



Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Meeting Agenda Town Council



Tuesday, February 8, 2022

7:00 PM

Remote Meeting-View Livestream or Cable TV

18

7:00-7:05

A. ROLL CALL

7:05-7:10

B. POETRY READING, RESOLUTIONS, PROCLAMATIONS, AND ACKNOWLEDGEMENTS

7:10-7:15

C. ANNOUNCEMENT OF UPCOMING MEETINGS

7:15-7:20

D. PUBLIC COMMENT

Comments are limited to three minutes per speaker.

7:20-7:25

E. CONSENT AGENDA

[22-49](#) Approval of December 14, 2021 Meeting Minutes

F. OTHER MATTERS

7:25-7:55

1. [22-46](#) Discussion and Adoption of a Strategy to use Town-Owned Land for Affordable Housing

PURPOSE: The purpose of this item is for the Town Council to discuss and consider adopting a strategy to use Town-owned land to create affordable housing.

Attachments: [Attachment A Resolution](#)
[Attachment B - Background Information](#)
[Attachment C - Affordable Housing Authority](#)
[Attachment D - Best Practices](#)
[Attachment E - Proposed Strategy](#)

7:55-8:40

2. [22-47](#) Energy and Climate Protection Plan and Community Climate Action Plan Implementation Update
- PURPOSE:** The purpose of this item is to update the Council on Energy and Climate Protection Plan and Community Climate Action Plan Implementation Efforts.
- Attachments:** [Attachment A - Resolution To Receive Update and Provide Comments on Draft Fleet Study Scope](#)
[Attachment B - CCAP and ECPP Implementation Update - February 2022](#)
[Attachment C - Draft Fleet Study Scope](#)
[Attachment D - Draft Carrboro Dietary Emissions Report](#)

G. MATTERS BY COUNCIL MEMBERS

- H. CLOSED SESSION 143-318.11 (A)(5) To establish, or to instruct the public body's staff or negotiating agents concerning the position to be taken by or on behalf of the public body in negotiating (i) the price and other material terms of a contract or proposed contract for the acquisition of real property by purchase, option, exchange, or lease; or (ii) the amount of compensation and other material terms of an employment contract or proposed employment contract.**



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Agenda Item Abstract

File Number:22-49

Agenda Date: 2/8/2022

File Type:Agendas

In Control: Board of Aldermen

Version: 1

Approval of December 14, 2021 Meeting Minutes



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Agenda Item Abstract

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TITLE:

Discussion and Adoption of a Strategy to use Town-Owned Land for Affordable Housing

PURPOSE: The purpose of this item is for the Town Council to discuss and consider adopting a strategy to use Town-owned land to create affordable housing.

DEPARTMENT: Housing and Community Services

CONTACT INFORMATION: Anne-Marie Vanaman, Management Specialist, amvanaman@carrboronc.gov <<mailto:amvanaman@carrboronc.gov>>; Rebecca Buzzard, Housing and Community Director, rbuzzard@carrboronc.gov <<mailto:rbuzzard@carrboronc.gov>>

INFORMATION: The proposed strategy document (Attachment E) for using town-owned land to develop affordable housing provides a process for town-owned land use that is centered in previous Town Council official action, the current affordable housing goals and strategies document, the draft comprehensive plan, and the Town's priorities of racial equity and climate action. It is also based on staff experience developing the Hill Street parcel, as well as the best practices of other municipalities who utilize public land to create affordable housing (Attachment D).

On [June 19, 2018](https://carrboro.legistar.com/LegislationDetail.aspx?ID=3508037&GUID=A87A3FE4-CEF1-4F97-820E-15272F88CE07&Options=&Search=>) <<https://carrboro.legistar.com/LegislationDetail.aspx?ID=3508037&GUID=A87A3FE4-CEF1-4F97-820E-15272F88CE07&Options=&Search=>>> the Town Council received a staff update on the potential use of town-owned land for developing affordable housing, which included an assessment of Town parcels to determine which ones would be suitable for development. Based on this assessment, the Town Council supported the use of three parcels that were identified as suitable for development to be used for affordable housing: Hill Street, Crest Street and Pathway Drive. Information about these parcels can be found in the background information document (Attachment B).

On November 17, 2021, the Affordable Housing Advisory Commission (AHAC) reviewed the draft strategy document and provided feedback. The AHAC noted the overall significance of proactively building affordable housing and that building on Town-owned land provides the opportunity for a community-driven development process, rooted in the Town's vision that there is a home for everyone in Carrboro.

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The AHAC recommended prioritizing housing for extremely low-income (30% AMI) households and elevating racial equity in affordable housing decisions, adding that Black households have been not only excluded from the private market, but are the most housing cost burdened. They also recommended extending RFP submission eligibility to private developers, rather than non-profit developers exclusively, if private developers can retain the desired affordability structure.

On January 19, 2022, the AHAC reviewed the revised draft, and supported moving forward with presenting the draft strategy document to Town Council in February 2022.

The Town's legal authority to undertake this work was confirmed on February 15, 2018, when the Town Council received a memo, Options for Developing Town Property for Affordable Housing, from the Town attorneys that concluded that the Town has the authority to use municipal-owned property to provide affordable housing in the community (Attachment C).

FISCAL & STAFF IMPACT: While anticipating the adoption of this strategy, the current Housing and Community Services budget has \$5,000 set aside for pre-development costs for town-owned property. Pending approval of the draft strategy, staff will request the estimated additional pre-development costs in the FY23 budget.

RECOMMENDATION: Staff recommends the Town Council receive the presentation, provide comments, and consider adopting the strategy (Attachment A) and implementation in spring FY22.

A RESOLUTION CREATING A PROCESS FOR THE USE OF
TOWN-OWNED LAND FOR AFFORDABLE HOUSING

WHEREAS, the Carrboro Town Council on June 17, 2014, approved the Affordable Housing Goals and Strategies, and approved updates to the document on March 3, 2015; and

WHEREAS, Goals 1.1 and 2.1 of the Town's Affordable Housing Goals and Strategies are to increase the number of permanently affordable homeownership and rental units respectively;

WHEREAS, the Town Council, on February 15, 2018, received a memo from the Town Attorneys, that affirmed the Town's authority to provide affordable housing within the community, and may do so utilizing Town-owned property; and

WHEREAS, the use of Town-owned land is another way in which the Town Council can advance its goal of increasing the stock of affordable housing within the Town and its planning jurisdiction; and

WHEREAS, the Affordable Housing Advisory Commission supported the use of Town-owned land to create affordable housing and the draft strategy detailing the process for using Town-owned land for this purpose;

NOW THEREFORE BE IT RESOLVED, the Carrboro Town Council approves the Town-owned Land Use Strategy and its process to create affordable housing (Attachment E).

NOW THEREFORE BE IT ALSO RESOLVED, the Carrboro Town Council provides the following comments and staff direction:

Adopted this 8th day of February, 2022.

BACKGROUND & FOUNDATION: USE OF TOWN-OWNED LAND FOR AFFORDABLE HOUSING

Alignment with Policies and Plans

Creating and preserving affordable housing in Carrboro addresses two of the Town's strategic priority areas: (1) encourage development that is compact, dense, and appeals to diverse lifestyles and incomes; (2) enhance and sustain the quality of life and place for everyone. However, the scarcity of buildable land, market development pressures, and high acquisition and construction costs, present a challenge to ensuring that the Town has an adequate and affordable supply of housing for all its residents.

Research conducted in 2020 for the Town's Comprehensive Plan found that, based on housing affordability versus demand for housing, there is a total affordability gap of 1,079 housing units, including 314 for-sale units and 765 rental units. (ACS, Esri and Freddie Mac Calculator)

The [draft Comprehensive Plan](#) outlines many strategies to address the lack of affordable housing. One strategy, frequently advocated by the Town's Affordable Housing Advisory Commission (AHAC), seeks to take advantage of land owned by the Town:

Strategy 3.4: Assist with acquisition of land for affordable housing. (Source: AHAC)

a) Identify existing Town-owned lands that can be conveyed to affordable housing developers (Source: AHAC). Review all Town-owned land not needed for public facilities to determine suitability for affordable housing and determine value of land in consideration of provision of public benefit.

This strategy is consistent with several of the Town's existing [Affordable Housing Goals and Strategies](#), which the Town Council adopted in June 2014 and updated in March 2015. For example:

3.5 Provide greater incentives for developers to include affordable housing in their projects

C. Evaluate the provision of public sector assistance for infrastructure in exchange for the provision of some percentage of affordable units (scaled).

Additionally, the use of public land for affordable housing provides the Town with opportunities to facilitate other Town priorities – racial equity and climate change – priorities also reflected in the draft Comprehensive Plan:

Goal 2. Increase number of rental units that are permanently affordable to very low-income households earning up to 60% of AMI with a particular focus on those earning less than 30% AMI and historically disadvantaged households.

Strategy 2.2: Create targeted rental programs for extremely low-income households (less than 30% AMI).

Likewise, Town-owned land is one strategy that can advance the Town’s Climate Action Plan and Energy and Climate Action Plan through:

Designing and retrofitting energy-efficient housing to reduce housing costs;

Locating housing in areas with high transit accessibility to provide transportation options and reduce auto-dependence, which can reduce total housing and transportation costs;

Increase energy and water conservation in new construction and rehabilitation to reduce costs to homeowners and renters.

Legal Authority

On February 15, 2018, Town elected officials received a memo (Attachment C), Options for Developing Town Property for Affordable Housing, from the Town attorneys that concluded:

Ultimately, the Town has significant authority to provide affordable housing within the community. The Town may do so by selling or leasing Town-owned property to for-profit or non-profit entities who will construct affordable housing units on the property, so long as the housing market and the available housing stock necessitate government action. It is also clear that the typical open bidding procedures are not required in these circumstances. Rather, the Town may engage in a “private sale” so long as any resulting sales agreements clearly express the public benefit to be provided, the projected budget, and the projected costs to the developer. In essence, it must be clear that any benefit conveyed to the developer—whether through a subsidy or reduction in sales price—does not exceed the value of the public benefit provided.

Identifying Potential Affordable Housing Sites

In 2015, staff, working with the Affordable Housing Task Force, comprised of 3 elected officials, a representative from the Planning and Transportation Advisory Boards and town staff, assessed 47 parcels of land owned by the Town of Carrboro by applying the below criteria. Parcels were immediately excluded if they fell into any of the following categories:

- Within a conservation easement
- Inside a Long-Term Interest Areas such as future utility development
- No water or sewer nearby
- Within 100-year floodplain
- Within dedicated right-of-way
- Parcel completely developed
- Inside Rural Buffer zoning

[On June 19, 2018](#), Town Council received a staff presentation on Town-owned land suitable for affordable housing and identified parcels on Crest and Hill Streets and Pathway Drive as the best suited for this use. Information about these three parcels can be found at the end of this attachment.

In 2020, the first, and smallest, of the three identified Town-owned parcels was explored for affordable housing development. The Jackson Center, through the Northside Neighborhood Initiative, and in partnership with the Compass Group, approached the Town about the possible development of small homes on the Hill Street parcel. Nonprofit developer, Pee Wee Homes, proposed to build three new units, supporting the Town's goal of increasing the number of rental units that are permanently affordable to households earning less than 60% of AMI. The Pee Wee Homes model is founded on creating housing for households earning less than 30% AMI, a very difficult demographic to serve.

On the recommendation of the AHAC, the Town has supported the project with funding from the Affordable Housing Special Revenue Fund and through the conveyance of the parcel to Pee Wee Homes. Staff regularly meet with Pee Wee Homes regarding the next steps for the project, including the processes for the zoning permit and conveyance of the property, which will include restrictions to guarantee permanent affordability.



Crest Street

PIN: 9778899390

Size: 1.08 acres

Value: \$308,928

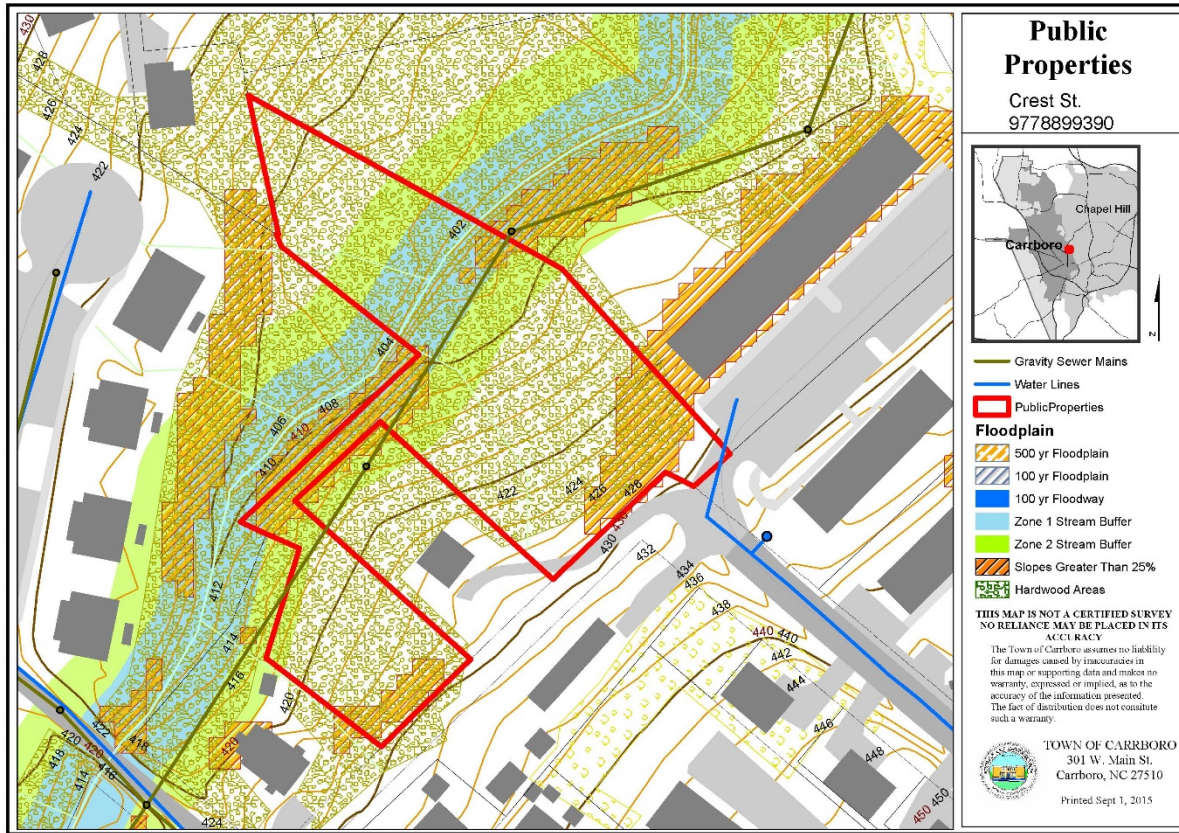
Zoning: R75



Known assets favorable to development	<ol style="list-style-type: none"> 1. All utilities are adjacent to the property 2. Most of the property does not contain significant slopes
Known issues that could potentially restrict development or add costs	<ol style="list-style-type: none"> 1. A property currently cuts off a large portion of the property, limiting density 2. Stream buffer towards the back of the property
Zoned density	6 units, 9 units with density bonus
Current uses	Open space
Future uses currently under consideration	Affordable housing
Transit	Approximately .4 miles to nearest bus stop
Relevant Notes	The Town of Chapel Hill conveyed the Crest Street property to the Town of Carrboro in 2003 for the use as affordable housing. The property was part of the Oakwood Public Housing complex before conveyance.



Map and Photograph of Property



View of site from Crest Street



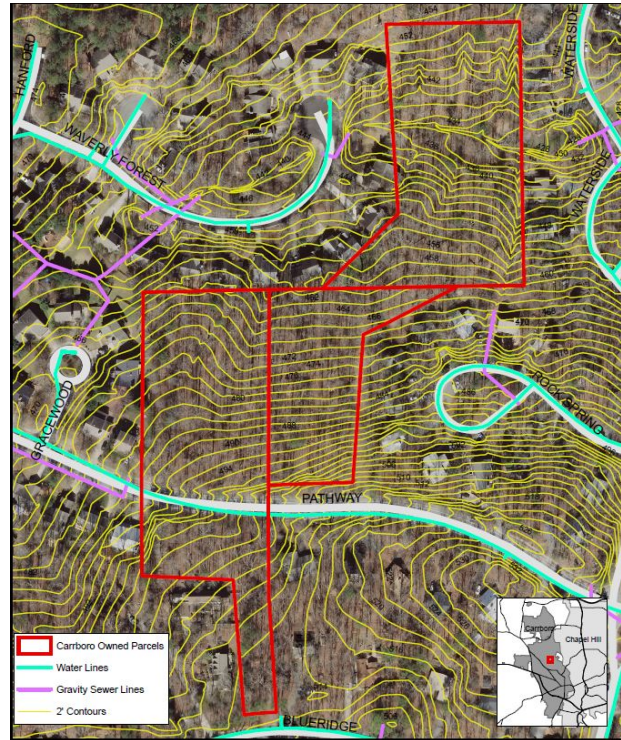
1814-1816 Pathway Drive

PIN: 9779427516, 9779429615, 9779531130

Size: 6.3 acres total

Value: \$261,728

Zoning: R15, RSIR, RSIR2



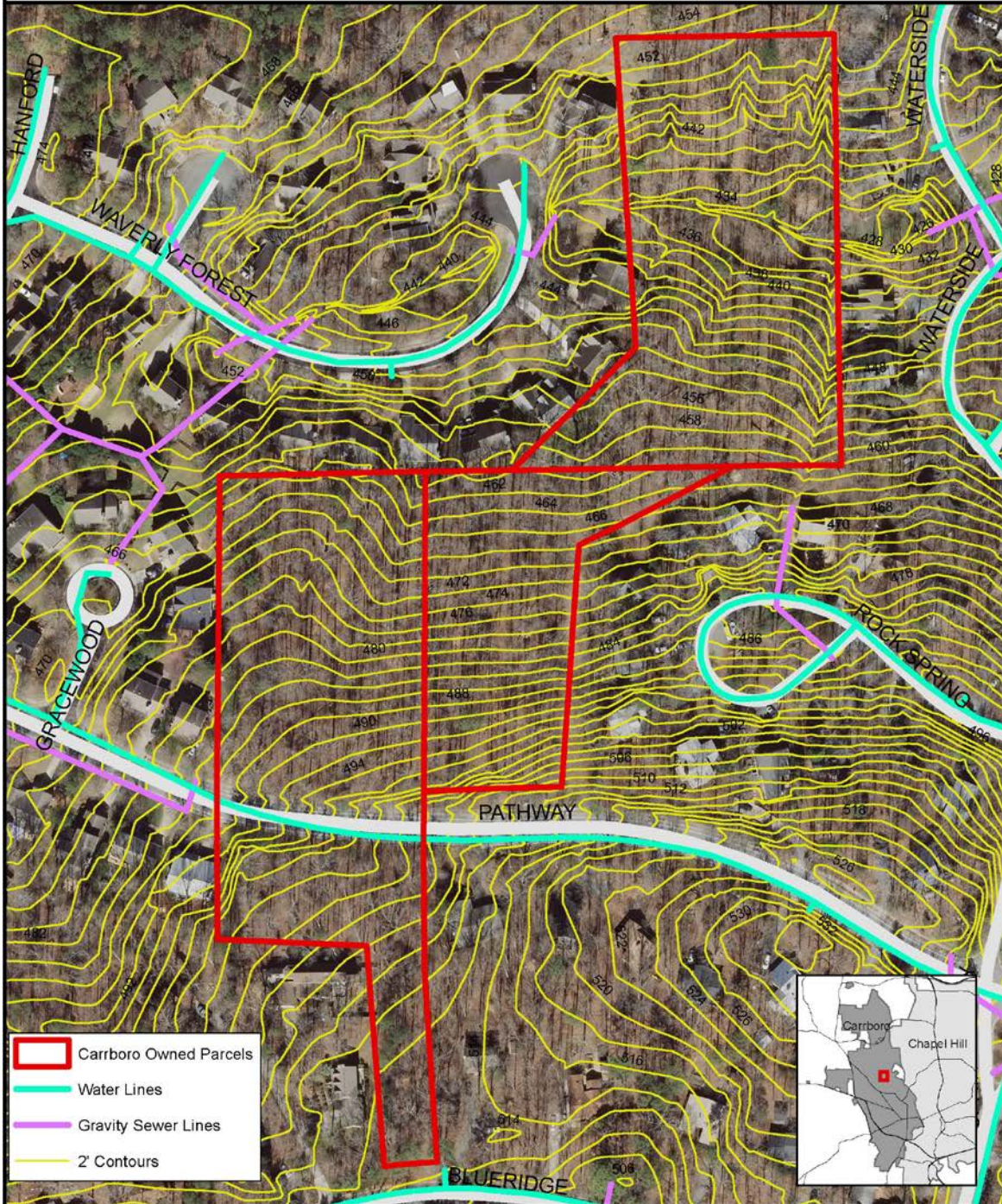
Known assets favorable to development	<ol style="list-style-type: none"> 1. All utilities are adjacent to the property 2. Few slope/grading issues 3. Stream buffers only located in the northern most property
Known issues that could potentially restrict development or add costs	<ol style="list-style-type: none"> 1. It is anticipated that an in-depth community engagement process would be conducted to assist in determining the scope of potential development on the parcels.
Zoned density	23 units collectively, 34 units with density bonus collectively
Current uses	Open space
Future uses currently under consideration	Affordable housing
Transit	Approximately .5 - .7 miles to nearest bus stop
Relevant Notes	The 2006 Recreation and Parks Comprehensive Master Plan states that, with the acquisition of MLK Park, none of the Pathway Drive parcels were needed to serve as recreation or park space.



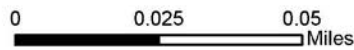
Map and Photographs of Property

Carrboro Owned Parcels, Pathway Drive

(9779427516, 9779429615, 9779531130)



TOWN OF CARRBORO
 301 W. Main St.
 Carrboro, NC 27510
 Zoran Stojakovic



Printed June 16, 2017



Street view near the center of the properties along the street



Street view on the western portion of the properties along the street



Street view from the eastern portion of the properties along the street



Street view of the portion of the site that crosses over the street



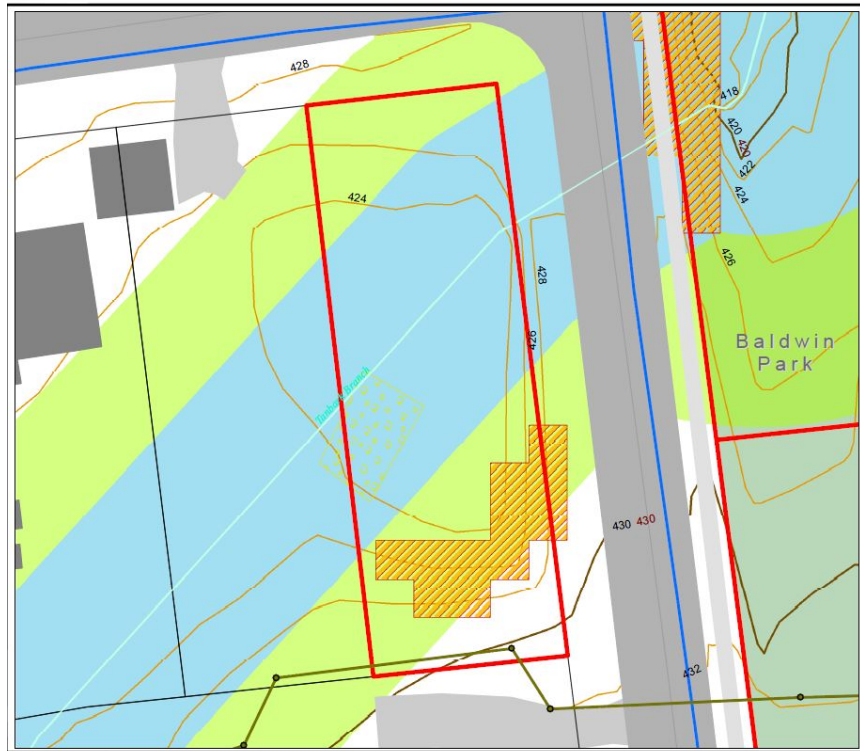
106 Hill Street

PIN: 9778975883

Size: .17 acres

Value: \$17,000

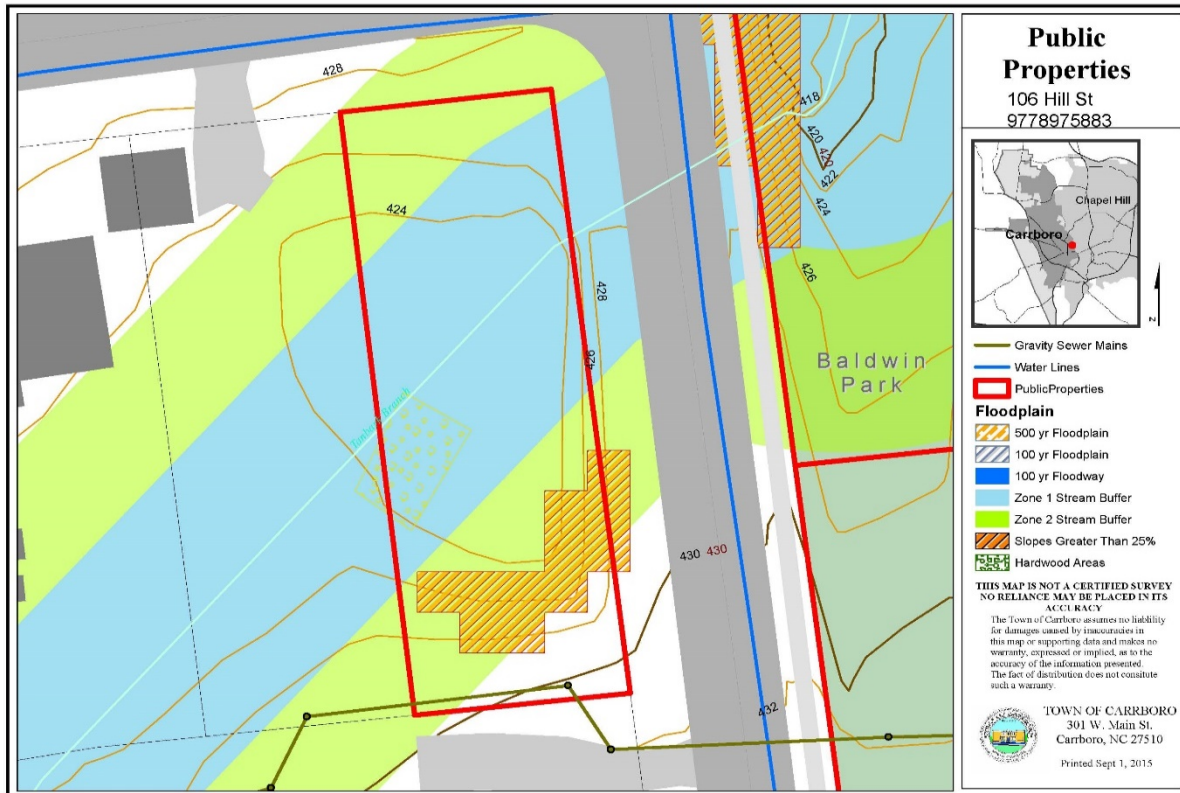
Zoning: R75



Known assets favorable to development	1. All utilities are adjacent to the property
Known issues that could potentially restrict development or add costs	1. Stream buffer runs through most of the property 2. OWASA easement on property 3. Duke Power easement on property 4. Would require a variance from the Board of Adjustment
Zoned density	1
Current uses	Open space
Future uses currently under consideration	Affordable housing
Transit	Approximately .4 miles to nearest bus stop
Relevant notes	Deeded to the Town in May 2006



Map and Photograph of Property



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View from near the corner of Lloyd St and Hill St

To: David Andrews

From: G. Nicholas Herman & Kevin R. Hornik

Date: February 15th, 2018

Re: Options for Developing Town Property for Affordable Housing

Mr. Andrews,

You have directed The Brough Law Firm, PLLC, on behalf of the Town of Carrboro (the “Town”), to research and outline the options available to the Town for developing affordable housing units on property owned by the Town. This Memorandum shall form the basis of the Town’s Affordable Housing Commission’s planning efforts with respect to how best to use Town property to provide affordable housing units for the community. The results of our research are outlined below.

North Carolina’s Housing Authorities Law (N.C. Gen. Stat. § 157-1, et seq.) authorizes local governments to create a “housing authority,” or a “public body and a body corporate and politic” vested with the power to undertake housing projects designed to provide housing for those with low or moderate income. However, N.C. Gen. Stat. § 157-4.1 authorizes city councils to either create a city-run “redevelopment commission... to exercise the powers, duties, and responsibilities of a housing authority” or to exercise those powers and duties itself. If the city council chooses to exercise those duties itself, it may assign the administration of those duties to any new or existing department of the city.

Local governments are authorized to engage in a number of different “housing projects” in an effort to provide affordable housing. This authority is detailed in N.C. Gen. Stat. § 157-1 through -70. The term “housing projects” covers a wide variety of activities related to the provision of affordable housing, including: planning for buildings or improvements related to affordable

housing, demolition of existing structures, construction, reconstruction, alteration, and repair of improvements, and any other work related to affordable housing. Of course, any fiscal involvement by the Town must meet the basic constitutional requirement that the expenditure of public funds be tied to some public purpose. However, a number of North Carolina Supreme Court Opinions clearly state that the provision of housing for persons and families with low income is a constitutionally-valid public purpose.¹

Generally, there are two categories of action available to the Town. The Town may engage in supply-oriented programs, which are designed to provide affordable housing options through affordable housing development projects either undertaken by the Town or subsidized by the Town. The Town may also engage in demand-oriented programs, which are designed to provide housing assistance funds to those seeking affordable housing. As the Town has already appropriated land in a number of subdivisions with the intention of providing affordable housing units to the community, our research efforts have focused primarily on the Town's supply-oriented authority.

Below, you will find an explanation of the Town's authority to use Town-owned land to provide affordable housing to persons of low to moderate income.

I. Authority to Finance Affordable Housing Projects

N.C. Gen. Stat. § 159-48(d)(7) very clearly authorizes city governments to borrow money and issue general obligation bonds to finance the development of affordable housing units. The statute specifically allows local governments to:

“[provide] housing projects for the benefit of persons of low income, or moderate income, or low and moderate income, including without limitation (i) construction or acquisition of

¹ See *In re Denial of Approval to Issue \$30,000,000.00 Single Family Housing Bonds and \$30,000,000.00 of Multi-Family Housing Bonds for Persons of Moderate Income*, 307 N.C. 52, 296 S.E.2d 281 (1982); *Martin v. North Carolina Housing Corp.*, 277 N.C. 29, 175 S.E.2d 665 (1970); *Wells v. Hous. Auth. Of City of Wilmington*, 213 N.C. 744, 197 S.E. 693 (1938).

projects to be owned by a city, redevelopment commission, or housing authority, and (ii) loans, grants, interest supplements and other programs of financial assistance to persons of low income, or moderate income, or low and moderate income, and developers of housing for persons of low income, moderate income, or low and moderate income. A housing project may provide housing for persons other than low or moderate income, as long as at least twenty percent (20%) of the units in the project are set aside for housing for the exclusive use of persons of low income. No rent subsidy may be paid from bond proceeds.”

This statute makes clear that the Town is authorized to develop affordable housing units, to be owned by the Town, or to provide financial assistance to those with low or moderate incomes, or to grant subsidies to developers who intend to provide housing for those with low or moderate incomes. The Town may finance these projects through the typical general obligation bond process, outlined in the Local Government Bond Act (N.C. Gen. Stat. § 159-43, et seq.).

II. Authority to Dispose of Public Property for the Provision of Affordable Housing

As a general rule, North Carolina local governments are required to dispose of public property through competitive bidding procedures—i.e., sealed bids (per G.S. 160A-268), upset bids (G.S. 160A-269), or public auctions (G.S. 160A-270). Further, local governments may not place conditions on the sale of public property that will depress the value of the property. However, one key exception to these general rules deals with local government authority to dispose of public property for the creation of affordable housing stock.

In cases where public property is sold to ensure the availability of safe, decent, and affordable housing for persons of low to moderate income, local governments may use “private sale” procedures to convey public property to the buyer of its choice, without undergoing the public bidding process.²

It is important to note, however, that under no circumstances may a local government convey property for less than it is worth. Article I, Section 32 of the North Carolina Constitution

² N.C. Gen. Stat. § 160A-279 and N.C. Gen. Stat. § 160A-267

prohibits the conveyance of “exclusive emoluments”—i.e., gifts of money, property, or privilege from the government—without some commensurate value in return. Where public property is being conveyed at less than market value, the local government must receive some valuable public service in return for any subsidy the government provides.

It is also worth noting that the North Carolina Constitution authorizes local governments to spend money “for public purposes only.”³ The North Carolina Supreme Court has determined that the expenditure of public money to provide affordable housing stock serves a “public purpose” when it is necessary—i.e., when decent affordable housing is “not otherwise available” to persons of low to moderate income.⁴ This is significant in that it requires a showing that private enterprise has not provided adequate housing on its own.

Because the conveyance of public property for less than fair market value is equivalent to an expenditure of public funds for the benefit of the recipient, the public purpose for the conveyance must be clearly articulated. This may be managed by demonstrating the lack of affordable housing stock for persons of low to moderate income in the community, and a description of how the local government’s financial support will benefit those with low to moderate incomes. Generally, this should be accompanied by a clearly defined budget and projected costs, as any public money expended in excess of what is necessary to provide the stated public benefit will be considered an unconstitutional exclusive emolument or gift to the developer.

Additionally, it is wise to require specific performance guarantees from the recipient. This can be accomplished by drafting a clear written agreement between the local government and the recipient, detailing, among other things: how many affordable housing units will be provided, any eligibility criteria for households to purchase or rent the affordable housing units, the affordability

³ Article V, Section 2(1) of the North Carolina Constitution

⁴ *Martin v. North Carolina Housing Corporation*, 277 N.C. 29, 50 (1970).

level of housing units as a percentage of household income, timing and phasing of the development and construction of affordable housing units, the process for certification of eligible households and the process for transfer from one eligible owner or tenant to another, and the period for which affordable housing must be provided on the property and whether the property will be returned to the local government at the end of that period.

Another common method for ensuring the provision of affordable housing following the conveyance of public property is through the inclusion of restrictions on the deed, which may also include a reverter clause. Such restrictions would prohibit the property from being used for any purpose other than the provision of affordable housing. A reverter clause would ensure that if, at any time, the property ceases to be used for affordable housing or otherwise violates the deed restrictions or other written agreements between the recipient and the local government to provide affordable housing on the property, ownership of the property will revert back to the local government.

In addition, local governments must clearly identify statutory authority to convey public property for affordable housing. There are a number of statutes which provide this authority, varying depending on what type of local government unit is making the conveyance (municipality or county), the recipient of the property (for-profit or non-profit), and the type of conveyance made (sale or lease). The following will briefly detail the statutory authority for municipal governments to sell or lease public property to for-profit and non-profit entities for the provision of affordable housing units.

A. Sale to Non-Profit Entities

Pursuant to N.C. Gen. Stat. § 160A-279, whenever a local government is authorized to appropriate funds to non-profit entities carrying out a public purpose, the local government is also

authorized to convey public property by “private sale” to that entity. Private sales allow local governments to choose their preferred buyer, as opposed to entering into a competitive bidding process. Private sales must be conducted according to the procedures outlined in N.C. Gen. Stat. § 160A-267 and, as described above, the local government must attach “covenants or conditions” to the conveyance to ensure that the property will be put to public use.

Municipalities are specifically authorized to make appropriations for affordable housing under the Housing Authorities Law⁵ and N.C. Gen. Stat. § 160A-465(b), which states that: “[a]ny city council may exercise directly those powers granted by law to...municipal housing authorities, and may do so whether or not a...housing authority is in existence in such city.” Therefore, since cities are authorized to exercise the powers of a housing authority and to make appropriations for the provision of affordable housing pursuant to that authority, N.C. Gen. Stat. § 160A-279 permits municipalities to convey public property by private sale to non-profit entities that covenant or agree to use the property and any associated subsidies to provide affordable housing for persons of low to moderate income.

B. Sale to For-Profit Entities

The provisions of N.C. Gen. Stat. § 160A-279, described above, which allow local governments to convey property to non-profit entities, do not apply to conveyances to for-profit entities. However, Pursuant to N.C. Gen. Stat. § 157-9, housing authorities are generally exempt from property disposition regulations. The statute specifically states that “[n]o provisions with respect to the acquisition, operation or disposition of property by other public bodies shall be applicable to a[] [housing] authority unless the legislature shall specifically so state.”

⁵ N.C. Gen. Stat. Chapter 157

As a result, when a municipality properly assumes the role of housing authority, as authorized by N.C. Gen. Stat. § 160A-456, the municipality is not obligated to follow the general procedures for the disposition of property by a municipality. As a result, municipal governments may convey public property to for-profit entities in much the same way they are authorized to convey property to non-profit entities, provided that the requirements of the Housing Authority Law and North Carolina Constitution are met.

C. Lease of Public Property for Affordable Housing

Finally, N.C. Gen. Stat. § 160A-278 authorizes municipal governments to engage in private negotiations to lease property to any entity that will use the property to construct affordable housing for persons of low to moderate income. This authority stands on its own, and does not require municipal governments to exercise or assume the powers of a housing authority.

III. Types of “Housing Projects” that Local Governments May Engage In

N.C. Gen. Stat. § 157-9(a) authorizes housing authorities, and, by extension, local governments acting under N.C. Gen. Stat. § 160A-456(b), to “prepare, carry out and operate housing projects” and to “provide for the construction, reconstruction, improvement, alteration or repair of any housing project or any part thereof.” This provides very broad authority to engage in the provision of affordable housing to persons of low to moderate income, when necessitated by the housing market.

“Housing project” is broadly defined under N.C. Gen. Stat. § 157-3(12), and includes the direct provision of affordable housing stock, payment of rent subsidies, provision of grants and loans to persons of low to moderate income, and the provision of grants, loans, or other financial assistance to public or private developers engaging in the construction or provision of affordable housing stock to persons of low to moderate income.

It is worth noting that where a housing authority, or local government acting as a housing authority, assists in the provision of a multi-family affordable housing development, the following requirements must be met:

1. At least 20% of the units in the housing project must be set aside for the exclusive use of persons of low income,
2. Units set aside for persons of low income must continue to be set aside for at least 15 years, and
3. “Persons of low income” must be defined as those in households earning no more than 60% of the local area median family income.

Additionally, it is common practice for municipal governments to oversee or regulate the rental or sale prices for affordable housing units, and to oversee the budget for construction and operation of affordable housing projects subsidized by the local government to ensure compliance with N.C. Gen. Stat. § 157-29’s requirement that the cost of affordable housing units be at “the lowest possible rates consistent with...providing decent, safe, and sanitary dwelling accommodations” and that the housing project cannot “provide revenues for other activities of the city.”

IV. Conclusion

Ultimately, it is clear that the Town has significant authority to provide affordable housing within the community. The Town may do so by selling or leasing Town-owned property to for-profit or non-profit entities who will construct affordable housing units on the property, so long as the housing market and the available housing stock necessitate government action. It is also clear that the typical open bidding procedures are not required in these circumstances. Rather, the Town may engage in a “private sale” so long as any resulting sales agreements clearly express the public

benefit to be provided, the projected budget, and the projected costs to the developer. In essence, it must be clear that any benefit conveyed to the developer—whether through a subsidy or reduction in sales price—does not exceed the value of the public benefit provided.

BEST PRACTICES – USAGE OF PUBLIC PROPERTY FOR AFFORDABLE HOUSING

Nationwide local governments have utilized their own real property, vacant land, and buildings, as resources to encourage the development of affordable housing. By conveying the property to a nonprofit, or by selling the property to a private developer at deep discount, local governments eliminate or reduce the cost of land for developers, which may be one barrier for the creation of affordable housing. However, it is important to note that even with a donation of land, building affordable housing still may not be financially feasible for a developer due to high infrastructure costs or additional funding requirements and timelines from lenders or federal programs.¹

Best practices can be determined by a review of existing national and regional strategies for using public land to create affordable housing. Although the research gathered for this document reflect significantly larger municipalities, with larger land inventories, many best practices are applicable to smaller municipalities. Five practices were consistently present in established national and regional strategies and are listed below. Staff has also included how Carrboro plans to incorporate these practices into the proposed strategy (Attachment E).

Clearly defined process: A clearly defined, consistent and efficient request for proposals (RFP) and step by step development process are hallmarks of a successful strategy, saving local governments as well as developers time and money. Municipal expectations such as design preferences, green building techniques and features, etc. should also be made clear at the start of the RFP process.

- Carrboro Proposed Strategy: If adopted, the overall strategy for the use of Town-owned land to create affordable housing, as well as the RFP itself, will outline a step-by-step process and timeline, and communicate the Town’s goals regarding affordability, equity, climate action, and other expectations at the beginning of the process.

Community engagement: Engaging the community, especially neighbors adjacent to the public property, at the optimal time in the process is critical in assessing support or opposition to a proposed use and creates the opportunity for the community to provide feedback on proposed designs.

- Carrboro Proposed Strategy: Using a design centered approach and the One Orange Racial Equity Plan outreach strategy, the Town will develop the vision and goals for the project with the community. The Town will contract to conduct pre-development work so that there is clear understanding at the outset of the property’s potential and its limitations, and to assist the community with developing the project’s vision.

Outreach to developers: Successful strategies also employ outreach and relationship building between local government (usually housing department) staff and regional developers before public property becomes available. Existing relationships improve the quality and clarity of communication and understanding and set clear expectations prior to an RFP release.

- Carrboro Proposed Strategy: Develop existing relationships and seek out networking opportunities with new developers and firms, prioritizing innovation and women-owned and minority-owned businesses.

Housing staff as intermediary: Housing staff can facilitate a project's progression by assisting in internal communication, project management, troubleshooting potential issues, and moving the project along.

- Carrboro Proposed Strategy: Housing staff will serve as a point of contact for the developer and assist as needed to move the project forward.

Expedited review: A streamlined review and permitting process for affordable housing projects can help reduce development expense and timeline.

- Carrboro Proposed Strategy: Also listed as a strategy in the draft Comprehensive Plan, an expedited review process is an incentive to potential developers as it saves them time and money. Staff will work with the Planning Department to streamline the development review process for affordable housing projects; monitor the progress of Chapel Hill's pilot expedited review process.

In addition to these practices, examination of national strategies can provide an indication of the human and funding resources a local government would require, depending on the role or level of involvement the local government plays in the development process. For example, some governments lead the planning and design process, including site analysis, community engagement and visioning before requesting proposals from developers. This provides the government control over the project, but also requires upfront funding and sufficient staff capacity and expertise.

The Hill St. parcel is providing the opportunity for Town staff to shepherd an affordable housing project through the process of using Town-owned land, from the initial query regarding the use of the parcel to the project's forthcoming completion. First-hand experience and lessons learned along the way are providing support for these best practices in using public land for affordable housing.

Resources:

[Conveyance of Local Government Property for Affordable Housing - Coates' Canons Coates' Canons \(UNC - SOG\)](#)

[Use of publicly Owned Property for Affordable Housing \(Local Housing Solutions\)](#)

[Public Land & Affordable Housing in the DC Region: Best Practices and Recommendations \(Urban Land Institute & National Housing Conference\)](#)

[Downtown Land Disposition Strategy - Raleigh, HR&A Advisors, Inc. \(localhousingsolutions.org\)](#)

[Leveraging Public Land for Affordable Housing in Northern Virginia \(Northern Virginia Affordable Housing Alliance\)](#)

[Prioritizing Public Lands for Affordable Housing and other Public Benefits \(Family Housing Fund\)](#)¹

¹ Whitus, Anna. (2020) Utilizing Public Land for Infill Development of Affordable Housing: Applications for Carrboro, NC, Master's project, UNC-DCRP

PROPOSED STRATEGY– CARRBORO TOWN-OWNED LAND USE FOR AFFORDABLE HOUSING

Based on research of public land disposition for affordable housing, lessons learned from working on the Hill Street lot, assessing the Town’s current capacity, and receiving feedback from the AHAC, the following outline for a proposed strategy and process to use the Town’s land to create affordable housing in Carrboro is provided.

STEP ONE – INVENTORY AND ASSESSMENT

As explained in Attachment B, in 2015, staff assessed Town-owned parcels for development suitability to create affordable housing and determined that five parcels, or three sites (if two parcels are combined) had the highest potential for affordable housing development. The Town will evaluate any parcels that may be added in the future, as well as any parcels previously assessed that may warrant further exploration. Criteria for suitability and possibility include:

- Ease of development from topographical and environmental perspectives
 - Land survey, soil testing, etc.
- Zoning considerations - potential number of units, need for re-zoning, etc.
- Proximity to public transit, groceries, pharmacies, schools, healthcare, etc. – similar to criteria used in scoring Low-Income Housing Tax Credit (LIHTC) projects

The Town will engage outside expertise to conduct pre-development assessments of identified properties and preliminary designs based on the site potential.

STEP TWO – COMMUNITY ENGAGEMENT & GOALS FOR THE IDENTIFIED PROPERTY

After pre-development assessments, the next step is to conduct community engagement to develop the project design. An inclusive community process helps build trust in the project and address possible issues early in the project. This step involves:

- Pre-design work to help the community visualize potential options
- Community outreach and engagement conducted through the lens of racial equity, using One Orange Racial Equity protocols and strategies
- Design-centered approach
- Design consultant involved in process
- Determine the goals for property, based on Carrboro Connects, community engagement, property factors such as location, unit potential, other Town priorities (racial equity and climate action) and the preliminary site assessment
- Population served
 - Household AMI
 - Prioritize housing for 30% AMI and below, who are disproportionately people of color who have been historically excluded from the private market, and who are the most housing cost burdened (AHAC)
- Type of housing

- Single or multi-family
- Rental, homeownership, mixed
- Mixed-use
- Desired community amenities and sustainable features

STEP THREE – REQUEST FOR PROPOSAL AND DEVELOPMENT REVIEW PROCESS

With pre-development work complete and a community vision for the development in place, the Town is in a strong position to seek developers to complete the project. A Town affordable housing project may be very attractive to a developer because, in addition to the conveyance of the property, much of the up-front costs and work have been completed.

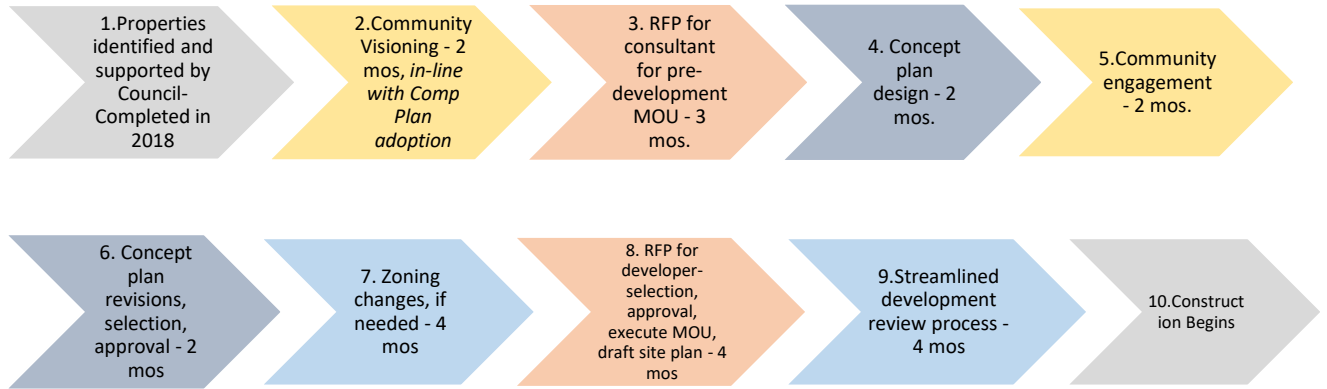
The Town will work to develop an expedited review process and will use a staff intermediary to shepherd the project through. This benefits the developer, saving them time and money, as well as the Town, by bringing more affordable housing to the community through a streamlined process.

With identified project goals and design, Town staff will develop a targeted and detailed request for proposals packet:

- RFP based on identified goals and vision, such as the # of units, intended residents, affordability mechanism, type of housing, community features, etc.
- Eligibility limited to nonprofit developers, or for-profit developers who can maintain the intended affordability structure
- Developer engagement and advertising
- Clear expectations to the developer at the outset
- Create an expedited review process to facilitate affordable housing development
- Land conveyance at the appropriate time in the process
- Determine affordability mechanism, i.e., deed restriction

Estimated Timeline

Key to the strategy's success will be proceeding through the process deliberately and methodically, gaining new insight along the way. This graphic is intended to show the steps of the development process. Times listed are estimates as each project will be unique and have different requirements. Any funding needs or requirements by funders are not included in this timeline. These requirements could hasten or extend the process, as could the timing of any action in relation to the Council's schedule, staffing, and the number of other projects underway.





Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Agenda Item Abstract

File Number:22-47

Agenda Date: 2/8/2022

File Type:Agendas

In Control: Board of Aldermen

Version: 1

TITLE:

Energy and Climate Protection Plan and Community Climate Action Plan Implementation Update

PURPOSE: The purpose of this item is to update the Council on Energy and Climate Protection Plan and Community Climate Action Plan Implementation Efforts.

DEPARTMENT: Planning Department

CONTACT INFORMATION: Laura Janway, Environmental Sustainability Coordinator, ljanway@townofcarrboro.org, (919) 918-7342; Patricia McGuire, Planning Director, pmcguire@townofcarrboro.org, (919) 918-7327

INFORMATION: The purpose of this item is to provide the Board with an update on the implementation of two climate action plans, the municipal Energy and Climate Protection Plan (ECPP) and Community Climate Action Plan (CCAP). Work on the ECPP has been underway since the Board's adoption on May 28, 2014. (A complete copy of the ECPP can be found at: <http://www.townofcarrboro.org/DocumentCenter/View/553/Energy--Climate-Protection-Plan-2014>). Progress on the CCAP has been ongoing since the Board's adoption of the plan on January 24, 2017. (A complete copy of the CCAP may be found at: <http://www.townofcarrboro.org/DocumentCenter/View/4116/Community-Climate-Action-Plan>).

This update includes a detailed report describing ECPP and CCAP implementation since the October update (Attachment B), a Draft Fleet Study Scope (Attachment C), and a Draft Carrboro Dietary Greenhouse Gas Emissions Inventory (Attachment D).

FISCAL & STAFF IMPACT: There is no fiscal or staff impact related to this update.

RECOMMENDATION: Staff recommends the Town Council consider the attached resolution to receive the report and provide comments on the Draft Fleet Study Scope.

A RESOLUTION RECEIVING AN UPDATE ON THE CLIMATE AND ENERGY PROTECTION PLAN AND COMMUNITY CLIMATE ACTION PLAN AND REQUESTING COMMENTS ON THE DRAFT FLEET STUDY SCOPE

WHEREAS, the Town Council has received a presentation regarding the Energy and Climate Protection Plan and the Community Climate Action Plan; and

WHEREAS, the Town of Carrboro has a number of emissions-reduction projects in process; and

WHEREAS, Town staff have requested Council input at key milestones; and

WHEREAS, staff have provided the Council with updates on particular projects at regular intervals; and

WHEREAS, staff have drafted a Draft Fleet Study Scope; and

WHEREAS, the funding for this study has been budgeted in the FY21-22 Town Budget; and

NOW, THEREFORE, BE IT RESOLVED by the Carrboro Town Council that the Council receives this update on the implementation of the Energy and Climate Protection Plan and the Community Climate Action Plan and provides the following comments on the Draft Fleet Study Scope:

Four horizontal lines for providing comments on the Draft Fleet Study Scope.

This the 8th day of February in 2022.



TOWN OF CARRBORO

TRANSMITTAL

Manager's Office

DELIVERED VIA: *HAND* *MAIL* *FAX* *EMAIL*

To: Richard J. White III, Town Manager

From: Laura Janway, Environmental Sustainability Coordinator
Patricia McGuire, Planning Director

Date: February 8, 2022

Subject: Implementation Update: Energy and Climate Protection Plan (2014)
& Community Climate Action Plan (2017)

Summary

The purpose of this memo is to provide the Council with a progress report on implementation of the Energy and Climate Protection Plan (ECPP), adopted May 28, 2014, and the Community Climate Action Plan (CCAP), adopted January 24, 2017. Both plans were updated in 2020 with goals to reduce 2010 levels of municipal and per capita community greenhouse gas emissions 80% by 2030. Town staff are examining and pursuing several initiatives to reach the emissions reductions goals.

Staff have continued to implement the ECPP through two upcoming Requests for Proposals (RFPs), regarding renewable energy procurement and installation as well as an alternative fuels analysis for the municipal fleet.

Recent CCAP implementation measures include progress on the installation of two electric vehicle (EV) charging stations on Town property and the award of grant funding for two proposals to the Orange County Community Climate Action Grant Program. The funding will cover the full cost of a part-time staff member to monitor organics collection at the Carrboro Farmers' Market. It will partially fund the installation of a green roof and solar photovoltaic panels on the west roof of the 203 Project. Staff will submit a proposal to the next round of funding to request additional finances for the panels on the west roof of the 203 Project.

Additionally, staff are working to implement the green neighborhoods grant program and a transportation demand management project as well as finalizing guidelines and protocols for an independent invasive species removal volunteer program. Staff have also completed a dietary greenhouse gas emissions inventory for the Town and will use this information moving forward with outreach regarding food choices.

Energy and Climate Protection Plan

Request for Proposals: Renewable Energy Procurement and Installation

- *Policy Connections:* ECPP Section 2.B.ii Facility Energy Efficiency, 3.C Renewable Portfolio

Town staff have finalized a draft Request for Proposals for the phased implementation of solar photovoltaic (PV) systems at the following properties:

The 203 Building	203 S. Greensboro Street
Fire Station 1	301 W. Main Street
Century Center	100 N. Greensboro Street
Public Works	100 Public Works Drive
Anderson Community Park	302 Highway 54 West

The RFP will help the Town understand the potential design and installation possibilities for systems at these properties. It will also help the Town fully understand the cost implications of developing these systems through a variety of potential financing options such as full ownership, leasing, and/or debt financing. The RFP has been finalized by staff and will be posted in early February. Staff anticipate receiving responses by early March to coincide with the 203 Project timeline.

Town Fleet Electrification and Alternative Fuels Exploration

- *Policy Connections:* ECPP Section 2.C (Fleet Replacement and Efficiency)

Town staff have drafted a preliminary draft fleet study scope which will be used to inform the Request for Proposals (RFP) for this project. The draft scope is provided in Attachment C for comments from the Council.

Staff anticipate releasing the RFP in early 2022 in order to have information to share with the Town Council by the fall.

Environmental Planner Position

Staff advertised and opened the position to candidates and have begun application review. Staff anticipate reaching out to candidates to begin the interview process in early February 2022.

Community Climate Action Plan

Community Integration

Climate Action Team (CAT)

- *Policy Connections:* CCAP Community Integration Recommendation #5:
Expand Capacity

Nine members were appointed to the Climate Action team in Fall 2021. The CAT held their first meeting in November 2021 and have held two subsequent meetings. Meetings in 2022 will follow the adopted meetings schedule. In early 2022, the CAT will review a draft Environmental

Sustainability Work Plan for FY22-23. Staff anticipate additional Special Meetings to be scheduled throughout the year as needed to plan outreach events or discuss projects related to CCAP implementation.

Carrboro Connects Comprehensive Plan

- *Policy Connections:* Entire CCAP and ECPP

Staff are working to calculate estimates for greenhouse gas emission reductions for the projects listed in the implementation section of the plan in order to inform revisions to the Public Hearing Draft.

Green Neighborhoods Grant Program

- *Policy Connections:* CCAP Community Integration Recommendation #3: Create Participatory Green Neighborhood Budgeting Program to Reduce Carbon Emissions, Build Community, Save Money, and Reallocate Savings to New Green Project Initiatives

The Green Neighborhoods Grant Program seeks to provide Town funding to help bring neighbors together to pursue projects which will reduce greenhouse gas emissions, create natural areas that are more resilient to the impacts of climate change, and ultimately benefit the entire community.

Staff have incorporated comments from the Town Council into the program and are working to finalize program documents. Staff anticipate that the program will be open for applications in early 2022. As part of the program's outreach campaign, staff plan to hold several information sessions for potential applicants. Staff also plan to deliver targeted engagement to several Carrboro neighborhoods utilizing approaches centered on equity employed by the Town during Comprehensive Plan development.

Modules Project

- *Policy Connections:* CCAP Community Integration Recommendation #5: Expand Capacity

The Community Climate Action Plan Modules Project is a community-driven outreach initiative aimed to educate and engage Carrboro residents in climate action. The initiative involves designing materials for Carrboro residents to educate others about specific climate action topics. The materials will be organized into modules, which will act as templates for residents to customize for presentations or demonstrations.

Four modules related to transportation, ecosystems, composting, and food choices have been reviewed by the Environmental Advisory Board and edited by volunteers and staff. Staff

anticipate working with the Climate Action Team to review additional several modules in 2022 before publishing the modules library for public use.

Orange County Community Climate Action Grant Program

- *Policy Connections:* CCAP Buildings Recommendation #1: 80% Challenge; Ecosystem Recommendation #3: Accelerate/Expand Organic Waste Collection/Composting; ECPP Recommendation 3.C: Renewable Portfolio

Staff submitted two proposals to this program in July 2021 to fund several projects, involving solar photovoltaic panels (west roof) and a green roof for the 203 Project, as well as staffing the Carrboro Farmers' Market organics collection/composting. Staff were notified in October 2021 that the following funding was awarded to the projects:

- Solar photovoltaic panels (west roof) and a green roof for the 203 Project: \$40,567.50
- Compost monitor staff member: \$3,765.00

Staff will work to move forward hiring the compost monitor in early 2022. Town staff will apply for additional funding for the west roof solar photovoltaic panels in the next round of funding this spring.

Building Energy Efficiency Measures

Energy Efficiency Revolving Loan Fund (EERLF)

- *Policy Connections:* Buildings Recommendation #1: Reduce Emissions Attributed to Carrboro Buildings by 80% by 2030, #2: Energy Audit/Performance Rating; Community Integration Recommendation #4: Integrate Climate Action with Local Living Economy, #6: Facilitate Low Cost Financing for Energy Efficiency & Renewable Energy Projects

Staff have held meetings and discussions regarding the planned updates to this program. Staff are now working to draft new program guidelines and will also examine opportunities to leverage this funding with larger-scale Federal programs.

Transportation

Volkswagen (VW) Settlement Phase 1 – Level 2 Charging Station

- *Policy Connections:* ECPP Goals; CCAP Transportation Recommendation #1: Reduce Greenhouse Gas Emissions from Motor Vehicle Use by 80% by 2030.

The North Carolina Department of Environmental Quality has offered all applicants an extension on agreements for electric vehicle (EV) charging stations. The stations have been installed and Duke Energy has been notified for the final power activation. Staff are working with ChargePoint to ensure cloud services are configured and the stations will be available on public

charging station maps. Staff will ensure that all final grant requirements are met, including signage. Stations will be in operation by March 2022.

EV Charging Stations Priority Analysis

- *Policy Connections:* ECPP Goals; CCAP Transportation Recommendation #1: Reduce Greenhouse Gas Emissions from Motor Vehicle Use by 50% by 2025.

Staff are meeting regularly with employees from other local jurisdictions to design a county-wide Geographic Information Systems (GIS) analysis to prioritize locations of EV charging stations in order to ensure a well-planned network of stations around Orange County. This analysis will allow staff to be prepared for future funding opportunities. The group is currently working to designate and rank points of interest and other criteria for site considerations.

Transportation Demand Management (TDM) Grant – Fresh Starts Project

- *Policy Connections:* CCAP Transportation Recommendation #4: Further Promote Walking, Biking, Transit

The Fresh Starts Project involves a partnership between the Center for Advanced Hindsight, the Town of Carrboro, and Orange County to design and study the efficacy of transportation welcome packets for new residents. The Center for Advanced Hindsight (CAH) presented the project to advisory boards in November 2021. Advisory boards discussed the potential information topics in the box, including the following:

- Personalized Routes
- Transportation Partners/Mentors
- User-Centered information to reduce barriers to participation
- Carpool matching guidance

The study protocol and materials have been submitted to Duke's Institutional Review Board (IRB) for ethical review. Staff are working to review additional items for the welcome boxes, including a social norms letter and informational flip cards, which will both be translated into English and Spanish versions for the welcome box.

CAH will begin to mail boxes in late February/early March 2022 after the IRB review is complete. The project measurement period will take place from April-June.

Transportation Demand Management (TDM) Grant – Triangle Transportation Choices

- *Policy Connections:* CCAP Transportation Recommendation #4: Further Promote Walking, Biking, Transit

Staff are working with the Town of Chapel Hill and the University of North Carolina to develop a set of activities, outreach, and events as part of the upcoming FY23 TDM grant application. The Triangle J Council of Governments (TJCOG) has recently updated the TDM program, adding a new emphasis on race and equity. Staff will submit an application for FY23 Triangle J Council of Government's FY23 Triangle Transportation Choices grant program as a subrecipient of the Town of Chapel Hill.

Contribution to Piedmont Electric Membership Corporation (PEMC) for Electric Vehicle (EV) Charging Station at Carrboro Plaza

- *Policy Connections:* ECPP Goals; CCAP Transportation Recommendation #1: Reduce Greenhouse Gas Emissions from Motor Vehicle Use by 50% by 2025.

The Town finalized a payment contributing towards PEMC's match for the grant in June 2021. Staff attended a ribbon-cutting ceremony for the station in November 2021. The station is now fully operational.

Ecosystem Protection and Enhancement

Riparian Restoration Project – Henry “Hank” Anderson III Community Park

- *Policy Connections:* Ecosystem Recommendation #4: Tree Preservation, Protection and Conservation; Ecosystem Recommendation #6: Pursue Watershed Restoration Actions to Protect Local Streams from Changes in Rainfall Due to Climate Change

Staff continue to monitor the health and condition of the trees planted through the NC Urban Forest Council Legacy Tree Fund Grant. Staff are currently working with a local Boy Scout to plan a tree-planting Eagle Scout Service Project at the park involving an assessment of tree survival in the project area and replacement of trees if necessary.

Bee City USA, Mayors' Monarch Pledge

Staff submitted the 2021 Mayors' Monarch Pledge report in December 2021. The report was reviewed and approved by the Mayors' Monarch Pledge Team. Staff anticipate requesting participation in the initiative for 2022.

Invasive Species Volunteer Events

- *Policy Connections:* Ecosystem Recommendation #5: Improve Regulations and Community Capacity to Discourage Invasive Plants and Encourage Native Plants

Staff are finalizing the documents, requirements, and protocols for a potential new volunteer program to allow independent volunteer work to remove invasive species.

Staff have also investigated areas infested with kudzu (*Pueraria*) discovered by a Carrboro resident on Town property bordering Morgan Creek. Staff are exploring options for removing the kudzu without exacerbating erosion issues along the banks of the creek.

Planning Department staff are coordinating with Stormwater Utility staff to plan outreach for Creek Week in early March. Staff plan to work with several volunteers to create and present a virtual invasive species workshop. Information will include:

- Introduction to invasive species
- Community Climate Action Plan implementation
- Overview of the most common invasive species in Carrboro
- Species identification techniques
- Best practices for treatment

Food Choice Measures

Build Dietary Greenhouse Gas (GHG) Emissions Profile

- *Policy Connections:* CCAP Food Choice Recommendation #2: Develop Local Dietary Consumption and Associated GHG Profile

Using the 2019 CCAP survey's annual self-reported meat and dairy consumption among Carrboro residents, the Town's Environmental Sustainability Coordinator worked with Doctoral Candidate and Climate Action Team (CAT) member Chrissie Schalkoff to perform an analysis of associated greenhouse gas emissions. The final report can be found as Attachment D.

Fleet Study Scope – DRAFT

For Town Council reference – February 8, 2022

Overview – Project Purpose

The Town of Carrboro’s vehicle fleet represents a significant sector of direct municipal greenhouse gas emissions. The [Energy and Climate Protection Plan](#) outlines a goal for the Town to reduce 2010 levels of municipal greenhouse gas emissions 80% by 2030. In order to reach this goal, the Town is pursuing a fleet transition to alternative fuel vehicles.

The Town of Carrboro active fleet consists of 105 heavy-, medium-, and light-duty vehicles. Of these vehicles there are twelve hybrid SUVs and three hybrid sedans. In 2019, the vehicles in the fleet used 92,885 gallons of fuel, producing 890 metric tons of carbon dioxide equivalent (CO₂e).

The fleet study is intended to result in a report detailing alternative fuel options to allow the Town to fully understand the available alternative fuel vehicles and equipment, infrastructure needs, facility capacity, maintenance needs, projected costs and returns on investment, and available financing mechanisms to transition the municipal fleet and equipment and meet the Town’s greenhouse gas emissions reduction goal by 2030.

Analysis Components

The analysis will detail the potential for alternative fuels for all municipal vehicles as well as all equipment that utilizes fuel e.g. chainsaws and mowers.

The analysis will include the following:

1. Available Alternative Fuel Vehicle and Equipment Review

The firm will review currently available and soon to be available alternative fuel vehicles and equipment to replace the vehicles and equipment used by the Town. The firm will include efficiency technology and fleet rightsizing options relevant to fleet operations in their analyses. The firm can explore potential retrofits for current Town vehicles and equipment if appropriate. The fuels, technology, and strategies analyzed will at a minimum include:

1. Battery Electric Vehicles (BEV); electric equipment
2. Hybrid Electric Plug-in Vehicles (PHEV)
3. Hybrid Electric Vehicles (HEV)
4. Biodiesel for vehicles and equipment
5. Renewable compressed natural gas (rCNG) from a local supply (potential partnership with OWASA) for vehicles and equipment
6. Alternative vehicle and equipment types, e.g., electric bicycles, shuttles
7. Anti-idling technology
8. Adjustments to Departmental procedures/fleet rightsizing

2. Infrastructure Needs Assessment

The firm will include an assessment of the fueling and other infrastructure investments needed to implement each of the technology options in their written reports.

3. Facility Capacity Analysis

The firm will calculate each facility's capacity to support electrical load demand from charging operations, identify potential grid impacts, and note backup generators or other energy storage methods needed for emergency response or to lighten the load from the additional impact to the electrical grid.

4. Maintenance Needs Assessment

The firm will include maintenance requirements for alternative fuel vehicles and equipment in their written reports.

5. Projected Greenhouse Gas Emissions Reduction Scenarios

The firm will develop estimates for greenhouse gas emissions reductions for each of the alternative fuel types analyzed.

6. Projected Costs and Return on Investment (ROI) Scenarios

The firm will develop estimates for the projected cost of fleet and equipment conversion to reduce fleet greenhouse gas emissions 80% (from 2010 levels) by 2030.

7. Financing Mechanisms and Strategies to Accelerate the Conversion of Fleet and Equipment to Alternative Fuel Vehicles and Equipment

The firm will identify and analyze financing mechanisms and strategies that could accelerate the transition of municipal vehicles and equipment to alternative fuel vehicles and equipment.

8. Draft Phased Fleet and Equipment Conversion Strategies

The firm will develop several alternative phasing and implementation strategies for fleet and equipment conversion. The strategies will allow the Town to reach its greenhouse gas emissions reduction goals by 2030 while also considering life cycle cost effectiveness and feasibility.



TOWN OF CARRBORO

TRANSMITTAL

Planning Department

DELIVERED VIA: *HAND* *MAIL* *FAX* *EMAIL*

To: Richard J. White III, Town Manager

From: Chrissie Schalkoff, Doctoral Candidate at UNC Gillings School of Public Health, Climate Action Team Member
Laura Janway, Environmental Sustainability Coordinator
Patricia McGuire, Planning Director

Date: February 8, 2022

Subject: Town of Carrboro Dietary Greenhouse Gas (GHG) Emissions Inventory

Summary

The Town of Carrboro's Community Climate Action Plan (CCAP), accepted in 2017, contains recommendations on food choice measures. One of the plan's food choice recommendations involves developing a method to capture diet-related greenhouse gas (GHG) emissions and measure progress towards the Town's reduction goal. In 2019, Town staff worked with BKL Research & Consulting to develop a survey to obtain data related to the composting, gardening, food choices, and commuting habits of Carrboro residents.

Using the survey's annual self-reported meat and dairy consumption among Carrboro residents, the Town's Environmental Sustainability Coordinator worked with Doctoral Candidate and Climate Action Team (CAT) member Chrissie Schalkoff to perform an analysis of associated greenhouse gas emissions.

Overall, annual meat and dairy consumption contributed an estimated 17,484 metric tons CO₂-equivalent (CO₂-eq) to Town GHG emissions. Beef consumption contributed the greatest amount to total meat and dairy emissions, despite consumption in an average of only 2.7 meals/week for residents.

In addition to this dietary emissions inventory, the Town has completed several community [GHG emissions inventories](#). The geographic boundaries for the dietary inventory are different than the community inventories, as except for indirect emissions from electricity generation, the geographic scope of the community inventories lies within the Carrboro city limits. Emissions from this dietary inventory are created outside Carrboro city limits. These emissions would also be accounted for in inventories performed by other jurisdictions or at a larger, global level.

Several additional aspects of dietary emissions Carrboro are accounted for in the community GHG emissions inventory. For example, electricity usage related to food storage in commercial and residential settings, as well as transportation by residents to purchase and consume food. More information about the system boundaries can be found in Figure 1.

It should also be noted that the dietary emissions inventory also accounts for food eaten by Carrboro residents outside of Carrboro city limits, as the survey did not make that distinction when asking residents about weekly food consumption.

CCAP Food Choice Recommendations

The CCAP states that monitoring progress towards diet-related greenhouse gas emissions relies on understanding consumption patterns that occur outside of Carrboro in the development and creation of food as well as consumption occurring within the Town limits. Previous community-scale greenhouse gas inventories have focused on directly accountable activities, such as motor vehicle fuel consumption and metered utilities that occur within the Town limits. These emissions account for a percentage of the direct and indirect life-cycle emissions associated with the behaviors and activities of community members.

In relation to food, emissions for local transport, storage, and processing, cooking, and waste management are included within total estimates for transportation, electricity, natural gas, and waste. Town staff developed the 2019 CCAP survey to obtain data to create the baseline estimate of dietary emissions associated with the additional aspects of food production and consumption. The survey obtained data on the consumption of foods with the highest carbon footprint, meat and dairy products (2). Staff plan to re-administer the survey on a biennial basis. This will allow for benchmarking as the Town continues to implement additional food choice initiatives recommendation in the CCAP.

Establishing a broader baseline of food consumption emissions will raise awareness and support individual and household choices to shift from more carbon-intensive to less carbon-intensive diets.

Analysis Overview

The goal of this analysis was to estimate the annual GHG emissions associated with meat and dairy consumption in the Town of Carrboro. The analysis was modeled heavily on a 2019/2020 analysis of the Pittsburgh Urban Food System which was conducted by students at Carnegie Mellon University (2).

In order to capture GHG emissions associated with food consumption for a town, city, or region, it is necessary to know both 1) the average/estimated GHG emissions associated with production and processing of distinct food types (usually reported in kg CO₂-eq/kg food); and 2) the annual estimated amount of each food type consumed in the area, in kg or metric tons.

Some analyses of GHG emissions from food consumption also include estimates of emissions from consumer transportation to purchase food, consumer or retail storage of food, and food waste disposal. For the purposes of this preliminary analysis of meat and dairy GHG emissions from dietary habits in the Town of Carrboro, this summary does not include transportation, consumer storage, or consumer food waste. Furthermore, additional limitations of this analysis are included in the *Limitations and Future Directions* section below.

Data Sources and Guiding Reports

Analysis Framework

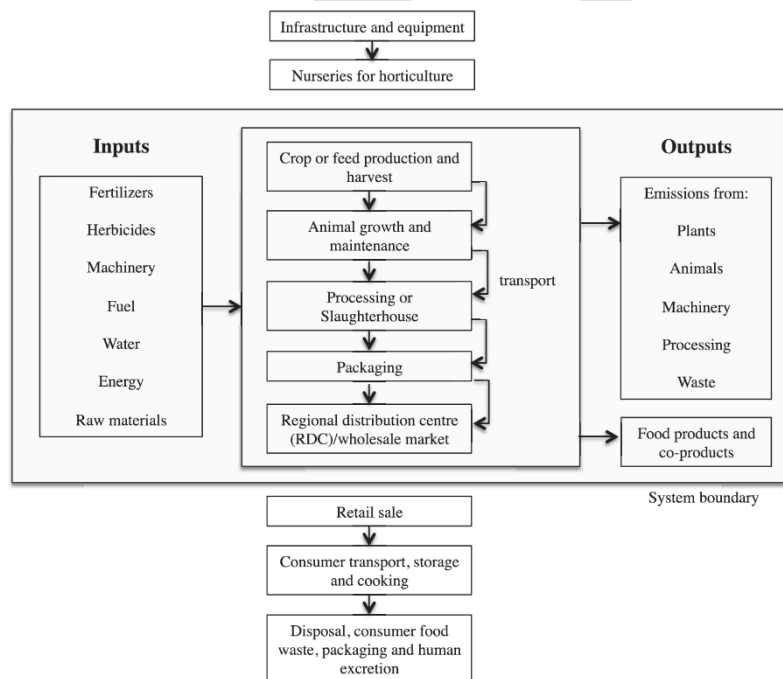
In January 2020, a group of students in the Department of Engineering and Public Policy and the Department of Social and Decision Sciences at Carnegie Mellon University conducted a comprehensive inventory of GHG emissions associated with food consumption in Allegheny County, PA. This inventory accounted for emissions associated with food production, transportation into the county, distribution to retail outlets, storage, and waste (2). This framework was used as a guide for the analysis. Due to differences and limitations in available data sources at the Town level for just the Town of Carrboro, the

inventory did not include all of the elements of the Pittsburgh Urban Food System report; however, emissions associated with food production and transportation to retail centers were analyzed in the same way as in the report.

GHG Emission Factors

GHG emission factor estimates were obtained from Clune et al.'s 2017 systematic review of food category greenhouse gas emissions (3). This systematic review and meta-analysis included worldwide data from the last 15 years (at the time of publication) and compiled manuscripts published in peer-reviewed journals, conference proceedings, and Environmental Product Declarations that included life cycle assessment (LCA) studies (3). In order to compare estimates across studies and geographic locations and compute basic descriptive statistics, the authors converted emissions factor values into a common functional unit of kg CO₂ equivalent/kg bone free meat (BFM) or produce. Furthermore, different LCA studies used different "system boundaries," i.e., the portion of the entire food production pathway included in the emissions calculation (e.g., farm to slaughterhouse vs. farm to regional distribution center vs. farm to cooked in home). Therefore, study authors also converted all emissions factors to fit the farm to regional distribution center (RDC) boundary (3). **Figure 1** (from Clune et al.) indicates the part of the entire food life cycle (shown within the box) that was included in this systematic review and meta-analysis (3).

Figure 1. From Clune et al. (2017). Simplified system boundary.



Due to the system boundary used, emissions factor estimates compiled in the review represent energy expended from 1) farm activities, including chemical/fertilizer use, irrigation/machinery, harvesting/processing, and emissions from soils, plants, and animals in fields; and 2) transport and refrigeration from farm to RDC (2).

Estimates were compiled and organized by food type, and median, mean, minimum, and maximum emissions factor estimates were provided across all studies and by continent/world region when available (2).

Carrboro Food Type Quantities

Estimates of food types and quantities consumed by Carrboro residents annually were obtained from the results of the 2019 Town of Carrboro Community Climate Action Plan Survey. This survey was conducted from November 25th through January 16th, 2019 by BKL Research & Consulting and was administered by phone to a sample of 401 Carrboro residents using standard random sampling survey methods. Both listed/unlisted landline and wireless telephone numbers coinciding with census tracts in the Carrboro area were included in the sampling frame. Participants included residents of Carrboro who were over the age of 18. Food questions included on the survey asked about weekly consumption of dairy, meat, and beef (reported in number of meals/week consumed), as well as self-reported identification of dietary preference lifestyles such as vegetarianism, pescatarianism, veganism, and dairy-free eating. A copy of the food items asked in the survey is included in **Appendix A**.

National Dietary Habit/Meal Reference Amount Food Values

Estimates of the quantity of different food types typically consumed by Americans during meals were obtained from United States Department of Agriculture (USDA) serving size dietary guidelines (3) and a 2018 Food and Drug Administration (FDA) report of Reference Amounts Customarily Consumed (4).

Methods/Analysis Steps

Following the same method employed in the Carnegie Mellon University “Climate Change and the Pittsburgh Urban Food System” report (2020), the final GHG footprint of dairy, meat, and fish consumption in Carrboro was calculated by multiplying quantities of food consumed by their respective GHG emissions factors (2), after converting food quantities to the requisite compatible metric.

Emissions factor estimates were obtained from Clune et al.’s 2017 systematic review and meta-analysis (3). Mean estimates for the products included in the Carrboro Community Climate Action Plan survey are shown in **Figures 2 and 3**. Overall (global) and North America (NA - when available) mean, median, minimum, and maximum emissions factor estimates were used, to produce a range of final estimates.

Figure 2. Emissions factor estimates (Clune et al., 2017).

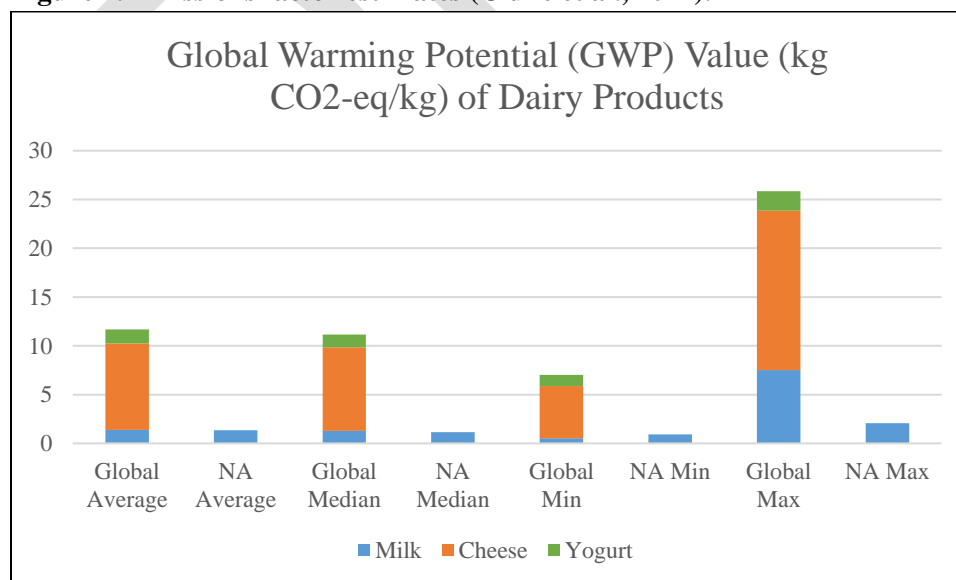
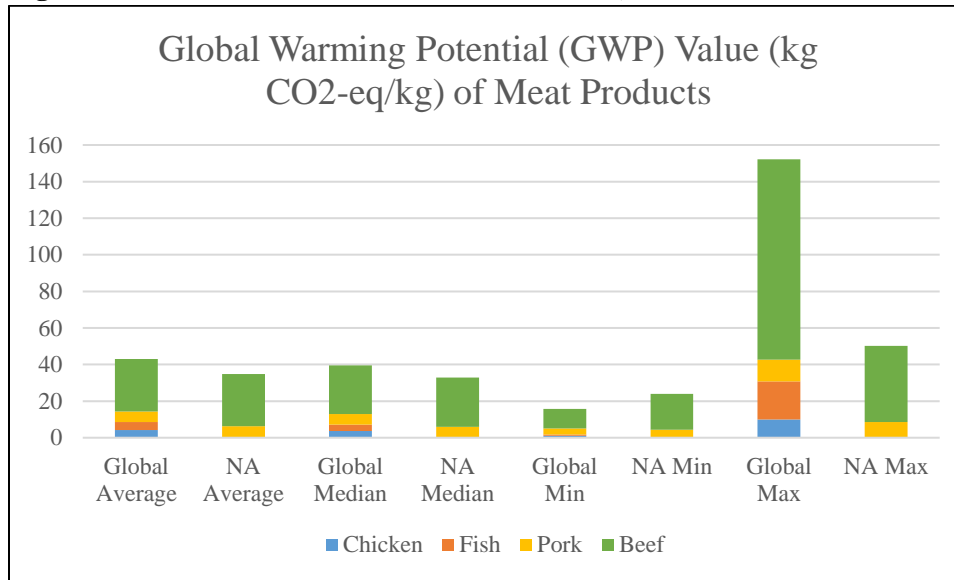


Figure 3. Emissions factor estimates (Clune et al., 2017).

Food quantity estimates for the Town of Carrboro were obtained from the Carrboro Community Climate Action Plan Survey. As participants were asked about the average number of meals per week that they consumed that included a particular food category, additional steps were needed to convert the survey data into food quantities by weight. To do this, it was necessary to obtain an idea of the approximate average portion size of each type of food, in order to calculate an estimate of how many grams/kg of food were consumed at each meal. Estimates of typical amounts of food consumed in a meal were obtained by referencing the USDA's serving size guidelines and the FDA's Reference Amounts Customarily Consumed report (3,4).

Following this, GHG emissions were then able to be calculated both per capita for Carrboro residents annually and for the Town overall, given the random sampling employed by the Community Climate Action Plan survey. To obtain overall Town GHG emission estimates, the per capita average calculated was then multiplied by the Town of Carrboro population as reported by the U.S. Census Bureau (5).

Figure 4. GHG Emissions Calculation Process.

Step 1: average # meals/week containing food product x average portion size (kg)/meal = kg food product/week

Step 2: kg/week x 52 weeks/1 year = kg food product consumed/year (average, 1 person)

Step 3: kg food product x product emissions factor (kg CO₂-eq/kg) = kg CO₂-eq annually (1 person)

Step 4: individual kg CO₂-eq x Town of Carrboro population estimate = kg CO₂-eq annually (Town)

Step 5: kg CO₂-eq x 1/1000 = **metric tons CO₂-eq annually (Town)**

Note: The survey was only administered to residents over age 18. The assumption was made that residents under age 18 follow similar eating habits to residents over age 18 with which they reside. The U.S. Census Bureau states that 20.9% of Carrboro residents are below the age of 18 (7).

Preliminary Results

Basic participant demographics and self-reported dietary habit information collected in the Carrboro Community Climate Action Plan Survey are reported in **Table 2**. Overall, approximately half of the sample consisted of adults between the ages of 36 and 55, and the sample was split fairly evenly between men and women (self-reported gender identity). Approximately 80% of the sample consisted of white/Caucasian individuals, 7% of participants were Black/African American, and 6% reported Hispanic ethnicity. The demographics of the survey sample differ slightly from the actual demographics of the Town, which can be obtained from the [U.S. Census Bureau](#). Additionally, 6.6% of respondents reported following a vegetarian diet, which is higher than the national average of 5% (6). The percentage of residents in Carrboro who follow a vegan diet is consistent with the national average of 3% (Hrynowski, 2019).

Table 2. Demographic and dietary characteristics of survey sample.

Characteristic	All participants (n = 401)
Age (years)	
18-25	9.7%
26-35	19.2%
36-45	23.6%
46-55	26.7%
56-65	12.6%
66-75	4.9%
>75	3.3%
Male (%)	51.5%
Female (%)	48.5%
Race/Ethnicity	
Caucasian	79.1%
African American	6.9%
Hispanic	5.8%
Native American	0.3%
Other	5.0%

Table 2 (Continued). Demographic and dietary characteristics of survey sample.

Average # of Meals/Week Containing Dairy	12.1
Average # of Meals/Week Containing Meat	9.5
Average # of Meals/Week Containing Beef (of those containing meat)	2.7
Vegetarian Diet	6.6%
Vegan Diet	2.8%
Pescatarian Diet	3.8%
Dairy-Free Diet	4.6%

Estimated annual GHG emissions associated with Town of Carrboro residents' self-reported consumption of meat and dairy products are shown in **Table 3**. As participants were only asked about “dairy products” and “meat” in general (with the exception of beef), estimates were produced by obtaining emissions factor estimates for the most common types of dairy products and meat available, calculating annual emissions associated with each product, and averaging across products. When available, North America average emission factor estimates were used (2); if not available, the general Clune et al. reported average was used.

A full range of estimates for each included food category, using each of the Clune et al. emissions factor estimates reported (North America and global mean, median, minimum, and maximum emissions factor estimates) can be found in the attached spreadsheet.

Table 3. Dairy and Meat greenhouse gas emission estimates for the Town of Carrboro, 2019.

Food category	Town GHG annual emissions estimate (tons CO ₂ -eq)	Per capita GHG annual emissions estimate (tons CO ₂ -eq)
Dairy products (average milk/cheese/yogurt; 12.1 meals/week)	4,083 metric tons	0.193 metric tons/person
Non-beef meat (average chicken/pork/fish; 6.8 meals/week)	4,058 metric tons	0.192 metric tons/person
Chicken	3,396 metric tons	
Pork	5,143 metric tons	
Fish	3,635 metric tons	
Beef (2.7 meals/week)	9,343 metric tons	0.441 metric tons/person
Overall dairy + all meat average*	17,484 metric tons	

Note: Calculations assumed 12.1 meals per week containing dairy, 6.8 meals per week of non-beef meat, and 2.7 meals per week with beef.

The overall estimated GHG emissions produced by average annual dairy and meat consumption of Town of Carrboro residents was calculated to be 17,484 metric tons CO₂-eq. For comparison, according to the most recent Town of Carrboro GHG Emission Inventory, in 2012 the Town produced 111,954 tons CO₂-eq (7); residential energy contributed 43,406 metric tons, and transportation accounted for 31,183 metric tons. Dairy and meat consumption alone among Carrboro residents therefore contributed as much toward Town emissions as more than 50% of all Carrboro transportation (at 2012 levels) (7).

Reducing Individual Dietary GHG Emissions Footprints

Staff plan to utilize the data and results from this research to develop methods for meeting the CCAP goal of an 80% reduction in dietary GHG emissions by 2030.

Reducing Emissions by Consuming Organic Foods

The Pittsburgh Urban Food System report examined research on the greenhouse gas emissions produced by choosing organic food (2). **Table 4** summarizes data from Tables 3.1 and 3.2 in the Pittsburgh Urban Food System report. Consuming organic fruits and vegetables results in the highest greenhouse gas emissions reduction per food category while consuming organic dairy and poultry resulted in increased greenhouse gas emissions.

The authors noted that the number of studies on emissions from organic food is limited (2). Further research should be performed to determine more conclusive data about the impact of choosing organic foods on greenhouse gas emissions.

Table 4. Summary of Tables 3.1 and 3.2 from the Pittsburgh Urban Food System Report (2), including percent change in emissions by consuming organic food in each category.

Food Category	Mean Emissions (CO ₂ -eq/kg) for Non-Organic Foods	Mean Emissions (CO ₂ -eq/kg) for Organic Foods	% Change in Emissions by Consuming Organic
Dairy	7.6	12	58%
Milk & Cream	1.4	1.4	0%
Fruit	0.7	0.3	-57%
Vegetables	0.9	0.2	-78%
Beef	28.7	25	-13%
Pork	5.8	5.1	-12%
Lamb	27.9	11	-61%
Poultry	4.1	5.7	39%
Eggs	3.3	4	21%
Oils/Fats/Nuts	1	2.3	130%
Cereals/Grains	1	1.7	70%
Legumes	0.8	0.4	-50%
Fish	4.5	3.2	-29%
Shellfish	13.1	13	-1%

Additional Ways to Reduce Dietary GHG Emissions Footprints

Staff utilized the Pittsburgh Urban Food System report (2) to estimate ways in which Carrboro residents can reduce their dietary GHG emissions footprints without changing the specific foods they consume. In addition to embodied emissions in food production, dietary GHG emissions footprints consist of food transportation, storage, and food waste related to the home, retail, and food service sectors. If a Carrboro resident walked or biked to purchase their food, purchased food from local producers, and composted their food waste, they could reduce their dietary emissions footprint by approximately 15%. The overall emissions breakdown in the Pittsburgh Urban Food System report is provided below in **Figure 5**.

Figure 5. Total Greenhouse Gas Emissions for the Allegheny County Food System

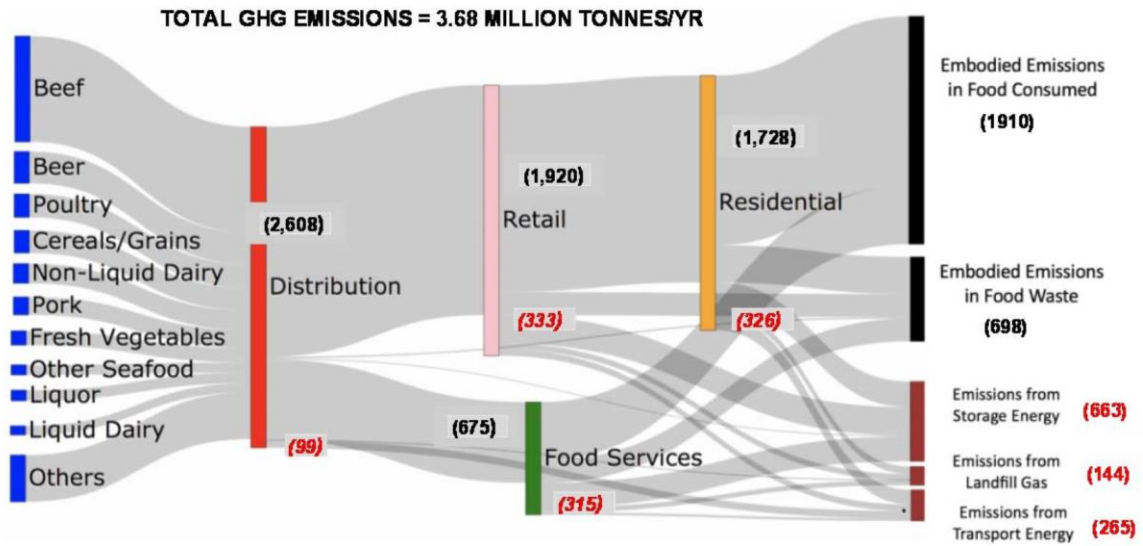


Figure ES-1: Greenhouse Gas Emissions for the Allegheny County Food System. All values are in 1,000 tonnes CO₂-eq/yr. Numbers in black are embodied emissions from food production and packaging; values in red are total additional emissions from landfills and energy used for food transport and storage.

In addition to future work to capture more of the food life cycle and associated emissions in the Town of Carrboro, initial educational materials can be produced to help disseminate results to community members. Sample educational pamphlets are shown in **Figures 6 and 7** below.

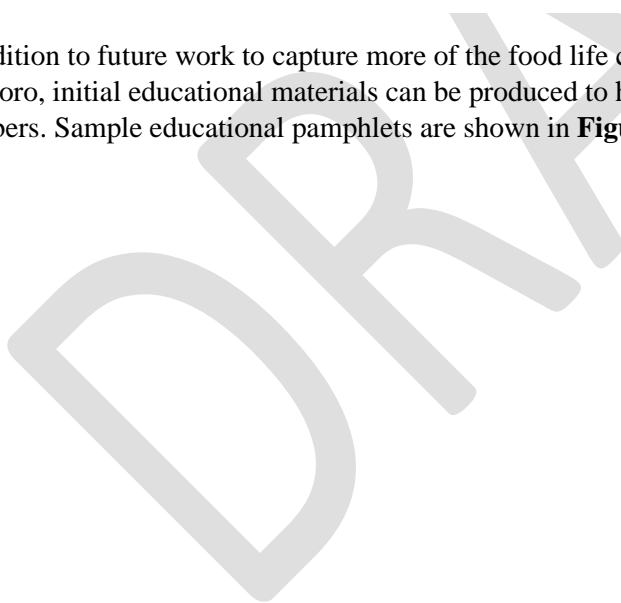



Figure 6. Sample educational materials

TOWN OF CARRBORO

CARRBORO COMMUNITY FOOD FACTS

WHAT'S THE CLIMATE IMPACT OF YOUR PLATE?


DID YOU KNOW....




Based on data from a 2019 survey of Carrboro residents, **annual meat and dairy consumption** in Carrboro contributes over **17,000 metric tons of CO₂**.

THAT'S THE SAME AS...

- **42 MILLION MILES** DRIVEN BY AN AVERAGE PASSENGER VEHICLE
- THE ENERGY USAGE OF **2,900 HOUSES** FOR ONE YEAR
- BURNING **19 MILLION POUNDS** OF COAL




ON AVERAGE, CARRBORO RESIDENTS CONSUME:



- 12.1 meals per week containing **dairy**
- 9.5 meals per week containing **meat**
- 2.7 meals per week containing **beef**


BOCA OR BEEF?

6.6% OF CARRBORO RESIDENTS REPORT FOLLOWING A VEGETARIAN DIET...



...which is higher than the **national average of 5%**, according to a 2018 Gallup poll.

WHAT CAN YOU DO TO HELP MINIMIZE YOUR DIETARY CLIMATE IMPACT?



IF CARRBORO RESIDENTS

- Switched **just one meal per week** from beef to chicken, it would save **2,961 tons of CO₂** annually, townwide.
- Ate **just one less meal with meat** per week, it would save **2,925 tons of CO₂** annually.
- That's the same as eliminating the energy use of **340 homes** for a year!




Figure 7. Sample educational material.

CARRBORO COMMUNITY CLIMATE ACTION PLAN

**Did you know?
Your dietary carbon footprint consists of more than food production**

Greenhouse gas emissions are also produced by food transportation, storage, and waste



How can you reduce your current dietary carbon footprint by an estimated 15%?

15%

Walk or bike instead of driving to purchase food



Purchase foods grown or produced locally



Compost Food Waste



Free at the Saturday Carrboro Farmers' Market!

For more info, visit www.townofcarrboro.com

Limitations and Future Direction

It is important to note that this preliminary analysis has several key limitations that should be considered when interpreting results.

First, survey respondents only indicated the approximate/average number of meals per week that included dairy or meat products; the survey did not capture exactly which type of dairy products were consumed nor the breakdown of how many of each type of meat products per week were included. This meant that multiple assumptions had to be made about portion size and exact food product type, leading to a range of possible estimates. It was assumed that Carrboro residents adhere to the portion sizes stated in the USDA's serving size guidelines and the FDA's Reference Amounts Customarily Consumed Report. Additionally, the accuracy of participant recall when asked to estimate how many meals in a week included a certain food product may be less than desired; in future surveys, measures such as a 24-hour dietary recall (such as those used by the National Health and Nutrition Examination Survey) could be considered (8).

Furthermore, based on the data captured by the Carrboro Community Climate Action Plan Survey and emissions factor estimates from Clune et al.'s meta-analysis, only dietary emissions associated with part of the life cycle of dairy and meat products consumed – this analysis did not include emissions associated with consumer transportation to obtain food, food storage, or food waste. As such, results from this analysis are likely underestimating total food-related emissions. Future analyses could include these parts of the food life cycle.

Finally, the survey did include a random sample of 401 residents; random sampling allows for more representative/generalizable conclusions about Town of Carrboro habits and behavior. However, the sample captured was not entirely demographically proportionate to the Town as a whole. In addition, the survey was only administered to residents over age 18. The assumption was made that residents under age 18 follow similar eating habits to residents over age 18 with which they reside. This preliminary analysis is a starting point and in the future, estimates may need to be weighted and adjusted to account for some of the assumptions made in this analysis

References

1. Agudelo-Frankel, D., Beaman, B., Marshall, G., & Myers, J. (2015). 2012 Greenhouse Gas Emission Inventory for the Town of Carrboro, NC. Available from <https://www.townofcarrboro.org/DocumentCenter/View/2788/2012-GHG-Emission-Inventory-Final>.
2. Climate Change and the Pittsburgh Urban Food System. (January 2020). Available from https://www.cmu.edu/epp/prospective/undergraduate/epp-project-courses/climate-change-and-the-pgh-urban-food-system_final_20200129.pdf.
3. Clune, S., Crossin, E., & Verghese, K. (2017). Systematic review of greenhouse gas emissions for different fresh food categories. *Journal of Cleaner Production*, 140, 766-783.
4. FDA. (2018). Reference Amounts Customarily Consumed: List of Products for Each Product Category: Guidance for Industry. U.S. Department of Health and Human Services. Available from <https://www.fda.gov/media/102587/download>.
5. Hrynowski, Z. (2019). What Percentage of Americans Are Vegetarian? Gallup News. Available from <https://news.gallup.com/poll/267074/percentage-americans-vegetarian.aspx>.
6. NCHS. (2015). Measuring Guides for the Dietary Recall Interview. National Center for Health Statistics, Centers for Disease Control and Prevention. Available from https://www.cdc.gov/nchs/nhanes/measuring_guides_dri/measuringguides.htm#:~:text=Measuring%20Guides%20for%20the%20Dietary%20Recall%20Interview,-Related%20Pages&text=The%20nutritional%20assessment%20component%20of,fluent%20in%20Spanish%20and%20English.
7. U.S. Census Bureau QuickFacts. (2019). Carrboro town, North Carolina. United States Census Bureau. Available from: <https://www.census.gov/quickfacts/fact/table/carrborotownnorthcarolina/POP060210>.
8. USDA. (2000). Dietary Guidelines for Americans, 5th Edition. United States Department of Agriculture. Available from <https://health.gov/sites/default/files/2020-01/DGA2000.pdf>.

Appendix A

Dietary Items from Carrboro Community Climate Action Plan 2019 Survey

We now have a few questions regarding dietary choices

11. Out of an average of 21 meals per week (3 daily), how many of these meals on average contain dairy products?

12. Out of an average of 21 meals per week, how many of your meals on average contain meat (beef, pork, chicken, fish)?

_____ (If zero, skip to #14)

13. Out of those (#12 response), how many of these meals on average contain beef?

14. Do you follow a vegan diet?

Yes (Skip to #20) No (Continue)

15. Do you follow a vegetarian diet?

Yes (Skip to #19) No (Continue)

16. Do you follow a pescatarian diet?

Yes (Skip to #19) No (Continue)

17. Have you considered eating fewer meals with meat/meat products?

Yes (Continue)
 No What would be an incentive for you to do so? (Ask and skip to #19)

18. What do you find is the most challenging aspect about eating fewer meals with meat?

19. Do you follow a dairy-free diet?

Yes No

20. What percentage of the food you eat was produced locally? (If zero, skip to #22)

21. What types of food do you eat that are produced locally? (Read choices)

Produce Meat Dairy Baked Goods Other

22. What percentage of the food you eat is organic? (If zero, skip to #24)

23. What types of food do you buy organic? (Read choices)

Produce Meat Dairy Baked Goods Other

24. What most influences your daily food choices?

Appendix B

Data from United States Department of Agriculture (USDA) serving size dietary guidelines and 2018 Food and Drug Administration (FDA) report of Reference Amounts Customarily Consumed

Food Type	Ave Portion Size/Meal (g for meat, mL for liquids)	Ave Portion Size/Meal (kg/meal)
Milk	240	0.24
Cheese	55	0.055
Butter	15	0.015
Yogurt	170	0.17
Chicken	110	0.11
Fish	110	0.11
Pork	110	0.11
Beef	110	0.11