To the Chair of the Environmental Stewardship and Action Community Advisory Committee

Executive Summary

The document below is essentially a zoning proposal that outlines what would amount to new zones to be applied to land in the city of London. The intention is to present the proposal in some form to "Re Think Zoning" sometime before Oct. 31. Prior to that submission the hope here is to enlist comments from the committee about the proposal, by way of edits, changes or improvements to the proposal. First, my sincere appreciation to the committee should it be willing to devote the time and energy to this request.

As to the proposal itself. The argument here is that London should adopt two, different zoning concepts. The first concept is that areas that have vegetation in London should be zoned: "Protected", "Supported" or "Planned for Improvement". The protection from this zoning would protect growing vegetation from harm or removal. The rationale for this zoning is to protect the ability of the vegetation to reduce emissions that contribute to global warming. The first part of the proposal is an explanation of that rationale.

The second zoning concept is to zone areas of the city and roads so as to restrict the traffic of diesel trains and trucks, such that it would be confined to certain locations for a time and ultimately eliminated. The rationale for this is to stop diesel emissions at source, a source which currently is the disproportionate cause of the highest level of emissions in the city. The second part of the proposal attempts to present that rationale in more detail.

Overall the argument here is for a new and different concept of zoning for the city. For example, currently in London land that is zoned park land, can be, following application, rezoned for industrial or residential use. If the city adopts the concept of "Protected" zoning for land with vegetation, exactly this kind of "rezoning" would not be possible.

Should the committee decide that in some way the proposal could be endorsed or supported by the committee, that of course would also be much appreciated.

Angus Johnson

Vegetation and Diesel Zoning as Climate Action Strategies in London

What we would like to do to deal with global warming is stop sources of emissions from producing emissions and protect vegetation that can reduce those emissions. To this point we are having limited success with both. By a stroke of luck, London has an opportunity to at least make some headway in dealing with both. The key to that opportunity is information about emissions that was produced by Dr. Daniel Rainham and his team from Dalhousie University who chose London as one of the thirty subjects for their environmental quality study which was completed about a year ago.

Those key pieces of information from the study are a comparison table of information and a map that accompanied the table. The map shows London with areas in different colours and the table effectively shows what the colours represent. The part of the table[1] dealing with emissions looks like this.

	0–30	30–39	40–49	50–59	60–69	70–79	80 - 100
$PM_{2.5}$ (μg/m³)	8.3 (5.5, 9.2)	7.9 (4.7, 11.2)	7.8 (3.3, 11.1)	7.4 (2.3, 10.8)	7.1 (2.2, 10.6)	6.9 (2.3, 9.6)	6.6 (4.5, 8.4)
NO_2 (ppb)	9.3 (6.9, 12.8)	9.1 (4.4, 13.0)	8.8 (1.8, 14.9)	7.7 (0.7, 14.9)	6.1 (0.2, 12.9)	5.3 (0.1, 9.8)	4.9 (0.8, 7.9)

What this table shows is amounts of two important emissions that cause global warming, particulate matter and nitrous dioxide, actually in varying amounts. The amounts of the emissions decrease going from left to right. The map for London (Map L)[1] that accompanies this table shows the location of areas of the city that actually have these amounts or levels of emissions.

Looking at the rows from left to right the top row (0-30, 30-39 etc.) are ranges of numbers corresponding to coloured areas on the maps. For example, the (70-79) area is shown on the map with a lighter green colour. What the table shows is that the level of particulate matter in that area is 6.9 (μg/m³) and the level of nitrous dioxide is 5.3 (ppb).

The two rows of emissions show, for the purposes of the study, information related to air quality. Both emissions pose significant health hazards, related to respiratory diseases, including cancer. The higher amount of emissions is reflected in lower environmental health scores. As the amount of the emissions decrease, the areas get "healthier'.

But again, the tables also show information about important emissions that contribute to global warming.

[1]https://ars.els-cdn.com/content/image/1-s2.0-S0160412022005608-mmc3.pdf

[2]https://www.sciencedirect.com/science/article/pii/S0160412022005608

Nitrous dioxide is one of the three main greenhouse gases along with methane and carbon dioxide. It is produced in the smallest quantities (6%) (Methane 16%, CO2 72%) but of the three, it is the most potent contributor to global warming, with 300 times the heating potential of carbon dioxide.

Particulate matter is also a significant contributor to global warming. It warms the atmosphere by absorbing incoming and scattered heat from the sun. The most conservative estimates of its effect place it at two thirds the effect of carbon dioxide and greater than methane. Recent studies argue that it may have an even greater effect than carbon dioxide.[3] These index maps can then be viewed as an emissions report card, each colored area on the map showing differing amount of emissions, or differing levels of success in dealing with global warming.

Globally the extent of emissions produced by burning fossil fuels, is 50 billion tonnes annually, and the amount of the reduction of those emissions by vegetation is 30%. The world's oceans reduce the amount by another 15%. Which means that 55% of emissions produced largely by our species, represents our residual responsibility for the heating of our planet. So, the Dalhousie team's coloured maps are really show in London, colour by colour the amount of those two emissions that are being produced.

On the maps of the thirty cities there are no areas anywhere, above 90. The highest fall in the (80-90) range. In those ranges are the best air quality scores and those measurements for particulate matter stop at 6.6 and for nitrous oxide at 4.9. Hence there is no area measured in the thirty cities that is entirely free from these emissions.

The lowest actual measurement of particulate matter occurred in the (60-69) region and that was 2.2 $\mu g/m^{3.}$ The lowest number of nitrous oxide occurred in the (70-80) area and that was 0.1ppg a very small amount, but not zero.

London's highest amounts of these emissions are in a (40-49) area and the lowest are in the (80-90) darker green category. In London, there are eight areas with these lowest emission amounts in patches around the city. In terms of the EQ study they are the "healthiest" areas of the city. Seven are located in protected natural areas (like ESAs): Meadowlily Woods, Pond Mills, Kilaly Meadows, Medway Valley, Springbank Park and Warbler Woods. The eighth is in part of the Greenhills Golf Club property in Lambeth.[4] In addition to being healthy they are the best in mitigating global warming because in these areas the two emissions are reduced to the lowest levels.

Viewed from above, the areas are entirely covered by vegetation and that vegetation has stomata which processes emissions, and stomata, that most growing plants have, are uniquely responsible

[3]https://www.theguardian.com/environment/2013/jan/15/black-carbon-twice-global-warming#:~:text=Soot%20warms%20the%20atmosphere%20by,surface%20of%20snow%20and%20ice.

[4]https://www.google.com/maps/search/Transit+stations/@42.9932647,81.2037,654m/data=!3m1!1e3?entry=ttu

for this processing and reduction of emissions. One mature tree which can have millions of stomata can remove 50 lb. of GHG a year. Growing grass removes approximately 400 lb. of emissions per acre, annually. As remarkable a job as vegetation does in dealing with human produced emissions, there is currently not enough of it to remove more than 30% of emissions, globally.

Moving away from these natural areas with lowest emissions and looking at other areas, the amount of vegetation covering the land decreases, the proportion of buildings and infrastructure covering land increases and the amount of emissions measured in the areas increases. The EQ index map then is showing area by area, colour by colour, the extent to which vegetation is processing emissions and it is London's good fortune to have a map that shows a pattern this clearly. In addition to showing how successfully vegetation is reducing emissions, the map can be used to help show how to protect and improve the vegetation that London has.

Zoning Protected Vegetation

Fundamentally vegetation needs to be considered by cities, where most vehicle emissions are produced, as a resource that needs protection and where possible, improved so that it can better mitigate the effect of emissions.

A way to protect vegetation so that it can perform this vital important function would be to be zone it so that it is protected from harm or removal. The land that the vegetation grows on would need to be zoned, but it's the vegetation not the land that gets the protection.

In the case of these natural areas, clearly deserving candidates for protection, it would seem just a matter of deciding what their borders are, something that may be marked on a map already, marking it on a Vegetation Zone Map and labelling it "Protected Vegetation". All that's needed is for the appropriate municipal body (London City Council) to accept the concept "Protected Vegetation" and draw the lines accordingly.

Other Areas

However, more fully recognizing the importance of this emission processing resource, vegetation, should include identifying many other areas of vegetation that are also performing that function, that would also not be difficult to identify and label, beyond the edges of the 'natural' areas.

Thinking of fairly large areas of vegetation that deserve inclusion, the list should include all parks, sports fields, cemeteries, golf courses, etc. Some care would be needed to avoid including buildings, parking lots, paved roadways, etc as protected areas. But this vegetation, must be. as a group, processing a great deal of emissions across the city and should be protected.

One specific area of vegetation that should be entitled to protection is that included in Labatt Memorial Baseball Park. This area is also protected as a designated historical site. The difference will be that buildings and paved areas will not be considered as protected vegetation, while under the historical designation they are. All only serving to emphasize that there are other good reasons for protecting vegetation, other than its importance in reducing emissions that contribute to global warming.

A historical/cultural designation was used to protect a golf course from development in a case before the Ontario Municipal Board. Significantly this was a situation where the owner planned to build high density apartment buildings over the vegetation.[5] The City of Oakville opposed the planned development of the Glen Abbey golf course by the owner ClubLink, and used that historical/cultural designation as the argument to prevent the proposed development. The hearing for the final determination by the tribunal was supposed to begin in Aug. of 2021. ClubLink withdrew the appeal before that happened. In short, in a case where the tribunal would have to choose between competing visions for the use of the property, no decision was ultimately required.

Alternately if London was in a position of having to justify the prevention of development on the grounds of it being 'Protected Vegetation', a city with a powerful, comprehensive commitment to the mitigation of global warming could be an effective image to convey if the city ever needed to defend an area of vegetation.

Zoning: "Planning for Improvement"

There should not be extensive cost to the city in any of these changes, essentially it's a matter of definitions, labelling and some mapping, possibly with the preparation of an inventory, at least insofar as it involves, existing, relatively easy to identify areas of vegetation.

Attempting to plan for the protection and improvement of vegetation for the rest of the city, would be more involved. It would require creating an organizational team who could functions as a liaison with groups which will, actually, be responsible for planning protection and improvements. The committee could also be tasked with preparing organizational maps used to keep track of the work completed by the groups. The costs will depend largely upon whether this organizational team is paid or not. Potentially if an advisory committee or some other committee were willing to take this on, the costs might be quite low.

The first task of the organizational team would be to decide whether or not there are any areas of the city that do not require a plan focused on improvement. At one end of the continuum are neighbourhoods with substantial amounts of vegetation, to the point where there would actually be hardly enough space to include more and at the other areas with much less. Many of the vegetation owners in the former are already quite involved in protecting their trees, and lawns, and gardens. The planning for these areas could be more about protect than improve. In fact hese neighbourhoods might deserve congratulations and appreciation for substantially contributing to environmental health, and to the health of our planet.

Ontario has only received a taste of the brew that is coming like cycles of drought, flood, fire, blight, invasive insects and species. A plan for protecting their investments in vegetation could relate to the protection from the potential effects of climate change itself. The science is indicating that to this point, London,

[5] https://www.oakville.ca/town-hall/news-notices/2021-news-releases-archive/historic-glen-abbey-property-saved-from-redevelopment/

Research and intervention needs to focus on dealing with them as the future unfolds. One scenario suggests that our climatic area in twenty years will resemble that of Washington D.C. today. This could mean that different species should be planted now to survive in that particular environment. Growing cycles could become longer. Which might actually make it easier to grow more vegetation as the growing year extends. But this whole uncertain future only emphasizes the need on the part of the city for ongoing careful planning, cataloging and managing the vegetation as is, and providing communication to vegetation owners.

In the protected areas discussed earlier, that zoning label carries the implication that the area is to be protected from adding infrastructure that would displace vegetation. While that's an issue everywhere and certainly it would be a normal concern of owners in these denser vegetation neighbourhoods, the zoning label should have a different connotation. If the vegetation in these neighbourhoods was referred to as "Supported", it could convey the message that there was a tacit approval for the amount of vegetation here and the way it is being managed by its owners and that the city (double meaning) viewed itself as a supporting, sharing partner in the protection of the vegetation.

And at some point in drawing distinctions between one area and its plan from another may call for an actual measurement of the density of the vegetation so as to compare one area with another. For example in selecting these "supported" areas it may be necessary to define the area as one with vegetation density x. Technical resources are now available free to the public to assist with this kind of project. An example of a project that utilizes these resources is "Inequalities of Urban Greenness" by Kyeezu Kim.[6] It is a good starting place for anyone looking to learn about measuring vegetation in urban area. Particularly useful here are the tools the study utilized in the NASA earthdata package.[7] Google Street View referred to earlier is also an excellent resource for identifying vegetation differences in land covering. It's useful in actually locating the areas being defined.

The organization of the teams for the planning could be by emission areas. Using the EQ index map as a guide it would be a matter of identifying an area on the map of basically one colour to guide the grouping. It may need some explanation to get across the backstory of all this. i.e. everyone actually lives in the area where the levels of the two emissions are such and such and the general idea is to try and introduce more vegetation in the area which should reduce the emission level and help mitigate global warming, but overall it's important to get across the idea that emissions-wise this group living in this area are in the same boat.

The invitation to be part of the group charged with developing the plan should be extended to anyone who lives or owns property in the designated area. Their task would be to meet as a group and develop ideas for things that could be done to add vegetation to the area. The representative from the city could act as a moderator, or serve as resource, if they are familiar with city plans and

[6]https://www.science.org/doi/10.1126/sciadv.adf8140

[7]https://search.earthdata.nasa.gov/search

policies that members might want to know about. But their main responsibility, when the group has decided that the plan is done, would be to inform council, or whoever is responsible for recording zoning that the area can be labelled on the map "Planned for Improvement". (Another option would be to zone the area "Planning for Improvement" as soon as the group meets and starts planning, and so the liason rep could be responsible for delivering that message and change it "Planned" when complete.)

The group should be free to decide how to execute their plan. If there are costs involved in the plan they should be free to seek funding from different levels of government. They can ask the city of London for money, establish a GoFundMe, solicit donations, use fundraisers, whatever they like. One responsibility of the liaison rep could be to help with this.

While the time frames should be in their hands, two fundamental facts should be conveyed to stimulate some sense of urgency in what they trying to accomplish. When growing vegetation is established, it begins to reduce emissions as soon as it has green leaves. For the foreseeable future there is a desperate, time sensitive need to reduce those emissions we are producing.

The 'invitation' map reflects a level of emissions per area, but also every area of the city should be accounted for on the map. In contrast to areas of the city that have enough vegetation so that they are considered effective in processing emissions, there are areas with very little vegetation, for example, the central downtown area of the city. This lack of vegetation may result in a lack of interest in the opportunity to participate in a project to protect and improve that small amount. Or, possibly not, there could turn out to be downtown dwellers with many wonderful ideas about how to vegetate the core area. But if there is no interest for any area in working on this project that area can simply be left blank. If that situation changes in the future and a group decides to take this on, well and good. The point is there is no time sensitivity as to the potentially filling of the map. Interest and recruitment may take longer to evolve for some areas than others.

Costs and Funding for Protecting Vegetation

The legal contest that the city of Oakville and ClubLink are engaged in has not been without substantial costs on both sides and the potential legal costs involved in protecting vegetation deserves consideration. However, the decision to take a leadership role here, might have potential advantages in terms of acquiring funding to support projects that protect vegetation. There may be granting opportunities for the creation of parks. Provincial funding may be available from federal transfers for projects that incorporate climate adaptation efforts, from a Natural Infrastructure Fund.[8] In terms of accessing needed financial resources. this may be just the right time for the city to adopt a powerful stance on vegetation protection.

[8]https://publications.gc.ca/collections/collection_2022/eccc/En4-469-2022-eng.pdf

Part 2   Diesel Emissions in London

At the C40 meeting of urban leaders in Mexico, four mayors (Paris, Mexico City, Madrid and Athens) declared that they would ban all diesel vehicles by 2025 and "commit to doing everything in their power to incentivise the use of electric, hydrogen and hybrid vehicles". Taking a different approach, London, England has had considerable success in reducing diesel emissions by instituting charges for diesel vehicles entering the city under a ULEG program (Ultra-Low Emission Zone) charging daily amounts of 12.5 £ for cars and 100 £ for trucks.[9]

To this point, the discussion of the need for zoning has focused on the importance of vegetatiom in removing emissions caused by the burning of fossil fuel. What follows is an examination of one source of emissions, namely diesel fuel burning. The objective here is to show how zoning also could be used to control it and limit the production and effect of these emissions. The starting point will be an examination of the area areas at the lowest end of the air quality and emission reduction scale.

The lowest scoring area (40-50) in London, on the EQ map, is a sandy coloured area forming a large irregular patch concentrated in an area between a line running east to west slightly north of Central Ave. that marks the northern extent of the C.P. Railyard and in the south to Hamilton Rd. and east to west between Highbury Ave. and Adelaide St. The other large portion of rail yard is owned by CN Rail. A small chunk of the area left of centre is beige (50-60) and yellow (60-70), a small older residential area. Slightly east of this the rail areas are connected by a strip of the (40-50) colour.

The rail areas are separate sections 21 and 22 rails wide. Around this area is an eclectic mix of six auto repair shops, three car dealerships, Fed Ex, a custom cabinetry, a salvage yard, a window and door supplier, a pet groomer, a designer shop, a plumbing supplier and one truck repair shop. Overall the area is an industrial/commercial residential mix. The Fed Ex business is probably the largest source of diesel truck traffic close by. Otherwise this area would have tow truck, light truck and van and car traffic. Overall, the area is not densely residential and has some vegetation. There is actually a small greenspace, Silverwoods Park, immediately beside the CN railyard.

The burning of gasoline does not usually produce amounts of particulate matter while diesel burning directly produces large amounts, two in particular, black carbon (soot) and fine particles under 2.5 microns. And while burning gasoline and diesel both produce nitrous oxides, diesel burning produces it in much larger amounts, eight to eleven times as much. It is estimated that diesel burning is responsible for 85% of all nitrous oxides from moving vehicles. In perspective, in this area, much of the particular fuel that produces a substantial amount of both these emissions is being burned by diesel powered locomotives in two railyards effectively sandwiching the area, virtually exclusively in this pattern in this area of the city.

In terms of development, if the railyards expand and the amount of diesel train traffic increased,

[9]https://www.c40.org/news/daring-cities-make-bold-air-quality-commitment-to-remove-all-diesel-vehicles-by-2025/

a kind of industrial growth, the emissions here would increase and the emissions amount in the area would increase. This is actually a mixed residential area and while residential growth itself would also cause some increase in emissions the real concern would be for literally putting more people in an area that is already, the lowest air quality residential area.

Comparing this area to Toronto's "unhealthiest" place shows another pattern of land use that results in diesel emission increase. (Toronto and Oshawa Map A) A large nonresidential area in the pink range (20-30) in the lowest air quality identified on the EQ scale, is in Etobicoke between Kipling and Royal York Road west to east and the Gardiner Expressway and Lakeshore Blvd, north to south. The principal owner of the area is CN Railway. It contains the GO and VIA maintenance yards and is dominated by a pattern of rail tracks, 56 tracks wide.

There are a number of buildings housing businesses around the rail centre: Draglam Salt, Toronto Redimix, Chiovitti Banana, Goodyear, Canpar. DCI Paint, Fix Auto, Lantic, Pioneer, 2D House. The actual businesses here are storage, delivery and distribution. Only one, Indie Brewhouse, has a manufacturing process and makes a product, beer. The buildings are not densely placed in the area. There is a lot of pavement and very little vegetation. Much of the road traffic here is large moving, diesel powered trucks.

In both of these areas, again, a substantial amount of the fuel that produces both of these emissions is being burned. The explanation for why the amount of emissions is higher again in the Etobicoke area than in the London could be that even more is being produced by traffic from heavy diesel trucks, more diesel truck traffic than would likely be happening near the London yard.

The Problem Finding Toronto's ESAs.

While (80-90) air quality areas are relatively easy to find on London's map, locating them in Toronto is more challenging. In all of Toronto, there is exactly one small area of this (80-90) quality. It is also in an ESA forming a narrow strip of land ½ km wide and 2 km long in Guildwood Park and Gardens, in Scarborough, south of the Guildwood Parkway on the shore of Lake Ontario. While the city has 85 other environmentally significant areas across the city "Most of these natural areas are found in ravines, river valleys and along the waterfront, where they form the core of the city's natural parkland system".[10] Unlike London, where there were eight 'darker green' areas only this one small area tested for emissions in the (80-90) category in Toronto.

Many of the other ESA areas in Toronto are in light green (70-80) areas. In London, as much as half of the city is this lighter green (70-80) but it is generally 'inhabited', with houses, buildings and vehicles inevitably producing a substantial amount of emissions. Much of this in London is in older residential areas of the city where there is vegetation characteristic of older urban design with areas of tree canopy, larger green lots surrounding houses, park areas, wider setback areas accommodating street trees. Vegetation is certainly here, just not as dense as in ESA areas. What

[10]https://www.toronto.ca/explore-enjoy/parks-gardens-beaches/ravines-natural-parklands/environmentally-significant-areas-2/

is denser are buildings and traffic. And here, on average each gas burning car produces 4.6 metric tonnes of GHG and each fossil fuel heated house 2.75 T of GHG.

The difference in score between the (80-90) area and these ESA areas in Toronto indicates that there are more emissions being counted that vegetation here can't remove, the overspill from the sources that are producing those emissions here that are basically causing the drop in the score from the (80-90) range in London to the (70-80) range in Toronto.

It raises the question about where basically this amount of emissions in those 85 ESA areas in Toronto that are scoring lower is coming from. There aren't buildings and traffic within the areas, so it must be migrating from somewhere else.

This issue of this movement of emissions was examined in a "Near-Road Air Pollution Pilot Study"[11] conducted by the Southern Ontario Centre for Atmospheric Aerosol Research at the University of Toronto, collaborating with Environment and Climate Change Canada and it provided much valuable information on the issue of the issue of diesel truck emissions and overall on the disproportional amount of emissions contributed by diesel trucks on roads travelled. The study monitored six stations beside major roads in Vancouver and Toronto between 2015 and 2017 and made these observations:

"Emissions from trucks represent the major source of key pollutants such as nitrogen oxides and black carbon. Data for these pollutants indicate that excessive exposure to diesel exhaust can occur near roads with a significant proportion of truck traffic….concentrations are higher on cold winter days suggesting that the emission control systems for diesel vehicles may not perform well at low temperatures….Emission factors for over 100,000 individual vehicle plumes also showed that a small portion of the trucks and cars were responsible for the majority of the emissions" The report concluded that "…policies and programs implemented to remove this small fraction of highest-emitting vehicles from populated areas could yield large benefits."

In Toronto, nearby roads are essentially delivering diesel emissions to areas near these ESAs where they are dispersed essentially driving up the measurement count of the emissions. The actual location of that one area that is testing lower in emissions than 85 other ESAs, offers some clues as to why it escapes the emission intrusion. The entire east side of the Guildwood area is the shore of Lake Ontario, which would rule out the possibility of a nearby road on that side for emission delivery and possibly prevailing breezes from the lake from the east might keep some at bay on the west side, or possibly enough vegetation on the west side acts as a barrier.

Given that London's eight lowest emissions areas are scattered around the city, it seems reasonable to conclude that London does not at least to this point have the amount of road diesel traffic that's having the effect that it has on ESA areas in Toronto. Putting this in the context of potential growth, the concern would be that if diesel traffic expands as the city grows, the amount of diesel emissions

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[11]https://www.socaar.utoronto.ca/wp-content/uploads/2019/10/SOCAAR-Near-Road-Air-Pollution-Pilot-Study-Summary-Report-Fall-2019-web-Final.pdf

could increase, and disproportionately impact a wider area.

In East London, east of the rail area, there's a large area, a level lower (50-60) than in (60-70) lower because of a disproportional effect of diesel emissions. While Toronto's Etobicoke CN rail area is a non residential area, London has more areas with mixes of industry, commerce and housing. The mixed residential-industrial area, become more industrial as you travel East. The housing is not particularly dense and the vegetation denser than in sprawl areas. It could well be a level lower because of a disproportional effect of diesel emissions. It makes sense in this residential areas to protect and strengthen vegetation but in both London's rail area and this extended area to the east, strategies should focus on reducing diesel emissions, in the (40-50) area from trains and in the (50-60) areas from trains and trucks.

The Provincial Approach to Diesel Emissions

Our provincial government also focused on the diesel truck emission issue in 2021. Then, our premier introduced a plan to eliminate the emission testing of cars, arguing that given how few vehicles were actually failing, it was largely unnecessary. Instead, there would be a stepped-up program focusing on diesel powered trucks which the premier argued were a more serious source of emissions. Diesel trucks are now tested for particulate matter, using an opacity test, which tests for particles that are visible, but doesn't identify smaller particles. The testing requirements also change with the age of the vehicle. Older vehicles (pre-1990) are allowed twice the emissions of newer vehicles. Trucks are also tested for nitrous dioxide but only in the sense that the nitrogen oxide storage catalytic converter (assuming it is present) is checked for cracks, leaks and perforations.

Unlike in London, England, the program has yielded little by way of emission reduction. Truck owners complain about the lack of qualified technicians to do the testing and the cost of towing vehicles to testing centers. Because the emission control systems negatively affect fuel efficiency, the practices of removing the systems and reprogramming engines are commonplace.[12] In the rail industry, there is emission testing for particulate matter and carbon monoxide but no testing for nitrous dioxide.[13]

Trains vs. Trucks

In London, Ont. local government needs to focus on controlling in the short term and eliminating in the longer, the sources of diesel emissions. For diesel train emissions, this would require intervention with the railway industry and for trucks, some regulation of diesel truck traffic. One challenge is with an ongoing situation. The other with a problem that could easily get worse in the future.

[12]https://www.trucknews.com/transportation/uoft-study-trucks-pollute disproportionately/1003094913/

[13]https://laws-lois.justice.gc.ca/eng/regulations/SOR-2017-121/page-1.html#h-839469future.
And in the region of London most affected by rail exhaust emissions, there are two rail companies to deal with.

Assuming that the rail industry plans to continue operating in London, both companies need to change to technology that doesn't endanger health and further contribute to global warming. Both companies have chosen technology to replace diesel locomotives, actually, different technologies. CN is changing to electric power sources, CP, to hydrogen fuel cells. Frankly, all cities that have. a problem with diesel emissions from the rail industry should be pressuring the industry to implement those technological changes quickly.

London city council should consider sending the companies a copy of the EQ map and circling the irregular sandy patch, as a graphic representation of an emissions problem that is fundamentally the responsibility of the railways. Taking a more positive tack, if there is a way to become part of a leading edge in technological changes. (Pilot projects?), London should be looking into it. Unless some form of dialogue has been already initiated with the railroads, starting that process ASAP seems a good idea.

What London is now using to reduce fossil fuel emissions is a substantial network of vegetation but diesel traffic could travel to every street corner and essentially overwhelm even relatively dense vegetation, The strategy to reduce diesel emissions in London should be to reduce sources already creating emissions in an area, and aggressively prevent their expansion. The strategies, city wide, should include preventing expansion of diesel traffic to areas which so far, are showing effects of diesel emissions "only" in the range. NO (7.7 - 4.9) ppb and PM (7.4 – 6.6) μg/m³.

At present, diesel truck emissions are dispersed around the city, but not enough to overwhelm existing vegetation. What needs to happen is the prevention of diesel truck traffic from increasing to intrusive, overwhelming levels, levels already reached in larger cities. Preventing it means looking at current industry and examining current use of transportation and patterns in the routes followed, and what plans for growth in transportation might amount to.

Every new business or industry considering starting up in London needs to be considered through this lens. There could be a program to encourage companies currently using diesel trucks to switch to trucks with zero emission fuels. Or, it could be a criteria used in permitting an industrial business for operation in London. More than looking at what new industry or commerce is doing in the building, it involves looking at what is happening at the loading dock at the back door.

The first steps in a process to hopefully end with elimination of all diesel traffic, should be to zone roads and areas of the city where diesel vehicles could be allowed to travel for some fixed term, with some end dates in place. The other option that could be used in addition to this approach would be to charge user fees like London, England in a ULEZ zone.

In mapping roads where diesel vehicles are allowed to travel, it would seem that all that would be needed would be to show, on a map, the existing roads with a certain legend colour, or symbolic design that serves to indicate "Diesel Traffic Allowed". For the lowest scoring rail area itself, the lines around the edges of that area on EQ index map are generally straight and maybe be on roads or partially on roads and if they are used to indicate the edges of the "Diesel Traffic Zone - Trains" locating and copying them would be a way to 'create' the zone, or possibly part of it.

Zoning Map Features

<u>"Diesel Traffic Zone - Trains"</u>

This designation would show areas in the city where the operation of diesel locomotives is allowed and where emissions are to be confined. It could indicate by timeline the date upon which the traffic and the operation of diesel burning vehicles in the area would no longer be legal.

<u>"Diesel Traffic Zone -Trucks"</u>

This zoning would reflect corridors within the city where diesel vehicles currently travel and will continued to be allowed to do so, until some date in the future when it is no longer legal. The understanding would be that by exclusion diesel traffic would not be legal in other areas. This could be supported by signage on the roads clearly indicating the limitations of the allowance.

<u>"Diesel Traffic Restriction Zone: Cars and Trucks"</u> (Option)

If a plan was adopted similar to the one in London, England this zone within some specified area would be where the payment of some kind of charge for access would be levied.

Angus Johnson

Greenspace Alliance