



# A Comparison of Four Audit Tools to Assess the Rural Built Environment for Active Travel: Which is best for community-led initiatives?

Professional Project Submission

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## Executive Summary

Rural areas face unique health and well-being challenges compared to their urban neighbors. Research shows that the built environment is considered a key influence on physical activity behaviors that directly influence obesity and chronic disease. The audit tool is an approachable method to measure the foundation of rural built environments, to build room for improvements. However, rural community members have more responsibility in the auditing process than urban communities, because of a relative lack of planning resources available to them. This project created guidance for communities to choose a rural audit tool that both suits their goals, and assesses the community capacity needed to conduct an audit (technology, skill, and labor required). The four tools assessed were: the Microscale Audit of Pedestrian Streetscapes (MAPS)-Mini, the Rural Active Living Assessment (RALA), the Pregnancy, Infection, and Nutrition (PIN3) Tool, and the Pedestrian Environmental Data Scan (PEDS). Positive findings included the minimum knowledge, labor, and cost needed to conduct the audits, and the moderate to high level of training materials and general tool reliability available. Limitations included a low number of audits readily available for assessment, and the need for more research addressing multiple forms of reliability and measuring time required to conduct rural audits. Rural communities face challenges utilizing audit results that stem from limited financial and planning capacities necessary to implement infrastructure changes needed for positive physical health outcomes. To achieve results, it's important for planners to provide guidance, and for communities to form local and professional coalitions centered on health.

# Contents

- Acknowledgements..... 2
- Cover Photo Credits ..... 2
- Executive Summary..... 3
- Tables ..... 5
- Introduction: Health and the Built Environment in Rural Communities ..... 6
  - Rural Health and Planning ..... 6
  - The Built Environment and Health..... 6
- Measuring the Built Environment..... 7
  - Audit Tools in Rural Areas ..... 8
  - Additional Need for Capacity ..... 8
- Methods..... 9
  - Selection of Audit Tools ..... 9
  - Assessment of Audit Tool Measures and Methodology ..... 11
- Results..... 14
  - Community Priorities ..... 14
- Discussion..... 17
  - Positive Findings ..... 17
  - Assessment Limitations ..... 17
  - Moving Forward and Roles for ‘Planners’ ..... 18
- End Notes/References ..... 20
- Appendices..... 25
  - 1. MAPS-Mini Audit Tool..... 25
  - 2. RALA Audit Tool ..... 26
  - 3. PIN3 Audit Tool ..... 29
  - 4. PEDS Audit Tool..... 31

# Tables

Table 1. Summary of Audit Tools Selected for Assessment. .... 10

Table 2. Total Questions Assessing Factors of the Built Environment for Each Audit Tool..... 11

Table 3. Support Materials Provided by and Capacity Needed for Audit Tool Process. .... 13

Table 4. Audit Tool Prescribed Based on Community Priorities, Needs and Capacity. .... 15

# Introduction: Health and the Built Environment in Rural Communities

This analysis focuses on the audit tool as an approachable method to measure the built environment in rural areas that face specific health and built environmental challenges. Following an overview of rural health and the built environment, the report presents approaches for measuring the built environment, outlines project methods, and introduces a guidance sheet for communities to use when choosing an audit tool to use in their rural community. The closing discussion highlights key findings for communities and implications for planning.

## *Rural Health and Planning*

Rural populations face unique health challenges compared to urban populations, and planning for rural communities must address rural health. The U.S. Census Bureau defines rural as an area that is not “urban” (2,500 people or more),<sup>1</sup> and rural residents make up approximately 15% of the U.S. population.<sup>2</sup> Rural areas have obesity rates 5% higher for children and 7% higher for adults, as compared to urban populations,<sup>3</sup> and have higher rates of chronic disease.<sup>4</sup> These higher rates are one result of a severely-lacking system of both healthcare and physical activity opportunities for rural areas.<sup>5</sup> The Centers for Disease Control and Prevention’s (CDC) Urban and Rural Health Chartbook,<sup>6</sup> which examines difference in health in relation to geography, shows that out of 23 health indicators, rural areas ranked low on 21 of them. This has led some researchers to name rural populations as a “priority population” for needed health improvements.<sup>7</sup> As obesity and chronic disease continue to plague rural areas, increased rates of physical activity, consistently tied to lower obesity rates and lower rates of chronic disease,<sup>8</sup> are recommended for individuals and communities by the CDC.<sup>4</sup>



**Physical activity is important. Rural obesity rates are 5% higher for children and 7% higher for adults, as compared to urban populations.**

**Image Credit: boca4kids.com**

## *The Built Environment and Health*

The built environment is defined by the CDC as including “all the physical parts of where we live and work (e.g. homes, buildings, streets, open spaces, and infrastructure).”<sup>9</sup> Planning the built environment for health outcomes is not a new concept in the United States.<sup>10</sup> Rapid urbanization of cities created a health crisis that helped birth the relationship between planning and built environment changes that impacted public health in the late 19th Century.<sup>11</sup> This “critical relationship”<sup>12,13</sup> between the fields of health and the built environment, although identified over a century ago, has really progressed in the last 15 years.<sup>14,15</sup> Recent research clearly shows that the built environment is considered a key influence on health

behaviors such as physical activity, which directly influences obesity, chronic disease,<sup>12,9,16</sup> and mental and social health.<sup>17</sup> This increased evidence has grown the influence of planners in the field of public health and the built environment. The Common Community Measures for Obesity Prevention (COCOMO) highlights activities community planners can take, such as “enhance infrastructure supporting walking,” “create safe communities that support physical activity,” and “improve access to outdoor recreation facilities.”<sup>21</sup> Building these physical activities into daily life is important for long-term health, and can be accomplished by planning a built environment that encourages physical activity.<sup>9</sup>

Aspects of the built environment shown to encourage physical health and safety include: transportation, land use (type, density), personal and traffic safety (lighting, crime), open space and recreation opportunities (parks, exercise clubs), pedestrian amenities (views, trees, benches), and pedestrian and cycling infrastructure (sidewalks, crosswalks, signage, bike lanes).<sup>4,18,7,16,19,14,15,20</sup> However, using the built environment to encourage physical activity can be a challenge in rural communities. From a geographic standpoint, the isolation and lack of density of rural areas results increased travel times to destinations by vehicle, instead of bicycle or foot.<sup>3</sup> A lack of destinations lessens incentives to walk or bike, and results in fewer healthy food options, exercise facilities, and parks.<sup>7</sup> Fewer open spaces for physical activity discourages youth and adults from participating.<sup>7</sup> Pedestrian travel to existing destinations can be dangerous or unwelcome,<sup>7</sup> as there are often high traffic speeds,<sup>3</sup> and a lack of bicycle and pedestrian infrastructure, lighting, roads, bike lanes, and sidewalks.<sup>22</sup>



***Aspects of the built environment that impact physical health, and are measured by audit tools. Seating, road type, sidewalk condition, crosswalks, and pedestrian signage are shown above. Image Credit: CDC.gov***

## Measuring the Built Environment

Often times, “what gets measured, gets changed,”<sup>23</sup> and this is especially true in the evidence-based health planning profession. In order to change the trajectory that rural communities are on, there is a need to measure these aspects of the built environment that relate to physical activity over time.<sup>24</sup> Depending on goals, time, available data, level of detail desired, and access to resources, a variety of options are available to measure these aspects of the built environment.<sup>25,26,12</sup> Systematic observations such as audits, as well as self-report surveys, and secondary data such as GIS analysis are all tools developed to measure the built environment.<sup>15,27-30</sup>

## *Audit Tools in Rural Areas*

The audit tool is an approachable method to measure the built environment in rural areas. Audit data are collected in-person, by walking or driving through a segment, using a standardized form to “code” built environment characteristics.<sup>31</sup> Auditing is inexpensive, fast,<sup>28,31</sup> and allows communities an accessible way to track changes over time. This can lead to built environment changes that may yield better health results.<sup>30</sup> Auditing can be used for research, and to supplement secondary data sources such as geographical data.<sup>32</sup> Auditing and other “systematic observation protocols” can reliably represent characteristics of the community.<sup>33,34</sup>

Most audit tools are designed for use in urban areas,<sup>15,35</sup> which can skew results, if used in rural areas. Small towns may lack density, a central downtown, public transit, grocery stores, pedestrian infrastructure like bike lanes and sidewalks, and other measures assessed in most urban audit tools.<sup>7,36</sup> Rural communities often do not have the geographic or statistical data many urban-focused audit tools require.<sup>31,37</sup> As a result of these differences, there have been a number of audit tools measuring the built environment that have been created and tested with rural communities in mind.<sup>36,3,7</sup>



***Often times, rural communities are decentralized, making access to destinations by foot or bicycle difficult.***

***Image credit: Birdshooter.smugmug.com***

## *Additional Need for Capacity*

The creation of audit tools specifically for the assessment of rural communities is an important first step. However, the capacity of a rural town to conduct audits is lower than that of urban areas.<sup>38</sup> Planners, regional planning commissions, and health professionals (who assist with planning for health) are often limited to urban areas, or cover many small communities within their geographic purview, stretching resources thin. Within the community, access to funding to hire consultants to assess the built environment is a challenge for rural towns,<sup>39</sup> and large health-



***Often times, rural communities take on a greater role to plan for, conduct, and assess an audit.***

***Image credit: Michigan DOT, www.miwats.org***

related networks are difficult to build with small numbers of people that may be spread out in a large geographic area. This increases the role required of local initiatives by community members, schools,<sup>40</sup> and neighborhood coalitions to plan for, conduct, and assess an audit.

Because of this increased responsibility, rural communities must choose an audit tool that is appropriate for their community based on their available resources and project goals. Thus, a resource that guides rural communities to the optimal rural audit tool would be beneficial. Based on the community's scenario, weighing in factors like available technology, reading level, and time for preparation, this project introduces guidance for rural communities to choose an audit tool that suits their capacity.

## Methods

### *Selection of Audit Tools*

Audit tools were selected from the Active Living Research website's list of Tools and Measures.<sup>41</sup> This website was the resource base chosen from a Google search for "rural audit tools health." This method was chosen because of its similarity to how a community member would find an audit tool for their neighborhood. Audit tools selected for analysis included those meeting the following criteria: include a broad overview of rural-specific built environment features; not constrained to one type (e.g. parks); measuring multiple age groups; not requiring technical knowledge (GIS) or specific collection devices; not based on surveys or interviews.

After eliminating the non-qualifying audit tools, four tools were left (**Table 1**). The four tools were: the Microscale Audit of Pedestrian Streetscapes (MAPS) -Mini, the Rural Active Living Assessment (RALA), the Pregnancy, Infection, and Nutrition (PIN3) Neighborhood Brief Observation Tool, and the Pedestrian Environmental Data Scan (PEDS).



***The four audit tools were selected from the Active Living Research website, a project supported by the Robert Wood Johnson Foundation.***

***Image credit: [activelivingresearch.org](http://activelivingresearch.org)***

*Table 1. Summary of Audit Tools Selected for Assessment.*

Source: *Activelivingresearch.org*<sup>53-56</sup>

Audit Tool	Summary and Resources
<p><b>MAPS-Mini</b> (Microscale Audit of Pedestrian Streetscapes-Mini)</p>	<p>MAPS-Mini is designed as a checklist, to compare neighborhoods, create maps, award great streets, pinpoint problems, and plan to improve weaknesses. Tool items were chosen because they are modifiable, and most are related to physical activity. The tool is short enough to be practical for use by cities and community groups and is a reasonable substitute for the research instrument that is 8 times longer. The tool was developed by San Diego State University, Urban Design 4 Health, Children’s Hospital Seattle, and Stanford University Medical Center.</p> <p>MAPS Mini tools and information are available at:  <a href="http://activelivingresearch.org/blog/2015/09/auditing-pedestrian-environment-brief-tool-practitioners-community-members">http://activelivingresearch.org/blog/2015/09/auditing-pedestrian-environment-brief-tool-practitioners-community-members</a></p>
<p>Rural Active Living Assessment (<b>RALA</b>)</p>	<p>The RALA tools were designed to conduct a comprehensive active living audit of a rural town. The RALA consists of three separate assessments, including: 1. The Town-wide Assessment, 2. The Program and Policy Assessment, and 3. The Street Segment Assessment. These three assessment instruments are designed to be used together. This tool was designed and tested by researchers at the Maine Rural Health Research Center, University of Southern Maine, Tufts University, University of Alabama, and University of Mississippi.<sup>7</sup> RALA tools and information are available at:  <a href="http://activelivingresearch.org/rural-active-living-assessment-rala-tools">http://activelivingresearch.org/rural-active-living-assessment-rala-tools</a></p>
<p>Pregnancy, Infection, and Nutrition (<b>PIN3</b>) Neighborhood Brief Observation Tool</p>	<p>The PIN3 neighborhood brief observation tool was developed to better understand salient physical environment features that may enhance outdoor physical activity. It was designed by researchers at the University of North Carolina Hospitals. The audit instrument is developed from two other audit tools,<sup>37,42</sup> and adapted for more rural areas.<sup>43</sup> PIN3 tools and information are available at: <a href="http://activelivingresearch.org/pin3-neighborhood-audit-instrument">http://activelivingresearch.org/pin3-neighborhood-audit-instrument</a></p>
<p>Pedestrian Environmental Data Scan (<b>PEDS</b>)</p>	<p>The PEDS audit instrument was designed to balance the need for detailed information about the environment with economy of administration and is thus limited to one page. It was designed by researchers from the University of Maryland and the University of North Carolina.<sup>44</sup> The PEDS audit instrument is adapted from the Systematic Pedestrian and Cycling Environmental Scan (SPACES).<sup>32</sup> PEDS tools and information are available at: <a href="http://activelivingresearch.org/pedestrian-environment-data-scan-peds-tool">http://activelivingresearch.org/pedestrian-environment-data-scan-peds-tool</a></p>

## Assessment of Audit Tool Measures and Methodology

Traits of the built environment assessed by MAPS-Mini, RALA, PIN3, and PEDS were tallied and summarized (Table 2). Also recorded were the increments of the community that each audit tool measured (e.g. segment or downtown). Each audit tool in its entirety is available in Appendices 1-4.

**Table 2. Total Questions Assessing Factors of the Built Environment for Each Audit Tool.**

Source: ActiveLivingResearch.org

MEASURES OF BUILT ENVIRONMENT	AUDIT TOOLS			
	MAPS Mini	RALA	PIN3	PEDS
Total questions in audit tool*	15	72**	43	35
Audit tool is intended for	Practitioner, advocate, community member	Rural communities with population less than 10,000	Urban and rural North Carolina	Unspecified, low cost and time
What is measured	crossings, route, or street segment	street segment, policies, and town	street segment	street segment
Land use type/condition	2	10 <sup>+</sup>	15	3
Destination presence/condition	1	41 <sup>+</sup>	2	1
Road infrastructure	0	4	3	4
Safety	2	3	2	4
Pedestrian amenities/natural features	3	2 <sup>+</sup>	12	6
Pedestrian paths	3	5	5	8
Bike paths	1	3	1	1
Signage	2	2	1	4
Public transit	1	0	1	1
Continuity	0	3	0	3
Policy/program assessment	0	11 <sup>++</sup>	0	0
Written answers	0	2	1	4
<p>*The number of total questions references the numbered questions listed on the survey. Some questions are divided into multiple answers with varying subjects, explaining why the total breakdown of questions does not add up to the total number of questions on the survey.</p> <p>** RALA has 3 separate tools, each with a varying number of questions. The Segment Assessment has 25 questions, The Policy Assessment has 11 questions, and the Townwide Assessment has 36 questions.</p> <p><sup>+</sup> Mostly or All In Townwide Assessment.</p> <p><sup>++</sup> All in Policy Assessment</p>				

In order for a community to conduct an audit, they need to understand what their input and output will be, so as to make an educated decision when selecting which tool may be right for their community. In order to accomplish this task, such factors as time and labor and education level were assessed for each audit tool. **Table 3** summarizes these findings, so the audit tools can be readily compared.

The first step was to gather information on the initial information and training available for the audit tools, as it is crucial to preparing the auditor to understand and reliably fill out the audit tool. Guidance such as field and class trainings, along with definitions and photographic examples of the questions in a condensed manual, were options available to the auditors.



***Audit tools were assessed as to what extent they provided guidance. Photographic examples of road shoulders in poor condition (left), and good condition (right) were one example of guidance shown in some tools.***

***Image credit: [activelivingresearch.org](http://activelivingresearch.org)***

The literacy level of the audit tool and tool instructions, along with the languages it is provided in are important, as that can dictate who is able to conduct the audit. For example, school children will likely not be able to

conduct an audit that reads at a grade 20 reading level. The Flesch-Kincaid grade level, commonly used in Department of Defense documents, was used to measure the literacy level of the audit tools and their instructions.<sup>45</sup> Text from both the audit tool instructions, as well as the audit worksheet, were assessed using this method by pasting the text into Microsoft Word, and calculating the “readability statistics.”

Preparation needed for the day of the audit was also assessed. Communities may need to divide up the area of focus, obtain physical maps, and acquire equipment needed to track what is audited, and this was assessed for each tool. The number of auditors needed, as well as technical or professional expertise needed to prepare or fill out the audit sheet, was also assessed. An auditor will likely struggle if they select an audit tool that requires extensive GIS knowledge to prepare maps, and those resources aren’t available.

The last assessment of the tools was how the results of the completed audit worksheets were tallied, or not tallied, and the overall reliability of the audit tool. Validity and reliability measured depended on research conducted and published for each tool, which included measures such as correlation, feasibility, inter-rater reliability, urban-rural test-retests, and significance of relation of scores to active transportation using Kappa statistics, percent agreement, and the concordance correlation coefficient.<sup>43,44,46-50</sup> Reliability of audit tools are an important issue discussed in research. There are many ways in which to measure reliability in an audit tool. Audit tool questions that are related to either physical activity outcomes, or are valid in rural areas as much as urban areas, are important measures of reliability expressed in some of the audit tools reviewed. Inter-rater reliability is very important, and can be based on correctly completing the training at the beginning of the auditing process, ensuring consistent answering of the audit tool questions. While auditing can be reliably done by communities,<sup>51</sup> they may not necessarily go through extensive training to ensure that inter-rater reliability is high.

**Table 3. Support Materials Provided by and Capacity Needed for Audit Tool Process.**

AUDIT TOOL ELEMENTS	AUDIT TOOLS			
	MAPS-Mini	RALA	PIN3	PEDS
Training preparation	<u>Extensive</u> - Manual, Class/Field Training, Certificate, Photo examples <sup>52,53</sup>	<u>Sufficient</u> - Manual, Webinar training, Photo examples <sup>7,54</sup>	<u>None</u> - Only available for original research project <sup>43,55</sup>	<u>Extensive</u> - Manual, Class/Field Training, Certificate, Video practice, Photo examples <sup>56-59</sup>
Literacy level of scoring & instructions	8.4	<i>Segment</i> - 12.3 <i>Policy</i> - 12.4 <i>Townwide</i> – 13.8	12.3	10.2
Literacy level of audit tool	4.6	<i>Segment</i> – 15.3 <i>Policy</i> – 10.0 <i>Townwide</i> – 20.9	15.5	10.4
Languages	English	English	English	English, Spanish
Audit preparation	Create Map of segments targeted for audit	<i>Townwide</i> -Map town <i>Policy</i> - Contact people with policy knowledge (town board/school) <i>Segment</i> - Partner with informed member of community, Create Map of segments targeted for audit	Create Map of segments targeted for audit	Create Map of segments targeted for audit  Walk segments once without marking on sheet
Labor assistance needed for audit?	Teammate to conduct audit with and to check answers against	<i>Townwide</i> - Contact town officials <i>Policy</i> - Need policy knowledge to answer questions <i>Segment</i> -Audit with informed community member to check answers against	Teammate to conduct audit with and to check answers against	Teammate to conduct audit with and to check answers against
Extra equipment or tools needed	None needed	None needed. Can use GPS for segment audit tool.	None needed. Can use handheld device	None needed. Adapted for use with GIS/GPS and personal digital assistants (PDAs)
Technical knowledge need	Ability to print aerial maps of area	Ability to print aerial maps of area	Ability to print aerial maps of area. Option to use handheld device.	Ability to print aerial maps of area. Option to use GIS/PDA

AUDIT TOOL ELEMENTS	AUDIT TOOLS			
	MAPS- Mini	RALA	PIN3	PEDS
Scoring procedure	Clear, numerical breakdown on audit worksheet, and further explanation in scoring guideline	<i>Segments</i> - not scored <i>Townwide and Policy</i> - numerical scoring in codebook, but not on the audit worksheet	Scores not explained. Checkboxes are used with no numerical value applied to them	No numerical scoring measures available, just questions answered
Reliability and validity of audit tool	Moderate to excellent inter-rater item reliability <sup>47</sup> Total microscale environment scores were significantly related to active transportation <sup>48</sup>	<i>Townwide and Policy</i> - evaluated for their feasibility and not reliability or validity <i>Segments</i> - found to have substantial agreement in inter-rater reliability <sup>49</sup> More research needed to test reliability for rural towns specifically	Two-week test-retest reliability had substantial to near perfect reliability in urban and rural segments for most categories of audit tool. “Decoration” had moderate reliability in urban segments, and lower reliability in rural segments. <sup>43</sup>	Has measures of reliability in rural areas, <sup>50</sup> Rated as reliable when assessing rater reliability <sup>44</sup>

# Results

## Community Priorities

The information organized and compiled in Table 2 and Table 3 was used to build a guidance table for communities to determine which audit tool is best for them based on their specific scenario. Scenarios were determined based on common practitioner scenarios,<sup>60</sup> and limitations in time, money, labor, and technology skills facing rural communities in particular. The reliability of the tool, and the format (e.g. numerical score) of audit results was also included, as communities may have different preferences for relaying and tracking these audit results. **Table 4** highlights some of these possible community needs or priorities, and based on information gathered from the audit tools, selects which audit tool(s) may be the best fit.

Table 4. Audit Tool Prescribed Based on Community Priorities, Needs and Capacity.

Community Priority/Need	MAPS Mini	RALA	PIN3	PEDS	Commentary
School-aged children as auditors	●			●	In order for young members, or lower-educated members of the community to readily use these audit tools, the literacy level should be attainable. MAPS- Mini was the most approachable, with an 8th grade and 4th grade literacy level for its instructions and worksheet. PEDS read at a 10th grade level for both.
Spanish-speaking community members can participate				●	PEDS was the only audit tool provided in another language besides English. This increases the ability of more community members to conduct an audit.
No professional trainer needed	●	●		●	The low technical skill level required, instructions provided, and low-to-no cost of the auditing process put MAPS-Mini, RALA, and PEDS on this list.
Adequate directions and preparation for auditors	●	●		●	PIN3 does not provide training materials.
Quick process of assessment and results	●				MAPS-Mini had the fewest number of questions, with 15. This is the shortest survey by far, and has the scoring mechanism right on the sheet, keeping the process condensed. The instructions and definitions guide is also very short, comparative to the other audit tools (except PIN3, which does not provide one).
A comprehensive assessment		●	●	●	RALA's 3 audit tools had 72 questions combined. PIN3 and PEDS 43 and 35 total questions in their tools, respectively.
Can use handheld device for data collection			●	●	Both PEDS and PIN3 had been adapted for collection by handheld device, however PIN3 information wasn't available for the public, as it was just mentioned in a research paper.
No experts needed to answer the audit tool questions	●		●	●	RALA is not included here because it needs a public official or someone with knowledge of policy information for some questions.
Assess routes and town, not only segments	●	●			For a perspective outside individual segments, MAPS-Mini measures routes and crossings, and RALA measures the town as a whole, as well as policies.
Actually conducting the audit is a quick process	●		●		PEDS requests a walk-through once without answering questions RALA requests an informed community member or elected official to conduct the audit as one of the partners. Scheduling or coordinating this can be time consuming.
Even representation of built environment factors, no gaps		●		●	Only lack of measurement is in RALA for public transit, which rural audit tools are not expected to rank high in.

Community Priority/Need	MAPS Mini	RALA	PIN3	PEDS	Commentary
A focus on pedestrian and cycling infrastructure		●		●	RALA and PEDS had more total questions focusing on infrastructure and signage for pedestrians and cyclists, with a total of 10 questions for RALA, and 13 questions for PEDS.
A focus on physical safety		●		●	Both audit tools had a higher number of questions geared toward this subject, however the range for all the audit tools was only between 2 and 4 questions related to safety.
A focus on policy		●			RALA is the only audit tool with the option for questions geared toward this subject.
A focus on presence/absence of destinations		●	●		RALA had a much higher number of questions geared toward this subject with 40 in their town assessment. Only one was in the street segment, however. PIN3 had the next highest number of questions with 15.
A focus on natural areas			●	●	PIN3 audited pedestrian amenities and natural areas more extensively than the other audit tools, with 12 questions. PEDS still had double the amount of the other two audit tools, with 6 questions.
Desire a numerical score	●	●			Numerical scores provide an easy-to-sum-up rating for a community that can be showed to an elected official. The non-numerical scores still allow the auditor to track changes, and some non-numerical observations can have numbers assigned to them, if desired.
Desire to use audit results for further research	●			●	Multiple research experiments conducted assessing reliability were found for these audit tools. The others were found reliable, but by one or two researchers.
Scientifically validated for rural areas specifically			●	●	Although research was conducted for the inter-rater reliability of the audit tools, only two audit tools had specific research that resulted in measures of reliability in rural areas.
Low cost of conducting audit	●	●	●	●	The overall cost to conduct these audits is low, as the training and audit tools are provided for free, and they do not require software, hardware, or technical skills that would need to be purchased.
Low number of auditors the day of audit	●	●	●	●	Each audit tool suggests two auditors, however, RALA suggests one of those be an informed community member or public official.
Total priorities addressed by each audit tool	11	14	9	15	These numbers signify how many total community priorities identified in this project each audit tool addressed.

In rural areas especially, it is important to consider the resources, or lack thereof, when determining which tool to use. Depending on what method of assessment is used, measuring the local built environment can be useful and inexpensive to community advocates or planners. While no tool will perfectly fit the goals and priorities outlined by a community, all of the tools addressed many priorities a community may have. Who is able to conduct the audit, the preparation needed, timeframe and geographical area intended for assessment, equipment, knowledge, labor, and technology needed for the audit tool, the importance of specific measures to the community (e.g. safety, policy), the presentation of audit results, and the reliability and validity of the audit tools were all able to be adequately assessed in this review. No audit tool was found to be severely lacking. When adding up the total scores of each audit tool, as measured by how many community priorities they addressed in this project, PEDS had a score of 15, followed by RALA with 12, MAPS-Mini with 11, and PIN3 with 9 community priorities met.

## Discussion

### *Positive Findings*

A positive finding from this assessment was that all audit tools had a low cost associated, as the training and audit tools are provided for free, and do not require software, hardware, or technical skills that would need to be purchased. Another positive finding was that all audit tools were amenable to communities not having many people available for the audit. Each audit tool suggests two auditors, however, RALA suggests one of those be an informed community member or public official. All audit tools had scientifically-based support for reliability and validity, with MAPS-Mini and PEDS having the most support. Another positive finding from this assessment was the large extent of training materials, trainings, and preparation that was provided for auditors for all of the audit tools except for PIN3. This can help ease the burden of taking on a project such as an audit conducted in a small community. Clear instruction and provision of materials, along with little demand on the auditors is important, and all of the audit tools readily provided this except for the PIN3 tool.

### *Assessment Limitations*

This assessment, although fairly comprehensive in its review, does have limitations. The audit tools chosen were restricted to the Active Living Research website, and therefore may not include all potentially useful audit tools for rural areas, such as the Wisconsin of the Social and Built Environment (WASABE), for example. The initial comparison of these tools was a challenge because of the diverse extent and range of the design, methodology, and length of the tools. PIN3 was difficult because of the lack of formal training materials available for communities. It was included in this study because it allowed a community to conduct an assessment of their community, and could be successful at doing that, if training and detailed explanation of the audit tool were not community priorities.

In addition, the selection of community priorities will not reflect every community, but was intended to be an overview of common issues that rural areas encounter. Time to conduct the audit is arguably an important priority for a community, but was not specifically included as one of the priorities, and instead, number of questions was used. Time to conduct an audit fluctuates based on multiple factors, including weather, who the auditor is, how organized the process is, and the town layout. Because of those

changing factors, it was not feasible to estimate how much time each specific audit tool would take to conduct. Further assessments could be conducted to properly estimate this factor.

Reliability of audit tools varies per tool. The inter-rater reliability, urban/rural reliability, and correlation to health outcomes were not consistently measured across the audit tools. It is not necessarily the case that the audit tools lacking research on reliability when assessed with rural areas or physical activity outcomes are not reliable. Further research is needed to determine if audit tool questions statistically capture this type of content. However, it should be noted that very little research has been conducted on this subject as a whole.<sup>28</sup> As to inter-rater reliability, further discussions are needed regarding the importance of assessing the value of audit tools in a non-academic or research-related setting. Specifically, to what extent inter-rater reliability adds or detracts from a community's ability to assess their built environment over time.

Despite its limitations, this assessment was designed to assist communities with identifying an appropriate audit tool for a specific project. Its usefulness is strengthened by the comprehensive assessment of the details of each of the audit tools, including length, outcome measures, reliability, and relative community capacity in terms of people, knowledge, time, and resources available. Communities are encouraged to identify these aspects in their community, along with goals of their specific project, in order to determine first, if an audit tool is appropriate for their community, and second, which tool would best fit their scenario.

### *Moving Forward and Roles for 'Planners'*

It is important to understand that a community audit is not the end of a project, but rather the beginning. In order to create sustainable changes to rural physical health, and utilize the results of whichever audit tool is best-suited for their situation, communities are encouraged to identify where auditing the built environment fits in their goals for health improvements, including how they will present the findings, and who they need to work with (e.g. schools, town officials). Audit tools are used as one aspect within this process.

Often times, making progress on those next steps proves difficult for many rural communities and planners, as there are obstacles they need to overcome. A lack of robust economy, high levels of poverty, unemployment, and low rates of insured residents lead to a smaller number of people who have financial access to healthcare.<sup>61,62</sup> Rural municipalities have a smaller tax base, leading to a lack of financial investments in healthcare facilities,<sup>63</sup> as well as built environment infrastructure.<sup>64</sup> Health care infrastructure is economically fragile, making it harder for providers to step outside their role, and collaborate with other sectors.<sup>65</sup> This can impact a community's ability to move forward on built environment projects to encourage physical activity, even when they are identified as needs in the audits.

As discussed, the presence of planning and health professionals vary in rural areas, and they often operate at a reduced capacity compared to urban areas. This leads to an expanded capacity of non-planners in order to assess, plan for, and implement projects. Whether educators, community advocacy groups, or local businesses, local residents become, in a sense, planners of their community. A planning professional's role is in creating and providing essential guidance for communities to educate themselves on the tools needed to assess, plan for, and implement projects. This includes training and information on leadership, business development, social marketing, public participation, public infrastructure, and health

sectors. Regional planning commissions, county planning departments, and extension offices are three resource hubs where planners can build these tools for rural communities.

Strong collaboration is needed to overcome challenges and attain goals in rural communities. Coalitions focused on population health need to be developed across health care, community, education and planning sectors, as well as rural cooperatives.<sup>65</sup> Collaborating across professional fields within their community as well as with other rural communities in order to accomplish health and the built environment goal is essential for accomplishing goals. The Institute of Medicine is one organization that has begun to tackle this need for cross-collaboration in order to achieve broad health goals in rural populations. Their report *“Quality Through Collaboration: The Future of Rural Health”* is a useful tool that proposes five strategies to link built, natural, social, and other relevant environments in order to strengthen rural populations around health.<sup>66</sup> This tool is one example of what guidance planners can provide for rural communities.

Creating positive health changes centered on the built environment can be a challenge for communities. Their specific health and infrastructure challenges inhibit the usefulness of audit tools, even ones that are tailored to rural communities. The audit tool guidance sheet is one aspect that can aide community members who are measuring their built environment as a part of a bigger health-oriented picture. However, building community capacity to create built environment changes, amongst other health-related initiatives, requires building coalitions across communities and sectors. Planners can assist in providing guidance to rural communities to do this. Rural communities may have challenges, but their strong culture of investing in relationships and personal connections may be the factor that makes these collaborations possible.

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# Appendices

## 1. MAPS-Mini Audit Tool

Source:

[http://sallis.ucsd.edu/Documents/Measures\\_documents/MAPS\\_Minis\\_Tool\\_SegmentMethod\\_090815.pdf](http://sallis.ucsd.edu/Documents/Measures_documents/MAPS_Minis_Tool_SegmentMethod_090815.pdf)

Date \_\_\_\_\_ Auditor ID# \_\_\_\_\_

Route # \_\_\_\_\_

Start Time: \_\_\_\_\_ End Time: \_\_\_\_\_



### Crossing

Intersection of \_\_\_\_\_ & \_\_\_\_\_

Crossing from N S E W to N S E W

1. Is a pedestrian walk signal present?
  - No (0)
  - Yes (1)
2. Is there a ramp at the curb(s)?
  - No (0)
  - Yes, at one curb only (1)
  - Yes, at both pre-crossing and post-crossing curbs (2)
3. Is there a marked crosswalk?
  - No (0)
  - Yes (1)

### Segment: \*Count one (your) side of the street\*

Street \_\_\_\_\_ Side N S E W

Starting Cross-street: \_\_\_\_\_

Ending Cross-street: \_\_\_\_\_

1. Type: Residential (0) / Commercial (1)
2. How many public parks are present?
  - 0  1  2 or more
3. How many public transit stops are present?
  - 0  1  2 or more
4. Are there any benches or places to sit (include bus stop benches)?
  - No (0)  Yes (1)
5. Are street lights installed?
  - None (0)  Some (1)  Ample (2)
6. Are the buildings well maintained?
  - 0-99% (0)  100% (1)
7. Is graffiti/tagging present (do not include murals)?
  - No (1)
  - Yes (0)
8. Is there a designated bike path?
  - No (0)  Painted line (1)  Physical barrier (2)
9. Is a sidewalk present? *If no, skip to 12*
  - No (0)  Yes (1)
10. Are there poorly maintained sections of the sidewalk that constitute **major trip hazards**? (*e.g. heaves, misalignment, cracks, overgrowth, incomplete sidewalk*)
  - None (1)  Any/no sidewalk present (0)
11. Is a buffer present?
  - No/no sidewalk present (0)  Yes (1)
12. What percentage of the length of the sidewalk/walkway is covered by trees, awnings or other overhead coverage?
  - 0-25% / no sidewalk (0)  26-75% (1)  76-100% (2)

Score = Total Points \_\_\_\_ / 21 = \_\_\_\_ %

2. RALA Audit Tool Source: [http://activelivingresearch.org/sites/default/files/RALA\\_Segment\\_Tool.pdf](http://activelivingresearch.org/sites/default/files/RALA_Segment_Tool.pdf)

<b>SEGMENT ID#:</b> _____		<b>AUDITOR ID:</b> _____	
RALA Segment Assessment		Primary land use & terrain	
Town Name: _____ 1. Primary streets: _____ _____ 2. Segment Boundaries: _____ _____ 3. Date _____ 4. Start Time: _____		<b>5. Land Use:</b> <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Public / civic <input type="checkbox"/> Open space <input type="checkbox"/> Other	<b>6. Terrain:</b> <input type="checkbox"/> Flat <input type="checkbox"/> Hills <input type="checkbox"/> Wooded / undeveloped <input type="checkbox"/> Winding roads <input type="checkbox"/> Water body <input type="checkbox"/> Other
<b>7. Segment Zone Type:</b> <input type="checkbox"/> Town center <input type="checkbox"/> Neighborhood <input type="checkbox"/> Thoroughfare <input type="checkbox"/> Isolated school zone		<b>Comments:</b>	
Walkability	Types (check all that apply)	Condition (check one for each type) 1 = poor/fair; 2 = good/excellent	
<b>8. Sidewalks</b>	<input type="checkbox"/> Both sides of street <input type="checkbox"/> One side of street <input type="checkbox"/> Intermittent <input type="checkbox"/> Footpath only <input type="checkbox"/> None	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2	
<b>9. Buffers and shoulders</b>	<input type="checkbox"/> Sidewalk buffer <input type="checkbox"/> Defined shoulder <input type="checkbox"/> None	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2	
<b>10. Cross walks and pedestrian signage</b>	<input type="checkbox"/> Crosswalks <input type="checkbox"/> Crossing signals <input type="checkbox"/> Pedestrian signs <input type="checkbox"/> Children at play signs <input type="checkbox"/> None	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2	
<b>11. Other safety features</b>	<input type="checkbox"/> Traffic lights <input type="checkbox"/> Stop signs <input type="checkbox"/> School flashing lights <input type="checkbox"/> Speed bumps <input type="checkbox"/> Public lighting <input type="checkbox"/> None	<b>Comments:</b>	
<b>12. Road/Traffic characteristics</b>	<b>Road Type:</b> <input type="checkbox"/> Paved multi-lane roads <input type="checkbox"/> Paved single lane roads <input type="checkbox"/> Unpaved roads <b>Road Condition:</b> <input type="checkbox"/> Poor/fair <input type="checkbox"/> Good/excellent	<b>Posted speed limit:</b> _____ <input type="checkbox"/> None posted <b>Traffic Volume:</b> <input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	
<b>13. Barriers</b>	<input type="checkbox"/> Highway <input type="checkbox"/> Train tracks <input type="checkbox"/> Private property—no trespassing <input type="checkbox"/> Industrial zone <input type="checkbox"/> Natural features <input type="checkbox"/> Other _____ <input type="checkbox"/> None	<b>Comments:</b>	
<b>14. Connectivity:</b> Do sidewalks, a bikepath or other trail link this segment to other parts of town / attractions or to another segment or road? <div style="text-align: right;"> <input type="checkbox"/> Yes  <input type="checkbox"/> No                 </div>		<b>Condition of connectors:</b> <input type="checkbox"/> 1 <input type="checkbox"/> 2	
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SEGMENT # : \_\_\_\_\_

AUDITOR ID: \_\_\_\_\_

Land Use	Types (check all that apply)	Condition (check one for each type): 1 = poor/fair; 2 = good/excellent	
<b>15. Residential</b>  Density: <input type="checkbox"/> Densely settled <input type="checkbox"/> Moderately densely settled <input type="checkbox"/> Not densely settled (dispersed) <input type="checkbox"/> None	<input type="checkbox"/> Single family detached homes	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Multi-family homes / apartments	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Mobile homes	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Other _____	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> None		
<b>16. Public/civic</b>	<input type="checkbox"/> Library	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Museum	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Community center	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Post office	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Town offices	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Courthouse	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Police station	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Fire station	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Church / religious	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Hospital/health center	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Athletic fields/courts	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Playground	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Other _____	<input type="checkbox"/> 1	<input type="checkbox"/> 2
<input type="checkbox"/> None			
<b>17. Commercial</b>	<input type="checkbox"/> Restaurant / café	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Bar	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Food market	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Theater	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Gas station	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Convenience store	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Small retail	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Big box retail	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Fitness center	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Private medical office	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Private other office	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Other _____	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> None		
<b>18. Schools</b>	<input type="checkbox"/> Elementary (public)	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Middle (public)	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> High (public)	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Private school	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Other _____	<input type="checkbox"/> 1	<input type="checkbox"/> 2
<input type="checkbox"/> None			
<b>19. Industrial/agricultural</b>	<input type="checkbox"/> Light industrial area	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Heavy industrial area	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Farmland area	<input type="checkbox"/> 1	<input type="checkbox"/> 2
	<input type="checkbox"/> Other _____	<input type="checkbox"/> 1	<input type="checkbox"/> 2
<input type="checkbox"/> None			
<b>Comments:</b>			

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Maine Rural Health Research Center, University of Southern Maine at [davidh@usm.maine.edu](mailto:davidh@usm.maine.edu) or 207-780-4513

20. Stop Time: \_\_\_\_\_ 2

SEGMENT # : \_\_\_\_\_

AUDITOR ID: \_\_\_\_\_

**Subjective Assessment** – please answer the following questions last (once the rest of the assessment tool has been fully completed)

**21. Subjective Assessment - Walkability**

How strongly do you agree with the following statement?

*"This segment is walkable."*

- Strongly agree
- Agree
- Disagree
- Strongly disagree

Comments:

**22. Subjective Assessment - Aesthetics**

How strongly do you agree with the following statement?

*"This segment is aesthetically pleasing."*

- Strongly agree
- Agree
- Disagree
- Strongly disagree

Comments:

**General Conditions** – please document the following current conditions:

**23. Current weather conditions:**

- Sunny/clear
- Partly cloudy
- Overcast
- Rain
- Snow
- Other \_\_\_\_\_

**24. Season:**

- Winter
- Spring
- Summer
- Fall

**25. Day of week:**

- Weekday
- Weekend
- Holiday

### 3. PIN3 Audit Tool

Source: [http://activelivingresearch.org/sites/default/files/PIN3\\_Audit.Tool\\_0.pdf](http://activelivingresearch.org/sites/default/files/PIN3_Audit.Tool_0.pdf)

#	Item	Response Options
	Palm ID #	
	Rater ID #s	
	Date	
	Time of day	
	Street segment number	
	Street name	
1	Subjective assessment: Is this street walkable	Relative to other areas you have observed, please provide a subjective assessment. <input type="checkbox"/> Strongly agree <input type="checkbox"/> Agree <input type="checkbox"/> Disagree <input type="checkbox"/> Strongly disagree
<b>RESIDENTIAL LAND USE</b>		
2	Number of residential units	# (if 0, then skip entire section)
3	Types of residential housing (mark all that apply)	<input type="checkbox"/> Single family - detached <input type="checkbox"/> Multi-family/apartment/duplex <input type="checkbox"/> Mobile homes/trailer home <input type="checkbox"/> Housing authority/HUD projects <input type="checkbox"/> New construction / renovation
4	Overall condition of most residential units	<input type="checkbox"/> Excellent condition <input type="checkbox"/> Good condition <input type="checkbox"/> Fair condition <input type="checkbox"/> Poor/deteriorated condition <input type="checkbox"/> Mixed condition (extreme differences) <input type="checkbox"/> Cannot see because heavily wooded (if cannot see, then skip entire section) <input type="checkbox"/> Cannot see for some other reason (if cannot see, then skip entire section)
5	Overall condition of resident-kept grounds	<input type="checkbox"/> Not applicable - no grounds <input type="checkbox"/> Excellent condition <input type="checkbox"/> Good condition <input type="checkbox"/> Fair condition <input type="checkbox"/> Poor/deteriorated condition <input type="checkbox"/> Mixed condition (extreme differences)
6	Type of most front yards	<input type="checkbox"/> None <input type="checkbox"/> Traditional lawn <input type="checkbox"/> Landscaped <input type="checkbox"/> Heavily wooded <input type="checkbox"/> Mixed conditions (extreme differences)
7	Presence of porches	<input type="checkbox"/> None <input type="checkbox"/> Less than half <input type="checkbox"/> Half or more than half
8	Presence of some form of decoration	<input type="checkbox"/> None <input type="checkbox"/> Less than half <input type="checkbox"/> Half or more than half
9	Presence of border (fences/shrubs)	<input type="checkbox"/> None <input type="checkbox"/> Less than half <input type="checkbox"/> Half or more than half
10	Presence of visible security warning signs	<input type="checkbox"/> None <input type="checkbox"/> Less than half <input type="checkbox"/> Half or more than half
11	Any burned, boarded up, or abandoned residential units	<input type="checkbox"/> No <input type="checkbox"/> Yes
<b>NONRESIDENTIAL LAND USE</b>		
12	Presence of nonresidential commercial (i.e., restaurants, cafes) land use	<input type="checkbox"/> None <input type="checkbox"/> Yes, new construction / renovation <input type="checkbox"/> Yes, existing <input type="checkbox"/> Yes, new construction / renovation and existing
13	Presence of nonresidential industrial land use	<input type="checkbox"/> None <input type="checkbox"/> Yes, new construction / renovation <input type="checkbox"/> Yes, existing <input type="checkbox"/> Yes, new construction / renovation and existing
14	Presence of nonresidential agricultural land	<input type="checkbox"/> No <input type="checkbox"/> Yes, field or farm
15	Number of religious structures on segment	#
16	Overall condition of most buildings (commercial, industrial, agricultural, or religious)	<input type="checkbox"/> Not applicable <input type="checkbox"/> Excellent condition <input type="checkbox"/> Good condition <input type="checkbox"/> Fair condition <input type="checkbox"/> Poor/deteriorated condition <input type="checkbox"/> Mixed condition (extreme differences)
17	Any burned, boarded up, or abandoned nonresidential units (commercial, industrial, agricultural, or religious)	<input type="checkbox"/> No <input type="checkbox"/> Yes
18	Presence of home-based businesses (e.g., repairs, sales, etc)	<input type="checkbox"/> No <input type="checkbox"/> Yes
<b>PUBLIC, RESIDENTIAL AND NONRESIDENTIAL SPACE / AESTHETICS</b>		
19	Presence of land that is vacant / underdeveloped	<input type="checkbox"/> None (if none, skip to #21) <input type="checkbox"/> Less than half <input type="checkbox"/> Half or more than half
20	Overall condition of land that is vacant / underdeveloped	<input type="checkbox"/> Excellent condition <input type="checkbox"/> Good condition <input type="checkbox"/> Fair condition <input type="checkbox"/> Poor condition (illegal dumping) <input type="checkbox"/> Mixed condition (extreme differences)
21	General condition of public spaces	<input type="checkbox"/> Excellent condition <input type="checkbox"/> Good condition <input type="checkbox"/> Fair condition <input type="checkbox"/> Poor / deteriorated condition <input type="checkbox"/> Mixed conditions (extreme differences) <input type="checkbox"/> Not applicable (private road)

22	Visible people	<input type="checkbox"/> None ( <b>skip to #24</b> ) <input type="checkbox"/> Children/youth only <input type="checkbox"/> Adults only <input type="checkbox"/> Children/youth and adults	34	Any trails that you can see in this segment	<input type="checkbox"/> No <input type="checkbox"/> Yes, soft surface <input type="checkbox"/> Yes, hard surface <input type="checkbox"/> Both hard and soft surface
23	Are the people being physically active	<input type="checkbox"/> No <input type="checkbox"/> Yes, children/youth <input type="checkbox"/> Yes, adults <input type="checkbox"/> Yes, children/youth and adults	35	Trees shading walking area	<input type="checkbox"/> No trees along segment <input type="checkbox"/> Yes, some trees along segment <input type="checkbox"/> Yes, trees along entire segment
24	Any public or neighborhood park or playground in this segment ( <i>mark all that apply</i> )	<input type="checkbox"/> No ( <b>skip to #26</b> ) <input type="checkbox"/> Yes, park <input type="checkbox"/> Yes, playground <input type="checkbox"/> Yes, church park &/or playground	36	Public lighting	<input type="checkbox"/> None <input type="checkbox"/> Road oriented <input type="checkbox"/> Pedestrian oriented <input type="checkbox"/> Both road and pedestrian oriented
<b>TRANSIT AND ROAD CHARACTERISTICS</b>					
25	Overall condition of park and/or playground	<input type="checkbox"/> Excellent condition <input type="checkbox"/> Good condition <input type="checkbox"/> Fair condition <input type="checkbox"/> Poor / deteriorated condition <input type="checkbox"/> Mixed conditions ( <i>extreme differences</i> )	37	Transit facilities (mark all that apply)	<input type="checkbox"/> None <input type="checkbox"/> Bus stop without bench or shelter <input type="checkbox"/> Bus stop with shelter <input type="checkbox"/> Bus stop with bench
26	Visible dogs	<input type="checkbox"/> No <input type="checkbox"/> Yes, none are loose and out of yard <input type="checkbox"/> Yes, at least one loose and out of yard	38	Number of lanes	Min number of lanes to cross: _____ Max number of lanes to cross: _____
27	Amount of litter	<input type="checkbox"/> None ( <b>skip to #29</b> ) <input type="checkbox"/> A little <input type="checkbox"/> A moderate amount <input type="checkbox"/> A considerable amount	39	Is road paved	<input type="checkbox"/> No <input type="checkbox"/> Yes, paved only <input type="checkbox"/> Both, paved and gravel
28	Type of litter ( <i>mark all that apply</i> )	<input type="checkbox"/> Nonalcoholic cans/bottles/paper <input type="checkbox"/> Alcoholic cans/bottles <input type="checkbox"/> Large items (tires, furniture, appliances, cars) <input type="checkbox"/> Other litter	40	Highest speed limit for segment	MPH: # _____ (if unknown enter 0)
29	Amount of graffiti	<input type="checkbox"/> None <input type="checkbox"/> A little <input type="checkbox"/> A moderate amount <input type="checkbox"/> A considerable amount	41	Presence of a shoulder or bike lane	<input type="checkbox"/> No <input type="checkbox"/> Yes, soft surface <input type="checkbox"/> Yes, hard surface but not a bike lane <input type="checkbox"/> Yes, hard surface bike lane
<b>WALKING AND BICYCLING AMENITIES</b>					
30	Presence of sidewalk	<input type="checkbox"/> None ( <b>skip to #33</b> ) <input type="checkbox"/> One side of street, whole segment <input type="checkbox"/> One side of street, partial segment <input type="checkbox"/> Both sides of street, whole segment <input type="checkbox"/> Both sides of street, partial segment	42	On-street parking	<input type="checkbox"/> None or not allowed <input type="checkbox"/> Allowed, but restricted <input type="checkbox"/> Allowed, no restriction
31	Sidewalk buffer	<input type="checkbox"/> Adjacent to street or curb (no buffer) <input type="checkbox"/> Within 2 feet of street (buffer) <input type="checkbox"/> Between 2-6 feet of street (buffer) <input type="checkbox"/> Greater than 6 feet of street (buffer)	43	Traffic control devices, crossing aids, and signs in segment (mark all that apply)	<input type="checkbox"/> None <input type="checkbox"/> Traffic light(s) <input type="checkbox"/> Flashing warning sign(s) <input type="checkbox"/> Stop sign(s) <input type="checkbox"/> Pavement marking / crosswalk(s) <input type="checkbox"/> Yield to pedestrian paddles / signal / crossing street sign(s) <input type="checkbox"/> "Share the road" bicycle sign <input type="checkbox"/> Other pedestrian or bike friendly traffic signs <input type="checkbox"/> Bicycle parking facilities <input type="checkbox"/> Speed bumps <input type="checkbox"/> Median / traffic island <input type="checkbox"/> Curb extension(s) <input type="checkbox"/> Neighborhood entrance signs <input type="checkbox"/> Neighborhood crime watch <input type="checkbox"/> No trespassing(s) <input type="checkbox"/> Beware of dog / invisible fence <input type="checkbox"/> Billboard
32	Sidewalk condition	<input type="checkbox"/> Good (very few bumps/cracks/holes) <input type="checkbox"/> Fair (some bumps / cracks / holes) <input type="checkbox"/> Poor (many bumps / cracks / holes) <input type="checkbox"/> Under repair			
33	Presence of footpath along road	<input type="checkbox"/> None <input type="checkbox"/> One side of street, entire length <input type="checkbox"/> One side of street, partial length <input type="checkbox"/> Both sides of street, entire length <input type="checkbox"/> Both sides of street, partial length			

# 4. PEDS Audit Tool

Source: <http://planningandactivity.unc.edu/PEDS%20Instrument%20v.2.pdf>

Name: _____	Date: _____	Study Area: _____
Segment Number: _____	Time: _____	Weather: _____

<p><b>0. Segment type</b></p> <p>Low volume road <input type="checkbox"/> 1</p> <p>High volume road <input type="checkbox"/> 2</p> <p>Bike or Ped path - skip section C <input type="checkbox"/> 3</p> <p><b>A. Environment</b></p> <p><b>1. Uses in Segment (all that apply)</b></p> <p>Housing - Single Family Detached <input type="checkbox"/> 1</p> <p>Housing - Multi-Family <input type="checkbox"/> 2</p> <p>Housing - Mobile Homes <input type="checkbox"/> 3</p> <p>Office/Institutional <input type="checkbox"/> 4</p> <p>Restaurant/Cafe/Commercial <input type="checkbox"/> 5</p> <p>Industrial <input type="checkbox"/> 6</p> <p>Vacant/Undeveloped <input type="checkbox"/> 7</p> <p>Recreation <input type="checkbox"/> 8</p> <p><b>2. Slope</b></p> <p>Flat <input type="checkbox"/> 1</p> <p>Slight hill <input type="checkbox"/> 2</p> <p>Steep hill <input type="checkbox"/> 3</p> <p><b>3. Segment Intersections</b></p> <p>Segment has 3 way intersection <input type="checkbox"/> 1</p> <p>Segment has 4 way intersection <input type="checkbox"/> 2</p> <p>Segment has other intersection <input type="checkbox"/> 3</p> <p>Segment deadends but path continues <input type="checkbox"/> 4</p> <p>Segment deadends <input type="checkbox"/> 5</p> <p>Segment has no intersections <input type="checkbox"/> 6</p> <p><b>B. Pedestrian Facility (skip if none present)</b></p> <p><b>4. Type(s) of pedestrian facility (all that apply)</b></p> <p>Footpath (worn dirt path) <input type="checkbox"/> 1</p> <p>Paved Trail <input type="checkbox"/> 2</p> <p>Sidewalk <input type="checkbox"/> 3</p> <p>Pedestrian Street (closed to cars) <input type="checkbox"/> 4</p> <p><i>The rest of the questions in section B refer to the best pedestrian facility selected above.</i></p> <p><b>5. Path material (all that apply)</b></p> <p>Asphalt <input type="checkbox"/> 1</p> <p>Concrete <input type="checkbox"/> 2</p> <p>Paving Bricks or Flat Stone <input type="checkbox"/> 3</p> <p>Gravel <input type="checkbox"/> 4</p> <p>Dirt or Sand <input type="checkbox"/> 5</p> <p><b>6. Path condition/maintenance</b></p> <p>Poor (many bumps/cracks/holes) <input type="checkbox"/> 1</p> <p>Fair (some bumps/cracks/holes) <input type="checkbox"/> 2</p> <p>Good (very few bumps/cracks/holes) <input type="checkbox"/> 3</p> <p>Under Repair <input type="checkbox"/> 4</p> <p><b>7. Path obstructions (all that apply)</b></p> <p>Poles or Signs <input type="checkbox"/> 1</p> <p>Parked Cars <input type="checkbox"/> 2</p> <p>Greenery <input type="checkbox"/> 3</p> <p>Garbage Cans <input type="checkbox"/> 4</p> <p>Other <input type="checkbox"/> 5</p> <p>None <input type="checkbox"/> 6</p> <p><b>8. Buffers between road and path (all that apply)</b></p> <p>Fence <input type="checkbox"/> 1</p> <p>Tress <input type="checkbox"/> 2</p> <p>Hedges <input type="checkbox"/> 3</p> <p>Landscape <input type="checkbox"/> 4</p> <p>Grass <input type="checkbox"/> 5</p> <p>None <input type="checkbox"/> 6</p> <p><b>9. Path Distance from Curb</b></p> <p>At edge <input type="checkbox"/> 1</p> <p>&lt; 5 feet <input type="checkbox"/> 2</p> <p>&gt; 5 feet <input type="checkbox"/> 3</p> <p><b>10. Sidewalk Width</b></p> <p>&lt; 4 feet <input type="checkbox"/> 1</p> <p>Between 4 and 8 feet <input type="checkbox"/> 2</p> <p>&gt; 8 feet <input type="checkbox"/> 3</p>	<p><i>If no sidewalk, skip now to section C.</i></p> <p><b>11. Curb cuts</b></p> <p>None <input type="checkbox"/> 1</p> <p>1 to 4 <input type="checkbox"/> 2</p> <p>&gt; 4 <input type="checkbox"/> 3</p> <p><b>12. Sidewalk completeness/continuity</b></p> <p>Sidewalk is complete <input type="checkbox"/> 1</p> <p>Sidewalk is incomplete <input type="checkbox"/> 2</p> <p><b>13. Sidewalk connectivity to other sidewalks/crosswalks</b></p> <p>number of connections _____ 1</p> <p><b>C. Road Attributes (skip if path only)</b></p> <p><b>14. Condition of road</b></p> <p>Poor (many bumps/cracks/holes) <input type="checkbox"/> 1</p> <p>Fair (some bumps/cracks/holes) <input type="checkbox"/> 2</p> <p>Good (very few bumps/cracks/holes) <input type="checkbox"/> 3</p> <p>Under Repair <input type="checkbox"/> 4</p> <p><b>15. Number of lanes</b></p> <p>Minimum # of lanes to cross _____ 1</p> <p>Maximum # of lanes to cross _____ 1</p> <p><b>16. Posted speed limit</b></p> <p>None posted <input type="checkbox"/> 1</p> <p>(mph): _____ 1</p> <p><b>17. On-Street parking (if pavement is unmarked, check only if cars parked)</b></p> <p>Parallel or Diagonal <input type="checkbox"/> 1</p> <p>None <input type="checkbox"/> 2</p> <p><b>18. Off-street parking lot spaces</b></p> <table border="1" style="margin-left: 20px;"> <tr> <td style="width: 33%;">0-5</td> <td style="width: 33%;">6-25</td> <td style="width: 33%;">26+</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> </tr> </table> <p><b>19. Must you walk through a parking lot to get to most buildings?</b></p> <p>Yes <input type="checkbox"/> 1</p> <p>No <input type="checkbox"/> 2</p> <p><b>20. Presence of med-hi volume driveways</b></p> <p>&lt; 2 <input type="checkbox"/> 1</p> <p>2 to 4 <input type="checkbox"/> 2</p> <p>&gt; 4 <input type="checkbox"/> 3</p> <p><b>21. Traffic control devices (all that apply)</b></p> <p>Traffic light <input type="checkbox"/> 1</p> <p>Stop sign <input type="checkbox"/> 2</p> <p>Traffic circle <input type="checkbox"/> 3</p> <p>Speed bumps <input type="checkbox"/> 4</p> <p>Chicanes or chokers <input type="checkbox"/> 5</p> <p>None <input type="checkbox"/> 6</p> <p><b>22. Crosswalks</b></p> <p>None <input type="checkbox"/> 1</p> <p>1 to 2 <input type="checkbox"/> 2</p> <p>3 to 4 <input type="checkbox"/> 3</p> <p>&gt; 4 <input type="checkbox"/> 4</p> <p><b>23. Crossing Aids (all that apply)</b></p> <p>Yield to Ped Paddles <input type="checkbox"/> 1</p> <p>Pedestrian Signal <input type="checkbox"/> 2</p> <p>Median/Traffic Island <input type="checkbox"/> 3</p> <p>Curb Extension <input type="checkbox"/> 4</p> <p>Overpass/Underpass <input type="checkbox"/> 5</p> <p>Pedestrian Crossing Warning Sign <input type="checkbox"/> 6</p> <p>Flashing Warning Light <input type="checkbox"/> 7</p> <p>Share the Road Warning Sign <input type="checkbox"/> 8</p> <p>None <input type="checkbox"/> 9</p>	0-5	6-25	26+	1	2	3	<p><b>24. Bicycle facilities (all that apply)</b></p> <p>Bicycle route signs <input type="checkbox"/> 1</p> <p>Striped bicycle lane designation <input type="checkbox"/> 2</p> <p>Visible bicycle parking facilities <input type="checkbox"/> 3</p> <p>Bicycle crossing warning <input type="checkbox"/> 4</p> <p>No bicycle facilities <input type="checkbox"/> 5</p> <p><b>D. Walking/Cycling Environment</b></p> <p><b>25. Roadway/path lighting</b></p> <p>Road-oriented lighting <input type="checkbox"/> 1</p> <p>Pedestrian-scale lighting <input type="checkbox"/> 2</p> <p>Other lighting <input type="checkbox"/> 3</p> <p>No lighting <input type="checkbox"/> 4</p> <p><b>26. Amenities (all that apply)</b></p> <p>Public garbage cans <input type="checkbox"/> 1</p> <p>Benches <input type="checkbox"/> 2</p> <p>Water fountain <input type="checkbox"/> 3</p> <p>Street vendors/vending machines <input type="checkbox"/> 4</p> <p>No amenities <input type="checkbox"/> 5</p> <p><b>27. Are there wayfinding aids?</b></p> <p>No <input type="checkbox"/> 1</p> <p>Yes <input type="checkbox"/> 2</p> <p><b>28. Number of trees shading walking area</b></p> <p>None or Very Few <input type="checkbox"/> 1</p> <p>Some <input type="checkbox"/> 2</p> <p>Many/Dense <input type="checkbox"/> 3</p> <p><b>29. Degree of enclosure</b></p> <p>Little or no enclosure <input type="checkbox"/> 1</p> <p>Some enclosure <input type="checkbox"/> 2</p> <p>Highly enclosed <input type="checkbox"/> 3</p> <p><b>30. Powerlines along segment?</b></p> <p>Low Voltage/Distribution Line <input type="checkbox"/> 1</p> <p>High Voltage/Transmission Line <input type="checkbox"/> 2</p> <p>None <input type="checkbox"/> 3</p> <p><b>31. Overall cleanliness and building maintenance</b></p> <p>Poor (much litter/graffiti/broken facilities) <input type="checkbox"/> 1</p> <p>Fair (some litter/graffiti/broken facilities) <input type="checkbox"/> 2</p> <p>Good (no litter/graffiti/broken facilities) <input type="checkbox"/> 3</p> <p><b>32. Articulation in building designs</b></p> <p>Little or no articulation <input type="checkbox"/> 1</p> <p>Some articulation <input type="checkbox"/> 2</p> <p>Highly articulated <input type="checkbox"/> 3</p> <p><b>33. Building setbacks from sidewalk</b></p> <p>At edge of sidewalk <input type="checkbox"/> 1</p> <p>Within 20 feet of sidewalk <input type="checkbox"/> 2</p> <p>More than 20 feet from sidewalk <input type="checkbox"/> 3</p> <p><b>34. Building height</b></p> <p>Short <input type="checkbox"/> 1</p> <p>Medium <input type="checkbox"/> 2</p> <p>Tall <input type="checkbox"/> 3</p> <p><b>35. Bus stops</b></p> <p>Bus stop with shelter <input type="checkbox"/> 1</p> <p>Bus stop with bench <input type="checkbox"/> 2</p> <p>Bus stop with signage only <input type="checkbox"/> 3</p> <p>No bus stop <input type="checkbox"/> 4</p> <p><b>Subjective Assessment: Segment...</b></p> <p>Enter 1,2,3, or 4 for 1=Strongly Agree 2= Agree, 3=Disagree, 4=Strongly Disagree</p> <p>..... is attractive for walking. _____ 1</p> <p>..... is attractive for cycling. _____ 1</p> <p>..... feels safe for walking. _____ 1</p> <p>..... feels safe for cycling. _____ 1</p>
0-5	6-25	26+						
1	2	3						

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