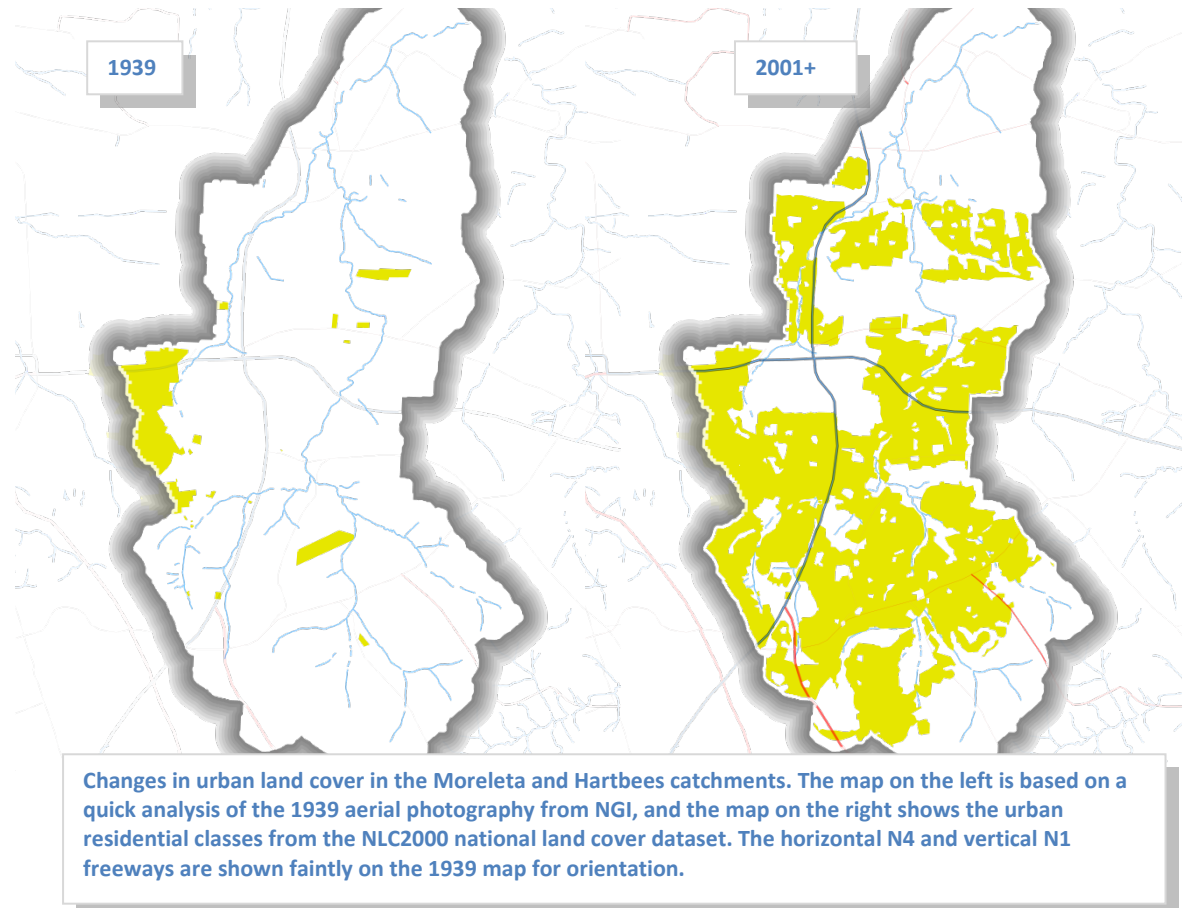## What do the photographs show?

From the patterns on the images, by 1939 the land use of the Moreleta catchment was already transformed into rural agriculture with some forestry. Urban Pretoria was spilling over into the upper Hartbees catchment. Hilltops were mostly undeveloped. The Mozambique railway line and Lynnwood Road were the major east-west communication lines cutting across the catchments.

Changes in urban land cover in the Moreleta and Hartbees catchments. The map on the left is based on a quick analysis of the 1939 aerial photography from NGI, and the map on the right shows the urban residential classes from the NLC2000 national land cover dataset. The horizontal N4 and vertical N1 freeways are shown faintly on the 1939 map for orientation.

What next?

Higher-resolution scans of the original aerial photographs, along with better contrast matching during the preparation of the mosaic, can provide even more detail in specific areas of interest. Comparisons in specific areas such as wetlands and parks would be helpful to planners, conservation bodies, historians and anyone wanting to know more about development in the catchment.
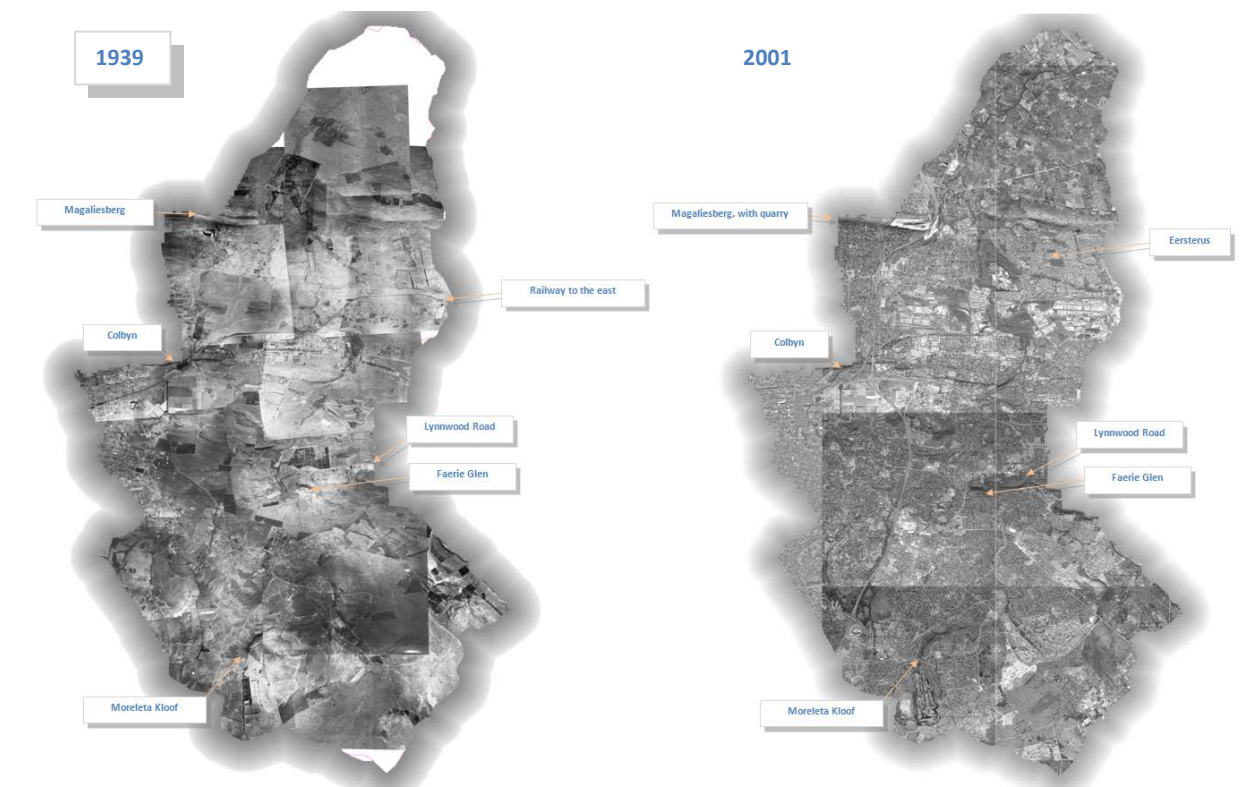
Acknowledgements

National Geo-spatial Information (NGI), a chief directorate in the Department of Rural Development and Land Reform, has archived the early aerial photography of South Africa, and kindly made digital copies of these and the recent orthophotos available. The perspective views would not have been possible without the extraordinary technical wizardry of Google Earth. Parts of the original habitat still exist thanks to the generosity of land-owners, the foresight of the City of Tshwane and its predecessors, and the dedication of Friends groups along the river course.

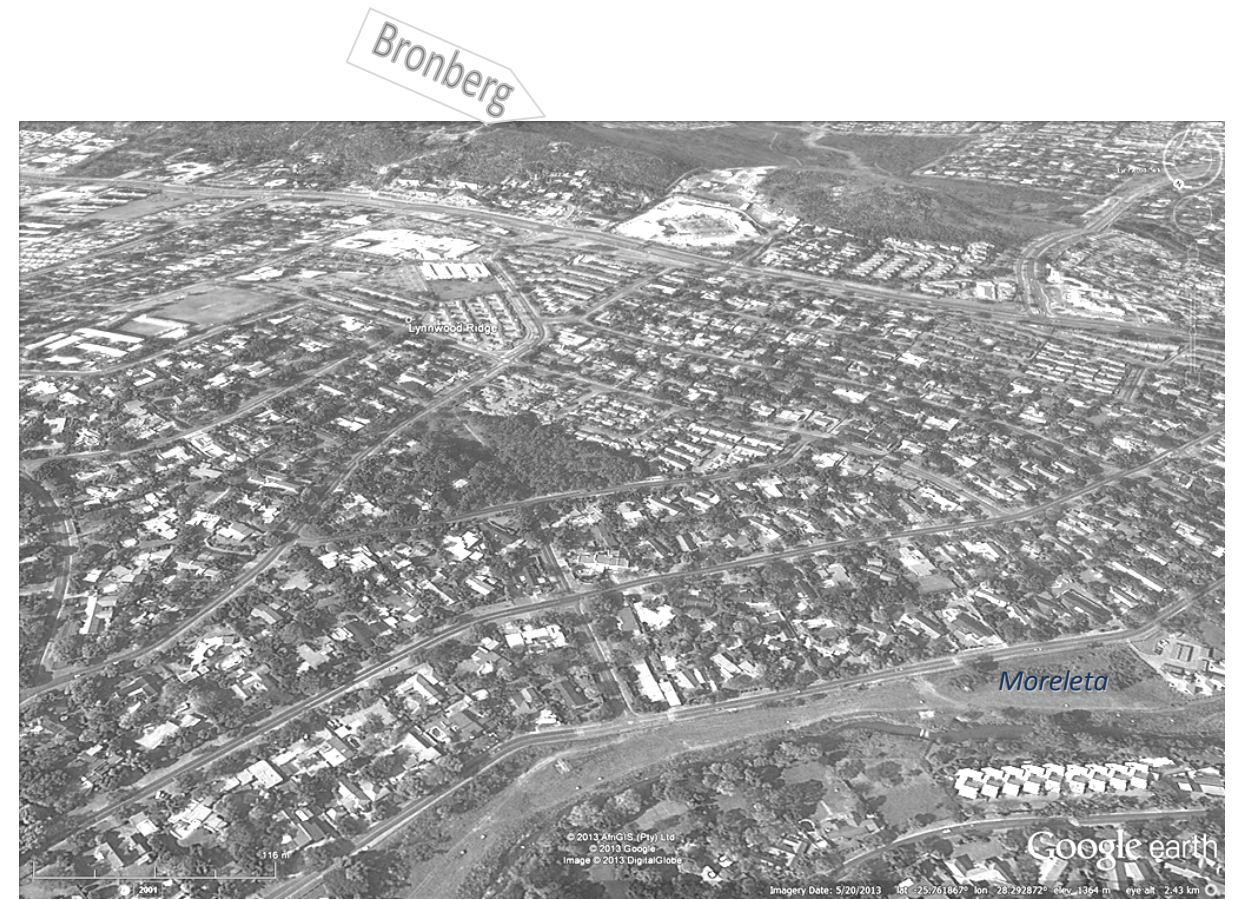# Land cover changes in the Moreleta Spruit catchment
M J Silberbauer – January 2014 – SilberbauerM@dwa.gov.za

The Moreletaspruit and Hartbeesspruit in the east of the City of Tshwane, have experienced extensive urbanisation since the middle of the twentieth century. The Golder Situational Analysis of the Moreleta Spruit showed that the land cover of the catchment, particularly in the southern part, is now almost completely urban.

Large land use changes are visible when comparing aerial photography from 1939 with orthophotos from 2001, for the Moreleta and adjacent Hartbees catchments. The raw 1939 photography has been "rubber-sheeted" to match the 2001 orthophotos as closely as possible. Both data sets are courtesy of National Geo-spatial Information, Department of Rural Development and Land Reform.

Please turn over the page for a more detailed view.

Perspective views

Viewing a landscape vertically is useful for making measurements of distance and area, but an oblique view gives a more realistic impression. Google Earth has an option for overlaying images onto the Google Earth landscape. You can do this interactively, or, if you have images with spatial information such as an ArcGIS "world" file, you can write a KML file with the coordinates of the image corners. Once the image is in Google Earth, a slider permits the user to fade it in and out.

Bronberg

Faerie Glen

Lynnwood Ridge

Moreleta

North

Bronberg

Lynnwood Ridge

Moreleta

A perspective view from a point above the CSIR, looking towards Lynnwood, in 1939 and ~2013. The present-day road network is superimposed on the 1939 image for ease of comparison (thin yellow or white lines). The Moreleta Spruit is in the foreground; the Bronberg and Faerie Glen reserve are in the background. Remnants of the plantations visible in the 1939 image have survived to the present day. Lynnwood Road, running along the base of the Bronberg, is the only major road visible in both aerial views.

Sources: NGI, Google Earth with NGI data, photo by author (2013).

Keyhole Markup Language or KML

KML is the code with which anyone can customise Google Earth views. The lines of code from the KML file for showing the above image in the correct place on Google's earth are:

```
<GroundOverlay>
        <name>moreleta_1939_geo_1200dpi.png</name>
        <visibility>0</visibility>
        <description>Topo map
C:/data_large/photos/2013/map/moreleta_2001_geo_1200dpi.png</description>
        <Icon>
        <href>C:/data_large/photos/2013/map/moreleta_2001_geo_1200dpi.png</href>
                <viewBoundScale>0.75</viewBoundScale>
        </Icon>
        <LatLonBox>
          <north>-25.6578803</north>
          <south>-25.8560894</south>
          <west>28.2279245</west>
          <east>28.3571292</east>
                <rotation>0</rotation>
        </LatLonBox>
</GroundOverlay>
```


This is a 2013 photograph: ground-level photos of the catchment in the 1930s would be extremely useful...