

Healthy Aging Research Network

Environmental Audit Tool & Protocol

Supported by the Centers for Disease Control and Prevention
Prevention Research Centers Program

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Prevention Research Centers Healthy Aging Research Network (PRC-HAN)

Background

This audit tool and protocol were designed to support a detailed quantitative and qualitative inquiry into community-scale and street-scale factors associated with mobility in older adults. The tool includes an extensive set of environmental factors to enable a fine-grained audit of permanent, transient, and social environmental factors that may influence the likelihood of older adult walking. The tool is the product of (1) extensive multi-site quantitative reliability testing and (2) qualitative walking interviews with older adults along familiar routes.*

This tool was developed for research purposes. When accompanied by a photo audit, it may also provide the detail necessary to specify desirable changes to the walking environment. Further work is necessary for the tool to be applied in a prescriptive or scoring fashion.

Some of the contextual factors that may be overlaid upon data collected with this tool include: person-environment fit, crime/personal safety, transportation environment, organizational initiatives for

environmental improvements (e.g., within transportation departments, planning agencies, parks departments, or neighborhood councils), ethnic or cultural variation, and pet ownership.

Special considerations for older adult populations consist of: living alone versus presence of a caretaker; capacity for activity; visual acuity; sensitivity to loud noises, bright lights and extreme temperatures; cognitive ability and memory; slower walking pace; susceptibility to steep inclines or cross-slopes; and a decline in bladder capacity.

Instructions for Use

These instructions help observers audit the built and social environments of neighborhoods and communities (quantitative approach). The methodological approach for qualitative evaluation (anthropological approach) is described elsewhere. Prior to collecting data in the field, auditors should be trained to use the tool and should be equipped with maps of the study area.

First—Choose a Sampling Approach

Begin by identifying the point of origin. Define a radius from that point (no larger than 0.5 miles). Choose a sampling approach:

- a) audit the entire area;
- b) audit particular routes (by identifying destinations);
- c) audit a randomly selected but designated number of segments for each area; or
- d) audit selected routes based on specified typologies (i.e., residential areas, commercial areas, mixed-use areas).

Second—Create Street Maps

For each study area, create maps that display all of the streets and intersections. This map may be produced either using a computer map database or by simply photocopying and enlarging a print map of the street network. If multiple auditors are assessing the environment, it is important to assign consistent identification numbers on the maps the auditors will use (see below). Mapping all segments and intersections in advance assists auditors in following correct segment protocol. Note that map data may not correspond to reality—be prepared to discover in the field that street segments on the map may not exist, and conversely, record any new segments that were not represented on the map.

Identify Street Segments

Each street or road in the study area is made up of one or more **segments**. A segment is a section of street or road between two

* PRC-HAN collaborated to develop the audit tool and protocol with Saint Louis University School of Public Health. It is an adaptation of the original Analytic Audit Tool and protocol developed by Dr. Ross Brownson and colleagues at Saint Louis University School of Public Health in 2003.

intersections. If this is a rural area without intersections, treat each one-quarter mile segment of that street as a separate segment for auditing purposes.

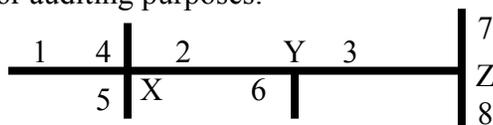


Figure 1. Segment Identification

Each segment and each intersection must have a unique identification number to facilitate organizing and analyzing data. Assign ID numbers to each of the street segments and each intersection to be included in the audit. ID numbers may be arbitrarily assigned. No specific numbering or lettering system is recommended aside from neighborhood or route codes.

Even if a sidewalk is continuous on one side of the street (as between intersection X and Z above) the T-intersection (as with X, Y, and Z above) means that these should be audited as two separate segments. A reference point should be noted on the continuous side so that no duplication of information occurs.

Develop a strategy to address each situation and have segment ID numbers prepared to use as back-up for these situations.

For GIS (Geographical Information System) purposes, each street segment is the “feature” for which audit “attributes” will be collected and recorded.

Definition: Block Face

Each segment has two block faces corresponding to the two sides of the street. This enables the audit to collect detailed information to determine, for example, that there are sidewalks on only one side of the street. In a grid system of streets it should be straightforward to determine the compass direction corresponding to the side of the street. When the street angles result in a curving or ambiguous, prioritize the northern versus southern compass orientation of the street.

Definition: Intersection

Intersections are represented in Figure 1 by ‘X’, ‘Y’ and ‘Z’ (Y and Z are “T intersections”). Multiple street segments share the same intersection. In order to avoid duplication of data, intersections are assigned unique identifiers and are rated using the specially-designed HAN Intersection Audit Tool.

Definition: Origin

A trip “origin” refers to any place that may be a starting point for utilitarian, recreational, or combined purposes. Trips may originate from home, from an office, or from other settings, so the origin may or may not be residential.

Definition: Trip Destination

A destination refers to any place that may be visited for utilitarian (e.g., a store, a workplace, a place of worship) or for recreational purposes (e.g., a park, a beach, a movie theatre, a neighbor’s house). This

definition includes residential and non-residential destinations.

Destinations (Item # 7): Note that one building often contains more than one type of destination. Simply check any destination type observed. When a destination has a corner entrance or entrances on two streets, only count it for one of the segments.

Special Conditions for Training:

Walkway continuity at T-intersections or on Dead end streets (Q 12)

When auditing a street that ends in a T-intersection, walkways are “continuous between segments” if you could cross the far side and walk left or right on a sidewalk or other walkway. For dead end streets, ignore continuity, unless there is access to adjacent street.

Walkway Width Varies (Q 9)

If the walkway is under 4 feet in some areas and over 4 feet in other areas, check “both.” If the walkway has temporary obstructions, do not include these in determining the walkway width. If there is a permanent obstruction (e.g., a pole) that narrows a 4 foot walkway to under 4 feet, indicate that the walkway is ‘both.’

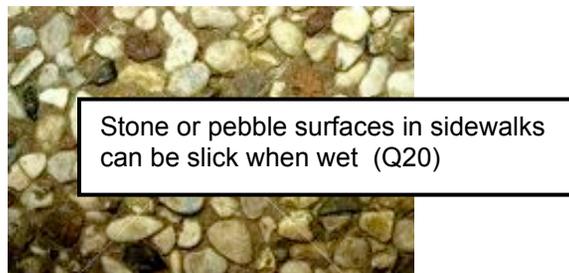
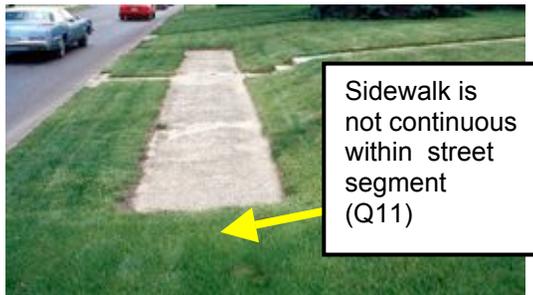
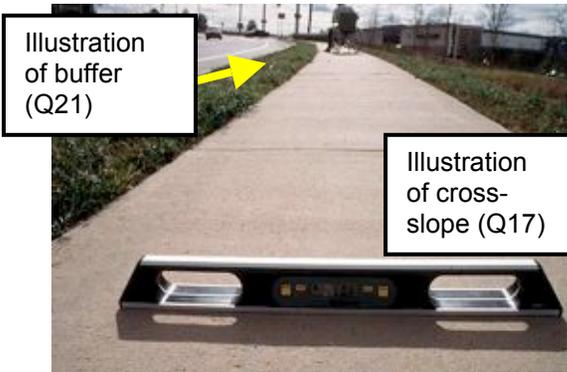
Curb Ramps Q 13

The terms “curb ramps” and “curb cuts” are used interchangeably to describe features that allow a wheelchair user to roll from the sidewalk to the street. Driveways found along the segment do not qualify. “Mountable curbs” are rounded curbs found in many subdivisions.

Ratings

In responding to these items **keep in mind older adults who may have some degree of visual, sensory or other functional limitation.**

Illustrations of Segment Observations



Illustrations of Segment Observations



(Q35) Example of retrofitted pedestrian lampposts to provide ample lighting of walkways



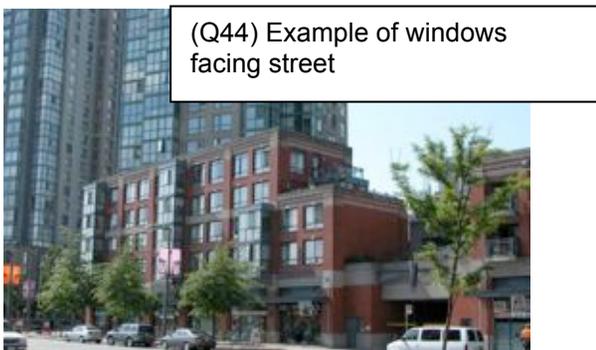
(Q8) Bike lanes



(Q38) Example of trees that offer shade

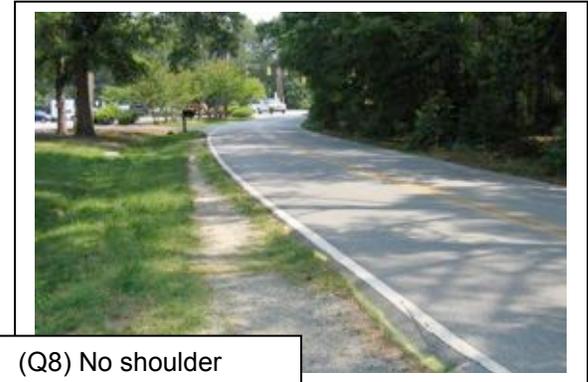


(Q8) Shoulder – paved section + unpaved section



(Q44) Example of windows facing street

This space reserved for additional illustrations as deemed helpful for training.



(Q8) No shoulder



(Q8) Goat path

Intersection Audit Instructions:

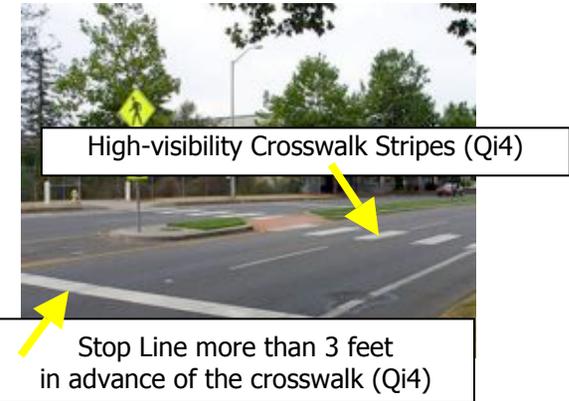
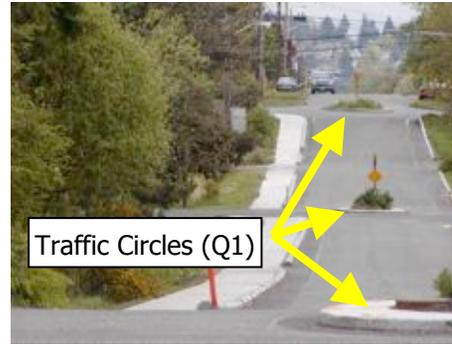
INTRODUCTION: Intersections present some of the greatest obstacles to pedestrian activity. There are many levels of intersection complexity, and this tool includes all of the elements for even a very complex intersection. This tool helps to describe an intersection and audit characteristics to recommend for possible improvements.

IDENTIFICATION: Each intersection should have a unique identification label to enter in the tool along with names of the cross streets. Data managers link the intersection and street segment data based on the identification labels.

INSTRUCTIONS: Each intersection requires a single audit sheet. Problems specific to one leg of the intersection should be noted in the *INTERSECTION NOTES* on the next page.

Use the intersection audit tool only to assess the area defined by crossings between/among segments that connect to the intersection. Use individual segment audit forms to assess each of the segments that connect with the intersection.

Illustrations of Intersection Observations



Special Conditions for Training:

Intersection Geometry - Distance (Qi6b)

Count the number of marked lanes on the widest crossing, as delineated by the street's centerline and any individual lane markings. For example, in the four cases depicted in the illustrations on this page, one would record Top Left=1; Middle Left=2; Top Right=4; Bottom Right (directly above)=2.

Guide to questions:

Questions	Subject Area
Q1	Data Collection
Q2-7	Land Use & Destinations
Q8-28	Walkways
Q29-38	Streetscape
Q39-45	Aesthetic & Social
Q46-49	Ratings
Qi1-i7	Intersections

Audit Preparation Checklist

Necessary:

- Maps with segments and intersections clearly identified
- List of segments and intersections to audit
- Copies of Audit Tool
- Copies of Intersection Tool
- Clip board, note paper, pencil

Suggested:

- Traffic safety vest
- Tape measure
- Compass
- Comfortable clothes & shoes
- Water bottle and snacks
- Cellular phone
- City/other maps w/ street directory
- Sun protection & hat
- Basic first aid kit
- No personal belongings
- Card or sheet w/ contact info for interested community members

Note:

After training is complete, the audit tool may be reproduced excluding training pages to reduce paper use.

Guidelines for Data Collection

Modify scripts below appropriate to your project.

Personal Safety:

- ✓ Conduct during daylight hours.
 - ✓ Auditor pairs remain in eyesight of one another.
 - ✓ If auditors feel threatened in any way, they should leave the area immediately and/or call police.
 - ✓ If someone asks where you are from and you feel comfortable responding, please respond “[sponsoring organization].”
 - ✓ If someone asks what you are doing, please respond “we are collecting information about the community environment.”
 - ✓ If someone further asks why you are doing this, please respond, e.g., “to learn about the conditions for walking in the neighborhood.”
 - ✓ If someone continues to ask for more information, please respond “for more information, you can call our project manager at {phone number}.”
- Street Safety:***
- ✓ If there is no safe place to walk, conduct audit from inside a vehicle or choose a safe vantage point.
 - ✓ If there is no path or sidewalk, walk on the verge or edge of the road (if minimal to no traffic).

