

A Plan for Sustainable Transportation at Yale

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INTRODUCTION

Yale Transportation Options has been providing support for members of the Yale community interested in more sustainable modes of transportation for over six years. As a result, there has been a 5% reduction in drive-alone commuting from 2007-2012, and 33% of commuters used emissions-free modes of transportation (bike, walk, telework) in 2012. Continued reductions in drive-alone commuting lead to improvements in local air quality, human health, mobility, and transportation choice while delivering reductions in traffic congestion, parking demand, facilities costs, and greenhouse gas emissions.

SUSTAINABLE TRANSPORTATION PLAN

To be successful at further reducing the number of single-occupant vehicles traveling to our campus, there must be investments made in the incentives, programs and infrastructure that will catalyze transportation culture change by making the alternatives to driving alone more viable and attractive to commuters. This Transportation Plan represents the best practices of our peers as we believe they are adaptable to our campus culture and existing transportation system, in order to stay ahead of what otherwise becomes demand for more expensive parking infrastructure.

The recommendations and approach of this plan are supported and reinforced in the [Sustainability Supplement to the Framework for Campus Planning](#). The Supplement refers to this plan and integrates its principles and strategies in its recommendations for campus planning. In addition, the [Yale Sustainability Strategic Plan](#) has set goals and projects in alignment with this plan. In this way the sustainable transportation principles herein have been integrated into the university's approach to campus planning and development.

The strategies and associated tactics proposed for the first phase of the plan include an investment of staff time and incentives that encourage more sustainable modes of transportation. They will create a clear direction for the university to achieve its sustainable transportation goals and will help change the way our community thinks about its transportation options.

SUSTAINABLE TRANSPORTATION PRINCIPLES

The following principles provide a framework for the strategies that strengthen Yale's transportation systems and improve commuters' transportation choices. These established sustainable transportation principles,

recognized nationally and internationally, include **Access, Health and Safety, Individual Responsibility, Integrated Planning, Pollution Prevention, and Fuller Cost Accounting.**¹

Access: Provide easy and safe access from outside and within campus for all members of the Yale community and its visitors.

Health and Safety: Design and operate systems to protect the health (physical, mental and social well-being) and safety of the Yale and New Haven community and enhance the quality of life on the Yale campus and its surroundings.

Individual Responsibility: Encourage and facilitate behavioral change to shift from driving alone to more sustainable transportation choices.

Integrated Planning/ Land & Resource Use: Coordinate decisions with New Haven and regional systems, maintain Yale's urban character and adhere to sound land use policies and practices.

Pollution Prevention: Favor non-motorized and multi-person transport within and between Yale's campuses, as well as to and from them (commuter trips).

Fuller Cost Accounting: Consider long-term costs, life cycle, and best practices to compare and assess the economic viability of various transportation infrastructure options.

The specific principles of Health and Safety, Pollution Prevention, and Fuller Cost Accounting are particularly compelling in the Yale context.

Health and Safety / Pollution Prevention

The local and regional impacts of Yale's transportation planning decisions cannot be overstated. Over 7,000 people drive to Yale's campus daily, generating greenhouse gas emissions, and congesting local streets, resulting in lost productivity and affecting quality of life. The average delay per peak-hour commuter delay in New Haven is 28 hours per year,² the equivalent of more than 3.5 full workdays stuck in traffic. All of Connecticut is currently classified as "non-attainment" for 2 of 6 criteria air pollutants tracked by the EPA. To the extent that we, as a university, can create incentives for transportation modes that reduce car traffic, we can also reduce greenhouse gas emissions, which in turn improves the health of our community and region.

Fuller Cost Accounting

Until 2007, Yale's parking operation generated positive revenue. That is no longer true. The cost to provide parking on our campus exceeded \$5 million last year, due in large part to Interest and Amortization (I&A) for our

¹ These Principles have been echoed consistently in the literature, but were first referenced at the National Round Table on Environment and the Economy (NRTEE), OECD International Conference, Vancouver Canada, 24-27 March 1996, Global Development Research Center (gdrc.org).

² Texas Transportation Institute 2011 Urban Mobility Report <http://mobility.tamu.edu/ums/congestion-data/>

newest parking garages. This report has been informed, and made even more imperative, by the results of a recent cost/benefit study conducted by the Office of Sustainability showing that the annual I&A on a new parking structure is more than the annual cost of a transit subsidy.

A transit subsidy would provide an incentive for commuting by train and bus, with the goal of reducing demand for parking for those commuters who would change their behavior based upon the incentive. Changing behavior is complex, and an investment into a transit subsidy has to be made well in advance of the behavior change sought, so that commuters will see that the university is committed to such a benefit and intends to continue it over time, increasing the likelihood that they will make the desired change.

A NEW TRANSPORTATION HIERARCHY

The preceding principles are considered in concert with a recommended transportation hierarchy that would rank types of transportation according to their effect on the environment, in descending order:

- 1) Pedestrian
- 2) Cyclist
- 3) Transit Rider
- 4) Single Occupant Vehicle (SOV) Driver

This is the same hierarchy set forth in the City of New Haven's *Complete Streets Design Manual*³ and is consistent with best practices in the sustainability field, in which more cities and campuses are giving priority to walkers and cyclists, and seek to create options such that commuters will have good, safe choices that allow them to seek alternatives to driving alone.

RECOMMENDED APPROACHES & BEST-PRACTICES—ORGANIZED BY TRANSPORTATION MODE

The following recommended approaches are organized by mode of transportation. A summary of the first priority strategies—chosen for their relatively low cost, short timeline, and high impact—can be found in Appendix A, as can preliminary cost/benefit assessments for each approach.

I. Pedestrian and Bicycle Transportation: As the two emission-free modes of transportation, bicycle and walking must be made safe, attractive and easy as alternatives to SOV use to get to, from and around campus.

A. Planning (Internal)

1. Improve campus bicycle and pedestrian infrastructure
 - i. Establish a campus-wide bicycle/pedestrian path design standard
 - ii. Install secure and sheltered bike parking at identified priority locations, 2x/year
 - iii. Install curb cuts, lighting and other necessary features for uninterrupted bicycle access on campus
2. Design way-finding and information resources for campus pedestrian and bicycle circulation.

³ City of New Haven *Complete Streets Design Manual*, p 11. 2010. www.cityofnewhaven.com/Engineering/pdfs/CS-Manual-FINAL.pdf.

3. Conduct a bicycle rack inventory and demand analysis updating the inventory annually.

B. Planning (External)

1. Coordinate with and support the City of New Haven to improve the safety of sidewalks and crosswalks. Advocate with City and State agencies for improved bicycle and pedestrian infrastructure
 - i. Create a regional Sustainable Transportation Committee to assess needs and propose priority projects.
 - ii. Lobby appropriate agency by project

C. Policies and Programs

1. Continue to support, maintain and enhance the Y-Bike bike-share program

D. Communication and Engagement

1. Promote bicycling and walking.
 - i. Create a tool that measures reduction of GHG emissions and health benefits of active transportation
 - ii. Continue to publicize the advantages of the Y-Bike Program
 - iii. Implement the bicycle commuter benefit program
 - iv. Display travel time between campus locations via a mapping tool

II. Transit: Transit is a central component of a sustainable transportation system as it provides mass mobility with reduced greenhouse gas impacts.

A. Planning (Internal)

1. Increase ridership by expanding participation and improving access to public transit
 - i. Continue to assess Yale Shuttle routes and schedules, assuring the most efficient service.

B. Planning (External)

1. Advocate with City of New Haven, State of CT and Transit agencies for expanded transit infrastructure, and improved transit frequency and reliability
 - i. Develop and prioritize list of potential projects and lobby appropriate agency by project
 - ii. Improve connections of train to bus, bus to Yale Shuttle, etc, to enable more robust, reliable utilization of these resources
 - iii. Work with City of New Haven to identify transit infrastructure needs for bus shelters and benches for CT Transit.

C. Essential Campus Infrastructure

1. Develop a plan for phased addition of bus shelters and benches for the Yale Shuttle that includes a prioritized list of locations, and seek approval from City/State to install solar-powered bus shelters for Yale Shuttles
2. Improve use of alternative fuel for Yale shuttles.
 - i. Continue to increase the mix of biodiesel used in Yale's Shuttles
 - ii. Investigate and pilot alternative fuel technologies for shuttles and fleet vehicles

D. Policies and Programs

1. Expedite improvements to self-service pre-tax transit program
2. Launch a Universal Bus Pass Program on CTTTransit, allowing all Yale ID holders to ride for free.

E. Communication and Engagement

1. Communicate the following existing and proposed initiatives created to achieve enhanced transit options for the Yale community.
 - i. Simplified pre-tax transit program.
 - ii. Universal Pass Program with CT Transit.
2. Develop and utilize individually targeted communication tools (similar to the GIS Transit email) to inform Yale commuters of transit options.

III. Single Occupancy Vehicles (SOVs): Reductions in SOV traffic may eliminate the need for new parking garage construction, free-up open space on the Yale campus for buildings and landscape development, and improve environmental quality and human health. This framework develops a multifaceted approach to improving sustainable transportation options, influencing individual behavior, and discouraging SOV use. Note, however, that deciding to stop building parking garages is a complex decision. The City currently requires that the university provide on-site parking as a condition for receiving approval to move forward with new buildings, and currently many faculty recruitments include agreements for proximate parking.

A. Planning (Internal)

1. Develop a phased plan for a Zero Growth parking strategy.
 - i. Critically assess need for additional parking spaces with new building projects
 - ii. Change parking requirements based on transportation survey data with City Plan office
2. Work toward the goal of “modal equity” (transit, walking, cycling, ridesharing are supported and/or subsidized as much as parking)
 - i. Utilize cost benefit and life cycle analyses to compare alternatives to parking (including investment in bicycle, pedestrian, and transit infrastructure). Adjust investment accordingly.
3. Decrease the number of SOVs coming to and from campus and decrease reliance on SOVs by making sustainable transportation more desirable
 - i. Target communities with high densities of Yale drivers for carpool promotion (ex: Cheshire, Wallingford, Woodbridge)
 - ii. Provide park & rides from suburbs to campus
 - iii. Improve workplace flexibility so that working from home & working more flexible hours (to accommodate carpool and transit schedules) are encouraged & supported
 - iv. Develop and roll out incentive programs (e.g. parking cash-out program, transit subsidy, and bicycle commuter benefit)

B. Policies and Programs

1. Institute policies to improve cost sharing by the university and its employees, faculty and students.
 - i. Equalize parking rates on Medical and Central Campuses.
 - ii. Consider parking pricing strategies based on other institutions’ best practices.

- iii. Expand upon carpool incentives, and implement incentives for multi-person transportation modes.

C. Communication and Engagement

1. Communicate essential transportation information to the Yale Community.
 - i. Cost Benefit and Life Cycle Analysis results of parking versus sustainable transportation infrastructure.
 - ii. Parking cost analysis results.
 - iii. Proximate parking pricing plans.
 - iv. Parking cash-out program, transit subsidy, and/or Bicycle Commuter Benefit.
 - v. Incentives for carpools and other less polluting modes of transportation.
 - vi. Telework Program and flexible scheduling options.
 - vii. Availability of videoconferencing facilities.

IV. Multi-Modal⁴ Campus Transportation: The interconnections between transportation modes, both on campus and regionally, are essential to provide Yale commuters with viable choices.

A. Planning (Internal)

1. Develop campus linkages between multiple transportation modes
 - i. Connect all important campus destinations via sustainable transportation modes
 - ii. Identify and plan for multi-modal transportation hubs in campus expansion and development
2. Integrate sustainable transportation priorities into the Sustainability Supplement to the Framework Plan; ensure that sustainable transportation standards are incorporated into all decision-making processes.
3. Ensure that all transportation system components respect the university's policies regarding land, water, and biodiversity, while preserving the campus's urban character.

B. Planning (External)

1. Update the New Haven Green Map to improve way finding and show campus walking, cycling and transit routes and pathways.

C. Essential Campus Infrastructure

1. Upgrade lighting along transit, walking, and cycling routes and hubs.
2. Accommodate campus community members' special needs for transportation in all planning activities.⁵

D. Policies and Programs

1. Develop and roll out incentive programs for sustainable transportation options (e.g. transit subsidy and bicycle commuter benefit).

⁴ Multi-Modal Transportation is used to describe transportation systems that involve two or more modes of transport. Examples include: secure bicycle parking at a transit hub, buses timed to meet trains, bicycle racks installed on buses.

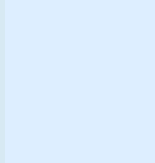
⁵ Special accommodations for persons with limited mobility include the very young and the elderly.

2. Support telework and flexible scheduling programs.
3. Develop strategic partnerships with area colleges to advance sustainable transportation priorities.

E. Communication and Engagement

1. Design a comprehensive communication campaign using Internet resources (websites, twitter feed, RSS), posters etc. that informs the community of their various transportation options and associated impacts (New Green Map, GHG, health, safety).

TRANSPORTATION FRAMEWORK: FIRST PRIORITY WORK



STRATEGY

Coordinate with and support the City in improving the safety of sidewalks and crosswalks. Advocate with appropriate City of New Haven and State of CT agencies for improved bicycle and pedestrian infrastructure and maintenance.

TACTIC 1

Create a sustainable Transportation Committee to assess needs and to develop and propose priority projects.
Annual Cost .05 FTE
Initiation Timeframe FY12 Q4 to FY13 Q4

TACTIC 2

Install curb cuts and other necessary features for uninterrupted bicycle access on campus.
Annual Cost .025 FTE
Initiation Timeframe FY12 Q4 to FY13 Q2

STRATEGY

Improve campus bicycle and pedestrian infrastructure.

TACTIC 3

Install sheltered bike parking within existing structures (e.g., garages) and outdoor racks at identified priority locations.
Annual Cost \$200,000
Initiation Timeframe FY13 Q1 to FY14 Q1

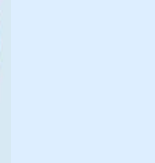
TACTIC 4

Install curb cuts and other requirements for wheeled access for campus bike routes.
Annual Cost \$14,000
Initiation Timeframe FY13 Q3 to FY14 Q4

TACTIC 5

Establish a campus-wide bicycle/pedestrian path design standard.
Year 1 (one-time) Cost \$15,000
Initiation Timeframe FY13 Q2 to FY14 Q2

TOTAL COST: \$100K–\$150K; 0.1 FTE



STRATEGY

Increase ridership by increased participation and improved access to public transit.

TACTIC 1

Simplify self-service, pre-tax transit program, and communicate broadly to the Yale community (results in savings to the University and to the transit rider).
Annual Cost .05 FTE
Initiation Timeframe FY12 Q4 to FY14 Q2

TACTIC 2

Develop and launch a Universal Bus Pass Program
Annual Cost \$50,000 – \$100,000
Initiation Timeframe FY14 Q1 to FY14 Q4

STRATEGY

Advocate with appropriate New Haven, State of CT and Transit agencies for expanded transit infrastructure, and improved transit frequency and reliability.

TACTIC 3

Develop prioritized list of potential projects and lobby appropriate agency by project.
Annual Cost .025 FTE
Initiation Timeframe FY12 Q4 to FY14 Q2

TACTIC 4

Install bus shelters and benches for Yale shuttles in phases at prioritized locations.
Annual Cost \$50,000
Initiation Timeframe FY13 Q3 to FY14 Q2

TACTIC 5

Improve connections of trains to bus, bus to shuttles, etc., to enable robust, reliable utilization of these resources.
Annual Cost .025 FTE
Initiation Timeframe FY12 Q4 to FY13 Q4

TOTAL COST: \$100K–\$150K; 0.1 FTE



STRATEGY

Develop a phased plan for a Zero Growth parking strategy.

TACTIC 1

Critically assess need for constructing additional parking spaces with new building projects by challenging the default of new parking structures.

Annual Cost .025 FTE

Initiation Timeframe FY13 Q1 to FY14 Q1

TACTIC 2

Work with City Plan office to change parking requirements based on transportation survey data.

Annual Cost .025 FTE

Initiation Timeframe FY13 Q1 to FY14 Q1

STRATEGY

Work toward the goal of “modal equity” (transit, walking, cycling, ridesharing are supported and/or subsidized as much as parking)

TACTIC 3

Utilize cost benefit and life cycle analyses to compare alternatives to parking (including investment in bicycle, pedestrian, and transit infrastructure).

Adjust investment accordingly.

Annual Cost .05 FTE

Initiation Timeframe FY12 Q3 to FY13 Q4

STRATEGY

Decrease SOVs coming to/from campus and decrease reliance on SOVs by making sustainable transportation modes more desirable.

TACTIC 4

Target communities with high densities of Yale drivers for carpool promotion (e.g., Cheshire, Wallingford, Woodbridge)

Annual Cost .05 FTE

Initiation Timeframe FY13 Q1 to FY14 Q2

TACTIC 5

Provide Park & Ride options from suburbs to campus

Annual Cost \$187,500–\$375,000

Initiation Timeframe FY13 Q2 to FY14 Q1

TACTIC 6

Improve workplace flexibility so that working from home, and working more flexible hours (to accommodate carpool and transit schedules) are encouraged and supported.

Annual Cost .025 FTE

Initiation Timeframe FY12 Q3 to FY13 Q4

TACTIC 7

Develop and roll out incentive programs (e.g., parking cash-out program, transit subsidy, and bicycle commuter benefit).

Annual Cost \$1,138,288–\$1,238,288

Initiation Timeframe FY13 Q2 to FY15 Q1

TOTAL COST: \$1.3M–1.6M; 0.175 FTE



STRATEGY

Develop campus linkages between multiple transportation modes.

TACTIC 1

Connect all important campus destinations via sustainable transportation modes.

Annual Cost .05 FTE

Initiation Timeframe FY12 Q3 to FY14 Q2

TACTIC 2

Identify and plan for multi-modal transportation hubs in campus expansion and development.

Annual Cost .05 FTE

Initiation Timeframe FY12 Q3

TOTAL COST: 0.1 FTE

OUTCOMES

Increase

- health benefits
- environmental quality
- commuter safety
- mobility/access
- transportation choices
- transit service
- user satisfaction

Decrease

- traffic congestion
- parking demand
- facilities costs
- consumer transport costs
- greenhouse gas emissions
- noise pollution

APPENDIX B: PROGRESS TO DATE

- Yale has consolidated and introduced self-service technology for its parking administration, implemented a carpool program, developed a “Y-Bike” bike sharing program for staff—as well as a universal Bikeshare program for all Yale-affiliates, and worked closely with the City and regional partners to promote transit and alternative commuting services.
- The Yale Shuttle system is regularly improved, changing to meet the needs of Yale’s evolving campus, with new routes and connections linking the shuttles to the train station, West Campus, and key points on and near campus.
- The shuttle fleet was converted to Ultra Low Sulfur Bio-Diesel in 2006 and each shuttle vehicle is equipped with an air filter system to reduce particulate emissions.
- A Trans-Loc system, for global positioning, is in place that allows riders to use their computers or smart phones to see at a glance where each shuttle is “in real time” so they can better use the systems. Use of the shuttle system continues to grow, with over 1.5 million rides each year.
- Between 2007 and 2011, the number of drive-alone commuters to campus decreased from 44% to 37%, a particularly notable accomplishment given Yale’s already low rate of drive-alone commuters (compared to the national drive-alone commuting average of 76%).
- The group most likely to commute by driving alone, faculty and staff, saw the largest reduction, from 58% to 52% over the same period. These reduced numbers are also significant because Connecticut does not have the large investment in public transportation seen in other metropolitan areas, such as New York or Boston, so a decision to give up a single occupancy vehicle for commuting takes more planning and commitment in Connecticut than it does in many other areas.