

City of Toronto

# **Truck Route Review for Highland Creek Wastewater Treatment Plant Biosolids Options**

## **ATTACHMENT 1**

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## Executive Summary

Two potential routes for the hauling of biosolids from the Highland Creek Wastewater Treatment Plant were reviewed. The review examined pavement condition, roadway geometry, potential school safety concerns, and other potential neighbourhood concerns. This summary and report are intended to comment on these issues only.

### ***Examined Route Options***

From the Plant, both options examined included Beechgrove Drive to its intersection with Coronation Drive, and Coronation Drive to its intersection with Manse Road. From this point, one option is Coronation Drive to Morningside Avenue crossing Lawrence Avenue to Highway 401; the other option follows Manse Road to Lawrence Avenue, followed by a right turn to Morningside Avenue and north to Highway 401. Speed limits are 60 km/hr along Lawrence Avenue, 50 km/hr along Morningside Drive (south of Lawrence), and 40 km/hr along the remaining neighbourhood streets. The curve immediately north of the Plant has a suggested speed limit of 20 km/hr. Based on City of Toronto weekday traffic counts in 2009 and 2010, approximately 100 trucks (daily) use Beechgrove Drive south of Lawrence Avenue, 185 trucks use Manse Road south of Lawrence, and 80 trucks use Coronation Drive between Morningside Avenue and Manse Road.

### ***Pavement Condition***

Pavement condition assessment is based on a “windshield” survey of the roadways. Although existing plans were not consulted and no pavement cores were collected, substantial indications of condition can be determined from existing pavement cracking patterns, rutting, and patching. Coronation Drive from Beechgrove Drive to Manse Road apparently was designed for truck loadings associated with light industrial use. The asphalt surface shows some aging, but types of pavement distress (mainly reflective cracking) do not indicate failure of the pavement structure. Conversely, Beechgrove Drive east of Coronation Drive shows clear signs of pavement base failure. The pavement has extensive areas of “alligator cracking,” rutting, and patching. This type of failure indicates loading significantly beyond the loads for which the pavement was designed. Daily heavy truck traffic (associated with the hauling of biosolids) added to Beechgrove Drive (east of Coronation Drive) *would significantly accelerate pavement failure*. Mitigation may require reconstruction of Beechgrove Drive (east of Coronation Drive).

For Morningside Avenue, Manse Road, and the portion of Coronation Drive between the two, the pavement displays reflective cracking, a number of utility cuts and patches, as well as some potholes (mainly in the surface layer of asphalt). The pavement does not display widespread base failure. Given the two route options already carry 80 to 185 commercial trucks per weekday (City of Toronto counts, 2009 and 2010); a five to ten percent increase in truck volumes would not likely impact pavement structure on Coronation Drive, Manse Road, or Morningside Avenue. Although the pavement structure does not appear to be failing, mitigation may require resurfacing of a few areas of the haul route to improve ride quality and decrease noise generated by the trucks at utility cut patches, cracks and partial depth potholes.

### ***Roadway Geometry***

The heavy commercial trucks observed did not exhibit problems negotiating any portions of the roadway network leading from the Plant to Lawrence Avenue. The curve north of the Plant is sharp, but well signed for 20 km/hr. The intersection of Coronation Drive at Manse Road is offset, but trucks were observed passing through the intersection without problem. The intersection of Coronation Drive at Morningside Avenue does require trucks to occupy the left-turn lane in order to negotiate the right turn to northbound Morningside Avenue.

### **School Safety**

Currently, four schools are open along the two route options; two on each route. On Manse Road, Heron Park Junior Public School and Joseph Brant Senior Public School are located on the west side of the road, just south of the Heron Park Community Recreation Centre. Peter Secor Junior Public School is located on the south side of Coronation Drive. St. Martin de Porres Catholic School, with students from PK – 8, is located in the southwest quadrant of Morningside Avenue and Lawrence Avenue. Both junior public schools are slated to close in September of 2012 with students moving to the Joseph Brant Senior Public School (per the Toronto District School Board, June 23, 2010). This school will then have students from JK – 8 in attendance. Many attending students, including very young students, walk to school. Many students are also dropped off by parents with line-ups forming in the morning and afternoon. As the activity of haul trucks would mainly be during morning hours, a *potential for conflict* in the vicinity of the schools will develop. Mitigation may require restriction of operating hours for the haul trucks.

### **Number of Trucks**

The number of trucks required for hauling biosolids will vary based on day of week and month. If demand for biosolids application for agricultural purposes was high, the required number of trucks may remain fairly steady across each weekday. However, in practice, biosolids will primarily be directed to landfills simply because the supply greatly exceeds demand for beneficial use. The City's landfill only operates on weekdays while biosolids are produced seven days a week. Additional trucks would be used on Mondays and Tuesdays in order to haul away the weekend backlog. Production also varies by month. Currently, on average, four to five truckloads of biosolids would be produced per day (29.2 dry tonnes). In future peak months, the estimated production will be five to six truckloads per day (36.3 dry tonnes).

With the route from Coronation Drive to Morningside Avenue, the added trucks per day would range from a low of 13 percent to a high of 30 percent. In practice, the added truck traffic would normally occur in the morning hours, as early as 4:00 AM (heading to the Plant empty) to midmorning (last truck for the day departing from the Plant). The hours of truck activity will have noise and residual odour implications, and the departure times may conflict with the start of school. Morningside Avenue south of Lawrence Avenue, and Coronation Drive between Morningside Avenue and Manse Road currently have truck restrictions – no trucks from 7 PM to 7 AM.

Along the Manse Road route, the added trucks per day would range from roughly 5 to 13 percent, again, concentrated in the morning hours. Currently, the half-day kindergarten at Heron Park Junior Public School begins at 8:15 AM.

Note that a significant change in traffic, including truck traffic, and the associated noise, odour, air quality, and concern for public safety, typically requires examination within the Environmental Assessment (EA) process. Since the Biosolids Master Plan EA included extensive public consultation and resulted in the recommendation of an alternative which did not involve daily trucking of biosolids through neighbourhood streets, re-examination of the trucking implications would likely be required including additional public consultation.

A change from the Master Plan recommendation of continued incineration (except when contingency capacity is required) would require further study including public consultation. The existing roadway condition can be mitigated with pavement reconstruction and minor resurfacing or patching. The school conflict could potentially be mitigated with restrictions on haul times for the biosolids. If the desired haul route follows Morningside Avenue to Coronation Drive, a change in restricted truck times along Morningside Avenue (south of Lawrence Avenue) and Coronation Drive (between Morningside Avenue and Manse Road) would likely be required.

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## Statement of Qualifications and Limitations

# 1. Background and Purpose

AECOM was requested to examine potential truck routes for the hauling of biosolids from the Highland Creek Wastewater Treatment Plant. Two potential routes for the hauling of biosolids through affected neighbourhoods were reviewed. The review examined only pavement condition, roadway geometry, potential school safety concerns, and other potential neighbourhood concerns. This report is not intended to be a full analysis of the impacts of biosolids haulage but is intended to identify any immediate concerns the City should take into account.

## 1.1 Public Works and Infrastructure Committee Recommendation

On June 8, 2010, Council approved the Public Works and Infrastructure (PWI) Committee recommendation that a beneficial use program be adopted for the biosolids generated at the Highland Creek Wastewater Treatment Plant. In absence of demand for the biosolids cake, the City's Green Lane landfill site was specified for contingency. A specific haulage route through the neighbourhoods to and from the Highland Creek Wastewater Treatment Plant was directed by Council.

## 1.2 Request from Councillor Ron Moeser

At the March 23, 2011 PWI meeting, Councillor Moeser requested a report on:

1. Operational feasibility and logistical challenges of pursuing a beneficial use program for the Highland Creek Wastewater Treatment Plant.
2. Feasibility of the biosolids haul route selected by the Public Works and Infrastructure Committee and potential impacts on the community surrounding the Highland Creek Plant.
3. Legal issues that arise should the City ignore the recommendations of the Biosolids Master Plan, a plan which was undertaken in accordance with the provincial Environmental Assessment Act.

The field review of potential haul routes and this report are intended to address, at a conceptual level, item 2. The requested scope for this review only includes pavement condition along the haul route options, geometric constraints, and potential impacts at the school zones. Other potential impacts on the community may be possible, including noise impacts (from added trucks, especially earlier than 7:00 AM), odours, air quality impacts, and other safety concerns related to pedestrians and cyclists. These other potential impacts are not the focus of this report.

## 2. Haul Route Options

Both haul routes examined are wholly contained within the West Hill neighbourhood. A portion of both routes, along Morningside Avenue, borders Ward 43. From the Plant to Morningside Avenue (and north toward Highway 401), both routes are contained within Ward 44. The two routes examined are shown in **Figure 1**.

**Figure 1. Potential Haul Routes**



Both options for hauling biosolids from the Plant to Highway 401 follow Beechgrove Drive from the Plant to its intersection with Coronation Drive. Coronation Drive would be followed to its intersection with Manse Road. From this point, one option is Coronation Drive to Morningside Avenue; the other option follows Manse Road to Lawrence Avenue to Morningside Avenue.

Speed limits are 60 km/hr along Lawrence Avenue, 50 km/hr along Morningside Drive, and 40 km/hr along the remaining streets. The curve immediately north of the Plant has a suggested speed limit of 20 km/hr.

During one field review (conducted on Friday March 18, 2011), movement of heavy commercial trucks and concrete trucks was observed. Approximately 25 trucks per hour passed along Coronation Drive with 70% using Coronation Drive to Morningside Avenue, 25% using Manse Road to Lawrence Avenue, and 5% using Beechgrove Drive to Lawrence Avenue. As several of the light industrial buildings along Coronation Drive are currently vacant, truck traffic may have been higher in the past when the businesses were active. Note that truck traffic observations during the field

review when compared with City of Toronto traffic counts demonstrates daily variations in truck volumes and truck patterns. Based on City of Toronto weekday traffic counts in 2009 and 2010, approximately 100 trucks (daily) use Beechgrove Drive south of Lawrence Avenue, 185 trucks use Manse Road south of Lawrence, and 80 trucks use Coronation Drive between Morningside Avenue and Manse Road. Based on the City's counts, and based on observations during a second day of field review (March 29, 2011), a greater percentage of trucks use Manse Road to connect from Lawrence Avenue to Coronation Drive (compared to the other available routes through the neighbourhoods).

### **3. Pavement Condition**

Pavement condition assessment was based on a "windshield" survey of the roadways. Although existing plans were not consulted and no pavement cores were collected, substantial indications of condition can be determined from existing pavement cracking patterns, rutting, and patching.

#### **3.1 Coronation Drive East of Manse Road**

Coronation Drive from Beechgrove Drive to Manse Road apparently was designed for truck loadings associated with light industrial use. The asphalt surface shows some aging, but types of pavement distress (mainly minor reflective cracking) do not indicate failure of the pavement structure.

**Figure 2. Coronation Drive East of Manse Road**



#### **3.2 Beechgrove Drive East of Coronation Drive**

Conversely, Beechgrove Drive east of Coronation Drive shows clear signs of pavement base failure. The pavement has extensive areas of "alligator cracking," rutting, and patching. This type of failure indicates loading significantly beyond the loads for which the pavement was designed. Daily heavy truck traffic (associated with the hauling of biosolids) added to



Beechgrove Drive (east of Coronation Drive) would significantly accelerate pavement failure. Mitigation may require reconstruction of Beechgrove Drive (east of Coronation Drive). (The cost of reconstruction would likely be over \$250,000. This is based on length and typical cost per kilometre only. A refined cost estimate would require geotechnical information, survey, assessment of drainage, collection of utility data, and so forth – which is beyond the scope of this review.)

**Figure 3. Alligator Cracking and Patching on Beechgrove Drive**



### 3.3

#### **Morningside Avenue, Manse Road, and Coronation Drive West of Manse Road**

For Morningside Avenue, Manse Road, and the portion of Coronation Drive between the two, the pavement displays reflective cracking, a number of utility cuts and patches, as well as a few isolated potholes (mainly in the surface layer of asphalt). The pavement does not display widespread base failure. Given the two route options already carry 80 to 185 commercial trucks (or more) per day, a five to ten percent increase in truck volumes would not likely impact pavement structure on Coronation Drive, Manse Road, or Morningside Avenue. Although the pavement structure does not appear to be failing, mitigation may require resurfacing of a few areas of the haul route to improve ride quality and decrease noise generated by the trucks at cracks and partial depth potholes.

**Figure 4. Utility Patch on Coronation Drive West of Manse Road**



**Figure 5. Pavement on Coronation Drive West of Manse Road**



**Figure 6. Pavement on Morningside Avenue**



## 4. Roadway Geometry

The heavy commercial trucks observed did not exhibit problems negotiating any portions of the roadway network leading from the Plant to Lawrence Avenue. The curve north of the Plant is sharp, but well signed for 20 km/hr. The intersection of Coronation Drive and Manse Road is offset, but trucks were observed passing through the intersection without problem. For the movement from westbound Coronation Drive to northbound Morningside Avenue, large trucks must “swing wide” to negotiate the turn (**Figure 8**).

**Figure 7. Existing Commercial Truck on Coronation Drive**



**Figure 8. Truck Turning Coronation Drive to Morningside Avenue**



**Figure 9. Existing Commercial Truck on Manse Road**



**Figure 10. Offset Intersection of Coronation Drive at Manse Road**



*The intersection has an offset of approximately 8 metres, but this had no impact on trucks passing through this intersection.*

Hauling of biosolids would be accomplished with specialized trucks and trailers. These combinations have 4-axle or 5-axle dump trailers with an

overall length between 20 and 22 metres. (See **Figure 11.**) Similar size trucks were observed during field reviews using Coronation Drive, Morningside Avenue, and Manse Road.

**Figure 11. Typical Haul Truck for Biosolids**



## 5. School Safety

Currently, four schools are open along the two route options; two on each route. On Manse Road, Heron Park Junior Public School and Joseph Brant Senior Public School are located on the west side of the road, just south of Heron Park. Peter Secor Junior Public School is located on the south side of Coronation Drive. St. Martin de Porres Catholic School, with students from PK – 8, is located in the southwest quadrant of Morningside Avenue and Lawrence Avenue.

**Figure 12. Bus Line Up at St. Martin de Porres Catholic School**



**Figure 13. Joseph Brant Senior Public School on Manse Road**



**Figure 14. School Crossing Guard on Coronation Drive**



Both junior public schools are slated to close in September of 2012 with students moving to the Joseph Brant Senior Public School. This school will then have students from JK – 8 in attendance. Many attending students, including very young students, walk to school. Many students are also dropped off by parents with line-ups forming in the morning and afternoon. As the activity of haul trucks would mainly be during morning hours, a potential for traffic conflict in the vicinity of the schools will develop. Mitigation may require restriction of operating hours for the haul trucks.

**Figure 15. Parent Line-Up in School Zone on Manse Road**



**Figure 16. School Bus Loading Zone and Crossing on Manse Road**



## 6. Pedestrians and Cyclists

There are no sidewalks along Beechgrove Drive leading from the Plant, and no sidewalks along the light industrial area of Coronation Drive. Along Beechgrove Drive, pedestrians walk in the street. Along Coronation Drive west of Manse Road, pedestrians were typically observed walking in the grassy area behind the curb. (A TTC bus route serves this portion of Coronation Drive, and a number of the pedestrians observed during the two field reviews were walking to or coming from bus stops.)

**Figure 17. Pedestrian along Beechgrove Drive**

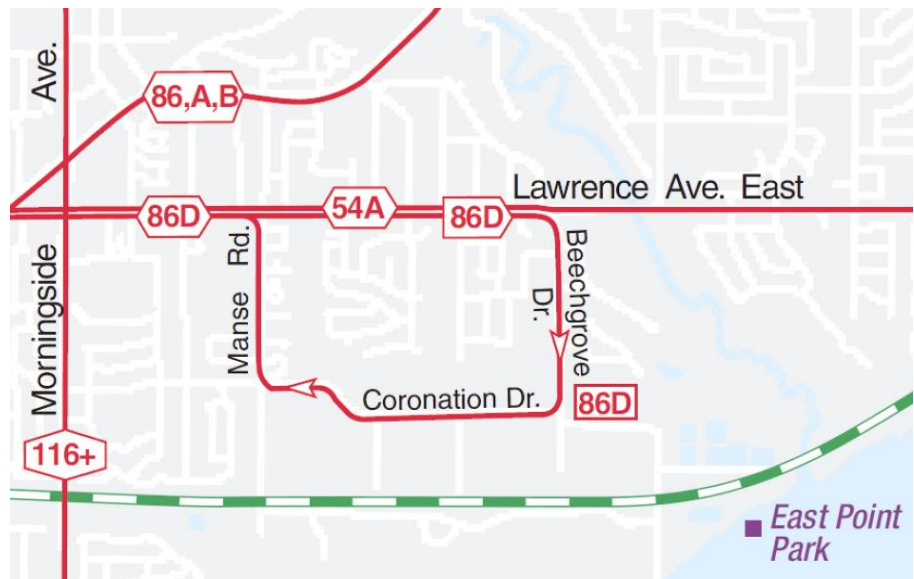




*Note that Pedestrians were observed on all route options during the field reviews including Beechgrove Drive, Coronation Drive, Manse Road, Morningside Avenue, and Lawrence Avenue.*

TTC bus routes overlap the haul routes. TTC Route 86D, following a portion of Coronation Drive and Manse Road, has scheduled buses every 15 minutes in peak hours. Impact of haul trucks on the TTC buses is not likely.

**Figure 18. TTC Bus Routes along Haul Route Options**



Sidewalks are present along Manse Road, Coronation Drive west of Manse Road, Lawrence Avenue, and Morningside Avenue. Especially on the March 29, 2011 field review, a substantial number of pedestrians were observed along all roadways proposed as potential haul routes. South of Lawrence Avenue, the sidewalks are separated from the travel lanes by a grassy boulevard. Pedestrians generally perceive a higher level of comfort with this separation. Along Morningside Avenue north of Lawrence Avenue, much of the sidewalk is directly adjacent to the back of curb. Pedestrians along this portion of Morningside Avenue would generally be more aware of the adjacent traffic, and safety for younger children may be of concern. Without separation from traffic, vehicles do not have a “recovery area” should an incident occur in the travel lanes.

Note that the presence of many pedestrians implies that many pedestrians must cross the streets at some point, generally at intersections. During daylight hours, visibility of pedestrians at crosswalks or intersections would generally be good. Darkness in winter morning hours may present visibility challenges.

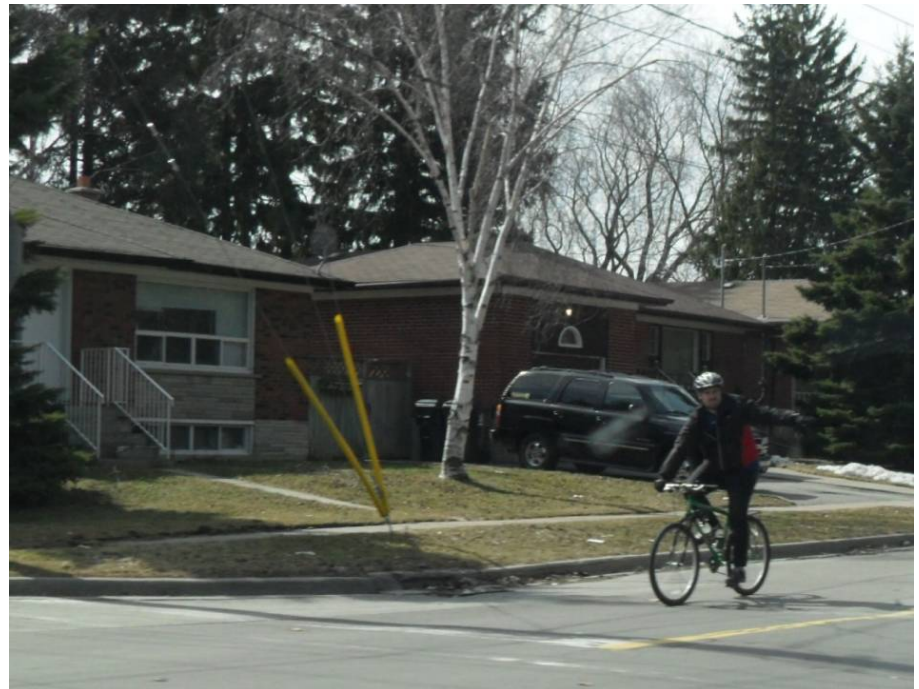
**Figure 19. Pedestrians along Manse Road**



*Sidewalks are in place on both sides of Manse Road, Coronation Drive west of Manse Road, Lawrence Avenue, and Morningside Avenue. During field reviews, many pedestrians were seen on sidewalks along all the subject roadways.*

Coronation Drive from Manse Road to Morningside Avenue is a designated cycle path.

**Figure 20. Cyclist on Manse Road**



*Note that during a field review (March 18, 2011), at least five cyclists were observed on Manse Road in a span of 45 minutes.*

Directly adjacent to the Plant, a cycle trail proceeds east from East Point Park. This trail would be directly adjacent to the loading area for the biosolids (and would likely be impacted by odour during the loading process).

**Figure 21. Cycle Trail Leading East from East Point Park**



*Immediately to the north of this cycle trail (to the left in this photo) is the location where the biosolids would be loaded into trucks. Loading would typically take place during early morning hours.*

## **7. Morningside Avenue from Lawrence Avenue to Highway 401**

North of Lawrence Avenue, the land use along Morningside Avenue includes residential, shopping, a high school, two colleges, and green space. West Hill Collegiate Institute and Centennial College Morningside Campus directly front Morningside Avenue. During the March 29, 2011 field review, many students were observed walking from these schools, either toward home or to bus stops along Morningside Avenue.

**Figure 22. Students at Morningside Avenue and Ellesmere Road**

*Centennial College Morningside Campus and nearby West Hill Collegiate Institute generate hundreds of pedestrians who walk along Morningside Avenue and use bus stops along and adjacent to Morningside Avenue.*

Morningside Avenue is a busy roadway. As such, the addition of four to five trucks would hardly be noticeable, except for two concerns.

First, the biosolids haul trucks are noticeable by their odour. Even if sealed trailers were possible, odour is present due to spillage, tracking of tires through sludge in the biosolids loading areas, and leakage at the seals. Second, the traffic along Morningside Avenue tends to have a “stop and go” pattern due to the TTC buses, school buses, traffic signals, and many access drives. The biosolids are not, as the name might imply, a solid material. The material has liquid characteristics and “sloshes” in the truck. With sudden stops, the material has been known to form a wave which overtops the sides of the trailer.

## 8. Generated Truck Traffic

The number of trucks required for hauling biosolids will vary based on day of week and month. If demand for biosolids application for agricultural purposes was high, the required number of trucks may remain fairly steady across each weekday. However, in practice, biosolids would be directed to landfill. The City’s landfill only operates on weekdays while biosolids are produced seven days a week. Additional trucks would be used on Mondays and Tuesdays in order to haul away the weekend backlog. Production also varies by month. Currently, on average, four to five truckloads of biosolids would be produced per day (29.2 dry tonnes). In future peak months, the estimated production will be five to six truckloads per day (36.3 dry tonnes). Each load requires two truck trips, one empty to the Plant, and one loaded from the Plant.

**Table 1. Truck Load Generation**

	Biosolids Generated Dry Tonnes	Biosolids Generated Wet Tonnes	Trucks Required (22-26 Tonnes Each)
Existing Daily Average	29.2	108	5
Future Daily Average	31.5	117	5
Future Daily Average in Peak Month	36.3	134	6

Many configurations for haul trucks are available. Dump trailers can have 4 or 5 axles. Double small trailers can be used. The overall length can vary from 20 to 24 metres. In Ontario, the trucks can generally haul payloads ranging from 34 to 39 metric tonnes. With higher payloads, the number of trucks required per day could be reduced to 4 to 5 rather than the 5 to 6 shown in the table above. Although sealed trailers (for odour control) are being investigated, we understand only tarp type systems are available on the market. Sealed trailers, if technically and economically feasible, would need to be custom designed and built to the City's specifications and as such the potential payload for these trailers is not known.

With the route from Coronation Drive to Morningside Avenue, the added trucks per day would range from a low of 13 percent to a high of 30 percent. In practice, the added truck traffic would mainly occur in the early morning hours, as early as 4:00 AM (heading to the Plant empty) to midmorning (last truck for the day departing from the Plant). The hours of truck activity may have noise and odour implications, and the departure times may conflict with the start of school. Currently, Coronation Drive west of Manse Road and Morningside Avenue south of Lawrence have truck restrictions between 7 PM and 7 AM.

Along the Manse Road route, the added trucks per day would range from roughly 5 to 13 percent, again, concentrated in the morning hours. Student activity at the schools along Manse Road is prior to 8:15 AM with students walking, buses arriving, and parents dropping off children.

**Figure 23. School Zone on Manse Road**



*Pedestrians near the schools on Manse Road, Coronation Drive, and Morningside Avenue include small, kindergarten-age children.*

With the current operation, hauling of ash is performed during one week per year and can avoid “spring thaw” conditions when the Beechgrove Drive base may not support heavy loads. With daily hauling of biosolids, hauling during the “spring thaw” cannot be avoided.

Note that a significant change in traffic, including truck traffic, and the associated noise, odours, air quality, and concern for public safety, typically requires examination within the Environmental Assessment process. Since the Biosolids Master Plan EA included extensive public consultation and resulted in the recommendation of an alternative which did not involve daily trucking of biosolids through neighbourhood streets, re-examination of the trucking implications would likely be required including additional public consultation.

## 9. Review Summary

The existing roadway condition can be mitigated with pavement reconstruction (on Beechgrove Drive from the Plant to its intersection with Coronation Drive) and minor resurfacing or patching on other portions of the route. The school conflict could potentially be mitigated with restrictions on haul times for the biosolids.

Further study would likely be required to address noise, odour, air quality, and safety concerns for cyclists and pedestrians.

If Coronation Drive to Morningside Avenue was selected as the haul route, the impact on truck restrictions will need to be examined. Trucks are typically loaded early in the morning (between 4:00 and 6:00 AM) with truck departing toward London before 7:00 AM (to avoid congestion on Highway 401 since delays due to congestion increase the cost of hauling the biosolids).

**Figure 24. Truck Restrictions**



*Trucks are currently prohibited between 7 PM and 7 AM on Morningside Avenue south of Lawrence Avenue and Coronation Drive between Morningside Avenue and Manse Road. As these streets pass through well established residential neighbourhoods, the truck restrictions likely originated from noise concerns as trucks traveled to or from the light industrial area to the east.*

