Annex A
Review of walking audit tools

City of Sydney Walkability Audit Project
Tim Pharoah, February 2015

Introduction

This paper provides a review of some of the most prominent walking audit tools from around the English speaking world. General comments are also made as to the various types of audit tool, and the wider research context.

On the basis of this review, during the course of the Project, a recommendation will be made to the City of Sydney as to the most appropriate tool (either in standard or modified form) for the benchmark auditing required in relation to the Walking Strategy.

General comments

Some examples of audit tools are reviewed in this paper. (Apart from the tools reviewed here, there are various other tools that have been developed for particular cities, including in non-English speaking countries.)

At the end of each item the following attributes are allocated:
Audit tool attributes:
A – Checklists of physical aspects of paths
B – Criteria with rating, and thus scoring
C – Subjective factors included (eg perception of safety)
D – Attractions and services within walking distance included (land use)
E – Neighbourhood features such as density or climate included
F – Opportunities and attractions for sojourn included

There are other ways of classifying walking audit tools. Pikora et al (2002) developed a framework for evaluating the physical environment for walkability. The framework includes four features:
- functional,
- safety,
- aesthetic and
- destination

The various audit tools reviewed here can also be categorised on this basis.

Audit tools can take various forms, and serve varying purposes:
- An inventory (of street infrastructure, design, land use etc)
- A series of questions to be answered in each situation)
- A checklist of attributes (of street sections)
- A rating of attributes (scores depending on level of performance or quality)
- Scoring of perceptions (opinions on quality, performance)

- Identification of problems (usually a mapping exercise)
- Identification of potential for improvements
- Designed for use by individual users, community groups, special groups (e.g. schools), or by professionals

Research has been undertaken at several universities at a more theoretical level to determine appropriate ways of measuring or assessing the environment for its walkability. Studies have been driven by varying concerns, for example: safety, physical activity and health, urban form and public realm design, and particular issues such as the journey to school. The health agenda has been particularly prominent in the research field, much more so than concerns about reducing car use or creating more attractive urban spaces for sojourn. There are many references related to the health agenda, and these are not comprehensively covered in the list of further references, as they are not seen as directly relevant to the purpose of this review. [A literature review of that subject is to be found in Schaefer-McDaniel, N., O'Brien Caughy, M., O'Campo, P. and Gearey, W. 2010. 'Examining methodological details of neighbourhood observations and the relationship to health: A literature review.' Social Science and Medicine 70(2): 277-292.]

A major European study **"Pedestrian Quality Needs"** 2010 (COST Action 358, which was reviewed by Tim Pharoah for the European Commission) http://www.walkeurope.org/final_report/default.asp included this view as to the type of audits needed in relation to pedestrians

> "1. Walking Account or Urban Life Account: it would provide a set of key figures for each city to benchmark itself against other cities or towns.
> 2. Public Realm or Walkability Assessment: it would focus on the qualities of specific spaces, e.g. a square or a street.
> 3. WAPAD or Walking Policy Audit Tool: it would analyse in detail and in a comparable form the input side, in particular the institutional framework and;
> 4. Community Street Audit: it would evaluate the quality of streets and spaces from the viewpoint of the stakeholders i.e. the people who use them."

The City of Sydney contract focuses on 2 above, but includes an element of 3 also.

One general but important point should be noted in relation to the various tools reviewed in this paper: very little attention has been paid to pedestrian activity other than as a means of transport. In recent years, increasing attention has been paid in urban planning to the potential for more enlivened public spaces and streets, and creating opportunities for sojourn as well as journeying on foot (staying, meeting, playing, looking, resting etc.).

Examples of existing walking audit tools

1. "Neighbourhood Environment Walkability Survey"
Summary: USA method adopted by the New South Wales Centre for Physical Activity and Health (CPAH). Self-reporting survey to determine level of walkability of a neighbourhood. Mixes objective facts with subjective perceptions. Attributes: B C D E
NEWS instrument can be downloaded from:
http://www.cpah.health.usyd.edu.au/pdfs/NEWS.pdf
NEWS scoring procedures can be downloaded from:
http://www.cpah.health.usyd.edu.au/pdfs/NEWSscoring.pdf
Contact for more information: Brian Saelens, Division of Psychology, Cincinnati Children's Hospital Medical Centre Email:
brian.saelens@cchmc.org

2. Janes Walk "Walkability Checklist"
Toronto-based checklist inspired by Jane Jacobs. Includes various factors to do with the walking infrastructure, that contribute to or detract from walkability. Much of it relates to suburban conditions rather than the central and inner city environments found in the City of Sydney. It is a good set of reminders about quality factors, but does not involve scoring. Attributes: A

3. Walkability Audit Tool (Dept Transport, Western Australia) November 2011
A tool consisting of a detailed form to be completed covering various criteria mostly related to the pedestrian infrastructure (pathways, crossings, street furniture, signage, adjacent traffic, amenities) but also a more subjective rating of "personal safety". It does not deal with the land use context.
Derived initially from Austroads Guide to Road Design, Part 6a Pedestrian and Cyclists Paths), which in turn refers in Section 4 to Tim Pharoah's "5Cs" classification. (Austroads 2009, not available free of charge, see
https://www.onlinepublications.austroads.com.au/items/AGRD06A-09)
Attributes A, B (yes/no rating only), C
Pdf "AT WALK….etc"
The WA tool and descriptions can be accessed here:
http://www.transport.wa.gov.au/activetransport/24033.asp

4. Victoria Walks walking audit tool
A series of questions related to walking, mostly the walking infrastructure, but also perceptions of safety. Rating system 0-3 for each question (with 0 being the best!)
Attributes A B C
http://www.victoriawalks.org.au/How_to_assess_walkability/
Detailed forms
http://www.victoriawalks.org.au/Walking_audit/

5. USA walk audit, from Partnership for a walkable America, PedBike Info, US Dept Transportation.

Refers to person and child undertaking a specific walk. A short list of positive and negative features which can be scored to get an overall rank. It mixes general factors (like the physical condition of a path) with factors that might affect a single walk at a particular time and day. This makes the scoring somewhat arbitrary. This tool is therefore not appropriate in the Sydney context.

6. Pedestrian Environment Review System (PERS)
(developed by TRL Limited, UK)
Contact James Beddingfeld, 01344 770510. Software licence price £1,495.
Useful principles established about the audit process which read well in the Sydney context:
- Based on pedestrian as end user, not the structures and funding regimes of the local authority.
- A standard based on the most vulnerable users will serve the greatest number of potential users.
- Broadly based: applicable within both town centre and residential environments; and in terms of quality, allowing for high quality environments to be audited as well as substandard features identified.

The PERS system was developed within Tim Pharoah's "5Cs" (LPAC 1997). The system aims to take account of the non-transport aspects of pedestrian activity (sojourn) but does not explicitly take in land use and urban design. It is primarily a review system of infrastructure walking as a mode of transport. Nevertheless a review of the PERS process (TRL and TfL) says that *"The work has also highlighted the fact that the qualitative components such as 'the quality of the environment' are as important as the quantitative components such as the 'effective width' of the footway"*.

The software marketed by TRL is designed to automate and present the audit results, and includes weighting of the different factors in scoring. The method combines quant and qual factors, and includes a 7 point scoring system (-3 to +3 with 0 as "average" standard, or not applicable).

PERS v2 extends the scope of the audit tool from "links, crossings, routes" to include "public transport waiting areas, interchange spaces and public spaces".

PERS now includes criteria for:
- Links
- Crossings
- Routes – links, crossings etc. forming complete route e.g. home to library.
- Public Transport Waiting Areas
- Interchange Spaces
- Public Spaces

PERS v3 include GIS capability, plus "quick win" output facility.

For the purposes of monitoring progress with the Sydney Walking Strategy, the PERS system may be too resource intensive for application on all Sydney

streets every 5 years. Nevertheless, the set of criteria are useful in establishing the Sydney method. As with most tools, the absence of focus on sojourn is a problem, as is the lack of attention to factors that influence sojourn and functionality (entrances, attractions, events, services)

Attributes A B C

7. SPACES Instrument (University of Western Australia and promoted by Uni of Sydney)
Designed for use across the whole of Metropolitan Perth. A major study of 2,000 km of street. 37 factors are considered, but the objectives and usefulness are not clear. It is largely cataloguing facts about the street, although subjective assessment of attractiveness is included.

http://sydney.edu.au/medicine/public-health/cpah/research/spaces.php
Attributes A C

8. Active Living Research tools (Saint Louis University School of Public Health, 2003)
Auditing tool for streets and walkability offered in two versions "analytic" and "checklist. Pays a lot of attention to the function and land use character of streets, and rather less attention to walking infrastructure itself. It is more comprehensive than many other tools, including for example activity on the street by different groups, and types of activity, signs and facilities (though art is missing!

However, there is not much in the way of scoring ability, so it is not clear how the results would/could be used. Much of it is factual rather than quantitative or qualitative.

http://activelivingresearch.org/analytic-audit-tool-and-checklist-audit-tool

Attributes D E F

9. Living Streets Community Street Audit (Living Streets, UK)
This is a community based tool which local people are organised to review issues with the walking environment
  • Footway Surfaces and Obstructions
  • Facilities and Signage
  • Maintenance and Enforcement
  • Personal Security
  • Crossing Points and Desire Lines
  • Road Layout and Space Allocation
  • Traffic
  • Aesthetics
There is no formal checklist available since the audits are commissioned from and designed by Livingstreets for individual client groups.
http://www.livingstreets.org.uk/professionals/working-with-communities/community-street-audits
Attributes A C, but potentially others

10. Pedestrian Environment Data Scan (PEDS)
(National Center for Smart Growth Research & Education, Maryland)
This is a mostly objective tool for assessing the character and condition of street segments. It seems to be well thought out. It covers:
Environment, pedestrian facility, road attributes, walking/cycling environment, subjective assessment (of safety)
http://activelivingresearch.org/pedestrian-environment-data-scan-peds-tool
Attributes: A C E

The same centre has issued a tool for:
Measuring urban design qualities
This doesn't measure walkability as such, but the built environment character. Interesting way to try to decode the design of a street, but it appears to include values of quality that either neither explained nor justified.
http://smartgrowth.umd.edu/measuringurbandesignqualities.html
Attributes: None of those listed

11. Neighborhood Environment Walkability Scale (NEWS)
(James Sallis, Uni of California, 2002)
98-question instrument that assesses the perception of neighbourhood design features related to physical activity, including residential density, land use mix (including both indices of proximity and accessibility), street connectivity, infrastructure for walking/cycling, neighbourhood aesthetics, traffic and crime safety, and neighbourhood satisfaction.

It asks people about their neighbourhood in general as well as about their own street. However the questions are poorly designed and inconsistent, making scoring extremely difficult, for example by mixing positive and negative features randomly.

There is a separate scoring form for youths (to be filled by parents)

http://sallis.ucsd.edu/measure_news.html

Attributes B C D

12. Pedestrian Mobility and Safety Audit Guide
(US Institute of Transportation Engineers, undated)
Mainly focused on road safety aspects. It is a checklist of questions to be asked to determine the safety and other qualities of a street or intersection. It places some importance on the legal aspects, e.g. when do pedestrians have right of way. It is clearly from an engineering perspective, and is a bit of a mish mash of different ideas, but some useful aspects can be learnt. Not very helpful as a tool in itself.
http://www.ite.org/pedaudits/
Attributes A

Note: The ITE has also issued a briefing document for auditing walk to school routes, but this is not a systematic audit tool.

13. Community Street Review (New Zealand Transport Agency)
Designed from a user participation perspective. It covers Safety from traffic, safety from falling, obstacles, security, pleasantness, efficiency, and directness.
Unlike most audit tools it also includes measures to bring about improvements (and users' attitudes to them), and references the participant's details.
http://www.nzta.govt.nz/resources/community-street-reviews/
Attributes A B C E F

14. Neighbourhood Walkability Checklist (Heart Foundation Walking - HFW, Australia)
Form with 4 sections with Yes/No rating of questions:
Walker friendliness, Comfort, Safety, Convenience and Connectedness.
It is designed for individuals to rate a particular walk/route, and not for general auditing of routes.
(Not available on HF website, hence alternative link below)
http://www.thinkingtransport.org.au/library/2011/08/neighbourhood-walkability-checklist-how-walkable-your-community
Attributes A B C

15. The Healthy Neighbourhood Audit Instrument
(School of Economics and Finance, Curtin Business School, Curtin University, 2013) Emily Mitchell and Susan Thompson, City Futures Research Centre, University of New South Wales, Sydney
(See 7th Australasian Housing Researchers' Conference, 6th – 8th February 2013, Fremantle, Western Australia)
http://www.be.unsw.edu.au/healthy-built-environments-program/projects/planning-and-building-healthy-communities

The tool requires detailed site surveys and consists of three parts:
1. Land use data (the uses and buildings enclosing the pedestrian environment). This is mostly an inventory, but there is also a requirement to judge qualitative aspects of the street, and pedestrian activity within it.
2. The street network. This mostly an inventory of pedestrian infrastructure, with a rating of some attributes (poor, average, good)
3. Overall issues: open ended questions on a range of issues

The audit instrument provides for a combination of objective observations – for example, the presence or lack of certain features like footpaths and street furniture, as well as the level of maintenance of such features – and subjective observations based on perceptions and feelings.

In the context of the Sydney project, the comprehensive inventory aspect might be seen as too detailed and not central to the purpose of benchmark auditing. Also, the inclusion of food aspects (in relation to health) may be more relevant in the suburban rather than the inner urban context.

Attributes A B C D E F

16. Twin Cities Walking Survey
(Twin cities refers to Minneapolis–Saint Paul, Minnesota)
http://activelivingresearch.org/twin-cities-walking-survey
This is a community survey which includes aspects of walkability, but is much wider in scope. It is a compilation of measures used to assess several environmental and social factors related to physical activity, including: quality of life, perceptions of neighbourhood environment (crime, social support), demographics, retail environment, and pedestrian and bicycle safety. It is designed to be completed by individuals in relation to their own community. It includes ratings for various street and neighbourhood attributes.
Attributes B C D

17. Walkability Checklist
US Department of Transportation/others
Designed for people to survey their own particular route(s), and to get them to think about what is wrong and what can be improved.
It is too general to be of use for a serious audit, but it does include some useful items on the checklist that could be incorporated in an audit tool.
Perhaps strangely, it asks people to comment on "trip specific" events, e.g. to say whether on their walk there was bad driver behaviour or scary dogs.

Similar checklists can be found in other places, such as Edmonton, and Saskatchewan, Canada, and San Diego – whose checklist is helpfully illustrated with real life examples.
Attributes A B C

18. WRATS walking audit tool for seniors
(Uni of California)
http://activelivingresearch.org/walking-route-audit-tool-seniors-wrats

Another tool from Active Living Research, this one modified to be more appropriate for "seniors". It is, however, designed to audit the person's own particular walk (e.g. home to friend), rather than to make a professional area-wide audit.
Attributes A B C

19. Pedsafe Pedestrian Audit, Austroads, Sydney 2001

20. **Active Travel Design Guidance**, Welsh Government 2014
Includes a scoring tool for routes (for cycling, but relevance also to walking routes). It scores 20 factors over 5 themes: attractiveness, comfort, directness, safety, coherence. Rating uses the traffic light system,
      Red: poor provision
      Amber: adequate but needs improvement
      Green: good quality provision

Attributes A, B, C

Further references

References that include reviews of methods or that take a more theoretical approach (drawn from the internet, and not reviewed in this document):

Ably, S, (2006) "Variables Collection Methodology", Walkability Tools Research, Land Transport, New Zealand. See also http://paperzz.com/doc/1337469/community-street-review-how-to-guide

Brownson, R.C., Chang, J., Eyler, A.A., Ainsworth, B.E., Kirtland, K.A., Saelens, B.E. and Sallis, J.F. 2004. 'Measuring the Environment for Friendliness Toward Physical Activity: A Comparison of the Reliability of 3 Questionnaires.' American Journal of Public Health 94(3): 473-483.

Clark, S., Davis, A., "Identifying and Prioritising Walking Investment through the PERS audit tool", (Experience from London) Walk21 Conference 2009 – New York.

Day, D., Boarnet, M., Alfonzo, M., & Forsyth, A. (2006). "The Irvine-Minnesota Inventory to Measure Built Environments". American Journal of Preventive Medicine, 30(2)144-152.

Dunstan, F., Weaver, N., Araya, R., Bell, T., Lannon, S., Lewis, G., Patterson, J., Thomas, H., Jones, P. and Palmer, S. 2005. 'An observation tool to assist with the assessment of urban residential environments.' Journal of Environmental Psychology 25(3): 293-305.

Gehl, J. (1987), Life Between Buildings: Using Public Space. New York: Van Nostrand Reinhold

Gehl, J. (2010). "Cities for People", Washington: Island Press.

Giles-Corti, B., Timperio, A., Cutt, H., Pikora, T.J., Bull, F., Knuiman, M., Bulsara, M., Van Niel, K., & Shilton, T. (2006). "Development of a Reliable Measure of Walking Within and Outside the Local Neighborhood: RESIDE's Neighborhood Physical Activity Questionnaire". Preventive Medicine, 42(2006)455-459.

Hoehner, C.M., Ivy, A., Brennan Ramirez, L., Handy, S., & Brownson, R.C. (2007). "Active Neighborhood Checklist: A User-Friendly and Reliable Tool for Assessing Activity Friendliness". American Journal of Health Promotion, 21(6)534-537.

Hoehner, C.M., Ivy, A., Brennan Ramirez, L., Meriwether, B., & Brownson, R.C. (2006). "How Reliably Do Community Members Audit the Neighborhood Environment for its Support of Physical Activity? Implications for Participatory Research". Journal of Public Health Management Practice, 12(3), 270-277.

Humpel, N., Owen, N., Iverson, D., Leslie, E., & Bauman, A. (2004). "Perceived Environment Attributes, Residential Location, and Walking for

Particular Purposes". American Journal of Preventive Medicine, 26(2)119-125.

Leslie, E., Coffee, N., Frank, L., Owen, N., Bauman, A. and Hugo, G. 2007. 'Walkability of local communities: Using geographic information systems to objectively assess relevant environmental attributes.' Health & Place 13(1): 111-122.

McMillan, T.E., Cubbin, C., Parmenter, B., Medina, A.V. and Lee, R.E. 2010. 'Neighbourhood sampling: how many streets must an auditor walk?' International Journal of Behavioural Nutrition and Physical Activity 7:20.

Mayne et al 'An objective index of walkability for research and planning in the Sydney Metropolitan Region of New South Wales, Australia: an ecological study' . International Journal of Health Geographics, 2013, 12:61 (Concludes on ability to predict utility walking using an index based on residential density, intersection density, and land use mix data.) http://www.ij-healthgeographics.com/content/12/1/61 (open access)

Moudon, A.V., & Lee, C. (2003). "Walking and Bicycling: An Evaluation of Environmental Audit Instruments". American Journal of Health Promotion, 18(1)21-37.

Pelletier, A., Paquin, S., & Chartrand, A. (2009). "Are all Walking Audits Equivalent? A Comparison of Three Walking Audits in a Montreal Neighbourhood". http://www.walk21.com/paper_search/results_detail.asp?Paper=416

Pikora, T., Giles-Corti, B., Bull, F., Jamrozik, K., & Donovan, R. (2002). "Developing a Framework for Assessment of the Environmental Determinants of Walking and Cycling". Social Science & Medicine, 56(2003)1693-1703.

Pikora, T., Bull, F., Jamrozik, K., Knuiman, M., Giles-Corti, B., & Donovan, R.J, (2002). "Developing a Reliable Audit Instrument to Measure the Physical Environment for Physical Activity". American Journal of Preventive Medicine, 23(3)187-194.

Tencer, Stephanie (undated, but 2007?) "Contextualizing the Community Walkability Audit Tool", Toronto Coalition for Active Transportation.

Wong, F., Stevens, D., O'Connor-Duffany, K., Siegel, K. and Gao, Y. 2011. 'Community Health Environment Scan Survey (CHESS): a novel tool that captures the impact of the built environment on lifestyle factors.' Global Health Action 4:5276.

Livi, A. D., and K. J. Clifton. 2004. Issues and methods in capturing pedestrian behaviours, attitudes and perceptions:
Experiences with a community-based walkability survey.
http://www.enhancements.org/download/trb/trb2004/
TRB2004-001417.pdf (October 2007).