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Logan Health Study CAC (DPH)
Logan Airport CAC (Noise Study)
MBTA Rider Oversight Committee
MAPC MetroFuture Steering Com. (pre-2003 to 2008)
Somerville Transportation Equity Partnership
Mystic View Task Force (of Somerville)
Move Massachusetts Board

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July 23, 2010

Ian Bowles, Secretary EOEEA
Attn: Holly Johnson, MEPA Analyst
100 Cambridge Street, Suite 900
Boston MA 02114-2524

Via Email: holly.s.johnson@state.ma.us

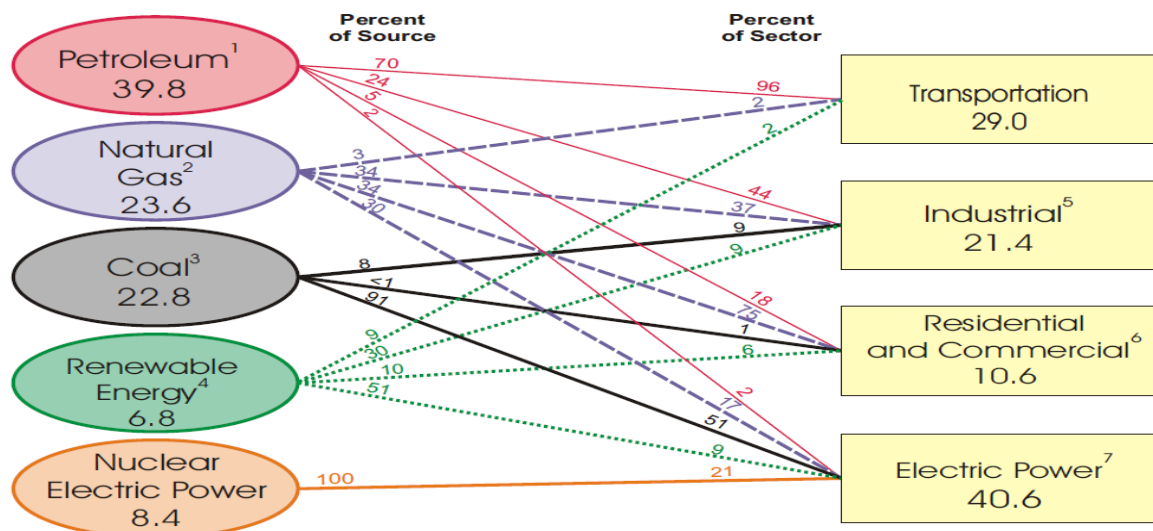
Re: **Green Line Extension Project Final EIR
EOEEA #13886**

Dear Secretary Bowles and Analyst Johnson,

Thank you very much for your attention to this and many other public comments on the Green Line Extension, GLX, the most important sustainable transportation project undertaken by the Commonwealth of Massachusetts in a generation. Before making more specific comments, I especially want to commend the efforts of those MassDOT personnel and consultants who are working on and championing this project despite a chronic and severe shortage of state transportation resources, both financial and staff. Given our ongoing environmental challenges and the need to grow out of a severe regional and global recession, all of us must take responsibility for accomplishing this project in a manner that is effective, efficient and expeditious. The GLX is the state's and the Boston Metropolitan Planning Organization's largest SIP transit commitment. Every effort should be made to restore its lapsed schedule so that completion can be accomplished by the legal December 31, 2014 deadline.

With transportation accounting for 70% of US petroleum use (see EIA chart next page) and a dominant share of our balance of payments indebtedness, it is necessary to shift our urban transportation mode shares as quickly as possible to clean transit, that can be powered without petroleum, and simultaneously to expanded walk and bike modes that are eminently compatible with transit. Clearly we cannot continue to base our regional transportation on roadways and conventional vehicles if we want either a stronger economy or a less carbon intense society over the next generation of time, let alone by 2020. Highway vehicle miles traveled per day in Massachusetts were about 25 million in 1970, 50 million in 1990 and 75 million in 2010 (see chart next page). If we want to hit MassDOT's green house gas (GHG) targets for 2020 we have few choices - cut our daily vehicle miles travelled in half and/or expand a wide range of alternative transportation practices, including GLX with integrated expansion of walking and bicycling.

U.S. Primary Energy Consumption by Source and Sector, 2007 (Quadrillion Btu)



¹Does not include 0.6 quadrillion Btu of fuel ethanol, which is included in "Renewable Energy."

²Excludes supplemental gaseous fuels.

³Includes less than 0.1 quadrillion Btu of coal coke net imports.

⁴Conventional hydroelectric power, geothermal, solar/PV, wind, and biomass.

⁵Includes industrial combined-heat-and-power (CHP) and industrial electricity-only plants.

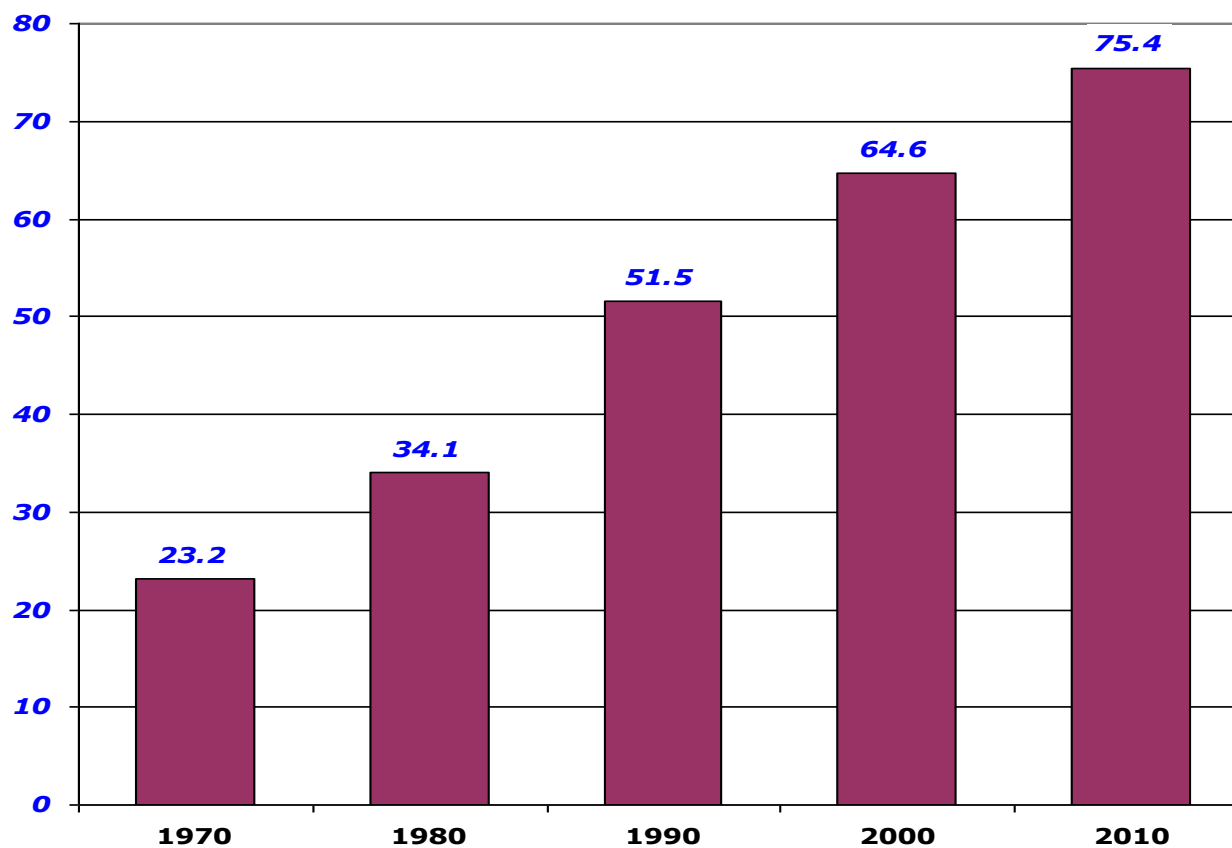
⁶Includes commercial combined-heat-and-power (CHP) and commercial electricity-only plants.

⁷Electricity-only and combined-heat-and-power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.

Note: Sum of components may not equal 100 percent due to independent rounding.

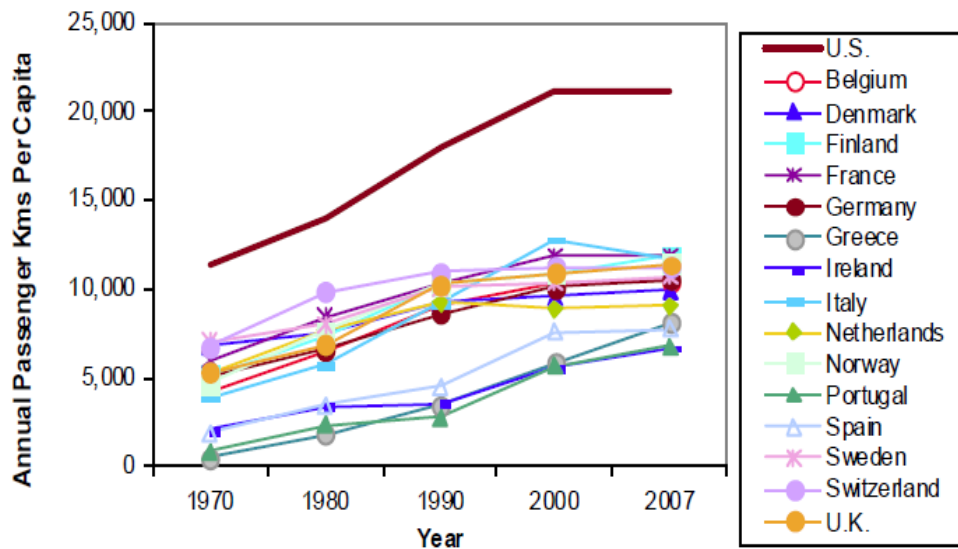
Sources: Energy Information Administration, *Annual Energy Review 2007*, Tables 1.3, 2.1b-2.1f and 10.3.

Massachusetts Highway Volumes Average Weekday Vehicle Miles Traveled in Millions



Without exception those developed nations of the world which use much less energy for transportation than the US have much higher mode shares for both public transit and for the healthy active transportation modes of walking and biking. The charts below come from various sources but the story is consistent. Increased transit, walk and bike shares equals less energy \$\$\$ and less GHG emissions.

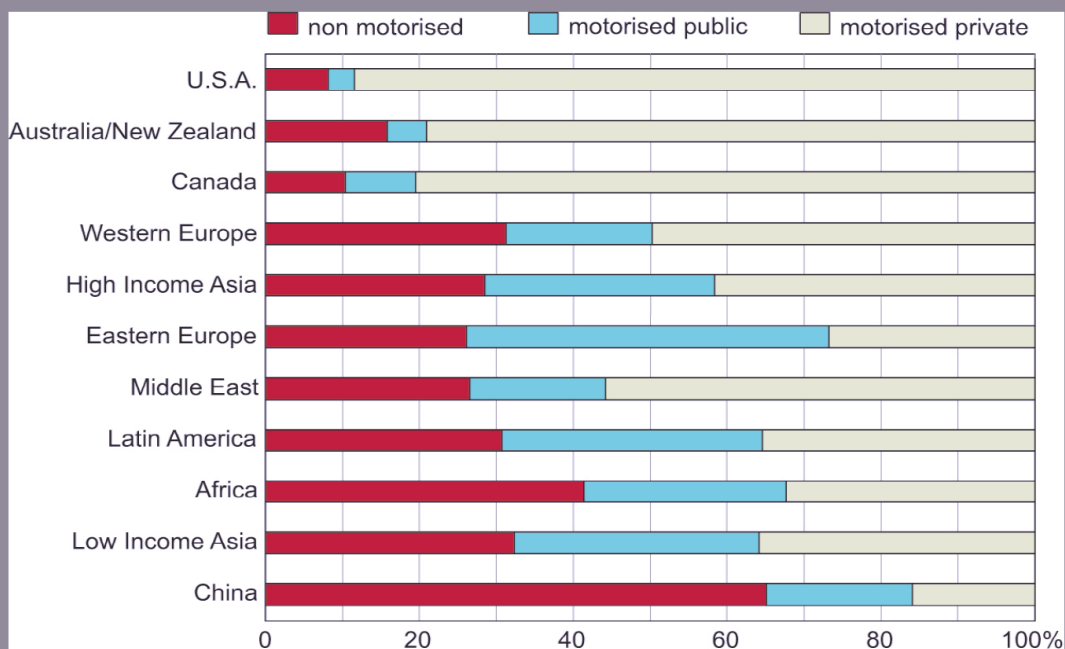
Figure 7 International Vehicle Travel Trends (EC 2007; FHWA, Various Years)⁶



Per capita vehicle travel grew rapidly between 1970 and 1990, but has since leveled off and is much lower in European countries than in the U.S.

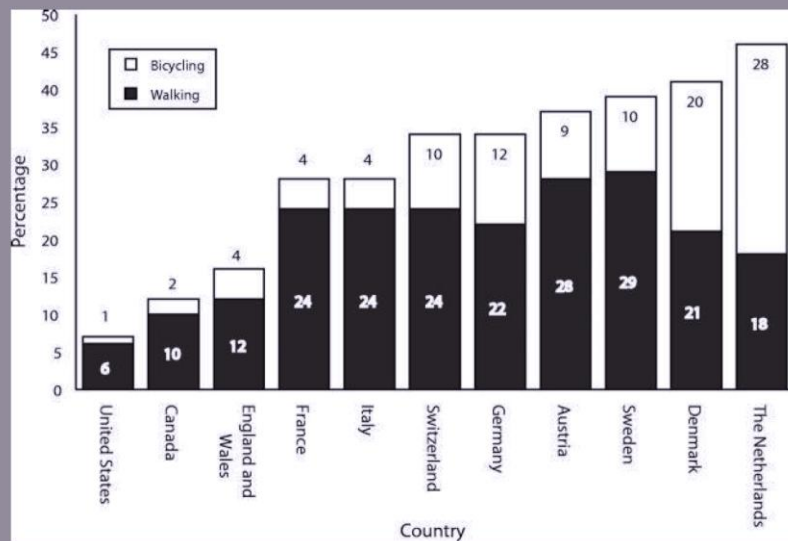
⁶ U.S. passenger-kms based on FHWA vehicle-miles x 1.67 (miles to kilometers) x 1.58 (vehicle-km to passenger-kms) x 0.8 (total vehicles to passenger vehicles).

Modes of Transportation



Proportion of trips in urban areas made by walking and bicycling in North America and Europe, 1995

Source: Pucher J, Dijkstra L. *American Journal of Public Health*, 93:1509-16, 2003.



At the more local level, it is well known that Somerville's Davis Square T Stop has had over twice the boardings per day predicted before the station was opened as a result of Red Line expansion a generation ago. The symbiotic relationship between transit, walking and bicycling is evident virtually every day in Davis Square as the Somerville Bike Path and Community Path feed MBTA customers to the T Stop. These two pleasant green routes to the T and to Davis Square carry more people than any conventional sidewalks in Somerville and they carry many MBTA customers further than they would likely travel along the city's sidewalks and roads. They are also mentally and physically healthier than many sidewalks or poorly paved shoulders along our sometimes

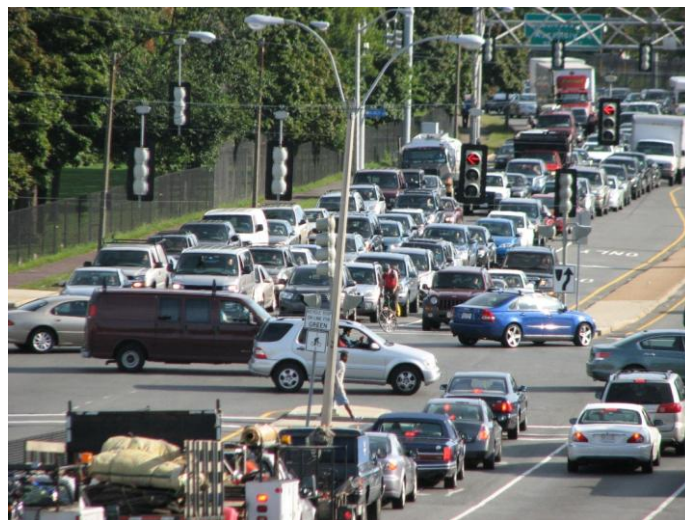
gritty urban streets. These routes are generally green and generally less pollution laden than our busy streets and arterials. It would be an extraordinary shame if the Community Path, which many people without cars will rely upon to reach future Green Line stations, is not able to be built simultaneously with GLX. The Path and GLX can most cost effectively be built together as integrated green transportation. (See photo below versus following pictures of Davis Square and McGrath Highway traffic.) The only link neither built nor funded between the Minuteman Bike Path in Bedford and downtown Boston is the remaining Community Path segment through Somerville which is needed to feed Green Line stations too. How ironic that this segment of what could be one of America's greatest regional bike networks is also the piece between Bedford and Boston with the greatest density of immigrants and low income residents!



Community Path near Davis Square T-stop



College Avenue, Davis Square



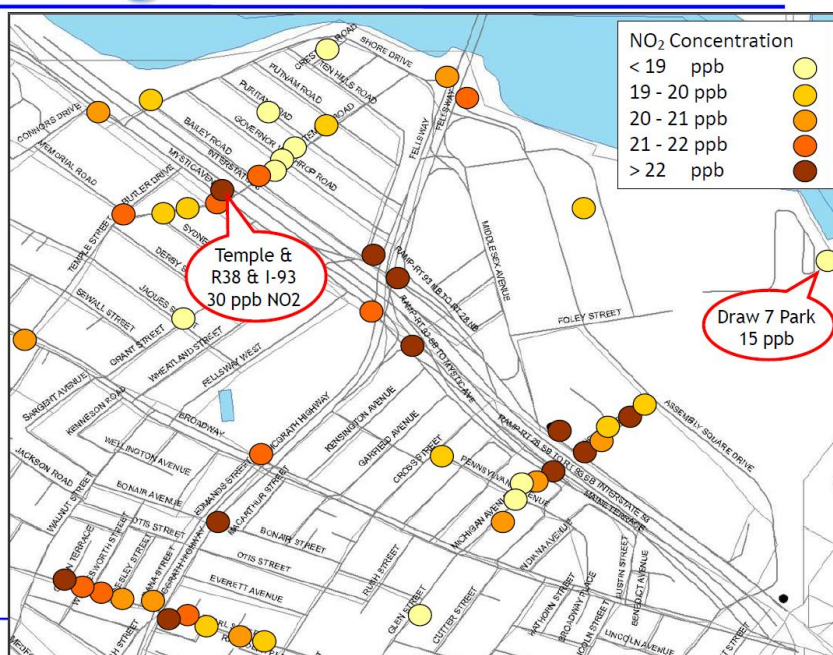
Intersection of Broadway and Route 28

With regard to air pollution and local exposures, Somerville community groups have worked with regional and national experts to develop an extensive knowledge of mobile pollution gradients along highways. While we do not desire any local increase in diesel train emissions, we have found that time integrated NO₂ concentrations, an excellent marker for transportation emissions, are significantly lower between diesel rail routes either side of Draw 7 Park at Assembly Square than in any Somerville neighborhoods close to Interstate 93 and arterial Routes 28 and 38. The relentless nature of major highway pollution during extended morning and evening rush hours appears to be more of a problem, as evidenced by NO₂, than the less frequent trains, notwithstanding the huge plumes of diesel exhaust which sometimes emanate from locomotives in Somerville when they notch up on their way from North Station to the suburbs they serve. We much prefer those trains to move through at constant speed than to have them idle, stop and start here, a process that can cause a hundred fold increase in emissions per unit of travel.

NO₂ Along Roads

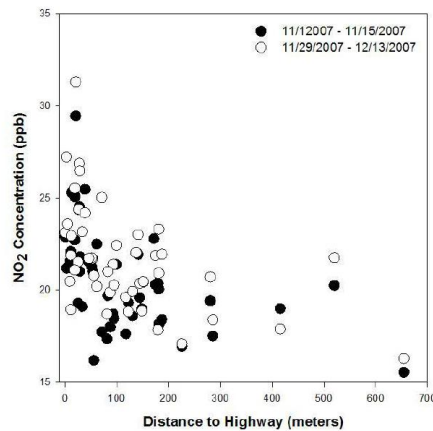
Lynn urban
background
~ 10 ppb

- Clear traffic-related pattern
- NO₂ measured near I-93 is twice as high as the level in Draw 7 Park which lies between 3 MBTA diesel commuter rail routes
- NO₂ within 50 m of I-93 is similar to the concentrations at Roxbury Crossing and Kenmore Sq.



NO₂ Levels

- Two-week averages
 - Mean (SD): 20.6 (2.7) ppb
 - Range: 15 – 32 ppb
- NO₂ weakly correlated with distance (m) to highway
 - I-93: -0.19 ($p=0.06$)
 - MA-28: -0.28 ($p=0.006$)
- NO₂ strongly correlated with traffic density (TD)
 - TD_{25m}: 0.61 ($p<0.0001$)
 - TD_{50m}: 0.60 ($p<0.0001$)
 - TD_{100m}: 0.48 ($p<0.0001$)



We have also measured NO_x and Particle Number Count in a real time pilot study on January 16, 2008 (Figure 7 below from a paper submitted to Atmospheric Chemistry and Physics) and in an NIH research project now underway (CAFEH) looking at pollution gradients and biomarkers of cardiovascular health.

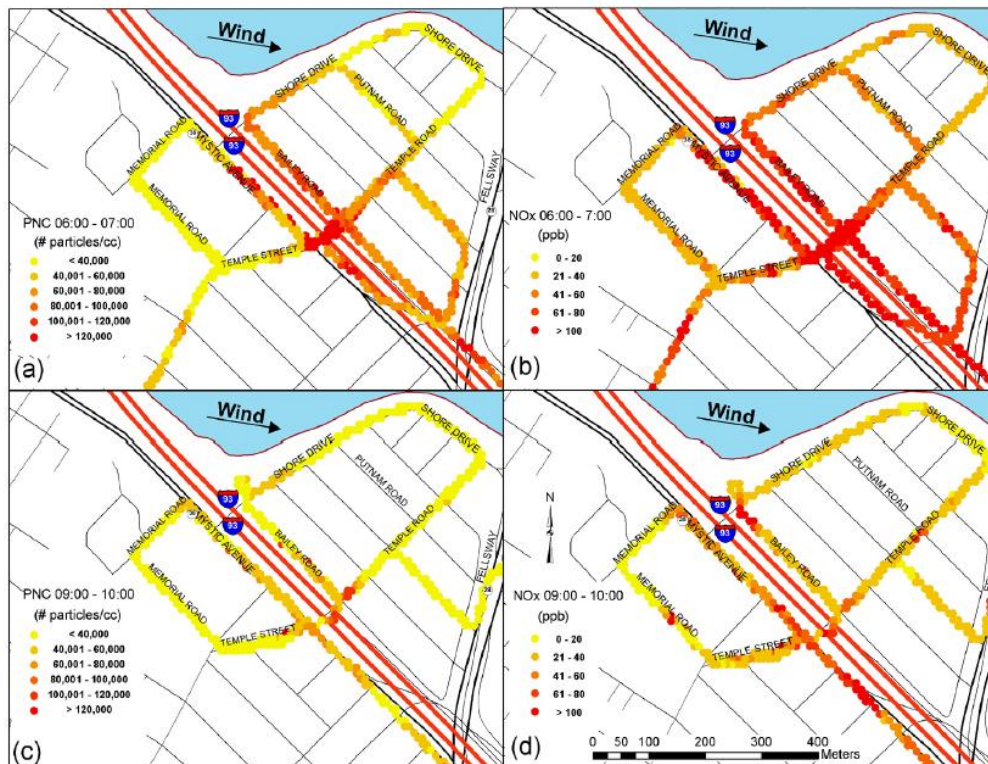


Fig. 7. Spatial distribution of particle number concentration (7–1000 nm) (a and c) and NO_x concentration (b and d) measured between 06:00–07:00 and between 09:00–10:00.

Durant 2010 ACPD - Aerodyne Research Inc. pilot work commissioned by Mystic View Task Force

Our Somerville studies show large excess concentrations of primary transportation pollutants close to local highways. Environmental epidemiology studies of the last decade, from North America and Europe, have shown significantly increased cardiopulmonary and lung cancer mortality for those most exposed to fresh mobile pollution sources - truck drivers, diesel train engineers and residents living next to highways. The California Children's Health study has shown increased childhood asthma and permanently decreased lung function for those growing up in near highway locations. Other studies have shown adults to have increased atherosclerosis risk, and adolescents and even children to have premature arterial stiffening proportional to these exposures. Unfortunately for healthy transportation facilities placed in polluted locations such as along busy roadways, bicyclists have 4 or more times the ventilation rates of the same people in vehicles, as well as deeper inhalation and higher metabolic rates, leaving them with 8 or more times the dose of fresh mobile pollutants (Panis 2010 Atmospheric Environment).

All of this is just to say that Somerville needs healthy transportation that also minimizes exposure to mobile pollution and that lowers activity based "effective dose". We need the Green Line Extension and we need the Community Path, both as one integrated project. We have been careful to point out major GLX cost savings whenever they have been warranted - such as discouraging an integrated commuter rail and Green Line station, discouraging transit adjacent garages and discouraging expensive land takings. But good pedestrian, bicycle and bus connections are absolutely necessary to make the GLX project the fully cost effective and efficient project that it can be. The Commonwealth will spend roughly \$500 million on the GLX if it succeeds in attracting Federal New Starts funding. If the Commonwealth or Somerville are able to find a Federal program to offer 80:20 funding of the remaining Community Path segments, that would amount to a local match of only \$5 million. In other words, a 1% local project cost increase for a healthy green feature that may add 20% or 30% to total GLX ridership and will certainly improve local health while significantly decreasing local GHG emissions. Please, isn't this a no brainer?

The air pollution comments above may also be extended to some residential locations impacted by the GLX. Foremost among these locations are the Glass Factory and Brickbottom, both located along Route 28 as well as immediately adjacent to the GLX. Brickbottom, with diesel rail corridors immediately next to both sides of the property, warrants extra attention and mitigation for its air pollution exposures. If it is true that commuter rails stop, idle and then start up again next to Brickbottom, that practice should immediately be stopped altogether, or at the very least minimized if it cannot be stopped. Central air conditioning with HEPA filtration should also be considered for Brickbottom. It is highly unlikely that most artists and residents understand the increased health risks intrinsic to their live - work location.

Maximum sound mitigation should also be a priority for Brickbottom and the Glass Factory, as well as others similarly impacted. Transportation noise is correlated with increased risk of hypertension (high blood pressure) and therefore pre-mature mortality. The World Health Organization (WHO) has recently established a concentration response function for noise and increased risk of hypertension. Babisch (in Noise and Health 2009) has concluded on behalf of WHO that,

"The calculated relative risk for an increase ("regression approach") of the day/night average weighted sound pressure level of aircraft noise of 10 dB(A) based on the presented meta-analysis is OR = 1.13, 95% CI = 1.00-1.28, range = 45-70 dB(A)." **[Note the large range of impact.]**

Bodin (in Environmental Health 2009) found an almost doubled risk of hypertension for middle-aged residents exposed to over 64 dB(A), concluding as follows regarding the relationship of traffic noise and hypertension,

"Modest exposure effects (OR \approx 1.1) were generally noted in intermediate exposure categories (45 -64 dB(A)), and with no obvious trend. The effect was more pronounced at > 64 dB(A) (OR 1.45, 95% CI 1.04 - 2.02). Age modified the relative effect ($p = 0.018$). An effect was seen among middle-aged (40 - 59 years old) at noise levels 60 - 64 dB(A) (OR = 1.27, 95% CI 1.02 - 1.58)) and at > 64 dB(A) (OR = 1.91, 95% CI 1.19 - 3.06)). An effect was also indicated among younger adults but not among elderly. No apparent effect modification by gender, country of origin, disturbed sleep or strained economy was noted."

Finally, Babisch found in 2005 (Epidemiology) that men (but not women) exposed to over 70dB(A) as compared to under 60dB(A) of daytime traffic noise had a 30% increased risk of myocardial infarction, with the increased relative risk increasing to 80% after 10 years of residence at one location.

Though perhaps not as drastic as the health outcomes for large traffic related air pollution exposures, these noise associated effects are nevertheless noteworthy. If MEPA and/or MassDOT do not accept the conclusions of these internationally respected noise experts, the current science behind any alternative concentration response functions that are accepted by MEPA and/or MassDOT should be quickly revealed to the public for their due consideration.

I have made extensive comments on the environmentally related aspects and context for the GLX, thinking that others may have spent more time on station design issues and the need for great on street pedestrian and bike connections to all the proposed stations from all compass directions. Seamless bus connections will also be important for key stations. I do want to repeat without elaboration that Route 16 is a much more natural GLX terminus than College Avenue and that East Cambridge citizens plans for a new Lechmere Square with enhanced pedestrian crossing of Route 28 are critically important aspects of a complete and successful GLX project.

Thank you again for your attention to this important 21st century project. It is greatly appreciated. I will separately forward some of the studies mentioned above.

With Best Regards,

Wig Zamore