

**Measure Name** Landscaping treatments to restrict access

**Definition** Landscaping treatments, such as shrubs, trees, or rocks, that restrict access to the railroad right-of-way to make passage along or across the tracks more challenging.

**Tags**

<b>Incident Type</b>	Both trespass and suicide
<b>Location</b>	Both station and right-of-way
<b>Intervention Strategy</b>	Engineering: technological and physical deterrents
<b>Measure Group</b>	Physical barriers

## Description

Landscaping treatments to restrict access is a measure that refers to the installation of shrubs, trees, or rocks at a station or along the right-of-way (ROW) to prevent access to the tracks by making travel along or across the tracks more challenging. As with ROW fencing, shrubs and trees should be installed strategically using a robust hazard analysis that includes information such as past trespass fatalities, suicides, debris strikes, trespass observations, and the presence of homeless encampments.

This measure is most effective when combined with other measures, such as signage or Closed-Circuit Television (CCTV). Prohibitive signs and wayfinding signs can be used to direct pedestrians to legal crossing areas. Landscaping treatments can range from basic shrubs to small trees. The choice of treatment depends on a variety of factors including climate, cost, existing policy, community impact, needs assessment, and potential for success.

Only one empirical study has investigated the effects of landscaping treatments on railroad trespasser activity [1]. The study found a 91.3 percent reduction in trespassers following the treatment. This reduction in trespass was most effective for children under 12 and adults over 20, but less effective on children between the ages of 12 and 20 years [1].

When using rocks to deter access, it is best to lay large, irregularly sized rocks on the ground outside of the tracks to prevent people from using the railroad ROW as a shortcut to get onto the tracks. Unlike anti-trespass panels, the rocks can only be installed along the ROW outside the track gauge. In the U.S., rocks are most often installed at a crossing that is close to a train station. These crossings tend to have train passengers using the ROW between the crossing and the station as a shortcut to the station platform.

This measure is most effective when combined with proper channelization that prevents people from walking around the landscaping or accidentally tripping and falling. The rocks should extend the entire length of the ROW from the end of the platform to the crossing, or they should be placed on a section of ROW towards the ends of the platform as well as at a grade crossing.

Although there are no known studies evaluating the effectiveness of rock treatment in reducing trespass, multiple commuter rail lines currently use landscaping treatments, including Caltrain, Metrolink, and SunRail.

Additional search terms: *barriers, bushes, deterrent, landscape, trees*

## Advantages

- Landscaping treatments are effective in reducing the number of people that trespass onto railroad ROW [1].
  - Landscaping treatments can enhance aesthetics of the ROW and blend in with the surrounding environment [2].
  - Rock treatments are relatively easy to install.
  - Most rock treatments are low cost, reflecting the type of landscaping selected, and they can usually be installed by in-house staff.
  - Many states use rock treatments for highway projects (especially near bridges), suggesting that rock treatments may be available for railroad ROW application.
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## Drawbacks

- Shrub and tree installations may be expensive to install and need periodic maintenance.
  - Without proper maintenance, rock treatments may become filled with dirt, fallen debris, or snow, thus reducing their effectiveness.
  - Trespass problems may move to an unsecured nearby area rather than being eliminated.
  - Trespassers may find ways to defeat landscaping treatments (walk through, cut, or knock over).
  - Landscaping treatments may hinder a train engineer's view of the ROW, upcoming highway-rail grade crossings, and station areas.
  - Rock treatments can only be used along the ROW outside the gauge. As such, pedestrians can still access the ROW by walking between the rails.
  - Landscaping treatments may interfere with passenger evacuation in the event of a train stopping short of a platform during an emergency.
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## Notable Practices

- Ensure that plants selected for landscaping treatment are native to the area.
- Ensure that fire prevention needs are addressed in areas that are highly susceptible to fire [2].
- Plants selected for landscaping should reflect the following: “non-poisonous; resistant to insects (bees, white flies or rodents) and diseases; free from sharp thorns, needles, or pointed sword-like leaves; adaptable to variable soil conditions; adaptable to drought conditions; free from noxious odors; free from messy fruits or leaves; non-aggressive root system that can damage pavement and sidewalks and low maintenance” [2, p. 26-7].

- Consider whether plants are appropriate for the specific region and climate.
- Ensure that plants do not block maintenance access, the train operator view of the ROW, or pedestrian and vehicle driver views of traffic at grade crossings [2].
- Ensure that all approvals, permits, licenses, and other authorizations required by applicable laws, regulations, rules, and ordinances are obtained [2].
- Consider safety and operational impacts when scheduling the installation of landscaping on the railroad ROW.
- Landscaping treatment could become less effective without proper care. Develop a strategy for maintaining the landscaping treatments so that rocks do not fill with dirt, fallen debris, or snow and shrubs/trees do not obstruct visibility.
- Ensure that there are escape routes for train passengers during emergency evacuations [3].
- Ensure that emergency responders are aware of landscaping treatments so they can quickly facilitate emergency evacuations without being impeded by the treatments.
- Consider adding entry gates along the fence for railroad workers to access the railroad ROW [3].
- Rock treatments are usually installed at crossings close to stations. Consider laying the rocks along the entire length of the ROW from the end of the platform to a crossing, or at a defined section of ROW at the ends of the platform and at the grade crossing. If used at each end of platform and crossing, the rock bed should be long enough so that people cannot jump over it.
- Consider adding a snowplow lift sign if rock treatments are installed in snowy areas so that they do not become damaged during snow plowing.
- Warning and prohibitive signs may be placed along the ROW to help convey that the area is restricted [1].
- Trespassing activities before and after the implementation of the countermeasure can be collected and used to help measure its effectiveness. If conducting such an evaluation, ensure that trespass activities before and after the implementation are collected during similar conditions [1].

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## References

[1] Silla, A. and Luima, J. (2011). Effect of three countermeasure against the illegal crossing of railway tracks. *Accident Analysis & Prevention*, 43(3), 1089-1094

Abstract: This study was designed to investigate the effects of three countermeasures – landscaping, building a fence and prohibitive signs – on the frequency of trespassing, which in this case means crossing the track at places where it is forbidden. At each location the official route was no more than 300 m away. The main results showed that the effect of each countermeasure on the frequency of trespassing was statistically significant. Specifically, the fencing reduced trespassing by 94.6%, followed by landscaping (91.3%) and prohibitive signs (30.7%). The majority of illegal crossings were committed alone and the persons trespassing were mostly adults and men. In addition, the results demonstrated some tendencies

of how the effects of the selected countermeasures can vary with the characteristics of the trespassers. The main implication of this study is that the building of physical barriers such as landscaping or fencing is recommended for reducing trespassing. However, if the required resources are not available or the site is not suitable for such measures, the use of prohibitive signs is recommended. Further, there is a need to tailor the countermeasures to the characteristics of the trespassers in order to ensure that the most appropriate countermeasures are applied.

[2] Southern California Regional Rail Authority. (2010). [SCRRRA Design Criteria Manual](#).

Description: This document provides landscaping design guidelines for Southern California Regional Rail Authority/MetroLink (refer to Chapter 26 for landscaping design).

[3] RESTRAIL. (2020, September 30). [8.5 Anti-trespass panels](#). Restrail Toolbox.

Description: This webpage provides information on implementing anti-trespass panels in Europe, including recommendations, considerations for implementation, and relevant research results.

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## Additional Resources

Stanchak, K., Foderaro, F., and DaSilva, M. (2015). [High-Security Fencing for Rail Right-of-way Applications: Current Use and Best Practices](#). Technical Report No. DOT/FRA/ORD-15/38. Washington, DC: U.S. Department of Transportation, Federal Railroad Administration

Abstract: The Volpe Center investigated how high-security fencing is used to prevent right-of-way (ROW) trespassing at several urban transit and commuter rail agencies in the United States. Interviews, operations documentation, and site visits were used to gather information for this research, and it was found that the best high security fencing installations do the following: 1) prevent trespassing in all directions, i.e., over, under, and around; 2) are strategically placed in locations determined through rigorous hazard analysis and have community support; and 3) are part of a comprehensive railroad fencing program.

MetroLink. (2019). <https://metrolinktrains.com/globalassets/about/engineering/4000-grade-xing.pdf>

Description: This document shows MetroLink engineering drawing of a grade crossing including rock treatments.

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## Related Measures

- Anti-trespass panels
- Collaboration with local government and communities
- Grade separation
- Identify funding opportunities
- Incident cost estimation
- Physical barriers at bridges
- Right-of-way fencing