



MICHAEL SCHABAS

+44 7973 241 214 / M CHAEL SCHABAS@FCPWORLD NET

FIRST CLASS PARTNERSHIP
28 GRAND AVENUE LONDON
UNITED KINGDOM N10 3BB
WWW.FCPWORLD.NET

March 18, 2014

Iain Myrans

Cc: Jill Hughes; Eric Yerro

Toronto Kitchener London High Speed Rail – Community and Environmental Impacts

1 Summary

You asked me to elaborate on the comment that “up to 100 homes” might need to be acquired to build the TKL HSR. As you know the initial study was done in a very short time frame, and the 100 homes was a rough estimate, really just of the magnitude of likely impacts. I’ve taken a couple more days and think I can give a better answer now, without overstating or seriously understating the challenges.

Normally I would walk or drive the entire route. I’ve been involved in route selection three times “for real”, and many times for schemes that have not happened. Vancouver Skytrain, London Jubilee Line Extension, and UK Channel Tunnel Rail Link. Google Earth does make it much easier to look at alternative routes, but with the caveat that not everything is marked, and some of the imagery is five years old and will not show recent developments. However, my conclusion is that overall, this looks to be an unusually easy route for a high-speed rail line, about as easy as you can get, in fact, both in terms of construction, and community and environmental impacts.

Less than 25 homes and farm buildings will need to be demolished, but 150 – 200 fields will be severed, requiring farmers to make longer trips to their fields (or they can rent fields to each other). About 50 small and medium sized businesses will be displaced, mostly in downtown Kitchener, but these can be compensated and relocated at a modest cost. No schools, hospitals, religious buildings, parks, burial grounds, protected wetlands, or similarly sensitive sites have been identified. The line (unavoidably) crosses the Niagara Escarpment, which is a World Biosphere Reserve, but the actual crossing of the escarpment is an existing quarry that can be remediated, and much of the route over the escarpment can be in cutting, thereby minimizing visual and noise impacts. The line will also cross a few small river bottoms, including the Speed River south of Guelph, and the Nith River south of New Hamburg, and there will be concerns about wetland habitats that will be affected.

The rest of this note looks at the impacts on each section of the line.

2 Toronto Union Station to Malton

Intercity trains will use the existing GO/CN line to Georgetown and Acton. We understand the line is all being rebuilt from Union almost to Malton for UP Express, with two passenger tracks for GO Regionals and UP Express, a total of 8 trains per hour. We also assume Little or

nothing more is required to allow use by 2 Intercity trains each hour, although probably they won't be able to go over 160 km/h.

We might need some passing sidings at stations so the Intercity trains can pass the Regional trains. There should be space to build these within the existing rail corridor.

An additional station might be required for interchange with a shuttle to Pearson Airport. There seems to be plenty of space for this alongside Woodbine Race Track. There may be a joint development opportunity here - the racetrack might build a hotel/convention centre connected to the airport and the high speed railway. This could also be an "edge of town" station for people driving from points north and east who will switch to the train to go to London.

No significant impacts on this section

3 Malton to Georgetown

Intercity trains will use the existing GO/CN line. The line is dead straight from Halwest Junction to Georgetown, but shared with CN's main line to Sarnia and Chicago with heavy traffic including double stack trains.

s.18(1)

then the line through Bramalea, Brampton, Mount Pleasant and Georgetown needs to be widened to four tracks. It is already three tracks most of the way to Mount Pleasant, and four tracking can be done, it seems, entirely within the existing rail corridor, which is 40 metres wide (although part of it is used for hydro lines).



Figure 1 The line through Bramalea is surrounded entirely by industrial uses

In Bramalea the land alongside the railway has been developed as industrial, but in Brampton and west through Mount Pleasant it is residential. *There may be some concerns about additional noise and vibration from local residents, but it is, after all, the CN main line and it has been here since 1856.*



Figure 2 The through Brampton and Mount Pleasant is wide and straight. Although the surrounding area is residential, additional noise and vibration should be relatively minor

Georgetown may be a problem, because the line is only two track, and is in a fairly deep cutting with houses on either side. *To widen the line may require retaining walls, and building these without closing the CN main line may require taking slices off about 20 residential back gardens.* There is probably no need to actually take the houses, which will still have gardens, and get most or all of the land back, but after two years of construction and without their trees.



Figure 3 Georgetown. The line is in narrow cutting, and some houses just east of Main Street may lose their back gardens during construction

It may also be necessary to rebuild a couple of road bridges, which don't seem to have room for 4 track underneath them. [s.18\(1\)](#)

Even with four tracking, the speed of Intercity trains will probably be limited to something below 200 km/h on the Malton - Georgetown section. The time penalty of about 4 minutes will cost about \$200m NPV in lost revenues. There are two reasons. First, there will need to be switches for freight trains at least through Bramalea. [s. 18](#)

Second, the (railway) power lines will need to be very high, to allow CN to run its double stack trains. [s. 18](#)

4 Georgetown to Acton

Intercity trains will use the line that GO is negotiating to purchase from CN. [s. 17](#)

This train can use the same tracks as GO and the Intercity services, as long as there are no curves or gradients.

The line from Georgetown to Acton is dead straight and can be widened to two tracks, and bridges built to eliminate the three road crossings. Three level crossings will need to be replaced with road overpasses. One, at Limehouse, may affect a couple of nearby houses.



Figure 4 Limehouse, between Georgetown and the escarpment. Note the auto scrapyard to the right.

5 Acton – Kitchener

The existing line through Acton has two sharp curves as it climbs the Niagara Escarpment, with a third curve in Rockwood. There are then more curves and level crossings as it runs through the middle of Guelph, virtually down the middle of a residential street. While it would be possible to build a bypass around Acton and Rockwood, and to improve the line through Guelph, I am now pretty sure it will be cheaper and easier to build a completely new line for the Intercity trains, around the south of Guelph. The existing line would remain for use by Regional (GO) trains and freight.

The new line, 41 km long, can be built with 5km or larger curve radii, so trains can go 300 km/h around Guelph, shaving valuable minutes. The line cuts through the Niagara Escarpment, a “World Biosphere Reserve” but it does so at an existing quarry, so arguably it will be an opportunity to improve the environment. The new cutting can be fairly short as high speed trains can climb 5% gradients, much like cars do.



Figure 5 Climbing the escarpment - the ground rises 40 metres from right to left. The railway will run across a gravel pit on a new embankment, then into a cutting on the high ground.

For the eastern 25 km, the new line runs through agricultural and “recreational” land, with a lot of hobby farms. By wiggling the line a bit, it does seem possible to miss every house, and even every swimming hole. Much of the new Acton - Kitchener line can probably be in cutting. This is the Niagara Escarpment, so drainage should not be a serious problem. Excavated rock will be re-used on the Kitchener - London section. Putting the line in cutting will make it less obtrusive, reducing noise impacts, and simplifying road crossings (overpasses). Even so, some owners may not want to stay if a high speed railway runs past their country place, but there is no requirement to take any of them. s. 18

British Rail tried this: it had the effect of destabilising the property market and may have caused more harm than good. There do not seem to be any parks, wetlands, historic buildings, First Nation lands, or cemeteries that would be affected by the new line.



Figure 6 Typical section across the Niagara escarpment, with the new railway threaded between farms and hobby farms. Much of this section can probably be in cutting, reducing visual and noise impacts.

The western 15 km of the new line, from the southern outskirts of Guelph to the point it re-joins the existing line east of Kitchener, runs through open farmland, crossing the Speed River but avoiding the Bird Sanctuary.

It seems possible to avoid all buildings but perhaps 50 fields will be severed. Farmers will have longer trips to their fields, or they will swap, sell, or rent fields to each other.

6 Kitchener

The existing rail corridor will be rebuilt, with two passenger tracks and one freight line. This can be done mostly in the existing rail corridor, which is about 30 metres wide.

6.1 Kitchener - East

On the east side of Kitchener, the line runs through industrial areas. One new overpass needs to be built, on the east edge of town. No significant impacts are identified here.

6.2 Kitchener – Centre

Through the centre of Kitchener, there are six level crossings. With 2 Intercity trains and 2 GO trains in the peak hours, each way, plus perhaps an hourly service to Stratford, there will be 9 or 10 trains per hour, so probably all of the level crossing need to be eliminated. The solution is further complicated by the need to fit in a station here, which needs to be reasonably level. There is one existing overpass, at Margaret Street, at the east end of the city centre and the highpoint in the area, about 5 metres higher than the land 1 km east or west.

Current plans are to build an underpass at King Street, which will be shared with the LRT. King Street is 900 metres west of Margaret Street. If this underpass is built, it will then be very difficult ever to grade separate the intermediate 4 street, Waterloo, Duke, Weber, and Ahrens. This seems a mistake, even if high speed rail was never to come to town.

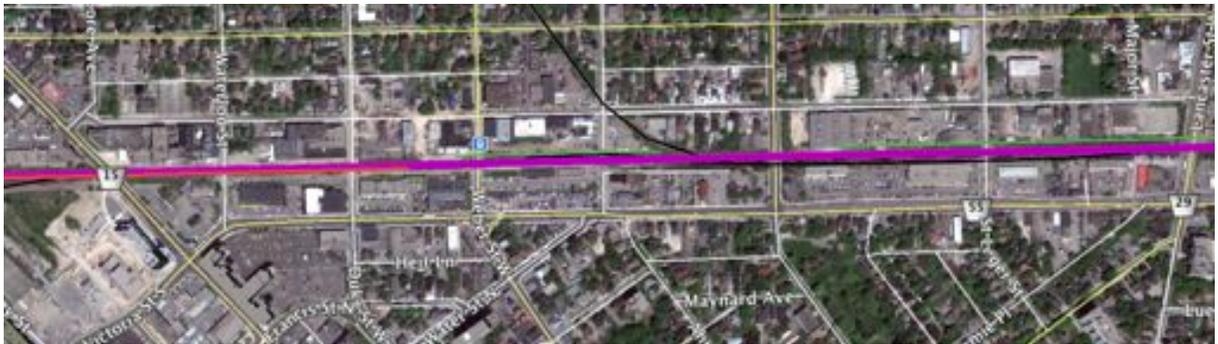


Figure 7 Kitchener City Centre.

Probably the solution is to drop the railway into cutting, so that it runs under all the streets. The King Street crossing can then remain on the surface. This should be cheaper than building 7 overpasses, and avoid creating a barrier through the middle of the city. The station would then also be below grade. Parts of it could be open air, and parts could be built over. About 5 hectares (12 acres) will need to be acquired to build the station, with at least three platforms, ideally four, for Intercity and GO trains, probably 350 metres in length to allow for future train lengthening. There will also need to be one platform for the diesel service we assume runs from Kitchener via Stratford to London and Sarnia, but this can be a “bay platform” at the end of the station. Probably the station will need three city blocks, between Victoria Street and Breithaupt Street which run parallel to the rail way on the north and south sides. There seems plenty of “soft” land on either side of the railway, which is mostly surface

car parks with some low rise strip development. *It should not be hard to buy this, but probably 20 or so small and medium size businesses will be displaced.* It will create an excellent development site.



Figure 8 Possible site for Kitchener Railway Station

Construction might require some disruption to the existing GO and VIA services, although it should be possible to maintain GO services throughout the construction period. It may be prohibitively expensive to maintain rail freight services, however. The train from Goderich could be routed via London, with local customers served using intermodal trucks during the construction period.

There will also need to be a parking garage, for people who drive to the station to catch the train to Toronto or London, or perhaps in future Ottawa (which will someday only be 3 hours away by rail). There is a bit more freedom as to where this is located, but ideally it is immediate east of the station with access off the Conestoga Parkway.

6.3 Kitchener - West

The west side of Kitchener is residential, with the railway in a wide corridor. *There are two level crossings which should be eliminated, and for each of these two or three houses that would be affected and might need to be acquired.*



Figure 9 Kitchener East Side

6.4 Kitchener Western Exit

The Intercity trains can run along the existing corridor out the west side of Kitchener, to a point where the line curves sharply north to go around New Hamburg. The new line to London would branch off here, to cross 401 and head for London. One possible route would cross under Snyders Road, in cutting, just east of the Sikh Temple on Snyders Road (the temple is on high ground). One barn would need to be demolished. The railway would then cross over 401, which is lower here, just east of the County Road 12 interchange.

7 London Approach and City Centre

The choice of route between Kitchener and London is first driven first by the choice of entry points into London and Kitchener. We assume the “Sikh Temple” fixes the Kitchener end. At the London end, there are two possible entry routes. One route is in from the northeast, using the Stratford - London railway line. The alternative is to use the CN main line, which comes into London from the east. Both routes are pretty straight, allowing trains to run about 160 km/h into the city. The two routes actually join together about 4km from the city centre, where there are several further curves that will limit speeds probably to 80 km/h or less.

7.1 London northern approach

The railway from Stratford and St Marys has an excellent alignment into London, with one quite gently curve, but also has some problems.

The railway corridor is narrow, only 20m wide.

There are many level crossings that would need to be grade separated. The cheapest solution would be to build the railway on an elevated line, which can probably be done within the existing corridor, but there would be noise and visual impacts on adjacent homes and commercial development. Building road overbridges would cause more disruption, because of the ramps to the bridges. Dropping the line in cutting might be possible, but could be substantially more expensive.

There are also some freight sidings and a connection between the CN and CP line, which make the solution a bit more complicated. There is a sharp curve 4km from the city centre, meaning trains will need to run slowly, for a longer distance, perhaps adding 5 minutes to the journey time.

This route deserves further study but seems less attractive than the Eastern Approach.



7.2 London Eastern Approach

This would follow the CN corridor in from the east. The route would be about 2km longer, but overall journey times may be very similar as the route into London is straighter with no sharp curve until London railway station. The line is partly in cutting, and road bridges have replaced most level crossings. The corridor is mostly 30 metres wide, and there seems to be enough space for two passenger tracks to provided alongside the CN freight lines, all the way into London City Centre. There are no freight sidings on the north side.

7.3 London City Centre

Both the Northern and Eastern approaches join together at Egerton street, about 2km from the city centre. There are five level crossings, and freight track connections on both sides of the line. The passenger line can run along the north side of the railway corridor, into London station, which is on a low embankment. There seems to be plenty of space on the north side of the rail line, east of the existing station, to build a new station, although this is probably not absolutely necessary. The land between the railway and York Street is mostly surface car parking, except for a large office building occupied by the Ontario Government. Fortunately, it is set back from the railway. As in Kitchener, the station could be an attractive development site.

The whole area is lot more spread out that central Kitchener, which makes it easier to find solutions, but there are also many more trains, 2 intercities to and from Toronto, smaller trains to Windsor, Sarnia, and via Brantford, as well as all the CN main line freights. s.18(1)



Figure 10 London City Centre



Figure 11 London Station Site. The existing station is to the left

Overpass bridges can be built for Egerton and Rectory Streets, but they won't be cheap. There is already an overpass for Adelaide Street, and an underpass at Wellington Street. Probably there is no solution for the intermediate three crossings, at Colbourne, Maitland and William Streets. They might be closed, or perhaps low-clearance car and pedestrian underpasses provided. If the level crossings remain, they will have a small effect on allowable train speeds, although trains will be slowing anyway to stop in London.

8 Kitchener to London

The line could be built dead-straight from the outskirts of Kitchener to the outskirts of London. This would allow trains to run at 400 km/h or, in future, maybe even faster. It would also leave the least room for arguments, but would have significant impacts. Depending on the line that is chosen, 50 to 200 houses might need to be demolished.

However, curves of 5km radius or more have little or no effect on train speeds up to 300 km/h. I have looked at several possible routes from the "Sikh Temple" on the west edge of Kitchener to the CN entry on the east side of London.

I have found one route that takes less than 10 houses and barns. Much of the line follows alongside Hydro lines, which run dead straight from New Hamburg to Kitchener.



Figure 12 Typical section between London and Kitchener

With more work, it may be possible to miss all the houses and barns, but it gets tricky because as you wiggle the line to miss one home, you get closer to others that might otherwise be quite far from the railway.

This is mostly rolling terrain; some sections can be in cutting but generally the line will need to be on a low raised embankment for drainage and snow reasons. In most cases, road crossings will be overbridges.

Although few farm houses will be taken, more than 100 fields will be “severed”, cut diagonally by the railway. There will be a road crossing about every km, and farmers regularly rent fields to each other, s. 18

MTO will have experience from this I guess building highways (is 416 the most recent?).

Substantial amounts of rock will be needed - this can be brought by rail from quarries and trucked from railheads on the CN line, 10 to 20 km south of the new line.

9 Other facilities

The railway will need a depot to store and maintain the high-speed trains, and also for track maintenance equipment. Probably, this will be located in London where most trains will spend the night. There seem to be many possible sites, not too far from the railway line. One possibility is to use the former Electro-Motive plant, which built diesel engines until it closed a few years ago.

There will also need to be electrical power feed-in stations. There seem plenty of sites for these, alongside the railway, where it is also near hydro switching stations.

Yours sincerely,



Michael Schabas
Partner, FCP