

TRAFFIC ESTIMATE REVIEW

An application to Cramahe Council has been made to increase operations of the Fidelity Pit located on Part Lot 19 Concession 3, 13945 Telephone Rd. Cramahe Township to 24/7 and ultimately the placement of a Permanent Asphalt Plant on-site.

Although Council has requested one, Fidelity has not provided a traffic study or any such related information. This estimate is a professional effort to inform both Council and the public.

AN ASPHALT PLANT WILL HAVE A SIGNIFIGANT IMPACT ON TRUCK TRAFFIC and NOISE

Significant increase in truck traffic will be a result of placement of an Asphalt Plant at the location.

Herein is a traffic estimate developed by a Professional Engineer, under the guidance of an experienced Sr. Civil Engineer, Chief Estimator, and confirmed using public asphalt calculating tools.

SUMMARY

For each kilometre of highway paved, at **least 82 truck trips** are required **and** up to a **maximum of 326** truck trips. These trips could increase due to project specifics. This figure includes delivery of raw materials in plus asphalt delivery out to site.

For a 401 MTO project that requires asphalt delivery, each km of **single lane** highway paved requires **40 to 160 asphalt truck trips during the night time.**

In an 8 hour shift, that equates from **1 trip every 12 minutes up to 1 trip every 3 minutes, during the night shift.**

To put this into broader perspective, to deliver raw materials to the asphalt plant and then deliver asphalt to the site to pave the 401, East AND West lanes, from **Cobourg to Brighton, would require at least 5.970 trips up to 23.660 trips travelling down Telephone Road over the contract period.**

See Exhibit 1 and Exhibit 2 for calculation details.

CONCLUSION

Asphalt and raw materials would move via Telephone Road which is of tar and chip construction and not designed to handle the excessive weight and traffic volume, and the significant hills to navigate. Furthermore, Telephone Road is not identified as an established truck haul route for asphalt in the Northumberland County Official Plan, approved as of November 23, 2016. See Exhibit 3.

By permitting an Asphalt Plant, the ensuing truck traffic would:

- **Damage Local Roads:** Increased heavy truck traffic will cause extensive damage to local roads, leading to costly repairs.
 - The fees paid by Fidelity are unlikely to cover the damage which will be substantial.
- **Put a Tax Burden on Cramahe Residents:** The uncovered costs of maintaining and repairing roads will likely fall on local taxpayers if no agreement is in place with Fidelity to maintain the road, over and above the levy paid.
- **Contravene the Northumberland County Official Plan** as Telephone Road is not identified as an established truck haul route.
- **Increase Noise Pollution:**
 - This pit is located in a quiet rural area. The operation of dump-trucks, generates high levels of noise from traffic, back-up alarms and slamming of tail gates, and the plant is planned to run 24/7.
 - Incessant, loud banging of dump-truck tail-gates is intolerable for neighboring residents.
 - Trucks will need to shift gears going up the steep hills, and use engine braking going down those hills.
 - An MTO Contract on the 401 would require night-time travel by trucks. A further 401 widening contract would result in continued, daily excessive, long-term night-time traffic noise resulting in Sleep Disturbance leading to insomnia, fatigue, and increased stress.
 - Chronic exposure to noise is proven to lead to hearing loss, increased stress levels, and cardiovascular problems.
- **Increase the Risk of Serious Accidents:** The combination of heavy trucks, school buses, local traffic and challenging terrain raises the likelihood of serious vehicular accidents, including hazardous spills, over a wide area between the 401 exits at Brighton and Colborne.
- **Restrict Homeowners' Access to Roads:** Heavy traffic will impede or restrict access to roads for local homeowners.
- **Increase Environmental Consequences of Bitumen Spills:** Any bitumen spill could have a severe environmental impact, particularly given that the access roads are close to a protected water zone and to numerous dwellings served only by well water.

EXHIBIT 1. TRUCK TRAFFIC ESTIMATE METHOD and CALCULATIONS

ASSUMPTIONS

- Anecdotally the property is exhausted of gravel deposits, so ALL RAW MATERIALS will need to be trucked in and stored on-site.
- Asphalt composition to estimate mix of trucks to tankers was gravel 93% and bitumen 7%
- Capacity of Dump/Asphalt Truck (3 axles) 25 tonnes
- Capacity of Bitumen Tanker 18 tonnes
- Minimum road spec: 4M wide by 50mm thick
- Maximum road spec: 4M wide by 200 mm thick
- Calculations done per 1 km (1000 M)
- Weight in metric tonnes (2,200 pounds)

ASPHALT VOLUME CALCULATION

To calculate volume of Asphalt required, an experienced industry source was contacted. The formula he provided and was verified was:

Volume of asphalt X .0025*

length(M) x width(M) x depth(mm) x 0.0025 = total (tonnes)

*The factor 0.0025 is based on an approximate density of 2.5 tonnes per cubic metre. There are variables that can affect the density depending on the asphalt mix to be used but this is a reasonable approximation.

Tonnage of asphalt estimated was calculated per kilometre for Minimum Road spec and a Maximum Road spec.

TRIPS CALCULATION

Trips were estimated based on.

- A) INCOMING Gravel & Bitumen Trucks bringing Raw materials
- B) OUTGOING EMPTY Gravel & Bitumen trucks returning to source
- C) INCOMING EMPTY asphalt transport trucks
- D) OUTGOING asphalt transport trucks required to pave the road.

SUMMARY OF CALCULATION RESULTS FOR SINGLE LANE PAVING

	MIN ROAD SPEC (1 LANE)	MAX ROAD SPEC (1 LANE)
RAW MATERIALS REQUIRED PER KM (TONNES)	500	2000
RAW MATERIALS TRUCK LOADS DELIVERED TO PIT PER KM (TRIPS)	21	83
EMPTY TRUCKS LEAVE PIT PER KM (TRIPS)	21	83



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ASPHALT TRUCKS LEAVING /RETURNING EMPTY TO PIT (TRIPS)	40	160
TOTAL TRIPS TO SITE REQUIRED PER KILOMETRE OF HIGHWAY	82	326
TRIPS PER 8 HOUR NIGHT SHIFT PER KM (1 LANE 401)	5	20
TRIPS PER MINUTE 8 HOUR NIGHT SHIFT PER KM (1 LANE 401)	12	3
Minimum 4M wide by 50mm thick . Maximum 4M wide by 200 mm thick		

EXHIBIT 2. TRUCK TRAFFIC ESTIMATE SAMPLE CALCULATIONS FOR 2-LANE 401 WIDENING PROJECT

EXAMPLE CALCULATION USING MINIMUM ROAD SPEC (50 mm asphalt)

Estimated Tonnage Based on Minimum Specifications

For a 1 km section of a single-lane highway, with:

- Lane width: 4 meters
- Average thickness: 50 mm

Calculation:

$1000\text{m}(1\text{km}) \times 4\text{m}(\text{width}) \times 50\text{mm}(\text{depth}) \times 0.0025 = 500$ tonnes of Hot Mix Asphalt required For single lane of the 401 project:

Truck Capacity Assumptions

- Tri-axle dump trucks: 22–25 tonnes per load (use 25 tonnes for calculations)
- Trailers: 38–42 tonnes per load
- Bitumen tankers: Typically, 20–40 tonnes (used 18 tonnes per tanker due to road limit of 10 tonnes/axle; 36 tonnes may also be allowable)

Truck Trips for Raw Material Delivery

Materials must be trucked in:

- Gravel (93% of mix): $465 \text{ tonnes} \div 25 \text{ tonnes/truck} = 19$
- Bitumen (7% of mix): $35 \text{ tonnes} \div 18 \text{ tonnes/tanker} = 2$

Return Trips for Empty Trucks

Since trucks return empty, additional trips must be accounted for:

- Empty gravel trucks returning: 19 trips
 - Empty bitumen tankers returning: 2 trips
-

Truck Trips for Hot Asphalt Mix Delivery

- Asphalt required for single lane: $500 \text{ tonnes} \div 25 \text{ tonnes/load} = 20 \text{ trips OUT per km}$
- Empty asphalt trucks returning: 20 trips

Total Truck Trips per km (Single Lane)

Raw material deliveries+empty return trips+hot asphalt deliveries+empty asphalt truck returns
 $(19+2)+(19+2)+20+20=82 \text{ truck/tanker movements per km}$

For every 1 km of minimum spec, single lane highway expansion (one direction only), a total of 82 truck/tanker trips are required.

For every 1 km of minimum spec, single lane highway expansion (East and West bound directions), a total of 164 truck/tanker trips are required.

Total Truck Trips Required to Pave 401 from Cobourg to Grafton

- Truck Trips per km (East and West bound directions): 164 truck/tanker trips per km
- Distance from Cobourg to Grafton: 12.4 km
- Number of Lanes: 2
- Total Truck Trips Req'd for Minimum Road Spec: $164(\text{Truck Trips per km}) \times 12.4(\text{Distance from Cobourg to Grafton}) = 2,033 \text{ trips}$
- Total Truck Trips Req'd for Maximum Road Spec: $326(\text{Truck Trips per km}) \times 12.4(\text{Distance from Cobourg to Grafton}) = 8,086 \text{ trips}$

SUMMARY OF RESULTS OF TOTAL TRUCK TRIPS REQUIRED TO PAVE 401 2 LANES EAST & WEST

TRIPS FOR AN EXAMPLE PROJECT TOTAL TRIPS (TWO LANES)	MIN RD. SPEC. 2 LANES	MAX RD. SPEC. 2 LANES
Cobourg to Grafton 12.4 km	2034	8060
Grafton to Colborne 11 km	1804	7150
Colborne to Brighton 13 km	2132	8450
Brighton to Trenton 16.5 km	2706	10725
TOTAL TRIPS FOR AN EXAMPLE PROJECT COBOURG TO BRIGHTON	5,970	23,660

A MINIMUM OF 5,970 TRUCK TRIPS of asphalt and raw materials (gravel, bitumen etc.) for 50mm pavement will travel Telephone Road in order to pave East and West bound lanes of 401 from Cobourg to Brighton; and

A MAXIMUM OF 23,660 TRUCK TRIPS of asphalt and raw materials (gravel, bitumen etc.) for 200mm pavement will travel Telephone Road in order to pave East and West bound lanes of 401 from Cobourg to Brighton.

ACKNOWLEDGEMENTS

This review, a summary of which was presented to the special meeting of Cramahe Council on February 18, 2025, has been developed in conjunction with and reviewed by an experienced Sr. Civil Engineer, Chief Estimator.

EXHIBIT 3 - ANALYSIS OF TELEPHONE ROAD AND ROAD WEAR WITH PROPOSED ASPHALT PLANT

1. Executive Summary

The proposed development of an asphalt plant at 13945 Telephone Road, Cramahe Township, poses severe risks to municipal infrastructure, public safety, environmental quality, and fiscal sustainability. This report outlines the direct and indirect impacts expected from a dramatic increase in heavy truck traffic on a local road not designed to handle such volumes.

2. Existing Road Conditions

Designation: Telephone Road is classified as a "local road" in Cramahe Township's Official Plan. It is not intended for high truck volumes.

Construction:

- Surface-treated, not paved to withstand industrial traffic.
- Includes steep gradients (e.g., 40 m elevation gain at a 10% grade near Chapman and Trotman Roads.
- Road is currently in disrepair with minimal shoulders and inconsistent ditching.

3. Engineering Evidence of Road Wear

AASHTO Data:

- A 10-ton axle load causes **17.5 times** more damage than a 5-ton axle load.

Tatham Engineering Road Needs Study (2023):

- States, "Local Roads (such as Telephone Road) are not designed for high truck volumes and degrade much faster under increased traffic loads."
- Recommends:
 - Maximum 400 vehicles/day for new roads
 - Degraded service at 1,000 vehicles/day

Current Traffic Volume:

- Previously Studied: 425 vehicles/day (with low truck traffic)
- **Updated (May 6–12, 2025 Traffic Study by Rodger Dingman):**
 - Total: 4,682 vehicles/week (669 vehicles/day)
 - This exceeds recommended maximum by **1.7 times**

4. Projected Traffic Impact from Asphalt Plant

CRAA Estimates:

- Truck trips per km (based on asphalt depth):
 - 82 for 50 mm
 - Up to 326 for 200 mm

Asphalt Application Example:

- 2 km of Highway 401 paving requires 320 truckloads
- Day and night operations expected
- Nighttime: One truck passes every **45 seconds** near rural homes

Tatham Engineering Warning: "Increasing truck traffic will cause rapid structural failure."

5. Fiscal Impact

- No revenue generated from the depleted gravel pit
- Long-term maintenance and repair costs fall on local taxpayers
- Estimated costs in the **millions**

6. Public and Environmental Safety

Road Safety:

- Narrow shoulders and poor conditions increase risk for:
 - Pedestrians
 - Cyclists
 - School buses
 - Horseback riders

Emergency Services:

- Congestion during Highway 401 detours poses risks to ambulance, fire, and police response times
- Township may face liability for accidents caused by poor road conditions

Environmental Concerns:

- Potential for **groundwater contamination** due to local soil composition
- Continuous **noise pollution** from tailgate slams, alarms, and heavy equipment
- **Light pollution** from site and vehicle operations disrupts rural night environment

7. Economic Risk to Residents

- Decline in property values
- Reduced MPAC assessments lead to a smaller municipal tax base
- Personal financial loss to residents in the form of equity devaluation

8. Conclusion

The introduction of an asphalt plant on Telephone Road represents a clear conflict with the area's infrastructure capabilities, environmental integrity, and the well-being of Cramahe residents. Immediate steps should be taken to halt the development or implement extensive mitigation strategies and corporate accountability measures.

Recommendations:

- Denial of zoning or permitting for the asphalt plant
- Road upgrades paid for by the developer, not taxpayers
- Mandatory traffic mitigation plans and groundwater protection systems

Sources & References

- American Association of State Highway and Transportation Officials (AASHTO)
- Federal Highway Administration (FHWA) Research on Pavement Deterioration
American Association of State Highway and Transportation Officials
- U.S. Dept. of Transportation, FHWA (1997). Federal Highway Cost Allocation Study.
- Ontario Min. of Transportation (2013). Pavement Design and Rehabilitation Manual.
- National Research Council of Canada (2018). Effect of Heavy Vehicles on Pavement Damage.
- Tatham Engineering (2023). Northumberland County Road Needs Study.
- Tatham Engineering (2023). Cramahe Road Needs Study.
- Northumberland County Official Plan (2016).
- Canada Topographical Maps, 2025
- CRAA Traffic Assessment Study March 2025

The Fourth Power Law (AASHTO)

- Pavement damage increases with the fourth power of axle load. Not 1:1
- A 15 ton axle load causes significantly more damage than a 9 ton axle load, even though the difference is only 3 tons.

- Trucks damage roads more than cars when the roads are under-designed for the amount of truck traffic that is using them
- Doubling heavy truck traffic can cause up to 16 times more road wear.

Sources: AASHTO (1993) - American Association of State Highway and Transportation Officials Guide for Design of Pavement Structures.

National Academy of Sciences (1979), Transportation Research Board

FHWA Research on Pavement Deterioration

- Studies confirm road wear is exponential, not linear.
- A single fully loaded truck can cause as much wear as 5,000–10,000 passenger vehicles.

Source: U.S. DOT FHWA (1997) - Federal Highway Cost Allocation Study.

Ontario MTO Pavement Design Guidelines

- Roads are designed for an expected lifespan based on single-axle truck loads.
- Doubling truck volumes drastically shortens road life.
- Resurfacing or full reconstruction much sooner than planned

Source: Ontario Min. of Transport. (2013) - Pavement Design and Rehabilitation Manual.

NRCC Study on Rural Road Deterioration

- Surface-treated roads fail much faster under heavy trucks.
- A road expected to last 20 years may fail in just 5–10 years.

Source: National Research Council of Canada (2018) - The Effect of Heavy Vehicles on Pavement Damage.

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