

# Focus on CSIR decision support for service access planning

## Using accessibility modelling

CSIR Built Environment  
October 2015



### Service access planning

Service access planning deals with the location and right-sizing of service delivery facilities, and the development of transportation and service linkages in order to achieve the following outcomes:

- Improvements to service accessibility and availability from the perspective of existing and potential customers;
- Attraction of the threshold volume of customers that is needed to cover the overheads and make the service viable;
- Development of cost-effective linkages between services (i.e. linkages that will reduce overheads and/or increase the range of accessible services).

### Methodology

The CSIR has pioneered the development of a customised methodology for service access planning in South Africa. This includes validated procedures for undertaking the following:

1. Auditing of service accessibility and availability at a district level, municipal, planning district or precinct level;
2. Demarcation of facility catchment areas;
3. Mapping of areas with poor access to facilities and/or insufficient capacity in relation to demand;
4. Identification of good locations for new or consolidated facilities;

5. Evaluation of impact of investment on service backlogs;
6. Prioritisation of different investment locations for facilities and/or improved transport links to achieve greater service reach.

### Software

Although the methodology can to some degree be executed with a variety of freeware and proprietary GIS-based software tools, the CSIR uses mainly Flowmap as the analysis tool – a freeware system developed by Utrecht University in the Netherlands.

One of the main features of Flowmap is its software algorithms for simultaneously analysing and matching the supply and demand of many service points within catchment areas. The demarcation of catchment areas is based on actual travel distances or times along a network of roads or pedestrian pathways. This means that the “severance effect” of rivers, railway lines and so forth can be modelled explicitly.

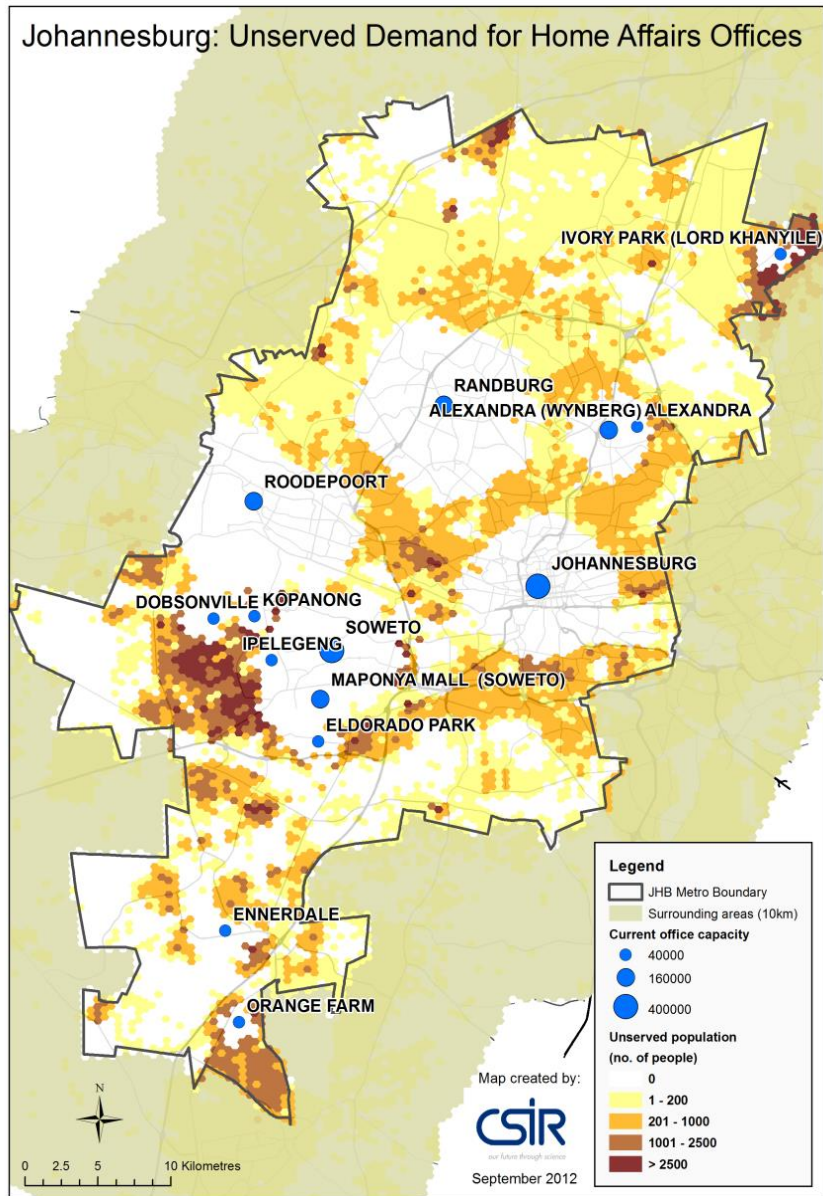
When applying the software, the study area is usually divided into equally-sized hexagons, which are then linked to the nearest point on the network. The hexagons are also used for the mapping of results – such as travel time to the nearest facility. This greatly improves the ease of interpreting the results, as well as increasing the accuracy of service access indicators (e.g. indicators of the proportion of the population with sufficient access to specified facilities). The ESRI software is mainly used for mapping of results.

### Standards and guidelines for facility provision

To successfully apply the accessibility modelling for spatial evaluation of service provision coverage, the CSIR – together with municipal clients – has developed a range of threshold standards and access guidelines for the provision of social facilities. The CSIR has extended this set of standards for application to a range of town and rural types. See [http://www.csir.co.za/Built\\_environment/pdfs/CSIR\\_Guidelines.pdf](http://www.csir.co.za/Built_environment/pdfs/CSIR_Guidelines.pdf)

### Examples of applications

- » Geographic accessibility study of social facility and government points for the metropolitan cities of Johannesburg and eThekweni for the Department of Public Service and Administration. See [http://stepsa.org/pdf/social\\_facility\\_planning/dpsa\\_report/201508\\_cover.pdf](http://stepsa.org/pdf/social_facility_planning/dpsa_report/201508_cover.pdf);
- » A study undertaken as part of the national crime prevention initiative to assess access to police services in Khayelitsha;
- » Assessment of fire station response times to land with different risk categories in the Cape Metropolitan Area Fire;



A map showing the concentration of unserved population in terms of demand for Home Affairs offices in Johannesburg (2012)

- » Accessibility analysis of the Department of Home Affairs offices in the Western Cape and assessment of future requirements;
- » A comprehensive audit of access to and availability of public facilities in eThekweni
- » A facility access audit for the City of Cape Town in order to assess facility backlogs, and potential sites for new facility provision to support the development of district spatial plans.

#### Contact details

**CSIR Built Environment**  
Chéri Green

Tel: +27 21 888 2508

Fax: +27 21 888 2694

E-mail: [cgreen@csir.co.za](mailto:cgreen@csir.co.za)

PO Box 320, Stellenbosch, 7599

[www.csir.co.za](http://www.csir.co.za)