

Appendix 3: Conservation Systems (Municipal scale)

Conservation systems are based on the principles established for the Stellenbosch Winelands and are applicable to the larger municipal area. They arose from the identification of specific opportunities for holistic, landscape and heritage-based conservation whilst assessing the inherent threats to the Stellenbosch cultural landscape. The table sets out a summary of the three systems conservation systems (CS). The bullet points show the layers of information they are based on; a) shows the base from which these ideas arose (threats/findings); and b) lists the major threat or finding.

Table 1: Municipal Conservation System Summary

1. Foothills CS <ul style="list-style-type: none"> Protected Areas, Critical biodiversity areas, Ecological support areas Cultural action within the landscape (heritage inventory) Vertical transition of development 	2. Green Transitions CS <ul style="list-style-type: none"> Agricultural character Public appreciation Horizontal transition of development from urban nodes 	3. Scenic Routes CS <ul style="list-style-type: none"> Viridian Visibility Analysis of grade II Scenic routes % visibility coverage of each landscape unit by a grade II scenic route The number of Grade II viewsheds in which the particular landscape unit is seen.
a) Threat	a) Threat	a) Heritage, and scenic value
b) Threat - eroding of wilderness areas and cultural use on rolling foothills and alluvial plains where insensitive development occurs.	b) Threat - loss of highly valuable agricultural land, and rural character due to urban sprawl. An opportunity for areas to link to the Rolling foothills CS to improve quality of life.	b) Visibility Analysis with investigation/perceptual analysis of routes identified and graded in Phase 3.

In all three systems, we have identified guidelines to enable integration and effective stewardship. All of these systems are translated back in terms of their heritage significance. It is for this reason that the landscape units proved an effective tool for such a high-level municipal scale analysis. While the Foothills conservation system (buffer to nature reserves) is more focused on the vertical transition within the landscape (rural to wilderness), the Green Transitions as a conservation System looks at the horizontal transition of development within the landscape, with the focus more on the open agrarian landscape and the transition from urban to rural, than the distant wilderness landscape.

3.1 Foothills Conservation System

Nature reserves are protected areas for wildlife, flora, fauna or features of geological or other special interest, and are reserved and managed for conservation and to provide special

opportunities for study and research. The study area consists of vast tracts of State Forest Nature Reserves, Mountain Catchment Areas, Provincial Reserves, Private Nature Reserves, Local Authority Nature Reserves, Protected Natural Environments and Conservancies (see Figure 1)⁶. The existing Protected Areas go a long way to protect the integrity of the natural landscape within the municipal area. These Protected Areas account for a large percentage of the wilderness domain which gives the municipality its unique spatial character. It is notable that these areas are predominantly located in the higher gradient mountainous landform and not in the foothills or alluvial plains. Some protected areas are disjointed and isolated, putting their integrity at risk (such as the Bottelary Conservancy, Mooiplaas and Koopmanskloof Private Nature Reserves and Simonsberg Nature Reserve).

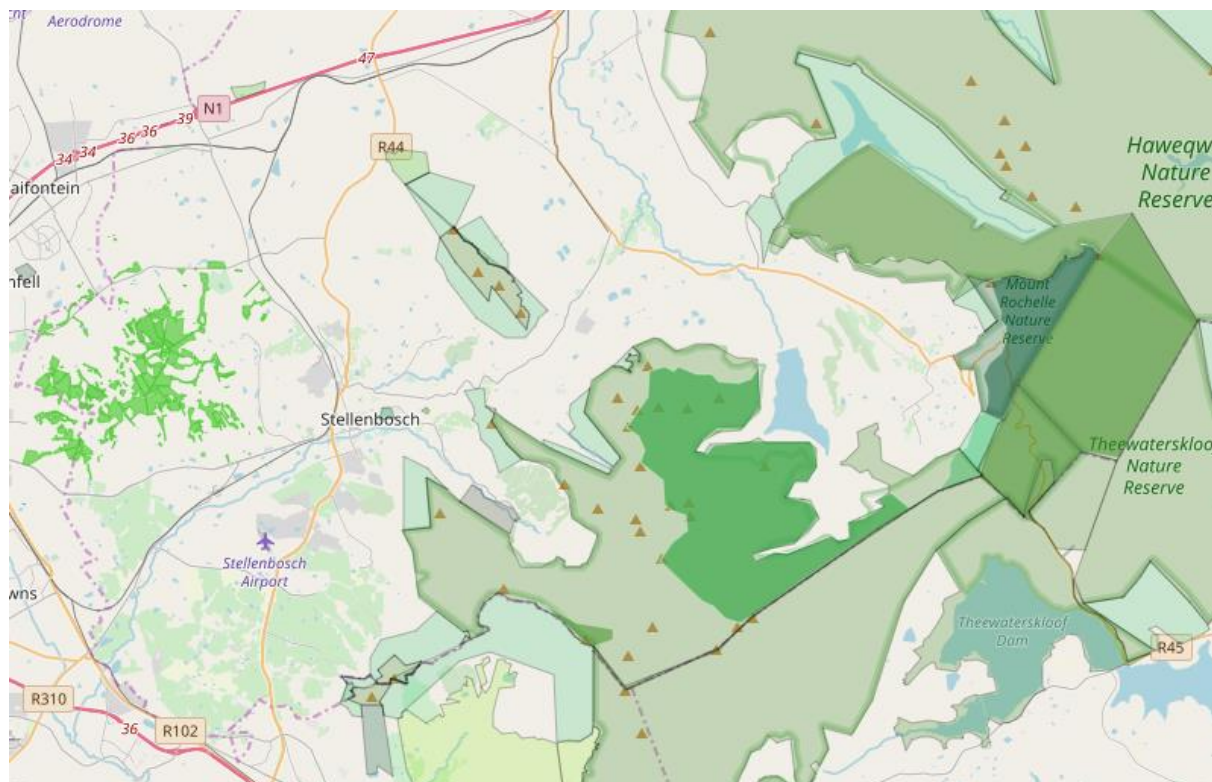


Figure 1: Existing conservancies, and protected areas

⁶ The *Western Cape Biodiversity Sector Plan: Spatial Assessment* (2016) features Critical Biodiversity and Ecological Support Areas which we used to illustrate Natural Constraints and areas of ecological significance in the Phase 2a and the Phase 3 Reports. Our rationale is that the CBA and ESA layers embody those natural hydrological, vegetation and ecological variables that are integral to maintaining the landscape character in some of the Stellenbosch Rural Domain. The CBAs constitute highly significant areas and the ESAs include areas of medium significance, even from a heritage perspective. This is because agricultural and heritage values overlap in these considerations.

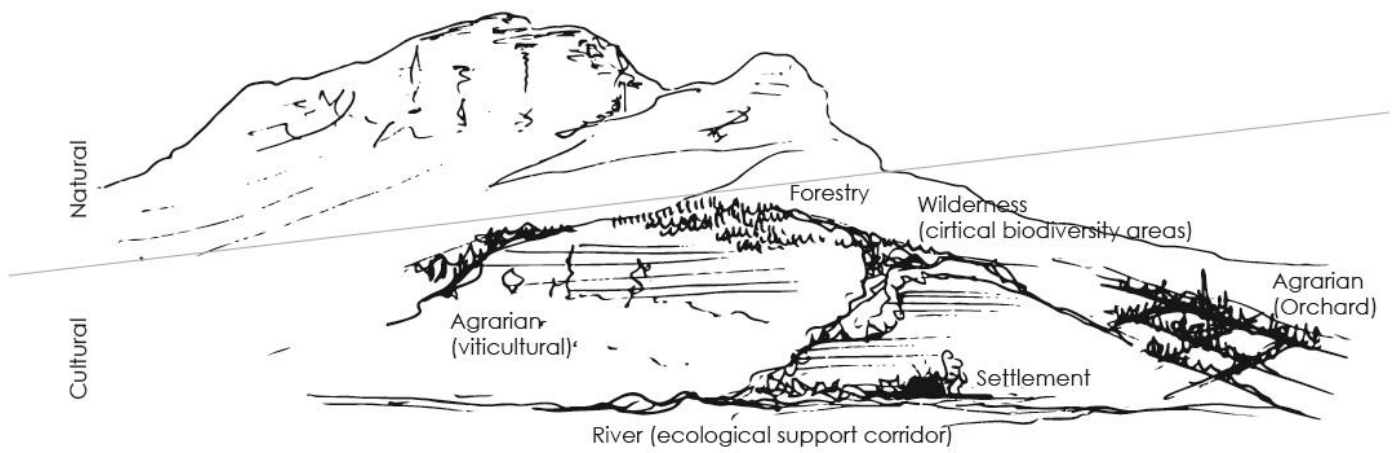


Figure 2: Vertical transition from the predominant cultural interface to the natural

The complex interplay of the wilderness, agricultural landscape and settlement unfolds on the lower rolling hills towards alluvial plains. These lower slopes become key to the sustainable evolution of the cultural landscape, and heritage significance of the municipal area. The continued protection and enhancement of these areas are of direct heritage interest for the following reasons:

1. Public aesthetic appreciation for the beauty of the cultural landscape and the distinct interplay between urban, rural and wilderness areas
2. The spiritual and recreational use of the landscape over many years by different users
3. The cultural use of the landscape by different users for ceremonies or cultural events, and the use of the indigenous vegetation for medicinal use, as well as traditions that finds itself in the landscape, such as the livestock drover routes, and commonages.
4. The ecological diversity these rolling hills support as corridors of connectivity between valley bottoms and mountaintops (protected within nature reserves). The mapped layer with areas of critical biodiversity, and ecological support by Cape Nature formed part of the indicating layer.
5. The landmark value of mountains, and rolling hills with their names, as part of a historic system of toponymy within the winelands actively contributing to a communal sense of identity and orientation
6. Vertical transition from historic settlement pattern in the predominant valley bottom to later development on the mid-slopes.

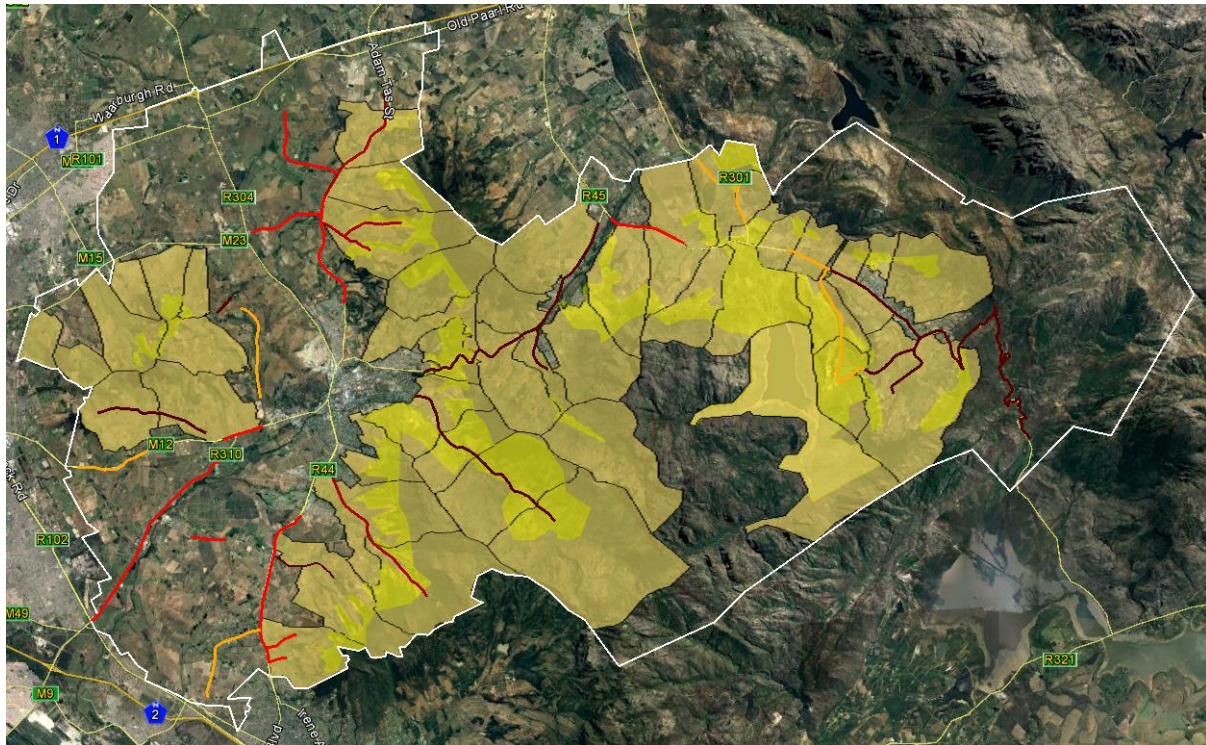


Figure 3: Landscape units that feature protected areas. The yellow polygon indicates ESA and CBA areas as support to existing protected areas.

The following guidelines are proposed for the area of interplay between nature and culture as support to formally protected nature reserves, with an emphasis on the cultural interface.

Foothills Conservation System Guidelines:

- When a landscape unit overlaps with a Protected Area, it will be noted as such, and subsequent management of that particular area will fall under the rules related to, and associated with the specific nature reserve or conservancy. The CMP can add additional guidelines from a heritage perspective, but the CMP cannot override the laws that govern these systems.
- When Critical Biodiversity Areas are located adjacent to Protected Areas, they become a buffer strip where only minimal development should be allowed. These CBAs are mostly located in sensitive topographical areas, where development on steep slopes would be difficult and require expert attention and will also be highly visible from the surrounding landscape.
- Maintain ecological support areas to sites of heritage significance (particularly river corridors). Only permit development that responds to the heritage sensitivity of the site, and that will not 'dominate', or irreparably damage the environments adjacent to these heritage sites. Optimize the scenic and recreational opportunities provided by water courses and larger water bodies, especially where they were enjoyed through historic right of way.
- Promote the creation of 'cultural conservancies' as transitions or buffers to nature reserves where possible, to protect important habitats, provide increased opportunities for

recreation, and historic cultural use of these areas (such as the controlled harvesting of medicinal plants), but discouraging the built environment to erode these sites. This will ensure that the important contribution of wilderness areas to the character of a variety of heritage sites, some of extremely high significance, is maintained and strengthened within the municipality.

- It is important to note that these cultural conservancies, in their function as buffer to nature reserves are not for the exclusive protection of nature but rather a transition zone where the appreciation of nature by individuals should be promoted
- Encourage the use and appreciation of the landscape by different users for different purposes, by promoting public footpaths (walking, hiking, cycling, and bridle paths) for access to nature. Make sure the required provision for the rehabilitation and maintenance of the slopes used for traditional and recreational purposes is in place.
- Facilitate education and interpretation to places of natural amenity by tourism sensitive tourism for local as well as international users.
- Always use existing roads and pathways, such as old forestry service roads, first before any new routes are established. In this way, as much wilderness area as possible can be left intact.
- Mountain slopes have been in use for many years, and care should be taken that any significant cultural sites, such as burial sites, are not disturbed.

3.2 Green Transitions

The rural, agrarian character of Stellenbosch is anchored by its natural setting and the green linkages that extend from the mountains, down to the rolling hills, and terminate against the towns and settlements of the Winelands (which are most often located along riverine corridors on the valley bottoms). The key feature of these green linkages is their openness; affording views across the predominantly viticultural landscape towards the dramatic mountains in one harmonious frame. In some instances, such as Stellenbosch Berg, it is the physical permeability of this feature that adds most to the quality of life of its residents: here they have open access through the grounds of the university, to the mountain. These green areas, due to their close proximity to the town of Stellenbosch, are under great development pressure.

The concept of green transitions as a conservation system was developed based on the threats exerted on these existing special features, and the opportunity to allow more of these areas to be positively utilised as open green spaces by thinking of them as a continuous system that fulfils a 'cultural service'. The system of Green Transitions⁷ also incorporates existing planning tools such as the urban edge. It thereby forms a dual heritage protection role: it prevents the encroachment of urban development into the rural character areas of Stellenbosch, and preserves the agricultural continuum/domain that traditionally surrounds settlements within the

⁷ Nature can be used to provide important services for communities by protecting them against flooding or excessive heat, or helping to improve air, soil and water quality. When nature is harnessed by people and used as an infrastructural system it is called "green infrastructure". Green infrastructure occurs at all scales. It is most often associated with stormwater management systems, which are smart and cost-effective. Green infrastructure serves to provide an ecological framework for social, economic and environmental health of the surroundings.

Winelands. Additionally, this green system can facilitate integration by creating an alternate system of mobility and of recreation. These are envisioned to be networks where different sectors of the public can rub shoulders, and where access to nature and agricultural practices improves individual and social wellbeing.

A useful byproduct exists whereby ecological support areas (part of the five core value lines, ecological, of the study, often in the form of a river corridor) fall within these green linkages, and could be utilised to become the driver for green infrastructure development. In this way, the parks, river corridors and other “green systems” running through the townscape units create secondary public access and ecological networks, connecting the surrounding green transitions systems through urban areas. Thus, Green Transitions can protect ‘visual permeability’ and ‘openness’ within settlements, as well as ‘physical permeability’ between urban areas and their agricultural and wilderness surrounds. The aims of green transitions on each of the scales (Town, and municipal) is listed with their related guidelines.

Green transitions on a town-scale aim to:

1. Uphold the rural character of Stellenbosch, and to uphold significant vistas towards the agricultural landscape from within these settlement nodes.
2. Prevent urban sprawl from eroding the significant landscape units situated directly adjacent to the historic town.
3. Maintain a clear transition between the townscape and its surrounding rural landscape.
4. Protect a diverse range of heritage values, not only the tangible heritage sites.
5. Stimulate innovative development that is focused on urban regeneration and densification, such that brownfields sites should always be considered first before greenfield sites can be developed.
6. Become connectors for the public to gain access to larger natural landscapes, which promotes connectedness with their landscape setting, and improves quality of life.

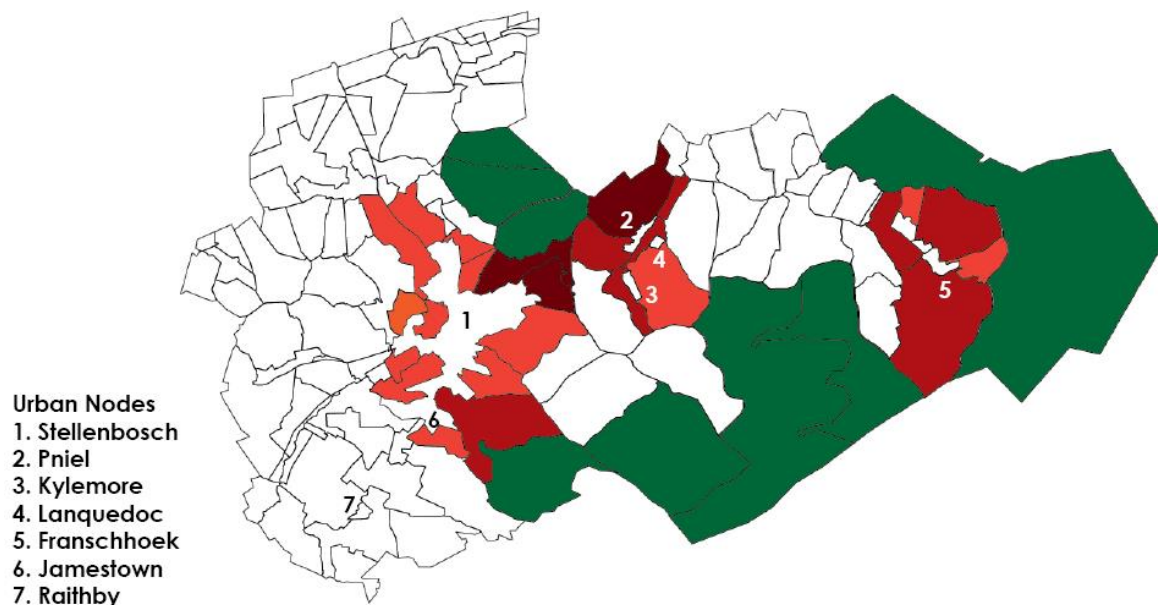


Figure 4: Green Transitions on a Town Scale around urban nodes

(the green relates to the mountains)

Green transitions on a municipal scale aim to:

1. Preserve the rural landscape of Stellenbosch as a significant cultural landscape within the context of the Western Cape.
2. Maintain a clear distinction between urban and rural on the municipal boundary.
3. Prevent pressure from the City of Cape Town to extend the urban edge into the significant cultural landscape of Stellenbosch.

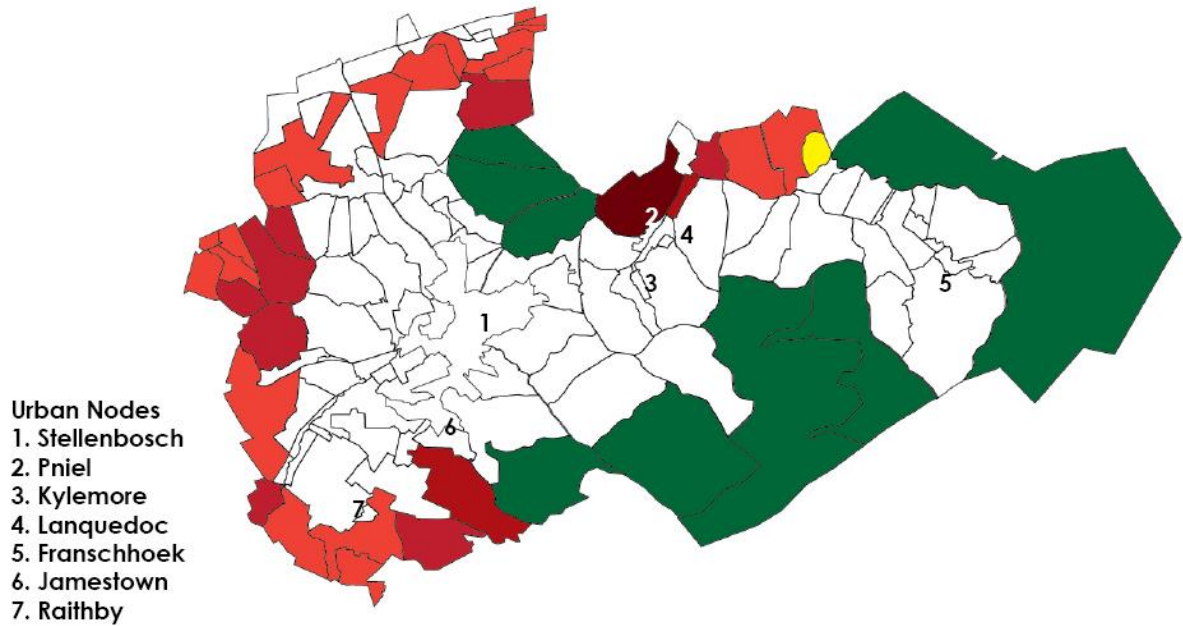


Figure 5: Green Transitions on a municipal scale
(the green relates to the mountains)

Green transitions are applied to future development nodes:

1. To act as a buffer that facilitates the goals of these development nodes, such as connectivity and integration.

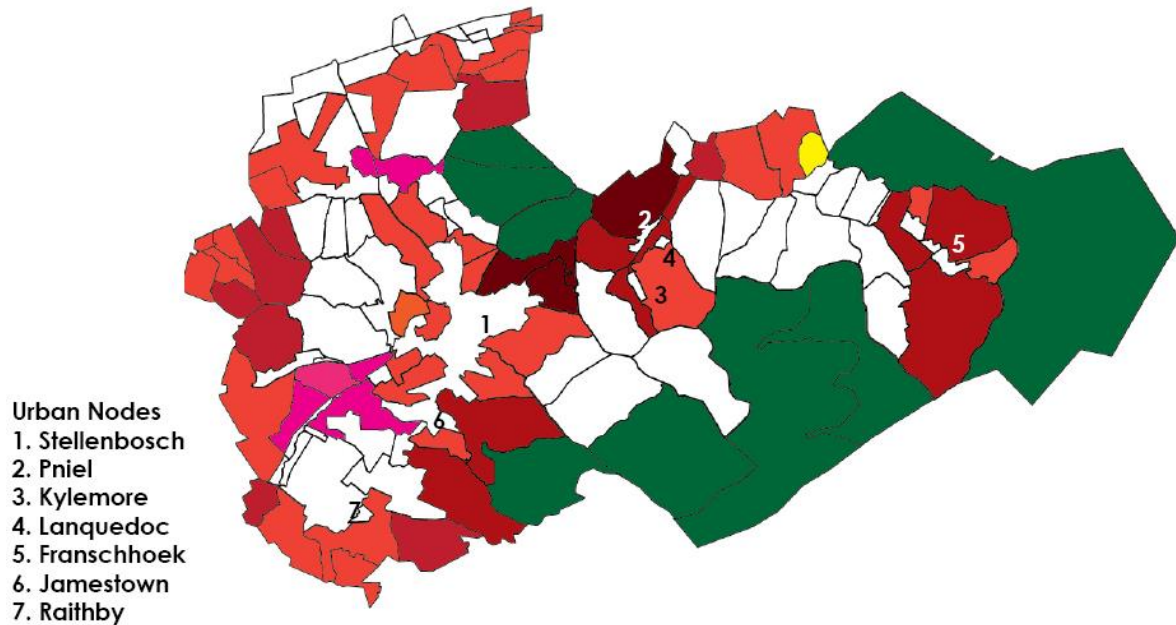


Figure 6: Green Transitions (town and municipal scale), with the pink showing landscape units triggered by proposed development nodes around Vloffenburg, and Koelenhof.

Aim 1-4 Promoting Rural Character.

Guidelines (applicable to all scales):

- Development or rezoning of productive agricultural lands and fragmentation of farmland should be avoided to protect the agricultural landscape, which is key to the unique sense of place of the Cape Winelands. Development should be discouraged on high potential agricultural soil (please refer to the layer on the online map on the Stellenbosch Municipality website).
- Discourage any large-scale development that constitutes urban sprawl and therefore impedes on the openness or purpose of the green transitions.
- The proliferation of non-agricultural uses within the agricultural domain/outside the traditional settlement areas, particularly in visually prominent locations, should be discouraged. Non-agricultural development that is unsupportive of the agricultural sustainability of a farming unit must be avoided in order to protect the agricultural character of the landscape.
- Land-Use that is not part of the two core agricultural systems (vineyards and orchards), could have a negative visual effect in the landscape based on the infrastructure associated with it (greenhouses, shade netting, chicken batteries). Therefore, the placement of this kind of land-use within the agricultural domain should be carefully considered to minimise visual impact on the character of the landscape.
- Any development proposals that threaten significant views, vistas and landmarks should be discouraged.
- Stimulate innovative and sustainable solutions (like urban regeneration) to cater to the demand for new development, and promote the increased use and viability of public

transport for greater access to underutilized urban areas.

Aim 5-6 Relating to Quality of life

Guidelines (applicable to all scales). Green transitions should:

- Encourage new development proposals to facilitate new linkages (access), and respect existing linkages, from within the urban nodes to the mountain tops through the Foothills Conservation System. It is proposed that preference should be given to development proposals that support this vision. Where traditional linkages exist (like Stellenbosch berg), they should preferably be protected, and any development that threaten its current, and historic right of way should be discouraged.
- Encourage access to opportunity, as an example, by promoting cycle routes as alternative option to get to places of employment.
- Encourage opportunity for interaction between different users. Here the landscape should fulfill a primary role of integration. Innovative ideas should explore the 'rubbing of shoulders' between different users of the public.
- The concept of Green Infrastructure should be explored here with open spaces and network routes that improve quality of life.

3.3 Scenic Routes

Scenic routes are movement corridors that traverse areas of outstanding scenic quality. Scenic Route Corridors are the channels through which we perceive the cultural landscape. The Scenic Drive Envelope includes the carriageway, the road reserve, the land directly adjacent to it. The scenes in which the views terminate is called the Viewshed of the Scenic Route. Scenic routes celebrate our communal heritage and belong to all members of the public, and therefore need to be protected as such.

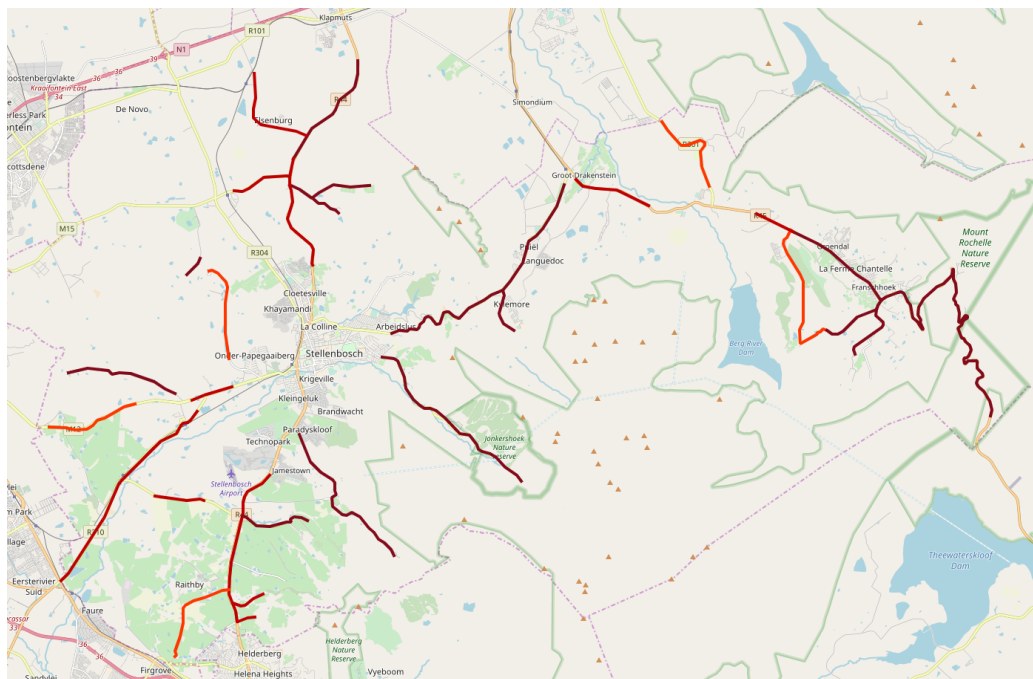


Figure 7: Graded Scenic Routes within the municipal boundary

The general guidelines for scenic routes are based on their distance away from the scenic drive. Distance zones are based on three categories; The closer a viewer is to a landscape feature, the greater the visible detail and the greater the value of the zone. The zones used are:

- foreground (fg) from 0 to 500 metres.
- middleground (mg) from 500 metres to 3 kilometres.
- background (bg) from 3 to 10 kilometres.

3.3.1 Foreground

The foreground views within the scenic route corridor is considered the most significant and therefore all scenic routes should have a 500m buffer on either side of the road where specific development guidelines apply. The principle is that nothing will be permitted that detracts from the existing scenic value of the Landscape Unit that is being traversed by the Scenic Route. Based on the significance of the Scenic Route (grade) and the significant character of the surrounding landscape, the following guidelines should be considered.

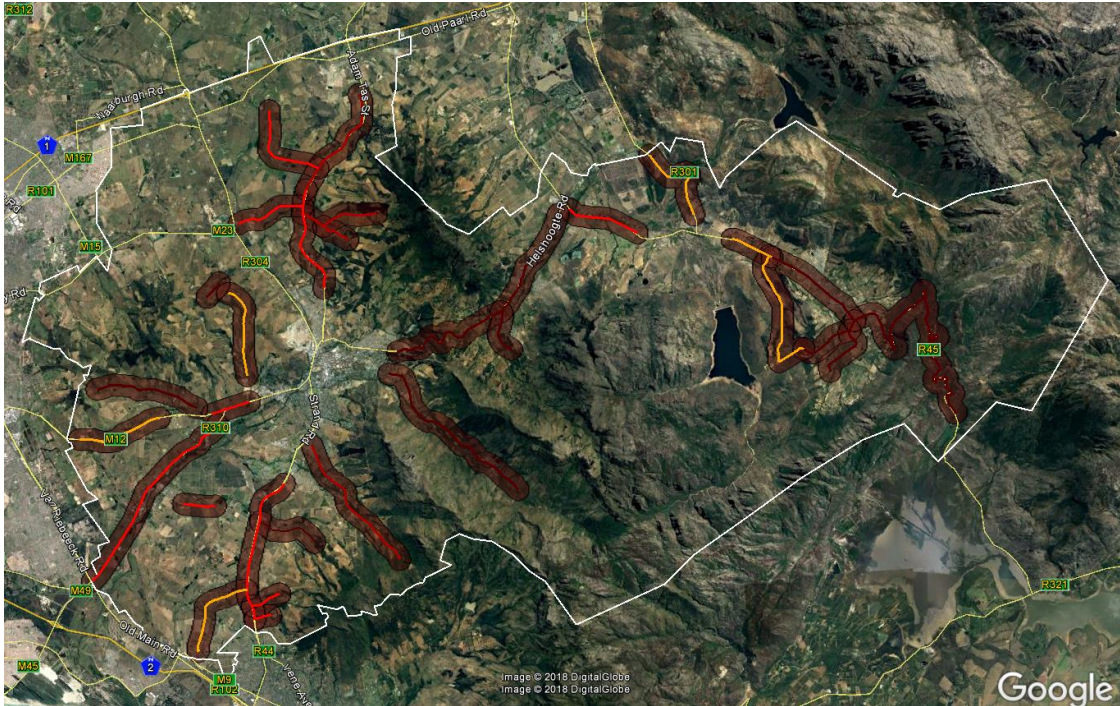


Figure 8: 500m buffer (foreground) around scenic routes

Foreground guidelines:

- Respect the landscape setting and gateway qualities of important scenic routes and mountain passes, particularly those with a wilderness or rural setting.
- Formally protect scenic routes of heritage significance through the provisions of the municipal zoning schemes (e.g. Scenic Overlay Zones and City of Cape Town's proclaimed scenic routes, such as Boyes Drive).
- Use by-laws to establish 500m visual buffer zones with setbacks and height restrictions along scenic routes.
- Avoid the obstruction of mountain views along proclaimed scenic routes and avoid visual

intrusions, such as inappropriate signage (billboards) and infrastructure, including transmission lines. Also, prevent the obstruction of views towards important cultural features.

- New buildings must be carefully sited to avoid the blocking views and erosion of its informal agricultural edges: hard boundary treatments (such as solid walls), over-scaled entrances, signage clutter, and road-related interventions affecting its sense of fit in the landscape must be avoided.
- Ensure appropriate design of road verges, stormwater structures, fences, farm stalls and picnic sites, which should be in character with the natural or rural surroundings. Insensitive road 'improvements', road widenings, out of scale flyovers and bridges are to be avoided, as it detracts from the rural character of the Winelands.
- Avoid over-engineered construction details, such as concrete kerbs and asphalt parking /pedestrian areas not in keeping with wilderness mountain areas.
- Scenic Visual Linkages: New buildings must be located to avoid the blocking of existing visual links between urban agricultural and urban development areas including framed vistas.
- The natural character of the Fynbos vegetation in the public realm, especially along scenic route corridors should be embraced, by carefully considering the effect of out of place 'landscaping' often associated with overscaled entrance structures.
- Other developments (not covered in one of the items above) should preferably not be allowed in the 500m scenic route corridor and should undergo a detailed Visual Impact Assessment with mitigation before it can be considered (from the list of deviated land-use documented for the Stellenbosch winelands, see CMP document):
 - Farm stalls/restaurants
 - Nurseries/mixed use/garden centres/timber yards
 - Greenhouses, agricultural netting, chicken broilers/Strawberry fields
 - Subdivisions, gated communities, shopping centres, business parks
 - Large scale industrial structures
 - Open Air Markets

3.3.2 Middle ground and Background (see Annexure X for detailed report)

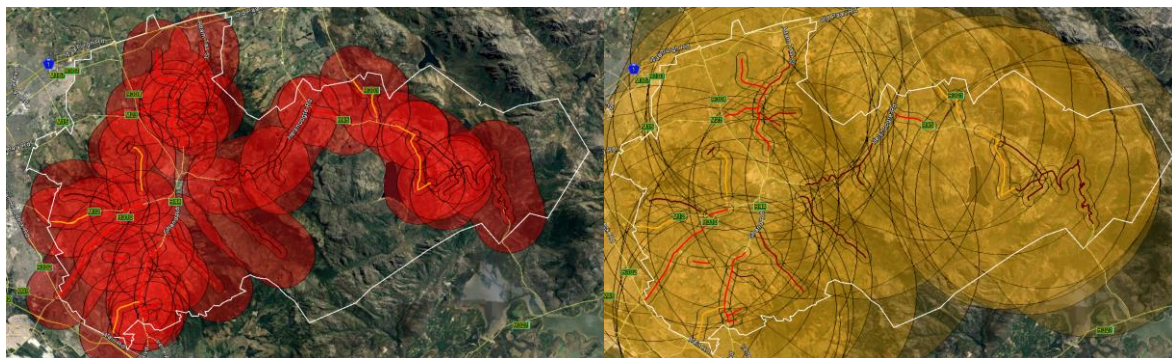


Figure 9: Red- Middle ground buffer (3km), and
Yellow- Background buffer (10km)

To understand the middle and background of each scenic route better, a high-level visibility

analysis was conducted by Viridian Consulting, and illustrates all the areas that are visible from the identified Scenic Routes within the Stellenbosch Municipal Area.

Although the high-level Visibility Analysis by Viridian Consulting, is beneficial to the study at a municipal scale, its limitation⁸ is the fact that buildings, vegetation and other features on the earth's surface other than natural topography do not feature as visual barriers or obstructions in the calculation of the viewsheds. It is also important to note that the Visibility Analysis was only conducted from within the study area, and does not relate to any distant views approaching from Cape Town, and the surrounding areas that are also valuable.

Viewsheds were generated every 200m along the totality of each Scenic Route. Viridian worked on the assumption that 200m will accommodate both a 2 – 3 second glance at a view for a driver, as well as more sustained and active looking at views from passengers or NMT commuters lasting up to 10 seconds. The other parameters used to provide the viewshed is listed below:

Viewshed Parameter	Value
Transmitter Elevation	1,5 m above Ground
Receiver Elevation	Transmission angle range of -89,9° to 89,9° above the horizon, checked at natural ground level
Atmospheric Correction	1.3333·
View Radius	15 km
Sample spacing	20 x 20 m

Figure 10: Parameters to viewshed analysis by Viridian Consulting

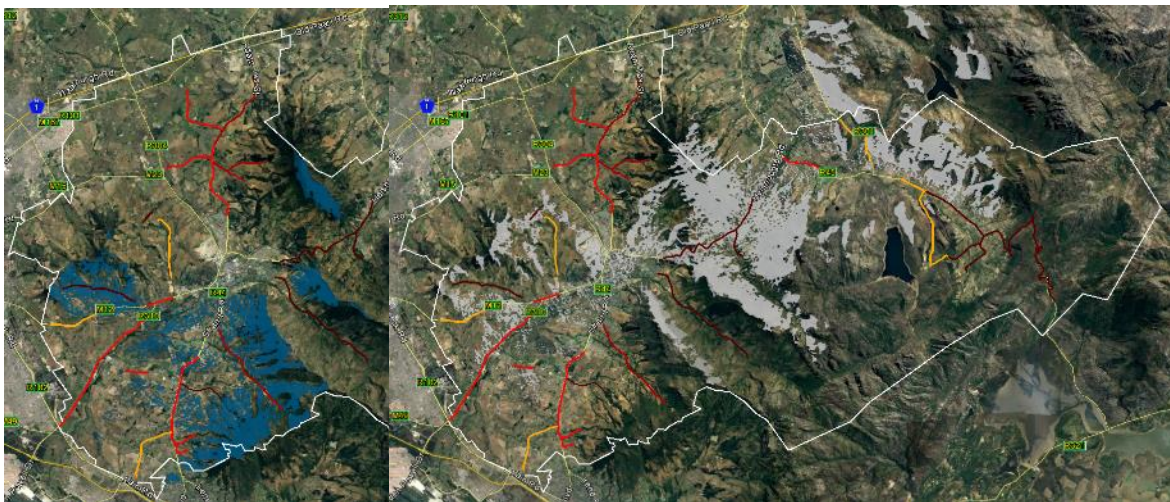


Figure 11: Viewshed examples⁹, Stellenboschkloof Road (blue), and Helshoogte Road (grey)

⁸ More limitations and technical detail is available in the visibility analysis report

⁹ See Appendix 3 for the full set of viewsheds analysis for each scenic route

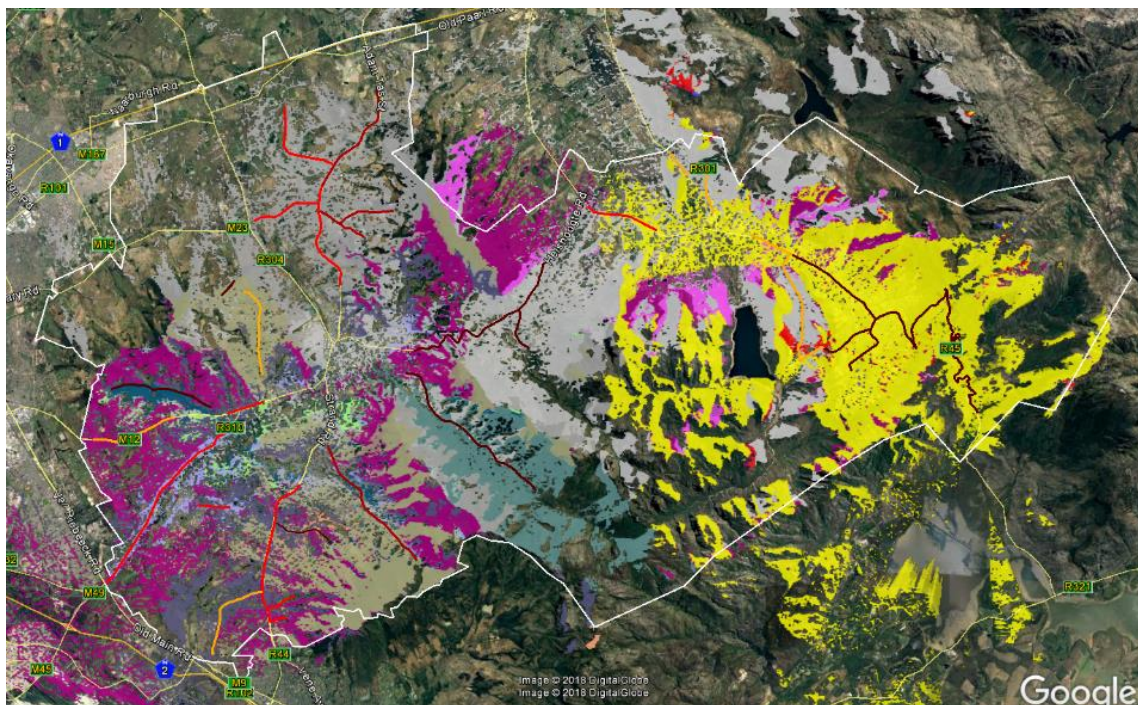


Figure 12: All scenic route viewsheds overlaid

We simplified the data using the grain of the landscape units (from the Landscape Character study) in order to distill information from the visibility analysis and indicate the visual importance of many areas within Stellenbosch. The following parameters were used to distill information:

1. The scope was narrowed to only consider Grade II (already extensive) scenic routes.
2. Landscape Units with a coverage of more than 70% by any given grade II viewshed are important units, and noted as such (see Figure 14 and 16).
3. In addition to the coverage, the amount of viewsheds from which the particular landscape unit are visible was marked from negligible to highly visible landscape units.
 - a. (1 - 2)/10 (Stellenbosch) and 1/6 (Franschhoek) viewsheds = negligible visibility from Grade 2 Scenic Routes
 - b. (3 - 4)/10 (Stellenbosch) and 2/6 (Franschhoek) viewsheds = visible from Grade 2 Scenic Routes
 - c. (5 - 7)/10 (Stellenbosch) and (2-4)/6 (Franschhoek) viewsheds = medium visibility Grade 2 Scenic Routes
 - d. (8 - 10)/10 (Stellenbosch) and (5-6)/6 (Franschhoek) viewsheds = highly visible from Grade 2 Scenic Routes

Figure 13 below shows the findings from light (negligible visibility) to dark blue (high visibility). The count for each landscape unit was calculated out of 10 viewsheds for the Stellenbosch side, and a count out of 6 for Franschhoek, by switching layers on and off in Google Earth. The visibility of each landscape unit was assessed by switching the received layers on and off in Google Earth, evaluating the impact of the number of viewsheds, and the % of coverage by a grade II scenic route (see diagram below). Landscape units with a coverage of 70% or more was noted.

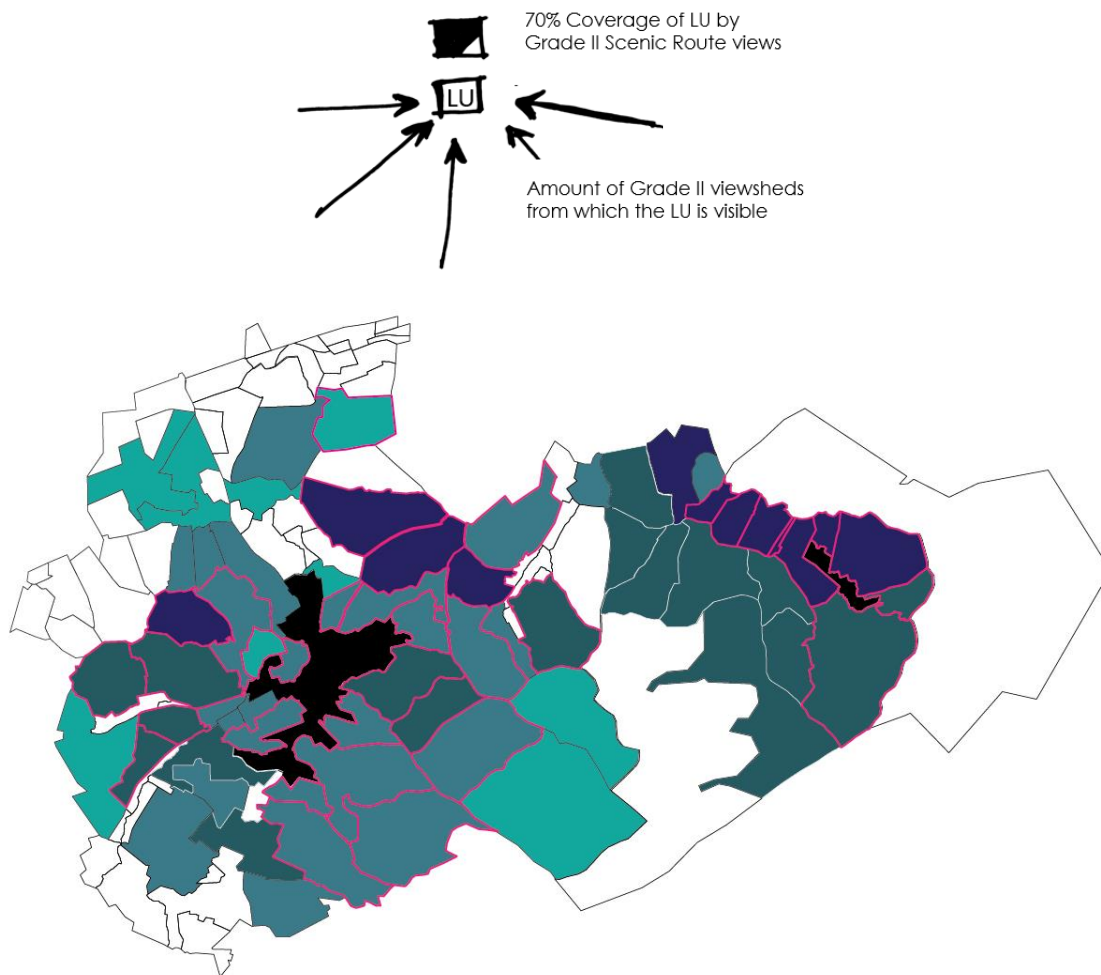


Figure 13: Negligible (light) to high visibility (dark blue), and pink outlines indicating more than 70% coverage

The high-level analysis highlighted some of the exceptional landscape units in terms of their scenic quality (Figure 14). The added value of the visibility analysis is especially relevant where it overlaps with the Foothills, and Green Transitions Conservation System, and therefore indicates the importance of these specific qualities each in terms of their visibility; the result being a middle and background to be managed according to their unique fit within its landscape setting.

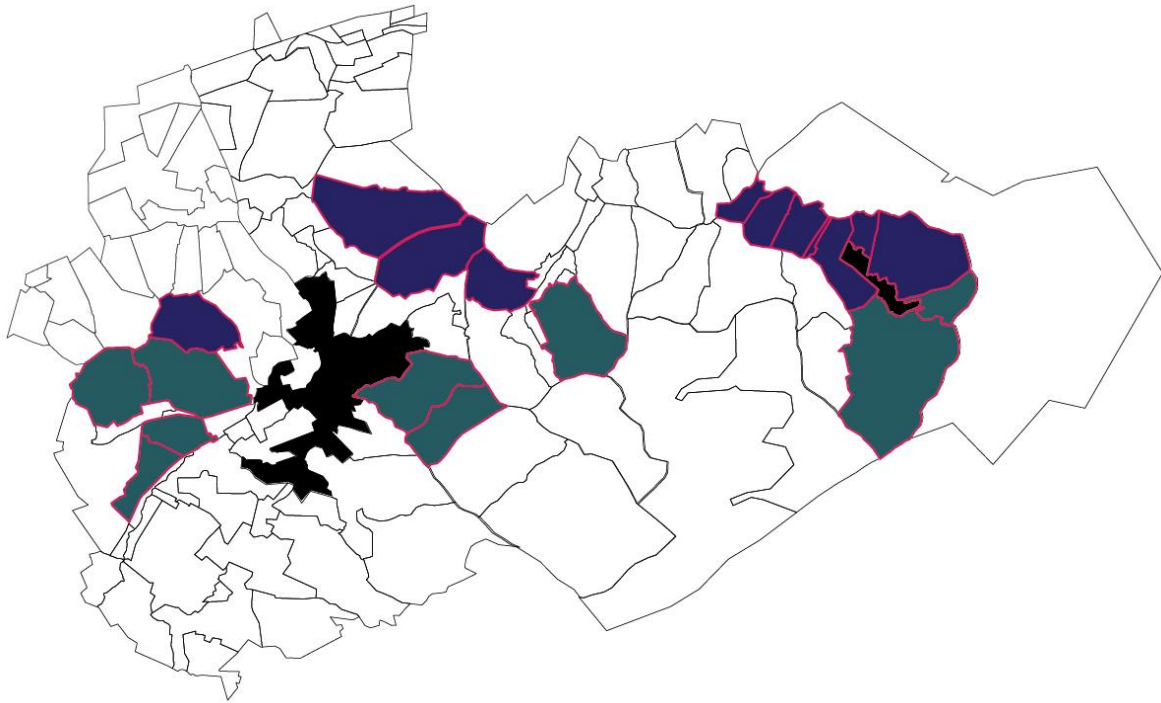


Figure 14: LU of exceptional scenic quality: Medium to high visibility (dark blue) landscape units with more than 70% coverage.

Guidelines for exceptional scenic landscape units:

- The general guidelines applicable to the foreground are also applicable to these exceptional scenic landscapes in terms of their visibility (>70% coverage and seen by more than half of the grade II scenic routes in the respective valleys).

Guidelines for a coverage of more than 70%:

- Where landscape units with a coverage of 70% or more intersect with the Foothill or Green Transition Conservation System, it heightens the importance of those landscape units for their open quality, and any development proposal should undergo a visual impact assessment.
- Each landscape unit is different, and should be discuss in each of the specific guideline sheets.

3.4 Conservation Systems summary and findings

A composite overlay process compared the following layers in terms of their value within the landscape from the bottom-up heritage findings to the potential conservation systems enhancing existing and proposed potential within the landscape. The synthesis map (figure 15) shows the potential landscape units to be included as Heritage Protection Overlay Zones within the landscape. This concept of management zones is proposed to show those areas that should be declared as protected zones on the basis of threats to heritage significance, as well as elements to be protected. This is the major interpretative spatial diagram that meshes with the proposed development considerations (urban and rural), to give guidance to development within the

winelands of Stellenbosch in order to preserve cultural significance.

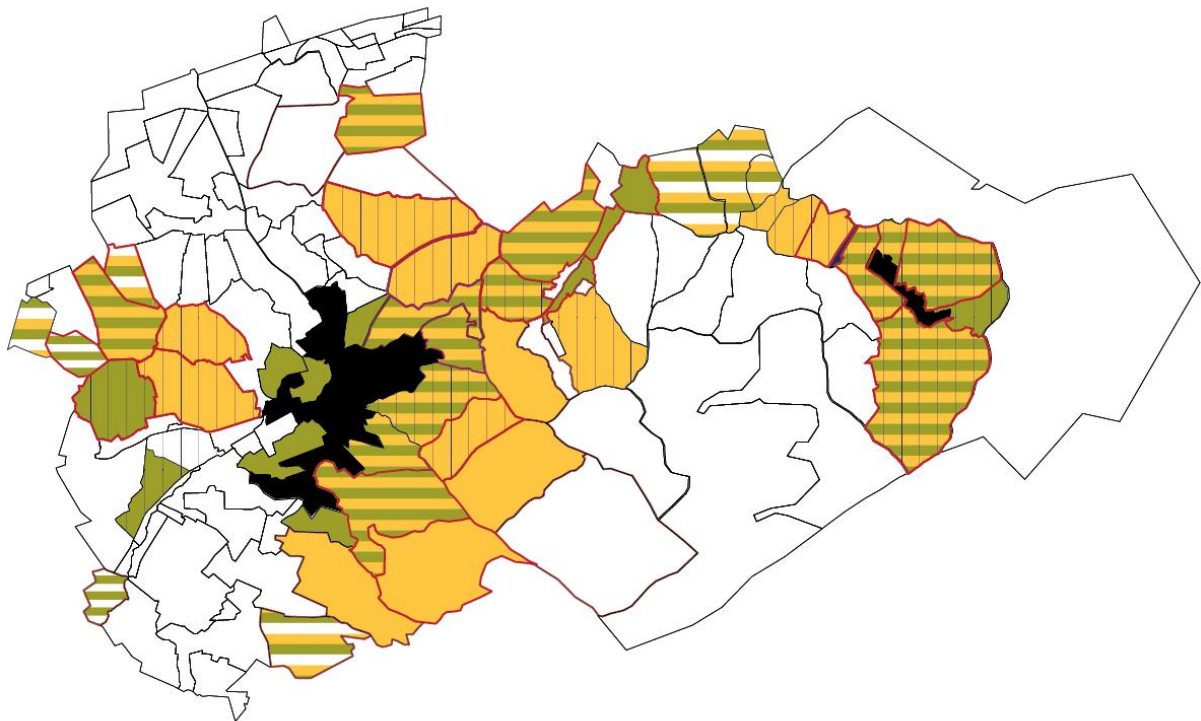









Figure 15: Composite Synthesis Map of all Conservation Systems (see table above)

Table 2: Synthesis map legend and layers (An image of all layers is extracted in the section to follow)

	Grade II landscape units (historic). Refer to Figure 17, and the online map and Phase 2 document
	Green transitions and Grade II landscape units
	Exceptional scenic landscapes (Figure 14)
	Landscape units with Foothills CS , and more than 70% visibility coverage (Figure 19)
	Landscape units with Green transition CS , and Foothills CS , with more than 70% visibility coverage
	Landscape units with Green Transition CS , and more than 70% visibility coverage (Figure 21)
	Landscape units with Green transition CS , and Foothills CS (Figure 22)

Each of the considered layers of the synthesis maps is extracted separately in the section to follow:

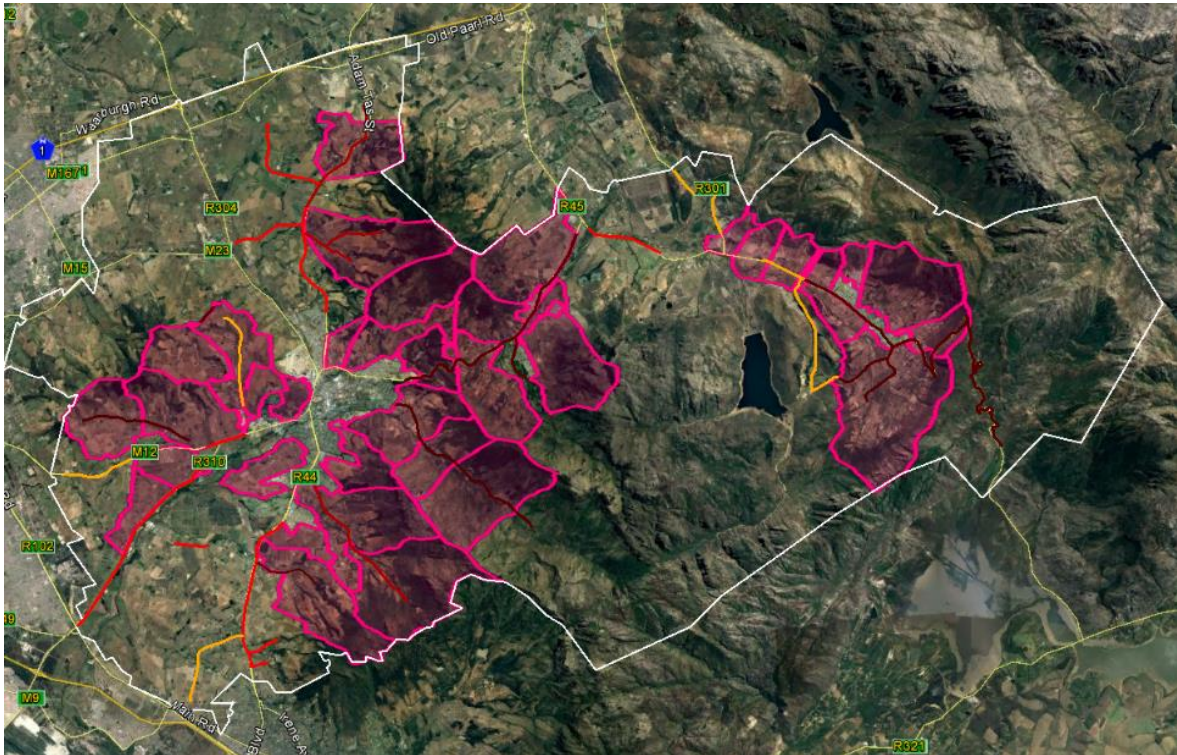


Figure 16: Landscape Units featuring more than 70% visibility coverage from Grade II scenic routes

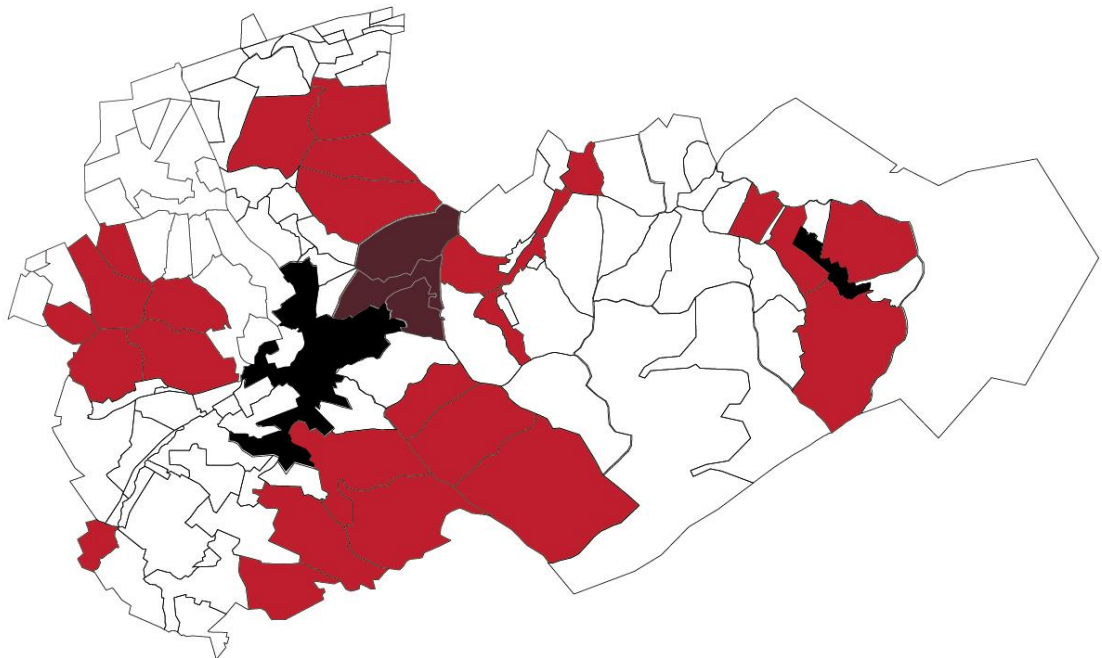


Figure 17: All Grade II Landscape Units (see the online map on the Stellenbosch Municipality heritage forum)

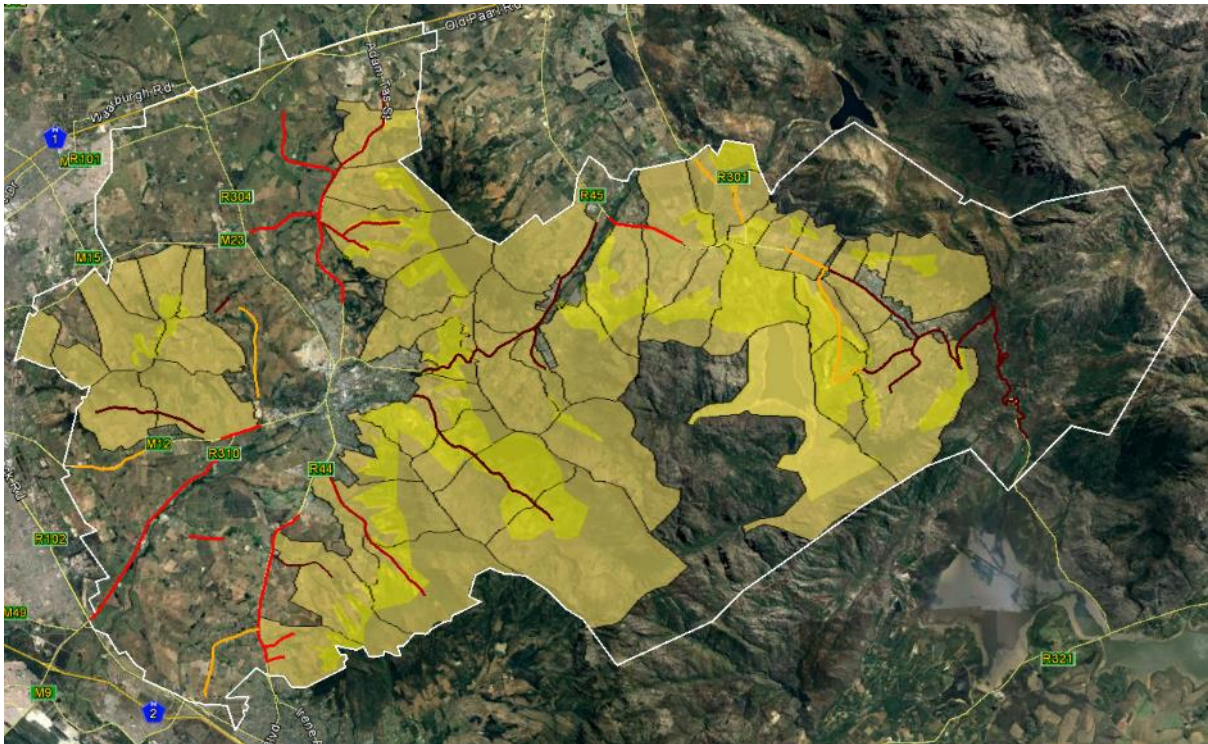


Figure 18: Landscape units that features protected areas. The yellow polygon indicates ESA and CBA areas as support to existing protected areas.

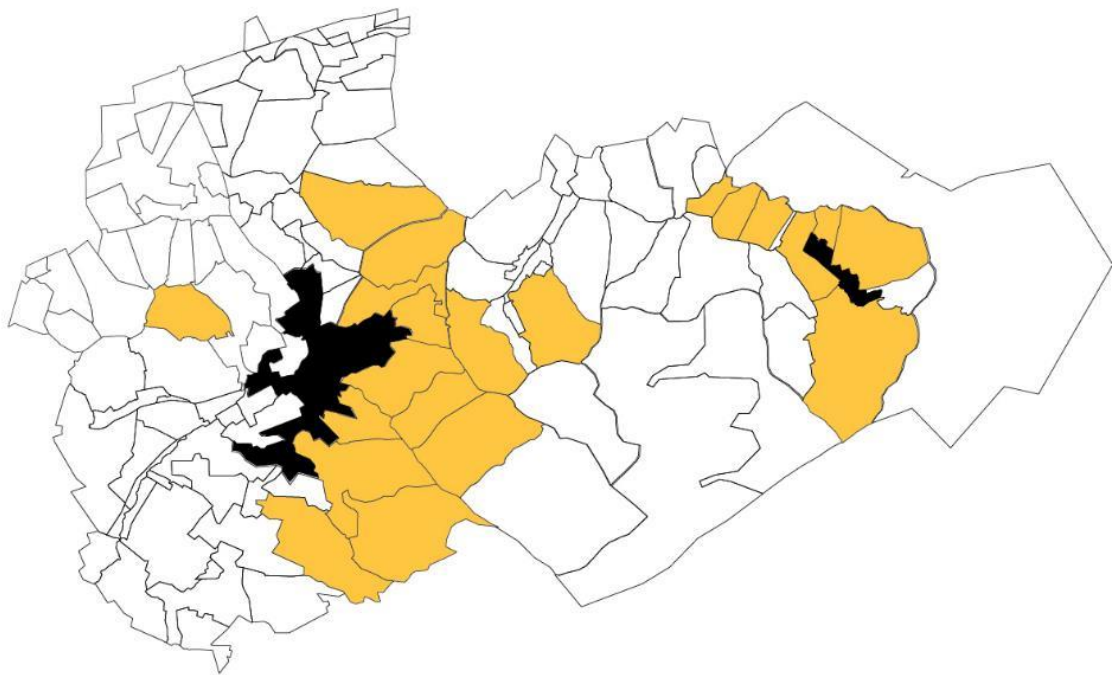


Figure 19: Landscape Units featuring Protected Areas and more than 70% visibility coverage from Grade II scenic routes

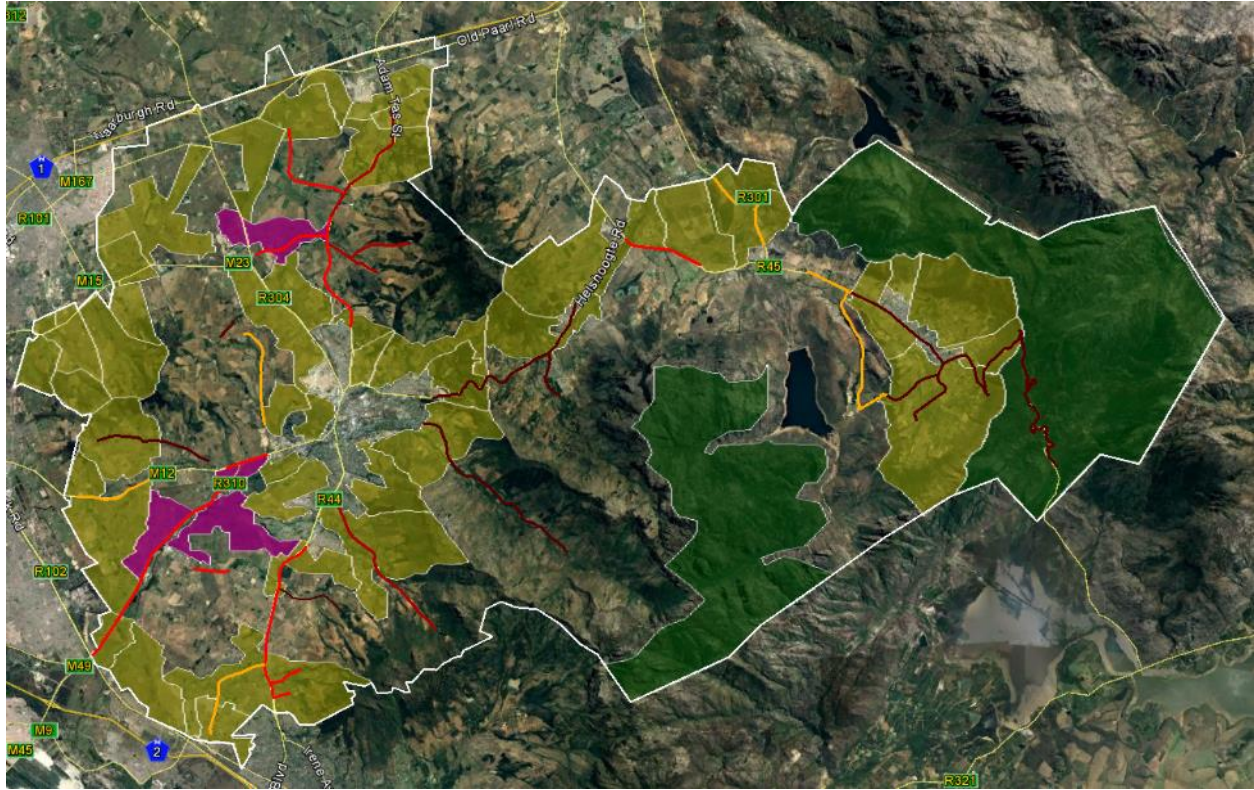


Figure 20: Green Transitions (town and municipal scale), with the pink showing landscape units triggered by proposed development nodes. Green shows mountain areas.

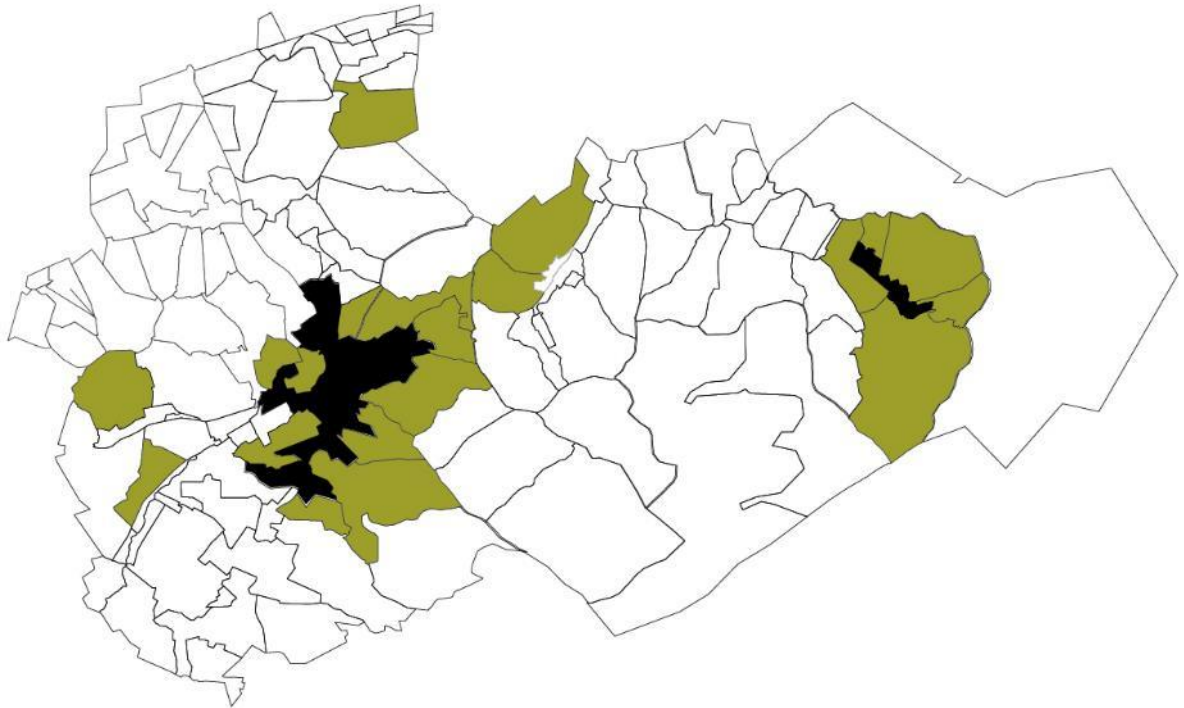


Figure 21: Landscape Units featuring Green Transitions, and more than 70% visibility from Grade II scenic routes

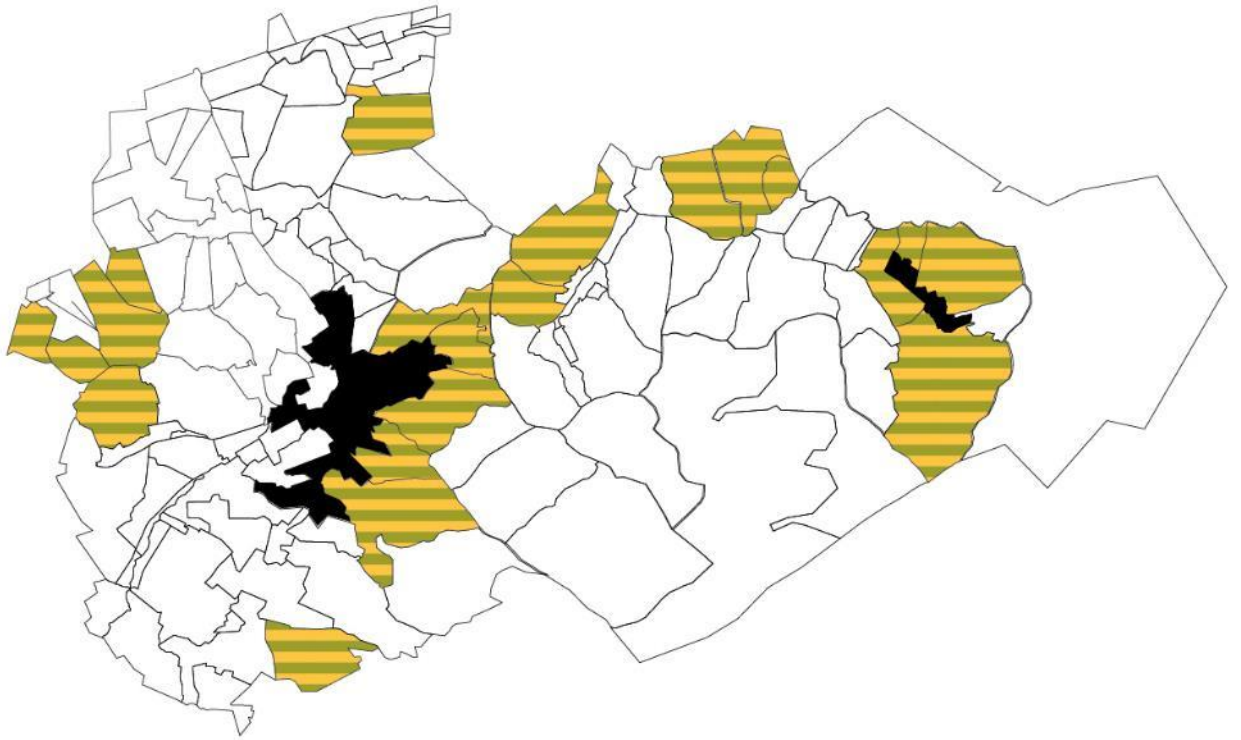


Figure 22: Landscape units with protected areas and green transitions