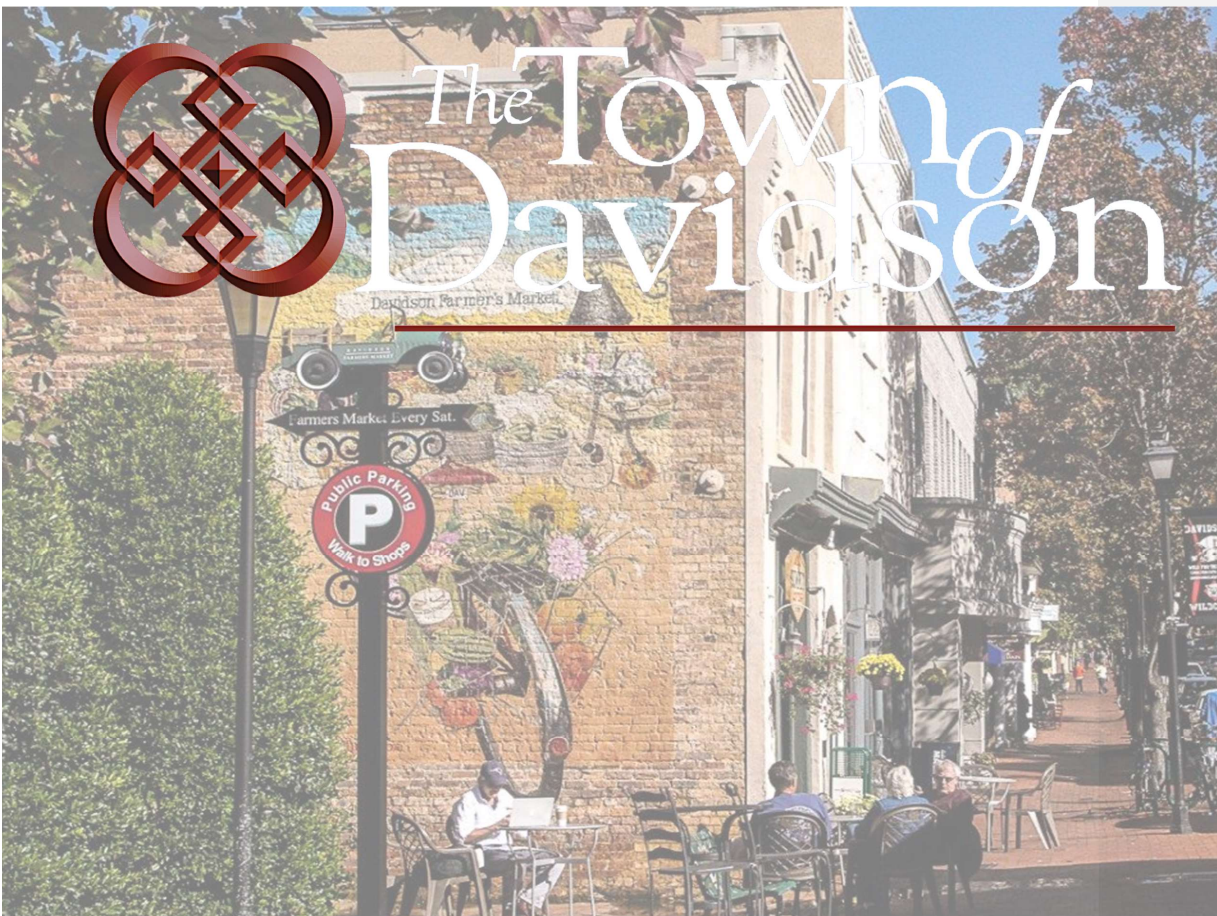


**TOWN OF DAVIDSON  
SUSTAINABILITY  
ANALYSIS**



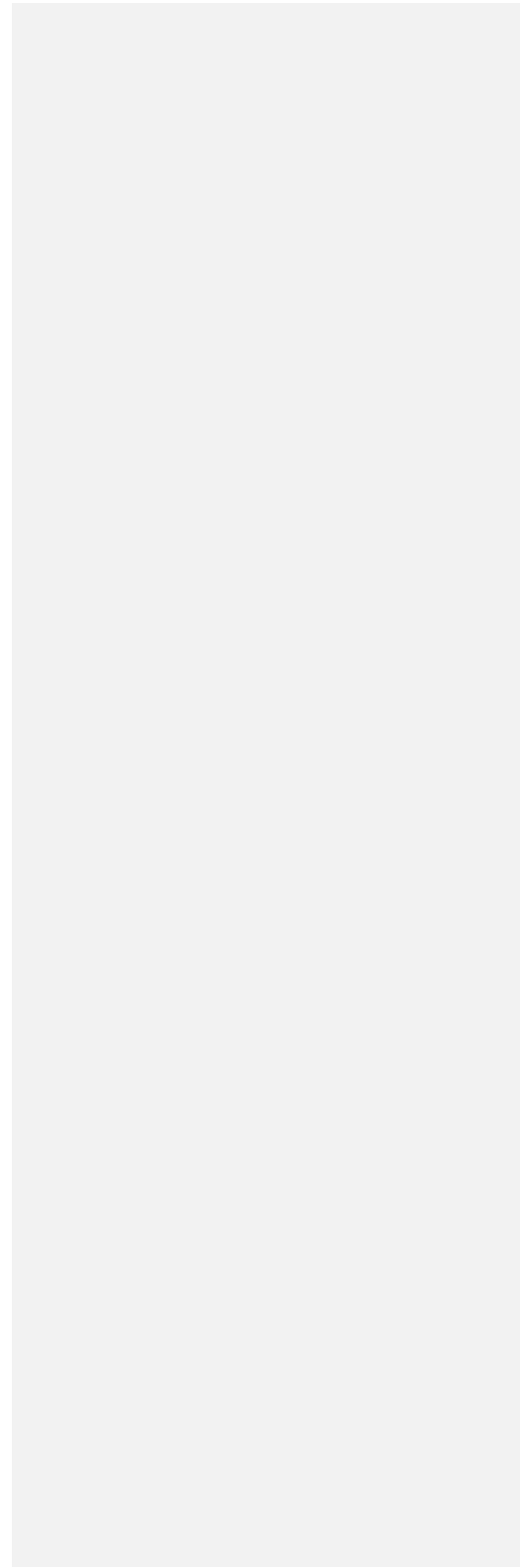
Town of Davidson Sustainability Analysis



The Gerald G. Fox Master of Public Administration Program at UNC  
Charlotte

Kathryn Arnold  
Tyricia Bradley  
David Clancy  
James Grindstaff  
Peter Grisewood  
Tanya Houston  
Nahom Kahsay  
Nsieme Lemvo  
Stacy Leotta  
Merritt McCully  
Meera Sanjad

Advised by:  
Dr. James Douglas  
Mr. Douglas Bean





## TABLE OF CONTENTS

<b>TABLE OF CONTENTS</b>	<b>3</b>
<b>EXECUTIVE SUMMARY</b>	<b>4</b>
<b>INTRODUCTION</b>	<b>6</b>
<b>COMMUNITY PROFILE</b>	<b>7</b>
<b>DATA AND METHODS</b>	<b>9</b>
<b>FINDINGS AND RECOMMENDATIONS</b>	<b>10</b>
<b>AIR – Reduce Harmful Impacts on Air Quality</b>	<b>12</b>
<b>WATER – Protect Water Resources</b>	<b>20</b>
<b>LAND – Enhance Beneficial Use</b>	<b>23</b>
<b>COLLABORATION – Create Community Partnerships and Initiatives</b>	<b>31</b>
<b>PRIORITIZATION</b>	<b>35</b>
<b>KEY LESSONS LEARNED</b>	<i>Error! Bookmark not defined.</i>
<b>SUMMARY AND CONCLUSION</b>	<b>41</b>
<b>ACKNOWLEDGEMENTS</b>	<b>42</b>
<b>REFERENCES</b>	<b>43</b>



## EXECUTIVE SUMMARY

### Overview

The Town of Davidson seeks to strengthen the sustainability efforts created in its 2020 Strategic Plan and 2020 Comprehensive Plan. This coincides with Governor Cooper's 2018 Executive Order 80, which aims to address clean energy and emission reduction (a website link can be found in Appendix A for more information on the Executive Order). Students of the Gerald G. Fox Master of Public Administration Program (the MPA team) at the University of North Carolina at Charlotte (UNCC) were asked to provide Davidson with strategies regarding environmental sustainability. The MPA team is supporting Davidson's joint committee, consisting of the Town's Livability and Planning Boards tasked with sustainability initiatives.

### Methods

To evaluate potential sustainability efforts, the MPA team developed a methodology to assess Davidson's current sustainability goals, research potential sustainability practices, and identify best practices to build strategies. The team's methods included:

- Extensive literature review on sustainability best practices and new technologies
- Interviews with Davidson, Mecklenburg County, and State of North Carolina officials
- Interviews with officials in benchmark towns and cities
- Interviews with recognized sustainability organizations

Using these data collection methods, the MPA team developed a comprehensive overview of current sustainability measures and best practices.

### Findings and Recommendations

The MPA team developed 14 sustainability strategies for the Town of Davidson to consider. These strategies are grouped into four focus areas: Air, Water, Land, and Collaboration. Detailed descriptions and suggestions for implementation are provided for each strategy. The team then created a ranking system of the top five priorities from benchmark municipalities are discussed where applicable.

Town of Davidson Sustainability Analysis

Table 1  
Identified Strategies

Focus	Strategies
 <b>Air</b> <i>Reduce Harmful Impacts on Air Quality</i>	1. IMPLEMENT ENERGY EFFICIENT STANDARDS FOR CONSTRUCTION AND RENOVATIONS ★ 2. CREATE A TROLLEY CIRCULAR 3. INVEST IN IDLE REDUCTION TECHNOLOGY (IRT) 4. IMPLEMENT ELECTRIC VEHICLE (EV) CHARGERS
 <b>Water</b> <i>Protect Water Resources</i>	5. PARTNER WITH MECKLENBURG COUNTY ON WATERSHED MANAGEMENT 6. ENCOURAGE AND INSTALL RAIN GARDENS ★ 7. UTILIZE PERMEABLE PAVEMENT TECHNOLOGIES
 <b>Land</b> <i>Enhance Beneficial Use</i>	8. CREATE A TOWN COMPOSTING PROGRAM 9. CREATE ADDITIONAL COMMUNITY GARDENS THAT ARE ACCESSIBLE TO TOWN POPULATION 10. EXPLORE GREEN DEVELOPMENT OPTIONS ON TOWN BUILDINGS ★ 11. IMPLEMENT CURRENT COMPREHENSIVE PLAN AND TREE INITIATIVES
 <b>Collaboration</b> <i>Create Community Partnerships and Initiatives</i>	12. DEVELOP A SUSTAINABILITY WEBPAGE ★ 13. EXPLORE ADDITIONAL PARTNERING WITH DAVIDSON COLLEGE 14. ESTABLISH A COMMUNITY ADVISORY BOARD ★

★ = Priority Strategy

Additionally, the MPA team found several lessons learned from the benchmark communities that have been included in their own section to help guide implementation of sustainability strategies. Davidson has created detailed comprehensive and strategic plans to serve as steppingstones to implement sustainability measures. The Town of Davidson can adopt a variety of programs to suit the individual needs of the Town. The MPA team recommends strategies within the four focus areas to help the Town of Davidson achieve the goal of "Implementation and encouragement of innovative solutions to environmental, energy, and climate-based challenges" as outlined in its 2020 Strategic Plan (The Town of Davidson, 2020 Strategic Plan).



## INTRODUCTION

The Town of Davidson recently adopted a new comprehensive plan (Our Davidson Comprehensive Plan 2020) and a new strategic plan (The Town of Davidson Strategic Plan 2020-2021) to guide its future growth and development. Sustainability was a theme in both plans that needed further development. In 2018, North Carolina Governor Roy Cooper signed into effect Executive Order 80 which addresses climate change and clean energy. The Town of Davidson's new focus on sustainability can support Executive Order 80. The Town of Davidson asked students from the Gerald G. Fox MPA program at UNC Charlotte (the MPA team) to research sustainability opportunities and provide findings and strategies.

Research to meet the goals defined by Davidson included: 1. a review of relevant literature, 2. interviews with local stakeholders, 3. interviews with sustainability organizations, and 4. identification of and interviews with benchmark communities. The research led to two overarching themes that form the structure of this report.

First, sustainability is a broad term that has a variety of meanings and definitions for various audiences. Sustainability is generally associated with a triple bottom line focus of social, economic, and environmental sustainability. This report is limited to environmental sustainability in order to narrow the scope and provide findings and strategies that are most relevant to Davidson.

Second, the research led the team to target 14 strategies across four focus areas for analysis: 1. Air, 2. Water, 3. Land, and 4. Collaboration. Multiple strategies for future action are identified for each focus area, based upon the research and analysis of the data collected. The MPA team chose benchmark municipalities for each strategy to highlight current projects and programs that may be suitable for implementation in Davidson. The team identified a total of 14 strategies for the Town of Davidson that can aid it in meeting its environmental sustainability goals. Strategies were evaluated based on the following: relevancy to the Town of Davidson's Comprehensive Plan, implementation cost, ease of implementation, and relevancy to the State of North Carolina's Executive Order 80. Although the research uncovered a broad array of sustainability initiatives, the recommended strategies focused on those which are achievable through the Town of Davidson's own authority or in collaboration with other organizations. In addition to the recommended strategies, the MPA team found several lessons learned from the benchmark communities that have been included as recommendations and considerations to help guide the Town of Davidson's implementation of sustainability strategies.



## COMMUNITY PROFILE

### History of Davidson

The Town of Davidson is a small college town located roughly 19 miles north of Charlotte in the southern piedmont region of North Carolina. Davidson’s history is tied to the opening of Davidson College in 1837, with the college playing a large role in the Town’s government from 1837 to 1879. In 1891, the Town formally changed its name to Davidson. Throughout the 19th and 20th centuries, Davidson saw growth through railroad construction and the movement of textile plants into the area. While Davidson has experienced recent population growth as major employers have moved into the area and young families and retirees have moved into the Town, it remains the smallest of the incorporated towns in Mecklenburg County (Town History, n.d.). With close proximity to Charlotte, Davidson has become home to several large employers. These employers include Ingersoll-Rand, Davidson College, MSC Industrial Direct, and Trane Technologies.

### Population, Demographics, and Housing

According to the US Census Bureau, as of 2019, Davidson had an estimated population of 13,064. As shown in Table 2, a large majority of citizens in the Town are classified as White. No other racial or ethnic group makes up more than 5.4% of the population. Between 2000 and 2010, Davidson grew by 53.5%, while Mecklenburg County grew by 32.3%, and the state of North Carolina grew by 18.5%. There is a shift in the Town’s demographics and demand for increased residential construction as young families and retirees move to Davidson (Town of Davidson, 2017). The average household size in the Town is 2.6 people. The high school graduation rate is 98.4%, and the percentage of individuals with a bachelor’s degree or higher is 74% (US Census Bureau, 2019).

Table 2  
Town of Davidson Racial Demographics

2019 Population Estimate: 13,054

Race/Ethnicity	Number of People	Percentage of Population
<i>White</i>	11,410	87.4%
<i>Black</i>	575	4.4%
<i>Asian</i>	156	1.2%
<i>Hispanic or Latino</i>	705	5.4%
<i>Two or More Races</i>	208	1.6%

Davidson Source: US Census Bureau

Davidson College and its 1,843 students are an important, albeit seasonal, part of the Town’s population. Ninety-five percent of students live on campus between August and May each year. The student population is slightly more diverse than the larger Town, with 63.3% identifying as White, 6.7% as Asian, 7.3% as Hispanic, 5.6% as African American, and 6.7% as multi-racial. Furthermore, 8.7% of the student body consists of international students (Davidson College, n.d.).



Table 3 compares the Town of Davidson’s housing and economic demographics to Mecklenburg County. The table reveals that the Town tends to be more affluent than the larger County.

Table 3  
**Town of Davidson Housing and Economics**

	Town of Davidson	Mecklenburg County
Total Housing Units	4,615	466,911
% Owner Occupied Units	80.0%	56.5%
Median Home Value	\$423,000	\$219,800
Average Mortgage	\$2,106	\$1,462
Average Rental Price	\$1,213	\$1,099
Median Household Income	\$128,255	\$64,312
% Population in Poverty	3.0%	11.7%

Source: US Census Bureau

### Major Transportation Features

Davidson is served by the Charlotte Area Transit System (CATS) route 77X express, which provides transport to and from Uptown Charlotte. There is also a local route known as Village Rider which connects Davidson to Huntersville and Cornelius (Town of Davidson, n.d). Davidson owns and operates a trolley, currently reserved for town sponsored events. Furthermore, Davidson is surrounded by major highways such as I-77 extending from South Carolina to Ohio. Local highways such as NC-115 and Davidson-Concord Road serve as primary routes for commercial and personal travel.

### Natural Environment

The Town of Davidson and its Extra Territorial Jurisdiction comprises over 9,000 acres of land. The original site chosen for Davidson College was a high point between the Catawba and Yadkin rivers. The Town is near Lake Norman, and important waterways like South Prong West Branch Rocky River that create both waterfront and riparian ecosystems for wildlife and flora. Farmland and mixed hardwood forests share a mostly red clay-based soil with some areas of sandy loam. Pressures from development and human-oriented uses have created a situation where greenspace is at a premium and competition for natural area space is high. Residents and community leadership are dedicated to a progressive environmental outlook, tempered with the need for economic development that fits with the small and historic college town/lake town authenticity (Town History,n.d).





## DATA AND METHODS

The MPA team used the following methods to conduct the sustainability analysis: an extensive literature review and interviews with Davidson officials and citizens, sustainability experts, and benchmark towns.

### Literature Review

The MPA team gathered information about sustainability practices primarily from scholarly books, scholarly journals, government reports, and internet resources. Internet resources included relevant government websites and websites of recognized sustainability organizations. A full list of resources can be found in the reference section.

### Expert Interviews

The MPA team conducted a series of interviews with the Town of Davidson, cities and towns identified as benchmarks, and sustainability organizations to understand their experiences and perspectives on implementing sustainability projects.

From Davidson, the MPA team interviewed the Assistant Town Manager, the Natural Assets and Sustainability Coordinator, the Livability Board Chair, the Planning Board Chair, the Director of Sustainability at Davidson College, and a local resident identified as being heavily involved in sustainability efforts in the Town.

The MPA team also interviewed officials from seven cities and towns across the nation with a record of strong sustainability efforts. Towns and cities were primarily selected based on having notable efforts in sustainability, however other criteria such as town size and composition as compared to Davidson were considered in selection as well. The purpose of the interviews was to discover the best practices being utilized in other cities and towns that Davidson could implement. These benchmark municipalities provided several examples of programs and policies that are included in this report. The benchmark cities and towns were:

- Chapel Hill, North Carolina
- Greensburg, Kansas
- Homer, Alaska
- Hurricane, Utah
- Juneau, Alaska
- Oakridge, Oregon
- Park City, Utah

The MPA team also interviewed two organizations that work extensively in sustainability efforts. Those groups were the National League of Cities and the North Carolina Department of Environmental Quality.



## FINDINGS AND RECOMMENDATIONS

The findings and recommendations of the MPA team are presented in this section. The team organized the project around four focus areas with suggested objective statements - **Air**, **Water**, **Land**, and **Collaboration**. The MPA team identified strategies within each focus area that the Town could employ to meet its sustainability goals (see Table 1). In each section, the team describes each strategy, outlines its potential impacts, discusses current practices and implementation issues, mentions Davidson’s current activities in relation to the strategy, and provides options for how Davidson might implement the strategy. Related benchmark communities are included where the implementation of similar programs and policies are suggested for Davidson. The strategies for each focus area are listed below:

Table 1  
Identified Strategies

Focus	Strategies
 <b>Air</b> Reduce Harmful Impacts on Air Quality	15. IMPLEMENT ENERGY EFFICIENT STANDARDS FOR CONSTRUCTION AND RENOVATIONS ★ 16. CREATE A TROLLEY CIRCULAR 17. INVEST IN IDLE REDUCTION TECHNOLOGY (IRT) 18. IMPLEMENT ELECTRIC VEHICLE (EV) CHARGERS
 <b>Water</b> Protect Water Resources	19. PARTNER WITH MECKLENBURG COUNTY ON WATERSHED MANAGEMENT 20. ENCOURAGE AND INSTALL RAIN GARDENS ★ 21. UTILIZE PERMEABLE PAVEMENT TECHNOLOGIES
 <b>Land</b> Enhance Beneficial Use	22. CREATE A TOWN COMPOSTING PROGRAM 23. CREATE ADDITIONAL COMMUNITY GARDENS THAT ARE ACCESSIBLE TO TOWN POPULATION 24. EXPLORE GREEN DEVELOPMENT OPTIONS ON TOWN BUILDINGS ★ 25. IMPLEMENT CURRENT COMPREHENSIVE PLAN AND TREE INITIATIVES
 <b>Collaboration</b> Create Community Partnerships and Initiatives	26. DEVELOP A SUSTAINABILITY WEBPAGE ★ EXPLORE ADDITIONAL PARTNERING WITH DAVIDSON COLLEGE 27. ESTABLISH A COMMUNITY ADVISORY BOARD ★

★ = Priority Strategy

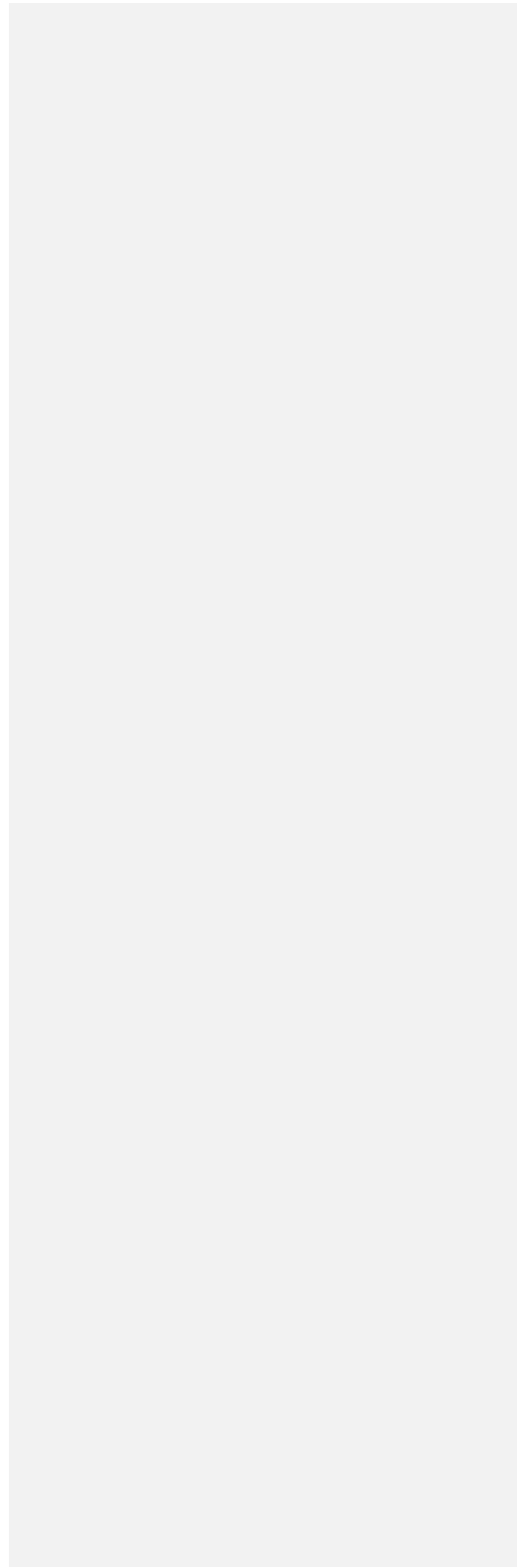
To provide effective suggestions for short-term implementation of successful sustainability efforts, the MPA team created a short list of the top prospective strategies. The criteria used to select these priorities were relevancy to the Town of Davidson’s Comprehensive Plan, implementation costs, ease of implementation, and relevancy to the Governor’s Executive Order 80.

Implementing these strategies can help the Town achieve the sustainability goals outlined in its strategic, comprehensive, and mobility plans. After, strategies in each of the focus areas are discussed, key lessons learned from the benchmark interviews are presented. These lessons cover

Town of Davidson Sustainability Analysis



more general operational issues that officials in the benchmark jurisdictions identified as useful for helping local governments to implement their sustainability strategies.



## AIR – Reduce Harmful Impacts on Air Quality

Air quality is vital when considering environmental sustainability. Mecklenburg County monitoring data shows a 2017 ozone compliance value of 70 parts per billion (ppb) which narrowly meets the health-based standard (Historical Air Quality Data, n.d). Major sources of air pollution include energy consumption in buildings and emissions from combustion engines. Buildings make up 39% of the total energy use and 68% of the total electricity use in the United States (Sanders, Parrish, & Earni, 2013). The process of creating electricity often releases harmful chemicals into the atmosphere such as, sulphur dioxide, nitrogen oxides, ozone, benzene benzo(a)pyrene, 1,3-butadiene, and carbon monoxide. These pollutants can create negative health effects, such as chronic bronchitis, hypertension, myocardial infarction (heart attack), and congestive heart failure (Wilkinson, 2007). Roughly 13% of Americans suffer from air quality-related health issues. MIT found that vehicle emissions alone contribute to some of the leading causes of death, such as asthma and cancer. In addition to the health effects, carbon-dioxide from emissions is a major contributor to climate change, which is predicted to cause severe environmental and quality of life problems (Speck, 2018). Under Governor Roy Cooper's Executive Order 80, there is a call for the State to reduce greenhouse gas emissions and create clean energy to address climate change. The Town of Davidson can follow the State's lead by mirroring the goals set out by the Executive Order. One such goal is to reduce energy consumption per square foot in State-owned buildings by at least 40% from fiscal year 2002-2003 levels.

In response, the MPA team recommends the following four strategies to reduce harmful impacts on air quality: implement energy efficient standards for construction and renovation, create a trolley circular, invest in idle reduction technology, and implement electric vehicle chargers. The details of these strategies are explained below.

### *1. Implement Energy Efficient Standards for Construction and Renovations*

Energy efficiency refers to reducing energy consumption by using less energy to attain the same amount of useful output. Buildings make up a majority of the total electricity use in the United States (Sanders, Parrish, & Earni, 2013). An increase in energy efficiency in the residential sector has the potential to yield large cost savings (Kaza et al., 2013). A reduction in energy use can also lower the amount of air pollutants created from energy production. This section will look at energy efficiency rating systems for buildings.

Green buildings are buildings that use a lower amount of energy than conventional buildings while also providing for the same human comforts (Bauer, et al., 2009). There are many energy efficiency and environmental impact-focused building standards in the United States. The MPA team has decided to focus on three building certifications.



The first program is the Leadership in Energy and Environmental Design (LEED). The LEED program was created by the United States Green Building Council (USGBC) and is a point-based rating system for buildings. LEED is a consensus-based rating system generated by the approximately 14,000 companies and organizations that make up the USGBC. (Ruegamer & Smith, 2012). In order to be certified by USGBC with a LEED rating, projects must meet three prerequisites. Projects must be in a permanent location on existing land, comply with project size requirements for its classification, and use reasonable LEED boundaries. LEED certification must be within all the contiguous land that supports the operations of the project. LEED ratings cover the following categories: energy, location, sustainability site, water efficiency, materials, indoor quality, and design. Each structure receives points based on how well it follows the specific requirements in each section. There are different LEED programs for different building and development uses, including LEED for Homes. A link to more information can be found in Appendix A. The Town of Davidson could increase the energy efficiency of Town-owned buildings by requiring that new structures are built to meet LEED certification standards. Construction bids can include how the construction will meet certification standards. New structures can be designed with LEED certification in mind. Renovation projects can utilize the certification requirements as a guide to what energy efficient items should be included.

The second program is the National Green Building Standard (NGBS). The National Association of Home Builders (NAHB), a trade association, created the NGBS to evaluate residential buildings' impact on the environment. The NGBS standards were created solely by the NAHB. A building can receive NGBS certification from Home Innovation Research Labs, a subsidiary of NAHB. The types of certifications that are available are Multifamily or Mixed-Use Certification, Single-Family Certification, NGBS Green+ (recognition for those that go beyond the certifications), Remodeling NGBS Green Certification, Land Development NGBS Green Certification, and Certified Water Rating Index. Homes can earn Bronze, Silver, Gold, or Emerald certification, depending on the number of green practices successfully incorporated into its design and construction. Structures receive points based on how well the structure follows the specific requirements in each section. While NGBS standards are primarily focused on residential buildings, there are standards created for mixed-use buildings. A link to more information can be found in Appendix A.

The third program is the ENERGY STAR program, which is a credential program offered through the Environmental Protection Agency (EPA). Certifications are annual and are conducted each year by a third-party licensed professional engineer or registered architect to be eligible for approval. The building owners place information about each building into a portfolio manager, which monitors energy and water usage over time. Tracking this information is useful in determining the efficiency of the building compared to other buildings across the United States with the same primary function. Each building receives a score ranging from 1-100, with a score of 50 being a moderately efficient building. A building with a score of 75 or more is eligible for the ENERGY STAR certification. This certification has proven to be one of the most effective means for advocating for energy efficiency in households and can bring around 15-20% greater efficiency to a building (Ruegamer & Smith, 2012). A link to more information can be found in Appendix A. The Town of Davidson can use this certification to ensure the appliances and internal systems of a building owned by the Town produce minimal energy waste. The Town



can use the portfolio manager to monitor energy efficiency over time and see how Town buildings compare to other structures across the country.

Developers of new construction can receive certification for LEED and NGBS by focusing on receiving high ratings in a few categories while not scoring as well in others. Requirements for energy efficiency certification that require a balanced score in all certification system categories can eliminate this problem. While they do improve the energy efficiency of the building, the rating systems alone cannot bring buildings into a state of net-zero energy efficiency (Ruegemer & Smith, 2012). As noted in the 2020 Davidson Comprehensive Plan Policy 5.1.4, the Town intends to reduce greenhouse gas emissions from Town facilities and operations to net zero by 2040. Implementation of a rating system should then enforce strict adherence to net zero building by mandating the highest certification possible.

Several benchmark jurisdictions encourage energy efficient construction and renovations. The Town of Chapel Hill uses the design review process to ensure that buildings meet or exceed energy efficiency standards. Working with building applicants, the Town works to implement efficiency and environmentally friendly designs in new developments. Chapel Hill requires that applicants be 20% more efficient than ASHRI 90.1 standards, which are energy efficiency standards created by the American Society of Heating Refrigerating and Air-Conditioning Engineers that apply to anything larger than a low-rise development. A link to more information can be found in Appendix A. Chapel Hill is planning on becoming carbon neutral in new construction by 2030, further reducing its environmental impact.

The Town of Carrboro created its Community Climate Action Plan in 2017 to implement strategies related to environmental issues. The Town has challenged itself to reduce community-wide building-related emissions by 50% by 2025. A link to the plan can be found in Appendix A. The Town seeks to make the voluntary 15% residential efficiency code located in Appendix 4 of the 2012 NC Energy Conservation Code mandatory for those applying for building permits.

The City of Durham published its Roadmap to Sustainability document in 2018 that listed the City's strategies regarding environmental sustainability. A link to the document can be found in Appendix A. The City published its City Energy Report in 2019, which detailed the energy usage of City buildings. In an update to its strategic plan, the City detailed their efforts at partnering with outside firms to create a data analysis tool that tracked the energy and utility usage at a City building. After the system was implemented, multiple energy-wasting activities were found and fixed, resulting in \$10,997 of annual savings. A link to the document can be found in Appendix A.

The City of Northampton, Massachusetts, detailed its environmental sustainability plans in its 2008 Sustainable Northampton Comprehensive Plan. A link to the document can be found in Appendix A. The City set the goal that all new significant municipal buildings be built to meet LEED clarification standards. The City will also prepare and implement an energy conservation plan, with assistance from utility companies. The city will conduct and compile energy audits for buildings to determine the effects of energy saving measures. It will then document and publish progress for the general public to promote the City's commitment to green standards and highlight specific accomplishments.



The City of Juneau, Alaska, while without formal policies, set a goal that large municipal facilities over \$4 million meet the LEED Silver standard when being renovated or in new construction. The City found instances in which energy savings did not have a quick return on investment. However, it still sees both long-term and short-term value in making these investments.

The City of Hurricane, Utah, promotes an energy cash incentive program provided by the Utah Associated Municipal Power Systems (UMAPS). The program (Cool Cash Program) provides rebates from UMAPS for contractors and homeowners for purchasing energy efficient heating and cooling systems. The City is also a participant in the UMAPS Home Energy Savings Appliance Incentive program. The program provides rebates from UMAPS for individuals buying energy efficient appliances. A link to the programs is available in Appendix A.

The Town of Davidson has provisions in its 2020 Comprehensive Plan that green building tools will be promoted for new developments. As stated by Policy 2.3.2, the Town plans to promote and incentivize innovative building tools and approaches. Additionally, Policy 2.3.4 states that the Town intends to adapt to climate variations and transition to becoming a carbon-neutral town. Policy 5.1.4 also states that the Town intends to reduce greenhouse gas emissions from Town facilities and operations to net zero by 2040. Adopting the use of building design rating systems would help to further these Town goals. It will also mirror actions taken by the State per Executive Order 80, which mandates that state-owned buildings reduce energy usage by 40% of 2002-2003 levels. While green building policies are clearly a priority of the Town, the policies have yet to be fully implemented. There are currently no provisions in the Site & Design Standards section of the 2015 Davidson Planning Ordinance that require new construction or renovations to meet any standard of energy efficiency. The Town can help meet the goals set in its 2020 Comprehensive Plan by stipulating that new construction and renovations of Town buildings be certified by a building design rating system such as LEED or ENERGY STAR. Such stipulations could be placed into Section 4: Site & Design Standards under Part 4.4: General Building Design Requirements and Part 4.7: Renovation of Existing Structures. The Town can also provide information on the energy efficiency benefits of the NGBS certification for those interested in energy efficient residential structures.

## [2. Create a Trolley Circular](#)

Municipalities often offer bus, trolley, or van services at a local level known as circulars. Circulars work to minimize individual-based automobile usage in higher density areas. Enticing automobile drivers into alternative forms of transportation can be a crucial way to reduce emissions. Single occupancy mobility patterns in metropolitan areas cause adverse environmental impacts and health issues due to air pollution and increased sedentary lifestyles (Saghapour, Moridpour & Thompson 2019). Shifting from mobilized transit to active transit is both healthy for individuals and the environment. Active transit refers to alternative modes of transit to singular automobile usage, such as walking, biking, and group transit. Mobilized transit is a form of active transit that comes in the form of buses, rail, trolleys, and motorized scooters and bikes. This section will look specifically at trolley options.

## Town of Davidson Sustainability Analysis



Trolley service gives commuters the option to grab public transportation and leave their cars parked at work or home. High rates of ridership and low-cost forms of implementation can be applied through various methods. First, placing trolley stops alongside high traffic areas such as coffee shops, storefronts, and parks can increase ridership. Second, using store awnings and other pre-existing structures reduces the need for trolley shelters and benches, creating savings on upfront development costs. Third, developing easy-to-understand transit stops and clear payment methods can encourage more ridership. Payment methods and fees that are not clearly laid out often discourage ridership as patrons see this as an unnecessary hassle. Fare-free transit is also an option if internal funding is available (Speck 2018). One example of successful internal funding sources is in Kansas City. To provide fare-free services the City implemented a 1% sales tax in a transportation development district along the trolley line and imposed an annual 0.5% assessment on all properties earmarked for the trolley's operations.



( Park City, Utah )

Park City, Utah, has a free trolley along Main Street and encourages locals and visitors to partake in free rides to commonly visited areas. Park City, Utah, has a similar median household income to Davidson with a year-round population of about 8,000, but due to major events hosted in the City, such as the Sundance Film Festival, it can host over 100,000 people in town. Park City exemplifies the best practice by advertising the trolley as an economic benefit to users because it is a free ride for passengers, saving them costs on driving and time. This is also connected to one of the key lessons learned from Park City, that sustainability efforts should be communicated to the public in economic terms and not focus too heavily on technical data. This helps to gain buy-in from the community.

The Town of Chapel Hill also implemented a fare-free local circular in 2002 through a partnership with the Town of Carrboro and the University of North Carolina at Chapel Hill. Funding for the service comes from partnerships with the University of North Carolina at Chapel Hill, where student transportation fees are charged to students allowing them full access to the circular. The remaining funding comes from selling advertising space on the trollies and transit stops and grants from the Federal Transit Agency. Once Chapel Hill Transit implemented a fare-free service, ridership went from 3.5 million in 2002 to 7 million in 2012. Chapel Hill revisited the idea of implementing fares and found that doing so would involve a large upfront capital investment in ticketing machines and increased operational staffing costs. Implementing fares would create additional revenue to help close the gap in operating costs currently made up through grants and advertisement space but would also lead to delays in service and boarding time (Chapel Hill Transit, 2012).

Currently, the Town of Davidson operates a trolley shuttle for specific events such as Christmas in Davidson and the Arts Gallery Crawl. In 2018, Davidson ran two 10-week trials to gauge





citizen interest in a local circular, one in the fall and one in the spring. Internal funding was used to implement the trolley trial. This trial measured ridership and observed traffic mitigation of the integrated trolley service. The trolley was free to riders, and the Town found that ridership ranged from zero to 56 per one-way trip. After the 10-week trial period, the Town went back to only offering the trolley service for major town events. The study found that although there was a high ridership demand, financial constraints would need to be addressed to implement the service long-term. Under Policy 3.3.3 within the Town of Davidson's Comprehensive Plan (2020), Davidson lists the desire to improve current transit services. A trolley circular would directly increase the accessibility of citizens and promote further transit developments. Expanding the trolley service will aid in reducing overall emissions and traffic congestion. Davidson could help to cover the cost by charging for advertising, partnering with local organizations, charging a small ridership fee, and acquiring grants.

### **3. Invest in Idle Reduction Technology (IRT)**

IRT refers to devices that allow engine operators to prevent unnecessary engine idling by providing an alternative energy source to provide heat, air-conditioning, or electricity while the vehicle is temporarily parked or stationary. Idling poses harmful health risks to individuals and the environment. Vehicle idling can affect human health due to the release of pollutants and particulate matter in the air (Shancita, et al. 2014). Many contaminants found in gas and diesel have been shown to have carcinogenic properties (Baratto & Diwekar 2005). The EPA found that, on average, long-duration idling vehicles lead to 1 billion gallons of fuel consumption, adding 11 million tons of carbon dioxide and 180,000 tons of nitrogen oxides to the atmosphere every year (Environmental Protection Agency, n.d). In addition to the negative health impacts of idling, fuel and maintenance costs can be substantial. For example, a study in 2014 found the annual fuel costs associated with idling for trucks to be \$2,250 per truck (Shancita, et al. 2014).

IRT, including onboard auxiliary power units (APU), shore power (SP), shutdown systems, and battery-based fuel cells, reduce engine idle time and emissions (Shancita, et al. 2014). For Davidson's purposes, APUS and SP are the most practical. APU is a small engine generator that creates electrical power. In contrast, SP requires that vehicles connect to a stationary source of electricity and are not mobile like the APU. APUs are the most cost-efficient for higher hours of usage per day while still significantly reducing fuel use and CO<sub>2</sub> emissions (Frey, Kuo & Villa 2009). A 2005 study found that APUs reduce carbon monoxide emissions by as much as 27 percent. APU also has the shortest payback period, averaging two years (Baratto & Diwekar 2005). The Town can apply IRT in order to address overall vehicle emissions and reduce the amount of greenhouse gases emitted into the atmosphere.

Davidson's fleet currently consists of vehicles for the Fire Department, Department of Public Works, and the Police Department. The Fire Department has one medic van, three Chevrolet Tahoes, five firetrucks, one Zodiac boat, and an all-terrain vehicle. The Public Works Department has two dump trunks, a backhoe, a street sweeper, two Ford F-150s, a Ford F-250, and a skid-steer. While the MPA team did not obtain the exact number of vehicles for the police department, it is fair to assume the police department utilizes a substantial fleet for patrols and public safety. Under North Carolina Executive Order 80, the implementation of IRT would directly aid in the implementation of low-emission vehicle alternatives. To benefit from IRT,



Davidson should investigate which vehicles have the highest emission rates and invest in IRT for long term savings and reduced environmental emissions.

#### 4. *Implement Electric Vehicle (EV) Chargers*

EV chargers are machines that hold a power supply to replenish supported EV's battery energy, including electric cars, hybrid vehicles, and neighborhood EVs such as low-speed vehicles. EV chargers encourage the use of EVs. There is an association with increased EV use and decreased combustion engine use, resulting in lower emissions. EV chargers are only slowly making their way into urban and rural areas. This could be associated with the fact that EVs have a significantly higher-than-average initial purchase price, typically due to the battery costs. Additionally, EV chargers operate at a high currency which can sometimes be too strong for current power grids in towns. This poses an issue for power grids as EV chargers constantly pull additional energy if not properly regulated. These factors may prove problematic for implementation (Sechilariu et.al., 2019).

One resolution to grid overload includes the use of smart grids. A smart grid is an electrical grid which measures the input and output of energy flow. It essentially aims to control and condition the distribution of electricity. Smart grids help to prevent grid overload, instability in the system, and fluctuating voltage (Sechilariu et.al., 2019). For small-scale areas, smart microgrids are a reliable solution. These microgrids are reliable and effective at increasing the introduction of renewable energy and minimizing energy costs for small-scale power. It makes sense to integrate smart grids into charging stations. This occurs in bidirectional stations, which control EV battery energy and improve power systems' reliability and sustainability (Sechilariu et.al., 2019).

Another option for integrating smart grids with EV charging infrastructure is sun-shading roofs over stations and including a smart grid in these panels (Sechilariu et.al., 2019). Panels installed on sun-shading roofs result in microgrid integration (Sechilariu et.al., 2019). The development processes for each of these stations will vary due to the width of roadways, building distances, and the type of EV device (Sechilariu et.al., 2019).

Implementing EV chargers comes with a costly upfront price tag. Devices vary in cost depending on size, grid load, charging hookups, and speed levels. The average commercial-grade charging stations cost between \$6,000 and \$10,000 to purchase and install equipment. A few grant options exist to aid towns in the installation of EV chargers. The Federal Transit Agency and the North Carolina Department of Transportation offer grants to encourage the implementation of EV chargers. These grants are highly competitive but offer new funding opportunities each fiscal year. Tesla also offers funding to towns looking to implement their branded charging stations. Once installed, electricity can be provided to customers at no cost or at a fixed rate. If charging for the service, there are two options: charging the user per kilowatt or per minute. In the state of North Carolina companies have the authority to set their own rates in compliance with EV charger vendors. Charging for the service can allow local governments to cover the cost of operations and pay off the cost of installation over time.



When optimizing the location of EV charging stations, it is essential to consider the following items: location, lifestyle of users and their mobility needs, regulations and technical constraints, and number of EVs in the area (along with traffic volume). Additionally, it is vital to consider the time and cost associated with the availability and reinforcement of necessary electricity and the scalability of the project (Sechilariu et.al., 2019). In addition to understanding placement, it is vital to keep device measurements in mind. EV chargers are relatively compact and can easily be placed in preexisting parking lots and garages. Charging stations can vary in size depending on how many actual chargers are present. Devices start at eight to 12 feet tall and fit within an average parking space. Fast chargers are often more compact, and size increases with charging strength and speed.

Greensburg, Kansas, successfully implemented EV chargers through a partnership with Tesla. Greensburg was able to secure this partnership after multiple grant application rounds through Tesla. The City decided to implement EV chargers after incorporating the concept into its sustainability master plan; Greensburg Comprehensive Plan, 2008. Currently, the City has four Tesla chargers located at the Big Well Museum in its downtown area that are open to the public.

Currently, there are five EV chargers located in Davidson. Four are located on the Ingersoll-Rand property. They are only available to Ingersoll-Rand employees. The remaining charger is open to the public and located off South Main Street. Davidson can benefit from an urban analysis to determine the need for EV chargers and the placement of stations. Under Policy 3.3.5 within the Town of Davidson's Comprehensive Plan (2020), there is mention of making steps towards adapting new mobility options. EV charger implementation would serve as encouragement for EV usage. Further implementation of EV chargers would encourage the use of EV and zero-emission vehicles in Davidson while also addressing greenhouse gas emissions discussed in Executive Order 80. If Davidson chooses to implement EV chargers with smart grid technology, it will have the ability to monitor these stations' energy usage.



## WATER – Protect Water Resources

Water quality and management is vital to the Town of Davidson in order to protect the health and safety of the public and the ecosystem. Stormwater management is an important component of sustainable development that can reduce both flooding and water pollution. With an average annual rainfall in Mecklenburg County of 42 inches (US average is 38 inches) and typically no dry season, the Piedmont area has the potential for flooding and pollution. According to the Charlotte-Mecklenburg Storm Water Services website, the County has identified the West Branch Rocky River (partially located in Davidson at Fisher Farm Park) as an impaired stream source. The river has issues with biological integrity, turbidity, and copper. Overall, water issues are important because flooding and pollution runoff can cause damage to property and harm the health of citizens.

The MPA team recommends three strategies to advance water resource protection in the Town of Davidson: partner with Mecklenburg County on watershed management, encourage and install rain gardens, and utilize permeable pavement technologies. The details of these strategies are explained below.

### *5. Partner with Mecklenburg County on Watershed Management*

Mecklenburg County is primarily responsible for watershed management and stormwater programs in the Davidson area. Davidson has a role with Mecklenburg County in watershed management by developing ordinances and policies that support the County's program. Please see Charlotte-Mecklenburg County Watershed Management website link in Appendix A.

The North Carolina Department of Environmental Quality's (NCDEQ) website offers resources and information on protecting water quality from stormwater impacts. They provide informational webinars, model plans, and resources for local governments. Please see the NCDEQ website link in Appendix A.

The Town of Chapel Hill has a user-friendly website containing its information and resources, including a stormwater pollution prevention plan. The Town requires that developers manage and control stormwater runoff rate, volume, pollutants, erosion, and sedimentation. Its plan also includes a risk assessment section, a BMP assessment section, a management schedule table, stormwater pollution prevention training instructions, and a spill prevention and response component in order to mitigate and manage the watershed system. Additionally, the website includes an education and outreach plan that offers school educational programs, litter cleanups, and volunteer stream monitoring. The Town of Chapel Hill website serves as an example for the Town and Mecklenburg County to partner to disseminate information to the public. The Town of Chapel Hill stormwater management website link in Appendix A has more information.

According to Davidson's Goal 2.2: Action 2.2.4 in its 2020 Comprehensive Plan, the Town can partner with Mecklenburg County to coordinate strategies and planning efforts in order to protect critical watersheds and other identified sensitive areas in Davidson. Three important objectives



of a stormwater management plan are to mitigate the impact of toxins on the environment; sustain clean water sources; and comply with federal, state, and local regulations.

## **6. Encourage and Install Rain Gardens**

Rain gardens are landscaped areas that assist with the filtration and drainage of stormwater. The garden beds are built at a shallow depth rather than a raised bed, with layers of soil, rock, and mulch that collect water flowing down from sloped terrain, rooftops, or paved surfaces. It is a sustainable and economical method that mimics how nature manages rainfall (McDowell, 2013). There are several benefits to creating and maintaining a rain garden. The planted filter bed substrate (layers of rock, mulch, and soil) facilitates stormwater nutrient and pollutant remediation. Rain gardens decrease dependence on conventional drainage systems, reducing landscape excavation and external piping costs. A rain garden can provide food and cover for birds and other wildlife. It encourages the planting of native plant species, which tend to thrive in rain gardens. A rain garden is also aesthetically pleasing and serves as an excellent dual-function approach to the Town's beautification.

Anna Mirandi from the National League of Cities recommended implementing a rain garden program to assist with climate-based challenges such as frequent heavy rain events. The program could be as simple as including rain garden information and external links on the Town's sustainability website and encouraging citizens to submit photos of their rain gardens for residents to see local examples. When Town residents see or hear about other residents taking sustainability actions, they are encouraged to follow suit or try similar sustainability projects.

Chapel Hill includes rain garden information and a brochure on its Town website that Davidson can follow. Its rain garden webpage contains building instructions, distinctions between rain gardens and bioretention basin, North Carolina native plant information, and rain garden resource links. A link to Chapel Hill's rain gardens webpage and brochure can be found in Appendix A. Mecklenburg County also provides a cost-share program to help land users address existing erosion and other non-point source water pollution issues. They also provide a one-page rain garden guide. Information about their program and guide is in Appendix A.

Davidson can encourage the creation of rain gardens by providing information about how to build and maintain rain gardens on its website and perhaps include a brochure. The Town can also build examples of rain gardens in areas of the Town where excessive rain runoff occurs. These would also serve as useful examples for citizens.

## **7. Utilize Permeable Pavement Technologies**

Permeable (or porous) pavement technology enables water to seep through the pavement and into the ground rather than flow into the municipal storm drains and sewers. Other types of permeable surfaces include groove-stone pavers, turf-stone pavers, bricks, and crushed rock, which allow water to run between the sections of the path. Conventional street pavement creates externalities like surface water runoff, heat island effects, and pollutant drainage into water systems (Zhou, et.al., 2018). According to UNC Chapel Hill, porous pavement allows water to drain through (rather than completely run off) due to its coarse structure (UNC, 2020). Allowing



stormwater to naturally infiltrate the soil reduces the risk of flooding, pollution, and land erosion.

Using porous pavement surfaces can provide a stable, environmentally friendly, and low-impact environment for parking lots, greenways, and walkways. Permeable pavement surfaces reduce the amount of soil nutrients like phosphorus and nitrogen from running off into waterways. The inclusion of foliage around or near the permeable surface area can also increase carbon storage. Permeable surfaces reduce the risk of flooding in localized areas by reducing the water runoff yield by allowing more water into the ground (Zhou, et.al., 2018).

The University of North Carolina at Chapel Hill has implemented permeable pavement extensively in its parking lots. Clay soil underneath porous parking lot surfaces retains rainwater, restricting the flow of pollutants from the UNC campus to Jordan Lake (UNC-CH, 2020). This can serve as a useful example for Davidson to follow, given that it sits adjacent to Lake Norman, a body of water it wishes to protect. Also, UNC Charlotte's Department of Civil and Environmental Engineering may be able to provide analysis and best method approaches for using varied permeable technologies. The Civil and Environmental Engineering Department has the Infrastructure, Design, Environment and Sustainability (IDEAS) Center. The IDEAS Center offers research expertise in pavement materials. A link to UNC Charlotte's IDEAS webpage with technology contacts information can be found in Appendix A.

American Trails is a nonprofit organization working to support and provide information regarding all trail interests. Its website contains information regarding sustainable trail development and provides a Sustainable Trails Development Guidelines document. A link to their guide is provided in Appendix A. This downloadable guide provides information about how to design, build, and maintain paths and trails for different terrains and climate areas while using sustainable materials to mitigate floods and toxins. These guidelines, combined with the permeable pavement technology previously discussed, can be utilized by the Town in its nature trails and paths.

Davidson's 2020 Comprehensive Plan includes Goal 2.3: Policy 2.3.5, which recommends that porous pavement or paving blocks be used in public projects. The MPA team recommends that the Town continue to encourage such practices by placing stipulations in an updated planning ordinance that requires the use of permeable surfaces in place of concrete and asphalt where possible. The Town should also strive to use permeable pavement technologies when it constructs and resurfaces its own parking lots, sidewalks, and greenways. The Town could promote permeable pavement further by providing information about porous technologies and their benefits on its website. Doing so would encourage local citizens and developers to utilize these technologies.



## LAND – Enhance Beneficial Use

Thoughtful land development protects and utilizes land areas and structures to enhance sustainability. The goal of sustainable land use is to reduce harmful emissions, create new opportunities for residents in underserved neighborhoods, and create beneficial uses of existing resources. In response to Executive Order 80 and the Town of Davidson’s 2020 Comprehensive Plan, the MPA team recommends four sustainability strategies for land: create a town composting program, create additional community gardens that are accessible to Town citizens, explore green development options on Town buildings, and implement the current comprehensive plan and tree initiatives. The details of these strategies are discussed below.

### 8. Create a Town Composting Program

Composting transforms raw organic waste materials, such as food and yard waste, into biologically stable and humic substances that make excellent soil amendments (Cooperband, 2002). Compost is easier to handle than manure and other raw organic materials. Compost also stores well and is odor-free. When implemented locally, composting supports community participation, educational opportunities, and environmental sustainability. When residents throw food waste into a normal trash can, waste management takes it to the landfill, where it releases a greenhouse gas called methane, which is 72 times more potent than carbon dioxide (Muller, 2011). In Governor Cooper’s Executive Order 80 included a State-wide target of reducing greenhouse gas emissions. Keeping compostable items out of trash cans not only frees up space in landfills but also reduces carbon and methane emissions released when organic materials break down.



Composting can improve soil structure and nutrient content, which reduces the need for chemical fertilizers (EPA.gov). Composting can also be an affordable option when the Town partners with the community. The Town can create a start-up program by partnering with local compost processors and pick-up or drop-off services. The ideal scenario would be to shift to an in-town processing facility. This may be slow to begin town-wide but may gain traction through voluntary community efforts and a small pilot program.



The City of Raleigh has created a successful composting program. An important best practice is drop off locations where residents can bring their waste to convenience centers. These may involve creating an online map showing various locations within an area or zip code, where residents may drop off their food waste. Raleigh also offers compost bins at a discounted cost.



Discounted compost bins are an excellent option for residents who are concerned with pest infiltration. Residents concerned about the space open-pile compost occupies in their backyard can also benefit from compost bins as they require less space. The Town of Bowling Green, Kentucky, processes more than 0.5 million cubic feet of compost each year. This produces humus that is sold for \$5 per cubic yard while saving \$200,000 annually in disposal costs and landfill space.

A local interviewee indicated to the MPA team that composting could be a potential focus area as Davidson has already created an educational program about composting. Davidson College has an active composting system that can also serve as a blueprint. The college's composting initiative can further Policy 4.4.1: Collaborate with Davidson College, as the partnership would be based on a mutually beneficial project. By working with the Town, the college can provide extra-credit incentives to students for composting initiatives outside the college.

Additionally, the Town should become a part of a larger and more comprehensive initiative to educate residents about the importance of reducing the amount of waste that goes to landfills. For example, the International Compost Awareness Week (ICAW) includes activities for schools, local governments, and businesses nationwide. See Appendix A for information about ICAW. Through the proper use of education and awareness, the Town could create a successful composting program that includes compost convenience centers and discounted compost bins for local businesses, citizens, and other organizations.

## 9. *Create Additional Community Gardens that are Accessible to Town Population*

A community garden is a single piece of land maintained by a group of volunteers. Nonprofit organizations often operate them as a strategy for community development and social and educational programs. Community gardens are an inexpensive way for cities to mitigate food and green space disparities and recapture unused land for beautification. A neglected vacant lot can be transformed into a garden where people of all ages can grow food together and strengthen community ties (Hanna & Oh, 2000).

Expanding community gardens can also open venues to educate residents and improve neighborhoods. This can promote social change at the community level since residents work together for a common purpose. Community gardens provide residents of underserved communities the opportunity to grow their fruits and vegetables, increasing access and





affordability. The need to access healthy foods, fresh air, and physical activity creates a focal point for all neighbors to meet and interact. Residents of all ages can contribute and benefit from the process and produce of community gardens (American Public Gardens Association, 2018). Both community and government efforts are essential for community gardening. Partnerships with nonprofits and residents who already have an interest in community gardening can facilitate best management practices. Similarly, barriers such as liability expenses, code restrictions, and a lack of resources can be overcome with local government engagement. (Local Government Commission, 2009).

Community gardens provide educational opportunities for children. In San Diego, California, the MPA team found that the teachers at Rosa Parks Elementary School use the school's community garden to take students outside the classroom and offer interactive instruction on health and nutrition, science, mathematics, ecology, and agriculture.

There are two community gardens in Davidson currently, one at the St. Albans neighborhood and another near Potts Road. Currently, there are only three areas downtown that do not allow community gardens. The MPA team recommends that the Town reevaluate its zoning ordinance in these areas to accommodate community gardens, as the downtown area is popular for grocery stores, restaurants, and shopping centers. Downtown residents who want to grow and enjoy their own healthy vegetables can benefit from downtown gardens as well as foster a sense of community. Zoning strategies are essential because underserved neighborhoods have less access to supermarkets, leaving fast-food as their primary food source. Purchasing fresh fruits and vegetables may be financially prohibitive for low-income families.

Policy 2.2.2 of Davidson's 2020 Comprehensive Plan, to integrate green space throughout the built environment, is premised on the importance of enhancing urban green space to protect human health and meaningful agricultural uses. The MPA team suggests that the Town identify sites available for community gardening, especially in lower income areas, provide information about how to organize and establish community gardens on its website, create zoning ordinances favorable to downtown community gardens, and work with local schools to teach students about gardening.

## **10. Explore Green Development Options on New Town Buildings**

Green roofs and solar panels are both efficient uses of space and can even create additional green space. To better explain the importance of green developments to sustainable land-use policies, the MPA team assessed the practicality of green roofs and solar panel installations at the local level.

### *Green Roofs*

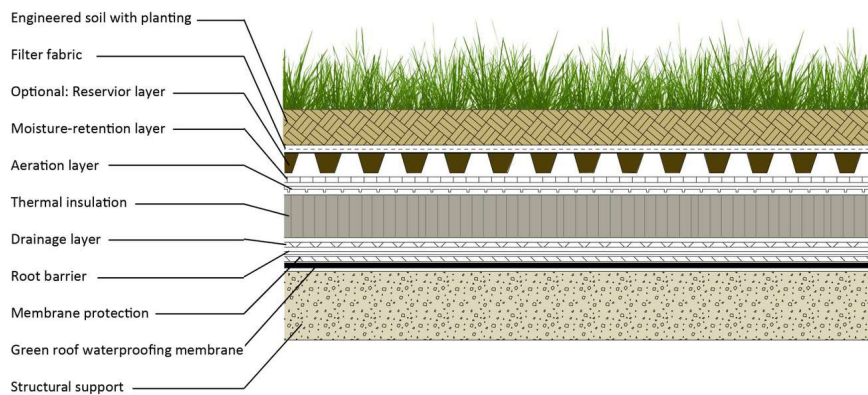
A green roof is a roof covered in vegetation that can improve city landscapes, reduce pollution, aid in stormwater retention, and increase roof life expectancy (Zhou et.al., 2018). The European Commission (2012) reported that green roofs could reduce the amount of water that reaches sewage systems during heavy rainfall because they can reduce flooding and erosion. Green roof

## Town of Davidson Sustainability Analysis



systems would further North Carolina's Executive Order 80 in reducing greenhouse gas emissions. This is because green roofs provide an insulatory effect on the building. Which reduces greenhouse emissions from fossil fuel combustion that is associated with heating, ventilation, and air conditioning (HVAC) equipment (Nation Parks Service, n.d). Over time, seasonal heating and cooling effects from green roofs can reduce the annual energy usage of HVAC systems.

To install an effective green roof system, Narigon (2013) suggests utilizing plants native to the local ecosystem as they have become accustomed to the local climate conditions. This is also the most cost-effective method because doing so requires less water, pesticides, and fertilizers to sustain the plants. Native plants also tend to have a lower purchase price. There are two types of green roofs, extensive and intensive. Extensive roofs require little maintenance and are typically used to increase local plant diversity. Soil depth is less than six inches for mass planting of small ground covers or wildflowers. Conversely, intensive green roofs are similar to backyard gardens and require routine maintenance. This type of roofing system generally requires additional structural support for buildings because it is designed to be used by people and may include features such as paved areas, benches, and ponds. The soil depth needs to be deeper than six inches in intensive roofs to allow for large plants and dramatic plant groupings (Narigon, 2013).



(architizer.com, n.d)

Currently, the Town of Davidson does not have green roof systems. However, Greenroofs.com, an international online portal for the green roof industry, currently collaborates with multiple networks to identify projects that contain over 14 million square feet of green roofs across the United States. While not sporting an example of a true green roof, Davidson College is recognized by the platform for its towering 40 foot high living wall in the entry atrium of the new E. Craig Wall Jr. Academic Center. The North Carolina Arboretum, a major attraction in Asheville, North Carolina, has also been recognized for its extensive green roof.

The MPA team found that the estimated cost of installing a green roof starts at \$10 per square foot for extensive roofs and \$25 per square foot for intensive roofs. Annual maintenance for



either type of roof can range from \$0.75 to \$1.50 per square foot (Greenroofs.com, n.d.). Although the cost of initially establishing a green roof is higher than a roof with conventional materials, building owners can offset the difference through reduced energy and stormwater management costs.

The MPA team recommends that the Town use resources such as Greenroofs.com to explore green roof development options for its properties. These recommendations reflect the foresight expressed in Policy 2.3.2 (promote innovative green building tools and approaches). The Greenroofs.com website features many innovative green roof examples from across the world that the Town could follow. The website also provides information regarding manufacturers and suppliers. Another option for the Town is to provide the Greenroofs.com link on its website in order to encourage private citizens and companies to consider green roofs on their properties.

#### *Solar Panels*

Solar energy has been a slow-growing movement for decades. Solar energy involves converting the sun's light into electrical energy. Rooftop panel installation is the most common method for producing solar power in urban areas. Solar energy generates the cleanest form of renewable energy, making it an effective way to reduce harmful emissions. Ultimately, solar panels contribute to sustainability by decreasing energy demands, reducing emissions, and streamlining the energy creation process to one source.

Solar panels also offer an attractive option for reducing energy costs for low-income citizens. Cities such as Washington, DC, San Francisco, and Chicago have undertaken pilot programs dedicated to providing affordable solar energy to low-income residents. The best example of this is Washington, DC, which created the Affordable Solar Program (ASP). The program installed approximately 300 solar system panels in affordable housing units (Paulos, 2017). The program met construction costs through tax credits, solar renewable energy credits, and fair rebates (Paulos, 2017). The ASP installed solar panels for free to eligible low-income households. In general, solar panels in Washington, DC, cost about \$24,000 for a 10-kW system. The 20-year savings on utility costs associated with solar energy in Washington, DC are over \$54,000 per household, with a general payback period of less than five years for the actual installation cost. ASP reported that the program outperformed expectations, and the impact should only increase with more awareness and resources devoted to sustainability initiatives.

Regionally, the City of Asheville and Buncombe County have begun working on a countywide project with the goal of installing solar power generating systems to 46 public buildings, including schools. The Town of Carrboro promotes solar panels through childhood education. On its website, there is a direct link to NC GreenPower, a nonprofit dedicated to funding and educating communities on energy conservation. Specifically, its goal is to support renewable energy, carbon offset projects, and offer grants for solar installations at K-12 schools. The organization also sponsors the Solar + Schools program, which provides up to \$27,000 toward school solar panel installation costs. It also designed a personalized school curriculum around sustainability, focusing on STEM courses and specialized teacher training. Within the curriculum, home energy efficiency kits are provided that focus on reducing energy consumption in households.



The City of Fayetteville introduced a community solar program in 2018, with the goals of producing energy cost savings and reducing greenhouse emissions. The City maximizes the use of its solar energy by storing excess power in a giant battery for later use (Bonner, 2019). The City's sustainability webpage reports that clean energy now accounts for 72% of the energy needs of City buildings, with a goal of 100% by 2030. The projected energy cost savings to the City is over \$160,000 per year. See Appendix A for more information.

The Town of Davidson promotes solar energy to its citizens through its website. The Town website offers two promotional videos for POWERHOME SOLAR through its Virtual Earth Day spotlight. Located in Concord and Mooresville, POWERHOME SOLAR's website offers valuable information on the benefits and financing options for solar panel installations.

Solar panels are an effective and economic way to produce clean energy. The Town should continue to promote solar energy on its website. The Town should consider adding resources to its site about the benefits of rooftop solar panels and North Carolina solar policies and incentives in order to encourage citizens and businesses to install solar panels on their properties. The Town should also consider providing solar options for lower income residents. Doing so would address one of the key objectives in its 2020 Comprehensive Plan, which is to create a more diverse and equitable community. This might be accomplished by collaborating with Duke Energy, Energy United, and regional nonprofits to educate community members on the impact of converting to solar energy.

### **11. Implement Current Comprehensive Plan and Tree Initiatives**

Davidson has recently adopted a new comprehensive plan and tree ordinance. These initiatives contain actions that are meant to have positive impacts on land development. Davidson community stakeholders identified land conservation as a top priority in the Town's Comprehensive Plan. According to page 28 of the Town's Comprehensive Plan, development pressures from rapid growth in the Charlotte region threaten unprotected forests and trees. According to the US Department of Agriculture (USDA), an urban tree canopy (UTC) refers to the layer of tree leaves, branches, and stems that provide tree coverage of the ground when viewed from above. A tree canopy is part of the Comprehensive Plan's Key Influence #3, and strong community support exists for this initiative. Chapter 9 in Davidson's Planning Ordinance contains the Town Tree Ordinance approved by the Board of Commissioners in November 2019. The Town's commitment led to the approval of a new position, the Town Arborist, to help implement the Tree Ordinance and serve as a resource for the Town and its residents. The



benefits of moving forward with tree initiatives include the conservation of open space for public access, providing aesthetic benefits, and improving social ties among neighborhoods.

The USDA states that using the Urban Tree Canopy Assessment toolkit allows scientists to qualify and quantify urban tree canopy benefits. The tools are used as a measure of the community’s tree canopy cover as a percentage of the total land area and sets a standard for tree canopy goals and measuring progress. Communities can use the five key steps to implementing a UTC project to assess their tree canopy progress. This helps determine their tree resources at various scales or by location, neighborhood, zoning, or land use (USDA.gov, n.d.). According to the Town Arborist, Peter Grisewood, Davidson is currently in the implementation phase (Step 4) of its tree canopy initiative and will be actively drafting a written document in 2021. Step 5, which follows implementation, is essential because communities can evaluate the initially mapped areas’ progress and changes over time. Experts recommend conducting a UTC assessment and analysis every five to eight years to identify tree canopy change, identify new priority areas, assess performance toward UTC goals, and adapt priorities to changing environmental and societal needs and municipal budgets

### FIVE KEY STEPS TO IMPLEMENTING A UTC PROJECT

1	<b>PROJECT PLANNING</b> Set clear goals and strategies for the UTC project.
2	<b>ASSESSMENT</b> Complete data collection and classification to obtain current UTC data.
3	<b>ANALYSIS</b> Integrate UTC data with stakeholder input and other datasets to answer questions about where to protect, plant, and manage trees for social, environmental, and economic benefits.
4	<b>IMPLEMENTATION</b> Develop a suite of products to share UTC information and help inform policies and planning.
5	<b>MONITORING AND EVALUATION</b> Implement short- and long-term monitoring to assess tree canopy change and progress in reaching goals.

(USDA.gov, n.d.).

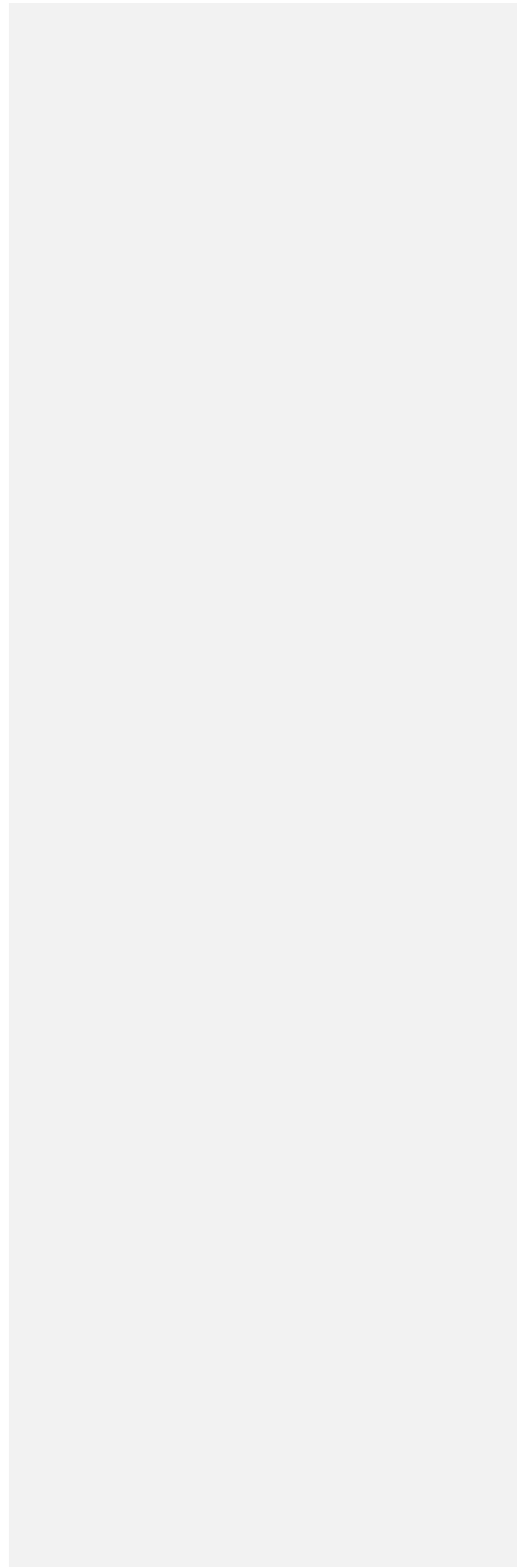
The Town of Davidson should move forward with its Current Comprehensive Plan and tree initiatives as several communities have recognized the importance of maintaining their tree canopies. Two jurisdictions in North Carolina, Durham and Carrboro, have each been designated as a Tree City USA community. Both municipalities have created departments dedicated to the pruning, planting, removal, and protection of trees (durhamnc.gov) (townofcarrboro.org). To become a Tree City, the Town must do the following: maintain a tree board or department, have a community tree ordinance, spend at least \$2 per capita on urban forestry, and celebrate Arbor Day (arborday.org). See Appendix A for Tree calculator link.

The MPA team suggests that the Town continue to implement the sustainability measures laid out in the 2020 Comprehensive Plan, many of which have been referred to in our research in support of the recommended strategies. The MPA team also recommends moving forward with the implementation of Action Item 2.2.2, which is to create a Tree Canopy Master Plan. In addition, the MPA team suggests incorporating the USDA’s Urban Tree Canopy Assessment

Town of Davidson Sustainability Analysis



Toolkit to the Tree Ordinance provisions to monitor changes and progress effectively. Davidson should continue to annually renew its membership as a Tree City USA, as it has for 10 years running. Doing so is a strong complement to its designation as a Bee City USA.





## COLLABORATION – Create Community Partnerships and Initiatives

One focus area the MPA team identified when interviewing benchmark towns was that collaboration between community residents, town employees, developers, and local business members was key to establishing successful sustainability programs. Civic engagement and collaboration efforts are at the root of sustainability efforts in Davidson. A primary benefit of collaboration, specific to sustainability efforts, is the cultivation of community support for environmentally sensitive, energy efficient, and cost-saving approaches to community living conditions. By leveraging community resources, Davidson can produce results that significantly educate and influence residents' efforts toward sustainability.

As described below, there are several methods for building a collaborative community. Each activity presents a unique opportunity to engage with the community in ways that drive the conversation of sustainability toward tangible solutions. To better facilitate civic engagement in Davidson, the MPA team recommends the following strategies: develop a sustainability webpage, explore additional partnership opportunities with Davidson College, and establish a community advisory board. Below the details of the strategies are explained, including the significance and benefits as they relate to Davidson.

### 12. Develop a Sustainability Webpage

Sustainability webpages are digital platforms designed to inform people about issues specific to environmental responsibility. This platform facilitates the dissemination of knowledge that includes insight from environmental advocates, nonprofit organizations, homeowner associations, local authorities, university faculty, and the general public. The purpose of a webpage is to streamline information so that anyone can find information on sustainability on one platform instead of several places. The sustainability website is a means of branding sustainability initiatives accurately across the community.

The MPA team identified the Research Triangle and Davidson College as having high quality templates for a sustainability webpage. The Town of Chapel Hill's website (see Appendix A) showcases how residents can involve themselves in sustainability activities. Four significant questions that the website looks to answer on behalf of Chapel Hill residents are:

1. What can I do?
2. What is the Town doing?
3. How are we doing?
4. How can I get involved?

The website provides information about what citizens can do at home, at work, in the community, and other places. The website provides a link to a quarterly report on how the Town is performing in several areas. The site also offers detailed information on what the Town is



doing in the key areas of energy efficiency and conservation, transportation and mobility, water conservation and management, education and innovation, renewable energy, tree and natural area protection, and waste production and recycling.

The City of Raleigh's webpage heavily emphasizes education, with sections being grouped by service units. These service units include the following: climate action, sustainability education and events, sustainability initiatives, and sustainability reports and publications. There are peer-reviewed articles and reports within each service unit that help inform residents about current options for sustainability. See Appendix A for more information about Raleigh's website.

The City of Durham provides an in-depth webpage that focuses on actionable plans the City has enacted to meet their sustainability goals. One unique feature includes an accessible sustainability dashboard that organizes Durham's sustainability efforts by priorities and focus areas. Within each focus area on its sustainability dashboard, Durham lists an attention-grabbing objective statement, performance measures, relevant strategies, and status updates.

Davidson College also provides an informative section dedicated to sustainability on its website. The webpage highlights the college's sustainability efforts by describing sustainability goals, practical applications of its goals through volunteering and education, and a thorough description of its college farm. The Farm at Davidson cultivates naturally grown and sustainably harvested produce to be consumed by the Davidson College community. It provides the students, faculty, and staff with an abundance of fresh produce while educating them on environmentally conscious farming practices. See Appendix A for information on the College of Davidson's website.

The Town of Davidson does not have a webpage dedicated solely to sustainability issues. Its general website, however, does provide information about the benefits of driving electric vehicles, energy-saving best practices, and the Davidson Farmers Market. It would be useful to consolidate this information on a single site dedicated to sustainability. Additional information could be added to the site as well, particularly information about stormwater management, community gardens, solar energy, and composting. The Town should consider including information on what actions it specifically is taking as well as information about what things citizens and private organizations can do to make an impact.

### **13. Explore Additional Partnering with Davidson College**

The Town should explore other partnership opportunities with Davidson College. Partnerships allow for better coordination of activities, which maximizes the number of people that can be involved in sustainability initiatives. To find out more about the relationship between cities, schools, and sustainability efforts; Samantha Mosier developed a study in 2015 using survey data. Mosier identified the most popular collaborations among college towns as short-term partnerships with low-cost styles of interaction (Mosier & Ruxton, 2018). Partnerships between local governments and institutions of postsecondary education tend to result in high levels of satisfaction among the actors involved (Mosier & Ruxton, 2018).





Partnerships between universities and municipalities have proven to be a strong formula for success. For example, Chapel Hill implemented a fare-free transit program after receiving community input. Since its inception, ridership among residents has increased by 100%. Specifically, students, low-income residents, and the elderly benefit most from fare-free transit in Chapel Hill.

In 2018, Davidson College implemented a bike-share program using the vendor Mobike. Bikes were free to use during the pilot program, and Davidson College extended this trial beyond the initial timeline. After the initial free trial, users paid through an application for the time they used the bikes. This program ended shortly after the bikes required payment, due to individuals not wanting to pay for the service (Davidson College, n.d.).

The Town and Davidson College should consider collaborating in a bike share program. Demand for such a service has already been established, and together the Town and college may be able to offer a fare-free option. Another option for the Town is to partner with the college on student-led research into sustainability efforts. For example, the United States Department of Energy hosts a Solar in Your Community Challenge, which presents Davidson students with an opportunity to work on behalf of their community. This challenge encourages college students to create research findings that can be used to strengthen communities seeking a more sustainable living environment. By collaborating with Davidson College, the Town can facilitate a more tangible discussion about what student-led research is most compatible with Davidson's sustainability goals. With this collaborative interaction, both faculty and college leaders can join the Town's leadership team to identify research topics that best meet the needs of the greater Davidson community.

#### **14. Establish a Community Advisory Board**

A community advisory board is a group of citizens organized to provide feedback and advice to a governmental body on a particular issue. An effective board comprises a diverse group of stakeholders, including members from different income groups (Baldock et al. 2019). While there are many ways to organize a community advisory board, the most common way is to use a small group of volunteers that are interested in getting involved in the issues facing their community.

Ohmer et al. (2009) found that community boards that included residents from underserved neighborhoods are more likely to address beautification efforts, environmental sustainability, and crime reduction. The Town of Cary, North Carolina, has its Environmental Advisory Board, which meets monthly. Since 2013, Board members have reexamined their purpose every three years. The Board provides feedback and advice to the council on policies, ordinances, and administrative procedures regarding environmental protection and the conservation of energy and natural resources. This is a useful resource for local governments as boards can communicate thoughts and ideas between community members and local government officials. Cary's Town Board uploads an annual report on its website. This report consists of sustainability topics to keep all citizens engaged and increase their participation in Town initiatives, such as solid waste reduction and compost bin sales.

## Town of Davidson Sustainability Analysis



Other municipalities have taken great steps using environmental advisory boards. Asheville previously developed a 100% renewable energy initiative to reduce its emissions in an economically efficient and socially responsible way. The City intended to reduce municipal energy consumption and ensure that the concerns of historically marginalized communities were considered throughout the transition. The goal was implemented through the successful use of an environmental advisory board.

In conducting research for this project, the MPA team interviewed various stakeholders who could be involved in an advisory board. Members of this board may include the Town Arborist, the Natural Assets and Sustainability Coordinator, a representative from Davidson College, local industry leaders, a member of the Livability Board, and citizens with a vested interest in the topic. This strategy can further Policy 5.2.5, from the 2020 Comprehensive Plan, which is to engage the community. Following Davidson's efforts toward finding strategies to make Davidson more inclusive, the MPA team believes that a community advisory board that includes citizens from underserved and lower-income areas of the Town can also aid in these efforts.



## PRIORITIZATION

While all the recommended strategies are important, prioritizing the ones that have the greatest impact and deciding which should be addressed first will help ensure success. The MPA team has provided the Town with a prioritization methodology template to help the Town with implementation of strategies. The team would urge the Town to use this, or a similar methodology to validate the prioritization of the strategies.

To provide a sense of priority, The MPA team developed a ranking of the recommended strategies. Each of the strategies was evaluated against the following criteria:

- Assessed Impact – Degree of positive impact generated by the strategy
- Cost – Lifetime cost of strategy implementation
- Time – Amount of time required for initial implementation
- Relevance to Executive Order 80 - Alignment with the goals of Executive Order 80

The table below can serve as a template for the Town’s consideration of priorities. The table lists each strategy’s scores for the criteria, each strategy’s total score, and the priority ranking of the strategies based upon their final scores. In the event of a tie in score between two or more strategies, the MPA team assigned the strategies a priority ranking based on group consensus. Davidson should consider public opinion for similar tie breakers in their priority analysis.

Table 4 - Strategy Prioritization Ranking Template

Rank #	Strategy	Assessed Impact	Cost	Time	Relevance to Executive Order 80	Point Total
1	Implement Energy Efficient Standards for Construction and Renovations	High (3)	Low (3)	Medium (2)	Yes (1)	9
2	Explore Green Development Options on Town Buildings	High (3)	Medium (2)	Medium (2)	Yes (1)	8
3	Develop A Sustainability Webpage	Medium (2)	Low (3)	Low (3)	No (0)	8
4	Establish a Community Advisory Board	Medium (2)	Low (3)	Low (3)	No (0)	8
5	Encourage and Install Rain Gardens	Medium (2)	Low (3)	Low (3)	No (0)	8

Town of Davidson Sustainability Analysis



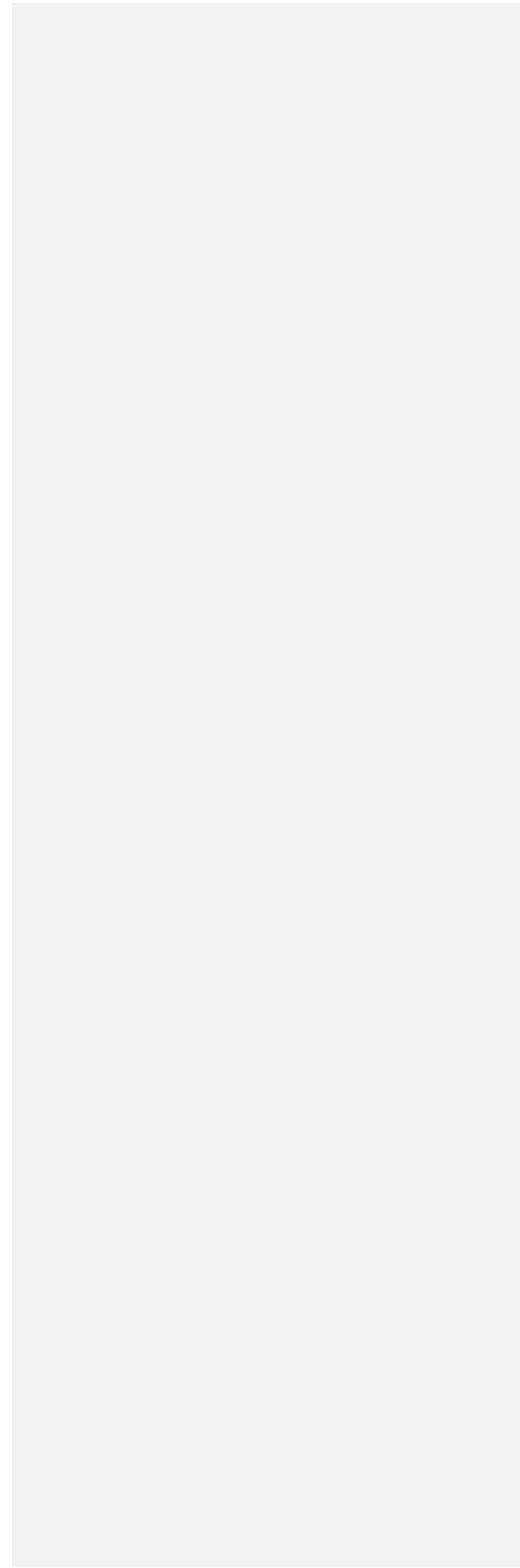
6	Implement Electric Vehicle (EV) Chargers	Medium (2)	Low (3)	Medium (2)	Yes (1)	8
7	Create Additional Community Gardens That Are Accessible to Town Population	Medium (2)	Low (3)	Medium (2)	No (0)	7
8	Invest in Idle Reduction Technology (IRT)	Medium (2)	Medium (2)	Medium (2)	Yes (1)	7
9	Create a Town Composting Program	High (3)	Medium (2)	Medium (2)	No (0)	7
10	Implement Current Comprehensive Plan and Tree Initiatives	High (3)	Medium (2)	Medium (2)	No (0)	7
11	Utilize Permeable Pavement Technology	High (3)	Medium (2)	Medium (2)	No (0)	7
12	Explore Additional Partnering with Davidson College	Low (1)	Low (3)	Medium (2)	No (0)	6
13	Partner with Mecklenburg County on Watershed Management	Low (1)	Medium (2)	Low (3)	No (0)	6
14	Create a Trolley Circular	Medium (2)	High (1)	High (1)	Yes (1)	5

While the method used above is one option to address prioritization, the Town of Davidson is not limited to this system. The Town may want to consider alternative or additional criteria such as public opinion. Lastly, the Town may need to also consider alternative prioritization methods if a

## Town of Davidson Sustainability Analysis



quick win is in the Town's greatest interest. For example, exploring additional partnering with Davidson College did not place high on the list above, but is the kind of low-hanging fruit Davidson might want to address initially in order to generate a quick win.





## KEY LESSONS LEARNED

In addition to the above recommendations and information, the MPA team found additional advice from other towns, cities, and organizations for Davidson in its pursuit of sustainability. The table below provides a summary of key suggestions and considerations that the interviewees offered for Davidson. While some of these excerpts did not directly tie into earlier sections of the report, the MPA team found these to be important lessons that Davidson can use in its sustainability efforts.

City/Town/Organization	Suggestions/Considerations for Davidson
Chapel Hill, North Carolina	<ul style="list-style-type: none"> <li>❖ Join the Southeast Sustainability Directors Network as it has been identified as helpful for idea sharing and applying for grants.</li> <li>❖ Establish broad goals and measures for which entities can be accountable. For example, have the department of public works be responsible for capturing and reporting sustainability measures around vehicles or buildings.</li> </ul>
NC Department of Environmental Quality	<ul style="list-style-type: none"> <li>❖ Use the NC Department of Environmental Quality as a resource to connect local governments with resources, such as:                             <ul style="list-style-type: none"> <li>➢ Grants, assistance on sustainability programs, access to a team of engineers and architects for project feasibility assessments, and access to advisors and experts in sustainability.</li> </ul> </li> </ul>
Greensburg, Kansas	<ul style="list-style-type: none"> <li>❖ Seek innovative funding methods in sustainability efforts, such as:                             <ul style="list-style-type: none"> <li>➢ Partner with local organizations to fund projects as Greensburg partnered with the recreation commission to fund its bike share program.</li> <li>➢ Reach out to Tesla for the installation of electric vehicle chargers.</li> </ul> </li> </ul>
Homer, Alaska	<ul style="list-style-type: none"> <li>❖ Use caution with trendy sustainability efforts as their popularity may rise and fall quickly and may not always be impactful.</li> <li>❖ Infuse sustainability in all decision-making.</li> <li>❖ A good sustainability plan is measurable, repeatable, and easy to understand.                             <ul style="list-style-type: none"> <li>➢ Plans overfocused in detail can often become ignored.</li> </ul> </li> </ul>

Town of Davidson Sustainability Analysis



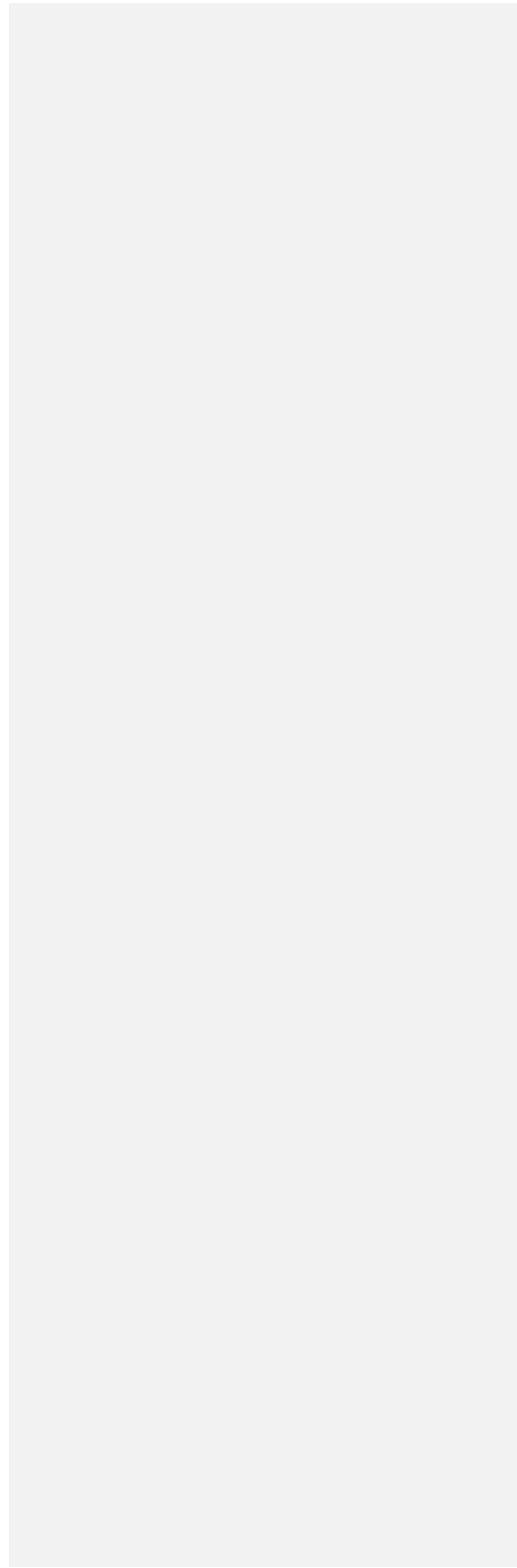
<p><b>Hurricane, Utah</b></p>	<ul style="list-style-type: none"> <li>❖ Do not be pressured into doing specifically what other cities or towns are doing.</li> <li>❖ Emphasize aligning with the town’s core values, because it is what makes the town unique and where the community wants to be.</li> <li>❖ Assess price and quality in efforts as some sustainability efforts cost more upfront but will reap more benefits over time.</li> <li>❖ For example, new Hurricane police stations being built during the pandemic had to be redesigned to increase ventilation, which was not a focus when the plans were drawn but has become a strong focus now. Although this is more expensive in the short-term, the benefits will outweigh the cost.</li> </ul>
<p><b>Juneau, Alaska</b></p>	<ul style="list-style-type: none"> <li>❖ Avoid a strict definition of sustainability. This can become a limitation in measuring success when it does not fit the definition exactly.</li> <li>❖ Focus on goals within reach and work to incrementally improve those areas over time, such as:             <ul style="list-style-type: none"> <li>➢ Retail gas footprint</li> <li>➢ Use of fossil fuels</li> <li>➢ Food security and fiscal sustainability</li> </ul> </li> </ul>
<p><b>National League of Cities</b></p>	<ul style="list-style-type: none"> <li>❖ Factor both sustainability and resilience. Sustainability focuses primarily on saving for the future while resilience focuses on designing in order to withstand physical, social, economic, or environmental shocks</li> <li>❖ Gain the support of the council to ensure that all understand the implications of implementation so that there is no surprise between the town creating the plan and what must be done to enforce the plan.</li> </ul>
<p><b>Oakridge, Oregon</b></p>	<ul style="list-style-type: none"> <li>❖ Emphasizes that sustainability can be implemented without a formalized plan.             <ul style="list-style-type: none"> <li>➢ Oakridge is an example as they do not have a formal sustainability plan. That does not prevent sustainability efforts as the city does use a recycling program to promote economic stability.</li> </ul> </li> </ul>

Town of Davidson Sustainability Analysis



Park City, Utah

- ❖ Communicate sustainability efforts to the public in terms of the economic impact instead of the highly technical measures to ensure understanding.
- ❖ Reach out to Park City with any questions. They are more than happy to help connect Davidson with peers in local government to help foster further understanding of any topic.







## SUMMARY AND CONCLUSION

The MPA team gathered information from benchmark municipalities across the United States, performed research on trends and practices, and interviewed local leaders to assess Davidson’s desire to implement environmental sustainability measures. The MPA team identified best practices and strategies for Davidson to implement to achieve the Town's sustainability goals from this research. Further, the MPA team identified a ranking system to identify top priority strategies toward timely and effective implementation.

Overall, the MPA team found that Davidson has taken preliminary steps toward identifying areas of improvement and sustainability goals that the Town wishes to meet concerning emerging trends. Though efforts have been taken within Davidson, the MPA team identified 14 strategies based on academic research and best practices in similar towns. A list of recommendations and priority strategies is listed below.

Table 1  
Identified Strategies

Focus	Strategies
 <b>Air</b> <i>Reduce Harmful Impacts on Air Quality</i>	1. IMPLEMENT ENERGY EFFICIENT STANDARDS FOR CONSTRUCTION AND RENOVATIONS ★ 2. CREATE A TROLLEY CIRCULAR 3. INVEST IN IDLE REDUCTION TECHNOLOGY (IRT) 4. IMPLEMENT ELECTRIC VEHICLE (EV) CHARGERS
 <b>Water</b> <i>Protect Water Resources</i>	5. PARTNER WITH MECKLENBURG COUNTY ON WATERSHED MANAGEMENT 6. ENCOURAGE AND INSTALL RAIN GARDENS ★ 7. UTILIZE PERMEABLE PAVEMENT TECHNOLOGIES
 <b>Land</b> <i>Enhance Beneficial Use</i>	8. CREATE A TOWN COMPOSTING PROGRAM 9. CREATE ADDITIONAL COMMUNITY GARDENS THAT ARE ACCESSIBLE TO TOWN POPULATION 10. EXPLORE GREEN DEVELOPMENT OPTIONS ON TOWN BUILDINGS ★ 11. IMPLEMENT CURRENT COMPREHENSIVE PLAN AND TREE INITIATIVES
 <b>Collaboration</b> <i>Create Community Partnerships and Initiatives</i>	12. DEVELOP A SUSTAINABILITY WEBPAGE ★ 13. EXPLORE ADDITIONAL PARTNERING WITH DAVIDSON COLLEGE 14. ESTABLISH A COMMUNITY ADVISORY BOARD ★

★ = Priority Strategy

The strategies provided in this report can aid in enhancing existing strategies and implementing new sustainability measures in the Town of Davidson. The MPA team commends the Town of Davidson for efficiently and effectively addressing the environmental sustainability concerns of the Town.

Commented [PG1]: did this get cut off? Is there more?



## ACKNOWLEDGEMENTS

The MPA would like to thank the following Davidson officials and residents for their time, assistance, and contributions:

- Jamie Justice- Town Manager
- Karen Whichard - Assistant Town Manager
- Charlene Minor - Natural Assets and Sustainability Coordinator
- Dave Cable - Livability Board Chair
- Matt Dellinger - Planning Board Chair
- Yancey Fouche - Director of Sustainability at Davidson College
- Nora Barger - Local Resident

Additionally, this report was made possible with the assistance of the following:

- Bryan Crutchen - City Administrator of Oakridge, Oregon
- John Richardson - Chapel Hill
- Terry Albrecht- Department of Environmental Quality
- Ken Castner - Mayor of Homer, Alaska
- Clark Fawcett – City Manager of Hurricane, Utah
- Rorie Watt - City Manager of Juneau, Alaska
- Luke Cartin - Environmental Sustainability Manager, Park City, Utah
- Stacey Barnes - City Manager of Greensburg, Kansas
- Anna Marandi – National League of Cities



## REFERENCES

- American Public Gardens Association. (2018). The Role of Public Gardens in American Urban Agriculture Programming. <https://www.publicgardens.org/resources/role-public-gardens-american-urban-agriculture-programming>
- Asheville Greenworks. (2020) Composting Information. <https://www.ashevillegreenworks.org/composting-information.html>
- Baldock, K. C., Goddard, M. A., Hicks, D. M., Kunin, W. E., Mitschunas, N., Morse, H., ... & Staniczenko, P. P. (2019). A Systems Approach Reveals Urban Pollinator Hotspots and Conservation Opportunities. *Nature Ecology & Evolution*, 3(3), 363-373.
- Baratto, F., & Diwekar, U. (2005). Life Cycle Assessment of Fuel Cell-Based APUs. *Journal of Power Sources*, 139(1), 188–196. <https://doi.org/10.1016/j.jpowsour.2004.07.025>
- Bauer, M., Möslle, P., & Schwarz, M. (2009). *Green Building: Guidebook for Sustainable Architecture*. In *Green Building*. Springer Berlin/Heidelberg.
- Benfield, F, Kaid. (2015, January 22, Updated 2015, March 24). Bringing Sustainability to Small-Town America. *HuffPost*. [https://www.huffpost.com/entry/bringing-sustainability-t\\_b\\_6519830](https://www.huffpost.com/entry/bringing-sustainability-t_b_6519830)
- Bonner, L. (2019, October 23). Solar energy without panels on your house: Fayetteville launches community solar. *The News & Observer*. <https://www.newsobserver.com/news/politics-government/article236561828.html>.
- Bradford, Abigail et al. (2019). Composting In America: A Path to Eliminate Waste, Revitalize Soil and Tackle Global Warming. U.S. PIRG Education Fund. Frontier Group. <https://uspig.org/sites/pirg/files/reports/USP%20Composting%20in%20America%20FINAL.pdf>
- Catawba Lands Conservancy (2020). <https://catawbalands.org/>
- Chapel Hill Transit - Fare Implementation Analysis (2012) <https://www.townofchapelhill.org/home/showdocument?id=29776>
- Cheshire, Kevin (2007). Market-Based Planning Tools: An Overview of TDRs and PDRs. [http://ncseagrant.ncsu.edu/ncseagrant\\_docs/coastallaw/pubs/cheshire.pdf](http://ncseagrant.ncsu.edu/ncseagrant_docs/coastallaw/pubs/cheshire.pdf)
- City of Durham, North Carolina. (2018). Roadmap to Sustainability. [https://issuu.com/cityofdurhamnc/docs/codurham\\_sustain\\_bro\\_web/1?e=33941847/63100281](https://issuu.com/cityofdurhamnc/docs/codurham_sustain_bro_web/1?e=33941847/63100281)
- City of Durham, North Carolina. (2020). Strategic Plan Initiatives Progress Highlights. <https://durhamnc.gov/DocumentCenter/View/29607/Strategic-Plan-Initiative-Progress-Highlights-English>
- City of Hurricane, Utah. (2020). Power Department. <http://www.cityofhurricane.com/categories/departments/power/>
- City of Ithaca, New York. (2020). Sustainable Ithaca. <https://www.cityofithaca.org/421/Sustainable-Ithaca>
- City of Northampton, Massachusetts. (2008). 2008 Sustainable Northampton Comprehensive Plan. <http://www.northamptonma.gov/DocumentCenter/View/838/SustainableNorthamptonPlan?bidId=>
- Cornell University. (2020). Cornell Climate Action Plan. Campus Sustainability Office. <https://sustainablecampus.cornell.edu/our-leadership/cap>
- Davidson College (n.d) <https://www.davidson.edu/about>



- Department of Environmental Conservation, State of Vermont. (2020). Vermont's Universal Recycling Law. State of Vermont. Agency of Natural Resources. <https://dec.vermont.gov/waste-management/solid/universal-recycling>
- Department of Environmental Conservation, State of Vermont. (2020). Universal Recycling Timeline. State of Vermont. Agency of Natural Resources. [https://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/Universal-Recycling/Timeline-factsheet\\_CURRENT.pdf](https://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/Universal-Recycling/Timeline-factsheet_CURRENT.pdf)
- Energy Star. (2020). <https://www.energystar.gov/>
- Environmental Protection Agency, EPA (n.d). <https://www.epa.gov/>
- European Commission. (2012). The Multifunctionality of Green Infrastructure. Science for Environment Policy: In Depth Reports. Brussels., 1-36.
- Forsyth Community Gardening. (2020). <https://www.forsythcommunitygardening.com/Resources.aspx>
- Frey, H., Kuo, P., & Villa, C. (2009). Effects of Idle Reduction Technologies on Real World Fuel Use and Exhaust Emissions of Idling Long-Haul Trucks. *Environmental Science & Technology*, 43(17), 6875–6881. <https://doi.org/10.1021/es900186e>
- Grow NYC. (2018). Rainwater Harvesting Guide. [https://www.grownyc.org/files/osg/RainwaterManual\\_2018\\_FINAL\\_HighRes.pdf](https://www.grownyc.org/files/osg/RainwaterManual_2018_FINAL_HighRes.pdf)
- Hanna, A. K., & Oh, P. (2000). Rethinking Urban Poverty: a Look at Community Gardens. *Bulletin of Science, Technology & Society*, 20(3), 207-216.
- Historical Air Quality Data (n.d) Mecklenburg County. <https://www.mecknc.gov/LUESA/AirQuality/AirQualityData/Pages/default.aspx>
- HUI, D. (2006). Benefits and Potential Applications of Green Roof Systems in Hong Kong. Evaluation, 11, 12.
- Institute for Local Self Reliance. (2020). What is Community Composting. <https://ilsr.org/composting/what-is-community-composting/>
- Karen Karp & Partners. (2018). Unlocking the Potential of Charlottes Food Markets and Farmers Markets. [https://charlottenc.gov/HNS/CE/Documents/KKP\\_CharlotteFarmersMarketsFINAL.pdf](https://charlottenc.gov/HNS/CE/Documents/KKP_CharlotteFarmersMarketsFINAL.pdf)
- Kaza, N., Quercia, R., & Tian, C. (2013). Home Energy Efficiency and Mortgage Risks . Dept. Local Government Commission. (2020). Cultivating Community Gardens. <https://www.lgc.org/resource/community-gardens/>
- Michigan Technological University. (n.d.). [https://www.cee.mtu.edu/sustainable\\_engineering](https://www.cee.mtu.edu/sustainable_engineering)
- Mosier, S., & Ruxton, M. (2018). Sustainability University–Community Partnerships: Lessons for Practitioners and Scholars from Highly Sustainable Communities. *Environment and Planning C: Politics and Space*, 36(3), 479–495. <https://doi.org/10.1177/2399654417749593>
- Narigon, H. (2013). Green Roof Biodiversity in Design: Influence of Local and Contextual Attributes on Bird Usage.
- National Association of Home Builders. (2020). National Green Building Standard (NGBS) Certification. <https://www.nahb.org/advocacy/industry-issues/sustainability-and-green-building/sustainability-and-green-building/national-green-building-certification>
- National Park Service. (n.d.). Green Roof Benefits-Technical Preservation Services, <https://www.nps.gov/tps/sustainability/new-technology/green-roofs/benefits.htm>
- Northeast Recycling Council. (2020). <https://necr.org/>

## Town of Davidson Sustainability Analysis



- Ohmer, M. L., Meadowcroft, P., Freed, K., & Lewis, E. (2009). Community Gardening and Community Development: Individual, Social and Community Benefits of a Community Conservation Program. *Journal of Community Practice*, 17(4), 377-399.
- Palermo, Jill. (2017, June 1. Updated 2019, November 12) County Composting Facility Keeps Yard Waste Out of the Landfill, except in Prince William. *Prince William Times*. [https://www.princewilliamtimes.com/news/county-composting-facility-keeps-yard-waste-out-of-the-landfill-except-in-prince-william/article\\_ce7d7b31-c82f-588f-936a-0856419452af.html](https://www.princewilliamtimes.com/news/county-composting-facility-keeps-yard-waste-out-of-the-landfill-except-in-prince-william/article_ce7d7b31-c82f-588f-936a-0856419452af.html)
- Paulos, B. (2017). Bringing the Benefits of Solar Energy to Low-Income Consumers A Guide for States & Municipalities. Cesa.org. <https://www.cesa.org/wp-content/uploads/Bringing-the-Benefits-of-Solar-to-Low-Income-Consumers.pdf>.
- Ruegger, J., & Smith, R. E. (2012). Energy Efficiency Benchmarks for Housing: A Comparative Study of Energy Efficiency Benchmark Housing Systems. *International Journal of Technology, Knowledge & Society*, 8(1), 85–101.
- Saghapour, T., Moridpour, S., & Thompson, R. (2019). Sustainable Transport in Neighbourhoods: Effect of Accessibility on Walking and Bicycling. *Transportmetrica A: Transport Science*, 15(2), 849–871. <https://doi.org/10.1080/23249935.2018.1540502>
- Sanders, M., Parrish, K., & Earni, S. (2013). Savings to Sustainability: Application of a Novel Approach to Delivering a Sustainable Built Environment. *Journal of Architectural Engineering*, 19(3), 156–163.
- Sechilariu, M., Molines, N., Richard, G., Martell-Flores, H., Locment, F., & Baert, J. (2019). Electromobility Framework Study: Infrastructure and Urban Planning for EV Charging Station Empowered by PV-Based Microgrid. *IET Electrical Systems in Transportation*, 9(4), 176–185. <https://doi.org/10.1049/iet-est.2019.0032>
- Shancita, I., Masjuki, H., Kalam, M., Rizwanul Fattah, I., Rashed, M., & Rashedul, H. (2014). A Review on Idling Reduction Strategies to Improve Fuel Economy and Reduce Exhaust Emissions of Transport Vehicles. *Energy Conversion and Management*, 88, 794–807. <https://doi.org/10.1016/j.enconman.2014.09.036>
- Skowlund, Natalie. (2020, October 16). Featured: An Exploration of Davidson’s Composting System. *The Davidsonian*. <http://www.davidsonian.com/featured-an-exploration-of-davidsons-compost-system/>
- Speck, J. (2018). Walkable City Rules: 101 Steps to Making Better Places. In Walkable City Rules. Island Press. <https://doi.org/10.5822/978-1-61091-899-2>
- Town Facts: Davidson, NC - Official Website (2017). <https://www.ci.davidson.nc.us/>
- Town of Carrboro, North Carolina. (2017). 2017 Community Action Plan. <https://www.townofcarrboro.org/DocumentCenter/View/4116/Community-Climate-Action-Plan>
- Town of Carrboro, North Carolina. (2019). 2019 Carrboro Community Action Plan Update. <https://www.townofcarrboro.org/DocumentCenter/View/6704/ECPP-and-CCAP-Update-March-2019>
- Town of Davidson, North Carolina. (2020) 2020 Comprehensive Plan. <http://www.townofdavidson.org/340/Davidson-Comprehensive-Plan>
- Town of Davidson, North Carolina. (2020) 2020-2021 Strategic Plan. <http://townofdavidson.org/DocumentCenter/View/10419/Town-of-Davidson-Strategic-Plan-2020-21-Final>

## Town of Davidson Sustainability Analysis



- Transit Service: Davidson, NC - Official Website. (n.d.).  
<http://townofdavidson.org/1251/Transit-Service>
- U.S. Green Building Council. (2018). About. <https://plus.usgbc.org/about/>
- UNC Chapel Hill. (2020). Three Zeros Initiative. About. <https://threezeros.unc.edu/about/>
- UNC Charlotte. (2020). Composting. <https://facilities.uncc.edu/our-services/business-related-services/recycling/programs/composting>
- Urban Farm Collective. (2020). About. <http://www.urbanfarmcollective.com/about/index.html>
- US Census (2019). Town of Davidson QuickFacts.  
<https://www.census.gov/quickfacts/davidsontownnorthcarolina>
- Wilkinson, P. (2007). Electricity Generation and Health. *The Lancet.*, 370(9591), 979–990.  
[https://doi.org/10.1016/S0140-6736\(07\)61253-7](https://doi.org/10.1016/S0140-6736(07)61253-7)
- Zhou, L., Shen, G., Woodfin, T., Chen, T., & Song, K. (2018). Ecological and Economic Impacts of Green Roofs and Permeable Pavements at the City Level: The Case of Corvallis, Oregon. *Journal of Environmental Planning & Management*, 61(3), 430–450.



## Appendix A

### Air

- LEED Certification Information:
  - <https://www.usgbc.org/leed>
- NGBS Certification Information:
  - <https://www.nahb.org/advocacy/industry-issues/sustainability-and-green-building/sustainability-and-green-building/national-green-building-certification>
- ENERGY STAR Certification Information:
  - <https://www.energystar.gov/>
- AHSRAE 90.1 Standards:
  - <https://www.ashrae.org/technical-resources/bookstore/standard-90-1>
- Town of Carrboro 2017 Community Action Plan:
  - <https://www.townofcarrboro.org/DocumentCenter/View/4116/Community-Climate-Action-Plan>
- Town of Carrboro March 2019 CCAP Update:
  - <https://www.townofcarrboro.org/DocumentCenter/View/6704/ECPP-and-CCAP-Update-March-2019>
- City of Durham Roadmap to Sustainability:
  - [https://issuu.com/cityofdurhamnc/docs/codurham\\_sustain\\_bro\\_web/1?e=33941847/63100281](https://issuu.com/cityofdurhamnc/docs/codurham_sustain_bro_web/1?e=33941847/63100281)
- City of Durham Strategic Plan Update:
  - <https://durhamnc.gov/DocumentCenter/View/29607/Strategic-Plan-Initiative-Progress-Highlights-English>
- City of Northampton
  - 2008 Sustainable Northampton Comprehensive Plan
  - <http://www.northamptonma.gov/DocumentCenter/View/838/SustainableNorthamptonPlan?bidId=>
- City of Hurricane
  - Smart Energy Appliance Incentive Program
  - <http://www.cityofhurricane.com/categories/departments/power/>
- The U.S. Department of Energy Solar Energy Technologies Office (SETO):
  - SETO has developed online resources to help those who want to go solar or who work with solar energy:
  - <https://www.energy.gov/eere/solar/solar-information-resources>
- North Carolina Sustainable Energy Association (NCSEA):
  - The leading 501(c)(3) non-profit organization that drives public policy and market development for clean energy. Our work enables clean energy jobs, economic opportunities, and affordable energy options for North Carolinians.
  - <https://energync.org/solar/>
- The Tree Benefit Calculator:

## Town of Davidson Sustainability Analysis



- Allows anyone to make a simple estimation of the benefits individual street-side trees provide.
- <https://www.arborday.org/calculator/index.cfm>
- North Carolina Statute regarding Dedication of Right-of-Way with Density or Development Rights Transfer:
  - <http://farmlandinfo.org/state/north-carolina/>
- NC Department of Transportation EV charger implementation:
  - <https://www.ncdot.gov/initiatives-policies/environmental/climate-change/Documents/nc-zev-plan.pdf>
- NC Community Garden Partners (NCCGP):
  - An organization that has cultivated a network of gardeners and supporters who share support, information, and experience with new gardens and with each other. NCCGP is now a fiscally sponsored project of the Rural Advancement Foundation International (RAFI-USA), and is housed under their Come to the Table Program:
  - <https://www.nccgp.org/>

### Water

- Charlotte-Mecklenburg Storm Water Watershed Planning:
  - <https://charlottenc.gov/StormWater/SurfaceWaterQuality/Pages/WatershedPlanning.aspx>
- Town of Chapel Hill Storm Water Control Measures:
  - <https://www.townofchapelhill.org/government/departments-services/public-works/stormwater-management/construction-stormwater-regulations/stormwater-control-measures-scms>
- Davidson Lands Conservancy (DLC):
  - This organization is dedicated to preserving each element of the beautifully complex ecosystem that makes our area such a rare gem.
  - <https://davidsonlands.org/>
- American Trails:
  - This organization brings agencies, trail builders, advocates, and volunteers the latest in state-of-the-art information on all aspects of trails and greenways:
  - <https://www.americantrails.org/images/documents/Sustainable-Trail-Development-Guidelines.PDF>
- Sustainable Trail Development Guidelines:
  - Prepared by Richard Havel, Trails Planner for Town of Castle Rock, Parks and Recreation Department.
  - <https://www.americantrails.org/resources/sustainable-trail-development>
- Town of Chapel Hill Rain Gardens Information:
  - <https://www.townofchapelhill.org/government/departments-services/public-works/stormwater-management/flooding-drainage-report-a-problem/drainage-maintenance-homeowner-tips/rain-gardens>
- Town of Chapel Hill Rain Gardens Brochure:
  - <https://www.townofchapelhill.org/home/showpublisheddocument?id=9320>



## Town of Davidson Sustainability Analysis



- NC Department of Environmental Quality Stormwater Program:
  - [deq.nc.gov/SW](http://deq.nc.gov/SW)
- UNC Charlotte's Infrastructure, Design, Environment and Sustainability Center:
  - <https://ideas.uncc.edu/about-us/thematic-leaders>
- UNC Charlotte; IDEAS Center:
  - <https://ideas.uncc.edu/about-us/thematic-leaders>
- Mecklenburg County Rain Garden Cost Share Program:
  - <https://www.mecknc.gov/LUESA/WaterandLandResources/Conservation/Pages/UCSP.aspx>
- Mecklenburg County Rain Garden Guide:
  - <https://charlottenc.gov/StormWater/SurfaceWaterQuality/Documents/raingardens.pdf>

### Land

- Green Roof Industry Puts Down Roots In Downtown Durham:
  - Currently with over 1,700 Project files in their data base. The website allows users to browse projects from across the planet to inform and inspire you for your next living masterpiece:
  - <https://bsc.poole.ncsu.edu/news/green-roof-industry-puts-down-roots-in-downtown-durham/#:~:text=The%20benefits%20are%20real.,Peter%20Raabe%20at%20American%20Rivers.>
  - <https://www.greenroofs.com/>
- Solar Array Project in Fayetteville:
  - Description and explanation of cost savings and program goals specific to the community solar program in Fayetteville.
  - <https://www.fayetteville-ar.gov/3536/Solar-Array-Project>
- International Compost Awareness Week (ICAW):
  - The largest and most comprehensive education initiative of the compost industry. It is celebrated nationwide and in other countries each year during the first full week of May. Started in Canada in 1995, ICAW has continued to grow as more people, businesses, municipalities, schools and organizations are recognizing the importance of composting and the long-term benefits from organics recycling.
  - <https://www.compostfoundation.org/About/The-Foundation>
- U.S. Department of Agriculture: Urban Tree Canopy Assessment: A Community's Path to Understanding and Managing the Urban Forest:
  - This report provides an overview of the approaches, methods, and data sources used in UTC assessments, focusing on the initial steps of project planning, assessment, and analysis. The report also provides general guidelines for conducting UTC assessments and analysis to ensure useful, quality results that can be applied in management and decision-making efforts, and resources for planning and implementing the UTC assessment process. The report is designed to help personnel involved in urban natural resource planning move forward with UTC project planning and assessment.
  - [https://www.fs.usda.gov/sites/default/files/fs\\_media/fs\\_document/Urban%20Tree%20Canopy%20paper.pdf](https://www.fs.usda.gov/sites/default/files/fs_media/fs_document/Urban%20Tree%20Canopy%20paper.pdf)

## Town of Davidson Sustainability Analysis



- City of Boston Zoning Ordinance:
  - [https://library.municode.com/ma/boston/codes/redevelopment\\_authority?nodeId=ART33OPSPSU](https://library.municode.com/ma/boston/codes/redevelopment_authority?nodeId=ART33OPSPSU)
- Environmental Protection Agency Information About Rain Gardens:
  - <https://www.epa.gov/soakuptherain/soak-rain-rain-gardens>
- North Carolina Sea Grant:
  - Provides research, education and outreach opportunities relating to current issues affecting the North Carolina coast and its communities. As part of a national network of Sea Grant programs, we align our focus with national goals set by the National Sea Grant College Program.
  - <https://ncseagrant.ncsu.edu/program-areas/coastal-hazards/n-c-coastal-rivers-flood-mitigation/>
- Town of Chapel Hill Rain Garden Webpage:
  - <https://www.townofchapelhill.org/government/departments-services/public-works/stormwater-management/flooding-drainage-report-a-problem/drainage-maintenance-homeowner-tips/rain-gardens>.
- North Carolina Executive Order 80 from Governor Roy Cooper:
  - <https://governor.nc.gov/documents/executive-order-no-80-north-carolinas-commitment-address-climate-change-and-transition>
  - <https://files.nc.gov/ncdeq/EJ/May-22-2019--EO-80-Presentation---FINAL.pdf>

### Collaboration

- City of Raleigh Sustainability Page:
  - <https://raleighnc.gov/sustainability>
- Town of Chapel Hill Sustainability Page:
  - <https://www.sustainchapelhill.org/>



## Appendix B



**GERALD G. FOX MASTER OF PUBLIC ADMINISTRATION**  
College of Liberal Arts & Sciences

### **I. Introduction**

The Town of Davidson is a small college town located on Lake Norman in northern Mecklenburg County. The current population is approximately 13,000 (15% of the population consists of Davidson College students). The Town is home to major employers such as MSC Industrial Supply, Trane Technologies, Ingersoll-Rand, and Davidson College. Davidson has a median household income of \$128,000, and 74% of the population have earned bachelor's degrees. Davidson has been nationally designated as a Tree City USA, a Bee City, and a Walk and Bike Friendly Community.

The Town of Davidson has developed both strategic and comprehensive plans in order to set long-term goals for promoting the wellbeing of the community. Town leaders would like to add to these efforts by establishing a plan and setting goals regarding sustainability. To this end, the Town has requested students attending the Gerald G. Fox Master of Public Administration (MPA) program at the University of North Carolina at Charlotte to propose recommendations to facilitate sustainability efforts in accordance with the Town of Davidson's Strategic Plan. The MPA team will define what sustainability is, identify and explore benchmark municipalities and best practices, assess legal constraints, and make recommendations regarding sustainability strategies and goals.

### **II. Goals**

The primary goal of the UNC-Charlotte MPA team is to provide the Town of Davidson with recommendations towards environmental sustainability efforts in ways that meet the needs of the present population while building a strong future. Based on the Town's strategic plans, comprehensive plans, and Greenprint Natural Assets Inventory; the MPA team will provide project recommendations and best practices for the implementation of identified projects under the purview of the town.

### **III. Tasks**

- Identify and research sustainability efforts of municipalities comparable to the Town of Davidson
- Identify the current environmental initiatives of the Town of Davidson, i.e. energy efficiency, pollution, waste, etc.
- Identify North Carolina's environmental laws and regulations to ensure the Town of Davidson's initiatives are within its legal means
- Recommend achievable sustainability efforts for the Town of Davidson
- Develop findings and recommendations for the Town of Davidson
- Deliver a final report to the Town of Davidson

### **IV. Deliverables**

Town of Davidson Sustainability Analysis



- Scope of work September 29th, 2020
- List of proposed benchmark communities October 13th, 2020
- Draft report for review November 10th, 2020
- Final report TBD December 17th, 2020
- Presentation and hand-out TBD December 17th, 2020

V. Limitations

- The time allotted for the UNC-Charlotte MPA team to complete this project is limited to the Fall 2020 semester.
- Although the Town of Davidson's strategic plans focus on a variety of sustainability efforts, for the purpose of this research, the MPA Team will focus specifically on issues of environmental sustainability.
- The tentative dates provided in this scope of work are subject to change in accordance with requirements for the UNC-Charlotte MPA team.
- Legislation and regulations may restrict the types of environmental projects and implementation procedures that are permissible

VII. Signatures

By signing this document, signatories are agreeing that the content of the scope of work is acceptable as the direction for the project during the fall 2020 semester.



---

Town of Davidson



---

UNC Charlotte MPA Team Representative

10-1-2020

Date

9-25-2020

Date