East Harbour Masterplan: 21 Don Roadway, 30 Booth Avenue, 375 & 385 Eastern Avenue

Rail Corridor Proximity - Letter of Support

June 1, 2021

To:	City Planning Division Strategic Initiatives, Policy & Analysis	From:	Jamie Kennedy, HATCH Wahed Fidaali, HATCH
cc:	Philip Murray, HATCH Andrew Middleton, HATCH Amra Hosein, HATCH		Rory MacLeod, Cadillac Fairview David Stewart, Cadillac Fairview Marzia Akbary, Cadillac Fairview

To the City of Toronto Planning Division,

This letter has been prepared in support of the proposed East Harbour development, specifically for the developments planned along the northern boundaries of the East Harbour Lands (buildings 1B and 2A as shown in Figure 1-1), as it relates to rail safety and rail corridor proximity with the adjacent Metrolinx rail corridor.

The existing rail adjacent development guidelines (including those by GO Transit / Metrolinx, the City of Toronto and the Federation of Canadian Municipalities / Railway Association of Canada (FCM/RAC)) do not address the unique situation of the East Harbour development, a Transit-Oriented Community that is planned around integration with the East Harbour Transit Hub (EHTH). The standard measure of a 30m setback from the property line combined with a 2.5m-high earthen berm is considered impractical and infeasible for this development.

An alternative approach providing an equivalent level of protection as the standard FCM/RAC guidelines is proposed and will be incorporated into the EHTH. These measures include the following:

Safety Barrier: Crash Wall Integrated into East Harbour Transit Hub

A safety barrier in the form of a crash wall will be integrated into the EHTH structure. As part of the EHTH project, the existing rail embankment will be replaced with an elevated structure to support the 4 GO tracks and 2 GO platforms. The crash wall which will be integrated into this rail carrying structure, will limit the opportunity for a derailed train to leave the station in a derailment scenario.

The integrated crash wall will provide enhanced derailment protection for the East Harbour development. It will also contribute to the safety of the public realm areas outside of the transit hub. The crash wall will be designed in accordance with the AECOM Crash Wall Design Guidelines and will be informed by both Method 1 or Method 2. The higher of the two design loads will apply. The wall will measure 2.135m high, measured from top of rail, along the southern extend of the elevated rail structure.

Early engagement with Metrolinx's Third-Party Project Review team and the Project Delivery Team have indicated support for the proposed measures, pending a successful review by the Chief Engineer and their technical advisors, AECOM. Detail design of the crash wall will proceed as part of the East Harbour Transit Hub project.

Setback

Consistent with the FCM/RAC Guidelines, where a 30-metre horizontal setback is not practical or feasible, reduced setbacks may be proposed, particularly where a crash wall (or deflection wall) is incorporated into the design.

The FCM/RAC Guidelines further state that, "where there are elevation differences between the railway and subject development property, appropriate variations in the minimum setback should be determined in consultation with the affected railway."[1]

A horizontal setback of 16m is proposed, measured from the centreline of track. Early engagement with Metrolinx's Third-Party Project Review team have indicated support for the proposed setback, pending a successful review by the Chief Engineer and their technical advisors.

Other Standard Measures Incorporated as part of the East Harbour Transit Hub

Other standard measures including inner guardrails, anti-trespassing fences and noise and vibration mitigations that will be incorporated into the East Harbour Transit Hub Project.

The measures that will be incorporated into the EHTH provide mitigation to address life-safety concerns (such as a train derailment and/or fire), as well as quality-of-life concerns that relate to occupant sensitivity and comfort (such as noise, vibration, and air quality) for the adjacent East Harbour development.

Hatch has reviewed the plans for the East Harbour development and is in support of the proposal on the grounds that the mitigation measures incorporated into the EHTH combined with the proposed setback to the buildings 1B and 2A provide an equivalent level of protection as the standard FCM/RAC guidelines.

We trust that this letter suitably addresses the City of Toronto and Metrolinx's criteria for new developments in proximity to railways for the Mixed-Use Submission. If there are any questions or concerns related to the proposed strategy / approach to addressing rail corridor risks, please reach out as soon as possible.

Regards,

Philip Murray, P. Eng.
Director, Hatch

Jamie Kennedy
Planner, Hatch

Wahed Fidaali, P. Eng.
Sr. Project Engineer, Hatch

[1] The Federation of Canadian Municipalities (FCM) and The Railway Association of Canada (RAC) – Guidelines for New Development in Proximity to Railway Operations. 2013. Page. 27

Rail Safety Strategy and Risk Mitigation Report

East Harbour Masterplan Development

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1. Introduction

Hatch Ltd. has been retained by Cadillac Fairview ("Site Owner") to prepare a Rail Safety Study for the Site Owner's Mixed-Use Submission. The Site is proposed as a transit-oriented, mixed-use community, anchored by the future East Harbour Transit Hub, which includes a new GO station, an Ontario Line station, and an extension to the existing TTC streetcar network.

The development is planned as a series of separate quadrants, each varying in their respective distance from the rail corridor. Only Buildings 1B and 2A, in quadrants 1 and 2, respectively fall within 30 metres of the rail corridor. Figure 1-1 below provides an overview of the development and the relative proximity to the rail corridor.

This Rail Safety Study introduces the mitigation measures and approach to achieving rail safety for the East Harbour development. As will be detailed further in this document, the risk mitigation measures will be incorporated into the EHTH.

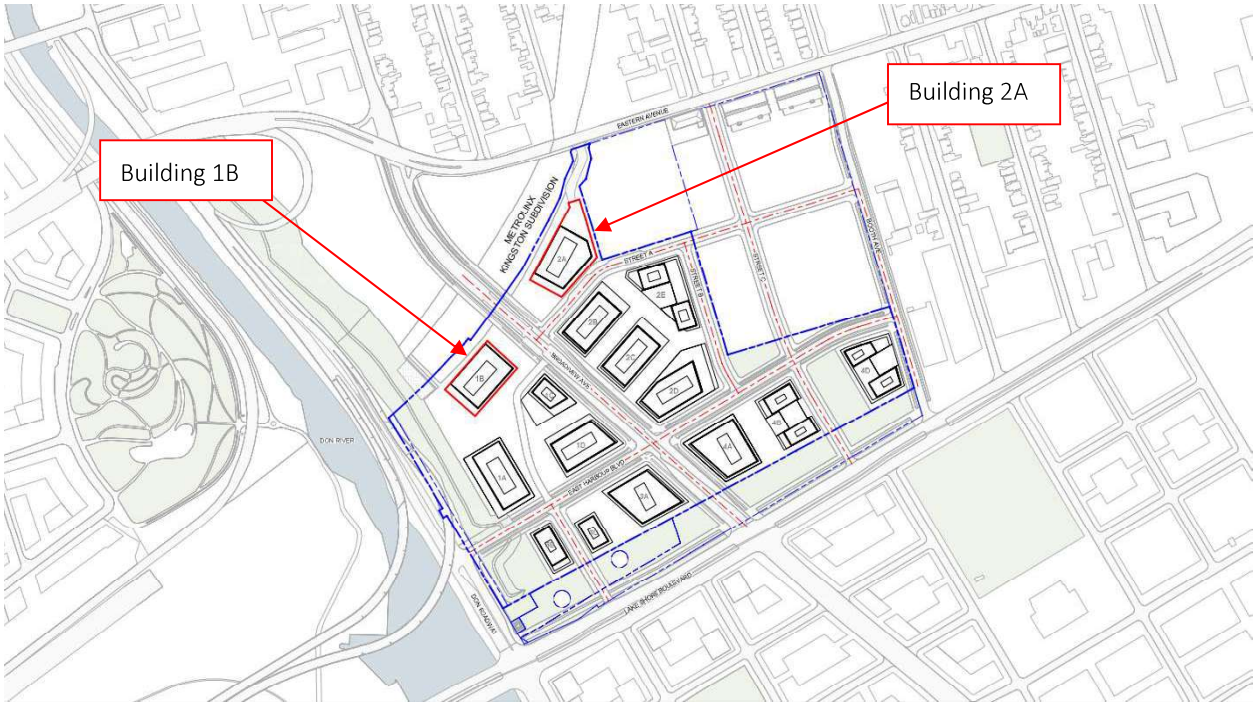


Figure 1-1: Site Plan

2. Guidelines and Design Criteria

All new development proposals that share a property line with the rail corridor or are located within 30 metres proximity of the railway right-of-way should consider the recommendations and requirements set out by the rail operators and municipalities as part of their development applications.

Both the City of Toronto and Metrolinx have independent criteria, based principally on the FCM/RAC Guidelines, both allowing for site-specific approaches to determining appropriate rail safety requirements. The guidelines used to inform the proposed development include:

- FCM/RAC Guidelines for New Development in Proximity to Railway Operations (2013)

- Metrolinx Adjacent Development Guidelines (2013)
- AECOM Submission Guidelines for Crash Walls and Development of Crash Wall Design Loads from Theoretical Train Impact
- City of Toronto – Land Use Study: Development in Proximity to Rail Operations (2019)

2.1. City of Toronto Land Use Study: Development in Proximity to Rail Operations (2019)

In 2019, the City of Toronto commissioned and published the Land Use Study: Development in Proximity to Railway Operations. The purpose of the study is, "to provide the City with recommendations specific to Toronto" as the City is ultimately responsible for regulating land use and managing development proposed on sites that are in proximity to railway lands.

The rail safety guidelines have not been formally adopted by the municipality; however, during the OPA, ZBA and SPA applications, the City of Toronto retains a peer reviewer to assess the rail safety mitigation measures for developments. The applicant is responsible for the cost of the City of Toronto peer review. This review process is intended to inform the City whether the proposed rail safety mitigation measures meet an acceptable level of safety.

2.1.1. City of Toronto Terms of Reference

The City of Toronto Terms of Reference indicate that where the risk mitigation measures vary from the City's preferred approach (that includes a 30-metre setback combined with a 2.5-metre-high earthen berm) a technical report (and/or series of reports) shall be prepared and submitted to the municipality and rail operator.

The report should demonstrate the practical and/or technical reasons why the preferred safety and risk mitigation measures cannot be accommodated on the proposed development site. The report shall show how the proposed alternative measures reduce the risks to acceptable levels or eliminate it in its entirety.

2.2. FCM/RAC Guidelines for New Development in Proximity to Railway Operations (2013)

In May 2013, the Federation of Canadian Municipalities (FCM) and the Railway Association of Canada (RAC) published the "Guidelines for New Development in Proximity to Railway Operations" (FCM-RAC Guidelines), a collaborative effort between the two groups that provided proximity guidelines and best practices for development along railway lines.

The FCM-RAC Guidelines define standard mitigation measures for new residential development in proximity to a railway corridor. Along principal main lines, the standard recommended building setback is 30 m, measured from the property line to the building face. This setback provides a buffer from railway operations, including noise, vibrations, and emissions, accommodates a safety barrier (i.e., 2.5 m earthen berm), and addresses the fundamental land use incompatibilities. Where the standard mitigation measures are not viable, alternative safety measures are recommended, including the application of the Development Viability Assessment tool.

2.3. Metrolinx Adjacent Development Guidelines (2013)

On April 1, 2013, Metrolinx released Adjacent Development Guidelines for development projects adjacent to their railway corridors. The Adjacent Development Guidelines were developed by Metrolinx to communicate the implications of development in close proximity to railway corridors, ensure safe and reliable rail operations, and minimize conflicts between current or future rail operations and development.

Metrolinx's Third-Party Project Review team reviews and comments on developments within 300 metres of a GO Transit rail corridor to safeguard the integrity of the railway corridor and ensure developments proceed in a safe manner, including construction activities and maintenance/operations of the railway and projected expansion-related real estate needs. The Third-Party Project Review team is intended to be the first point of contact for all parties wishing to carry out new construction, repairs, maintenance, or demolition activities on any Site adjacent to a GO Transit railway corridor.

The Adjacent Development Guidelines suggests mandatory measures for residential developments, and recommended measures for other types of developments. The mandatory safety measure for residential land use is the combination of a 2.5 m berm and 30 m building setback. The Adjacent Development Guidelines also identifies mandatory or recommended technical studies, including noise and vibration impact.

2.4. AECOM Crash Wall Design Guidelines

When a crash wall is proposed as part of the building design, the AECOM *Development of Crash Wall Design Loads from Theoretical Train Impact* Guidelines governs the design of the crash wall.

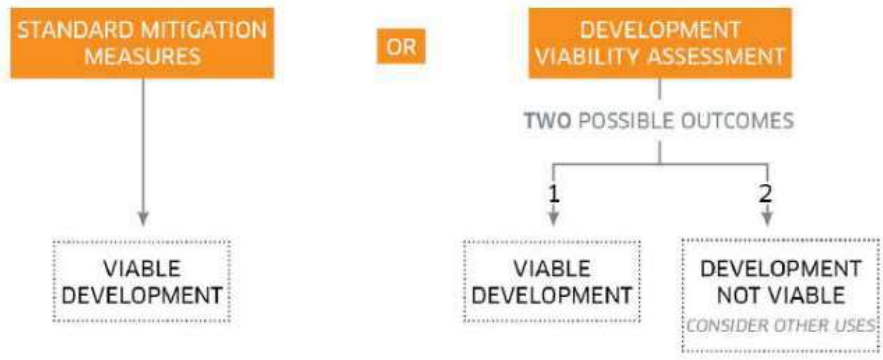
The AECOM Guidelines provide a framework for calculating a site-specific theoretical train impact that could occur in the event of a derailment. These impacts (or 'point loads') are then used to inform the overall design and specifications of the crash wall.

Within the AECOM Crash Wall Guidelines, two methods for determining crash wall design load requirements are outlined. The method used to design the crash wall is based on the track design speeds within the rail corridor.

2.5. Development Viability Assessment

The FCM/RAC Guidelines recommend the use of a 'Development Viability Assessment' to evaluate the rail corridor and site conditions, to determine appropriate mitigation measures that offer an equivalent level of protection as the standard measure.

The assessment should evaluate any potential impacts on the operation of the railway as a result of the new development. As well, the assessment should take into consideration details of the proposed development site, including topography and proximity to the railway corridor; details of the railway corridor including track geometry or alignment and track speed; details of the proposed development, including the proposed collision protection in the event of a train derailment; and identification of the potential hazards and risks associated with development on that particular site. The Development Viability Assessment process / framework is outlined in Figure 2-1 below.



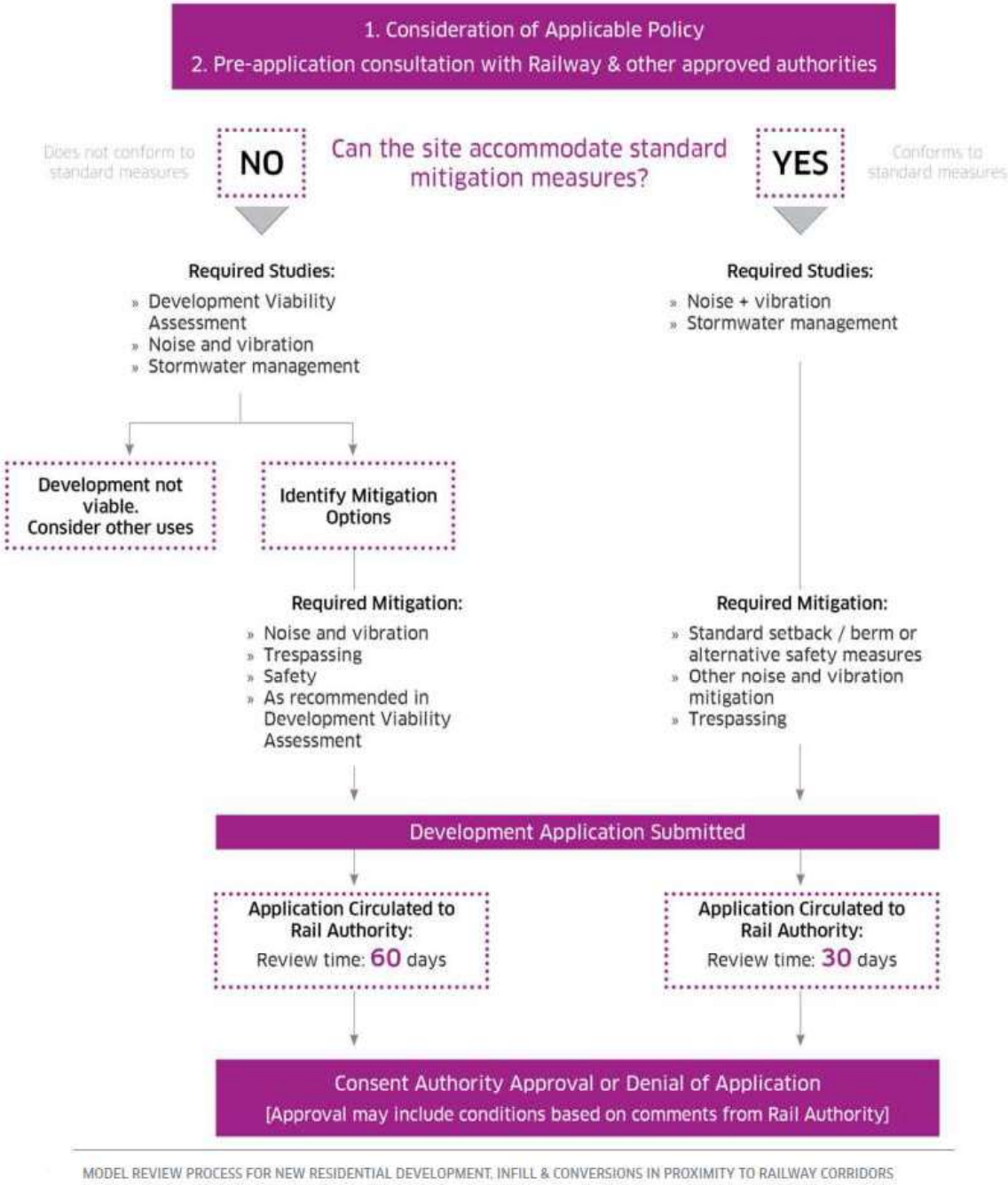


Figure 2-1: Development Viability Assessment Framework

3. Land Use and Proposed Development

3.1. Proposed Development

The East Harbour Masterplan is envisioned as a transit-oriented community anchored by the EHTH. The proposed development will include a number of new buildings with primarily office, retail, residential, and other amenity spaces. The total proposed development will include approximately 13.25M square feet (sf) of gross floor area (GFA) comprised of

- 10M sf of office GFA; and
- 3.25M sf of residential GFA

Figure 3-1: East Harbour Masterplan Site Plan

3.2. Rail Context at East Harbour

3.2.1. Current Condition

The site is immediately adjacent to the Metrolinx-owned Kingston Subdivision at Mile 332.3. Metrolinx operates daily GO Transit service on the Lakeshore East and Stouffville GO lines and VIA Rail operates daily passenger service through this corridor between Toronto and Kingston.

The rail corridor is comprised of 3 principal mainline tracks and a siding that connects to the Don Yard to the west. The current track speed is 60mph for this section of the corridor via a permanent slow order (PSO).

In addition to consideration for passenger train service, freight train service is included in the assessment of the site. Canadian National Railway (CN) maintained freight operating rights when they sold this portion of track to Metrolinx, however, CN does not currently schedule freight through the Kingston Subdivision corridor. The CN-owned York Subdivision serves as an east-west freight bypass route for currently scheduled freight and is expected to continue to carry CN freight and intermodal traffic in the future. Upon completion of Metrolinx's GO Expansion program, the operational window for freight is expected to decline

further, as GO Transit will operate 15-minute, all-day, two-way, service on the Stouffville and Lakeshore East GO Lines.

The passenger-only train environment represents a lower risk profile due to the absence of dangerous goods and hazardous materials in close proximity to the Site. In the current condition, the tracks are curved approximately 10° with the development situated on the outside of the curve.

Figure 3-2: Satellite Aerial of Rail Corridor Alignment

The rail corridor is elevated on an embankment approximately 5-6 metres above the adjacent ground level. A narrow parking lot is located immediately adjacent to the rail corridor.

Importantly, the construction of EHTH will significantly alter the rail corridor operating environment and local area. These future conditions are discussed below.

3.2.2.Future Condition – East Harbour Transit Hub

The construction of the EHTH will result in a number of changes to the rail corridor and operating environment including new track alignment, lower operating speeds for passenger and freight trains, dedicated tracks for specific types of rail traffic, the introduction of the Ontario Line, and a station environment where trains will stop each day serving thousands of daily passengers.

In the future, the EHTH tracks and platforms will be elevated above the adjacent ground and will include a concourse level below the platform that will include station elements, vertical circulation (stairs, elevators), mixed retail, mechanical, storage and back-of-house functions.

The two northernmost tracks will be dedicated to the Ontario Line, a light rail transit project being delivered by Metrolinx. The Ontario Line will be served by an island platform.

The four southernmost tracks will be dedicated to GO Transit and heavy rail traffic. Two island platforms will serve all four lines. The track alignment required to accommodate the island platforms will result in a maximum track speed of 40mph, a reduction from the 60mph in effect today via the permanent slow order.

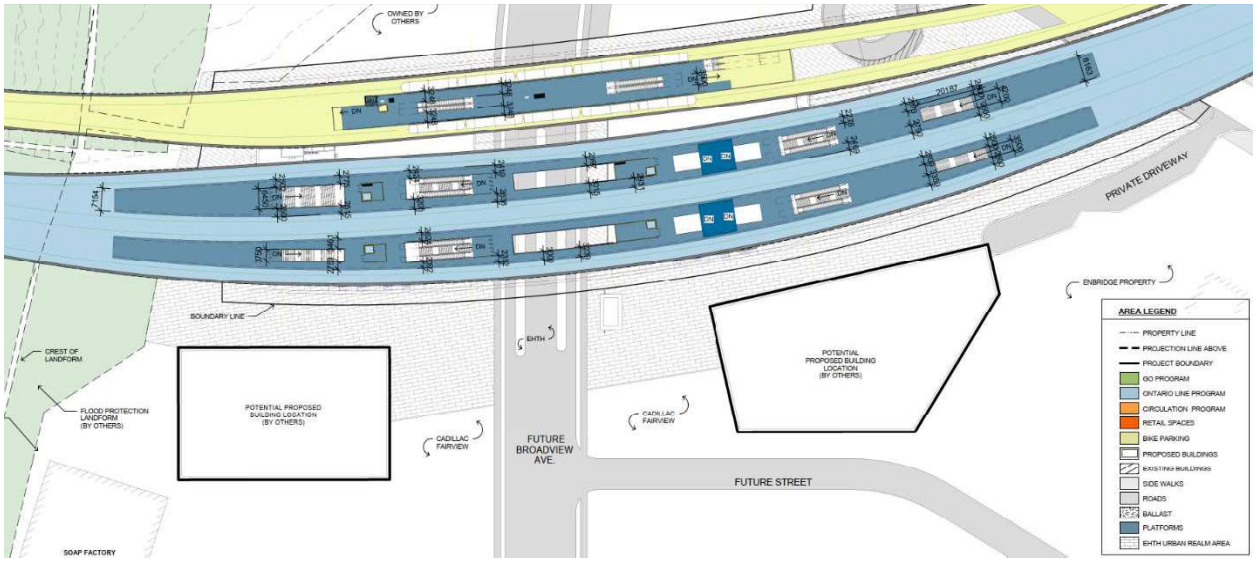


Figure 3-3: Preliminary Station Site Plan – Platform Level

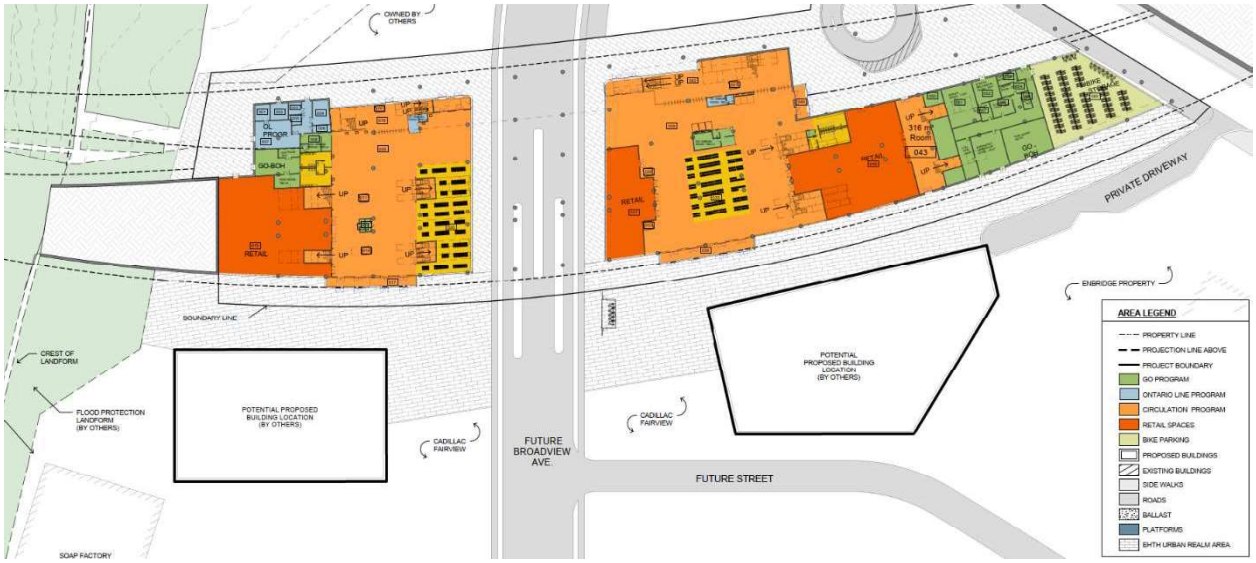


Figure 3-4: Preliminary Station Site Plan –Concourse Level

Note, the details of the station are still being coordinated with Metrolinx.

4. Mitigation Measures

Mitigation measures incorporated into the EHTH will protect the adjacent buildings at East Harbour from rail-related risks. The measures are described in further detail in the following sub-sections.

4.1. Safety Barrier

A safety barrier in the form of a crash wall will be integrated into the EHTH structure.

As part of the EHTH project, the existing rail embankment will be replaced with an elevated structure to support the 4 GO Tracks and 2 GO Platforms. The crash wall which will be integrated into this rail carrying structure, will limit the opportunity for a derailed train to leave the EHTH in a derailment scenario.

The integrated crash wall will provide enhanced derailment protection for the East Harbour development. It will also contribute to safety of the public realm areas outside of the Transit Hub.

The crash wall will be designed in accordance with the AECOM Crash Wall Design Guidelines and will be designed using either Method 1 or Method 2 under the guidelines. The higher of the design forces will apply. At minimum, the crash wall will be built to withstand an impact no less than 2700kN.

The wall will measure 2.135m high measured (from top-of-rail) and will be integrated into this rail structure.

Early engagement with Metrolinx's Third-Party Project Review team and the Project Delivery Team have indicated support for the proposed measures, pending a successful review by the Chief Engineer and their technical advisors, AECOM. Detail design of the crash wall will proceed as part of the EHTH project.

Figure 4-1 below illustrates the proposed location of the crash wall, integrated into the station structure.

4.2. Setback

For the new development buildings 1B and 2A, the recommended 30m setback is not considered practical, as it will introduce a barrier in the form of significant distance between the development and the transit hub. The FCM/RAC Guidelines broadly indicate that the "horizontal setback requirements may be substantially reduced with the construction of a crash wall" (pg. 27). Furthermore, the guidelines state that, "where there are elevation differences between the railway and a subject development property, appropriate variations in the minimum setback should be determined in consultation with the affected railway." (pg. 27).

In consultation with Metrolinx, a horizontal setback of 16m is proposed, measured from the centreline of the nearest GO track (T4).

Buildings 1B and 2A are proposed as commercial office towers. The specific programming for the interior of the buildings has not yet been determined, the 16m setback can also be considered as the setback to sensitive use. Figure 4-1 demonstrates the approach to setback.

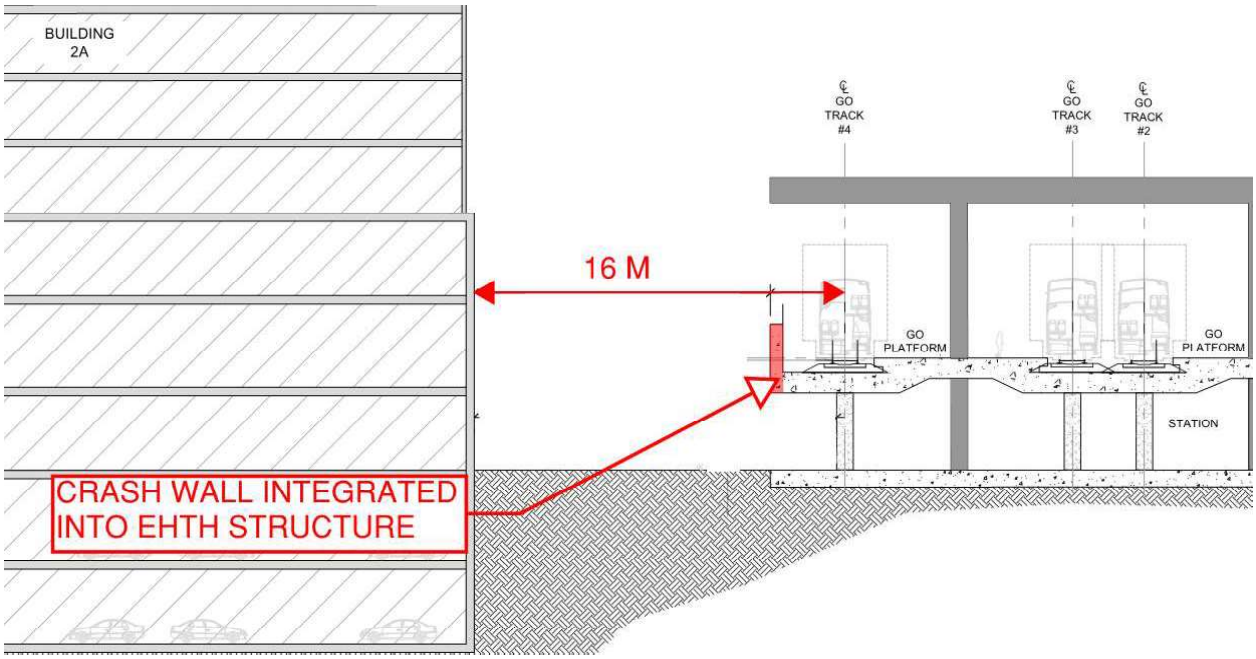


Figure 4-1: EHTH Crash Wall/Setback (Typical)

4.3. Reduced Track Speed

As discussed in 3.2.2, in order to accommodate the track and platform configuration for the EHTH, the track design speed will be reduced to 40mph for the four mainline GO tracks. This reduced speed decreases the risk profile of the rail corridor. As most trains will be stopping at the Transit Hub, operating speeds are likely to be much lower than the maximum track speed of 40mph, further reducing the risk of a derailment.

4.4. Anti-Trespassing Fence

Trespassing and unauthorized rail corridor access accounts for the overwhelming majority or railway-related fatalities in Canada each year. In the case of the East Harbour development, opportunities for trespassing and unauthorized rail corridor access are limited. Given the elevated condition of the rail corridor, trespassing into the rail corridor from the subject site is not considered to be a likely occurrence.

Access to the rail corridor will be encouraged through the future EHTH, where the expectation is that passengers will interact with the GO Transit and Ontario Line networks within the station. This is considered a form of controlled, authorized access to the rail corridor and is the responsibility of the rail operator, Metrolinx, to ensure the protection and safety of passengers within the station environment.

Outside of the Transit Hub, where unauthorized access to the rail corridor may be gained, a 2.43-metre-high security fence will be installed as part of the EHTH project to reduce the risk of trespassing

4.5. Inner Guard Rails

As the Inner guard (Jordan) rails, which have been shown to reduce the severity and potential impact of derailments on elevated rail structures and are a typical feature on Metrolinx rail structures such as bridges. Inner Guard Rail will be implemented as part of the EHTH (elevated) structure.

4.6. Noise and Vibration

Noise and vibration studies have been undertaken as part of the Environmental Assessment for the EHTH and will be conducted by a qualified engineer for the East Harbour development. These studies will determine appropriate mitigation measures to ensure the indoor noise levels achieve the recommended indoor noise levels

5. Conclusion

The rail safety strategy proposed herein considers the recommendations outlined in the FCM/RAC Guidelines, the Metrolinx Adjacent Development Guidelines, and the City of Toronto's Land Use Study: Development in Proximity to Railway Operations. However, as these guidelines do not adequately address the conditions at the East Harbour development, a site-specific approach has been used to determine the appropriate mitigation measures to address land use compatibility concerns. The mitigation approaches outlined in this report will be implemented as part of the EHTH project and will provide an equivalent level of protection to the standard measure. Hatch recommends that this development be allowed to proceed on the basis that the rail adjacent development requirements and concerns related to rail corridor proximity will be mitigated by the East Harbour Transit Hub project.