



## Report:

Visual constraints report for the development of a Portion  
of the Remainder of Erf 464, George

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## GLOSSARY

Aesthetics	Relates to the pleasurable characteristics of a physical environment as perceived through the five senses of sight, sound, smell, taste, and touch.
Adverse visual impact	Any modification in landforms, water bodies, vegetation or any introduction of structures which negatively impacts the visual character of the landscape and disrupts the harmony of the basic elements (i.e. form, line, colour and texture).
Basic elements	The four design elements (form, line, colour and texture) which determine how the character of a landscape is perceived.
Contrast	Opposition or unlikeness of different forms, lines, colours or textures in a landscape and therefore the degree to which project components visually differs from its landscape setting.
Colour	The property of reflecting light of a particular intensity and wavelength (or mixture of wavelengths) to which the eye is sensitive. It is the major visual property of surfaces.
Form	The mass or shape of an object(s) which appears unified, such as a vegetative opening in a forest, a cliff formation or a water tank.
Integration	The degree to which a development component can be blended into the existing landscape without necessarily being screened from view.
Interfluve	The area of higher ground which separates two rivers/watercourses which flow into the same drainage system
Key viewing locations	One or more points on a travel route, use area or a potential use area, where the view of a management activity would be most revealing.
Landscape character	The arrangement of a particular landscape as formed by the variety and intensity of the landscape features and the four basic elements of form, line, colour and texture. These factors give the area a distinctive quality which distinguishes it from its immediate surroundings.
Landscape features	Land and water form, vegetation and structures which compose the characteristic landscape.
Line	The path (real or imagined) that the eye follows when perceiving abrupt differences in form, colour or texture. Within landscapes, lines may be found as ridges, skylines, structures, changes in vegetative types or individual trees and branches.
Micro-topography	Small scale variations in the height and roughness of the ground surface; in the context of this report the definition includes structures such as buildings and larger-sized vegetation that can restrict views
Mitigation measures	Methods or procedures designed to reduce or lessen the adverse impacts caused by management activities.
Mountain, hill or ridge	Is a physical landscape feature, elevated above the surrounding landscape. It includes the foot/base, slopes and crest of the mountain, hill or ridge
Rehabilitation	A management alternative and/or practice which restores landscapes to a desired scenic quality.
Ridgelines	Ridgelines are defined as the line formed by the meeting of the tops of sloping surfaces of land. Significant ridgelines are ridgelines which, in general, are highly visible and dominate the landscape.

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Scale	The proportionate size relationship between an object and the surroundings in which the object is placed.
Sense of place	The unique quality or character of a place, whether natural, rural or urban and relates to uniqueness, distinctiveness or strong identity. It is also sometimes referred to as genius loci meaning 'spirit of the place.
Texture	The visual manifestations of the interplay of light and shadow created by the variations in the surface of an object or landscape.
Visual modification	A measure of the visual interaction between a development and the landscape setting within which it is located.
Viewshed	The creation of a computer generated probable viewshed to define the extent to which the planned infrastructure is visible from key viewing locations.
Visual Sensitivity	The degree to which a change to the landscape will be perceived adversely.
Visual Impact	A measure of joint consideration of both visual sensitivity and visual modification

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# 1. INTRODUCTION

## 1.1 General

Visual impact assessments should not be an obstacle in the approval process of a proposed development. Visual input, especially at the early concept stage of the project, can play an important role in helping to formulate design alternatives, as well as minimising impacts, and possibly even costs, of the project

It is in the nature of visual and scenic resources to include abstract qualities and connotations that are by their nature difficult to assess or quantify as they often have cultural or symbolic meaning. An implication of this is that impact ratings cannot simply be added together. Instead, the assessment relies on the evaluation of a wide range of considerations, both objective and subjective, including the context of the proposed project within the surrounding area.

The analysis of the interaction between the existing visual environment and the planned infrastructure provides the basis for determining visual impacts and mitigation strategies. This visual statement provides an overview of the landscape character of the locality and assesses the degree to which the proposed development would be visually appropriate.

## 1.2 Methodology

### 1.2.1 The sequence of work employed in this study

A desktop survey using 1:50,000 topographical survey maps, Google Earth, and ArcMap (Esri, ArcGIS software) was undertaken. Following the desktop information gathering process, a site visit was undertaken to test the conclusions of the terrain analysis, to identify receptors and appraise the local landscape.

The methodology employed by this visual assessment is based on the following methodologies:

- The United States Department of Agriculture: Forestry Service - *Landscape Aesthetics*;
- The United States Bureau of Land Management Visual Resources Management;
- The Landscape Institute and the Institute of Environmental Management & Assessment - Guidelines for Landscape and Visual Impact Assessment; and
- The Provincial Government of the Western Cape's Guideline for involving visual and aesthetic specialists in EIA processes and the Guidelines for Landscape

### 1.2.2 Written and drawn material was made available

- An urban design report for the development of a portion of the remainder of erf 464, George for the purposes of a University/Research Institute/Academy, Aurecon, 2019

### 1.2.3 Receiving site

The receiving site was assessed, and areas of the locality from where the development appeared to be likely to be visible, adjacent lands, and local roads.

This study was conducted during April 2019. The weather on the days of the site visit was clear and open. A photographic survey of the site and surrounding areas was carried out.



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The visual assessment was undertaken using standard criteria such as geographic view-sheds and viewing distances as well as qualitative criteria such as compatibility with the existing landscape character and settlement pattern.

### 1.3 Assumptions and limitations

It should be noted that the 'experiencing' of visual impacts is subjective and largely based on the perception of the viewer or receptor. The presence of a receptor in an area potentially affected by the proposed development does not thus necessarily mean that a visual impact would be experienced.

Value can be placed in a landscape in terms of its aesthetic quality, or in terms of its sense of identity or sense of place with which it is associated. If no such values are held with respect to a landscape, there is less likely to be a perception of a visual impact if the landscape becomes subject to visual alteration. Development within a landscape may not be perceived negatively at all if the development is associated with progress or upliftment of the human condition.

The perception of visual impacts is thus highly subjective and thus involves 'value judgements' on behalf of the receptor. The context of the landscape character, the scenic / aesthetic value of an area, and the types of land use practised tend to affect the perception of whether landscape change (through development) would be considered an unwelcome intrusion.

The abovementioned landscape values can be interlinked, but can also be conflicting, e.g. amenity values associated with a landscape held by a certain group of people as described above may conflict with economic values associated with the market or development possibility of the landscape that is held by others. It is in this context that visual impact associated with a potential development often arises as an issue in environmental impact assessments.

#### 1.3.1 Data

The best currently and readily available datasets were utilized for the visual impact assessment. It is important to note that variations in the quality, format and scale of available datasets could limit the scientific confidence levels of the visual impact assessment outcomes.

#### 1.3.2 Viewshed analysis

Slope and aspect are very important in the context of views. Topography expressed in the form of slope and aspect can perform an important role in limiting views or 'focusing' views in a certain direction. Viewers located low down within an enclosed valley would experience a limited visual envelope or viewshed, as the rising topography around them would prevent wider views of the surrounding terrain beyond the immediate valley.

Similarly, an object placed lower down in such an enclosed valley would have a limited viewshed, being shielded or partly shielded by the terrain surrounding it. A viewer located on a hill slope with a certain aspect would only be able to view the surrounding terrain in the direction of the aspect of the slope. Conversely, a viewer on a higher-lying interfluvium will be exposed to potentially wide-ranging views over the surrounding terrain, and large objects placed in these terrain settings could similarly be visible from a wide area.

The micro-topography within the landscape setting in which the viewer and object are located is also important. The presence of micro-topographical features and objects such as buildings or vegetation that would screen views from a receptor position to an object can remove any visual impact factor associated with it.

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Fischer (1995) analysed the effects of data errors on viewsheds calculated by Geographic Information Systems and has shown that the calculations are extremely sensitive to small errors in the data and the resolution of the data and the errors in viewer location and elevation. Other studies have also shown that a view-shed calculated using the same data but with eight different Geographic Information Systems can produce eight different results. Hankinson (1999) also states that view-shed are never accurate, and they contain several sources of error and may not always be feasible to separate these errors or to estimate their size and potential effects. It is, therefore, better to describe a view-shed analysis as a probable view-shed that must be subjected to subsequent field testing and verification.

A probable viewshed can be based on topography only and shows areas that will be screened by intervening hills, mountains etc. A probable topographic view-shed does not consider heterogeneous and complex natural and man-made elements in the surrounding landscape. Intervening vegetation, buildings or small variations in topography, such as road cuttings are therefore not considered.

Therefore, it is a conservative assessment of those areas that may be visually impacted by the planned infrastructure. Increasing sophistication/accuracy of the probable view-shed by the addition of data on complex natural and man-made elements in the landscape is desirable, but it will introduce further errors of detail and interpretation in the view-shed analysis.

### 1.3.3 Visualisation

It must be remembered that any visualisation (3D models, photomontages, photos and maps) of complex natural and man-made elements produce perceptions, interpretations and value judgements that are not always consistent with those that would be produced by actual encounters with the elements represented. Visualisations should, therefore, be considered an approximation of the three-dimensional visual experiences that an observer would receive in the field and must be subjected to subsequent field testing and verification

Photomontage is the superimposition of an image onto a photograph to create a realistic representation of proposed or potential changes to any view. The overall aim of photography and photomontage is to represent the landscape context under consideration and the proposed development, both as accurately as is practical. It must be kept in mind that the human eye sees differently than a camera lens, both optically and figuratively.

The focusing mechanisms of human eyes and camera lenses are different; human eyes move, and the brain integrates an intricate mental image. Human vision is binocular, and dynamic compared to a camera that tends to flatten an image.

## 2. APPLICABLE POLICIES AND GUIDELINES

A number of government policies and plans, guidelines, environmental management instruments and other decision-making instruments are relevant to the site and development and have been reviewed. These include:

### 2.1 The Western Cape Provincial Spatial Development Framework (PSDF)

Makes provision for:

- the protection and sustainable use of Landscape and Scenic Resources,
- the protection, management and enhancement of the provinces Sense of Place, Heritage and Cultural Landscape

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## 2.2 The George Spatial Development Framework

Recognises:

- The vital importance of protecting landscape character and visual resources of the Garden Route including sensitive viewsheds
- That should developments have to occur in sensitive landscapes, and along scenic routes, it must be sensitive to the landscape and natural visual resources.

## 2.3 The George Municipality Landscape Characterisation Visual Resources Management Analysis

The George Municipality's Landscape Characterisation Visual Resource Management Analysis determines visually sensitive areas in the George landscape and must be applied to manage visual impacts of development.

## 2.4 The Garden Route Environmental Framework

This document provides baseline data on the Topographical, Visual and 'Sense of Place' aspects in the Garden Route, the sensitivity, constraints and development guidelines for the area assist in informing decision-making.

Management Guidelines are provided for Ecologically Sensitive Geographical Areas. Of particular reference to this report are the guidelines for development in:

- Topographically Sensitive Geographical Areas;
- Conservation and Protected Areas; and
- Visually Sensitive Landscape Geographical Areas.

Risks include:

- Erosion of steep slopes;
- The potential for visual and light pollution;
- Destruction of visual topographical quality;
- Development impact of sensitive topographical features and landscapes;
- Inappropriate large-scale development;
- Sprawling urbanization; and
- Large scale change of land use developments outside of the urban edge.

Objectives include:

- Maintain the integrity of the Garden Route Landscape;
- Limit development on steep slopes;
- Enhance and protect the topographical landscape backdrop to the Garden Route;
- Manage development on steep slopes, discouraging development;
- Limit development densities
- Retain the 'sense of place' of villages and hamlets;
- Enforce building control and aesthetics;
- Protect the 'sense of place' of the Garden Route;
- Protect and enhance the visual quality of prominent tourism routes, meanders and nodes;
- Protect the visual integrity of the South African National Park asset, as well as provincial nature reserves; and
- Limit and prohibit development on prominent visually sensitive and exposed features.

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Proposed activities/developments within areas of outstanding natural beauty, scenic drives and panoramic views must be sensitive to the natural beauty. The layout, buildings, density, landscape treatment and infrastructure should be:

- Be visually unobtrusive,
- Utilise materials and colours that originate from or blend into the surrounding landscape,
- Be grouped in clusters with open spaces between clusters,
- Not interfere with the skyline, landmarks, major views and vistas,
- Not result in light, noise or effluent pollution,
- Not result in excessive water consumption, and should incorporate a requirement for rainwater collection as part of the building,
- Respond to the historical, architectural and landscape style of surrounding layout and buildings,
- Incorporate existing man-made or natural landmarks and movement patterns
- Keep and protect a visual buffer along the N2 National Road as far as possible.

## 2.5 Heritage and Scenic Resources: Inventory and Policy Framework for the Western Cape

The study provides input on cultural and scenic resources and provides a guide for the identification and conservation of these resources. The report focuses on the broader regional scale rather than the local landscapes or individual site scales and is, therefore, an overview rather than a detailed inventory of cultural and scenic resources.

## 2.6 DEA&DP Guideline for Management of Development on Mountains, Hills & Ridgelines

Key decision-making criteria regarding development on mountains, hills and ridges, relevant to this visual impact assessments, are:

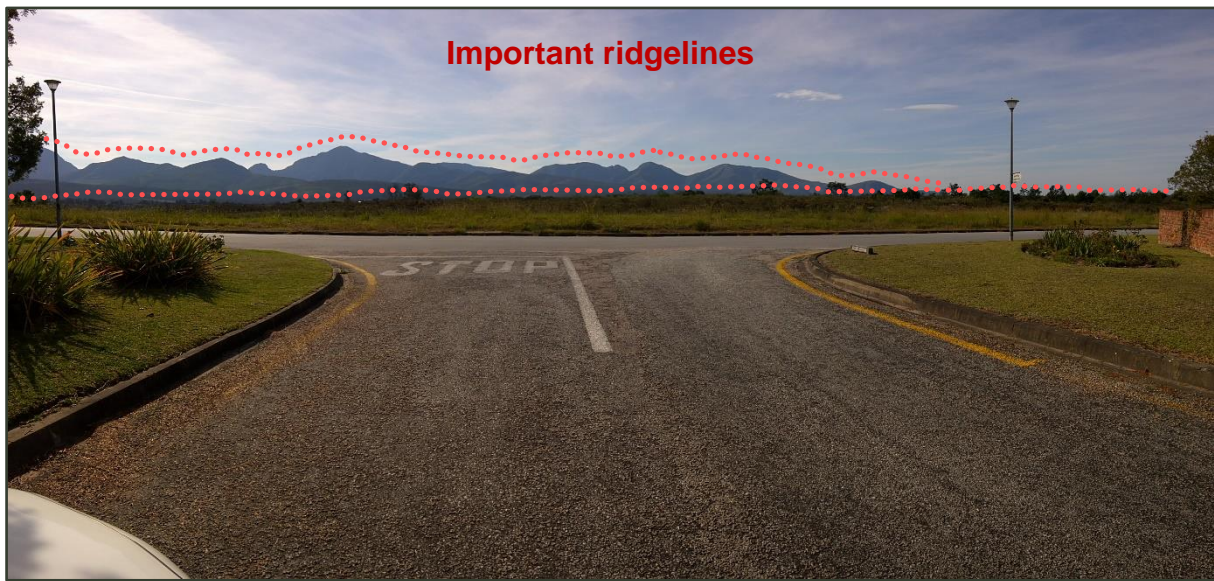
- to avoid inappropriate development (i.e. intrusive and consumptive development) on mountains, hills and ridges taking into account the character of the existing environment;
- to ensure that where development does take place, that its layout and design takes account of sensitive features and environmental constraints, thereby promoting environmentally sensitive development of projects on mountains, hills and ridges where development is authorized;
- to preserve landform features through ensuring that the siting of facilities is related to environmental resilience and visual screening capabilities of the landscape;
- to ensure that the scale, density and nature of the developments are harmonious and in keeping with the sense of place and character of the area.

Environmental characteristics such as steep slopes (steeper than 1:4) and development on the crest of a mountain, hill or ridge will serve as key indicators of environmental sensitivity.

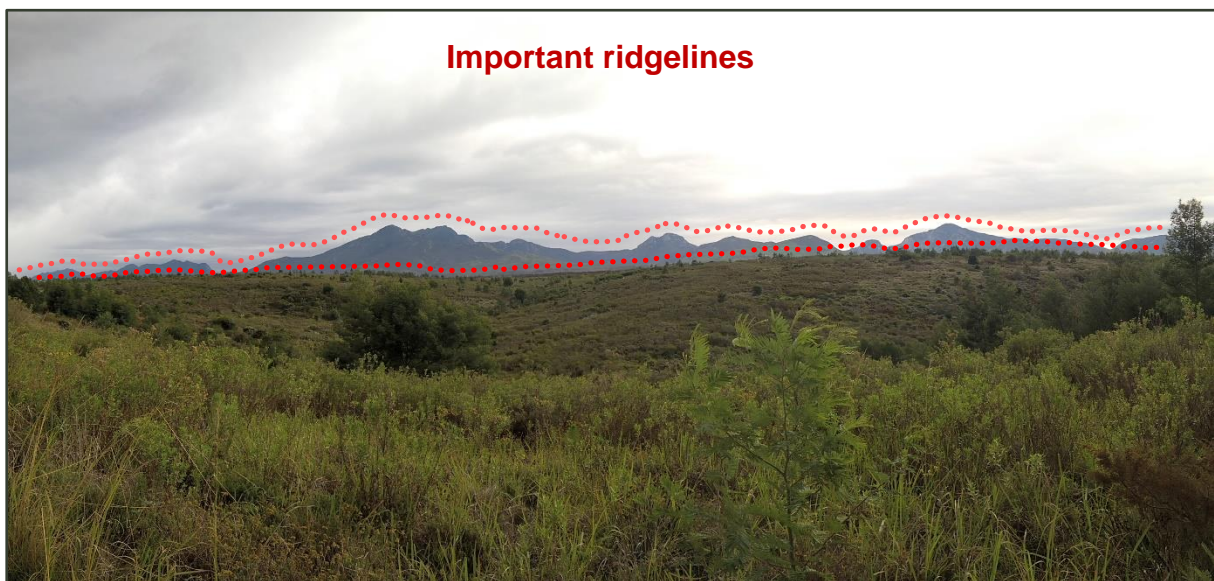
The development pattern/s and the character of the area within which the proposed development will be situated must be described.

### 3. DESCRIPTION OF THE AFFECTED AREA AND SCENIC RESOURCES

The project is located on the southern banks of the Garden Route Dam on the eastern edge of the town. The study area of approximately 118 Hectares edges the dam on the north. This edge is identified being the approximate level of the dam at maximum capacity. The western edge is guided by the established neighbourhoods of Eden and Loerie Park. The southern edge is guided by Madiba Drive and the Glenwood AH neighbourhood. Towards the east on the opposite side of the Garden Route Dam is commercial Pine plantations and the Nelson Mandela University Campus located. The project location provides unobstructed views of the Outeniqua Mountains towards the north (Figure 1, 2, 4, 5)



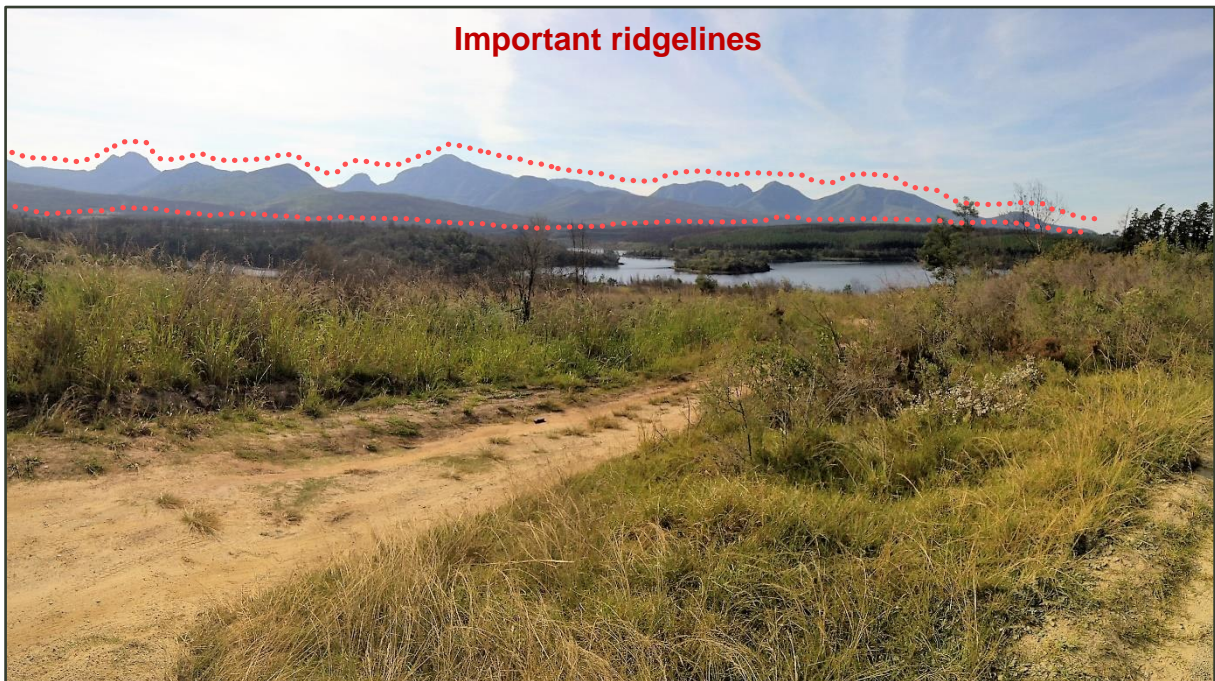
**Figure 1:** A view corridor on a portion of the project site and the Outeniqua mountains in the background



**Figure 2:** A view corridor from Madiba Drive on the project site and the Outeniqua mountains in the background



**Figure 3:** A view from the project site towards the Glenwood neighbourhood next to Madiba Drive



**Figure 4:** A view corridor from the project site towards the Garden Route Dam and the Outeniqua mountains in the background

### 3.1 Surrounding land uses

The project area is surrounded by urban areas, smallholdings, areas degraded by invasive alien plants, commercial Pine plantations and natural areas (Figure 1, 3, 6).

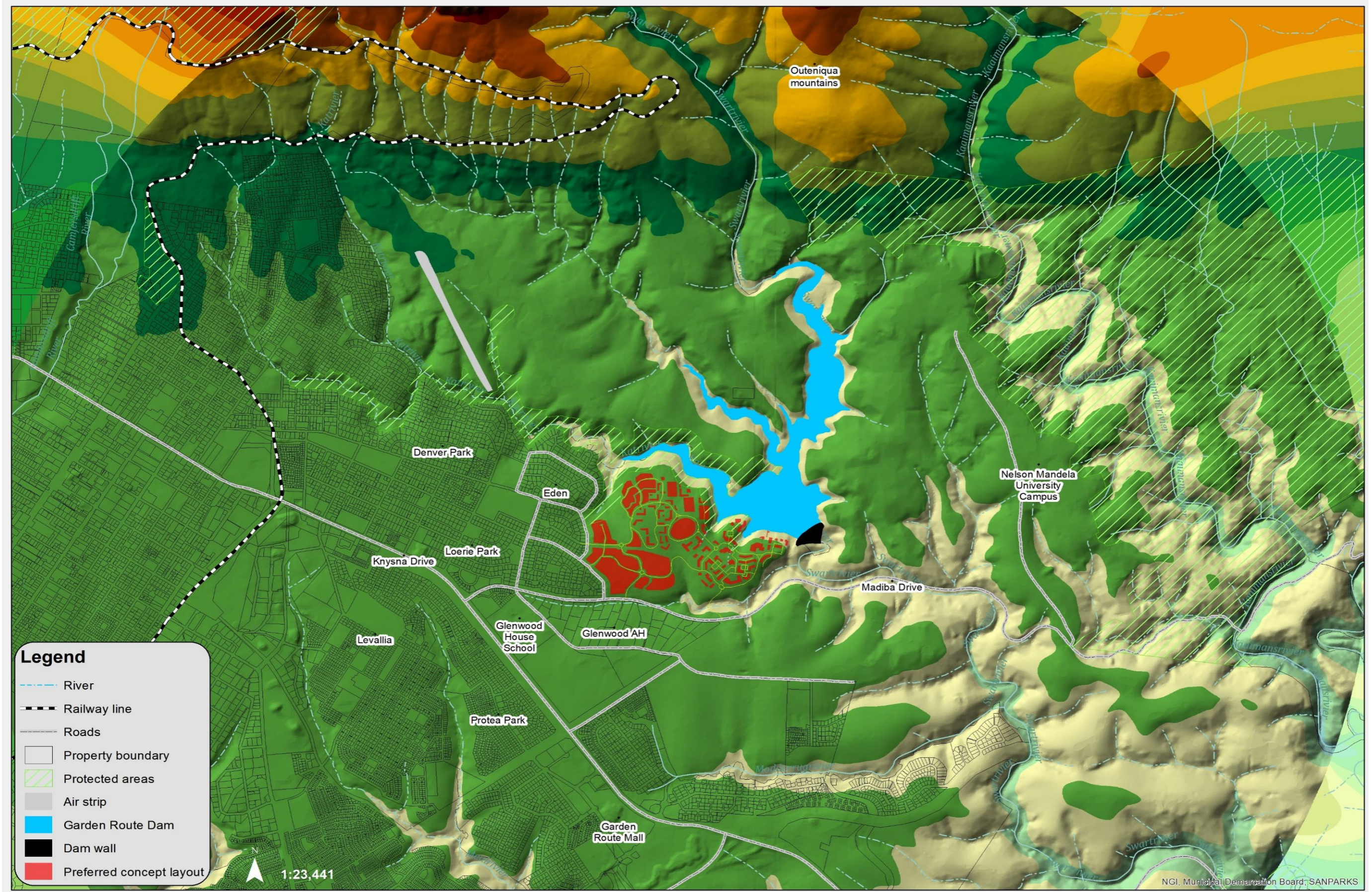
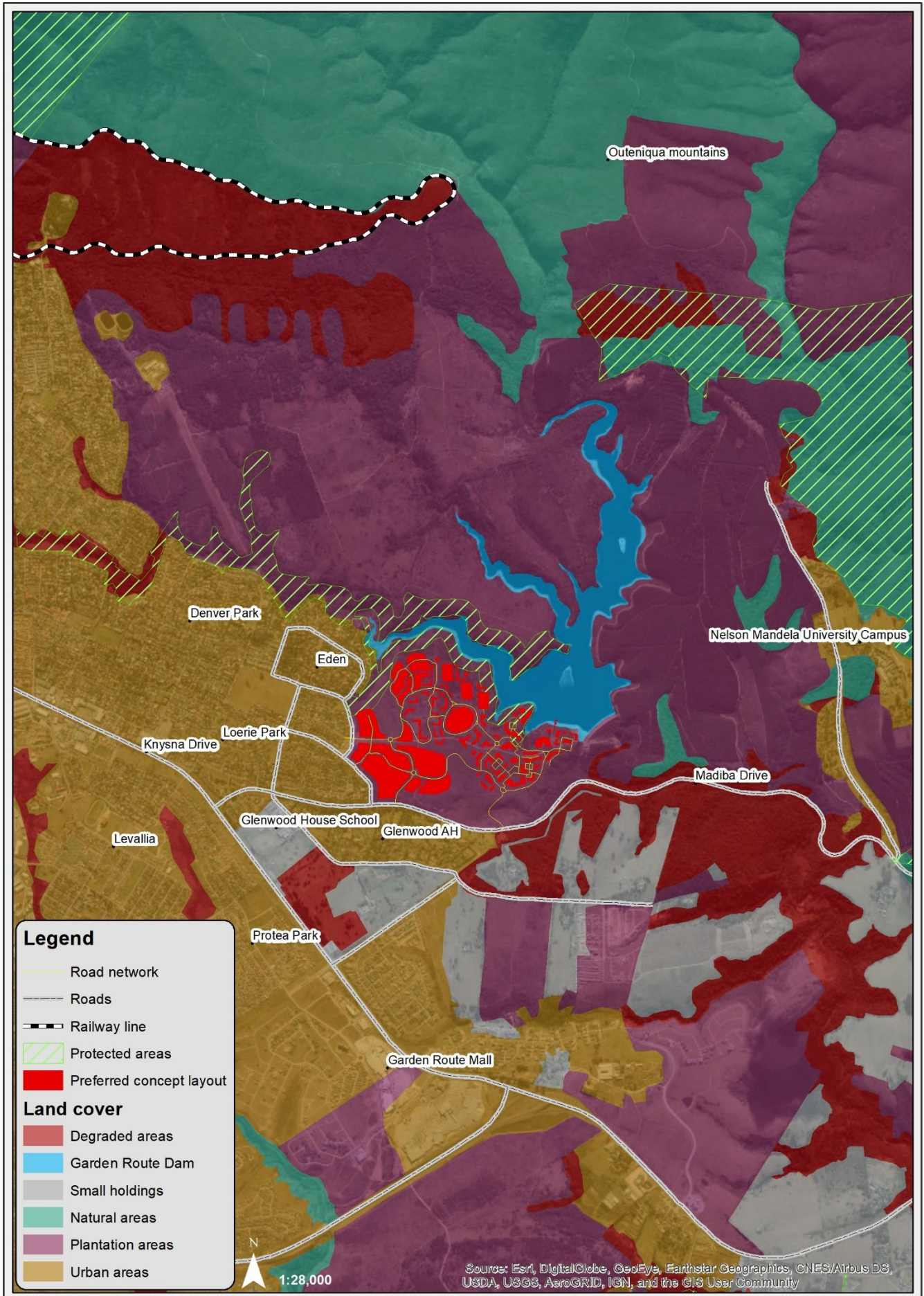


Figure 5: Project location



**Figure 6: Land cover**



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## 3.2 Topography

The project area is located on top of a hill with views over the Garden Route Dam, George (Eden, Loerie Park, Glenwood AH), Madiba Drive and Outeniqua mountains. The average height above sea level varies between 177 – 220 meters (Figure 3,4 & 7).

## 3.3 Local vegetation

The project site has been managed as commercial Pine plantations for many years, transforming the natural vegetation on the site (Figure 3 & 4).

## 3.4 Protected landscapes

The site lies within the Garden Route Biosphere Reserve, and the Kat river Nature Reserve covers a narrow section of the project area. The project area contains small areas of Critical Biodiversity Areas 1 (Aquatic) and Ecological Support Areas 1 (Terrestrial) and Ecological Support Areas 2 (Restore from plantation or high-density invasive alien plants) (Figure 9).

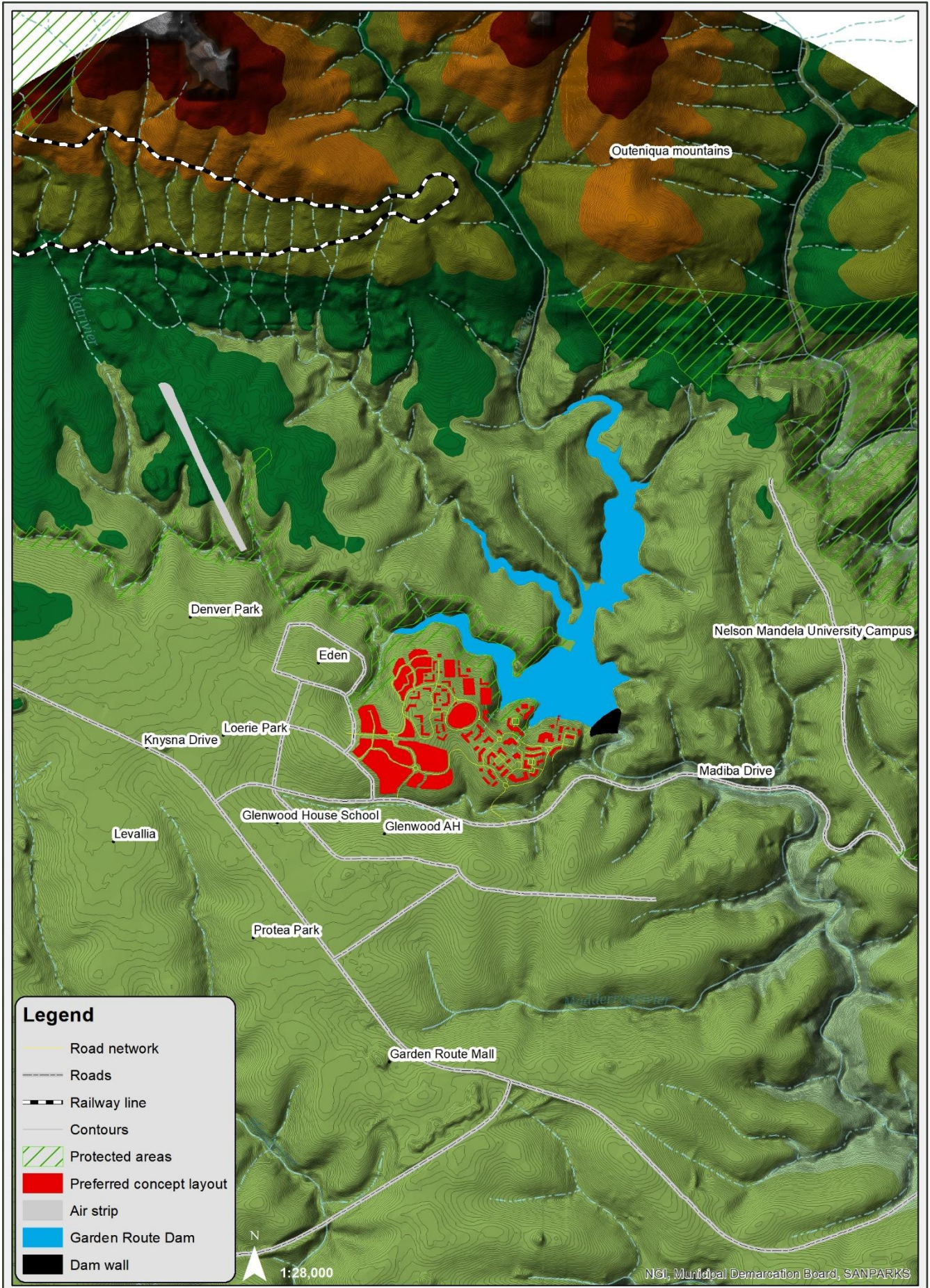
## 3.5 Landscape character & value

Landscape character is defined as the distinct, recognisable, and consistently occurring pattern of elements in a particular type of landscape as created by specific combinations of geology, landform, soils, vegetation, land use, field patterns, and human settlement.

The George Spatial Development Framework (GSDF) states (Policy D6) that valuable view corridors, undeveloped ridge lines, cultural landscape assets and existing vistas should not be compromised by any development proposal or cumulative impact of development proposals. Proposed developments up the slope of a prominent hill or mountain should not degrade its aesthetic/visual value.

The GSDF identifies the Seven Passes Road that starts at Madiba Drive as a significant scenic route that must be managed in such a way that it does not compromise the scenic views offered by the route (Figure 5). The area around the Garden Route Dam (GRD) has also been identified as an important view corridor

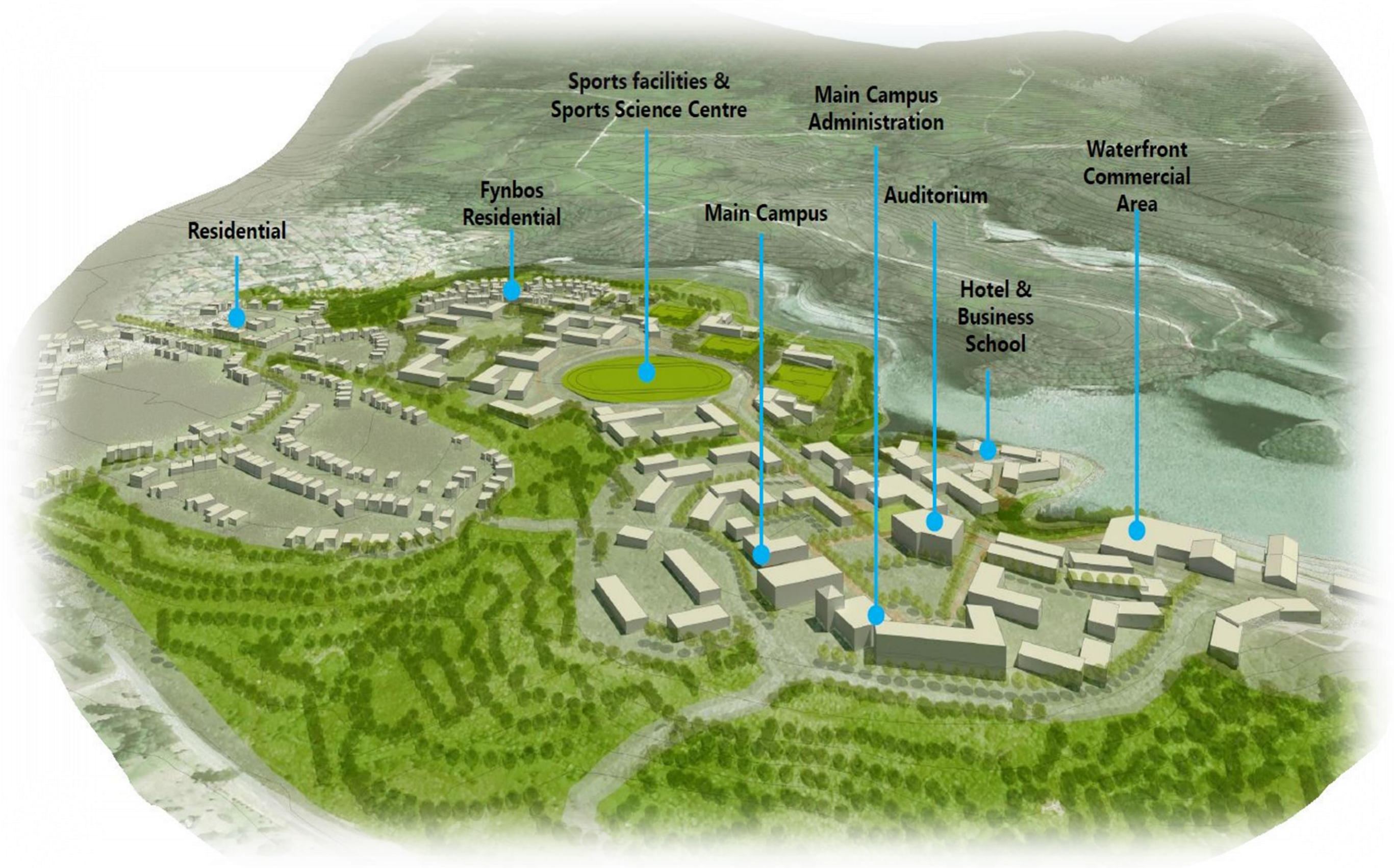
A mountain, hill or ridge is described as a physical landscape feature, elevated above the surrounding landscape. This includes the foot/base, slope and crest of a mountain, hill or ridge. Ridgelines are defined as the line formed by the meeting of the tops of sloping surfaces of land. Significant ridgelines are ridgelines, which, in general, are highly visible and dominate the landscape. The project is located on a hill with views on important ridgelines identified in the GSDF that should not be compromised by developments (Figure 1, 2, 4, 11).



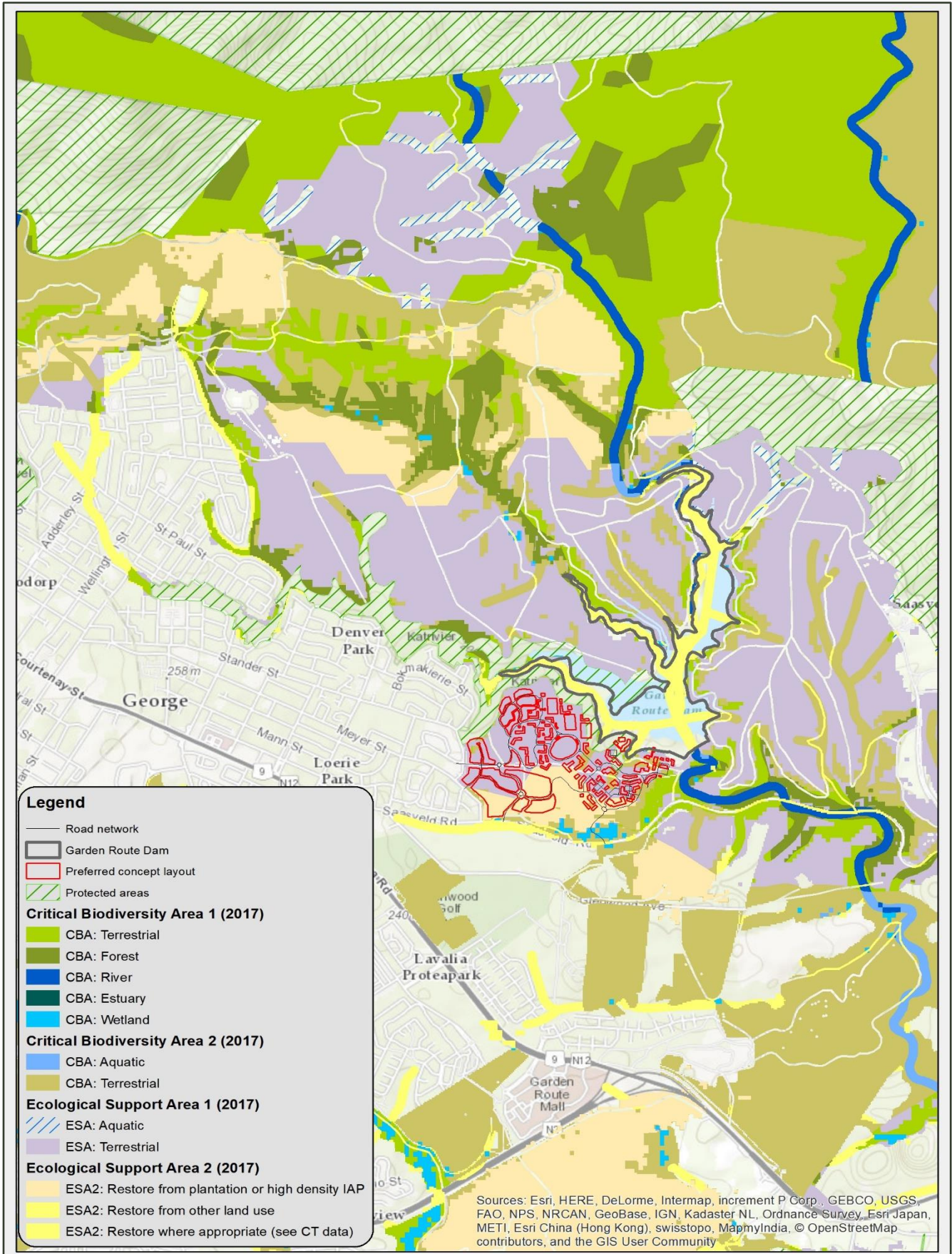
**Figure 7: Project area topography**



Figure 8: Preferred concept layout



**Figure 9:** Preferred concept layout visualisation



**Figure 10: Protected landscapes**

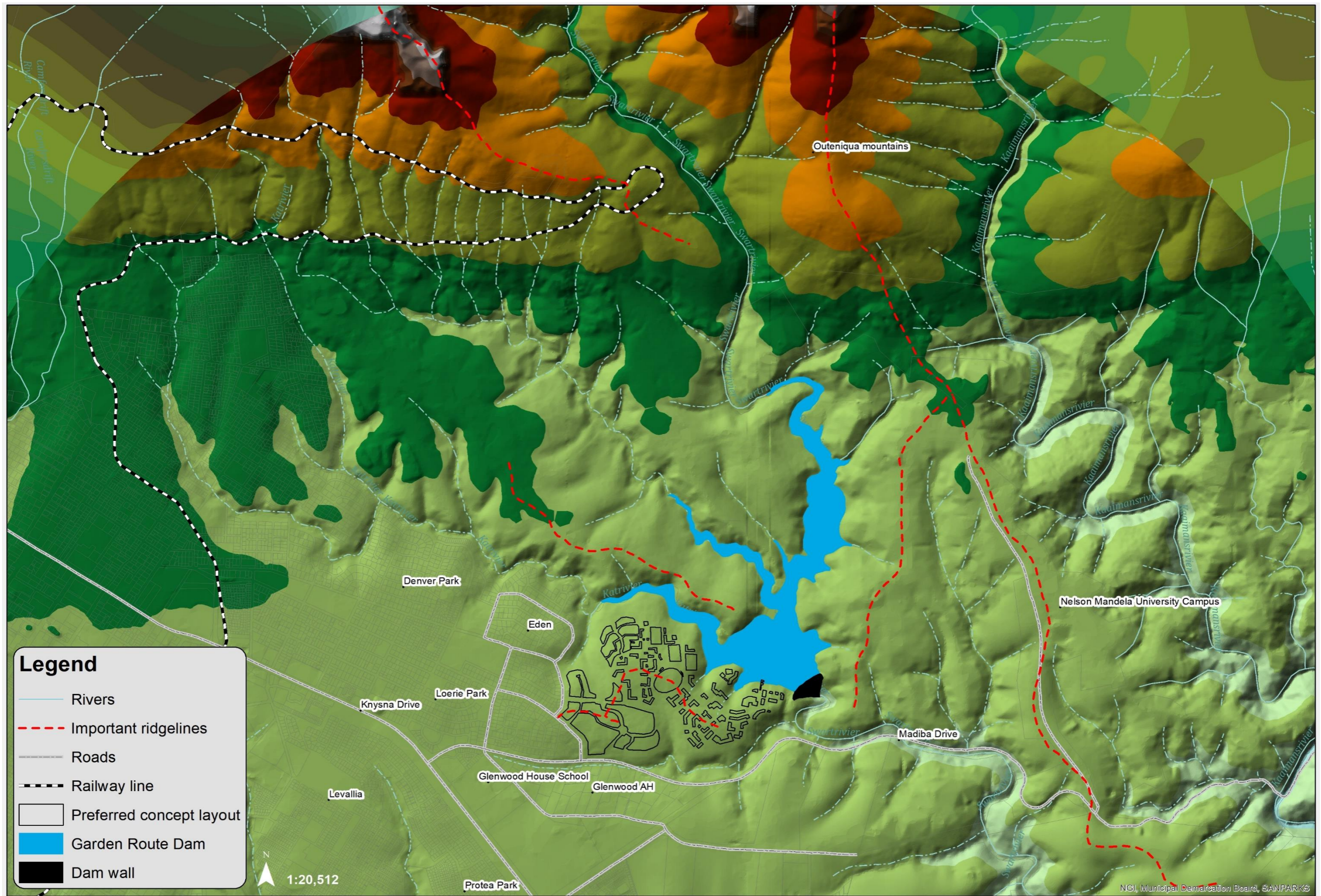


Figure 11: Important ridgelines

## 4. PROJECT DESCRIPTION

### 4.1 Project Description

Three design options were presented by the design team to stakeholders and consultants. The preferred option (vision) sees a campus as central the development with supporting uses and mutually beneficial functions (Figure 8 & 9). The accompanying residential land should support the campus environment and could also evolve and grow into various products that can be used for students during term and holidaymakers during the holidays. A variety of types of housing will also cater for undergrad students, lecturers, visiting lecturers, post grad students through to single residential erven. The varied public uses in the development should make use of the scenic nature of the site and be accessible to the community of George as well as the campus users. Key development concepts:

- The campus is located on a high point with some visibility from Madiba Drive. This allows for the main buildings to be more prominent as you drive up the hill.
- This area is connected to the business area and the sport and student housing area with a campus walk.
- Additional walkways and pathways should be planned to run throughout the development and to use the opportunities alongside the green belts to create strong connections to the various precincts of the development.
- The main campus is near both the Waterfront business area, the hotel area and the sports facilities.
- Other departments and/or other symbiotic academies are dotted in groups along the campus walk.
- The hotel area can be linked to the business area with a pedestrian bridge, and this precinct could also include a business school and possible tourism related training facilities.
- The sports facilities and a possible sports science centre are located in the flatter areas.
- A sports oval that can accommodate an athletics field, as well as a cricket field, is located on the rise with framed views through from the residences and the road.
- The soccer/rugby fields are set into the slope with embankments on the one side and a slight rise on the other to benefit from the scenic position as well as to screen the fields partially from the residential areas.
- The areas on the edge of the dam and sports fields present great opportunities for public parks, picnic areas and recreational activities. These are connected to the waterfront business area via walkways and paths.
- Parking areas a broken up into small pockets throughout the development to avoid large unsightly parking lots.
- Residential uses decrease in intensity towards the existing residential neighbourhood where they would mirror the typologies.

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## 5. VISUAL CONSTRAINTS & MITIGATION

The proposed development is located on an elevated landform (hill & ridgeline) and is therefore visually exposed to a potentially large area (Figure 12). The George Spatial Development Framework (GSDF) states that valuable view corridors, undeveloped ridgelines, cultural landscape assets and existing vistas should not be compromised by any development proposal or cumulative impact of development proposals. Urban developments located on the slopes of prominent hills and located in viewing corridors with a high exposure should not degrade its aesthetic/visual value. The GSDF has identified important ridgelines and sensitive viewing corridors on the proposed development (Figure 11).

The GSDF also states that scenic routes such as the Seven Passes Road that is located next to the project area should be managed in such a way as not to compromise the scenic views offered from these routes. The Garden Route Environmental Management Framework (GREMF) has identified the inappropriate placement of development infrastructure on prominent and exposed topographical features such as ridgelines as a risk to the visual landscape of the Garden Route.

Based on the results from the policy review and the visual assessment, a visual constraints map was produced that will inform the further refinement of the preferred concept layout (Figure 13).

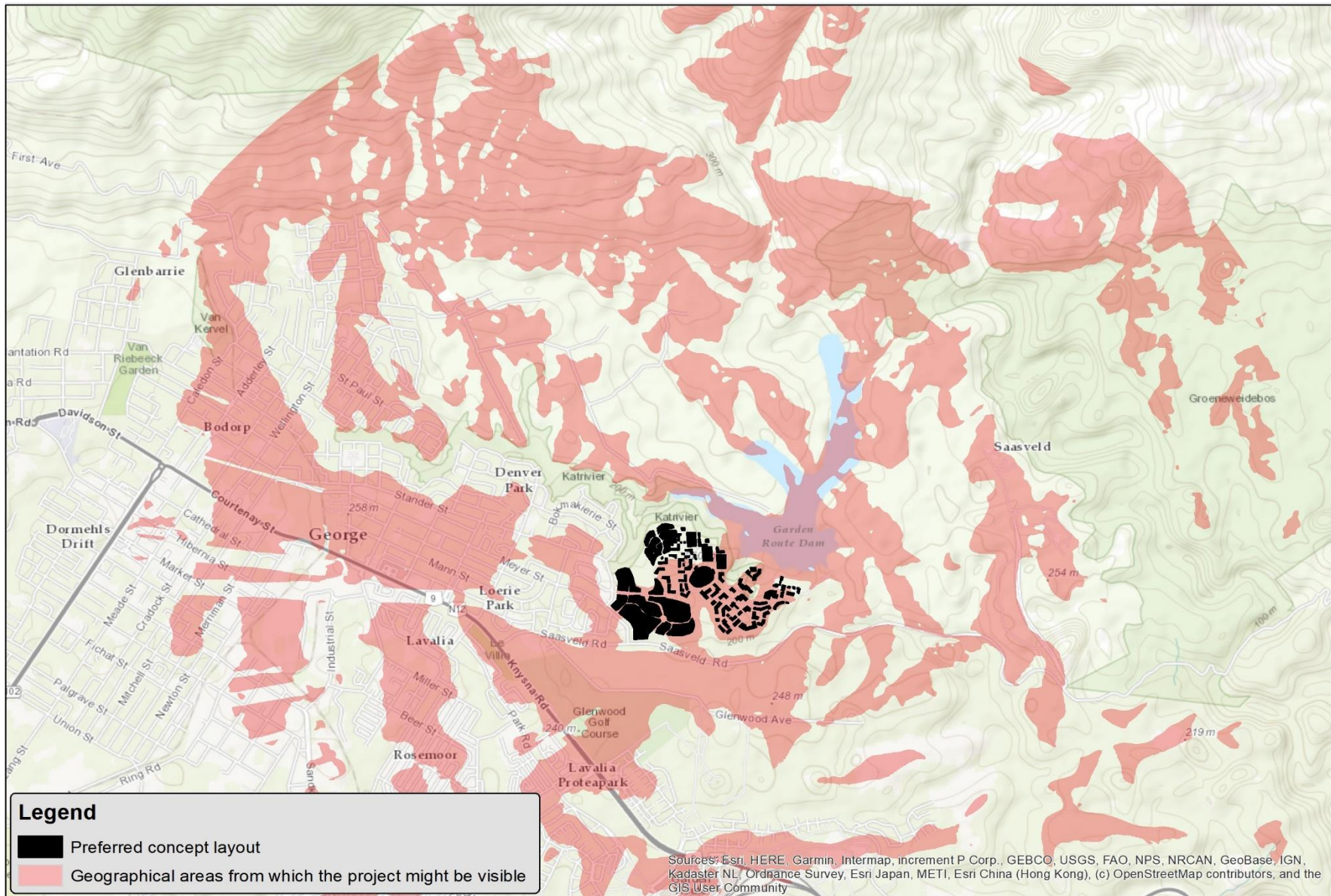
The development must be designed so that buildings, structures, and other improvements do not extend above the existing ridgelines (high visual sensitivity) or alter the ridge profile significantly when viewed from the public streets, roads, water bodies or facilities (Figure 13). Structures should be sited below the ridgeline to preserve a natural topographic and vegetative profile. Ridgelines and prominent hillsides should be retained as open space through appropriate clustering and/or transfer of density to other parts of the development site.

Infrastructure should be designed to conform to the natural topography and hillside setting of the project site. Buildings and associated infrastructure located on the hillsides (moderate and low visual sensitivity) below ridgelines should follow the contours of the site and blend with the existing terrain to reduce bulk and mass. Infrastructure should be positioned to allow adequate space for tree planting and other vegetation screening interventions. Roof forms and rooflines should be broken into smaller building components to reflect the irregular forms of surrounding natural features. The slope of roofs should be oriented in the same direction as the natural slope.

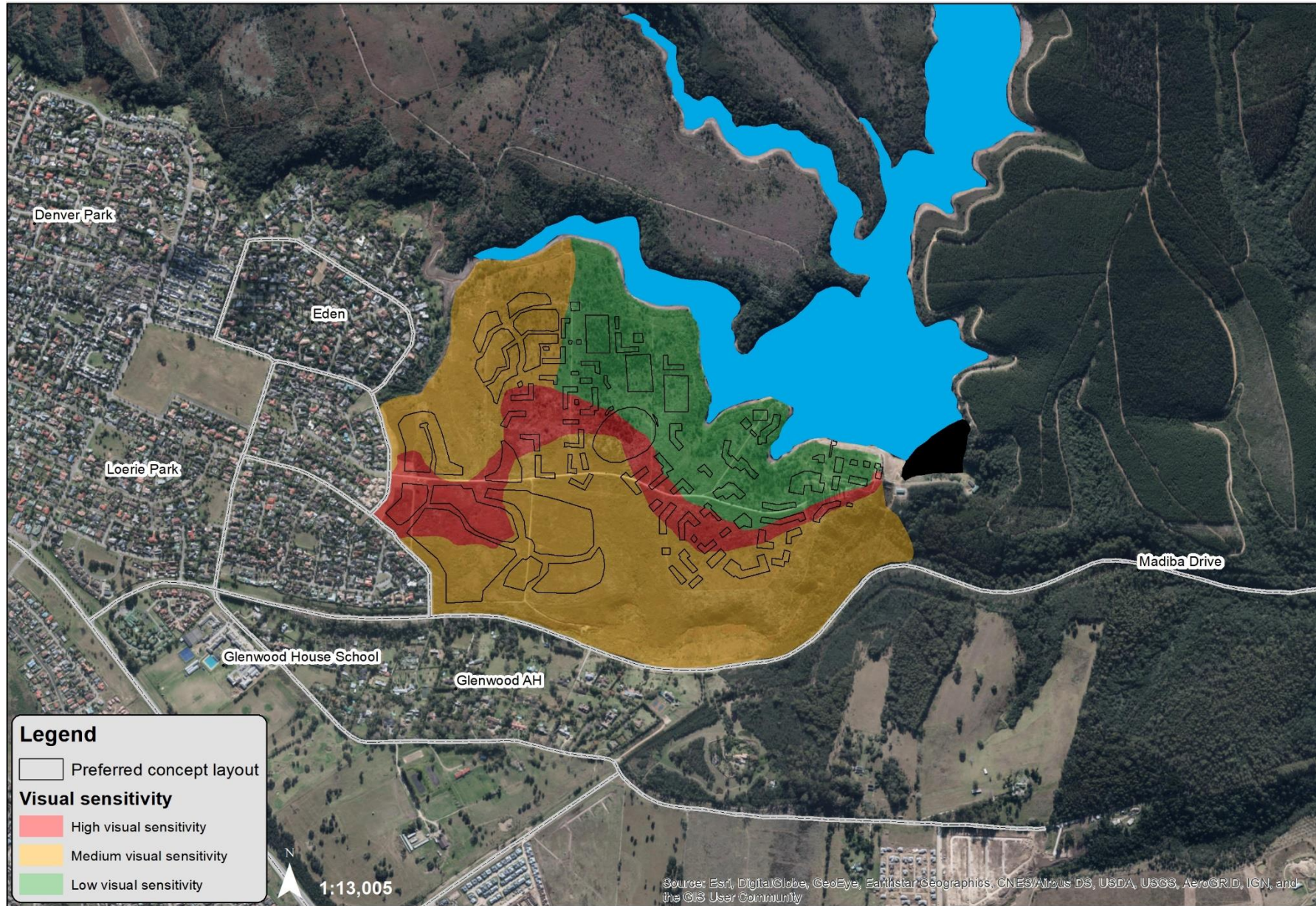
The GREMF states that proposed developments within areas of outstanding natural beauty, scenic drives and panoramic views must be sensitive to the natural beauty and consider the following aspects when planning the development:

- Infrastructure should be visually unobtrusive
- Materials and colours used for the development should blend into the surrounding landscape
- Infrastructure should be grouped in clusters with open spaces between clusters
- Infrastructure should not interfere with the skyline (ridgelines), landmarks, major views and vistas
- The development should not increase light, noise or effluent pollution
- The development should correspond to the historical, architectural and landscape style of surrounding layout and buildings





**Figure 12:** Project viewedshed



**Figure 13:** Visual sensitivity of the project site

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