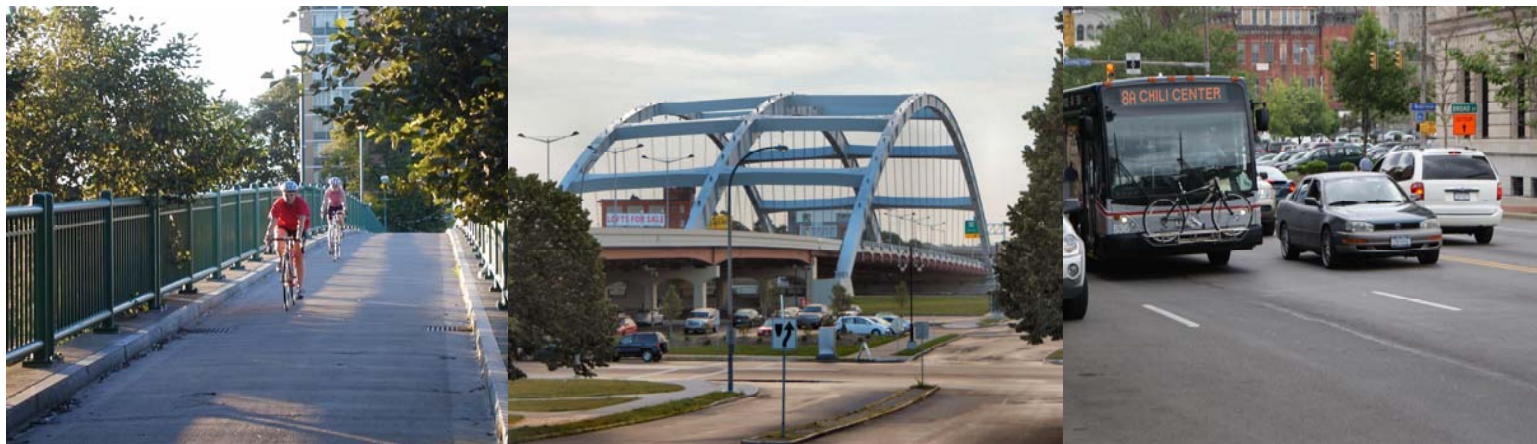


Long Range Transportation Plan for the Genesee-Finger Lakes Region

2035



GENESEE TRANSPORTATION COUNCIL

June 2011

GENESEE TRANSPORTATION COUNCIL



Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035

GENESEE TRANSPORTATION COUNCIL

RESOLUTION

Resolution 11-51 Adopting the *Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035*

WHEREAS,

1. Title 23, Section 134 of the United States Code requires that each Metropolitan Planning Organization (MPO) prepare and update a long range transportation plan (LRTP) for its metropolitan area;
2. Title 23, Section 134 of the United States Code requires that an LRTP shall, at a minimum, identify transportation facilities that should function as an integrated system, and include a fiscally-constrained financial plan for implementing the recommendations contained in the LRTP;
3. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law on August 10, 2005 and mandated additional elements that must be incorporated into a MPO LRTP by July 1, 2007;
4. The specific elements mandated by SAFETEA-LU are further defined by the Metropolitan Transportation Planning Final Rule that was published jointly by the Federal Highway Administration and Federal Transit Administration on February 14, 2007;
5. GTC in consultation with affected stakeholders and the general public has developed the *Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035* in a manner that meets and exceeds the requirements of Title 23, Section 134 of the United States Code and the February 14, 2007 Metropolitan Transportation Planning Final Rule;
6. SAFETEA-LU requires the incorporation of a Congestion Management Process (CMP) into the metropolitan transportation planning process of Transportation Management Areas (TMAs);
7. The *FY 2011-2012 Unified Planning Work Program* includes Task 7110, Congestion Management Process Implementation, which has been further advanced and incorporated into said LRTP to meet and exceed the requirements of SAFETEA-LU for incorporating the identification of congested roadways, activities to mitigate the congestion, and measures to monitor performance into the metropolitan transportation planning process;

8. The GTC Board adopted the *LRTP Non-Air Environmental Scan* via Resolution 07-7, which has been incorporated into said LRTP to meet and exceed the requirements of SAFETEA-LU for incorporating the identification of non-traditional partners, the full scope of environmental considerations, and activities to mitigate negative non-air quality related impacts into the metropolitan transportation planning process; and
9. Said LRTP has been developed and reviewed by GTC staff and member agencies through the GTC committee process and its recommendations have been found to be consistent with the principles of sound transportation planning practices.

NOW, THEREFORE, BE IT RESOLVED

1. That the Genesee Transportation Council hereby adopts the *Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035* as the official LRTP for the Rochester TMA in accordance with Title 23, Section 134 of the United States Code and the February 14, 2007 Metropolitan Transportation Planning Final Rule; and
2. That the Council encourages those responsible for the development and advancement of transportation projects in the Rochester TMA to do their utmost to adhere to its principles and recommendations in carrying out their respective programs.

CERTIFICATION

The undersigned duly qualified Secretary of the Genesee Transportation Council certifies that the foregoing is a true and correct copy of a resolution adopted at a legally convened meeting of the Genesee Transportation Council held on June 16, 2011.

Date 6/17/11

Robert A. Traver
ROBERT A. TRAVER, Secretary
Genesee Transportation Council

GENESEE TRANSPORTATION COUNCIL



Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035

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Financial assistance for the preparation of this report was provided by the Federal Highway Administration and Federal Transit Administration. The Genesee Transportation Council is solely responsible for its content and the views and opinions expressed herein do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

The Genesee Transportation Council assures that no person shall, on the grounds of race, color, national origin, disability, age, gender, or income status, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity. GTC further assures every effort will be made to ensure nondiscrimination in all of its programs activities, whether those programs and activities are federally funded or not.

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GENESEE TRANSPORTATION COUNCIL



Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035

Chapter I - INTRODUCTION

Introduction

Since the adoption of the last long range transportation plan for the Genesee-Finger Lakes Region in June 2007, the United States has gone through and is in the midst of what will likely be the long process of recovering from the greatest economic downturn since the Great Depression. In addition, volatility in energy prices not seen since the 1970s occurred in the summer of 2008 providing a glimpse of future impacts on American society if emphasis on lessening our dependence on oil from foreign countries is not increased.

Over the next two-plus decades, the region's senior population is projected to grow at a significant rate while the working age population is expected to decrease. Based on historical trends of the relationship between the size of the labor force and jobs, employment will increase modestly but could exceed projections if the region is able to attract more working age persons as a result of its high quality of life and affordable cost of living.

The multi-year federal legislation that provides direction and funding for transportation infrastructure and services expired on September 30, 2009 and successor legislation has yet to be enacted. The primary source of funding for programs contained in multi-year legislation is the federal gas tax. The federal gas tax was last increased in 1993 to its current flat rate of 18.4 cents per gallon. Combined with the appreciable increase in the fuel efficiency of vehicles since that time, it is no longer a viable means for generating the needed revenues to sustain the current transportation system much less develop the one needed for the future.

Global economic conditions and the cost of energy coupled with projected regional demographic trends requires that the mobility of an aging population and ensuring that the transportation sys-

tem is a distinguishing factor in retaining and attracting businesses be primary considerations. Achieving this via a regional transportation system that allows people and freight to move safely, efficiently, and reliably with the limited revenues expected to be available will be a challenge.

It is within this context that the *Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035 (LRTP 2035)* sets the direction for transportation infrastructure and services over the next nearly 25 years and provides the framework for future federally-funded planning and investments.

The *LRTP 2035* is organized into six primary elements:

LRTP 2035 Development – Provides the objective of the *LRTP 2035*, the role of the Genesee Transportation Council (GTC) in transportation policy, planning, and investment decision making, and the guiding principles and process used to develop the *LRTP 2035*.

The Region – Discusses the existing and projected demographic and economic conditions, recreational and cultural resources, different types of places based on land use, and major emerging opportunities and issues in the region.

The Transportation System – Examines the regional transportation system by mode and associated travel characteristics, the congestion management process, and safety and security considerations as well as presenting transportation needs through 2035.

Financial Plan – Describes the anticipated change in costs of implementing transportation projects and programs and the revenues that can be reasonably expected to be available over the period covered by the *LRTP 2035*.



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Recommendations – Presents the strategies and actions to address existing and future needs within the financial resources reasonably expected to be available through 2035 for transportation projects and programs.

Performance Measurement – Identifies the metrics used to monitor changes in the performance of the regional transportation system in order to gauge progress toward addressing the identified needs of the *L RTP 2035*.



GENESEE TRANSPORTATION COUNCIL



Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035

Chapter II - THE PLAN

L RTP 2035 Development

The objective of the *L RTP 2035* is to 1.) determine the current and projected transportation needs of the region's residents, businesses, and institutions over the next nearly 25 years; 2.) assess the ability of the existing transportation system to meet these needs; and 3.) identify a set of fiscally constrained strategies that best fill the gap between the capabilities of the existing transportation system and current and projected needs through 2035 within reasonably expected levels of available funding.

The *L RTP 2035* provides a strategic framework for policy, planning, and investment decision making to ensure that the multiple agencies that own, maintain, and operate transportation infrastructure and services are working continuously, cooperatively, and comprehensively in a coordinated fashion. It is not, nor is it intended to be, a capital or operating plan for any single transportation agency in the Genesee-Finger Lakes Region.

The data collected, technical documentation reviewed, analyses conducted, and alternatives considered in the development of the *L RTP 2035* are significant. To improve the readability of the *L RTP 2035* document, GTC has chosen to emphasize brevity and non-technical language. It is anticipated that this will facilitate increased understanding among all stakeholders about the future direction of transportation in the region.

The Genesee Transportation Council

The mission of GTC is to maximize the contribution of the transportation system to the social and economic vitality of the Genesee-Finger Lakes Region. Simply put: GTC is not interested in transportation for transportation's sake. Every transportation policy, planning, and investment decision made by GTC is based on how quality of life and economic opportunity will be improved by that choice.

Responsibilities

The U.S. Department of Transportation (USDOT) requires every metropolitan area with a population of over 50,000 to have a designated Metropolitan Planning Organization (MPO) to qualify for the receipt of federal highway and transit funds. GTC was designated as the MPO responsible for transportation policy, planning, and investment decision making in the Genesee-Finger Lakes Region by then-New York State Governor Hugh Carey in 1977.

Subsequent to GTC's designation, federal legislation has further increased the role of MPOs in transportation policy, planning, and investment decision making beginning in 1991 with the enactment of the Intermodal Surface Transportation Efficiency Act (ISTEA). The responsibilities of MPOs were further expanded in the subsequent Transportation Equity Act for the 21st Century (TEA-21), which was enacted in 1998, and its successor the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

SAFETEA-LU was enacted on August 10, 2005 and expired on September 30, 2009. The next federal surface transportation authorization legislation has yet to be created and SAFETEA-LU has been extended multiple times while the White House and Congress continue to deliberate on redefining federal interests and, as noted in the introduction, identifying revenues to support the funding programs that will be contained therein.

Beginning with ISTEA in 1991, GTC is responsible for the metropolitan transportation planning process in the Rochester Transportation Management Area (TMA). The Rochester TMA includes all of Monroe County and the adjacent developed areas of Livingston, Ontario, and Wayne counties. However, recognizing that the transportation system in the Rochester TMA both



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greatly influences and is influenced by the transportation system in the surrounding area, GTC continues to conduct the metropolitan transportation planning process for the entire region.

A map of the nine-county Genesee-Finger Lakes Region, highlighting the Rochester TMA is presented on the following page (Map 1).

USDOT requires that MPOs conduct their activities using the following “3C” process:

Continuing

The MPO must meet regularly to discuss and identify transportation solutions to the constantly changing needs of the region’s residents, businesses, and institutions that depend on the system for their economic, social, and domestic needs.

Cooperative

The MPO must include stakeholders at all levels (local, regional, state, and federal) in recognition that their respective transportation infrastructure and services must be planned, implemented, and operated in a coordinated fashion to maximize benefits to the travelling public.

Comprehensive

The MPO must consider and plan for the entire surface transportation system, which includes highways, bridges, public transportation, and bicycle and pedestrian facilities, emphasizing connections that improve safety, efficiency, and reliability.

To maintain the metropolitan transportation planning process required by USDOT in order to receive federal transportation funding, GTC must at a minimum produce and maintain three major products:

1. Long Range Transportation Plan (LRTP)

The LRTP must address no less than a 20-year horizon and lead to an integrated multimodal surface transportation system, giving priority to those elements that serve regional, statewide, and national goals. Beyond infrastructure preservation and maintenance, the LRTP must explicitly consider transportation system management and operations capabilities. The LRTP must be fiscally constrained in that system-level estimates of the costs of the recommendations contained in it cannot exceed reasonably expected revenues. The LRTP must be updated no less than every four years.

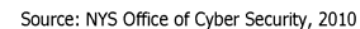
2. Unified Planning Work Program (UPWP)

The UPWP allocates federal transportation planning funds to activities conducted by GTC that maintain the federally-certified planning process required by USDOT. Because of the significant operating efficiencies realized by GTC, a large portion of UPWP funds are able to be provided directly to counties, municipalities, and others throughout the region to conduct regionally- and locally-needed plans that advance the LRTP by identifying specific projects and programs to be advanced in the future. The UPWP must be updated no less than every two years and is typically updated by GTC every year.

3. Transportation Improvement Program (TIP)

The TIP identifies and schedules the specific transportation improvements that will receive federal transportation implementation funds over the next four to five years. Projects included in the TIP advance with the recommendations of the LRTP and typically emerge from infrastructure needs identified by member agencies and through UPWP-funded plans and programs. The TIP must be updated no less than every four years and is typically updated by GTC every two years.

Map 1



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In addition to completing these three major products, GTC also undertakes various other USDOT-required activities and programs. Two examples are the Congestion Management Process (CMP) and air quality conformity determination for ground-level ozone; both of which are fully incorporated in the *LRTP 2035*.

All GTC activities and the resulting deliverables incorporate input from the public, technical professionals, and non-transportation organizations at all levels through direct outreach and consultation as prescribed in the adopted *GTC Public Participation Plan*. GTC also ensures that the metropolitan transportation planning process is responsive to federal mandates and guidelines including, but not limited to, the Americans with Disabilities Act, Clean Air Act Amendments of 1990, Title VI of the Civil Rights Act of 1964, and environmental justice considerations. Environmental justice builds on Title VI of the Civil Rights Act of 1964 by requiring agencies using federal funds to identify and address, as appropriate, any disproportionately high or adverse human health or environmental impacts on minority and low-income populations that may result from their activities.

Goals and Objectives

The GTC Goals and Objectives reflect local and regional priorities within the context of the eight major transportation planning focus areas established by the federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), enacted in 2005. The GTC Goals and Objectives are presented in Exhibit 1.

The development of the *LRTP 2035*, the selection of planning activities carried out through the UPWP, the investments programmed in the TIP, and all other activities and programs conducted by GTC are guided by these goals and objectives.

Exhibit 1 - GTC GOALS & OBJECTIVES

1. **Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency**
 - A. The transportation system should support balanced community and economic development of the metropolitan area
 - B. The transportation system should be a distinguishing competitive feature of the metropolitan area relative to other areas, serving the needs of existing businesses and enhancing the region's attractiveness to new business
2. **Increase the safety of the transportation system for motorized and non-motorized users**
 - A. Transportation designs, services, and education programs should enhance and protect life, health, and property
3. **Increase the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized users**
 - A. The transportation system, and its associated programs and services, should support both national and personal security initiatives
4. **Increase the accessibility and mobility options available to people and freight**
 - A. The transportation system should provide the capacity, coverage and coordination necessary to provide mobility to the region's population and commercial activities in a fashion consistent with the overall intent of Goal 1

- B. Reasonable travel alternatives should be available to all persons in the area regardless of age, physical or mental ability, and/or income

5. **Protect and enhance the natural environment, cultural heritage and community appearance, and promote energy conservation**

- A. Transportation planning and decision making should support and reinforce local land use and development objectives
- B. Transportation planning and decision making should recognize local priorities balanced with broader community goals
- C. Transportation planning and decision making should strive to address issues on a corridor level, recognizing both the multi-jurisdictional component of travel and the interrelationship between transportation and non-transportation policies and investments
- D. The transportation system should encourage the efficient use of non-renewable energy resources and the exploration of renewable alternatives
- E. Transportation planning and decision making should strive to embrace designs and processes that respect the natural environment and enhance the overall contribution of the transportation system to community livability

6. **Promote efficient system management and operations**

- A. The transportation system should be designed and managed in a fashion that minimizes lifetime maintenance and user costs
- B. Transportation investments should advance the Long Range Transportation Plan's goals and objectives in a fashion which maximizes benefits relative to costs *

- C. Transportation and land use planning should be integrated in a fashion that optimizes the use of existing transportation and other municipal infrastructure

- D. Transportation investments should be guided by cooperative planning, design, and maintenance standards to promote system continuity and uniformity across jurisdictional boundaries

7. **Facilitate partnerships in planning, financing, and the execution of transportation initiatives**

- A. The transportation planning and decision making process should be multi-jurisdictional, fostering coordination and cooperation among local, county, state, and federal governments, concerned agencies, and the private sector
- B. The transportation planning process should be conducted in as open and visible a manner as possible, encouraging community participation and interaction between and among citizens, professional staff, and elected officials
- C. Financial and non-financial support for transportation initiatives should be provided by all levels of government and the private sector in a fashion which reflects their relative responsibilities for, and/or benefits from, the initiatives and related economic and social impacts
- D. Innovative financing/partnerships for transportation initiatives that reflect the full scope of interests impacted or served should be explored
- E. Transportation and transportation-related information resources should be developed and shared in a fashion that promotes informed public and private sector decision making



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- F. Awareness should be promoted regarding the impact of individual, public, and private sector decisions on the quality of mobility and the potential impact of these decisions on others

* Note: Benefits and costs are broadly defined, quantitative as well as qualitative, non-monetary as well as monetary, and involve non-transportation effects as well as those related to the direct provision of transportation services.

Organizational Structure

GTC is governed by a 27-member policy committee (the GTC Board) which is supported by the Executive Committee, Planning Committee, and ad-hoc committees. Their various roles in the MPO process are discussed below.

GTC Board

The GTC Board is the governing body of GTC. It provides direction and establishes policy with regard to the roles and responsibilities of GTC as the designated MPO for the region. The GTC Board approves all activities and work products, including the LRTP, UPWP, and TIP. The 27 members of the GTC Board include elected officials from the nine counties of the region, the City of Rochester, and representatives of other local, regional, state, and federal agencies. GTC Board Officers are elected from among the members.

The GTC Board meets quarterly, or as required. Each GTC Board meeting is open to the public and advertised as such through media outlets across the region. A public forum is included at the beginning of all meetings to allow for public comment on meeting agenda items before GTC Board action is taken.

A listing of current GTC Board members is presented in Exhibit 2.

Exhibit 2 – GTC Board Members

County Legislative/Boards of Supervisors (9)

Genesee County*	Livingston County*
Mary Pat Hancock - Chair	James Merrick - Chair
Monroe County	Ontario County*
Jeffery Adair - President	Theodore Fafinski - Chairman
Orleans County	Seneca County
David B. Callard - Chair	Chuck Lafler - Chair
Wayne County *	Wyoming County
James Hoffman - Chairman	A. Douglas Berwanger - Chair
Yates County	
H. Taylor Fitch - Chair	

Other Local Members (9)

Monroe County Executive*
Maggie Brooks - County Executive
Monroe County Planning Board
Linda A. Faubel - Acting Chair
Monroe County Supervisors' Association
Ronald Nesbitt, President
Monroe County At-Large
Daniel Hogan - At-Large Member
Daniel DeLaus - At-Large Member

Mayor - City of Rochester*
Thomas Richards - Mayor

Rochester City Council
Lovely Warren - President

Rochester City Planning
David L. Watson - Chair

Rochester At-Large
Vacant - At-Large Member

Regional Agencies (2)

Genesee/Finger Lakes Regional Planning Council*
Jerry Davis - Chair

Rochester-Genesee Regional Transportation Authority*
James Redmond - Chair

State Agencies (4)

Empire State Development Corporation
Kenneth Adams - Commissioner

NYS Dept. of Environmental Conservation
Joe Martens - Commissioner

NYS Dept. of Transportation*
Joan McDonald - Commissioner

NYS Thruway Authority
Michael R. Fleischer - Executive Director

Federal Agencies (3)

Federal Aviation Administration**
Steven Urllass, District Manager

Federal Highway Administration**
Michael (Mike) Davies, Acting Division Administrator

Federal Transit Administration**
Brigid Hynes-Cherin, Regional Administrator

Council Officers

Mary Pat Hancock, Chairperson
James Hoffman, Vice Chairperson
Robert Traver, Secretary**

* Executive Committee Member

** Non-Voting

Executive Committee

The Executive Committee is a subset of the GTC Board responsible for specific decision making related to administrative, organizational, and financial issues affecting GTC and its staff. The Executive Committee is comprised of the chairperson of the GTC Board, the lead elected officials of the Rochester TMA counties, the mayor of the City of Rochester, the chairperson of the Rochester Genesee Regional Transportation Authority (RGRTA), the chairperson of the Genesee/Finger Lakes Regional Planning Council (G/FLRPC), and the regional director of the New York State Department of Transportation (NYSDOT).

The Executive Committee meets as needed at the discretion of the GTC Board Chairperson.



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Planning Committee

The Planning Committee provides professional and technical direction to the GTC Board. With input from various other committees, the Planning Committee reviews and recommends action on activities and work products that are considered by the GTC Board. Each member of the GTC Board appoints a representative to the Planning Committee. The representative is typically a transportation or planning professional.

The Planning Committee meets eight times per year during the months that GTC Board meetings are not held, or as required. Each Planning Committee meeting is open to the public and advertised as such through media outlets across the region. A public forum is included at the beginning and the end of all meetings to allow for public comment on meeting agenda items before and after recommendation to the GTC Board is made or action is taken.

Other committees support GTC and meet as necessary based on the specific product (e.g., UPWP, TIP, etc.) or activity (e.g., project- and program-specific steering and advisory committees) for which they were formed.

Guiding Principles

The uniqueness of regions is what defines them. Their combination of physical geography, history, existing development, and future goals for quality of life and economic development determine the opportunities to be maximized and the issues to be addressed. It is easy for planners to look solely at what other areas have completed or are implementing and recommend that the same projects and programs be advanced in their areas. This approach is easy to adopt – and often popular – but does a disservice to the region served. Successful communities don't simply copy others' answers; they ask the same questions rec-

ognizing that their answers may differ (sometimes significantly) based on their own characteristics and resources, learning from others' successes and failures.

To ensure that GTC properly considers how best to improve transportation in this region, the questions asked in developing the *LRTP 2035* have been guided by the four principles discussed below. Each stage in the development of the *LRTP 2035* adheres to these principles to connect the presence of transportation infrastructure and services with broader community goals related to the social and economic vitality of the region over the next nearly 25 years. In every instance, the *LRTP 2035* strives to improve livability and promote economic development within the context of limited financial resources and decision making that must consider more than transportation exclusively.

Plan for People

Too often the approach to transportation policy, planning, and investment decision making is to consider infrastructure and services as the customers. Safely, reliably, and efficiently moving persons and the products of their labor should be the most important consideration, and is in the development of the *LRTP 2035*. In short, the *LRTP 2035* considers people as the customers; not highways, bridges, buses, streetcars, trails, or any other means of transport. This first and primary guiding principle is wholly consistent with and is key to advancing the mission of GTC.

Place Matters

The region's residents live and its businesses operate in diverse settings. While transportation needs are similar across the region (everyone needs both mobility and access to their home, economic opportunities, needed services, etc.), how these needs can and should be met will differ. Regions that are more homogenous in terms of types of places (i.e., do not include rural areas to the significant extent that our region does) do not have



to consider the range of issues that GTC does. Accordingly, the *L RTP 2035* emphasizes that where people live, work, and play will determine the appropriate solutions to their transportation needs.

Maximize Existing Assets

Funding for transportation infrastructure and services has been and will continue to be significantly less than the amount required to address recognized needs. This requires that publicly-funded investments produce the most “bang for the buck.” Given the significant investment in our current system, the *L RTP 2035* identifies how best to use what we have to meet existing and future transportation needs. Part and parcel of this approach is the emphasis on asset management and the application of appropriate treatments at appropriate times, as well as identifying ways to better manage and operate the transportation system to get the most out of it. Empowering travelers to make better decisions based on fuller and timelier information is critical to accomplishing this, recognizing that strategic expansions will also be necessary.

Accept Uncertainty

Funding for transportation at all levels is extremely limited. Lack of revenue for federal transportation funding programs is delaying the enactment of the next multi-year surface transportation authorization legislation. Not only is federal transportation funding critical to the region given the current and projected level of commitment of state and local funds, but the next multi-year surface transportation authorization is expected to establish the necessary direction for how the national transportation system will support global economic competitiveness and local quality of life. As such, the *L RTP 2035* considers how this region can chart its own course toward making the transportation system a distinguishing factor in social and economic vitality.

Development Phases

The development of the *L RTP 2035* began in earnest in December 2008 with the creation of a critical path schedule that identified and scheduled the primary phases (i.e., major tasks) and their specific work items. The critical path schedule was updated as needed to ensure that the *L RTP 2035* incorporated the timeliest data and information available, provided adequate resources for essential analysis, and allowed for thorough review and input over the next two-plus years. As with previous *L RTPs*, GTC recognized that the process used to develop the *L RTP 2035* would determine its success in identifying recommendations that most effectively meet the needs of transportation system users over the next nearly 25 years.

The primary phases were conducted consistent with the Guiding Principles to ensure that the *L RTP 2035* not only meets federal requirements but is meaningful to this region. The primary development phases and a synopsis of each are provided below.

Identification of Regional Opportunities and Issues

A review of historical and current demographic and economic data and information from a variety of national, state, regional, and local sources was conducted along with the development of future population and employment projections. The associated analysis sought to determine not only the current socioeconomic characteristics of the region but, more importantly, to identify emerging opportunities and issues.

Assessment of the Regional Transportation System

The regional transportation system was inventoried by mode (e.g., highway and bridge, public transportation, bicycle and pedestrian, freight, etc.) and associated travel characteristics were assessed. This inventory included the presence, condition, and operating attributes of the assets that comprise the regional transportation system (infrastructure and services). An assess-



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ment of associated travel characteristics compared to the inventory of the regional transportation system provided insights into not only how it is being used currently but might be used differently in the future.

Determination of Regional Transportation Needs

Based on the identification of regional opportunities and issues and the assessment of the capabilities of the regional system, the transportation needs of people and freight were determined based on the ability of the system to make the most of the opportunities and eliminate or mitigate the issues. This determination incorporated a broad view of travel to fully capitalize on the opportunities and accepted that some issues occur or are made more intense by non-transportation decisions.

Development of Alternatives

The full range of possible transportation improvements through 2035 was identified. These alternatives encompassed physical improvements and operational improvements, new and modified services, and other strategies that would respond to the transportation needs of the region's residents, businesses, and institutions. Recommendations from UPWP-funded plans, local comprehensive plans, and regional and statewide plans, as well as projects and programs suggested by technical professionals, the public, and GTC staff, were considered.

Estimation of Costs and Reasonably Expected Revenues

Per federal requirements, the amount of funding to advance recommendations included in the *LRTP 2035* cannot exceed reasonably expected revenues and must account for changes in the cost of transportation improvements (e.g., prices for materials, labor, etc.). The estimation of these future costs and revenues are contained in the financial plan for the *LRTP 2035*. This financial plan ensures the credibility of the *LRTP 2035* with policy-makers, the public, and others regarding what can actually be achieved over the next nearly 25 years.

Selection of Preferred Alternatives

The generalized costs and benefits of the assembled alternatives (i.e., how well the determined needs could be addressed) were evaluated against the revenues that are reasonably expected to be available for transportation in the region. A risk assessment was undertaken to identify what combination of alternatives would represent the optimal set of preferred investments. This portfolio represents the recommendations of the *LRTP 2035*. Funding is allocated among the categories of recommendations – preservation and maintenance, management and operations, and expansion.

Adoption of the *LRTP 2035*

The *LRTP 2035* is anticipated to be adopted by the GTC Board at its June 2011 meeting upon recommendation by the GTC Planning Committee. The final *LRTP 2035* document represents the maximum effort possible to identify those strategies that can be justified for implementation based on the needs of the region and the financial resources available.

Stakeholder Participation

The *LRTP 2035* was developed with significant stakeholder participation. This included review and input from the public, technical transportation professionals, and other entities in the region responsible for planning and development that are affected by transportation. The public involvement component was conducted in accordance with and exceed the requirements of the *GTC Public Participation Plan*.

Public Involvement

The development of the *LRTP 2035* included two public involvement periods with four public meetings held during each. Public comments were accepted via e-mail, fax, and a comment sheet, as well as verbally at the public meetings. The public comment periods were advertised on the GTC website with advance no-



tices sent to over 40 media outlets (print, television, and radio) throughout the region and via legal notices published in the *Democrat & Chronicle* (the daily newspaper with the largest circulation in the region). A direct mailing was sent to contacts in the GTC Environmental Justice Database, which includes approximately 200 organizations in the region that serve or represent groups not traditionally well-represented in the transportation planning process; namely, low-income and minority persons.

The first round of public involvement was held in November and December 2010 to review and gather input on opportunities and issues facing the region and potential transportation alternatives to be considered. The four public meetings included a presentation by GTC staff prior to accepting and responding to public comments. The presentation provided an overview of GTC; the purpose, primary elements, and guiding principles of the *L RTP 2035*; regional demographic, economic, cultural, and travel characteristics; opportunities and issues facing the region; the transportation system by mode; proposed performance measures; and remaining milestones in the process. It was emphasized that GTC has not selected any recommendations and that all proposed projects and programs would be considered.

The second round was held in March and April 2011 to present and solicit input on the draft recommendations (i.e., preferred alternatives) of the *L RTP 2035*. As with the first round, four public meetings were held and included a presentation by GTC staff prior to accepting and responding to public comments. The presentation provided an overview of the topics discussed in the first round of public involvement; regional transportation needs; range of alternatives considered; components of the financial plan; draft recommendations; and remaining milestones in the process.

Technical Review

The input, guidance, and critical review of transportation professionals was obtained at key points in the development of the *L RTP 2035* to ensure that the analysis conducted and conclusions reached were technically sound. Previous LRTP Development Committees consisted of representatives from the Rochester TMA counties, City of Rochester, RGRTA, G/FLRPC, and NYS-DOT. For the *L RTP 2035*, the full Planning Committee served as the LRTP Development Committee. This was done to ascertain that the framework provided by the *L RTP 2035* for future planning and investment decision making incorporated as much input from transportation planning professionals as possible.

The Planning Committee was updated on the status of the development of the *L RTP 2035* at each of its meetings since the adoption of the last LRTP in June 2007. The collection and analysis of data, information, and alternatives was completed in the spring of 2010. The Planning Committee discussed the direction and purpose of the *L RTP 2035* at its August 2010 meeting taking into consideration the absence of a successor to SAFETEA-LU. The approach for developing the *L RTP 2035* based on the agreed upon direction and purpose of the plan was considered and finalized at the October 2010 Planning Committee meeting prior to the first round of public involvement.

Based on the first round of public involvement, the draft *L RTP 2035* document was developed. A special meeting of the Planning Committee was held in March 2011 to review and comment on the draft *L RTP 2035* document, which was revised prior to conducting the second round of public involvement. In addition to making the draft *L RTP 2035* document available to the general public, it was sent to agencies and officials responsible for non-transportation planning activities within the region, the Tonawanda Indian Reservation, and federal land management agencies.



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Comments received from the public and affected agencies during this round were considered by the Planning Committee at its April and May meetings. At the May meeting, the Planning Committee concurred on additional modifications and recommended adoption of the revised draft *L RTP 2035* to the GTC Board. In addition, the Planning Committee authorized the preparation of and reviewed the draft of the air quality conformity statement for the *L RTP 2035* to demonstrate that it conforms to the Clean Air Act Amendments of 1990.

Additional Participation

The *L RTP 2035* included extensive participation beyond the two rounds of public involvement and technical review discussed above. Many of the recommendations of the *L RTP 2035* emerged from UPWP-funded plans. Per the *GTC Public Participation Plan*, plans developed using federal transportation planning funds through the UPWP must be guided by steering/advisory committees that include community stakeholders and GTC member agencies and are required to hold two public meetings. Like the requirements for the LRTP, one of the meetings must be held to identify opportunities and issues and the other to solicit input on the proposed recommendations.

Over 50 UPWP-funded plans that included public involvement and technical review were evaluated as part of the development of the *L RTP 2035*. These plans were conducted for all modes and many were multimodal, resulting in the alternatives that were considered and ultimately selected as recommendations for inclusion in the *L RTP 2035*. In addition, over 25 technical and data collection studies were completed using UPWP funds and these activities were instrumental in the identification of regional opportunities and issues, assessment of the regional transportation system, and determination of regional transportation needs.



GENESEE TRANSPORTATION COUNCIL



Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035

Chapter III - THE REGION

The Region

Located in western-central New York State, the nearly 4,700 square-mile Genesee-Finger Lakes Region stretches south from the shores of Lake Ontario to the low rolling hills of the Appalachian Highlands. Many striking natural features and scenic vistas lie within the Genesee-Finger Lakes Region including the western Finger Lakes, the Genesee River, and Letchworth State Park, commonly known as the "Grand Canyon of the East."

Founded in 1803 and incorporated in 1834, Rochester is New York State's third largest city (2000 population: 219,773) and the internationally recognized corporate and cultural center of the nine-county region that includes the counties of Genesee, Livingston, Monroe, Ontario, Orleans, Seneca, Wayne, Wyoming, and Yates. Home to approximately 1.2 million residents and over one-half million workers, the region's population and employment exceed that of eight of the fifty states in the nation.

While topography and natural features shaped the earliest physical development of the region, it was the opening of the Erie Canal in 1825 that laid the foundation for its prosperous future. The presence of such an efficient transportation route to America's frontier enabled entrepreneurial skills and talents to be combined with the natural resources necessary to fill a burgeoning nation's demand for goods and provisions.

The Erie Canal eventually gave way to railroads and then highways as the primary modes of travel, but it remains an excellent example of how transportation influences the character and development of a region. Regardless of the form it takes in

the future, the ability of people and freight to move safely, efficiently, and reliably will continue to be a major factor in determining the quality of life and economic success of the region.

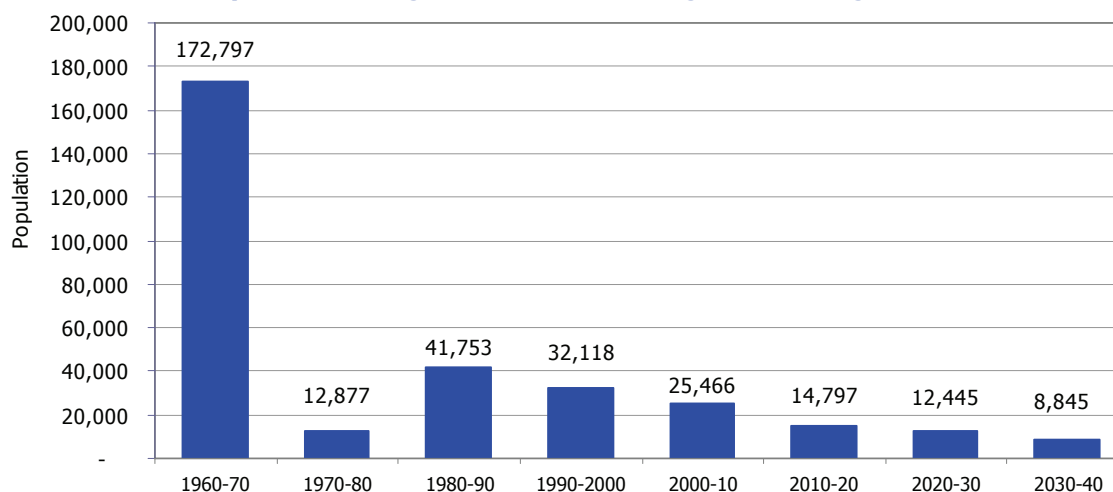
People

The decennial censuses of population and housing that have been conducted since 1790 provide the most accurate and detailed demographic information available for planning purposes. The results of the 2010 Census were not available during the development of the *LRTP 2035*. Data from Census 2000 combined with estimates of the current population and projections of the future population were utilized.

Population growth in the region has been modest since 1970, after experiencing a nearly 20 percent increase in residents in the ten years before (1960 to 1970). According to Census 2000, the population of the Genesee-Finger Lakes Region was 1,199,588 persons. It is estimated that the region gained ap-

Exhibit 3

Population Change in the Genesee-Finger Lakes Region, 1960-2040



Source: U.S. Census Bureau and Genesee/Finger Lakes Regional Planning Council

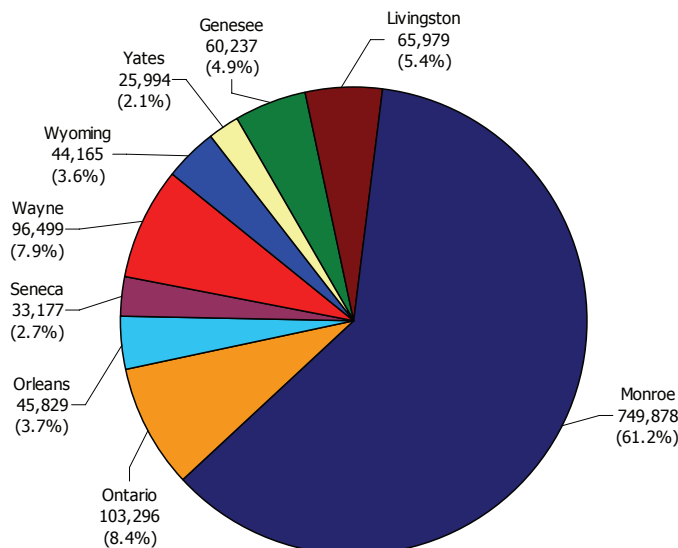


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proximately 25,500 residents through 2010, representing a 2.1 percent increase in the population. It is projected that an additional nearly 32,000 people will call the region home between 2010 and 2035. Exhibit 3 presents the change in population in ten year increments from 1960 through 2040. In short, it is anticipated that the population of the region will continue to grow but at a slower rate with a projected population in 2035 of 1.26 million people.

The distribution of the regional population among the nine counties of the region is expected to remain nearly constant from the present through 2035. This is not surprising given the limited increase in population that the region is expected to experience over the next nearly 25 years. Approximately six out of 10 people will reside in Monroe County with the remainder of the population nearly equally split between the Wayne-Finger Lakes sub-region (Ontario, Seneca, Wayne, and Yates counties) to the east

Population in the Genesee-Finger Lakes Region by County, 2010

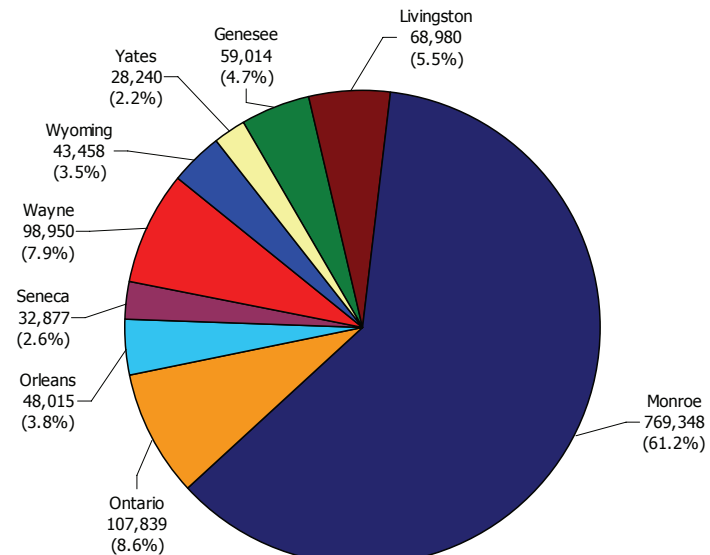


Source: Genesee/Finger Lakes Regional Planning Council

and the GLOW sub-region (Genesee, Livingston, Orleans, and Wyoming counties) to the west and south. The distributions of regional population by county in 2010 and 2035 are presented in Exhibit 4.

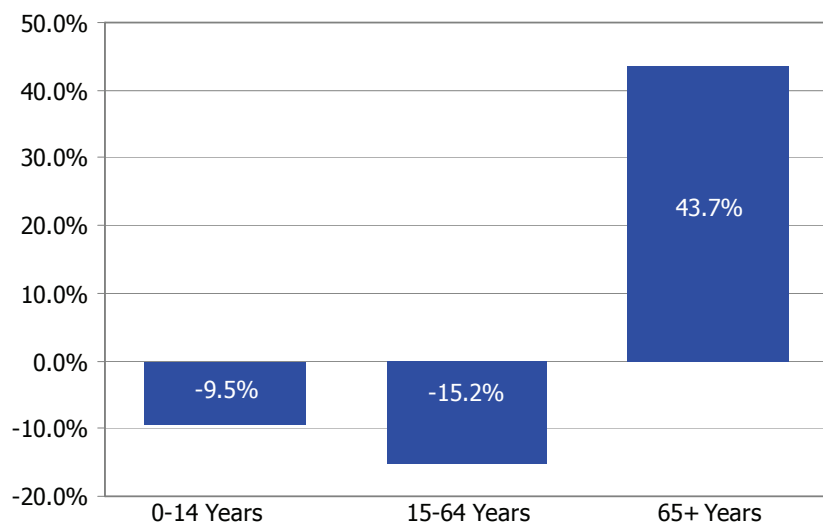
While the distribution of the population within the counties is expected to be nearly the same in 2035, the distribution of population among age cohorts is anticipated to be far different than it is today. The first of the Baby Boomers have begun to turn 65. Increases in life expectancy and the size of this generation will have significant impacts on the nation, New York State, and the Genesee-Finger Lakes Region for the entirety of the time period covered by the *L RTP 2035*. As shown in Exhibit 5, it is projected that the senior population (65 years and older) will increase more than 40 percent while the number of persons 14 years and younger and the working age cohort (15 to 64 years) will decrease approximately 10 percent and 15 percent, respectively, between 2010 and 2035. A related issue that has and

Population in the Genesee-Finger Lakes Region by County, 2035



Source: Genesee/Finger Lakes Regional Planning Council

Exhibit 5 **Percent Change in Population of the
Genesee-Finger Lakes Region by Age Cohort,
2010-2035**



Source: Cornell University Program on Applied Demographics

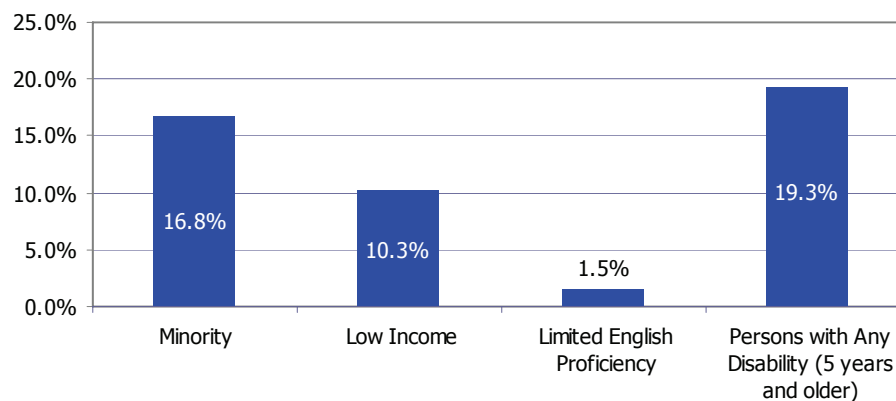
continues to capture the attention of the public and media is the so-called “brain drain”. Research by the Federal Reserve Bank of New York and others locally has demonstrated that the real issue is not the out-migration of younger residents but rather a lack of in-migration of this cohort. Regardless, the emphasis should be as much on “brain gain” (i.e., attracting younger residents) as retaining those that are leaving as the rate of younger workers leaving is consistent with that seen among other regions at the state and national level.

While the senior population requires special attention with respect to transportation, so do those groups of persons traditionally underrepresented in the transportation planning process. Specifically, minorities (i.e., non-whites and those of Hispanic origin), individuals with low-incomes, lim-

ited English proficiency, disabilities face transportation challenges that include, but are not limited to, access to employment and needed services, inability to obtain or understand pertinent information about opportunities to participate in the planning process, and a lack of required accommodations. The presence of these groups relative to the overall regional population is presented in Exhibit 6. The *GTC Environmental Justice, Title VI, and Americans with Disabilities Act Involvement Plan* was adopted in December 2010. This plan identifies these groups by location within the region and discusses the actions that GTC is undertaking to ensure their increased involvement in the metropolitan transportation planning process.

Exhibit 6

**Groups Traditionally Under-Represented in the
Transportation Planning Process by Percent of
Total Population in the Genesee-Finger Lakes
Region, 2000**



Source: U.S. Census Bureau



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Businesses

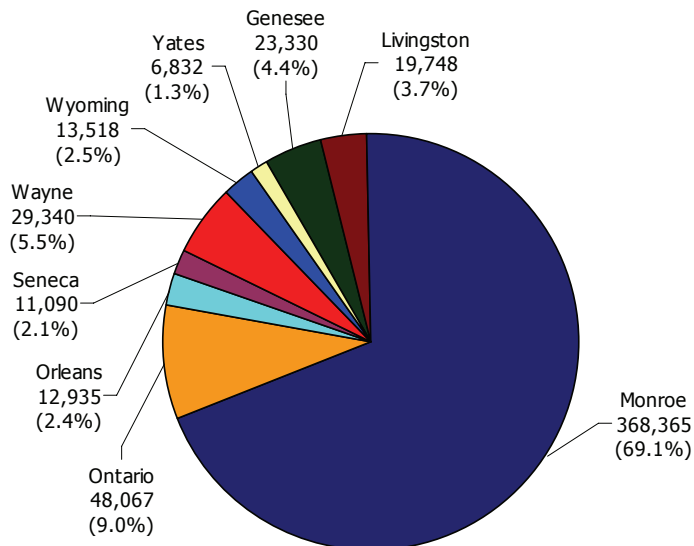
Nearly 30,000 establishments employing more than 530,000 workers – 85 percent of whom are employed by the private sector – are located in the Genesee-Finger Lakes Region. In 2009, seventy percent of jobs in the region were located in Monroe County. As with population, the distribution of employment within the nine counties of the region is expected to remain nearly constant through 2035. Employment in the region over the next nearly 25 years is expected to increase at a rate consistent with the projected rise in the population and the greater numbers of seniors – both of which determine the number of potential candidates to fill new positions. The distributions of regional employment by county in 2009 and 2035 are shown in Exhibit 7.

In terms of value, the Gross Domestic Product of the Rochester Metropolitan Area (Livingston, Monroe, Ontario, Orleans, and Wayne counties) was the 54th largest of the nearly 370 metropolitan areas in the United States in 2009 at more than \$45 billion, demonstrating that the regional economy is an important contributor to the national economy.

Overall, employment in the region declined five percent (slightly less than 30,000 jobs) between 2000 and 2009. During this period, more than 40,000 jobs were lost in the manufacturing sector with an additional loss of nearly 11,000 jobs in the retail trade, information, professional and technical services, and administrative and waste services sectors. Nearly two-thirds of the new jobs created in the region have been in the health care, social assistance and educational services sectors, accounting

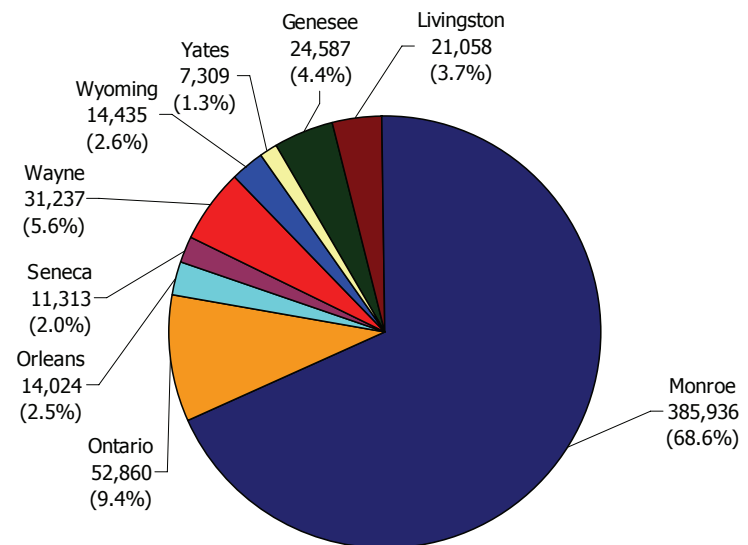
Exhibit 7

Employment in the Genesee-Finger Lakes Region by County, 2009



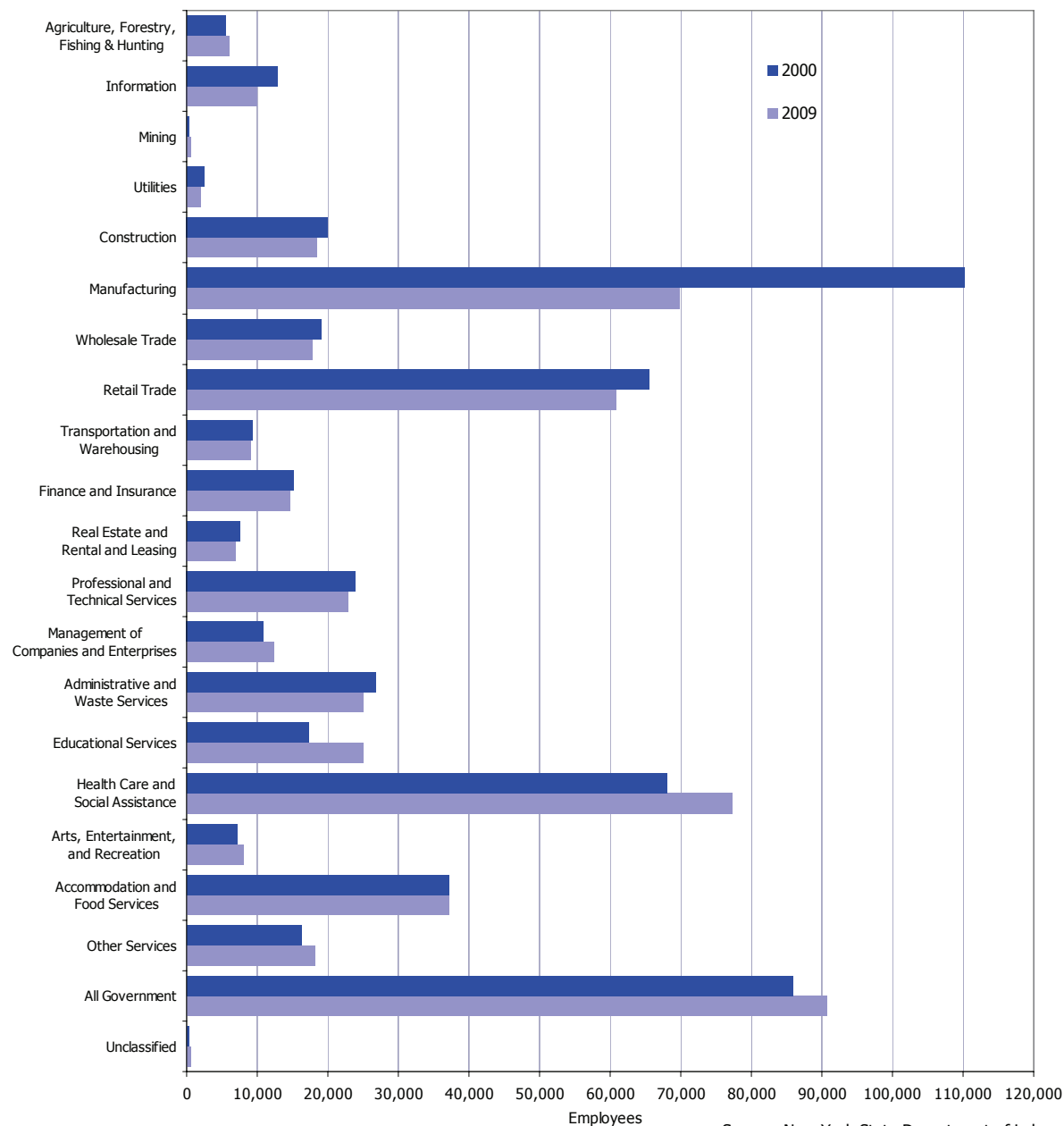
Source: New York State Department of Labor

Employment in the Genesee-Finger Lakes Region by County, 2035



Source: Genesee Transportation Council

Exhibit 8 **Employment by Sector in the Genesee-Finger Lakes Region, 2000 & 2009**



for more than 17,000 of the approximately 26,000 new positions added from 2000 to 2009. Exhibit 8 presents regional employment by sector in 2000 and 2009.

Even as manufacturers continue to shed jobs and transition to higher value-added activities to compete in the global marketplace, they remain a major component of the regional economy. As shown in Exhibit 9, the percentage of jobs in manufacturing in the Genesee-Finger Lakes Region exceeds that of the other four largest metropolitan areas in Upstate New York, as well as New York State as a whole. Due to increases in productivity, the volume of goods produced (both finished products and intermediate inputs) in the region is expected to continue to grow.

Not all manufacturing firms will continue to reduce the number of workers they employ. Emerging and established high-value components of the region's manufacturing sector that have the greatest potential for job creation include optics and imaging, alternative energy and fuels, biotechnology, printing and publication, food and beverage manufacturing, telecommunications, and precision instruments. Growth in biotechnology and food and beverage manufacturing thrive upon the region's



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skilled workforce and plentiful natural resources, such as agriculture and access to fresh water.

Agriculture and related agri-business are also important components of the regional economy that require transport of products to market and processing facilities. In 2007, half of the land in the region was dedicated farmland, the highest percentage of any region in New York State. The market value (adjusted for inflation) of agricultural products sold by farms in the region increased 50 percent between 1997 and 2007. In 2007, five of the nine counties in the region ranked within the top 10 in New York State in market value of agricultural products sold. Four counties in the region ranked in the top 100 nationwide in market value of milk and other dairy products from cows and three counties ranked in the top 100 in the country for market value of fruit and vegetable crop products sold in 2007.

With over 80,000 full- and part-time students, the more than 20 two- and four-year colleges and universities in the region are essential to training the future workforce, upgrading the skills of employees and those seeking work, and acting as an economic catalyst by employing over 6,000 persons. Furthermore, these institutions play a vital role alongside local industry in creating an environment of innovation that is one of the highest in the nation as measured by the number of patents issued per worker. The prominence of colleges and universities continues to grow and is vital to the current and future economic success of the region.

The region's higher education institutions continue to increase their important role in workforce development through the development of degree programs – at both the undergraduate and graduate levels – in established and emerging industries. Over half of all degrees in optics and imaging are conferred by the University of Rochester. In addition, the region's colleges and

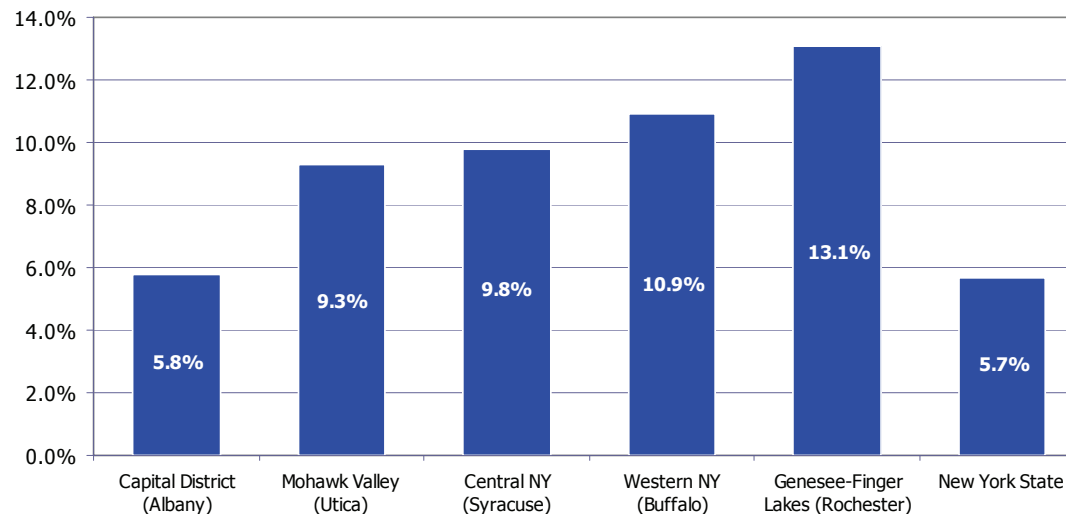
universities continue to expand their role in overall economic development, contributing approximately \$4 billion to the regional economy. Additions and renovations to campuses and at other affiliated locations that are currently underway or expected to begin over the next three years at the region's universities, colleges, and community colleges total more than \$350 million in development.

Recreational and Cultural Resources

The Genesee-Finger Lakes Region is defined not only by its residents and businesses but by its history, scenic beauty, and recreational venues – providing opportunities to not only live and work but also play. The normal daily mean temperature in

Exhibit 9

Percent of Total Employment in Manufacturing in the Largest Upstate New York Regions and New York State, 2009



Source: New York State Department of Labor

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Rochester varies from 24 degrees Fahrenheit in January to 71 degrees Fahrenheit in July, providing recreational opportunities that range from downhill skiing during the winter to water sports and fishing in the summer. The region's parks and historical sites offer year-round opportunities to enjoy a range of outdoor activities and enriching experiences.

The Erie Canal, so influential to the development of the region, continues to serve as a major attraction for residents and tourists. The western Finger Lakes are also located in the region and offer multiple recreational opportunities, as does the Cayuga-Seneca Canal. Water-based recreational activities offer opportunities for increased visitor spending and have the potential to be expanded through increased access and promotion.

The top 15 arts and cultural attractions in the Genesee-Finger Lakes Region attracted 3.8 million attendees in 2007, a 27 percent increase from 2001. These venues are also a significant component of the region economy. Visitor spending in 2008 accounted for approximately \$1.3 billion, with \$936 million spent in Monroe County alone. The majority of tourists came from other areas in New York State, Pennsylvania, New Jersey, Canada, and Ohio. Canadian tourists comprise the majority of international travelers to the region.

The region's cultural center is the City of Rochester, which plays host to museums of science and art, theatrical productions, the National Museum of Play at the Strong, Rochester Philharmonic Orchestra, the George Eastman House and its International Museum of Photography and Film, and numerous festivals.

The region is home to 20 New York State Parks, the most notable being Letchworth State Park nestled in southern Wyoming and Livingston Counties where the Genesee River winds through the park's 14,350 acres, flows over three major waterfalls, and is continuing to carve out the famed 17-mile gorge. The City of Rochester is home to an "emerald necklace" of parks designed

by Fredrick Law Olmsted, the father of American landscape architecture. These parks are located along the Genesee River banks, Erie Canal, and Lake Ontario, and provide a multitude of recreational opportunities. The Monroe County parks system is extensive and home to many of the region's renowned festivals. Highland Park, designed by Olmsted, with over 1,200 lilac bushes hosts the acclaimed Lilac Festival. Held every year during the month of May the festival draws about 500,000 attendees from all over the world.

The region's agricultural bounty can be seen in the variety of local farmers markets throughout the region. The Rochester Public Market was voted the number one farmer's market in the 2010 America's Favorite Farmers Market contest sponsored by the American Farmland Trust. Many other communities in the region have similar markets that are key to ensuring access to healthy foods and supporting local agriculture.

The Finger Lakes Wine Region is the largest wine producing area in New York State and is renowned for its Rieslings. The lakes offer the ideal climate for growing grapes along their banks, moderating the temperature throughout the year. The wineries attract a large number of tourists year round, supporting the local economy, particularly in the balmy summer months and in the fall to admire the foliage. The New York Wine and Culinary Center opened its doors in 2006 on the shores of Canandaigua Lake. The \$7.5 million center offers wine tasting, culinary and wine classes, and a restaurant featuring regional produce and food products. The Center has hosted over 151,000 visitors since 2008.

From an historical standpoint, the region is renowned as the birthplace of the women's suffrage movement, center of the abolitionist movement, the birthplace of Memorial Day, and for its American Indian heritage. This history is preserved and celebrated in numerous venues including the Women's Rights National Historic Park, the Susan B. Anthony House, Memorial Day



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celebration in Waterloo, and the Ganondagan State Historical Site.

A study prepared by the Genesee/Finger Lakes Regional Planning Council for GTC identified over 50 landscapes that define the region's history but are not currently listed on either the New York State or national registers of historic places. These include historic landscapes that were designed, have been defined by their occupants or the activities they were used for, are associated with a historic event or person, or contain a variety of natural or cultural resources. These culturally-significant landscapes are presented on Map 2.

Area amusement and water parks include Darien Lake Theme Park, Seabreeze Amusement Park, and Roseland Water Park. Concert Venues throughout the region draw national recording artists and entertainment acts. These include the Blue Cross Arena, Constellation Brands Marvin Sands Performing Arts Center (CMAC), and Darien Lake Performing Arts Center. The traffic generated during events at these facilities can be significant and is considered in the Congestion Management Process discussed later.

Places

Due to the importance of place to the transportation needs of persons, businesses, and institutions, areas within the region have been classified based on land use patterns and uses as well as physical, social, and economic characteristics now and as projected through 2035. Considerations in delineating these areas include their population density and the time period in which the majority of their growth occurred for the residential places and the amount of space they provide and for what economic activity they are meant to serve for the employment places.

Essentially, their function and form were considered. It is this combination of purpose and design that defines the built envi-

ronment and determines the use of physical space and the associated transportation needs now and in the future. The generalized transportation needs for each type of place through 2035 along with the corresponding degree of priority are discussed later. Map 3 shows the Genesee-Finger Lakes Region by place and Map 4 provides greater detail of the same for the Rochester TMA. The various types of places in the region are discussed below.

Regional Urban Core

The Regional Urban Core is comprised of the City of Rochester and includes the densest neighborhoods, the largest central business district, and major civic, cultural, and sports venues. The largest number of infill and redevelopment opportunities exists in the Regional Urban Core and the strength of this place is critical to the success of the overall region.

Sub-Regional Urban Cores

The Sub-Regional Urban Cores include the cities of Batavia, Canandaigua, and Geneva and the villages in the Census Bureau-defined Rochester Urbanized Area. Development in these places includes mixed-use areas of population and employment that are less dense than the Regional Urban Core. Historic, civic and cultural venues are also located in these places. The Sub-Regional Urban Cores possess infill and redevelopment opportunities that can preserve and strengthen their neighborhoods and commercial districts.

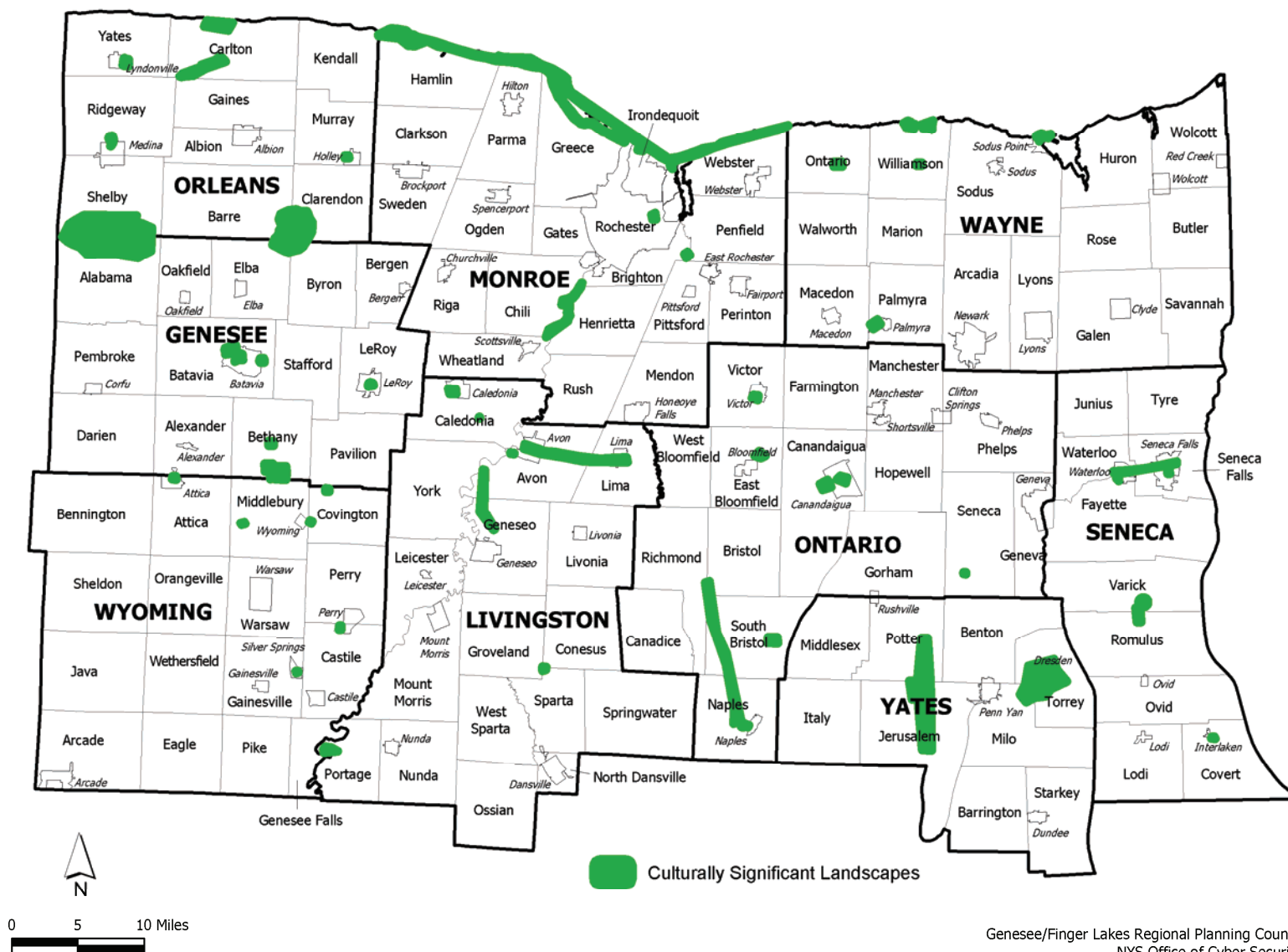
Mature Suburbs

Mature Suburbs include areas in the Census Bureau-defined Rochester Urbanized Area that saw the earliest expansion of development (initially, residential) outside of the urban cores (the City of Rochester and Sub-Regional Urban Cores). Population density is less than in the urban cores but multi-family housing



Culturally Significant Landscapes in the Genesee-Finger Lakes Region

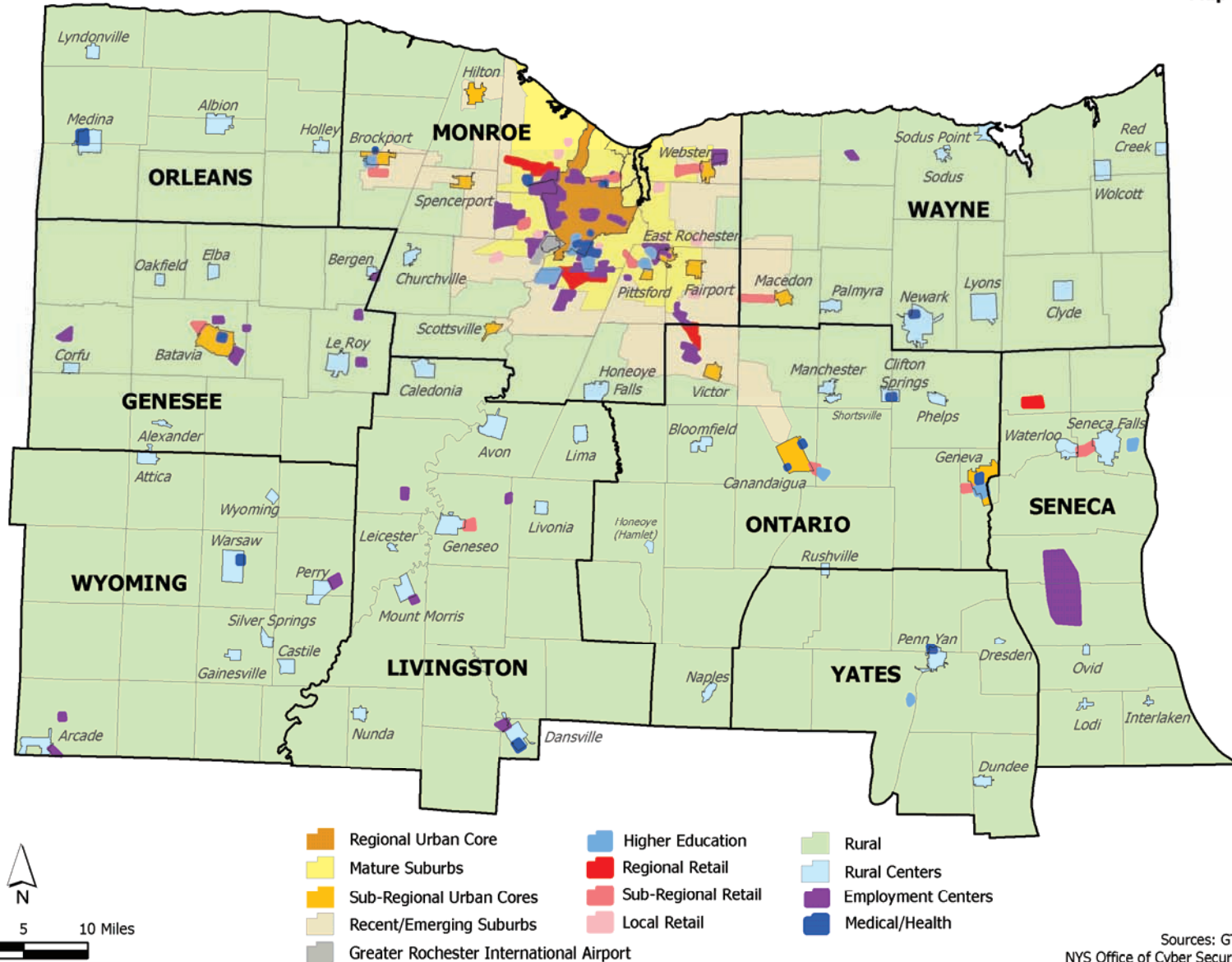
Map 2



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Genesee-Finger Lakes Region by Place

Map 3



Sources: GTC, 2010
NYS Office of Cyber Security, 2010

is more prevalent than in other places (including Recent/Emerging Suburbs). Non-residential development that serves commercial uses is less dense than the urban cores and more automobile-oriented. Infill and redevelopment opportunities exist as recent residential and commercial development have increased in the Recent/Emerging Suburbs, but to a lesser extent than in the urban cores.

Recent/Emerging Suburbs

Recent/Emerging Suburbs include the portions of towns in the Rochester TMA that have seen their greatest amount of development over the last thirty years with residential development of a less dense character than the Urban Cores or Mature Suburbs. Associated retail and commercial development in proportion to residential development has occurred in some but not all of these places, and is almost exclusively automobile-oriented.

Rural

Rural places include towns with the lowest residential and employment densities and significant portions of their land devoted to critical agriculture and related agri-business uses, which are integral to the regional economy and food system, as well as forested lands and open space. Pressure for residential and associated retail and commercial development is limited compared to Mature Suburbs and Recent/Emerging Suburbs as are infill and redevelopment opportunities.

Rural Centers

Rural Centers include villages and hamlets located in Rural places that include mixed use development and provide localized but limited commercial and civic uses with most residents required to travel to other places for necessary employment, retail, and civic needs. Infill and redevelopment opportunities exist

but are limited given population and associated market opportunities.

Employment Centers

Employment Centers include industrial and business parks that, due to their location (with limited surrounding residential development in the case of industrial) and associated infrastructure (including transportation), have been and are planned to be developed to support the attraction and retention of large-scale employment opportunities.

Regional Retail

Regional Retail includes the region's malls and adjacent retail and commercial development that are the major agglomerations of national shopping chain outlets, contain some associated non-retail commercial development but little or no residential development, and are almost exclusively automobile-oriented.

Sub-Regional Retail

Sub-Regional Retail includes retail and commercial development that are agglomerations of national and regional chain outlets which are smaller than and of a less intense nature than Regional Retail places and may contain limited residential development but are still primarily automobile-orientated.

Local Retail

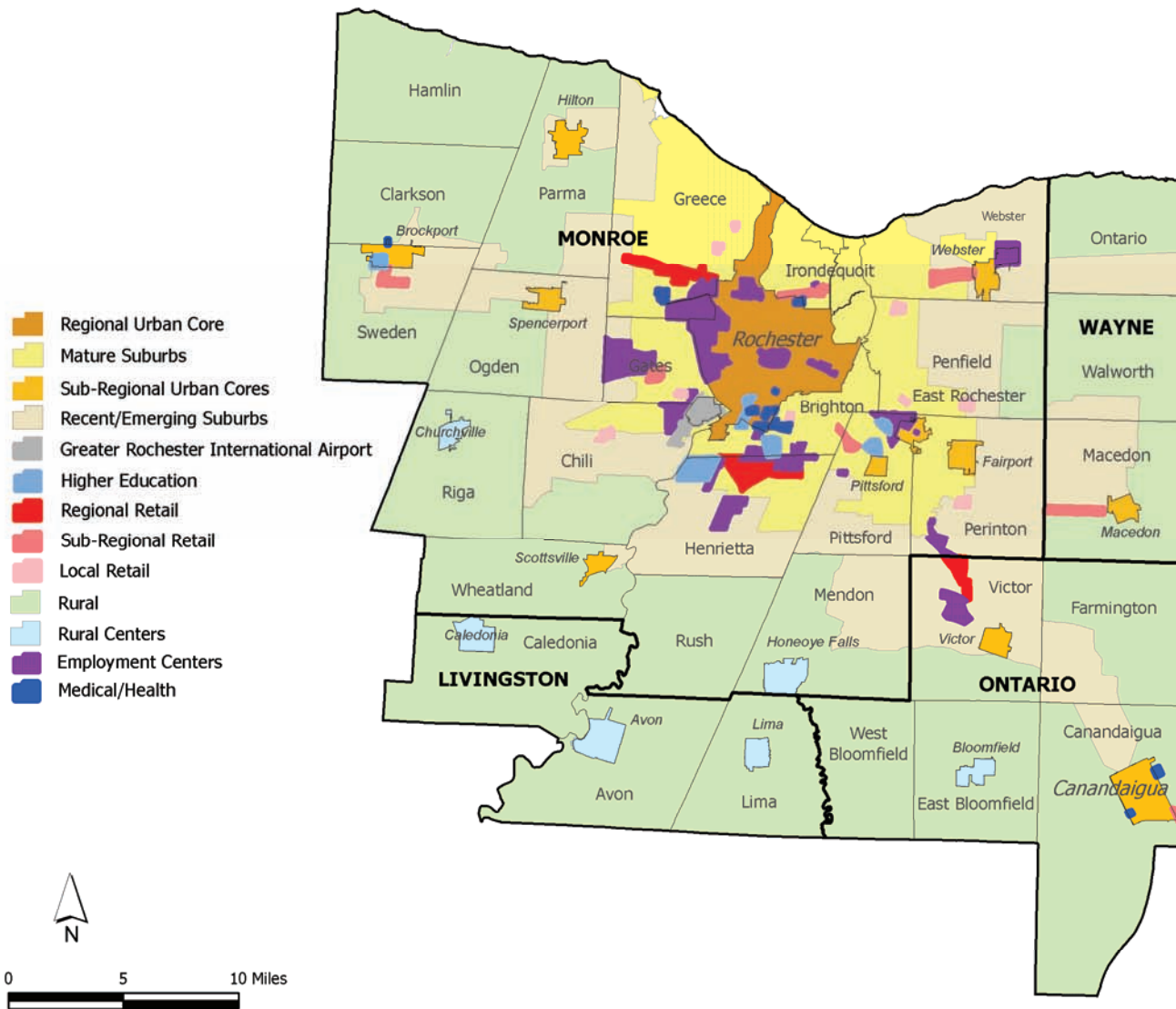
Local Retail includes retail and commercial development with a supermarket as the typical anchor that serves a portion or combination of suburban, urban, and/or rural places and is typically primarily automobile-oriented but can be accessed by bicycling or walking due to residential development in closer proximity than in Regional Retail and Sub-Regional Retail places.



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Rochester Transportation Management Area by Place

Map 4



Sources: GTC, 2008
NYS Office of Cyber Security, 2010

Medical/Health

Medical/Health includes either a hospital and/or an agglomeration of health-related facilities that provide wellness services to the region's residents and will gain importance due to the increasing senior population through 2035 and the overall growth of jobs in the health care sector.

Higher Education

Higher Education includes the universities and colleges which serve as both a major component of the regional economy and include student housing that results in higher residential density than the immediately surrounding area (particularly in Mature and Recent/Emerging Suburban places), but does not necessarily support higher employment density other than potentially adjacent retail uses.

Airport

This represents the Greater Rochester International Airport and the surrounding area that supports the transport and logistics needs of the majority of goods moved by airplane in the region, which are typically high-value and low-volume. Development opportunities must strictly adhere to clearance requirements necessary for the safe and efficient movement of airplanes.

Emerging Opportunities and Issues

The following considerations are those that will impact the region over the next 25 years and beyond. How they are addressed both now and in the future will be vital to the success of the region both in terms of quality of life and economic development. There is overlap among the emerging issues discussed below and many are interrelated in terms of how transportation will impact and be impacted by them. The emerging opportunities and issues are addressed throughout the recommendations

to the extent possible given the limited financial resources available to address the region's transportation needs through 2035.

The Growing Importance of Seniors: An Economic Engine

The aging of Baby Boomers will be one of the most powerful demographic events in our nation's history. As noted earlier, the number of seniors in the Genesee-Finger Lakes Region will increase by almost 80,000. The stereotype that seniors, like children, are a dependent population is a misconception and one that could severely limit regional economic opportunities. In 2000, households in the region that were headed by persons 65 years and older realized nearly \$4 billion in income. In each of the nine counties of the region (and, therefore, the region as a whole), seniors had disproportionately more income than their population size – 15.8 percent of the region's total household income compared to comprising 13.0 percent of the region's population.



While working seniors in the region earned nearly \$800 million in 2000, the majority of seniors' income came from transfer payments (e.g., Social Security, pension payments, etc.) which are



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not directly dependent on the regional economy and serve as a buffer against cyclical national economic downturns. As the senior population grows, these somewhat insulated sources of income will become an even more important component of regional purchasing power. This is particularly important because the region's seniors through 2035 will be Baby Boomers who, with their keen sense of lifestyle and personal fulfillment, currently outspend every population cohort and can be expected to do so as they age. Jobs follow purchasing power and people follow jobs. Accordingly, the ability to retain wealthy retirees (including current and potential "snowbirds") presents the opportunity to increase economic development in the region.

The Regional Food System: Stability and Enhancement

As discussed previously, agriculture is a critical component of the regional economy. This previous discussion focused on agriculture in the traditional sense as characterized by larger scale operations that are major economic drivers in rural areas. Smaller-scale and more localized agricultural production, including in the Regional Urban Core and Sub-Regional Urban Cores, have the potential to significantly contribute to improving access to nutritious foods for residents in all places and reshaping the physical development of the region. This reshaping will influence and need to be supported by the regional transportation system – specifically, through targeted farm-to-fork initiatives. The regional food system – and the contribution of agriculture to the economy and equitable access to fresh fruits and vegetables – can be stabilized and enhanced by ensuring that the transportation system connects production with consumption.

Given the modest projected increase in the regional population through 2035 and the corresponding availability of land for contained, small-scale production of fruits and vegetables, the opportunities for increased urban and suburban agriculture has the potential to create landscapes that have not been seen in this region since the 1800s and increase equitable access to whole-

some foods that improve public health. Current examples include elements of the City of Rochester's Project Green which includes the conversion of over three dozen blocks to "green infrastructure" that can be converted to, among other uses, urban farms, and Freshwise Farms, a farm in Penfield, that is operated by Foodlink and provides over 2,000 prepared meals each day for schools and runs a for-profit catering service.



The Transportation System's Role in Public Health: Beyond Safety

Decreasing the number of motor vehicle crashes that result in fatalities, injuries, and property damage should be and is the primary risk to the personal well-being of the region's residents addressed in the *L RTP 2035*. In addition but not in place of reducing crashes, there is a greater role that transportation can play in supporting improved health in the larger sense. Healthy communities are those that not only enable the production of nutritious foods and provide greater connectivity to them but also increase opportunities for residents with the requisite physical ability to take trips by modes other than private vehicles (regardless of the fuel source), reduce air and water pollution, and increase access to health care. These health considerations



should be more prominently considered in transportation planning activities via Health Impact Assessments or some other form of analysis of proposed improvements and services.

Most importantly from a transportation perspective, enabling bicycling and walking promotes active transportation that has the potential to reverse the epidemic of obesity that is one of, if not the most, prescient public health issue in the nation. The most acute illustration of this is the widely publicized fact that the current generation of children is the first in history to have a life expectancy less than its parents as a result of a sedentary lifestyle void of the level of physical activity of previous generations. With an increasing senior population, it is imperative that access to health care (including preventative services that reduce overall costs) be a primary consideration in the design of future transportation services. Reductions in transportation-related emissions that are detrimental to air and water quality have and will continue to be the result of increased efficiency in the engines and pollution control devices of motor vehicles.



The Larger Mega-Region: Positioning the Region for Success

As metropolitan areas have expanded over the past 50 years, the connections between them have increased both physically and functionally into agglomeration economies as defined by a ready availability of customers, requisite labor force, and connected industries (or clusters). These mega-regions have been the topic of a growing discussion and associated research agenda. As presented in Exhibit 10, the Genesee-Finger Lakes Region has been included in two identified mega-regions: the Royal Institute of Technology-Centre of Excellence for Science and Innovation Studies' Tor-Buff-Chester (i.e., Toronto-Buffalo-Rochester) Mega-Region and the Regional Plan Association's Great Lakes Mega-Region. Both of these mega-regions include the Greater Toronto Area. The economy of the Greater Toronto Area includes one out of every eight Canadian jobs and is expected to grow by approximately five percent this year. This prosperous economy represents significant opportunities for the Genesee-Finger Lakes Region.

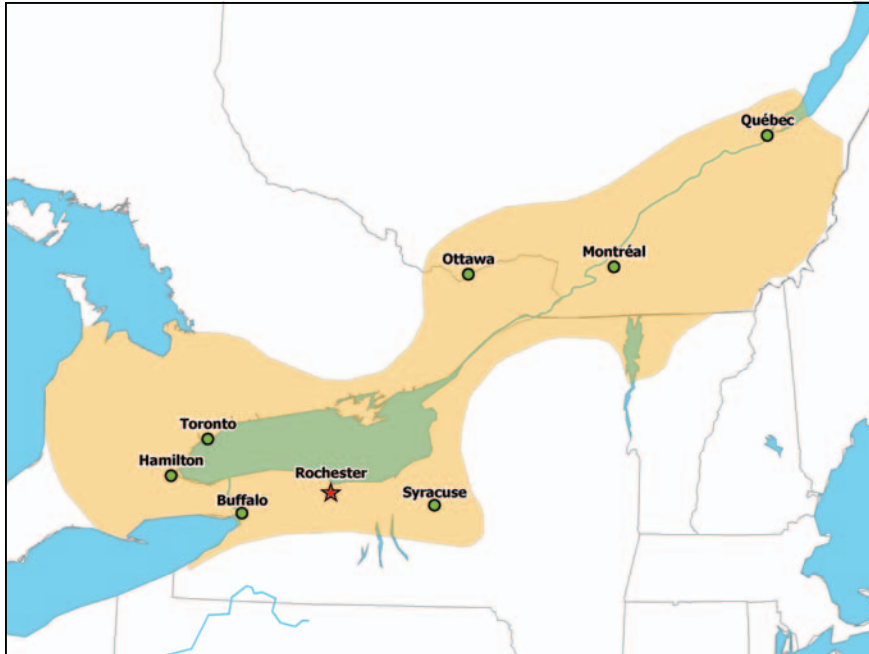
In terms of an agglomeration economy, the combined population of the Greater Toronto Area, Buffalo-Niagara, and Genesee-Finger Lakes regions is approximately 10 million residents (availability of customers), over 5.5 million workers (requisite labor force), and a similar economic base with a comparable proportion of workers employed in various economic sectors (connected industries). To take full advantage of this region's geographic location in this emerging context, the transportation system will need to ensure reliable, convenient, and cost-effective connections for people and freight both within the larger mega-region and to other domestic and international markets.



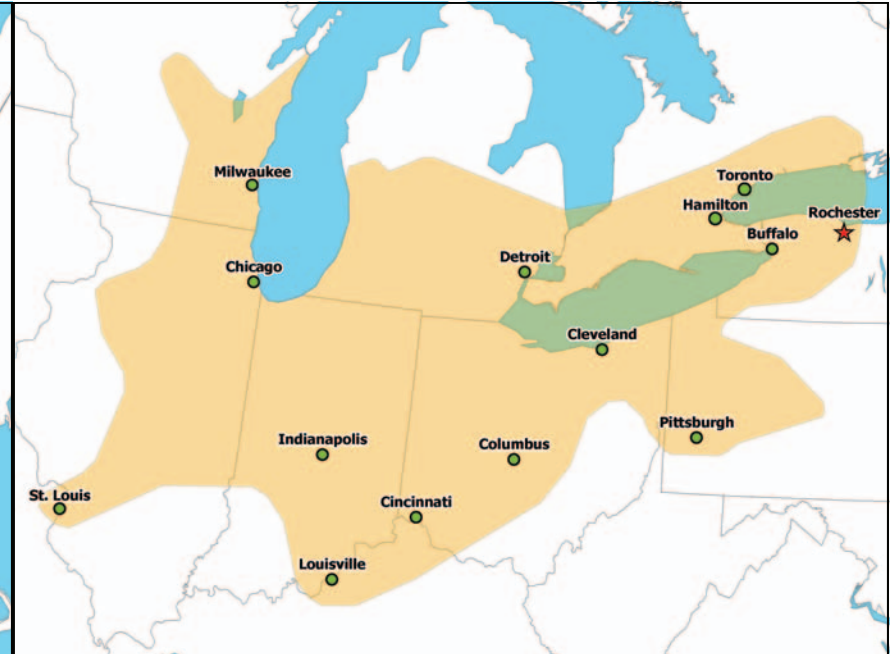
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Exhibit 10

Tor-Buf-Chester (Royal Institute of Technology)



Great Lakes (Regional Plan Association)



The Impacts of Climate Change: Mitigation and Adaptation

Significant scientific debate continues over the impacts of human (i.e., anthropogenic) activities on global temperatures. Regardless, transportation policies, services, and programs can reduce the emission of greenhouse gases (GHG) and simultaneously attain other significant benefits. The most fundamental of these is reducing dependence on foreign oil which constitutes both an environmental and national security concern. Replacing oil from the Middle East and North Africa with domestically-produced, cleaner energy sources for transportation would assist in reducing GHG and potentially mitigating the impacts of climate change while also creating jobs in the United States and improving the nation's position in the global political economy.

Independent of mitigating climate change, adapting transportation facilities and programs to be more resistant and resilient is equally if not more important. Adaptation activities as they relate to transportation are clearly a public responsibility given that the vast majority of associated infrastructure and services are provided by government entities. Accordingly, evaluation of the vulnerability of critical infrastructure to impacts resulting from more severe and intense weather events, including storms and corresponding flooding, needs to be conducted so that the reconstruction and replacement of these facilities includes de-

Exhibit 11

Estimated Number of Daily Truckloads to Stimulate a Horizontally-Drilled Well for High-Volume Hydraulic Fracturing of Natural Gas from Marcellus Shale

Well Development Activity	Truckloads
Drill Pad and Road Construction Equipment	10-45
Drilling Rig	30
Drilling Fluid and Materials	25-50
Drilling Equipment (casing, drill pipe, etc.)	25-50
Completion Rig	15
Completion Fluid and Materials	10-20
Completion Equipment	5
Hydraulic Fracture Equipment (pump trucks, tanks)	150-200
Hydraulic Fracture Water	400-600
Hydraulic Fracture Sand Trucks	20-25
Flow Back Water Removal	200-300
Total Per Well	890-1,340

Source: NYSERDA, September 2009

sign features and operations and management capabilities that account for these impacts.

The Future Energy Requirements of the Nation: Undecided Sources

Probably the greatest amount of uncertainty exists in the future sources of energy for transportation. As of late-December 2010, it was being reported that many experts believe that gasoline demand in the United States will decrease over the period covered by the *L RTP 2035*. This reduction in demand domestically will result in tempered global demand and occur due to federal requirements and demographic changes. What is certain is that the freedom of mobility provided by private automobiles, the

fact that public transportation in the majority of areas in this country utilize buses, the need for trucks to transport the majority of freight to its final destination, and the significant investment in facilities that serve these modes of travel (e.g. highways and bridges) demand that alternative fuel sources for vehicles be identified and that related vehicles and fueling infrastructure be developed.

It is highly likely that there will be multiple non-petroleum-based energy sources developed and used for transportation over the next nearly 25 years covered by the *L RTP 2035*. Electric and hydrogen fuel cells represent non-fuel sources for automobiles, but require further refinement to increase the distances that can be travelled between recharges (and mitigate drivers’ “range anxiety”) and improve the affordability of these sources by reducing production costs. Bio-fuels will continue to evolve beyond those based on foodstuffs to reduce the fuel versus food debate, as well as become “drop in” (i.e., do not require any vehicle modifications) and more energy efficient. These non-petroleum-based energy sources offer the opportunity to reduce the nation’s dependence on foreign oil, which serves both environmental (including climate change) and national security goals.

One immediate energy-related issue in the Genesee-Finger Lakes Region is the discussion over hydraulic fracturing (commonly referred to as hydrofracking). Hydrofracking involves injecting water and chemicals into horizontally drilled wells to fracture rock formations and release natural gas. Hydrofracking is being considered in the Marcellus Shale formation that is located in the southern portion of the region. The Utica Shale, which lies to the north of the Marcellus Shale, has also been identified as large source of natural gas worthy of detailed consideration for exploitation. Regardless of the debated environmental impacts of hydrofracking, if approved, its impacts on the transportation system will be significant. As presented in Exhibit



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11, it has been estimated that between 890 and 1,340 truckloads would be required to establish (or stimulate) each horizontally-drilled well. This number does not include the number of trucks that would transport the natural gas that is exported from the well, and there is the potential for multiple wells on a single fracking site. While hydrofracking is not currently allowed in New York State and no permits have been approved (at the time of the development of the *L RTP 2035*), the resulting deterioration to roads owned, operated, and maintained by the state, counties, and municipalities if they were demand that means for obtaining appropriate compensation be considered. One option used elsewhere in the country is road use agreements that require compensation for damage sustained beyond the existing level of deterioration as a result of the increased truck traffic necessary to stimulate wells and transport extracted natural gas.

The Region in 2035

Based on the projected population and employment and the emerging opportunities and issues in the Genesee-Finger Lakes Region through 2035, two future scenarios were developed. Scenario planning is typically conducted by regions that expect to experience significant growth in residents and jobs. Even though population and employment growth in the region is not anticipated to be comparable to that of high-growth regions, it was decided that the *L RTP 2035* would benefit from consideration of alternate reasonable scenarios of how the moderate growth the region is expected to experience may occur.

Both of these scenarios adhere to the population and employment projections discussed previously, which are based on the official population forecasts for the region (as adopted by the Genesee/Finger Lakes Regional Planning Council that developed them with funding through the UPWP) and the employment projections developed by GTC for the *L RTP 2035*. The scenarios differ in the distribution of growth in population and employment within the Rochester TMA. Effectively, the scenarios repre-

sent a “Familiar Tomorrow” and a “Changing Landscape”. The former assumes that growth will continue to occur as it has in the past based on historical trends and the latter incorporates a re-densification within the Rochester TMA driven by increased energy costs and/or other factors that precipitate changes that alter the demand for housing and location of firms in a way that results in more compact development.

Compared to the “Familiar Tomorrow” scenario, the “Changing Landscape” scenario can be summarized as:

- Stabilization of and an increase in the population of the City of Rochester as opposed to a decrease;
- Similar population growth in the Sub-Regional Urban Core and Rural Center places;
- Reduced population growth in the Mature Suburban, Recent/Emerging Suburban, and Rural places and;
- Greater concentration of manufacturing, wellness services, and shopping in the existing Employment Centers, Medical/Health, and Regional, Sub-Regional, and Local Retail places.

While the growth in the Mature Suburban, Recent/Emerging Suburban, and Rural places would be reduced, these areas would still receive a significant amount (approximately 60 percent) of the growth in households in the Rochester TMA; just not as much as they would based on historical trends under the “familiar tomorrow” scenario.

Given the nearly 25-year horizon of the *L RTP 2035*, both the “Familiar Tomorrow” and “Changing Landscape” scenarios are plausible. The development pattern that materializes in the region will depend on decisions made at the local level regarding land use and the associated types of development that are allowed by comprehensive plans and zoning codes that determine what is approved for construction. The vast majority of this development will be driven by the private sector as it responds to market demand within locally-determined land use regulations.



However, major transportation infrastructure and services will continue to be provided by the public sector; specifically, state and regional agencies. Accordingly, coordinating transportation and land use planning is essential as transportation facilities and services determine the land uses that can be reasonably supported while land use decisions determine the demand for transportation infrastructure and services.

Recognizing that transportation is one of many considerations in the land use planning and development processes, it is imperative that cities, towns, and villages work with county, regional, and state transportation agencies to gain a full understanding of how their decisions impact the existing transportation system and what improvements are generally achievable given physical and fiscal constraints. GTC has and continues to develop resources that allow for better integration of transportation and land use planning, as well as provide direct financial assistance to local governments to conduct coordinated transportation and land use plans.



Chapter IV - TRANSPORTATION SYSTEM

TRANSPORTATION SYSTEM

Transportation System

The Genesee-Finger Lakes Region's social and economic vitality are dependent on a transportation system that safely, efficiently, and reliably moves people and freight. Residents and visitors require a system that provides them mobility and access to gainful employment, schools, health care services, religious and social activities, and recreational and cultural venues. The system must also connect employers with inputs (including labor) and the ability to get their products and commodities to local, domestic, and international markets. In meeting these requirements, consideration must be given to the system's impacts on the environment and how non-transportation-related decisions (namely, land use) affect the function and form of the system.

The transportation system of the region considered in the GTC policy, planning, and investment decision making processes is comprised of the following modes:

- Highways and Bridges
- Public Transportation
- Bicycle and Pedestrian
- Freight
- Interregional Travel

In addition, congestion, safety, and security are important transportation-related factors that have significant impacts on quality of life and economic development, requiring specific attention in the regional transportation planning process.

Highways and Bridges

Highways and bridges comprise the vast majority of the transportation system in the Genesee-Finger Lakes Region. Personal vehicles and bicycles, trucks carrying freight, and buses that provide public transportation services utilize these highways and bridges. The highway and bridge network carries over 30 million vehicle miles (the number of vehicles multiplied by the distance

they travel) daily on nearly 27,000 lane miles and over nearly 1,600 bridges. GTC has and continues to emphasize the preservation and maintenance of this network as its highest priority.

Major highways that serve regional, state, and national needs are eligible to be repaired and improved with funding from federal transportation programs (i.e., are federal-aid eligible). Approximately 7,300 lane miles of roadway in the region (about 40 percent of total lane miles) are federal-aid eligible, handling approximately 80 percent of the vehicle miles traveled on any given day. Map 5 presents the annual average daily traffic on federal-aid eligible roads. The physical state of these highways is measured by their pavement condition. Between 2000 and 2009, the percent of federal-aid highways in the region with pavement conditions of fair or better has improved slightly to 90 percent or above on a consistent basis beginning in 2006.

Bridges are the most critical element of the regional transportation system. Ensuring their structural integrity is absolutely vital to safety and connectivity. If a road is allowed to deteriorate, it can result in increased wear and tear – and possibly damage – to vehicles; if a bridge that is not structurally sound remains open to traffic, the consequences can be disastrous including loss of life. Inspectors measure the various components of the bridge (e.g., substructure, superstructure, bearings, deck, etc.) and rate the bridge's overall condition on a scale of one to seven, with seven being the highest. These ratings are based on inspections that are conducted for all bridges in the region no less frequently than once every two years.

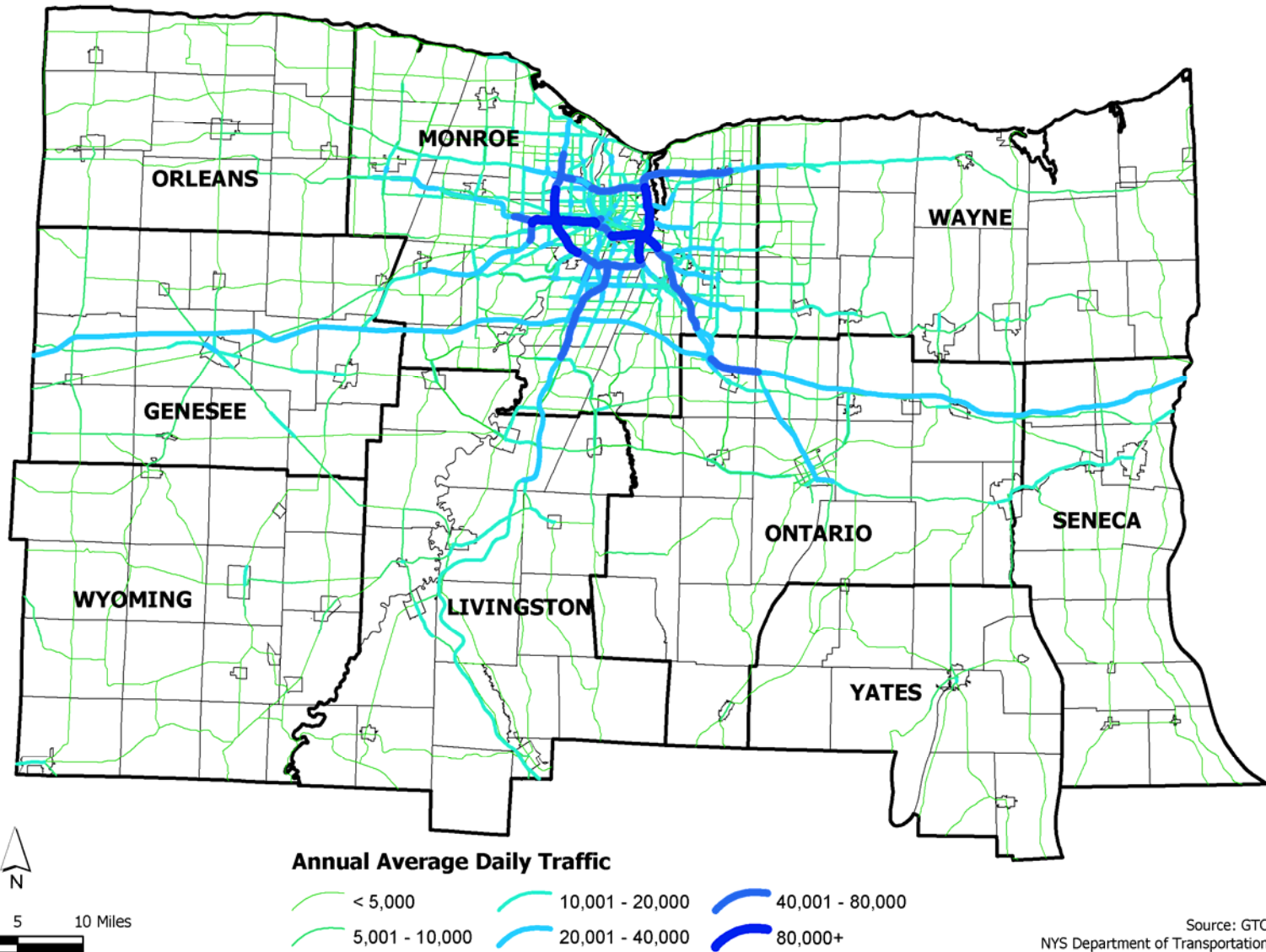
In terms of the age of bridges in the region, approximately 40 percent have been built in the last 30 years and an almost equal number were built prior to 1960. Using the rating system discussed above, bridges with a condition rating of 5.0 or above are considered non-structurally deficient – those with a condi-



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Traffic Volumes in the Genesee-Finger Lakes Region

Map 5



Source: GTC, 2010
NYS Department of Transportation, 2008

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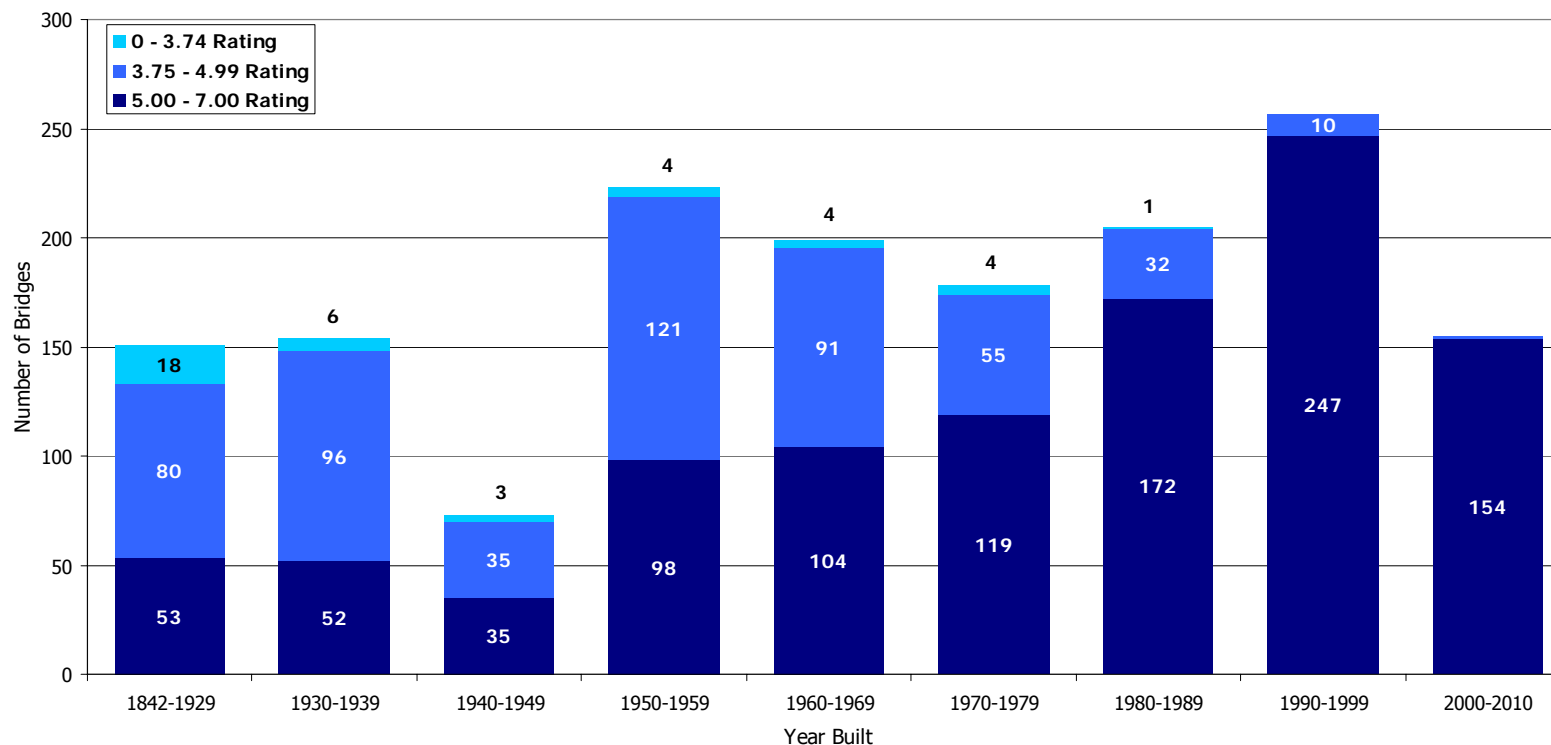
tion rating of 4.99 or below are considered structurally deficient. It is critical to note that sufficiency ratings apply to the overall structural condition of bridges and structurally deficient bridges are not inherently unsafe. Unsafe bridges are closed and bridges that cannot handle typical weights are flagged, resulting in weight limits being posted and more frequent inspections.

Approximately two of every three bridges in the region are non-deficient. Of the approximately one-third of bridges that are deficient, 90 percent have a condition rating of 3.75 to 4.99. This is important to note because bridges that are non-deficient require preventive and corrective maintenance. Deficient bridges

often require rehabilitation or replacement. While both rehabilitation and replacement are more expensive than maintenance treatments, rehabilitating a bridge costs less than removing and replacing it. Bridges with a condition rating of 3.75 to 4.99 are typically candidates for rehabilitation. Ninety-three percent of deficient bridges in the region fall within this range of being candidates for rehabilitation as opposed to replacement. Provided the required funding is available and based on use by the traveling public, rehabilitating as many of these bridges as possible before they deteriorate further could save the region a substantial amount of money in the long-term. Exhibit 12 presents the condition ratings of bridges in the region by the year built.

Exhibit 12

Condition Ratings by Year Built for Bridges in the Genesee-Finger Lakes Region, 2010



Source: New York State Department of Transportation



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Beyond asphalt, concrete, and steel, the use of communications and information technologies – collectively referred to as Intelligent Transportation Systems (ITS) – is an increasingly important component of the regional highway and bridge network. ITS elements allow transportation agencies to maximize the functionality of the existing highways and bridges by providing for better management and operations. Specific ITS capabilities include, but are not limited to, closed circuit television (CCTV) monitoring, vehicle volume and speed detection, dynamic messaging (via highway signs and mobile phone texts and e-mails), automatic vehicle location (AVL), roadway weather information systems (RWIS), and highway advisory radio (HAR) using both fixed (e.g., fiber optic) and mobile telecommunications.

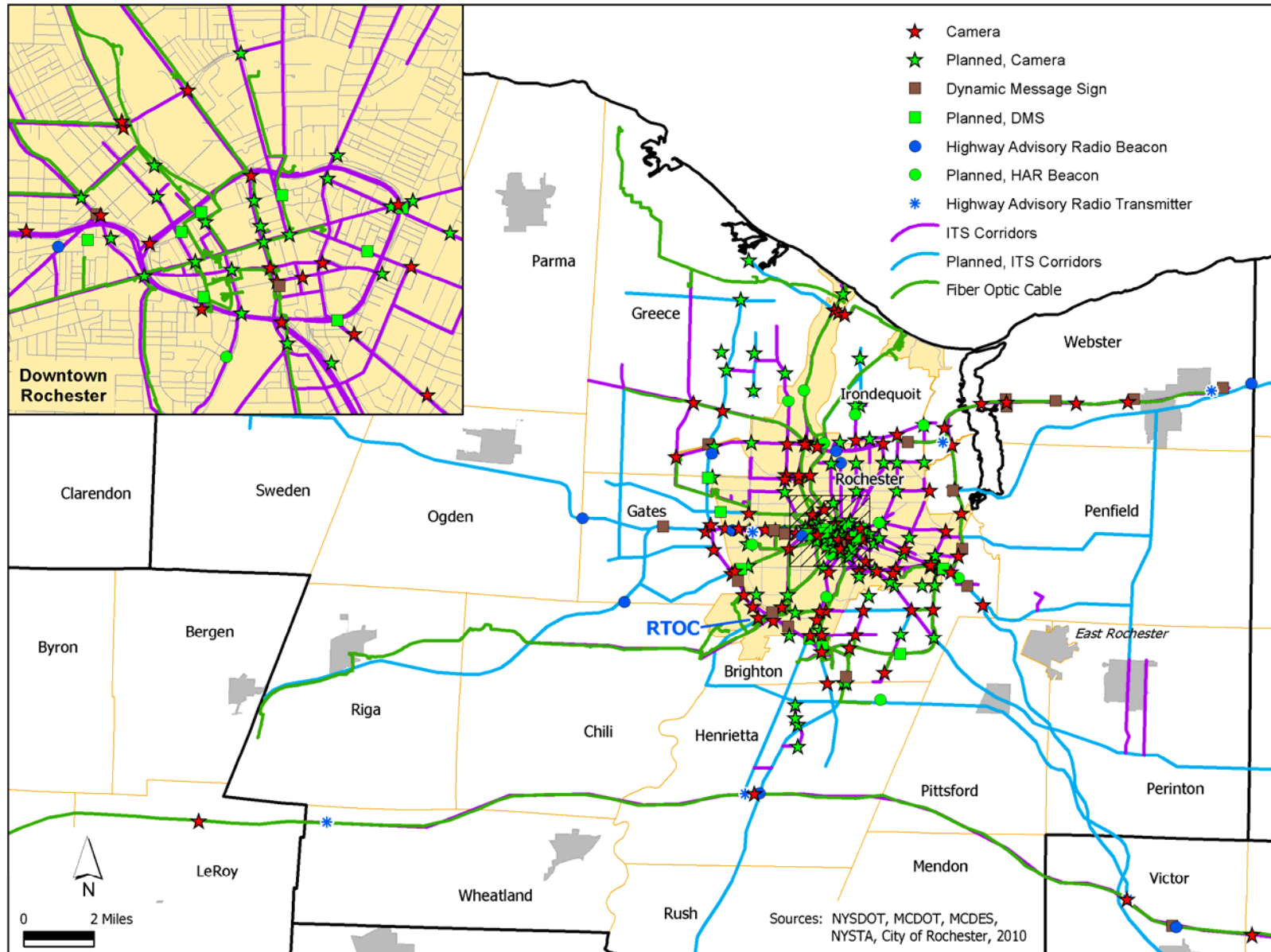
The region has and continues to place an emphasis on expanding ITS instrumentation to better manage and operate the transportation system as cost-effectively as possible while also improving safety. While many similar-sized areas have comparable ITS instrumentation on the highways operated by their state department of transportation, Monroe County (which serves as the City of Rochester's traffic engineer) maintains and continues to expand its ITS capabilities, and is recognized as a national leader among mid-sized metropolitan areas. The New York State Department of Transportation and Monroe County Department of Transportation manage and operate the highway and bridge network from the Regional Traffic Operations Center (RTOC). The New York State Police also maintain a presence at the RTOC. Like the extensive deployment of ITS instrumentation on non-state-operated highways, the multi-agency RTOC facility is considered a model for other areas. The New York State Thruway Authority (NYSTA) also maintains and is expanding ITS deployment across the region. NYSDOT, Monroe County, and NYSTA coordinate the monitoring of the region's highway and bridge network through ITS instrumentation, as well as their associated responses to incidents. Map 6 presents the current deployment of ITS instrumentation in the Genesee-Finger Lakes Region.



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Intelligent Transportation Systems Instrumentation

Map 6



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Public Transportation

Public transportation is critical to improving access to employment and needed services for individuals without private vehicles, expanding mobility for persons with disabilities, and reducing delay on the highway and bridge network, as well as providing other benefits to the region. Fixed-route public transportation service is available in eight of the nine counties of the region. In 2010, approximately 18 million trips in the region were made via fixed-route public transportation. Map 7 presents the routes of the eight fixed-route public transportation services in the region.

The Rochester Genesee Regional Transportation Authority's (RGRTA) Regional Transit Service (RTS) operates primarily in Monroe County and accounted for nearly 95 percent of these 18 million trips. City of Rochester residents are the most frequent users of RTS service and Map 8 presents the RTS Routes in the City of Rochester with a corresponding one-quarter mile buffer. One-quarter mile is generally seen as a reasonable distance for individuals to walk to access public transportation service.

RTS service is configured as a hub-and-spoke system that reinforces downtown Rochester as the region's commercial, civic, and cultural center in a cost-effective manner. Over the past five years, growth in RTS ridership has consistently exceeded the national average. In 2008-2009 RTS ridership grew almost 11 percent – more than two and one-half times the national average – and in 2009-2010, RTS ridership increased slightly even as public transportation ridership nationally declined approximately five percent.

While the density of development to support the most extensive and frequent public transportation service is located in the Regional Urban Core and Mature Suburbs, the availability of service in other places (especially, Rural and Rural Centers) is critical to those that depend on it. RGRTA provides fixed route ser-

vice in six other counties and dial-a-ride service (DAR) in all but Wayne County through the services listed below.

- Batavia Bus Service (B-Line or BBS) serves Genesee County
- Livingston Area Transportation Service (LATS) serves Livingston County
- Orleans Transit Service (OTS) serves Orleans County
- Seneca Transit Service (STS) serves Seneca County
- Wayne Area Transportation Service (WATS) serves Wayne County
- Wyoming Transportation Service (WYTS) serves Wyoming County

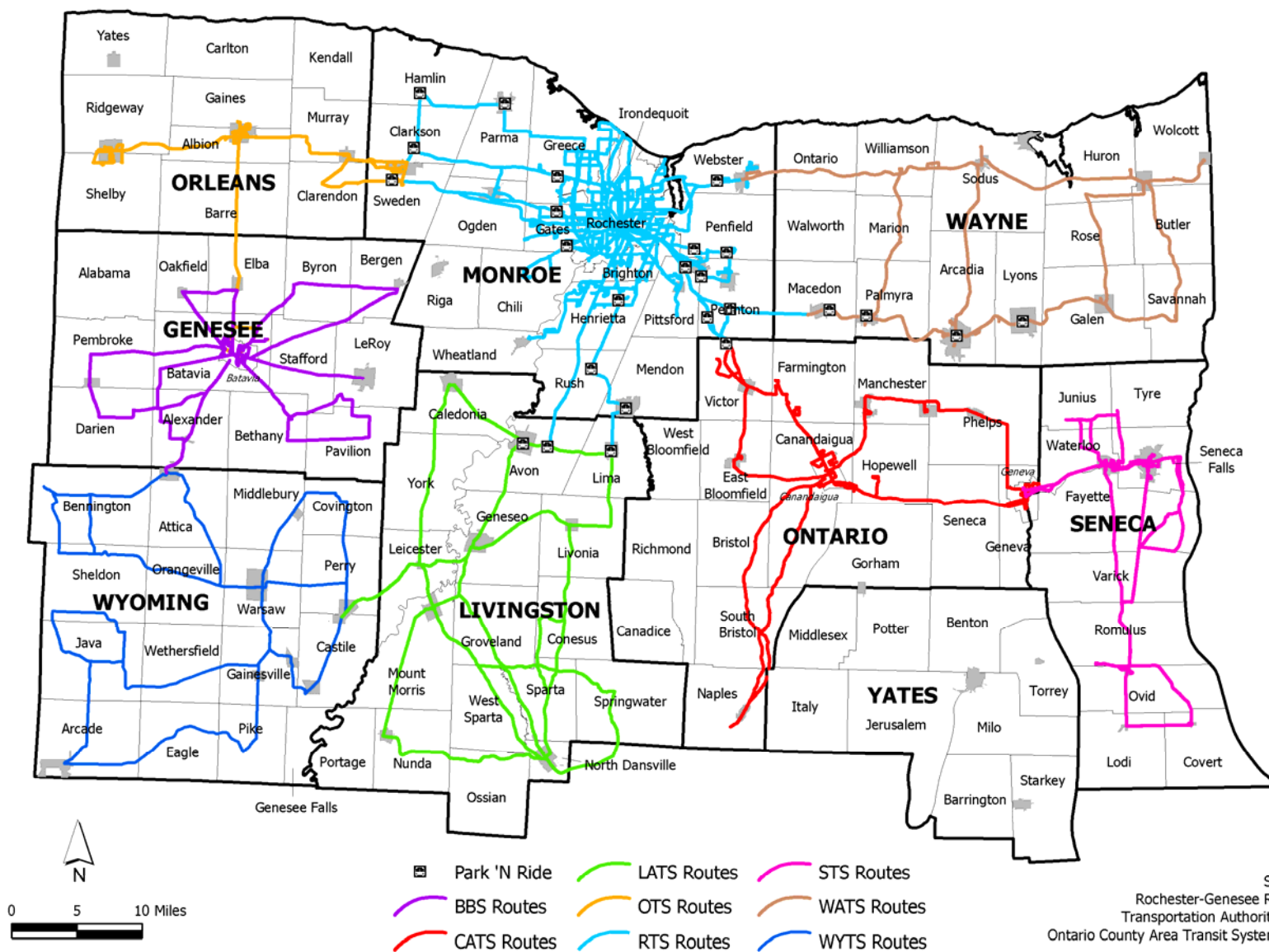
Ontario County operates the County Area Transit System (CATS) which provides fixed-route service complemented by DAR service in those communities not served by the fixed-route service. The fixed-route service consists of two components: the city routes that operate in the Cities of Canandaigua and Geneva and the intra-county routes that connect the larger communities in the county with the cities and Victor. Like RTS, CATS is also configured as a hub-and-spoke system with the City of Canandaigua serving as the hub.

Linkages across county lines exist to varying degrees. RTS Route 92 provides service to Eastview Mall in Victor, Ontario County, and Lyons, Wayne County. LATS provides connections to and from Marketplace Mall in Henrietta, Monroe County, Eastview Mall in Victor, Ontario County, and Perry, Wyoming County. Between Seneca and Ontario County, STS Route 4 provides service to and from Geneva, Ontario County. OTS Route 3 provides service along NYS Route 31 from Albion to Brockport, and various medical shuttles ensure that residents can get to and from hospitals and health facilities throughout the region.

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Public Transportation Routes in the Genesee-Finger Lakes Region

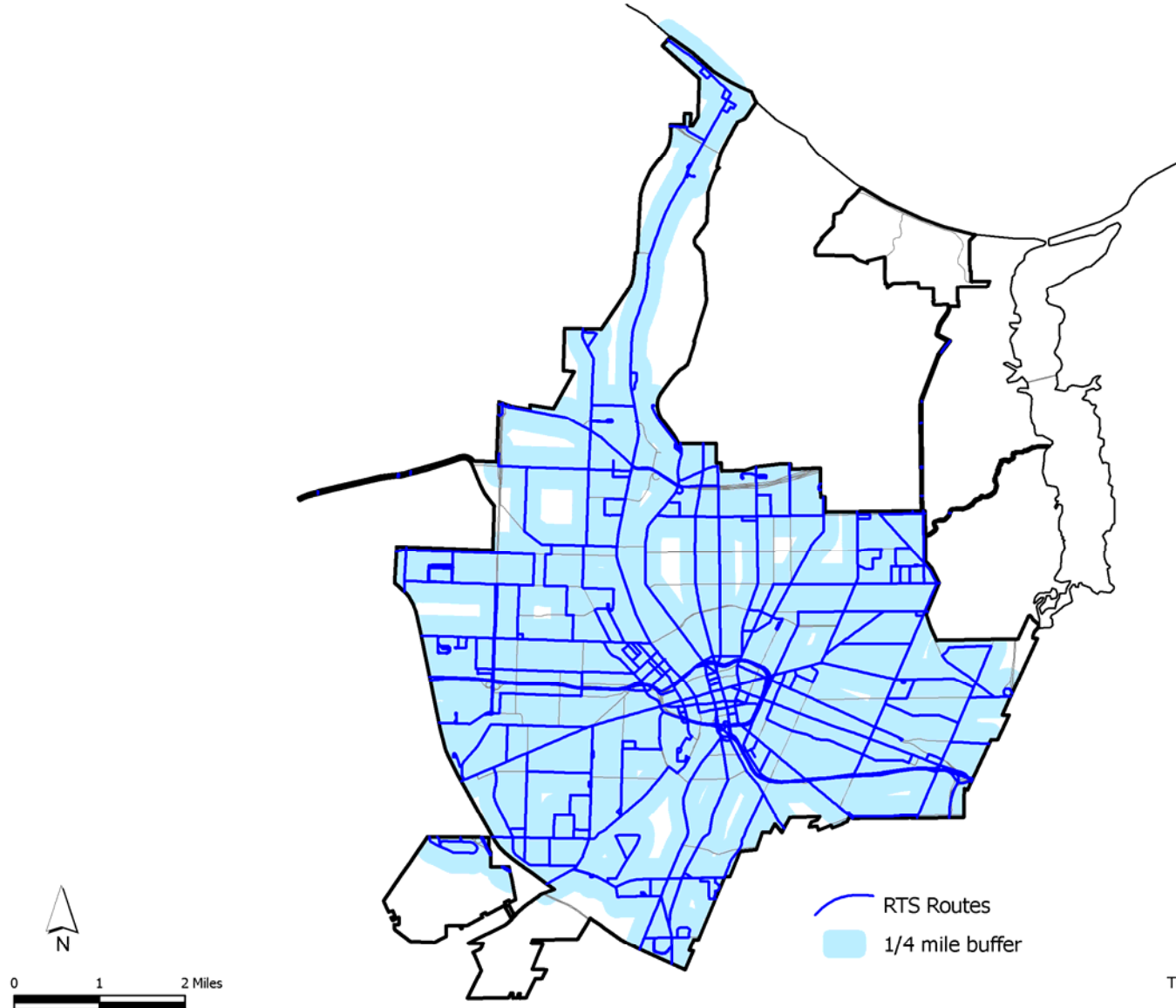
Map 7



TRANSPORTATION SYSTEM

Regional Transit Service Routes in the City of Rochester

Map 8



Sources:
Rochester-Genesee Regional
Transportation Authority, 2010

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Paratransit services are available to persons with disabilities throughout the region. The majority of these trips are made in Monroe County by Lift Line, Inc., a subsidiary of RGRTA that provided over 180,000 trips in 2009-2010. The Lift Line, Inc. service area was expanded voluntarily by RGRTA in 2007 through a supplemental service that exceeds the existing American with Disabilities Act-compliant service.

As with highways and bridges, preservation and maintenance of vehicles to improve the cost-effectiveness of public transportation is a high priority. Approximately one-third of the Federal Transit Administration funds allocated directly to RGRTA for its RTS service are programmed for preventive maintenance activities to ensure that the existing fleet of buses which provides 17 million trips per year is reliable with breakdowns kept to a minimum. Frequent breakdowns or disruptions in service will inconvenience those who depend on public transportation and result in choice riders (i.e., those that have the option to drive themselves) opting not to use it.

RGRTA has and continues to expand the use of ITS to improve operations and customer service. Beginning in 2007, RGRTA began implementing Technology Initiatives Driving Excellence (TIDE) in its RTS service. TIDE is a comprehensive public transportation ITS initiative. It includes a bus operations and facility management system, automatic stop annunciation and bus sign controls, real-time next bus information at stops and through text and e-mails, upgraded fare collection system, computer aided dispatch, vehicle in-service health monitoring and diagnostics, and a next generation AVL system. TIDE components are planned to be introduced in other RGRTA services, as appropriate – currently, AVL is being introduced on LATS, OTS, and Lift Line, Inc. buses.

Improvements to transit facilities are also planned and underway. These include multi-million dollar investments with the most notable being the development of the downtown transit

center that was part of the former Renaissance Square project. Designs are being finalized and funding for the construction remains programmed in the TIP. In addition, the feasibility of satellite transit centers at specific locations that would improve RTS service are in various stages of planning. The most advanced is Mt. Hope station that would be part of the University of Rochester's College Town. A suburban satellite transit stations feasibility analysis is currently underway to assess the potential for various service concepts in Mature Suburbs. Beyond facilities that directly serve customers, RGRTA is also implementing improvements to its main campus on East Main Street in Rochester. Constructed in 1974, this will be the first major upgrade to the campus and will improve safety, security, and efficiency.

Bicycle and Pedestrian

In addition to the highway and bridge network and public transportation service, bicycle and pedestrian facilities are key elements of the regional transportation system. Between a greater emphasis on increasing physical activity to promote healthy lifestyles, creating walkable communities and complete streets, and developing an interconnected multi-use trails network, bicycling and walking as reasonable transportation alternatives are and continue to gain prominence in the regional transportation planning process.

Like public transportation, improving bicycle and pedestrian infrastructure is critical to improving access to employment and needed services for individuals without private vehicles, expanding mobility for persons with disabilities, and reducing delay on the highway and bridge network. In addition, increased bicycling and walking have the potential to create a healthier community which would reduce overall public costs for medical care and energy usage (regardless of the source).

The bicycle and pedestrian network is especially important to certain populations. These include children, seniors, people with



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disabilities, and those without access to a private automobile. Many of these groups not only use but depend on the ability to safely travel to and from public transportation service and their final destinations. The Genesee-Finger Lakes Region is home to a contingent of organizations representing these groups that actively promotes and advocates for the expansion of this element of the regional transportation system.

The highway and bridge network serves as the main component of the bicycle and pedestrian network. Roads and sidewalks provide the primary facilities for bicyclists and pedestrians. In addition, multi-use trails are an important piece of infrastructure that is specifically built for non-motorized transport. Excluding multi-use trails, improving the safety of the bicycle and pedestrian facilities through creation of dedicated space for cyclists and walkers and improved understanding among motorists of their right to the road is key to increasing bicycling and walking as modes of travel.

Typical bicycle space on highways and bridges consists of a minimum of four-foot paved shoulders or curb offsets, the latter being the right-hand edge line of the traffic lane being at least four feet from the curb. Both provide delineated space for bicyclists but, because they are not intended solely for bicyclists, are not designated (and, therefore, signed or marked) as bicycle lanes. Although delineated bicycle space is available along many highways in the region, designated bicycle lanes are uncommon. There are only three signed bicycle routes in the region:

- State Bicycle Route (SBR) 5 which runs east-west parallel to the Erie Canal
- SBR 14 which runs north-south from the Seaway Trail in Sodus Point, Wayne County through Ontario and Yates Counties into the Southern Tier of New York State and Pennsylvania

- SBR 19 which runs north-south from the Seaway Trail/Lake Ontario State Parkway in Hamlin, Monroe County past Letchworth State Park into the Southern Tier of New York State and Pennsylvania

A field assessment of the suitability of highways in the Rochester TMA for bicycling (i.e., bicycle suitability ratings) was conducted by the Rochester Bicycling Club (RBC) in cooperation with GTC in 2007. These ratings served as the basis for the 2009 Edition of the *Greater Rochester Area Bicycling Map* produced by GTC and posted to Google Maps in 2010. Based on the RBC assessment, nearly two-thirds of highways were rated good. Map 9 presents the bicycle suitability ratings as determined by the RBC. A bicycle level of service (BLOS) has been created as part of the development of the City of Rochester's Bicycle Master Plan. It was determined that the BLOS of the City was 3.7 (with one being the best and five being the worst); the national average is 3.9.

The Genesee-Finger Lakes Region has a strong commitment to developing multi-use trails. These facilities serve as expressways for bicyclists and require interconnections with highways to optimize their usefulness. There are more than 340 miles of existing trails in the region, including 141 miles that have been completed or rehabilitated since 1993. The development of multi-use trails is guided by the *GTC Regional Trails Initiative (RTI)* and Priority Trails Advancement Program studies that determine the feasibility and preferred alignment for trails included in the *RTI*.

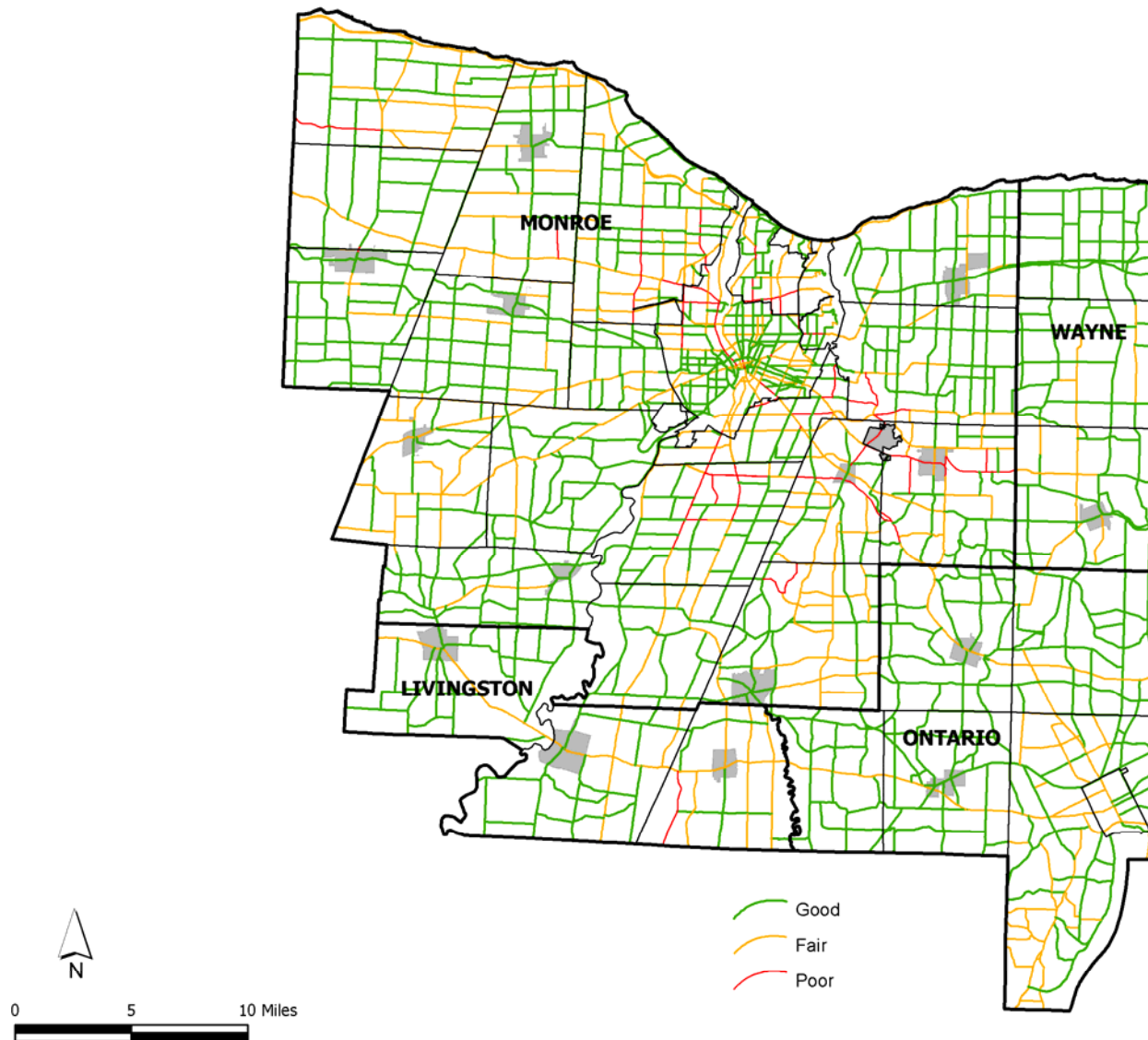
Over the past 15 years, \$23.6 million in federal funds have been invested in multi-use trails and \$14.7 million is programmed in the current TIP to develop more than 20 additional miles of multi-use trails. According to a 2009 University of California (UC)-Davis report, the region ranked 11th in the nation in per capita federal investment in bicycle and pedestrian facilities from 1993 to 2004. Since that time, the per capital amount of federal investment in bicycle and pedestrian facilities – the majority in



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Bicycle Suitability Ratings on Major Roadways in the Rochester Transportation Management Area

Map 9



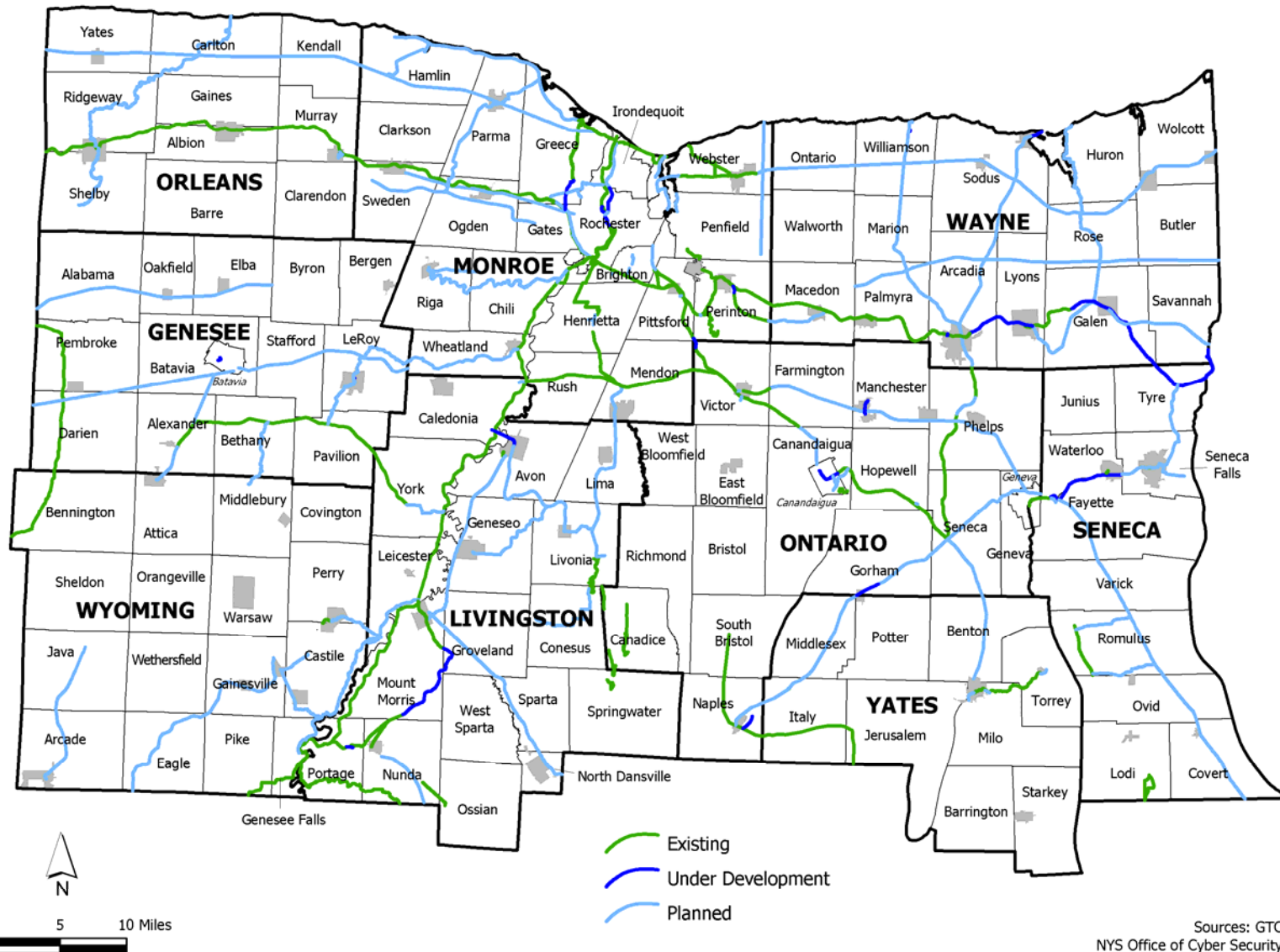
Sources:
Rochester Bicycling Club, 2007
NYS Office of Cyber Security, 2010



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Multi-Use Trails in the Genesee-Finger Lakes Region

Map 10



TRANSPORTATION SYSTEM

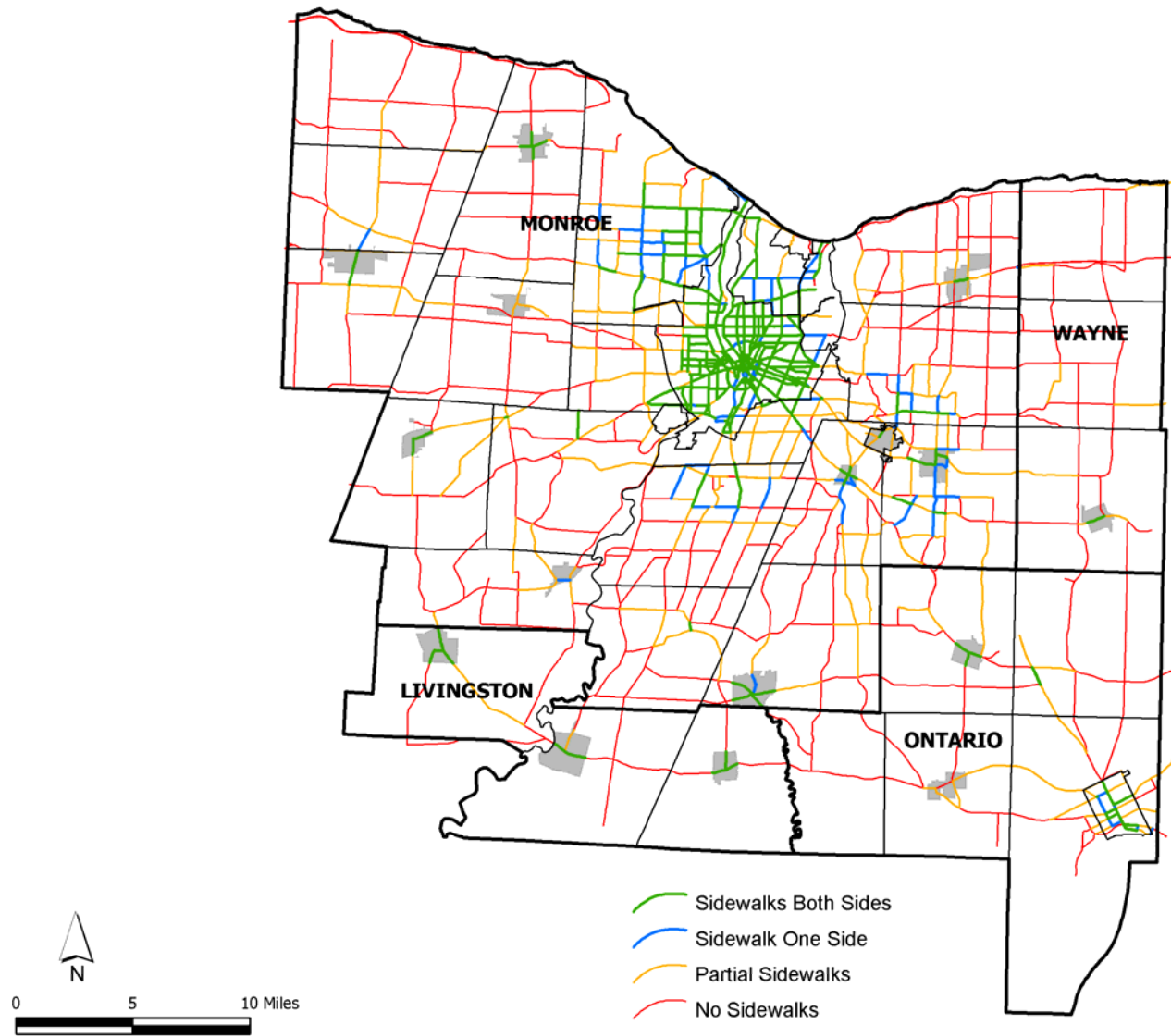
multi-use trails – is greater than the first ranked region in the UC-Davis report. Map 10 presents existing multi-use trails and those that are under development or planned in the region. Bicycle facilities can be provided on-street by delineated or dedicated space. Pedestrians, however, require separate travel ways via sidewalks. The limited exceptions would be along certain low-traffic, low-vehicular speed roads such as residential streets and rural highways where origins and destinations are separated by distances that cannot be reasonably traversed by walking. Sidewalks are also critical to providing access to public transportation services, especially for persons with disabilities that may require the use of assistive devices such as wheelchairs. A recent field survey of pedestrian facilities in the Rochester TMA conducted by GTC found that 20 percent (203 miles) of federal-aid eligible roadways have complete sidewalks. Sidewalks are most common in the cities of Rochester, Batavia, Canandaigua, and Geneva, Mature Suburbs, and the villages (Sub-Regional Urban Cores and Rural Centers) of the region. The results of the GTC Pedestrian Facilities Inventory are presented in Map 11.



TRANSPORTATION SYSTEM

Pedestrian Facilities on Major Roadways in the Rochester Transportation Management Area

Map 11



Sources: GTC, 2008
NYS Office of Cyber Security, 2010

TRANSPORTATION SYSTEM

Freight

The economic health of the region is dependent on its ability to safely, efficiently, and reliably transport freight within the region and to domestic and international markets. Due to the importance of manufacturing and agriculture to the region's economic vitality, the transportation system is a particularly important factor in retaining and attracting new firms and the employment they generate. Despite the region's decline in employment in manufacturing, increased productivity (mainly due to advances in technology and operating processes) will result in larger volumes of freight needing to reach customers within the United States and abroad.

In 2010, approximately 282 million tons of freight worth over \$900 billion was transported into, out of, within, and through the Genesee-Finger Lakes Region. Between 2010 and 2035, these freight movements are expected to increase 63 percent in

terms of weight to approximately 460 million tons and 115 percent in terms of value to nearly \$2 trillion. The breakdown of tonnage and value by direction in 2010 and 2035 is presented in Exhibit 13.

The primary mode for moving freight is truck, which accounts for over 80 percent of the tonnage transported in all directions. Thirteen percent of tonnage is transported by rail, five percent by water, and approximately one-half of one percent by air. The percent of freight tonnage by mode of transport in 2010 is provided in Exhibit 14. The presence of the existing highway and bridge network and the flexibility that truck service provides in meeting access to the vast majority of customers receiving raw materials, intermediate inputs, and final products will in all likelihood result in trucks continuing to be the preferred method for receiving goods by businesses and consumers.

Exhibit 13

Freight Tonnage and Value by Direction in the Genesee-Finger Lakes Region, 2010 and 2035

Direction	Tonnage		Percent Change 2010- 2035	Value		Percent Change 2010- 2035
	2010	2035		2010	2035	
Inbound	40,066,000	57,300,000	43.0%	\$ 122,005,776,725	\$ 215,576,194,562	76.7%
Out-bound	34,442,000	52,261,000	51.7%	\$ 170,993,401,128	\$ 465,933,612,915	172.5%
Within	14,047,000	21,557,000	53.5%	\$ 11,014,860,961	\$ 29,060,925,102	163.8%
Through	193,362,000	329,104,000	70.2%	\$ 611,801,443,611	\$ 1,262,934,492,699	106.4%
Total	281,917,000	460,223,000	63.2%	\$ 915,815,482,424	\$ 1,973,505,225,278	115.5%

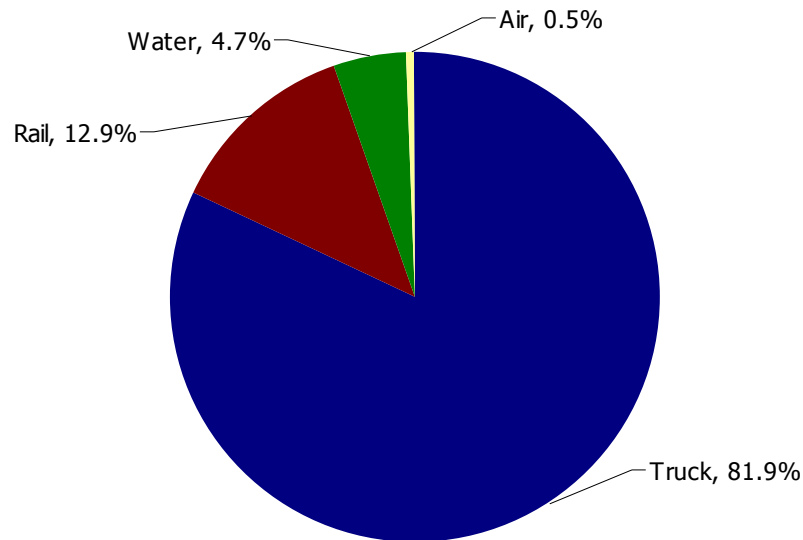
Source: IHS/Global Insight via NYS Department of Transportation and U.S. Department of Transportation, 2010



TRANSPORTATION SYSTEM

Exhibit 14

Freight Tonnage by Mode in the
Genesee-Finger Lakes Region, 2010



Source: IHS/Global Insight via NYS Department of Transportation and U.S. Department of Transportation, 2010

Map 12 presents the Highway Trade Corridors in the region that were identified through an analysis of the number of trucks that use them currently and are expected to through 2035. They are classified as Primary Regional, Secondary Regional, and Connector based on the amount of truck traffic they carry, representing the level of access they provide to national/statewide, regional, and sub-regional markets, respectively. These corridors represent existing and projected conditions and do not necessarily reflect where freight movements should be promoted in the future.

Railroads serve an important function in the regional freight network, moving high-volume, low unit cost commodities in a

highly efficient manner (one ton of freight can be moved approximately 435 miles on a single gallon of diesel fuel). Most of the rail lines in the region have been continually transporting freight in some capacity since the late 1800's. Two of the seven Class I railroads – those with operating revenue of \$378.8 million or more in 2009 – in the United States and Canada operate in the region: CSX Transportation (CSXT) and Norfolk Southern (NS). The CSXT main line that traverses the region and New York State (the former Conrail Chicago Line) is the most heavily traveled of the any of the company's lines, which includes operations in 22 states. In addition to the Class I operators, the region is home to nearly a dozen Class III (or Shortline) railroads – those with operating revenue of less than \$40 million in

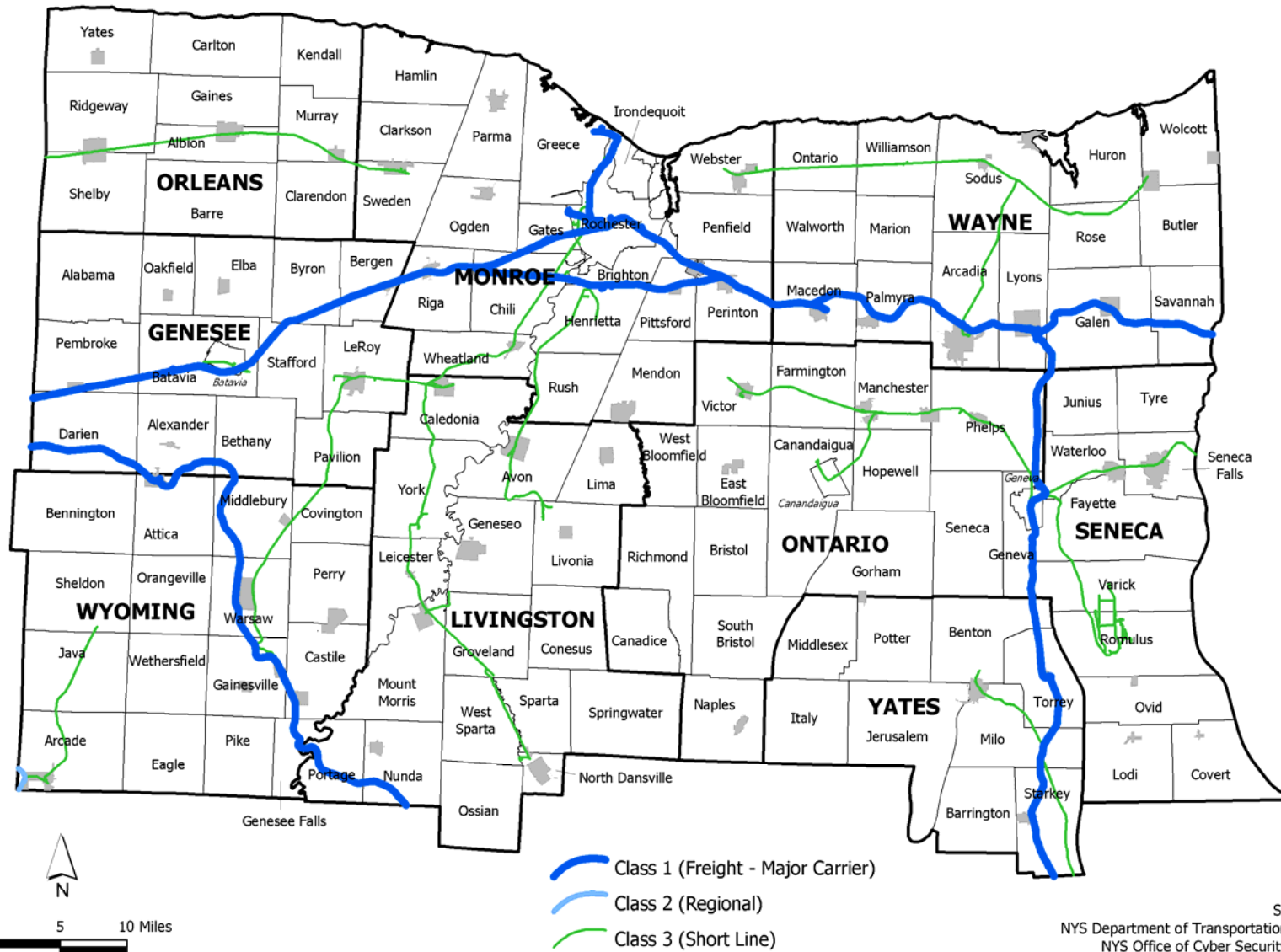
Map 12



TRANSPORTATION SYSTEM

Railroads in the Genesee-Finger Lakes Region

Map 13



TRANSPORTATION SYSTEM

2009 – accounting for approximately one-third of the Shortlines in New York State. Map 13 presents active Class I and Class III railroads in the Genesee-Finger Lakes Region.

In addition to trucks and railroads, freight also moves via airplanes and waterborne vessels. The Greater Rochester International Airport (GRIA) is the region's main cargo handling airport. In 2009, nearly 145,000 tons of freight landed at the GRIA. Cargo shippers operating at the GRIA include Federal Express (including feeder services provided by Wiggins Airways), ABX Air (formerly Airborne Express), BAX Global, DHL Worldwide, and Emery Worldwide. Cargo is handled at two terminals – one in the northwest corner of the airfield operated by USAirports that handles all non-FedEx shipments and another at the south end of the airfield that is exclusively for FedEx operations. While the tonnage of freight handled via air service is minor compared to the trucks and railroads, the proportional value is significantly higher. Accordingly, air cargo capabilities comprise a vital component of the freight network that is critical to the growth of industries such as optics and imaging and biotechnology.

Marine freight movements in the region primarily consist of cement shipments to the ESSROC cement dock in Rochester near Turning Point Park from the ESSROC plant in Picton, Ontario via the *Stephen B. Roman*, a 488-foot-long draft vessel. The Port of Rochester was once a busy freight port but lack of direct access to major highways and the proposed revitalization of the Port as a residential and entertainment center limit its potential as a shipping facility. There are also minor freight movements along the Erie Canal but, because of varying controlling depths along the 524-mile long waterway, major shipping activity is expected to be limited.

GTC is currently developing a regional freight plan that will provide a more detailed assessment of the facilities that serve the movement of goods and will identify recommended projects and programs to increase the transportation system's contribution to

economic development through 2035. In addition, NYSDOT and NYSTA are progressing the Mohawk-Erie Multimodal Corridor Study which includes a component that will inform future investment decision making regarding freight movements to, from, within, and through the region

Interregional Travel

Regions that are easily accessible from other areas offer greater economic development opportunities (including national and international businesses activities and tourism) and lower costs for residents who travel for domestic, vacation, and other purposes. The region currently offers interregional travel options via air, bus, and railroad to residents and visitors. The facilities providing these services are presented in Map 14. Ensuring convenient, reliable connections between these facilities and other modes is an important consideration.

The majority of interregional passenger travel (excluding trips by personal automobile) occurs at GRIA. GRIA is served by eight carriers (it was served by nine prior to the Delta/Northwest merger) and offers nearly 5,000 seats per day to 19 destinations. In 2009, over 2.5 million passengers began or ended the air travel portion of their journey at GRIA. The number of enplanements (i.e., those boarding a plane at GRIA) increased 15.5 percent between 1999 and 2008, the latest 10 years for which data was available from NYSDOT.

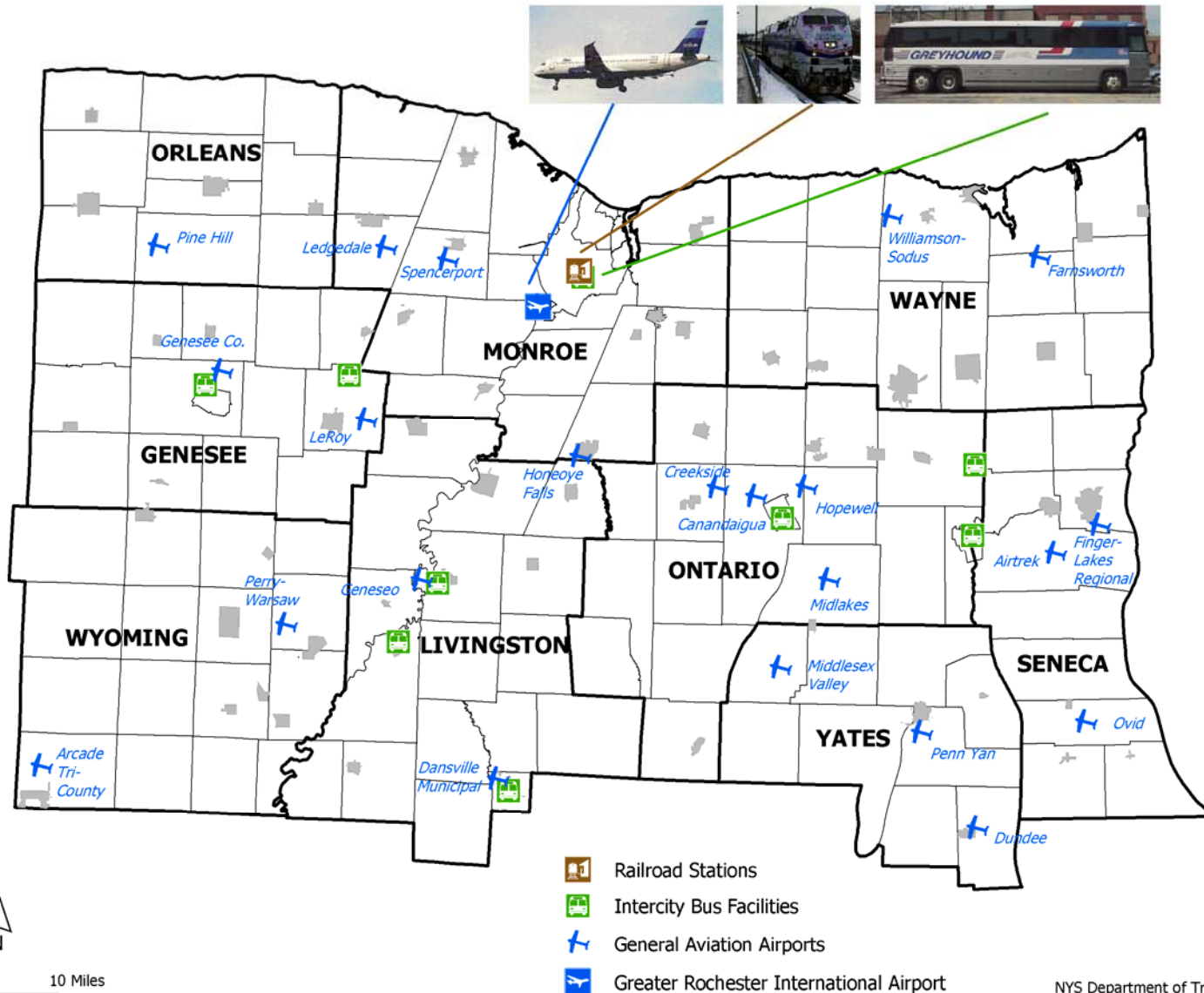
In addition to GRIA, there are over 20 public use airports in the region of which 10 are designated as General Aviation airports. General Aviation airports serve all civil aircraft that are not classified as air carrier, commuter, or military. Five of these ten General Aviation airports are Reliever airports that reduce traffic at Commercial Service airports such as GRIA by providing service for smaller aircraft.



TRANSPORTATION SYSTEM

Interregional Transportation Facilities in the Genesee-Finger Lakes Region

Map 14



Sources:
NYS Department of Transportation, 2006
NYS Office of Cyber Security, 2010

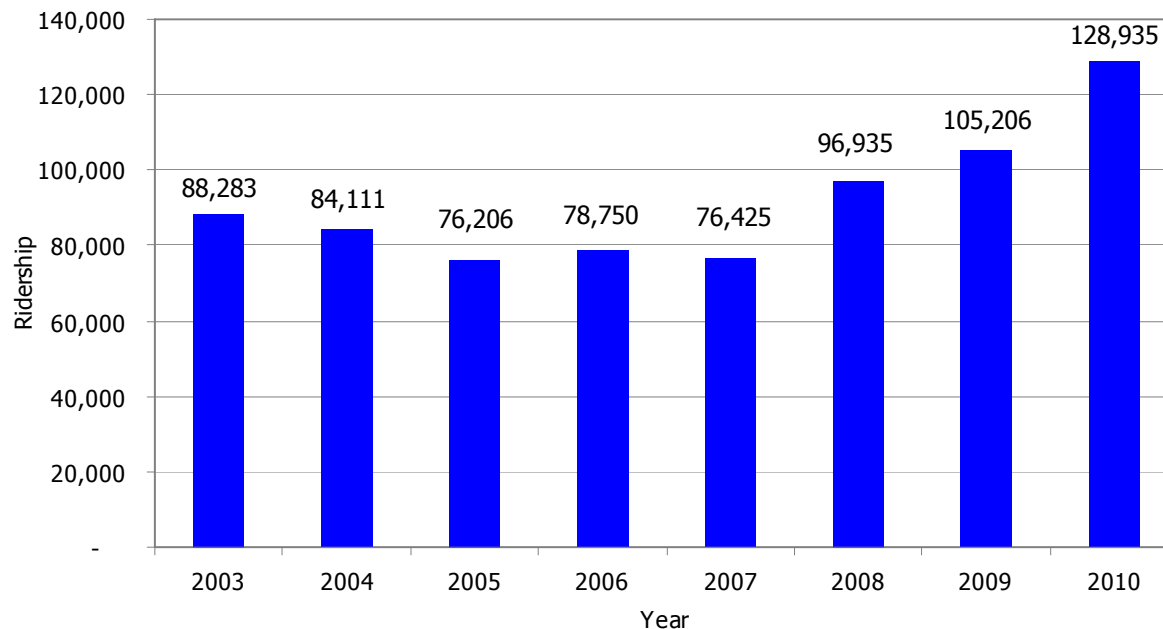
TRANSPORTATION SYSTEM

Greyhound Lines and New York Trailways provide interregional bus service in the region. According to their latest ridership statistics, 140,000 passengers depart or arrive at the Rochester Terminal and over 300,000 pass through Rochester on schedules operating on the Toronto to New York corridor and the Boston to Cleveland corridor. In addition to the Rochester Terminal, there are eight other locations in the region where residents and visitors may access Greyhound Lines and New York Trailways interregional bus service.

Amtrak provides passenger rail service to Rochester via nine trains per day on its Empire Service, Lakeshore Limited, and Maple Leaf routes. Amtrak ridership in Rochester (as measured by passenger boardings and alightings) has increased approximately 45 percent since 2003, but continues to serve the fewest

passengers of any of the interregional transportation options available. Exhibit 15 presents annual Amtrak ridership in Rochester from 2003 to 2010. With a renewed interest in passenger rail service at the national level, additional federal funds have been allocated to design a replacement of the current Amtrak station in Rochester, which was built nearly 40 years ago, and improve passenger rail service along key routes including the Empire Corridor, which serves Rochester. Discussions also continue regarding the development of a station in Wayne County with Lyons the most mentioned site for the new facility.

Exhibit 15 **Annual Amtrak Ridership - Rochester, NY Station
2003-2010**



Source: Amtrak Fact Sheets - State of New York (Amtrak website [www.amtrak.com] as of February 11, 2011)



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Travel Characteristics

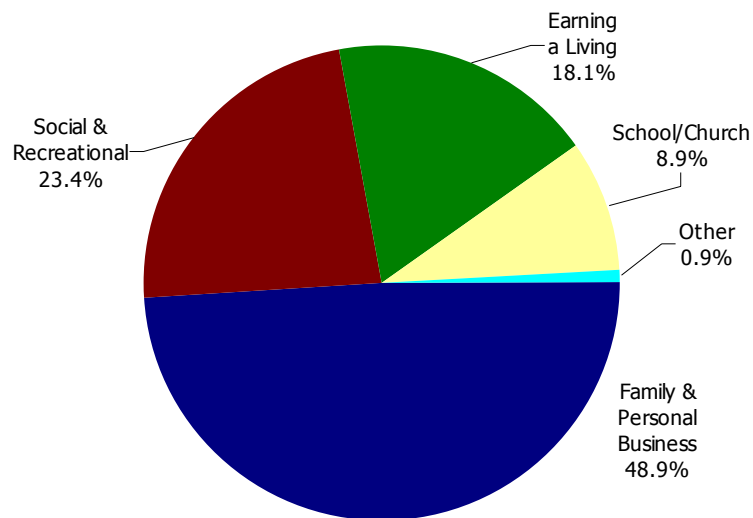
The travel characteristics of the region's residents are determined by where they live and where they need and want to go. Given the modest change in population and employment over the past twenty years – both in terms of amount and location, it is not surprising that the associated travel characteristics and patterns are relatively unchanged. Nearly half of all person trips in the Rochester TMA in 2009 were for family and personal business (e.g., shopping, health care visits, etc.). Trips made for social and recreational (e.g., visit friends and relatives, take vacation, etc.) purposes made up approximately 23 percent of all person trips in 2009. Work-related (i.e., those made to earn a living) trips accounted for nearly 20 percent of all person trips. However, because many work-related trips are made during the

morning and evening peak periods, they result in the most intense use of the transportation system during limited times. The proportion of person trips in the Rochester TMA by purpose in 2009 was nearly the same as what it was in 1995. A breakdown of person trips by purpose in 2009 is presented in Exhibit 16.

The average length of person trips in the Rochester TMA remained almost unchanged between 1995 and 2009 at 9.1 miles and 9.4 miles, respectively. Average work-related trips increased from 9.2 miles to 10.2 miles while shopping trips decreased from 7.3 miles to 5.5 miles between 1995 and 2009. All other trips by purpose remained almost unchanged with the differences between 1995 and 2009 being less than one mile in every instance.

Exhibit 16

**Person Trips by Purpose in the
Rochester Transportation Management Area, 2009**



Source: National Household Travel Survey - Rochester, NY Add-on, 2009.

The vast majority of person trips in 2009 were made by private vehicle at 87.5 percent; this is the same as it was in 1995. Primary differences in the mode and type of trips is based on age. Trips by seniors (ages 65 and over) are made almost exclusively by private vehicle (94.5) and their primary trip purpose is family and personal business (67.7 percent). It is anticipated that seniors will continue to choose private vehicles as their preferred method for mobility but the increase in their overall numbers will require additional public transportation services as discussed later. As would be expected, the largest percentage of person trips for work-related purposes are made by persons 16 to 64 years of age and the largest percentage of trips made by school bus are by those under 16 years old.

According to 2006-2008 American Community Survey (ACS) data from the Census Bureau, there has been only slight variation since 1990 in terms of county to county workflows in the region. Monroe County continues to have the highest percentage of residents who work in their county of residence at 95 percent. As with county to county workflows in the region, the most recent ACS data shows that very little has changed in

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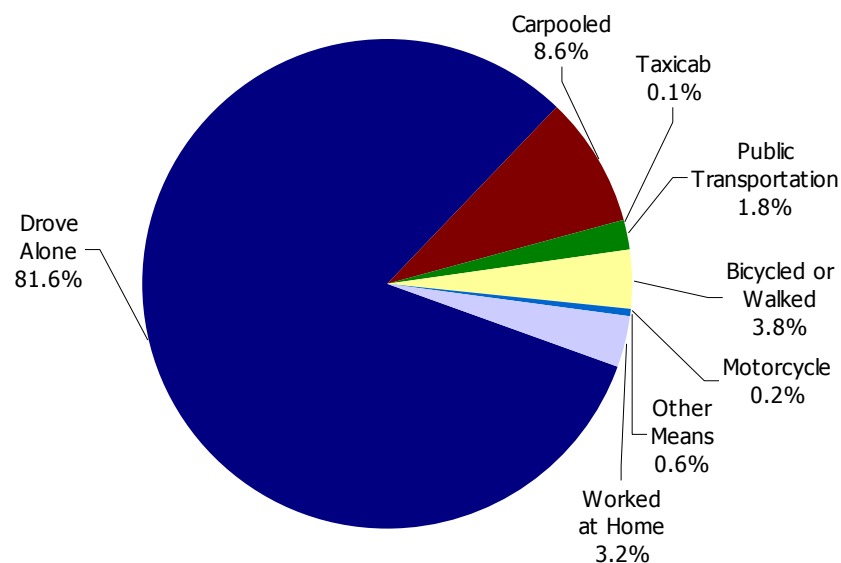
terms of how people travel to and from work since the last time similar data was collected as part of Census 2000. Ninety percent of workers either drive alone or carpool to their place of employment. Exhibit 17 presents the means of transportation to work by employed persons residing in the Genesee-Finger Lakes Region.

Between 1990 and 2000, the number of at-home workers increased approximately 15 percent but was nearly unchanged between 2000 and 2009. However, a survey of municipalities in Monroe County conducted by GTC in October 2010 found that two-thirds have noticed or expect to experience an increase in at-home workers based on permits from residents requesting to conduct business from their homes. Even though the majority of

respondents indicated that this increase has not resulted in additional complaints from neighbors, the potential for impacts is present if not addressed. Local streets are not designed for traffic that can result from increased vehicular traffic from customer appointments and deliveries by truck to these at-home workers.

Exhibit 17

**Means of Transportation to Work in the
Genesee-Finger Lakes Region, 2009**



Source: American Community Survey, 2009



TRANSPORTATION SYSTEM

Congestion Management Process

The ability of the highway and bridge network to carry traffic efficiently and minimize delay to the travelling public and freight carriers is important to economic and social productivity as well as environmental quality. Time lost in traffic and increases in emissions of pollutants due to congestion are detrimental to quality of life and economic development. Even though the Genesee-Finger Lakes Region consistently ranks low in terms of congestion compared to similar sized areas in the nation, the U.S. Department of Transportation requires that Transportation Management Areas maintain a Congestion Management Process to:

- monitor and evaluate transportation system performance;
- identify alternative congestion mitigation actions;
- assess and implement cost-effective congestion mitigation actions; and
- evaluate the effectiveness of the implemented actions.

The objective of the GTC Congestion Management Process is to provide practical tools to identify and implement strategies that improve the mobility of people and freight, emphasizing coordinated corridor-level and region-wide solutions that mitigate existing sources and avoid the creation of future sources of congestion that result in excess delay.

Congestion that results in delay along the highway and bridge network of the region has been categorized into three types:

1. Recurring Capacity Related Delay – results in trips taking longer during peak hours than during off-peak hours. This type of delay typically occurs on the key commuter corridors throughout the region as presented in Map 15. Recurring Capacity Related Delay can be reduced by a combination of supply-driven and demand-driven strategies, ranging from operational improvements such as traffic signal management and traveler in-

formation systems to strategies that influence user demand, such as promoting alternate forms of transport (e.g., ridesharing, carpooling, etc.) and alternate work locations (e.g., telecommuting, remote worksites, etc.). It is important to note that this type of delay has limited impact on freight movements since truck operators can and do travel during non-peak periods to the greatest extent possible. Other points of recurring congestion include primary and secondary schools during drop-off and pick-up times as buses and private automobiles access and leave these sites.

2. Planned Event Related Delay – occurs as a result of a planned special event such as a concert, sports game or match, or scheduled road work. This type of delay typically occurs on roads in the vicinity of major venues, including performing arts centers and stadiums or around a pre-planned work zone. Planned Event Related Delay can be reduced through techniques such as effective special-event parking management and traffic management and enforcement, traveler information systems, and work zone management plans and programs.

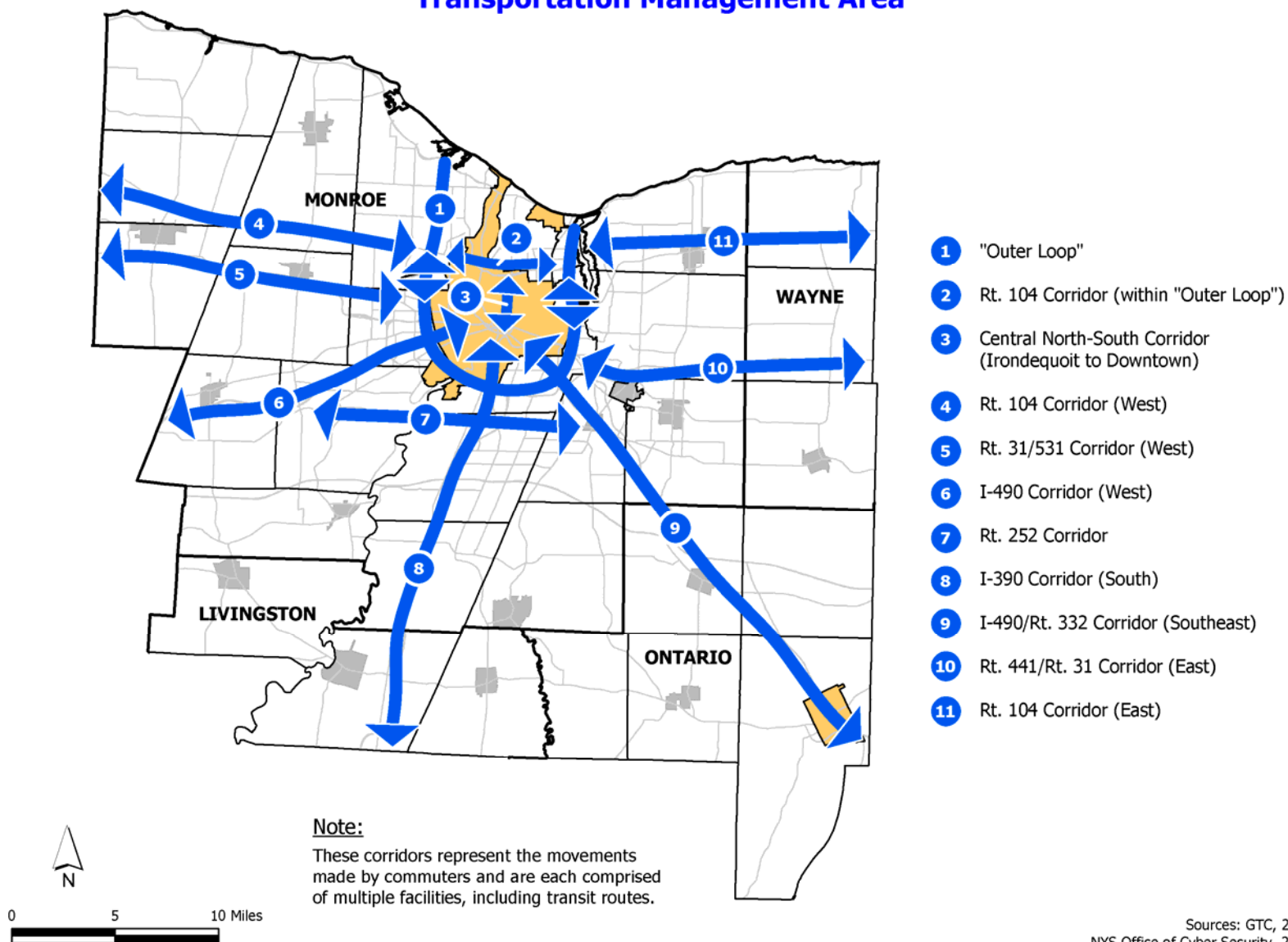
3. Non-Recurring Incident Related Delay – happens as a result of unplanned incidents such as an automobile crash or a severe weather event. This type of delay can occur anywhere on the transportation system, but is most likely to happen when an incident occurs on an already busy highway. According to the Texas Transportation Institute, incidents are estimated to cause between 52 and 58 percent of delay in all urban areas. Non-Recurring Incident Related Delay can be reduced through improved incident management such as quicker detection, response, and clearance times, as well as by using traveler information systems to help drivers avoid the incident scene altogether.

In 2007, GTC began collecting travel times on major roadways in the Rochester TMA using the “floating car” technique, which employs Global Positioning System-equipped vehicles that main-

TRANSPORTATION SYSTEM

Commuter Corridors in the Rochester Transportation Management Area

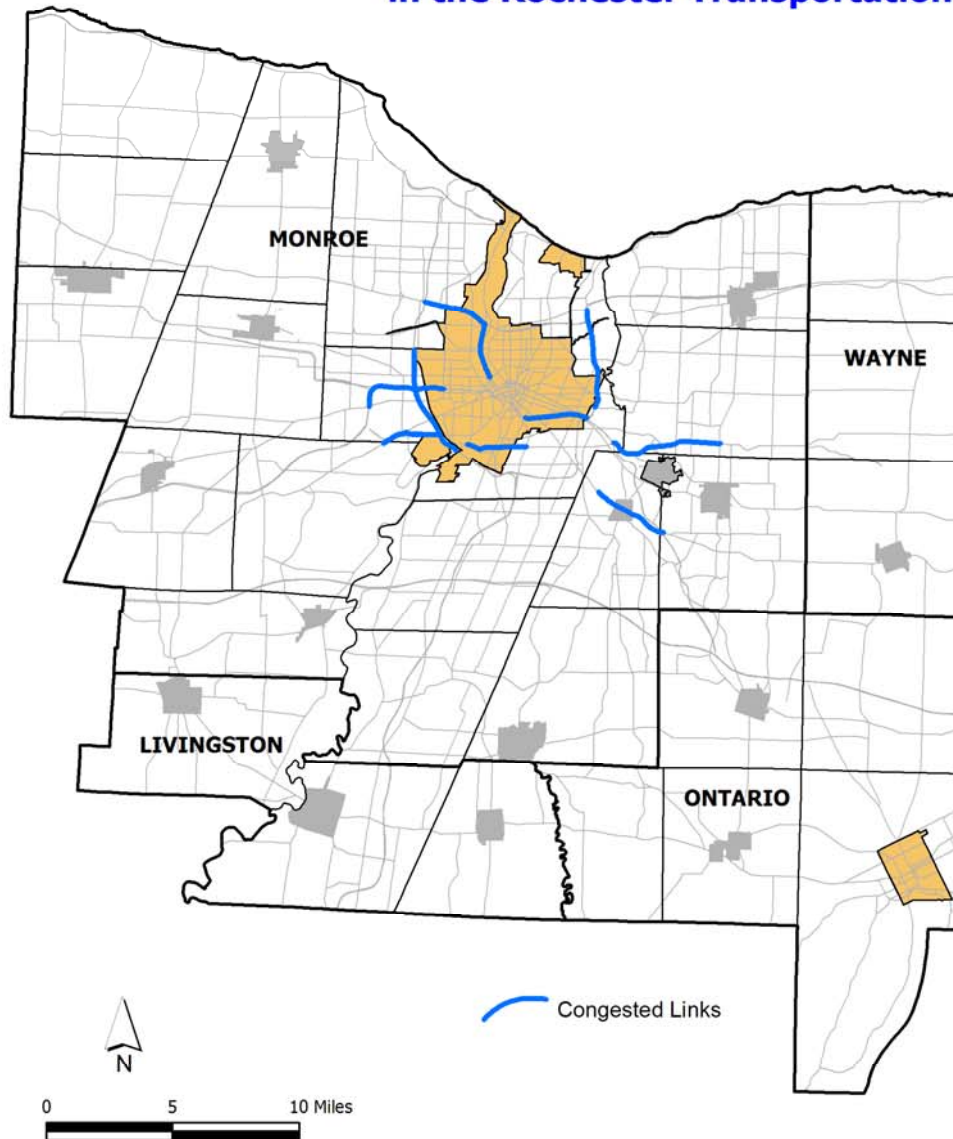
Map 15



TRANSPORTATION SYSTEM

Congested Links in the Morning Peak Period in the Rochester Transportation Management Area

Map 16



Congested Links (Travel Time Index ≥ 1.3)

Principal Arterials

I-390 - Southbound from Exit 22, Lexington Ave to Exit 17, Scottsville Rd.
 I-490 - Eastbound from Exit 7, Buffalo Rd. to Exit 10, Mount Read Blvd.
 I-490 - Westbound from I-590 Split to Exit 17, South Goodman St.
 I-590 - Southbound from Exit 11, East Ridge Rd. to Exit 6, Blossom Rd.
 Lake Ave. - Southbound from NYS Rt. 104 / West Ridge Rd. to Lyell Ave.
 NYS Route 104 - Eastbound from I-390 to Lake Ave., Rochester
 NYS Route 204 / Chili Ave. / Brooks Ave. - Eastbound from I-490 to I-390
 NYS Route 204 / Chili Ave. / Brooks Ave. - Westbound from I-390 to I-490
 NYS Route 441 - Westbound from NYS Rt. 250 to I-490

Minor Arterials & Collectors

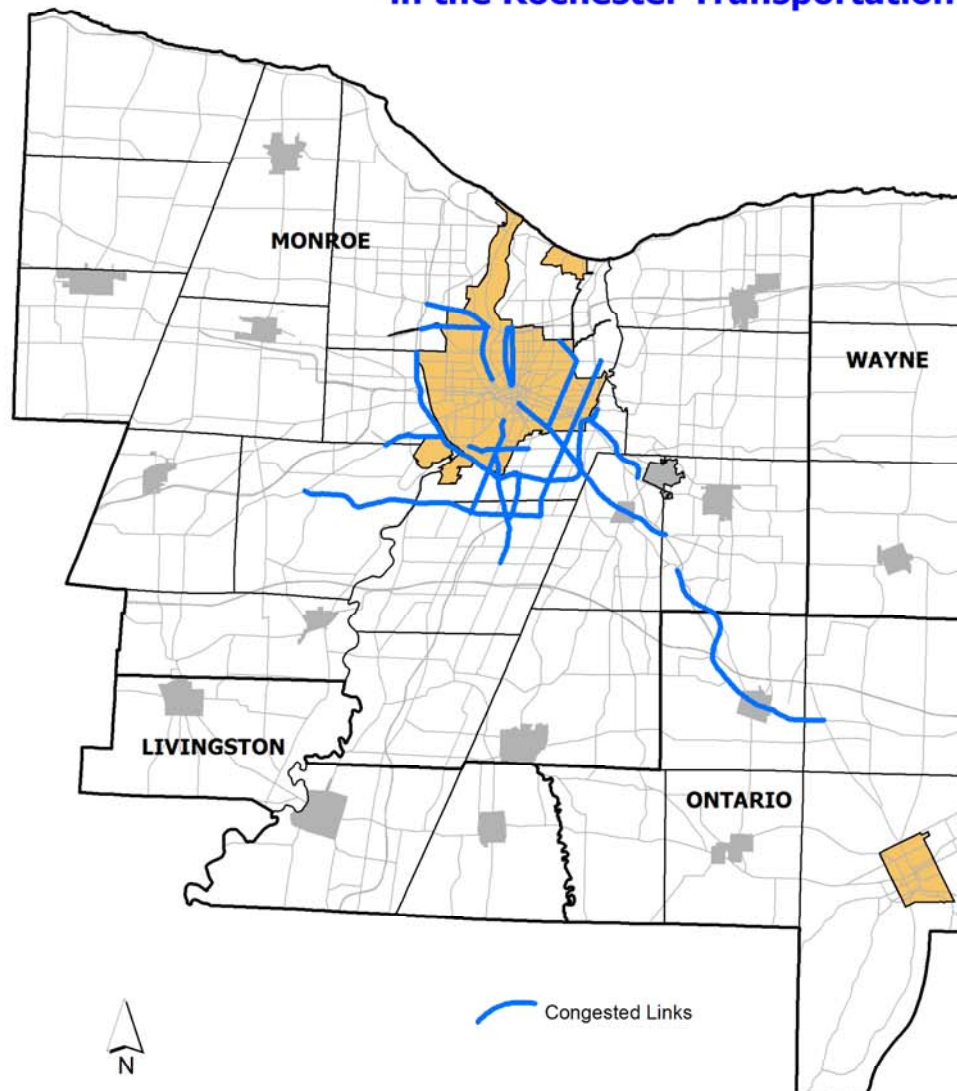
Elmwood Ave. - Westbound from Clinton Ave. to NYS Route 383
 NYS Route 31 - Westbound from I-490, Exit 26 to French Rd.

Sources: GTC, 2008 & 2010
 NYS Office of Cyber Security, 2010

TRANSPORTATION SYSTEM

Congested Links in the Evening Peak Period in the Rochester Transportation Management Area

Map 17



Congested Links (Travel Time Index ≥ 1.3)

Principal Arterials

I-390 - Northbound from Exit 14, NYS Route 15A to Exit 17, Scottsville Rd.
I-390 - Northbound from Exit 17, Scottsville Rd. to Exit 22, Lexington Ave.
I-490 - Westbound from Exit 24, E. Rochester to I-590 Exit 6, Blossom Rd.
I-590 - Northbound from I-390 Split to Exit 6, Blossom Rd.
Lake Ave. - Northbound from Lyell Ave. to NYS Rt. 104 / West Ridge Rd.
NYS Route 104 - Westbound from Lake Ave., Rochester to I-390
NYS Route 15 - Southbound from Ford St. to Westfall Rd.
NYS Route 15 - Southbound from Westfall Rd. to NYS Route 252
NYS Route 204 / Chili Ave. / Brooks Ave. - Westbound from I-390 to I-490
NYS Route 252 - Westbound from Hylan Dr. to Scottsville Rd.
NYS Route 252 - Westbound from Winton Rd. to Hylan Dr.
South Winton Rd. - Southbound from I-590 to NYS Rt. 252
South Winton Rd. - Northbound from NYS Rt. 252 to I-590

Minor Arterials & Collectors

Culver Rd. / Waring Rd. - Northbound from Monroe Ave. to Norton St.
Elmwood Ave. - Westbound from Clinton Ave. to NYS Rt. 383
Joseph Ave. / Seneca Ave. - Northbound from Clinton Ave. to E. Ridge Rd.
NYS Route 31 - Westbound from Highland Ave. to Inner Loop
NYS Route 31 - Eastbound from Inner Loop to Elmwood Ave.
NYS Route 31 - Westbound from Elmwood Ave. to Inner Loop
NYS Route 31 - Eastbound from Elmwood Ave. to French Rd.
NYS Route 31 - Westbound from French Rd. to Elmwood Ave.
NYS Route 31 - Eastbound from French Rd. to I-490, Exit 26
NYS Route 31 - Westbound from I-490, Exit 26 to French Rd.
North Clinton Ave. - Northbound from Inner Loop to East Ridge Rd.
NYS Route 15A - Southbound from Mt. Hope Ave. to NYS Rt. 253
NYS Route 252 - Westbound from NYS Rt. 383 to Chili Ave.
NYS Route 96 - Eastbound from I-490, Bushnells Basin to I-490, Victor
NYS Route 96 - Westbound from I-490, Victor to I-490, Bushnells Basin
NYS Route 96 - Eastbound from I-490, Victor to NYS Rt. 332
Ridgeway Ave. - Eastbound from Latona Rd. to NYS Rt. 104
Winton Rd. - Northbound from I-590 to East Ave.
Winton Rd. - Southbound from NYS Rt. 404 to East Ave.

Sources: GTC, 2008 & 2010
NYS Office of Cyber Security, 2010

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tain the position of an average vehicle in traffic (i.e., pass as many vehicles as pass the floating car). The real-world information that is collected as part of the Travel Time Data Collection Program is used to produce a Travel Time Index as measured by the ratio of the travel time during the peak period to the time required to make the same trip at free-flow speeds (mid-day period). For the purposes of the GTC Congestion Management Process, congested links that experience Recurring Capacity Related Delay are those that have a Travel Time index of 1.3 or greater, indicating that a trip takes one-third more time or longer to complete during the peak period than in the mid-day period. Maps 16 and 17 present links on major roadways within the Rochester TMA that have a Travel Time Index of 1.3 or greater. All of these links correspond to specific facilities included in the Commuter Corridors.

To address Planned Event Related Delay, locations of events that will result in delay that would not otherwise occur are identified. These include programmed construction work that will reduce roadway capacity and require maintenance of traffic and safety plans. Other planned events occur at the region's theaters, performing arts centers, sports facilities, and convention centers, several of which have allowable capacities that exceed 10,000 persons with the largest being Darien Lakes Performing Arts Center at 21,600.

Locations that experience the greatest amount of Non-Recurring Incident Related Delay are those where volumes relative to the capacity of the roadway is nearing Recurring Capacity Related Delay and are more likely than other locations to experience crashes or other types of incidents that reduce the capacity of the roadway. The only location that is likely to be subject to Non-Recurring Incident Related Delay in the region outside of the Rochester TMA is located in the City of Batavia where NYS Routes 5, 33, 63, and 98 are in close proximity to each other in the heart of the City's central business district.

The GTC Congestion Mitigation Toolbox, ranging from constructing new highways to building and operating commuter rail, has been updated as part of the *LRTP 2035*. An evaluation of the benefits and costs of the strategies included in it relative to the guiding principles (discussed later) and the transportation needs of the region through 2035 (discussed previously) was conducted. Based on this evaluation, those mitigation strategies that are considered reasonable in the Genesee-Finger Lakes Region for each type of congestion are presented in Exhibit 18.



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Exhibit 18

Congestion Mitigation Strategies

Recurring Capacity Related	Planned Event Related	Non-Recurring Incident Related
Supply-Driven Strategies		
Intersection/Interchange Improvements	Parking Management	Incident Management
Traffic Signal Improvements	Traffic Signal Improvements	Traffic Signal Improvements
Multi-Modal Traveler Information Systems	Multi-Modal Traveler Information Systems	Multi-Modal Traveler Information Systems
Roadway Monitoring and Management	Roadway Monitoring and Management	Roadway Surveillance and Management
Parking Management	Traffic Enforcement	Traffic Enforcement
Access Management	Reversible Traffic Lanes	Work Zone Management
Expanded Bicycle and Pedestrian Networks	Temporary Turn Prohibitions	Temporary Turn Prohibitions
Expanded Public Transportation Services	Work Zone Management	Safety Awareness Programs
Transit Signal Prioritization		
Demand-Driven Strategies		
Promotion of public transportation/bicycling/walking	Promotion of public transportation/bicycling/walking	
Transit-Supportive Development		
Alternative Hours to Travel		
Alternative Workplace Locations		



TRANSPORTATION SYSTEM

Safety

The popular phrase to describe an incident involving a motor vehicle that results in physical harm or property damage is that it “was an accident”. However, many of these incidents are anything but accidental. They result from unsafe behavior such as operating a vehicle under the influence of alcohol or drugs or driving while texting or talking on a mobile phone. As such, these incidents are better termed by what they result in: crashes.

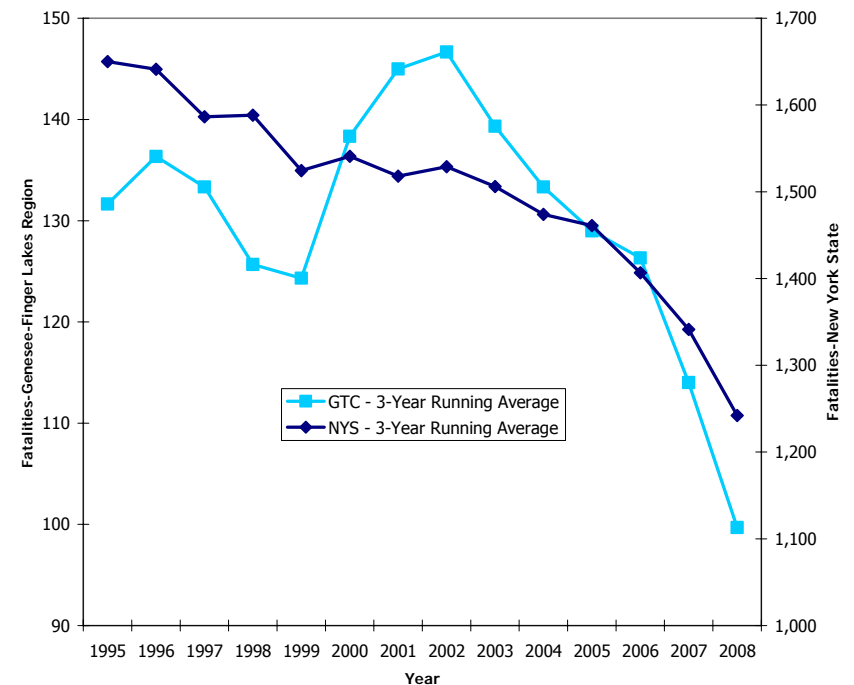
The New York State Governor’s Traffic Safety Committee (GTSC) reports that in 2007, crashes in the Genesee-Finger Lakes Region resulted in 131 fatalities, 11,010 injuries, and 17,523 instances of property damage. Beyond the immense physical harm and emotional toll that results from crashes, the American Automobile Association estimates that the cost of crashes that resulted in fatalities in the Rochester Urban Area exceeded \$300 million in 2005, not including property damage costs. In an effort to address the staggering human and financial costs that result from crashes, safety has and continues to be the primary consideration in the regional transportation planning process.

Due to efforts to improve vehicle and highway design as well as influence human behavior, the fatality rate per vehicle miles traveled in the United States has been declining for several decades and reached an all-time low in 2008. To identify the long-term trend and account for unusual variations in a single year, fatalities resulting from motor vehicle crashes in the region and in New York State were analyzed using a three-year rolling average. As presented in Exhibit 19, there has been a marked decrease in the number of fatalities resulting from motor vehicle crashes regionally and statewide, mirroring the national trend.

Human behavior including consumption of alcohol, excessive speed, and driver distraction is a contributing factor in many crashes and can be addressed by a variety of countermeasures,

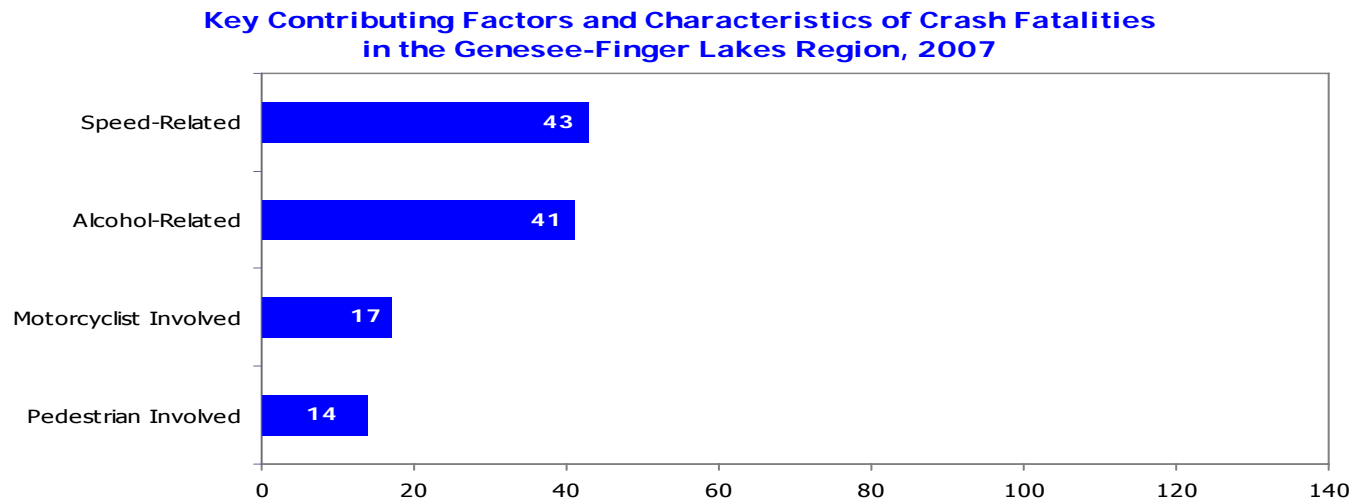
Exhibit 19

Three-Year Running Average of Fatalities Resulting from Motor Vehicle Crashes in the Genesee-Finger Lakes Region and New York State, 1995 through 2008



primarily relevant laws and associated enforcement. Attempts to discourage these unsafe behaviors are extremely important to improving traffic safety. Distracted driving has caught the attention of the public and lawmakers over the past few years. While a significant amount of recent media attention has focused on younger drivers, recent research by the Pew Center indicates that nearly half of all adults have sent or read a text message while driving compared to approximately one-third of 16 and 17 year olds. The key factors contributing to and characteristics of crash fatalities in the region in 2007 are presented in Exhibit 20. The New York State Highway Safety Strategic Plan (HSSP), prepared by the GTSC and submitted to the National Highway Traffic Safety Administration (NHTSA), articulates the state’s traffic

Exhibit 20



Source: NYS Governor's Traffic Safety Committee. 2010

safety priorities at both the state and local level and the state's performance-based plan for achieving its goals. The 2011 HSSP identifies nine emphasis areas including improving the safety of younger and older drivers, commercial vehicle operators, motorcyclists, pedestrians and bicyclists and improvements to New York's traffic records systems. The HSSP also describes existing programs intended to increase seat belt and child restraint use and reduce dangerous driving behaviors, including impaired driving and speeding. The HSSP guides the implementation of the State and Community Highway Safety Grant Program (Section 402) focusing on programmatic countermeasures. In New York State, the GTSC administers the Section 402 funds on behalf of NHTSA.

The statewide Strategic Highway Safety Plan (SHSP) prepared by NYSDOT and submitted to FHWA is intended to promote best practices and strategies that, if implemented, could have a substantial impact on reducing fatal and injury crashes. The 2010 SHSP identifies seven emphasis areas driver behavior, pedestri-

ans, large trucks, motorcycles, highways, emergency medical services, and traffic safety information systems. The SHSP is intended to guide the implementation of the Highway Safety Improvement Program (HSIP) and its associated funding which is intended for transportation planning and infrastructure improvements. In New York State, NYSDOT administers the HSIP on behalf of FHWA.

The HSSP and SHSP address programmatic and infrastructure-based improvements to highway safety, respectively. They share the common goal of improving highway safety and recognize the need for a balanced approach to that goal. GTC programs and activities are intended to advance both plans through complimentary infrastructure- and program-based countermeasures.



TRANSPORTATION SYSTEM

Security

The Genesee-Finger Lakes Region is fortunate to not be prone to natural disasters such as major earthquakes, hurricanes, tornados, and sustained heavy flooding. However, blizzards, ice storms, and minor flooding are natural disasters for which the region should increase its ability to cope with when they occur. In addition, acts of terrorism could be aimed at incurring loss of life and property via the transportation system or requiring it to serve non-traditional purposes such as the dispensing of vaccines or as a means for evacuation. The *L RTP 2035* supports and is consistent with emergency and evacuation management plans, some of which are publicly available.

Transportation Needs

The transportation needs of the region through 2035 have been identified based on an evaluation of how the existing transportation system (including projects programmed in the current Transportation Improvement Program, which represent committed investments of federal transportation funds in the Rochester TMA through October 1, 2013) will perform in the “Familiar Tomorrow” and “Changing Landscape” scenarios.

Overall, it is anticipated that there is and will be significant capacity on the region’s highway and bridge network to support not only the increased activity resulting from the growth in population and employment within the region but also a greater volume of trips that both begin and end outside of the region (i.e., through trips), including freight movements by truck. Delay resulting from congestion is expected to increase slightly in the morning and evening peak periods, with the vast majority of it happening in the general vicinity of where it is currently occurring.

Fixed-route public transportation service is provided in every county in the region with the exception of Yates County. The

highest level of service is provided in the City of Rochester and along key commuter corridors in the Mature Suburban places and, to a lesser extent, in most Recent/Emerging Suburban places. Expanding public transportation service – either increasing the frequency of existing service or adding new service – requires, at a minimum, additional vehicles (i.e., an increased fleet), labor to operate and service the vehicles, and facilities to store and maintain (e.g., repair, wash, etc.) them. Based on variation in the density of development across the region, not all places can reasonably support expanded public transportation services. Providing convenient and reliable service in those places that can best support it allows individuals to make the choice to reside near and use fixed-route public transportation where it can be a viable travel option.

Analyses of bicycle and pedestrian demand based on population density and employment density were conducted and compared to the bicycle suitability ratings and pedestrian facilities inventory, respectively. Based on these analyses, there are significant opportunities to expand and enhance mobility, access, and connectivity for bicyclists and pedestrians. It is important to note that the needs of bicyclists and pedestrians differ. Bicycles provide greater range and the ability to traverse much longer distances than by walking. Pedestrians, which include those who use assistive devices, rely on their ability to walk safely to meet employment and domestic obligations.

Development that complements rather than detracts from meeting these needs, as enabled by local land use regulations and building permits that incorporate transportation considerations, will ensure that the safety, mobility, and access needs of the region can be met now and in the future.

TRANSPORTATION SYSTEM

The identified transportation needs of the region through 2035 are discussed below.

Increase Safety for All Users

Regardless of age, physical ability, or the mode chosen, all users of the regional transportation system need to be assured that they can travel with as minimal risk as possible. Like all transportation needs they vary by place – pedestrian safety needs are more prevalent in the Urban Cores and Rural Centers than other places just as the need for agricultural equipment to traverse public roads safely is and will remain primarily applicable to Rural Places.

Preserve and Maintain Existing Infrastructure and Services

Just as with safety, the preservation and maintenance of the existing infrastructure and services that comprise the regional transportation system is a primary need of all regional users and, therefore, all places in the region. Highways, bridges, buses, trails, and sidewalks should, at a minimum, continue to serve residents, businesses, and institutions in a safe, efficient, and reliable manner. While this will be a challenge given deterioration of existing infrastructure and vehicles relative to reasonably expected revenues, it is a challenge that must be met by transportation agencies and organizations at all levels.

Improve Mobility for Automobiles

As noted in the Emerging Issues, the primary means of travel is anticipated to continue to be cars, trucks, and buses. Accordingly, improving the mobility of automobiles through operational improvements that incorporate better design and fuller use of technology will be a primary transportation need for persons, firms, and institutions. This balance will be different based on place but improved mobility for automobiles will be most needed

in the Recent/Emerging Suburban, Rural, Employment Centers, Regional and Sub-Regional Retail, Medical/Health, and Airport places of the region. This need (if properly planned, designed, and implemented) can and should be met through improvements that also enhance and expand mobility for bicyclists.

Increase Frequency of Existing Public Transportation Service

Public transportation service is reasonably available to many of the region's residents, including those in rural areas. Nearly all City of Rochester residents are within one-quarter mile of an RTS bus route and RTS provides service in the commuter corridors of the Rochester TMA, which includes Mature Suburban and most Recent/Emerging Suburban places, as well as some Rural Places in Monroe, Livingston, Ontario, and Wayne counties. A reasonable improvement to public transportation in the Regional Urban Core, Sub-Regional Urban Cores, Mature Suburban, Employment Centers, Medical/Health, Higher Education, and Airport places will consist of increasing the frequency of existing service as opposed to adding new service.

Add New Public Transportation Service

Expanding fixed-route public transportation service represents less of an overall need than increasing the frequency of existing service but is still an identified need over the next nearly 25 years. Specifically, increased public transportation service to the Employment Centers and Medical/Health places should be considered first and foremost. Expansion should be tied to investments from those entities that will gain from the additional service, reflecting the need for all sectors to contribute in a manner relative to the respective benefit obtained.



TRANSPORTATION SYSTEM

Enhance and Expand Mobility and Access for Bicyclists

Too often transportation planning combines bicyclists and pedestrians due to the fact that neither utilizes a vehicle (i.e., cars or buses). However, the differences in mobility, as measured by the distances able to be traveled, are distinct. Improving conditions for bicyclists provides different (but not necessarily better) opportunities than doing the same for persons who walk. At the same time, both require access – specifically in the Regional and Sub-Regional Urban Cores, Mature Suburbs, Rural Centers, Employment Centers, Local Retail, and Higher Education places. There is a regional need to improve the conditions that facilitate bicycling as an active transportation mode.

Enhance and Expand Connectivity and Access for Pedestrians

All trips begin and end via walking; whether it is to or from private or public vehicles or as the lone mode of travel. Further, these beginning and ending segments are particularly important to persons with disabilities and pedestrian facilities that serve these individuals are vital because they can be used by all persons. There is a particular need to enhance and expand connectivity and access for pedestrians in Regional and Sub-Regional Urban Cores, Mature Suburbs, Rural Centers, Employment Centers, Local Retail, and Higher Education places. However, all places will benefit from improved pedestrian facilities which would promote walking as a form of active transportation.

Expand Connectivity and Access for Freight

Taking full advantage of the region's position in the larger mega-region is dependent on the ability of raw materials, intermediate inputs, and finished goods to be able to be delivered from and transported to domestic and international markets. Connectivity and access for freight transported by truck, rail, air, and water is identified as a primary economic need for the region now and in the future. This need is critical to the economic

development of the region given the importance of manufacturing and agriculture in Rural, Employment Centers, Regional Retail, and Airport places.

Explore Enhanced Parking Management Options

Better managing parking allows the existing supply to be better utilized, increasing capacity and ensuring that businesses can accommodate customers conveniently. This enhanced management can result in reduced need for additional physical space to be committed to parking for automobiles. The need for improved parking management is and will continue to be most prevalent in the Regional Urban Core (including the Port of Rochester), Employment Centers, Regional Retail, Higher Education, and Airport Places. In addition, secure parking for bicycles such as lockers and racks (as well as the addition of other appurtenances such as showers/changing areas) are also needed in these places. In addition, the additional amount of freight projected to be moved to, from, within, and through the region will require that parking for trucks be monitored to ensure sufficient space for these vehicles in an environmentally-friendly manner.

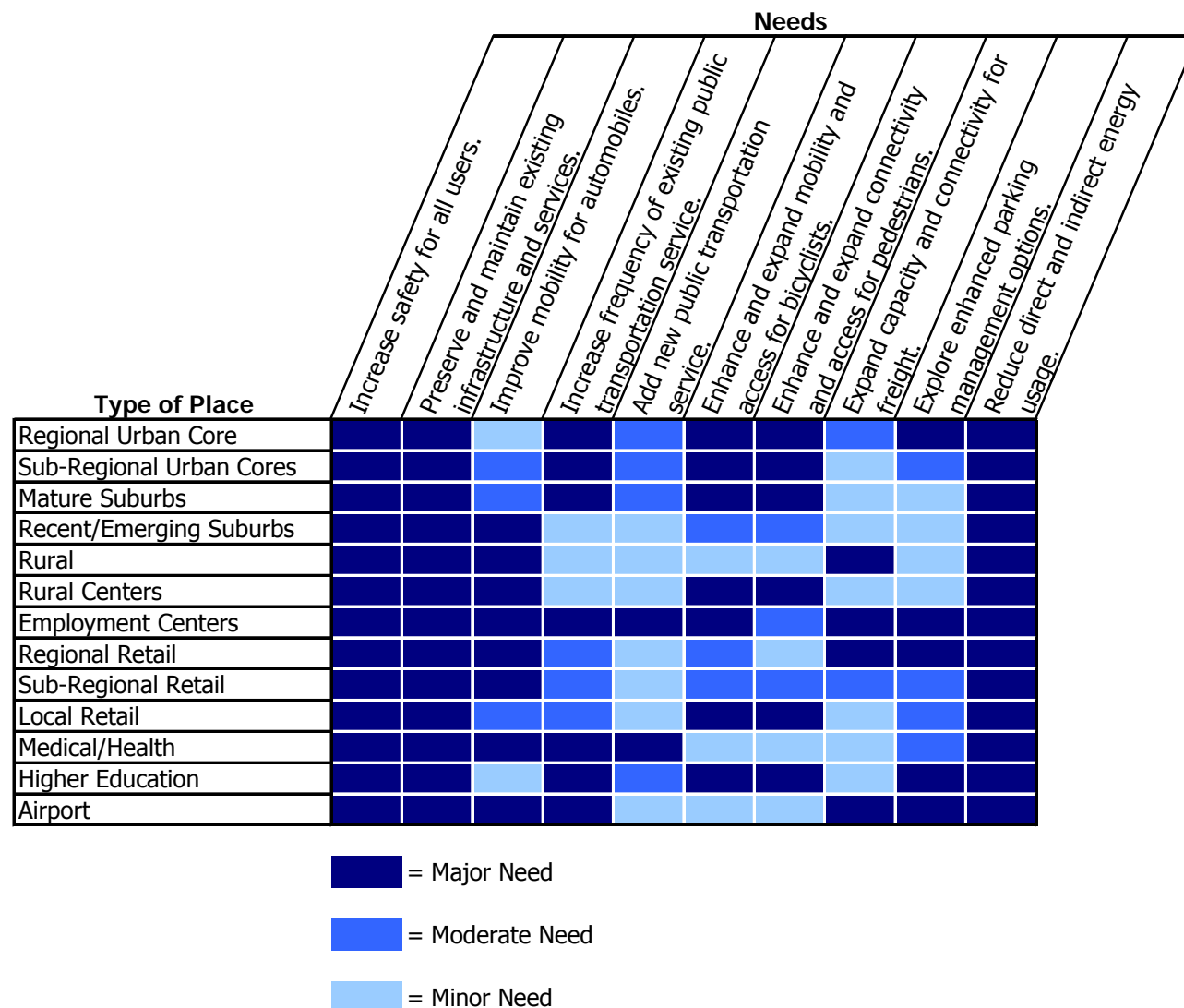
Reduce Direct and Indirect Energy Usage

Providing opportunities to reduce the amount of energy consumed in the use and construction of transportation facilities and services can reduce dependence on foreign oil and decrease harmful fossil fuel and GHG emissions. Actions to reduce energy usage can address both national security and environmental concerns (including mitigating climate change) by finding a common ground that addresses the other transportation needs of the region. The operation of vehicles through sources other than petroleum-based fuels and increases in the opportunity to complete trips by public transportation, bicycling, and walking will address this need to the extent possible given limited fiscal resources.



TRANSPORTATION SYSTEM

Exhibit 21 Transportation Needs by Place in the Genesee-Finger Lakes Region through 2035



Per the guiding principles of the *LRTP 2035*, the transportation needs of the region's residents, businesses, and institutions vary and will continue to do so based on where they are located; their place in the larger community. The relative priority of each of the needs discussed above by place is presented in Exhibit 21.

Combined with the reasonably expected revenues discussed next in the Financial Plan element, these needs and their priority by type of place serve as the basis for the recommendations of the *LRTP 2035*.



Chapter V - FINANCIAL PLAN

Financial Plan

Federal requirements mandate that the *LRTP 2035* include a financial plan that demonstrates how the recommendations can be implemented based on system-level estimates of costs and reasonably expected revenues. Further, both costs and revenues must be expressed in year of expenditure (YOE) dollars to accurately account for the anticipated revenues available to the region and the costs of materials and labor to implement projects through 2035. These fiscal constraint requirements are critical to ensuring that the *LRTP 2035* is credible and provides realistic expectations of what can be accomplished; not simply a wish list that has little to no chance of being advanced.

The *2011-2014 Transportation Improvement Program (2011-2014 TIP)* was adopted by GTC on June 17, 2010 and meets the same fiscal constraint requirements as the *LRTP 2035*. The revenues used to develop the *2011-2014 TIP* and the costs of projects included in it represent the full commitment of federal surface transportation funds for federal fiscal years (FFY) 2011 through 2014 in YOE dollars, commencing on October 1, 2010 and ending on September 30, 2014.

Costs

The primary driver of cost increases for transportation infrastructure and services will be global demand for materials and supplies. As the economies of developing nations – including the BRIC countries (Brazil, Russia, India, and China) – continue to expand, their corresponding investment in infrastructure plays a major role in determining global prices for oil, steel, concrete, and other materials. The future outlook for these economies is that they will continue to grow at a faster rate than the United States and the Eurozone albeit more slowly than prior to the Great Recession.

Two separate data sources were utilized to estimate the escalation in prices of materials and labor through 2035. Initially, a straight line projection of the change in a weighted average of the Bureau of Labor Statistics' (BLS) Producer Price Index (PPI) for Materials and Supply Inputs to Highway and Street Construction from 1986 to 2010 and Consumer Price Index for Northeast Urban Consumers – Size Class B/C (between 50,000 and 1.5 million residents) from 1996 to 2010 was calculated. The average annual increase of 4.07 percent was applied to the years 2011 through 2035 using 2010 as the base year to create the first dataset.

The second source of data used to estimate future inflation in transportation costs was obtained from NYSDOT. NYSDOT purchases highway contract cost index special tabulations from IHS Global Insight. These tabulations are one of several inputs into the escalation factors used by NYSDOT in preparing cost estimates for future projects. The IHS Global Insight tabulations include three weighted indices of future materials and labor: baseline, trend, and business cycle.

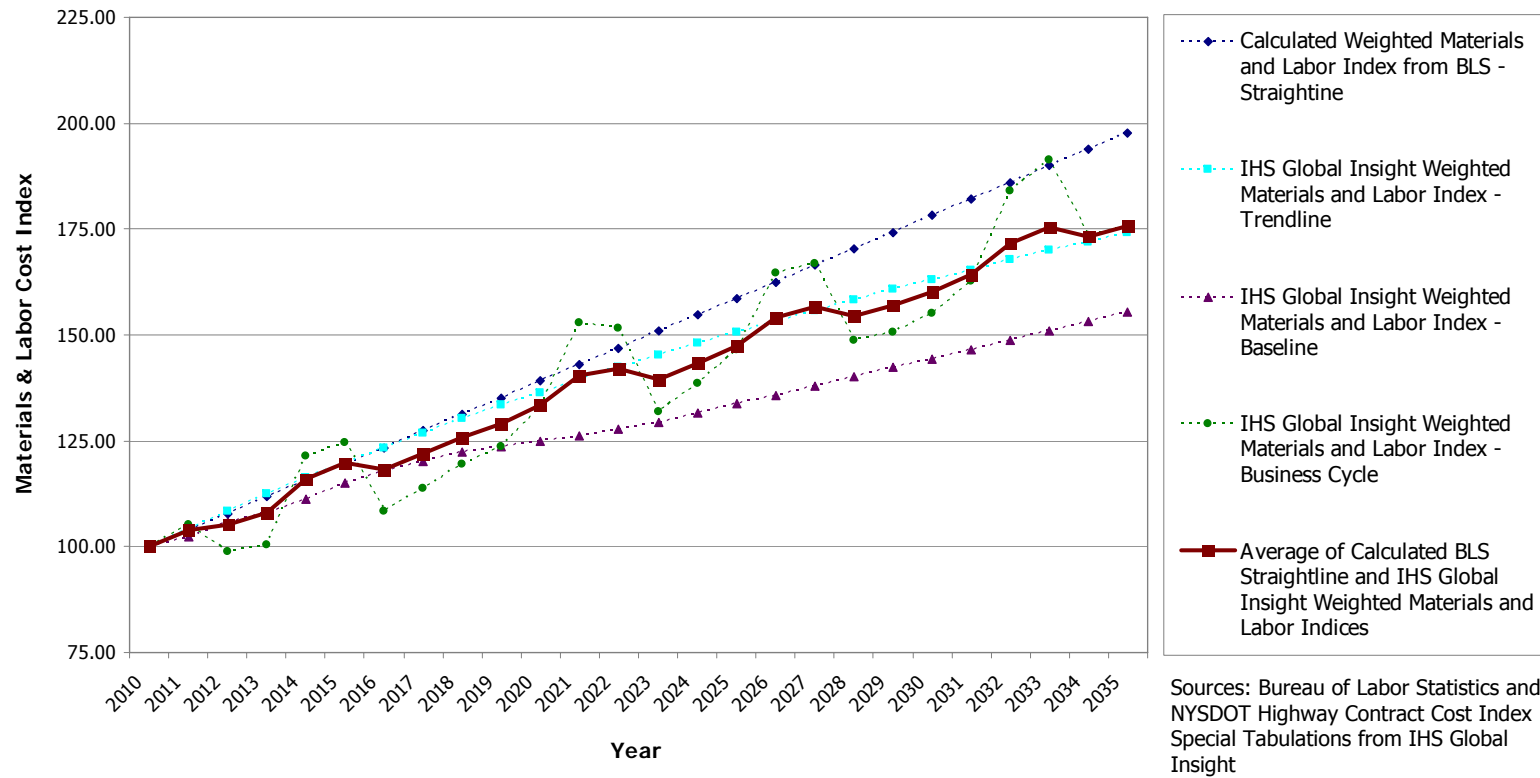
Given the uncertainty over such a long time period and the unique advantages and disadvantages of using various historical trends and future projections, the annual increase in costs over the next nearly 25 years is estimated to be the average of all four indices – 3.2 percent. Exhibit 22 presents the rate of change for the various indices (displayed as broken lines) as well as the average (displayed as the solid line) that is being used to escalate current costs to YOE dollars.



FINANCIAL PLAN

Exhibit 22

Transportation Materials and Labor Indices, 2010 through 2035



Revenues

There is just as, if not more, uncertainty regarding the availability of future revenues for transportation projects and programs in the region through 2035. The last multi-year surface transportation legislation, SAFETEA-LU, which authorizes funding for highway and transit programs expired on September 30, 2009 and has been extended multiple times. Successor legislation was not enacted during the development of the *L RTP 2035*.

The vast majority of taxes collected on the sale of motor fuels (e.g., gasoline, diesel, etc.) are deposited into the Highway Trust Fund (HTF), with a small amount (.01 cents) going to the Leaking Underground Storage Tank Trust Fund. The HTF via its Highway Account and Mass Transit Account is the primary source of revenues for federally-funded surface transportation programs. The major formula-based programs funded through the HTF that are apportioned by legislated formulas include:

FHWA Programs

- Highway Bridge
- Interstate Maintenance
- National Highway System
- Surface Transportation (Flex, Large Urban, Small Urban, and Rural)
- Highway Safety Improvement
- Congestion Mitigation and Air Quality Improvement
- Transportation Enhancements
- Safe Routes to School

FTA Programs

- Urbanized Areas
- Elderly Persons and Persons with Disabilities
- Other than Urbanized Area
- Job Access and Reverse Commute
- New Freedom

The major reason for the delay in enacting a successor to SAFETEA-LU has been how to pay for federal surface transportation programs. The HTF is no longer the reliable source of revenue that it has been in the past. The federal excise taxes on the major motor fuels of gasoline (18.4 cents per gallon) and diesel (24.4 cents per gallon) have not been raised since 1993. Materials and labor have increased appreciably since that time, eroding the purchasing power of the HTF. In addition, requirements for increased fuel efficiency for new vehicles mean that increases in driving are resulting in increased wear and tear on transportation infrastructure but less revenue for improvements on a vehicle miles traveled basis. The *L RTP 2035* fully presumes that the HTF will be replaced with a new user fee (potentially, a graduated vehicle miles travelled tax charge based on impact to infrastructure) or that federal transportation revenues will be derived from some other means.

Discussions on the structure of federal highway and transit programs in the successor to SAFETEA-LU are also taking place. Most of these discussions include the consolidation of programs around major initiatives that serve national interests. Inherent in these discussions is the need to provide more funding to and flexibility in what projects and programs are advanced with federal funds while requiring a higher degree of accountability regarding outcomes (e.g., the structural condition of infrastructure, performance of public transportation services, etc.).

To estimate reasonably expected federal revenues in YOE dollars, the percent increase from TEA-21 (the predecessor authorization legislation) to SAFETEA-LU – inclusive of extensions to both – for the formula-based programs listed previously were determined and applied to the amounts allocated to the GTC TIP area in six-year increments. There is speculation that the successor to SAFETEA-LU will be a standard six-year authorization that will be enacted in 2013 (i.e., FFY 2013 through FFY 2018).



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Since the current TIP (*2011-2014 TIP*) represents the commitment of federal funds through FFY 2014, it is assumed that only funds authorized in FFYs 2015 through 2018 will be available for new projects.

The GTC TIP area includes the counties of Genesee, Livingston, Monroe, Ontario, Orleans, Wayne, and Wyoming. Federal funds programmed in Seneca and Yates counties are determined by the New York State Department of Transportation and not included in this analysis as it is not anticipated that GTC will be involved in these deliberations.

Even at these increased levels, the United States will continue to significantly lag the investment in transportation that emerging nations are projected to make as measured by percent of gross domestic product (GDP). China is currently investing upwards of 10 percent of its GDP in infrastructure and India is investing approximately five percent. The United States is currently investing less than two percent across all levels of government. The disparity in GDP between the United States and China is shrinking with (according to some sources) the Chinese economy expected to surpass that of the United States as the largest in the world sometime between 2016 and 2022.

The ability to move workers and freight in a safe, efficient, and reliable manner is crucial to economic productivity and competitiveness in the global marketplace. Accordingly, the increases in reasonably expected federal surface transportation revenues during the time period covered by the *LRTP 2035* are deemed appropriate given the recognition by policymakers of the importance of transportation infrastructure and services to the economic vitality of the nation.

To account for the uncertainty in the composition of federal transportation funding programs (including the potential consoli-

dation of existing programs), reasonably expected future revenues were combined to create the following categories:

- Highway and Bridge – includes the FHWA Highway Bridge, Interstate Maintenance, National Highway System, and Surface Transportation programs
- General Public Transportation – includes the FTA Urbanized Area (Section 5307) and Other than Urbanized Area (Section 5311) programs
- Human Service Public Transportation – includes the FTA Elderly Persons and Persons with Disabilities (Section 5310), Job Access and Reverse Commute (Section 5316), and New Freedom (Section 5317) programs
- Flexible – includes the FHWA Congestion Mitigation and Air Quality, Transportation Enhancements, and Safe Routes to School programs

Programs that are not apportioned by legislated formula are discretionary and typically allocated by Congress. These non-recurring revenues include earmarks and are not included in the estimates of reasonably expected revenues given the uncertainty of their availability over the period covered by the *LRTP 2035*.

In addition, states have the ability to transfer funds among apportioned programs (e.g., a state may transfer up to 50 percent of its National Highway System program funds to the Interstate Maintenance, Surface Transportation, Highway Bridge, Congestion Mitigation and Air Quality Improvement, and/or Highway Safety Improvement programs). New York State has never availed itself of these transferability options but the combined categories used in the *LRTP 2035* do account for the continued availability of these provisions.

Apportioned federal programs (i.e., those distributed by legislated formula) typically require a non-federal match of 20 per-

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cent of the total project cost – current exceptions include the FHWA Interstate Maintenance and Highway Safety Improvement programs, which require a 10 percent non-federal match, and the FTA Job Access and Reverse Commute and New Freedom programs, which require a 20 percent match for capital expenses and a 50 percent match for operating expenses. Non-federal revenue sources include those provided by state and local governments and authorities that are generated by taxes, fees, tolls, and fares.

The projections of reasonably expected federal revenues in YOE dollars by the combined categories discussed above by anticipated federal authorization legislations through 2035 are presented in Exhibit 23.

Nearly all of the federal-aid-eligible transportation system in the GTC TIP area is owned, operated, and maintained by state, regional, county, and city departments and authorities – all of whom are members of GTC. As an example, 95 percent of the 1,484 bridges in the GTC TIP area are under the jurisdiction of GTC member agencies. Each of these agencies makes substan-

tial investments in the regional transportation system with non-federal revenues complementing the federal highway or transit funding available to the region.

NYSTA does not receive any federal funding for the approximately 75-mile portion of Interstate 90 that crosses the GTC TIP area. Because this portion of the NYS Thruway is tolled, federal legislation requires an agreement with USDOT for Interstate Maintenance Program funds to be programmed for projects on it.

The most significant non-federal transportation funding sources include:

- New York State Dedicated Highway and Bridge Trust Fund – This is the primary source of non-federal funding that is invested in the region's federal-aid highway and bridge network. Between 2005 and 2010, more than \$200 million has been allocated for physical improvements to the highway and bridge network.

Exhibit 23

Projected Reasonably Expected Federal Aid Transportation Program in the GTC TIP Area, 2015 to 2035
(in millions of YOE dollars)

Combined Federal Aid Category	2015-2018	2019-2024	2025-2030	2031-2035	Total
Highway & Bridge	\$ 366.33	\$ 505.53	\$ 601.58	\$ 715.88	\$ 2,189.32
Public Transportation	\$ 46.31	\$ 73.81	\$ 95.73	\$ 124.16	\$ 340.01
Specialized Public Transportation	\$ 5.79	\$ 9.22	\$ 11.96	\$ 15.51	\$ 42.49
Flexible	\$ 35.07	\$ 48.39	\$ 57.58	\$ 68.53	\$ 209.56
Total Reasonably Expected Federal Aid	\$ 453.48	\$ 636.95	\$ 766.86	\$ 924.09	\$ 2,781.38
Required Non-Federal Match ¹	\$ 113.37	\$ 159.24	\$ 191.71	\$ 231.02	\$ 695.34
Total Matched Federal Aid Program	\$ 566.85	\$ 796.19	\$ 958.57	\$ 1,155.11	\$ 3,476.72



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- NYSTA Capital Program – The *2005-2011 NYSTA Capital Program* includes more than \$200 million dollars in investments in the GTC TIP area. The largest initiative is the \$150 million pavement reconstruction and bridge improvements project from the LeRoy interchange to west of the Batavia interchange, beginning in 2011. Other projects include multiple pavement and bridge repairs, preventive maintenance, and safety upgrades, as well as improvements to toll booths (including the addition of higher speed EZ Pass lanes) and travel plazas. An additional \$8.5 million is included in the program for improvements to the Erie Canal.
- State Transportation Operating Assistance (STOA) – This is the primary state funding source for public transportation operations. Operations activities are not an eligible use of FTA Urbanized Area (Section 5307) funds, requiring that these revenues be used for RTS capital purposes only. In 2010, approximately \$33 million in STOA funds were distributed to public transportation operators in the GTC TIP area, with \$30.8 million (94 percent) for RTS.

Essential non-capital maintenance and operating activities performed on the federal-aid highway and bridge network are typically paid for with local taxes and fees, additional funds from the New York State Dedicated Highway and Bridge Trust Fund, and NYSTA tolls. These activities include snow and ice removal, mowing, and road debris cleanup, which are critical to safety and community appearance.

In addition, there are needed transportation projects and operating expenses to which federal transportation revenues cannot be allocated for implementation. Counties, cities, towns, and villages typically utilize funds from the State Consolidated Local Street and Highway Improvement Program (CHIPS) for highway and bridge projects that are expected to have a useful service life of at least 10 years. In SFY 2010-2011, the seven counties in the GTC TIP area and the City of Rochester have been appor-

tioned over \$16 million dollars from the CHIPS program.

On the public transportation side, RGRTA utilizes customer fares and Mortgage Recording Tax receipts. Farebox receipts (excluding guaranteed revenues, subsidy agreements, and school tripper service) and one-quarter of one percent of the New York State tax levied on mortgage transactions in the seven counties served by RGRTA provided needed revenues for expenses that would be the equivalent to highway and bridge projects advanced with CHIPS Program funds (i.e., routine maintenance and operating activities).

Given the importance of the transportation system to the social and economic vitality of the region, it is anticipated that public agencies will maintain their current level of effort with respect to capital and operating activities through 2035 and allocate the necessary funding to accomplish this.

Beyond public funds, the only private revenue source considered reasonably expected to be available for implementing the recommendations of the *L RTP 2035* are subsidy agreements to increase the frequency of or provide new public transportation service. Subsidy agreements are a contractual arrangement between a public transportation operator and another party to cover all or a part of the cost of expanded (i.e., more frequent or new) service. Subsidy agreements between RGRTA and businesses, colleges and universities, and other parties have averaged \$3.5-\$4 million per year since SFY 06-07. While it is difficult to estimate the level of these revenues over the next nearly 25 years, the benefits of public transportation and limited additional public funds for it mean that expanded public transportation service (more frequent or new service) will likely rely on subsidy agreements.

Beyond revenues for transportation, trail maintenance activities performed by not-for-profit organizations are conducted in the region and are expected to continue at their current level or in-

crease. These in-kind contributions are vital to the multi-use trails network and reduce the need for funding for preventive maintenance, debris clearance, and general repairs to keep these facilities attractive and usable.

Additional financing mechanisms that would include the participation of the private sector and provide the opportunity to reduce costs, thereby making reasonably expected revenues available for other projects, have also been considered. Public-private partnerships have not been used to date due to the lack of enabling legislation but have the potential to stretch limited revenues from all public sources (e.g., federal, state, and local). Mechanisms that include the private sector and are considered reasonable for this region include:

- Availability Payments – These represent payment for performance to a private operator (concessionaire) based on the availability of certain characteristics that can be related to condition and performance of a single or multiple facilities (e.g., highways, bridges, etc.). Availability payments can be appropriate when a project does not generate direct revenue and service quality is more important than revenue maximization. An example in this region could be for a public agency to bundle a set of bridges and offer the opportunity for a private concessionaire to maintain and operate the bridges for a specified period of time with payments made based on performance measures including, but not limited to, structural condition of the bridge, pavement quality, and lighting provisions. If the private sector could realize efficiencies that would reduce the cost for doing so below the amount at which the public agency would require using existing transportation revenues, savings would be realized that could be used for additional transportation projects, allowing limited existing revenues to go further in improving the regional transportation system.

- Leasing – Leasing of specific facilities would be advantageous to the regional transportation system as a whole if determined to be revenue positive and the funds were guaranteed to be allocated to transportation uses. Leasing arrangements typically include fixed assets of sufficient size to attract private interest. While not being recommended, one potential transportation asset for which leasing could be an option for generating additional revenues to a local government are parking garages and meters in the City of Rochester.

In order to take advantage of public-private partnerships (including those discussed above) at the state level, New York State would need to pass the requisite enabling legislation. This legislation must include provisions that protect the public interest from safety and fiscal perspectives while attracting interest from private sector operators. Typical examples include design-build and design-bid-build arrangements, but these do little for concessionaires to maximize revenues over the entire life-cycle of a facility. Accordingly, more comprehensive public-private partnerships such as design-build-operate-maintain arrangements should be considered in any enabling legislation as well.

Currently, the only tolled highway in the region is the Thruway (the Erie Canal is the only other tolled transportation facility). Tolling (including congestion pricing) on other highways and bridges is not considered a viable revenue source or financing mechanism. The primary reason for not considering tolling is that it is typically instituted when providing additional capacity which, based on the identified needs of the region, is not expected to be necessary over the next nearly 25 years. As such, introducing tolls on existing facilities is not considered reasonable and associated revenues that would be realized are not considered in the *L RTP 2035*.

Reasonably expected non-federal transportation revenues through 2035 from the State Dedicated Highway and Bridge



FINANCIAL PLAN

Trust Fund and for State Transportation Operating Assistance were projected based on the median amount over the past several years. Given the fiscal crisis facing New York State and in an effort to be conservative, no escalation factor was applied to these revenues. This is considered appropriate given competing needs that have led to recent reductions in these programs. In the case of the State Dedicated Highway and Bridge Trust Fund, the median is the 2009 allocation which is significantly less than the amounts made available from 1999 to 2003. In 2010, State Transportation Operating Assistance was slightly less than the amounts provided in the immediately two preceding years.

While tolls comprise more than 90 percent of NYSTA revenues and travel on the Thruway has begun to increase as the economy rebounds, there are significant needs on this system outside of the GTC TIP area. Accordingly, to be conservative in projecting the availability of these funds, the annual average amount programmed in the GTC TIP area in the *2005-2011 NYSTA Capital Program* minus the major reconstruction project scheduled in Genesee County was calculated and a compounded annual growth factor of one percent was applied from 2018 through 2035.

As presented in Exhibit 24, approximately \$4.8 billion in revenues are projected to be available for federal-aid-eligible projects in the GTC TIP area through 2035. Again, non-capital maintenance and operating activities on the federal-aid system have and are expected to continue to be accomplished with other state and local funding sources.

Exhibit 24

**Projected Reasonably Expected Revenues for
Federal-Aid-Eligible Projects and Programs by Source
in the GTC TIP Area through 2035¹**
(in millions of YOE dollars)

Federal Transportation Aid Program	\$ 2,781.38
State Dedicated Highway and Bridge Program	\$ 833.93
State Transportation Operating Assistance	\$ 738.86
NYS Thruway Capital Program	\$ 405.04
Total Reasonably Expected Revenues	\$ 4,759.21

¹Does not include revenues for non-capital maintenance and operating activities on the federal-aid system.

GENESEE TRANSPORTATION COUNCIL



Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035

Chapter VI - RECOMMENDATIONS

RECOMMENDATIONS

Recommendations

The recommendations of the *LRTP 2035* represent those actions that best meet regional transportation needs and can be expected to be accomplished with the reasonably expected revenues for federal-aid-eligible projects and programs over the next nearly 25 years. Based on the amount of federal-aid-eligible projects for which funding has been solicited from GTC from 2005 through 2010, requests in the amount of \$450 million (\$75 million per year) have been unable to be funded. This represents a nearly 44 percent annual shortfall between available funding and the total amount requested. Approximately 70 percent of these unmet requests have been for projects on the *existing* highway and bridge network, representing an inability of federal transportation funding programs (as currently constituted) to address the deterioration of highways and bridges that is currently occurring.

Given this deficit between available funds and needed revenues, it is a certainty that all of the region's transportation needs will not be able to be met with the reasonably expected revenues. These recommendations are those strategies that will lead to the projects and programs that best address regional transportation needs and the emerging opportunities and issues as discussed previously and noted throughout the discussion of individual recommendations.

As discussed previously, the capacity of the highway and bridge network is currently sufficient for the needs of people and freight and is expected to be so throughout the period covered by the *LRTP 2035*. Accordingly, the need for new highways and bridges for the sole purpose of improving mobility is not warranted. Ensuring the continued structural integrity of existing facilities is paramount. Physical expansion of highway and bridge infrastructure via altogether new through lanes is discouraged. Management of both the existing system across all modes and the demand placed on it is considered the most cost-

effective means for improving mobility and access. Expansion of the system will be limited but additional investments in the public transportation and bicycle and pedestrian networks represent the best opportunities to address the needs of an aging population and improve public health through opportunities that promote active lifestyles and reduce emissions.

A risk assessment was performed to determine the opportunity costs of various investment scenarios. The assessment considered what would and would not be able to be accomplished by allocating the reasonably expected federal funds through 2035 to various modes given upfront capital costs and lifecycle operating and maintenance costs. Specific considerations included investing only in highways and bridges, introducing fixed guideway public transportation (e.g., streetcars, light rail, or commuter rail), and completing the planned multi-use trail and sidewalk network, as well as multiple combinations of the aforementioned considerations at varying levels.

The existing regional emphasis on extending the useful life of highway and bridges through preventive and corrective maintenance, supporting increased system management and operations, and devoting significant fiscal resources to public transportation, bicycle, and pedestrian networks has been determined to be the optimal approach given the limited financial resources.

This region was the first in New York State to invest federal funds in highway and bridge preventive and corrective maintenance projects that defer the need for more costly rehabilitation, reconstruction, and replacement projects by extending the useful life of these facilities. Based on existing investments, this region has and continues to provide more federal highway funding to public transportation than any other area in Upstate New York. Regional spending of federal revenues on bicycle and pe-



RECOMMENDATIONS

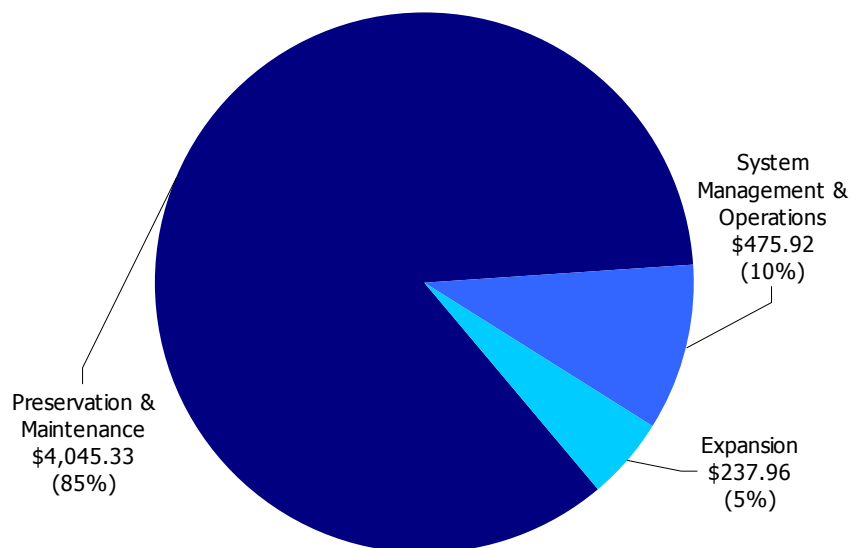
destrian projects is among the highest in the nation.

As such, the allocation of reasonably expected revenues for federal-aid-eligible projects and programs through 2035 by category – Preservation & Maintenance, System Management & Operations, and Expansion – continues this investment strategy as presented in Exhibit 25. The actions included in the *LRTP 2035* serve as a framework for investment decisions made through future TIPs where proposed projects and programs are evaluated to determine their benefits and costs relative to other proposals. Projects and programs selected to receive federal transportation funds represent the tactics that will realize the strategy of the *LRTP 2035*. It is anticipated that additional planning will be conducted through future UPWPs to further refine and develop proposals for advancement with both federal and non-federal funds. Based on the limited amount of reasonably ex-

Exhibit 25

**Allocation of Reasonably Expected Revenues for
Federal-Aid-Eligible Projects and Programs
through 2035**

(in millions of YOE Dollars)



pected revenues, the specific allocation of revenues may diverge slightly from the percentages shown below.

Should reasonably expected revenues result in less than the amount estimated, the assumption should not be that a proportional reduction in the amounts allocated to the various categories will be made. In other words, the region will need to consider all alternatives, including strategic divestment of existing infrastructure to reduce the allocation to preservation and maintenance and preserve the allocations to system management and operations and/or expansion.

Recommendations that provide opportunities to mitigate the three types of delay discussed previously are considered part of the Congestion Management Process (CMP) and noted as such. These recommendations include supply-driven and demand-driven mitigation strategies that emphasize getting the most out of the existing assets that comprise the regional transportation system. Advances in technology will play a major role in lessening any additional delay that will result from the projected increases in population and employment.

GTC has conducted the associated conformity statement for the *LRTP 2035* and *2011-2014 TIP* to comply with the current requirements of the Clean Air Act related to ground-level ozone, and this document is hereby incorporated by reference. GTC also conducted an analysis of direct and indirect energy usage and carbon dioxide emissions (the primary greenhouse gas) consistent with the approved methodology of the New York State Energy Plan. This analysis demonstrates that in 2035 energy usage and carbon dioxide emissions will be slightly less if the *LRTP 2035* is implemented than if it were not, establishing that the recommendations are worthy of advancement beyond those currently required by National Ambient Air Quality Standards.

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Beyond air quality concerns, GTC commissioned the Genesee/Finger Lakes Regional Planning Council to produce the *Long Range Transportation Plan Non-Air Environmental Issue Scan*. This report identifies issues and associated mitigation activities related to nonpoint source water pollution; terrestrial habitat, open space, and historical/cultural modification; noise and light pollution; and thermal pollution/urban heat island effect. It is incorporated by reference in the *L RTP 2035* as a resource for implementing agencies.

Not all of the reasonably expected revenues are available immediately. As such, the recommendations have been prioritized based on need and when funds for their implementation are expected to be able to be accessed. The timeframe for implementation of the recommendations discussed below are as follows:

- Immediate = Federal Fiscal Years (FFYs) 2011-2014 (aligns with current TIP)
- Near-Term = FFYs 2015-2019 (October 1, 2014 through September 30, 2019)
- Medium-Term = FFYs 2020-2025 (October 1, 2019 through September 30, 2025)
- Long-Term = FFYs 2026-2035 (October 1, 2025 through September 30, 2034)
- Ongoing = FFYs 2015-2035 (all FFYs of the *L RTP 2035*)

Preservation and Maintenance

In previous LRTPs, Preservation and Maintenance was limited to planning the extension of the useful physical life of existing infrastructure and services. Beginning in the *L RTP 2035*, preservation and maintenance recommendations encompass not only the maximization of existing assets but also improvements to these assets when they are reconstructed or replaced at the end of their useful life. Given the length of time between reconstructions and replacements of facilities, simple in-kind replacement of infrastructure and the vehicles that currently serve our transportation needs represents a lost opportunity to improve the

system. In addition, these opportunities represent the ability of the transportation system to meet the challenges of sustainability and climate change adaptation through the use of new materials and design elements that were not available when the facilities were first built or last reconstructed, whichever the case may be. There are two primary initiatives that serve as the basis for the Preservation and Maintenance recommendations of the *L RTP 2035*: Asset Management and Improved Design. While the number of Preservation and Maintenance recommendations are limited, these actions constitute the majority of projects to which reasonably expected federal transportation funds will be allocated through 2035.

Asset Management

At its core, asset management is about maximizing the service life of necessary infrastructure. This encompasses preventive maintenance and on-demand repairs to ensure that the travelling public can continue to utilize the existing system knowing that it is safe and reliable. Effectively applying this approach requires the selection of appropriate treatments at the proper times in the lifecycle of individual assets. A fundamental goal of asset management is to keep assets from deteriorating to a condition where they have to be reconstructed or replaced for as long as possible. Significant savings can be realized by conducting preventive and corrective maintenance on a facility at a fraction of the cost of reconstructing or replacing it prior than absolutely having to do so.

Unfortunately, because of financial resource constraints, not all of the corrective and preventive maintenance that is required can be accomplished with federal transportation funding. Regardless, the region should and will continue to get the most out of previous and current expenditures of public funds by identifying candidates that would benefit from corrective and preventive maintenance treatments and making



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requisite revenues available to the greatest extent practical given other competing preservation and maintenance needs that include reconstruction/replacement and rehabilitation. Capitalizing on the opportunity to gain additional useful life from existing infrastructure and vehicles requires that the agencies that own, operate, and maintain these assets have a thorough working knowledge of their needs.

Recommendations

- Conduct preventive and corrective maintenance treatments on highways and bridges to extend the useful life of infrastructure without requiring more costly rehabilitation and reconstruction before absolutely necessary – Ongoing

Preventive and corrective maintenance treatments can cost in the hundreds of thousand dollars per lane-mile compared to rehabilitation and reconstruction projects that typically cost upwards of \$1.5 million per lane mile. These treatments maximize previous investments, including not only the roadway but also safety and security related features such as signage, lighting, striping, and guiderails. Communities throughout the region have embraced preventive and corrective maintenance as the primary means for effectively managing their assets – the current TIP includes projects of this type in both major



population centers (Monroe County) and areas where agriculture is the primary industry (Wyoming County).

- Reconstruct and rehabilitate highways and bridges in-kind (i.e., as currently designed) when they reach the end of their useful life and there is suitable space provided for cars, trucks, bicycles, and pedestrians – Ongoing

Not all highways and bridges are candidates for preventive and corrective maintenance treatments. When infrastructure reaches the end of its useful life and currently provides for safe and efficient use by all modes (i.e., is a complete street), its replacement should ensure that this functionality is maintained and consider the ability to handle rising sea levels and extreme weather events that may occur as a result of climate change. Clearance under bridges that carry traffic above Class I railroads should be increased when they are replaced to allow for double-stacked rail cars. Similar consideration should be given to bridges that have had multiple incidents involving trucks becoming stuck underneath them. Given the large costs of reconstruction and rehabilitation projects, federal aid will continue to be the primary source for these types of projects and it is expected that this will be reflected in future TIPs.

- Increase the use of recycled materials and incorporate green technologies in the rehabilitation and reconstruction of highways and bridges – Ongoing

Opportunities to increase sustainability through the use of reused and recycled materials in the construction of highways and bridges continue to grow and become more affordable. Use of these materials would reduce the amount of refuse deposited in landfills and can be produced in a manner that, when applied, could result in more porous pavements which would improve stormwater management and have other environmental benefits.

RECOMMENDATIONS

Conduct preventive maintenance on public transportation vehicles to ensure the reliability of services in the region, allowing service to be attractive to choice riders – Ongoing

Persons in the region that are dependent on public transportation should and can expect that public transportation services will be reliable, taking them where they need to go consistent with published schedules. In addition, individuals who have a choice to either use public transportation or travel via privately-owned automobiles will not choose the former if the vehicles that provide the service are not properly maintained and prone to mechanical problems that affect the reliability of the service. As with highways and bridges, the importance of preventive maintenance is recognized by public transportation service providers. Per the current TIP, RGRTA will invest over one-third of the FTA Urbanized Area (Section 5307) Program funds in vehicle preventive maintenance activities.

- Maintain and improve the condition and functionality of public transportation facilities throughout the region – Ongoing

The age of public transportation facilities in the region varies with the RGRTA/RTS campus constructed in the 1970's while the CATS and LATS maintenance and operations facilities were completed in the last five years. Regardless, these facilities will need to be not only preserved and maintained but improved with respect to their security, energy efficiency, safety, and operational functionality over the next nearly 25 years. The building envelopes (e.g., roofs, walls, doors, etc.), mechanical systems (e.g., heating, cooling, ventilation, etc.); and electrical (lighting, control, etc.) systems will require repairs and replacement.

- Preserve and maintain dedicated bicycle and pedestrian facilities, including multi-use trails and sidewalks – Ongoing

The more than 500 miles of multi-use trails and sidewalks in the region are vital to promoting public health via active transportation. The ability of persons to travel safely by bicycling and walking would be severely compromised if these facilities are not maintained and kept in a state of good repair. The ownership of these facilities is more diverse than that of other modes of transportation with local governments and not-for-profit entities having a larger role in ensuring their continued use compared to highways, bridges, and public transportation services. Nevertheless, providing the necessary resources to preserve and maintain multi-use trails and sidewalks cannot be overlooked in the region's comprehensive, multimodal asset management strategy.



- Reconstruct and rehabilitate rail infrastructure to allow for the efficient movement of freight into, out of, and within the region – Ongoing

While privately owned, operated, and maintained, rail infrastructure is an important component of the regional transportation system. The maintenance of and upgrades (via reconstruction and rehabilitation) to tracks, ties, ballast, and bridges along with signaling, switching, and crossing equipment should be continued and increased



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as private and public resources allow. Representative projects in the region include rehabilitation and improvements to both Class I and Shortline infrastructure to allow them to carry maximum weights at the highest operating speeds allowed. In addition, the over-100-year old Portage Bridge that crosses the Genesee River Gorge in Letchworth State Park is a critical component of Norfolk Southern's Southern Tier Line that is in need of major restoration or replacement to remove weight and speed restrictions.

Improved Design

The physical design of transportation infrastructure and development served by public transportation services can appreciably improve the safety, efficiency, and reliability of the transportation system. Access management, interchange configurations, and provision of space for public transportation and non-motorized travelers (i.e., complete streets) can enhance the existing system and better serve regional transportation needs now and in the future. Specifically, physical measures that improve mobility, safety, and predictability for vehicles (including freight) and non-motorized modes, when and where appropriate, increase economic opportunities and quality of life. These improvements require coordination and cooperation with local governments who have land use planning and decision making authority.

Recommendations

- Improve the function of interchanges on major roadways (i.e., Interstates and other Principal Arterials) through improved design that reduces delay and improves mobility – Immediate/Near-Term **CMP**

The region's interstate highways and other expressways are the facilities that have the greatest impact on mobility. Recurring delay that results where they intersect with



other highways has significant implications including increased emissions and reduced productivity. Incorporating improved design of these interchanges when they have reached the end of their useful life and require reconstruction will result in significant benefits to regional mobility and safety. Representative projects in the region include the reconstruction of the I-490/I-390/NYS Route 390 interchange, the current western terminus of NYS Route 531, and the I-590/Winton Road interchange.

- Improve the function of intersections through improved design that increases safety, reduces delay, and improves mobility – Ongoing **CMP**

The safety and efficiency of high volume intersections that result in delay can sometimes be improved through dedicated turning movements enabled through the addition of turn-only lanes and signalization. Other options include reconfiguring intersections via the introduction of roundabouts and new alignments. In the case of roundabouts, appropriate pedestrian safety considerations need to be included in their planning and design. Representative projects in the region include the O'Connor Road realignment at NYS Route 31F and Jefferson Avenue in Perinton and the construction of roundabouts at the County Road 10 and County Road 46 and County

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Road 4 and County Road 46 intersections in Ontario County. Further, improving safety at rail crossings in the region through maintenance and replacement of signaling equipment and gates as well as, where necessary, redesign of the geometry of crossings will be advanced.

- Advance Access Management recommendations contained in completed UPWP-funded studies as part of rehabilitation and reconstruction highway projects – Near-Term/Medium-Term **CMP**

Proactively managing access from highways to adjacent land can improve efficiency and reduce crashes, mitigating both Recurring Delay and Non-Recurring Incident Related Delay without requiring the physical expansion of infrastructure. GTC has provided funding for and technical assistance to numerous communities to conduct multi-jurisdictional access management plans that have integrated transportation and land use planning. These plans include recommendations that should be advanced as part of reconstruction and rehabilitation projects in the region and are incorporated by reference in the *LRTP 2035* subject to available funding and the willingness of municipalities to commit to the corresponding revisions to land use regulations.

- Advance Circulation, Accessibility, and Parking (i.e., “Complete Streets”) recommendations contained in completed UPWP-funded studies as part of preventive/corrective maintenance, rehabilitation, and reconstruction highway projects – Near-Term/Medium-Term

GTC instituted the Circulation, Accessibility, and Parking (CAP) program to improve livability and economic vitality in villages, city neighborhoods, and hamlets by identifying physical and operational improvements and regulatory changes to enhance traffic circulation, accessibility, and parking for all transportation system users, as well as community appearance including gateway treatments.

The CAP plans, like GTC-funded access management plans, have integrated transportation and land use planning and include recommendations that should be advanced as part of reconstruction and rehabilitation projects in the region. Their recommendations are incorporated by reference in the *LRTP 2035* subject to available funding and the willingness of municipalities to commit to the corresponding revisions to land use regulations. Lane reconfigurations that include reductions in the number of lanes and addition of on-street parking and bicycle space should be advanced, where appropriate, as part of preventive maintenance and minor rehabilitation projects – recent examples include East Avenue in the City of Rochester (an urban area) and Phillips Road in Webster, Monroe County (a suburban area).



- Institute a regional program to prioritize the retrofit and/or new installation of American with Disabilities Act (ADA)-compliant treatments – Immediate/Near-Term

A regional program should be developed to address ADA-related non-compliance issues. Improvements to pedestrian facilities, including crosswalks, sidewalks, and curb cuts, need to be prioritized so that they can be addressed not only as part of rehabilitation and reconstruction projects but also as stand-alone improvements. State, county, and local governments that receive federal



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funding are required to have ADA transition plans. These plans should fully incorporate pedestrian and other transportation considerations that limit mobility and access for persons with disabilities, including access to public transportation. Making these improvements will also increase the attractiveness of walking as a preferred mode of travel for persons of all abilities.

- Support development that more fully considers and integrates transportation needs (e.g., transit-supportive, cluster, etc.) by creating and providing associated information materials for local planning and zoning boards – Immediate/Near-Term **CMP**

As discussed above, local land use decisions are a major determinant of transportation system performance.

When the demand created by land uses outstrips the supply provided by transportation infrastructure and services, the potential for delay, crashes, and other negative events increases. To improve understanding among local governments of the impacts of their decisions on the transportation system, GTC has developed and funded resources and studies that are available to cities, towns, and villages to assist in more fully integrating transportation and land use planning and development. These activities are in addition to the examples contained in and lessons learned from access management and CAP plans.

- Regularly assess and, as necessary, adjust existing public transportation services based on current and projected needs, demand, and market potential – Ongoing

RGRTA has developed and continues to refine a nationally-recognized route analysis system that allows it to optimize RTS routes and schedules, putting buses where people are to take them where they want to go when they want to go there. RTS routes and schedules are adjusted quarterly based on analyses of trip-level and stop-

level ridership and fare data. Strategic plans for public transportation have been completed for all of the counties of the region. Adjustments to maximize the effectiveness of non-RTS service consistent with strategic plans should be conducted. The evaluation of Ontario CATS fixed route and dial-a-ride services was completed in 2010, but strategic plans for services in other rural counties should be revisited and updated, as needed, over the period covered by the *L RTP 2035*. The large increase in the number of seniors and growing importance of universities and colleges will necessitate a review of how route structures are developed and adjusted regularly. In addition, improved connections between existing RTS, other RGRTA, and Ontario CATS services should be developed.

System Management and Operations

Transportation system management and operations (TSMO) recommendations provide the best opportunity to maximize the effectiveness of the current transportation system at the lowest cost. There are three primary initiatives that serve as the basis for the TSMO recommendations in the *L RTP 2035*: Technology, Coordination, and Demand. These initiatives are not mutually exclusive (e.g., there are Technology elements that are critical to and included in Coordination and Demand and the same is true for Coordination and Demand as they relate to Technology and each other).

The majority of delay in the region is non-recurring and is the result of crashes, weather, and other irregular events. TSMO programs and projects can effectively address non-recurring delay through improved incident response, more efficient deployment of resources to clear snow and ice, and timelier information to travelers. Even in cases where the delay is recurring due to peak demand and fixed capacity, TSMO programs and projects that inform travelers of less costly options that could be

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more convenient have the potential to reduce demand on the system when use is at its highest level.

TSMO programs and projects can increase safety by providing timely and accurate information to make travelers aware of hazards such as adverse weather conditions, work zones, crashes, and other incidents. By improving incident response and management, TSMO programs and projects can also shorten clearance times for crashes which reduce the likelihood of secondary crashes. This improves safety, reduces resulting delay and decreases emissions. The technologies used to monitor transportation system performance can also be used for homeland security purposes to prevent or respond to a terrorist attack, natural disaster, or other large-scale emergency.

Technology

Technology provides multiple opportunities to improve safety, efficiency, and reliability for transportation users while reducing the need for expansion of physical infrastructure or introduction of new services. Utilizing continuously improving information and communication technologies via Intelligent Transportation System (ITS) instrumentation will allow transportation agencies to better manage and operate the existing system, including parking in areas where it is limited. Consistent with Moore's Law, which describes the long-term trend of computing capacity increasing exponentially, the usefulness of technology in TSMO will increase substantially over the period covered by the *L RTP 2035*.



Current and immediately forthcoming uses of ITS (for all modes) in the region includes closed circuit television monitoring, vehicle volume and speed detection, dynamic messaging (physical signs and mobile phone texts and e-mails), automatic vehicle location (AVL), roadway weather information systems, and highway advisory radio via both fixed (e.g., fiber optic) and mobile telecommunications.

At present, transportation agencies in the region emphasize the use of ITS to determine what is occurring on the system and make corresponding adjustments remotely, to the extent possible. In the near future, it is anticipated that ITS can be used to identify not only what *is* happening on the transportation system but what *will* happen. Effectively, technology will allow transportation agencies to conduct not only diagnosis but, more importantly, also prognosis to proactively address the safety, efficiency, and reliability of the system as it affects travelers. An example of prognostic capabilities is the use of sensors to continuously monitor the structural conditions of bridges to ensure their safety via the adequacy to handle the load of vehicles they routinely carry.

In addition to managing and operating transportation facilities, ITS offers the opportunity to improve preservation and maintenance of infrastructure and vehicles by monitoring and reporting on the structural integrity of roadways, bridges, and buses. As part of the TIDE program, RGRTA is outfitting RTS buses with sensors that are able to identify issues with the functioning of buses prior to breakdowns that would inconvenience travelers and may result in choice riders choosing not to use public transportation. Using ITS to detect deterioration of transportation system infrastructure that compromises the structural integrity of a facility can allow for appropriate repairs to be undertaken before weight limits need to be enacted or closures are required.



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Recommendations

- Upgrade regional communications infrastructure for greater integration of transportation agency operations – Ongoing **CMP**

The key to fully utilizing technology to improve transportation system management and operations is dependent on the transfer of information among and between personnel and devices that are deployed to monitor travel conditions and make necessary adjustments. This communication can and should be accomplished by an appropriate combination of hardwired (i.e., fiber contained in conduit) and cellular technologies. As new capabilities become available, existing and expanded communications devices connecting instrumentation and TSMO agency staff will be implemented. Representative projects include linking traffic signals and other ITS elements to each other and to the Regional Traffic Operations Center (RTOC) through new fiber optic and wireless means, including along corridors that are not currently remotely connected such as the NYS Route 96 corridor in Victor, Ontario County.

- Deploy ITS instrumentation along and in First Priority Critical Operations Corridors and Areas as identified in the *ITS Strategic Plan for Greater Rochester* – Near-Term/Medium-Term **CMP**

The *ITS Strategic Plan for Greater Rochester* prioritizes corridors and areas along and in which ITS instrumentation will have the most benefits relative to existing and projected travel volumes and characteristics. These corridors and areas serve the largest number of travelers and amount of freight, making them the most likely to experience Recurring Delay. The emphasis should be in filling gaps in the regional transportation system via these corridors and areas to address the largest and most immediate needs.

- Deploy ITS instrumentation along and in Second Priority Corridors and Areas of Regional Operations Significance as identified in the *ITS Strategic Plan for Greater Rochester* – Medium-Term/Long-Term **CMP**

To fully advance TSMO capabilities, deploying ITS instrumentation should be expanded to corridors and areas that experience lesser amounts of Recurring Delay as well as significant amounts of Planned Event Related Delay due to concerts, sports matches, and other events.

- Replace ITS instrumentation when necessary with next generation technologies along and in Critical Operations Corridors and Areas and Corridors and Areas of Regional Operations Significance as identified in the *ITS Strategic Plan for Greater Rochester* – Long-Term **CMP**

Many of the ITS instruments currently deployed in the region are first or second generation equipment and the technologies that will be available when they require replacement will provide increased management and operation capabilities. Regardless of the type of technology available when replacement is required, the next generation of instruments is anticipated to allow for increased TSMO capabilities.

- Develop integrated/coordinated interchange and arterial signal timing systems and plans – Ongoing **CMP**

Optimizing signal timings along and between major corridors improves efficiency, leading to reduced delay and vehicle emissions. Creating plans to implement systems that include an entire corridor or significant portion thereof must include input from agencies whose roadways intersect with the corridor so that the needs of adjacent and parallel facilities are considered. Replacing existing fixed-time (light cycles change at pre-programmed intervals) signal controllers with actuated ones (light cycles change when triggered by actual needs) that can be adjusted remotely rather than require



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manual modification of timings allows for quicker responses to changing traffic conditions.

- Monitor advances in and, as appropriate, implement IntelliDriveSM to provide networked wireless communications between vehicles, infrastructure, and personal communications devices – Medium-Term/Long-Term **CMP**

The continuous and active interconnection of vehicles and infrastructure has the potential to improve efficiency and safety. By allowing vehicles to communicate with each other and infrastructure in real-time, better information can be provided to drivers to alert them to possible hazards. As an example, if many cars engage their stability control and anti-lock braking systems in a similar location, information can be transmitted to drivers approaching that location that slippery conditions are present and caution is advised.

- Further expand electronic payment options for on-street, garage, and surface lot parking in the City of Rochester, including a pilot electronic toll tag for garages – Near-Term

Offering electronic payment (e.g., credit card, online, etc.) options for parking in the City of Rochester can result in improved efficiency of parking administration and improve the friendliness of the central business district as parking is not limited to currency, and only coins for on-street meters. Currently, electronic payment options are available on select city streets and some city-owned garages. These options should be expanded to all city parking facilities and privately-owned garages and lots should be encouraged to adopt them as well. The installation of multi-space on-street parking meters in Downtown Rochester that accept coins and credit cards should be expanded.

- Install AVL and weather information instrumentation on public fleets to maximize vehicle routing and serve as floating, real-time data sensors – Immediate/Near-Term **CMP**

The data provided from AVL technology installed on publicly-owned vehicles such as snow plows and refuse trucks allows operating agencies to optimize routing of these vehicles as they provide needed service. Improved routing based on this data can make service delivery more efficient, reducing costs for labor and fuel. Installing sensors that provide data on weather conditions can, when combined with data on changes in the locations of vehicles equipped with AVL instrumentation, provide valuable information for transmittal to the travelling public informing them of delay and hazards. The City of Rochester is currently developing a project funded through the TIP to equip its Department of Environmental Services vehicles with AVL technology.



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- Install relevant pedestrian ITS instrumentation at identified intersections and crossings to reduce vehicle/pedestrian crashes – Ongoing **CMP**

Installation of pedestrian countdown signals, audible/tactile devices, and similar ITS elements can improve pedestrian safety and accessibility. Pedestrian countdown signals inform pedestrians of the time allotted for crossing; this is especially important for persons with limited mobility, including seniors. Audible/tactile devices provide guidance and assistance to persons with disabilities as to when it is appropriate to cross streets. Locations for installation should be determined based on the volume of pedestrians and data on vehicle-pedestrian incidents to ensure the instrumentation is deployed where it is most needed.

- Continue the implementation of and expand Technology Initiatives Driving Excellence (TIDE) for RTS – Ongoing

As discussed previously, TIDE is a comprehensive Advanced Public Transportation Systems (APTS) **CMP** suite that improves operational efficiency and customer service. The benefits derived from TIDE are critical to attracting choice riders and reducing delay on the highway and bridge network. Given the time period covered by the *L RTP 2035*, TIDE instrumentation (like many ITS elements) are first generation and will require replacement. As technology advances, additional capabilities will become available and will be incorporated as the system matures.

- Introduce transit signal priority (TSP) on heavily traveled RTS routes to decrease travel time and improve reliability – Ongoing

TSP allows buses to signal their arrival at an intersection and, as overall operations requirements allow, receive a green light as they approach to continue through. TSP works best when done in combination with the consoli-

dation of stops and queue jump lanes. Queue jump lanes are dedicated to public transportation vehicles at the approach to a signalized intersection allowing the bus to jump to the front of queuing cars and trucks. TSP and associated roadway configuration improvements (i.e., queue jump lanes) can serve as the precursor to more robust bus service, including Bus Rapid Transit. The *RTS Signal Prioritization Study* has identified the Lake Avenue (RTS Route 1) and Dewey Avenue (RTS Route 10) routes as the optimal routes to introduce TSP. The introduction of queue jump lanes can and should be accomplished as part of highway reconstruction projects, as appropriate, and in coordination with RGRTA.

- Expand relevant APTS technologies and capabilities to other RGRTA systems and the Ontario CATS – Medium-Term/Long-Term

APTS implementation plans based on TIDE experiences and lessons learned should be developed and implemented for other public transportation services in the region. AVL systems for Lift Line, LATS, and OTS are scheduled for completion in the next three years. Additional APTS elements and associated instrumentation will be considered as appropriate on all non-RTS services to improve operational functionality and improve customer service.

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Coordination

TSMO programs and projects also include the coordination of transportation infrastructure and services and the associated organizational relationships among all transportation agencies, including but not limited to NYSDOT, NYSTA, counties, the City of Rochester, and other municipalities. Like the design of infrastructure and services, the relationships between transportation agencies can also appreciably improve the safety, efficiency, and reliability of the transportation system. How transportation agencies coordinate their respective activities can maximize the investment of public resources and the delivery of services that clear crashes, address weather-related consequences, and provide connections between public transportation services operated by public and not-for-profit providers. The structure of interagency collaboration between transportation, emergency management, and law enforcement entities is critical to efficient management and operation of the transportation system. Formal protocols (including via Regional Concepts of Transportation Operations) to coordinate information sharing, incident response, and timing of construction projects based on a cooperatively-developed vision can improve efficiency and effectiveness.

Recommendations

- Develop Integrated Corridor Management (ICM)-based Regional Concepts of Transportation Operations (RCTOs) to improve interagency collaboration and coordination – Immediate/Near-Term **CMP**

A RCTO provides a shared strategy among transportation agencies representing all modes, law enforcement, and emergency responders to better coordinate system operations and management. ICM-based RCTOs to be developed in this region will address the following issues: winter roadway conditions information sharing, joint

management of parallel facilities in designated corridors, expressway management and operating characteristics information sharing, and incident management.

- Execute the interagency agreements necessary to implement protocols contained in the ICM-based RCTOs – Near-Term/Medium Term **CMP**

It is anticipated that the RCTOs will require formal agreements between the involved agencies to advance the recommended operational activities contained in them. The specific form of the agreements (e.g., memoranda of understanding, shared services contracts, etc.) will need to be determined, but it is anticipated that the initial one will serve as a template for future agreements with minimal additional effort necessary to implement RCTOs.

- Continue federal funding for Regional Traffic Operations Center (RTOC) staffing, including continued 24-hour operations and cross-training of NYSDOT and Monroe County staff – Ongoing (Near-Term for cross-training) **CMP**

To take full advantage of the capabilities provided by current and future ITS instrumentation, an adequate number of trained personnel need to be available at all times to monitor and process the information provided. Improving interoperability is an important component that can be addressed in the near-term through cross-training of NYSDOT and Monroe County operators, with the expectation that greater consistency between ITS instruments software and associated applications can occur in the future. Funding for RTOC staffing has been and continues to be provided in the TIP and these financial resources will continue to be made available.



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- Continue federal funding for the NYSDOT Highway Emergency Local Patrol (HELP) Program to decrease delay and increase safety on major highways by providing emergency roadside service to disabled vehicles –

Ongoing

CMP



The HELP Program is an important initiative in minimizing Non-Recurring Incident Related Delay. The program provides assistance to motorists that have experienced issues on major roadways that without quick action will limit capacity and cause congestion with the potential for secondary incidents as a result. The *NYSDOT-Region 4 Advanced Transportation Management System Local Evaluation Report* found that the HELP Program had one of the highest cost/benefit ratios of any initiative assessed. Like RTOC staffing, funding for the HELP Program has been and continues to be provided in the TIP and these financial resources will continue to be made available.

- Conduct relevant training opportunities between transportation, law enforcement, fire and medical, and other agencies to improve incident response, management, and clearance – Ongoing

Clearing crashes as quickly as possible while providing for the safety of emergency responders and law enforcement agents requires significant coordination. The National Highway Institute Coordinated Incident Management (Quick Clearance) Workshop, developed by the I-95 Corridor Coalition, was conducted in October for regional local law enforcement, first responder, and transportation system management agencies, as well as representatives from the local towing industry. This workshop or a similar training opportunity should be offered in the region on a regular basis.

- Institute informational programs to reduce distracted driving – Ongoing

Distracted driving is a major safety hazard that has arisen as a result of people's need to feel connected at all times to personal communication devices. Talking on the phone and texting while driving reduce drivers' attentiveness to required actions to ensure their and others' safety. Studies have shown that distracted driving is as comparable to operating a vehicle while impaired by alcohol or drugs. Traffic safety boards that include transportation agencies, law enforcement, and other organizations should develop and implement educational and enforcement programs to reduce distracted driving. Absent intervention, the problem will only increase as ownership of smart phones and in-vehicle communication technologies proliferate at an accelerated rate.

- Ensure that public transportation facilities are accessible to all users during service hours – Immediate

All trips taken by fixed-route public transportation begin with the customer making their way to a bus stop or shelter. If snow and ice have not been cleared, the sidewalks are in such condition as to make them impassable for persons with disabilities, or some other issue prevents reasonable access, the viability of public transportation is compromised.

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tation is compromised. The responsibility for ensuring this access is typically borne by the owner of the right-of-way in which the sidewalk is located. Ensuring that those sidewalks that provide access to public transportation are a priority for preservation and maintenance activities should be increased.

Demand

The Technology and Coordination initiatives focus almost exclusively on managing and operating the system. This remaining initiative emphasizes providing users with better and additional information to manage the demand that is placed on the system. In some cases, technology is the primary enabler of the provision of the information (e.g., text alerts regarding incidents and next bus arrival times, directions provided by smart phones with GPS-based navigation applications, etc.). In other cases, information is provided to travelers the same way it has been for centuries: on printed materials (e.g., color coordinated wayfinding signage to assist visitors in reaching a destination in a downtown or special district, printed marketing fliers promoting a new transportation service, etc.).

Making full and complete information on options and conditions widely accessible allows users to choose how they



travel based on their individual needs. Providing access to travel time, route, and cost information for multiple modes (specifically, non-single occupancy vehicles) in a single place permits users to comparatively assess their full range of options. Doing so via the Internet is currently the most effective means for users to revise or adjust their preferences dynamically, and its reach will extend in coming years as tomorrow's seniors will be more technologically savvy than their predecessors.

Recommendations

- Continuously identify ways to increase and improve real-time travel information – Ongoing **CMP**
Improved information on travel choices will lead to better decisions for all modes, and the means for doing so over the next two-plus decades will change in ways that cannot be predicted. Providing more and better information on traffic conditions and arrival times of buses and inter-regional trains to regional transportation system users in real-time is an important component of managing travel demand and getting the most out of existing infrastructure and services. Partnering with smart phone providers and media outlets throughout the region should be explored.
- Initiate the Greater Rochester Regional Commuter Choice Program to consolidate information on and allow comparative assessment of transportation options – Immediate **CMP**
GTC is establishing a website where commuters can 1) find other commuters with proximate origins and destinations for carpooling; 2) identify optimal public transportation route(s) and schedule(s), and 3) determine preferred bicycling routes, as well as gain information on the amount of out-of-pocket costs, greenhouse gases, and air pollution reduced via the various non-single-



RECOMMENDATIONS

occupancy vehicle options available to them. The website is expected to be operational in fall 2011 and will provide the traveling public with the maximum opportunity to save money and reduce pollution by accessing commuting options other than the single-occupancy vehicle. The use of internet-based scheduling of paratransit rides should also be explored either as part of this program or one dedicated to persons with disabilities but with appropriate connections to this program.

- Continuously upgrade the 511NY Program to expand information on statewide travel conditions and options – Ongoing **CMP**

The 511NY program is maintained by NYSDOT and is the state's official traffic and travel resource. The program is accessible through the internet and by phone. The program provides traffic and weather conditions, offers a public transportation trip planner, and includes carpooling and vanpooling resources. It is being enhanced regularly and should continue to include additional information to be as valuable as possible to transportation system users in this region.

- Integrate the Greater Rochester Regional Commuter Choice Program with the 511NY Program – Near-Term/Medium-Term **CMP**

The Greater Rochester Regional Commuter Choice Program and 511NY program share common goals. Having a regional or local identity is generally seen as a factor in increasing the use of such programs. However, once the benefit of the Greater Rochester Regional Commuter Choice Program is proven, integrating it with the statewide program will increase traveler benefits by providing a one-stop-shop for residents to obtain information for trips outside of the region and for visitors to assess their options when they will be in the region.

- Improve or install (as appropriate) wayfinding signage in business, cultural, and other unique districts as well as interregional travel facilities – Near-term/Mid-Term **CMP**

Providing information at key points is an important element in providing access to specific locations and can reduce delay and visitor angst. Districts and interregional travel facilities that would benefit from the introduction of new or improved wayfinding signage should have visitor needs and requirements assessed and then determine the appropriate form in which to provide signage that is simple, effective, and aesthetically consistent with the theme of the area. In addition to defined districts, wayfinding signage at multi-use trailheads and along multi-use trails should also be developed, including identifying connections to "blue ways" or recreational waterways for boating and kayaking.

- Implement an electronic parking guidance system for Downtown Rochester – Medium-Term/Long-Term

Parking supply in Downtown Rochester is inherently restricted by the physical space available and need to use it for higher value-added activities. The existing supply of parking can be maximized by increasing the efficiency in which motorists are able to locate an appropriate place to park, be it a garage, surface lot, or on street. Options for accomplishing this include erecting dynamic messaging signs and developing an application for smart phones and in-vehicle communication technologies to provide information on the availability of parking spots and where alternatives exist nearby.



RECOMMENDATIONS

Expansion

Based on the identified transportation needs of the region through 2035, expansion of the bicycle, pedestrian, and public transportation networks is warranted. The level to which this can occur is limited by the reasonably expected revenues available for investment in the system over the next nearly 25 years and the need to preserve, maintain, and better manage and operate the existing system. Accordingly, investments in additional infrastructure and services must build upon the existing system by either increasing connectivity (i.e., bridging gaps) or offering increased access. The objective of these recommendations is to *expand* travel choices available to residents, visitors, and freight – not to replace current options. There are three primary initiatives that serve as the basis for the Expansion recommendations in the *L RTP 2035*: Bicycle and Pedestrian, Public Transportation, and Vehicle Options.

Bicycle and Pedestrian

Based on current and projected development patterns and trip making characteristics in the region, expanding the bicycle and pedestrian networks offer the greatest opportunity to improve public health, reduce greenhouse gas emissions, and provide mobility and accessibility to the majority of residents. Regional highway project proposal criteria strongly favor reconstruction and rehabilitation projects that add or improve on-street bicycle space and sidewalks. To complement shared space on roadways, the region has used federal transportation funds to make a significant investment in planning and implementing a comprehensive regional multi-use trails network that is dedicated to providing an efficient and safe bicycle and pedestrian network for both commuting and recreation.



Recommendations

- Expand the amount of and increase the connectivity of multi-use trails in the region per the Regional Trails Initiative – Ongoing

Multi-use trails will function best when connected to improved on-street bicycling facilities. An emphasis should be placed on filling in gaps and increasing connections to the “core trails” which include the Canalway Trail (specifically, east of Lyons, Wayne County), Riverway Trail, Genesee Valley Greenway, Auburn Trail, Lehigh Valley Trail, and several other locally important trails such as the El Camino Trail and the 390 Trail. As discussed previously, the on-street facilities are expected to be developed as part of highway and bridge reconstruction, rehabilitation, and, where possible, preventive maintenance projects; some on-street facilities may be implemented as on-demand projects specifically for this purpose.



RECOMMENDATIONS

- Increase the availability of sidewalks along federal-aid highways to expand connectivity and access for pedestrians – Ongoing

With the majority of retail, commercial, and civic uses located along major roadways that are eligible to receive federal-aid, the provision of sidewalks is critical to accessing these destinations. Many federal-aid highways have partial sidewalks but only about 20 percent have sidewalks that would be considered complete. Beyond adding them as part of federally-funded highway reconstruction and replacement projects, sidewalks should be improved where their condition deters walking and added where they don't exist via dedicated funding from federal and non-federal sources. This applies to all places in the region from the Regional Urban Core in the City of Rochester to Rural places like the Town of Williamson, Wayne County where residents, businesses, and elected officials recognize their benefits.

- Promote safe routes to school (SRTS) programs and the availability of technical resources that are available to implement them – Ongoing

According to the FHWA *1972 Nationwide Personal Transportation Survey*, 49 percent of elementary school children walked or bicycled to school in 1969, while 12 percent traveled by passenger vehicle. By 2001, FHWA reported that the tables had turned: fewer than 15 percent walked or bicycled to school, and the percentage that traveled by passenger vehicle had increased to approximately 50 percent. SRTS programs promote deliberate efforts to increase the number of children that can safely walk and bicycle to school in all places (e.g., urban suburban, and rural). By encouraging "active transportation", they complement ongoing community- and school-based programs and activities intended to improve the overall health and wellness of children. Many SRTS also serve as safe routes to play, doubling their purpose in

promoting active lifestyles and reducing the tendency towards increased instances of childhood obesity and diabetes. In addition, SRTS programs can reduce delay during drop-off and pick-up periods.

- Ensure that all fixed route buses can accommodate bicycles – Immediate/Near-Term

Installing racks for bicycles on public transportation buses increases the opportunity for persons to begin and complete trips without having or choosing to use a private automobile. Bicycle racks are currently installed on all RTS buses and being added to other RGRTA services outside of Monroe County. In all places where fixed-route public transportation service is available, bicycle racks on buses are a cost-effective means to improving intermodal connections. Bus operators should be trained in the use of these racks and encouraged to assist customers in utilizing them.

- Increase the amount of bicycle parking at key locations in the Regional and Sub-Regional Urban Cores, Employment Centers, all Retail, and Higher Education Places – Near-Term/Medium-Term

Bicyclists (commuter or recreational) invest personal financial resources in their bikes. Their use can be discouraged if secure places to leave them as they conduct their other activities are not available. Short-term and long-term bicycle parking should be highly visible, advertised, and located in well-lit areas (preferably, with surveillance to deter theft and vandalism). The parking means should hold the frame, accommodate a large variety of bicycles, and be suitable for a U-shaped shackle lock. Associated signage should be included whenever possible.



RECOMMENDATIONS

Public Transportation

To effectively serve the needs of the region over the next nearly 25 years, a fundamental shift in what is considered public transportation will need to occur. The fixed-route and dial-a-ride services of RGRTA and Ontario CATS will need to be supplemented to a greater degree by specialized transportation services supplied by not-for-profit agencies and private providers. In many cases, the need for public transportation will increase the most among seniors that may not have the physical ability to travel to a bus stop or wait in inclement weather, requiring a new approach to public transportation that will support aging in place. Ensuring access for persons with disabilities to non-emergency medical appointments, employment sites, and social events will be a major determinant of their independence, quality of life, and the overall livability of the region. The establishment of RTS satellite transfer centers in the City of Rochester and, potentially, Mature and Recent/Emerging Suburbs should also be advanced. Increased frequency of fixed-route service in select locations where transit-supportive development is or will be located is recommended.



Recommendations

- Construct the Renaissance Square Downtown Transit Center – Immediate

The RTS hub-and-spoke operating model reinforces Downtown Rochester as the business, civic, and cultural center of the Genesee-Finger Lakes Region. Providing an enclosed, climate-controlled transit center for customers that removes buses from Main Street is critical to improving the quality of RTS service and the continued revitalization of downtown as not only an employment center but a 24-hour activity center. Notably, moving the transfer point for Ontario CATS buses off of Main Street in Downtown Canandaigua has also been recommended for similar reasons. Sufficient funding for the Renaissance Square Downtown Transit Center is secured with the federal portion of this funding included in the current TIP.

- Design and implement a mobility management program that coordinates existing and future services of public, not-for-profit, and private transportation providers – Immediate

CMP

Mobility management involves focusing on meeting individual customer needs through the variety of services offered by multiple providers. The range of services provided by public, not-for-profit, and private transportation providers are inventoried and cataloged to create a clearinghouse of available options. The mobility manager uses the clearinghouse to match customers to the most appropriate service based on their requirements (e.g., ability to access the service, if the destination is served by the provider, etc.). This program would create greater efficiencies as all public transportation services would be considered in a centralized manner. Sustaining the program would be an ongoing activity for regional transportation service providers.



RECOMMENDATIONS

- Increase the frequency of fixed-route public transportation services in the Regional Urban Core, Sub-Regional Urban Cores, Mature Suburbs, Employment Centers, Medical/Health, Higher Education, and Airport places – Near-Term/Medium-Term **CMP**

Fixed-route public service should support and be supported by adjacent land uses that provide density in both population and employment. The places of the region that offer the best opportunities for and would be best served by expanded service in the form of more frequent buses along existing routes are the Regional Urban Core (City of Rochester), Sub-Regional Urban Cores in the Rochester TMA (including the City of Canandaigua), and Mature Suburbs. Determinations of when and where to increase frequency of service should consider lower-income residents' employment prospects, retail and commercial businesses' operating hours, and access to Medical/Health places in recognition of their growing importance to the increasing senior population. As discussed previously, the use of transit signal priority and associated infrastructure such as queue jump lanes in appropriate locations may allow trips by bus to become more competitive with private automobiles in terms of time.

- Construct satellite transit stations in the City of Rochester and assess their feasibility in Mature and Recent/ Emerging Suburbs – Near-Term/Medium-Term **CMP**

Mixed-use developments are transit-supportive and more attractive to both residential and commercial tenants when a commitment is made to provide fixed-route public transportation service. This can lead to increases in choice riders. RGRTA is actively developing transit stations as part of the University of Rochester's College Town development. In addition, an assessment of the feasibility of the current RTS Park and Ride route structure with respect to service to Mature Suburbs through

mixed use developments that include a satellite transit station will also be advanced.

Vehicle Options

To address energy, air quality, climate change, and cost concerns, the migration of energy sources for public fleets from gasoline and diesel to domestically-produced, cleaner options needs to be accelerated. The expanded availability of alternative energy sources for vehicles is largely dependent on actions at the national level but options that are immediately available are fully considered as part of this initiative. The establishment of alternative fuel dispensing and electric vehicle recharging infrastructure for public fleets can spur the use of more sustainable energy sources by other public operators, as well as commercial vehicles and private automobiles, creating private sector demand to provide the service. In addition, offering the opportunity for individuals to have access to an automobile or bicycle without owning one or having theirs immediately available can also assist in reducing energy use, emissions, and being beholden to oil prices. Future vehicle options for people and freight may require the use of land that served transportation uses in the past; preserving access to these rights-of-way is an important long range consideration.

Recommendations

- Expand the necessary infrastructure to facilitate increased use of alternative fuel/electric and hybrid vehicles in public fleets (including school districts) – Ongoing

As discussed previously, it is likely that no single energy source for powering vehicles will have the same nearly monopolistic position as oil has had for the past 100-plus years. To maintain the flexibility and independence offered to people and freight by cars, buses, and trucks, various energy sources are being promoted as replacements to gasoline and diesel. Funding has been provided through



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the TIP for the development of stations to dispense alternative fuels for the City of Rochester and Monroe County fleets and for the creation of plug-in charging stations at several City of Rochester facilities along with the purchase of plug-in hybrid electric vehicles. The development of additional fueling/charging infrastructure will be advanced including agreements to ensure access to the energy sources for additional public fleets and, as allowable, personal and commercial vehicles.

- Encourage and, to the extent practical, financially support the expanded use of more energy efficient, alternative fuel/electric, hybrid, and retrofitted vehicles in public and private fleets (including school buses) – Ongoing

Wide acceptance of new vehicle technologies typically comes after a minimum level of use by early adopters that alleviates the anxiety of the larger market that they are safe and reliable. Encouraging the use of cleaner, more energy-efficient vehicles by providing objective information on their capabilities and limitations and, as funding allows, financially supporting their purchase for use in public fleets can significantly promote their acceptance in commercial fleets and as private automobiles. GTC has and continues to partner with Genesee Regional Clean Communities, including providing funding through the TIP, to incentivize the replacement of gasoline and diesel vehicles with those that are more energy efficient and environmentally friendly, as well as retrofit existing vehicles to reduce emissions. The current TIP also includes funding to retrofit CSX Transportation switcher locomotives with more efficient engines that will increase operating efficiencies and significantly reduce emissions in and around the Goodman Street Yard, improving air quality in the surrounding neighborhood.

- Institute car sharing and bike sharing programs to expand access to automobiles and bicycles without requiring ownership – Immediate/Near-Term

Many individuals want to enjoy the benefits of a private vehicle for certain activities but may not engage in these activities enough to warrant the costs of ownership. In addition, lower-income persons may not be able to afford to own and maintain a vehicle but would significantly gain from access to one for certain trips that cannot be served by other modes. Individuals who participate in car sharing programs typically have a desire to lower their overall transportation costs, drive less, and use other modes more frequently. Many public fleets do not use or need passenger vehicles full time (law enforcement, fire, and other emergency responders excluded). By instituting car sharing for these vehicles, government agencies can reduce overall fleet purchase and maintenance costs while maintaining access to passenger vehicles for official use when needed. Bike sharing programs can promote increased use of not only bicycling but also public transportation by allowing program members to travel further distances from the bus stop than if they had to walk.

- Increase the number of Truck Stop Electrification (TSE) facilities to reduce idling emissions – Immediate/Near-term

Operators of long-haul trucks will idle their vehicles when stopping overnight at rest stops to provide heating or cooling in their sleeper cabs and to maintain the charge of their vehicle batteries while using appliances. This leads to



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significant diesel emissions. With the increasing amount of freight projected to be moved into, out of, and through the region by truck, expanding the number of facilities that provide TSE options can have significant benefits such as improved air quality, reduced fuel usage, and decreased maintenance costs.

- Preserve existing rights-of-way for future transportation uses that may be needed – Ongoing

Existing linear rights-of-way – including active and abandoned rail corridors and utility corridors – that are suitable for transportation purposes need to be preserved as corridors for potential future use. When portions of these corridors are used for non-transportation uses, it is very challenging and, usually expensive, to reestablish or create a new corridor. In some cases, the former transportation use of the corridor may be needed again in the future. One example would be acquisition of nearly 20 miles of right-of-way from just east of the Village of Brockport, Monroe County to Rochester by the Falls Road Railroad to reinstate freight rail service on this corridor, extending their current operations from Lockport, Niagara County through Orleans County to Brockport.

Illustrative Projects

The recommendations discussed above will be advanced with the reasonably expected revenues available through 2035. In addition, other projects have been identified that the region would pursue implementation of if and when additional funding becomes available. These projects are provided for illustrative purposes and represent actions above and beyond those that can reasonably be expected to be accomplished given limited federal resources. Financial partnerships with private and not-for-profit entities should be explored; specifically, those that would directly benefit from the projects. Each of these projects have been discussed and vetted through the regional transpor-

tation planning process and are considered worthy of implementation if sufficient additional revenues were to be made available for their advancement.

- Construct an interchange at Kendrick Road as part of the I-390 Southern Corridor Project

The purpose of the overall I-390 Southern Corridor Project is to improve I-390 from the Genesee River to I-590, including the reconfiguration of the existing interchanges at NYS Routes 15 and 15A. Due to funding constraints, the addition of an interchange at Kendrick Road to serve the planned expansion of the University of Rochester and its medical center cannot be included in the overall project. The University of Rochester is the region's largest employer and has recently completed its Master Plan, which calls for approximately \$500 million in investments that would create roughly 11,000 jobs. These investments are dependent on improved access to the University's facilities that will not affect mobility by creating additional delay along the corridor. Given the location of the project, it would serve as a catalyst for further development in the City of Rochester (Regional Urban Core) and Town of Brighton, Monroe County (a Mature Suburb). This project continues to be the top infrastructure investment priority of the Rochester Community Coalition that includes the City of Rochester, Monroe County, Rochester Business Alliance, and the labor and construction industries. Construction costs are estimated at approximately \$20-25 million in current dollars.

- Reconstruct the eastern portion of the Inner Loop as an at-grade boulevard

Based on a strong interest in continuing the revitalization of Downtown Rochester and adjacent areas, the City of Rochester has assessed the feasibility of raising the eastern portion of the Inner Loop to an at-grade boulevard. Current traffic volumes on this portion of the facility are



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well below the capacity provided by the current grade-separated four-to-six lane configuration. As envisioned, the reconstruction would reclaim land for private, taxable development, and improve connections between Downtown Rochester and surrounding neighborhoods. The reconstructed facility would allow for bicycling and walking and improve the overall contribution of the roadway to community character. Construction costs are estimated at approximately \$21.5 million in current dollars.

- Establish a Center City Circulator Service to serve daily commuters, visitors, and tourists

The circulator service would be designed to serve the needs of morning and evening peak period commuters, daytime workers and tourists, and evening/late-night visitors and tourists. The service would link major employment destinations, entertainment venues, and parking in Downtown Rochester, extending into the East End, High Falls, and Cascade districts. At present, it is recommended that this service initially utilize buses that could be purchased for \$1.5-\$1.75 million and be operated for \$2-\$3 million per year in current dollars. The feasibility of converting the service to modern streetcars or some other fixed-guideway system should be considered based on ridership and changes in development Downtown.

- Construct the Rochester Intermodal Station for interregional rail and bus services at the site of the current Amtrak Station

The current Rochester Amtrak Station is over 30 years old and not suitable as a gateway for visitors arriving to the region. The City of Rochester is progressing designs for a combined interregional train and bus station that would combine Amtrak, Greyhound Lines, and New York Trailways services with connections to RTS service, taxicabs, public parking, and bicycle parking. Construction costs are estimated at approximately \$25 million in current dollars.



- Support efforts to establish high-speed passenger rail service on the Empire Corridor

Improved passenger rail service between Buffalo and Albany (with connections to Toronto and New York City) that is faster and more reliable than current Amtrak service should be provided as it offers the opportunity to increase connections within the larger mega-region. As part of this, the proposed Rochester Intermodal Station will need to be built and the development of a station in central Wayne County should be strongly considered. To be feasible, this service must save time for existing riders, attract new riders from other modes, and not interfere with freight operations. NYSDOT is currently advancing planning for proposed higher-speed passenger rail service along the Empire Corridor. Once the associated corridor-wide Environmental Impact Statement is drafted, the region will be able to consider whether the proposed service meets future transportation needs.



Chapter VII - PERFORMANCE MEASURES

PERFORMANCE MEASURES

Performance Measures

Using quantitative metrics to measure the performance of the transportation system over time is important to being accountable to taxpayers, given the large amount of public funds used for its construction, maintenance, and operation. There is no current federal or state requirement that system performance be monitored and reported but there are increasing discussions at the national level on this issue. Performance measures are included in the *L RTP 2035* in order to monitor changes in key areas that matter to users of the transportation system.

GTC sought to ensure that the selected performance measures would be both meaningful (having significance) and understandable (capable of being comprehended) to users and policymakers, providing a common basis to discuss changes in how the transportation system is meeting or not meeting regional needs. The current value for each performance measure is provided as a benchmark along with the desired direction consistent with the GTC Goals and Objectives and the likely direction based on what can realistically be accomplished within the reasonably expected revenues.

Though less important than meaningfulness and understandability, another consideration in the selection of the performance measures was the availability of quality data for the region (or Rochester TMA) and the likelihood that it will continue to be collected. As a result, all of the data is collected either by a GTC member agency, GTC staff, or a New York State government agency that is not a GTC member agency. Exhibit 26 presents the *L RTP 2035* Performance Measures with each discussed below.

The number of fatalities in the region represents the three-year rolling average of the number crashes that resulted in loss of life based on information provided by the National Highway Traffic Safety Administration. A three-year rolling average was selected

to ensure that longer-term trends were not lost due to a significant fluctuation in a single year.



Pavement condition measures the physical integrity of the surface of a roadway. Poor pavement conditions result in accelerated wear and tear on vehicles, generating increased maintenance and operating costs for users. The percent of federal-aid highways with pavement conditions of fair or better was calculated based on data collected by NYSDOT and GTC and includes the vast majority of roadways in the region to which FHWA funds can be programmed for their repair or maintenance.

As discussed previously, all bridges in the region are inspected by NYSDOT not less than every two years to assess the condition of the various components of the bridge (e.g., substructure, superstructure, bearings, deck, etc.) and calculate an overall rating of one through seven, with seven being the highest. Bridges with a condition rating of five or above are considered non-structurally deficient. It is important to reiterate that deficient bridges are not intrinsically unsafe – unsafe bridges are closed before presenting a danger to the public.

Transit operators are required by FTA to maintain their buses and keep them in service for varying lengths of time based on the type of bus. RGRTA provided the average age of RTS buses, which have a 12-year lifecycle. Ideally, the average age of these buses would be six years, representing an equal number of buses being replaced each year. However, competing capital



PERFORMANCE MEASURES

Exhibit 26

LRTP 2035 Performance Measures

Performance Measure	What It Evaluates	Benchmark	Desired Change	Likely Change
Number of Fatalities	Safety	100	Decrease	Slight Decrease
Federal-Aid Highways with Pavement Fair or Better	System Preservation	90.3 percent	Increase	Slight Decrease
Non-Deficient Bridges	System Preservation	64.8 percent	Increase	Slight Decrease
Average Age of Transit Buses	System Preservation	7.65 years	Decrease	Slight Decrease
Travel Time Index on Major Roadways	Mobility	1.10	Decrease	Slight Increase
Transit On-Time Performance	Mobility	84 percent	Increase	Slight Increase
Passenger Rail On-Time Performance	Mobility	70 percent	Increase	Slight Decrease
Median Incident Clearance Time on Major Roadways	Mobility	52 minutes	Decrease	Slight Decrease
Median Transit Load Factor	Accessibility	0.93	Slight Increase	Slight Increase
Gaps in Core Multi-Use Trails Network	Accessibility	36 miles	Decrease	Slight Decrease
Federal-Aid Highways in TMA with Complete Sidewalks	Accessibility	19.6 percent	Increase	Slight Increase
Emissions of Nitrogen Oxides	Environment	18,914.8 Kg/day	Decrease	Decrease
Emissions of Volatile Organic Compounds	Environment	13,537.8 Kg/day	Decrease	Decrease
Emissions of Carbon Dioxide Equivalent	Environment	11,385 tons/day	Decrease	Slight Decrease
Direct Energy Usage	Environment	146.2 billion BTUs/day	Decrease	Slight Decrease

needs and other expenses make this difficult for any public transportation operator to achieve. In addition, proper preventive maintenance of vehicles can make it possible for buses to remain in service longer while providing levels of reliability similar to newer models.

As discussed previously, the Travel Time Index is a ratio of the time it takes to make a trip during the peak period compared to making the same trip at free-flow speeds (mid-day period). Data is currently collected by GTC using GPS-equipped vehicles. A

Travel Time index of 1.3 on a single segment indicates that the trip takes one-third longer in the peak period than in the mid-day period (i.e., a 20-minute free-flow trip requires 26 minutes in the peak period).

The historical transit on-time performance was provided by RGRTA for RTS with on-time defined as between three minutes early and 6 minutes late. Passenger rail on-time performance was obtained from Amtrak for their Empire Corridor New York City to Niagara Falls routes in December 2010 (the last monthly

PERFORMANCE MEASURES

performance report available) with on-time defined as reaching their end-point within 25 minutes of the scheduled arrival time. Median incident clearance time on major roadways was calculated by GTC for calendar year 2010 based on when notifications of in-



cidents and their corresponding clearances were provided by e-mail through NY-Alert and the NYSTA TRANSalert.

Transit load factor is the ratio of the number of passengers on a bus to the number of seats. A ratio of 1.0 indicates that all of the seats on a route are occupied. It is important to note that a transit load factor of above 1.0 does not mean that there is no room on a bus and additional passengers are not allowed to board. The industry standard for determining crowding on a bus using the transit load factor is 1.25 or higher (i.e., all of the seats are full and an additional 25 percent of the customers are standing). In cases where many of the passengers are making short trips (e.g., up and down a corridor with closely-spaced stops), a transit load factor of above 1.25 is not necessarily considered unreasonable. The transit load factor benchmark is based on January 2011 data provided by RGRTA for RTS routes.

As noted previously, the Core Multi-Use Trails Network includes

the Canalway Trail, Riverway Trail, Genesee Valley Greenway, Auburn Trail, Lehigh Valley Trail, and several other locally important trails such as the El Camino Trail and the 390 Trail. These trails represent nearly two-thirds of the existing multi-use trail mileage in the region. The mileage of the Core Multi-Use Trails Network will be approximately 260 miles when fully built out.

The federal-aid highways with complete sidewalks represents those roadways to which FHWA funds can be programmed for their repair or maintenance that have sidewalks on both sides of the street with no gaps. This data was collected through the Pedestrian Facilities Inventory, a field survey of the over 1,000 miles of federal-aid roads in the Rochester TMA that was conducted by GTC.

The emissions of ozone precursors (oxides of nitrogen and volatile organic compounds) were derived from post processing volume and speed data from the GTC Travel Demand Model using methodologies approved by FHWA, FTA, and the U.S. Environmental Protection Agency. Carbon dioxide (the most abundant greenhouse gas) emissions and energy use were also derived from post processing volume and speed data from the GTC Travel Demand Model using methodologies developed in conjunction with NYSDOT.



TRANSPORTATION ACRONYMS

TRANSPORTATION ACRONYMS

ACS	American Community Survey
ADA	The Americans with Disabilities Act of 1990
APTS	Advanced Public Transportation Systems
AVL	Automated Vehicle Location
BBS	Batavia Bus Service
BLOS	Bicycle Level of Service
BLS	Bureau of Labor Statistics
CAP	Circulation, Accessibility, and Parking
CATS	County Area Transportation System (Ontario County)
CCTV	Closed Circuit Television
CHIPS	State Consolidated Local Street and Highway Improvement Program
CMP	Congestion Management Process
CSXT	CSX Transportation
DAR	Dail-A-Ride
FFY	Federal Fiscal Year
G/FLRPC	Genesee/Finger Lakes Regional Planning Council
GRIA	Greater Rochester International Airport
GTC	Genesee Transportation Council
GTSC	New York State's Governor's Traffic Safety Committee
HAR	Highway Advisory Radio
HELP	Highway Emergency Local Patrol
HSIP	Highway Safety Improvement Program
HSSP	New York State Highway Strategic Plan
HTF	Highway Trust Fund
ICM	Integrated Corridor Management
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITS	Intelligent Transportation Systems
LATS	Livingston Area Transportation Service
LRTP	Long Range Transportation Plan
MPO	Metropolitan Planning Organization



TRANSPORTATION ACRONYMS

NHTSA	National Highway Traffic Safety Administration
NS	Norfolk Southern
NYSDOT	New York State Department of Transportation
NYSTA	New York State Thruway Authority
OTS	Orleans Transit Service
PPI	Producer Price Index
RBC	Rochester Bicycling Club
RGRTA	Rochester Genesee Regional Transportation Authority
RTI	Regional Trails Initiative
RTOC	Regional Traffic Operations Center
RTS	Regional Transit Service
RWIS	Roadway Weather Information Systems
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SBR	State Bicycle Route
SHSP	Strategic Highway Safety Plan
SRTS	Safe Routes to School
STS	Seneca Transit Service
TEA-21	Transportation Equity Act for the 21st Century
TIDE	Technology Initiatives Driving Excellence
TIP	Transportation Improvement Program
TMA	Transportation Management Area
TSE	Truck Stop Electrification
TSP	Transit Signal Priority
UC	University of California
UPWP	Unified Planning Work Program
USDOT	United States Department of Transportation
WATS	Wayne Area Transportation Service
WYTS	Wyoming Transportation Service
YOE\$	Year of Expenditure dollars



GENESEE TRANSPORTATION COUNCIL



Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035



GENESEE TRANSPORTATION COUNCIL

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Appendices

Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035



GENESEE TRANSPORTATION COUNCIL

June 2011

Appendix A - PUBLIC INVOLVEMENT

Long Range Plan for the Genesee-Finger Lakes Region 2035 **Summary of Public Comments Received**

The development of the *L RTP 2035* included nearly three months of focused public involvement periods that included eight public meetings, as well as specific outreach to low-income and minority populations in two distinct phases. Public comments were accepted via e-mail, fax, and comment sheets, as well as verbally at public meetings.

The first comment period was held from Friday, November 5, 2010 through Friday, December 17, 2010 to gather input on opportunities and issues facing the region. The second round was held from Tuesday, March 15, 2011 through Friday, April 29, 2011 to solicit input on the draft recommendations. Four public meetings were held during each round of public involvement.

The following represents a summary of the comments received from the participants at the eight public meetings and others who provided statements during both public involvement periods. The comments are organized according to the chapters and sections of the draft *L RTP 2035* document that was made available for public review. No priority has been assigned to any comments. Numbers in parentheses represent the number of times the same comment was received.

Introduction

Introduction

- Plan needs to be easily understood by the general public in order to engage them.

The Plan

L RTP 2035 Development

- None

The Genesee Transportation Council

- None

Responsibilities

- There should be a greater level of accountability for local municipalities using the Unified Planning Work Program (UPWP) funding for planning projects. Should not be planning for the sake of planning.

Goals and Objectives

- All of the goals and objectives related to economic vitality (1.A. and 1.B.), safety (2.A.), mobility (4.A. and 4.B.) connect to the concept of the increased mobility of people with disabilities bringing greater economic prosperity to the region as these people go out to work, shop, eat, etc.
- Regarding the goal related to efficient system management and operations (6.), Liftline's costs for supplemental rides are not minimal, in fact for those who rely on them, the costs are out of line.
- Regarding the goal related to partnerships (7.), there needs to be a community-based group, with some level of authority that has the ability to ensure necessary changes happen.

Organizational Structure

- The GTC technical committee should have requirements for training and/or education.
- Ensure that public health representatives are on both the Policy Committee and Planning Committee.
- Advance the level of Health Impact Assessment (HIA) type involvement in decision-making.

Guiding Principles

- Maximizing assets is key going forward but current assets need to be considered with respect to their future financial liability and transportation benefits to determine if they're worth fixing.
- It is our desire that the Plan consider people as the major concern, not the means of transport.
- Likes the emphasis on "plan for people" and the focus on personal health.
- Concept of "place matters" is very important. (2)

Development Phases

- None

Stakeholder Participation

- Improve methods for more meaningful and effective neighborhood engagement.
- RGRTA seems to present plans that have limited public input opportunities to influence outcomes.
- GTC should use real life examples of what citizens can do to help guide the planning process.

- Transportation is not generally considered in neighborhood planning. Education and outreach can change this.
- There is a need for increased coordination of transportation and land use decision making. (2)

The Region

People

- None

Businesses

- None

Recreational and Cultural Opportunities

- None

Places

- City residents have a different experience using the transportation system than suburban or rural residents.

Emerging Opportunities and Issues

- We are especially supportive of the plan's acknowledgment that older adults (65 years and older) in our region represent a growing economic engine. This assessment of the economic importance of seniors challenges an often negative stereotype that older adults are a financial drain or burden to the community. Indeed, as the plan confirms, older adults are an important contributing sector to the economy and quality of life.
- Transition the focus of transportation planning and resources to better align with community health needs and priorities to combat obesity and improve public safety. Promote transportation/land use connection through a health lens.
- Acknowledge that changes in population require additional needs and improve accommodation for senior citizens so they may make better use of transportation.
- An aging population will have major impacts as we are already seeing growing numbers of motorized wheelchairs on public roads in the City of Rochester. Safety is an issue especially during the winter months. (2)
- A conflict exists between the regulatory environment which maintains the status quo and emerging opportunities.
- GTC should review the NYSDOT Consortium of Renewable Energy and Sustainable Transportation (CREST) proposal.

The Region in 2035

- None

Transportation System

- The existing system has limited options for those who do not want to drive.
- Traditional measures used in the plan show that the region's transportation does well (for those using a vehicle), but for many people it does not (there is a lack of options). GTC needs to ask different questions when evaluating the success of the transportation system.
- The trade deficit with China is less than what the US spends importing oil, representing a major geopolitical issue that should be addressed.

Highways and Bridges

- Supports safety emphasis placed on the bridges.

Public Transportation

- Supports the recognition that public transportation is critical to improving access to employment and needed services for persons with disabilities.
- Three-quarters of a mile off a fixed route is the distance that makes Liftline routes become "supplemental." It is these routes that are exorbitantly priced. It is arguable that paratransit services are available throughout the region, as the way Liftline is run, many times its service is inadequate. The most blatant example is the cost of "supplemental" rides, which at \$8 per ride, each way, is cost prohibitive for those who use paratransit.
- Many people with disabilities who use RGRTA services have reported aspects of this system (Technology Initiatives Driving Excellence [TIDE]) are frequently not working. Also, RGRTA's over reliance on technology has made them indifferent to individual needs.
- Existing public transportation corridors (e.g. transit route on Monroe Avenue) have been established for over 100 years and will continue to have service.
- Currently public transportation is very affordable and should continue to be.
- RGRTA is not a for-profit company, it is a public authority; a public utility, to some degree. While the authority should always be fiscally responsible, its number one priority should not be making money, but providing the best service possible to the entire community. RGRTA and its outgoing CEO are on the record, in fact, Mark Aesch has written a book bragging about their "product" and refusing to call what RGRTA does a "service". This philosophy is incorrect and not in line with what a state-created authority should be doing.
- Presently it is easier to drive to many places rather than use public transportation. It often takes much longer when using public transportation

versus driving a car. Time is a factor when deciding whether or not to use public transportation.

Bicycle and Pedestrian

- There have been trail extensions in the Town of Webster that should be added to the trail map (map 10) in the draft *L RTP 2035* document. The Town can provide this information to GTC.

Freight

- Railroad spurs to access smaller businesses should be incorporated into the regional freight plan.
- The short line railroads have seen an increase in the tons of soybeans shipped overseas. This is an example of the balancing of the trade deficit in the global marketplace.

Interregional Travel

- None

Travel Characteristics

- Split of the trip purposes is interesting. GTC should look further into the nature of the trips and the destination.

Congestion Management Process

- I believe we should be investigating, soon, how to move more people efficiently to the locations now noted as high traffic, high congestion (e.g. the airport, the UR/Strong area, the Victor/Canandaigua corridor). Whether by high-amenity fast speed buses, or fixed rail, is less important than giving priority to such high-capacity systems over expanding, improving or even maintaining traditional highways and interchanges. The latter may well soon be expensive dinosaurs left from the fossil fuel era.
- Schools represent areas of congestion in the region due to student drop-offs and pick-ups by private vehicles and buses that have minimal numbers of students on them. (2)

Safety

- Distracted driving related to cell phones and bicycle vulnerability is becoming a significant issue in Penfield.
- The Whalen and Five Mile Line Road intersection in Penfield is problematic (safety issue) for bicyclists due to curb alignment.

Security

- None

Transportation Needs

- While traditional public transit is a necessary and important component of the transportation network in our community, we also believe that accessible sidewalks, bike paths, and highway and road designs that facilitate use by older citizens are all crucial to meeting the needs of this growing population. Older adults who are economically disadvantaged need specific transportation programs.
- Freight should be considered as part of intermodal connections.
- In the area served by Catholic Charities of the Finger Lakes – Ontario, Yates, Seneca, and Cayuga Counties – we struggle with the lack of compatibility between other local systems to assure the residents have easy transition between systems; it is essential for access to health care, employment, education and other opportunities. This is often an issue for Ontario County clients who are trying to access services in Monroe County. In addition to compatibility for services that deviate from the main thoroughfares as well as transfers between the systems.
- Urban (City of Rochester) job seekers face difficulties when trying to access suburban jobs using public transportation.
- Those older adults who can afford to pay for other safe/secure options (other than taxi) would like additional choices.
- Steps need to be taken to move away from a fossil-fuel based transportation system. As the cost of fuel rises the current transportation system may be crippled with out viable alternatives.
- I strongly believe we need to start now to implement transportation options that reduce our dependence on fossil fuels, and improve the possibilities for neighborly interdependence and walkable communities
- Don't know if GTC affects school buses, medical transport services or cabs; but this issue is important. These forms of public transportation are dirty and germ ridden. There needs to be a regulation requiring steam cleaning public transportation at least once a year. I'm a driver for these services for 15 years and have become sick as well as passengers over time. The minimum wage bus cleaners haven't a clue about universal precautions and etc. In the late 90's a local contractor only charged \$45/large bus to steam clean. They contracted with Blue Bird at that time. I doubt \$50/year will bankrupt these transportation districts or companies!
- It is also critical to support the development of services that complement traditional public transit such as volunteer and not-for-profit transportation services.

- Incentivize active transportation on local levels to all age groups by developing a Bicycle and Pedestrian Master Plan(s) with help from neighborhood citizens.
- There are factors other than transportation that are considered in where people choose to live. Therefore to flatly say that people need to move to where there is public transportation is inappropriate. The extreme of this concept would be that all people with disabilities must live in one area as this is where paratransit services are. Again, if you truly believe that transportation for the entire region is vital, then more cost-effective measures make up for services that are less than cost-neutral.
- If there are not public transportation resources for rural residents with disabilities, then "pedestrian" safety is just as important in these regions as in urban centers.
- A disproportionately high percentage of people with disabilities do not have access to public transportation, whether it be in urban, suburban or rural areas. We argue that it is this demographic that needs and would utilize public transportation more, on average, than able-bodied people, if the access was equal or better.
- Enhancing and expanding mobility and access for bicyclists correlates with wheelchair and other assistive-device users. Usually, what is good for bicyclists is good for the disabled.

Financial Plan

Costs

- None

Revenues

- None

Recommendations

- Overall the plan is strong and reads well. However, there is a disconnect between the emerging issues and the recommendations.
- Expansion component hits key targets (bike, pedestrian issues) but a modest increase in funding from 5 percent to 10-15 percent would produce a larger impact.
- I strongly urge that, while not ignoring safety issues addressed in the body of the plan, more emphasis be placed on projects that are future-oriented. Surely, much depends on the available funds. But I believe that articulating a vision of a better way to get around will create excitement in the general public, which helps greatly with generating the needed funding. It is well known that citizens in other cities have been willing to approve tax increases for projects they can get excited about. Let's do that here, too!

- It seems as though GTC is focused on too many objectives resulting in few accomplishments.
- Funding for public transportation should not be decreased from current levels.
- The link between transportation investment and economic development is lacking – noting Upstate NY's lack of brain gain versus supposed brain drain.

Preservation and Maintenance

- Disabled fixed-route users frequently complain that bus drivers tell them their wheelchair lifts are not operational.
- Roundabouts are a welcome change as one does not have to come to a complete stop.
- Roundabouts need to be made accessible. The creation of intersections with brick crosswalks need to be discontinued as well, as they are hazards for blind pedestrians and make navigation of wheelchairs difficult.
- It is an excellent idea to institute a regional program to prioritize the retrofit and/or new installation of American with Disabilities Act (ADA)-compliant treatments, but the program must contain a significant number of disabled consumers in the administration of this program.
- RGRTA satisfaction surveys are "created" by secretive focus groups with no real accountability.
- Increase routine and preventative maintenance of transportation routes within the plan for active transportation in route annual maintenance programs and include consideration of road diets, lane diets, introduction of bike lanes, pedestrian realm improvements, transit stop improvements, etc.
- Introduce "Complete Streets" approaches for cities, villages, and towns and discuss benefits with community members to include more balanced improvements to support walking and biking in the street and pedestrian realm.
- Improve traffic calming in City of Rochester neighborhoods
- Roads should be reengineered (or reconstructed) to reduce waste (large swaths of asphalt) on the current system as many roads in the region are over built for their current functions.
- The conversion of 4-lane highways to 3-lane highways provides a safer environment for bicyclists and pedestrians. These types of conversions should be happening frequently.
- Additional bike lanes on roadways are necessary and should be officially striped during reconstruction projects.

System Management & Operations

- There has been a problem with RGRTA's push for "efficiency". In the push to make the most money out of every minute a vehicle is on the road, people who take more time to get on a bus are being passed over at stops on fixed routes.

There is not enough emphasis on service. Again, this is due to RGRTA's insistence that it provides a product and not a service.

- Can there be a specific section for paratransit riders?
- There should be the ability to book paratransit rides online as part of the Greater Rochester Regional Commuter Choice Program. The technology is readily available to create databases and "tickets" that can be sent to RGRTA or any entity that books paratransit rides, the user and a neutral third party in order to keep track of paratransit rides scheduled and to handle missed rides, no-shows, etc.
- The Corporate Challenge would provide a good opportunity to spread the word about the Greater Rochester Regional Commuter Choice Program.
- Transit schedules are very difficult to use. Next Bus and overall Advanced Traveler Information Systems can help.
- Reduction of the number of people who are approved for Lift Line to physical disabilities leaves some people with developmental disabilities very vulnerable. In addition, some medically frail people are unable to wait at bus stops in cold or snowy weather.
- The synchronization of traffic signals should be increased and made to function seamlessly.
- Increase the reliability and efficiency of public transportation by ensuring that routes and schedules are consistent with published schedules and identify ways to better meet customer needs – i.e. decentralize RTS routes from Downtown Rochester so people can get around the City outskirts without going Downtown
- A greater level of focus/planning needs to be done to increase compatibility between all modes of transportation.
- RGRTA should explore using smaller passenger style vans to service routes on off peak hours and/or routes with few riders, as to save wear and tear on the larger buses.
- GTC should increase outreach and/or coordination with colleges and universities regarding increasing transit options. The University of Rochester currently operates a separate/closed facility.
- GTC should develop resources for employers to demonstrate the value of location incentives.
- The transit authority and GTC should work with local employers to shift commuters to public transportation. (2)

Expansion

- The Renaissance Square Downtown Transit Center was abandoned over two years ago because it was not feasible, and it was replaced by a single mode bus transfer shed with no other amenities. The project name should be changed.

- The Center for Disability Rights (CDR) submits a proposal for paratransit in the area call on GTC to sign onto our proposal.
- The call for multiple providers in the mobility management program recommendation fits in with the Finger Lakes Health Systems Agency's Sage Commission's call for more choices in paratransit. This recommendation aligns with our work group's recommendation for the development of a regional alliance of mobility management programs. We believe that mobility management services need to be encouraged and developed throughout the region and that, in turn, a coordination of these services is essential for the efficient use of our region's transportation assets. It would be an important collaboration between the public and private sector. We would request that funding to develop a business plan for an alliance of mobility managers be made available as soon as possible.
- Park and ride facilities for bicyclists should be explored.
- Access to transit via bicycles should also be encouraged through bike racks on buses.
- Expand fixed-route public transportation services so the Lift Line service area is extended.
- RGRTA should provide a more user-friendly website including information about routes and costs.
- Reinstate training for RTS users.
- Trail system currently disjointed and gaps in the system should be completed. The Lakeside Trail in Irondequoit is one example where part of the trail is not complete. GTC should focus on an east-west trail and a north-south trail.
- Disappointed in the lack of public transportation recommendations (lack of Light Rail, BRT, and other modes).
- Existing high volume bus routes should be converted to a trolley or light rail route if a cost-effective manner is available.
- BRT can be a precursor to Light Rail. It does not need to be an either or situation.
- Advance Safe Routes to School, Safe Routes to Play, Safe Routes to Transit involvement
- GTC should research future transportation opportunities that could be potentially provided by the abandoned railroad corridors.
- The Town of Irondequoit supports establishing increased connections around Irondequoit Bay. An excerpt from a letter to Congressman Maffei describing the said connection is provided. The Town would also like GTC's support on this issue.

Illustrative Projects

- I would like to express my strong support for the Illustrative Projects noted in the last pages of the document, specifically:
 - Raising at least part of the Inner Loop to street level and narrowing it, connecting adjacent neighborhoods to downtown and providing additional development sites in the area
 - Providing high speed intercity rail transportation, with an attractive and functional multi-modal station very close to the CBD
 - Establishing a downtown circulator system

As someone who has always appreciated and patronized the downtown core of Rochester, and hopes to live there within the next 5 years, I see these projects as enhancing the quality of my life; indeed, I need projects like these to make it actually feasible for me to live in center city.

- Amtrak and interregional bus services have been available for two years now at the site of the current Amtrak Station, but not located in a single building with appropriate patron interconnections. We (I) applaud the support of dollars to improve the physical appearance and functionality of the outmoded and temporary facilities presently at the train station. However, we are (I am) very concerned with what it is that is being supported. The number of people interconnecting between the two modes is miniscule, so few as to be insignificant. The Plan should be changed to support an intermodal transfer at the Amtrak station location to include both local and regional busses, and taxis, and with appropriate storage facilities for bicyclists.
- If high-speed rail is to succeed, ridership needs to be encouraged with seamless intermodal connections at the new station. This plan does not support that. It supports a bus destination a half a mile away, just far enough to make carrying your own bags inconvenient, with a connection only possible by taking yet another bus, or simulated trolley, or if you are on a tight schedule, a taxi. It promotes a great waste of money.
- Financially, high-speed rail is a hard improvement to justify. There is concern over the cost of on-going operations and probable funding sources. There does not seem to be a large demand to travel by train between Buffalo and New York City. (2)
- The \$21 million needed to raise the Inner Loop seems like a small amount of funding needed compared to the plan's overall budget of \$4.8 billion.
- It is possible to respond to University of Rochester that GTC would not support an I-390 interchange but would support alternative modes?

Performance Measures

- Suggest having specific bicycle and pedestrian performance measures

Other

- Recent emphasis on public infrastructure as public art (490 Gateway reconstruction and the Fredrick Douglass-Susan B. Anthony Bridge) is a positive resource for the community.
- The region has many college students but they are currently disjointed from the city and the cultural resources available – the colleges and universities need to encourage linkages for maximum economic benefit.

GENESEE TRANSPORTATION COUNCIL



Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035

Appendix B - Non-Air Environmental Issue Scan

Long Range Transportation Plan Non-Air Environmental Issue Scan



Commissioned by the Genesee Transportation Council

February 2007

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Long Range Transportation Plan Non-Air Environmental Issue Scan

Commissioned by the Genesee Transportation Council

February 2007



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GENESEE/FINGER LAKES
Regional Planning Council

Mission Statement

The Genesee/Finger Lakes Regional Planning Council (G/FLRPC) will identify, define, and inform its member counties of issues and opportunities critical to the physical, economic, and social health of the region. G/FLRPC provides forums for discussion, debate, and consensus building, and develops and implements a focused action plan with clearly defined outcomes, which include programs, personnel, and funding.

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Report Overview

The following report lists each primary non-air environmental issue category and any applicable sub-categories. For each category and sub-category, an Issue Description is included in order to provide the reader with a clear understanding of the issue's definition and context as it relates to this project. Along with issue descriptions, each category includes lists of the following items:

- Applicable *Federal and state legislative mandates*;
- Key *partners for consultation*, split by Federal, state and independent categories; and
- Useful *inventories and resources*.

Each primary non-air environmental issue is listed in order of priority; that is, the first issue (nonpoint source water pollution) is considered to present the greatest threat to the health of the environment.

Environmental mitigation activities related to each issue are identified below each issue description. Tables contain strategic policies, programs, actions and activities that, over time, will serve to avoid, minimize, rectify, reduce, or compensate for the impacts to or disruption of elements of the human and natural environment associated with the implementation of a long-range transportation plan.

Primary Non-Air Environmental Issues

A total of seven primary non-air environmental issue categories have been identified. Together, these categories cover the range of non-air environmental issues that can be associated with the implementation of a long-range transportation plan. These categories are prioritized as follows ("1" being the highest priority):

1. Nonpoint Source Water Pollution
2. Terrestrial Habitat Modification
3. Open Space Modification
4. Historical/Cultural Modification
5. Noise Pollution
6. Light Pollution
7. Thermal Pollution/Urban Heat Island Effect

Update and Maintenance Schedule for Inventories and Resources

Environmental issues and inventories identified within this scan should undergo regular review in order to accommodate new developments in best management practices as well as significant changes in Federal and state mandates. Review of best management practices across the primary categories identified above can generally occur in conjunction with routine LRTP updates and revisions, notwithstanding significant new developments in or alterations to Federal and state mandates.

Issue 1: Nonpoint Source (NPS) Water Pollution

Issue Description

Water is necessary for the health and function of all forms of life. The impairment of this resource can result in significant health impacts to a wide variety of organisms, including insects, fish, animals, flora and humans. Furthermore, the impairment of water resources can have a negative impact on the quality of life within natural and human communities, degrading the aesthetic value of lakes and streams as well as ancillary benefits such as recreation. When the cost and complexity of cleanup and treatment measures are taken into account, prevention of water resource degradation presents a far more efficient and cost effective method of maintaining the integrity of the resource.

Nonpoint source (NPS) water pollution is considered to be the most significant threat posed to the natural environment identified within this non-air environmental issue scan. Nonpoint sources of water pollution emanate from diffuse and variable sources. They are primarily conveyed to surface and ground water resources over impervious surfaces, such as pavement, and through appurtenances, such as storm water drainage systems. The implementation of a long-range transportation plan (LRTP) can therefore result in the generation of significant quantities of NPS pollution unless reliable mitigation measures are given serious consideration.

NPS water pollution is created through a variety of transportation system construction, maintenance and operation activities. This environmental issue has therefore been grouped into two subcategories: (1) *Stormwater Runoff from Roads, Highways and Bridges* and (2) *Hydromodification and Habitat Modification*.¹

1. Stormwater Runoff from Construction of Roads, Highways and Bridges

This subcategory refers to environmental issues associated with the construction of roads, highways and bridges, maintenance of such facilities, and anticipated impacts resulting from routine facility use and operation. The two specific types of NPS pollution that can be expected to result from road, highway and bridge use and construction include *storm water runoff* and *erosion/sedimentation*. Storm water runoff is a direct result of the impervious nature of the materials used for the construction of transportation facilities. As described by the USEPA:

Storm water discharges are generated by precipitation and runoff from land, pavements, building rooftops and other surfaces. Storm water runoff accumulates pollutants such as oil and grease, chemicals, nutrients, metals, and bacteria as it travels across land. Heavy precipitation or snowmelt can also cause sewer overflows which, in turn, may lead to contamination of water sources with untreated human and industrial waste, toxic materials, and other debris.²

Stormwater runoff can come in many forms and result from a variety of different actions. Road deicing materials are often a major component of storm water runoff and are a necessary component of cold-weather road and bridge operational maintenance. Other nonpoint source materials (metals, oils, grease,

¹ Major NPS categories as identified by the USEPA. Accessed 2/2/07 at <http://www.epa.gov/owow/nps/categories.html>

² US EPA. Primary EPA Topics: Stormwater. Accessed 2/2/07 at <http://www.epa.gov/ebtpages/watestormwater.html>.

etc.) can accumulate upon impervious surfaces from passing vehicles and impact local surface and ground water when storm and thaw events occur, flushing these pollutants into area water bodies. Impervious surfaces can also have an adverse effect on the natural function of rivers and streams. When storm water is collected and transported across impervious surfaces, its velocity and volume increases. These sudden surges of water – which would otherwise be diminished if allowed to percolate into the ground – increase the likelihood of stream bank erosion and sedimentation.

The construction of new facilities can also result in significant land erosion and water body sedimentation when proper stabilization techniques are not put in place at exposed construction sites. When vegetative cover is disturbed and/or removed for construction, underlying sediment becomes unstable and can be easily eroded and carried into streams, rivers, lakes and ponds. With this sediment come attached nutrients such as phosphorous and nitrogen as well as any associated contaminants or debris that may be on or near the construction site. The gradual accumulation of these contaminants and materials in water bodies can result in a variety of negative impacts, including eutrophication (i.e. algae blooms), decreased oxygen levels, organism death or impairment (such as fish kills), and water body use impairment (such as aesthetic degradation, foul odor or taste and/or a decline in recreational enjoyment).

2. Hydromodification and Habitat Modification

This subcategory refers to the disturbance that the presence of a transportation facility creates within the environment. Bridges, culverts, road ditching and road embankments all require the surrounding natural environment to be altered during their installation. As explained by the USEPA:

Hydromodification is one of the leading sources of impairment in streams, lakes, estuaries, aquifers, and other water bodies in the United States. [The] major types of hydromodification activities...change a water body's physical structure as well as its natural function. These changes can cause problems such as changes in flow, increased sedimentation, higher water temperature, lower dissolved oxygen, degradation of aquatic habitat structure, loss of fish and other aquatic populations, and decreased water quality. It is important to properly manage hydromodification activities to reduce nonpoint source pollution in surface and ground water.³

Once these facilities are installed, their presence can generally be assumed to be permanent or semi-permanent in nature, often causing an alteration to the local natural habitat, or *habitat modification*. Habitat modification refers to the permanent or temporary alteration of the aquatic or terrestrial environment. In the context of NPS water pollution, habitat modification refers specifically to aquatic impacts associated with new transportation facilities; terrestrial impacts are discussed in the following section under *Issue #2: Habitat Modification*.

3 USEPA. "National Management Measures to Control Nonpoint Source Pollution from Hydromodification." Accessed 2/2/07 at <http://www.epa.gov/owow/nps/hydromod/index.htm>.

Federal and State Mandates

Clean Water Act Compliance, §402: Implementation of Phase II Stormwater Rules and Regulations. EPA has granted NYSDEC the authority to implement this law through its State Pollution Discharge Elimination System (SPDES). Construction site operators statewide are required to conform to GP-02-01: SPDES General Permit for Stormwater Discharges from Construction Activity. Operators disturbing one acre or more of land must obtain permit coverage for their operation according to the following requirements:

- File a Notice of Intent (NOI) with NYSDEC before starting
- Prepare a Storm water Pollution Prevention Plan (SWPPP)
- Follow state technical guidance
- Control all wastes generated on-site

The NOI and SWPPP must be submitted to the local governing body and a copy must be made available to the public on-site.

Point source discharges are regulated through *GP-02-02: SPDES General Permit for Stormwater Discharges from Regulated Municipal Separated Storm Sewer Systems (MS4s)*.

Clean Water Act Compliance, §404: Corps of Engineers §404 Permits. A §404 permit is required for most discharges of dredged or fill material into US waters, including adjacent interstate and isolated wetlands. Regulated activities include placement of pilings as fill and side-casting associated with ditching, draining and excavating activities.

Safe Drinking Water Act: There can be no Federal assistance or participation in any project which the EPA Administrator has determined has the potential to contaminate sole source aquifers.

River and Harbor Act of 1899 (33 U.S.C. 403), US Army Corps of Engineers: §10 requires a permit to place a structure in navigable water of the US; §13 was modified by the Federal Water Pollution Control Act which established NPDES Permits.

Floodplain Management, Executive Order 11988, 1977: Basis for assessment of flood hazards which may be related to highway improvements. Combines the need to protect lives and property with the need to restore and preserve natural and beneficial floodplain values.

Impounding, Diverting or Controlling of Waters (16 U.S.C 662(a)): Requires consultation with FWS on any federal action that involves a surface area of 10 acres or more of modification to a stream or body of water.

Essential Fish Habitat, 1996 (16 U.S.C. 1801): 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act mandate that Federal Agencies identify and protect important marine and anadromous fish habitat.

Article 15 of the NYS Environmental Conservation Law: Water Resources: Title 5 of this law provides for the protection of the bed and banks of streams; DEC coordination is required to disturb

streambeds classified as AA, AA(T), A, A(T), B, B(T), C(T). Title 27 of this law provides certain protections for waterways designated as “wild, scenic and recreational rivers.” Outside the Adirondack Park, a DEC permit may be required for certain activities or projects located within certain distances of designated waterways, unless project is for maintenance or in-kind replacements of existing structures.

Partners for Consultation

Federal entities:

U.S. Department of Transportation (USDOT)	www.dot.gov
Research and Innovative Technology Administration (RITA)	www.rita.dot.gov
Federal Highway Administration (FHWA)	www.fhwa.dot.gov
Turner-Fairbank Highway Research Center (TFHRC)	www.tfhrc.gov
Federal Railroad Administration (FRA)	www.fra.dot.gov
Federal Transit Administration (FTA)	www.fta.dot.gov
National Highway Traffic Safety Administration (NHTSA)	www.nhtsa.dot.gov
Pipeline and Hazardous Materials Safety Administration (PHMSA)	www.phmsa.dot.gov
U.S. Environmental Protection Agency (EPA)	www.epa.gov
U.S. Army Corps of Engineers (USACE)	www.usace.army.mil

New York State entities:

New York State Department of Environmental Conservation (NYSDEC)	www.dec.state.ny.us
New York State Department of Transportation (NYSDOT)	www.nysdot.gov

Independent Organizations:

Transportation Research Board of the National Academies (TRB)	www.trb.org
American Association of State Highway and Transportation Officials	www.transportation.org
AASHTO Center for Environmental Excellence	www.environment.transportation.org

Inventories and Resources:

Publications:

- EPA. Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters. EPA Publication No. 840-B-92-002 (January 1993). Last access: February 20, 2007.
<http://www.epa.gov/nps/MMGI/>

Description: This is a comprehensive technical document on methods to abate and control nonpoint pollution in coastal areas. [The document is] primarily intended for State and local watershed project staff. Report includes chapters and fact sheets dedicated to subjects including: management measures for urban areas; management measures for hydromodification; and management measures for wetlands, riparian areas and vegetated treatment systems.

EPA. National Management Measures to Control Nonpoint Source Pollution from Urban Areas. 2005. EPA Publication No. 841-B-05-004 (November 2005). Last access: September 11, 2006
<http://www.epa.gov/nps/urbanmmm/>

Description: This guidance helps citizens and municipalities in urban areas protect bodies of water from polluted runoff that can result from everyday activities. These scientifically sound techniques are the best practices known today. The guidance will also help states to implement their nonpoint source control programs and municipalities to implement their Phase II Storm Water Permit Programs. Report includes chapters dedicated to subjects including: watershed assessment and protection; site development; new development and runoff treatment; bridges and highways; construction site erosion, sediment, and chemical control; pollution prevention; retrofitting systems for existing development; and operation and maintenance guidelines.

Finger Lakes/Lake Ontario Watershed Protection Alliance. Highway Superintendent Road and Water Quality Handbook, 2nd Ed. 1996.

Description: The Highway Superintendents Road and Water Quality Handbook was a multi-agency project designed to assist local Highway Superintendents in the permit process associated with activities that may impact local and regional water quality. Although road and right-of-way maintenance is the primary source of water quality problems on only a few waterbodies in NYS, numerous waterbodies are impacted by these activities as secondary sources of pollution. Becoming familiar with the permitting processes and technical information concerning water-related impacts associated with roadway construction and maintenance should help reduce uncertainties and frustrations encountered by local highway superintendents. Incorporating best management practices should also serve to hasten the permit application process and serve to minimize the impacts of roadway activities on local water resources. The manual is broken down into three sections: *Sec. I: The Permitting Process*; *Sec. II: Technical Information*; and *Sec. III: Where to go for Assistance*.

Michigan Department of Transportation. The Use of Selected Deicing Materials on Michigan Roads: Environmental and Economic Impacts. 1993. Last access: September 27, 2006.
http://www.michigan.gov/mdot/0,1607,7-151-9622_11045-57246--,00.html

Description: This report analyzes the performance, environmental effects, and economic costs of seven deicing materials: sodium chloride (road salt), CMA (calcium magnesium acetate), CMS-B (a patented product, Motech, containing principally potassium chloride), CG-90 Surface Saver (a patented corrosion-inhibiting salt), calcium chloride, Verglimit (a patented concrete road surface containing calcium chloride pellets), and sand (an abrasive). The data for the analysis of deicer performance are derived from current literature.

NYSDEC Division of Water. New York State Standards and Specifications for Erosion and Sediment Control. 2005. Last access: February 20, 2007.
<http://www.dec.state.ny.us/website/dow/toolbox/escstandards/index.html>

Description: The purpose of this document is to protect water quality due to construction activity and reduce sediment damage and associated maintenance costs of road ditches, storm sewers, streams, lakes, and flood control structures. It is distributed by the Empire State Chapter of the Soil and Water Conservation Society and

also available on the New York State Department of Environmental Conservation stormwater web site. This manual should be used by site developers in preparing their erosion and sediment control plans, and by local municipalities in preparing and implementing their soil erosion and sediment control programs, reviewing proposed site development plans, establishing or encouraging uniformity through standards in applying erosion control techniques, and helping developers, private engineers, and planners make maximum use of potential development sites by proper management of their natural resources.

Useful Websites:

FHWA, Turner-Fairbank Highway Research Center “Hydraulics and Hydrology Research Webpage” Last access: October 4, 2006.

<http://www.tfhrc.gov/structur/hydrlics/index.htm>

Description: Provides research, technical support and advice regarding hydromodification and hydrology related to transportation facilities.

USEPA Section 319 Nonpoint Source Success Stories Website. Last access: February 20, 2007.

<http://www.epa.gov/owow/nps/Success319/>

Description: The *Section 319 Nonpoint Source Success Stories Website* features projects receiving grant funds from the section 319 program that have achieved documented water quality improvements. Water quality improvements are demonstrated through the achievement of water quality standards for one or more pollutants/uses; nonpoint source total maximum daily load allocations (and removal from the state's section 303(d) list of impaired waters); measurable, in-stream reduction in a pollutant; or improvement in a parameter that indicates stream health (e.g., increases in fish or macroinvertebrate counts). Stories also demonstrate innovative strategies used to reduce nonpoint source pollution, the growth of partnerships, and diversity of funding sources.

NYSDEC Stormwater Information Webpage. Last access: February 20, 2007.

<http://www.dec.state.ny.us/website/dow/mainpage.htm>

Description: The NYSDEC Stormwater Information Webpage was designed to provide NYS contractors, municipalities, and other entities with a comprehensive array of data pertaining to permitting process, key documents, timelines, and other important facts associated with Phase II Stormwater implementation.

NPS Water Pollution: Stormwater Runoff from Construction, Operation, and Maintenance of Roads, Highways and Bridges

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Stormwater Runoff from the Construction, Operation and Maintenance of Roads, Highways and Bridges	Clean Water Act Compliance, §402: Implementation of Phase II Stormwater Rules and Regulations. Construction site operators statewide are required to conform to GP-02-01: SPDES General Permit for Stormwater Discharges from Construction Activity. Operators disturbing one acre or more of land must obtain permit coverage for their operation according to the following requirements:	<ul style="list-style-type: none"> SWPPPs must be prepared by a licensed professional (Certified Landscape Architect, Professional Engineer (PE), or Certified Professional in Erosion and Sediment Control (CPESC) When properly prepared, SWPPPs offer the most comprehensive level of protection from sedimentation occurring off-site Standards are national in scope, as stipulated under the Federal Clean Water Act 1987 Amendments 	<ul style="list-style-type: none"> Regulations are complex Procedures are not always enforced in a uniform manner between counties Due to the complexity of the regulations and the dearth of private contractors working in the field, end results of regulation implementation can vary significantly
	Stormwater Retrofitting is an innovative approach to updating outmoded stormwater transmission systems. They can reduce pollutants, restore habitats, and stabilize stream morphology. Different types of retrofitting solutions can be developed depending on the location, local geography and volume of stormwater anticipated. Types of retrofit approaches include: <ul style="list-style-type: none"> The overall reduction or elimination of paved surfaces; Use of pervious pavement materials, which allow stormwater infiltration; Vegetative swales or rain gardens, which convey stormwater and provide temporary storage for eventual infiltration; Detention/retention areas, which provide either temporary or semi-permanent storage for storm water for eventual infiltration; 	<ul style="list-style-type: none"> Replaces inadequate structures Reduces pollutants entering water bodies Reduces downstream volumes of stormwater, thereby reducing the potential for localized flooding and property damage Potential to reduce stormwater volumes to local sewage treatment plants and the associated treatment costs 	<ul style="list-style-type: none"> Potential for high initial construction costs Developed areas are generally devoid of extra space, making retrofitted facility siting difficult Facilities require routine maintenance and upkeep in order to ensure proper operation Large stormwater surges can inundate retrofits and bypass the facility

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	<ul style="list-style-type: none"> • Constructed wetlands, which can treat stormwater, slow its velocity, and provide natural habitat; • Infiltration trenches/basins which can convey large volumes of water while allowing moderate infiltration; and • Sand filters, which trap harmful pollutants. 	<ul style="list-style-type: none"> • Stabilizes stream morphology by decreasing overall volume of storm water surges during rain/thaw events • Restores natural habitats • Vegetated areas and rain gardens can provide an aesthetically pleasing appearance in urban settings 	<ul style="list-style-type: none"> • Areas such as retention ponds incorporate standing water, posing a health and safety risk to the public
	<p>Road Deicing Best Management Practices: Alternative Spreading Considerations can limit the amount of deicing materials used on roads and highways or offer alternatives to their use.</p> <p>“Smart Salting” is a concept that raises awareness among operators and the public of the impacts associated with over-application of road deicing materials. Application rates, the location of streams and wetlands, and other relevant factors are considered. This enables highway departments to apply modest amounts of salt and avoid over-salting, particularly in environmentally sensitive locations. Public outreach efforts (signage, media, etc.) alert the public to the issue and need to drive with caution.</p>	<ul style="list-style-type: none"> • Prevents over-salting in environmentally sensitive areas and associated salinization of waterways • Decreases costs associated with salting due to a decrease in product and equipment use • Decreases costs associated with spring clean-up and repairs (potholes, storm sewer maintenance, street sweeping, ditch cleaning) 	<ul style="list-style-type: none"> • A commitment of resources for training and implementation is necessary • Locations must be identified which are most suitable for smart salting implementation • Commitment of education and outreach required in order to prepare the public for policy change • Possible road safety concerns
	<p>Road Deicing Best Management Practices: Storage Area Considerations</p> <p>Covering and stabilization of salt piles. Best management practices in storage of salt include locating areas outside of floodplains; designing storage facilities to prevent seepage of salt into the ground or onto the vehicle lot and neighboring waterways; designing facilities large enough so that vehicles can be loaded entirely within the covered area; and equipping storage facilities with drainage and collection devices that prevent losses from storm or melt water.</p>	<ul style="list-style-type: none"> • Environmental benefits • Decreases operational costs by preventing salt loss/seepage during wet weather events • Facilities provide a convenient and effective loading area for highway staff 	<ul style="list-style-type: none"> • Construction costs • Can be difficult to locate if space is limited

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	<p>Road Deicing Best Management Practices: Alternative Deicing Materials: Alternatives to traditional rock salt have been developed in an effort to provide highway departments with flexible and environmentally-friendly approaches to road deicing.</p> <p>Calcium Magnesium Acetate (CMA) has a deicing range that is very close to salt. It is harmless to humans, plants, and animals; non-corrosive to metals; and nondestructive to concrete and other highway materials. Its main ingredient, dolomitic lime, is readily available throughout the country, making distribution feasible. The compound sticks to the highway longer than salt, thereby prolonging its lifespan on the roadway. Overall, CMA is considered to be less harmful to the environment than salt. It is known to be less toxic to fish and plants; it is, however, more deleterious to certain types of plankton.</p> <p>Verglimit (a proprietary product) consists of calcium chloride flakes encapsulated in linseed oil which are blended into the plant-mixed bituminous wearing surface. It essentially lengthens the response time and/or eliminates the need for added deicing maintenance.</p>	<ul style="list-style-type: none"> • Lengthens response time • Eliminates need for extra maintenance • Works well on bridges, ramps, and steep grades • Less corrosive than salt • Initial studies indicate that it is less harmful to the environment than salt 	<ul style="list-style-type: none"> • Does not work as well as salt at lower temperatures (below 23 degrees F) • Sticks to spreading equipment, requiring stop-and-go maintenance • More persistent in the environment • May decrease oxygen levels in water • Does not require storage considerations that salt does • Higher costs than salt
		<ul style="list-style-type: none"> • Effective in known hazard areas that are prone to icing • Decreases the need for quick responses during freezing events • Little environmental threat • Less corrosive than road salt 	<ul style="list-style-type: none"> • High cost relative to salt • Application is limited to specific areas, such as bridge decks, ramps, shaded areas, and steep grades • Compaction and cracking problems • Maximum traffic volume of 5,000 vehicles per day

NPS Water Pollution: Hydro-Modification and Habitat Modification: Bridges

There are several best management practices in bridge design that can mitigate hydro- and habitat modification from bridges. These include:

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Hydro – modification/Habitat Modification – <i>Bridges</i>	Incorporating best management practices into general bridge construction, maintenance and demolition considerations , which include guidelines for painting and enclosures for repairs that can trap harmful materials before entering the environment.	<ul style="list-style-type: none"> • Incremental addition of BMPs can gradually reduce environmental impacts • Can be voluntary 	<ul style="list-style-type: none"> • Costs associated with training and implementation of BMPs
	Bridge design and construction alternatives , which incorporate longer bridge spans, alternative materials that are less likely to degrade the surrounding environment, or designs that avoid environmentally sensitive areas altogether.	<ul style="list-style-type: none"> • Natural channels can be maintained; environmentally sensitive areas can be protected • Additional benefits include added protection from flooding hazards • Greater likelihood of species passage underneath 	<ul style="list-style-type: none"> • Additional length or materials will increase construction costs • Designs can be complex, also adding to costs • No design can provide 100% assurance that occurrences of environmental degradation will be eliminated
	Scupper drains are an example of a best management practice in design, which allow storm water to drain out of bridges into areas where it can be treated;	<ul style="list-style-type: none"> • Scupper drains effectively protect water resources from various harmful materials deposited on roadways • Stormwater can be routed away from direct drainage into a waterway • Stormwater can also be treated once on land • Retrofitting existing bridges with scupper drains is feasible 	<ul style="list-style-type: none"> • Cost of retrofits on existing bridges may be considerable • Maintenance is required in order to assume proper drain function • If treatment facilities are part of the design, additional space may be necessary

NPS Water Pollution: Hydro-Modification and Habitat Modification: Culverts

Key design consideration for culverts is to permit water, sediment and debris transport through the crossing by maintaining natural channel dimensions and slope through the structure, and considering flow through the entire riparian area. Incorporating alternative designs will very likely increase the complexity and costs of the project. Comprehensive analysis of the construction site, stream dynamics, and design alternatives can result in amenable solutions, however. Design considerations and alternatives include:

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Hydro – modification/Habitat Modification – <i>Culverts</i>	Box culverts , which are usually square or rectangular reinforced concrete structures with single or multiple openings; research indicates that a pre-cast inlet with the optimum bevel is the best performer when the inlet was submerged because the streamlined curve of the bevel provides a better path for the water flow.	<ul style="list-style-type: none"> • Culvert has minimal impact on natural stream flow 	<ul style="list-style-type: none"> • Cost associated with design and implementation
	No-slope designs , which are useful for new as well as replacement culverts due to their simple installations, low to moderate channel gradient, and suitability for species passage.	<ul style="list-style-type: none"> • Works as new, retrofit, or replacement culvert • Simple installation • Works for variety of species 	<ul style="list-style-type: none"> • Only works for low to moderate gradients • May be costly
	Stream simulation designs , which mimic natural channel flow; i.e. sediment transport, fish passage, and flood and debris conveyance function as they would in the natural channel. These can be used for new and replacement installations, complex installations with higher gradients and lengths, narrow stream valleys, and locations where all fish species require passage.	<ul style="list-style-type: none"> • Comprehensive approach to stream mitigation • Functions as natural channel would • Can be used for a variety of new and replacement installations 	<ul style="list-style-type: none"> • Costs associated with design and installation
	Fishways and fishrocks , which are used to slow water velocity in a steepened streambed and to create small fish resting areas. This technique involves placing “rocks” in the form of wet concrete or some other material that is secured to the existing streambed and culvert bottom.	<ul style="list-style-type: none"> • Allows fish to climb gradient • Creates resting areas for fish 	<ul style="list-style-type: none"> • Cost of construction

NPS Water Pollution: Hydro-Modification and Habitat Modification: *Ditching and Embankments*

Increased awareness of the negative impacts that erosion and sedimentation can have on waterways has led state and local highway departments to research best management practices in roadside ditch and slope designs. Most solutions are relatively simple and cost effective. These include:

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		Benefits	Impacts
Hydro – modification/Habitat Modification – <i>Ditching and Embankments</i>	Ditch shape designs: Ditch shape designs should consider the proximity to receiving water bodies and the potential for erosion in the general vicinity. Vegetation above embankments should be maintained to avoid erosion. The ditch should be able to handle peak flows. Maintenance should occur during seasonally dry conditions, or immediately after any soil disturbance. Ditches should be cleaned and reshaped as needed. Constructing ditches in these shapes is simple and would not necessarily add time.	<ul style="list-style-type: none"> Long-term maintenance costs can decrease Straight-forward designs Little time required 	<ul style="list-style-type: none"> Short-term design and maintenance costs may increase Education and outreach to highway staff regarding proper designs and benefits of alternative designs and approaches The best shape may not be best for project
	Selection of lining materials: Concrete, stone bottom and sides, fabric, stone bottom/grassed sides, and vegetated swales are less prone to erosion and decrease waterway sedimentation. Weeds and tall grass, mowed grass, stone bottom/grassed sides, earth bottom/grassed sides, and stone bottom and sides have a higher ability to slow water velocity.	<ul style="list-style-type: none"> Long-term maintenance can decrease due to increased stability Vegetated areas provide aesthetic and environmental benefits Areas will become less prone to erosion due to a reduction in water velocity 	<ul style="list-style-type: none"> Cost of materials: geo-textiles in particular can be expensive Knowledge of proper installation and/or construction methods is required Solutions are often site-specific: site designs and material selection are likely to vary significantly based on slope, soil type, soil stability and other site characteristics
	Slope considerations refer to materials and approaches to the design of roadside slopes. The key considerations are stability, safety, and maintenance. Slopes can be stabilized with geo-textiles or other reinforcements such as reinforcing bars. Retaining walls may be needed at the toe of slopes. Signs and guardrails help warn people	<ul style="list-style-type: none"> Proper slope design can reduce area erosion Maintenance can be decreased Improved safety for motorists 	<ul style="list-style-type: none"> Materials may be costly Construction may be time-consuming Costs associated with design are likely to be high

LRTP Non-Air Environmental Scan

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	about steeply sloped embankments. Rip rap, vegetation, and fabrics can reduce erosion and ease maintenance.		

Issue 2: Terrestrial Habitat Modification

Issue Description

Terrestrial habitat modification refers to the modification (i.e. destruction, displacement, or impairment) of natural vegetative, animal or insect communities or the resources necessary for their survival. A variety of transportation system construction, maintenance and operation activities can result in significant terrestrial habitat modification. The types of habitat modification that are likely to occur can be grouped into two primary categories: *habitat loss and/or landscape fragmentation* and *mortality or injury* resulting from vehicle collisions.

1. Habitat Loss and/or Landscape Fragmentation

This category refers to the loss of habitat that may occur as new transportation facilities are created. All variety of insects and animals require a basic habitat that they depend on for their survival. Within this area exists the means for their sustenance, shelter and socialization. The construction of new facilities can either destroy an organism's habitat entirely or significantly impair it in a manner that decreases the organism's chances of survival.

Landscape fragmentation refers to the cumulative impacts that transportation facilities can have on habitat. The construction of basic transportation facilities has the potential to induce the growth of new supportive facilities over time. As such, areas of contiguous natural habitat are gradually intersected, reducing large, undivided areas into smaller patches of land. This phenomenon can have a negative impact on an organism's ability to survive over a prolonged period of time. As a species' habitat is slowly reduced, competition for scarce resources (food, shelter, etc.) will increase. All types of birds, reptiles, insects and vegetative organisms can be negatively impacted to various degrees by landscape fragmentation.

2. Species Mortality or Injury of Deer and/or Threatened or Endangered Species

Mortality or injury resulting from vehicle collisions is likely to occur as new transportation facilities are created that neglect to take organisms' migratory capabilities, preferences and patterns into account. Impacts with large animals – such as deer – can put individuals at significant risk due to losses associated with property damage, personal injury or death. Impacts with other species that may be endangered or threatened should also be given serious consideration as new transportation facilities are constructed. Retrofitting existing facilities in areas where such species are found to exist should also be given serious consideration.

Federal and State Mandates

Federal Highway Administration Wetland Policy, 1977 (23 CFR 777, Mitigation of Impacts to Wetlands and Natural Habitat): It is the FHWA's policy to prepare a formal wetland finding prior to the approval of any project involving new construction in wetlands and classified as an EIS or a Finding of No Significant Impact (FONSI).

Protection of Wetlands, Executive Order, 11990, 1977: Directs federal agencies to avoid unnecessary alteration or destruction of wetlands, and requires implementation of actions to minimize the loss or degradation of wetlands affected by a project that received federal funding.

Endangered Species Act, 1973 (50 CFR 402), Fish and Wildlife Service, Department of the Interior, National Marine Fisheries Service, Department of Commerce: Protects nationally designated threatened and endangered species.

Fish and Wildlife Coordination Act, 1958 (U.S.C. 661-667): Ensures that wildlife conservation will receive equal consideration.

National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd), U.S. Fish and Wildlife Service (FWS): Provides protection of wildlife refuges and ranges, game ranges, wildlife management areas, or waterfowl production areas as administered by the Secretary of the Interior through the U.S. Fish and Wildlife Service.

Environmentally Beneficial Landscaping, Executive Memorandum, 1994: Environmentally beneficial landscaping entails utilizing techniques that complement and enhance the local environment and seek to minimize the adverse effect that the landscaping has on it. In particular, this means using regionally native plants and employing landscaping practices and technologies that conserve water and prevent pollution.

Migratory Bird Treaty Act, 1918 (16 U.S.C. 703-712): Generally prohibits the taking, possession, transportation, sale, purchase, barter, importation, exportation, and banding or marking of migratory birds, and the taking of nests or eggs, except for scientific purposes.

NYS Freshwater Wetlands Act, Article 24 of the NYS Environmental Conservation Law: A permit is required for most activities that will alter freshwater wetlands or adjacent areas. The approximate boundary of all wetlands within jurisdiction are shown on official NYS Freshwater Wetlands Maps maintained by NYSDEC

NYS Tidal Wetlands Act, Article 25 of the Environmental Conservation Law: A permit is required from the NYSDEC for almost any activity that will alter tidal wetlands or adjacent areas. The approximate boundaries of all tidal wetlands within agency jurisdiction are shown on official NYSDEC maps.

Partners for Consultation

Federal entities:

U.S. Department of Transportation (USDOT)
Federal Highway Administration (FHWA)
U.S. Environmental Protection Agency (EPA)

www.dot.gov
www.fhwa.dot.gov
www.epa.gov

New York State entities:

New York State Department of Environmental Conservation (NYSDEC)

www.dec.state.ny.us

Independent Organizations:

Transportation Research Board of the National Academies (TRB)
American Association of State Highway and Transportation Officials

www.trb.org
www.transportation.org

Inventories and Resources

Publications:

EPA. Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters. EPA Publication No. 840-B-92-002 (January 1993). Last access: February 20, 2007.
<http://www.epa.gov/nps/MMGI/>

Description: This is a comprehensive technical document on methods to abate and control nonpoint pollution in coastal areas. [The document is] primarily intended for State and local watershed project staff. Report includes chapters and fact sheets dedicated to subjects including: management measures for wetlands, riparian areas and vegetated treatment systems.

FHWA. Critter Crossings: Linking Habitats and Reducing Roadkill. 2000. An electronic version of Publication No: FHWA-EP-004. Last access: February 20, 2007.
<http://www.fhwa.dot.gov/environment/wildlifecrossings/main.htm>

Description: The website describes transportation's impacts on wildlife and highlights exemplary projects and processes that are helping to reduce these impacts. The website includes illustrated chapters on subjects pertaining to: tortoise underpasses; tunnels for small burrowing animals and reptiles; tools to assess wildlife linkage areas; fish passages; passages for large mammals; and other related assessment tools and websites.

Transportation Research Board. Guidance for Estimating the Indirect Effects of Proposed Transportation Projects. 1998. Last access: September 15, 2006.
http://trb.org/news/blurb_detail.asp?id=3004

Description: TRB's National Cooperative Highway Research Program (NCHRP) Web Document 43: Guidance for Estimating the Indirect Effects of Proposed Transportation Projects is an instructional course based on research conducted for National Cooperative Highway Research Program Project 25-10: Guidance for Estimating the Indirect Effects of Proposed Transportation Projects. The course consists of a PowerPoint presentation and support materials.

Transportation Research Board, National Cooperative Highway Research Program. Interaction Between Roadways and Wildlife Ecology: A Synthesis of Highway Practice. 2002. Last access: February 20, 2007. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_305.pdf

Description: This synthesis report will be of interest to state department of transportation (DOT) staff involved in the development, operation, and maintenance of roadways and how they can effect wildlife and ecological systems across the country. Roadway development choices made in response to population growth can affect many, if not all, forms of wildlife. Such effects include loss of wildlife habitat, fragmentation, mortality, and

increased competition. The synthesis reviews and discusses regulatory context (laws, regulations, policies, and guidance); transportation planning and development processes; the types of effects, including habitat loss, fragmentation, and chemical and physical impacts; the scale and assessment of effects; analytical tools, including motorist safety studies and wildlife surveys; conservation measures and mitigation; maintenance (culverts and habitat restoration); and funding sources and deficiencies.

Useful Websites:

FHWA. Keeping it Simple: Easy Ways to Help Wildlife Along Roads. Last access: February 20, 2007. <http://www.fhwa.dot.gov/environment/wildlifeprotection/index.cfm?fuseaction=home>.

Description: This website highlights more than 100 simple, successful activities from all 50 states and from FHWA's Western Federal Lands Division. All these activities are "easy." Most are low- or no-cost. All benefit fish and wildlife or their habitat. Categories include mitigations measures organized in sections dedicated to roads, bridges, waterways, wetlands, and upland areas.

International Conference on Ecology & Transportation: Conference proceedings for the years 2001, 2003 and 2005. <http://www.icoet.net/index.asp>

Description: Conducted every two years, ICOET is designed to address the broad range of ecological issues related to surface transportation development, providing the most current research information and best practices in the areas of wildlife, fisheries, wetlands, water quality, overall ecosystems management, and related policy issues. ICOET is a multi-disciplinary, inter-agency supported event, administered by the Center for Transportation and the Environment.

Texas Transportation Institute. Deer Vehicle Crash Information Clearinghouse. Last access: February 20, 2007. <http://www.deercrash.com/>

Description: This website includes: detailed deer-vehicle crash statistics at regional, state and national levels; a "countermeasures toolbox" detailing deer-vehicle mitigation activities and approaches; and links to relevant partners and resources.

Habitat Modification: Habitat Loss and/or Landscape Fragmentation

The following considerations should be made regarding mitigation of the loss of environmentally sensitive habitats:

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Habitat Modification: Habitat Loss and/or Landscape Fragmentation	Alternative facility site considerations for wetland areas and other environmentally-sensitive areas should be a priority. The most sensitive areas are often irreplaceable and provide ecological benefits that are difficult to quantify. Destruction, relocation or alteration of sensitive habitats should be a choice if no other feasible alternatives exist.	<ul style="list-style-type: none"> • Maintenance of the integrity of natural areas • Species protection • Aesthetic benefits of open space preservation 	<ul style="list-style-type: none"> • Costs associated with land acquisition and alternative site planning
	Land and/or wetland banking is a process whereby entities set aside lands in anticipation of growth and development. In instances where destruction of the resource is unavoidable, lands that have been set aside can be used to offset losses.	<ul style="list-style-type: none"> • Replaces impacted or destroyed lands with lands of equal or greater value • Provides developers with a method of ensuring compliance with Federal and state mandates 	<ul style="list-style-type: none"> • Original natural resource is permanently altered • Mitigation costs are generally high • Difficulty reproducing the natural conditions of original resource
	Vegetative buffer zones between transportation facilities and adjacent areas of sensitive habitat should be promoted.	<ul style="list-style-type: none"> • Maintenance of the integrity of natural areas • Species protection • Aesthetic benefits of open space preservation 	<ul style="list-style-type: none"> • Costs associated with the design of feasible landscaping and approaches
	Encourage use of indigenous plants within buffer zones in an effort to maintain the integrity of the surrounding natural habitat.	<ul style="list-style-type: none"> • Maintenance of the integrity of natural areas • Species protection • Enhancement of ecological integrity 	<ul style="list-style-type: none"> • Costs associated with materials and necessary professional consultation

Habitat Modification: Species Mortality or Injury – Deer

Deer collisions present the most significant risk due to their potential to inflict losses including property damage, personal injury or death and should therefore be given the most consideration and priority.

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	Public Information and Education. Many collisions are often random and may be unavoidable altogether. Public awareness as to the problem of and hazards associated with deer collisions can work well as part of a comprehensive mitigation program.	<ul style="list-style-type: none"> • Cost effective • Capability of reaching a wide audience 	<ul style="list-style-type: none"> • Will not eliminate the problem altogether • Costs associated with reaching a wide audience
	Speed Limit Reduction in known high-frequency collision areas can provide the driver with extra time and distance to react to deer. There is a documented connection between the reduction of speed limit and the reduction of deer-vehicle crashes. Drivers, however, do not always follow posted speed limits. Roads with higher speed limits often already have better design features that increase visibility for the driver.	<ul style="list-style-type: none"> • Practical approach to decreasing collisions 	<ul style="list-style-type: none"> • Difficulty assuring enforcement and compliance
	Roadway Maintenance, Design, and Planning Policies: Various road designs can decrease collisions by improving driver awareness and sight lines. Four-lane roads have fewer crashes than two-lane roads due to visibility and room for evasive maneuvers.	<ul style="list-style-type: none"> • Long-term approach to overall reduction in impacts in known high-impact areas 	<ul style="list-style-type: none"> • Not feasible in all locations, particularly rural areas • Costs associated with research, design and construction implementation
	Deer Crossing Signs and Technologies, which can alert drivers to hazards caused by animals when and where they are observed to gather in numbers or with frequency.	<ul style="list-style-type: none"> • Innovative solution within high-impact areas 	<ul style="list-style-type: none"> • Costs associated with research and installation • Identifying appropriate sites can be difficult • If used too frequently, may decrease drive awareness due to complacency • Research regarding effectiveness inconclusive

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	Roadside Vegetation Management involves controlling vegetation near roadsides that either attract deer (for feeding) or obscure deer from passing motorists.	<ul style="list-style-type: none"> • Long term solution within areas experiencing a high frequency of impacts • Increase in overall safety and visibility for drivers • Part of an overall roadside vegetation strategy, which should include a variety of environmental considerations 	<ul style="list-style-type: none"> • No conclusive research proving that this method is an effective means of preventing collisions.
	Roadside Reflectors and Mirrors (Swareflex Wildlife Reflector (a proprietary product)) which work in conjunction with passing automobile headlights. The reflection of light may frighten, distract, or freeze deer enough so that they will not cross the road. Such reflectors are currently being tested along high-frequency collision areas of the NYS Thruway (Rt. 90 near Lancaster).	<ul style="list-style-type: none"> • Innovative solution within high-impact areas 	<ul style="list-style-type: none"> • Current research regarding effectiveness is inconclusive • Technology requires frequent maintenance in order to assure proper function (particularly in the winter time) •
	Deicing Salt Alternatives. Deer are attracted to salt. Using alternative deicing materials in known high-frequency collision areas can decrease deer's desire to congregate near areas with salt.	<ul style="list-style-type: none"> • Temporary solution within areas experiencing a high frequency of impacts 	<ul style="list-style-type: none"> • Use of alternatives may contradict or otherwise complicate a department's overall deicing strategy • Costs associated with materials
	Repellants , which can make food that otherwise has an attractive taste or smell offensive to deer. When placed near a road, this may cause them to avoid the road. Only specific types of repellents have been shown to be effective.	<ul style="list-style-type: none"> • Temporary solution within areas experiencing a high frequency of impacts 	<ul style="list-style-type: none"> • Costs associated with product purchase, application and monitoring the effectiveness • Can simply cause deer to migrate to other areas, transferring the hazard

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	Exclusionary Fencing physically separates animals and vehicles. Research shows that this method is highly effective in reducing crashes in known high-frequency collision areas. This method does, however, adversely impact necessary animal movement patterns.	<ul style="list-style-type: none"> Permanent solution in known high-impact areas 	<ul style="list-style-type: none"> Costs associated with design and construction Deer are very likely to be capable of surpassing the barrier Can simply cause deer to migrate to other areas, transferring the hazard Devices often need to be combined with other barriers to be effective

Habitat Modification: Species Mortality or Injury – Threatened or Endangered Species

There are several effective methods that can be used to reduce mortality or injury to threatened or endangered species that should be given serious consideration and priority during transportation facility construction.

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Habitat Modification: Species Mortality and Injury – Threatened or Endangered Species	Signage, Education and Outreach to inform motorists that threatened or endangered species are likely to exist in the area and due diligence should be used	<ul style="list-style-type: none"> Cost effective Capability of reaching a wide audience 	<ul style="list-style-type: none"> Will not eliminate the problem altogether Costs associated with reaching a wide audience
	Wildlife Crossing Structures and barriers , including amphibian and reptile walls and culvert systems. These are designed to channel species into safe crossing areas (typically a culvert or tunnel). Crossing structures are typically designed to accommodate specific species. Animal Barriers prevent burrowing animals from crossing the highway through a fencing system that is placed partially underground, rising above the ground. Such animals are not able to burrow under the barrier and cross the road. Animals can be channeled to an appropriate crossing point or area if necessary.	<ul style="list-style-type: none"> Innovative solution proven to be effective with various species within known high-frequency collision areas 	<ul style="list-style-type: none"> Costs associated with design and construction Structures often must be customized to accommodate an individual species

Issue 3: Open Space Modification

Issue Description

Open space modification refers to negative impacts to local and regional open space resources due to the construction of new facilities. Open space resources include public and private lands such as grasslands, parks, or forests that are devoid of infrastructure, roads and permanent structures. Open space also includes land that is either actively used for agricultural production or grazing as well as fallow agricultural lands that are not presently used for such purposes. Specific benefits provided by open spaces include agricultural and timber production, air and water purification, recreational enjoyment and aesthetics.

This issue shares many similar attributes with *Issue 2: Habitat Loss*. The primary distinction here, however, is the destruction or impairment of open space resource characteristics that are enjoyed specifically by human communities. The enjoyment provided by scenic vistas or the utilitarian function and food security provided by agricultural areas are notable examples. As with habitat loss, the construction of new transportation facilities is likely to induce the growth of other supportive facilities, resulting in the loss of open space resources, gradually impairing or diminishing their value over time.

1. Preservation, Conservation and Adaptive Reuse

The preservation and conservation of open space resources is the surest way to safeguard their benefits. Outright purchase of resources and/or the protection of their current uses from various types of development are among the options available to the public and municipalities. Adaptive reuse of abandoned or underutilized developed spaces can further act to decrease the demand for open spaces.

2. Growth Management and Compact Development

Growth management refers to policies or procedures that can be used to provide for the sustainable growth of communities. The primary goal of growth management techniques is to ensure that adequate services (i.e. infrastructure, housing, etc.) are available to meet the demand created by new growth. Compact development refers to practices in community development that increase density, thereby reducing the overall need for new facilities. Furthermore, the close proximity of services available within compact developments reduces personal dependence on the automobile. When these two concepts are successfully applied to community development, an overall reduction in the need for and demand of open spaces may result.

Federal and State Mandates

Environmentally Beneficial Landscaping, Executive Memorandum, 1994: Environmentally beneficial landscaping entails utilizing techniques that complement and enhance the local environment and seek to minimize the adverse effect that the landscaping has on it. In particular, this means using regionally native plants and employing landscaping practices and technologies that conserve water and prevent pollution.

Federal Highway Administration Wetland Policy, 1977 (23 CFR 777, Mitigation of Impacts to Wetlands and Natural Habitat): It is the FHWA's policy to prepare a formal wetland finding prior to

the approval of any project involving new construction in wetlands and classified as an EIS or a Finding of No Significant Impact (FONSI).

Land and Water Conservation Fund Act of 1965 (LAW-CON) (16 U.S.C. 460I-4 et seq.): Section 6(f): Requires that recreation land purchased or improved under the LAWCON Act cannot be used unless replacement land of equal value, use, and size can be supplied.

Protection of Wetlands, Executive Order, 11990, 1977: Directs federal agencies to avoid unnecessary alteration or destruction of wetlands, and requires implementation of actions to minimize the loss or degradation of wetlands affected by a project that received federal funding.

NYS Freshwater Wetlands Act, Article 24 of the NYS Environmental Conservation Law: A permit is required for most activities that will alter freshwater wetlands or adjacent areas. The approximate boundary of all wetlands within jurisdiction are shown on official NYS Freshwater Wetlands Maps maintained by NYSDEC

NYS Tidal Wetlands Act, Article 25 of the Environmental Conservation Law: A permit is required from the NYSDEC for almost any activity that will alter tidal wetlands or adjacent areas. The approximate boundaries of all tidal wetlands within agency jurisdiction are shown on official DEC maps.

Partners for Consultation

Federal entities:

U.S. Department of Transportation (USDOT)	www.dot.gov
U.S. Environmental Protection Agency (EPA)	www.epa.gov
Federal Highway Administration (FHWA)	www.fhwa.dot.gov
US Department of Housing and Urban Development	www.hud.gov

New York State entities:

New York State Department of Environmental Conservation (NYSDEC)	www.dec.state.ny.us
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Independent Organizations:

American Association of State Highway and Transportation Officials	www.transportation.org
AASHTO Center for Environmental Excellence	www.environment.transportation.org
American Planning Association	www.planning.org
Brookings Institution on Urban and Metropolitan Policy	http://www.brook.edu/metro
Congress for New Urbanism	www.cnu.org
Smart Growth Network	www.smartgrowth.org

Inventories and Resources

Publications:

American Planning Association. “How Cities Use Parks for...”. 2003. Last access: September 18, 2006
<http://www.planning.org/cpf/briefingpapers.htm>

Description: The APA City Parks Forum is dedicated to providing information on how healthy parks are fundamental to many aspects of community prosperity. This briefing series includes ten pieces: one pertains specifically to how city parks can be used for green infrastructure; another pertains specifically to smart growth.

Belzer, Dena and Autler, Gerald. “Transit Oriented Development: Moving from Rhetoric to Reality.” The Brookings Institution on Urban and Metropolitan Policy. 2002. Last access: September 29, 2006. <http://www.brookings.edu/es/urban/publications/belzertod.pdf>

Description: Discusses three modern trends in American land use: new investment in America’s downtown areas, suburban growth and maturation of suburban communities, and transit oriented development. At the convergence of these three trends is the realization that a substantial market exists for a new form of walkable, mixed-use urban development around these new rail or rapid bus stations and transit stops.

EPA. Community Culture and the Environment: A Guide to Understanding a Sense of Place. 2002. Last access: October 6, 2006. <http://www.epa.gov/ecocommunity/pdf/ccecomplete.pdf>

Description: The Environmental Protection Agency (EPA) has compiled this technical document of tools and methods for understanding the human dimension of environmental protection. It is designed to provide leaders in the environmental field a means for better understanding community values and processes as they relate to environmental issues, thus resulting in more effective partnerships and approaches to solving environmental problems. The tools are intended to assist communities in meeting or exceeding current environmental protection standards.

EPA. Growing Toward More Efficient Water Use: Linking Development, Infrastructure, and Drinking Water Policies. 2006. Last access: February 20, 2007.
http://www.epa.gov/dced/pdf/growing_water_use_efficiency.pdf

Description: Land use decisions are often driven by the availability of infrastructure, specifically water and sewer. This resource provides information on policies and approaches that pertain to alternative development patterns, demand for water, and infrastructure provision.

EPA. Using Smart Growth Techniques as Stormwater Best management Practices. 2005. Last access: October 6, 2006. http://www.epa.gov/dced/pdf/sg_stormwater_BMP.pdf

Description: Examples of smart growth techniques and approaches covered in this publication include: regional planning; infill development; redevelopment policies; special development districts (e.g., transit oriented development and brownfields redevelopment); tree and canopy programs; parking policies to reduce the number of spaces needed or the footprint of the lot; “Fix It First” infrastructure policies; smart growth street designs; and stormwater utilities.

Office of the New York State Comptroller: Division of Local Government Services and Economic Development. Smart Growth in New York State: A Discussion paper. 2004. Last access February 20, 2007. http://www.osc.state.ny.us/localgov/pubs/research/smart_growth.pdf

Description: The report is intended to help stimulate a vigorous debate on smart growth in New York State by providing a general background and helping to define major issues.

Pendall, Rolf; Martin, Jonathan; and Fulton, William. Holding the Line: Urban Containment in the United States. 2002. The Brookings Institution Center on Urban and Metropolitan Policy. Last access: September 29, 2006. <http://www.brookings.edu/es/urban/publications/pendallfultoncontainment.pdf>

Description: Policies designed to deliberately control the spread of urban areas are increasing in popularity throughout the United States. Several states, and many local governments in the west, are adopting urban growth boundaries and other containment measures in their land-use planning laws and legislation. Whatever the primary purpose, it is clear that the precise impacts of containment policies are not well understood. This paper reviews the research on urban containment generally, and also examines the experience of such policies in particular metropolitan areas. It discusses some lessons learned and raises relevant research questions for practitioners as well as policymakers at the state and local level.

Smart Growth Network. “Getting to Smart Growth: 100 Policies for Implementation.” 2003. Last access: October 2, 2006. <http://www.smartgrowth.org/pdf/gettosg.pdf>

Smart Growth Network. “Getting to Smart Growth II: 100 More Policies for Implementation.” 2003. Last access: October 2, 2006. <http://www.smartgrowth.org/pdf/gettosg2.pdf>

Description: Getting to Smart Growth Vol’s I and II serve as a road map for states and communities that have recognized the need for smart growth but are unclear on how to achieve it. Each volume provides 10 policy options to achieve each of the 10 Smart Growth Principles. These policies are supported with “Practice Tips” which offer additional resources or brief case studies of communities that have applied the approach to achieve smart growth. Features of the Volume II include: a list of 100 policies for implementation; case studies and examples in each chapter; and an appendix listing funding resources for smart growth projects.

US Department of Housing and Urban Development. “Redeveloping Brownfields: How States and Localities Use CDBG Funds.” 1998. Last access: September 18, 2006. <http://www.huduser.org/publications/econdev/redevelo.html>

Description: Brownfield redevelopment is recognized as a tool to reuse developed urban spaces as an alternative to developing green spaces. In this publication, researchers recommend that HUD "maintain and highlight the availability and flexibility of CDBG funds for brownfields redevelopment" without displacing or earmarking existing CDBG funding. Sponsored by HUD's Office of Policy Development and Research, the study surveys States and urban areas that receive CDBG funds about their awareness, involvement, and technical assistance needs in this area.

Open Space Modification: Preservation, Conservation and Adaptive Reuse

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Open Space Modification: Preservation, Conservation and Adaptive Reuse	Outright purchase of environmentally sensitive lands for permanent protection or management, set aside for the public good.	<ul style="list-style-type: none"> • Permanent protection of open space resources 	<ul style="list-style-type: none"> • High costs associated with purchase • Purchase negotiations are often complex • Management and stewardship considerations can be equally complex • Site selection and resource allocation are difficult choices that require public dialogue and input
	Land and/or wetland banking is a process whereby entities set aside lands in anticipation of growth and development. In instances where destruction of the resource is unavoidable, lands that have been set aside can be used to offset losses.	<ul style="list-style-type: none"> • Replaces impacted or destroyed lands with lands of equal or greater value • Provides developers with a method of ensuring compliance with Federal and state mandates 	<ul style="list-style-type: none"> • Original natural resource is permanently altered • Mitigation costs are generally high • Difficulty reproducing the natural conditions of original resource
	Purchase/Transfer of Development Rights programs allow landowners to sever development rights from properties in designated low-density areas, and sell them to purchasers who want to increase the density of development. TDR programs provide advantages to local governments that want to control land use but also compensate landowners for restrictions on the development potential of their properties.	<ul style="list-style-type: none"> • Innovative solution that allows development to occur while simultaneously preserving open space or environmentally sensitive lands • TDR programs can be easier to implement than typical zoning. • TDR programs are also more permanent than traditional zoning regulations. 	<ul style="list-style-type: none"> • Complexity and expense associated with negotiating TDRs or PDRs • Difficulty quantifying and comparing the costs and anticipated benefits associated with PDRs and TDRs – actual benefits realized by the public may not be equal to costs invested

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	Redevelopment of Brownfields/Grayfields conserve space by reusing an inefficient land use. Grayfields and brownfields are located in places with existing infrastructure and access to roads and public transportation. These are located in areas with high concentrations of people, reducing or eliminating the need for new roads.	<ul style="list-style-type: none"> • Reduction of the need for development on green spaces • Reinvestment in declining neighborhoods or urban areas • Increase in tax base for communities • Reduction in the need for new infrastructure to new facilities 	<ul style="list-style-type: none"> • Complexity associated with negotiating reuse of areas • Costs associated with necessary environmental mitigation of toxic hazards
	Cost of Community Services Studies (i.e., to encourage agricultural conservation) can demonstrate to local policy makers that development often requires more in municipal services than the tax revenue it produces. Agricultural land and open space, by comparison, often brings in more tax revenue than it costs to service. These studies can help guide local decisions on development in infrastructure provision.	<ul style="list-style-type: none"> • Helps land owners, community members and local officials make informed decisions regarding open space preservation 	<ul style="list-style-type: none"> • Costs associated with conducting study

Open Space Modification: Growth Management and Compact Development

Growth Management Techniques comprise a variety of regulatory and voluntary approaches to concentrating development in existing developed areas. Less new infrastructure is needed, specifically new roads.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Open Space Modification: Growth Management and Compact Development	Traditional Neighborhood Design is based on a more compact form of development, similar to how communities were built prior to WWII. This differs from the currently dominant pattern of diffuse development that has different uses widely separated.	<ul style="list-style-type: none"> • Compact development requires less infrastructure per capita • Dense, mixed-use neighborhoods decrease the need to travel by car • Using different parking techniques, such as shared 	<ul style="list-style-type: none"> • Difficult to mandate • Relies on the assumption that such designs are desired by the public

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
		parking and on-street parking, can reduce the amount of surface parking lots.	
	Transit Supportive Development is a type of traditional neighborhood design that provides more connections via transit with destinations across the region, reducing the need for more roads and parking lots.	<ul style="list-style-type: none"> Decreases the need for individuals to travel by automobile Provides marginalized citizens (poor, elderly, disabled) with increased mobility and housing options 	<ul style="list-style-type: none"> Costs associated with site planning and design, which can be complex
	Balanced Transportation (walking, bicycling): Encouraging forms of transportation other than the currently dominant mode (private vehicles) reduces the need for, and capacity of, roads and parking lots. Creating a balanced transportation system that encourages modes such as walking, biking, and public transit can lower the impact of transportation infrastructure on open space.	<ul style="list-style-type: none"> Health benefits associated with walking and bicycling Decreased traffic congestion when a critical mass of users results 	<ul style="list-style-type: none"> Need for facility planning, management and construction of pedestrian and bicycling facilities Winter travel is not desirable for the majority of citizens

Issue 4: Historical/Cultural Modification

Issue Description

Poorly conceived transportation projects have the ability to damage and even destroy important parts of the nation's heritage. Historical/cultural modification, therefore, refers to the alteration of features, spaces, and spatial relationships of historically and culturally significant buildings, landscapes, and sites. As outlined below, considerable legislation is in place at the federal and state levels to protect these places and many programs exist at the local level for preserving community heritage. Knowledge of and adherence to these mandates are therefore the most important best management practices relating to the preservation of these features.

Historical and cultural modification can be divided into three primary categories:

- Archaeological Sites, Historical Structures, and Significant Landmarks
- Cultural Heritage Sites and/or Places of Unique Interest
- Neighborhood Modification

1. Archaeological Sites, Historical Structures, and Significant Landmarks

Federal and state agencies need to expand and focus efforts to consult with concerned parties when deciding what resources are important and to whom they matter. This is particularly true when it comes to representatives of the communities in which resources are located. Public disclosure and consultation is required by law when Federal and state agencies are considering various undertakings, but many agencies view these requirements as time-consuming hindrances rather than opportunities for creative problem-solving. While Federal and state agencies must consult with a wide range of stakeholders when they make major land-use decisions, a number of agencies could make major improvements in the way they identify stakeholders and seek their views in planning and decision-making.

Understanding requires effective communication. Federal and state agencies need to develop mechanisms to better inform and engage communities and business groups, such as those involved with heritage tourism, in decisions about resource protection and access. They also need to develop better means for addressing the concerns and interests of groups who have a special affinity with particular historic and cultural resources, such as Indian tribes and other Native Americans.

2. Neighborhood Modification

This category refers to the disruptive effects that new transportation facilities can have on a neighborhood (in particular, new railways and highways). The construction of new transportation facilities of this type can have a dramatic and deleterious impact on surrounding neighborhoods, particularly in more densely settled areas. Community consistency and cohesiveness can be agitated or severed by new infrastructure; attempting to mitigate these harmful impacts can prove to be difficult and costly.

Transportation planning agencies must take into account the structure and community connectivity of the places where new or expanded transportation corridors are proposed. Much in the way that environmental laws discourage the bisection of sensitive areas, these same laws and processes should strongly discourage the bisection of human habitat (i.e. neighborhoods and communities). Transportation corridors should be routed around identifiable neighborhoods and communities, so as not to divide them. Where divisions have already occurred, enhancements to these corridors should seek to correct past

errors. The divisive transportation corridor should be removed and rerouted, or redesigned to be less of a barrier. For example, a high speed highway with infrequent crossings can be redesigned into a lower-speed boulevard with more frequent crossing opportunities.

3. Cultural Heritage Sites and/or Places of Unique Interest

Heritage tourism presents transportation facility planners with an alternative for protecting cultural heritage sites and/or places of unique interest which are *not* officially designated as registered landmarks. The existing transportation system can be utilized to create new linkages and promote transportation improvements that enhance safety and ease of use for pedestrians, bicyclists, boaters, and users of mass transit.

Partnerships among Federal, State, local, tribal, and private sector entities lead to the most successful heritage tourism efforts and leverage substantial additional financial and technical support. However, overcoming institutional barriers to creating partnerships, balancing resource protection with the economic and educational benefits of increased tourism, and balancing public access with security concerns are some challenges. A close working relationship with the local community is essential. The community may or may not want the economic stimulus of increased tourism. Issues include increased trash, traffic, vandalism, theft, and invasion of privacy. Citizens and local communities need a central information resource for getting information from the various agencies involved. Agencies need to share relevant information with each other.

Federal and State Mandates

Archeological and Historic Preservation Act (AHPA) (1974): Greatly expanded the number and range of Federal agencies that had to take archeological resources into account when executing, funding, or licensing projects.

Archaeological Resources Protection Act (ARPA) (1979): Protects public archeological sites before Federal authorities can issue a permit to excavate or remove any archeological resource on Federal or Indian lands.

Department of Transportation Act (1966) (Section 4f): Prohibits federal approval or funding of transportation projects that require use of any historic site unless: (1.) there is “no feasible and prudent alternative to the project,” and (2.) the project includes “all possible planning to minimize harm.”

Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, Executive Order 12898, 1994: Requires that federal actions consider disproportionate impacts to low-income and minority groups.

Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. 4601-4639): Provides for the fair and equitable treatment of persons displaced from their homes, farms, or businesses by federal or federally assisted projects.

National Environmental Policy Act (NEPA) (1969): Authorizes State Environmental Quality Review Act (SEQRA) (see below).

National Historic Preservation Act (1966) (Section 106): Authorizes the identification of registered properties and properties determined “eligible” for the National Register of Historic Places. Landmark properties are eligible to receive a measure of protection from the effects of federal and/or state agency sponsored, licensed, or assisted projects through a notice, review, and consultation process. Identification of archaeologically and historically-sensitive areas: A field check or survey and documentation determine whether an “eligible” site is indeed “significant” for listing on the National Register.

New York State Historic Preservation Act (1980) (Section 14.09): State agencies must consult with SHPO if it appears that any projects being planned may or will cause any change, beneficial or adverse, in the quality of any property that is listed on the National Register of Historic Places or is listed or eligible to be listed on the State Register. Identification of archaeologically and historically-sensitive areas can be done using the New York State Historic Preservation Office Online Resource (SPHINX, “Document Imaging for National Register,” and “GIS for Archaeology and National Register”). A field check or survey and documentation determine whether an “eligible” site is indeed “significant” for listing on the National Register.

Protection and Enhancement of the Cultural Environment, Executive Order 11593, Section 1(3), 1971: Requires that federal agencies, in consultation with the Council, establish procedures regarding the preservation and enhancement of non-federally owned historic and cultural properties in the execution of their plans and programs.

State Environmental Quality Review Act (SEQRA), 6NYCRR Part 617 of the New York State Environmental Conservation Law: Establishes a set of uniform regulations by which all state, county and local governmental agencies must incorporate consideration of environmental impacts into their planning, review and decision-making processes. If an action may have a significant adverse impact, agencies must prepare or request an Environmental Impact Statement (EIS).

Partners for Consultation

Federal Entities:

Advisory Council on Historic Preservation (ACHP)	www.achp.gov
U.S. Department of the Interior, National Park Service (NPS)	www.nps.gov
U.S. Department of Transportation (DOT)	www.dot.gov
U.S. Environmental Protection Agency (EPA)	www.epa.gov

State Entities:

New York State Council on the Arts	www.nysca.org/public/home.cfm
New York State Department of Environmental Conservation (NYSDEC)	www.dec.state.ny.us
New York State Department of Transportation (NYSDOT)	www.nysdot.gov
New York State Office of Parks, Recreation & Historic Preservation, State Historic Preservation Office (SHPO)	www.nysparks.state.ny.us/shpo

Independent Organizations:

American Cultural Resource Association	www.acra-crm.org
Archaeological Institute of America	www.archaeological.org/
Citizen's Environmental Coalition	www.cectoxic.org
Context Sensitive Solutions	www.contextsensitivesolutions.org
National Association of Tribal Historic Preservation Officers (NATPO)	www.nathpo.org
National Conference of State Historic Preservation Officers (SHPO)	www.ncshpo.org
National Trust for Historic Preservation (NTHP)	www.nationaltrust.org
Preservation Action	www.preservationaction.org
Preservation Easement Trust, Inc.	www.preservationeasement.org/home
Preservation League of New York State	www.preservenys.org
Register of Professional Archaeologists	www.rpanet.org
Society of Architectural Historians	www.sah.org
Society of American Archaeology	www.saa.org
Society for Historical Archaeology	www.sha.org

Regional Entities:

The Arts & Cultural Council of Greater Rochester	www.artsrochester.org
Landmark Society of Western New York	www.landmarksociety.org

Inventories and Resources

FHWA. Flexibility in Highway Design. 1997. Last access: February 21, 2007.

<http://www.fhwa.dot.gov/environment/flex/index.htm>

Description: When faced with extreme social, economic, or environmental consequences, it is sometimes necessary for designers to look beyond the "givens" of a highway project and consider other options. The design exception process is one such alternative. In other cases, it may be possible to reevaluate planning decisions or rethink the appropriate design. This Guide illustrates the flexibility already available to designers within adopted State standards. These standards, often based on the AASHTO Green Book, allow designers to tailor their designs to the particular situations encountered in each highway project. Often, these standards alone provide enough flexibility to achieve a harmonious design that both meets the objectives of the project and is sensitive to the surrounding environment.

FHWA. A Guide to Achieving Flexibility in Highway Design. 2004.

Description: 2004 update of Flexibility in Highway Design. Selected excerpts available at:
<http://www.contextsensitivesolutions.org/content/reading/guide-for-achieving-flexibility/>

FHWA, National Scenic Byways Program. Online Forums. Last access: February 21, 2007.

<http://www.bywaysonline.org/forums/index.html>

Description: These online forums provide readers with an opportunity to learn about and discuss various scenic byway topics.

National Trust for Historic Preservation and Federal Highway Administration. Building on the Past, Traveling to the Future: A preservation's Guide to the Federal Transportation Enhancement Provision. 2nd Ed. Last access February 21, 2007.
http://www.nationaltrust.org/help/downloads/Building_on_the_Past.pdf

Description: Transportation enhancement funds and historic preservation projects. Examples cited from throughout the US.

Mead & Hunt, Prepared for New York State Department of Transportation. Contextual Study of New York State's Pre-1961 Bridges. 1999. Last access: February 21, 2007.
<https://www.nysdot.gov/portal/page/portal/divisions/engineering/environmental-analysis/repository/bridgescontextuastudy-99.pdf>

Description: The contextual study establishes a framework for understanding the historic and engineering significance of New York's bridges. The study includes an overview of national trends in bridge engineering, the history of bridge design and construction in New York State, and the development of New York's transportation networks.

Mead & Hunt, Prepared for New York State Department of Transportation, and Federal Highway Administration. Historic Bridge Management Plan. Last assess: February 21, 2007.
<https://www.nysdot.gov/portal/page/portal/divisions/engineering/environmental-analysis/repository/historicbridgemanagementplan.pdf>

Description: The Historic Bridge Management Plan presents practices and recommendations consistent with the needs of transportation and preservation that NYSDOT and other bridge owners can apply to their historic bridges.

National Trust for Historic Preservation. Legal Tools for Fighting Freeways and Saving Historic Roads. 2000. Last access: February 21, 2007.
http://www.nationaltrust.org/issues/transportation/legal_tools.pdf

Description: This report summarizes the law and provides excellent examples of how reviews can help protect America's heritage.

National Trust for Historic Preservation. The Returning City: Historic Preservation and Transit and the Age of Civic Revival, Part 1. Last access: February 21, 2007.
http://www.nationaltrust.org/issues/transportation/returning_city_1.pdf

National Trust for Historic Preservation. The Returning City: Historic Preservation and Transit and the Age of Civic Revival, Part 2. Last access: February 21, 2007.
http://www.nationaltrust.org/issues/transportation/returning_city_2.pdf

Description: This study illustrates how many different places can benefit by connecting historic preservation and transit. The report also examines the historic neighborhoods immediately adjacent to downtown in cities like San Francisco, Cleveland, and Chicago, highlighting methods that support rather than undermine community preservation and transit-oriented development.

New York State Department of Transportation. Transportation Enhancement Guidebook. 2006. Last access: February 21, 2007.

<https://www.nysdot.gov/portal/page/portal/programs/tep/2006guidebook.pdf>

Description: This guidebook is designed to give sponsors and applicants a general understanding of the Transportation Enhancements Program, how the New York State Department of Transportation (NYSDOT) intends to administer this federal program, and how prospective applicants and sponsors can participate.

Historical/Cultural Modification: Archeological Sites, Historic Structures and Significant Landmarks

Public disclosure and consultation is required by law when Federal and state agencies are considering various undertakings, but many agencies view these requirements as time-consuming hindrances rather than opportunities for creative problem-solving. While Federal and state agencies must consult with a wide range of stakeholders when they make major land-use decisions, a number of agencies could make major improvements in the way they identify stakeholders and seek their views in planning and decision-making.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Historical/Cultural Modification: Archeological Sites, Historic Structures and Significant Landmarks	Strict Adherence to current Federal and state mandates: If funded adequately, federal and state review processes have a wide array of effective tools that can be used to conduct archeological investigations, reports, and other kinds of activities to mitigate the impacts of projects on important archeological sites.	<ul style="list-style-type: none"> Designates historic properties based on uniform national criteria and procedures Sets boundaries for historic districts based on the actual distribution pattern of intact historic properties in the area. Provides recognition by the federal government that an area has historical or archeological significance. Requires the effects of federally assisted work projects (actions) on historic properties be considered prior to the commencement of work. Makes available federal tax incentives for qualified rehabilitation projects. Requires conformance to the Secretary of the Interior's Standards for Rehabilitation (36 CFR 67). Makes a property eligible for HPF pre-development planning grants (such as plans and 	<ul style="list-style-type: none"> Laws apply only to sites officially recognized as landmarks Limits growth, or regulates where growth takes place. Growth must be separately addressed through local zoning ordinances and preservation planning

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
		specs) and also "bricks and mortar" repair grants, if selected by SHPO for grant assistance. Work projects require conformance to the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68).	

Historical/Cultural Modification: Neighborhood Modification

Neighborhood modification refers to the disruptive effects that new transportation facilities can have on a neighborhood (in particular, new railways and highways). The construction of new transportation facilities of this type can have a dramatic and deleterious impact on surrounding neighborhoods, particularly in more densely settled areas. Community consistency and cohesiveness can be agitated or severed by new infrastructure; attempting to mitigate these harmful impacts can prove to be difficult and costly.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Historical/Cultural Modification: Neighborhood Modification	Strict Adherence to current Federal and state mandates: If funded adequately, federal and state review processes have a wide array of effective tools that can be used to protect neighborhoods and the people that live in them. Environmental justice	<ul style="list-style-type: none"> Provides neighborhoods with a level of protection from serious deleterious impacts from new transportation facilities Provides a level of protection for marginalized populations 	<ul style="list-style-type: none"> Project planning and design process is likely to be expensive

Historical/Cultural Modification: Cultural Heritage Sites and/or Places of Unique Interest

Heritage tourism presents transportation facility planners with an alternative for protecting cultural heritage sites and/or places of unique interest which are not officially designated as registered landmarks. The existing transportation system can be utilized to create new linkages and promote transportation improvements that enhance safety and ease of use for pedestrians, bicyclists, boaters, and users of mass transit.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Historical/Cultural Modification: Cultural Heritage Sites and/or Places of Unique Interest	<p>Individual Best Management Practices within Heritage Tourism Sites include (but are not limited to):</p> <ul style="list-style-type: none"> • Increasing public access through acquisition of scenic easements and scenic and historic sites • Alternative modes of access and improved access to existing recreational areas • Providing attractive and accessible parking • Signage: roadside way finding signs, safety signs, logo signs, and identification signs for trail destinations • Interpretive exhibits for scenic overlooks, rest areas, historical sites, waterfront areas and recreational sites • Historic Highway Programs (including the provision of tourist and welcome-center facilities) • Creation or enhancement of pedestrian and bicycle facilities: new bicycle lanes, sidewalk improvements, safer pedestrian crossings, landscaping and other scenic beautification, handicapped improvements, and traffic calming measures 	<ul style="list-style-type: none"> • Conscientious designs can have many added benefits, including increased tourism and an improved quality of life for local residents • Partnerships can leverage additional technical and financial support • Community values and interests will be built into new designs, adding significant value to them 	<ul style="list-style-type: none"> • Cost would increase significantly • Complexity of developing and interpreting areas could be expected to be high • Consequences of increased tourism

Issue 5: Noise Pollution

Issue Description

The dominant form of noise pollution results from transportation sources, principally motor vehicles. Noise pollution is defined as displeasing human- or machine-created sound that disrupts the environment (or environmental noise). It encompasses roadway noise, aircraft noise, industrial noise, as well as high-intensity sonar. Noise pollution associated with L RTP implementation can be divided into two primary categories:

1. Noise Pollution from Transportation Facilities

This category includes excessive sounds emanating from facilities such as railway stations, airports, or from automobile traffic along highways.

2. Noise Pollution from Construction of Transportation Facilities

This category refers to the noise pollution that can be expected to occur during the construction and maintenance of transportation facilities. This type of noise pollution is generally assumed to be temporary in duration.

Federal and State Mandates

FHWA Procedures for Abatement of Highway Traffic Noise and Construction Noise, 1997 (Federal Aid Policy Guide, Part 772): *Establishes a set of policies and procedures related to traffic noise that is to be applied to federal-aid projects. Although this is a Federal requirement, the absence of an applicable State regulation has led to the practice of applying it to 100% state funded projects. This has been incorporated in the Noise Analysis Policy of NYSDOT.*

Partners for Consultation

Federal Entities:

U.S. Environmental Protection Agency (EPA)
U.S. Department of Transportation (DOT)

www.epa.gov
www.dot.gov

State Entities:

New York State Department of Environmental Conservation (NYSDEC)
New York State Department of Transportation (NYSDOT)
Citizen's Environmental Coalition

www.dec.state.ny.us
www.nysdot.gov
www.cectoxic.org

Independent Organizations:

Acoustical Society of America (ASA)
American Academy of Audiology
American Tinnitus Association
Better Hearing Institute

asa.aip.org
www.audiology.org
www.ata.org
www.betterhearing.org

Institute of Noise Control Engineering	www.inceusa.org
International Committee on Biological Effects of Noise	www.icben.org
Laborer's Health and Safety Fund of North America: Construction Noise Control Partnership	www.lhsfna.org
League for the Hard of Hearing	www.lhh.org
National Hearing Conservation Association	www.hearingconservation.org
National Organization to Insure a Sound-Controlled Environment (NOISE)	www.aviation-noise.org/index.htm
Noise-Free America	www.noisefree.org
NoiseOFF: The Citizens Coalition Against Noise Pollution	www.noiseoff.org
Right to Quiet Society for Soundscape Awareness and Protection	www.quiet.org
Self Help For the Hard Of Hearing (SHHH)	www.shhh.org
U.S.-Citizens Aviation Watch (US-CAW)	www.us-caw.org
World Forum for Acoustic Ecology (WFAE)	interact.uoregon.edu/MediaLit/WFAE/home/index.html

Regional Organizations:

Rochester Soundscape Society	groups.yahoo.com/group/rochestersoundscapesociety
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Inventories and Resources

Publications:

FHWA. The Audible Landscape: A Manual for Highway Noise. 1976. Last access: September 29, 2006.
<http://www.fhwa.dot.gov/environment/audible/index.htm>

Description: This comprehensive manual covers all major mitigation measures associated with noise pollution. Administrative techniques, such as zoning, special development concepts and other legal controls are described in detail. Municipal ownership approaches are described, such as conservation easements and other land acquisition policies. Financial incentives and other municipal services are also detailed, along with implementation strategies and resources for further study.

FHWA. Highway Noise Barrier Design Handbook. Last access: September 29, 2006
<http://www.fhwa.dot.gov/environment/noise/manual.htm>

Description: The objectives of this document and accompanying video and CD-ROM are to provide: (1) guidelines on how to design a highway noise barrier that fits with its surroundings and performs its intended acoustical and structural functions at reasonable life-cycle cost; and (2) a state-of-the-art reference of common concepts, designs, materials, and installation techniques for the professional highway engineer, the acoustical and design engineers and planners, and the non-professional community participant. This handbook may also be used as a guide for other applications such as noise barriers used to attenuate noise from rail lines, as well as noise from other sources which are not necessarily found in transportation.

The San Diego General Plan. Noise Element (Draft). 2006. Last access: September 18, 2006.
<http://www.sandiego.gov/planning/genplan/pdf/generalplan/noiseelement.pdf>

Description: City of San Diego, CA municipal plan which provides goals and policies to guide compatible land uses and the incorporation of noise attenuation measures for new uses to protect people living and working in the city from an excessive noise environment. This purpose becomes more relevant as the city continues to grow with infill and mixed-use development consistent with the Land Use and Community Planning Element.

Noise Pollution from Transportation Facilities: Improved Site Planning and Design for Minimizing Operation Noises

The most effective means of mitigating the effect of noise associated from transportation systems is improved site planning and location of such facilities. Many negative effects can be overcome if planning is begun early to allow a wide variety of physical techniques. Specific planning techniques include:

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Transportation Facility Noise Pollution: Improved Site Planning and Design	Noise Compatibility Land Use Control Programs include local land use controls that segregate residential uses from transportation facilities that generate significant noise pollution	<ul style="list-style-type: none"> Maintenance of quality of life 	<ul style="list-style-type: none"> Difficulty and costs associated with alternative site selection
	Acoustical site planning , which involves incorporating buffer zones, such as green space	<ul style="list-style-type: none"> Maintenance of quality of life 	<ul style="list-style-type: none"> Costs associated with consultation and additional site planning
	Public Noise Ordinances which restrict noises generated from transportation facilities such as airports and locomotive facilities. Restrictions in departure times and adjustments in airplane take off trajectories can be incorporated in order to alleviate extreme sonic intrusion within residential areas during specific periods of time	<ul style="list-style-type: none"> Maintenance of quality of life 	<ul style="list-style-type: none"> Training of local officials Complexity Monitoring and enforcement

Noise Pollution from Transportation Facilities: Physical Techniques for Minimizing Operation Noises

Site planning and design are not always a feasible approach to mitigating noise pollution, particularly within areas where facilities such as highways or rail systems are already in place. High-density residential and business areas also limit the types of site planning and design options that are available. In cases such as these, physical techniques can be used to mitigate the adverse effects of noise pollution.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Transportation Facility Noise Pollution: Physical Techniques	Improved highway design , which incorporates techniques in the design and structure of highways and other transportation systems that can be used to reduce noise pollution	<ul style="list-style-type: none"> Maintenance of quality of life 	<ul style="list-style-type: none"> Costs of planning, design and construction Costs associated with alternative site selection
	Acoustical construction of pavements which can reduce the noise made from vehicle contact with the pavement	<ul style="list-style-type: none"> Maintenance of quality of life 	<ul style="list-style-type: none"> Costs of materials and construction

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	Barrier construction , consisting of earthen berms, walls and fences, thick plantings of trees and shrubs, and combinations thereof	<ul style="list-style-type: none"> Maintenance of quality of life 	<ul style="list-style-type: none"> Aesthetic impacts Costs
	Acoustical architectural design , which has typically been limited to public use structures such as schools and hospitals. Builders can be influenced to voluntarily implement noise insulators and/or reconfigure the placement of doors and windows in high-noise areas	<ul style="list-style-type: none"> Maintenance of quality of life 	<ul style="list-style-type: none"> Costs of planning, design and construction

Noise Pollution from Construction: Analytical and Physical Techniques for Minimizing Construction Noises

Noise from construction can be difficult to manage and often must be tolerated. Heavy machinery, for example, which is the major source of noise in construction, is constantly moving in unpredictable patterns. Several approaches do exist, however, to help manage excessive construction noise if it is expected to exist for prolonged periods of time.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Construction Activity Noise Pollution: Analytical and physical techniques	Traffic Noise Analyses include work-hour limits, equipment muffler requirements, location of haul roads, elimination of “tail gate banging,” reduction of backing up due to equipment alarms, and particularly community notification and dialogue	<ul style="list-style-type: none"> Maintenance of quality of life 	<ul style="list-style-type: none"> Costs associated with consultation
	Computerized prediction model aides in estimating noise levels	<ul style="list-style-type: none"> Maintenance of quality of life 	<ul style="list-style-type: none"> Costs associated with consultation
	Portable noise barriers and special quieting devices for construction equipment	<ul style="list-style-type: none"> Maintenance of quality of life 	<ul style="list-style-type: none"> Costs associated with equipment

Issue 6: Light Pollution

Issue Description

Light pollution can be construed as “annoying, wasteful or harmful” light that intrudes on an otherwise natural or low light setting. Light pollution can be associated with the implementation of transportation projects and can cause obscuring of the night sky, interfere with astronomical observatories, and can be disruptive to a variety of nocturnal species. Light that is allowed to escape into the atmosphere also represents an inefficient use of electrical power.

Federal and State Mandates

No known federal or state mandates apply.

Partners for Consultation

Federal Entities:

U.S. Department of Energy	www.energy.gov
U.S. Department of Transportation (DOT)	www.dot.gov
U.S. Environmental Protection Agency (EPA)	www.epa.gov

State Entities:

New York State Department of Environmental Conservation (NYSDEC)	www.dec.state.ny.us
New York State Department of Transportation (NYSDOT)	www.nysdot.gov

Independent Organizations:

American Astronomical Society	www.aas.org
American Lighting Association	www.americanlightingassoc.com
Amateur Observers’ Society of New York	www.aosny.org
Citizen’s Environmental Coalition	www.cectoxic.org
Citizens for Responsible Lighting (CRL)	www.crlaction.org
Environmental Advocates	www.eany.org
IDA Youth Working Group	saveourstarryskies.homestead.com
Illuminating Engineering Society of North America (IESNA)	www.iesna.org
International Association of Lighting Designers (IALD)	www.iald.org
Institute of Electrical and Electronics Engineers (IEEE)	www.ieee.org/portal/site
International Commission on Illumination (CIE)	www.cie.co.at/cie
International Dark-Sky Association (IDA)	www.darksky.org
Low Voltage Lighting Institute of the Americas	www.lvliia.com
National Dark Sky Week	www.ndsw.org
National Optical Astronomy Observatory	www.noao.edu
The National Parks Conservation Association	www.npca.org
Natural Resources Defense Council	www.nrdc.org
The National Lighting Product Information Program	www.lrc.rpi.edu/programs/nlpip/index.asp

Sierra Club
U.S. Green Building Council

www.sierraclub.org
www.usgbc.org

Regional Organizations:

The Astronomy Section of the Rochester Academy of Science

www.rochesterastronomy.org

Inventories and Resources

Publications:

IESNA. Lighting for Exterior Environments: An Illuminating Engineering Society of North America Recommended Practice. IESNA RP-33-99. 1999.

Description: A comprehensive resource addressing the basics of outdoor lighting, including: terminology; approaches for appropriate community lighting designs and standards; selection of light sources and ballasts; luminaire classification; energy conservation and maintenance issues; structure lighting; roadway/street lighting; walkway/bikeway lighting; pedestrian mall/park lighting; parking lot lighting; and other applicable subjects.

International Dark Sky Association. The Problem with Light Pollution. 1996. Last access: September 8, 2006. <http://www.darksky.org/resources/information-sheets/is001.html>

Description: Short position paper regarding the problems associated with light pollution.

The Institution of Lighting Engineers. Guidance Notes for the Reduction of Obtrusive Lights. 2005. Last access: Sept 11, 2006. http://ile.org.uk/uploads/File/02_lightreduction.pdf

Description: Comprehensive overview of the issues pertaining to light pollution and light pollution mitigation.

Rensselaer Polytechnic Institute. Lighting Answers. 2004. Last access: September 11, 2006. <http://www.lrc.rpi.edu/programs/NLPIP/publicationResults.asp?type=2>

Description: Twenty-one research papers can be found in the online series “Lighting Answers.” Reports cover a wide range of subjects pertaining to lighting.

Light Pollution from Transportation Facilities: Implementing IESNA (Illuminating Engineering Society of North America)

Recommendations

Lighting for the outdoor environment is different than lighting an interior space. Nuances of electric lights such as glare, luminance (quantity of light), localized needs (i.e. security vs. historic lighting), and a person's visual acuity all play a significant role in the appropriate outdoor light selection. The IESNA puts forth general recommendations that should be seriously evaluated in order to minimize the negative impacts caused by excessive outdoor lighting and light pollution.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Light Pollution: Implement IESNA Recommendations	Cutoff considerations describe the basic way to eliminate light pollution. "Cutoff" describes the manner in which lights are mounted, the intensity and distribution of light emitted, and the degree to which light is allowed to escape into the atmosphere. The primary cutoff goals should be to address glare, light pollution into the nighttime sky, and light trespass onto neighboring properties or areas.	<ul style="list-style-type: none"> • Reduction or elimination of light pollution or light trespass on neighboring properties • Best practices in outdoor lighting can greatly improve aesthetics of local districts and neighborhoods • Cost savings through increased energy efficiency can be achieved 	<ul style="list-style-type: none"> • Costs associated with equipment are likely to be high • Professional consultation is highly recommended and can also inflate costs
	Implement community responsive design , which involves a thorough review of community lighting goals, lighting themes, and a variety of options in lighting types. The ultimate goal of community responsive design is to facilitate better site planning design or to establish guidelines that clearly explain community themes, goals, and establishing a family of luminaries for different districts. Good site planning design strives to eliminate glare on roadways, reduce lighting spillover onto adjacent properties, etc. Design guidelines discuss existing conditions, efficient technologies, appropriate pole heights and spacing, current attempts to minimize light pollution, and maintenance and component life considerations.	<ul style="list-style-type: none"> • Consistent approach to outdoor lighting can be established • Once guidelines are established, they can provide a clear framework for contractors • Proper implementation can increase the quality of life of residents and the overall aesthetic appearance of the community • Energy efficiency can be a stated goal or outcome of designs 	<ul style="list-style-type: none"> • Requires professional consultation, which inflates costs • Requires community consensus • Conflicting goals are likely to arise • Difficult to enforce without legal authority, which would generally involve passing a land use ordinance
	Land use ordinances can be drafted in order to put community guidelines into	<ul style="list-style-type: none"> • Provides the legal authority to 	<ul style="list-style-type: none"> • Local lighting laws tend to

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	law; these can work in conjunction with existing land use ordinances and zoning districts.	<p>enforce community lighting goals</p> <ul style="list-style-type: none"> • Can provide a clear framework so that developers and planning boards will consider the ramifications of lighting choices more carefully • Well conceived ordinances can greatly improve aesthetics of districts and neighborhoods • Cost savings through energy efficiency can be achieved 	<p>be more complicated than local zoning codes and therefore require professional consultation</p> <ul style="list-style-type: none"> • Room for misinterpretation or misapplication • Require added resources for their proper drafting, implementation and enforcement • Inappropriate application of ordinances can create unforeseen and negative results • Costs associated with mandated equipment are likely to be high

Issue 7: Thermal pollution/Urban Heat Island Effect

Issue Description

In this context, thermal pollution refers to the raising of localized temperatures and alteration of micro-climates in urban areas. Often referred to as the “urban heat island effect,” evening temperatures are often found to be higher in urban areas primarily due to the large percentage of land covered by paved surfaces, black asphalt in particular. These surfaces are effective at absorbing heat during the day and retaining it during evenings, creating temperatures slightly higher than would be found in the absence of paved surfaces. Furthermore, vegetated areas are more effective at reflecting or absorbing heat during the day and transferring it during the evening hours.

A USEPA fact sheet on the subject states:

In general, summertime heat islands raise air conditioning demand, air pollution levels (particularly smog), and greenhouse gas emissions. They also increase the incidence of heat-related illness and mortality...Heat islands augment this public health threat by directly increasing temperature and indirectly raising ground-level ozone concentrations.⁴

Alternatives to traditional patterns of sprawling development, which depend on large road networks and other impervious surface facilities, can help to mitigate the urban heat island phenomenon. Retrofitting existing facilities can also mitigate the negative effects while simultaneously improving overall aesthetics.

Federal and State Mandates

(No known Federal or state mandates apply)

Partners for Consultation

Federal Entities:

U.S. Department of Energy
Environmental Energy Technologies Division, Heat Island Group
U.S. Environmental Protection Agency (EPA)

**www.energy.gov
eetd.lbl.gov/HeatIsland
www.epa.gov**

State Entities:

(No state entities were identified)

Independent Organizations:

Cool Communities
Smart Growth Network

**www.coolcommunities.org
www.smartgrowth.org**

⁴ EPA. Smart Growth and Urban Heat Islands.

<http://www.epa.gov/heatislands/resources/pdf/smartgrowthheatislands.pdf>

Inventories and Resources

Publications:

EPA. The Heat Island Mitigation Strategies Guidebook. Currently unavailable: anticipated release date in 2007. http://www.epa.gov/heatislands/resources/publications/miti_strat_guidebook.html

Description: Guidebook will include: benefits from reducing summertime urban temperatures; background on four mitigation strategies: (1) trees and vegetation, (2) green roofs, (3) cool roofs, and (4) alternative pavement technologies; emerging opportunities to collaborate with urban planning, energy; environment programs that have related goals; and additional technical resources.

EPA. Smart Growth and Urban Heat Islands. . EPA 430-F-03-001.
<http://www.epa.gov/heatislands/resources/pdf/smartgrowthheatislands.pdf>

Description: Two page fact sheet on the subject.

Useful Websites:

U.S. Environmental Protection Agency (EPA). Heat Island Webpage. Last accessed February 20, 2007.
<http://www.epa.gov/heatislands/>

Description: General information pertaining to the urban heat island effect, including an array of useful resources.

Thermal Pollution (Urban Heat Island Effect) Resulting from Transportation Facilities: Guidelines for New Facilities and Retrofitting Old Facilities

Common paving materials such as asphalt blacktop absorb heat during the daytime hours and release it during the evening, raising overall ambient temperatures. Retrofitting facilities with alternative materials can mitigate this effect

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Thermal Pollution: Retrofitting Facilities	<p>Elimination or reduction of impervious surfaces, which absorb heat;</p> <p>Proliferation of urban forests and green spaces, which constitute large green areas (made up primarily of mature tree stands) that shade road surfaces from the sun and cool surrounding areas through evapotranspiration;</p> <p>Use of concrete or other surfaces that have a light color, which will reflect light as opposed to absorbing it; and</p> <p>Use of permeable surfaces or porous paving materials, which allows stormwater to infiltrate the material, having a lasting cooling effect.</p>	<ul style="list-style-type: none"> • Improvements work in concert with best management practices for managing storm water • Improvements tend to be aesthetically-pleasing • Likely to result in a notable improvement in local quality of life 	<ul style="list-style-type: none"> • Solutions are interdependent – no single approach used alone will solve the problem • Costs associated with incorporating new materials and practices can be high • Locating experienced practitioners that specialize in devising comprehensive solutions for implementation can be difficult • Reflective materials (such as concrete) can have the adverse effect of increasing light pollution, as it would reflect the light from fixtures during the evening • Added consultation for retrofitting sites or improving landscaping is likely to be necessary, inflating costs • Costs associated with incorporating new materials and practices can be high

