



# eThekweni GIS Geospatial Digital Twin User Guide

2025-07-24

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# User Guide for eThekweni Geospatial Digital Twin

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## 1. Introduction

Welcome to the eThekweni Geospatial Digital Twin.

This guide walks you through how to navigate, interact, and make the most of our eThekweni Geospatial Digital Twin.

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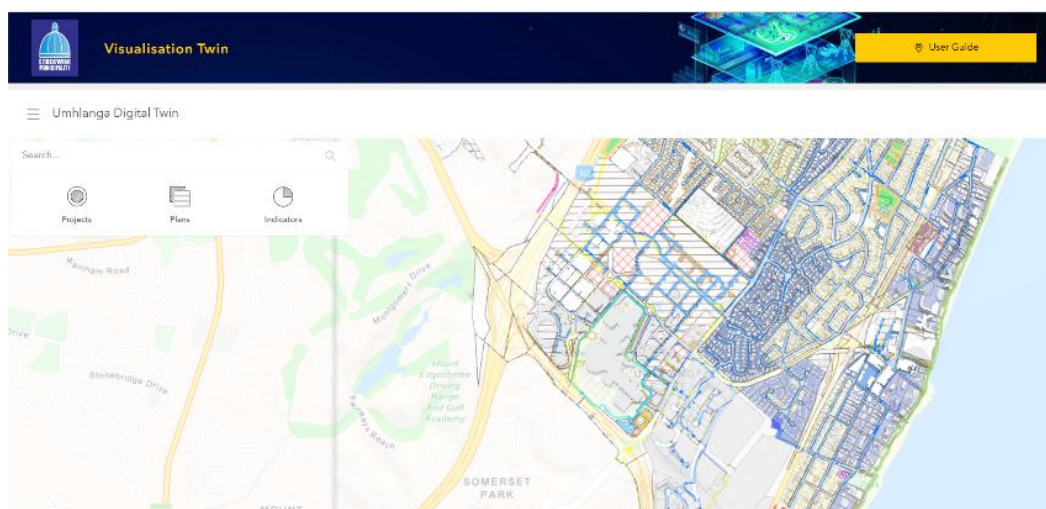
## 2. Navigating the Visualization Twin

There are a number of methods to navigating the Visualization Twin. These will be demonstrated in the steps that follow and include:

- View and Layer Visibility
  - Mouse Functions
  - Keyboard Functions
  - Navigation Tools
- 

## 3. View and Layer Visibility

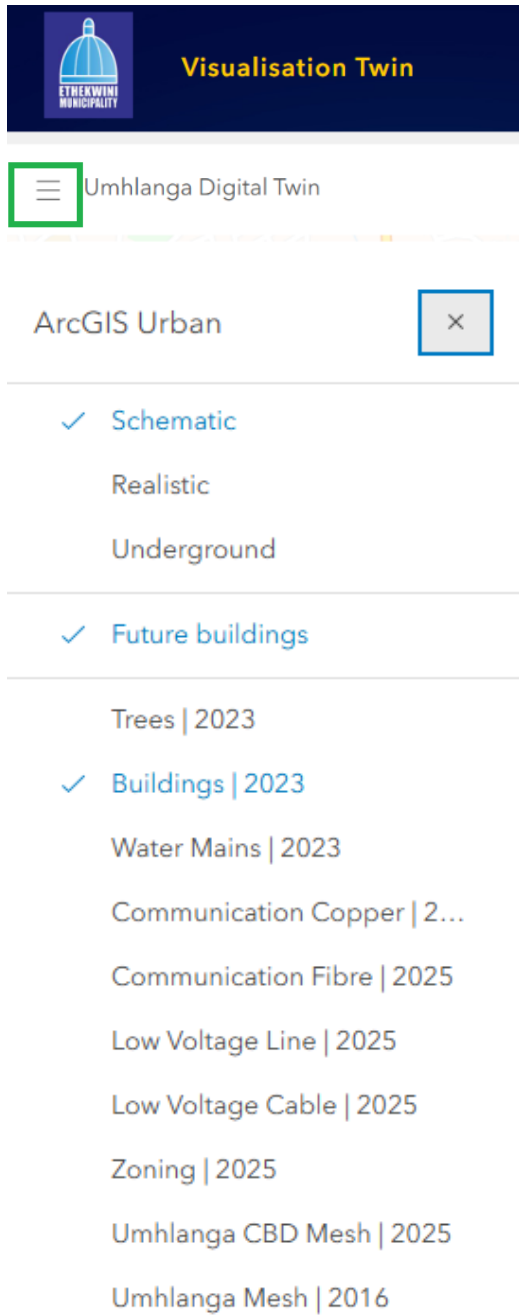
1) The Visualization Twin opens by default in a new tab on the **Overview** Page.



The overview is a complete view of all plans, projects, and indicators in a city. The overview window contains the following key elements:

- The view—A 3D model of a city with plans and projects represented by multicolored buildings, study areas, and pins.  
The search panel—An interactive side panel with search and filter functionality with a list of plans, projects, and indicators.

2) On the ribbon, click the **Options** button to display the contents of the urban model. A menu opens on the left side of the page:



The layers in the urban model are divided into groups. You can show or hide these layers from the map by clicking them. The **Schematic** representation is displayed by default. You can change to the **Realistic** or **Underground** representation to provide different views of the urban model.

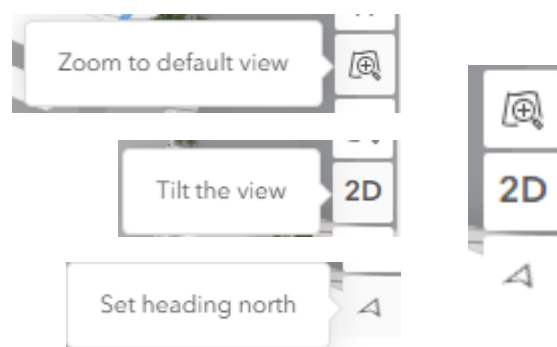
3) You can explore the twin using various mouse functions:

- Click and drag the map to pan the view.
- Right-click while moving the pointer forward and backward to tilt the view.
- Right-click while moving the pointer from side to side to rotate the scene.
- Double-click to zoom to the pointer.
- Use the mouse wheel to zoom in and out.

4) Alternately, there are several keyboard shortcuts you can use to navigate as well:

- Press N to rotate the view to face north.
- Press P to tilt the view to perpendicular.
- Press J to incrementally move closer in the view.
- Press U to incrementally move away from the view.
- Press the arrow keys to incrementally pan the view left, right, up, or down.

5) You can also make use of the toolbar navigation tools.



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## 4. Using the 3D Analysis Tools

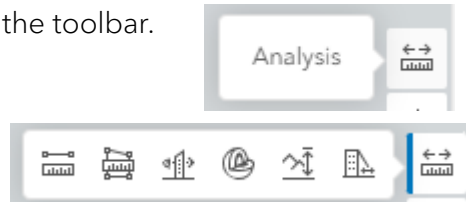
Functionality that is built into the Visualization Twin includes analysis tools that allow you to do the following:

- Measure distance.
- Measure area.
- Conduct a visibility analysis.
- Slice a cross section.
- Generate an elevation profile.
- Conduct a shadow cast analysis.
- Analyze the lighting conditions.

1) Locate the **View** toolbar near the bottom of the screen:



2) Click **Analysis** to expand the toolbar.

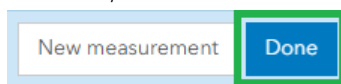


3) The Analysis toolbar is displayed. The options on this toolbar allow you to measure distance or area, perform line of sight analysis, and slice objects for cross-sectional analysis.

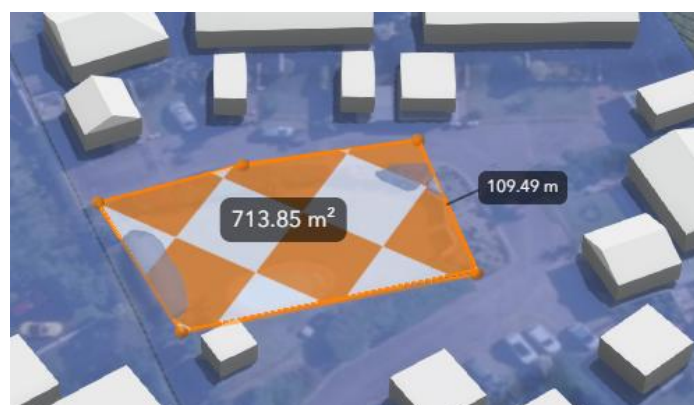
4) Select the **Measure distance** tool. Click on the map to place a starting point for the Measure distance tool.



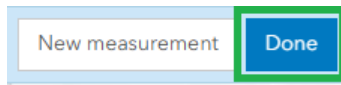
Move your mouse pointer to view vertical and horizontal distance change. Double click to place your end point and complete your measurement. To clear the distance measurement and start over, you can click **New measurement** on the **Measure distance** toolbar. To close the tool, on the **Measure distance** toolbar, click **Done**.




5) Select the **Measure area** tool. Click on the map to place a starting point for the Measure area tool. Click to place each subsequent point.

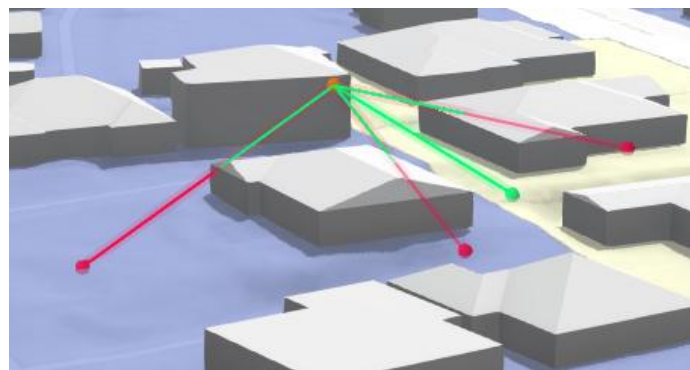


Double click to place your end point and complete your measurement. To clear the area measurement and start over, you can click **New measurement** on the **Measure area** toolbar. To close the tool, on the **Measure area** toolbar, click **Done**.

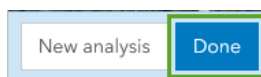


6) Select the **Line of sight** tool. Click on a point in the scene to place an observer point. (This is the point at which your hypothetical observer is standing. ) Click different points around the building to add multiple sight lines to the model. Double-click the last point to complete

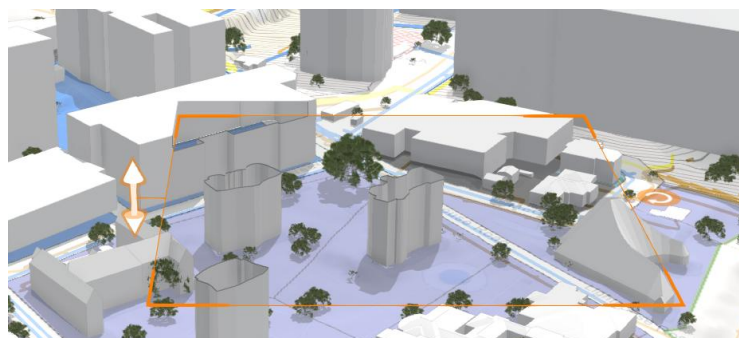
the analysis. 



As you move the mouse around the scene, green indicates what you can see from the observer point of view, and red shows where the target is not visible. Yellow elevation guides show the height of the cursor on the screen. To clear the lines of sight and start over, you can click **New analysis** on the **Line of sight** toolbar. To close the tool, on the **Line of sight** toolbar, click **Done**.

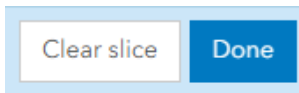


7) Select the **Slice** tool. 



A plane appears, depending on the pointer location. When the plane is visible, click and drag to activate it. You can make vertical or horizontal slices using the **Slice** tool and

hovering over a building. To clear the slice and start over, you can click **Clear slice** on the **Slice** toolbar. To close the tool, on the **Slice** toolbar, click **Done**.



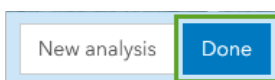
8) Select the **Profile** tool. Draw a line to generate an elevation profile of your scene.



To create an elevation profile of the scene or ground, click in the scene to place the first point and double-click to place the last point. A chart is rendered on the right of the screen.



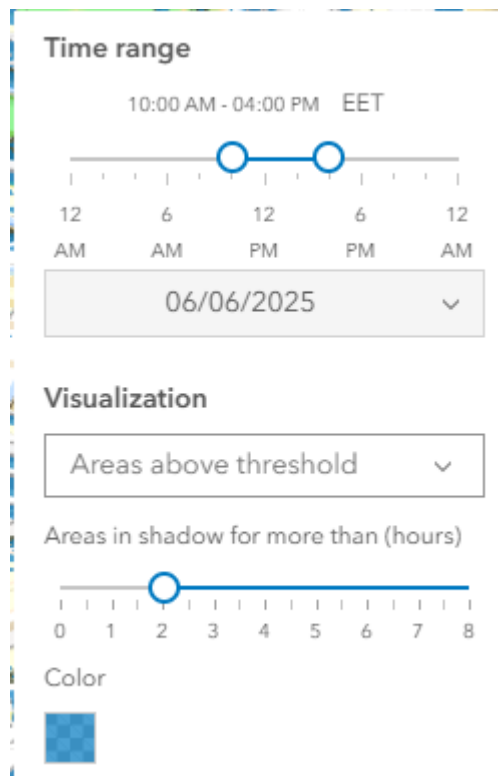
Toggle between “Scene” and “Ground” values for the elevation profile created. To clear the elevation profile and start over, you can click **New analysis** on the **Elevation profile** toolbar. To close the tool, on the **Elevation profile** toolbar, click **Done**.



9) You can use the **Shadow cast analysis** tool to view the shadows in your scene at a specific



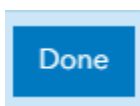
date for a certain time range.



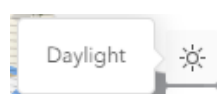
Define the visualization for the scene by choosing between the following modes:

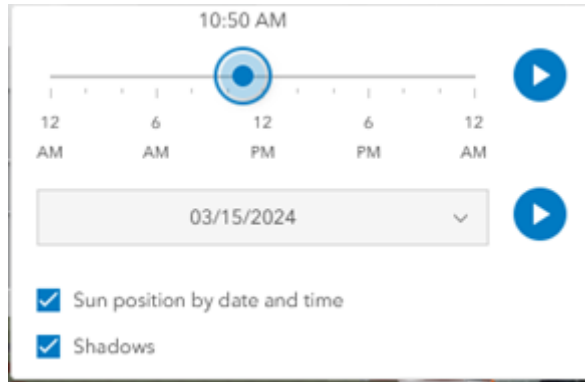
- **Areas above threshold**—Display only the areas that are covered by shadows for more than a certain number of hours in the scene view. Change the threshold value (in hours) using the slider. The default threshold is 2 hours.
- **Total shadow duration**—Display the duration of the cumulative shadow using opacity. Areas that are not covered by shadows are fully transparent. The transparency decreases the longer an area is covered by shadows. Continuous (continuous change in transparency) and hourly (transparency changes each hour) visualization modes are available.
- **Discrete shadows**—Display individual shadows at a given time interval. You can specify the time interval in the drop-down list.

You can also select the colour and opacity of the shadow duration analysis. To clear the shadow cast analysis, on the **Shadow cast analysis** toolbar, click **Done**.



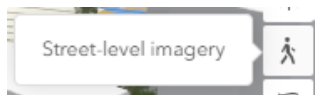
10) Click **Daylight** and move the slider to change the shadows based on the month and time of day.




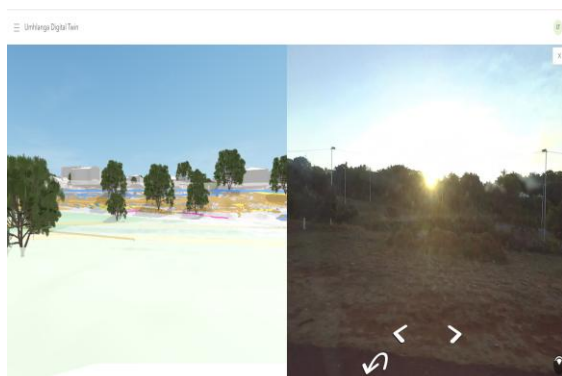



Building shadows move as you move the slider. To see what the building might look like in other seasons, you can also change the date and explore shadow cover based on the specified month. Adjust the date and time to set the position of the sun and the stars. The light and the shadows in the scene will change accordingly. Uncheck the **Sun position by date and time** check box to apply the virtual light source relative to the camera.

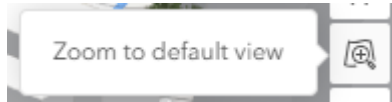
11) The **street-level imagery** functionality in Urban allows you to compare the future of a city with the current situation on street level in a split screen.



1. Point to the **Street-level imagery** button  in the lower right corner. A hand icon appears.
2. Drag the icon onto the scene. The streets appear as green lines. Drop the icon where you want to see the street-level imagery.



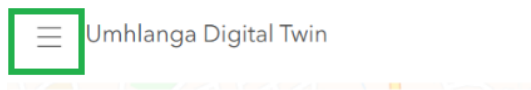
The Urban scene is on the left and the corresponding street-level imagery is on the right. To navigate on both sides, use the arrows in the street-level imagery to navigate along the street and use the normal scene navigation (pan, zoom, rotate) to look around. Click the **Close** button  in the upper right corner to close the street-level imagery mode. Click the **Zoom to default view** button once you have finished exploring the analysis tools.



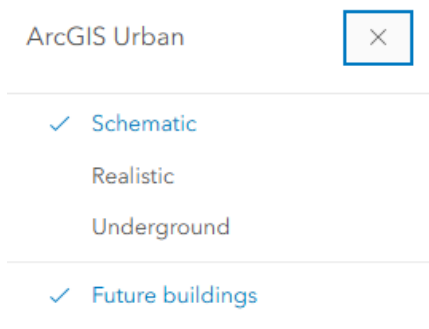
## 5. Viewing a proposed plan

Plans are created by editors in ArcGIS Urban with the necessary permissions. They can be viewed by the public but not edited or modified. For the purpose of the Visualization Twin, this functionality will allow users to view, explore and comment on proposed developments or projects.

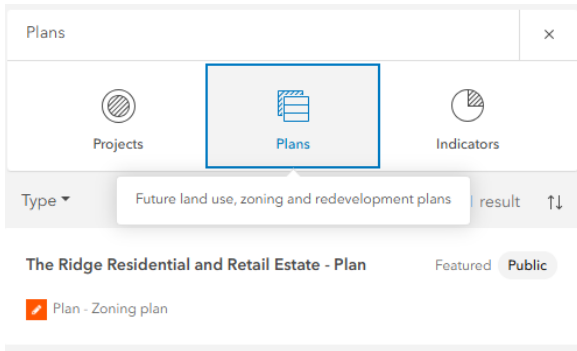
1) On the ribbon, click the **Options** button to display the contents of the urban model.



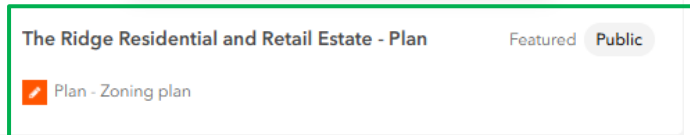
2) Change the view to the **Schematic** representation and close the content panel.



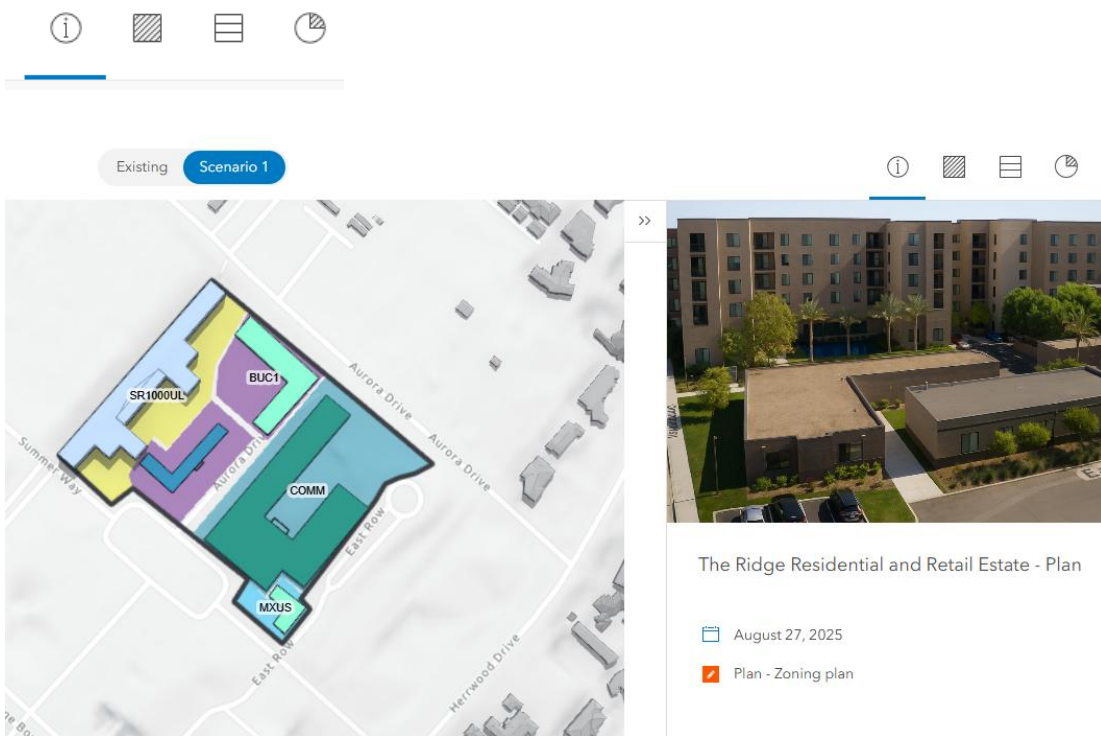
3) Click on the Plans button to activate a development plan.



4) Click on the Plan to activate the plan view.



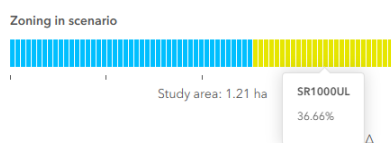
5) The default view opens on the **Details** pane.



6) Click the **Zoning** button.



Hover your mouse cursor over each zone in the bar to see the percentage of the plan area covered by each zone type.

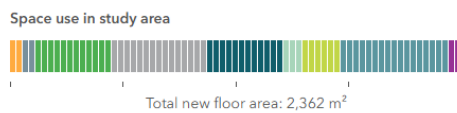


Click on a Zone type to view description and parameter details. You can also view the same information in a pop-up by clicking on the zone polygons in the map.

7) Click the **Development** button.



The development pane provides the user with details about the proposed developments on the site, specifically the space use types and the breakdown of each space use type coverage in the selected zone area. Hover your mouse cursor over each of the space use type categories to view the percentage of the plan area covered by each space use type. Select the polygon feature on the map to filter the pane on the right-hand side. (Click anywhere outside of the feature to deselect it).



CONS 64 m<sup>2</sup>

**Name**  
Conservation Area

**New floor area**

Total area	64 m <sup>2</sup>
Net area	64 m <sup>2</sup>

Expand the space use types to view more details.

HOTE 485 m<sup>2</sup>

**Name**  
Hotel

**New floor area**

Total area	485 m <sup>2</sup>
Net area	485 m <sup>2</sup>

**Parameters**

Area per job	75 m <sup>2</sup>
Daily trips per job	5 /d
CO <sub>2</sub> emissions per job	5.5 kg/d
Energy use per job	75 kWh/d
Solid waste per job	0.75 kg/d
Waste water per job	750 l/d
Water use per job	1,250 l/d

8) Click the **Dashboard** button.



The **dashboard** shows the metric values of the plan scenarios. In zoning plans, metrics are calculated based on your proposed development (building spaces and surfaces). Click on a specific metric to view more details.

**Solid waste** ×

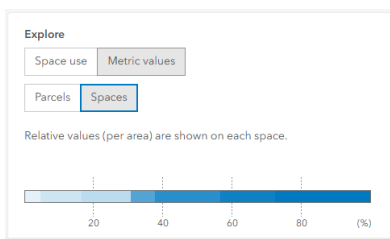
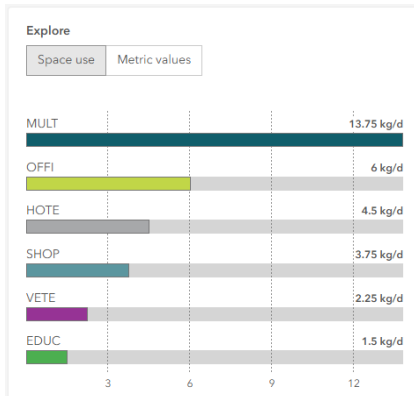
**In study area**

**31.75**  
kg/d

**Description**  
Solid waste per day generated from population and jobs

**Calculation**

- = Existing
- + Population × Solid waste per person
- + Jobs × Solid waste per job




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## 6. Contact Support

For questions, feedback, or technical issues:

Email: [onke.mconi@durban.gov.za](mailto:onke.mconi@durban.gov.za)

Phone: 031 311 7107

Website: <https://www.durban.gov.za/pages/residents/contact> <sup>1</sup>

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<sup>1</sup> This reference will change when the web site is deployed to Production