles.

Projects:

a) Refer to Transportation project 2.1.b

Extending bus service to include off-peak and weekend hours can better serve residents employed by service-oriented jobs. Funding would be needed to extend such service.

b) Increase opportunities for alternatively fueled public transit, municipal, and private vehicles (Community Meeting 2020).

   - Alternative fueled vehicles' demand continues to grow as motorists desire ecologically sensitive (reduced carbon dioxide, so cleaner air) and cost effective (save on fuel, tax breaks, fuel efficiency) vehicle options.

c) Improve and market vanpool and carpool options for commuters (CCAP 2020).

d) Explore and implement land use practices to support greenhouse gas emissions reductions.

   - On June 8, 2021, the Land Use Ordinance (LUO) was updated to require EV charging stations and infrastructure in new developments. Incorporate solar panels to power EV charging stations at these locations (CCAP 2020). The Town should pursue grants and other funding sources to make EV charging a possibility at affordable house locations and support shared EV use programs.

Goal 4: Improve the management of parking spaces in the downtown area.

Parking management strategies in downtown areas can oftentimes be complex: too little supply of parking can make a downtown unattractive to potential businesses, too much parking can increase traffic congestion, and an oversupply of surface parking can negatively impact the built

environment by creating large gaps between buildings, making walking, and biking unpleasant. The following parking management strategies seek to balance concerns.

Strategy 4.1: Establish a regular schedule for conducting parking counts and inventorying existing spaces. Consider a more accurate methodology for utilizing shared parking and satellite parking**.** *See Economic Sustainability Chapter, Goal 2: Strategy 2.1 for more information on "park once" policies.*

Projects:

a) Conduct additional outreach to business owners, residents, and visitors to understand parking concerns (Community Workshop 2020).

   - Outreach efforts should include educational components to ensure stakeholders truly understand strategies and trade-offs being presented. Education and outreach will help determine priorities and help the town determine which approaches to use. The town should consider targeting specific focus areas (such as the most congested streets downtown) to better identify needed stakeholders.

   - Discussing parking management with stakeholders should include conversations around right-pricing parking. Free parking is often seen as an incentive to drive, so potential solutions to dissuade an increase in numbers of drivers/cars may include requiring payment for parking: installing parking meters, implementing market-based parking pricing, or enforcing penalties.

     "Consider the true costs of parking" – Community member

b) Implement wayfinding/signage improvements (Town of Carrboro Downtown Parking Plan, 2017).

   - Wayfinding signage is an effective way to attract visitors, lengthen their stay, and support local businesses by marketing them together. Wayfinding signage should be provided at varying sizes and scales, and easily read by pedestrians, cyclists, and motorists.

c) Incorporate and increase parking infrastructure for bicycles in parking plans (Community Meeting 2020).

   - Thoughtful parking infrastructure for bikes, e-bikes, and other micromobility options is one way to encourage cycling and support local businesses. When a destination adds bike parking it draws cyclists and normalizes bike culture to draw more diverse riders.

d) Town should implement Transportation Demand Management (TDM) policies as a leader in these policies.

- TDM focuses on understanding how people make transportation decisions and helping them use the infrastructure in place for transit, walking, or biking. Some tangible policies to implement TDM include educating people about their transportation options, shifting the priority away from driving alone, improving public transportation, and collaborating with employers to financially incentivize bike and transit use.

e) Plan for multi-level electric vehicle (EV) and bicycle charging stations.

- Electric vehicle charging stations have various positive impacts on communities: they promote cleaner air, lower the overall cost of driving for community members, pave the way for other forms of clean transportation options, and help communities achieve their climate change goals. Outreach and analysis should be conducted to determine the best locations for and levels of stations (wattage) to remain accessible for all.

Strategy 4.2: Investigate and reduce negative effects of parking requirements on housing costs (Source: Goals & Strategies)

a) Investigate lowering residential parking requirements to reduce impervious surfaces and enhance affordability (Source: Task Force) Undertake a residential parking study to investigate parking standards for small single-family homes, multi-family units (currently 1 ½ spaces for each one- bedroom unit and 2 spaces for each unit with two or more bedrooms) and multi-family units limited to persons of low- or moderate-income or elderly (currently 1 space per unit).

b) Reclaim underused parking lots in larger residential developments to allow for development of affordable housing. (Task Force)

Electric vehicle charging station in Carrboro.

WATER - VISION

Ensure that current and future generations of Carrboro residents, especially BIPOC populations, can enjoy reliable and affordable access to high quality drinking water, while improving healthy environments and aquatic ecosystems for Carrboro wildlife.

WATER - KEY FINDINGS

1. OWASA is continuously working towards maintaining a sustainable water supply, particularly one that is affordable for its lower income residents.

2. The Town holds an EPA National Pollutant Discharge and Elimination System stormwater permit that requires the Town to implement and enforce a program to reduce the discharge of pollutants to protect water quality and satisfy requirements of the Clean Water Act.

3. As part of Community Climate Action Plan implementation, the Town created a Stormwater Utility in 2017 (and increased fees in 2020) to provide dedicated revenue and staff to oversee the Town's stormwater related efforts.

WATER - DRAFT METRICS

1. Increase distribution of communication/educational materials for residents/business owners.
2. Increase funding for stormwater management projects by %?

WATER - GOALS, STRATEGIES, AND PROJECTS

Goal 1: Maintain and improve the quality of the water supply for Carrboro residents. (OWASA Long-Range Water Supply Plan, 2010)

OWASA is responsible for the maintenance and quality of water (drinking and wastewater) that Carrboro residents depend on in the short-term and long-term. Carrboro must work with OWASA to support maintenance of the water system. The Town of Carrboro can primarily assist in this effort by advocating for land use protections are in place for University Lake and the Jordan Watershed, along with maintaining their respective impervious surface limits.

Strategy 1.1: Coordinate with OWASA and others (Jordan Lake Watershed, University Lake) for the maintenance and improvement of water supply.

Projects:

a) Identify resident concerns, especially those of marginalized identities, related to water and share with OWASA (Stakeholder interviews).

   - Create a clear line of communication so that residents can share issues with the Town about water affordability, quality, and supply issues. The Town can share these concerns with OWASA and support work to address these issues.

b) Encourage OWASA to explore affordable water rates targeted to lower-income households (Stakeholder interviews).

   - OWASA currently sets water rates based on a typical household usage at a base rate, and charges higher rates for greater use. This can still put a high burden on low and moderate income residents. OWASA also offers the Care to Share program which is a partnership with the Inter-Faith Council for Social Service. All funds donated to Care to Share go directly to providing bill assistance. According to OWASA, while North Carolina law does not allow utilities to offer discounted rates or debt forgiveness for those who cannot pay their water bill, residents have expressed the need for OWASA to explore innovative approaches to address this issue to make sure that water is not turned off due to households not being able to pay their water bills.

   - OWASA currently provides water saver filters

c) Work with OWASA to communicate goals and projects to residents in culturally responsive ways (Stakeholder interviews).

- OWASA serves many jurisdictions. Carrboro should suggest to OWASA how to best communicate to Carrboro residents so that everyone is fully informed. This is particularly important for water efficiency measures which can help reduce financial burden on low-income households and address residents' concerns of drought.

Goal 2: Protect, rehabilitate, and restore watersheds and ecosystems. (Little Creek Watershed Assessment, Morgan Creek Local Watershed Plan, Bolin Creek Watershed Restoration Plan, 2012).

Due to development, many of the aquatic ecosystems in and around Carrboro have been destroyed, polluted, or severely restricted in size. To ensure the health of all living things, people's access to water, and to improve resilience to climate change, the Town needs to invest in and protect these ecosystems.

Carrboro is committed to investing in and protecting all bodies of water and ensuring the health of all living things.

Strategy 2.1: Update stormwater management practices to improve water quality (Bolin Creek Watershed Restoration Plan, 2012, Morgan Creek Local Watershed Plan, 2004, Carrboro: Illicit Discharge Detection and Elimination Program, 2020).

Stormwater runoff can decrease water quality by picking up pollutants while moving from urbanized and polluted spaces to water bodies. By managing stormwater, the pollution to aquatic ecosystems can be diminished.

One of the ways Carrboro can continue improving water quality is by enhancing stormwater runoff management projects.

Projects:

a) Create a program to fund and implement bioengineering stormwater methods (Morgan Creek Local Watershed Plan, 2004).

- Bioengineering stormwater methods include stormwater wetlands, detention ponds, and rain gardens. Ensure that the program prioritizes projects that will improve outcomes in areas most affected by stormwater issues and includes equity components to increase low-income households and BIPOC household's access to clean and healthy water bodies.

b) Invest in educational efforts to residents and business owners about best practices for fertilizer use (Little Creek Watershed Assessment, 2003).

- Residents and business owners of Carrboro may use fertilizer to improve the aesthetic look of their lawns or gardens. Fertilizers can cause eutrophication of water bodies, can lead to the loss of aquatic life. The Town could work to educate the public about more eco-friendly lawn and garden care to reduce eutrophication.

Strategy 2.2: Address the effect of development on stormwater management (Bolin Creek Watershed Restoration Plan, 2012, Little Creek Watershed Assessment, 2003; Morgan Creek Local Watershed Plan, 2004).

Impervious surfaces created during development reduce the opportunity for water to infiltrate soil. Instead, water travels as runoff, leading to stormwater issues.

Projects:

a) Implement structural and non-structural management measures for redevelopment and infill and add retrofits in dense locations to increase stormwater volume control (BCWRP, 2012, Morgan Creek Local Watershed Plan, 2004; Little Creek Watershed Assessment, 2003).

- Non-structural management measures reduce the creation of stormwater runoff and can include installation of green stormwater infrastructure at development sites. Structural management measures are technologies that prevent pollution from entering stormwater runoff.

b) Require low impact development practices for any new developments, such as reduced impervious surfaces (Little Creek Watershed Assessment, 2003; Community Workshop 2020).

- Low impact development practices use nature-based solutions (like green stormwater infrastructure) to manage stormwater with infiltration and evapotranspiration.

c) Establish stabilizing vegetation in new construction (Little Creek Watershed Assessment, 2003).

- Stabilizing vegetation refers to maintain existing vegetation at construction sites. This can help prevent erosion during precipitation events because the roots of vegetation keep soils intact. Carrboro can add this as a practice for consideration in approving construction permits.

d) Implement incentive programs for stormwater management or infrastructure mitigation projects (Bolin Creek Watershed Restoration Plan, 2012) that prioritize BIPOC-led businesses.

- Educate and fund BIPOC-led businesses on stormwater management projects to support Carrboro's business enterprise goals. Provide programmatic support to help BIPOC businesses bid comparatively to other businesses.

e) Develop programming and accompanying financial assistance for income-eligible households to install green stormwater infrastructure (RainReady Carrboro, 2019).

- Installing green stormwater infrastructure can be expensive. Identifying funding and financing opportunities so that low-income households can participate and install green stormwater infrastructure.

Strategy 2.3: Continue to Implement watershed management and restoration practices.

Projects:

a) Research and develop pollution prevention and clean-up, and erosion control practices to best serve the various ecosystems in Carrboro (Bolin Creek Watershed Restoration Plan 2012).

- Work with consultants or academics to understand pollution prevention, clean-up, and erosion control practices specific to the ecosystems of Carrboro. Prioritize which practices to implement based on budget, and impacts on the ecosystem, and

carefully consider unintended consequences on historically marginalized residents of Carrboro.

b) Limit disturbance of riparian areas while maintaining sanitary sewer infrastructure and greenways (BCWRP, 2012) (Little Creek Watershed Assessment, 2003).

- Work with OWASA to identify disturbed riparian areas near sanitary sewer infrastructure. Riparian areas refer to terrestrial land in the transition between river or stream to land. Limit any future disturbance to minimum extent and reestablish vegetation when possible.

c) Implement stream restoration projects (BCWRP, 2012) (Little Creek Watershed Assessment, 2003) prioritizing communities near water that do not currently have safe access to aquatic ecosystems.

d) Develop regularly administered procedures for detecting and removing illicit discharge sources (Carrboro: Illicit Discharge Detection and Elimination Program 2020).

- Regularly review and revise the town's Illicit Discharge Detection and Elimination program, maintain a current map of the stormwater system, annually maintain and evaluate written procedures for identifying illicit discharges, train staff appropriately, educate the public, publicize how community members can report illicit discharges, and track violations.

e) Educate residents and staff and businesses about hazards of illegal discharge (Carrboro: Illicit Discharge Detection and Elimination Program, 2020).

- Work with citizen groups to help spread information about hazards of illegal discharge. Partner with Chapel Hill's stormwater education program or UNC to develop content for the educational campaign.

- "Provide more publicity and outreach to expand existing volunteer waterway cleanups" – Task Force Member

f) Explore if there is a disparate impact of legal discharge policies on BIPOC communities and/or low-income communities.

- Historically, across the nation, BIPOC communities and/or low-income communities bear the brunt of pollution. To work towards equitable access to water quality and aquatic ecosystems, Carrboro can investigate if there are disparate impacts of legal discharge policies, and if so, begin rectifying the situation.

g) Establish a program to identify and prioritize opportunities for retrofit projects that will improve water quality (Jordan Lake Rules, BCWRP).

- Retrofit projects can scale from lot-level stormwater management to larger regional treatment facilities. Successful retrofitting requires available space for structure and maintenance, permission from owner, funding for engineering design and initial construction, regular maintenance, designated entity responsible for maintenance and repairs, and a method to enforce maintenance after construction.

h) Fund retrofits and other watershed restoration measures through the Stormwater Utility and Enterprise Fund.

- Identify high priority projects and allocate sufficient budget and staff time to identified projects. Priority projects should be identified via data-driven method and contribute to improvement for the whole watershed, not be isolated to one section.

Goal 3: Reduce the amount of Carrboro's treated water use (OWASA Long Range Water Supply Plan, 2013) **while increasing water rate affordability** (stakeholder interviews).

Reducing treated water use can reduce water costs because less energy and facility use is required when less water is treated, saving expenditure.

OWASA building located on Jones Ferry Road with a sign alerting residents of water supply capacity in the town.

Strategy 3.1: Promote water conservation and efficiency efforts among residents and businesses (OWASA Long Range Water Supply Plan, 2013).

Support water conservation and efficiency efforts among people of the town, not just of municipal water use.

Projects:

a) Develop programs to educate residents and business owners education about local water supply and stewardship programs (OWASA Long Range Water Supply Plan, 2013).

- Work with OWASA to support communications on water stewardship programs to residents and business owners. Ensure that education is culturally responsive so that all residents and business owners can understand messaging.

Water conservation programs should be culturally responsive, so all residents and business owners understand the message.

b) Provide financial and technical assistance to income-eligible residents and business owners to install water conservation and efficiency measures (OWASA Long Range Water Supply Plan, 2013; Triangle Regional Water Supply, 2014).

- Partner with OWASA to support water conservation and efficiency programs that reduce cost and technical burden for residents and business owners. Engage

community members to support development and implementation of programs to make sure that they are effective and useful for residents.

c) Establish water efficiency standards for new developments and encourage retrofits to older developments (OWASA Long Range Water Supply Plan, 2013).

- Setting water efficiency standards will force developers to build more water efficient buildings. For retrofits, develop a program to help fund retrofits and determine which entity is responsible for retrofits. Work with OWASA to provide technical assistance for these retrofits.

d) Develop policies to expand safe use of reclaimed water (Triangle Regional Water Supply, 2014).

- Reclaimed water is reusing wastewater for other purposes prior to treatment. For example, irrigating gardens with safe wastewater. Identify policies that are barriers to reclaimed wastewater use and advocate for different policies. Support public education around same reclaimed water use.

e) Initiate water use audits, repairs, and retrofits in government buildings (Collaborative Report on Water Conservation Strategies, 2008).

- Improve municipal water efficiency by first auditing water use to determine a baseline and then budget for and implement water infrastructure repairs and retrofits to reduce water use.

f) Pilot demonstration of water conservation and efficiency projects at public facilities (Collaborative Report on Water Conservation Strategies, 2008).

- To encourage private water conservation and efficiency projects, use a public facility as a demonstration project. Educate community members about the projects so that they can become comfortable – speak to how it works and the water and cost savings.

g) Assess what level water rates must be set at to improve affordability for low-income residents and advocate to OWASA to set affordable rates.

- Advocate to OWASA to look at water bill payment data and understand payment trends looking at both qualitative and quantitative data. Facilitate meetings between OWASA and community members to ensure culturally responsive meeting logistics and content. Use meetings to understand how affordability can be improved.

ENERGY - VISION

Carrboro reduces its dependence on fossil fuel energy sources with opportunities for all residents, especially low-income BIPOC residents, to participate.

ENERGY - KEY FINDINGS

1) Carrboro is working towards their energy goals of reaching 80% of 2010 GHG levels by 2030.

2) The Town wants to be responsive of social justice while working towards their energy goals by addressing the energy burden on low-income households.

ENERGY - DRAFT METRICS

1) Reduce Greenhouse gas emissions reduction (per capita) by 80% from 2010 levels.
2) Increase use of solar and geothermal by xx%.

ENERGY - GOALS, STRATEGIES, AND PROJECTS

Goal 1: 80% reduction 2010 levels of per capita greenhouse emissions by 2030. (CCAP 2020)

This goal was updated in Carrboro's Community Climate Action Plan in October 2020; the previous adopted goal was 50% reduction in greenhouse gas emissions by 2025. The goal refers to community-wide greenhouse gas emissions, not only emissions due to municipal operations.

Strategy 1.1: Reduce greenhouse gas emissions from motor automobile use by 80% by 2030 (CCAP 2020).

Transportation is a significant source of greenhouse gas emissions. Automobiles that use gasoline emit greenhouse gasses because the energy source comes from fossil fuels which are rich in carbon. To achieve reductions in greenhouse gas emissions, transportation emissions must be reduced. Increased density around mixed-use residential and commercial areas, and accessible alternatives to single-occupancy vehicle travel methods to points of interest, could reduce community emissions due to transportation. Mixed-use areas and transportation options must be accessible from a variety of residential types that are affordable across a range of household incomes and meet a variety of household needs and preferences.

Projects:

a) Provide a variety of public transit options (buses, small buses, vans, etc) and increase opportunities for alternatively fueled vehicles (Community Meeting 2020). Relatedly, improve vanpool and carpool options for commuters and seek funding opportunities from Triangle TDM (CCAP 2014).

    - The Triangle TDM provides funding opportunities for alternatives to automobile use. Staff should allocate time to understand these opportunities and align these to community desires for a variety of public transit options. A variety of public transit options may increase service hours while managing concerns of largely empty typically sized buses.

b) Support adoption of electric vehicles by requiring EV charging stations, infrastructure, and spaces at popular destinations. (CCAP 2020).

    - As of June 8, 2021, the LUO requires EV charging stations in new developments. Assess where EV charging stations would benefit drivers without displacing current residents from their homes by triggering gentrification. Popular destinations may include downtown Carrboro or recreational locations. Including EV charging stations in new developments can entice environmentally friendly households to reside there. Additionally, research car-sharing electric vehicle programs, so that those who cannot afford their own vehicle can make use of the charging infrastructure as well.

Strategy 1.2: 80% reduction 2010 levels of community greenhouse emissions attributed to Carrboro buildings by 2030 (CCAP 2020).

Improve energy efficiency of buildings to reduce emissions related to energy use.

Projects:

a) Continue conducting building energy assessments and ratings for all municipal buildings and inventory energy efficiency measures throughout the town (ECPP 2014).

    - The Town worked with a consultant to establish a baseline of building energy use and develop a rating system to prioritize buildings for energy efficiency projects.

b) Increase energy efficiency within municipal buildings with technologies used in weatherization efforts (ECPP 2014).

    - Identify and budget for weatherization best practices – such as those related to insulation, window fixtures, etc. This should be determined using the information learned from the building energy assessment (in progress).

c) Address limitations to financing energy efficiency for low-income households and renters by creating and administratively supporting a Rental Environmental Task Force including owners and renters (CCAP 2017).

    - The Town should partner with a community organization to develop and facilitate a task force comprised of compensated stakeholders, tasked with identifying strategies to increase participation of rental properties in energy efficiency projects. Conduct a community engagement program to develop a program that best serves low-income households. Budget annual amount to implement energy efficiency projects (CCAP 2020).

d) Support energy efficiency financing for small businesses and low-income households through the Energy Efficiency Revolving Loan Fund (CCAP 2017).

- Conduct a program evaluation of the Energy Efficiency Revolving Loan Fund program to identify best practices, understand previous program participants' opinions, and explore changes that would allow greater flexibility and more categories of uses (solar and geothermal). Speak with current business owners that have yet to participate to understand what improvements would benefit potential future participants. Budget annual amount to implement energy efficiency projects (CCAP 2020).

e) Host renewable energy sites in the business district, among clustered commercial buildings, or Town buildings.

- Determine legal barriers to publicly owned renewable energy sites and advocate for policy changes. Identify opportune locations for renewable energy sites among clustered buildings. Educate the public about the renewable energy site to increase awareness of renewable energy.

f) Conduct an energy audit of Town buildings and develop a Community Energy Dashboard to identify progression or regression from the Town's energy goal over time (CCAP 2020).

- Using the building energy assessments develop a dashboard that is publicly viewable to show how building energy consumption in relation to Town energy goals. Regularly update the dashboard for accurate counts.

g) Create policies that incentivize net-zero construction and energy efficient retrofits in new and existing affordable housing developments.

- Carrboro is part of the Cities Initiative through which the town can do research and understand net zero building stretch codes and advocate for such legislation at the state. Add net-zero provisions or suggestions (if provisions are not legally allowed) to building permits and educate developers and landowners about the provisions. Provide technical assistance on net-zero retrofit construction projects.

h) Explore options to increase renewable energy usage through Renewable Energy Credits (RECs) purchases or advocate reinstatement of state solar tax credits. (CCAP 2020).

- Advocate with a coalition of other jurisdictions for reinstatement of state solar tax credits. Purchase additional RECs and advocate against any policy barriers to purchasing more RECs.

Strategy 1.3: Increase Carrboro's use of renewable energy (CCAP 2017).

Increasing renewable energy use – solar or geothermal are best fits for Carrboro – to reduce greenhouse gas emissions.

Projects:

a) Develop a renewable energy portfolio that takes advantage of federal and state tax credits and supports increased solarization (ECPP 2014).

- Work with Duke Energy to increase renewable energies in the portfolio. Look into procuring additional solar energy for the portfolio. Allocate staff time to identify federal and state tax credits to incentivize renewable energy procurement.

b) Advocate for state legislation that enables Carrboro to invest in renewable energy generation projects that allows shared solar investment benefits in the community or can generate revenue to be invested in community needs, like affordable housing (Community Meeting 2020).

    - Advocate to the state to streamline community solar facility requirements for utilities and other enabling policies that allow access to solar energy for residents who can't install rooftop solar. Research opportunities and best practices for generating revenue from community solar and allocate these revenues to support affordable housing projects in the town.

c) Develop programs and policies to support all interested homeowners' and business owners' ability, regardless of income, to generate renewable energy and financially benefit the town (Energy and Climate Protection Plan; Community Meeting 2020).

    - Identify a technical partner to educate building owners to identify what types of renewable sources are plausible and recommended for building location. Assess the limitations to owners' generating solar, geothermal, or other renewable energy. Develop financial and technical assistance programs to ease adoption of roof solar energy for low-income homeowners. Finance ideas can include grant base programs, low-cost financing, or on-bill financing – but should be determined with low-income homeowners in program development. Additionally, the programs should also plan for and support owner management of maintenance, replacement, and/or investment of technology on properties to ensure longevity of working conditions. Financial benefits can include favorable return on investment, use of tax credits, net metering which allows building owners to receive credit for excess energy supplied back to the power grid.

Example of distributed renewable energy (solar panels) Identify opportunities to increase municipal or community-based solar projects (ECPP), including funding to allow participation at a variety of income levels.

Some households are unable to access rooftop solar, due to factors such as tree canopy or rental status. To serve these households, a study can be completed to investigate community solar facilities (e.g. municipal or commercial rooftops may host solar arrays) and programs, though implementation of this model this may require state enabling legislation. The Town can also study the potential to implement innovative financing programs (e.g., solar leasing, third-party solar, PACE, on-bill financing) which can increase resident access to solar projects.

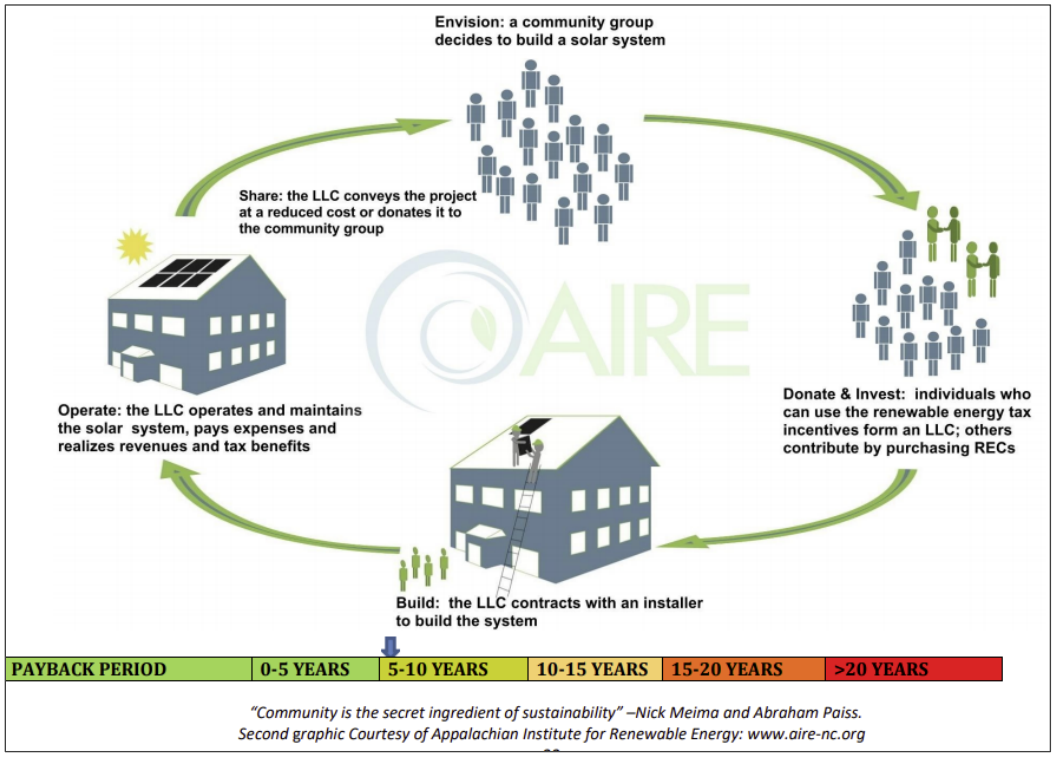


Figure 5-4. Diagram from the ECPP explaining how a community solar project could be implemented. ECPP 2020, pg 22.

Investigate the opportunity to create a community geothermal utility (CCAP 2020).

If marginal costs of adding adjacent community/commercial buildings to the heating and cooling network are low, then a municipal utility could be an effective way to provide services at low cost. A community geothermal utility would make it easier to adopt geothermal broadly by lowering costs and simplifying construction (CCAP 2020).

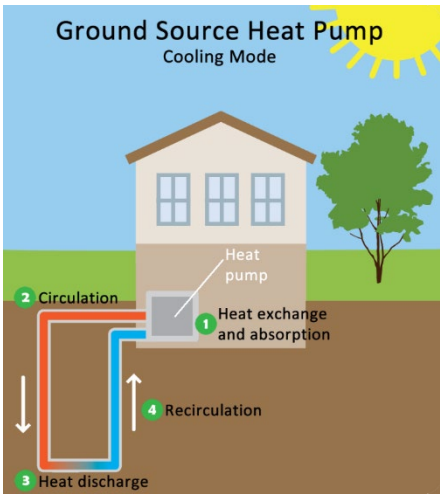


Figure 5-5. A Geothermal heating and cooling system (EPA).

GREEN INFRASTRUCTURE - VISION

Carrboro routinely prioritizes green infrastructure over grey infrastructure, throughout the town and ETJ, to enhance ecosystems and improve vibrancy and quality of life in the community.

GREEN INFRASTRUCTURE - KEY FINDINGS

Environmental sustainability is a priority for Carrboro and the development of greenways that connect to a comprehensive sidewalk and biking network will amplify recreational activity while protecting the natural environment. Several initiatives are underway to improve access to and traveling through existing trails and greenways. Current projects include Jones Creek Greenway, Homestead-Chapel Hill High School Multi-use path, and Morgan Creek Greenway. Two greenways, Jones Creek and Morgan Creek, are currently being funded in the CIP budget (the CIP budget dedicates $1,987,500, with federal monies funding 80% of that value, to the development of greenways along Jones and Morgan Creek). The Homestead-CHHS Multi-use path is almost complete, and the Jones Creek Greenway project is currently underway.

Carrboro town staff continue to identify opportunities to educate and assist residents in implementing green stormwater infrastructure on their private properties. In 2019, the Town supported a study that was driven by flood related concerns in the upper Toms Creek watershed and included a recommendation to pilot a green infrastructure-based residential assistance program.

GREEN INFRASTRUCTURE - DRAFT METRICS:

1. Increase residential participation in native planting by xx%.
2. Increase tree canopy coverage by xx%.

GREEN INFRASTRUCTURE - GOALS, STRATEGIES, AND PROJECTS

Goal 1: Increase the use of native plants and vegetation to mitigate climate change impacts. Native vegetation can improve stormwater mitigation efforts and reduce the heat island effect.

Strategy 1.1: Develop programs to provide education and funds to assist individuals and neighborhoods with planting campaigns, including those with financial barriers or that have historically been excluded from participation.

Marginalized residents are typically on the frontlines of feeling climate change impacts. Work with these residents to understand if and how they are disproportionately impacted by climate change impacts to then understand how to use green infrastructure to improve their life experiences and financial burdens.

Projects:

a) Support the formation of a community scale, and community-led urban forestry program for the preservation, protection, and conservation of the community forest (CCAP 2020).

- Increase public awareness of the value of trees. Provide oversight for a community scale urban forestry program that seeks to preserve and protect the community forest. Partner with civic groups to improve and expand the Town's tree canopy.

b) Increase public education of the benefits of native plants and vegetation for stormwater management (NDPES PHASE II).

- Educate the public about the difference between turf lawns and native plants in terms of stormwater management. Native plants have deeper roots which can slow down rainwater runoff which reduces stormwater flooding.

c) Pursue regulatory and non-regulatory approaches to discourage non-native and invasive plants and encourage native plant use (CCAP 2017).

- Encourage naturalized landscaping instead of manicured lawns which require less fertilizers and pesticides and can also reduce heat island effect. Look at the Bolin Forest and Quarterpath Trace neighborhoods' initiatives with regard to urban forest stewardship to discourage non-native/invasive plant use.

d) Identify opportunities to promote technical assistance and cost-share grant program to residents seeking (RainReady Carrboro, 2019) to abide by regulatory approaches for encouraging native plant use.

e) Identify local resident "champions" who can partner with the Town to support the development of the program and serve as a liaison to residents (RainReady Carrboro, 2019)

f) Identify program design options that provide financial support enabling low-income residents' participation in a technical assistance and cost-share grant program to install green infrastructure (RainReady Carrboro, 2019).

g) Invest in the completion of a new significant restoration project (NDPES PHASE II).

- Identify priority locations for native plant restoration projects that support continuity of natural spaces, native pollinators, and residents' access to nature.

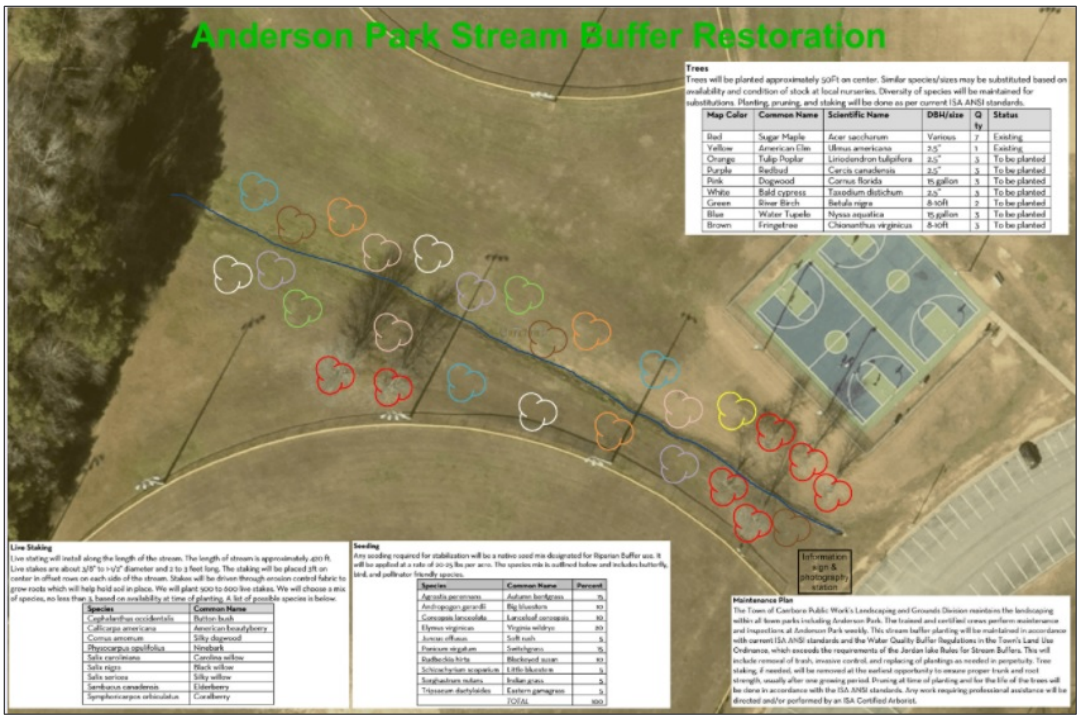


Figure 5-6. Anderson Park Stream Buffer Restoration Project: This project will host volunteer events to plant trees (in order to create a pollinator habitat, improve water quality, install stormwater control measures, and provide education/outreach to Carrboro residents).

https://www.townofcarrboro.org/2517/12895/Anderson-Park-Riparian-Buffer-Restoratio

Refer to the Climate Action and Environment Chapter for additional projects.

Goal 2: Enhance the tree canopy along roads.

Improving tree canopy along roads can reduce heat island effect and reduce stormwater runoff on streets.

Strategy 2.1: Improve canopy downtown to create a more vibrant and inviting urban landscape, reduce the heat island and stormwater runoff, and sequester carbon.

Tree canopy can entice more people to the street because they can depend on the shade and feel comfortable as they traverse down the streets.

Projects:

a) Develop and implement a downtown street tree master plan.

- Create a baseline for downtown street trees. Develop priority streets with community and stakeholder engagement. Allocate budget for installing street planters and culturally and ecologically appropriate trees.

b) Make the 2019 "tree tag" outreach an ongoing and regular initiative.

- The tree tag project identified tree and shared how each tree provided financial savings, avoided stormwater runoff, saved electricity and energy, and stored carbon dioxide. This initiative can be expanded past current reach is an example of a public education campaign.

c) Work with downtown businesses and residents to improve the canopy on private lots.

d) Seek grant support from the State and other sources to provide financial and technical support.

- Allocate staff time to research funding opportunities for increasing the tree canopy.

Strategy 2.2: Work with neighborhoods to improve tree canopy and the forest along roads, in neighborhood open spaces, and on private lots.

Tree canopy coverage provides shade for users while reducing the heat island effect and reduce stormwater runoff.

Projects:

a) Support neighborhood efforts to pursue grant funds for neighborhood improvements, especially those with ecological value or related to other town priorities.

b) Consider providing criteria for neighborhood street tree inventories and related master plans.

c) Work at a neighborhood scale to "green" the public right-of-way.

d) Provide technical assistance for individual resident's improvement and expansion of tree canopy.

- Provide workshops, trainings, and a resource center (virtual or physical) to educate residents on how to expand the tree canopy on their own property.

e) Seek grant support from the State and other sources to provide financial and technical support.

Goal 3: Integrate green stormwater infrastructure practices into the Town's public transportation investments.

Green infrastructure refers to nature-based solutions that address stormwater issues, whereas grey infrastructure refers to concrete, pipes, etc.… used to manage movement of water. These measures can include drainage and storage improvements such as bioretention, permeable pavement, and more street trees including suspended pavement tree planter (to increase detention capacity, promote infiltration, and reduce exposure to flood waters).

Green stormwater infrastructure practices would help alleviate the ponding of water in common areas such as Anderson Park's parking lot right after rainfall.

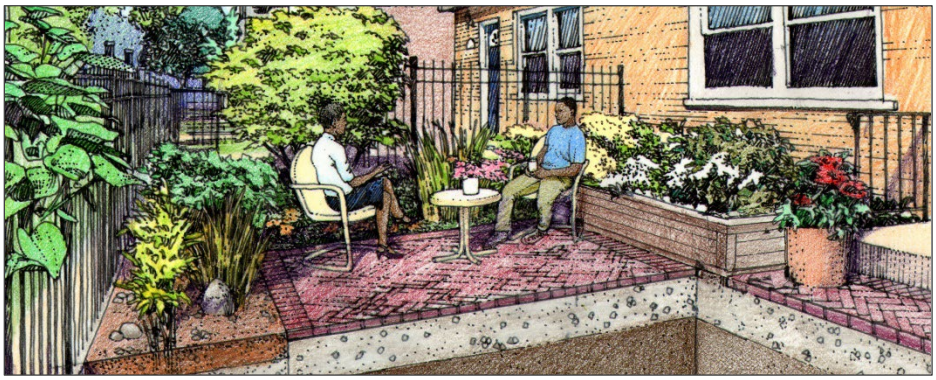
Strategy 3.1.: Coordinate transportation and public infrastructure improvements with stormwater green infrastructure in partnership with residents, especially BIPOC and low-income residents.

Green infrastructure included in transportation plans manages the stormwater issues that impervious surfaces (like streets and roads) create by allowing a path for water to travel instead of inundating sewer systems.

Projects:

a) Integrate green stormwater infrastructure solutions to improve stormwater management practices around transportation infrastructure (streets, alleys, sidewalks, curbs, storm sewers, and greenways).

- National best practices explained in National Association of City Transportation Official's (NACTO) Urban Street Stormwater Guide that can help retrofit and reconstruct roadways that promote safety and improved stormwater management. Example solutions include street planters and permeable pavement which will slow down rainwater runoff. Street planters can be installed in sidewalks or medians and are large concrete boxes with soil that allow for plant growth and include gravel for rainwater storage. Permeable pavement are areas filled with gravel and covered by porous pavement to allow water to travel through.

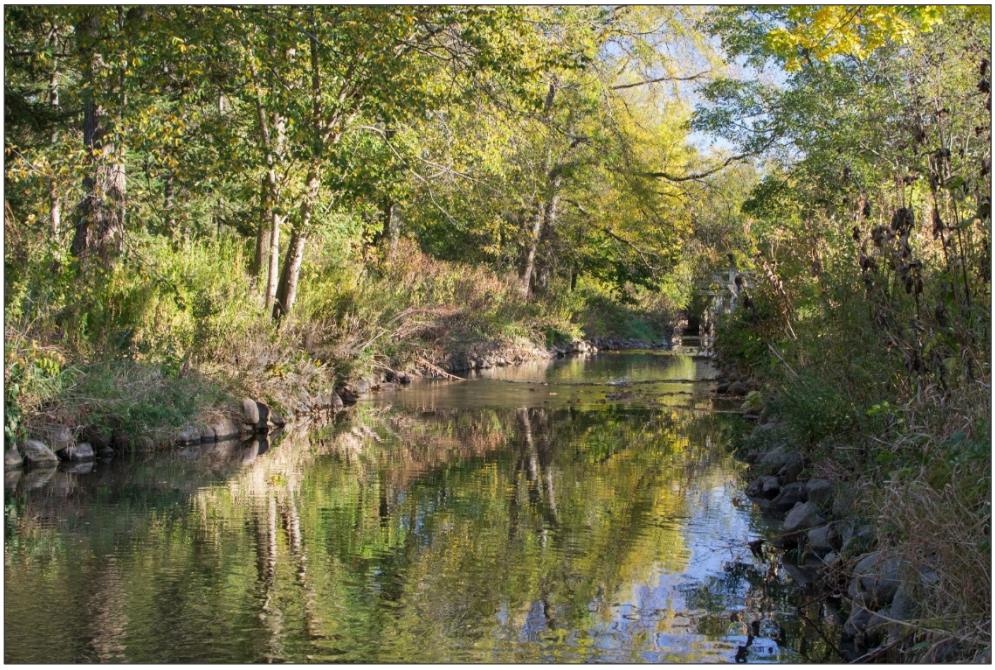


Examples of green stormwater infrastructure.

Permeable Pavement

Permeable Pavement & Bioretention Bump Outs

Tree planters with Stormwater Filtration



Riparian/Stream Repair/Restoration Projects

Impervious Removal and Disconnection

b) Educate residents about the Town's definition of a greenway and its benefits, and foster discussion about greenways (Community Meeting 2020).

Greenway *Definition* and *Typology*:

In 2013, NCDOT developed a set of design guidelines for greenway facilities. According to the "Bicycle and Pedestrian Greenway Design Guidelines Value Engineering Report", some recommendations for greenway design should include: using a base course that would allow tree roots to grow through without buckling the pavement, provide pavement options with a pros/cons list to understand their benefits and limitations, allow alternate foundations for boardwalks, provide seeding options in environmentally sensitive areas, conduct a flood study if it crosses a FEMA jurisdictional flood channel, develop warrants that would allow for development of signalization for bike and ped crossings, and consider utilization of hydraulic tunnels or box culverts for pedestrian use. Greenway implementation should follow NCDOT design guidelines, while continuing to work closely with residents and the Greenways Commission.

The Town of Carrboro is considering implementing two types of greenways to help complete the greenway/biking/walking system: recreation-based and transportation-based.

Cultural greenways are intended to rehabilitate and conserve cultural resources and make them accessible to the public. Combinations of walking routes, scenic roads, and waterways can be part of this network. Cultural greenways should be used as a subset to both greenway types.

Goal 4: Expand stormwater green infrastructure as part of watershed restoration and climate resilience efforts (hydrology).

Strategy 4.1: Expand access to retrofit existing stormwater infrastructure and add new green stormwater infrastructure on private property for greater lot, neighborhood, and watershed scale resilience and environmental quality as well as community enjoyment of outdoor spaces.

Projects:

a) Develop programming and accompanying financial assistance for income-eligible households to install green stormwater infrastructure (RainReady Carrboro, 2019).

   - Installing green stormwater infrastructure can be expensive. Identifying funding and financing opportunities so that low-income households can also participate and install green stormwater infrastructure.

b) Develop a playbook for stormwater infrastructure retrofits to help the public and landowners implement solutions.

   - Identify experts who can develop "retrofit typologies" that landowners can use. Develop public education campaign to publicize this playbook and explain how to implement retrofits. Provide technical assistance for retrofit projects.

GLOSSARY

Distributed renewable energy sources: Energy coming from renewable sources (i.e, solar, wind, geothermal) and are generated near point of use (e.g., residential home, municipal building) rather than a centralized power plant.

Greenway A: Trail-based greenways can take numerous forms while providing a variety of recreational opportunity. The main purpose a trail-oriented greenway is to provide people with easy recreational activity and easy access to the outdoors. Many are used as automobile alternatives for commuting, shopping, and other local activities. In some cases, a separate bike lane is designated to help avoid conflict with the greenway users.

Greenway B: Cultural greenways are intended to rehabilitate and conserve cultural resources and make them accessible to the public. Combinations of walking routes, scenic roads, and waterways can be part of this network.

Green Stormwater Infrastructure: Nature-based stormwater management methods that mitigate flooding, improve the ecosystem's health, and provide additional benefits to the community.

Grey Stormwater Infrastructure: Built stormwater management methods like pipes

Micro-mobility: Any small, low-speed, human- electric-powered transportation device, including bicycles, scooters, electric-assist bicycles, electric scooters (e-scooters), and other small, lightweight, wheeled conveyances. (Ch. 6 Motor Vehicles and Traffic)

Points of Interest: Groceries, restaurants, businesses, government buildings, etc.

Racial Equity Assessment Tools: A Racial Equity Impact Analysis can be used to inform and shape transportation policy decisions and/or recommendations. Some criteria that may be included in an assessment include: assessing the benefits and impacts (burdens) of the project on certain racial groups, how the needs of racial minorities will be prioritized, and strategies to mitigate potential negative consequences around decision-making.

Transportation Demand Management: A set of strategies aimed at maximizing traveler choices. (US DOT Federal Highway Administration)

APPENDIX

Elevated Chicago's Principles and Recommendations for inclusive community engagement: Examples of how another community (Chicago) is thinking about equitable Transit Oriented Development that could be helpful when thinking about improving transit accessibility without displacement and providing inclusive outreach to BIPOC communities.

City of Chicago Equitable Transit-Oriented Development (ETOD)

ETOD is about planning with communities so that people of all income levels experience the benefits of dense, mixed-use, pedestrian-friendly living near transit hubs. Recommendations to avoid displacement of lower-income and racial minorities include: streamlining and incentivizing the production of multifamily affordable housing, preserving existing affordable housing in the TOD zone, strengthening affordability and accessibility requirements, strengthening density and parking incentives, unbundling housing and parking costs, and strengthening equity in procurement and supplier diversity policies.

1) Shift our mindset: When engaging with communities bring a mindset that sees values in all voices, understand that communities are not monolithic, build and rebuild trust through both words and actions, foster collective learning, be mindful about timelines and commit to an action-oriented process.

2) Co-design Community Engagement with Community: Community engagement is most meaningful and effective when the process is designed with community partners.

3) Enable two-way Communication and Learning: Having an ongoing dialogue with communities makes engagement around a particular project or plan easier because we already have a trusted relationship established.

4) Promote Cultural Competency and Empathy: We must get to know the contexts—community values and norms—in which we are working, really well.

5) Value Community Knowledge and Capital: Community residents are, hands down, the experts on their community context and built environment challenges. We must not only acknowledge local expertise, but compensate and amply it.

6) Seek and Embrace Multiple Viewpoints: Seek out and engage people who are or will be most affected by development decisions. Embrace diversity and design engagement opportunities to reach out unusual community participants.

7) Cultivate Leadership and Advocacy: From inception and design to implementation and activation, we can use the built environment decision making process to cultivate and empower community leaders to lead future efforts.

8) Foster Ownership and Identity in Community: Celebrate community identity and explore ways to integrate technical and creative methods that spark interest in permanent community assets.

https://www.chicago.gov/content/dam/city/sites/etod/Pdfs/ETOD-Full-Policy-Plan-with-Appendices-6-15-21.pdf