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2030 District Transportation Survey

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Jan Culbertson, Ann Arbor 2030 District
Graham Sustainability Scholars Final Report
2024-2025

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Executive Summary

Our Graham team worked with Ann Arbor 2030 District to update, distribute, and analyze the bi-yearly Washtenaw Transportation Survey. Ann Arbor 2030 District is a public-private-nonprofit that has the goal of reducing greenhouse gas emissions in Washtenaw county, while also increasing competitiveness for local businesses. Our team worked in tandem with Jan Culbertson, the operations lead of Ann Arbor 2030 District, to collect data on transportation patterns across the Ann Arbor area.

In October 2024, we started with laying out our scope of work and discovering what kind of work Ann Arbor 2030 District does. We confirmed our partners' needs; we were tasked with creating a survey for local Ann Arbor businesses so that we could compare and analyze how transportation trends were changing in the area. Gaining insight into carbon emissions data and mitigation strategies were focuses of the project. From October to December, we focused on the marketing and outreach to our past surveyees and the expansion to new businesses in the Ann Arbor 2030 District contact list. Through the winter we continued to engage with our potential surveyees and confirm participation. In January and February of 2025, we updated our survey and launched it to our participants, providing gift cards and prizes as incentives for both individual and building-wide participation. Through the spring, we were able to collect and analyze our results and hold a webinar to share trends with participants. Prizes were distributed and we sent out individual reports to participating buildings so they may better understand their employees' transportation practices.

Through the past year, 465 survey responses were collected from 32 different buildings. This was a 46% increase in survey responses from the 2023 survey (319 responses were collected), likely due to marketing and outreach efforts. Many employees are still commuting for around 4 days/week and averaged a 25 mile distance from work. If we are to make transportation "greener", we must observe ways to lessen individual carbon footprint and lessen our limitations. When parsing through the data, common limitations were lack of public transportation, housing affordability and commuting distance, barriers to carpooling, accessibility to EVs, and biking/walking issues.

The information collected from this survey shows how increasing sustainable modes of transportation is pertinent to reach the city's climate goals. Improving housing affordability in Washtenaw County and building bike/walking infrastructure could also be beneficial to decrease emissions. The reduction of emissions is pertinent to combatting the climate crisis, and the city as well as the 2030 District should continue to employ data collection as a tool to provide guidance for businesses and policymakers.

Introduction and Background

As previously mentioned, our Graham Institute team worked in tandem with the Washtenaw 2030 District to ensure participation in the bi-yearly transportation survey to analyze response trends. We built on the previous Graham team's goal of analyzing pre & post-COVID 19 transportation trends by gearing our questions towards the purchase of electric vehicles (EVs) and incentive and desire to change commuting behaviors, in order to deduce any changes between the previous survey's responses and this year's responses.

This survey acts as part of the emissions benchmarking process for the Ann Arbor 2030 District's initiative, and the 2025 version allowed for further analysis of transportation behaviors based on the passage of time and different business types. Our survey provision and analysis showed changes in inclinations to alter transportation behaviors and the factors that would cause these behavior changes, in order to inform policy advocacy efforts.

In this report we will detail the methods used to achieve our project goals, the deliverables we produced, the recommendations we drew from survey results, and the anticipated impact of the newly updated Ann Arbor 2030 District transportation survey.

Methods

Marketing

To create incentives for our eventual participants, we reached out to local businesses for gift cards to be raffled out. We secured gift cards from Zingerman's, Bivouac, BYOC, and Argus Farm Stop. The incentives were promoted in our marketing flyer, which was featured in the Washtenaw 2030 newsletter and encouraged Washtenaw 2030 contacts to sign up to receive the survey (see Figure 1). Email templates were drafted and sent out, targeting new and old survey participants by outlining the goals and timeline of the survey.

Updates

The 2023 survey contained a number of questions about COVID-19. They captured the change in transportation behavior by asking participants how often they worked from home before, during, and after the pandemic. Since the 2023 survey already measured this, we took the questions related to COVID-19 out of our current survey. Additionally, the transportation mode split question of the survey measures the proportion, out of a week, that participants use

certain transportation methods. To reflect the growing popularity of E-bikes and E-scooters, we added these options to our question about transportation mode split (see Figure 2).

Distribution and Engagement

In February, we sent the survey to each building partner that requested the survey for their building and we sent a separate, slightly different survey to our contact for the city of Ann Arbor. We hosted a webinar that introduced the survey to our partners. The webinar included a walkthrough of the survey and highlighted the incentives that the partners should promote to their employees. We sent the video and slides out to partners that did not attend the live webinar. To make promotion of the survey easy for our partners, we gave them an email template which they could use to send the survey out to their employees. Routine emails were sent out to the partners to check-in and gauge current engagement with the survey. We extended the deadline of the survey to get more participants and eventually closed the survey in March.

Aggregate and Analyse Data

We compiled data on mileage of average round-trip commute, average weekly and annual emissions per employee and total annual emissions for the building. The emissions were calculated with the grams of carbon dioxide per mile of each transportation method, with special consideration for carpoolers. We did these calculations in python (see Figure 3). To make the reports more digestible, we made the following figures for each building based on the responses:

- A bar chart to display the transportation mode split
- We calculated what percentage of respondents would change their habits based on eleven different policy incentives. A stacked bar chart displayed the proposed policies most likely to influence commuting behavior.
- A pie chart showing the proportion of plans to purchase an electric vehicle (“maybe”, “yes”, or “no”)

Results

We emailed the survey results to each building contact. These documents contained the individual building results as well as the overall results of the survey, enabling them to compare their results with the habits and emissions of all respondents.

Deliverables

Throughout the Winter and Fall 2025 semesters, our team produced a set of materials for the Ann Arbor/Washtenaw 2030 District that supported survey administration, increased engagement, and enabled meaningful analysis of transportation emissions across 32 buildings. Over the course of the year, our team developed a set of survey tools, communication materials, analysis scripts, and reports that together formed a complete survey to report pipeline.

Survey and Outreach Materials

We created an updated 2025 Transportation Survey in Google Forms, removing outdated pandemic-related questions and adding e-bike/e-scooter options to the transportation mode split (Figure 2). Customized versions were produced for the City of Ann Arbor buildings and Washtenaw County buildings in addition to general businesses to accommodate different audiences and employee types.

To support recruitment, we designed a marketing flyer included in the Washtenaw 2030 District newsletter and created a full outreach toolkit with email templates of initial contact, survey launch, reminders, and employee-facing communication (Figure 1). These templates were designed to be easily adaptable for the 2027 survey.

Engagement and Communications

To introduce the 2025 survey and clarify expectations for participants, we planned and hosted a virtual webinar for building contacts in February 2025. The presentation walked through the structure of the survey, explained how the results would be returned to buildings, and emphasized incentives and deadlines (Figure 5). We recorded the webinar and shared both the video link and slides with all contacts, including those who could not attend live.

We also hosted a webinar in April 2025 for all building contacts and interested stakeholders in our project to share high-level takeaways from the survey, many of which have been included in our recommendations and impact sections below (Figure 6). Once again, all of the slides and resources were sent out to all contacts, and the winners of the incentive prizes were announced.

During the distribution period, we maintained a detailed progress tracker documenting building contacts, employee counts, and response rates, enabling targeted follow-up and supporting long-term continuity for future cycles of the survey (Figure 7).

Data Processing and Analysis Toolkit

Once the survey closed, we compiled and cleaned 465 responses across 32 buildings. Using Python, we wrote an emissions calculator script that converts distance and transportation mode into weekly and annual emissions for each respondent and for each building. The script incorporates emissions factors for driving alone, carpooling, transit, walking, biking, and the newly added e-bike and e-scooter categories, and can be adapted as emissions factors or survey questions are updated in the future (Figure 3).

We also created code to generate standardized visualizations for every building, including bar charts for transportation mode split, stacked bar charts of policy preferences, and pie charts summarizing employees' plans to purchase an electric vehicle (Figure 3). These figures, paired with tables summarizing commute distance and emissions, formed the core of the building-level reports.

Building-Level Reports

A central deliverable was the creation of 32 individualized building reports, each containing commute and emissions statistics, visualization of mode split and policy preferences, electric vehicles interest summaries, and a set of transportation and policy resources compiled by the 2030 District to share with all contacts. (Figure 4). Each report included data for the individual building in question and aggregate survey data to allow contacts to compare their building's response to overall trends. These reports were sent directly to building contacts via email so they can guide internal sustainability efforts, staff communications, and future policy decisions.

Recommendations

The portion of our survey offering the clearest insights for next steps were the respondents' policy preferences. As in previous years, survey participants were presented with policies such as improved biking infrastructure, subsidized public transportation, increased EV charging stations, affordable housing, and more. Compared to the 2023 report, the most favored policies, with changes from last year in parentheses, were: more affordable housing closer to work (33%, ↑7.7%), expanded work from home policies (29%, ↓6.4%), financial incentives for carpooling (26%, ↑4.1%), and company wide ride-share programs (21%, ↑1.03%).

These results indicate that affordable housing is an increasingly pressing concern across the district. Addressing this issue requires collective action, particularly through encouraging

employees to support City of Ann Arbor representatives who favor local regulatory laws related to housing, though sparking this engagement may be challenging within company environments. The extent to which other recommendations can be implemented is largely dependent on individual companies, and feasibility will vary widely among them.

The last Washtenaw/Ann Arbor 2030 cohort focused on energy tracking for 44 buildings within the district. Our recommendations for remaining proposed policies would be more precise and effective if we had access to these documents, along with a baseline understanding of how each building is progressing toward energy targets. With detailed building reports, we could identify which properties require additional support in implementing strategies to achieve meaningful changes. For example, it is unclear whether companies included in the 2023 Transportation Survey have adopted any of the proposed policies, even though many increased in favorability. Understanding the outcomes of policy implementation would help future scholars evaluate the impact of such policies and refine recommendations for specific companies.

Based on these insights, we recommend that future cohorts between transportation surveys collaborate with companies and buildings most in need of assistance in achieving energy goals. These partnerships could facilitate the testing of company-specific policies and drive progress that otherwise would not be initiated. Since many companies may be uncertain about the value or incentives associated with adopting these practices, additional support from students, the Washtenaw/Ann Arbor 2030 District, and government agencies would be extremely valuable.

Overall, our primary recommendation is to establish a centralized database for ongoing energy tracking, policy adoption updates, and other pertinent efforts for each company or building. This would enable students and stakeholders to adapt their support and interventions dynamically, fostering the potential for more meaningful change.

Impact

Working with the Washtenaw 2030 District to better understand the transportation emissions profiles of the District's members with both short and long term implications.

In the short term, the provision of transportation surveys allows the District to gain a holistic view of each member's transportation emissions and potential changes in employee transportation choices. First off, this project is able to quantitatively display progress towards the District's carbon reduction goal. By providing trends on the district and individual business

level, the survey can identify whether changes need to be made to the district's approach if bi-yearly progress is not sufficient towards accomplishing such a goal. Secondly, by understanding the current spread of employee transportation emissions, the 2030 District can identify high-emission businesses to then prioritize promoting behavioral changes for those members. Once these trends are identified, the 2030 District can then tailor its resource provision to attempt to mitigate these trends. The 2030 District's website already houses a comprehensive set of educational resources and recommendations for businesses to reduce their carbon footprint, but Graham's inclusion in this project may make them more pointed. For example, trends in the data showed high preference for driving alone to work across members, so the Washtenaw 2030 District may benefit from including resources about the benefits of carpooling and specific ways to implement such behaviors.

Not only does the project help the 2030 District to understand emissions patterns, but allows members to do so as well. By visualizing transportation data understandably, the individual business reports can be used by business executives to understand current trends and make transportation decisions based on anticipated ones. For example, if employees are inclined to change their transportation behaviors if public transportation is subsidized by the business, that member may research ways to make this possible. Conversely, if employees are motivated to change transportation behaviors based on a more expensive, largely-scoped factor (such as more affordable housing closer to work), the member may increase its advocacy efforts for policies that would allow for behavioral changes.

In the long term, the project can promote sustainable practices outside of the project's scope. As the 2030 District is a public website, membership may influence businesses that are not currently a part of the district to change their behaviors to become more sustainable, if they see their competitors doing so. This ripple effect can further encourage a culture of transparency among Ann Arbor businesses to fuel more responsible transportation practices in the future.

Additionally, public advertisement of the Washtenaw 2030 District's progress towards a greener future may inspire other businesses to not only change their own behaviors, but request membership to the district as well, furthering its 50% emissions reduction goal.

Acknowledgements

We would like to formally thank and acknowledge those who made our project possible. First, Jan Culbertson has been an irreplaceable source of knowledge and help for our project. She continually provided guidance as well as kindness and understanding over the past year. It was truly beneficial to work with someone who has such a deep understanding of the Ann Arbor community and sustainability, as well as insight on how to communicate with various stakeholder groups. We were very fortunate to work alongside her and others from the Ann Arbor 2030 District Team to help us understand the importance of local surveying and emissions.

Additionally, we would like to thank those at the Graham Sustainability Institute. Thank you to Bridget Gruber for her help with kickstarting our program and providing us insight through many seminars and workshops. Her commitment to the Graham Sustainability Scholars Program shined through in her efforts to improve our knowledge of “sustainability” and create actual change through our various projects. Thank you to MacKensey King for helping throughout the program and showing us thoughtfulness. Lastly, thank you to Carly Silverman for her efforts to help us wrap up our project and continue educating us. It is never easy to come into something half way through, but Carly has done an amazing job with ensuring our success.

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Appendix

Figure 1: Survey Marketing Flyer

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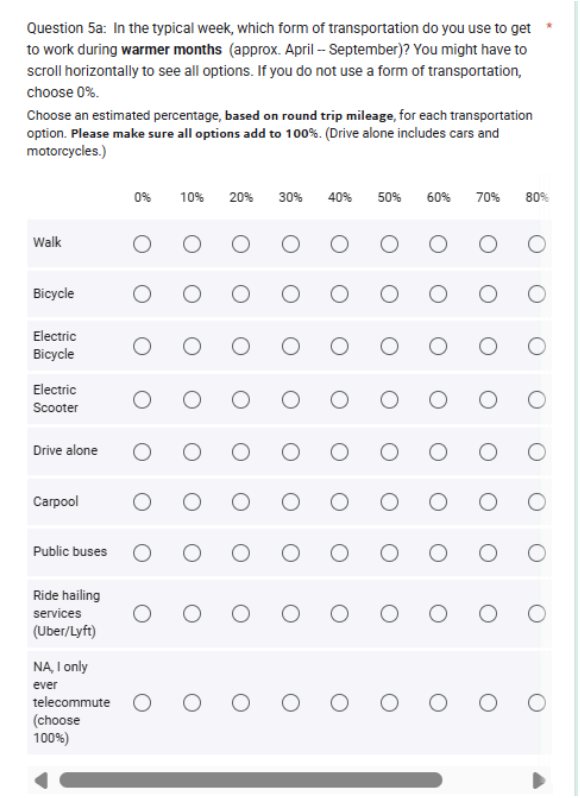
Figure 2: Transportation Mode Split Question



Question 5a: In the typical week, which form of transportation do you use to get to work during **warmer months** (approx. April -- September)? You might have to scroll horizontally to see all options. If you do not use a form of transportation, choose 0%. *

Choose an estimated percentage, **based on round trip mileage**, for each transportation option. **Please make sure all options add to 100%**. (Drive alone includes cars and motorcycles.)

	0%	10%	20%	30%	40%	50%	60%	70%	80%
Walk	○	○	○	○	○	○	○	○	○
Bicycle	○	○	○	○	○	○	○	○	○
Electric Bicycle	○	○	○	○	○	○	○	○	○
Electric Scooter	○	○	○	○	○	○	○	○	○
Drive alone	○	○	○	○	○	○	○	○	○
Carpool	○	○	○	○	○	○	○	○	○
Public buses	○	○	○	○	○	○	○	○	○
Ride hailing services (Uber/Lyft)	○	○	○	○	○	○	○	○	○
NA, I only ever telecommute (choose 100%)	○	○	○	○	○	○	○	○	○

Figure 3: Emissions Calculation Script

```
# load in the data from the drive (simplified version from Lily)
import pandas as pd
import numpy as np
from google.colab import auth
auth.authenticate_user()

import gspread
from gspread_dataframe import set_with_dataframe
from google.auth import default
creds, _ = default()

gc = gspread.authorize(creds)

survey = gc.open('Simplified Gen Survey Response').sheet1
responses = survey.get_all_records()
surveyDF = pd.DataFrame(responses)
surveyDF.head()

#computing weekly distance traveled
surveyDF['weekly_distance'] = surveyDF['Days Commuting'] * surveyDF['Miles roundtrip']

emmisionsPerMode = {"bus":252,"gascar":409,"dieselcar":345,"HEVcar":293,"BEVcar":164,"PEVcar":228, "ebike":21} #all in g CO2e/mi, from 2020-2021 final report

emissionVector = np.array([0,0,21,21,409,409,252,409,0]) #5th element is carpool

#Adjust emmissions from carpooling according to how many carpoolers there are

surveyDF["carpool_num_numeric"] = pd.to_numeric(
    surveyDF["Carpool Num People"], errors="coerce"
)
cmask = surveyDF["carpool_num_numeric"].notna()

surveyDF.loc[cmask, "Warm % Carpool"] = surveyDF.loc[cmask, "Warm % Carpool"] / surveyDF.loc[cmask, "carpool_num_numeric"]
```

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```
surveyDF.loc[dieselMask, "Cold % Drive"] = surveyDF.loc[dieselMask, "Cold % Drive Alone"] * emmisionsPerMode["dieselcar"]/emmisionsPerMode["gascar"]

surveyDF.loc[BEVmask, "Warm % Drive"] = surveyDF.loc[BEVmask, "Warm % Drive Alone"] * emmisionsPerMode["BEVcar"]/emmisionsPerMode["gascar"]
surveyDF.loc[BEVmask, "Cold % Drive"] = surveyDF.loc[BEVmask, "Cold % Drive Alone"] * emmisionsPerMode["BEVcar"]/emmisionsPerMode["gascar"]

surveyDF.loc[HEVmask, "Warm % Drive"] = surveyDF.loc[HEVmask, "Warm % Drive Alone"] * emmisionsPerMode["HEVcar"]/emmisionsPerMode["gascar"]
surveyDF.loc[HEVmask, "Cold % Drive"] = surveyDF.loc[HEVmask, "Cold % Drive Alone"] * emmisionsPerMode["HEVcar"]/emmisionsPerMode["gascar"]

surveyDF.loc[PEVMask, "Warm % Drive"] = surveyDF.loc[PEVMask, "Warm % Drive Alone"] * emmisionsPerMode["PEVcar"]/emmisionsPerMode["gascar"]
surveyDF.loc[PEVMask, "Cold % Drive"] = surveyDF.loc[PEVMask, "Cold % Drive Alone"] * emmisionsPerMode["PEVcar"]/emmisionsPerMode["gascar"]


warmModeColumns = slice(8,17)
coldModeColumns = slice(17,26)

df = surveyDF

warm_columns_by_index = df.iloc[:, warmModeColumns]
cold_columns_by_index = df.iloc[:, coldModeColumns]
print(warm_columns_by_index)
print(cold_columns_by_index)

# Compute dot product row-wise
warmEmmissionPerWeek = warm_columns_by_index.dot(emissionVector)
coldEmmissionPerWeek = cold_columns_by_index.dot(emissionVector)

surveyDF['Warm Emmissions Per Week'] = warmEmmissionPerWeek
surveyDF['Cold Emmissions Per Week'] = coldEmmissionPerWeek

surveyDF['Emmissions Per Year kg CO2e'] = (surveyDF['Warm Emmissions Per Week'] * 26 + surveyDF['Cold Emmissions Per Week'] * 26)*.001

building_emissions = df.groupby("Building")["Emmissions Per Year kg CO2e"].sum().reset_index()
print(building_emissions)
```

Figure 4: Example Building-Level Report

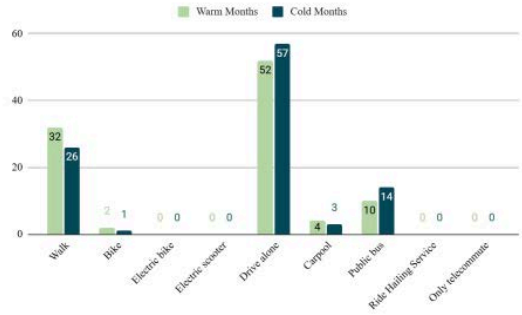
Washtenaw/Ann Arbor 2030 District 2025 Transportation Survey Building Report
Ann Arbor Art Center, 117 West Liberty Street

This report contains the information collected from the 2025 Building Transportation Survey. You will find your specific building(s) data displayed below, followed by the aggregate data for all survey participants for comparison (if desired).

Individual Building Survey Data

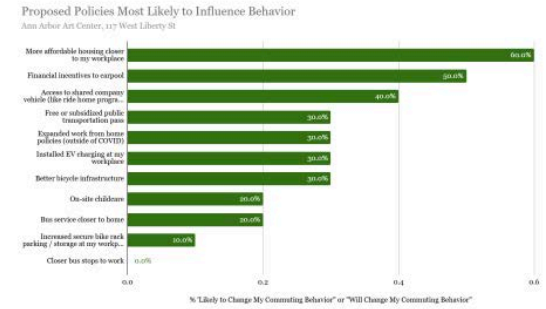
- No. of Responses: **10**
- Average round trip commute: **17.09 miles** per respondent
- Average weekly emissions per employee: **0.26 kg** of CO2 per week
- Average annual emissions per employee: **13.64 kg** of CO2 per year
- Total annual emissions for building: **136.42 kg** of CO2 per year for all building respondents

Transportation Weekly Mode Split



Bars represent employee utilization (by percent) of each mode of transportation per week. Warm month split is represented by light green, cold month split is represented by dark green.

Ways Your Building Can Influence Cleaner Transportation Methods:



Employees' response to which policies would most likely influence their commuting behavior. Bars represent the percent of employees who said a given policy was "likely to change" or "will change" their commuting behavior.

Plans to purchase an electric vehicle:

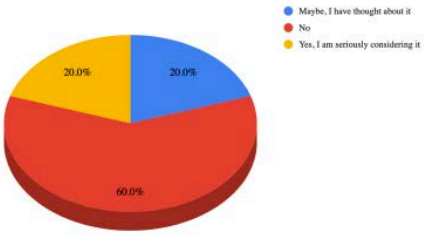


Figure 5: Survey Intro Webinar Slide

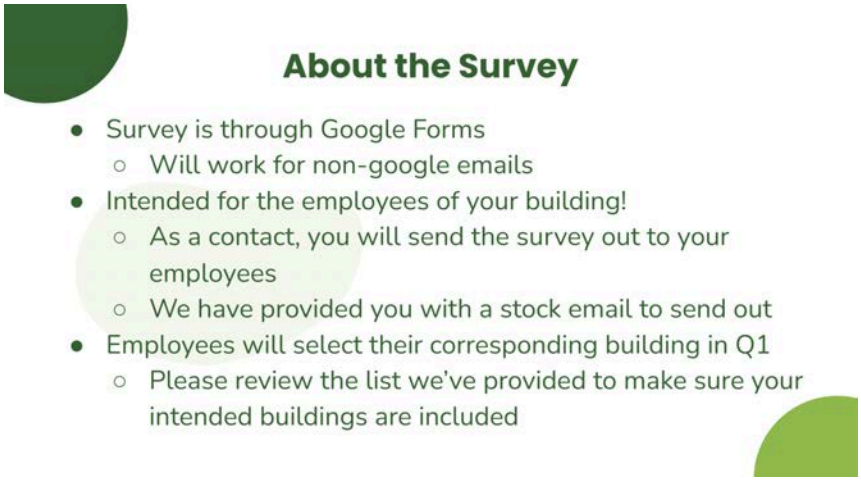


Figure 6: Survey Results Webinar Slide

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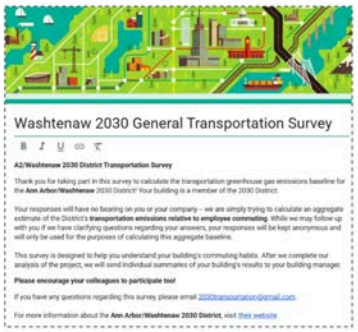
A look at the 2025 Survey...



465 Total Responses

32 Buildings Responded

2023: 319 Responses

2023: 21 Buildings

2021: 175 Responses

2021: 21 Buildings

Figure 7: Survey Response Tracker

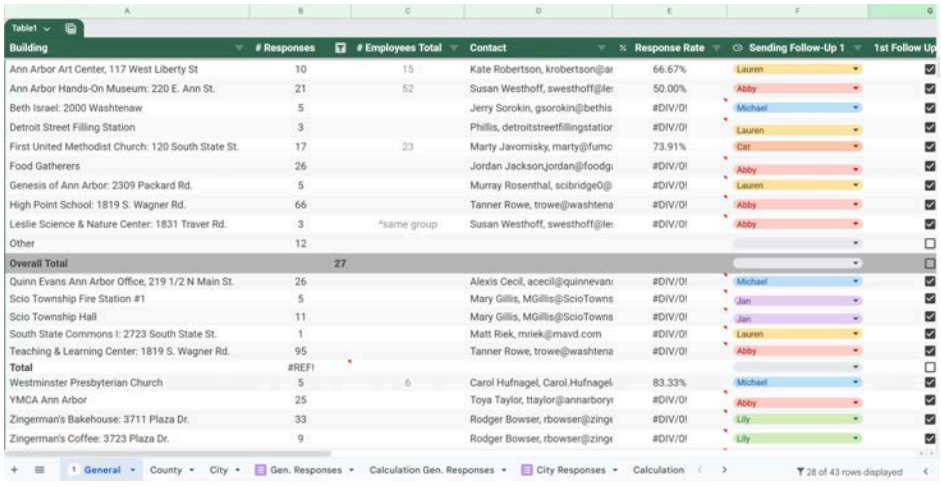


Table1

Building	# Responses	# Employees Total	Contact	Response Rate	Sending Follow-Up 1	1st Follow Up
Ann Arbor Art Center, 117 West Liberty St	10	15	Kate Robertson, krobertson@a	66.67%	Lauren	☑
Ann Arbor Hands-On Museum: 220 E. Ann St.	21	52	Susan Westhoff, swesthoff@le	50.00%	Abby	☑
Beth Israel: 2000 Washtenaw	5		Jerry Sorokin, gsorokin@bethis	#DIV/0!	Michael	☑
Detroit Street Filling Station	3		Phillis, detroitstreetfillingstatior	#DIV/0!	Lauren	☑
First United Methodist Church: 120 South State St.	17	23	Marty Javornisky, marty@fumc	73.91%	Cat	☑
Food Gatherers	26		Jordan Jackson,jordan@foodg	#DIV/0!	Abby	☑
Genesis of Ann Arbor: 2309 Packard Rd.	5		Murray Rosenthal, scibridge0@	#DIV/0!	Lauren	☑
High Point School: 1819 S. Wagner Rd.	66		Tanner Rowe, trowe@washtena	#DIV/0!	Abby	☑
Leslie Science & Nature Center: 1831 Traver Rd.	3	*same group	Susan Westhoff, swesthoff@le	#DIV/0!	Abby	☑
Other	12					☐
Overall Total		**27**				☐
Quinn Evans Ann Arbor Office, 219 1/2 N Main St.	26		Alexis Cecil, acecil@quinnevan	#DIV/0!	Michael	☑
Scio Township Fire Station #1	5		Mary Gillis, MGillis@ScioTowns	#DIV/0!	Jan	☑
Scio Township Hall	11		Mary Gillis, MGillis@ScioTowns	#DIV/0!	Jan	☑
South State Commons I: 2723 South State St.	1		Matt Riek, mriek@mavd.com	#DIV/0!	Lauren	☑
Teaching & Learning Center: 1819 S. Wagner Rd.	95		Tanner Rowe, trowe@washtena	#DIV/0!	Abby	☑
Total	#REF!					☐
Westminster Presbyterian Church	5	6	Carol Hufnagel, Carol.Hufnagel	83.33%	Michael	☑
YMCA Ann Arbor	25		Toya Taylor, ttaylor@annarbory	#DIV/0!	Abby	☑
Zingerman's Bakehouse: 3711 Plaza Dr.	33		Rodger Bowser, rbowser@zingc	#DIV/0!	Lily	☑
Zingerman's Coffee: 3723 Plaza Dr.	9		Rodger Bowser, rbowser@zingc	#DIV/0!	Lily	☑

General | County | City | Gen. Responses | Calculation Gen. Responses | City Responses | Calculation

28 of 43 rows displayed