



Treatment Options for Obstacles within the Clear Zone

Design Manual
Chapter 8
Safety Design
Originally Issued: 12-13-10

The main goal in establishing a forgiving roadside is to reduce the presence of roadside obstacles. These obstacles should be mitigated or eliminated whenever possible. Use one or more of the following methods to reduce the likelihood of the obstacle being struck (listed in order of preference):

1. Remove the obstacle entirely.

- Portions of structures that stick up out of the ground may be cut off flush with the ground surface.
- Abandoned structures can be removed.

2. Redesign the obstacle to make it traversable.

- Steep slopes can be flattened.
- Culvert openings may be fitted with safety grates.

3. Relocate the obstacle to a point where it is less likely to be struck.

- Power poles can be relocated to the right-of-way line.
- Culverts may be extended, placing the openings further from the roadway.

Relocated objects should be placed outside the clear zone, preferably near the right-of-way line. Each additional foot that an object is offset from the roadway provides an incremental safety benefit to drivers. However, the next foot out from a given offset provides less benefit than the previous one provided.

4. Make the obstacle breakaway.

- Light poles and sign supports can be constructed or replaced with a breakaway design.

5. Shield the obstacle with a barrier.

- Steel beam guardrail, cable guardrail, and concrete barrier can be used to shield many types of obstacles.
- Blunt ends of otherwise crashworthy obstacles can be protected with a crash cushion.

6. Delineate the obstacle (no treatment).

- The presence of an obstacle can be emphasized with pavement markings, signs, or object markers.

Choosing a Treatment Method

Determining an appropriate treatment method is often the most difficult task when addressing the presence of an obstacle in the clear zone. Designers should first consider removing the obstacle entirely. If this is not practical or feasible, then consideration should be given to making the obstacle traversable. If this option is not practical or feasible, the designer should investigate whether the obstacle can be relocated to an area where it is less likely to be struck. If the obstacle cannot be removed, redesigned, or relocated, the designer should check to see if the obstacle can be made breakaway. Only after exhausting these options should the designer consider shielding the obstacle with a barrier.

Some other factors to consider choosing a treatment method:

- Crash history involving the obstacle
- Current and projected traffic volumes
- Distance of the obstacle from the roadway
- Severity of a crash into the untreated obstacle vs. the treated obstacle
- Initial and maintenance costs of treatment methods
- Presence of other obstacles in the vicinity and their distances from the roadway
- Types of safety treatments, if any, that have been applied to the other obstacles

Because barriers are typically located closer to the roadway than the obstacles they are protecting, installing a barrier usually results in an increased number of crashes; although the severity of the crashes tends to be lessened. Whenever possible, obstacles should be removed, redesigned, relocated, or made breakaway rather than being shielded.

If the treatment options discussed previously are not practical or feasible, it may be acceptable—especially on very low-volume roads—to leave an obstacle in place and delineate it (no treatment). This is often driven by benefit-cost analysis; however, the decision whether or not to treat an obstacle ultimately comes down to engineering judgment. If the option to not treat the obstacle is chosen, document this decision in accordance with Section [1C-8](#).



Some obstacles should not be left in place untreated. Refer to Section [8A-4](#) for warrants.

Chronology of Changes to Design Manual Section:

008a-003 Treatment Options for Obstacles within the Clear Z

12/13/2010 NEW

To document treatment options for obstacles within the clear zone