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August 11, 2021

Tonlu Holdings Limited
111 Strada Drive
Vaughan, ON L4L 5V9

Attn: Ms. Isabel Bercasio

Re: 259 Innisfil St., Barrie, ON
Structural Train Derailment Review
Our Project No. 21113

Dear Ms. Bercasio,

As per your recent request, we are providing the following design brief regarding the structural impact of a train derailment, on the site of 259 Innisfil St., adjacent to the Barrie line. The proposed development consists of an above grade, reinforced cast-in-place concrete structure with a 6-storey podium and 4 towers which are proposed to be 29, 35, 37 and 20 stories. The development is located adjacent to the Barrie Rail Line.

The approach typically taken to design a crash barrier is to equate the momentum of the moving body to the work done or energy absorbed in reducing the momentum of that moving body to zero. Current guidelines produced by AECOM (last amended in 2014) provide information with respect to train mass, direction and impact and train velocity. As well, recommendations are made with respect to how much energy is absorbed by the plastic deformation of the locomotives and rail cars. This site is unique in that the rail speeds are quite low and so the potential impact of a derailment is significantly reduced. Based on the track speeds of this line, we have chosen to use Method Two in which the following four cases are to be considered:

1. Freight Train Glancing Blow: nine cars weighing 143 tons (129,700 kg) each, impacting the wall at an angle, θ_G. The angle of impact will be a function of track curvature, and for tangent track may be taken as 3.5 degrees.
2. Freight Train Single Car Impact: a single car weighing 143 tons (129,700kg) impacting the wall as it undergoes rotation about its center. The angle of rotation at impact is θ_F.
3. Passenger Train Glancing Blow: eight cars weighing 74 tons (67,120kg) each impacting the wall at an angle, θ_G. The angle of impact will be a function of track curvature and for a tangent track may be taken as 3.5 degrees.
4. Passenger Train Single Car Impact: a single car weighing 74 tons (67,120kg) impacting the wall as it undergoes rotation about its center. The angle of rotation at impact is θ_F.

Based on information provided to us, the track design speed for freight trains is 10 mph (4.47m/s) and there is no passenger traffic. Based on these speeds, we can report the following (see enclosed diagram and calculations):

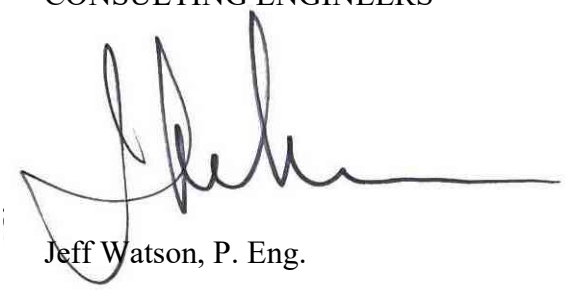
1. Based on the deceleration parameters included in the guidelines, beyond 1.4m from the centerline of track, the train will have reached zero velocity and therefore would impose no load.
2. Based on the guidelines, this load case does not need to be considered where the distance from the centerline of track is greater than 8.5m.
3. As there is no passenger traffic, this load case does not apply.
4. As there is no passenger traffic, this load case does not apply.

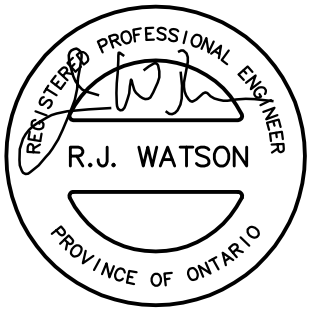
As the subject site is greater 8.5m from the centerline of track, any crash barrier required would not experience any loading associated with a potential derailment and would be of no benefit structurally.

We trust the foregoing will be sufficient, however, should you have any further questions, please do not hesitate to contact our office.

Yours very truly,

JABLONSKY, AST AND PARTNERS
CONSULTING ENGINEERS

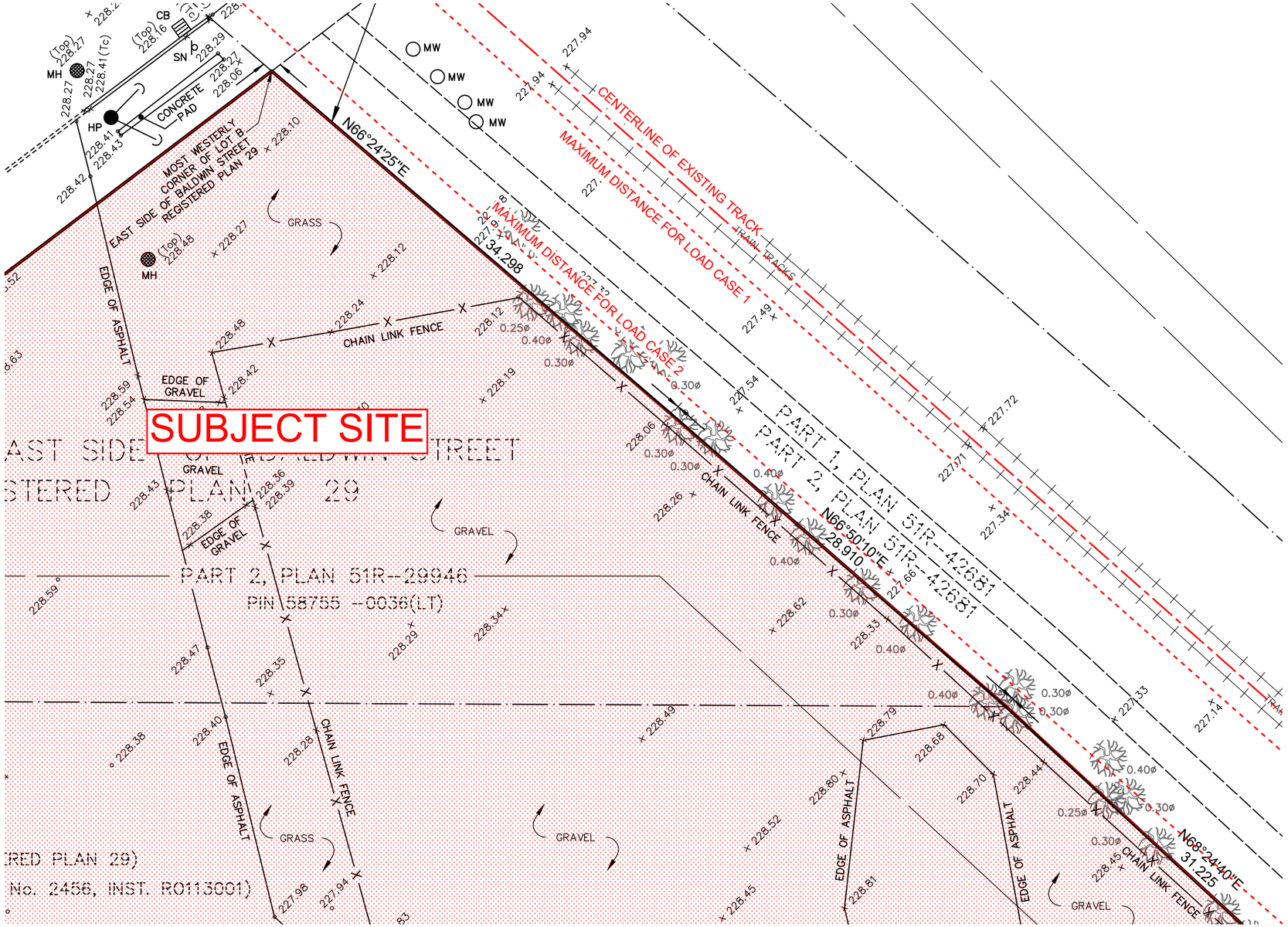




Jeff Watson, P. Eng.

Enclosure

cc: Gordon Tattle, JAP



G = (228.06-227.94)/(10 / sin3.5)
= -0.00

a = -9.8(0.25 - 0.00)
= -2.45 m/s2

CASE 1:
x1 = 1.1625 + (4.47^2)*sin3.5/(2*2.45)
= 1.41m

CASE 2:
x2 = 8.5m (GUIDELINES)

CASE 3:
x3 = N/A (FREIGHT ONLY)

CASE 4:
x3 = N/A (FREIGHT ONLY)

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PROJECT/DWG. TITLE
259 INNISFIL ST.

JOB NUMBER	21113
DRAWN G.T.	DATE 2021-08-11
SCALE N.T.S.	SKETCH No. SK-1