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Subject: Rail Proximity Review Memo
 170 Northfield Drive West, Waterloo – Proposed Mixed-Use development

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1.0 Introduction

Forgestone Capital Management (the ‘Owner’) has retained Hatch Ltd. to review the proposed development at 170 Northfield Drive West (the ‘Site’) with respect to its proximity to the heavy rail corridor of the Waterloo Central Railway (WCR); and the light rail corridor of the ION Light Rail Transit (LRT). The development is currently in the Site Plan Application (SPA) phase.

This Memorandum (the ‘Memo’) is meant to supplement the development’s complete SPA submission. The goal of this Memo is to present the development and outline the minimum recommended rail safety mitigation measures.

2.0 Rail Adjacent Development Guidelines

The industry approach for addressing new developments in proximity to heavy rail corridors is found in the *Guidelines for New Development in Proximity to Railway Operations* (the ‘Proximity Guidelines’) developed collaboratively by the Federation of Canadian Municipalities (the ‘FCM’) and the Railway Association of Canada (the ‘RAC’), last updated in May 2013. The Proximity Guidelines include baseline design requirements for developments located directly adjacent to railway operations. The guidelines are meant to act as the primary reference for federally regulated railways, municipalities, and developers. The primary goals of the guideline include the following¹.

- informing development stakeholders on the issues (noise, vibration, safety) and mitigation measures associated with developments near railway operations with a focus on residential development, and

¹ *Guidelines for New Development in Proximity to Railway Operations*, Executive Summary, May 2013.

- promoting consistency in the application of relevant standards across the country.

The Proximity Guidelines apply only to heavy rail corridors for freight & passenger trains on lines with a track gauge (distance between both rails) of 56-1/2 inches (1435mm). Passenger Light Rail Transit (LRT) or Tram (Streetcar) services have lines with a narrower track gauge than heavy rail, slower speeds, and shorter and lighter trains, which result in lower noise, vibration, emissions, and derailment risks when compared to heavy rail corridors. Therefore, LRT or Tram operations are generally excluded from the Proximity Guidelines as they are seen to have lower risks.

The Proximity Guidelines include a description of the following considerations for developments adjacent to active railway corridors:

- a) Principles for Mitigation Design
- b) Consultation with the Railway
- c) Building Setbacks for new Developments
- d) Noise Mitigation
- e) Vibration Mitigation
- f) Safety Barrier / Crash Wall
- g) Security Fencing
- h) Stormwater Management and Drainage
- i) Warning Clauses and Other Legal Agreements
- j) Construction Issues

In addition to the Proximity Guidelines, railways and municipalities can have additional requirements for rail adjacent developments. Such additional requirements can include conformance to railway-specific standards; municipal development plans or by-laws; and/or Peer Review processes by stakeholders and/or their agents.

Figure 1 outlines a procedural flow chart illustrating how the application of rail safety mitigations can be considered for new developments. It should be noted that the first step is the most critical which involves establishing the category of railway adjacent to the development lands. In terms of the Site, existing adjacent rail corridors include the WCR heavy rail corridor to the east, and the ION LRT light rail corridor to the southeast.

Specifically for the development proposed at 170 Northfield Drive West, the following guidelines are applicable:

- a. The Region of Waterloo is the owner of both the Waterloo Central Railway (WCR) and the ION LRT. Through initial inquiry with the Region of Waterloo's Corridor Planning department, it was revealed that the Region will perform a site-specific review of each development application. However, the following general guidelines were provided for consideration:
 - Application of a minimum 15-metre setback from the railway property line to the closest building face; and
 - Site-specific incorporation of fencing or other safety barriers, where deemed required by the Region.It is also implied that the Region recognizes the Proximity Guidelines as an industry best practice for developments adjacent to heavy rail corridors.
- b. Informal consultation with the WCR was also conducted and confirmed that the Region is the authority who will dictate the applicable rail safety mitigations for the development. Details on the existing and future operations of the railway were also established through initial consultation. The information gathered from the consultation are also presented in **Section 3.0** of this Memo.

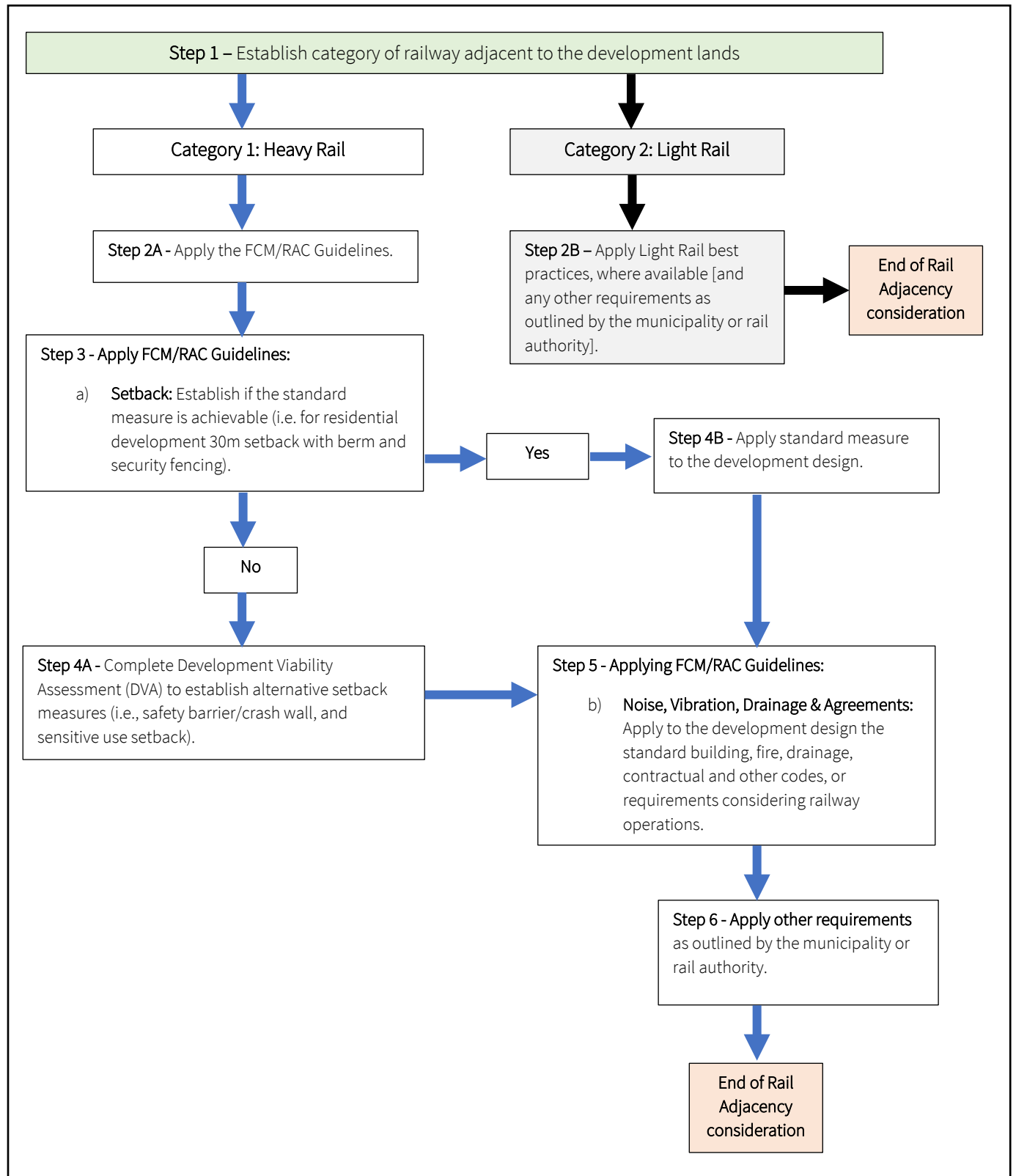


Figure 1: Flowchart for establishing rail safety mitigation measures. Source: Hatch

3.0 Waterloo Central Railway (WCR)

Initial consultation with WCR on 16-Jan-2024 revealed the following details regarding their operations:

- Both passenger and freight train traffic use the Region of Waterloo owed track. The seasonal WCR passenger train is a licensed short line registered with Transport Canada. Periodic Canadian National Railway (CN) freight trains have running rights on the track adjacent to the Site.
- The seasonal passenger train runs during daytime hours from April 1 to October 31 annually. The freight movements occur during evening hours and serve a chemical plant in the Township of Elmira north of the Site.
- The maximum train speed on the WCR track is 10 miles per hour (mph).
- At the time of this Memo, the WCR had no foreseen plans for future expansion.

The track diagram illustrated in **Figure 2**, depicts the Waterloo Spur track which comes from approximately mainline mile 62.49 of the Guelph Subdivision. The Waterloo Spur is shown as being 11.93 miles long from the mainline northward towards the Township of Elmira. The maximum speed along the WCR heavy rail corridor for passenger and freight trains is 10 mph.

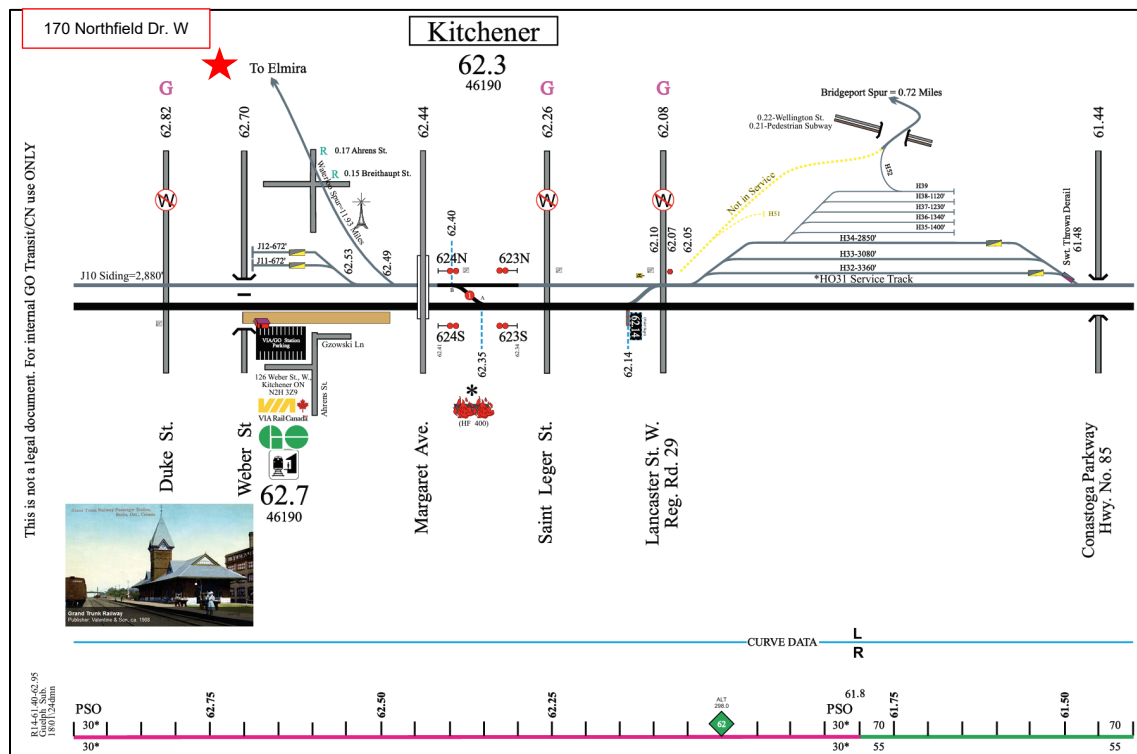


Figure 2 CN Guelph Subdivision Track Diagram showing the Site's approximate location (red star) along the Waterloo Spur. Annotated by Hatch. Source: Metrolinx-CN Track Diagram, Guelph Subdivision.

As shown in **Figures 3 to 5**, the existing Market Trail is located between the Site and the WCR. An existing berm more than 1.5 metre (5 feet) in height is found between the trail and the Site. The centerline of the WCR track is estimated to be more than 7.0 metres from the Site's eastern property line.

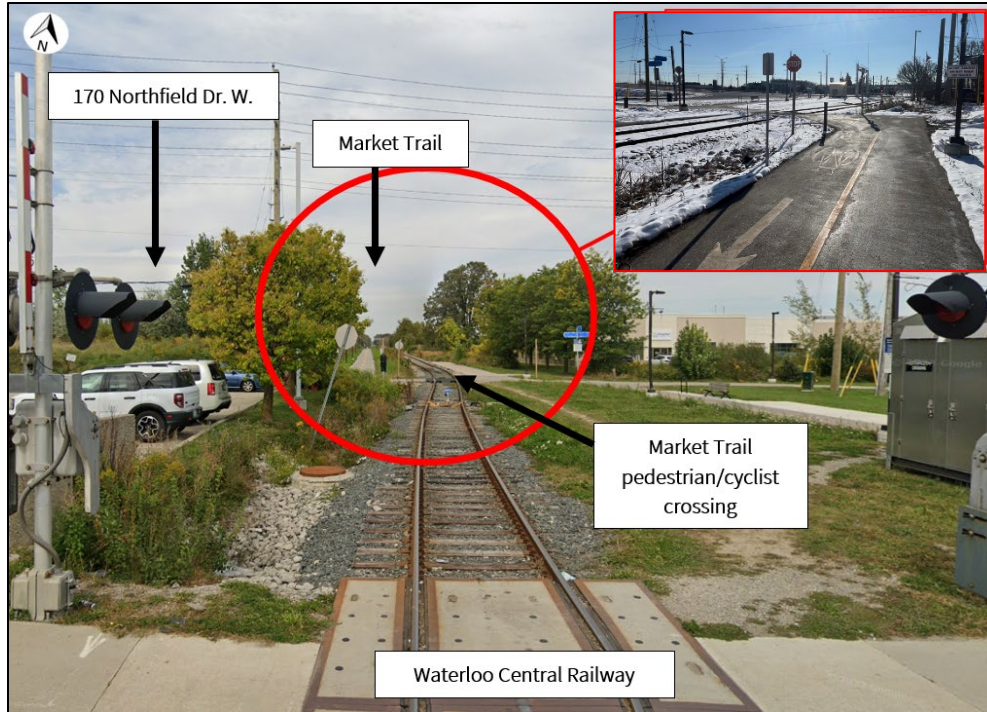


Figure 3 Facing north at the grade crossing of Northfield Drive West and the WCR. (Photo detail of the crossing taken 20-Feb-2024, facing south). Source: Google Maps taken 7-Feb-2024.



Figure 4 Facing north at the west approach of the grade crossing of Market Trail and the WCR. (Photo taken 20-Feb-2024, facing south). Source: Hatch



Figure 5 Facing south on the Market Trail east of the Site. (Photo taken 20-Feb-2024, facing south). Source: Hatch

4.0 ION Light Rail Transit (LRT)

As illustrated in Figure 6 and 7, adjacent to the southeast corner of the Site is the Region of Waterloo’s ION LRT which travels along Northfield Drive. The ION LRT, does not have any published guidelines related to adjacent developments. As a result, the Region of Waterloo’s review of this development may also include addressing controls for the adjacent LRT.



Figure 6 Plan view showing the approximate location of the Site (in red), annotated by Hatch. Source: Grand River Transit, ION Route Map taken 7-Feb-2024 from <https://www.grt.ca/en/about-grt/ion-route-map.aspx>

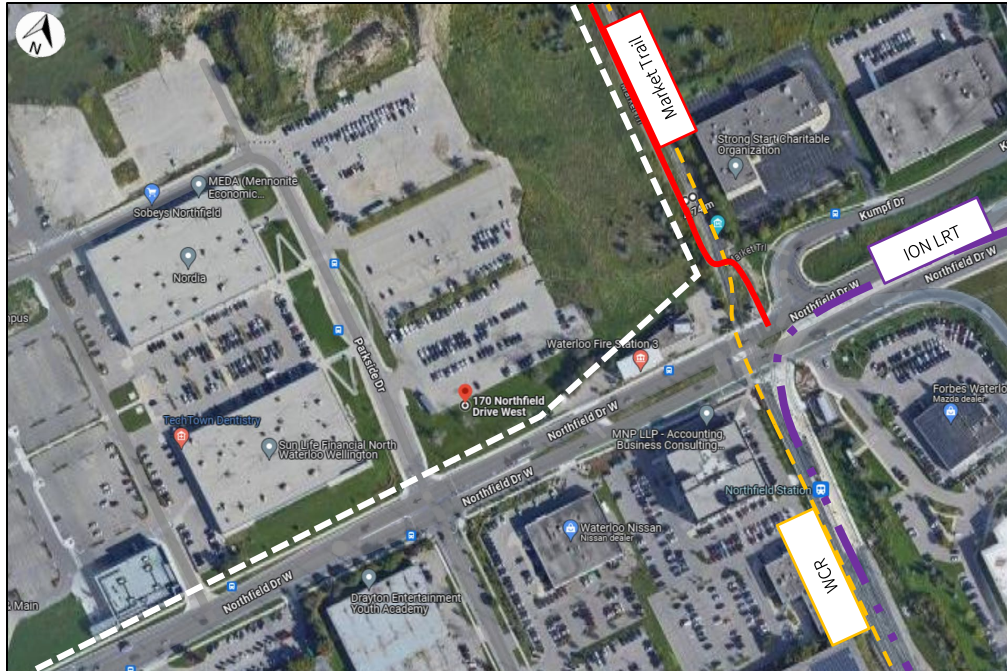


Figure 7. Plan view showing the approximate southeast limits of the Site (in white) and the ION LRT track. Source: Google Maps taken 7-Feb-2024.

More specifically, the southeast corner of the Site's property line is setback approximately 65.0 metres from the nearest ION LRT track. The Site itself does not have a mutual property line with the ION LRT.

For the adjacent ION LRT service, the Proximity Guidelines would not formally apply. Typically, LRT or Tram operators could produce rail safety mitigations specific to their territories and operations. For example, in Ontario, the Toronto Transit Commission (TTC) has published a *Developer's Guide* (2018) which outlines the following aspects to be considered when developing adjacent to an electrified TTC (LRT) system:

- Physical building and foundation setbacks to TTC infrastructure.
- Location of any above or underground storage tanks for flammable or combustible liquids and associated piping.
- Building design conformance to applicable Fire Protection codes and standards.
- Air study including modeling to analyze air in-take/discharge openings.
- Geotechnical investigation report to mitigate construction impacts on TTC infrastructure.
- Electrolysis and Stray Current Study, completed by a Professional Engineer.
- Written acknowledgement that noise, vibration, electro-magnetic interference and atmospheric emissions from TTC's operations have been considered in the design and appropriate mitigations applied.

Due to the approximately 65.0-metre setback to the ION LRT, many of the above aspects may not be applicable to the Site. However, the Region of Waterloo will be the authority to dictate the applicable mitigations for the Site.

5.0 Site Context

As illustrated in **Figure 8**, abutting the west side of the Site is the existing pedestrian / cyclist Market Trail. The Waterloo Central Railway (WCR) is then located easterly adjacent to the Market Trail. Therefore, the Site shares a mutual property line with the existing Market Trail, and not with the railway. The Region of Waterloo is the owner of the Market Trail which provides connectivity between Northfield Drive West and Farmer’s Market Road in Woolwich². As a best practice, the proposed development will consider and address the applicable rail adjacent development guidelines as described in **Section 2.0** of this Memo.

As shown in **Figure 9**, the existing Market Trail is located between the Site and the WCR. An existing berm separates the trail from the Site. Both the trail and railway are owned by the Region of Waterloo. Therefore, the Site’s east property line is shared with that of the Region of Waterloo. As a result, the Site is applying a 15.0-metre setback from the closest Region of Waterloo property line to meet the pre-consultation recommendation provided by the Region. Within the 15.0-metre setback, green space is being proposed to compliment the existing Market Trail. Additionally, the occupancy of the closest adjacent building for the first 6 levels will be a parking podium (i.e. non-sensitive use).

The centerline of the WCR track is estimated to be approximately 4.75 metres from the Site’s eastern property line. This would then translate to a setback of the nearest track to the closest proposed building face of 19.75 metres, with the existing Market Trail in between the track and the Site. This setback value exceeds the minimum setback recommended by the Region of Waterloo.

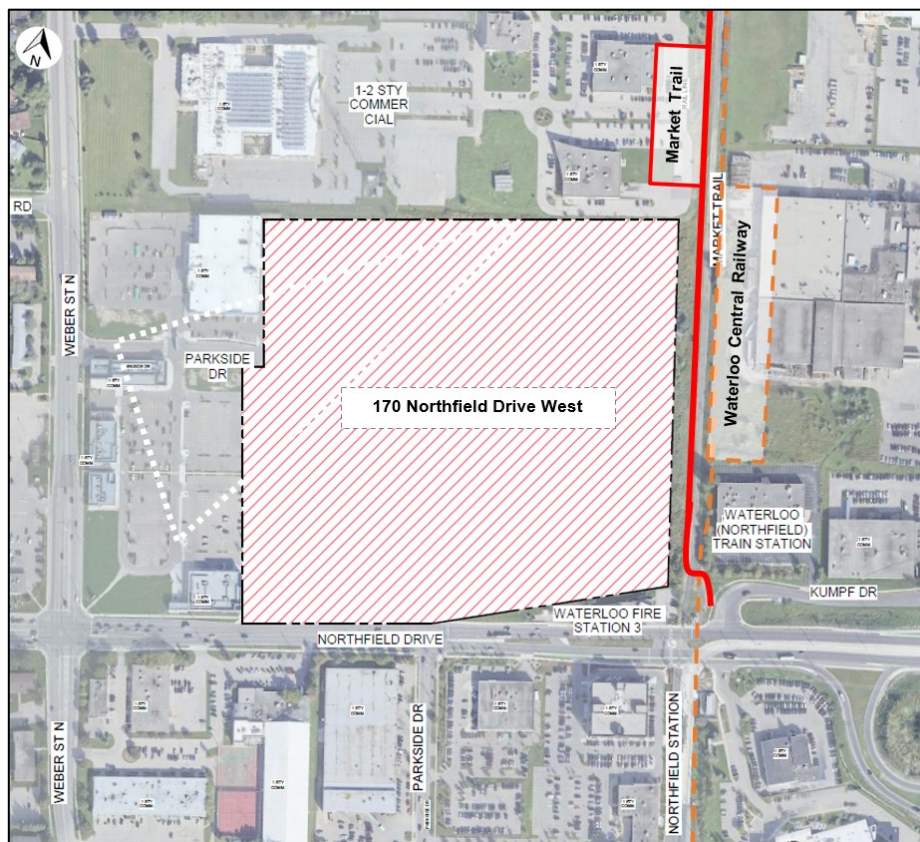


Figure 8 Plan view showing the approximate property limits of 170 Northfield Drive West in Waterloo. Source: (Excerpt annotated by Hatch) Turner Fleischer Architects Inc. Context Plan DWG No. RZ002 provided 29-Jan-2024.

² Region of Waterloo Public Notice, ‘The 1.5km multi-use Market Trail is open’, posted on Thursday, August 18, 2022. Source: <https://www.regionofwaterloo.ca/Modules/News/index.aspx?feedId=ab159244-c732-45c7-b4c9-67b38b43eed5&newsId=47ad33b5-c384-4c2d-b4ef-bc199f29c0a4>

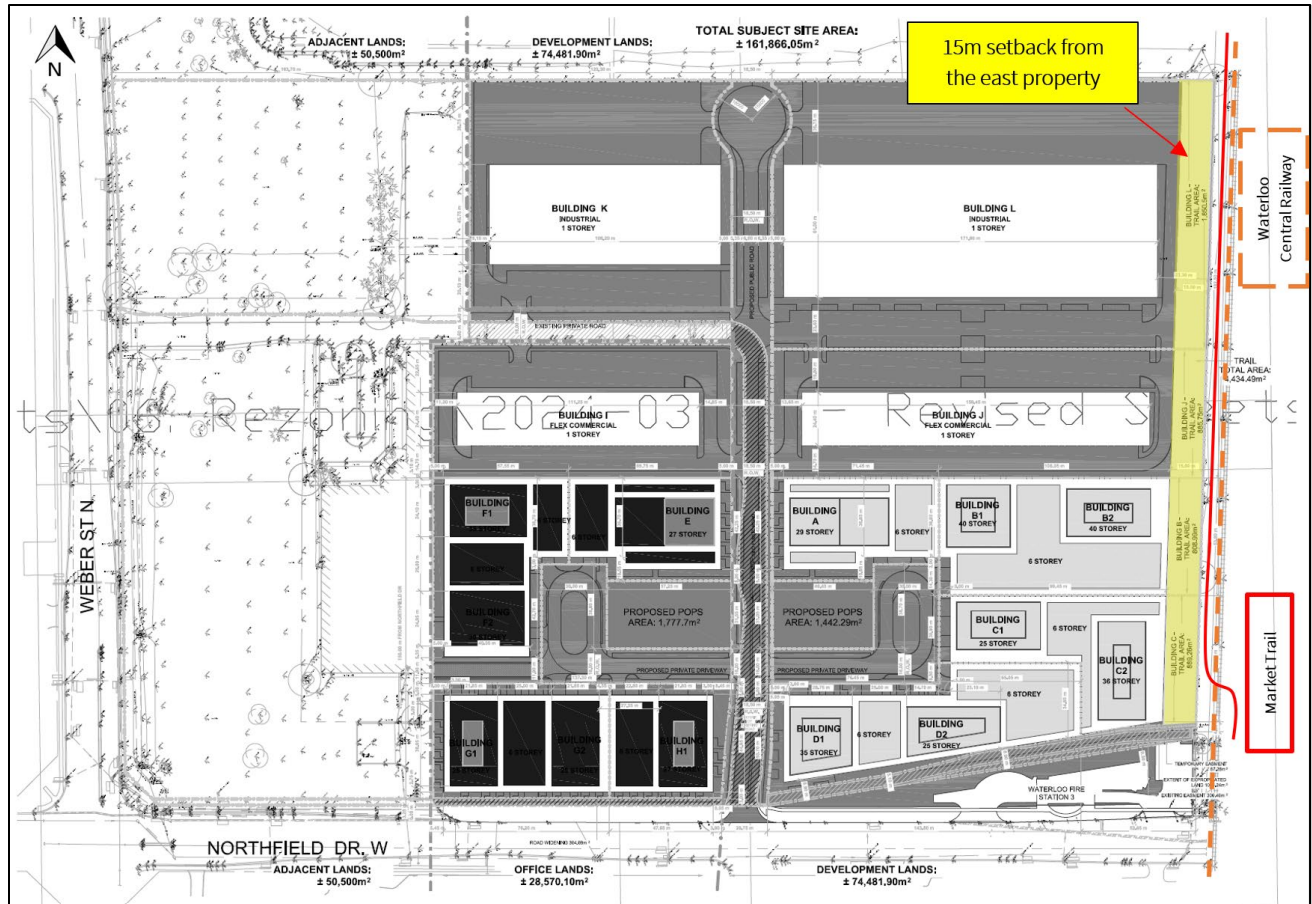


Figure 9. Plan view showing the approximate development limits for the Site. A 15-metre setback from the east property line to the closest building face is proposed. Hatch. Source: (Excerpt annotated by Hatch) Turner Fleischer Architects Inc. Overall Site Plan DWG No. RZ013 provided 11-Mar-2024.

6.0 Proposed Development

The Owner is proposing to develop the Site with multi-building mixed residential and commercial uses, as illustrated in **Figure 10**. The preliminary architectural drawings can be referenced in **Appendix A**. According to the proposed layout, the ground floors of the buildings most adjacent to the railway will be occupied by parking or commercial spaces. **Figure 11** illustrates the setback from the WCR to the closest building face at the southeast corner of the Site (i.e. Building C).

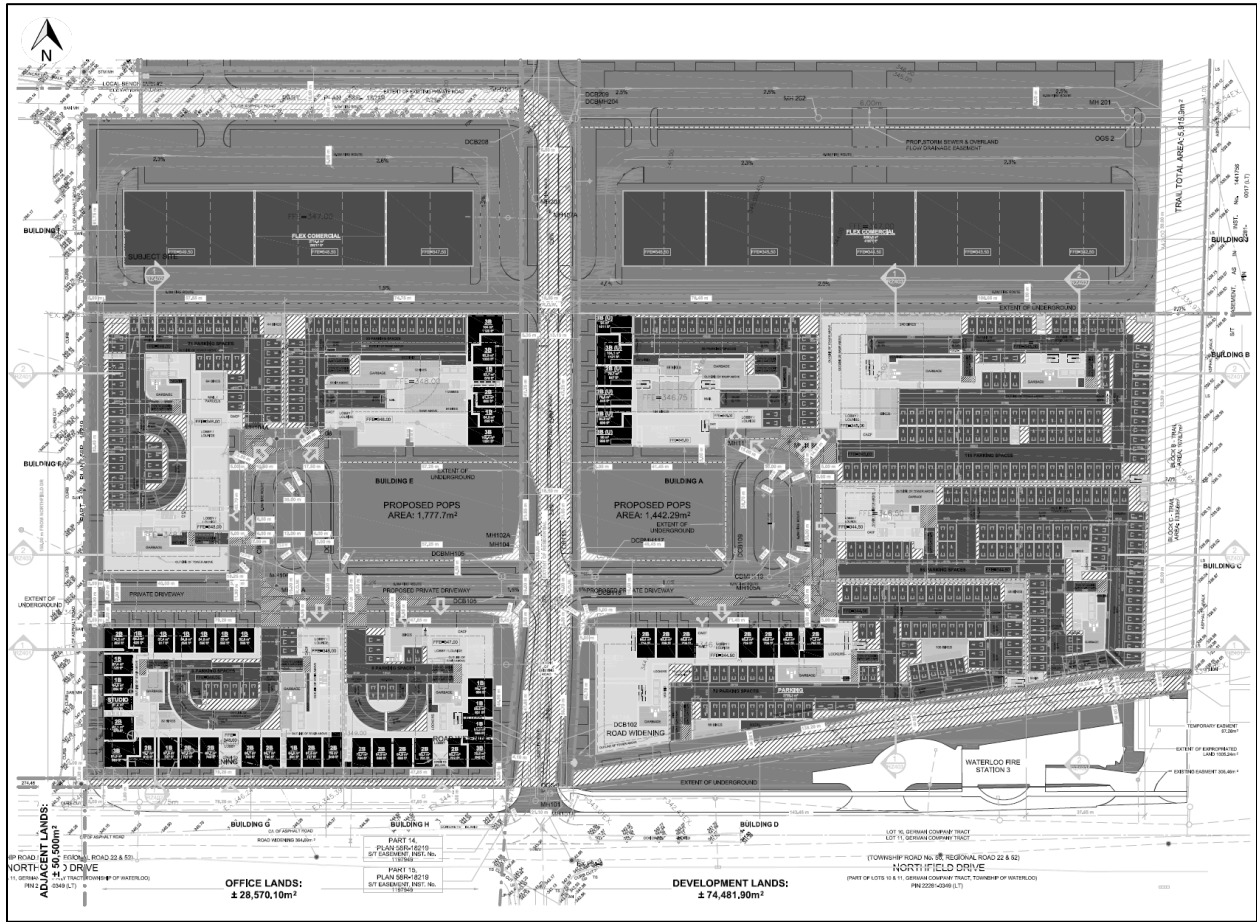


Figure 10: Plan view showing the Ground Floor of the Site. Source: Turner Fleischer Architects Inc. Floor 01 DWG No. RZ151 provided 11-Mar-2024.

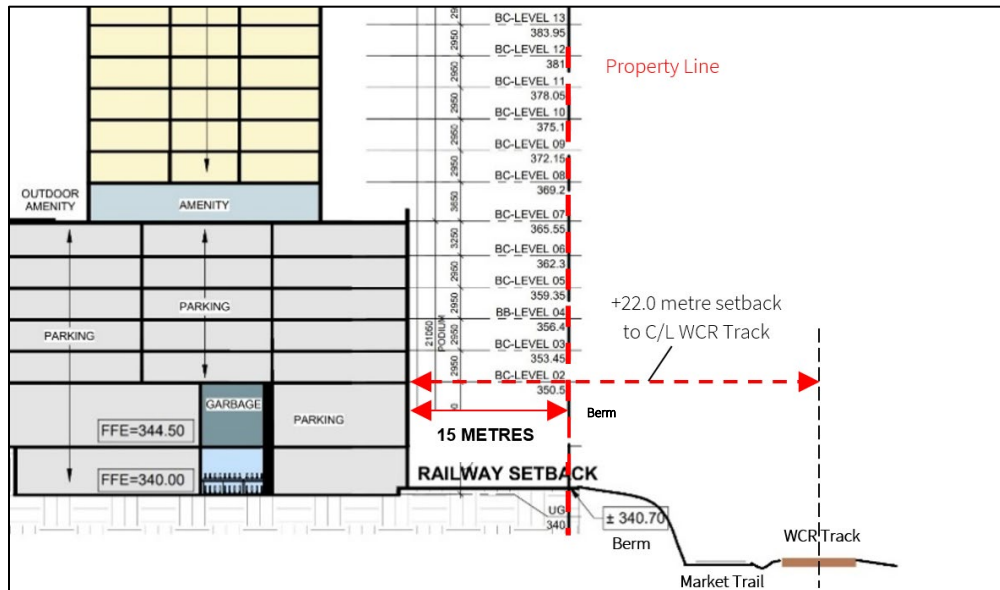


Figure 11: Building C section showing approximate setbacks to the Market Trail and WCR Track. Source: (Excerpt annotated by Hatch) Turner Fleischer Architects Inc. Building Sections DWG No. RZ401 provided 29-Jan-2024.

7.0 Primary Rail Safety Mitigations

The primary rail safety mitigations relate to the physical setback, safety barrier, and access control fencing to be applied to the development. As described in the previous section, the setback for the proposed development meets and/or exceeds the recommended minimums.

The Site is conformant to the minimum recommended setbacks dictated by the Region of Waterloo and the Proximity Guidelines. The setback for the proposed development is a minimum 15 metres from the eastern property line. The proposed closest eastern building face (i.e. Building C) of the development is more than 22.0 metres from the centerline of the WCR track. Furthermore, the existing Market Trail and a berm are located between the WCR track and the Site. This intervening land use can be seen as a safety barrier / buffer zone further protecting the Site from a derailed train. Should a WCR train derail towards the Site, the intervening land uses of the existing Market Trail, and berm would be directly impacted. With a maximum train speed of 10 mph on the WCR track, a derailed train should theoretically not reach the Site as it would lose all momentum before reaching the nearest buildings. As a result, a safety barrier in the form of a crash wall designed to withstand derailment forces is not applicable.

Table A provides a summary of the primary rail safety mitigations proposed for the Site.

Table A: Summary of the primary rail safety mitigations proposed for the Site.

Item	Rail Safety Mitigation Aspect	Conformance to Region of Waterloo recommendations	Conformance to FCM/RAC Proximity Guidelines
1	Horizontal setback from mutual property line to the closest proposed mixed-use buildings	15 metres = the 15 metres minimum recommended adjacent developments	Both setbacks are > 15 metres minimum recommended for non-residential developments; and developments adjacent to secondary tracks (i.e. non-mainline)
2	Fence line to address access control	An existing berm with vegetation exists between the Market Trail and the Site.	
Safety Barrier Characteristics			
3	Crash Wall (i.e. safety barrier designed to resist derailment forces)	Crash wall not required as the minimum setback to the nearest building face is +22.0 metres, and a train travelling 10mph which derailed would theoretically lose momentum before reaching the development buildings.	
4	Site-specific safety barrier application	Intervening land uses within the horizontal setback, including the existing Market Trail, berm, and 15-metre setback, will be directly impacted by a derailment prior to reaching the nearest Site buildings.	

8.0 Secondary Rail Safety Mitigations

In addition to the primary rail safety mitigations, secondary rail safety mitigations related to liveability and drainage can also apply to the Site. Secondary rail safety mitigations are typically established through studies on noise, vibration, and drainage/stormwater. Stakeholder agreements and clauses in the Purchase and Sales agreements for residential units can also be applicable to the Site. Furthermore, when the development enters the construction planning phase, additional temporary mitigations to protect railway operations from construction activities should be considered.

Furthermore, the development guidelines which are not applicable to the Site are as follows:

- i. Incorporation of physical measures described in the Proximity Guidelines is not applicable due to the equal to or greater than 15-metre setback and existing intervening land occupancies between the Site and rail corridor. As such, the provisions for physical measures such as earth berms and crash walls need not be considered for the development, as outlined by the Proximity Guidelines.

The minimum development guidelines which are applicable to the site are as follows:

- a. Notification to the railway company of the proposed development is required, as outlined by industry guidelines for sites within a 300 metres zone of influence adjacent to railway corridors.
- b. A General Technical Study on noise and vibration is required, as outlined by industry guidelines for sites within 300 metres of the railway.

- c. Warning clauses in sales contracts and/or legal agreements are typically recommended for sites within 300 metres of the railway. The Owner may be asked to enter into an agreement with the Region of Waterloo. Other legal agreements and requirements may be applied by the Region of Waterloo on a site-by-site basis.

9.0 Conclusion

The primary rail safety mitigations are met by the proposed development at 170 Northfield Drive West, Waterloo. The physical horizontal setback exceed the minimum recommendations, and existing intervening land uses could act as a further safety barrier between the Site and railway operations. The Owner is encouraged to address the secondary rail safety mitigations through the planning review phase, where appropriate.

We hope this Memo adequately summarizes the existing rail safety guidelines and best practices applicable to the Site. Should you have any further questions or comments, please contact the undersigned.

Sincerely,



Li-Lian Lui, M.Eng., P. Eng., PMP
Project Manager, Rail

Appendix A
Preliminary Architectural Drawings
(including Land Survey for 170 Northfield Drive West)