

Surfaces for ORARs

The surface of an ORAR and the surface surrounding constructed features must be firm and stable. No exceptions are allowed. Slip resistance is not required because leaves and needles, dirt, ice, snow, and other surface debris and weather conditions are components of the natural environment that would be difficult, if not impossible, to avoid.

The FSORAG defines a firm surface as a surface that is not noticeably distorted or compressed by the passage of a device that simulates a person using a wheelchair. A stable surface is defined as a surface that is not per-

manently affected by normally occurring weather conditions and can sustain wear and tear during normal use between planned maintenance cycles. During the planning process, the compaction qualities of natural soils should be evaluated under weather conditions that occur normally when the surface will be used.

If the natural soils won't provide a firm and stable surface, soil stabilizer or artificial surfacing will be needed. The Forest Service Technology and Development report, *Soil Stabilizers on Universally Accessible Trails*, contains information about the effectiveness of soil stabilizers. It is available at: <http://www.fs.fed.us/eng/pubs/pdf/00>

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DESIGN TIP—

Paving the wilderness?

Does a firm and stable surface always mean concrete and asphalt? No! The surface provision states that the type of surface material used should be appropriate to the setting and level of development. Some natural soils can be compacted so they are firm and stable. Other soils can be treated with stabilizers without drastically changing their appearance. Many

surfaces that appear natural and that meet the firm and stable requirements also are available on the market. Designers are encouraged to investigate these options and use surfacing materials that are consistent with the site's level of development and that require as little maintenance as possible.

CONSTRUCTION TIP—

Surfacing materials

Generally, the following materials provide firmer surfaces that are more stable:

- Crushed rock (rather than uncrushed gravel)
- Rock with broken faces (rather than rounded rocks)
- A rock mixture containing a full spectrum of sieve sizes (rather than a single size)
- Hard rock (rather than soft rock that breaks down easily)
- Rock that passes through a 1/2-inch (13-millimeter) screen (rather than larger rocks)
- Rock material that has been compacted into 3- to 4-inch (75- to 100-millimeter) thick layers (rather than thicker layers)
- Material that is moist, but not too wet, before it is compacted (rather than material that is compacted when it is dry)
- Material that is compacted with a vibrating plate compactor, roller, or by hand tamping (rather than material that is laid loose and compacted by use)

231202.pdf and <http://www.fbwa.dot.gov/environment/fspubs/00231202/>.

Firm and stable surfaces prevent assistive devices from sinking into the surface, which would make movement difficult for a person using crutches, a cane, a wheelchair, or other assistive device. In the accessibility guidelines, the standard assistive device is the wheelchair because its dimensions, multiple moving surface contact points, and four wheels often are difficult to accommodate. If a person using a wheelchair can use an area, most other people also can use that area.



DESIGN TIP—

What is firm and stable?

In the late 1990s, the Access Board funded an Accessible Exterior Surfaces research project conducted by Beneficial Designs of Minden, NV. Results of the study are available on the Access Board's Web site at: <http://www.access-board.gov/research/Exterior%20Surfaces/exteriorsarticle.htm>. Figure 31 shows the rotational penetrometer tool that can be used to evaluate surfaces. For further information, consult Beneficial Designs' Web site at: <http://www.beneficialdesigns.com/>. One of the results of the project was development of a scientific method for determining firm and stable exterior surfaces.

What sort of surface is firm and stable? In general, if the answer to both of the following questions is *yes*, the surface is probably firm and stable.

- Could a person ride a narrow-tired bicycle across the surface easily without making ruts? (The bicycle tires are similar to large rear wheels of a wheelchair.)
- Could a folding stroller with small, narrow plastic wheels containing a 3-year-old be pushed easily

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stroller's wheels are similar to the front wheels of a wheelchair.)

While this method for determining firmness and stability isn't scientifically accurate, it has proven to be effective.



Figure 31—Using the rotational penetrometer to determine whether a surface is firm and stable.

Clear Tread Width and Passing Spaces for ORARs

Clear tread width means the width of the traveled surface on the ground and also above the ground between obstacles (figure 32). The minimum clear tread width of an ORAR is 36 inches (915 millimeters), which is wide enough to allow unobstructed passage by a wheelchair. Where a condition for departure exists, such as when an ORAR must be routed between two large boulders that can't be removed, then the clear tread width may be reduced to not less than 32 inches (815 millimeters) for a maximum distance of 24 inches (610 millimeters).

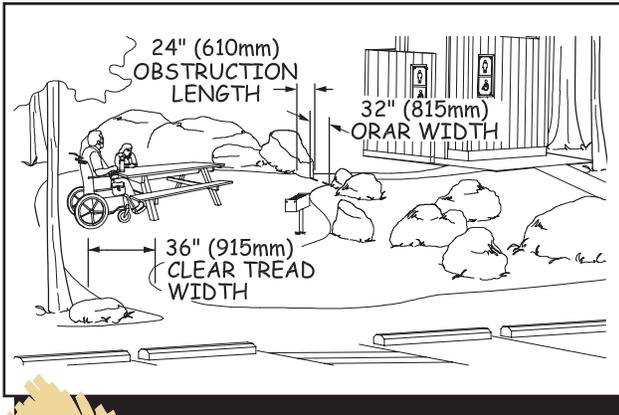


Figure 32—The clear tread width is the width of the unobstructed traveling surface.

DESIGN TIP—
How wide should the access route be?

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The 36-inch (915-millimeter) minimum clear tread width is just that—a minimum. To determine how wide the ORARs in a project should be, look at the level of development of the site and how it will be used. In a more highly developed area, a 48- or 60-inch- (1,220- or 1,525-millimeter-) wide ORAR may be appropriate, while a 36-inch- (915-millimeter-) wide tread may be a better fit in a less developed site.

All ORARs in a recreation site don't necessarily have to be the same width. It may make sense to vary the width, depending on the location of the ORAR. For example, a designer may decide to make the main ORAR 60 inches (1,525 millimeters) wide if it connects campsites to important constructed features, such as a rustic outdoor amphitheater, toilet buildings, or water hydrants.

Secondary ORARs, such as a spur from the main ORAR to a quiet, intimate path along a stream, may be only 36

inches (915 millimeters) wide. Consider how many people will likely be using the ORAR at the same time and how they will want to use it—single file or walking and talking side by side—and design accordingly.

Two wheelchairs need 60-inch- (1,525-millimeter-) clear tread width to pass comfortably and safely on an ORAR. However, this width isn't always appropriate or required. Where the clear tread width of an ORAR is less than 60 inches (1,525 millimeters), passing spaces are required at least every 200 feet (60 meters). If this isn't possible because of a condition for departure, an exception is provided that permits passing spaces to be 300 feet (90 meters) apart. Passing spaces must be at least 60 inches (1,525 millimeters) wide (including the ORAR width) by 60 inches (1,525 millimeters) long (figure 33).

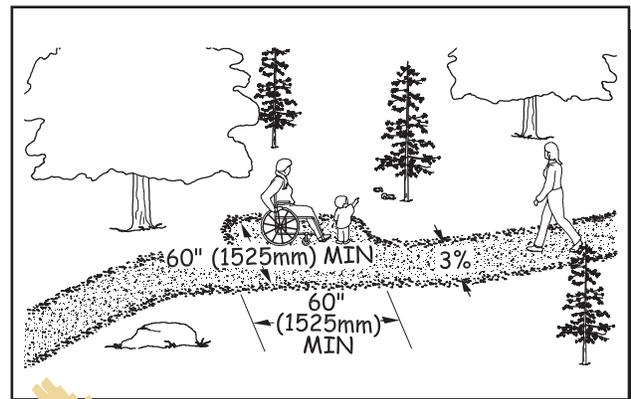


Figure 33—A passing space for an ORAR or a beach access route.

Another option allows a T-intersection of two ORARs or other walking surfaces to be a passing space (figure 34), provided that the arms and stem of the T-shaped space extend at least 48 inches (1,220 millimeters) beyond the intersection. Either configuration would provide enough room for someone to move to the side and let an oncoming person pass along the ORAR. The cross slope of a passing space shouldn't exceed 3 percent.

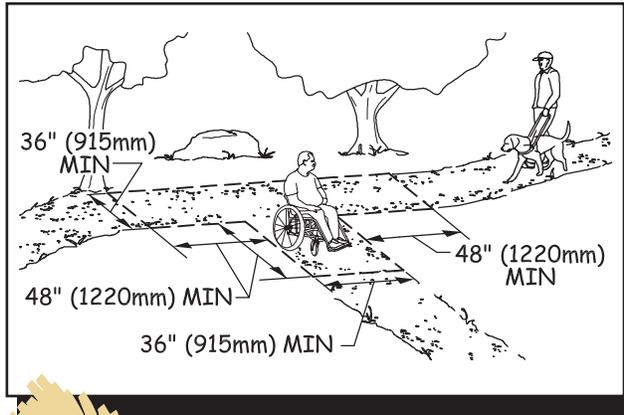


Figure 34—A “T” Intersection for passing on an ORAR or a beach access route.

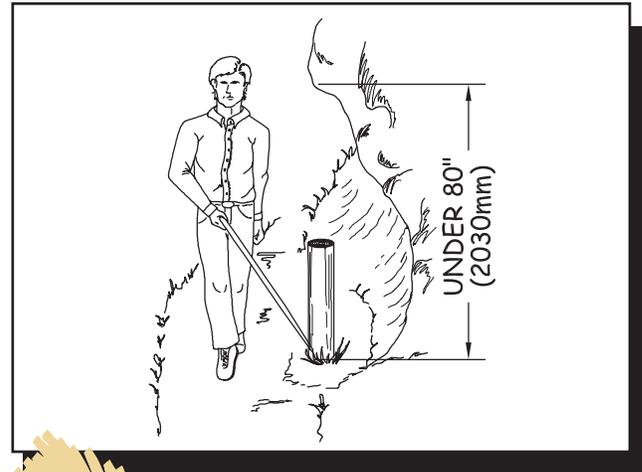


Figure 35—A warning barrier is required wherever vertical clearance is insufficient.

Tread Obstacles on ORARs

A tread obstacle is anything that interrupts the evenness of the tread surface. On ORARs, an obstacle may occur where a tree root or rock protrudes above the surface or where two different surfaces abut, such as when a concrete path joins an asphalt path. If they are pronounced, tread obstacles can pose a serious tripping hazard. Where tread obstacles exist along an ORAR, they can't be more than 1 inch (25 millimeters) high. If compliance with this provision isn't possible because of a condition for departure, an exception permits obstacles up to 2 inches (50 millimeters) high, provided that the obstacle is beveled with a maximum 1:2 slope.

Protruding Objects and ORARs

Protruding objects extend into the clear width area of an ORAR from beside or above the ORAR. Leaning tree trunks, rock ledges, and branches are common protruding objects. The ORAR must provide at least 80 inches (2,030 millimeters) of clear headroom (figure 35), which is the same requirement as ABAAS section 307. Where the vertical clearance of an ORAR is reduced to less than 80 inches (2,030 millimeters) because of a condition for departure, a barrier to warn blind and visually impaired persons must be provided. This exception allows an ORAR to pass under ledges or other naturally constricted areas.

Openings in ORAR Surfaces

Openings are gaps in the surface of an ORAR. Gaps include spaces between the planks on a boardwalk or in a drainage grate. Openings that are big enough for wheels, cane or crutch tips, or shoe heels to drop through are hazards that shouldn't exist in pedestrian routes (figure 36). Openings up to $\frac{1}{2}$ inch (13 millimeters) wide are permitted. Elongated openings must be placed so that the long dimension runs perpendicular



Figure 36—Big openings in ORAR surfaces are a bad idea.