DURHAM ACADEMY

SUSTAINABILITY GUIDE 2024-25

Action Plan, pp. 1-20

2023-24 Greenhouse Gas Report, pp. 21-41

Durham Academy Sustainability Action Plan

November 2024

Contents

Executive Summary

Sustainability at Durham Academy means fulfilling the school's mission while safeguarding the natural environment for future generations. Starting in 2019, students petitioned the administration and Board of Trustees to make a commitment to sustainability that includes measurable goals and a timetable for meeting them. In December 2023, the Board of Trustees identified sustainability as a top-level priority and endorsed the four-year goals proposed by student and adult leaders:

- Educate for sustainability at every level and in every subject
- Reduce greenhouse gas emissions by 25% from 2022-2023 levels
- Increase biodiversity on our campuses by at least two acres

By fulfilling this commitment, we will contribute to a positive environmental foundation for the lives that we envision for our students:

Moral: Care for others, care for the world, and live with integrity.
Happy: Find solace in nature and joy in improving the world around us.
Productive: Take action to reduce the biggest crises of our time, climate change and biodiversity loss

Goal #1: Educate for sustainability at every level and in every subject

Educating for Sustainability (EfS) is based on the premise that a healthy and sustainable future is possible. To contribute to that positive future, students need to see a path beyond environmental threats such as climate change, pollution and biodiversity loss. They therefore learn about solutions as they learn about environmental challenges. They also develop age-appropriate skills and competencies reflected in these transfer goals.

Students will independently:

- Develop a connection to the place where they live and learn
- See themselves as members of the natural community
- Recognize common resources, understand their histories, and protect their futures
- Foster diversity and cooperation in ecosystems and human organizations
- Investigate root causes of problems; use imagination, determination, and empathy to seek solutions
- Integrate individual rights and collective responsibilities

"[In conducting interviews], I grew to understand the need for structural change. It made environmental justice more real. I can better put myself in others' perspectives." —Sara Lipsitch '23

Goal #2: Reduce greenhouse gas emissions by 25%

In 2022–2023, Durham Academy emitted a total of 3,789 mT of greenhouse gasses. The sources of those emissions were varied: 40% came from electricity, 21% from the commute to school, 11% from business travel, 7% from waste, and 21% from other sources. Strategies for reduction include technical measures, such as converting older lighting to LED, and cultural interventions to increase carpooling and decrease the volume of waste.

> *"As graduates of Durham Academy, we will be the ones leading change, creating new products and systems, and restoring nature."* —Environmental Sustainability in Action class presentation to Administrative Team, 1 February 2022

Goal #3: Increase biodiversity of campuses by at least two acres

As the largest private landowner in southwest Durham, Durham Academy has an opportunity to restore plant and animal life on our properties and influence others to do the same. By June 2028, we seek to restore natural habitat on at least two acres of non-recreational, low traffic areas of our campuses. This action will have added ecological benefits, including increased carbon storage, reduced stormwater runoff, better control of invasive species, and more shaded, vegetated spaces. It will also provide new spaces for outdoor education and quiet reflection.

> *"By changing the ways we think about our campus, Durham Academy can strive to set the bar for biodiversity across the private school sector." —Sustainability in Action* class presentation to Board of Trustees, 18 October 2023

Structure and Accountability

The commitment to sustainability requires a united effort by faculty, staff, administrators, students, and families of Durham Academy; everyone's participation is welcomed and needed. The Sustainability Coordinator organizes these efforts in conjunction with administrators and the Sustainability Leadership Team.

Upper School students elect a Student Government Sustainability Committee Chair each year. That person and the Committee lead student activities including recycling, composting, and support for school events. They also lead the Sustain-in, an annual educational event for the whole school community.

Introduction & Definition

Durham Academy thrives today because it has sustainably managed its financial and human resources over more than 90 years of its existence. Like society around it, the school's development patterns have been shaped by abundant, inexpensive fossil fuels and infrastructure (electricity, roads, plastics, solid waste collection, etc.). The school has complied with evolving codes for building and construction and stormwater management, but has not otherwise prioritized or regularly assessed its impact on the natural environment. Surrounding communities, particularly those of color, have been harmed by landfills, highways, power plants and other facilities that support the school. DA recognizes both a moral imperative and an educational opportunity to become a leader in sustainability and environmental justice.

Student leadership and advocacy has been instrumental in increasing awareness and conveying a sense of urgency about assuming more direct responsibility for a cooler, healthier future for the planet. The first Sustainability Committee conducted "Operation Shoe Size" in 2019–2020 to estimate the school's carbon footprint. In every subsequent year, the committee has made presentations to the Leadership Team and the Board of Trustees to advocate for sustainability in school operations and education of students and adults. They have planted trees and a rain garden, analyzed waste streams, and operated recycling and compost systems. Successive classes of students have maintained a transformative level of energy and determination.

In spring 2022, DA's Innovation Journey process catalyzed the formation of a Sustainability Leadership Team with representatives from every division of the school, the Family Association, and the staff. This team was awarded an Innovation Journey Grant to fund professional development by The Cloud Institute and a greenhouse gas inventory by GreenPlaces. These consultants helped us develop a detailed and pragmatic vision.

Sustainability at Durham Academy means fulfilling the school's mission while safeguarding the natural environment for future generations.

In December 2023, the Board of Trustees endorsed the school's commitment to sustainability as a top-level priority, including four-year SMART[1] goals proposed by the Sustainability Leadership Team:

[1] SMART=Specific, Measurable, Achievable, Realistic, and Time-bound

- Educate for sustainability at every level and in every subject
- Reduce greenhouse gas emissions by 25% from 2022-2023 levels
- Increase biodiversity on our campuses by at least two acres

By fulfilling this commitment, we will contribute to a positive environmental foundation for the lives that we envision for our students:

> **Moral:** Care for others, care for the world, and live with integrity.
> **Happy:** Find solace in nature and joy in improving the world around us.
> **Productive:** Take action to reduce the biggest crises of our time, climate change and biodiversity loss

We will also extend our impact on diversity and equity beyond the school community. We seek to adopt sustainable practices that contribute to a liveable planet for all. With increasing awareness of the inescapable interdependence of all living things, we are fostering future leaders ready to meet the challenge of sustaining human life in the long term.

Goal #1: Educate for sustainability at every level and in every subject

Educating for Sustainability (EfS) is based on the premise that a healthy and sustainable future is possible. To contribute to that positive future, students and adults need to see a path beyond environmental threats such as climate change, pollution and biodiversity loss. They need to know that people near and far are contributing to a positive future for the planet through lifestyle choices, volunteer activities, and professional pursuits in the arts, psychology, science, diplomacy, business, law, and many other fields. To meet this need and to instill a sense of hope for the future, students learn about solutions as they learn about environmental problems. They also develop age-appropriate skills and competencies reflected in the following transfer goals.

Students will independently:

- Develop a connection to the place where they live and learn
- See themselves as members of the natural community
- Recognize common resources, understand their histories, and protect their futures
- Foster diversity and cooperation in ecosystems and human organizations
- Investigate root causes of problems; use imagination, determination, and empathy to seek solutions
- Integrate individual rights and collective responsibilities

"[In conducting interviews], I grew to understand the need for structural change. It made environmental justice more real. I can better put myself in others' perspectives." —Sara Lipsitch '23

Education for sustainability harmonizes with other school initiatives. It supports wellness, for example, by getting children outside, increasing social connectedness and instilling hope for the future. It supports community engagement through collaboration with local nonprofits, neighborhoods, and government entities. And similar to the school's strategic foundation of broadening and deepening our work with diversity, equity and engagement, sustainability focuses on systemic issues, empathy and increased understanding that we are all sharing the same finite set of resources.

Through formal and informal mechanisms of professional development, curriculum development workshops, reflection and conversation, teachers will be supported in learning how to see where they are already teaching EfS principles and how those principles can be folded into other curricular priorities.

Baseline

The baseline for EfS content and competencies in our curriculum will be determined through a comprehensive EfS audit including:

- Individual interviews with a sample of teachers
- Work sessions with grade-level teams and departments
- Recommendations from students on the Middle and Upper School Student Academic Committees

Findings will be incorporated into a sustainability curriculum map, and teachers will be encouraged to share ideas and possibilities for ways these goals can be met.

Goals and Metrics

By 2027-2028, all faculty will incorporate transfer goals for sustainability in their curricula and/or instructional strategies.
Starting in 2025-2026, professional development will be devoted to curriculum planning and developing progress indicators for each grade level and department. Sustainability leaders within the faculty will develop instructional coaching skills so they can help teachers incorporate the transfer goals and performance indicators into their teaching.

Timeline

2024-2025	Establish a baseline for sustainability education by refining transfer goals and identifying existing curricular elements. Initiate a curriculum map for transfer goals and performance indicators. Continue to cultivate high-level awareness of the sustainability goals and their significance for humanity. Identify themes for subsequent years in four-year time span.
2025-2026	Develop performance indicators; share examples of transfer goals being implemented; focus community attention on theme for the year.
2026-2027	Expand implementation of transfer goals and performance indicators to all grade levels and departments; focus community attention on themes for year.
2027-2028	Revise transfer goals and performance indicators as needed; complete implementation; focus community attention on theme for the year.

“Engaging in collective action can have a multitude of benefits including social connectedness with people who share similar goals and values. We know from a large body of literature that social

support is one of the strongest predictors of mental well-being. We also thought that individuals who engaged in collective action — particularly if they saw those actions as having an impact — could have a stronger sense of self-efficacy and hope for the future." —Dr. Sarah Lowe, clinical psychologist and Associate Professor in the Department of Social and Behavioral Sciences, Yale School of Public Health. Yale Sustainability Explainer: Climate Anxiety

"As I've experienced firsthand, this kind of learning engages a wide range of students, because sustainable change takes all of us. Moreover, it fosters a variety of important skills while connecting academic knowledge with real-world problems, which is the best imaginable motivation for learning. Sustainable learning is at the heart of what DA is all about." —Cana Yao '25

Resources

- The Cloud Institute for Sustainability Education, Education For Sustainability: Standards & Performance Indicators
- Matto Mildenberger, The Tragedy of *The Tragedy of the Commons*
- NOAA Climate Literacy Guide

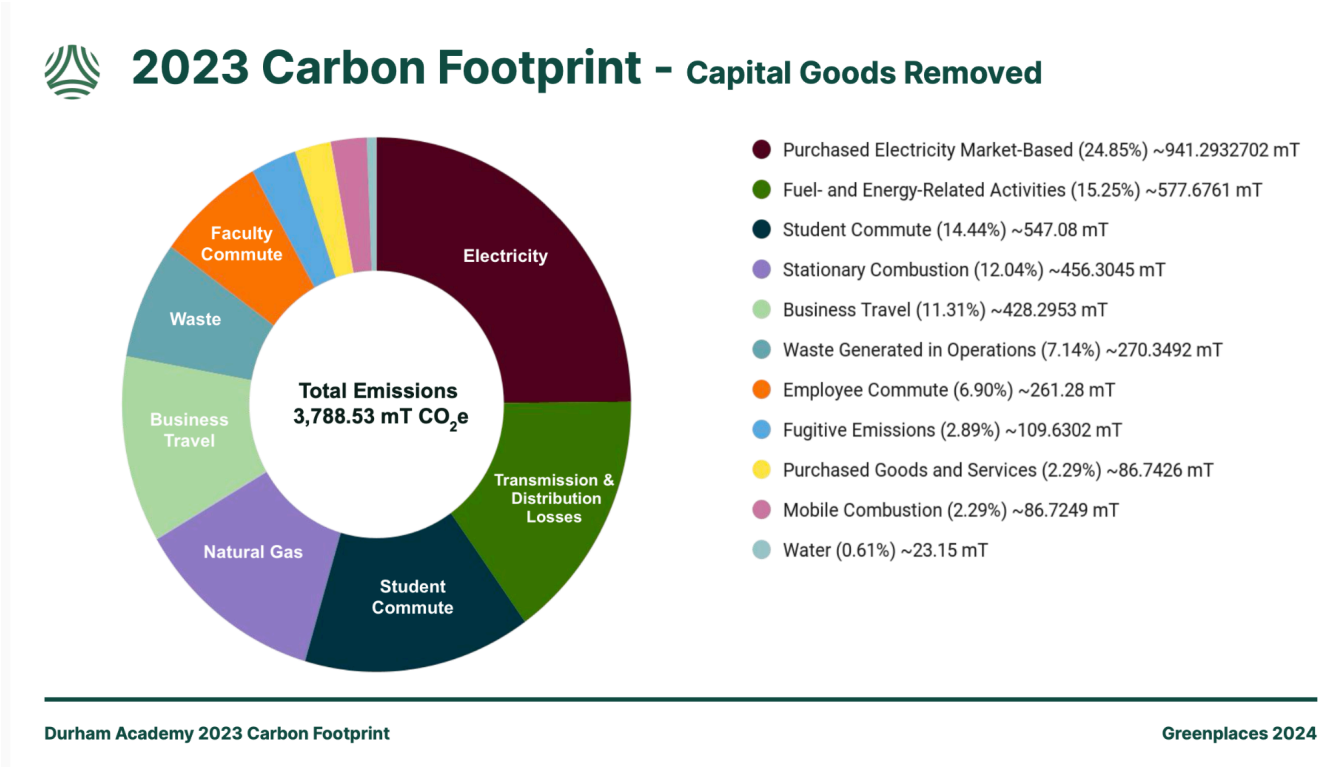
Goal #2: Reduce greenhouse gas emissions by 25%

"I wonder if there is a way to find a balance between the things that we want as people and the things that we need as humans on Earth." —Avery Foster '27

"*It's not a question of whether we can be sustainable, but whether we choose to be."* —Gary Lawrence, Lawrence Research

Since 2022, DA has contracted with GreenPlaces to generate an annual inventory of greenhouse gasses emitted. This inventory follows the global Greenhouse Gas Protocol. The 2022-23 inventory is the baseline against which annual change is measured.

Greenhouse gasses cause climate change. It is therefore important for Durham Academy to reduce its emissions as much as possible. DA's goal is to reduce emissions by 25% within four years, and we aspire to meet the global goal for reducing emissions by 50% by 2030[2]. The sources of our greenhouse gas emissions are varied, as the graphic summary of our carbon footprint shows. (The full report is available here). Emissions in 2022-2023 doubled as a result of construction of the Gateway Building, adding 3,848 mT in the category of Capital Goods to our operating total of 3,789 mT. An effort to minimize emissions will be made during the final phase of construction, but the primary opportunity for reducing emissions lies in the day-to-day operations of the school. We therefore focus on our footprint with Capital Goods removed.



The top two categories of our carbon footprint both relate to electricity use. Transmission losses are not within our direct control, but they will decrease as we reduce use of electricity. It is appropriate to think of these categories in combination as representing 40% of our greenhouse gas emissions. Similarly, the student and employee commutes can be combined for 21% of the total.

The varied sources of emissions require varied strategies for reduction. Some are technical in nature, such as converting older lighting to LED. They tend to have an initial cost and a long-term savings. Technically, this makes them investments rather than expenses. Other measures have ongoing costs. Many have no cost and instead require changes in culture.

[2] Source: Intergovernmental Panel on Climate Change Special Report, *Global Warming of 1.5°C* (2018).

Baseline Measurements and Goals for Reduction by Category

Durham Academy's emissions were evaluated according to the Global Greenhouse Gas Protocol in the 2021-2022 and 2022-2023 fiscal years. In 2022-2023, the total was 3,789 metric tons of CO_2e. Here is how Durham Academy could meet its goal of reducing its emissions by25% within four years.

	Baseline: 2022-2023 (calculated)	*Four-year reduction goal*	*2026-2027 (anticipated)*
Electricity use & transmission loss	1,519 mT	114 mT (7.5%)	1,405 mT
Student & employee commute	808 mT	267 mT (33%)	541 mT
Business travel*	428 mT	428 mT (100%)	0
Waste	270 mT	135 mT (50%)	255 mT
Mobile combustion**	87 mT	9 mT (10%)	78 mT
Total	3,789 mT	947 mT (25%)	2,842 mT

*Airline flights for debate tournaments, Cavalier Capstones and other student trips are the major sources in this category; professional development, alumni events and recruitment contribute to a lesser extent. The opportunity to reduce carbon emissions without weakening the overall experience is expected to be limited. This category, therefore, will be addressed primarily through offsets.

**Reducing emissions from this category would require purchasing 1-2 electric vehicles. This would not be cost effective, but could have other benefits such as visibility, inspiration, and influence on peer schools and the local community.

"Sustainability is the future. Sustainability is inherently part of Durham Academy's Strategic Vision, because sustainability is working to create an equitable, habitable world for EVERY human being on this planet. —Sanju Patel '23

Possible Initiatives (items in bold are underway)

Electricity use

- **Update lighting to LED in Lower School gym, Lower School classrooms, Upper School Kirby Gym**. Lighting in the Middle School gym also needs to be converted but will probably be completed as part of a larger renovation project.
- Maximize efficiency of HVAC systems; improve uniformity of indoor temperatures.
- Foster community support for 2° increase in acceptable temperature range.
- **Investigate options for solar energy generation, both rooftop and remote (Renewable Energy Credits).**
- Investigate geothermal energy systems for new construction.
- Remove unused appliances (e.g. some mini fridges and microwaves). Replace as needed with communal resources and education about caring for them.
- Avoid purchases of motorized equipment such as standing desks when the purpose can be achieved by mechanical devices.

Business Travel

- Consider carbon emissions when planning modes of travel and purchasing tickets.
- Choose vendors who demonstrate a commitment to sustainability or low emissions.
- **Hold an educational seminar for students and adults about the different types and providers of carbon offsets. Make recommendations for purchase.**

Reduce Waste

- **Develop systems for measuring volume or weight of landfill waste generated by the school. Make data available to all.**
- Replace existing, scattered receptacles with waste stations that include compost containers, recycling containers and trash containers. Waste stations should be identical across all campuses and include explicit, engaging, consistent signage to clarify proper use.
- Explore the value of joining a Zero Waste initiative/competition.
- Eliminate single-use containers from the school store, lunch providers and food trucks.
- Provide Zero Waste information and support for campus events, including DA Summer and Student U.
- Renegotiate contract with Meridian to reduce frequency of pickups.

Encourage Carpooling and Active Commutes

- **Gather and monitor data on the number of cars entering campus daily.**
- **Teach parents to use Veracross to find prospective carpool partners. Explore use of apps.**
- Encourage carpooling to major community events (e.g. Back-to School Night)
- Work with Family Association to create geographically-based meetups.

- Expand shuttle service, at least in morning, between Middle and Upper School campuses. Promote single campus drop-off to reduce traffic.
- Incentivize students and faculty who drive and park on campus to carpool.
- Purchase a set of e-bikes and charging stations for use by faculty and staff traveling between campuses.
- **Incorporate commuting to school into special programming such as Earth Day, Special Olympics, Senior Challenge: Local.**
- Participate in national Bike, Walk, and Roll to School days in fall and spring.

Mobile Combustion (school-owned vehicles)

- Record mileage on all vehicles annually on June 30.
- Log all fuel purchases (gas, diesel, and mixed fuel for landscaping equipment).
- Investigate purchase of electric bus(es).

Stationary Combustion

Investigate potential for use of electric landscaping equipment.

Timeline

2024-2025	● Update lighting in Lower School gym and classrooms. ● Get quotes on installation of sub meters where existing electricity meters serve multiple buildings. ● Hold seminar on offsets and RECs for DA students and administrators ● Investigate potential for rooftop solar, geothermal energy and Renewable Energy Credits. ● Begin replacement of scattered waste, recycling and compost receptacles with waste stations. ● Measure volume or weight of landfill waste generated by school. ● Reduce reliance on single-use containers in school store, athletic concession stands and lunch vendors. ● Provide Zero Waste information and support for campus events, DA Summer, and Student U. ● Sample number of cars entering campus during school day, athletic contests, etc. ● Conduct annual inventory of greenhouse gas emissions. ● Form task force to evaluate carpooling apps and work with Family Association to promote carpooling. ● Encourage adult carpooling for special events such as New Family Night.

2025-2026	• Create sortable list of potential investments in reducing carbon emissions, including cost, amount of reduction per dollar, educational value and social impact. • Create data dashboard and public displays of electricity use, waste volume, water usage and cars entering campuses. • Record indoor temperatures in key locations to determine disparities. • Maximize efficiency of HVAC systems; improve uniformity of indoor temperatures. • Continue replacement of scattered waste, recycling and compost receptacles with waste stations. • Engage Family Association task force to develop incentives (both positive and negative) for carpooling and vet carpool apps. • Conduct annual inventory of greenhouse gas emissions.
2026-2027	• Complete rollout of waste stations (indoor and outdoor). • Implement data dashboard into curriculum and school-wide communications. • Begin incentivizing carpooling. • Conduct annual inventory of greenhouse gas emissions.
2027-2028	• Complete implementation of measures to increase carpooling, supplement as needed with opportunities for families to purchase offsets. • Conduct annual inventory of greenhouse gas emissions.

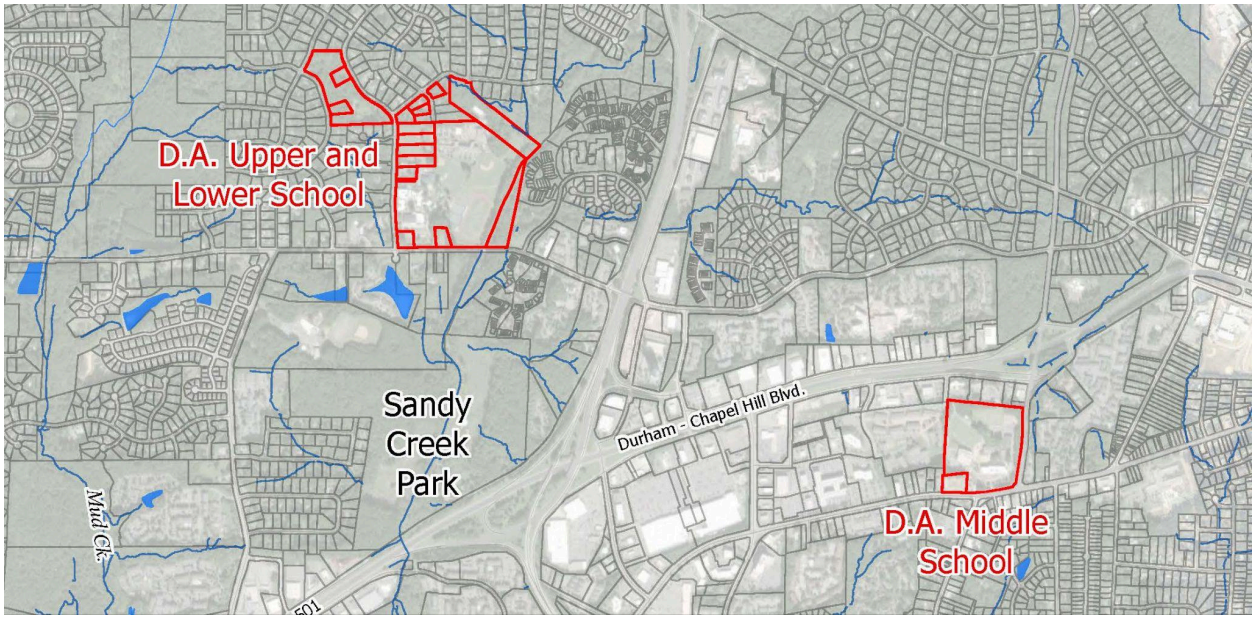
Resources

- Carpooling: Week without Driving national event. Can be rolled out in conjunction with Bike Durham
- GoKid Carpool App
- Waste: Zero Waste USA

"As graduates of Durham Academy, we will be the ones leading change, creating new products and systems, and restoring nature." —Environmental Sustainability in Action class presentation to Administrative Team, 1 February 2022

Goal #3: Increase biodiversity of campuses by at least two acres

"By changing the ways we think about our campus, Durham Academy can strive to set the bar for biodiversity across the private school sector." —Sustainability in Action class presentation to Board of Trustees, 18 October 2023



Parcels of Land Owned by Durham Academy

As the largest private landowner in southwest Durham, Durham Academy has an opportunity to restore plant and animal life on our properties and influence others to do the same. By June 2028, we seek to restore at least two acres of natural habitat in non-recreational, low traffic areas of our campuses. This action will have added benefits, including increased carbon storage, reduced stormwater runoff, better control of invasive species, and more shaded, vegetated spaces. Cultural understanding of the need for deliberate, strategic landscaping decisions will change with familiarity and education about the benefits of biodiverse plantings as opposed to expanses of short grass (a/k/a "green deserts"). These areas will also provide new spaces for outdoor education and quiet reflection.

Baseline

A limited baseline for our capacity to increase biodiversity on DA property was established via surveys of satellite maps of the 64-acre Preschool/Lower School/Upper School campuses. Sustainability Committee members utilized aerial maps to identify and estimate the acreage of DA property committed to non-functional (non-athletic or recreational) turf grass. This survey identified approximately 3.6 acres of turf grass that is not utilized for athletics, recreation or gathering space. The Middle School was not included because it was undergoing extensive reconstruction at the time, and information was not available for other properties owned by the school.
A more thorough baseline will be established in spring 2025.

> *"Our current landscaping paradigm has been making withdrawals from the ecological bank account that supports us for far too long. By helping our properties reach… ecological goals, we can finally start making life-saving deposits."* —Douglas R. Tallamy, author of *Nature's Best Hope* and *The Living Landscape*

Specific Goal and Metrics

GOAL: Increase quality of habitat and native plant diversity in at least two acres of land on our campuses by June, 2028.

METRICS (modeled after landscape goals set by Homegrown National Park co-founder Douglas R. Tallamy).

1. Support native pollinators at all stages of life:
    - Include native plants that share energy to support insects from larva to adult stage, with preference for keystone species where possible.
    - Manage landscape to provide opportunities for seasonal life stage and population development (e.g. reduce frequency of mowing on edges of property to support firefly habitat, leave the leaves in select non-recreational areas to protect insects during dormant periods).

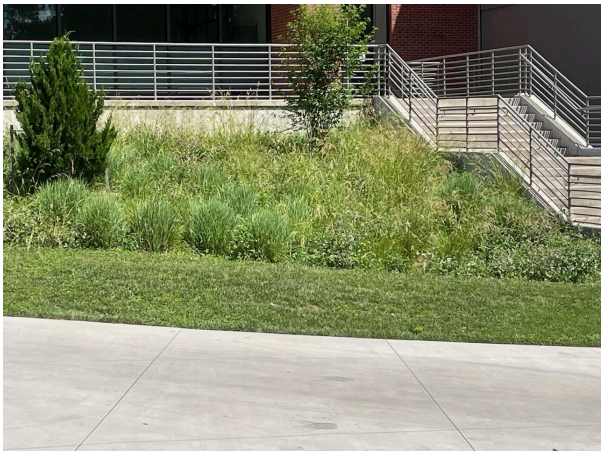
2. Support a food web:
    - Promote plantings that provide seeds and/or fruit for birds and mammals, and add to the regional habitat corridor for wildlife.
    - Reduce prevalence of invasive species: eradicate major infestations (e.g., tree of heaven), limit spread and prohibit future plantings.
    - Minimize use of pesticides and herbicides.

3. Sequester carbon, including in soil:
    - Reduce surface area of turf grass by at least 0.5 acre per year.
    - Increase prevalence of more deep-rooted native plants and trees.
    - Reduce frequency of mowing in non-recreational areas.

4. Manage the watershed by supporting upstream and downstream watershed protection and promoting soil infiltration:

    - Create vegetated swales.
    - Increase volume of native plants around drains.
    - Be vigilant about litter on campus and in Sandy Creek Park.

Examples from nearby locations:



Ravenscroft School, May 2024

Natural area allowed to grow tall. Grassy strip mowed along sidewalk gives buffer and sense of order (“cues to care” in landscaping parlance).

NC State University campus, April 2024

Native flowering plants, grasses and trees in dense planting alongside buildings. Gravel allows infiltration while reducing establishment of weeds.

Possible Initiatives

- Involve students, faculty, and parent volunteers in assessing the state of biodiversity on our campuses by conducting yearly campus bioblitzes; seek support from organizations such as Ellerbe Creek Watershed Association, Keep Durham Beautiful, and the Piedmont Wildlife Center.
- Offer workshops and movie nights for the school community to increase understanding of biodiversity and its value.
- Collaborate with science faculty and beyond to develop labs and activities that help track and collect data for weather conditions, stream flow and biodiversity on DA properties.
- Develop protocol for landscaping purchases such that no species deemed invasive or noxious in North Carolina is included. New plantings would include at least 50% perennial plants from the Southeastern U.S., and minimize water use.
- Convert existing beds of exotic plants to natives.
- Plan large-scale landscaping efforts to occur at seasonally appropriate times to reduce water use and maximize chances for success, seeding open areas with cover crop at other times.
- Make biodegradable pesticides and mechanical weeders the default and specify circumstances that warrant alternatives.
- Support Sandy Creek Park through community engagement programs; explore the possibility of a programmatic commitment to park maintenance.

Timeline

2024-2025	• Expand on student-designed native “pocket prairie” parcels via Upper School biodiversity elective course. • Increase informational labels and signage at existing sites with consistent aesthetics. • Move forward with planned development of 0.5 acre, Family Association-funded, Elder Oak Commons with assistance from local landscape developer Preston Montague and guidance/support from Duke Gardens. Groundbreaking expected in Spring 2025. • Identify areas where invasive species need to be controlled and initiate control measures.
2025-2026	• Initiate second phase of Elder Oak Commons (trees, outdoor classroom features). • Expand native plantings at Lower School Giving Garden in alignment with 3rd grade pollinator projects, and include them in Preschool garden/playground area design. • Train/hire landscape design expert to support installation and maintenance of native plantings across campuses.

	● Expand on-campus outdoor programming and volunteer opportunities. ● Assess progress on meeting two-acre goal for native plantings, identify sites for continued expansion, ideally within the context of a five-year landscaping plan.
2026-2027	● Complete installation of plants and structures in Elder Oak Commons. ● Increase opportunities for landscape design position on maintenance team to coordinate with student community engagement and campus-based outdoor programming. ● Assess progress on meeting two-acre native plantings goal, consider potential sites for expansion on campus and on the property of community partners.
2027-2028	● Complete installation of native plants on two acres of DA property. ● Strengthen ties to community partners, especially in the immediate area, to foster more robust and coherent benefits to native species.

Structure and Accountability

"Climate change is here now, but so are we."—Rocco Pacciana '22

The commitment to sustainability requires a united effort by faculty, staff, administrators, students, and families of Durham Academy; everyone's participation is welcomed and needed. The Sustainability Coordinator organizes the school-wide effort in conjunction with the Sustainability Leadership Team, which includes representatives from each division, the Family Association, and key administrative departments. The Coordinator reports to the Associate Head of School for Goal #1 (Educate) and to to the Chief Finance & Operations Officer for Goal #2 (Reduce emissions) and #3 (Increase biodiversity).

Upper School students elect a Student Government Sustainability Committee Chair each year. That person and the Committee lead student activities including recycling, composting, support for school events, and an annual educational event for the whole school community. Younger students also contribute and are led by their teachers and advisors.

Contributors

Tina Bessias, Sustainability Coordinator

Michael Ulku-Steiner, Head of School
Kristen Klein, Associate Head of School
Leslie King, Director of Marketing and Communications
Jason Mundy, Director of Diversity, Equity & Engagement
Victoria Muradi, Director of Strategic Initiatives

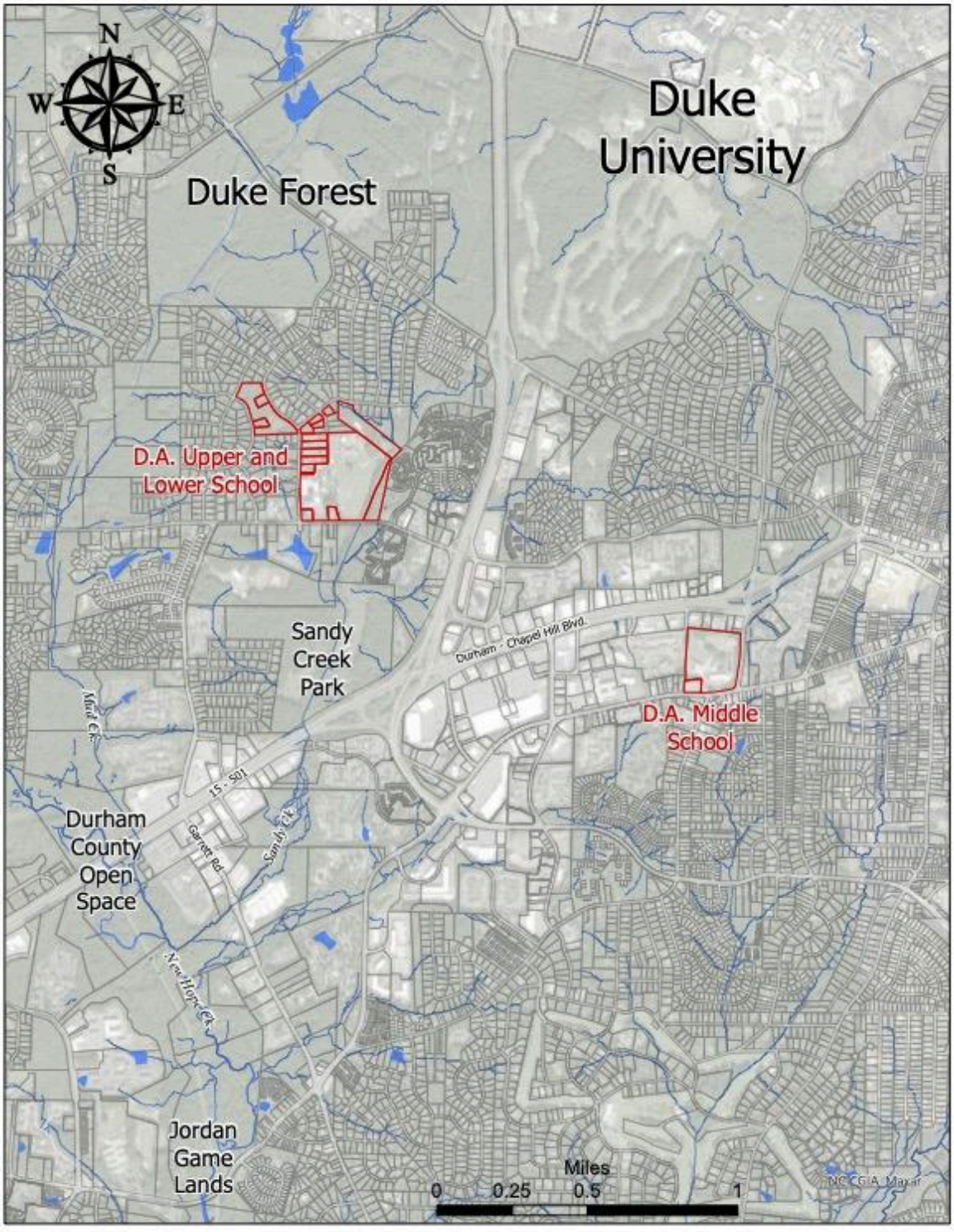
Hobson Hogan, Chair of Buildings, Grounds & Sustainability Committee

Sustainability Leadership Team:

- Andrea Caruso, Upper School science teacher
- Karen Richardson, Middle School chorus teacher, Fine Arts Academic Leader
- Alex Eren, Middle School science teacher and Science Academic Leader
- Michelle Preslik, Office of Information Technology Mobile Device Administrator'
- Lori Evans, Lower School science teaching assistant
- Diane Daly, Lower School science teacher and Academic Leader
- Theresa Shebalin, Preschool Science Teacher
- Ann Leininger, Buildings, Grounds & Sustainability Committee member, parent of alumnus
- Elizabeth Albright, Family Association Sustainability Committee Chair

David Bradley '13, Durham County Open Space Specialist

Appendix: Durham Academy property in context



Durham Academy FY 2024 Greenhouse Gas Summary Report

December 13, 2024

Mimi Franco, Senior Customer Success Manager

Lily Rowland, Customer Success Manager

Erin Bryson, Senior Carbon Accountant

Greenplaces

Table of Contents

Introduction

Thank you for partnering with Greenplaces to assess your company's carbon footprint. Learning your emission sources is a critical step in your sustainability journey. We've prepared this document to help you understand your footprint and the methodologies we use to measure your emissions. Please feel free to reach out to our team with any questions or clarifications.

Prepared By

Greenplaces

For

DURHAM ACADEMY

Assessment Summary

Based on the information provided and the analysis conducted, subject to the attached Statement of Limiting Conditions, we have concluded that as of the assessment date, Durham Academy (also referred to as the client or reporting company) emissions in metric tons (mT) of carbon dioxide equivalent (CO_2e) from the examined categories is as follows:

Category	Location-Based Emissions (mT CO_2e)	Market-Based Emissions (mT CO_2e)
Scope 1	519.25	519.25
Scope 2	1,048.11	876.56
Scope 3	1,746.27	1,746.27
Totals	3,313.64	3,142.08

Company Overview

Durham Academy is an independent, coeducational day school in Durham, North Carolina, whose students range from pre-kindergarten to grade twelve.

The purpose of a Durham Academy education is to prepare each student to live a moral, happy, and productive life. The development of intellect is central to such a life and, thus, intellectual endeavor and growth are the primary work of the school. The acquisition of knowledge, the development of skills, critical judgment, and intellectual curiosity, and increased understanding are the goals of the school's academic program.

Geographic Boundary

This report includes Durham Academy campus buildings listed below:

1. Upper School Building: 3601 Ridge Road, Durham, NC
2. Middle School Building: 3116 Academy Road, Durham, NC
3. Lower School Building: 3501 Ridge Road, Durham, NC
4. Administration Building: 3130 Pickett Road, Durham, NC

Base Year, Reporting Period, and Consolidation Approach

This greenhouse gas inventory follows the Greenhouse Gas (GHG) Protocol (World Resources Institute [WRI], 2003, 2015, 2018) guidance and standards unless otherwise noted or requested by the client. The global warming potential (GWP) values applied in calculations are sourced from the The Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) unless otherwise noted (IPCC, 2014). This greenhouse gas inventory report focuses on the reporting company's emissions from their 2024 fiscal year (July 1, 2023 to June 30, 2024).

The operational control approach was used to determine Durham Academy's organizational boundaries. Durham Academy owns and controls all of the buildings located on their campus, thus all direct emissions activities and purchased energy emissions are included in scopes 1 and 2 of their inventory. Upon request from Durham Academy, their FY 2024 footprint operational boundaries include only the following limited emissions categories:

- Scope 1 - Stationary Combustion
- Scope 1 - Fugitive Emissions
- Scope 2 - Purchased Electricity
- Scope 3 Category 1 - Purchased Goods & Services (Water Only)
- Scope 3 Category 5 - Waste Generated in Operations
- Scope 3 Category 6 - Business Travel
- Scope 3 Category 7 - Employee Commute

Greenplaces began working with Durham Academy in 2022 and has also supported the calculation of their FY 2022 and FY 2023 footprints. Greenplaces advises against direct comparison between the FY 2024 footprint and preceding years due to the change in operational boundaries.

Table 1.0a Operational Scopes

Scope 1	mT CO_2e	Exclusions	Estimated Activity	Database Used
Fugitive Emissions	**31.98**	Client assumed no new purchases or disposals of refrigerant equipment during the reporting period. Domestic refrigeration equipment with low-GWP gasses were excluded.	The screening method was used to estimate fugitive emissions based on the domestic refrigeration and HVAC equipment inventory provided for Durham Academy's FY2023 footprint.	Bjønness et al., 2019 IPCC, 2014
Stationary Combustion	**487.28**	No known exclusions.	No estimates or assumptions applied in calculations.	US EPA, 2024a
Mobile Combustion	**Excluded, relevant**	Excluded from footprint upon request by client.	Not applicable.	Not applicable.
Process Emissions	**Excluded, not relevant**	Not applicable.	Not applicable.	Not applicable.
Total Scope 1 Emissions	**519.25 mT CO_2e**			

Scope 2	mT CO_2e	Exclusions	Estimated Activity	Database Used
Purchased Electricity - Location Based	**1,048.11**	A single electricity meter was excluded due to insufficient information. This meter was only active for six months of the reporting period and likely represents an immaterial exclusion.	No estimates or assumptions applied in calculations.	US EPA, 2024a
Purchased Electricity - Market Based	**876.56**	The exclusions and estimated activity notes provided for Location Based emissions are also applicable for Market Based emissions calculations.		US EPA, 2024b

Total Scope 2 Emissions (Location-Based)	**1,048.11 mT CO_2e**
Total Scope 2 Emissions (Market-Based)	**876.56 mT CO_2e**

Scope 3	mT CO_2e	Exclusions	Estimated Activity	Database Used
Category 1: Purchased Goods and Services	**2.41**	All purchased goods and services except for purchased water were excluded from footprint upon request by client.	No estimates or assumptions applied in calculations.	DEFRA, 2024
Category 2: Capital Goods	**Excluded, relevant**	Excluded from footprint upon request by client.	Not applicable.	Not applicable.
Category 3: Fuel- and Energy-Related Activities Not Included in Scope 1 or Scope 2	**553.24**	Exclusion notes from Stationary Combustion, Mobile Combustion, and Purchased Electricity are applicable to this category.	Estimation notes from Stationary Combustion, Mobile Combustion, and Purchased Electricity are applicable to this category.	DEFRA, 2021 DEFRA, 2024 US EPA, 2024a US EPA, 2024b
Category 4: Upstream Transportation and Distribution	**Excluded, not relevant**	No known exclusions.	Not applicable.	Not applicable.
Category 5: Waste Generated in Operations	**245.01**	No known exclusions.	Where waste data was provided in volume of disposal containers and frequency of pick-ups, containers were assumed to be 100% full at time of collection. A 1:1 ratio of water supply to wastewater generation was assumed.	DEFRA, 2024 US EPA, 2016 US EPA, 2024a
Category 6: Business Travel	**157.66**	Only business travel paid for by Durham	The spend-based method was used to calculate the	Greenview, 2024

		Academy was included in the footprint.	majority of business travel emissions.	Ingwersen & Li, 2024 NAICS, 2017 World Bank, 2023
Category 7: Employee Commuting	*Employee Commute:* **202.50** *Student Commute:* **585.46**	Emissions associated with remote work energy consumption are not included in this footprint.	Employee and student commute survey results were extrapolated to represent 100% of headcount. Employee survey results were allocated based on % of headcount per employee type. Durham Academy provided an assumed number of commuting days per year for students and per employee type.	DEFRA, 2024 Electric Vehicle Database, n.d. US EPA, 2024a
Category 8: Upstream Leased Assets	**Excluded, not relevant**	No known exclusions.	Not applicable.	Not applicable.
Category 9: Downstream Transportation and Distribution	**Excluded, not relevant**	No known exclusions.	Not applicable.	Not applicable.
Category 10: Processing of Sold Products	**Excluded, not relevant**	No known exclusions.	Not applicable.	Not applicable.
Category 11: Use of Sold Products	**Excluded, not relevant**	No known exclusions.	Not applicable.	Not applicable.
Category 12: End-of-Life Treatment of Sold Products	**Excluded, not relevant**	No known exclusions.	Not applicable.	Not applicable.
Category 13: Downstream Leased Assets	**Excluded, not relevant**	No known exclusions.	Not applicable.	Not applicable.
Category 14: Franchises	**Excluded, not relevant**	No known exclusions.	Not applicable.	Not applicable.

Category 15: Investments	**Excluded, potentially relevant**	Not included in footprint assessment.	Not applicable.	Not applicable.
Total Scope 3 Emissions	**1,746.27 mT CO_2e**			
Total Scope 1, 2 & 3 Market-based emissions	**3,142.08 mT CO_2e**			

Table 1.0b Intensity Ratios

Total emissions in mT CO_2e per employee head, based on total employee count of 278	11.30 mT CO_2e/employee	**Total emissions in mT CO_2e per 1,000 sq ft, based on total square footage of 279,349**	11.25 mT CO_2e/1,000 sq ft

Targets

After the conclusion of this assessment report, Greenplaces can provide high-level strategies for emissions reduction targets with Durham Academy.

Carbon Offsets and Renewable Energy Credits

Greenplaces has not purchased carbon offsets or renewable energy credits on behalf of Durham Academy's FY 2024 footprint at the time of this report.

Discussion of Methodology

1.0 Objective

Greenplaces strives to provide clients with a comprehensive, accurate representation of their current carbon footprint, adhering to the GHG Protocol accounting and reporting principles: relevance, completeness, consistency, transparency, and accuracy.

2.0 Scope 1 Emissions

Stationary Combustion: Durham Academy

Primary utility bill data for natural gas consumption was provided for eleven meters, which was assumed to represent all Durham Academy buildings. Emissions were calculated using the natural gas emission factor provided by the US Environmental Protection Agency (US EPA) in their 2024 Emission Factor Hub (US EPA, 2024a). The calculated emissions value represents the tank-to-wheel impact of the stationary fuel combustion.

Total emissions from stationary combustion of natural gas came to **487.28 mT CO_2e**. This value represents a low degree of uncertainty due to the use of primary consumption data from utility bills.

Fugitive Emissions: Durham Academy

The screening method was used to estimate fugitive emissions from domestic refrigeration and heating, ventilation, and air conditioning (HVAC) equipment. The data provided for in-use refrigerant equipment from Durham Academy's 2023 footprint was used as proxy data, based on the assumption that no new equipment was acquired or disposed of during the reporting period. In alignment with the methodology followed in the 2023 footprint, domestic refrigeration equipment with low-GWP gasses (e.g. R600a, R290) were excluded as the associated emissions are negligible.

The equipment type, refrigerant type and charge capacity was provided for twenty-six domestic refrigeration units and fifty-two HVAC units. The total refrigerant gas leakage was calculated by applying an average annual leakage rate for each equipment type to the equipment charge capacity (Bjønness et al., 2019).

The GHG Protocol specifies that GHGs regulated under the Kyoto Protocol are to be included within corporate inventory boundaries, and all other GHGs, such as those regulated by the Montreal Protocol on Substances that Deplete the Ozone Layer, are optional (WRI, 2003). The reporting company did provide data for equipment charged with Montreal Protocol refrigerant gasses, and Greenplaces calculated the associated fugitive emissions using the screening method described above. The resulting emissions total, which is excluded from Durham Academy's inventory totals and listed separately here for reference, is 14.68 mT CO_2e.

Total fugitive emissions came to **31.98 mT CO_2e**. This value represents a high degree of uncertainty due to the use of the screening method.

3.0 Scope 2 Emissions

Purchased Electricity: Durham Academy

Primary utility bill data for electricity consumption was provided for seventeen meters, which was assumed to represent all Durham Academy buildings.

The utility bill provided for meter number 329284139 did not include a 12-month consumption total despite appearing to have been active from January 2024 onwards. The reporting company indicated that this meter was likely connected to a temporary construction trailer and that any electricity consumption associated with it was insignificant, so it was excluded from this footprint.

Location based emissions were calculated using the US EPA eGrid subregion emission factor for SERC Virginia/Carolina (US EPA, 2024a). Market based emissions were calculated using the supplier-specific emission factor for Duke Energy Carolinas (US EPA, 2024b).

The reporting company indicated the presence of a small on-site solar panel installation. Information about the quantity of renewable energy generated by this installation and whether any renewable energy was sold to the grid could not be obtained. The reporting company indicated the solar panels were damaged during the reporting period and likely did not produce a significant quantity of electricity, so were excluded from this footprint.

Total location-based electricity emissions for all locations were calculated at **1,048.11 mT CO_2e** and total market-based electricity emissions were calculated at **876.56 mT CO_2e.** This value represents a low degree of uncertainty due to the use of primary data provided via utility bills. Table 2.0 below displays kWh per meter.

Table 2.0 Electricity per Meter: Durham Academy

Source: US EPA, 2024a; US EPA, 2024b

Meter No.	Kilowatt hours per year
77552058	22,831
77568555	80,567
77617050	11,636
77617081	36,852
77633625	198,900
77633626	230,630
77633931	34,107
77633932	749,058
77670084	28,492
319358968	315
320252099	594,013
322043702	1,014,742
327974508	309
328506177	335,246
329284139	Excluded
344036700	267,617
No Meter Number Provided	84,888
Totals	**3,690,203**

4.0 Scope 3 Emissions

4.1 Category 1: Purchased Goods & Services

Purchased Goods and Services: Durham Academy

Upon Durham Academy's request, purchased water is the only emissions source included for Purchased Goods and Services in this footprint. The reporting company provided primary utility bill data for water consumption for twelve meters, which was assumed to represent all Durham Academy buildings.

Emissions were calculated using the water supply emission factor from the UK Department for Environment, Food and Rural Affairs (DEFRA) emission factor database (DEFRA, 2024).

Total emissions from purchased water supply came to **2.41 mT CO_2e**. This value represents a low degree of uncertainty as primary utility bill data was used in calculations.

4.3 Category 3: Fuel- and Energy-Related Activities Not Included in Scope 1 or Scope 2

Fuel- and Energy-Related Activities (FERA) Not Included in Scope 1 or Scope 2: Durham Academy

Greenplaces calculated the reporting company's fuel- and energy-related activities (FERA) emissions not already accounted for in Scope 1 and Scope 2 from stationary combustion and purchased electricity. This includes Well-to-Tank (WTT) emissions associated with the extraction, refinement, and transportation of fuels used for energy generation and lifecycle Transmission & Distribution (T&D) emissions from grid system energy loss. All usage data and estimation methods discussed for fuel and energy activities in Section 2.0 and 3.0 of this report are relevant to this category as the same usage data was used to calculate FERA emissions.

WTT Emissions

Well-to-tank emissions from stationary combustion were calculated using fuel-specific emission factors from UK DEFRA (DEFRA, 2024). The WTT emissions from purchased electricity were calculated using US-specific emission factors obtained from the DEFRA (2021) emission factors database and are reported using AR4 GWP (DEFRA, 2021).

Lifecycle T&D Emissions

T&D loss emissions from purchased electricity were calculated using US EPA eGRID subregion emission factors multiplied by the US-average grid loss of 5.1 percent (US EPA, 2024a & 2024b). The upstream WTT emissions associated with T&D loss from purchased electricity were calculated using country-specific emission factors obtained from the DEFRA (2021) emission factor database and are reported using AR4 GWP (DEFRA, 2021).

Total emissions from FERA are **553.24 mT CO_2e.** This value represents a low degree of uncertainty due to the use of primary energy and fuel consumption data.

4.5 Category 5: Waste Generated in Operations

Waste Generated in Operations: Durham Academy

The reporting company provided primary utility bill data for solid waste generation that was assumed to represent all Durham Academy buildings. The reporting company switched solid waste service provider companies part way through the reporting period, with the previous company providing waste collection data in container volume and pick-up frequency and the current company providing waste collection data in units of weight. Both waste service providers differentiated the quantity of solid waste collected by waste type and disposal method.

Where solid waste data was provided as container volume units and pick-up frequency, waste containers were assumed to be 100% full at time of collection. Container volume was multiplied by the number of pick-ups per month to determine the total volume collected per month, which was then converted to units of weight using waste-type-specific conversion factors (US EPA, 2016). Solid waste

emissions were calculated by applying waste type- and disposal method-specific emission factors (US EPA, 2024a).

Wastewater generation was determined based on an assumed 1:1 ratio of water supply to wastewater generation, and the same data sources described in Section 4.1 of this report were used. Emissions from wastewater were calculated using the water treatment emission factor from the UK DEFRA emission factor database (DEFRA, 2024).

Total emissions from waste generated in operations are **245.01 mT CO_2e.** This value represents a moderate degree of uncertainty due to the assumptions that bins were 100% full at time of collection and the use of waste density conversions.

4.6 Category 6: Business Travel

Business Travel: Durham Academy

The reporting company provided data for their business travel activities, including air travel, ground travel (vehicle rentals, taxi/rideshare services, charter bus rentals), and accommodations. The data type provided by Durham Academy is broken down by travel category and group below:

	Air Travel	Ground Travel	Accommodations
Debate	Spend-based	Spend-based	Spend-based
Capstone	Spend-based	Spend-based	No. of Nights
Recruit., Alumni & Consultants	Spend-based*	Spend-based	Spend-based & No. of Nights
Professional Development	Spend-based	No Data Provided	Spend-based

* *An assumption provided by Durham Academy of US$300 per domestic round trip flight was used to estimate the total air travel spend for twenty-five teaching candidates.*

Where possible, emissions from accommodations were calculated using the number of room nights rather than spend-based data. If the country of stay was not

indicated in the data provided, the US was assumed. Country-specific emission factors per room night were applied (Greenview, 2024).

The spend data was assigned to a North American Industry Classification System (NAICS) 2017 industry code using the transaction description or notes provided by Durham Academy. Spend-based emission factors from the US EPA Supply Chain GHG Emission Factors (v1.3) database were used to calculate emissions and applied to the transaction data based on the corresponding NAICS industry code (Ingwersen & Li, 2024). Emission factors were adjusted for inflation from 2022 to 2023 purchasing power using the US inflation factor provided by the World Bank (World Bank, 2023).

A breakdown of business travel emissions by travel type and group is provided in mT CO_2e below:

	Air Travel	Ground Travel	Accommodation	Total
Debate	48.43	19.42	16.45	**84.30**
Capstone	46.71	4.91	6.67	**58.28**
Recruit., Alumni & Consultants	7.20	0.03	1.14	**8.37**
Professional Development	4.80	-	1.90	**6.70**
Total	**107.14**	**24.36**	**26.16**	**157.66**

Total emissions from business travel are **157.66 mT CO_2e.** This value represents a high degree of uncertainty due to the use of the spend-based method for calculating the emissions from the majority of business travel activities.

4.7 Category 7: Employee Commute

Employee Commute: Durham Academy

Durham Academy provided the results of their 2024 employee and student commute survey, as well as assumptions for the number of days on campus per

year. Each survey response included the respondents usual method(s) of transportation, one-way daily commute distance in miles, and number of carpool partners also traveling to Durham Academy. Greenplaces assigned each reported method of transportation to an applicable EPA vehicle type category and adjusted the commute distance to per-person miles using the number of carpool partners indicated. Where multiple methods of transportation were reported by a single respondent, Greenplaces assumed an equal allocation of commuting miles per method. The survey data included 739 student responses and 113 employee responses, which represents sixty-one percent and forty-one percent of total headcount, respectively.

To calculate the total annual commuting miles per transportation method for students, the daily commute data from the survey was extrapolated to 100 percent of the headcount and multiplied by an assumed 169 days on campus per year. Of the total employee headcount of 278, three were identified as remote employees that commuted to campus five days per year, seventy-seven were identified as administrative and maintenance staff that commuted to campus 210 days per year, and 198 employees were identified as faculty and extended day staff that commuted 178 days per year. Daily employee commuting miles per transportation method were extrapolated to 100% of the headcount and assigned proportionally to the employee types and multiplied by their respective assumed on-campus days per year.

Emissions from both student and employee commuting by gasoline vehicles, bus, and motorcycle were calculated by multiplying the annual commute mileage per method of transportation by emission factors from the US EPA 2024 emission factors hub (EPA, 2024a). Emissions from commuting via electric vehicle (EV) were calculated by converting the miles driven to kilowatt-hours using an average EV energy efficiency of 190 Watt-hours per kilometer (Electric Vehicle Database, n.d.) and applying the eGrid subregion emission factor for SERC Virginia/Carolina (US EPA, 2024a). Emissions from commuting via hybrid vehicles and diesel vehicles were calculated using emission factors from UK DEFRA (DEFRA, 2024).

Total emissions from employee and student commuting are **787.95 mT CO_2e.** The total emissions from students only are **585.46 mT CO_2e** and the total emissions from employees only are **202.50 mT CO_2e.** These values represent a moderate degree of uncertainty due the survey response rate of under sixty-percent across all commuters.

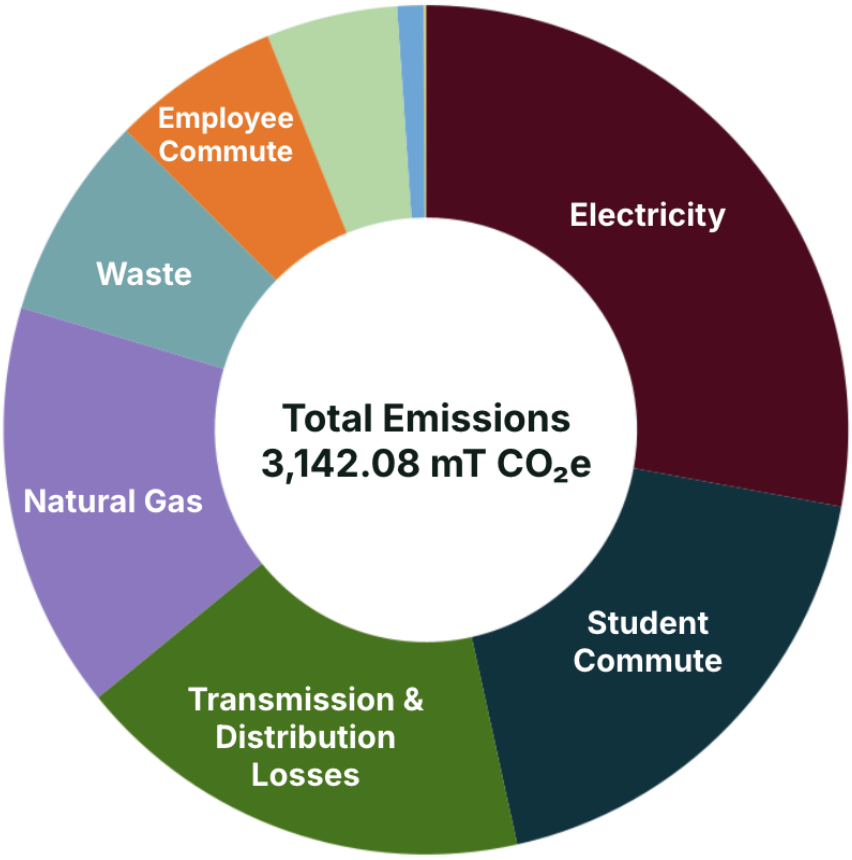
Assessment Results

Based on the information provided and the analysis conducted, and subject to the attached Statement of Limiting Conditions, we have concluded that Durham Academy scope 1 and 2 emissions, with market-based method purchased electricity, as of the assessment date are: 1,395.81 mT of CO_2e. Scope 3 emissions from included categories as of this assessment date are approximately 1,746.27 mT CO_2e.

Total emissions are:

3,142.08 mT of CO_2e

[Visual breakdown by category, next pg.]



- Purchased Electricity Market-Based (27.90%) ~876.56 mT
- Student Commute (18.63%) ~585.46 mT
- Fuel- and Energy-Related Activities (17.61%) ~553.24
- Stationary Combustion (15.51%) ~487.28
- Waste Generated in Operations (7.80%) ~245.01 mT
- Employee Commute (6.44%) ~202.50 mT
- Business Travel (5.02%) ~157.66 mT
- Fugitive Emissions (1.02%) ~31.98 mT
- Purchased Goods and Services (0.08%) ~1.41 mT

Documentation

When conducting carbon assessments, Greenplaces recommends that client include any verifying documentation of carbon emissions, REC and carbon credit purchases as applicable.

Statement of Limiting Conditions

1. This Carbon Assessment is valid only for the stated purpose and as of the date of its completion.
2. Information provided by the client or its representatives has been accepted by Greenplaces without verification and is not audited, reviewed, or otherwise validated. The carbon footprint arrived at herein is based on such information.
3. Greenplaces has obtained certain information regarding GHG from public sources that it believes to be reliable. However, Greenplaces makes no representation regarding the accuracy or completeness of such information and has not taken action to corroborate such information.
4. This Carbon Assessment does not constitute an environmental site assessment, and Greenplaces takes no responsibility for identifying any actual or potential environmental liabilities or contamination on or associated with the Client's property.
5. The prior written consent of Greenplaces is required before all or any part of the contents of this Carbon Assessment may be disseminated to the public or reproduced or distributed to any third parties. Any modification of this Carbon Assessment requires the prior written consent of Greenplaces.

Works Cited

Bjønness, K. L., Gustafsson, T., Ishikawa, J., & Maione, M. (2019). Emissions of fluorinated substitutes for ozone depleting substances. International Panel on Climate Change. https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/3_Volume3/19R_V3_Ch07_ODS_Substitutes.pdf

Department for Environment Food and Rural Affairs. (2021). Greenhouse Gas Reporting: Conversion Factors 2021. Government of the United Kingdom Department for Environment Food and Rural Affairs.

Department for Environment Food and Rural Affairs. (2024). Greenhouse Gas Reporting: Conversion Factors 2024. Government of the United Kingdom Department for Environment Food and Rural Affairs.

Electric Vehicle Database. (n.d.). Energy consumption of full electric vehicles. Retrieved November 22, 2024. https://ev-database.org/cheatsheet/energy-consumption-electric-car

Greenview. (2024). Hotel Footprinting Tool V3.0. Retrieved November 22, 2024. www.hotelfootprints.org.

Ingwersen, W., & Li, M. (2024). Supply Chain Greenhouse Gas Emission Factors for US Industries and Commodities: Supply Chain Greenhouse Gas Emission Factors v1.3 by NAICS-6. U.S. Environmental Protection Agency, EPA/600/R-20/001.

Intergovernmental Panel on Climate Change. (2014). Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

North American Industry Classification System. (2017). North American Industry Classification System 2017 Manual. https://www2.census.gov/library/reference/naics/publications/2017-NAICS-Manual.pdf

United States Environmental Protection Agency. (2016). Volume-to-Weight Conversion Factors. https://www.epa.gov/sites/default/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fnl.pdf

United States Environmental Protection Agency. (2024a). GHG Emission Factors Hub. United States Environmental Protection Agency. https://www.epa.gov/climateleadership/ghg-emission-factors-hub

United States Environmental Protection Agency. (2024b). The Emissions & Generation Resource Integrated Database: eGRID Technical Guide with Year 2022 Data. https://www.epa.gov/system/files/documents/2024-01/egrid2022_technical_guide.pdf

World Bank. (2023). A Global Database of Inflation. https://www.worldbank.org/en/research/brief/inflation-database

World Resources Institute. (2003). GHG Protocol Corporate Accounting and Reporting Standard. Greenhouse Gas Protocol.

World Resources Institute. (2015). GHG Protocol Scope 2 Guidance. Greenhouse Gas Protocol.

World Resources Institute. (2018). Technical Guidance for Calculating Scope 3 Emissions. Greenhouse Gas Protocol.

[End of Report]