

City Farm Garden

Countering the impacts of urban expansion into a rural valley in the Western Cape through a gardening approach to place-making.

Sonjia Hendrikse

Abstract

Globally, the uniqueness of rural landscapes is at risk of disappearing thereby threatening rural society, traditional agro-ecological knowledge systems and local, regional and global ecological processes that may ultimately determine the future sustainability and quality of life on earth.

The rural landscapes of the Western Cape of South Africa are renowned for their exceptional scenic beauty, a floral kingdom recognized as world heritage, rich cultural diversity, agriculture and viticulture heritage. The province is experiencing exceptional population growth, urban expansion and urban dispersion into the rural countryside placing immense pressure on infrastructure and natural resources that may culminate in the degradation or loss of valuable natural and cultural landscape assets.

In this dissertation I explore how landscape architecture may contribute to the protection of rural landscape character and authenticity. The theoretical framework for the study is grounded in theories from various disciplines: *genre de vie*, place-work-folk relationships, traditional agro-ecological knowledge systems (TAeK) and the work of architects from the French school of landscape architecture. The study focuses on the development of pilot gardens as a means to integrate landscape character, biodiversity conservation and rural agro-ecological place-work-folk relationships in designed landscapes. Pilot gardens offer opportunities for experimentation, iteration, testing and pedagogy from which strategies for protecting the authenticity and continuity of rural landscapes on a larger scale can be developed. In this way, it may be possible for rural landscapes in transformation to retain their connection and relationship to the larger territory to the benefit of the ecological, productive, cultural and aesthetic values that rural landscapes embody.

Project information

Dissertation Title: City Farm Garden: Countering the impacts of urban expansion in a rural valley in the Western Cape through a gardening approach to place-making.

Submitted by Sonjia Hendrikse, in fulfillment of part of the requirements for the degree Masters of Landscape Architecture (Professional) within the Department of Architecture, Faculty of Engineering, Built Environment and Information Technology, University of Pretoria, 2021.

Study leader & Studio master: Johan N. Prinsloo

Course co-ordinator: Professor Arthur Barker

Landscape typology: Rural landscapes, landscape architecture on a regional scale, landscape architecture as a function of sustainable regional development.

Location: Dwars River Valley, Western Cape, South Africa.

GPS coordinates: Between -33.9199°S , 18.9284°E and -33.8633°S , 18.9769°E

Research field: Memory, Legacy and Identity & Inhabitation of Place

Client: Western Cape Government / Stellenbosch Municipality / Stellenbosch Heritage Foundation

Theoretical premise: An explorative study towards the development of landscape strategies to protect rural landscape character, socio-ecological systems, biodiversity and traditional agro-ecological knowledge systems amidst the impacts of urban expansion and dispersion in a rural Western Cape.

Keywords: Rural landscapes, regional landscapes, landscape characterisation, landscape architecture, Dwars river valley, Pniel, Lanquedoc, Kylemore, Johannesburg

Sonjia Hendrikse, 18 January 2022

Student declaration

Department of Architecture, Faculty of Engineering, Built Environment and Information Technology, University of Pretoria.

In accordance with Regulation 4(e) of the General Regulations (G.57) for dissertations and theses, I declare that this dissertation, which I hereby submit for the degree Master of Landscape architecture (Professional) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

I further state that no part of my dissertation has already been, or is currently being, submitted for any such degree, diploma or other qualification. I further declare that this dissertation is substantially my own work. Where reference is made to other works of other authors, the extent to which that work has been used is indicated and fully acknowledged in the text and list of references.

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2. I did not make use of another student's previous work and submitted it as my own.
3. I did not allow and will not allow anyone to copy my work with the intention of presenting it as his or her own work.

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1. Introduction

Globally, the uniqueness of rural landscapes is at risk of disappearing thereby threatening traditional landscapes, the structure of rural society as well as local, regional and global ecological processes that will ultimately determine the future sustainability and quality of life on earth (Makhzoumi & Pungetti 1999:16, 24; Redman & Foster 2008:3; Rotherham 2015:305).

Rural landscapes encompass semi-natural ecosystems that provide habitat for local indigenous species and are a priority for biodiversity conservation (Hanspach, Loos, Dorrensteijn, Absen & Fischer 2016:853). Long-term, predictable, traditional uses of landscapes form a critical part of biodiversity conservation, whereas the loss of traditional and customary land management practices, called '*cultural severance*', is considered to be even more damaging to nature conservation than climate change, whilst having serious adverse effects on rural economies and communities (Rotherham 2015:305). Land-use change through urban development affects every aspect of ecology, from soil, air, water and wetlands, to climate and biodiversity (Sauerwein 2011:50) and leads to the disintegration of the coherence of a landscape (Marot 1999:52).

The landscapes of the Western Cape form a central part of the economy of the province (WCPSDF 2014:53). The province is experiencing exceptional population growth, urbanization and urban expansion that places immense pressure on its natural resources, infrastructure and human resources (Van Niekerk, Du Plessis, Boonzaaier, Sprocter, Ferreira, Loots & Donaldson 2016:181-182). This may lead to the degradation and loss of many of the Western Cape's valuable cultural and natural landscape assets.

The Western Cape Provincial Government (WCSDF 2014:53) explains the dilemma in the following way:

Western Cape's cultural and scenic landscapes are significant assets to underpin the tourism economy, but these resources are being incrementally eroded and fragmented. Agriculture is being reduced to 'islands', visual cluttering of the landscape by non-agricultural development is prevalent and rural authenticity, character and scenic value is being eroded. ... A number of scenic landscapes of high significance are under threat and require strategies to ensure their long-term protection (Western Cape Provincial SDF 2014:53).

Urban Growth Boundaries (UGBs) or 'urban edges' are used to contain urban sprawl, encourage densification and integration, and protect agricultural- and environmentally sensitive areas (Horn & Van Eeden 2018:15; Sinclair-Smith 2014:313,317). However growing population numbers require the re-definition of UGBs and the recent addition of multiple new urban edge areas in rural areas. Urban dispersal into farmland further contribute to the fragmentation of rural landscapes, loss of valuable agricultural land and agri-employment, and increased pressure on the environment and natural resources (Sproctor, Horn & Van Eeden 2018:17).

A renewed focus on regional development highlights the importance of space and place in effective development policies (Van Niekerk, Du Plessis, Boonzaaier, Spocter, Ferreira, Loots & Donaldson 2016:179). Regional development driven by socio-economic pressures often bring about the transformation of pristine landscapes and landscapes shaped by long-term customary land management practices to man-made environments which result in the decline and disappearance of more sustainable systems (Rotherham 2015:305; Smiraglia, Tombolini, Canfora, Bojocco, Perini & Salvati 2019:154). Unsustainable use of land may generate territorial imbalances and trigger progressively intense social conflict and humanitarian crises (Smiraglia *et al.* 2019:154).

For the purpose of this research, the Dwars River Valley was selected as the study area. The Dwars River Valley, a small valley located in the mountains between the historic towns of Stellenbosch, Paarl and Franschhoek, was

proclaimed a natural heritage site in 2009 by the South African Heritage Resource Agency (SAHRA) in response to the perceived threat of residential development (Van der Waal 2014:7). The valley is known for its exceptional scenic beauty, historic farms and rural villages. The Stellenbosch Heritage Framework, that provides a means of integrating the protection of rural landscapes with spatial planning to prevent inappropriate or intrusive urban expansion into rural areas of high heritage value (Todeschini & Jansen 2017:171, 174), indicates this landscape to be of high heritage value.

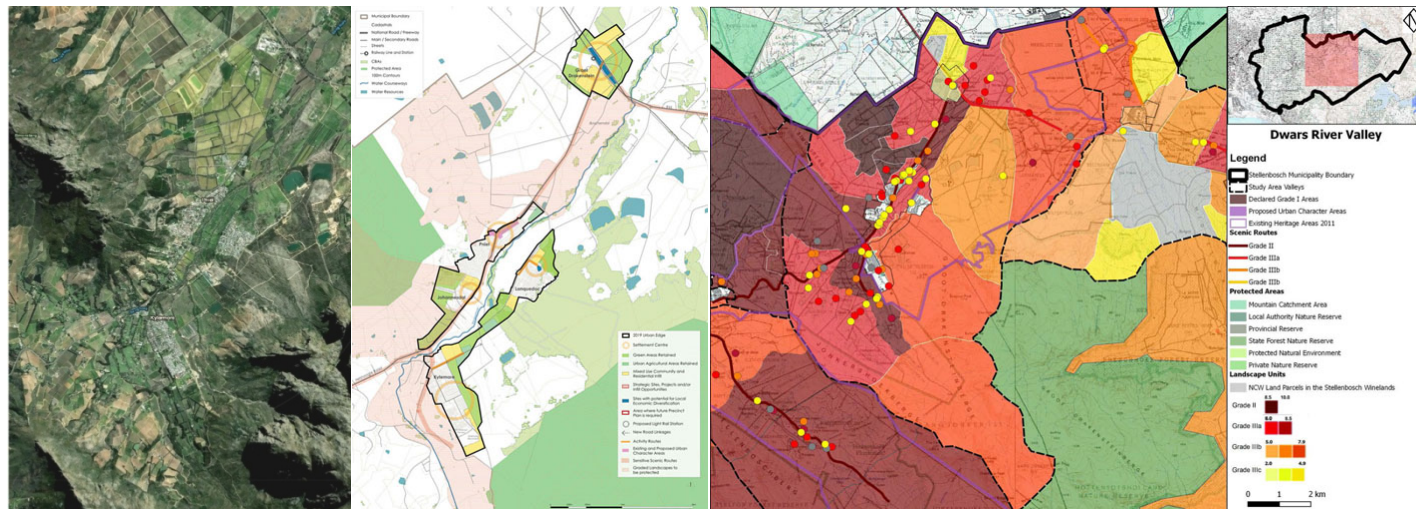


Figure 1: The Dwars River Valley; The Dwars River Valley; New urban edge definitions for the Dwars River Valley (SMSDF 2019:58); Stellenbosch Heritage Framework (Part F)

Landscape architecture finds itself positioned at the convergence of agricultural- and urban traditions (Marot 1999:49, 53) or, to paraphrase, the convergence of the rural- and urban, the natural and the cultural. In this dissertation I explore how landscape architecture may contribute to the protection of rural authenticity through the

integration of landscape character, rural agro-ecological practices and biodiversity conservation in designed landscapes. The theoretical framework for research is found in *genre de vie*, place-work-folk relationships, traditional agro-ecological knowledge systems (TAeK) and the work of French landscape architects.

The research follows an approach of landscape characterization from which two pilot gardens were developed. The pilot gardens provide opportunity for experimentation and testing from which strategies may be developed to protect the rural landscape character of the valley amidst of proposed land-use change and redefinition of urban edges in the valley (SMSDF 2019:85).

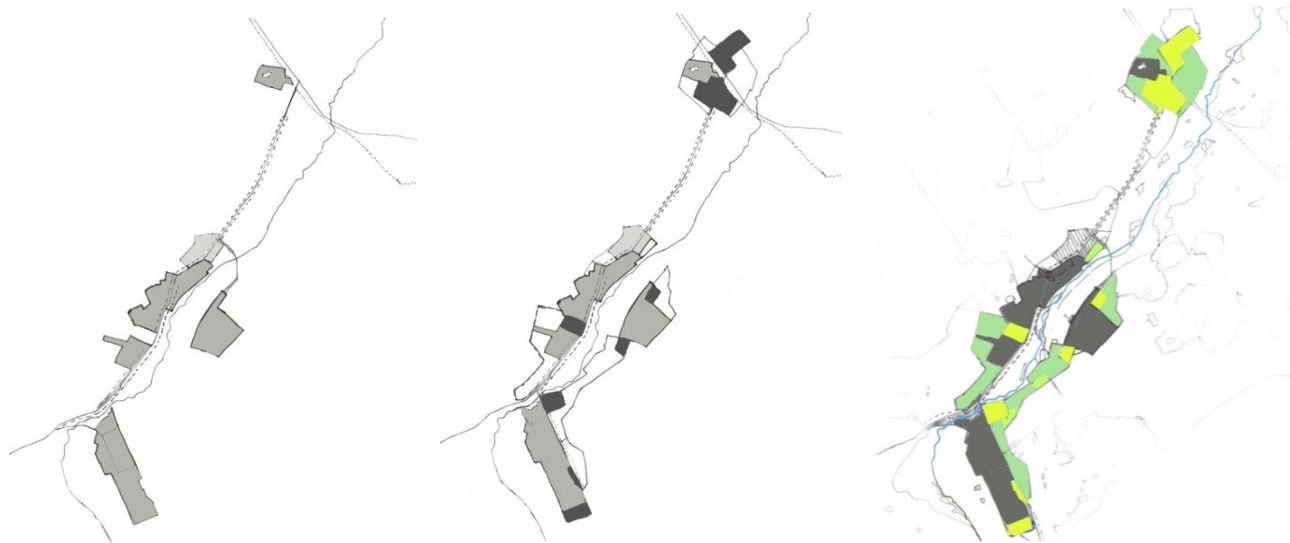


Figure 2: i) Existing villages ii) new urban edge definition for Drakenstein, Pniel and Kylemore (Author 2021, based on SMSDF 2019:58)

Through this explorative study I hope to gain greater insight in developing landscape based strategies that may contribute to protection of the rural landscape character of the region.

2. Research questions, methodology and literature review

Research Question

In this dissertation I will investigate ways in which the landscape character and identity, and the contribution of local communities and their knowledge systems to landscape character, may be protected and invigorated amidst of urban development.

Methodology

This study subsumes both inductive and deductive methodological approaches and includes an ethnographic component that involves the observation, description and interpretation of the landscape. Empirical data was gathered through the analysis and re-drawing of aerial photographs of the Dwars River Valley and the larger regional territory at various scales in CAD, in addition to the study of historical maps, interviews, sketches and photography.

These explorations led to the identification of the final study area: the central part of the Dwars River Valley, with a focus on the four historic rural villages. Landscape character studies of five areas were conducted. Based on the

findings from these landscape character studies, two pilot gardens were designed by applying the methods of Michel Desvigne. The purpose of these experimental pilot gardens is to test principles and components derived from landscape character studies for use in a larger ‘territorial’ landscape framework.

For this purpose the following hypothesis is postulated: In order to maintain the coherence that is characteristic of rural landscapes, new developments in rural areas should be derived from the landscape itself, so as to ensure that the landscape maintains its “rural authenticity, character and scenic value”, highlighted in the Western Cape Provincial SDF (2014:53). Pilot gardens provide the opportunity to implement and test landscape proposals from which larger landscape strategies may be developed. Pilot gardens form provide immediate status and structure to the rural landscape.

Literature review

Regional studies and transitional thinking require a cross-disciplinary approach (Bogart & Schelereth 2015:2; Bélanger 2016:193-194; Hunt 2016:248). The initial literature review encompasses an explorative investigation of perspectives on rural landscapes from various disciplines in an attempt to gain a better understanding of the complex dynamics that shape rural landscapes, with specific focus on the Western Cape and the Dwars River Valley. For the purpose of this study, sources from the various relevant disciplines were consulted that will be discussed throughout this study. Hence, I do not present a comprehensive literature review at this point.

3. Theoretical approaches to determine a 'research by design' methodology

3.1. *Genre de vie* (1894)

The French geographer Paul Vidal de la Blanche's theory of regional geography, *genre de vie* (1894), explores the relationship between people's way of dwelling and the identity provided by the surrounding landscape (Donovan & Gkartzios 2014:342; Howard 2011:11-12). *Genre de vie* is based on the concept of *pays* - relatively small-scale socio-ecological or geographical units that encompass land, soil, terrain, regional vegetation, landscape character, cultural tradition, crops and produce. *Pays* are shaped and cultivated by *paysans*, a most important figure in French psyche. *Paysans* describe the small-scale family farmer or peasant, representative of craftsmanship and quality produce, the "salt of the earth" (Howard 2011:65).

The distinctive character of *pays* constitute units of eco-cultural relationships (Makhzoumi & Pungetti 1999:105) that contribute to a community's sense of place and belonging (Rippon 2013:180). *Pays* therefore provide a valuable means to counter the homogenising effects of globalization (Bélanger 2016:211) and can form the basis for regional development (Everitt 1985:15). In recent years, Franco-Mediterranean academics have developed territory-product, place-based local agro-food systems (LAFS), linked by formal Geographic Identities (GIs) as a core tool in sustainable rural development (Bidwell, Murray & Overton 2018:4-5). GIs provide economic benefit

for local producers by linking a product’s unique quality characteristics to a specific territory (Belletti, Marescotti & Touzard 2017:51). Historic landscape features further contribute to the preservation of regional identity, culture and history and can aid in the economic revitalisation of rural communities (Donaldson, Sprocter, du Plessis & Van Niekerk 2012:131).

3.2. *Place-work-folk* relationships (1911)

Patrick Geddes, a botanist and the “father of regional design” and “ecological sociology”, explored *place-work-folk* inter-relationships based on Frédéric Le Play’s (1855) theory of *Lieu, Travail et Famille* (place-work-family) (Scott 2016:240). In 1911 Geddes developed the ‘valley section’ as a regional system of analysis, organisation and planning in terms of place - work - folk relationships (Ndubisi 1997:15; Groth & Wilson 2003:89; Scott 2016:242; Shane 2016:50).

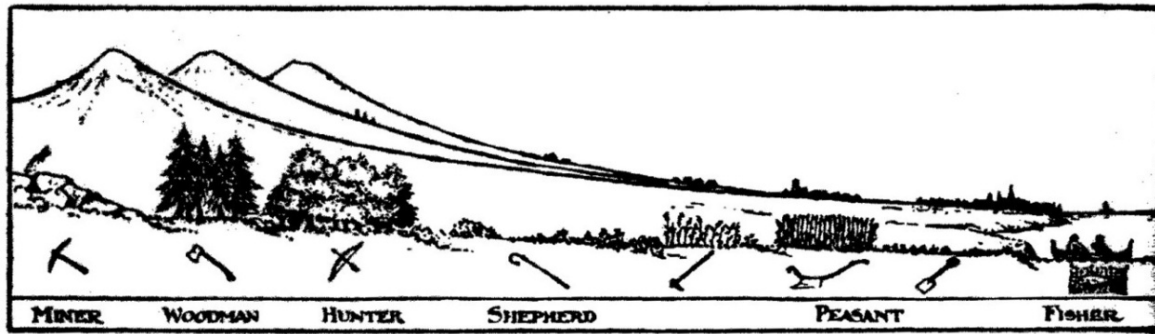


Figure 3: Patrick Gedde’s Valley section (Bélangier 2016:196)

In contrast to urban landscapes, rural landscapes are often still characterized by active *place-work-folk* relationships. Place-work-folk relationships reflect how people work in and on a particular place and how the place “works on a people”. ‘Work’ is the socially organised means through which organic needs are met through adaption to a specific environment. The ‘work’ of a people consists of the activities through which they operate on and so transform their environment. Thus, a people can determine the character of a region through their capacity to modify and transform the conditions under which they act (Scott 2016:241). Intimacy with a landscape is expressed in the range of tools, architectural forms and artifacts devised for shaping, traversing, and harvesting a region (Bogar & Schelereth 2015:42). The landscape architecture theorist, Dorothy Imbert (2018:28) writes that when “landscape architects invoke geography we think natural or physical geography, while it should be human geography since our territory is entirely structured by human activity, practices and relations”. Agricultural- and horticultural practices reflect the “active collaboration” between people and plants (Raxworthy & Harrison 2018:70, 168). Agriculture and horticultural practices constitute an important part of the *place-work-folk* relationships in the Dwars River Valley and form a core part of the design strategy.

3.3. Agricultural education and traditional agro-ecological knowledge systems

Agro-biodiversity helps to maintain the structure and functions of landscape and human well-being by providing complexity, stability and ecological connectivity (Cecchini *et al.* 2019:247). Traditional agro-ecological knowledge systems (TAeK) form a significant part of the world’s bio-cultural heritage but is rapidly being eroded,

often due to the devaluation thereof and lack of transmission to younger generations (Benyei *et al.* 2020:19). It is anticipated that agriculture will be one of the main sources of future employment and rural economic development in Africa. Agricultural education and training (AET) is considered to be of strategic importance and will be integrated in primary, secondary and tertiary education curriculums (Minde 2015:138,164; Johnson 2020:8). Sustainable local food systems is to be form part of all aspects of settlement planning and design (Donaldson *et al.* 2012:132). The rich agricultural heritage of the Dwars River Valley and its villages can play an valuable role in the conservation and transfer of traditional agro-ecological knowledge and skills.

3.4. Vernacular gardens

The Garden is the place where the great inventions of our time are made - Bernard Lassus (Weilacher 2016:111)

The Cape Winelands District Municipality spatial development framework highlights the critical need for sensitizing communities to the existence and value of cultural landscapes (CWDSDF 2019:25). Allotment gardens, a type of vernacular garden, provide opportunity for local community gardeners, *habitants-paysagistes*, to engage with the landscape, give expression to local knowledge and contribute to the development of a neighborhood - and regional landscape plans (Hunt 2016:79,83-84; Spirn 1998:8).

4. Rural landscapes and the French school of landscape architecture

The French word for landscape or countryside, *paysage*, links the words *pays* and *paysan* (Howard 2011:12). *Paysage* conveys the visible and invisible qualities of a landscape (Girot 1999:59). The landscape architectural theorist, Christophe Girot (1999:59) writes that *paysage* "... refers not only to issues of environment and ecology but also to the mood of an entire nation, to its changing sense of identity and cultural belonging" (*ibid.*). Practitioners in the landscape industry are called *paysagiste*, 'landscape engineers' (Howard 2011:67; Wall 2010:13) or 'landscape painters' (Tiberghien 2008:153).

4.1. Historical overview

It has been suggested that the foundations of contemporary urban planning can be traced to spatial principles conceived in seventeenth-century French landscapes (Laurie 1978:25; Marot 1999:54; Young 2000:134).

Historically, France was known as a rural country with a large part of the population owning or working the land (Marot 1999:46). Following the impacts of World War II, the main focus of reconstruction policies from the mid 1940's to early 1970's was to provide mass-housing and infrastructure. At the same time rural France was undergoing dramatic agricultural, economic and cultural transformations, the impacts of which were not foreseen

before it had become too late to reverse (Imbert 2018:30; Marot 1999:46-47). Following a top-down style of planning, described by Le Corbusier as “*du dedans vers le dehors*” (“from the inside to the outside”), the focus was on program without taking in consideration local differences or the innate richness and history of a territory or site (Marot 1999:47). Sites were seen “as blank surfaces on which to organize urban functions in efficient and often standardized ways” (*ibid.*). As a result, features such as the *bocage* (a landscape marked by intermingling patches of small fields, tall hedgerows, orchards, woodlands and heaths), ditches and paths with rich heritage and cultural meaning, disappeared from the landscape (Imbert 2018:30). In the mid-1980’s it became clear that rural France and its agricultural economy was in crises (Marot 1999:49). In spite of containment efforts the decline and abandonment of smallholdings, farms and the agricultural economy as a whole was irreversible (Marot 1999:49). In response to these crises, overall plans and inventive landscape projects were developed for the French rural countryside in an attempt to preserve the legacy of agrarian communities and agricultural resources, and provide support to communities to adapt to conditions caused by rural transformation (*ibid.*). There was a growing recognition that landscape lies at the core of what makes an area special and unique (Marot 1999:48). Landscape architects from the *École Nationale Supérieure de Paysage (ENSP)* started to explore the possibilities of landscape character and hidden phenomena, rather than program, as the starting point of projects, and the role of landscape architecture in the transformation of territories (Santiago 2015:44; Marot 1999:48).

4.2. The gardens André le Nôtre

André le Nôtre's French Renaissance gardens are characterized by an expansive organization of space and the integration of gardens and architecture into the surrounding landscape context (Jellicoe & Jellicoe 1991:179, 183). Le Nôtre used the innovative technologies of the time, derived from cartography and military sciences, to enable precision and careful adaption to the topography and vegetation of the setting (Jellicoe & Jellicoe 1991:179, 183; Young 2000:134). Optical devices and illusions were used to direct the eye, increases or reduces visual distance and expand the scale of the garden outwards. Crossroads and avenues were designed to seemingly extend indefinitely, whilst ordered woodlands integrated the garden with the surrounding rural context. Grid layouts were abandoned in favor of greater complexity, diversity and structure (Young 2000:135). Given these tactics, the landscape could be read as a whole at a glance, with elements of surprise and contrast found as the landscape unfolds. In this way Le Nôtre created a sense of place in the garden and the landscape and mediates 'the city' (*pars urbana*), the rusticity and simplicity of 'the countryside' (*pars rustica*) and links them with the surrounding environment (*campagnes environnantes*) (Marot 1999:54).



Figure 4: Clockwise - top left to bottom right - Versailles garden plan (Jellicoe & Jellicoe 1991:179-181); Representation of the plan of Washington DC by L'Enfant (Ching, Jarzombek & Prakash 2017: 627); Garden of Vaux-le-Vicomte (Raxworthy & Harrisson 2018:32), Garden of Versailles (Raxworthy & Harrisson 2018:43)

4.3. Michel Corajoud and the regional park

In the 1970's landscape architects from *École Nationale Supérieure de Paysage (ENSP)*, the Versailles school of landscape architecture, started designing landscapes on multiple scales, ranging from 'the garden', to agricultural land, the 'natural park' and urban areas (Di Carlo 2015:69). Michel Corajoud, a founding member of the school, approached landscape as a "conversation" and expression of "continuity" between current- and historic landscapes (Marot 1999:50). Marot highlights that this approach is in stark contrast to development ideologies based on domination and willful imposition (*ibid.*). Corajoud extends the concept of 'the garden' to large scale projects and fuses the *grandeur* of the French formal garden with the rational and methodical approaches of traditional agrarian and rural landscape traditions (Di Carlo 2015:70). Corajoud sought to establish a widespread knowledge of managing natural- and human habitats and diffusing this knowledge to involve an "entire nation" through garden design (*ibid.*).

Michel Corajoud's *Parc Départemental du Sausset*, along with Bernard Tschumi's *Parc de la Vilette*, are considered some of the seminal landscapes of the 1970's (Imbert 2018:21). *Parc Départemental du Sausset*, a two hundred hectare regional park northeast of Paris, integrates the rural fringe, agricultural fields, gardens, suburban settlements and urban infrastructure (Di Carlo 2015:68, 71). Natural processes, temporal dynamics and stages of implementation are made visible, facilitate execution and invite users to bring their own interpretation to the site (Marot 1999:51). The park is known for its innovative water regimes and forest- and arboreal systems, and actively incorporating and allowing nature to bring about unforeseen potential (Di Carlo 2015:74; Marot 1999:51).



Figure 5: Clockwise - top left to bottom right - Plan of *Parc Départemental du Sausset*; Forest landscape and different qualities of light; Trees as structuring elements; Wetlands and riparian landscape; *Bocage* landscape (Di Carlo 2015:68, 75, 76)

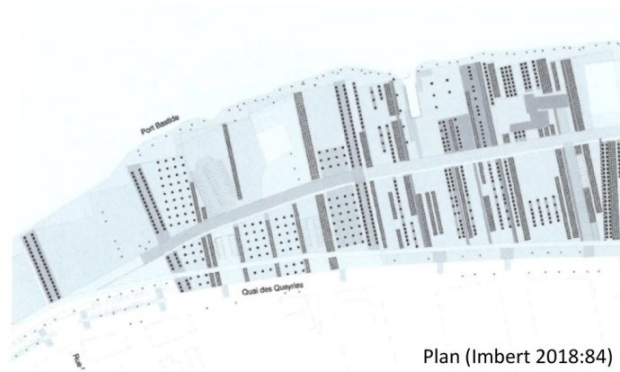
4.4. Michel Desvigne's architecture on a 'geographic scale'

Michel Desvigne approaches landscape projects based on the scientific method of observation, hypothesis, and confirmation or refutation (Imbert 2018:19). His landscapes are laboratories for verifying hypotheses informed by interdisciplinary collaboration. Desvigne's work is characterised by explorations into natural- and agricultural processes and the exchange between natural phenomena and construction - 'nature' and 'artifact' (Imbert 2018:20, 57-58). In the words of the landscape architectural theorist James Corner (2008:7)

Desvigne's landscapes propagate new sets of conditions to grow complex environments over time. Inspired by agricultural fields, tree farms, and ecosystems such as forests and deltas, Desvigne considers landscape architecture as a living artform that is more about cultivation, process and change over time than it is with more familiar landscape architectural practices such as formal composition and representation. With a farmer's pragmatism and a landscapist's eye, Desvigne is able to create extremely sensible, rational and strategic, yet poetic projects.

Desvigne puts processes into action that shape the landscape, making allowance for the unpredictable and unforeseen character of nature (Tiberghien *et al.* 2008:153, 155). His landscapes retain an experimental quality thereby giving his work an "acrobatic, suspenseful and risqué quality" (Tiberghien *et al.* 2008:156; Constant 2017:134). 'Completion' always seem to be deferred (*ibid.*). Desvigne's experiments form the basis for developing a vocabulary of materials and modalities to be used in developing a set of standards and guidelines for local municipalities to define and manage different kinds of landscapes (Imbert 2018:60; Tiberghien *et al.* 2008:39).

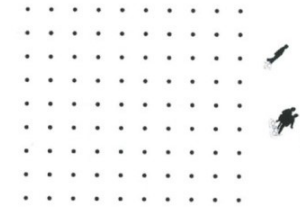
Experimental projects, ‘pilots’, remain a permanent part of the landscape, and are later expanded to form part of a larger landscape framework (Imbert 2018:60).



Plan (Imbert 2018:84)



Masterplan (Koller 2016:36)



Forest component (Imbert 2018:88)



Forest, glade & meadow components (Author 2021)

Figure 6: Left to right - *Parc aux Angéliques*, Bordeaux riverfront park, plan (Imbert 2018:84); Masterplan (Koller 2016:36); Forest component (Imbert 2018:88); Forest, glade & meadow components (Author 2021)

5. Design methods and tactics

Michel Desvigne's design methods and tactics are explored in greater detail to inform research by design strategies for the Dwars River Valley.

5.1. Traces - Landscape architect as “guarantor of the authenticity of the landscape”

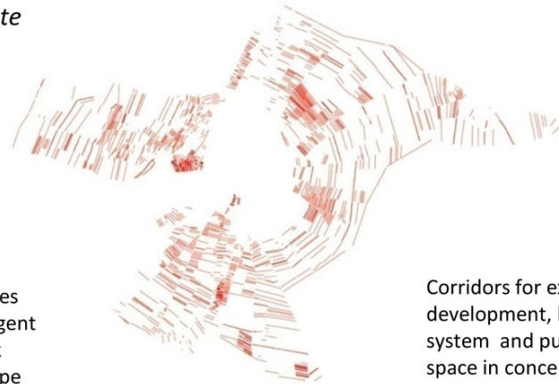
Michel Desvigne believes that landscape architects are the “guarantor of the authenticity of the landscape” (Constant 2017:140). Designed landscapes should cultivate the distinct attributes of a site, study the cultural history and traces of a society's activities which give insight into the meaning a place holds for a community, enhance the site's connection to the broader terrain whilst envisioning new ways of living and constituting the area (Constant 2017:137, 140; Tiberghien *et al.* 2008:157).

Precedent

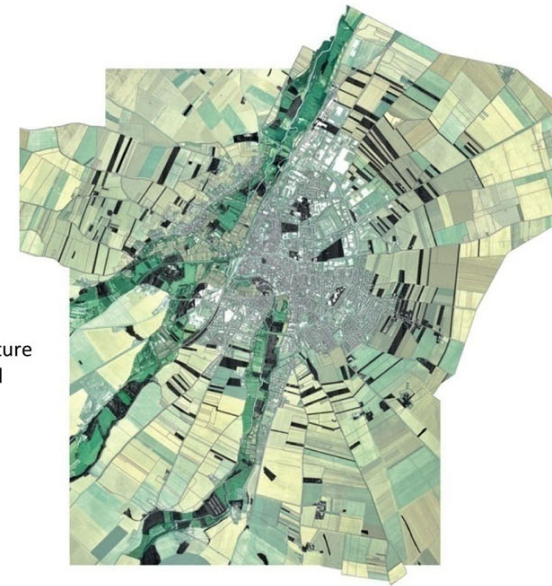
Valley of Issoudun landscape

Framework

Michel Desvigne Paysagiste

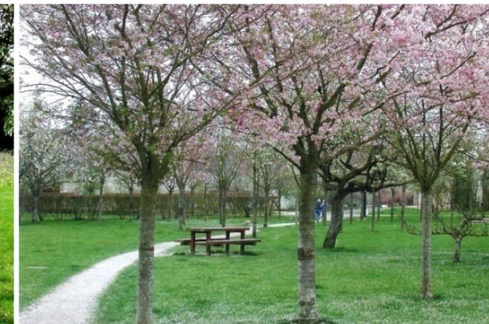
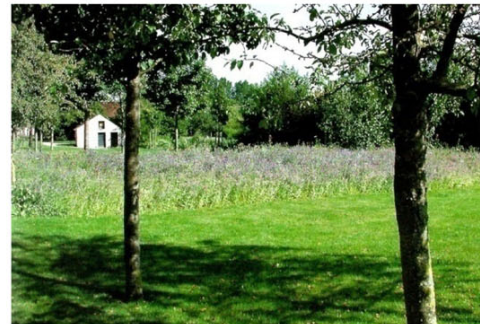


Traces of medieval agricultural parcels & ditches becomes the form giving agent for a vegetative framework that structures the landscape (Tiberghien *et al.* 2009:68, 72)



Corridors for existing & future development, hydrological system and public green space in concentric & radiating pattern.

Parc de la Théols,
Valley of Issoudun
Simplicity and rustic rural character



(Imbert 2018:29, 92, 102; Tiberghien *et al.* 2009:72)

Figure 7: Clockwise - top left to bottom right - Traces of medieval agricultural plots as form-giving agent (Tiberghien *et al.* 2009:49, 68, 72); Rustic landscape character (Imbert 2018:29, 92, 102)

5.2. Multi-scalar design: Desvigne's conceptual scalar hierarchy

First, you have to understand the scale of a site, which is difficult - Michel Desvigne (Imbert 2018:68).

To enable design on multiple scales, Desvigne developed a conceptual scalar hierarchy that ranges from the 'amplified geography' (30 kilometers), 'park system' (10 kilometres) to 'public space' (3 kilometres) (Imbert 2018:11). The scale determines the components and types of transformations that are used in a design (Imbert 2018:60).

5.3. Aerial photographs, components and abstraction

Aerial photographs are used extensively to facilitate a 'geographic understanding' of a site's logic, systems and components in compliment to *in situ* studies (Constant 2017:142; Tiberghien *et al.* 2008:19). Through the careful study, analysis and redrawing of aerial photographs, traces of past and current activities, geographical- or agricultural processes, historic- and cultural dynamics, landscape-, agricultural and geomorphological character, parcel division, services and infrastructure can be understood whilst revealing various scales of patterns and systems, their proportions and interactions (*ibid.*). Characteristic landscape features and their interaction with the landscape are then abstracted by isolating and transposing their scale and filling them with colour. These symbolic "techno-aesthetic" diagrams reminds one of scientific drawings, conceptual sketches and minimalist art, but are

clearly not focused on form or decorative purposes (*ibid.*). Components derived in this manner become design elements used to bridge the challenge of design and representation on multiple scales, and are transposed and used to compose larger landscape frameworks (Imbert 2018:21-22; Tiberghien *et al.* 2009:19, 63).

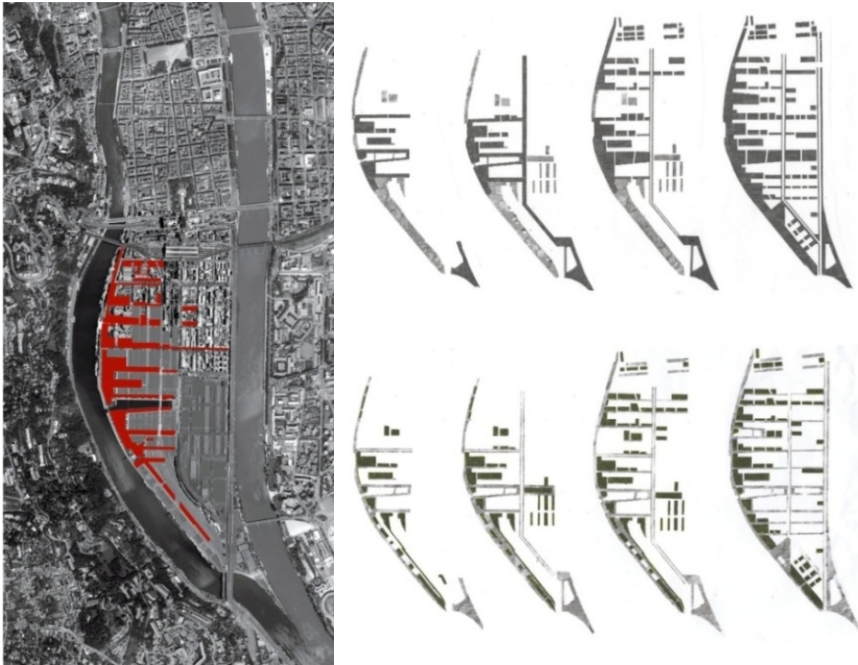


Figure 8: Diagram, Lyon confluence, *Michel Desvigne Paysagiste* (Tiberghien *et al.* 2009:44, 46)

5.4. Pilots

Pilots are experimental landscapes used to test design hypothesis (Imbert 2018:19). Pilots form part of *intermédiaire*, provisional landscapes, that give positive attributes and immediate status to a landscape in process of transformation (Constant 2017:141; Imbert 2018:32; Tiberghien *et al.* 2008:38). Pilots are used to test and demonstrate aspects such as spatial qualities, proportional relationships, tree spacing, combinations of foliage textures, and maintenance regimes, at different scales and in different locations (Imbert 2018:40-41).

A pilot project provides immediate results and structure (Constant 2017:141; Di Carlo 2015:70; Imbert 2018:58). A pilot may be as simple as a ‘screen’ planting but must carry sufficient weight to make an impact in its context (*ibid.*). Pilots can act as a pedagogical tool from which a set of directives and guidelines can be documented for use in a comprehensive landscape system of new landscape projects, nurseries, greenhouses and schools (Imbert 2018:58, 60).

The success of a pilot and landscape framework will to a great extent depend on the social fabric and political will of a region (Imbert 2018:54, 56).

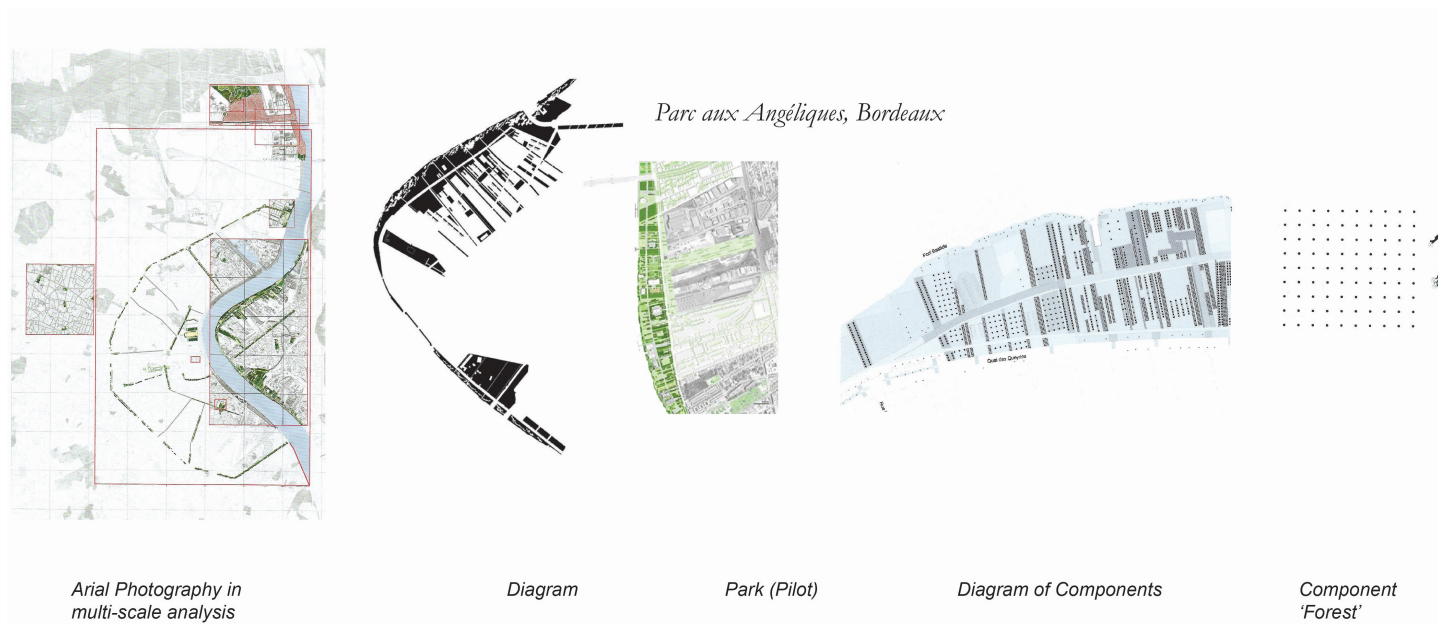


Figure 9: Michel Desvigne's multi-scale design tactics (Koller 2016 :33, 36; Tiberghien *et al.* 2009:35 ; Imbert 2018:59, 84, 88)

5.5. Agricultural processes and practice

Desvigne's design tactics draw on the notion of *terroir*, that encompasses the interactions of local indigenous plant communities, geography, geology and climate, as expressed in a region's distinct quality of place and its agricultural products (Constant 2017:137). His projects have a rustic, unsophisticated character that is rooted utilitarian practices, particularly agricultural processes and practices (Imbert 2018:71; Green 2020). The apparent simplicity of Desvigne's designs however rest on rigorous research, experimentation and innovation and the

incorporation of practices that shape the landscape rather than simply reproducing the ‘form’ characteristic of a landscape (Imbert 2018:28, 29). Agricultural landscapes, and farming technique and practices, provide legibility, structure, immediate presence and a sense of connection between the built environment, the surrounding landscape and landscapes in process of construction (Imbert 2018:48).

5.6. Nature – artifact exchange

Desvigne engages phenomena and ecologies that shape and transform the landscape (Imbert 2018:19, 26). He is fascinated by the markings of natural phenomena such as wind, rain, flood and sunlight on the landscape. Desvigne purposefully engages collisions and disruptions through ‘superimpositions’ to elicit creative interactions or reactions in the landscape (Tiberghien *et al.* 2009:65). Projects are carefully curated over time, allowing for ecological succession whilst valuing the place of the human hand (Reed & Lister 2014:36).

5.7. *Lisière*

The *lisière* is based on the idea of a forest- or fabric edge that mediates the transition between suburban and rural farm zones. A *lisière* is a hybrid open space based on horticultural practices with orchards, greenhouses, productive gardens, storm water systems and community facilities such as sports fields, paths and commons, that softens the urban edge (Imbert 2018:32).

6. Regional landscape character

Following Michel Desvigne's conceptual scalar hierarchy, the landscape character of the Dwars River Valley is explored at scales ranging between the larger region, 30 kilometers, 10 kilometers and 3 kilometers.

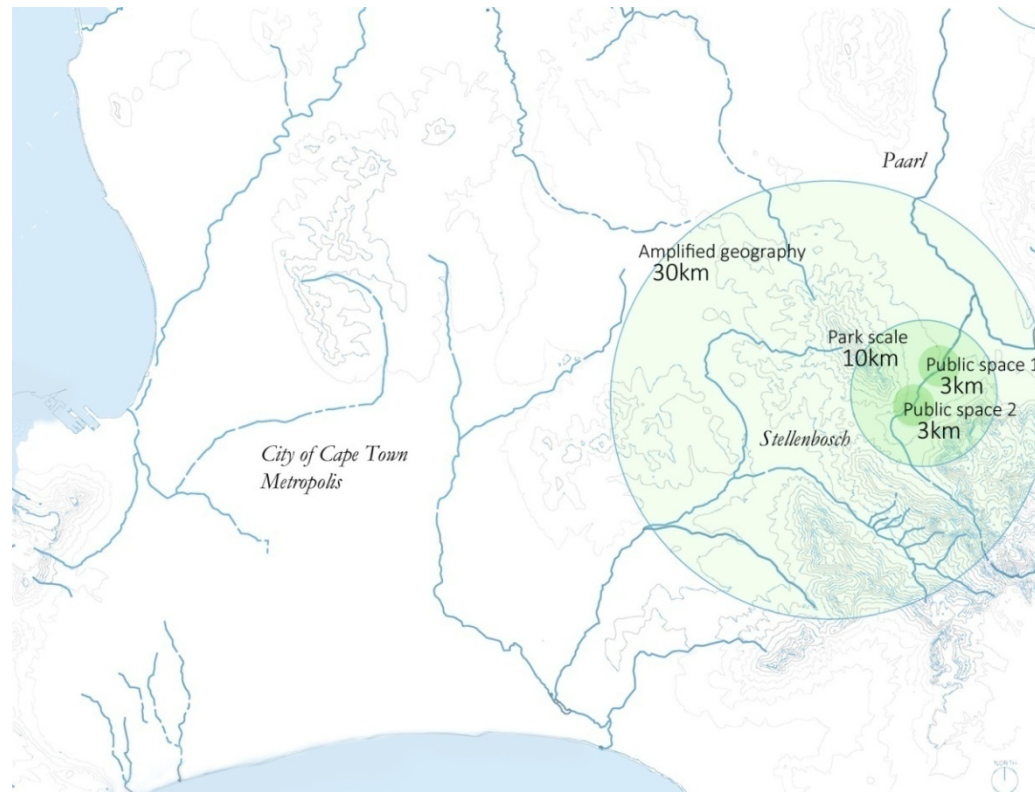


Figure 10: Landscape character studies of the Dwars River Valley based on Michel Desvigne's conceptual scalar hierarchy: 30km, 10km, 3km (Author 2021)

6.1. Climate, topography and vegetation

At the southernmost tip of the African continent, where mountain ranges within fifty kilometers of the sea causes the rains to be brought inland by winter winds, is located one of the five Mediterranean regions of the world. Mediterranean regions are transitional zones located between temperate- and extremely arid climate zones. These regions are characterised by winter rainfall, hot, dry summers and recurring droughts (Knox 1976:8; Shapera 1965:17; Rick, Ontiveros, Jerardino, Mariotti, Méndez & Williams 2020:7). Mediterranean climate zones are highly influential on ecosystems, resource availability, human activities and settlements, and are extremely sensitive to climate change (Makhzoumi & Pungetti 1999:20).

Each of the five Mediterranean regions is characterized by a particular vegetation type, such as the French Mediterranean *garrigue* vegetation, Australian *kwongan* and *fynbos* in the Cape Floristic Region (CFR) (Holmes & Richardson 1999:216; Manning 2007:9).

The CFR is the smallest of the six floral kingdoms of the world, exceptionally species rich, and home to approximately one-sixth of the world's flora (Manning 2007:8). As many as 120 plant species can be found in a square 1000 meter plot of Fynbos (Pauw & Johnson 2018:224) and around 10 000 species are found in the 90 000 square kilometer region (Bouchenak-Khelladi & Linder 2017:2548). The CFR is recognized as a World Heritage site but has extremely high levels of species extinction, especially in lowland- and valley regions, due to urban expansion, agricultural intensification and invasive alien vegetation (UNESCO 2021; Rebelo, Holmes, Dorse & Wood 2011:20; Railoun, Simaika & Jacobs 2021:2). This millennium has already seen the delisting of three UNESCO World Heritage Sites as a result of building development or the reduction of protected areas (UNESCO 2021).

Climate

5 Mediterranean regions of the world



Vegetation

Cape Floral Kingdom
World Heritage site

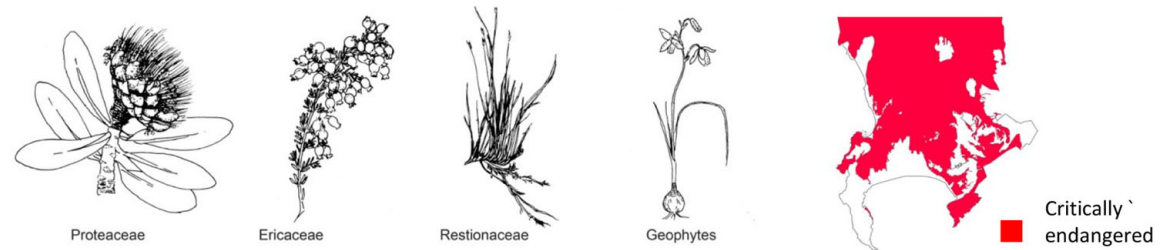


Figure 11: Climate, vegetation and characteristic *Fynbos* plant families (Proteaceae - *Protea ntida* (based on von Breitenbach 1985:5); Ericaceae - *Erica bergiana* (based on Baker & Olivier 1967:97); Restionaceae - *Hypodiscus willdenowia* (based on Haaksma & Linder 2000:28); Geophytes - *Albuca Canadensis* (based on Levyns 1966:68) (Author 2021)

Fynbos describe evergreen woodland shrubs with small, stiff, leathery leaves, between 1 and 3 meters in height and smaller plants with subterranean storage organs (Manning 2007:8; Shapera, 1965:17). *Fynbos* does not include timber tree species (*ibid.*). Forest areas are limited to Afromontane forest patches in *kloofs* or south-facing mountain slopes, and riparian ‘scrub forests’ that provide shade to river margins (Shapera 1965:17; Fourie, Holmes, Richardson, Esler & Witkowski 2005:555; Rebelo *et al.* 2011:25). To compensate for the limited availability of shade- and timber trees, exotic trees were imported to the Cape on a large scale, some of which have become characteristic of farm- and village landscapes in the region (for instance *Quercus robur*), whereas exotic species such as Australian *Acacia* species have become highly invasive.

Barriers between vegetation units consist of complex combinations of climatic- and edaphic factors located in narrow intervals of 5 to 200 kilometers (Wüest *et al.* 2019:1943). Intermontane valleys, characterised by hotter and drier than average *fynbos* climates, make up most of the barriers between these vegetation units (Wüest *et al.* 2019:1943).

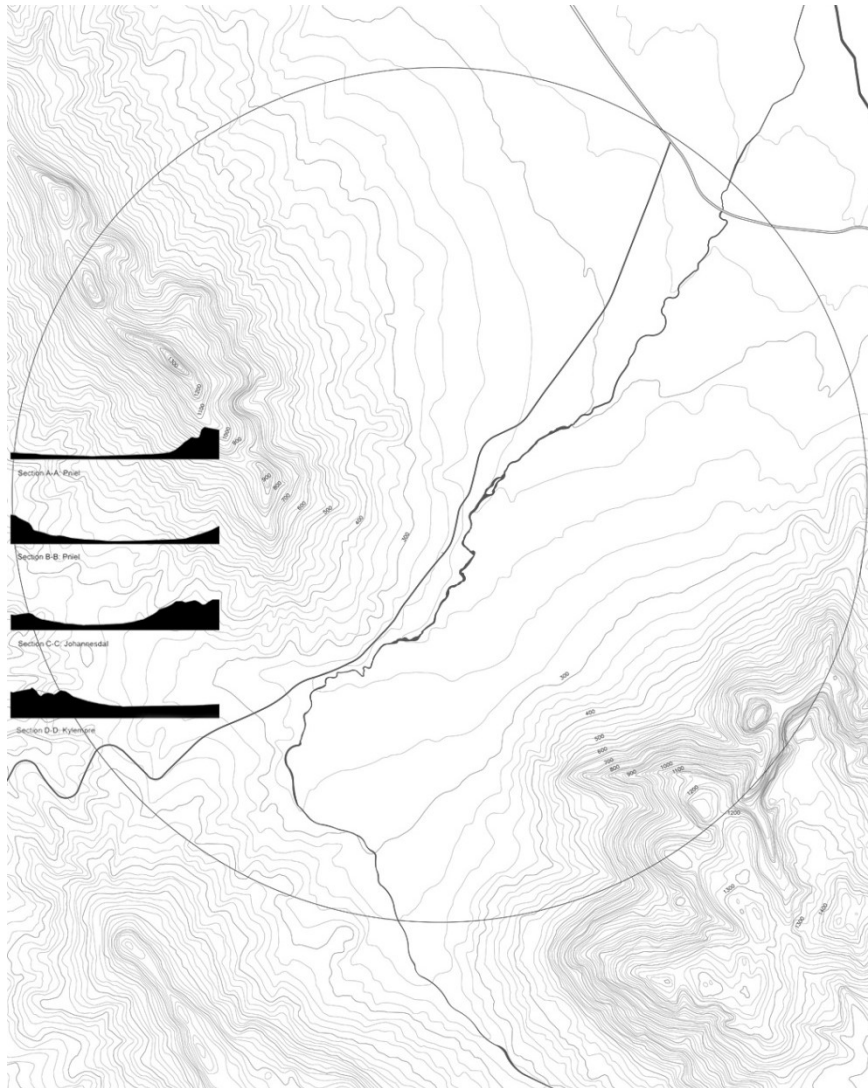


Figure 12: Topography & Landform of the Dwars River Valley (Author 2021)

Three vegetation units are present in the Dwars River Valley, with the four villages located in the transitional zone between Swartland Alluvium Fynbos and Boland Granite Fynbos (Mucina & Rutherford 2016:164-165, 167-168).

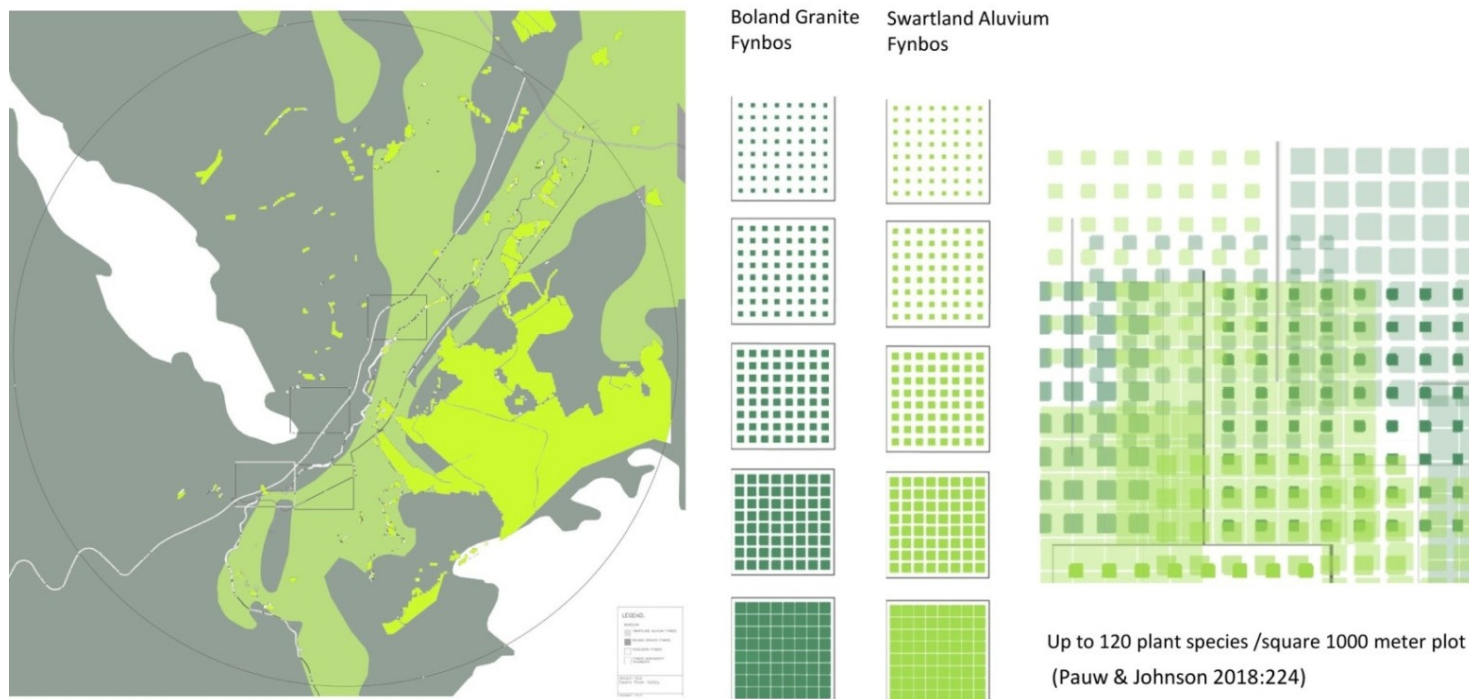


Figure 13: Dwars River Valley vegetation units (light and dark green) and biodiversity fragments (lime green) (Author 2021)

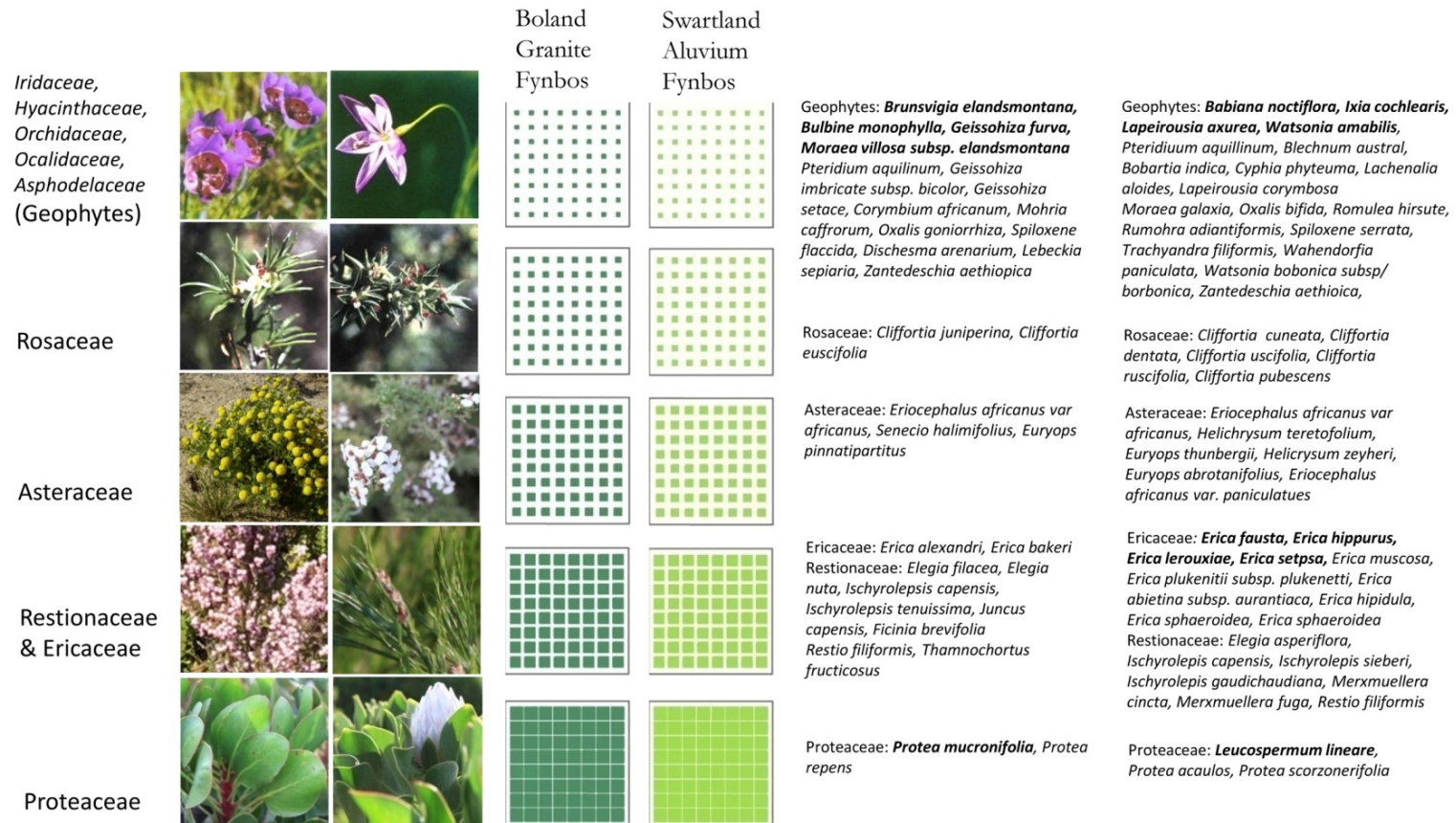


Figure 14: A selection of species from the vegetation units found in the Dwars River Valley (Author 2021, based on Goldblatt 1985:279, 281; Kolokoto & Magee 2018:58; Mucina & Rutherford 2016:164-165, 167-168; Whitehouse, 2001:113, 114).

6.2. Catchment, hydrology and hydromorphology



Figure 15: Location of the Dwars River Valley - primary-, secondary- and quaternary catchments (Author 2021)

The Dwars river originates in the Banhoek valley at an elevation of 2000 meters. The area is characterised by very steep rainfall gradients and very high rainfall peaks (De Lange, Botha & Oberholster 2016:450). Due to increasing water insecurity in the Western Cape and the effect of global warming on atmospheric evaporative demand, the optimization of water yield from catchments, the protection of river- and groundwater systems and the re-vegetation of riparian zones are critical factors in development planning (Bugan, Jovanovic, De Clercq 2012:201; LaVanchy, Kerwin & Adamson 2019:1537; Naik & Abiodun 2020:1; Pienaar, Brent, Musango & de Kock 2017:91). The Greater Cape Metro Regional Spatial Implementation Framework (2019:85) states:

Water is a critical limiting resource in the Western Cape ... investing in priority ecological infrastructure within catchments can potentially improve water supply, improve dry season flow, reduce flood risk, lengthen the lifespans of dams and reduce maintenance costs.

Hydromorphological assessments are used to characterize rivers to support effective catchment management, riparian re-vegetation and river restoration (Belletti, Rinaldi, Buijse, Gurnell & Mosselman 2014:2079). Factors taken in consideration include river morphology, hydrological regime, river continuity and riparian habitat characterisation (Belletti *et al.* 2014:2079-2080).

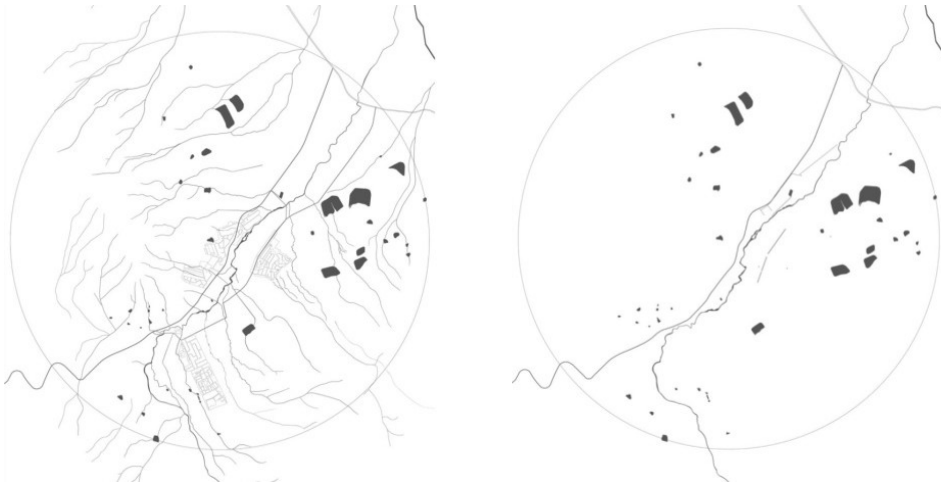


Figure 16: Hydrology (10km) (Author 2021)



Figure 17: Hydromorphology (3km) (Author) i.) Riparian buffer zones, ii.) Pebble-rock river bed, iii.) Sand river beds iv.) Riparian vegetation.



Figure 18: Hydromorphology of study area (3km) (Author 2021)

Riparian zones play a critical role in catchment management. Riparian scrub forests provide shaded canopies that reduce evaporative losses during dry summer months when environmental evaporative demand is at its peak and water resources scarce (Swift, Jacobs & Esler 2008:508). Riparian vegetation provides key ecosystem services such as riverbank stabilization, erosion control, filtration of sediments and nutrients from the surrounding catchment. Riparian vegetation also provide rich habitats that encourages high levels of biodiversity, reduce the risk of alien re-invasion and increase the rate of seed dispersal by birds which helps to promote natural (passive) re-colonization and species diversity (Fourie, Holmes, Richardson, Esler & Witkowski 2005:553, 559; Galatowitsch & Richardson 2005:509; Meek, Richardson & Mucina 2010:156).

The infestation of alien invasive species (IAPs) such as *Acacia mearnsii*, *A. longifolia*, *A. saligna* in Western Cape rivers and riparian forest systems have had severe impacts on ecosystem services and has resulted in the near complete elimination of native species from many watersheds, habitat loss and altered nitrogen-, carbon-, phosphorous and water cycles (Railoun, Simaika & Jacobs 2021:2; Swift *et al.* 2008:509). The eradication of invasive alien species has left many rivers stripped of tree cover. The re-vegetation of riparian zones is therefore a priority for sustainable water resource management.



Figure 19: Projection of Dwars river riparian corridors as *lisière* at 3km Pubic scale (Author 2021)

6.3. Settlements and agriculture

A nomadic people, collectively called the “Khoi-San” inhabited Southern Africa from the late stone age (Shapera 1965:26). The San inhabited Southern African for more than 150,000 years whereas Khoi-Khoi (Khoekhoe) arrived more or less two thousand years ago (Jack 2019:4). Settlements were characterized by mobility, flexibility and adaptability to climatic conditions, whilst the number and size of settlements was determined by the availability of water and density of the vegetation (Shapera 1965:5, 21; Rick *et al.* 2020:7). Circular encampments were enclosed with a thorn fence with gateways to the north and the south and inward facing dwellings along the circumference. Encampments were easy to dismantle and relocate when climatic conditions so required (Shapera 1965:228; Jack 2019:14).

The mid seventeenth century sees the interaction of the Dutch East India Company with the landscape through the surveying of the land in geometric farm plots of 60 morgen (125 hectares) at right-angles to rivers (Fagan 1995:i; Lucas 2004:77-78). Many farms in the Dwars River Valley were allocated to French refugees who, having fled France to escape religious persecution after the revocation of the Edict of Nantes by King Louis XIV in 1685, arrived in the Cape in 1688 (Lucas 2004:68, Jack 2019:68). At the turn of the 19th century twenty nine of these historic farms, including Boschendal, *La Rhone* (Rhone), *Languedoc* (Lanquedoc), Goede Hoop and *Lecrévent* (Lekkerwyn), were bought by the politician and mining magnate Cecil J. Rhodes who instructed his agent “to buy the whole Drakenstein Valley”. In this way, agriculture in the valley was transformed from subsistence family farming to industrial deciduous fruit farming (De Bosdari 1953:100-101).

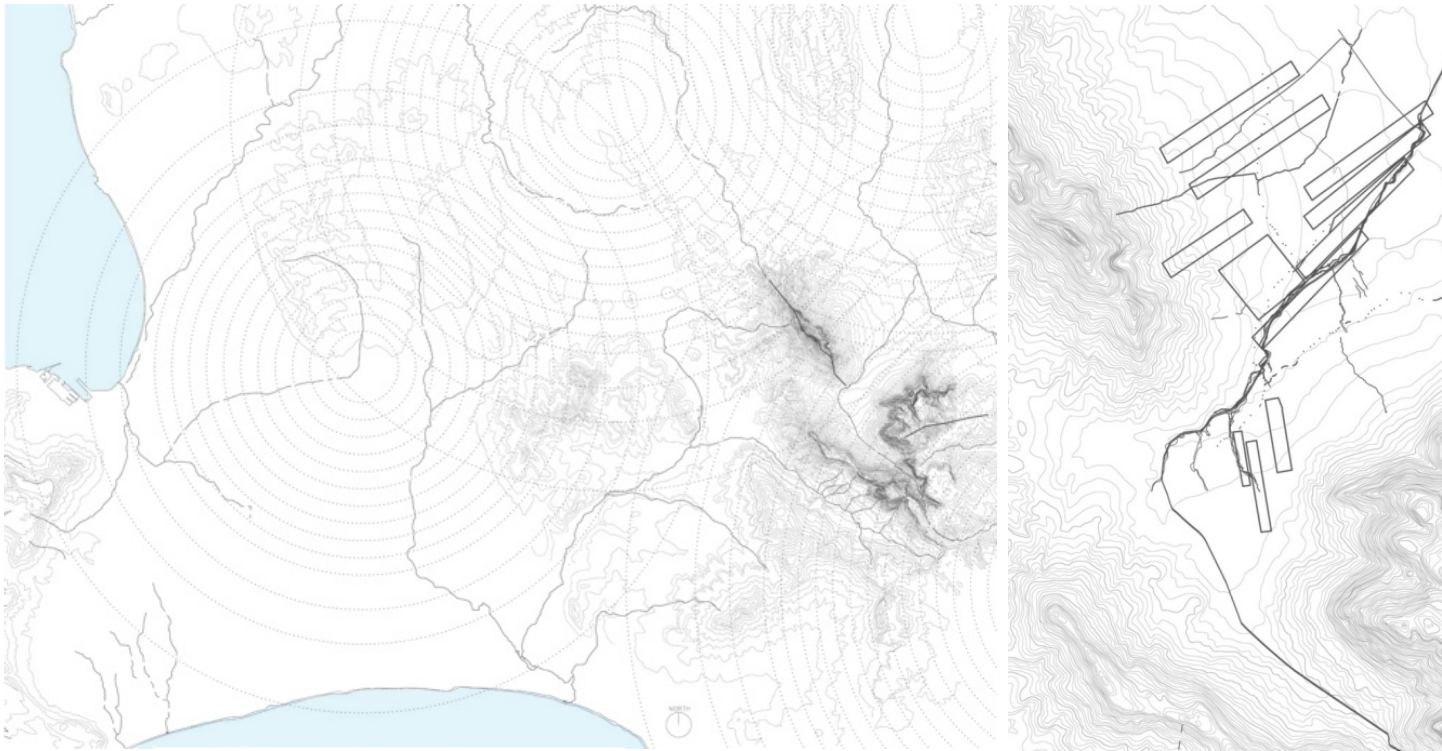


Figure 20: Grazing areas of the Goringhaiqua, Gorachoquas, Cochooqua and Chainouqua Khoikhoi tribes based on a map of 1680-1700 (Burden 2012:4); Historic Farms of the Dwars River Valley (Author 2021, based on Lucas 2004:77, Fransen & Cook 1980:215, 216, De Bosdari 1953: 78-80)

Four rural villages developed in the valley, each with a unique character. Pniel, an agricultural mission village for ex-slaves, Lanquedoc, a garden city inspired farm worker village designed by Sir Herbert Baker for the Rhodes Fruit Farms (RFF), Kylemore a settlement of smallholding on farmland bought by families from Pniel, and Johannesdal on the farm *Johannesdal*.



Figure 21: Settlement patterns, four rural villages & historic farmsteads in the Dwars River Valley (Author 2021)



Figure 22: Agricultural land patterns (10km) (Author 2021)



Figure 23: Traces of 1970's windbreak patterns (3km) (Author 2021)

Agriculture forms the back-bone of the non-metropolitan districts of the Western Cape (Van Niekerk *et al.* 2016:181). The Mediterranean climate makes the region well- suited for vine and olive cultivation (Knox 1976:8; Impey 1953:1-2).



Figure 24: Vineyards and orchards in the Dwars River Valley (Author 2021)



Figure 25: Farm landscape, Rhone, Dwars River Valley (Author 2021)

The analysis of the landscape character of the region and the valley brings us to the application of Desvigne's design tactics and methods in more detailed landscape character studies in the Dwars River Valley from which components and pilot gardens will be developed.

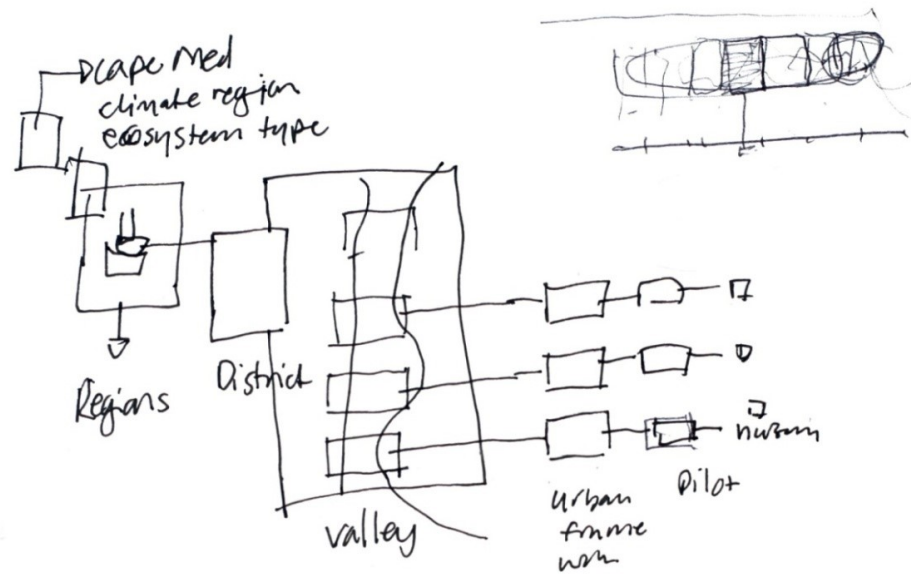


Figure 26: Multi-scale design strategy diagram (Author 2021)

7. Five landscape character studies in the Dwars River Valley

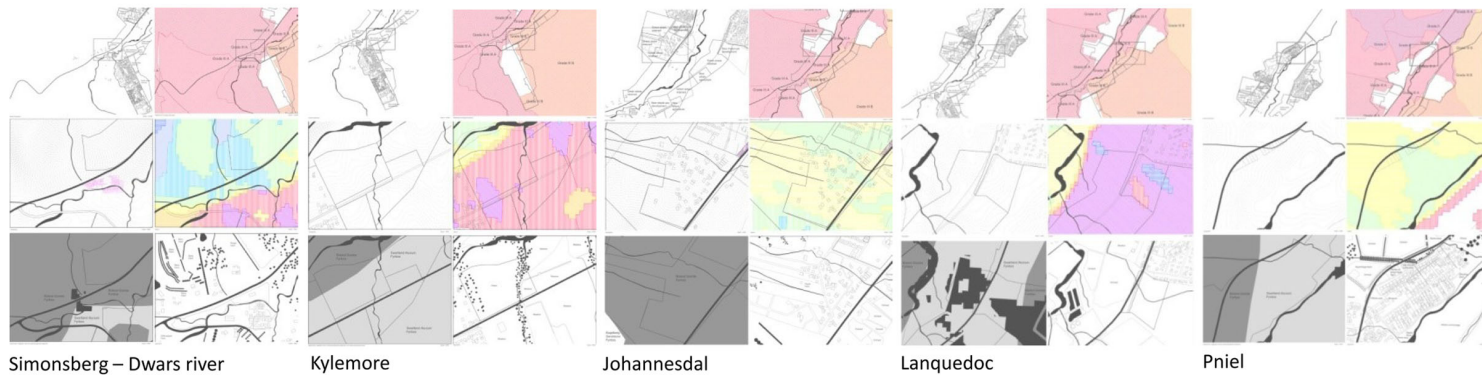


Figure 27: Five landscape character studies in the Dwars River Valley (Author 2021)

7.1. Simonsberg – Dwars river (-33.9194 °S, 18.9525 °E)



Figure 28: Foothills of Simonsberg south-facing slopes, Dwars River Valley (Author 2021)



Figure 29: Simonsberg - Dwars river topography at scale 1: 12 000 and 1: 200 (Author 2021)

Driving along the R310, this site stood out for its forest-like quality. From the landscape character study it was found that the site partly has a south facing aspect - typical of Afromontane forests, which have, to a great extent, become extinct.

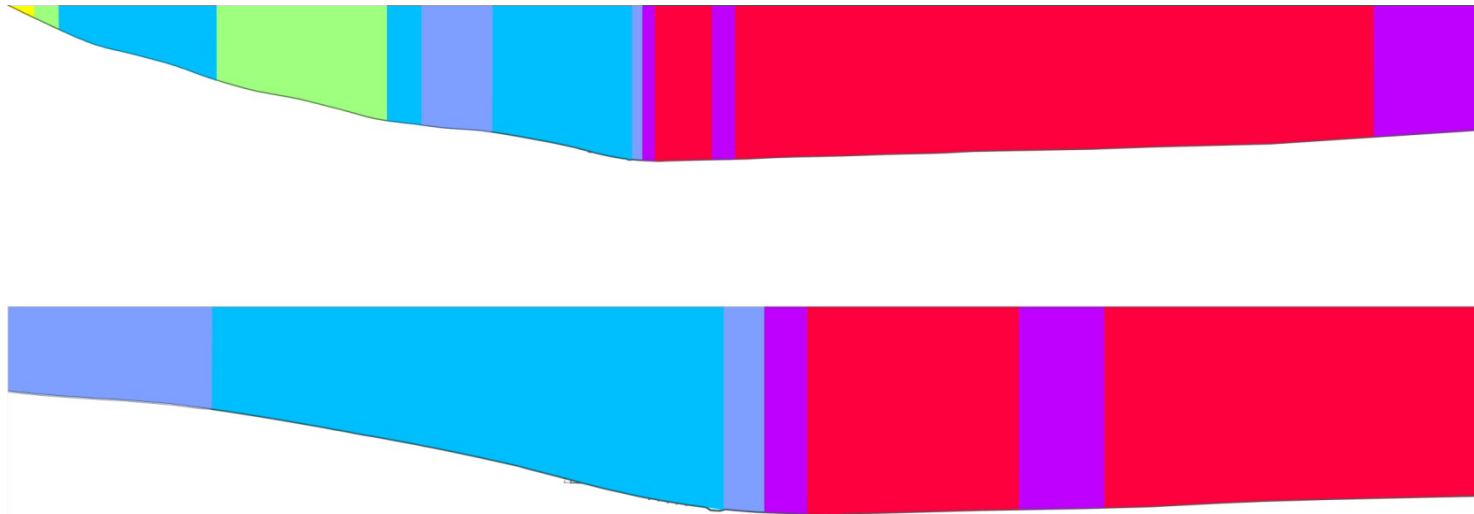


Figure 30: Simonsberg - Dwars river topography and aspect at scale 1: 5000 and 1:1000 (Author 2021)

Further characteristics of the site is its richness and complexity in terms of topography, aspect, hydrological systems and ecotone character as the site transitions between Boland Granite Fynbos and Swartland Alluvium Fynbos vegetation units. The riparian zone is in a post-clearance state and is completely stripped of tree cover. The site has retained some fragments of biodiversity and is graded as a Grade IIIA heritage site in the Stellenbosch Heritage Framework. The site is dissected by the main access route through the valley.

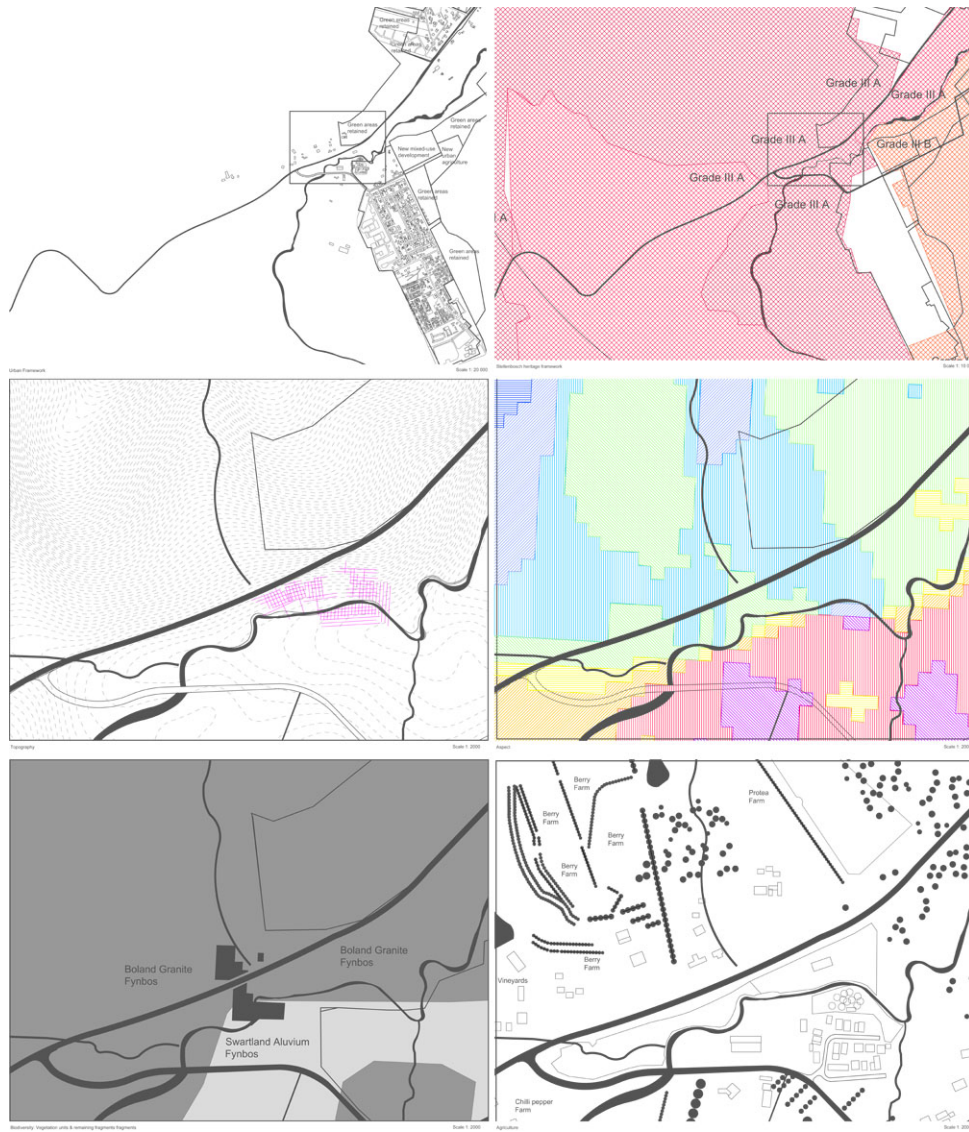


Figure 31: Simonsberg - Dwars river landscape character studies (Author 2021)



Figure 32: Dwars river post clearing riparian zone (Author 2021)

7.2. Kylemore (-33.9194 °S, 18.9525 ° E)



Figure 33: View towards the site of Kylemore new mixed-use development, green areas retained and 'urban agriculture' (Author 2021)

This site is zoned for mixed-use development, urban agriculture and green areas to be retained (SMDF 2019:58). The site includes a seasonal river and connects the village of Kylemore and the historic farm, *Ou Bethlehem*. The site is graded as a Grade IIIB heritage site in the Stellenbosch Heritage Framework.



Figure 34: Landscape character studies - Ephemeral qualities of Kylemore riparian landscapes (Author 2021)

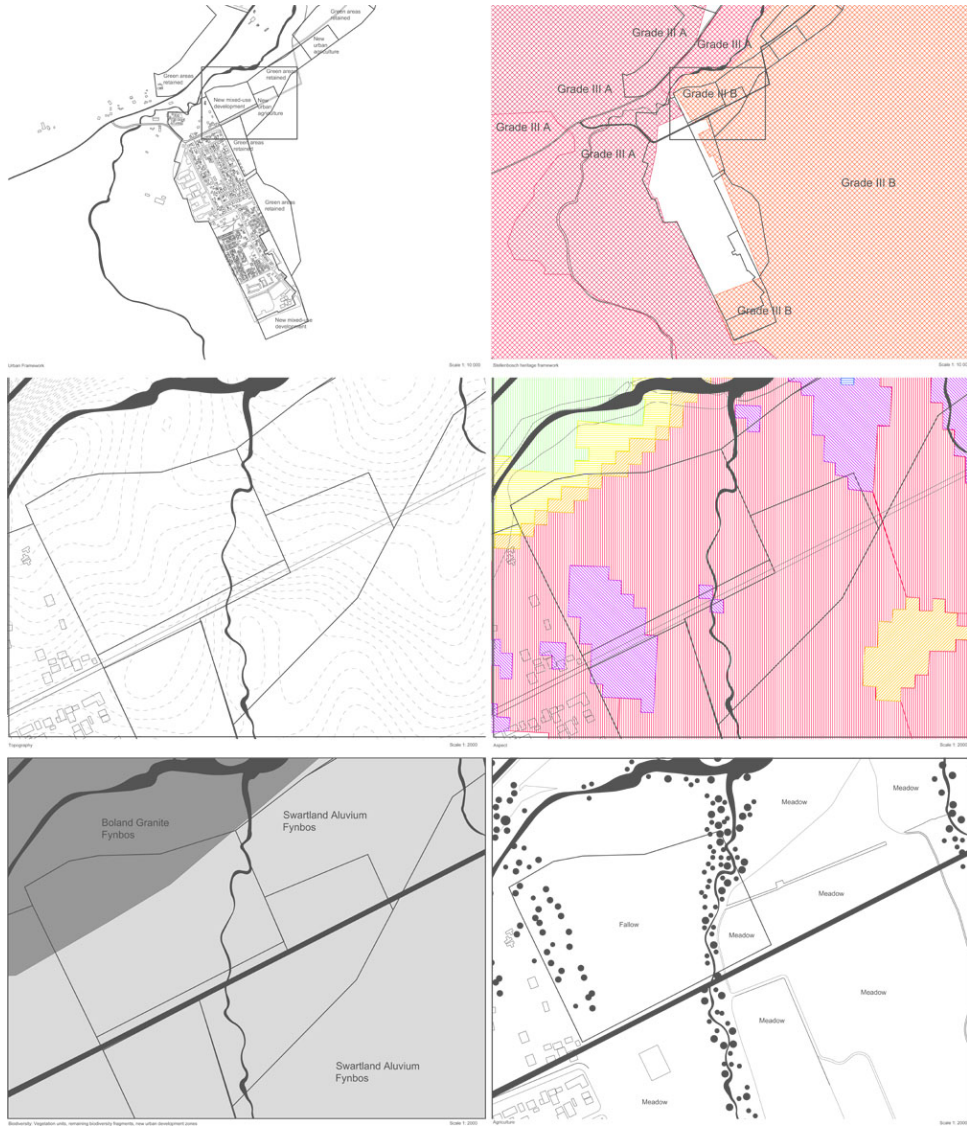


Figure 35: Kylemore landscape character studies (Author 2021)

7.3. Johannesburg (-33.9194 °S, 18.9525 °E)



Figure 36: Site of Johannesburg new mixed-use development (Author 2021)



Figure 37: Central location of critical site in the rural landscape character of the Dwars River Valley (Author 2021)

The location of this site is critical to the visual character of the valley and will require extensive landscape analysis and planning to ensure that its transformation does not impact the character of the valley as a whole is not seriously affected.



Figure 38: Johannesburgdal topography at scale 1:12 000 and 1:200 (Author 2021)

This landscape character unit is marked by a steep slope, magnificent views of the valley, proximity to cultural landscapes of high heritage value, and numerous new residential developments currently in progress. A *lisière* of indigenous or orchard species may soften the transition between the rural landscape and areas identified for new mixed-used development which fall within the scenic corridor of 500 meters advised by the Stellenbosch Heritage framework. The site is graded as a Grade IIIA heritage site in the Stellenbosch Heritage Framework.



Figure 39: Johannesdal landscape character studies (Author 2021)

7.4. Lanquedoc (-33.8990°S, 18.9666°E)



Figure 40: Old Lanquedoc village leivore (canals), oak lined street and rose gardens (Author 2021)

The village of Lanquedoc (1902) was designed by Sir Herbert Baker for Rhodes Fruit Farms (RFF) on the historical farm *Lanquedoc*. As a farm worker village inspired by the garden-city movement, each house had an orchard, a flower garden, and pasture for two horses, a cow and a pig. The contemporary village of Lanquedoc consists of the original Herbert Baker village, additional houses built by Anglo American Farms (AFF) in 1968, and New Lanquedoc, built in 2004 when AFF was sold (Van der Waal 2014:8,10).



Figure 41: New Lanquedoc (Author 2021)



Figure 42: Lanquedoc topography at scale 1:12 000 and 1:200 (Author 2021)

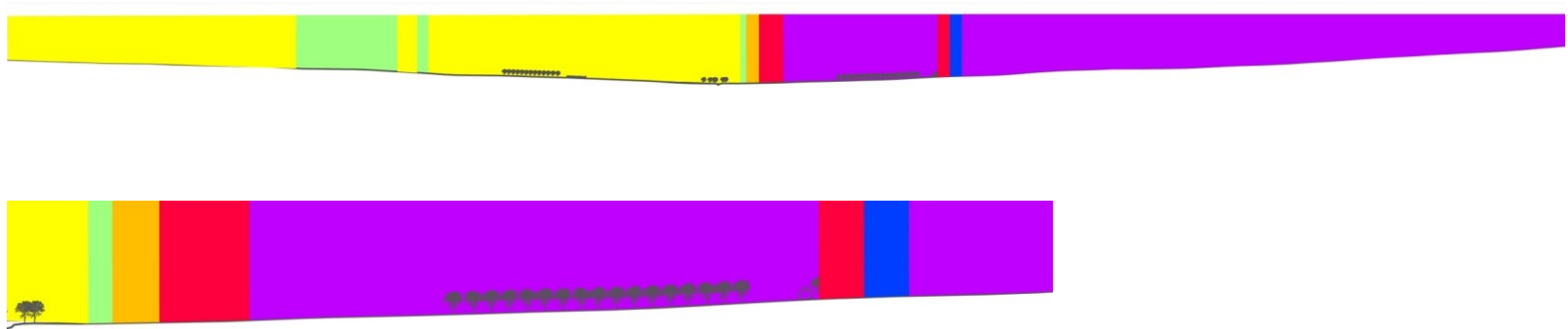


Figure 43: Pniel – Lanquedoc topography and aspect at scale 1:5000 and scale 1:1000 (Author 2021)



Figure 44: Landscape character studies: Lanquedoc new mixed-use development (Author 2021)



Figure 45: Land allocated for Lanquedoc new mixed-use development (Author 2021)

The site is graded as a Grade IIIA And Grade IIIB heritage site in the Stellenbosch Heritage Framework. An outstanding feature of this landscape is the high level of biodiversity indicated in this area. A new mixed-use development is to be located in this area. It would be critical to explore mediating strategies such as incorporating biodiversity ‘steppingstones’ throughout the development to contribute to the protection the biodiversity assets and heritage carried by the landscape.

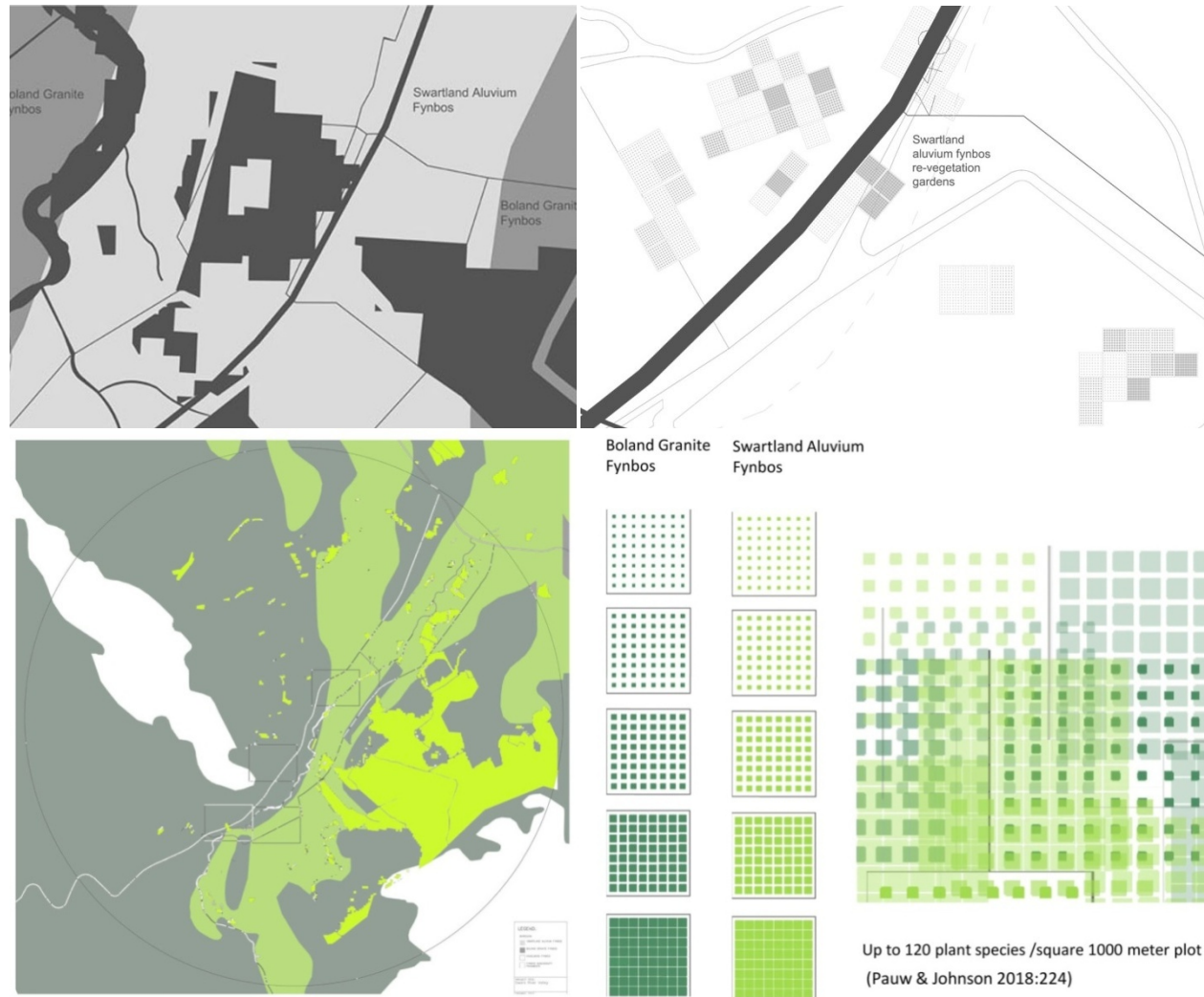


Figure 46: Remaining fragments of biodiversity in areas allocated for new mixed-use development (Author 2021)

7.5. Pniel (-33.8881 °S, 18.9591 °E)



Figure 47: Pniel pilot site (Author 2021)



Figure 48:Pniel topography at scale 1:12 000 and 1:200 (Author 2021)

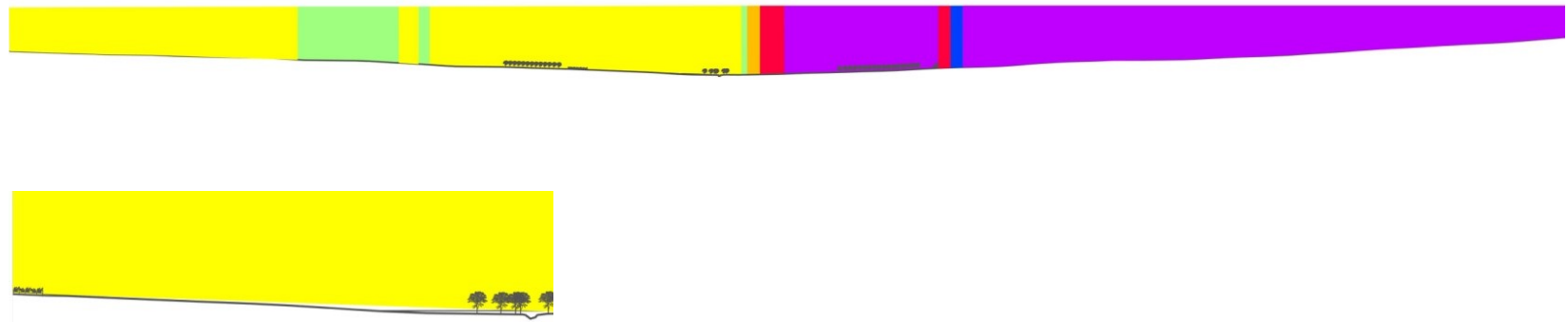


Figure 49: Pniel – Lanquedoc topography and aspect at scale 1:5000 and scale 1:1000 (Author 2021)



Figure 50: Pniel landscape character studies (Author 2021)

Pniel was established in 1843. The village consisted of self-built houses, lime-washed every spring according to tradition. Each family had a garden lot of 22.9 meters by 19.9 meters where fruit and vegetables could be grown and livestock was kept. Garden lots were connected with an irrigation canal (*leivoor*) and garden path (*die tuinpaadjie*) (Cyster, Cyster, Damon & Simpson 2008:42; 95, 145, 153; Lucas 2004:96, 145, 148). Until the mid 20th century these productive gardens provided in the household needs of most families, but as time passed most of the garden lots were built-up to make way for growing families (Lucas 2004:168).

Today, remaining patches of old orchard trees evoke the memory of these family gardens and the agricultural roots of the community. The site is graded as a Grade IIIA heritage site in the Stellenbosch Heritage Framework.



Figure 51: Traces of historic family garden lots in Pniel (Author 2021; Cape Farm Mapper 2021)



Figure 52: Patches of old orchards in Pniel (Author 2021)

Mr. Matthew Cyster, co-author of the book *Pniel en sy mense*, recalls the deep held love of the land and the agricultural roots of many villagers. In days gone by, people from the valley were known for their expertise in agricultural practices such as pruning and grafting. Though still practiced by older generations these skills are disappearing amongst the younger generations (Cyster *et al.* 2008:42, 93, 149, 157, 159). Many villagers are avid gardeners, fruit and flower farmers, nursery owners or fruit- and flower traders (Cyster *et al.* 2008:126). Historically, villagers knew the edible wild plants, berries, bulbs and mushrooms, such as *Aroeas*, *Froetang*, *Koekmakranka*, *Suikerkanne*, *Bergtee* (bush tea), which was collected from the *veld*. Wild flower bunches and herbs from the Dwars River Valley were sold as far as Claremont and Simonstown (Cyster *et al.* 2008:91). Firewood collection formed an important part of the daily routine in the villages of the Dwars River Valley (Cyster *et al.* 2008:89). To this day 10% of Ward 4 and Ward 5, where the four rural villages are located, is dependent on firewood for energy (Stellenbosch Municipality, Ward 4).



Figure 53: Pniel streetscape and museum garden (Author 2021)

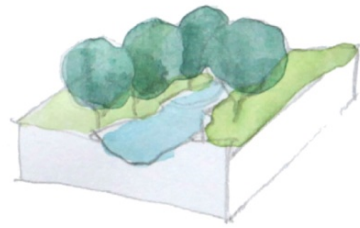
8. Pilot Gardens

Based on findings from the five landscape character studies, ‘components’ were identified and a conceptual framework for two pilot gardens was developed.

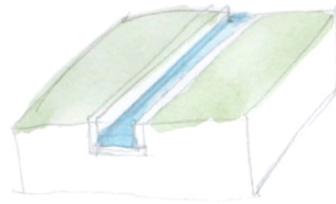
The Pniel vernacular pilot garden is rooted in the history of the community and is based on the historic traces of agricultural garden lots and the agricultural heritage of the community.

The Kylemore agro-ecological village garden, is on historic traces and nature-artifact interactions. Cultural responses to the *terroir* is reflected in historic windbreak patterns that are reinstated in the landscape framework for the new mixed-use development, whilst ‘nature-artifact’ exchange is given expression in the integration of a Olive pilot avenue and irrigation canals with the re-vegetation of the riparian zone and the integration of vernacular irrigation canals (*leivore*) with the seasonal river on site. The pilot garden also incorporates orchards and fynbos re-vegetation “steppingstones”.

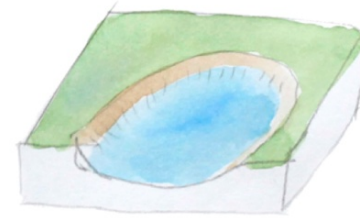
The goal of the pilot gardens is to make aspects of the landscape character tangible and understandable. The Pilot gardens will immediate structure and status to the landscapes in the face of planned development in the valley and can provide a reference system for incorporation in the landscape design of the development. The gardens provide opportunity for experimentation, testing and demonstration of aspects such as spatial-, proportional- and vegetal qualities, maintenance regimes and so forth. Findings from these experimental gardens can be used in expanded landscape frameworks for the villages and the valley. In this way development may be integrated with the character of the surrounding landscape so as to maintain coherence within the landscape fabric and the rural character of the valley as a whole.



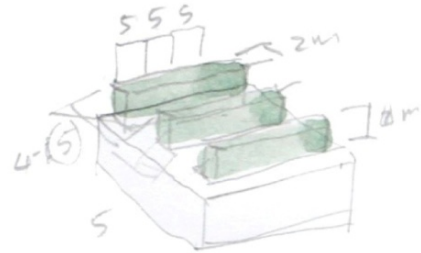
riparian
re-vegetation



leivore



farm ponds



orchards, windbreaks &
hedges



biodiversity stepping stone
gardens

Figure 54: Components (Author 2021)

8.1. Pniel vernacular pilot garden

8.1.1. Traces

The Pniel vernacular pilot garden is based on traces of historic allotment gardens. The garden celebrates the cultural history of the village and its people and tells the story of past and current generations and their connection to the valley.

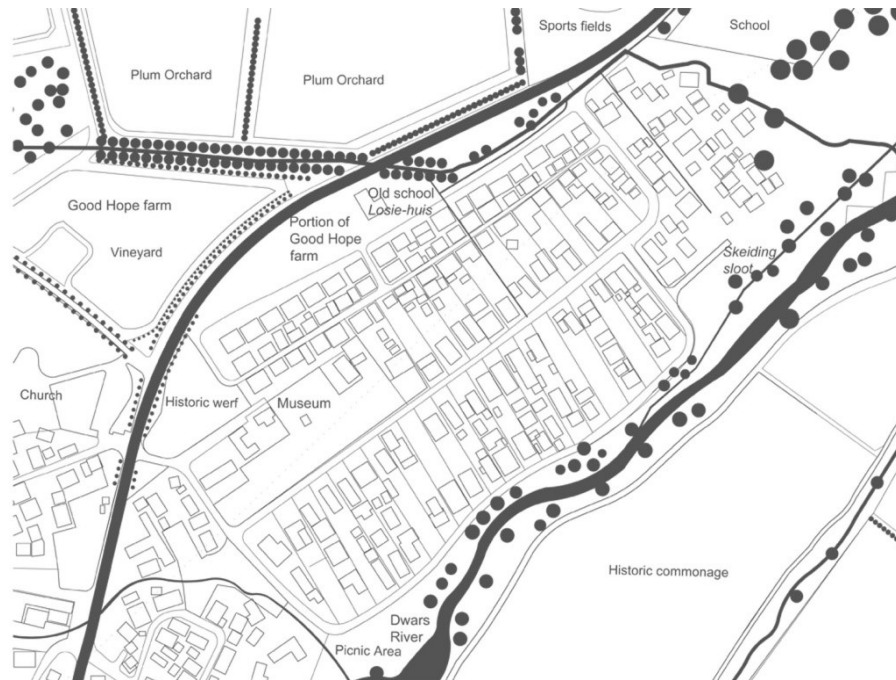


Figure 55: Traces of historic garden lots (Author 2021)

8.1.2. Abstraction and diagrams

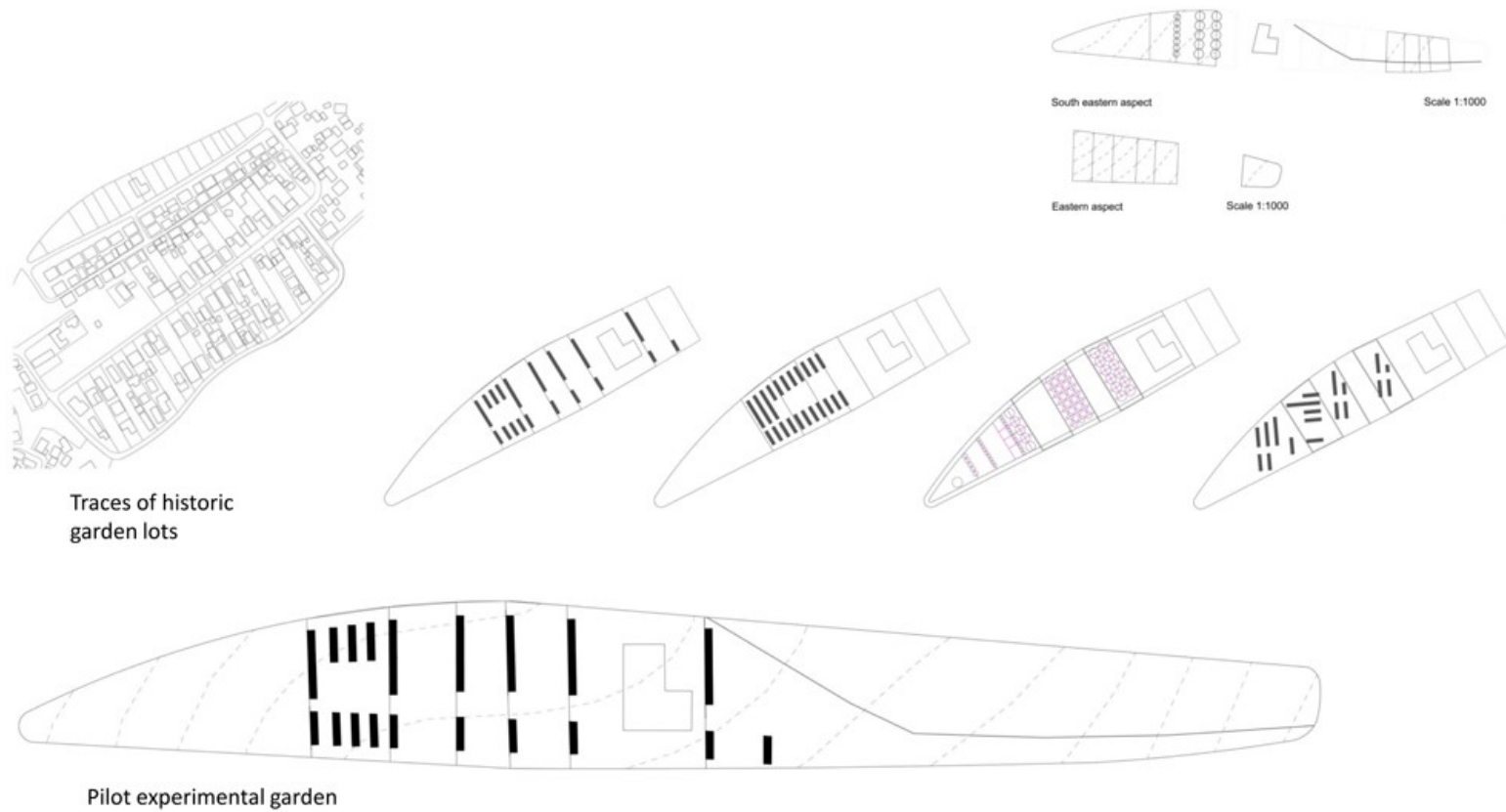


Figure 56: Pniel pilot based on traces of historic garden lots (Author 2021)

8.1.3. Agricultural practice

The traces of the village garden lots are transposed to new screen planting components that incorporate agricultural practices such as *espalier* and *cordons*. In this way, the pilot garden re-establishes the tradition of the agricultural garden lot and the opportunity for the community to provide in their household needs, practice traditional agro-ecological knowledge and transfer these skills to future generations.



Figure 57: Pruning practice (Author 2021)

8.1.4. Pilot to village framework

The designs developed in the pilot garden, is then extended to a larger scale in the village framework.

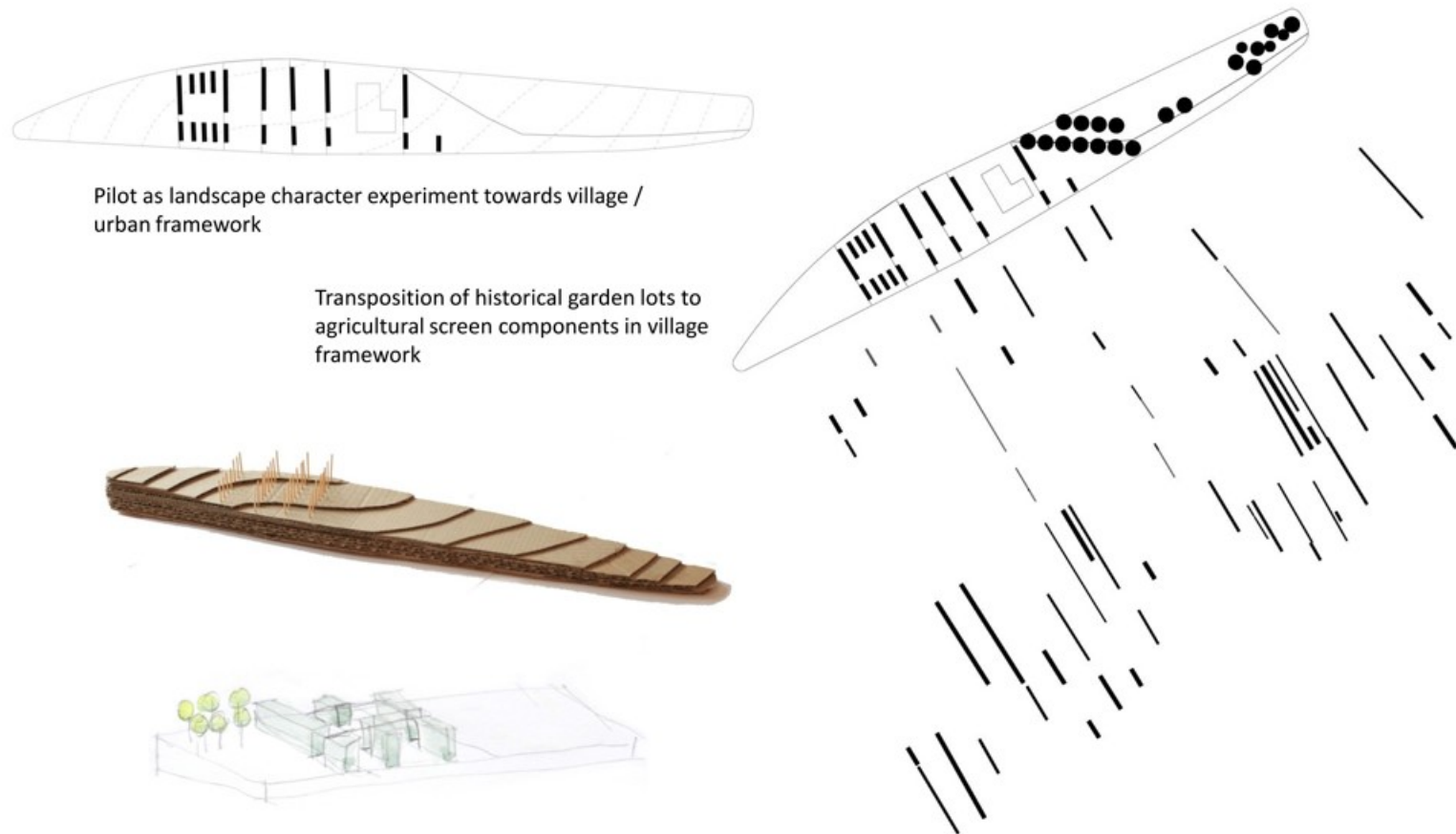


Figure 58: Pniel pilot character extended to village landscape framework (Author 2021)

8.2. Kylemore agro-ecological pilot garden

8.2.1. Agricultural traces

Traces of historic windbreaks patterns from 1970's aerial photographs were superimposed onto the areas zoned for mixed-use development and 'urban agriculture' in an attempt to re-establish historic patterns rooted in *terroir*. These patterns may contribute to maintaining coherence and rural character amidst of the planned development.

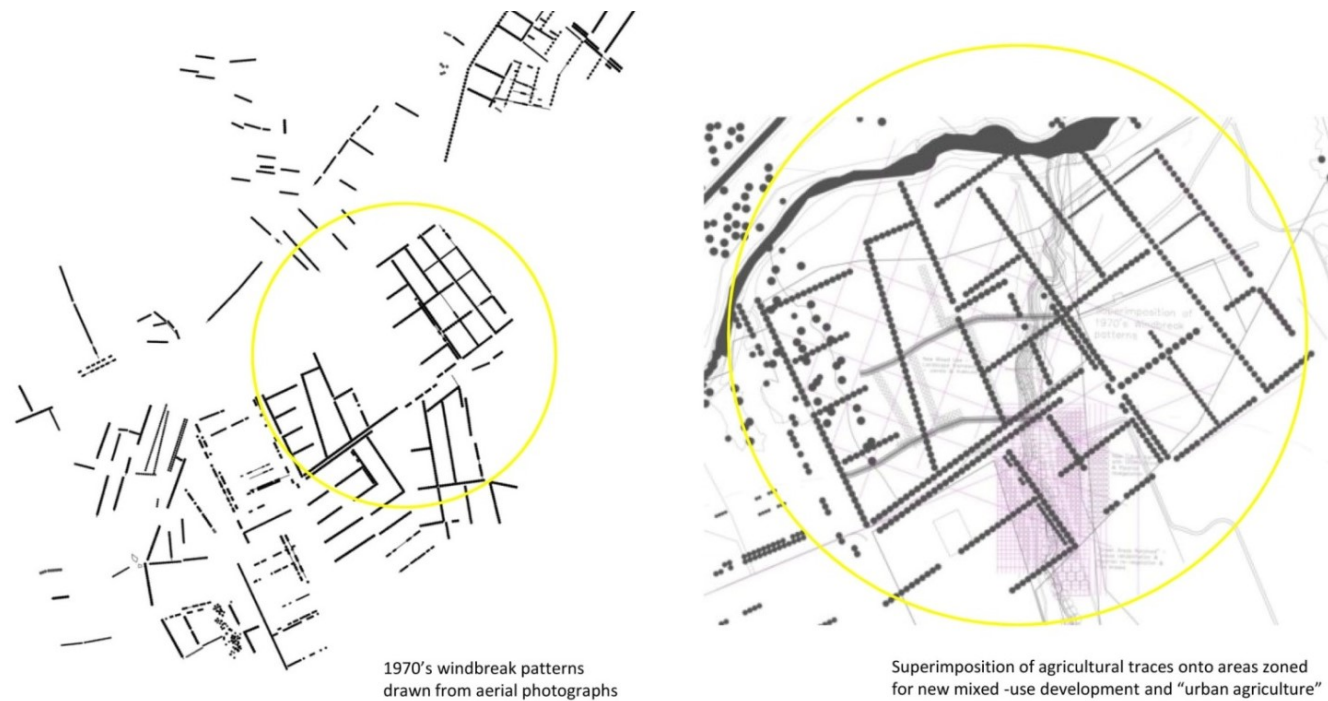


Figure 59: Superimposition of agricultural traces of 1970's windbreak patterns (Author 2021)



Figure 60: Kylemore agro-ecological village garden (Author 2021)

8.2.2. Agricultural processes and practice

Agricultural practices such as tree spacing conventions are incorporated in the design of agro-ecological pilot garden. Tree spacing conventions depend on factors such as the growth form of species and local soil- and climatic conditions. Row alignment is determined by the slope (planted with contours), the prevailing wind direction (planted in the prevailing wind direction to prevent wind fall of fruit), orientation and aspect (roughly in a north-south direction to ensure maximum morning and afternoon sunlight) (Impey 1980:20). Factors such as the size of an area, the design intent, how the landscape will be used and the envisioned spatial qualities are taken in consideration when making decisions on tree species and spacing.

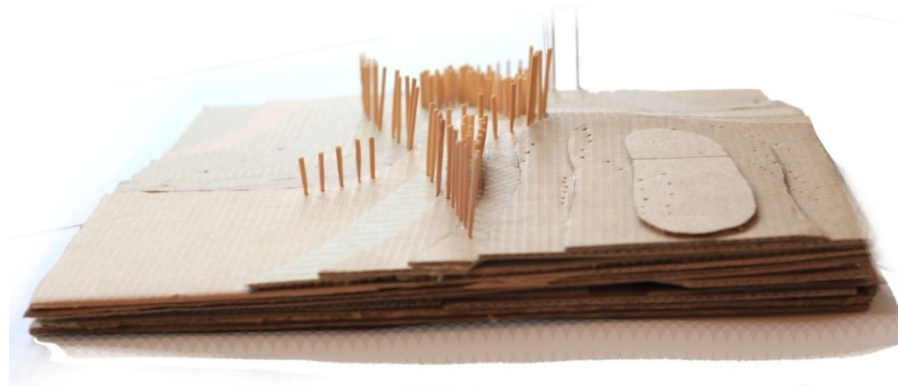


Figure 61: Model of contour planting, Kylemore agro-ecological village garden (Author 2021)

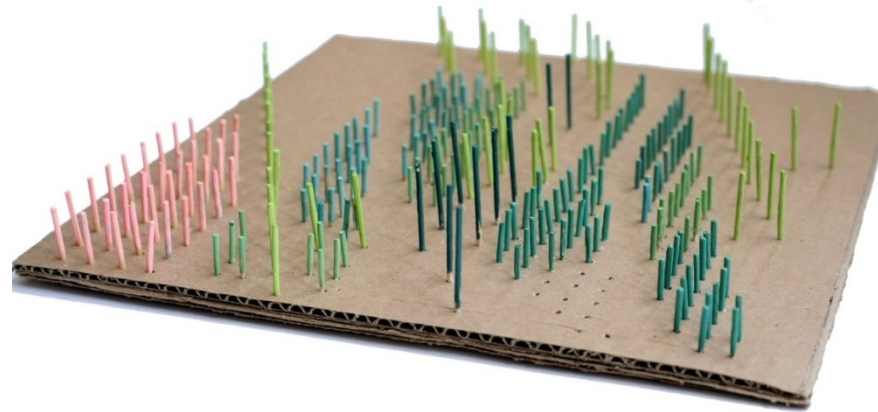


Figure 62: Model of seasonal colours, Kylemore agro-ecological village garden (Author 2021)

8.2.3. *Lisière*

Riparian zones comprise a transitional zone between terrestrial and aquatic habitats and form most of the connecting corridors in a green infrastructure network (Benedict & McMahon 2006:208). For the purposes of this study, riparian corridors are considered based on Desvinge's conception of *lisière* as fabric edge and transitional zones.

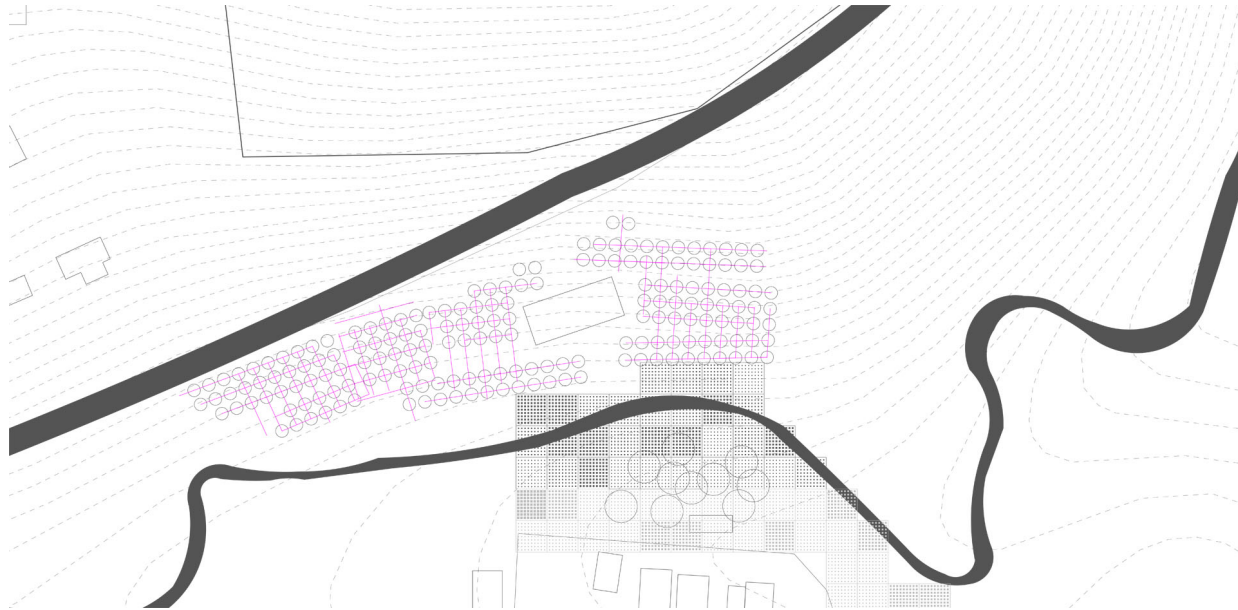


Figure 63: Forest-riparian re-vegetation, Simonsberg - Dwars River (Author 2021)

The choice of riparian species are critical based on the complexity of the environmental conditions. Tree species such as *Brabejum stellatifolium*, *Metrosidores angustifolia*, *Olea. europaea subsp. africana*, *Kiggelaria africana* and *Salix mucronata subsp. mucrunata* are well adapted to post-clearance conditions, low water availability, tolerant to shade conditions and competition from alien species. These species play important ecological roles in that their foliage and fruits are highly sought after by native bird and invertebrate species that promotes passive revegetation and increased species diversity (Meek *et al.* 2013:10; Schachtschneider & Rieneke 2014:293, Swift *et al.* 2008:514).

Herbaceous species such as *Erica curviflora*, *Erica bakerii*, *Erica bergiana*, *Ischyrolepis suberticellata* and *Restio fourcadei*, and geophytes such as *Zantedeschia aethiopica* and *Cianella orchidiformis* can be planted in the light shade of riparian scrub forests (Haaksma & Linder 2000:4; Winter 1972:61; Scott 1989:65). Bio-engineering structures of *salix* cuttings with seed mixtures of herbaceous vegetation can be used for slope protection, erosion control, sediment containment and to promote rapid re-vegetation (Rey & Labonne 2015:971; Weissgerber, Jaunatre, Dommanget, Jacob, Huyghe & Evette 2019:178). *Prionium serratum* can also be planted to stabilize river soil banks where necessary (Rebelo *et al.* 2019:71).

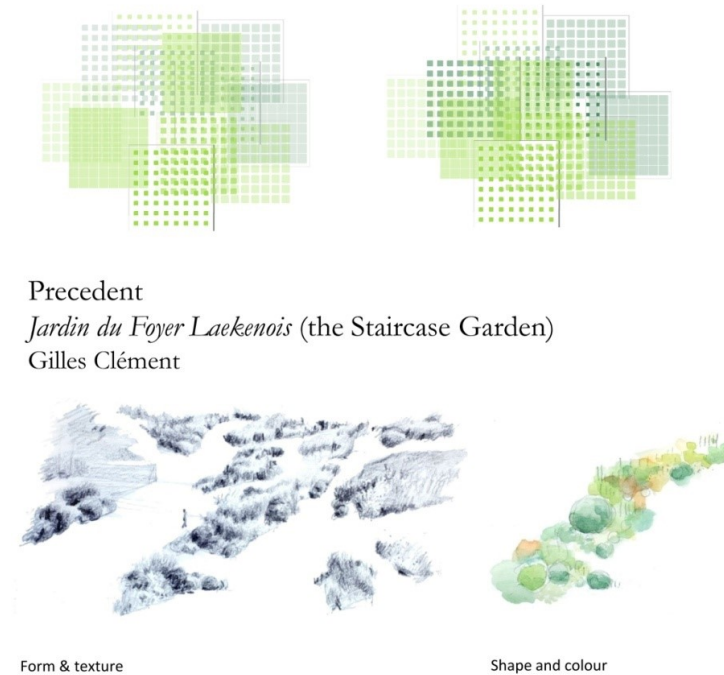


Figure 64: Fynbos re-vegetation 'steppingstones' (Author 2021)

8.2.4. Nature – artifact exchange

Lisière offers opportunity for experimentation with nature – artifact exchange through water and vegetative systems.

The role of water as structuring element within settlements must be respected. River courses are founding elements in historic agricultural and gardening activities. Water often serves as a place-making and social element within the settlement fabric and the role should be preserved and strengthened where possible (Stellenbosch Heritage Framework Part F, 2017).

Irrigation canals, informed by vernacular irrigation canals, *leivore*, will be designed to correspond with the anticipated geometry of the future mixed-use development in collaboration with specialists such as urban designers, hydrological engineers and ecologists. A network of irrigation channels can play an active role in climate mitigation and ecosystem services. Canals provide ecological corridors, help regulate seasonal floods and droughts, facilitate water retention, oxygenation and rainwater infiltration, replenish groundwater and contribute to the aesthetic quality of the landscape (Aspe, Gilles & Jacqué 2016:1975-1976, 1979).

Excess water is directed to clay retention ponds, based on farm dam typologies. Farm dams or ponds will be used for *Aponogeton* farming during the winter rainfall season. Ponds will be filled naturally at the onset of the rainfall season, late autumn, and release water into irrigation canals during the dry summer months when the dams have to be drained and dried in order to remove excess *Aponogeton* corms to ensure an economically viable harvest of large flowers in the next season (Pemberton 2000:146).

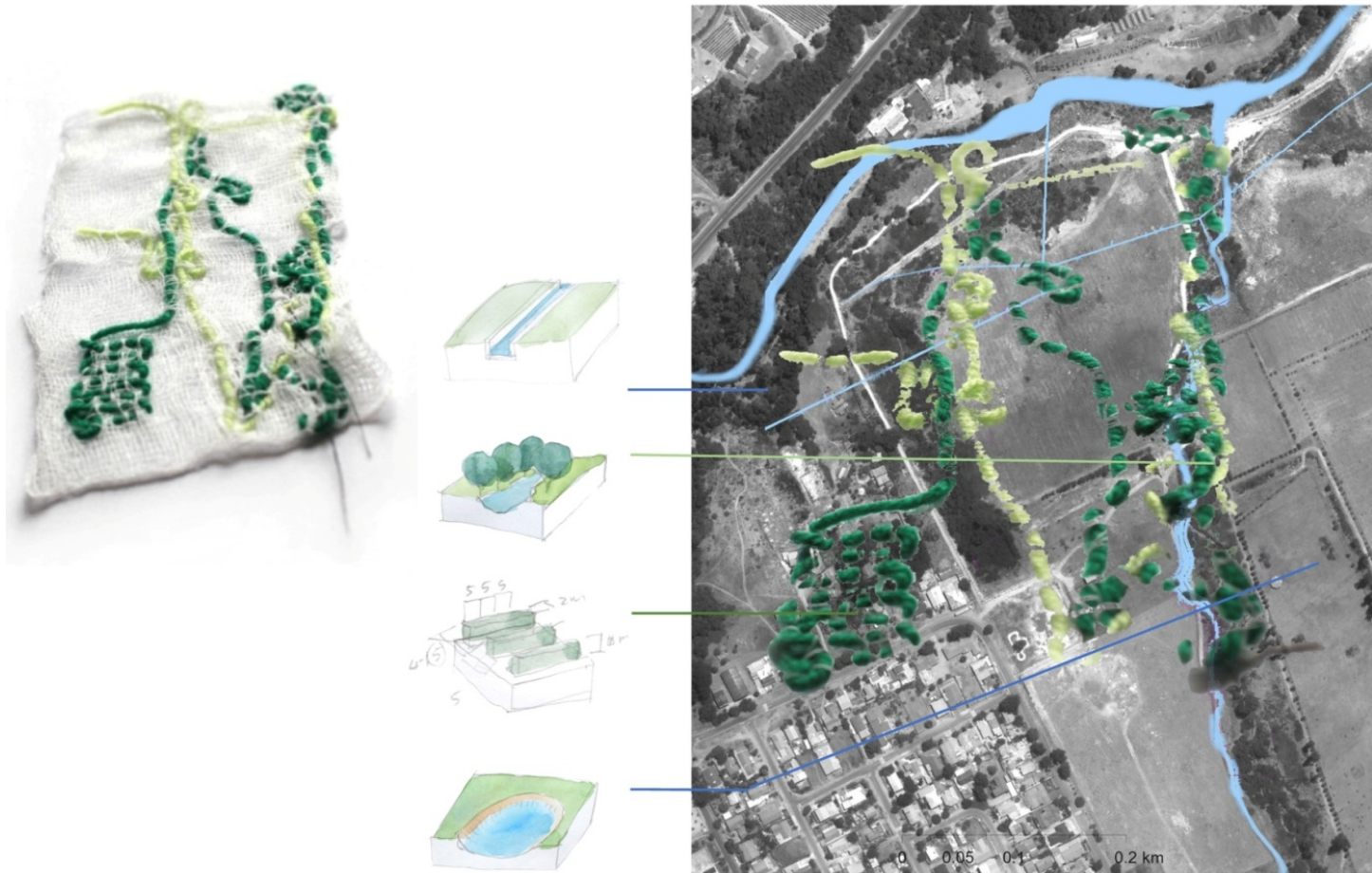


Figure 65: Pilot garden: Lisière Nature – artifact exchange (Author 2021)

Plantings of *Olea europaea subsp. africana* are also incorporated in the design to facilitate nature-artifact exchange. Olive species are adapted to poor soils and dry Mediterranean climates and provide multiple ecosystem services, including fire mitigation, soil stabilization and erosion control. Olives groves support rural economies and contribute to the aesthetic qualities of the landscape (Cecchini, Zambon, Pontrandolfi, Turco, Colantoni, Mavrakis & Salvati 2019:238, 239, 247, 251). Indigenous *Olea europaea subsp. africana* are grafted or budded with cuttings from selected varieties of olive species (Impey 1980:22). Young olive trees are planted July to mid-August in rows 5m apart and 4 to 6 meters between trees with whitewash or straw as stem protection for the first two years (Impey 1980:20, 21). Trees are pruned in a “y” shape after three or four years to grown into hedgerows of about 2 meters wide by 4 meters high (Impey 1980:20).

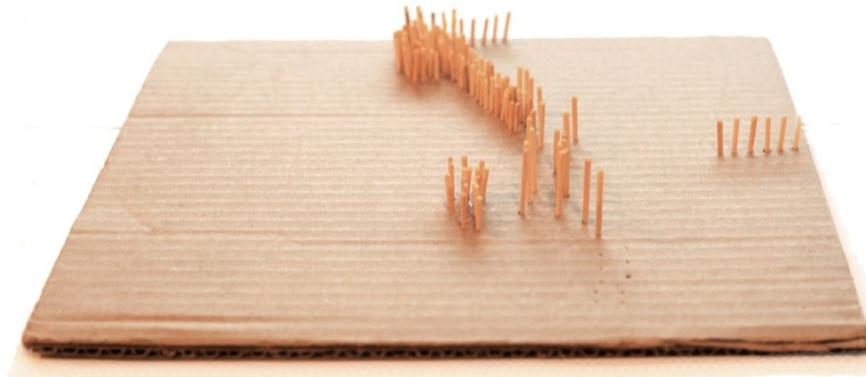


Figure 66: Model of pilot Olive avenue and park integrated with riparian re-vegetation (Author 2021)



Figure 67: Kylemore agro-ecological pilot garden (Author 2021)

Conclusion

The focus of this study was largely to gain understanding of rural landscapes - their characteristics and the challenges they face.

Work in rural contexts call for great wisdom and care as we touch the world's last natural (or semi-natural) refuges and rich rural cultural heritage. Landscape architecture is positioned at the interface between the rural and the urban. Through landscape characterisation we may be able to propose landscape interventions that could help maintain the identity, character and functions of rural landscapes. When these interventions are on a small scale, such as a pilot garden, they offer the opportunity to test hypotheses, materiality, proportions, scale and fit within the landscape and opportunities for community members to participate in the stewardship of the landscape.

Pilot gardens provide opportunities for experimentation, testing, iteration and pedagogy. From a successful pilot garden larger territorial landscape plans may be developed. In this way, rural landscapes may be able to maintain a sense of authenticity and continuity amidst urban expansion and retain their connection and relationship to the larger territory to the benefit of the ecological, cultural and aesthetic aspects of the landscape.

This is only an explorative study in a highly complex domain. If urban - and landscape interventions are not done with sensitive consideration of the landscape character, it could be more harmful than helpful. This exploratory study should therefore be followed by further interdisciplinary research.



Figure 68: City Farm ... (Cape Farm Mapper)

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