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Metrolinx - GO Transit

Fencing Guidelines

Document Approval Information

Document	Effective Date	Approved By
Fencing Guidelines	01 April 2013	Grant Bailie

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Document Approval History

Version #	Date	Approved By	Description
1.0	01 April 2013	Grant Bailie	

Document Revision History

Version #	Date	Revised By	Description
1.0	01 April 2013		Final Edit

Document Details

Issuing Department	GO Railway Corridors
Document Owner	Director, Railway Corridors, Operations
Update Authority	Director, Railway Corridors, Operations
Intended Audience	Division Personnel and External Stakeholders
Original Issue Date	01 April 2013
Effective Date	01 April 2013
Expiry Date	01 April 2018
Document Status	Final Report
Review Cycle	Five Year
File Name	Fencing Guidelines
File Location	Railway Corridors

1. Introduction

GO Transit manages approximately 288 km of Metrolinx-owned railway corridors, corresponding to about 68 per cent of the total railway network that GO Trains regularly operate over. By keeping these corridors and the nearly 535 km of track they contain properly managed and maintained, GO Transit's Railway Corridors division helps to ensure that every week approximately one million train passengers get where they need to be going, safely and reliably.

The Railway Corridors Management Office (RCMO) resides within the GO Transit, Railway Corridors Division.

The RCMO supports safe and reliable train service through a variety of measures that range from trespassing prevention to ensuring vegetation does not block train sightlines. This group also deals with community proximity issues including anti-whistling initiatives and general landlord responsibilities associated with railway corridors, such as debris and graffiti management. To achieve these goals, the RCMO oversees the railway right-of-way maintenance contractor and liaises with the municipalities our corridors pass through and other government agencies such as Transport Canada.

In addition, the RCMO oversees all Third Party Project applications, such as utility companies or road authorities wishing to cross our tracks (either over, at-grade or under) or work undertaken adjacent to the railway corridor.

2. Purpose

One of the key cornerstones of the GO Transit Customer Service Strategy is a commitment to always take safety seriously. As such, the installation and maintenance of fencing systems is a key component of the larger safety strategy aimed at trespass and related issue prevention (vandalism, graffiti) on GO Transit managed corridors.

The purpose of the following Fencing Guidelines are to provide an overview of:

- Current fencing practices on GO Transit managed railway corridors;
- Natural and urban form barriers to the railway corridor;
- Maintenance and progression of fencing systems;
- Fencing type evaluation criteria; and
- Other strategies to address trespass issues and evaluate fencing systems.

In addition to the installation and maintenance of fencing systems, other approaches to address trespass and other related issues are included in the GO Transit toolbox. Approaches such as Crime Prevention Through Environmental Design (CPTED, Operation Lifesaver and Community Outreach

initiatives provide opportunities to work closely with our community stakeholders and implement broader strategies and responses targeted at the root causes of trespassing.

3. GO Transit Operated Corridors Map

Figure 1 below provides an overview of all GO Transit managed railway corridors.

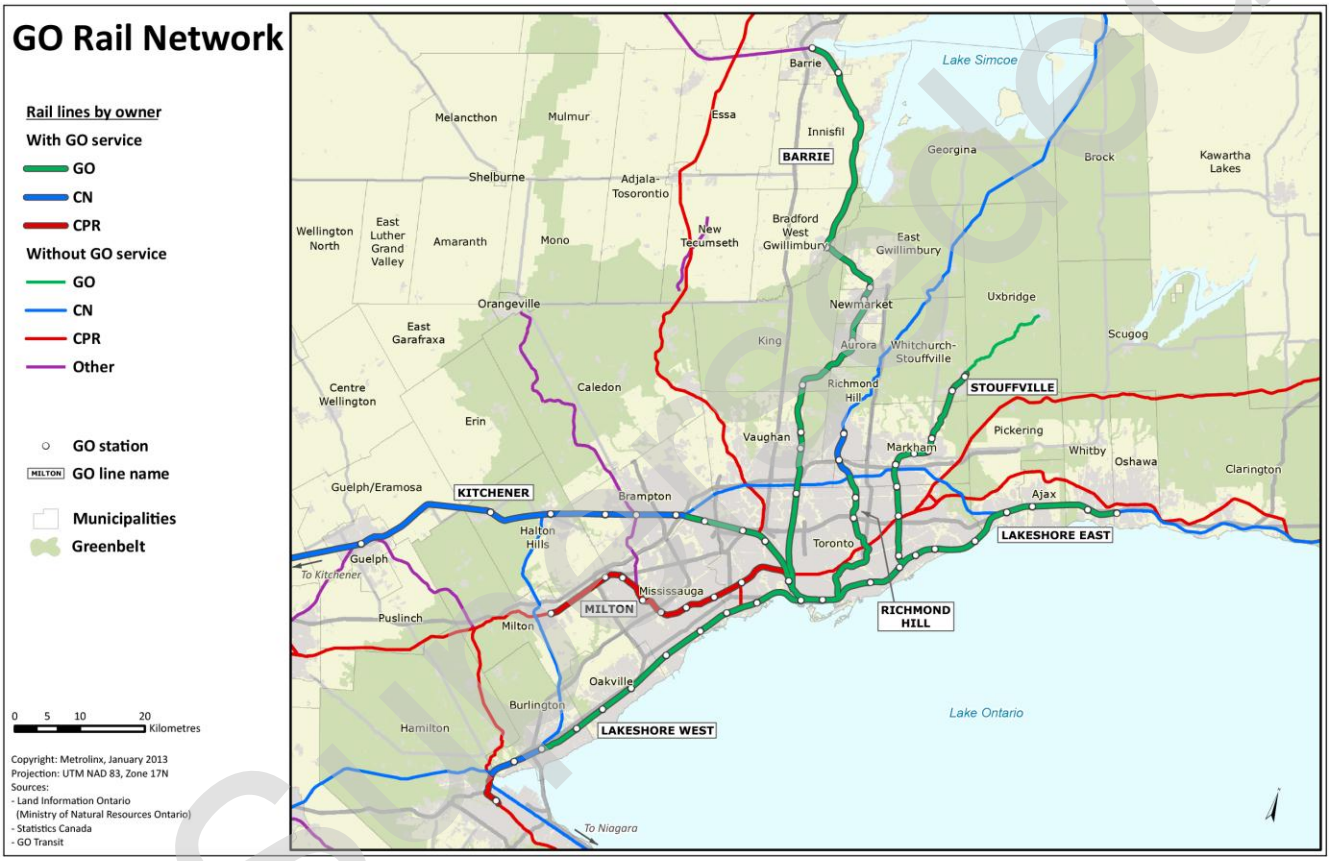


Figure 1 – GO Transit Managed Railway Corridors

4. Fencing Management Priorities

Fencing systems management will be prioritized in the following order:

- **Emergent** - repair of existing GO owned fencing that has been damaged in high train frequency corridors in urban and suburban conditions due to vandalism and/or storms;

- **High Trespass** - install upgraded or new fencing in areas of high trespass and vandalism, for example, where fencing progression required in urban and suburban conditions;
- **Risk Assessment Audits** - areas of no fencing with high trespassing locations identified by risk assessment and/or Transit Safety within urban and suburban conditions;
- **New Developments** – areas of no fencing, low trespass and vandalism within suburban and rural conditions where a new development and/or school have been built alongside the rail. Developers are responsible for the installation of the new fence to divide the property, GO Transit will assess the areas and fill in the large gaps between the developer's fence and the rail line if deemed necessary; and
- **Rural Areas** - low risk, mainly to demark property line.

Fencing systems maintenance is part of routine track and corridor maintenance. The current maintenance contracts with PNR and TTR include provisions for fencing management.

5. Current Fencing Practices on GO Transit Managed Railway Corridors

The large GO Transit service area comprises many different urban, suburban and rural conditions that influence the height, application and type of fencing system to be used. For example, some fencing systems may be appropriate when installed adjacent to new residential subdivisions while reinforced fencing systems are appropriate around critical infrastructure and in areas of high trespass.

"Railway right of way access control requirements were initially set out in the *Railway Act* of 1868, which has since been repealed. The Act and subsequent amendments required railway companies to erect and maintain fences on each side of the railway. Specifically, it required fencing to prevent cattle and other animals from entering the railway right of way and restricted train speed to 10 m.p.h. in densely populated urban areas unless fencing was in place or an exemption to this requirement was granted.".

- Source - Transport Canada

With respect to fencing system standards in Canada, the Transportation Safety Board has recommended the establishment of minimum standards for the type, location and requirement for fencing along railway rights-of-way approaching railway bridges and any other areas where frequent pedestrian incursions are known. (Reference No. R91-01). In response, Transport Canada has been working on requirements and consulting with various interests for the fencing of railway rights-of-way, however to-date no formal standards for fencing have been established in law.

The following provides an overview of current GO Transit fencing types, described in progression from the lowest to highest security types:

Post and Wire (Farm or Highway Fencing) - Post and Wire fencing is generally considered as the minimum standard and is primarily used in rural areas or along the side of highways since these

areas generally have the lowest risk of trespassing and vandalism. The fencing is also used to define property lines and as a deterrent to keep farm animals from the rail right-of -way.

Chain Link - Chain link fencing is the current GO Transit standard and has been adopted in many urban/suburban areas generally at a height of 1.8 m (6') and placed adjacent to the property line. In certain cases the height of the chain link fencing may be increased by 2' (to 8') to deter trespassing and illegal dumping.

Expanded Metal Mesh – Expanded Metal Mesh fencing is generally welded as a retrofit onto the existing chain link fence posts in areas that are subject to higher levels of trespassing and vandalism.

High Security - High Security fencing is generally adopted in locations that are subject to the highest areas of trespassing and vandalism and as well in places that require additional security such as at signal bungalows and layover yards.

Detailed specifications for the various fencing types are provided in Attachment A.

Access Control Signage - Access control signage will not physically impede an individual trespassing on railway property but they will increase awareness and give due notice that railway rights-of-way are private property. This is important for trespass enforcement programs and subsequent prosecution. Access control signs will also provide residents in nearby communities along railway rights-of-way with a contact number to help promptly report illegal activity or potentially unsafe conditions to GO Transit. As a matter of good practice, signs are installed in clear view to avoid concealment and posted or attached to the fencing system materials at uniform intervals to deter accidental or inadvertent trespass.

Inspection - GO Transit's fencing systems are regularly inspected by its maintenance contractor (PNR and TTR) for integrity, functionality and signs of damage. In addition, Transit Safety Officers perform patrols and assist Railway Corridors in the identification and remediation of problem areas.

GO Transit has a commitment to the communities that interact with the rail network and responds to numerous fencing inquiries from corridor neighbours, local authorities and political representatives. Information from the community is a form of natural surveillance that assists in the identification of issues and ensuring a timelier repair to fencing systems.

Gates - There are many variations of gate types (swing, slide, horizontal, vertical, etc.) to accommodate site and other vehicular and/or pedestrian access requirements and are the only moveable part of a fencing system. As such, gates can increase or decrease the security requirements at a site and must be closed and locked when not in use. Measures to prevent hinges from being removed (e.g., peen bolts or loop and crimp wire rope around gate and fencing post) are incorporated into all GO Transit gate installations.

As the rail corridor asset manager for Metrolinx, Railway Corridors is assessing vehicular and staff entry requirements to determine the appropriate number and locations of gates required for railway operations.

6. Natural and Urban Form Barriers to the Railway Corridor

The following applications are also utilized by GO Transit to limit access to the railway corridor:

Living Fence – GO Transit is moving forward with the installation of "living fences" in addition to/ or to complement the fencing types detailed above. This creates a more natural barrier (e.g., Russian olive, thorny rose bushes) to limit access and deter trespassing.

Urban Form – In the most urbanized areas of the GO Transit Service Area and in particular along the Union Station Rail Corridor, noise attenuation and crash barriers create man-made walls or barriers that are acceptable substitutes for standard fencing installations. In some cases however, additional fencing may be required in locations with direct exposure to the rail corridor.

For all new developments adjacent to the rail corridor, an appropriate fencing type along the boundary line is required to be installed by the property developer as a condition of subdivision/site plan approval. The current minimum standard is a 6' high chain link fence. GO Transit also reserves the right to advise the developer whether a higher security fencing type is required. All costs for fencing associated with new developments are paid in full by the property developer.

In the case of private fencing (residential, commercial, industrial, institutional etc), the adjacent landowner is responsible for the continued maintenance and upkeep of fencing systems along the mutual property line.

7. Maintenance and Progression of Fencing Systems

Regular inspections provide Railway Corridors staff with the information to identify frequency, location and ongoing areas of concern. This has a direct influence on the type, style or components of the fencing design.

Fencing systems (post and beam and chain link) are restored to their original condition when damaged by accident, storms, occasional vandalism and other circumstances. Private wooden fences in these circumstances will be replaced (at the owners expense) with chain link fence if the property owner is unwilling to restore the integrity of the original wooden fencing.

In other areas where there are consistent trespassing issues, community complaints and deliberate acts of vandalism to the existing fencing system, GO Transit will undertake a series of progressive measure to address the integrity of the fencing system.

For example, in areas where chain link fencing is consistently being damaged and there are continued issues, the fencing type will progress (step-up) to Expanded Metal Mesh. The integrity of the Expanded Metal Mesh will continue to be monitored to evaluate its success in deterring trespassers at that particular location. The fencing type may also be complemented with other measures such as living fencing (thorn bush plantings), brush clearing and in some cases ditching to impede or dissuade entry onto the railway corridor. Other measures will also be considered based on site location, topology etc.

At locations where the Expanded Metal Mesh fencing is proving ineffective, GO Transit will progress to the installation of its highest security fencing in addition to other measures and treatments based on site considerations.

8. Fencing Type Evaluation Criteria

The large variation of land uses throughout the GO Transit Service area have a direct influence on the height, application and type of fencing system to be used. As such, a formal evaluation matrix or risk criteria is difficult to establish and current efforts are more directed at addressing existing problem locations and areas of known risk. In addition, other factors such as train volume, train types (freight /commuter and inter-regional rail), speed and other operational issues have an important role in the selection of fencing systems to be maintained and established.

For example, schools or commercial uses located across the railway corridor from residential uses create a direct pedestrian desire line across the railway corridor. This type of pedestrian desire line is further enhanced if there are no public crossings in the immediate area.

Increased trespass locations associated with parks or trails (formal and informal) open space, community centers and schools typically correspond with the need to continually repair fences and initiate a progression of fencing systems.

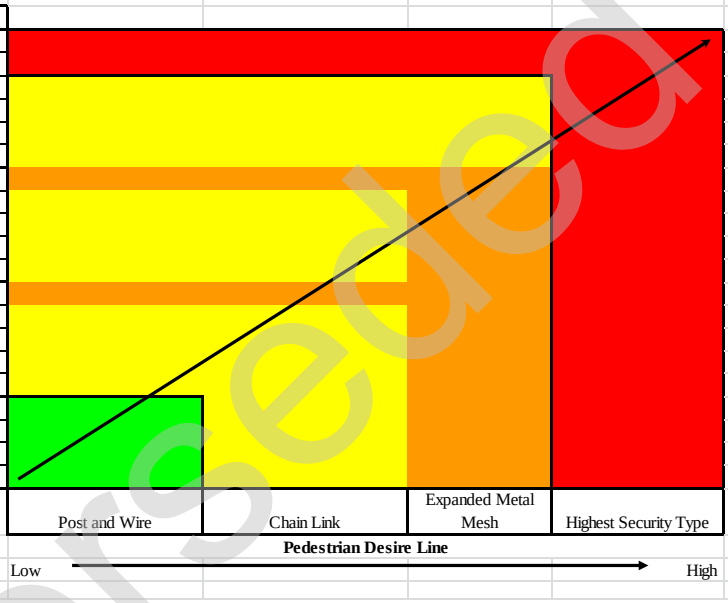
Figure 2 provides a high level overview of the appropriate fencing systems to be installed and maintained based on the general risk area/typical land use categories and the anticipated level of pedestrian desire (line) to cross the railway corridor.

As Figure 2 illustrates, the anticipated level of the pedestrian desire line increases as the urban form along the railway corridor becomes denser and the variation of land uses increase. As the pedestrian

desire line increases across the railway corridor, the progression of fencing types and applications to be considered to mitigate trespassing and protect railway infrastructure and assets also increases.

Figure 2 - Pedestrian Desire Line and Fencing Type Evaluation Guide

General Risk Area	Typical Land Use Categories
Urban Core	Critical infrastructure (signal systems, control buildings etc)
	High Trespass and security concerns
	Residential - high and medium density
	Commercial - office and retail
	Institutional - schools, hospitals, community centres, libraries
	Parks and Open Spaces
Outer Urban Core	Established Trespass locations
	Residential - high and medium density
	Commercial - office and retail
	Institutional - schools, hospitals, community centres, libraries
	Parks and Open Spaces
Suburban	Established Trespass Locations
	Residential - high and medium and low density
	Commercial - office and retail
	Institutional - schools, hospitals, community centres, libraries
	Parks and Open Spaces
Rural	Residential - low density
	Agricultural
	Institutional - schools, hospitals, community centres, libraries
	Parks and Open Spaces



9. Other Strategies to Address Trespass Issues and Evaluate Fencing Systems

In addition to the installation and maintenance of fencing systems, other approaches to address trespass and other issues are included in the GO Transit toolbox:

Crime Prevention Through Environmental Design (CPTED) - In addition to the ongoing inspection and maintenance of the existing fencing systems, Railway Corridors and System Safety staff will initiate, for selected problem locations, CPTED surveys to inventory and address changes in community built form/land uses and surrounding environment. The CPTED survey would also be used to identify or recommend enhancements that can be employed as crime prevention or other security measures.

Operation Lifesaver and Community Outreach Initiatives - As part its commitment to railway safety, GO Transit is a proud partner in Operation Lifesaver. Operation Lifesaver is a partnership initiative of the Railway Association of Canada and Transport Canada and works in cooperation with the rail industry, government, police, unions, and many public organizations and community groups to advocate for railway safety and, among other things, prevent trespassing incidents that lead to serious injury or death.

"Every year in Canada approximately 300 collisions and trespassing incidents occur at highway/railway crossings and along railway tracks resulting in the death or serious injury of nearly 130 people."

- Operation Lifesaver -

The Community Trespass Prevention (CTP) program is an important community based outreach initiative developed by Operation Lifesaver aimed at reducing railway trespassing and crossing incidents and related injuries. The goal of the CTP is to develop trespass prevention strategies through community problem-solving partnerships. The Community, Analysis, Response and Evaluation (C.A.R.E.) model provides a four step process for the identification, analysis and areas of response for addressing trespassing issues in a community.
Step 1 – Community **-** identify the trespassing problem in the Community in general terms and identify potential community stakeholders that may be able to assist in the responding to the issue(s).

Step 2 – Analysis **-** collect detailed information about the trespassing problem and determine underlying causes (e.g. review of pedestrian desire line, local attractors).

Step 3 – Response **-** identify and implement response(s) targeted at the root causes of trespassing. Identify the most effective and feasible response(s):

- education (e.g. school presentations, media, web-based)
- engineering or CPTED (e.g. fences, signs, crossing)
- enforcement (e.g. targeted/tickets)
- other Strategy (e.g. living fences)

Step 4 – Evaluation - determine if response was effective. Evaluate the effectiveness of your response over the immediate and longer term based on measures identified in the analysis step. Was the issue displaced, reduced, unchanged or eliminated?

10. Conclusion

The large GO Transit service area comprises many different urban, suburban and rural conditions that influence the height, application and type of fencing system to be used. For example, some fencing systems may be appropriate when installed adjacent to new residential subdivisions while reinforced fencing systems are appropriate around critical infrastructure and in areas of high trespass, etc. Other factors such as train volume, train types (freight /commuter and inter-regional rail), speed and other operational issues have an important role in the selection of fencing systems to be maintained and established.

Chain link fencing is the current GO Transit standard and has been adopted in many urban/suburban areas generally at a height of 1.8 m (6’) and placed adjacent to the property line. In certain cases the height of the chain link fencing may be increased by 2’ (to 8’) to deter trespassing and illegal dumping. Other fencing systems such as post and wire, expanded metal mesh and higher security types are also utilized.

Regular inspections provide Railway Corridors staff with the information to identify frequency, location and ongoing areas of concern. This has a direct influence on the type, style or components of the fencing design. In other areas where there are consistent trespassing issues, community complaints and deliberate acts of vandalism to the existing fencing system, GO Transit will undertake a series of progressive measure to address the integrity of the fencing system.

A formal evaluation matrix or risk criteria is difficult to establish and current efforts are more directed at addressing existing problem locations and areas of known risk. In addition, other factors such as train volume, train types (freight /commuter and inter-regional rail), speed and other operational issues have an important role in the selection of fencing systems to be maintained and established.

In addition to the installation and maintenance of fencing systems, other approaches to address trespass and other related issues are included in the GO Transit toolbox. Approaches such as CPTED, Operation Lifesaver and Community Outreach initiatives provide opportunities to work closely with our community stakeholders and implement broader strategies and responses targeted at the root causes of trespassing.

Attachment A - Detailed Specifications Various Fencing Types

Post and Wire Fence (Farm or Highway Fencing)

Fencing type to be seven (7) wire, installed in accordance with the most current CN Rail standards plan TS-2211.

Fence posts and woven wire to meet the most current version of the following Ontario Provincial Standard Specifications: (OPSS) 1601, “Material Specifications for Timber Posts” and OPSS 1540, “Material Specifications for Standard Highway Fence Components”.

Chain Link Fencing

Unless otherwise stated, Chain link fencing shall meet the most current version of OPSS 541, “Construction Specification of Chain Link Fence” and OPSD 900.01, Fence, Chain Link Installation – Roadway”.

The fence wire shall be Type 1 Steel Fabric 3.5 mm diameter steel wire; Class A zinc coated, Style 2 medium steel wire, hot dip galvanized after weaving with a diamond pattern size of 50 mm.

Height of the fabric to be 1800 mm and the fence is to include the top rail.

The diameter of the bottom tension wire shall be 5mm.

Tie wire fasteners: to CAN/CGSB – 138.1 single strand, galvanized steel.

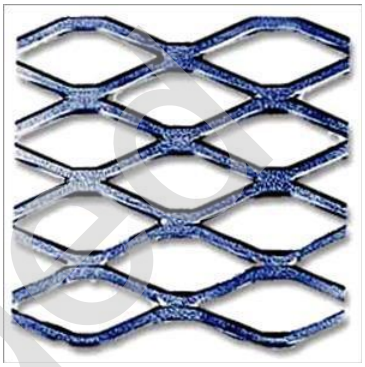
Tension bar: ASTM A525M, 5x20 mm minimum galvanized steel.

Organic rich zinc coating: CAN/CGSB – 1.181.

All mechanical fasteners to be sealed with loctite as a means of vandal proofing the fastening system.

Concrete Mixes and materials: to CAN/CSA-A23.1

Security Mesh (Expanded Metal Mesh)



Fabric: expanded metal mesh, gauge 9, 1'' mesh size, raised mesh (not flat), hot dip galvanized steel (AMICO Secure fence systems or similar).

Fittings: galvanized clamps and bands and are as recommended and supplied by the manufacturer.

Installation: as per manufacturer's recommendations.

High Security Fencing

The high security fence height above ground shall be 1.8 or 2.4 m.

The high density mesh panel to have 4mm diameter high tensile wire, with aperture sizes (openings) 76.2 x 12.7 mm centers with suitable length fence mesh posts to allow a minimum foundation depth of 1200 mm. The fence panels shall be reinforced with 4 x 50 mm with deep 'V' formation horizontal recessed bands and 2 x 75 mm, 70 degree flanges along sides, internal fixings - 8 single bolt comb clamps, 8 double bolt comb clamps mechanically galvanized. Mesh coating to be galvanized with alugalv coating (for extra protection).