



Accessible Route AUDIT (Version 1.0)

Denis Anson, MS, OTR & Kathy Longenecker Rust

Last updated January 26, 2009



© 2009 R₂D₂ Center

OK to copy and distribute, but use in its entirety and do not alter

Compatibility

All AUDITs have been tested for compatibility with Excel 2004 in Mac OS X and Excel 2003 in Windows XP and Windows Vista.

Note: If you are a PC user in order to use the AUDITs, Macro Security must be set to Medium (recommended) or Low (not recommended). The AUDITs will run on a Mac system without needing this adjustment.

Background

Universal design (UD) is a process that ensures that a newly created product is useful to the broadest possible array of people, particularly those with disabilities. This AUDIT requires the investigation of multiple design features, including whether Accessible Routes comply with legal minimum standards, the level of accessibility, and the level of usability.

For a person with a disability, the simple act of getting from one place to another, both inside and outside of buildings, can present a significant challenge. The person who uses a wheeled mobility device may encounter barriers in the form of steps, curbs, uneven surfaces, or narrow portions of the path. Individuals with little or no vision may use a cane to identify changes in the route's surface, but have more difficulty with obstructions that can occur overhead or extend into the path above ground level. Blind people are more likely to detect such obstructions with their head or shoulder than with their cane. People with visual or cognitive limitations may not benefit from standard signs, and will have difficulty finding desired locations. Designing accessible paths is not difficult, if the designer is thinking of the needs of individuals with disabilities. Unfortunately, most existing paths were designed without such consideration.

The conflict between the needs for short, direct paths and accessible paths results in a mix of accessible and inaccessible paths. Short paths are likely to be too steep, or to have stairways. The physical geography of a campus may make this unavoidable. However, equal access requires that there be an accessible, if somewhat longer, path between all campus features. Since the barriers along a path may not be observable from any given point, it is vital that the accessible paths be clearly identified.



Construction or temporary obstacles (e.g. reserved parking for special events) frequently present major problems for individuals with disabilities. For example, yellow tape placed more than 27 inches off the ground will not protect an individual who walks with a cane, and at any height are less detectable than a solid barrier. Dual height barriers at 27” and 9” are much more usable. This AUDIT may be extremely helpful when planning in these instances.

[Figure 1: Detour Signs](#)

Directions

Note: If you are a PC user, turn the "Macro security" down in Excel to "Warn", or the spreadsheets won't work. The AUDITs will run on a Mac system without needing this adjustment.

To perform an AUDIT:

- ✓ Open the Excel file: click on “enable macros”.
- ✓ The AUDIT will open in “Page Break Preview” view. You may change to another view mode if you wish.
- ✓ Save your file with a new name.

- ✓ Identify the route for audit and clearly label it (along with your name and date) at the top of the worksheet by double clicking on “AUDIT Target”, “AUDIT Date”, and “Auditor” to enter data in these cells.
 - (The AUDIT Target, in this case, could be “Bus stop X to library”.)
- ✓ Print a copy of both the Accessibility and Usability worksheets,
(or, you may enter scores into the AUDIT directly on your computer).
- ✓ You may use the print features of Excel, or you may click on the buttons at the bottom of the page to print individual sheets or the entire workbook.
- ✓ This AUDIT requires the investigation of multiple features of the route. Carefully observe the route and its signage. Follow each branch of the accessible route. Use every feature of the route. This process may take 15-20 minutes or more, depending on the length of the path.
- ✓ Score the AUDIT/enter data.
- ✓ You can move from sheet-to-sheet by using the buttons across the top or by clicking on the Excel worksheet tabs at the bottom.
- ✓ Examine and interpret the graphical data.
- ✓ Write comments about the presentation, or specific issues related to the P3 AUDIT, in the comments section.

For most AUDITs (e.g. doing an AUDIT of an architectural feature) it is easiest to print a paper copy of both the accessibility and usability worksheets. Take the paper copy to the location, score the items, and then transfer your scores to the computerized spreadsheet. Some AUDITs may be scored directly on the spreadsheet. The method you use depends on the item you are auditing and the computer you use.

The AUDITs are formatted in an Excel workbook with 3 spreadsheets. You may use arrow keys to facilitate the entering of data. Double click on the boxes where you will enter text (e.g. “Comments”, “Auditor”). The spreadsheets for both the accessibility and usability sections will tally the scores and provide a numerical score based on the

degree of **demonstrated** accessibility or usability. Graphical data are presented on the 3rd sheet.

Trichotomous scoring (e.g. “Yes”, “Partial”, “No”) is used to rate each item in the AUDIT. The spreadsheet converts these to numerical scores.

- A “Yes” score indicates the item is present and effective. This should not be selected if there is any doubt if the item is present.
- A “Partial” score indicates that the item is present to some extent. If the item is only present in some cases, or is present but not in an effective way, you mark “Partial”.
- A “No” score indicates that the specified item is not present. If a feature is present, but not readily “discoverable,” the typical user will not benefit from it. If you are not sure that an item is present, it should be marked “No.”
- “NA” will remove the item from scoring.

The Accessibility and Usability scores compute the “demonstrated” levels of accessibility and usability. Thus, items that are not scored are considered not to have been demonstrated. If you do not score all items the score will be lower because the spreadsheet will interpret any unscored items as zero.

Clarification on individual item scoring

Note: This AUDIT is designed to evaluate routes/pathways in the built environment, including outdoor pathways. It does not address criteria for pathways through natural areas.

Accessibility Items

Accessibility Section 1, item 1: The surface of the route is firm, stable, and slip resistant in all seasons, including when wet. (Note: This requires prompt and thorough snow and ice removal in some climates.)

- ✓ A person who uses wheeled mobility will have difficulty with uneven or loose surface treatments. In climates where accumulation of snow or ice is common, a path that is accessible for part of the year may not be accessible in winter unless snow and ice removal is both prompt (as soon as snow begins to accumulate) and thorough. While a half inch of compacted snow is easier to walk through than two inches of loose snow, it remains a barrier to the person using wheeled mobility.
- ✓ “Firmness means the surface “does not give way significantly under foot.” Stability means surfaces “do not shift from side-to-side or when turning.” For example, when one walks or wheels on sand, the sand shifts and the foot or wheel sinks. When turning, a foot or wheel will displace the sand. Therefore, sand is neither firm nor stable. Firmness and stability can be measured using a rotational penetrometer. When controlled pressure is applied to the penetrometer, the penetration depth of the device is measured as the degree of firmness while rotating the penetrometer will provide the stability measurement.” [See site for ANSI/RESNA standards.]

From National Center on Accessibility, “Trail Surfaces”
<http://www.indiana.edu/~nca/monographs/1trail-surfaces.shtml>

Accessibility Section 1, item 2: If the accessible route crosses a grating, the long dimension of the grating openings are at right angles to the direction of travel, and the narrower dimension is less than 1/2 inch.

- ✓ Gratings along a route can present a significant barrier to wheeled mobility and service animals as well as to persons wearing narrow heels. If the long dimension of the grating aligns with the direction of travel, the casters of a wheelchair or wheeled walker can become trapped in the grating, making travel impossible

Accessibility Section 2, item 3: The route is free from steps and level changes of greater than 1/4 inch.

- ✓ Most people will recognize that a person in a wheelchair will have difficulty with stairs, but many do not realize that much lower level changes are also barriers. Because many wheelchairs use two-inch front wheels, a 1-inch barrier is no different than a wall. A bump as low as $\frac{1}{4}$ inch can stop a wheeled device, and throw the rider to the ground.
- ✓ Look at sidewalk cracks from this perspective.

Accessibility Section 2, item 4: Where there are level changes greater than $\frac{1}{2}$ inch, or the slope is greater than 1:20, the route is treated as a ramp.

- ✓ Changes in level between $\frac{1}{4}$ and $\frac{1}{2}$ inch can be made accessible to those who are wheelchair mobile by beveling the edge at 1:2. (In general, if the sloped surface is 1 inch long, it will be adequate.) But greater level changes can be a barrier even if sloped at this level. In general, any level change of more than $\frac{1}{2}$ inch should be treated as a ramp. For very short changes, that means a slope no greater than 1:12, and possibly the addition of grips at the sides to allow efficient propulsion or stability assist. Where possible, such “ramps” should have hand-rails, smooth transitions, and the meet other requirements of an accessible ramp.

Accessibility Section 2, item 5: Where the accessible route crosses a traffic island, the island is cut through at the level of the route, or the island has curb cuts on each side.

- ✓ Outdoor paths that cross streets sometimes must also cross traffic islands. Where this occurs, there should be either a street level path through the island (meeting the standards of routes), or there should be curb cuts on each side of the island. In some situations, a traffic light will change before a person with limited mobility can fully cross the street, so that person must wait on the island through a cycle of the lights. When curb cuts are used, there must be a level area large enough to contain a wheelchair at the top, so that the individual doesn't inadvertently roll into traffic (48 inches is an adequate level area).

Accessibility Section 3, item 1: There are at least 80 inches of headroom at all points on the accessible route.

- ✓ When a person who is blind navigates with a cane, they are able to detect changes in the surface over which they are walking. In addition, the cane provides a warning to others that this person cannot see, and will not move to avoid someone approaching them. But a cane does not provide warning of overhead obstacles.
- ✓ If a pathway has signs hanging from the ceiling, overhead pipes, or low-hanging branches or decorations, a person who is blind may well discover them with his/her head.

Accessibility Section 3, item 2: In an area next to the route has headroom of less than 80 inches (below a staircase or tree limbs, for example) there is a cane-detectable barrier with 27 inches of the ground.

- ✓ Even when the direct path is free from overhead obstacles, the person who is blind is still at risk from overhead barriers that lie along side of the path. An individual moving along an accessible route, such as a hallway, may move into neighboring areas without being aware of it. If those areas have low-hanging barriers, the person may strike them through not being aware of being off the accessible path.
- ✓ A cane-detectable barrier can consist of any object that a person using a cane can detect before running into the obstacle. This maximum height for the barrier gives someone who has low vision and using a cane the time to stop before his body hits that overhead object.

Accessibility Section 4, item 1: The accessible route is no less than 36 inches wide to a height of 48 inches from the surface (e.g. no barrier projects into the route above the surface making it narrower).

- ✓ In order for a person in a wheelchair to comfortably propel along a path, the path must be wide enough to accommodate both the wheelchair and the arms of the

individual. While pathways may be wide enough at ground level, they may be narrowed above the ground by wall hangings, doorknobs, or other intrusions. It is important to assure that the required width is available above the surface as well as at the surface.

Accessibility Section 4, item 2: Where the accessible route makes a U-turn, it is at least 42 inches wide approaching the turn, and 48 inches wide in the turn.

- ✓ When a route makes a tight turn (less than 48 inches gap inside the turn), a wheelchair requires additional width to maneuver. Thus, as a path approaches and enters a hard turn, it must be wider to allow a wheelchair to pass.

Accessibility Section 4, item 3: The accessible route includes areas that are at least 60 inches wide and 60 inches long at intervals of 200 feet or less.

- ✓ If the path is just wide enough to accommodate a wheelchair, it will not allow the individual to turn around, should they start on the wrong path. It is important to provide spaces large enough to allow turning a chair around at intervals. This space is 60x60 inches.

Accessibility Section 4, item 4: Wall mounted objects either do not project more than 4 inches into the route or extend to within 27 inches of the ground (e.g. drinking fountain, display case).

- ✓ When a person who is blind uses a cane to navigate, they are able to detect changes in the path at ground level, and up to about 27 inches (because of the slope of the cane), but not higher. On a crowded route, the individual may be forced to walk close to the wall, but in general, not brushing against the wall. If a phone box, fire extinguisher, or other wall-hung object protrudes into the path more than four inches, a person walking near the wall may well strike it with a shoulder because the path was clear at ground level

Accessibility Section 5, item 1: The accessible route does not pass through areas where an individual cannot hear natural sounds in the environment.

- ✓ Many individuals who are blind depend on sound to navigate. If a route passes by a structure where there is a lot of noise (e.g. made by heating &/or cooling equipment, fans), street noise or oncoming people may not be audible. Whenever possible, accessible routes should avoid areas with high ambient noise levels. At times, however, the destination may be noisy (e.g. A path-side waterfall), and this guideline cannot be applied.

Usability Items

Usability Section 1, item 1: Indoor accessible routes are covered with a water and slip resistant surface that allows a wheeled object to roll with minimal resistance in all directions. (Industrial low-pile carpeting with no padding is recommended.)

- ✓ Floor surfaces require complex compromises for accessibility. Hard surfaces (e.g. tile) have minimal rolling resistance, but often become very slick when wet, presenting a risk of falls. Carpets offer good traction, but absorb energy from wheels, so are very difficult to propel a wheelchair over. To provide both adequate traction and minimal rolling resistance requires careful selection of surface materials. Currently, low-pile industrial carpeting without padding seems to provide a good balance, but other surfaces might be equally accessible.

Usability Section 1, item 2: The surface of the accessible path can be discriminated by touch or cane from the surrounding surfaces (i.e. a person following the path can tell the path from the surrounding surfaces by touch).

- ✓ A sighted person can navigate open spaces by focusing on distant landmarks. A blind person cannot. Because walking in a perfectly straight line can be difficult, we all require frequent cues to maintain our direction of travel. While it is easy to detect the difference between a sidewalk and grass with a cane, it can be more

difficult to follow the path in a large paved area, for example. Providing a tactile cue for the path allows a blind person to navigate open areas more readily.

Usability Section 2, item 1: Required railings for safety en route have contiguous surfaces and are provided at multiple heights.

- ✓ Railings that change heights along the route can allow individuals to get their arm caught, or can fail to be available when the pedestrian needs support.
- ✓ While a blind person learns the routes that are traveled on a daily basis, detours often occur because of temporary obstructions or construction. Often, temporary barriers are simple horizontal bars across the path. Such a barrier, because it is unexpected, and because it may be mounted above 27 inches, will not be detected by a cane user.

Usability Section 3, item 1: The route has dual height "Cane detectable" warnings/barriers.

- ✓ 27" is the standard for cane detectable warnings. This is based on the angle of the cane as the individual walks with it extended. A second warning barrier, located at 9" above the ground, would provide earlier warning for cane users and also provide a safety barrier to a wheelchair user.

Usability Section 4, item 1: If the accessible path is between 36 and 60 inches wide, the location of the next 60 inch wide passing area is visible from each passing area.

- ✓ If an accessible path is not wide enough at all points to allow a wheelchair to turn around, the wheelchair mobile person must commit to the path until the next wide point. If that turning point is not visible, the person is committing to the path on faith that the path is the correct one. Designing a path so that a turning place is always visible allows more confident navigation for the person in a wheelchair.

Usability Section 4, item 2: The accessible path is of sufficient width (>65 inches) to allow a person in a wheelchair to move alongside a person walking.

- ✓ Ambulatory people often walk side-by-side and engage in conversation as they walk. Service animals often walk at the side of their masters. If an accessible path is just wide enough to accommodate a wheelchair, the rider cannot engage in a conversation, and the service animal must walk in front of, or behind the person needing assistance. In either case, equivalent opportunity is not provided.

Usability Section 5, item 2: The accessible path signage indicates key landmarks and features to which it leads.

- ✓ While knowing that a route is accessible is important, it is also useful to know what the route leads to. Since the accessible route must move around geographic barriers (e.g. steep slopes), it may not be obvious at any intermediate point what destinations can be reached along this route. Providing accessible signage that indicates not only accessibility of the route, but the key locations to be reached via the path makes navigation easier for everyone.

AUDIT Score Sheet

The AUDIT summary graphs display the accessibility and usability scores for both parts of the AUDIT. The graphs help determine the perceived levels of accessibility and usability for the item under review based on the percentage of possible points. Behind the scenes a score of “Y” = 2 points, a score of “P” = 1 point and a score of “N” = 0 points. A score of “NA” removes the item from consideration, reducing the total number of possible points for the section of the AUDIT.

Accessibility interpretation: A one hundred percent score suggests full, basic access to people with disabilities. Any "no" or "partial" scores indicate that some people with disabilities will not be able to use the AUDIT target. They flag major problems.

Usability interpretation: The usability scores illustrate the "friendliness" of the AUDIT target. This usability affects all users, including people without disabilities, but difficulties are often amplified for people with disabilities. The higher the "yes" and "somewhat" scores, the more usable the AUDIT target is for everyone. "No" responses signify less access for everybody.

The score sheet "comments" section is provided for your notes and recommendations.

The ACCESS-ed Project considers all AUDITs to be live/working documents. Please share any comments, feedback or suggestions that you may have through the "Contact Us" feature of our website.

R₂D₂ Center, Enderis 135
University of Wisconsin-Milwaukee
PO Box 413
Milwaukee, WI 53201-0413
voice (414) 229-6803
fax (414) 229-6843
TTY (414) 229-5628

Email: access-ed@uwm.edu
www.access-ed.r2d2.uwm.edu

The ACCESS-ed project is supported in part by the U.S. Department of Education's Office of Post-secondary Education, PR/Award #P333A050090. The opinions contained in this publication are those of the grantee and do not necessarily reflect those of the U.S. Department of Education

Brief Description: Figure 1: Detour sign. Four diamond road signs, colored in orange in black, indicating there is construction road work taking place and cautioning those in the area.

Essential Description: The orange road signs are expressing the concept that before preceding any further, an individual must take caution. They indicate that there is some type of work being done that will impact the pathway of travel.

[Continue to Detailed Description or return to content](#)

Detailed Description: An orange diamond is situated in the upper right corner with a thin black border around the outside. Within the orange diamond is a bolded person, in the color black, with their right arm bent at the elbow up in the air and their left arm holding a thick black flag in the shape of a square. In the bottom left hand corner of the diamond with the person there appears an additional orange diamond that is overlapping. The orange diamond also has a thin black border around the outside. Inside the diamond are the words bolded and in black stating "ROAD WORK." In the bottom right hand corner of the orange ROAD WORK diamond there is an additional diamond that is not touching. The diamond is filled in with black and has a thin orange border around the outside. Within the diamond top and center is a hard hat which is colored orange. Below the hard hat are words colored in black within an orange background stating "HARD HAT AREA." In the upper right hand corner of the black diamond with the orange hard hat, there appears another orange diamond overlapping the top part of the hard hat. The orange diamond has a thin black border and in the inside are the words bolded, and centered stating "DETOUR AHEAD."

[Back to Content](#)