Section 2
Transportation

INTRODUCTION

Middlefield residents are primarily dependent on the automobile for transportation. Most of the residents who are destined for work, shopping and recreation can travel on the state and local roadway network which radiates through most sections of town. The most highly-traveled state road is Route 66, bisecting Middlefield in the north, connecting Middletown and Meriden. It links Route 9 in the east to Route 91 to the west, via Route 691. Route 147 links Route 66 to Route 17 in Durham to the southeast. Route 157 (Main Street) runs north-south, connecting Route 66 in Middletown to Route 68 in Durham.

Transportation Policies and Issues

The primary goal for the transportation network in Middlefield's future is to provide for the safe and efficient movement of persons, goods and services in a way that is economically and energy efficient, while preserving the natural resources and character of the town. This goal is achievable through the incorporation of a diverse combination of transportation policies that the town should encourage. Obtaining this goal will preserve the high quality of life Middlefield residents have come to enjoy.

Transportation policies that the town should encourage to achieve its goals include:

1) Promote energy-efficient transportation alternatives to the single occupancy vehicle, such as ride-sharing, mass transportation, bicycling, walking and integrate them into the traffic system.

2) Design a roadway network that accommodates these transportation alternatives.

3) Maintain the existing roadway network, while preserving the historic, aesthetic, and environmental resources located along Middlefield's streets.

4) Design a roadway network that emphasizes safety and the natural and cultural resources of the town.

5) Use and promote flexible roadway and land use design standards to reduce adverse aesthetic and environmental impacts to the community.

6) Prevent traffic congestion within the community.

7) Design a roadway network that will provide an adequate level of service to the community throughout its design life.

8) Cooperate with federal, state, and regional agencies, interest groups and the public in the transportation planning process.

Road System

The regional highway network provides a hierarchy of service functions to address different levels of needed mobility. The resulting network therefore tends to correspond directly to the travel needs of the population. For example, interstate and state highways provide for fast, high-volume transportation from city to city

increasing our overall mobility, whereas local roads allow direct access to desired places or establishments, such as a residence or store.

Functional classification is the process by which the roadway network is divided into different classes depending on the type of service they are intended to provide. No single road serves travel independently. The majority of roadway travel is through a system or network of roads. To determine how roadway travel can most efficiently move through the network, the functional classification helps to define how a specific road serves the volume in the overall network. Functional classification is subdivided into urban and rural arterials and collectors and principal arterials or expressways.

Principal urban arterials, such as interstates, are the highways that serve major activity centers, have the highest volumes and longest trip desires. They should carry the major trips entering and exiting the urban area and most of the through-movements. Intra-area travel between a central business district and outlying residential areas should also be served by the principal urban arterial.

Principal urban arterials, such as expressways and other roads, are indented to interconnect and augment the interstates. They should serve trips of moderate lengths, with a greater emphasis on land access, and a lower level of traffic mobility than the principal arterials. An urban main arterial may carry a local bus route and provide intra-community service, but should not enter identifiable neighborhoods.

Urban collector streets provide land access and traffic circulation in residential neighborhoods, commercial and industrial areas. Collector streets may provide access to residential neighborhoods, unlike arterials. The urban collector streets collect traffic from local streets and direct it to the arterials. In a central business district, the collector streets may include the streets that provide the basis of traffic circulation.

The local street system consists of all the roads not on the higher systems. Local streets provide direct access to abutting properties and the higher classified roadways. They offer the lowest level of mobility, do not contain bus routes and where through traffic is discouraged.

The functional classification in rural areas follows the same hierarchy as the urban areas. Principal arterials provide interstate and inter-regional service creating an integrated statewide roadway network. Other rural arterials link cities, towns, major traffic generators and inter-regional trips.

Rural collectors serve intra-regional travel, with travel distances that are usually shorter than the arterial routes. The major rural collectors link larger outlying communities and serve traffic generators of intra-regional importance. The minor rural collectors link traffic generators, such as neighborhood stores with outlying rural areas and collect traffic from local roads.

Local roads in rural areas serve to provide access to adjacent land and accommodate short trips. The local road system comprises all of the roads not classified as arterials or collectors.

The functional classification of roadways is thoroughly reviewed every 10 years in conjunction with the federal census, because the urban boundaries are modified based on the revised census figures. CTDOT and the regional planning organization then adjust these boundaries for transportation planning purposes. The functional classification of specific roads is also reviewed on an as-needed basis or in conjunction with other state or local programs.

Arterials

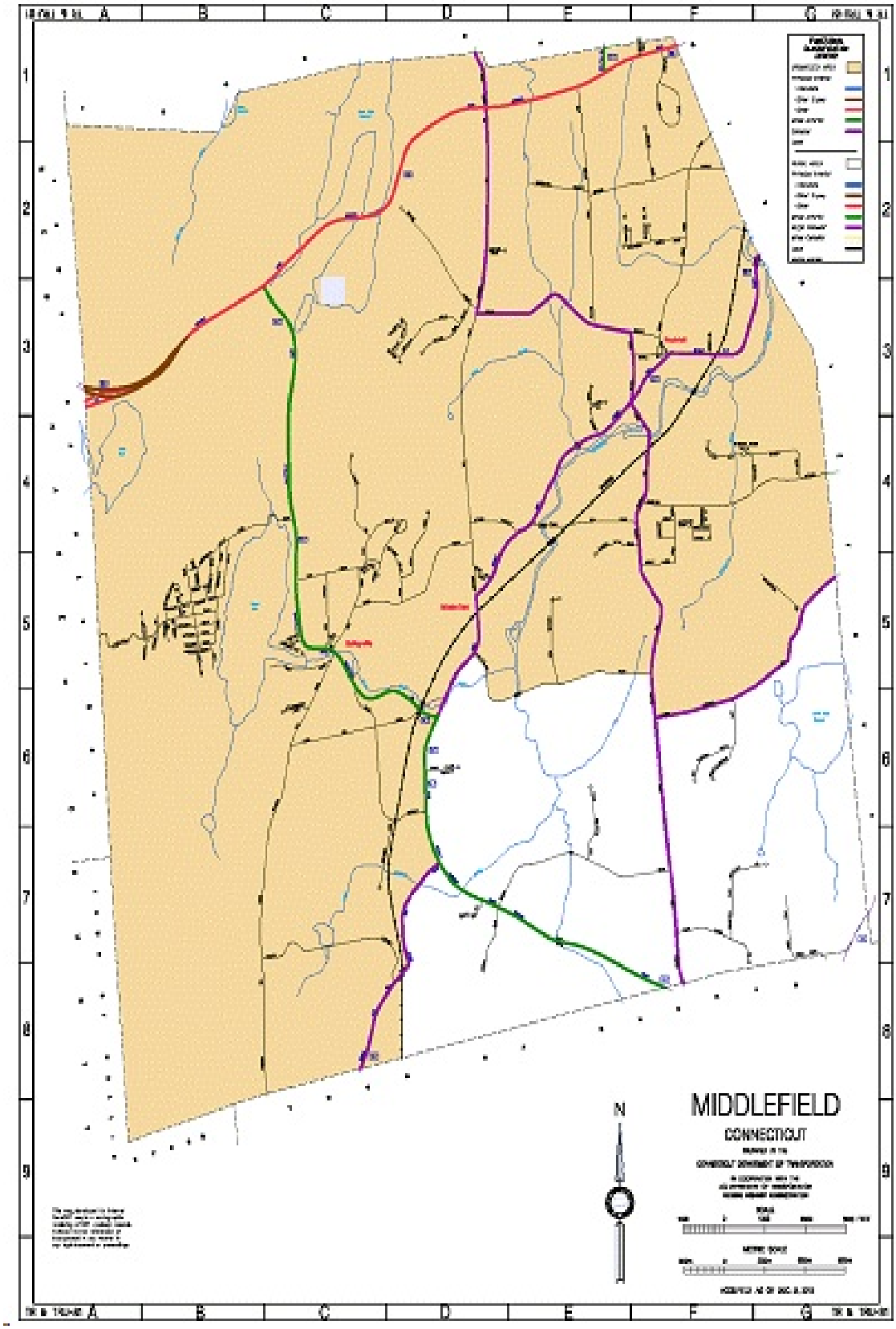
Most state roads in Middlefield are classified as arterials. Route 66 was classified as a principal arterial other expressway and Routes 217 and 147 were minor arterials in 2010. These roads serve most of the vehicle trips entering and leaving the town, serve the longest trips and serve the travel between urban and suburban centers. The arterials can provide access to abutting land, but such access should be limited since the main role of the arterials is to service major traffic movements.

Collectors

Collector roads distribute the trips from the arterials to their destinations which may be collectors or local streets. They also collect traffic from local streets and channel it to the arterials. Collectors provide direct access to abutting land, plus access to local streets. Route 157, Cedar Street, Cherry Hill Road, Derby Road, Higby Road, Jackson Hill Road and Laurel Brook Road were classified as collector roads in 2010.

Local Roads

Local roads provide direct access to neighborhoods and collector streets. Vehicular traffic movement through these areas should be deliberately discouraged. All other roads not classified on the map are designated as local roads.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Public Transit

The Middletown Transit District (MTD) and Estuary Transit District (ETD) currently provide public transportation service in the Lower Connecticut River Valley Region. Rural route service was incorporated in October 1987 on a route running through Durham, Middlefield and Cromwell, with a second route in Portland and East Hampton. Middlefield service was provided on Route 157 from the Middletown town line to the junction of Route 147. It then followed Route 147 to Route 17 in Durham.

The rural route service began as a two-year demonstration program funded by CTDOT. After the two-year trial period, CTDOT recommended that MTD reduce service levels due to high operating costs and low ridership. MTD reduced service from nine runs per day to six. Cromwell withdrew from the program in October of 1989 and Middlefield dropped the service as of June 30, 1990 due to low ridership. Since then, there has been no public transit service in Middlefield.

Elderly and Disabled Transportation Services

In accordance with the Americans With Disabilities Act of 1990, MTD provides paratransit (curb-to-curb) bus service to eligible individuals with disabilities that is similar to the level of service provided to individuals without disabilities who use the fixed route bus system. Service is provided Monday through Saturday. MTD also provides curb-to-curb transportation service for elderly, over the age of 60, for the towns of Middletown, Portland, East Hampton, Durham and Middlefield. Appointments for transportation must be made one day in advance. The fare for ADA/Dial-A-Ride service is $2.00 one-way.

Travel Patterns to Work

The 2013 American Community Survey (ACS) commuting flow data for Middlefield is shown below. Approximately 43 percent of Middlefield residents work in four municipalities. For residents of Middlefield, 15.2 percent work in Middlefield, 14.1 percent in Middletown, 7.2 percent in Wallingford and 6.7 percent work in Meriden.

For workers in Middlefield, 22.8 percent live in Middlefield and 16.9 percent live in Middletown. Another 5.6 percent commute from Meriden, 5.2 percent from Cromwell and 4.9 percent from Wallingford. Data is based on a sample and are subject to sampling variability. A margin of error is a measure of an estimate's variability. The larger the margin of error in relation to the size of the estimates, the less reliable the estimate is. When added to and subtracted from the estimate, the margin of error forms the 90 percent confidence interval.

2009-2013 Residence Commuting Flows – Middlefield Residents

Live	Work	Commuting Flow
Minor Civil Division Name	**Minor Civil Division Name**	**Workers in Commuting Flow**
Middlefield town	Avon town	36
Middlefield town	Berlin town	37
Middlefield town	East Hartford town	83
Middlefield town	Farmington town	54
Middlefield town	Hartford town	97
Middlefield town	New Britain town	98
Middlefield town	Newington town	28
Middlefield town	Plainville town	56
Middlefield town	Cromwell town	25
Middlefield town	Durham town	93
Middlefield town	Essex town	36
Middlefield town	Middlefield town	348
Middlefield town	Middletown town	324
Middlefield town	Portland town	47
Middlefield town	Westbrook town	39
Middlefield town	Hamden town	63
Middlefield town	Meriden town	154
Middlefield town	New Haven town	94
Middlefield town	Southbury town	25
Middlefield town	Wallingford town	166
Middlefield town	Waterbury town	27
Middlefield town	27 Other towns with less than 1% of total trips (23)	361
Total		2,291

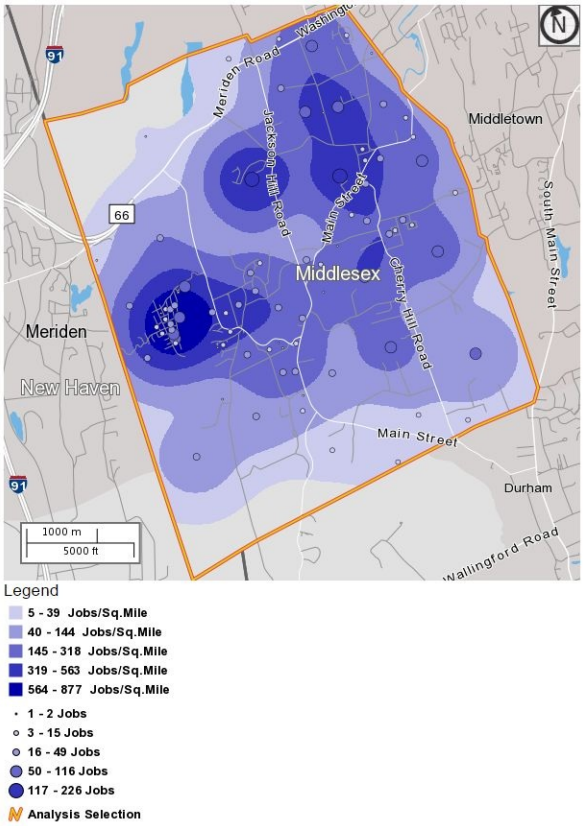
Source: US Census Bureau, 2009-2013 American Community Survey.

2009-2013 Residence Commuting Flows – Middlefield Workers

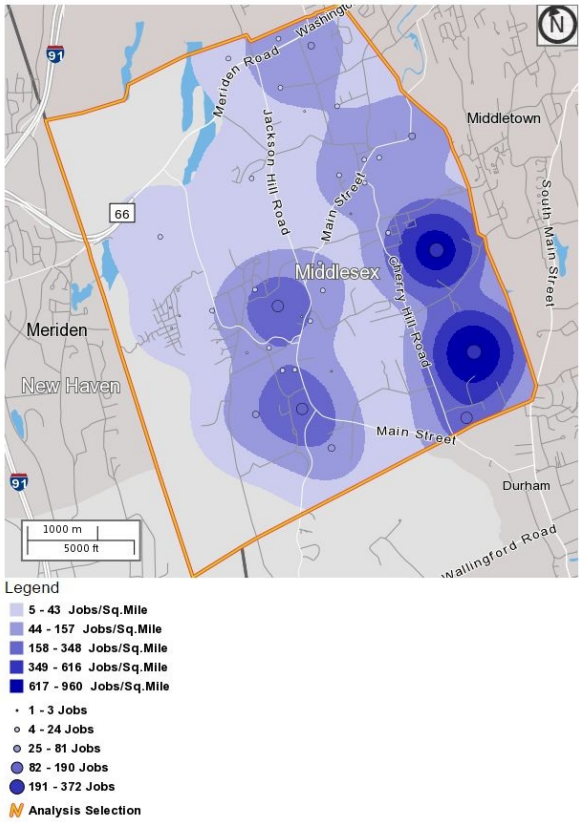
Live	Work	Commuting Flow
Minor Civil Division Name	**Minor Civil Division Name**	**Workers in Commuting Flow**
Berlin town	Middlefield town	20
Bristol town	Middlefield town	27
Hartford town	Middlefield town	28
Manchester town	Middlefield town	28
New Britain town	Middlefield town	38
Rocky Hill town	Middlefield town	16
Southington town	Middlefield town	19
Cromwell town	Middlefield town	79
Deep River town	Middlefield town	22
Durham town	Middlefield town	51
East Haddam town	Middlefield town	22
East Hampton town	Middlefield town	46
Essex town	Middlefield town	16
Haddam town	Middlefield town	56
Hebron town	Middlefield town	20
Middlefield town	Middlefield town	348
Middletown town	Middlefield town	257
Old Saybrook town	Middlefield town	27
Beacon Falls town	Middlefield town	17
Meriden town	Middlefield town	85
North Haven town	Middlefield town	36
Wallingford town	Middlefield town	75
Lyme town	Middlefield town	21
Norwich town	Middlefield town	9
Mansfield town	Middlefield town	15
17 Other towns with less than 1% of total trips (15)	Middlefield town	147
Total		1,525

Source: US Census Bureau, 2009-2013 American Community Survey.

Home Area Profile



Work Area Profile



Source: U.S. Census Bureau Longitudinal Employer Household Dynamics, On The Map Tool.

Ridesharing

Ridesharing techniques, such as car and vanpooling, became popular during the fuel shortages of the mid- and late-1970's and continued through the 1980's as it primarily saved commuters' money. Ridesharing should still be considered a viable transportation alternative to the single occupancy personal automobile since it reduces congestion, increases air quality and is still more cost effective than driving alone.

The Connecticut Department of Transportation has developed a family of commuter services designed to meet the needs of commuters and employers. CT**rides** is the network of employer and employee support programs that endorse a variety of alternatives to driving alone, such as carpooling, vanpooling, riding the bus and train or telecommuting resulting in improved air quality, reduced traffic congestion and a better quality of life for all.

CT**rides** is also people reaching out to people with the belief that what they offer can improve quality of life by putting more choice, control and benefits into the hands of the residents of this state. CT**rides** also seeks to improve commuter mobility to help sustain the growth and vitality of our economy and make Connecticut more competitive in the employment marketplace.

Middlefield should place an emphasis on carpooling by promoting employer ridesharing incentives for employees, such as flexible work hours, transit subsidies or organizing a formal rideshare program. Promoting ridesharing and providing areas for commuter parking could help to lessen the congestion in Middlefield.

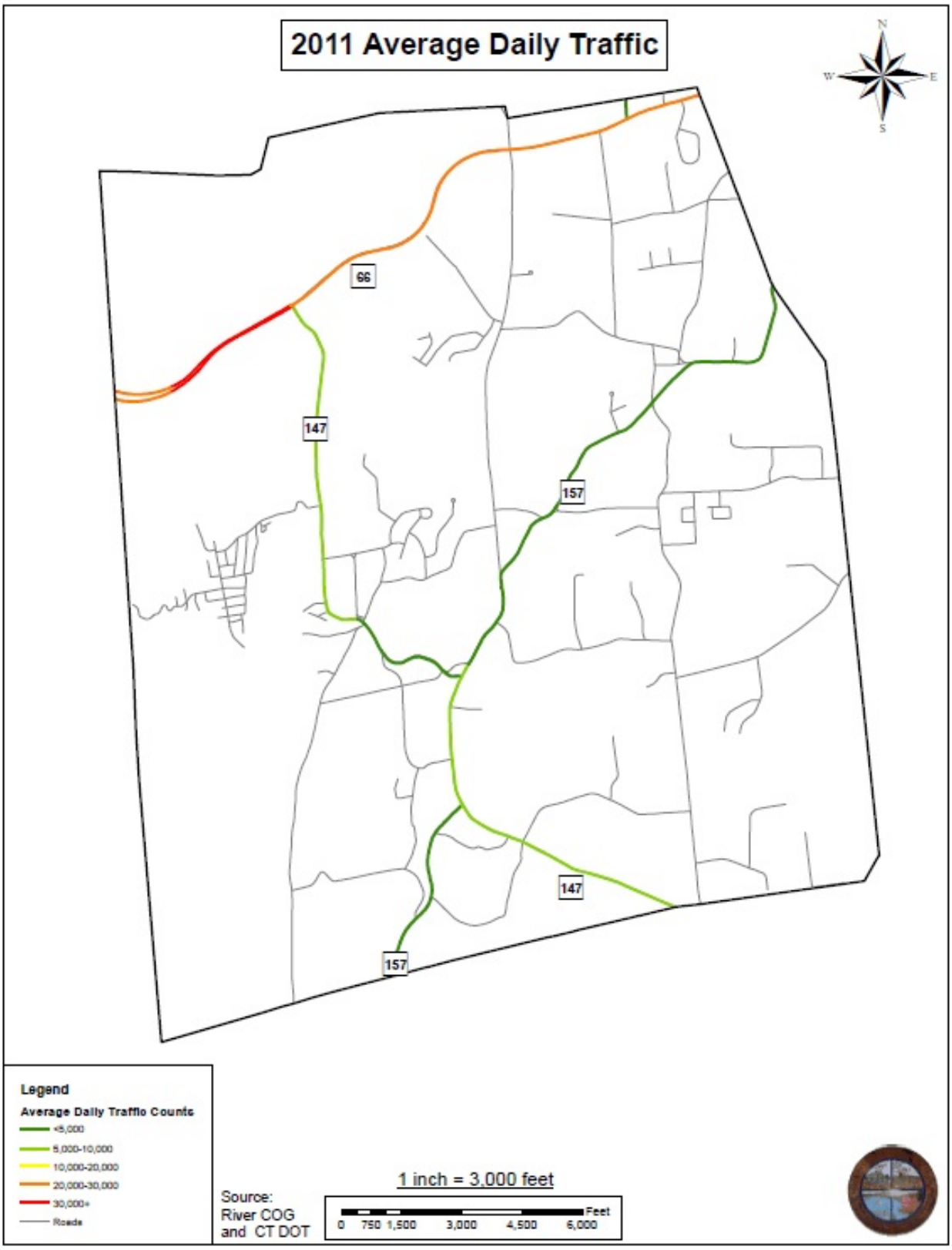
Traffic Volume

The following section shows the most recent traffic volumes in Middlefield. State road and some local road statistics were obtained from CTDOT's 2014 traffic log.

Route 66 has the highest average daily traffic (ADT) in Middlefield. The segment of Route 66 with the most traffic is the segment between East Main Street and RT 147, with an average of 30,400 vehicles per day. All segments of Route 66 in Middlefield possess an ADT of more than 23,000. Jackson Hill Road, north of Cedar Street, has the highest ADT of the local roads surveyed at 4,100.

Traffic Volume - State Roads		2014 Average
Route	Segment	Daily Traffic
66	Meriden/Middlefield TL to EB access E Main	23,900
66	EB access E Main to WB exit E Main	27,300
66	WB exit E Main to RT 147	30,400
66	RT 147 to Jackson Hill Rd	23,600
66	Jackson Hill Rd to RT 217	24,300
66	RT 217 to Middlefield/Middletown TL	24,300
147	Durham/Middlefield TL to begin ovlp RT 157	6,000
147	begin ovlp RT 157 to end ovlp RT 157	OVLP
147	end ovlp RT 157 to Powder Hill Rd	4,700
147	Powder Hill Rd to N jct Way Rd	5,200
147	N jct Way Rd to RT 66	6,100
157	Durham/Middlefield TL to S jct RT 147	3,100
157	S jct RT 147 to N jct RT 147	6,600
157	N jct RT 147 to Jackson Hill Rd	4,600
157	Jackson Hill Rd to Ross Rd	2,000
157	Ross Rd to Sunset Dr	2,900
157	Sunset Dr to Middlefield/Middletown TL	3,500
217	RT 66 to Middlefield/Middletown TL	3,300

Traffic Volume - Local Roads		2010 Average
Route	Segment	Daily Traffic
Higby Rd	N of RT 66	3,000
Jackson Hill Rd	N of Cedar St	4,100
Cedar St	W of Peter's Ln	1,300
Cedar St	E of Peter's Ln	2,700
Derby Rd	N of RT 157	2,200
Cherry Hill Rd	N of Hubbard Rd	2,600
Cherry Hill Rd	S of Hubbard Rd	3,200
Cherry Hill Rd	N of Strickland Rd	2,500
Cherry Hill Rd	N of Miller Rd	3,000
Laurel Brook Rd	E of Cherry Hill Rd	1,500


2011 Average Daily Traffic
N
W
E
S
66
147
157
147
157
Legend
Average Daily Traffic Counts
<5,000
5,000-10,000
10,000-20,000
20,000-30,000
30,000+
Roads
Source:
River COG
and CT DOT
1 inch = 3,000 feet
Feet
0 750 1,500 3,000 4,500 6,000

Roadway Capacity

The principal objective of capacity analysis is to estimate the maximum amount of traffic that a given facility can accommodate. Capacity analysis would be limited, however, if this were its only focus. Traffic facilities generally operate poorly at or near capacity and facilities are rarely designed or planned to operate in this range. Capacity analysis is also intended to estimate the maximum amount of traffic that a facility can accommodate while maintaining prescribed operational facilities.

Capacity analysis is a set of procedures used to estimate the traffic-carrying ability of facilities over a range of defined operational conditions. It provides tools for the analysis and improvement of existing facilities, and for the planning and design of future facilities.

In general, the capacity of a facility is defined as the maximum hourly rate at which vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time under prevailing roadway, traffic, and control conditions (i.e., traffic signals, stop and yield signs etc.). The time period used in most capacity analysis is 15 minutes, which is considered the shortest interval during which stable flow exists.

The level of capacity was determined by the road's volume-to-capacity ratio (V/C). A V/C ratio of between 0.90 and 0.99 suggests a roadway is approaching capacity, whereas ratios of 1.00 or greater are roadways that are over capacity.

Middlefield State Roadway Capacity Status

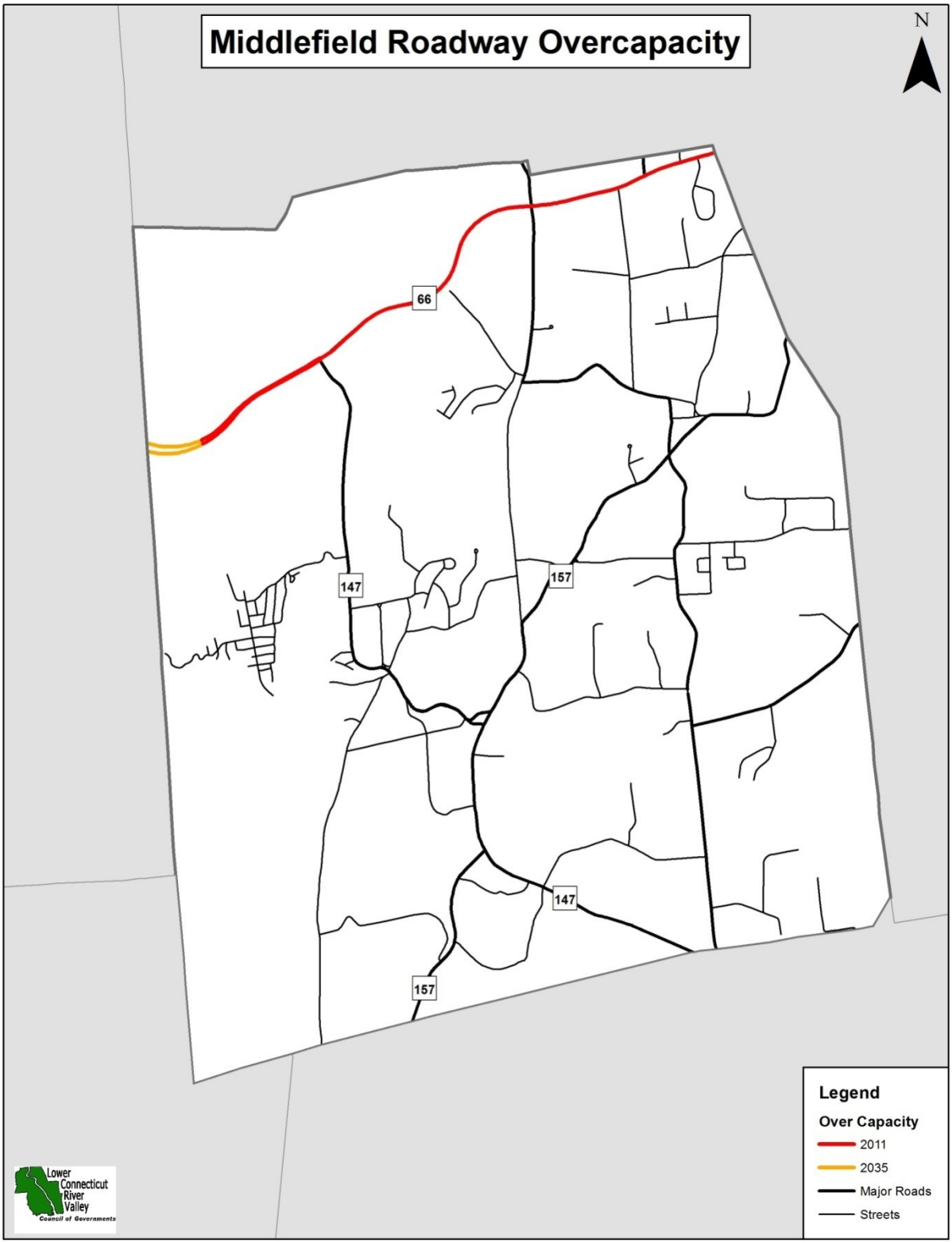
Route	Begin	End	Capacity	2011 peak hour	2011.00 v/c ratio	2035 peak hour	2035 v/c ratio
66	0.96	1.14	2546	2124	0.83	2740	1.08
66	1.14	1.22	1623	1332	0.82	1718	1.06
66	1.22	1.54	1623	2203	1.36	2842	1.75
66	1.54	1.96	1623	2203	1.36	2842	1.75
66	1.96	3.3	1623	1670	1.03	2155	1.33
66	3.3	3.88	1623	1944	1.2	2508	1.55
66	3.88	4.24	1623	1721	1.06	2220	1.37
147	0.92	1.72	1701	610	0.36	787	0.46
147	1.72	2.07	1650	732	0.44	944	0.57
147	2.76	2.88	1540	576	0.37	743	0.48
147	2.88	3.48	1701	528	0.31	681	0.4
147	3.48	3.83	1769	624	0.35	805	0.46
147	3.83	5.09	1718	682	0.4	880	0.51
157	1.02	1.47	1800	286	0.16	369	0.21
157	1.47	1.59	1980	312	0.16	402	0.2
157	1.59	1.96	1809	286	0.16	369	0.2
157	1.96	2.58	1809	682	0.38	880	0.49
157	2.58	2.65	1675	495	0.3	639	0.38
157	2.65	3.13	1675	495	0.3	639	0.38
157	3.13	4.52	1675	273	0.16	352	0.21
157	4.52	5.22	1809	416	0.23	537	0.3
217	0	0.04	974	206	0.21	265	0.27
217	0.04	0.09	906	206	0.23	265	0.29

Source: CTDOT 2011 Capacity Status

Vehicle Miles of Travel (VMT) and delay are also useful when identifying congested roadways. CTDOT estimates VMT based on Series 29 modeling techniques in the Congestion Screening and Monitoring Report. 1990 VMT in the region was 2,483,668. VMT are increased to 2,979,542 by 2000 and is projected to reach 4,261,972 by 2040. Statewide VMT increases generally fluctuate between 1 and 3 percent per year.

Traffic Crash Data

The Connecticut Crash Data Repository shows 262 crashes in Middlefield from 2012 through 2014. There was one fatal crash, 81 injury crashes and 180 property damage crashes. Fifty-seven (21.8 percent) crashes occurred on local roads and 205 (78.2 percent) occurred on state roads.


Middlefield Roadway Overcapacity
N
66
147
157
147
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Legend
Over Capacity
2011
2035
Major Roads
Streets
Lower Connecticut River Valley
Council of Governments

Rail Transportation

The Providence and Worcester Railroad (P&W) operates freight service in the Lower Connecticut Valley Region on rail line rights of way owned by CTDOT. Service originates in Middletown with three stub-end radial access lines to Cromwell, Portland and Middletown. The main line runs southwest from Middletown, Middlefield (roughly corresponding to Route 157) and Durham to Reeds Gap. From Reeds Gap to North Haven, the line is owned by Tilcon and from North Haven to New Haven by Conrail. The P&W has traffic rights to reach New Haven and interchange traffic with Conrail on the Northeast Corridor.

The P&W replaced the rail along its Middletown Branch between Reeds Gap and New Haven since the rail joints were bent from inadequate support and the heavy weight of gravel cars operating over the line. P&W has nearly completed its upgrade of the Wethersfield secondary line from Middletown to Hartford which meets with the Middletown Branch.

Currently, there is no passenger service in Middlefield or the Lower Connecticut River Valley Region. Rail transport of freight and passengers should be encouraged since it is less polluting and more economically efficient than other forms of surface transportation.

Bicycle and Pedestrian Transportation

Historically, the development of the transportation infrastructure in America has been focused almost exclusively on the private automobile and commercial truck. As a result, Connecticut roads were not designed for bicycle use and may be unsafe for use in many areas due to narrow, gravel or nonexistent shoulders, drainage grates, curbs, poor markings, heavy volume and other obstacles that may pose a threat to cyclists. Therefore, bicycle use on Connecticut roads is, for the most part, “at your own risk.” The Connecticut Bicycle Map, revised by CTDOT in 2009, shows state highways recommended for bicycle routes within the state. The map shows roads designated as “least suitable” through “most suitable” in five varying degrees for cycling, cross state bicycle routes, and other pertinent information for cyclists.

Suitable north/south routes include Route 157 in Middletown, Middlefield and Durham and suitable east/west routes include Route 66 in Middlefield, Middletown, Portland and East Hampton.

CTDOT, in conjunction with Fitzgerald and Halliday Inc., is in the process of updating the statewide bike/ped plan. They hope to have the plan updated in the spring of 2017.

Support of bike-friendly shared roadways, bike lanes, wide shoulder lanes, shoulder bikeways, signed bicycle routes, off road multi-use paths, trails and greenway corridors for bicycle and pedestrian use should be a priority for recreational, personal, business and commuting purposes. Benefits from such projects include more than reduced roadway congestion, environmental and personal user benefits. Several studies have shown an increase of property values near trails and greenways, which may likewise increase local tax revenues. Resident and visitor facility users patronize local businesses such as food, lodging and other recreation-orientated establishments. Surveys also show that trails and greenways improve the quality of life in a region and quality of life factors are important in business and corporate relocation and retention decisions.

Education and enforcement will also help to achieve regional bicycling and pedestrian goals. It is important to remember that bicyclists and motorists most often have to share the same roadways. To ensure the safety of both users, it is beneficial to promote bicycle safety to bicyclists and motor vehicle operators. This can be accomplished through a variety of methods, which include education and enforcement.