

# 12

## Sustainability & Climate Change



2016 Regional Transportation Plan

# 12 Sustainability and Climate Change

The promotion of energy efficient and sustainable transportation systems is an issue that has increasingly become a priority both regionally and nationally. Higher fuel costs and concerns related to climate change have contributed to a strengthening focus on reducing the personal use of automobiles and also on using new and developing technologies that create more fuel efficient and cleaner burning vehicles.

Climate change is a result of global warming, which is largely caused by human activities, specifically the production of greenhouse gases (GHG). Greenhouse gas emissions are caused by everyday activities, such as the generation of electricity and the operation of motor vehicles. While electricity was the largest contributor (31%) of GHG emissions in the United States in 2013, the transportation sector comes in at a close second at 27 percent. It is projected that transportation will continue to account for more than one-third of Massachusetts' total GHG emissions in 2020. The consequences of climate change are expected to include increased numbers of very hot days, higher average rainfall and temperatures, and more severe storms. These effects will also, in turn, impact the performance of our infrastructure. As a result, these variables must be examined when planning for the future of the transportation system in Franklin County, because the decisions that are made today, "particularly those related to the redesign and retrofitting of existing transportation infrastructure or the location and design of new infrastructure, will affect how well the system adapts to climate change far into the future."<sup>1</sup>

Sustainable transportation and the reduction of GHG's is a priority for the Franklin County Transportation Planning Organization (FCTPO). This chapter will discuss ongoing and recommended initiatives that encourage sustainable transportation and, therefore, the mitigation of GHGs in the region. In addition, this chapter will examine ways in which the transportation infrastructure system can be adapted to the changing conditions that climate change will bring to the region.

## **Guiding Policies, Programs and Plans**

The Commonwealth of Massachusetts, FRCOG, and other regional organizations have demonstrated their commitment to reducing GHG emissions. Within the past few years, the following policies and plans have been enacted to help reduce the level of GHGs.

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<sup>1</sup> Transportation Research Board (TRB). Potential Impacts of Climate Change on U.S. Transportation. TRB Special Report 290. 2008.

## **Metropolitan Planning Organizations and the Global Warming Solutions Act**

The Commonwealth's Global Warming Solutions Act (GWSA) of 2008 requires statewide reductions in greenhouse gas (GHG) emissions of 25 percent below 1990 levels by the year 2020, and 80 percent below 1990 levels by 2050. As part of the GWSA, the Executive Office of Energy and Environmental Affairs developed the Massachusetts Clean Energy and Climate Plan (CECP), which outlines programs to attain the 25 percent reduction by 2020 – including a 7.6 percent reduction that would be attributed to the transportation sector.

The Commonwealth's thirteen metropolitan planning organizations (MPOs) are integrally involved in helping to achieve greenhouse gas reductions mandated under the GWSA. The MPOs work closely with the Massachusetts Department of Transportation (MassDOT) and other involved agencies to develop common transportation goals, policies, and projects that would help to reduce GHG emission levels statewide. For example, one of the programs in the CECP is MassDOT's sustainability initiative known as GreenDOT. GreenDOT policy goals were developed in accordance with the GWSA, and are as follows:

- Reduce greenhouse gas (GHG) emissions
- Promote the healthy transportation modes of walking, bicycling, and public transit
- Support smart growth development

The FCTPO shares in these goals and is working to meet the specific requirements of the GWSA regulation – *Global Warming Solutions Act Requirements for the Transportation Sector and the Massachusetts Department of Transportation (310 CMR 60.05)*. The purpose of this regulation is to assist the Commonwealth in achieving their adopted GHG emission reduction goals by:

- Requiring MassDOT to demonstrate that its GHG reduction commitments and targets are being achieved
- Requiring each MPO to evaluate and track the GHG emissions and impacts of its Regional Transportation Plan and Transportation Improvement Program
- Requiring each MPO, in consultation with MassDOT, to develop and utilize procedures to prioritize and select projects in its RTP and TIP based on factors that include GHG emissions and impacts

Meeting the requirements of this regulation will be achieved through the transportation goals and policies contained in the 2016 Regional Transportation Plans, the major projects planned in the RTPs, and the mix of new transportation projects that are programmed and implemented through the Transportation Improvement Program. The GHG tracking and evaluation processes enable the MPOs to identify the anticipated GHG impacts of the

planned and programmed projects, and also to use GHG impacts as a criterion in prioritizing transportation projects. This approach by the MPO is consistent with the greenhouse gas reduction policies of promoting healthy transportation modes through prioritizing and programming an appropriate balance of roadway, transit, bicycle and pedestrian investments; as well as supporting smart growth development patterns through the creation of a balanced multi-modal transportation system. All of the MPOs and MassDOT are working toward reducing greenhouse gases with plans, actions, and strategies that include (but are not limited to):

- Reducing emissions from construction and operations
- Using more fuel-efficient fleets
- Implementing and expanding travel demand management programs
- Encouraging eco-driving
- Providing mitigation for development projects
- Improving pedestrian, bicycle, and public transit infrastructure and operations (healthy transportation)
- Investing in higher density, mixed use, and transit-oriented developments (smart growth)

#### Regional GHG Tracking and Evaluation in RTPs

MassDOT coordinated with MPOs and regional planning agency (RPA) staffs on the implementation of GHG tracking and evaluation in development of each MPO's 2012 RTPs, which were adopted in September 2011. This collaboration has continued for the MPO's 2016 RTPs and 2016-19 TIPs. Working together, MassDOT and the MPOs have attained the following milestones:

- Modeling and long-range statewide projections for GHG emissions resulting from the transportation sector for use before final RTP endorsement. Using the Boston MPO's regional travel demand model and the statewide travel demand model for the remainder of the state, GHG emissions will be projected for 2020 no-build and build conditions, and for 2040 no-build and build conditions. The results of this modeling will be available before the endorsement of this RTP and the MPO staff will present on the results to the MPO membership before a vote on endorsement.
- All of the MPOs will include GHG emission reduction projections in their RTPs, along with a discussion of climate change and a statement of MPO support for reducing GHG emissions as a regional goal.

MassDOT, using its statewide travel demand model, will provide the FCTPO with statewide estimates of CO<sub>2</sub> emissions resulting from the collective list of all recommended projects in

all the Massachusetts RTPs combined (and supplemented by CO<sub>2</sub> emission reduction results for smaller, “off-model” projects supplied by the MPOs). Emissions will be estimated using the new (2014) MOVES model, and also incorporate the latest planning assumptions including updated socio-economic projections for the Commonwealth.

The project mix from this RTP (and all other RTPs) – modeled for both 2020 and 2040 using an Action (Build) vs. Baseline (No-Build) analysis to determine the CO<sub>2</sub> emissions attributed to all MPO’s mix of projects and smart-growth land use assumptions – is expected to show a neutral shift toward meeting the statewide greenhouse gas emissions reduction goal of 25 percent below 1990 levels by the year 2020, and 80 percent below 1990 levels by 2050. The reason for the anticipated neutral shift is that early indicators have shown that major infrastructure projects, both individually and collectively, would not trigger a significant change in GHG emission levels.

Working closely with MassDOT, the FCTPO continues to make efforts toward progress through planning activities to meet the GHG reductions targets and complying with the requirements of the GWSA. As part of this activity, the FCTPO will provide further public information on the topic and will continue to advocate for steps needed to accomplish the FCTPO’s and Commonwealth’s goals for greenhouse gas reductions.

The FCTPO certifies that it has made efforts to minimize the GHG emissions and impacts from the recommended projects (see certification at the end of this chapter. Potential TIP projects are subjected to an evaluation process using Transportation Evaluation Criteria (TEC). The TEC scores proposed projects in six different topic areas: condition, mobility, safety, community effects, land use & economic development, and environmental effects. The last criterion, environmental effects, specifically examines a project’s potential impact on air quality and climate. In addition to minimizing the GHG impacts from proposed projects, the FRCOG staff has sought public input on how to further reduce GHGs in the region. This topic received the most attention during the public meetings for the development of this RTP.

### **HUD-DOT-EPA Interagency Partnership for Sustainable Communities**

In 2010, the U.S. Department of Housing and Urban Development (HUD) announced the Sustainable Communities Planning Grant Program. In the 2010 Budget, Congress provided a total of \$150 million to HUD for the Sustainable Communities Initiative to improve regional planning efforts that integrate housing and transportation decisions and increase the capacity to improve land use and zoning. In the Fall of 2010, a consortium, with FRCOG as lead partner, received a \$425,000 grant under this program for Franklin County. Through

this grant, the FRCOG created *Sustainable Franklin County: a Regional Plan for Sustainable Development*. The goals and recommendations in the plan were identified through an extensive public outreach process and focus on sustainable development within the context of a rural region. It not only examines issues associated with transportation, but also comprehensively looks at the effects of land use, housing, economic development, natural and cultural resources, and land use and infrastructure on sustainability.

## **Green Communities**

In 2008, Massachusetts created the Green Communities Program which uses funding from auctions of carbon emissions permits under the Regional Greenhouse Gas Initiative to reward communities that achieve Green Communities designation by meeting five clean energy benchmarks:

1. Adopting local zoning bylaws or ordinances that allow “as-of-right siting” for renewable and/or alternative energy R & D facilities, manufacturing facilities or generation units;
2. Adopting an expedited permitting process related to the as-of-right facilities;
3. Establishing a municipal energy use baseline and a program to reduce use by 20 percent within five years;
4. Purchasing only fuel-efficient vehicles for municipal use; and
5. Requiring all new residential construction over 3,000 square feet and all new commercial and industrial real estate construction to reduce lifecycle energy costs (i.e., adoption of an energy-saving building “stretch code”).

Currently, 16 towns in Franklin County are officially designated as Green Communities and are eligible to receive funding grants.

## **Massachusetts Clean Cities**

The Clean Cities program is a national U.S. Department of Energy program that seeks to reduce petroleum consumption in the transportation network. The Massachusetts Clean Cities Coalition offers training, assistance, and program support necessary to promote alternative transportation throughout the Commonwealth. It also administers the

Massachusetts Electric Vehicle Initiative (MEVI) which aims to increase the battery, fuel cell, and plug-in hybrid electric vehicles. Related to this, there are several electric vehicle



**Electric car charging in a downtown Greenfield municipal parking lot.**

charging stations in the region. Three are located in Greenfield, including one high power station that can charge cars in 15-30 minutes. There are also multiple charging stations located just outside of Franklin County in Amherst and Northampton.

### **Alternative Transportation Plan**

In 2009, the FRCOG created the *Alternative Transportation Plan* that examined ways to encourage alternative forms of transportation other than the singly-occupied vehicle. Some of the Plan's recommendations are summarized here:

- Continue implementation of the 2009 *Franklin County Bikeway Plan Update*,
- Continue implementation of the 2008 *Franklin County Park and Ride Study*;
- Support passenger rail in the region;
- Promote ridesharing efforts;
- Improve bus transit to attract residents wishing to park and ride, and increase the level of service for lower-income people and elderly.

Many of the recommendations in the *Alternative Transportation Plan* are part of ongoing efforts by the FRCOG, FRTA, and other organizations in the region and are described in more detail in the next section.

### **Current Planning Activities**

The FRCOG recognizes the rural nature of the Franklin County region and acknowledges that traveling by automobile is often the most convenient or only option. However, with increases in the cost of fuel and more attention being focused on environmental issues, it is important to discuss options for reducing dependence on the single-occupied vehicle and increasing alternative transportation options. The Franklin County region and the FRCOG have been working on bringing sustainable transportation to the area and mitigating GHGs. In fact, the FRCOG recently received an Excellence in Commuter Options (ECO) Award from the state for its work in supporting and promoting alternative transportation in Franklin County. This section highlights the many planning activities that have recently been completed or are ongoing in this topic area.

### **Park and Ride Lots**

Park and ride lots provide an opportunity to those who do not live on or within walking distance of public transit routes to travel to an intermediary location and take public transportation or carpool with other commuters. There are currently several park and ride lots in Franklin County. They include:

- Charlemont Park & Ride (Route 2)
- Whately Park & Ride (Route 116/5/10)
- Greenfield Visitors Center Park & Ride

- Sunderland Park & Ride (Route 47)

In 2014, FRCOG published the *Evaluation of Franklin County Park and Ride Facilities* which assessed the performance of the existing park and ride lots. The study found that the majority of the



**MassDOT Park and Ride lot in Whately on Route 5/10.**

park and rides had consistent and regular use. Most of the lots had utilization rates between 20 percent and 35 percent, which show that the lots are being used but that they have additional capacity for more users. The Charlemont Park & Ride is the least used facility with a utilization rate of only 8 percent. The study recommended that marketing of these facilities be conducted as residents of the region may be unaware of their presence.

### **Ridesharing**

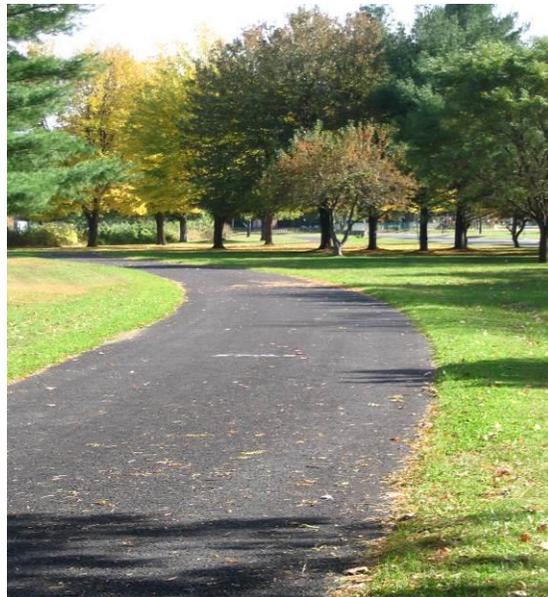
There are several programs and internet-based resources that promote carpooling or “ridesharing” in Franklin County and the wider region. The major program to encourage ridesharing across Massachusetts is through MassRIDES, which is a MassDOT-run program. MassRIDES provides travel assistance by providing information about transportation alternatives, including: transit, biking, and walking. It helps employers to establish vanpool or carpool options for employee commutes. There are also several other locally-based internet rideshare resources that attempt to connect ride-seekers with drivers offering rides within the region. They include: RideBuzz.org and Craigslist.org.

### **Shared Vehicle Program**

Car sharing is defined as the joint access and ownership of a car. For individuals who do not need a car every day, it is a way to have a car when you really need one while relying on alternatives for most trips. Zipcar is a national vehicle sharing program that is available in Massachusetts. This service allows users to pay a fixed rate for the use of a vehicle that they are able to reserve when they need it. Members can reserve cars for time periods ranging from just hours to many days. These reservations include the cost of fuel, insurance, and reserved parking. Presently, there are six Zipcars located in Amherst and four Zipcars in downtown Northampton. There are no Zipcars sited in Franklin County.

### **Promote Walking and Bicycling**

There has been a lot of support in Franklin County for increased walking and bicycling. Bicycling and walking play a large role in community livability by impacting the environment, community health and wellness, and the transportation network. Shifting to these transportation modes can result in a significant decrease in transportation-related GHG emissions, while promoting the health of residents. In Franklin County, several reports and studies have examined the safety and security of the pedestrian and bicyclist transportation network and have sought to increase the quality and quantity of these facilities. Chapter 10 summarizes in detail the efforts to encourage bicycling and walking in the region.



**Canalside Trail in Turners Falls**

### **Increase Use of the Public Transit System**

In Franklin County, several reports and studies have examined the demand for public transit in the region. The following studies and reports have focused on transit service and include: *Alternative Transportation Plan*, *West County Transit Study*, *North County Transit Study*, and *Survey of Select Populations Regarding Transit Service*. The major strength of the transit system is that most of the major commuting routes within Franklin County are currently being served by public transit. Another beneficial aspect of the public transit system is the inclusion of bicycle racks on all of the buses. This coordination between various modes of transportation can help decrease dependence upon the single occupant motor vehicle and help mitigate GHG emissions. On the other hand, these studies and public outreach has shown that a weakness with the current status of transportation options within Franklin County is the limited service of public transit. This is primarily due to the high cost of providing transit service to such a rural population. See Chapter 9: “Transit and Paratransit Services,” for recommendations on how to improve the public transit system in Franklin County.

### **Alternative Transportation Map**

One of the ways the FRCOG is working to promote mode shift and healthy transportation options is through the creation of an alternative transportation map. Building on the work of the Massachusetts Department of Energy Resources (DOER) and MassRIDES, the maps will

show areas of concentrated transit service, including Greenfield Community College, Deerfield, Orange, and Shelburne Falls, and will highlight the available connections to the alternative transportation network, such as bicycle routes, shared-use paths, and park and ride lots. In addition to providing information on the available transportation alternatives, this effort will also include a report and map identifying where barriers to use of alternative transportation still exist, thus creating an opportunity to reduce these barriers and increase the connectivity of the alternative transportation network.

### **Passenger Rail in the Region**

In 2014, passenger rail returned to Franklin County with the Amtrak “Vermont” service stopping at the new rail station constructed at the John W. Olver Transit Center. This service, running on the recently improved Knowledge Corridor, connects Springfield, MA and White River Junction, VT with two runs per day – one northbound and one southbound. In addition to this newly established service, there is also planning work underway to establish a regional rail system with more frequent commuter-like service between Greenfield and Springfield. See Chapter 7: “Passenger Rail,” for more information on passenger rail in the region.

### **Telecommunications**

Telecommuting can help decrease GHG emissions by allowing workers to eliminate some daily commutes and work from home instead. It is anticipated that the number of employees telecommuting in Franklin County will continue to increase in the future. This is due in large part to the recent and pending expansion of the telecommunications infrastructure and high-speed internet services in the region.

### **Improve Traffic Operations**

#### Reduce Congestion and Travel Time

The time vehicles spend idling in traffic congestion is a direct contributor to GHG emissions. In order to prevent idling and decrease time spent in traffic, the efficiency of the transportation network needs to be examined. The 2012 Greenfield Signals Improvement Project included the redesign of eight signalized intersections in Greenfield to improve the intersection efficiency and decrease emissions.

#### Improve Communication and Notification

Technology can help improve the efficiency of the transportation network through driver communication and advanced notice of incidents to users of the transportation network. Improvements in communication may include better and more frequent use of variable message signs to notify drivers of upcoming construction schedules or delays. Another form

of notification is the Massachusetts Travel Advisory System which is a free service provided for the Commonwealth in which a motorist can call 511 to see if a select number of major roadways are experiencing congestion. This service includes Interstate 91 and Route 2 in western Massachusetts. Motorists who are aware of an incident can take an alternate route, which will result in an avoidance of the congestion and a decreased travel time.

### **Adaption of Transportation Infrastructure to Climate Change**

Transportation-related GHG emissions contribute significantly to climate change. In turn, however, climate change will also have an impact on the transportation system. A special report from the Transportation Research Board (TRB), “Potential Impacts of Climate Change on U.S. Transportation,” determined that the following impacts on the transportation system can be expected:

- Prolonged hot days lead to increased risk of wildfire;
- Compromised pavement integrity (hotter weather = softer pavement and increased rutting from traffic);
- Deformed rail lines;
- Adversely affected bridge operation due to thermal expansion of bridge joints;
- Increased flooding and inundation of bridges, roads and rail lines; and
- Heavier rainfall will require redesign and replacement of drainage structures.

It is clear that not only does the county need to take an active role in reducing GHG emissions by promoting sustainable transportation, but it also needs to plan for these potential changes and their impact on transportation infrastructure. The following strategies are aimed at preparing for the impacts of climate change on the future of the transportation system and the incorporation of this concern into planning practices.

### **Plan for More Severe and Frequent Flooding in the Region**

A safe transportation system protects users from hazards, including hazards resulting from climate-related stresses on the system. It is expected that more extreme weather events will lead to more precipitation and flooding. It is critical that infrastructure be planned and maintained to be able to withstand a higher frequency of these events. Tropical Storm Irene in August 2011 provided crucial information on the vulnerability of the transportation network in the event of major flooding. This event flooded and washed out many roads and bridges in the region. Such events may be more severe in the future, so a revised examination of potential flooding areas and critical infrastructure should be performed for the whole region. The FRCOG has prepared updated flood maps with evacuation routes for each municipality in order to assess changes in flooded areas as a result of climate change and its effects on emergency preparedness.

### Preserve Aspects of the Transportation System that are Threatened by Climate Change

More prolonged heat spells and hotter days are expected with climate change, along with increased precipitation events. These effects will directly impact pavement condition. Warmer days will result in the softening of the pavement for longer periods of time and may lead to more rutting. Additional concerns regarding stormwater runoff should be examined when updating or redesigning the roadway network to accommodate the potential need for more drainage. FRCOG has developed a Pavement Management Program for the region to monitor this critical component of the transportation infrastructure.

### Improve Emergency Response Times via an Updated GIS Network

There are several tools which can aid in improving emergency response to an event. Emergency vehicle preemption is one proactive tool that can be used. Another aspect of emergency response is the accuracy of the information emergency responders use to reach an event. The FRCOG has identified changes to the Road Inventory File (RIF), which contains information used by emergency responders about the transportation network. The updated RIF will help improve emergency response times.

### **Recommendations for Transportation and Climate Change**

The transportation sector is the second largest contributor to GHG emissions, which are a primary cause of climate change. There are many steps that have already been taken in the region to help mitigate GHG emissions. The region has also taken a proactive role in preparing for the impact of climate change on the regional transportation system. This chapter demonstrates how Franklin County is working towards the state's goal of reducing GHG as laid forth in the Massachusetts Clean Energy and Climate Plan for 2020.

#### **Recommendations**

- Continue to promote a reduction in GHG emissions in the region through the mitigation strategies described in the chapter.
- Continue to promote sustainable and alternative forms of transportation to the singly-occupied motor vehicle.
- Develop local and regional emergency action plans for events related to climate change.
- Continue to implement a Pavement Management System for the county.

**2016 Franklin County Regional Transportation Plan**  
**310 CMR 60.05: Global Warming Solutions Act Requirements for the Transportation Sector and the Massachusetts Department of Transportation**

**Self-Certification Compliance Statement for Metropolitan Planning Organizations**

This will certify that the 2016 Regional Transportation Plan for Franklin County Transportation Planning Organization is in compliance with all applicable requirements in the State Regulation 310 CMR 60.05: Global Warming Solutions Act Requirements for the Transportation Sector and the Massachusetts Department of Transportation. The regulation requires the Metropolitan Planning Organizations (MPOs) to:

1. 310 CMR 60.05, 3(b)(1)(a): Evaluate and track the GHG emissions and impacts of RTPs and TIPs;
2. 310 CMR 60.05, 3(b)(1)(b): In consultation with MassDOT, develop and utilize procedures to prioritize and select projects in RTPs, TIPs, and STIPs based on factors that include GHG emissions and impacts;
3. 310 CMR 60.05, 3(b)(1)(c): Quantify net GHG emissions and impacts resulting from the projects in RTPs and TIPs and have made efforts to minimize GHG emissions and impacts;
4. 310 CMR 60.05, 3(b)(1)(d): Determine in consultation with the RPA that the appropriate planning assumptions used for GHG emissions modeling are consistent with local land use policies, or that local authorities have made documented and credible commitments to establishing such consistency;
5. 310 CMR 60.05, 4(a)(2)(a): Develop RTPs and TIPs;
6. 310 CMR 60.05, 4(a)(2)(b): Ensure that RPAs are using appropriate planning assumptions;
7. 310 CMR 60.05, 4(a)(2)(c): Perform regional GHG emissions analysis of RTPs and TIPs;
8. 310 CMR 60.05, 4(a)(2)(d): Calculate GHG emissions for RTPs and TIPs;
9. 310 CMR 60.05, 4(a)(2)(e): Develop public consultation procedures for GHG reporting and related GWSA requirements consistent with current and approved regional public participation plans;
10. 310 CMR 60.05, 4(c): Prior to making final endorsements on the RTPs, TIPs, STIPs, and projects included in these plans, MassDOT and the MPOs shall include the GHG Assessment and information on related GWSA activities in RTPs, TIPs, and STIPs and provide an opportunity for public review and comment on the RTPs, TIPs, and STIPs.
11. 310 CMR 60.05, 6(a): After a final GHG assessment has been made by MassDOT and the MPOs, MassDOT and the MPOs shall submit MPO-endorsed RTPs, TIPs or projects within 30 days of endorsement to the Department for review of the GHG assessment.

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Stephanie Pollack, Secretary and CEO  
MassDOT

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Date

(signatures continued on next sheet)

Thomas Tinlin, Acting Highway Administrator MassDOT Highway Division	Date
Bill Perlman, Chair FRCOG Executive Committee	Date
Lance Fritz, Chair Franklin Regional Transit Authority	Date
William Martin, Mayor City of Greenfield	Date
John Paciorek Regionally Elected Representative to the FRCOG Executive Committee	Date
Robert Dean West County Sub-Regional Appointment	Date
Jonathan Edwards Central County Sub-Regional Appointment	Date
Vacant East County Sub-Regional Appointment	Date