MARKET CONDITIONS DATA

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Polygon

Midlife Constants

Dominant Tapestry Segment

48.1
Median Age

KEY FACTS

306
Total Population

$164,000
Median Home Value

321
Businesses

4,669
Daytime Population

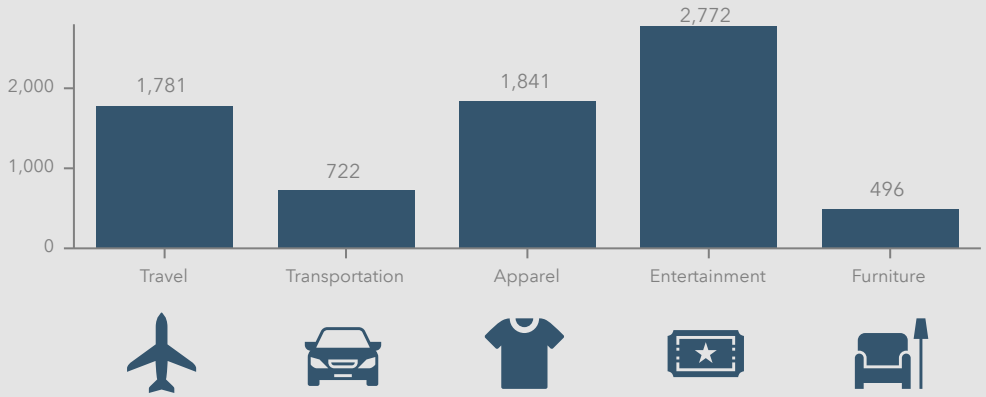
0.2%
2010-17 Pop Growth Rate

$28,613
Per Capita Income

2.3
Avg Household Size

$52,901
Median Household Income

KEY SPENDING FACTS ($)

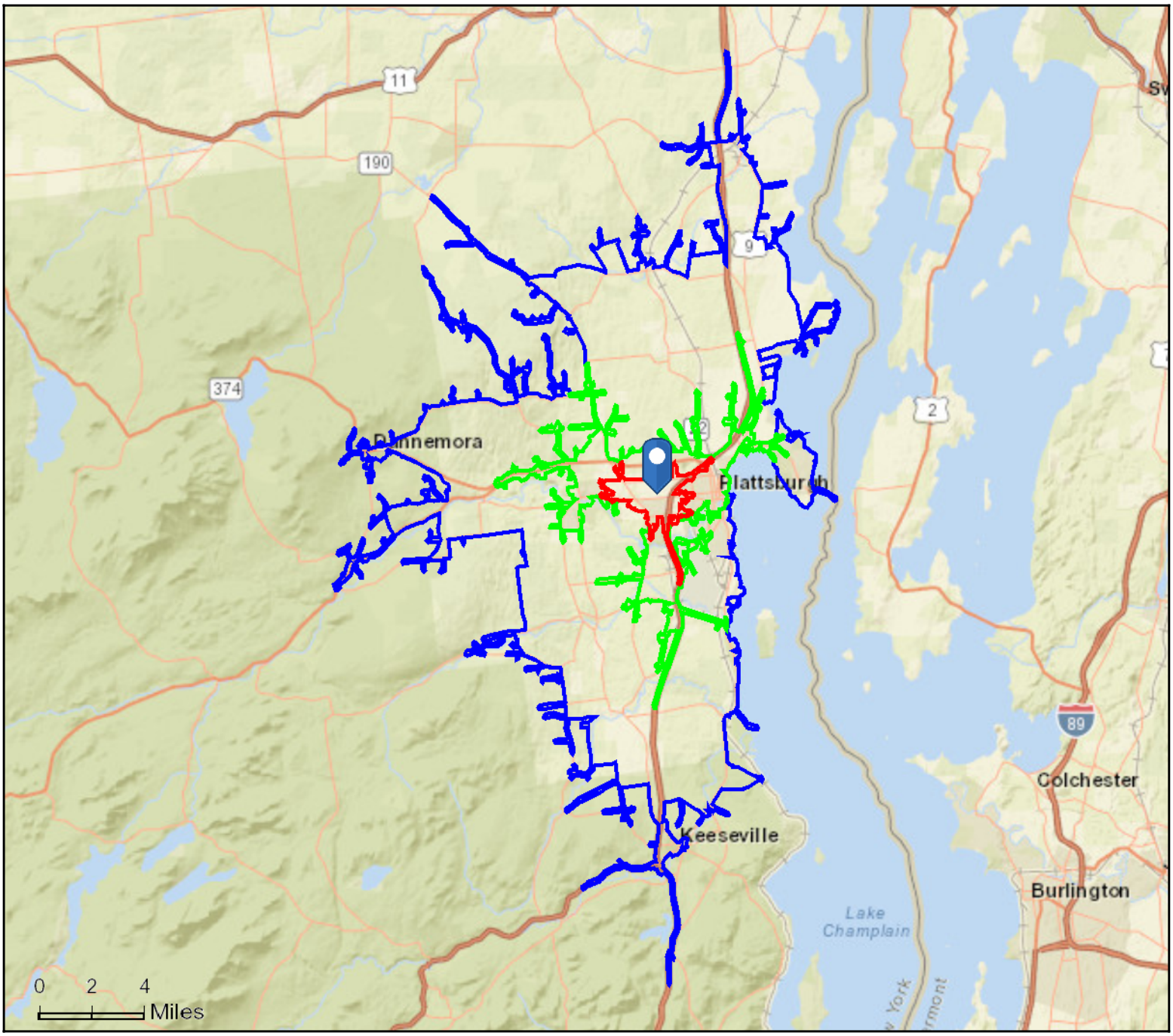


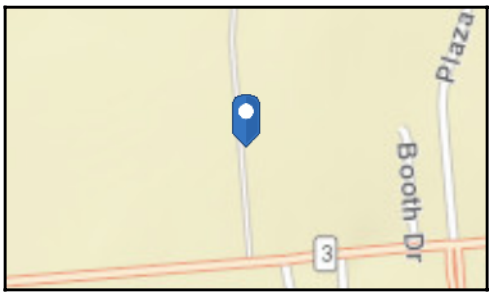
Spending facts are average annual dollars per household

Site Map

Town of Plattsburgh, New York
Drive Time: 5, 10, 20 minute radii

Prepared by Esri
Latitude: 44.69747
Longitude: -73.50093





June 20, 2018

MARKETING PROFILE

Town of Plattsburgh, New York (Drive time of 5 minutes)

Drive Time: 5 minute radii

esri
THE SCIENCE OF WHERE™

KEY FACTS

1,874
Population

45.4
Median Age

2.2
Average Household Size

$58,268
Median Household Income

ANNUAL HOUSEHOLD SPENDING

$2,023
Apparel & Services

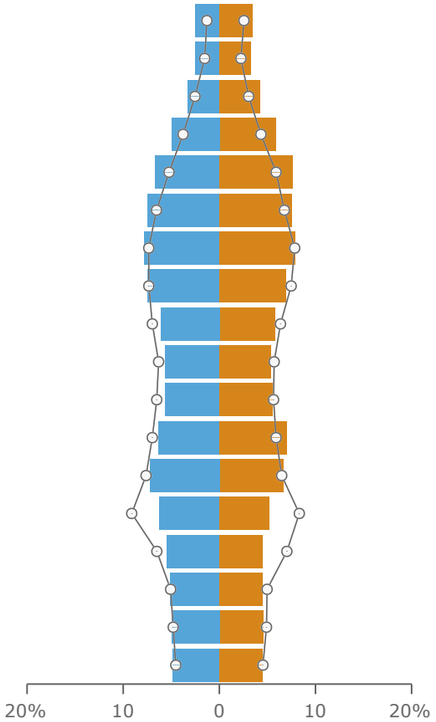
$4,773
Groceries

$160
Computers & Hardware

$5,424
Health Care

$3,146
Eating Out

Age Pyramid



The largest group:
2017 Female Population Age 55-59 (Esri)

The smallest group:
2017 Male Population Age 80-84 (Esri)

Dots show comparison to Clinton County

EDUCATION

9%
No High School Diploma

31%
High School Graduate

24%
Some College

36%
Bachelor's/Grad/Prof Degree

ANNUAL LIFESTYLE SPENDING

$1,921
Travel

$52
Sports Events

$54
Theatre/Operas/ Concerts

$4
Online Games

$69
Movies/Museums/ Parks

Tapestry Segments

 5B	In Style 340 households	39.6% of Households
 10D	Down the Road 275 households	32.0% of Households
 5E	Midlife Constants 226 households	26.3% of Households

MARKETING PROFILE

Town of Plattsburgh, New York (Drive time of 10 minutes)

Drive Time: 10 minute radii

KEY FACTS

21,534
Population

37.0
Median Age

2.2
Average Household Size

$45,599
Median Household Income

ANNUAL HOUSEHOLD SPENDING

$1,725
Apparel & Services

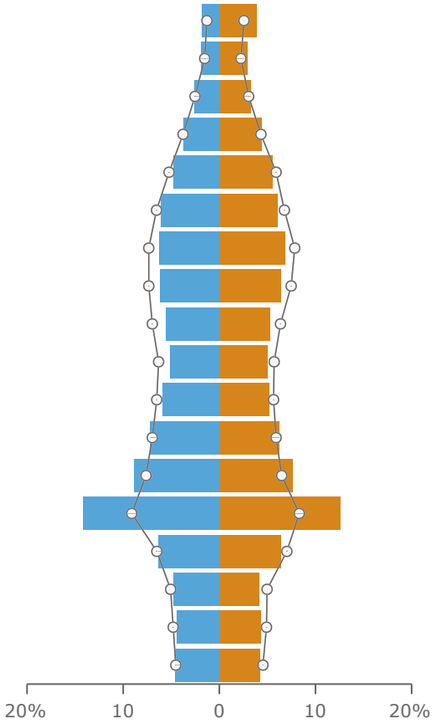
$143
Computers & Hardware

$2,705
Eating Out

$4,095
Groceries

$4,325
Health Care

Age Pyramid



The largest group:
2017 Male Population Age 20-24 (Esri)

The smallest group:
2017 Male Population Age 85+ (Esri)

Dots show comparison to Clinton County

EDUCATION

12%
No High School Diploma

28%
High School Graduate

30%
Some College

30%
Bachelor's/Grad/Prof Degree

ANNUAL LIFESTYLE SPENDING

$1,545
Travel

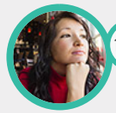
$45
Theatre/Operas/ Concerts

$61
Movies/Museums/ Parks

$44
Sports Events

$4
Online Games

Tapestry Segments

 11D	Set to Impress 1,856 households	19.9% of Households
 10D	Down the Road 1,408 households	15.1% of Households
 5E	Midlife Constants 1,327 households	14.3% of Households

MARKETING PROFILE

Town of Plattsburgh, New York (Drive time of 20 minutes)

Drive Time: 20 minute radii

KEY FACTS

51,973
Population

38.7
Median Age

2.3
Average Household Size

$51,553
Median Household Income

ANNUAL HOUSEHOLD SPENDING

$1,791
Apparel & Services

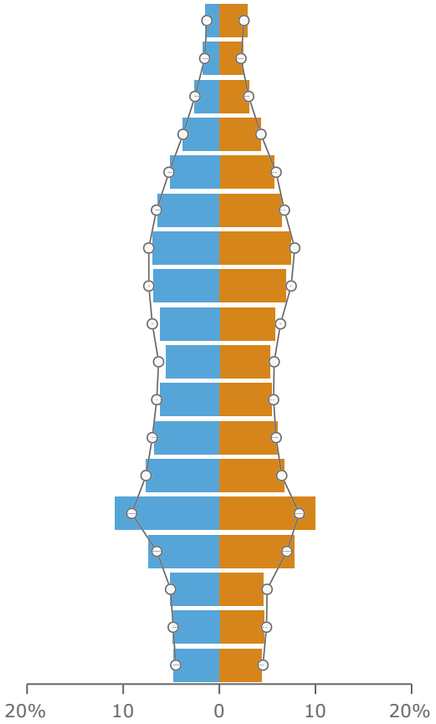
$4,320
Groceries

$144
Computers & Hardware

$4,795
Health Care

$2,814
Eating Out

Age Pyramid



The largest group:
2017 Male Population Age 20-24 (Esri)

The smallest group:
2017 Male Population Age 85+ (Esri)

Dots show comparison to Clinton County

EDUCATION

12%
No High School Diploma

32%
High School Graduate

29%
Some College

27%
Bachelor's/Grad/Prof Degree

ANNUAL LIFESTYLE SPENDING

$1,656
Travel

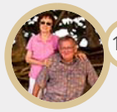
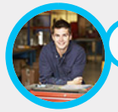
$47
Theatre/Operas/ Concerts

$61
Movies/Museums/ Parks

$46
Sports Events

$4
Online Games

Tapestry Segments

 10A	Southern Satellites 2,629 households	12.7% of Households
 8F	Old and Newcomers 2,027 households	9.8% of Households
 5E	Midlife Constants 1,964 households	9.5% of Households

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EXISTING CONDITIONS MAPPING

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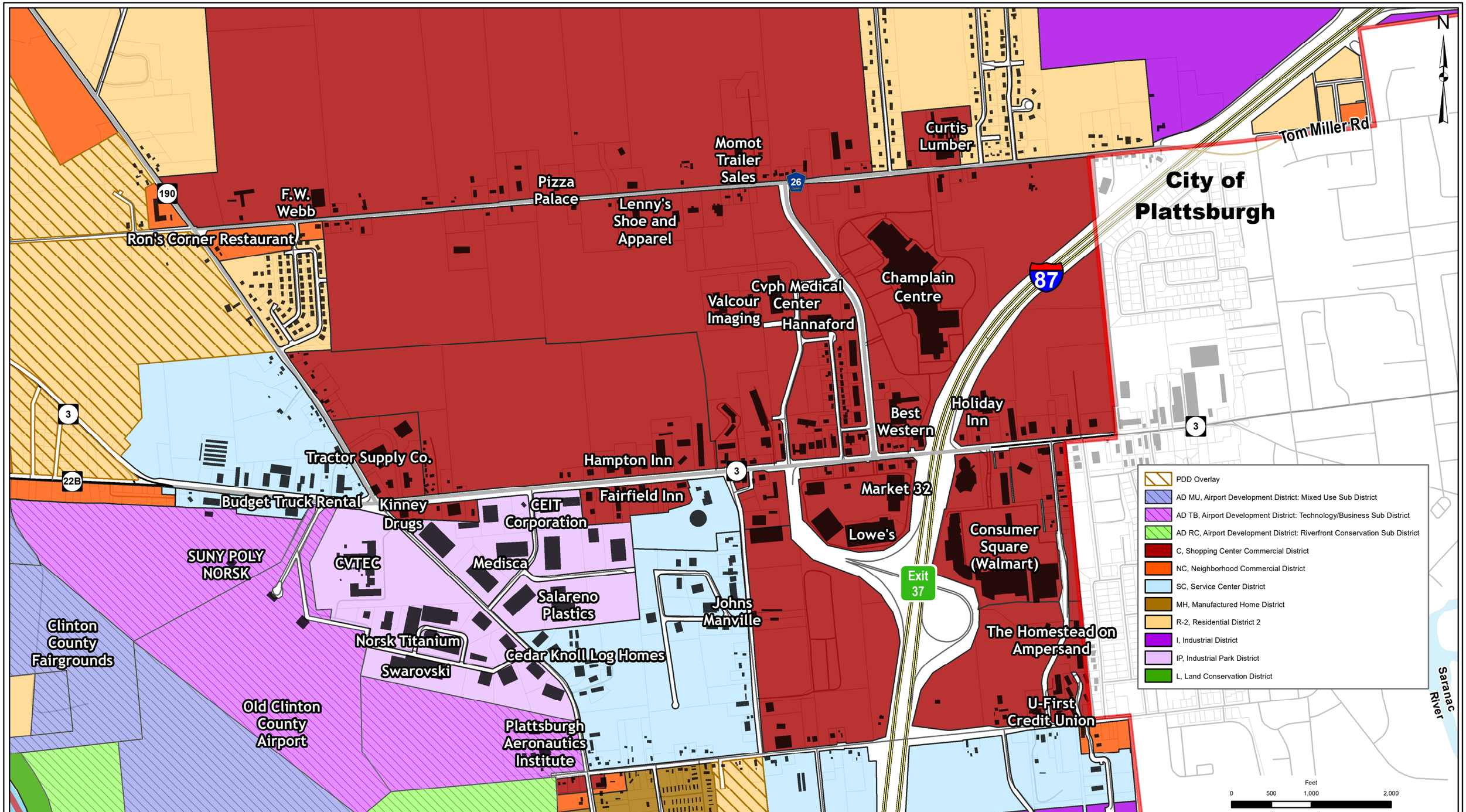

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Capital District Office:
547 River Street
Troy, NY. 12180
Phone: (518) 237-0055

North Country Office:
375 Bay Road
Queensbury, NY. 12804
Phone: (518) 812-0513

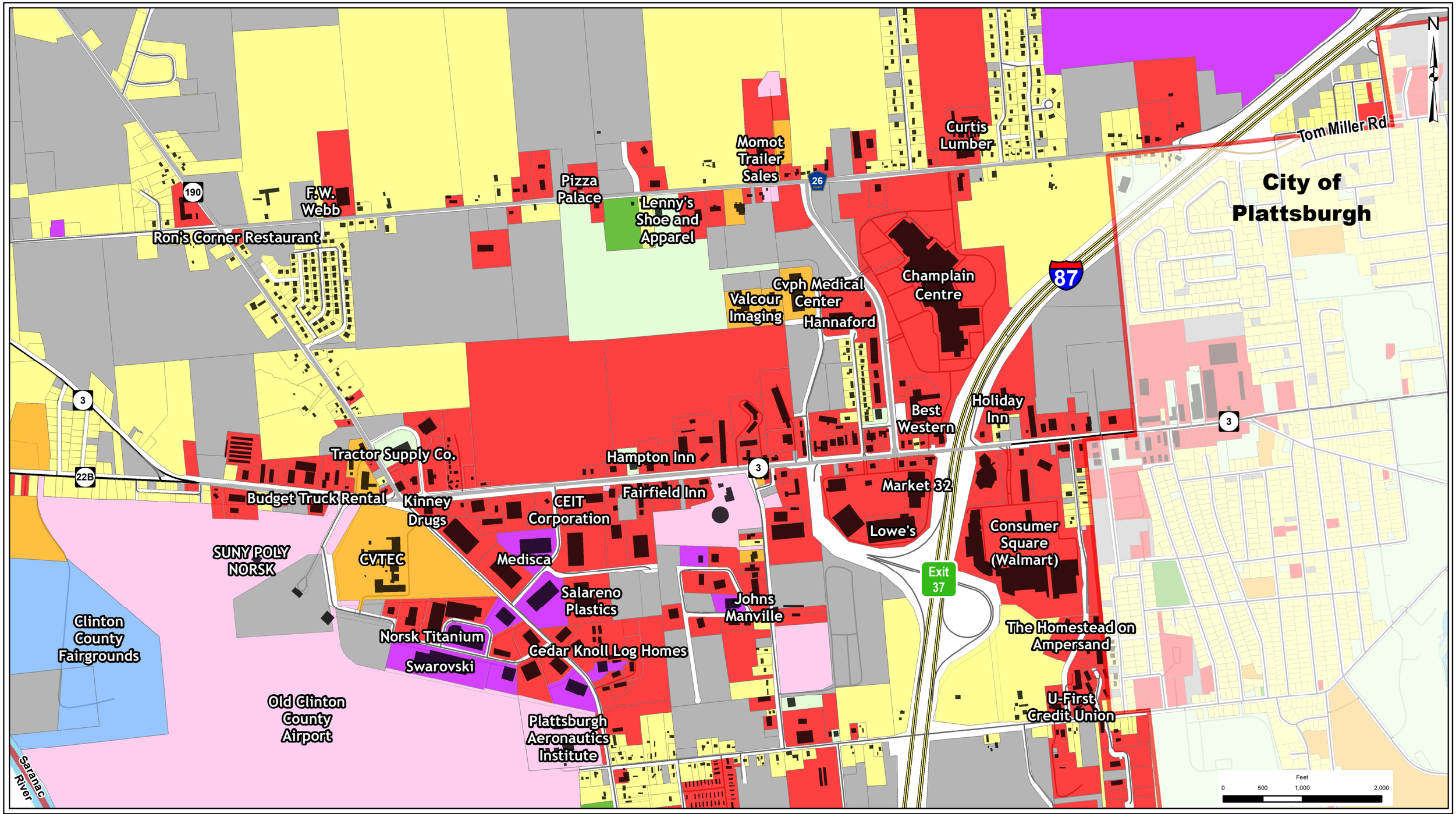
NEW YORK STATE OF OPPORTUNITY. Department of State

This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund.

Elevate Plattsburgh Smart Growth Plan

Project Area Zoning

Drawn:	EJG
Date:	03/01/2018
Scale:	1:13,350
Project:	91804.00
Figure:	NA



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Land Use

- Agricultural
- Residential
- Vacant
- Commercial
- Recreation and Entertainment
- Community Services
- Industrial
- Pblic Services
- Conservation and Public Parks

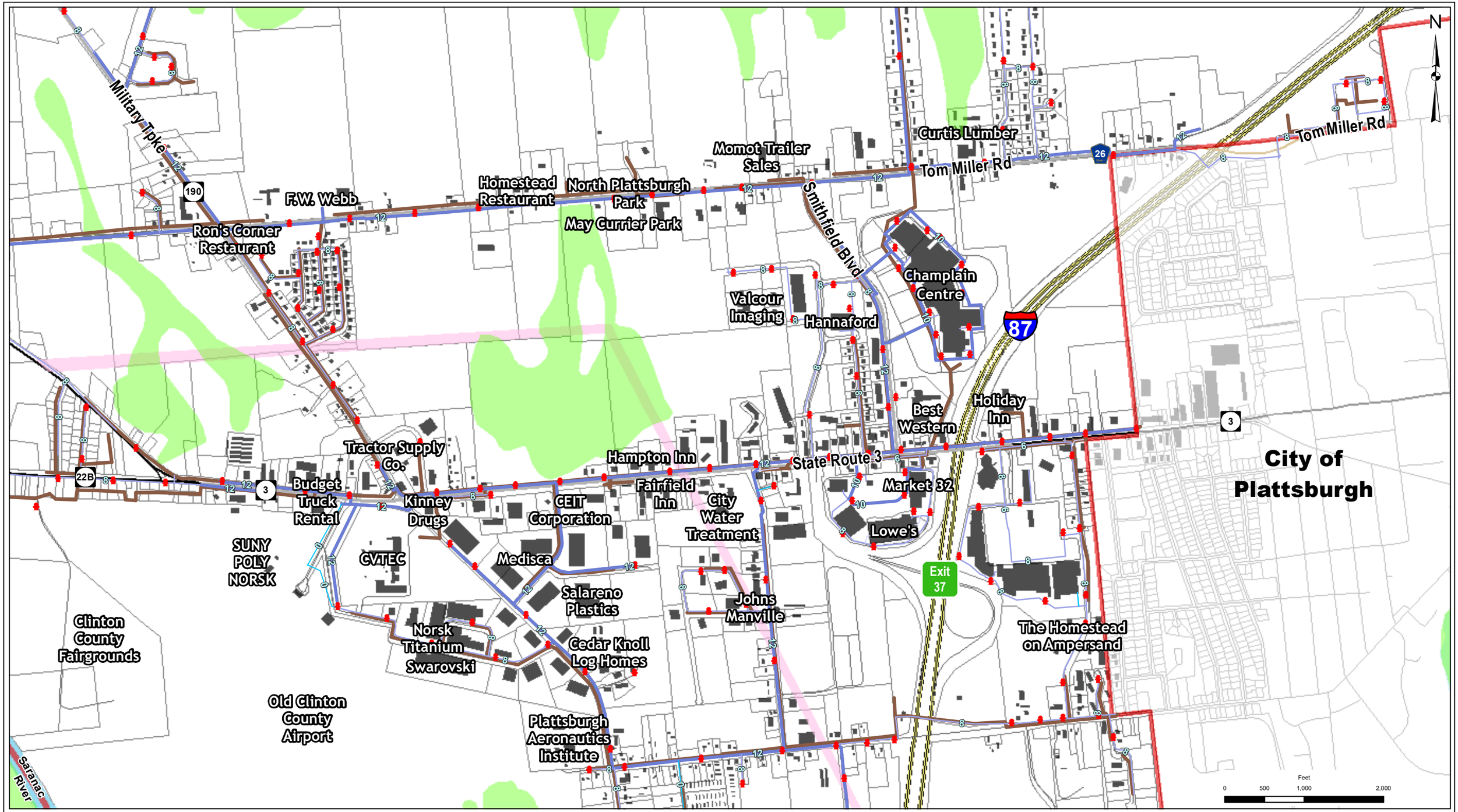
Elevate Plattsburgh Smart Growth Plan

NEW YORK STATE OF OPPORTUNITY. Department of State

This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund.

Project Area Land Use

Drawn:	EJG
Date:	03/01/2018
Scale:	1:13,350
Project:	91804.00
Figure:	NA



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Legend

- Fire Hydrant
- Sewer Main
- NYSDEC Wetlands
- Utility Corridor

Water Main Diameter

- 1-3"
- 4-8"
- 10-18"
- Unknown
- 20-24"
- 30-36"
- 40"+

Elevate Plattsburgh Smart Growth Plan

NEW YORK STATE OF OPPORTUNITY Department of State

This map was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund.

Infrastructure & Environmental Features

Drawn:	EJG
Date:	05/07/2018
Scale:	1:13,350
Project:	91804.00
Figure:	NA

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NYSERDA ANALYSIS

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INTRODUCTION

The Town of Plattsburgh, through the New York State Energy Research and Development Authority's (NYSERDA's) Clean Energy Communities (CEC) Program is investing in several project components to further the advancement of its clean energy and efficiency goals. One of these projects is the development of the Plattsburgh Smart Growth Plan (the "Plan"). The Plan explores land use strategies and design measures to encourage mixed-use development following Smart Growth Principles. The Plan is envisioned to establish a formal street grid, increase the density and mix of housing styles, and encourage alternative transportation methods. Mixing of land uses will also provide opportunities to live, work, and play with a newly envisioned "Town Center." By directing development to the Town Center, where infrastructure is already in place, the Town hopes to reduce utility costs, reduce vehicle usage, conserve land, mitigate sprawl development, and reduce greenhouse gas (GHG) emissions. Lastly, the Plan explores opportunities to incentivize the use of renewable energy and alternative transportation methods, while reducing waste.

SMART GROWTH PRINCIPLES

The Smart Growth movement was born out of a desire to combat the social, environmental and fiscal impacts of sprawl, which, as identified in the American Planning Association's (APA) Smart Growth policy document, "decline of many urban communities and older suburbs, congest streets and highways, demand higher levels of energy consumption, accelerate the loss of natural resources and deteriorate the natural environment, and limit opportunities for the retention and creation of affordable housing.[1]"

Smart Growth America identifies ten principles of Smart Growth.[2] A summary of these principles, as identified on Smart Growth America's website, is provided below.

1. *Mix land uses* near one another (e.g., on the same block, or within the same building) to attract people, support businesses, improve safety, and increase vitality.
2. *Take advantage of compact design* (e.g., infill development, building up) to make more efficient use of land that has already been developed.
3. *Create a range of housing opportunities and choices* for families at all stages and income levels.
4. *Create walkable neighborhoods* by mixing land uses, taking advantage of compact design, and incorporating smart street design that makes walking practical, safe, and convenient.
5. *Foster distinctive, attractive communities with a strong sense of place* by incorporating natural features, historic structures, public art, and placemaking to attract new residents and visitors.
6. *Preserve open space, farmland, natural beauty, and critical environmental areas* to meet housing and tourism demand and make communities more resilient.
7. *Direct development towards existing communities* rather than building on previously undeveloped land, to make the most of existing infrastructure, strengthen local tax bases, and protect open space.
8. *Provide a variety of transportation choices* to attract talent, compete global scale, and improve residents' daily lives.

[1] https://www.planning.org/policy/guides/adopted/smartgrowth.htm
[2] https://smartgrowthamerica.org/our-vision/what-is-smart-growth/

9. *Make development decisions predictable, fair, and cost effective* to create a supportive environment for developments that follow Smart Growth principles.
10. *Encourage community and stakeholder collaboration in development decisions* to ensure that local needs and the strategies to address them are defined by the people who live and work there.

Encouraging development that supports Smart Growth principles is key to reducing energy consumption and greenhouse gas (GHG) emissions. Specifically, the U.S. Environmental Protection Agency (EPA) notes that "as of 2010, […] buildings and transportation together accounted for about 70 percent of energy use in the United States and about 62 percent of U.S. greenhouse gas emissions. Creating more energy-efficient communities and buildings would reduce our impact on climate change, reduce our reliance on foreign fuel and non-renewable energy, and save money on household energy costs.[3]"

A discussion of the Plan components, how they align with Smart Growth principles, and their energy and GHG reduction benefits is provided below.

Land Use & Transportation Enhancements

Zoning Changes

Existing Conditions

Under existing conditions, the study area is characterized by Euclidean zoning, which discourages the mix of use, thereby causing increased distance between uses and the reliance on driving from home, to work, and to other destinations. Under this Town-wide Euclidean zoning umbrella, the area along Route 3 is a commercial district and is characterized by strip malls and shopping centers surrounded by large surface parking lots, as prescribed by existing parking and building density zoning regulations. These design elements further discourage walking or biking, prioritizing ease of access for vehicles above all other modes of travel. Furthermore, this more sprawling landscape contradicts the typical "transect" development pattern as one moves outward from the City of Plattsburgh.

One example of a typical development permitted under existing zoning is the Champlain Centre site, which is bordered by Route 3 to the south, Smithfield Boulevard to the west, Tom Miller Road to the north, and I-87 to the east was selected as a

Champlain Centre

Source: https://www.tripadvisor.com/Attraction_Review-g48411-d3710265-Reviews-Champlain_Center_Mall-Plattsburgh_New_York.html#photos;aggregationId=&albumid=101&filter=7&ff=311215628)

[3] https://www.epa.gov/smartgrowth/location-efficiency-and-housing-type

model site for analysis. The site, which comprises Tax Parcels 206.4-2-1.21 and 206.4-2-1.22, is currently occupied by the approximately 705,635-gross square foot (GSF) Champlain Centre mall. The one-story building was constructed in 1987, with an addition constructed in 2008, and is surrounded by surface parking lots totaling a combined estimated 3,250 spaces.[4]

Proposed Improvements

The Plan proposes a Form Based Code (FBC) transect zoning that would allow for a mix of uses, encourage infill development and increased density, and decrease parking requirements. The transect approach seeks to promote higher density development patterns closer towards the City where there is supporting infrastructure, with moderate decreases in densities as one moves outward. This, in turn, produces a wide range of land use opportunities, including "missing middle" housing. One example of a typical development that could occur under the proposed zoning is at the Champlain Centre site. Specifically, the Plan envisions a land use paradigm where the Champlain Centre site could be redeveloped with a multi-building, mixed-use development comprising residential and retail uses. For planning purposes, it is estimated that the site could be built out with a total of approximately 2.27 million SF of development, including approximately 1,818,250 SF of residential floor area (comprising an estimated 1,818 residential units[5]) and approximately 454,560 SF of non-residential (retail) floor area. The mixed-use development would be surrounded by a mix of on-site open space and smaller surface parking lots. While this represents an increase in total development on the Champlain Centre site, this level of density would require substantially more land area if developed outside of the Town Center under existing zoning regulations. Therefore, in conjunction with the recommended zoning modifications, the Town would consider means to encourage development within the Town Center area as a means to conserve land and discourage sprawl. This could take the form of administrative changes to streamline the approval process in certain areas or other incentives.

Potential future development on the Champlain Centre site

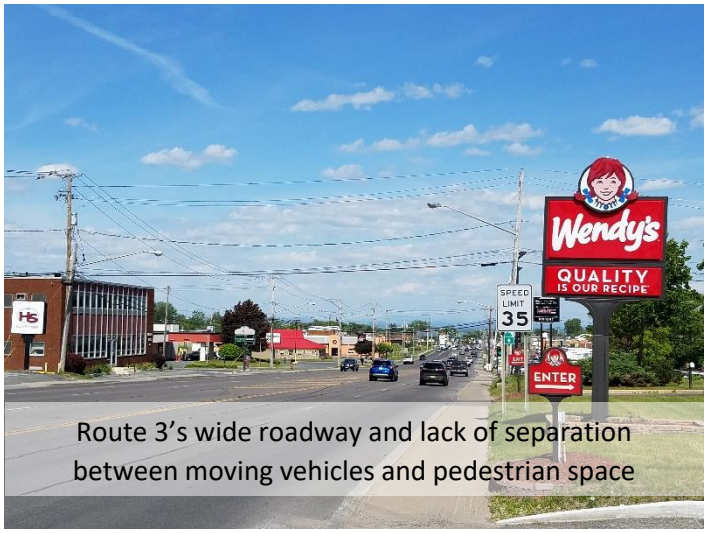
The proposed zoning changes are informed by Smart Growth principles, including mixing land uses, taking advantage of compact design, creating a range of housing opportunities and choices, creating walkable neighborhoods, and preserving open space.

[4] Based on a review of aerial earth imagery. Assumes 350 SF per space.
[5] Assumes 1,000 SF per unit.

Proposed Complete Streets Roadway Network & Route 3 Streetscape Redesign

Existing Conditions

The Town center study area is an auto-centric environment comprised of an irregular network of dead-end/cul-de-sac streets and large, uninterrupted roadway stretches between intersections. The NYS Route 3 corridor that runs through the center of the Plan's study area is generally comprised of four lanes of traffic with few stop signs or traffic lights; additional turn-only lanes are provided at signalized intersections. Intersections and access to adjacent businesses along NYS Route 3 are typically provided by slip lanes intended to allow vehicles to quickly join moving vehicles along Route 3, and many adjacent businesses have multiple or wide curb cuts/access points. These conditions, combined, create a very auto-centric condition that prioritizes vehicle speed and ease over pedestrian/bicycle safety or comfort. The existing sidewalks along the route are frequently interrupted by curb cuts with no crosswalks, raising safety concerns, and there are minimal to no street trees along the route to provide shade and comfort to pedestrians. With no designated bike lanes, any bicyclist opting to travel along the route would likely choose to travel on the sidewalk, out of the way of the fast-moving traffic, which can cause additional pedestrian and bicyclist conflict concerns. The Route 3 corridor also lacks defined, uniform bus stops resulting in the use of "flag" stops within the travel lanes and private property utilized for pickup locations. The existing conditions along Route 3 are not supportive of Smart Growth principles nor complete streets and, in its current design, encourages the use of private automobiles over alternative modes of transportation.



Route 3's wide roadway and lack of separation between moving vehicles and pedestrian space


Existing slip lanes and poorly defined crosswalks prioritize vehicles over pedestrians and bicycles

Proposed Improvements

The Plan envisions an improved Complete Streets network that is designed to be safely used by all users, including pedestrians, bicyclists, motorists, and transit riders. One of the key general design principles of the Plan's recommended Design Guidelines is to "design with the pedestrian in mind" by creating

attractive, shaded, and safe routes for people to walk and relax that links to surrounding buildings and properties; and limiting the visibility of parking areas and wide expanses of asphalt that make it uninviting for pedestrians. Specific design guidelines that will affect the streetscape include creating a consistent street wall close to the public way and pedestrian areas, restricting parking between the building façade and road, providing street trees along all public road frontages, providing sidewalks and pedestrian paths, limiting curb cuts, and screening parking. Wider sidewalks and designated bike paths are also proposed along the length of the corridor. The recommended improvements along Route 3 support Smart Growth principles, most notably by "incorporating smart street design that makes walking practical, safe, and convenient."

Energy & GHG Reduction

Alternate Transportation

The U.S. EPA notes that "the most effective way to reduce energy consumption is to locate homes of all types in areas where households could replace some automobile use with transit use, leading to reductions of 39 to 50 percent in household energy use.[6]" The Plan would encourage the use of alternate modes of transportation by increasing density, encouraging infill development, permitting a mix of uses, and improving the streetscape to create a less auto-oriented environment.

> *"Well-designed neighborhoods in convenient, accessible locations make walking, biking, and public transit more appealing options. Therefore, encouraging infill development can help more people meet their everyday needs with less driving, which can reduce traffic congestion and improve regional air quality." – U.S. EPA*
>
> https://www.epa.gov/smartgrowth/measuring-air-quality-and-transportation-impacts-infill-development

The recommended Complete Streets road network and NYS Route 3 improvements are intended to encourage the use of alternate modes of transportation by creating a more pedestrian and bike-friendly environment. Shifting from private auto to alternate modes reduces CO_2 emissions. For example, a personal auto occupied by one passenger emits an average of 371 CO_2 g per passenger mile, compared to 299 CO_2 g per passenger mile of a transit bus.[7] The provision of

[6] https://www.epa.gov/smartgrowth/location-efficiency-and-housing-type
[7] https://jamesrivertrans.com/wp-content/uploads/2012/05/ComparativeEnergy.pdf

bicycle parking (per the Plan's Design Guidelines) will further serve to encourage the use of bicycles for travel.

Reducing Per Capita Vehicle Miles Traveled

The U.S. EPA notes that "Increases in VMT contribute to traffic congestion and air pollution, causing carbon dioxide and particulate matter emissions. Because of population growth and economic development, most regions cannot feasibly reduce absolute VMT. Reducing per capita VMT can help a region achieve air quality, climate change, and congestion reduction goals without penalizing it for population growth.[8]"

> *"Even though changes in urban form may take years to occur, the best regional transportation models suggest that altering urban form can affect travel and emissions measurably within a time frame of 10 to 20 years." – U.S. EPA*
>
> https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P

Mixed-use development, as compared to the separation of uses associated with Euclidian zoning, allows for codependent uses to be in close proximity to each other, thus shortening trips and allowing what might otherwise have been external personal vehicle trips to become internal trips and, in turn, reducing VMTs, as compared to if the same uses were to be separated in single-use development.

As an example, VMTs for the Champlain Centre site were estimated under existing conditions (with the site occupied by an approximately 705,000 SF shopping center) and the potential build-out identified in the Plan (occupied by approximately 1,800 residential units and over 450,000 SF of retail). The number of daily trips for each scenario were first estimated using the *ITE Trip Generation Manual (10th Generation)*, the results of which are presented in **Table 1**. As shown in the table, assuming a 25% linked trip credit for the future build-out's retail use, there would be a reduction of 169, 6,896, and 260 daily weekday, Saturday, and Sunday trips, respectively, compared to existing conditions. This reduction in total daily trips does not assume a shift in modal split (to alternative, non-auto trips); however, Smart Growth America's January 2017 report "Empty Spaces: Real Parking Needs at Five TODs" noted that "ITE's data do not fully account for other travel modes that are available and actively encouraged at TODs. In each of the five TOFs studied, at least 33 percent of trips were taken by modes other than driving.[9]"

Table 1: Comparison of Annual VMT—Champlain Centre Existing and Build-Out Conditions

	Weekday Trips	Saturday Trips	Sunday Trips	Annual VMT
Existing	22,701	29,931	14,889	80,023,788
Future Build-Out (with the Plan)	22,352	23,035	14,629	75,979,763
Increment	-169	-6,896	-260	-4,044,025

Sources: *ITE Trip Generation (10th Edition)*; US DOT FHA's 2013 *Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance.*

[8] https://www.epa.gov/sites/production/files/2014-01/documents/sustainable_transpo_performance.pdf
[9] https://smartgrowthamerica.org/resources/empty-spaces-real-parking-needs-five-tods/

Assuming the national average vehicle trip length of 9.72 miles (per the US DOT FHA's 2013 *Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance*[10]), this translates to a 4,044,025 VMT reduction per year, compared to existing conditions.

> *"An energy-efficient, multifamily home using fuel-efficient vehicles and located in a transit-friendly site uses 70 million BTUs per year — less than 30 percent of the 240 million BTUs used by a single-family, detached home without energy-efficient features or cars in an automobile-dependent site." – U.S. EPA*
>
> https://www.epa.gov/smartgrowth/location-efficiency-and-housing-type

Reducing VMTs directly reduces CO_2 emissions, which is the primary GHG emitted by transportation and, per the U.S. EPA, accounts for 95 percent of transportation's impact on climate change. As CO_2 emissions are nearly directly proportional to the amount of fuel that gas-powered vehicles burned, the U.S. EPA notes that CO2 emissions can be calculated as VMTs, divided by average fuel economy (miles per gallon), multiplied times carbon content of fuel (grams per gallon).[11] Therefore, with an estimated annual VMT reduction of 4,044,025, the Champlain Centre redevelopment example would result in an approximately 403,750 KG reduction in annual CO_2 emissions, compared to existing conditions.[12]

It should be noted, however, that the above estimate does not account for any shift from gasoline-powered vehicles to electric and/or hybrid vehicles. In addition to the building and streetscape elements described above, the Plan would encourage the provision of electric vehicle (EV) charging terminals at destination sites where there are restaurants, shops, or offices designed to cater to large numbers of people. By providing more EV charging stations, the Plan would increase the convenience of using electric vehicles, thereby promoting a shift away from the use of gasoline powered vehicles.

Reducing Building Energy Demands & GHG Emissions

The Plan would reduce building energy demand and, therefore, GHG emissions through encouraging a more energy-efficient design envelope, reducing heat islands (e.g., large surface parking lots and roofs), and encouraging a more efficient use of space. Specific components of the Plan of note include recommending the use of induction or LED fixtures for all exterior lighting, to minimize energy use and recommending that new construction orient buildings and rooflines to accommodate existing (or future) solar panel installations with direct southern exposures.

Table 2 provides a comparison of the estimated average annual energy use for the Champlain Centre site under existing and build-out conditions. As presented in the table, while the site's estimated annual energy use is expected to increase by approximately 176,000 MBtu to an estimated 328,695 MBtu, the average energy consumption per SF would decrease by approximately 36% from 0.22 MBtu/SF to 0.14 MBtu/SF. Based on information from the US Energy Information Administration, electricity accounts for

[10] https://www.fhwa.dot.gov/policy/2013cpr/chap1.cfm
[11] https://www.epa.gov/sites/production/files/2014-01/documents/sustainable_transpo_performance.pdf
[12] Assumes an average fuel economy of 24.7 MPG (https://www.reuters.com/article/us-autos-emissions/u-s-vehicle-fuel-economy-rises-to-record-24-7-mpg-epa-idUSKBN1F02BX) and 87% carbon content (https://www.fueleconomy.gov/feg/contentIncludes/co2_inc.htm)

approximately 44% of household energy use, with the remainder comprising natural gas, petroleum, and renewable energy sources.[13]

It should be noted that the above energy and GHG estimates are based on average energy use rates and do not reflect the reduced energy demand resulting from energy-efficient design measures, such as the use of LED fixtures and shading. Notably, the Plan recommends tree plantings along all public street frontages. Trees can provide building shading, reducing the building cooling needs and associated winter energy demand, particularly if trees are located within 60 feet of the east, south, or west-facing walls of a building. On a per-tree basis, studies have found that an appropriately placed 25-foot-tall deciduous tree can result in annual energy savings for cooling in the range of 100 to 400 kWh (or 10 to 15%).[14]

Table 2: Comparison of Average Annual Energy Use—Champlain Centre Existing and Build-Out Conditions

Land Use	Energy Use Rate (Thousand Btu (MBtu)/SF)	Energy Use (MBtu)
	Existing Conditions	
Commercial	216.3	152,629 *(or 0.22 MBtu/SF)*
	Build-Out Conditions (with the Plan)	
Residential	126.7	230,373
Commercial	216.3	98,322
	Total	*328,695* *(or 0.14 MBtu/SF)*
	Increment over Existing Conditions	*+176,066* *(or -0.08 MBtu/SF)*

Source: *2014 CEQR Technical Manual*

NYSERDA's May 2015 *CGC Project Benefits Report Template* provides information on converting energy demand to GHG emissions. Using the estimated total energy demand presented in **Table 2** and assuming electricity accounts for 44% of energy use, with the remaining 56% comprised of natural gas, a comparison of the Metric Tons of Carbon Dioxide Equivalent (MTCDE) was calculated for the Champlain Centre site for the two scenarios. Using this approach, it is estimated that, while the MTCDE is expected to increase (from 10.2 to 21.79), the total GHG emissions per 1,000 SF would be comparatively lower under future build-out conditions with the Plan (0.0096 MTCDE per 1,000 SF), as compared to existing conditions (0.0143 MTCDE per 1,000 SF). In addition, GHG emissions would be further reduced

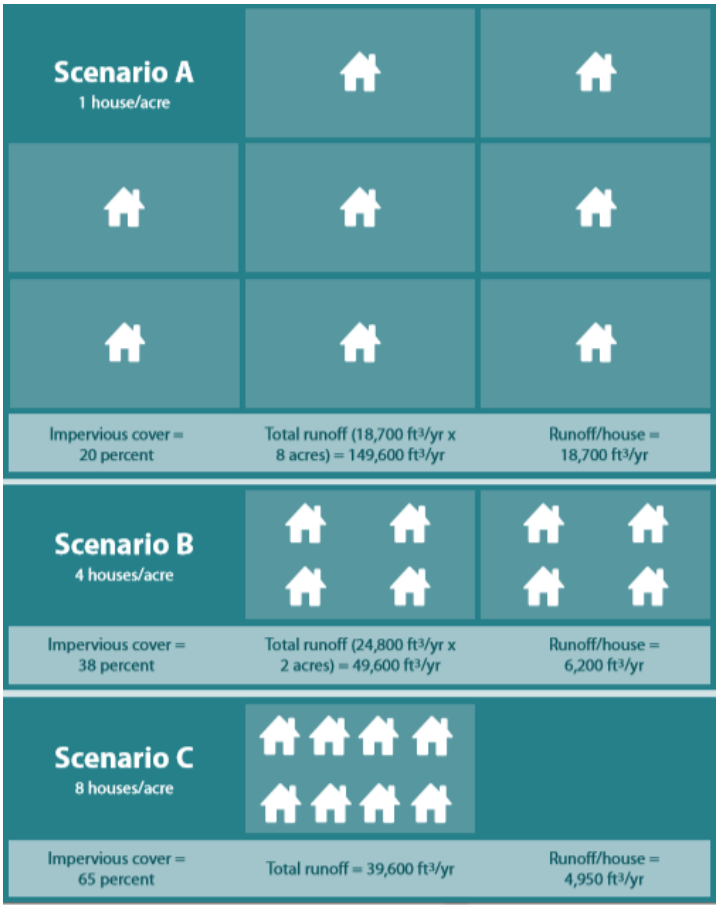
> *"More centrally located neighborhoods, even if suburban in character, exhibit lower rates of driving and vehicle emissions. The implication is that smart-growth strategies intended to limit growth in automobile dependence and emissions should look first to centrally located sites for infill and redevelopment."*
> *– National Resource Defense Council*
>
> https://www.nrdc.org/sites/default/files/charnash.pdf

[13] https://www.eia.gov/energyexplained/index.php?page=us_energy_homes
[14] https://www.fs.usda.gov/ccrc/tools/tree-carbon-calculator-ctcc

through the use of alternative, renewable energy sources, which would be encouraged by the Plan's recommendation that new buildings and rooflines be oriented to accommodate existing (or future) solar panel installations with direct southern exposures.

Land Conservation & Natural Resources

The Plan would serve to minimize land consumption by both increasing the permitted density and incentivizing infill development in the study area. Using the Champlain Centre example, the potential future build-out on the 85.5-acre site comprises approximately 2.27 million SF of development, including approximately an estimated 1,818 residential units and approximately 454,560 SF of non-residential (retail) floor area; this represents approximately 21 units per acre. Alternately, under the existing C, "Shopping Center Commercial District" zoning mapped on the Champlain Centre site, the 1,818 residential units would require approximately 230 acres (or eight units per acre); the same 230 minimum acreage would be required for the 1,818 residential units if they were developed outside of the Town Center in a mapped R-2, "Residential District 2." This represents approximately 2.7 times more land consumption than under the recommended FBC transect zoning.



Source: https://www.epa.gov/sites/production/files/2014-04/documents/stormwater-best-management-practices.pdf

Multiple studies have identified the benefits of infill development, which include: reducing average trip distances by 50 to 60 percent; reducing travel time; lowering public infrastructure and household travel costs by 40 to 60 percent; reducing environmental impacts, including an approximately 50 percent reduction in NO_x and CO_2; creating a greater multi-modal orientation; improving access to community amenities; and increasing transportation choice.[15] Looking at one example, a U.S. EPA study of Denver, Colorado found that shifting just eight percent of the City's jobs and households towards ten regional centers reduced congestion by six percent and emissions by four percent.[16] In terms of infrastructure

[15] https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=91018FRG.txt
[16] https://www.epa.gov/smartgrowth/measuring-air-quality-and-transportation-impacts-infill-development

costs, another U.S. EPA study noted a reduction of 32 to 47 percent under traditional neighborhood development patterns, as compared to conventional suburban development.[17]

While many of these benefits associated with minimizing land consumption are discussed in the preceding section, it is worth noting the benefits on stormwater runoff, as increasing density decreases impervious cover, which, in turn, reduces stormwater runoff. Stormwater runoff is considered a "nonpoint" pollution source, with stormwater runoff in areas with large impervious, non-porous surfaces picking up pollutants along its pathway to nearby waterways. As shown in the graphic on the preceding page, with an increase in density from one house per acre to eight houses per acre, the average runoff per housing unit decreases by approximately 75 percent. Reducing stormwater runoff is critical for minimizing environmental impacts, including flooding, erosion, polluted waterways, and threats to public health and public safety, in addition to economic impacts, such as the increased costs of water and wastewater treatment.

It is also worth noting that impervious surface areas would be further decreased through the Plan's Design Guidelines' goals of increasing the amount of greenspace and trees in the area. Plants play an important role in the fight against climate change, as they remove CO_2 in the air, store carbon in the trees and soil, and release oxygen into the air. Specifically, a 2013 study found that the estimate rate of carbon storage per square meter of tree cover is 7.69 kg C m^{-2}.[18]

Creating Jobs near Residences

The U.S. EPA notes the benefits of increasing the ratio of jobs to housing, specifically stating the following:

> "One of the simplest metrics is the ratio of jobs to housing. At the metropolitan scale, the ratio of jobs to housing is usually close to 1, but cities and neighborhoods often have a large imbalance between jobs and housing, meaning that people have to commute farther to work. Land use visioning at the neighborhood scale can involve calculating an employment-to-dwelling unit ratio. Alternatives that shift this ratio closer to 1 are considered preferable, as this means jobs are available near where people live, reducing commute times and increasing accessibility by foot, bicycle, and public transit.[19]"

The number of jobs on the Champlain Centre site was calculated for existing and future build-out conditions using the typical employee generation rates of 1 employee per 25 residential units and 3 employees per 1,000 SF of retail. Based on these rates, Champlain Centre's approximately 605,635 SF of leasable space employ an estimated that there are 1,817 existing employees on the site (assuming no vacancy); with no existing residential units, the site is not currently maximizing the ratio of jobs to housing on-site and most, if not all, employees must commute by private auto. In comparison, using the potential build-out scenario for the site under the Plan, there would be an estimated 1,436 employees and 4,289 residents[20] on the site under future build-out conditions, which translates to a jobs-to-housing ratio of 0.33; this estimate does not account for additional jobs and residents on neighboring sites, which could

[17] https://www.epa.gov/smartgrowth/smart-growth-conventional-suburban-development-infrastructure-case-study-completed-epa
[18] https://www.fs.fed.us/nrs/pubs/jrnl/2013/nrs_2013_nowak_001.pdf
[19] https://www.epa.gov/sites/production/files/2014-01/documents/sustainable_transpo_performance.pdf
[20] Based on the Town of Plattsburgh's average household size of 2.36 (per the 2013-2017 ACS).

further increase the jobs-to-housing ratio. By increasing the jobs-to-housing ratio, the Plan will reduce the reliance on commuting by private auto, thereby reducing GHG emissions and improving air quality.

CONCLUSION

The Plattsburgh Smart Growth Plan consists of land use strategies and design measures, including establishing a formal street grid, increasing the density and mix of housing styles, and encouraging alternative transportation methods to encourage mixed-use development, following Smart Growth Principles. Implementation of the recommendations outlined in the Plan is expected to result in energy and GHG reduction by reducing auto usage, per capita VMTs, building energy demands, and consumed land and increasing the number of jobs near residences. While this memo outlines and quantifies the benefits in these key GHG reduction strategies, the project has additional benefits in many of the other areas highlighted in NYSERDA's Cleaner Green Communities (CGC) program, including infrastructure cost savings, reducing the use of non-renewable energy sources, and increased revenue generated by new or increased businesses. It is lastly worth reiterating a statement made by the U.S. EPA: "Even though changes in urban form may take years to occur, […] altering urban form can affect travel and emissions measurably within a time frame of 10 to 20 years." The benefits of the project will continue to be realized and accrued for years to come, as developers opt for infill development over sprawl and residents, employees, and visitors to the area shift their current auto-dependent travel behaviors for alternative modes more keeping with the envisioned Town Center built environment.

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