Western Cape Government

Transport and Public Works

Intermodal Terminals Concept Study

Final Report

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ACRONYMS AND ABBREVIATIONS

CAGR	Compound Annual Growth Rate
CAPCOR	Cape-Gauteng Corridor
DEA&DP	Department of Environmental Affairs and Development Planning
DEDAT	Department of Economic Development and Tourism
DIA	Durban International Airport
DOA	Department of Agriculture
DTP	Dube Trade Port
DTPW	Department of Transport and Public Works
GCM	Greater Cape Metro
GPS	Growth Potential Study
HGV	Heavy Goods Vehicle
ITP	Integrated Transport Plans
KZN	KwaZulu-Natal
LC	Logistics Centre
O-D	Origin and Destination
PPECB	Perishable Products Export Control Board
PPP	Public-Private-Partnership
PSDF	Provincial Spatial Development Framework
PSP	Private Sector Participation
RFP	Request for Proposal
RSIF	Regional Spatial Implementation Framework
SEZ	Special Economic Zone
TFR	Transnet Freight Rail
TSDC	Tambo Springs Development Company
WCFDM	Western Cape Freight Demand Model
WCG	Western Cape Government

1 Background

The Western Cape Freight Strategy (referred to as the Strategy later in this report) includes a Strategic Action 4B-3 on identifying other locations for future intermodal terminals in the Western Cape. Intermodal freight terminals are transhipment facilities, normally directly connected to seaports through high-capacity transport modes such as rail. A more detailed definition of the facilities is provided in Chapter 2.

Currently, the main intermodal terminal in the province is at Belcon, linked to the Port of Cape Town. There is consideration of relocating this terminal to another site in Kraaifontein, for which a study is planned by the City of Cape Town, collaborating with stakeholders such as the Western Cape Government and Transnet.

Besides Belcon, there is a low-volume intermodal terminal at Saldanha, linked to the Port of Saldanha.

Strategic Action 4B-3 was included in the Strategy to address the interconnectivity of the Western Cape's freight transport infrastructure network over the long term. Intermodal terminals are useful in linking the road, rail, air, and maritime freight transport modes in the province, providing more transport options to businesses. Also, the interconnectivity of the network has other benefits such as:

a. **Improved ability to shift freight from road to other modes such as rail and maritime**. Currently, road freight's market share of general freight in the Western Cape is more than 90% (Western Cape Government, 2022), which results in challenges such as congestion, resulting in traffic spilling over into secondary roads, a high number of road freight crashes, damage to road infrastructure, related cost and hazardous emissions from heavy-goods vehicles (HGVs). Intermodal facilities are useful in linking road to rail, which could reduce the negative impacts of the use of road freight transport. The 2020 WCFDM shows that the most significant potential for the shift of rail-friendly freight from road to rail exists on the N1 corridor, where an estimated 6.5 m tonnes, which is 23% of the freight on this corridor has potential to be shifted.
b. **Lower costs of logistics, resulting from improved efficiency and more transportation options**, allowing consignors to choose the most suitable and affordable mode. Currently, the poor connectivity of the network results in limited choices and results in businesses relying on road because the mode is more accessible, although it is not the most suitable mode for certain commodities.

c. **Supporting the economic development of regions outside the main metropolitan area.** A more interconnected network provides more transportation options for businesses. Intermodal terminals could potentially improve the viability of certain branch lines, making it justifiable to invest into these lines and providing outlying areas with access to the network.

Strategic Action 4B-3, therefore, supports the Western Cape Freight Strategy's overall vision of providing sustainable freight transport services by addressing challenges related to access, safety, affordability, efficiency, resilience, and the environmental impacts of freight transport.

To address the needs identified in Strategic Action 4B-3, the Western Cape Government initiated this study to determine potential locations for additional intermodal terminals. This report describes the methodology of the study, the analysis conducted and potential terminal location proposals.

1.1 Purpose of the study

In accordance with Action 4B-3 of the Strategy, the purpose of the study is to identify other locations for future intermodal facilities in the Western Cape, in addition to the Belcon facility and the low-volume facility at Saldanha. As stated under Objective 4B of the Strategy, under which Action 4B-3 was included, the identification of the additional intermodal terminals is aimed at improving the interconnectivity of the Western Cape's freight network, which is important in supporting the economic development of the province and promoting the use of the most appropriate modes for transporting commodities. Therefore, the study objectives are:

i. Support economic growth, through improving access, especially for outlying areas that cannot make use of terminals such as Belcon.
ii. Leveraging the terminals to improve modal shift, especially the shift of freight from road to rail.

These objectives are different from those for the Belcon terminal, which is aimed at augmenting the Port of Cape Town's capacity. Connectivity to the Port of Cape Town is, however, a secondary objective of the terminal locations identified in this study, considering that improving the connectivity of the Western Cape's freight transport network improves the ability of outlying areas to access the port. This is particularly useful for origin regions for export goods and destination regions in the case of imports. Considering the above, this study is therefore mainly focused on areas outside the Cape Town metro.

The study is essential for planning purposes and the results of the study will be taken into consideration in the Western Cape's long term freight transport and spatial planning framework.

1.2 Study type

The intermodal terminal study was conducted at a concept level of accuracy. This mainly involved the qualitative assessment of the potential locations of the intermodal terminals. Where necessary, only high-level quantitative assessment was conducted, including the review of data from the Western Cape Freight Demand Model (WCFDM). The concept study informs preliminary decision-making to be refined in a more detailed future pre-feasibility study.

1.3 Study methodology

The steps followed in the concept study are shown in Figure 1-1, below.

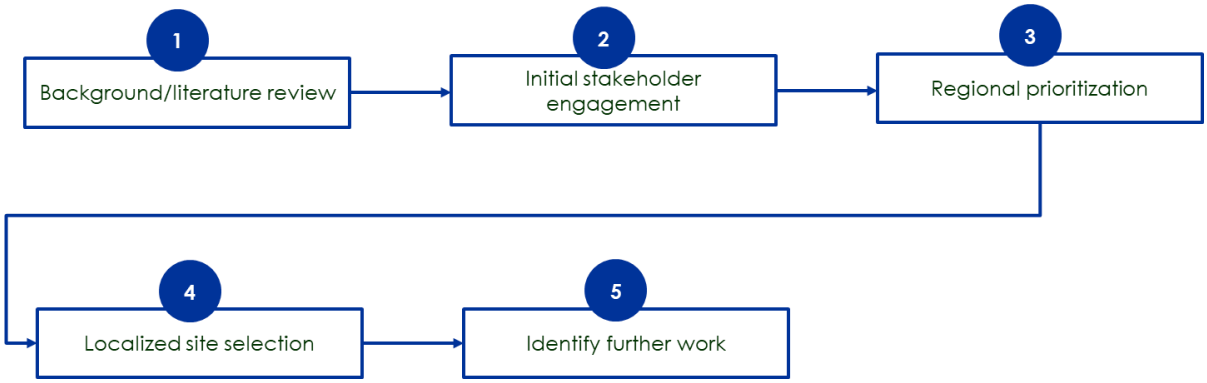

Figure 1-1: Study steps

The steps in the study methodology are described below.

1.3.1 Background information and literature review

Information from a desktop literature review was among the inputs into the study. The literature review focused on defining intermodal terminals, exploring the purposes of such terminals, and identifying the factors that impact the location of such terminals.

The review also explored similar initiatives such as the Dube Trade Port and Tambo Springs in South Africa. The literature review was supported by information from other inputs pertaining to the context of the Western Cape, including:

a. Western Cape's Freight Demand Model (WCFDM)
b. Western Cape Provincial Spatial Development Framework (PSDF)

c. Western Cape Growth Potential Study (GPS)
d. Western Cape's Sector Growth Studies
e. Port of Cape Town Congestion Study
f. Western Cape Freight Strategy
g. Transnet Ports and Rail Plans

The study was also conducted in line with the national strategy and policy as articulated in the documents below:

1. White Paper on National Transport Policy 2021(Revised)
2. National Infrastructure Plan (2050)
3. National Spatial Development Framework (2022)

A bibliography, listing the main references for the study is included in Appendix A.

1.3.2 Initial stakeholder engagement

This step involved the initial engagement of stakeholders to discuss the preliminary findings from the background research and to request further advice and information. The information and advice received at this stage and other information obtained though the study team's own research informed the regional prioritisation in Step 3 of the study methodology.

The stakeholders who were engaged are shown in Figure 1-2 below.

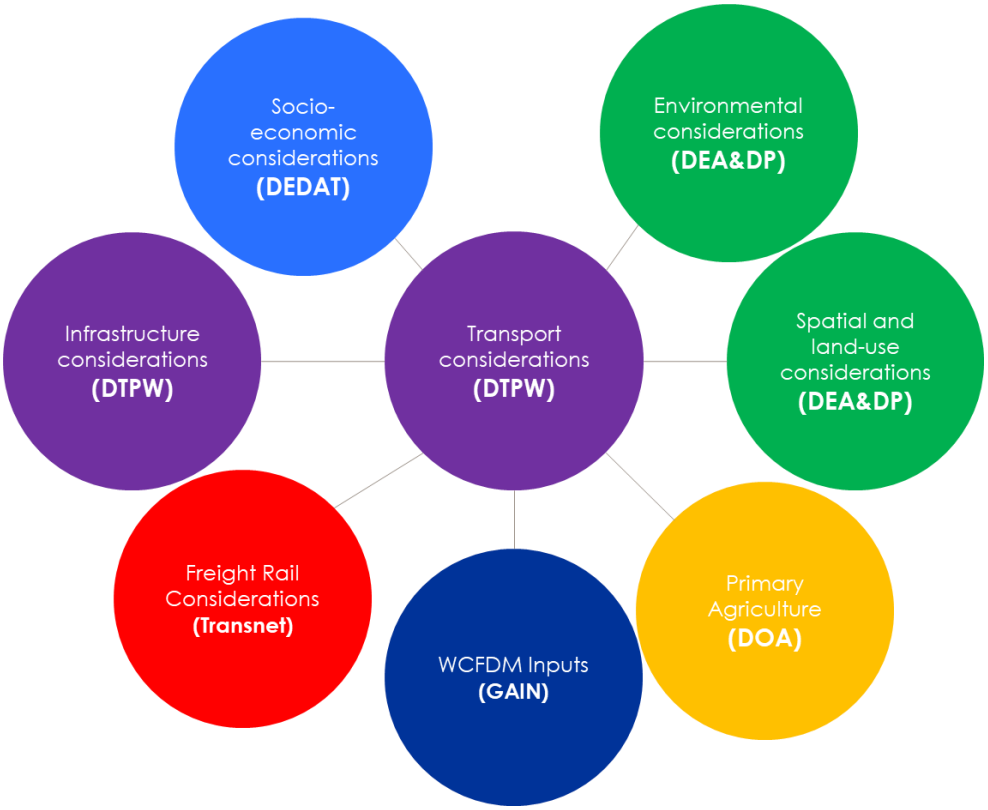

Figure 1-2: Stakeholders engaged for the study

The Department of Economic Development and Tourism (DEDAT) was consulted on the socio-economic factors that impact the study, including the projected economic growth factors and the underlying sectorial and regional factors contributing towards this growth.

The Department of Environmental Affairs and Development Planning (DEA&DP) was consulted on the spatial planning, land-use planning, and growth potential inputs. In addition, DEA&DP was engaged on other opportunities such as the transportation of waste by rail, for which intermodal terminals could be useful.

The Department of Agriculture (DoA) was consulted on the needs of the primary agriculture sector. This was based on initial indications that the primary agriculture and agri-processing sectors are projected to be Western Cape's top economic growth contributors over the next 10 years.

Within the Department of Transport and Public Works (DTPW), other branches responsible for the development of Integrated Transport Plans (ITPs) and infrastructure initiatives were consulted.

Transnet Freight Rail (TFR) was engaged to provide rail infrastructure and rail services inputs whilst the GAIN Group was engaged to conduct the WCFDM analysis.

Further engagements were conducted throughout the course of developing the study when additional inputs were required.

1.3.2.1 Examples of information obtained during the initial stakeholder engagement

The main data inputs that were obtained during the initial stakeholder engagements are:

1. **Western Cape Sector Growth Study** – the study identifies opportunities for economic growth in the Western Cape, based on several inputs such as the Economic Growth Strategy, Sector Plans (Value Chain Analysis), Western Cape Export Strategy and Economic Infrastructure Plans. Intermodal terminal could support this growth, making the Sector Growth Study an important reference for this study. The team received relevant extracts from the Sector Growth Study.
2. **Provincial Spatial Development Framework (PSDF)** – land-use and spatial planning are important considerations in the development of transport networks. Optimal spatial planning improves the flow of goods by improving the ability to connect origins and destinations. Besides this, optimal spatial planning could reduce the need to transport goods by locating demand and supply close to one another. For intermodal terminals, understanding planning around centres of economic activity, for example, Special Economic Zones (SEZs) is useful in determining the areas that could be sources of freight demand to make intermodal terminals viable.

3 **Western Cape Growth Potential Study (GPS)** – the GPS was developed to determine the growth potential and socio-economic needs of settlements in the Western Cape, outside of the City of Cape Town. The study uses quantitative data such as factors relating to socio-economic, economic, physical environmental, infrastructure and institutional aspects. The results of the quantitative analyses were combined with qualitative information to identify potential interventions that might unlock latent potential within settlements and regions. Considering the economic development objective of this study, the GPS was an important source of information. It is, however, important to highlight the long-term nature of the planning in the GPS and its focus on potential. While certain regions may have potential, it is possible that some of this potential may not be realised. Considering this, growth potential alone is not sufficient in determining the location of infrastructure such as intermodal terminals. Proposing sites based on potential alone has risks in that if the potential does not result in growth, then the intermodal terminals could have no demand to respond to. On the other hand, providing infrastructure such as the intermodal terminals could be an important catalyst for the realisation of the growth potential.

4 **Regional Spatial Implementation Frameworks (RSIFs)** – the inputs from RSIFs were similar to those from the PSDF, but more specific to regions in the Western Cape. Certain RSIFs included information on past proposals for intermodal terminals in the Western Cape, which were useful references for this study.

In addition, the stakeholder engagement process involved the discussion of information sources that was already available to the study team, such as WCFDM. WCFDM uses supply and demand data from the econometric modelling of relationships between total freight transport demand and its drivers to identify freight movements between supply and demand areas for all commodities and modes in the Western Cape. The WCFDM was, therefore, important in identifying the areas that have demand that could be met by the intermodal terminals investigated in this study. Besides estimating current demand, the WCFDM includes forecasts of up to 30 years.

1.3.3 Regional prioritisation

The regional prioritisation step aimed at identifying broad areas that could generate sufficient freight transport demand to make an intermodal terminal viable or where there was the greatest need for such a facility. The regional prioritisation was based on the insights drawn from the background literature review and the information obtained during stakeholder engagement. The step involved the analysis of the information provided by stakeholders and other sources of information to determine areas where intermodal terminals could support economic growth and improve the connectivity of the freight transport network as per the objectives of the study.

1.3.4 Localised site selection

This step involved identifying potential locations of intermodal terminals in the prioritised regions from the step above. For this concept study, the localised selection is a guideline only, considering that significant work would be required to determine specific locations with certainty. The additional work needed could include the estimation of costs for developing the terminals, the economic assessment of the locations, for example, cost-benefit analysis and the assessment of land ownership at the sites.

The localised site selection was based on criteria for selecting lower-level locations or sites within the prioritised regions. The criteria were similar to the regional prioritisation, including factors such as the existing and projected demand. In addition, the lower-level criteria included other factors such as infrastructure considerations, for example, the availability of rail branch lines to link to the intermodal terminals and road network links with the sites.

1.3.5 Identify future work

As mentioned in the introduction, this study was conducted at a concept level of accuracy. As a result, the proposals are preliminary, informed by high-level analysis. Further work will be required to develop the findings more and improve the accuracy of the proposals in the study. This work could include the estimation of costs for developing the terminals, the economic assessment of the locations, for example, cost-benefit analysis, the assessment of land ownership to determine whether Transnet or other key stakeholders have land parcels suitable for the development of intermodal terminals, environmental impact assessment and the existence of bulk services, such as water and electricity needed at the intermodal terminals. Future needs for such work were identified in this step and will inform the scope of a future prefeasibility study.

2 Literature Review

This chapter describes findings made during the review of literature and other background information on intermodal terminals. The findings provided an important basis for developing the study and for the discussions in the initial stakeholder engagements.

2.1 Definition of intermodal terminals

Intermodal terminals are part of a broader group of Logistics Centres (LCs). Researchers have tried to develop a common definition of intermodal logistics centres, but so far there is no universally accepted definition. The definition varies among researchers in different countries and contexts.

Most researchers, however, agree that LCs should contribute towards intermodal transport, promote regional economic activity, and improve land-use and local goods distribution. LCs may include:

- Goods terminals
- Freight villages
- Inland terminals
- City logistics terminals
- Distribution centres
- Freight centres
- Hub terminals
- Dry ports
- Inland container centres, and others

The list above is not perfect because there are overlaps in these definitions, which are often used interchangeably for facilities that may have different characteristics or serve different purposes.

For this study, the following definitions of intermodalism and multimodalism as well as related terminal definitions in the following sections are used (Rodrigue, 2020).

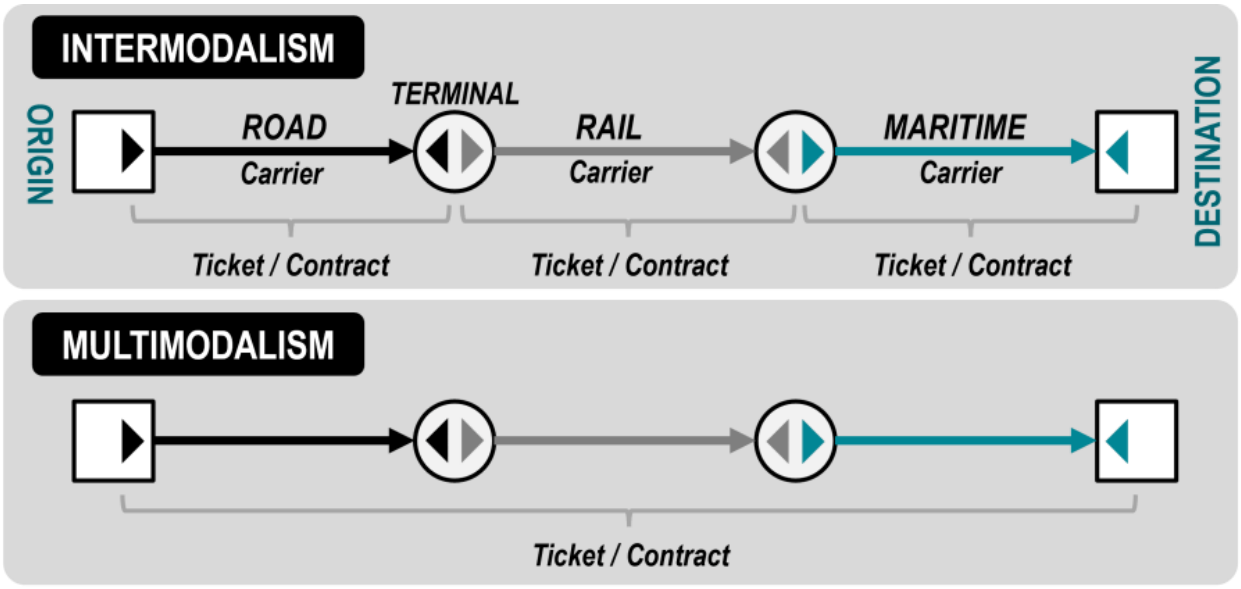

Figure 2-1: Illustration of intermodalism and multimodalism (Rodrigue, 2020)

1. **Terminal** is defined as any location where freight and passengers either originates, terminates, or is handled in the transportation process. Terminals are central and intermediate locations in the movements of passengers and freight. They often require specific facilities to accommodate the traffic they handle.

2. **Intermodalism** involves the organisation of a sequence of modes between an origin and destination, including the transfer between the modes. Its main goal is to connect transportation systems that could not be connected otherwise because they are not servicing the same market areas due to their technical characteristics. In its broadest interpretation, intermodalism refers to a holistic view of transportation in which individual modes work together or within their own niches to provide the user with the best choices of service, and in which the consequences on all modes of policies for a single mode are considered.

3. **Intermodal terminal** facilitates the movement of freight from an origin to a destination, relying on several modes of transportation. In the literal sense, intermodal terminals refer to terminals where exchange of freight between two transportation modes occur. Intermodal terminals increasingly tend to be specialising at handling specific types of freight traffic.

4. **Multimodalism** is simply an extension of intermodalism where all the transport and terminal sequences are subject to a contract that can be assumed by a single integrated carrier.

5. **Multimodal terminal** terminals that facilitate the movement of freight from an origin to a destination, relying on several modes of transportation using contract. Technically, multimodal terminals are the same as intermodal terminals, but represents an evolution requiring a higher level of integration between the actors involved such as carriers and transport operators.

6. **Multipurpose terminal** offers infrastructure, equipment, and services for different types of freight and modes of transport. Multi-purpose terminals typically require a certain degree of flexibility to cope with diverse user requirements and different types of freight (UNCTAD, 1991).

Among the LCs, intermodal terminals are significant due to their overall contribution to the logistics network operation and integration. Intermodal freight terminals are transhipment facilities, normally directly connected to seaports through high-capacity transport modes such as rail. Cargo owners leave or pick up their freight at, or from the intermodal freight terminals as if they were doing so at a seaport. The seaport operators, who ideally owns or controls the high-capacity transport modes between the dry ports and seaports, handle the movement of freight between the two facilities. The inland intermodal freight terminals, therefore, enable the port operators to expand capacity without facing constraints such as the limited availability of land around the ports themselves. Besides the capacity augmentation for seaports, inland intermodals freight terminals have other advantages, including:

1. The prevention of heavy congestion at seaports. Caution should, however, be exercised to ensure that this congestion is not transferred to the areas around the inland intermodal freight terminals.
2. Improved freight transport efficiency from the use of high-capacity modes such as rail over the final leg to the port, instead of road.
3. Lower environmental impacts, resulting from the use of high-capacity modes over the final leg to the port and the relocation of certain freight operations to areas that are less sensitive to the environmental impacts of these activities.

The distance from the intermodal terminal to the port varies from a few kilometres to hundreds of kilometres. For example, the distance from the Port of Cape Town to Belcon is about 20 km whilst the distance from Port of Durban to the City Deep terminal in Johannesburg is approximately 560 km. For facilities located further from the port, the port capacity augmentation advantages become less important than the freight network connectivity advantages of the intermodal terminals. For purposes of this study, the freight network connectivity advantages were more important considering that facilities such as Belcon already provides for augmentation of the Port of Cape Town's capacity.

An important consideration is that intermodal terminals are becoming more than physical configurations of pavement and tracks. Intermodal terminals are being developed as organisations of integrated services that meet the business needs of regions and markets. This approach was taken at Tambo Springs and Dube Trade Port, which are both linked to SEZs and support a wide range of services, including manufacturing, warehousing, and distribution. Other services that could be provided at intermodal terminals include general storage, freight track and trace, maintenance facilities for freight containers and truck maintenance, refilling facilities, customs clearance and product final inspection and certification services such as those provided by the Perishable Products Export Control Board (PPECB) before agricultural products leave the country for export markets.

2.1.1 Purposes of intermodal terminals

As described in Section 2.1 above, intermodal terminals primarily connect inland regions of economic regions with seaports, normally through a high-capacity transport mode such as rail. The intermodal terminals allow for the easy transhipment of freight from road to rail and eventually to maritime. Where links with other modes such as aviation exist, an intermodal terminal could allow for the integration with such additional modes. Through the improved interconnectivity of the network, intermodal terminals provide additional advantages such as improved freight transport network efficiency, augmentation of the capacity of ports, ability to shift freight from road to rail, which has additional advantages such as reduction in congestion, emissions, and damage to road infrastructure.

The importance of the advantages described above differs among intermodal terminals, depending on where terminals are located and the needs that they address. Terminals are located and designed to support specified economic, spatial, and business needs. Poor alignment between the objectives of providing the intermodal terminal and the needs that the terminal is addressing could impact the transport network, resulting in issues such as high transhipment costs.

As mentioned in Section 2.1, intermodal terminals are no longer only physical configurations of pavement and tracks, but organisations of integrated services that meet the business and economic needs of a location.

For this study, the analysis conducted partly aimed at identifying the economic and business activities that the proposed intermodal terminal will serve. These economic and business needs provided guidance on the objectives of purpose that the intermodal terminals will address. Considering the importance of several stakeholders in determining these economic and business needs, it was important to consult the stakeholders to align with their interests. The list

of stakeholders consulted for this concept study was not exhaustive and it could be necessary for additional stakeholders to be consulted at a future pre-feasibility or feasibility stage.

2.2 Factors impacting the location of intermodal terminals

Broadly, the factors impacting the location of intermodal terminals are in six main groups. The first two groups of criteria are mandatory prior to evaluating a location against the remaining 4 of the criteria groups.

Table 2-1 below shows the mandatory location selection criteria groups.

Table 2-1: Mandatory Location Selection Criteria Groups

No.	Criterion	Comments
1	Legislative	Considers legislative limitations in the location of terminals, for example legally defined uses of land.
2	Environmental	Considers the likely environmental impacts of terminal. Certain environmental requirements are defined in legislation, resulting in overlaps with the legislative criterion.

Table 2-2 below shows the other location selection criteria groups.

Table 2-2: Location Selection Criteria Groups

No.	Criterion	Comments
1	Flow of goods	Takes the movement of goods and the resulting demand into consideration. This could be linked to the economic activity in an area surrounding the intermodal terminal location.
2	Spatial	Considers the spatial planning needs of the area in which a terminal is proposed. Spatial planning considerations could prevent the location of intermodal terminals in certain locations.
3	Technical and Technological	This takes needs such as infrastructure, services and facilities that are necessary in operating a terminal into consideration.
4	Organisational or institutional	This takes the relationships among stakeholders with interests in a terminal into consideration. Strategic alignment among these stakeholders is necessary.

Within the broad groups in the tables above, specific considerations include:

i. Proximity to centres of production to ensure a catchment area with sufficient demand to ensure the viability of a terminal.
ii. Good core rail network access or a direct rail connection.
iii. Direct connectivity to the major road highway network.
iv. Environmental and socio-economic impacts on the surrounding area.
v. The availability of suitable land for construction and expansion, taking land ownership into consideration.

2.2.1 Freight transport demand considerations

Freight transport demand is a crucial factor to consider in selecting the location of an intermodal terminal. After the mandatory environmental criteria and legislative criteria, the flow of goods group is the next most important location selection criteria.

The sub-criteria of the flow of goods are shown in Table 2-3 below.

Table 2-3: Flow of goods sub-criteria

No	Sub-criteria
1	Current volume of goods flowing in the catchment area of the terminal and the distance to or from which the goods flow
2	Future volume of goods in the catchment area of the terminal
3	The importance of the economic sectors contributing towards the freight to and from the catchment area of a terminal and the type of freight generated
4	Freight flows that are induced in the catchment area of a terminal
5	The destination of the freight flows that pass through the catchment area of a terminal, including whether they are for local or export markets
6	The split of freight between road and rail.

For this study, freight transport demand data was obtained from the 2020 Western Cape Freight Demand Model (WCFDM).

2.2.2 Other factors

Besides the factors described above, other factors that impact the location of intermodal terminals include:

a. **Ongoing economic development initiatives** – considering their importance in supporting economic growth, intermodal terminals should be located to support ongoing economic development initiatives. Examples of such initiatives include Special Economic Zones (SEZs), which could make use of intermodal terminals. In the Western Cape, there

are plans for SEZs at Atlantis and Saldanha, which were taken into consideration in this study. The two designated Western Cape SEZs are shown in Figure 2-2, together with other SEZs in South Africa.

b. **Political factors** – certain aspects of intermodal terminals, for example, the provision of land and investments into infrastructure such as roads leading to the terminals require political support. As a result, aligning the role of intermodal terminals with broad economic objectives is important as it enhances political support. It is worthwhile to note that the organisational considerations shown in Table 2-2 are closely linked to political factors.

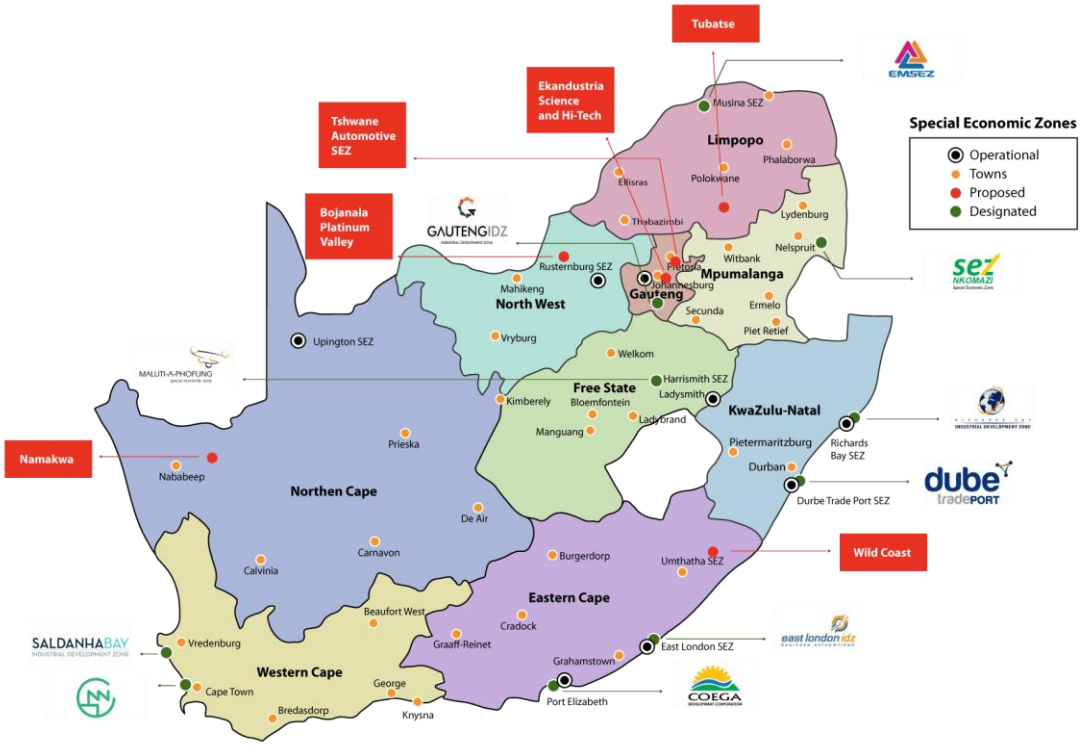

Figure 2-2: Special Economic Zones (SEZs) in South Africa (Industrial Financing, 2021)

2.3 Other background information

2.3.1 Rail Infrastructure

The availability of rail infrastructure, preferably core network link is an important prerequisite for the location of an intermodal terminal. As a result, information on the Western Cape's rail infrastructure network was important for this study.

The rail network in the Western Cape and South Africa as a whole, has faced some capacity issues due to historical underinvestment in the network. While there are ongoing initiatives to

improve the network and efforts to encourage private sector participation, several challenges remain, which could impact the ability to provide intermodal terminal in certain areas.

The Western Cape rail network is shown in Figure 2-3 below. The key rail lines in the province are:

1. The Sishen – Saldana ore line; and
2. The Gauteng – Cape Town line

The Sishen to Saldanha railway line is an 861 km long, heavy haul, single railway line, which connects iron ore mines near Sishen in the Northern Cape with the port at Saldanha Bay in the Western Cape. The traffic is predominantly export iron ore to Saldanha. The overall condition of the line infrastructure is good taking into consideration that it carries the heaviest axle tonnage (30 t/axle).

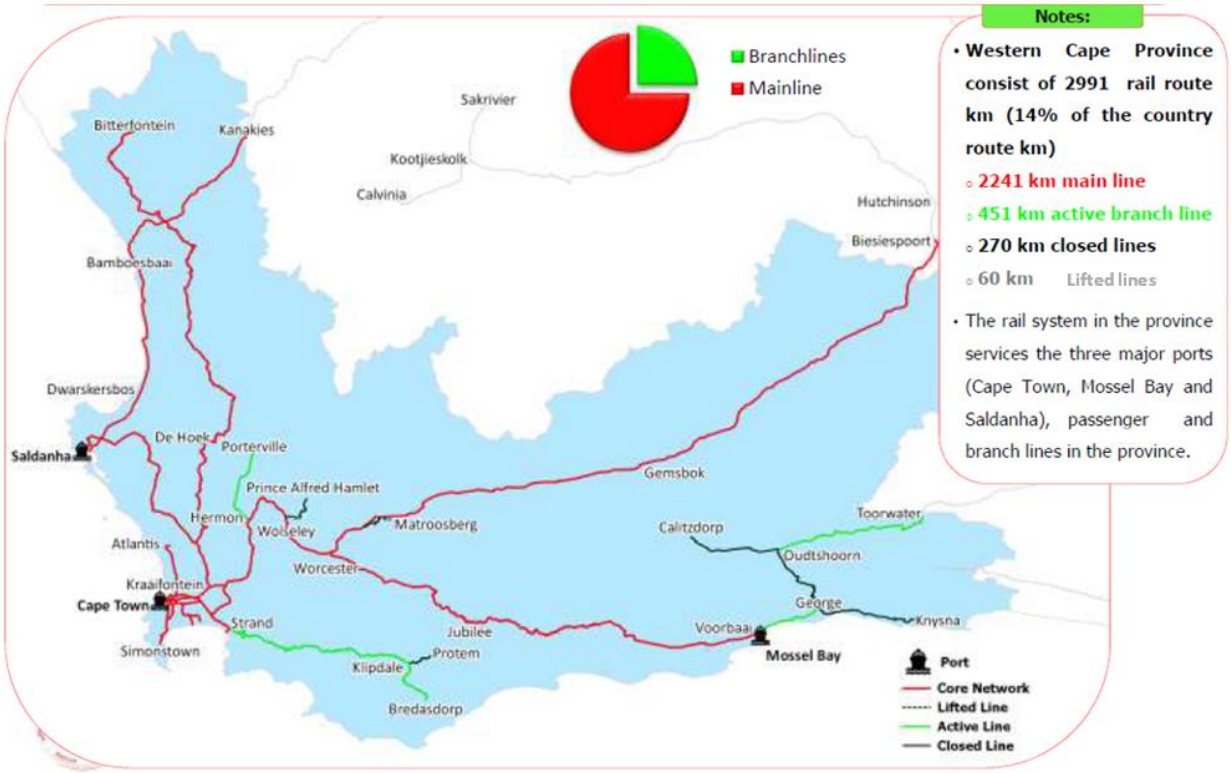

Figure 2-3: Western Cape rail network (Transnet, 2015)

The Gauteng-Cape Town Corridor (CAPCOR) runs from Gauteng to the Port of Cape Town. Traffic is predominantly containers, domestic coal to Saldanha and other general freight.

Transnet has developed a Branch Line Strategy, which includes a focus on the economic development of rural areas and regaining market share. A Branch Line Revitalisation Programme was initiated to allow for the participation of external operators through the Private Sector Participation (PSP) Plan. Work has commenced on the refurbishment of several branch lines and funds have been allocated for further work in the future.

A more detailed map of the Western Cape rail network is shown in Figure 2-4.

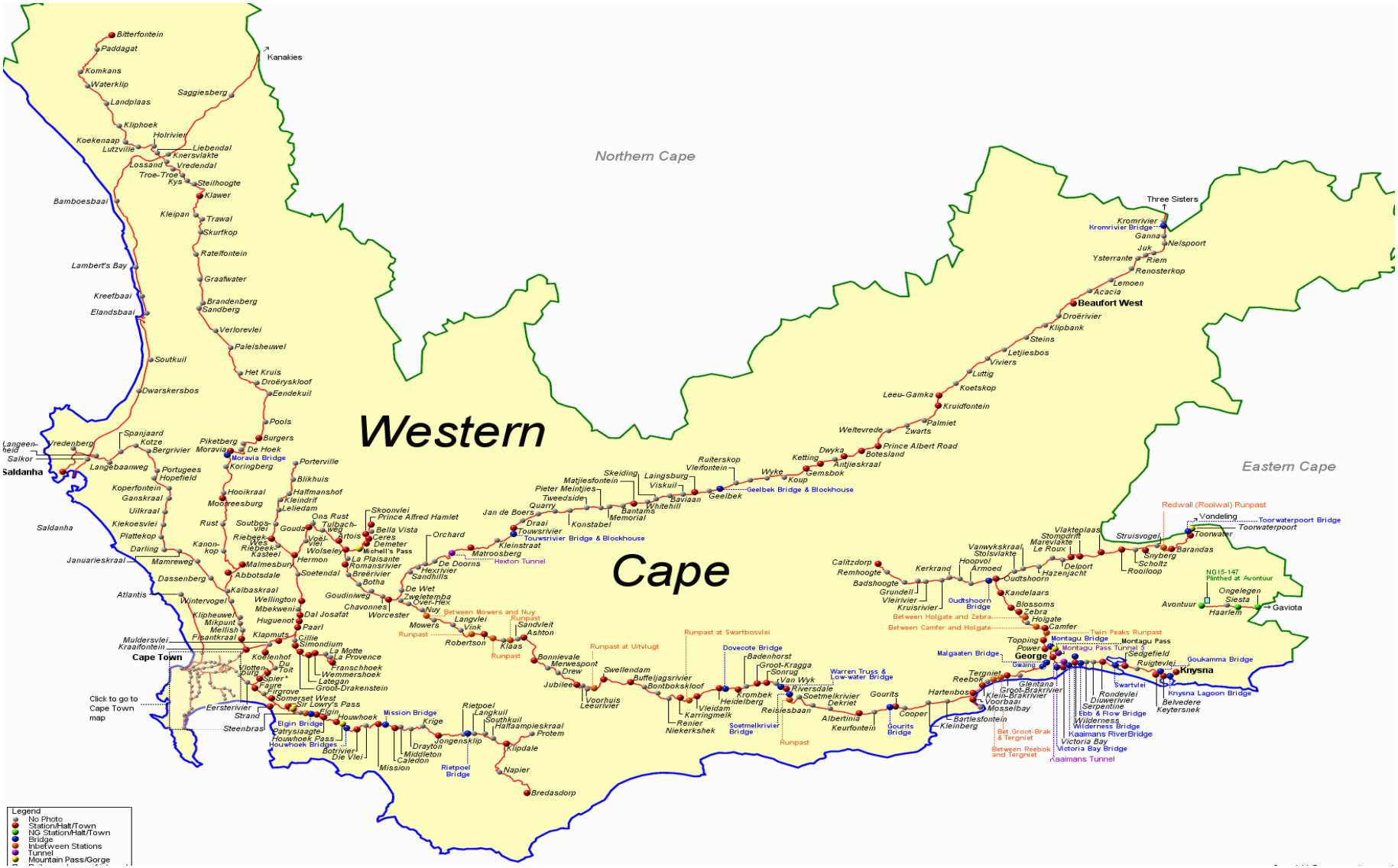

Figure 2-4: Detailed Western Cape rail network (SA Transport, 2021)

2.4 Examples of intermodal facilities in South Africa

A high-level assessment of initiatives in other provinces where intermodal terminals have a significant role was conducted. The assessment was aimed at identifying factors that could be used in this concept study. The examples are described below.

2.4.1 Tambo Springs logistics gateway

The 607-hectare Tambo Springs development is in the southern region of Ekurhuleni, along the road freight and rail corridors that link Johannesburg, Durban, Port Elizabeth, and Cape Town. Combining several aspects such as warehousing and distribution, Tambo Springs is a next-generation inland port that could double the current freight logistics capacity into and out of Gauteng. Tambo Springs is an approved Presidential Strategic Infrastructure Project. The location of the development is shown in Figure 2-5 below.

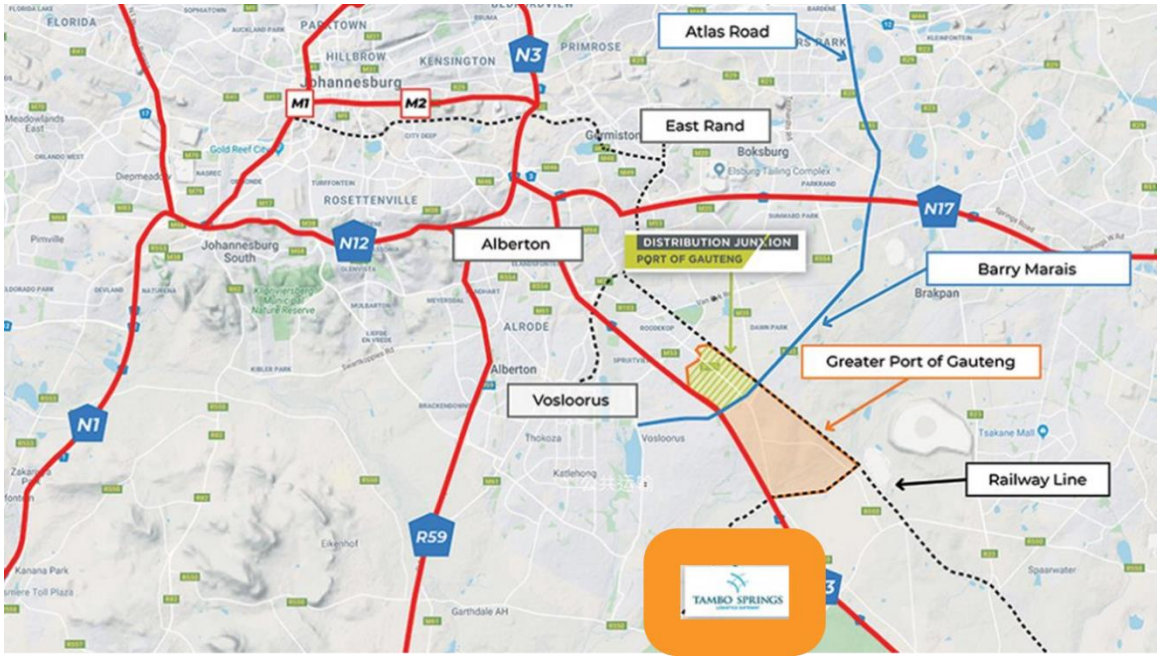

Figure 2-5: Location of the Tambo Springs Logistics Gateway (Engineering News, 2020)

The main characteristics of the Tambo Springs project that were important considerations for this study included:

a. **Site selection in relation to the main corridors to and from Gauteng** – as described above and shown in Figure 2-5, Tambo Springs is located near the road freight and rail corridors that link Johannesburg, Durban, Port Elizabeth, and Cape Town. Considering this, the development provides good access to the freight transport network, which enhances the terminal's connectivity. Besides this, the development is close to the OR Tambo International Airport, further strengthening its ability to connect to several

modes. Therefore, the terminal's location and transport network are ideal in linking the Gauteng Province to local, regional, and international markets.

b. **Link to a nationally identified SEZ** – part of the Tambo Springs development is a nationally identified SEZ. The development, therefore, contributes towards economic development. Also, locating the development near an SEZ improves its viability, considering the significant freight that could be generated by businesses in the SEZ.
c. **Funding and operating models** – the Tambo Springs Development Company (TSDC), the landowner and master developer of the project is investigating several innovative ways of funding and operating the project, including concession agreements and Public-Private-Partnerships (PPPs). These models provided important examples for consideration in this study or future work on the development and operation of the intermodal terminals under consideration.

Besides the considerations above, it is clear that Tambo Springs was planned to become more than a logistics gateway. It will become a key industrial development in Gauteng.

2.4.2 Dube Trade Port

The Dube Trade Port (DTP) is a 3 000-hectare, SEZ set up to promote local and international trade and is located North of Durban at the King Shaka International Airport, in the KwaZulu-Natal (KZN) Province. The absence of a globally competitive air freight solution was preventing the KZN's multi-modal logistics hub from providing a complete logistics platform to service the needs of high-value manufacturing and perishables, which the DTP aimed to address. The key objectives of the DTP were to:

- Create air freight logistical efficiencies within an integrated multi-modal national logistics platform.
- Support high-value manufacturing, value-added logistics and the transportation of perishables, through co-location with an existing logistics platform, the creation of a competitive operating environment and coordinated government support.
- Support tourism growth through providing access to direct international flights.
- Address the inadequacies of Durban International Airport (DIA).
- Develop alternative uses of the DIA, in alignment with the spatial and economic plan for the Southern Industrial Basin.

While built primarily as an air freight and air passenger hub, DTP borders major road and rail links, allowing it to become a noteworthy player in the global supply chain network.

Like Tambo Springs, the DTP includes several economic activities, making it more than a logistics hub.

3 Insights from stakeholder engagement

3.1 Sector Growth Studies

As described in Section 1.3.2, DEDAT was consulted for this study and provided inputs related to the Western Cape's economic sectors and projected growth, based on the Sector Plans that the department develops. Freight transport, including the provision of facilities such as intermodal terminals, is important in the value chains of most sectors of the economy. Therefore, understanding the economic sectors and their value chains was vital for this study. The questions addressed in the engagements with DEDAT included:

a. The most significant sectors of the Western Cape economy and their projected growth
b. The drivers of this projected growth
c. The geographical distribution of the economic activity and projected growth
d. The implications of the economy and its growth on freight transport demand in the Western Cape

Agriculture and agri-processing are projected to contribute towards most of the Western Cape's economic growth over the short to medium term (ten years). Information in a presentation[1] made by DEDAT during the stakeholder engagement process showed that:

- Approximately 72% of the Western Cape's total fruit production is exported, and only around 28% is sold locally. The value of exports increased by 6% between 2010 – 2017. The need to improve access to the exports markets makes intermodal terminals important because they improve the ability of producers in outlying areas to access rail links to the port.
- 95% of South Africa's wine is produced in the Western Cape. Over 50% of the wine produced in the Western Cape is exported, of which 60% is bulk and 40% is packaged.
- Fruit juice has had strong per capita consumption growth over the past few years. 75% of the Western Cape's fruit juice is sold in the domestic market and 25% is exported.
- The global breakfast cereals market is expected to grow at a compound annual growth rate (CAGR) of 4% for the next several years, which could contribute towards the growth of this sector in the Western Cape.
- The demand for rooibos increased since 2018 and is expected to continue increasing.

[1] There are no references included in the data because this information was taken from a presentation made by the relevant stakeholder.

- South Africa has a 0.8% share of global essential oil industry. The Western Cape contributes 30.2% of South Africa's essential oils production.

The areas that are projected to experience economic growth linked with the growth of the agriculture and agri-processing sectors include the Cape Winelands, Overberg, Southern Cape, West Coast and Karoo Areas (spread across the Western Cape). Information from the Western Cape WCFDM was used to investigate the agriculture and agri-processing freight demand in these areas.

Intermodal facilities could be useful in supporting this projected economic growth. Investments into logistics (storage and cold chain facilities, transportation networks, and information and communication technology) to effectively transport and store products throughout the supply chain, while maintaining the quality of the products, are important because of the perishable nature of agriculture and agri-processing products. These facilities could be provided at intermodal terminals. In addition, the improved connectivity resulting from intermodal terminals could reduce the time that it takes to transport products over the value-chain, mitigating transportation delays and the risk of losses resulting from the deterioration of the quality of the perishable commodities.

3.1.1 Provincial Gross Value Added

In 2020, the estimated Western Cape Gross Value Added (GVA), outside Cape Town, was R148.6 billion. The breakdown of the GVA is shown in Figure 3-1 below.

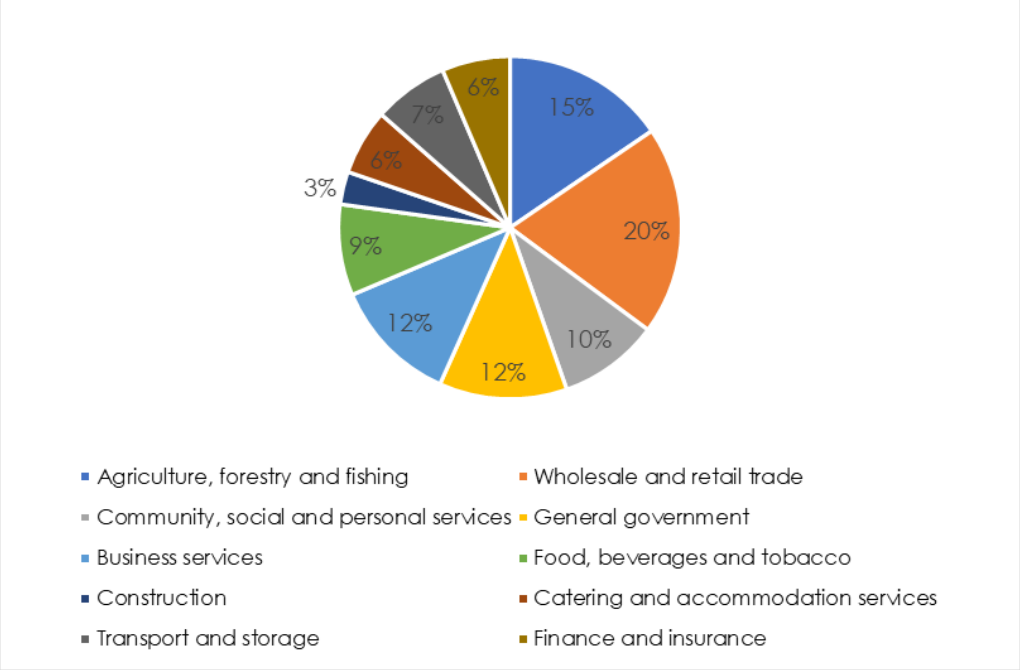

Figure 3-1: Western Cape's 2020 GVA (Western Cape Department of Economic Development and Tourism, 2021)

The largest sectors were Agriculture, forestry and fishing and Wholesale and retail trade. Of these, Agriculture, forestry, and fishing has higher freight intensity because of the bulk nature of the unprocessed commodities transported.

The regional breakdown of the GVA is shown in Figure 3-2 below.

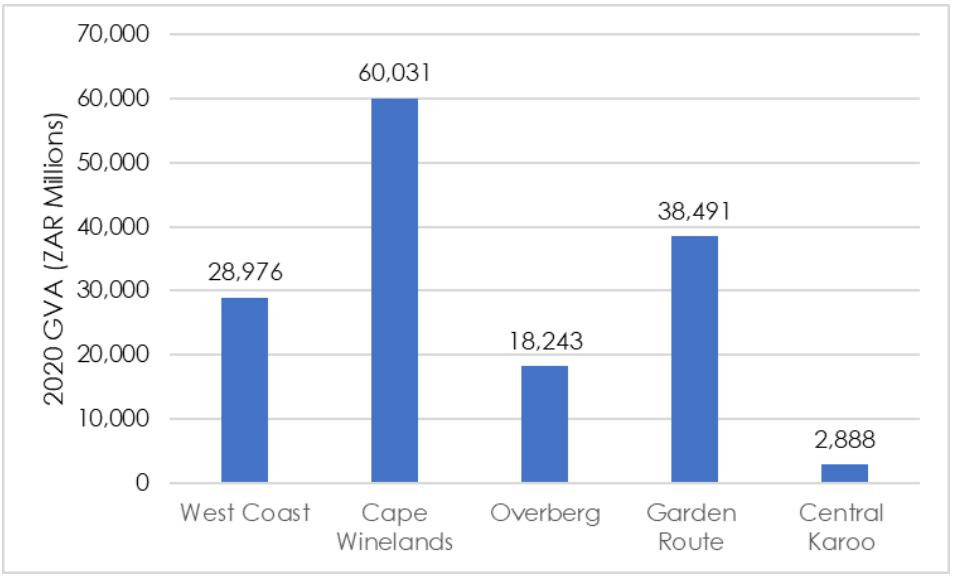

Figure 3-2: Western Cape 2020 Regional GVA (Western Cape Department of Economic Development and Tourism, 2021)

Outside Cape Town, the Cape Winelands was responsible for the largest GVA, which was more than 50% larger than that of the Garden Route, which had the second largest GVA.

The breakdown of the regional 2020 GVA by economic sector is shown in Figure 3-3 below.

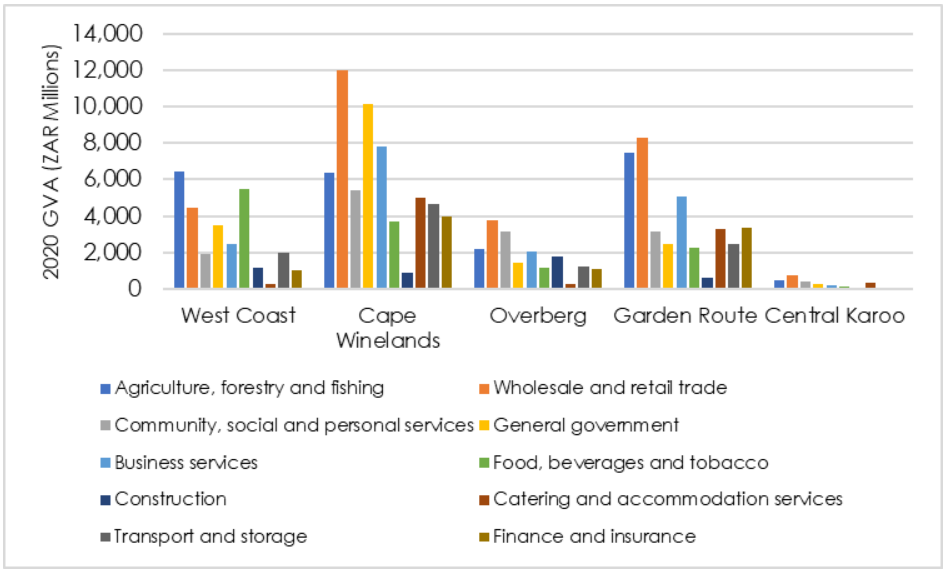

Figure 3-3: Breakdown of the Western Cape's 2020 GVA by sector (Western Cape Department of Economic Development and Tourism, 2021)

Garden Route had the largest Agriculture, forestry, and fishing GVA, followed by West Coast and Cape Winelands.

3.2 Insights from the 2018 Growth Potential Study

The Growth Potential Study (GPS) assesses the growth potential and socio-economic needs of settlements in the Western Cape, outside of the City of Cape Town, using quantitative data (e.g., factors relating to socio-economic, economic, physical-environmental, infrastructure and institutional capacity). The results of the quantitative analysis were combined with qualitative information to identify initiatives to unlock latent potential of settlements and regions.

For the intermodal terminals study, the GPS was useful in the following:

a. Providing an indication of the areas that could experience significant growth in the future and could, therefore, generate demand that makes intermodal terminals viable.
b. Providing an indication of the areas in which the provision of intermodal terminals could be a catalyst for economic development.

The above would require the prioritisation of areas that have high growth potential. As mentioned in Section 1.3.2, caution was exercised in the interpretation of growth potential or in referencing it in the study, considering that this is a long-term factor, and certain potential may never be realised.

An overview of the findings of the 2018 Growth Potential Study is shown in Figure 3-4.

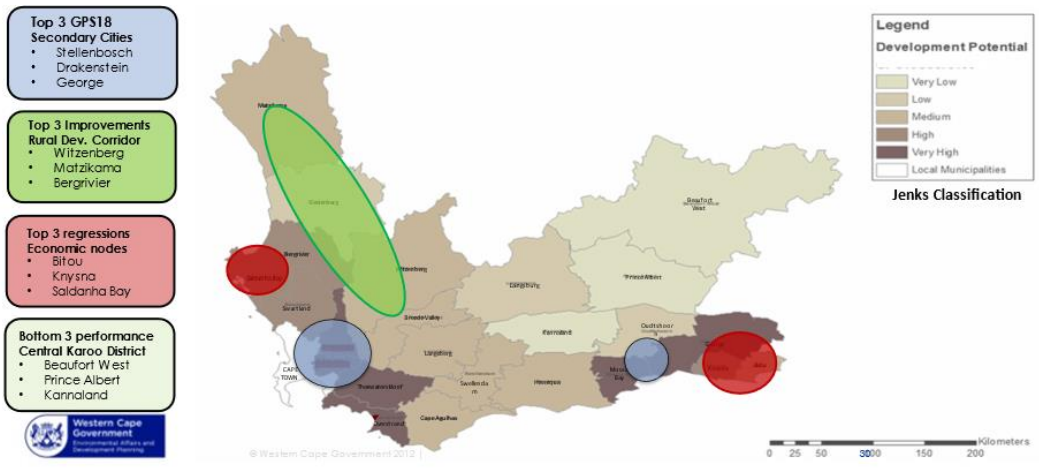

Figure 3-4: Growth Potential Study 2018 Results (Western Cape Department of Environmental Affairs and Development Planning, 2020)[2]

[2] In this figure, Kannaland was grouped under the Central Karoo District Municipality by error. The municipality is, however, under the Garden Route District Municipality. This change could not be made in this report, considering that the figure was sourced from another official, published report.

In 2018, the areas that had very high growth potential were in the Cape Winelands, Garden Route, and Overberg regions. Most of the areas in the West Coast had high growth potential and most of areas in the Central Karoo had very low to medium growth potential.

3.2.1 Provincial Spatial Development Framework and Regional Strategic Implementation Frameworks

The Provincial Spatial Development Framework (PSDF) and Regional Strategic Implementation Frameworks (RSIFs) were developed to identify and address spatial challenges in the Western Cape. The link between the PSDF and RSIFs, and the topics that are addressed in these frameworks are shown in Figure 3-5.

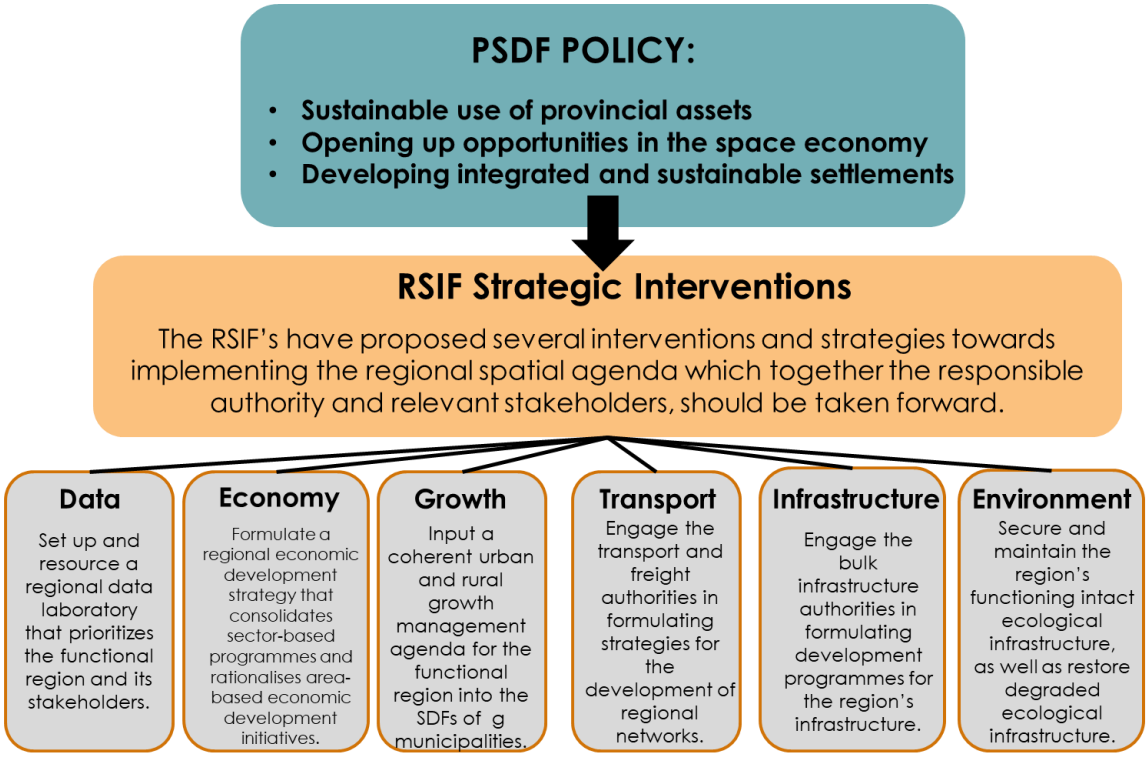

Figure 3-5: Overview and links between the PSDF and RSIFs (Western Cape Department of Environmental Affairs and Development Planning , 2021)

As shown in Figure 3-5, transport and infrastructure, which are both linked to the intermodal terminals in this study are among the topics in which initiatives were developed in the RSIFs, informed by the PSDF policy.

The main initiatives considered in the past and that provided guidance for this study are summarised in the tables below for the Greater Cape Metro (GCM) Functional Region, for which information was provided.

Table 3-1: Greater Cape Metro RSIF initiatives (Western Cape Department of Environmental Affairs and Development Planning , 2021)

Objective	Initiatives or projects
Formulate a coherent strategy for the development of regional networks through engaging with the GCM's transport and freight authorities.	Develop a regional freight logistics strategy.
Based on ECMAP's outputs, formulate a GCM regional economic development strategy.	Rationalise area-based economic development initiatives (e.g., Saldanha IDZ and Atlantis SEZ, Agri-Parks, Aerotropolis, Regional Hubs).
	Confirm the functional roles of the region's economic infrastructure (e.g., roles of the GCM sea, air, and land ports.
Formulate development programmes for the region's bulk infrastructure (i.e., water management, energy and electrical grid, water supply and demand, sanitation, and ICT) by engaging with the GCM's bulk infrastructure authorities.	Explore integrated waste management facilities and opinions such as waste-to-energy PPP (Drakenstein, Stellenbosch) through regional economies of scale.

Table 3-2: Greater Saldanha and Garden Route RSIF initiatives (Western Cape Department of Environmental Affairs and Development Planning , 2021)

Region	Initiatives or projects
Greater Saldanha	Designated route network for freight movements through the Regional Area.
	There is a need to respond to the possibility of an "Inland Port" as part of the freight strategy especially in respect of the IDZ/SEZ.
Garden Route	Establishment of a regional waste site in the Garden Route
	Explore/ establish a Special Economic Zone for the Mossel Bay region to support PETROSA.
	Determine infrastructure, land use changes, support and systems needed for Mossel Bay Port diversification and/or expansion.
	Agri-beneficiation, agri-exports - need a support plan for niche products (honey bush tea and berry).

Besides the Greater Cape Metro initiatives above, other initiatives were identified in the RSIFs for the Greater Saldanha and Garden Route regions. These are shown in Table 3-2. Links between the initiatives in the tables above and the work in this study were taken into consideration in the prioritisation of potential locations of the intermodal terminals.

3.2.2 Other regional and local initiatives

Besides the initiatives in the RSIFs, information on historical initiatives in other plans such as regional and local freight strategies was shared or discussed during the stakeholder engagements. Examples of initiatives that were discussed or mentioned that relate to intermodal terminals are listed in Table 3-3.

Table 3-3: Other regional and local initiatives

Plan	Initiative
Cape Winelands District Freight Strategy, 2012	Conduct a study to determine the feasibility of a 'freight transport transfer station' at either Klapmuts or Worcester to promote intermodalism.
	Investigate the feasibility of developing a freight hub in Worcester. The possible location was to the east of the town between the N1 and the existing rail marshalling yard / industrial area. The hub was to serve as an intermodal transfer facility and logistics hub.
Agri-Park Master Plan	Proposes the location of agri-hubs in the Western Cape and that could make use of road and rail transport. Locations include: • Central Karoo – Beaufort West (Beaufort West Local Municipality) • West Coast - Vredendal/Doring Bay (Matzikama Local Municipality • Overberg – Bredasdorp/ Cape Agulhas Local Municipality • Cape Winelands - Ceres/ Witzenberg Local Municipality

3.3 Opportunities for transporting waste on rail

Intermodal terminals could contribute towards the transportation of waste by rail in the Western Cape. Currently the Western Cape Province is running out of land for landfill sites. There are ongoing efforts to promote the diversion of waste from landfills, with the goal of diverting 50% of organic waste for recycling and disposal in other areas. Effective diversion, however, requires a well-development waste logistics system, considering the long distance over which the waste would be transported. These long distances result in significant costs of

logistics. Rail is generally more affordable for the transportation of bulk commodities over long distances, making it a suitable mode for the transportation of waste diverted from landfill sites. Most of the waste transported is collected using trucks. For the transportation of this waste over long distances, rail is a better mode. Intermodal terminals will have a significant role in enabling the connectivity between road and rail. As a result, opportunities for the transportation of waste were taken into consideration in the prioritisation of the location of intermodal terminals in this study. Waste volumes are, however, generally less than volumes of other types of freight such as general freight, resulting in the waste-on-rail opportunities being viable where there is already potential to transport other types of freight.

3.4 Insights from Transnet

The engagement with Transnet covered important freight logistics market trends that impact the provision of rail infrastructure, including intermodal terminals. In addition, the discussion covered projects that Transnet is planning or developing and that may impact decisions on the provision of intermodal terminals.

3.4.1 Freight logistics market trends

Transnet's own engagement with stakeholders in the agriculture sector confirmed the growth of the sector. A key trend has been the growth of the citrus sector in South Africa, including in the Western Cape. The growth of the citrus sector is supported by information published by the Citrus Growers' Association of South Africa in its Key Industry Statistics for Citrus Growers, published annually. Data from the 2020 issue is shown in Figure 3-6 below.

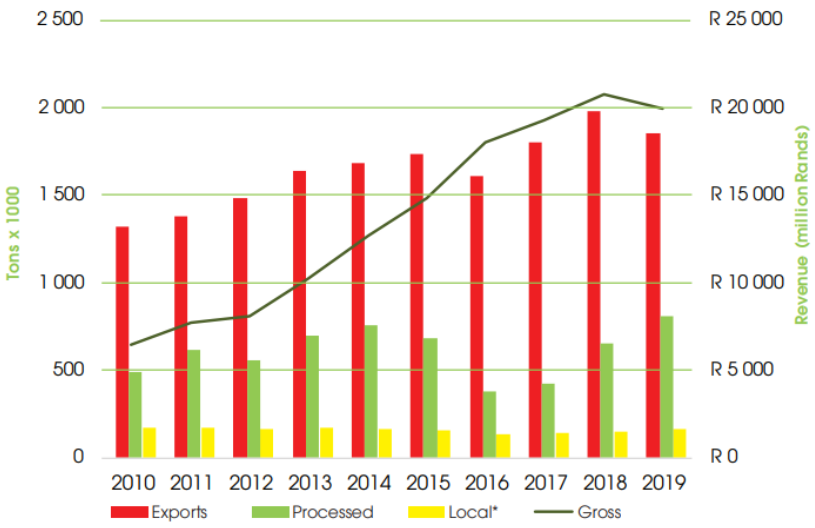

Figure 3-6: Citrus volumes produced in South Africa (Citrus Growers' Association of Southern Africa, 2020)

There has been a general increase in the volume of citrus produce from South Africa over the past ten years. Among the citrus fruits, soft citrus[3] production has increased significantly. This type of fruit has unique logistics needs, including the need for cold treatment soon after harvesting.

The demand in citrus produce has resulted in a steady increase in the citrus planting area. In 2019 the Western Cape had the second largest number of hectares with new citrus trees as shown in Figure 3-7.

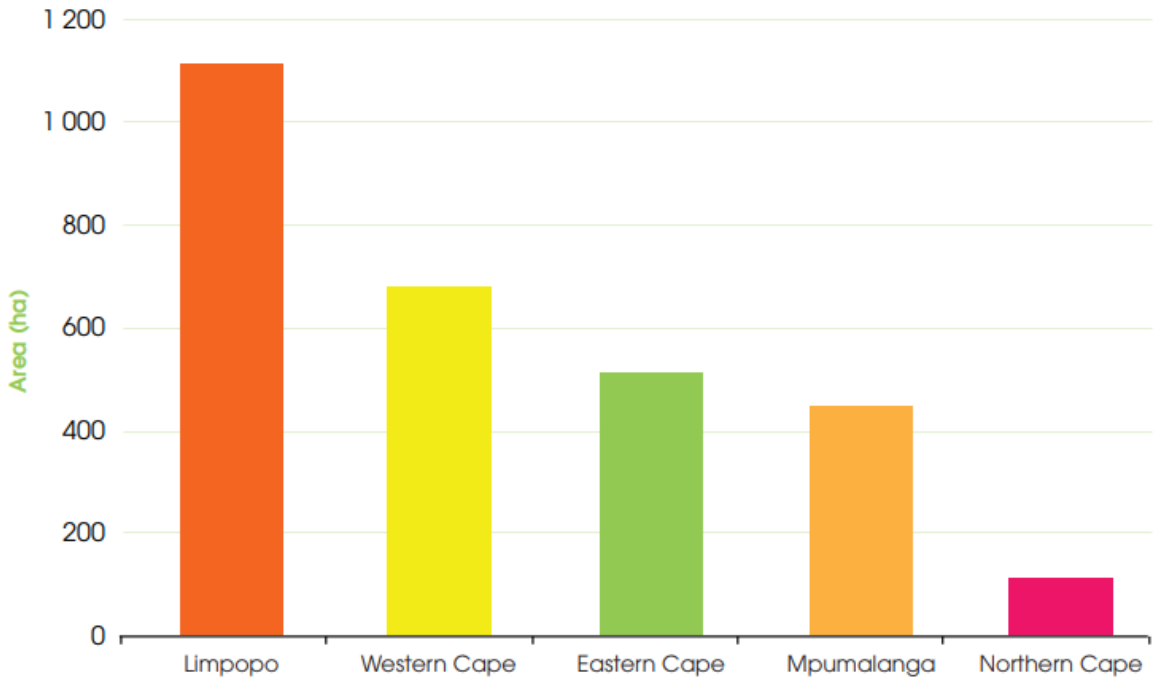

Figure 3-7: New citrus planted area per province in 2019 (Citrus Growers' Association of Southern Africa, 2020)

The volume of citrus produce handled at the ports in South Africa are shown in Figure 3-8.

[3] Soft citrus, also known as 'easy peelers' means mandarins, clementines and satsumas.

Load Port	Pallets	%
Durban	873 632	57%
Cape Town	301 572	20%
Ngqura (Coega)	257 755	17%
Port Elizabeth	104 489	7%
Grand Total	1 537 447	

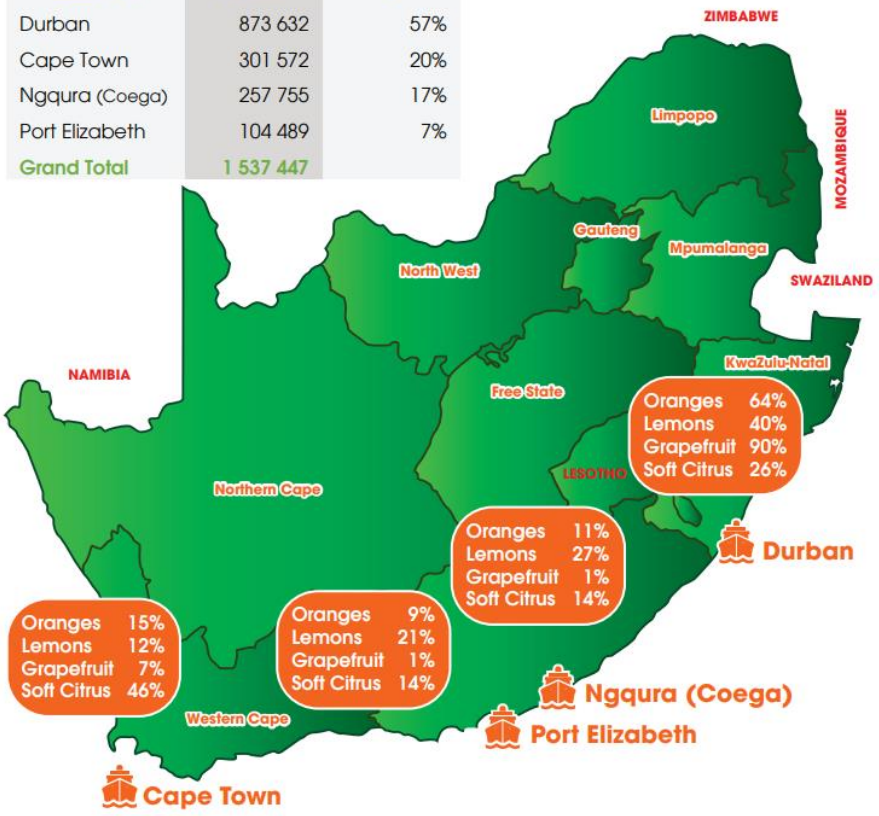

Figure 3-8: Citrus exports handled at South African ports (Citrus Growers' Association of Southern Africa, 2020)

The Port of Cape Town handled the second largest total volume of citrus produce exported from South Africa. It handled the largest volume of soft citrus.

3.4.2 Transnet projects that are related to intermodal terminals

Transnet provided information on several projects under consideration or being developed. These included:

- Consideration for a terminal along the Paarl-Franschhoek branch line. This is being assessed in a collaboration with a fruit producer in that area and could address demand from several large packhouse under development in the Franschhoek area.
- Scoping for a facility at Ashton, which could serve the surrounding areas, including the Robertson agricultural hub. Transnet has property near the Ashton facility, which could be developed into a multipurpose terminal. Transnet also has land in Robertson, but this is not as large as that at Ashton.
- Consideration for the development of land that the company owns in Worcester, close to agricultural areas. There are ongoing discussions with the agriculture sector to determine how this land could be utilised to provide logistics support to the sector.

- With reference to the facility at Elgin, a tender for the facility was put out to the market, with no respondents. It is understood that Transnet intends to readvertise the tender. The Elgin terminal already has facilities such as cold storage and packing lines, which makes it attractive for investors.
- Assessment of potential locations for intermodal terminals on the West Coast, where Transnet is collaborating with stakeholders such as Bergrivier Municipality. Other locations under consideration include the Vredendal and Klawer areas, which could be used for the consolidation of freight from other locations such as the Northern Cape.
- The reclassification of lines from being core to being branch lines. Lines being reclassified include those from Caledon to Bredasdorp and Worcester to Port Elizabeth (via Mossel Bay), for which concessions will be investigated.
- The development of a land-use framework to ensure alignment and optimisation of land ownership across the group. This process could have an impact on the process of allocating land for facilities such as intermodal terminals.

Transnet highlighted the transportation of wheat by containers as an agriculture logistics trend that could become important. This is already taking place, mainly for the domestic market. Currently wheat is being transported from the Western Cape to Pietermaritzburg, through Durban using containers and may grow significantly.

3.5 Insights from the Department of Agriculture

The Department of Agriculture highlighted changes in the production of fruit in the province, due to climate change and shifts in the prices of fruit produce. This has resulted in the reduction in the area under cultivation for produce such as grapes and an increase in the area under cultivation for produce such as citrus fruit. This was confirmed by the results of the Western Cape flyover census completed in 2017. The census showed that between 2013 and 2017 citrus orchards expanded by 39% to 4216 hectares, with product price increases of lemons and limes, and soft citrus types supporting the farm level decision to invest in these citrus varieties.

The change in the area under cultivation of citrus fruit is shown in Table 3-4 below.

Table 3-4: Change in citrus area under cultivation by municipality (Bureau for Food and Agricultural Policy, 2018)

Municipality	2013	2017	Absolute change	Percentage change
Langeberg	735	2 044	1 310	178%
Cederberg	7 794	9 059	1 265	16%
Bergrivier	954	1 671	718	75%
Breede Valley	316	602	287	91%
Swartland	115	389	273	237%
Swellendam	679	891	212	31%
Drakenstein	711	844	132	19%
Other	834	854	20	2%
Total	**12 137**	**16 354**	**4 216**	**35%**

The reduction in the wine industry was evident in most of the production regions as shown in Table 3-5.

Table 3-5: Change in grape area under cultivation by municipality (Bureau for Food and Agricultural Policy, 2018)

	2013	2017	Absolute change	Percentage change
Stellenbosch	16 286	13 043	-3 244	-20%
Drakenstein	15 461	12 298	-3 163	-20%
Langeberg	16 680	14 133	-2 547	-15%
Swartland	13 560	11 062	-2 499	-18%
Breede Valley	17 199	15 803	-1 396	-8%
Witzenberg	5 511	4 285	-1 226	-22%
Matzikama	10 575	9 500	-1 075	-10%
City of Cape Town	5 766	5 051	-715	-12%
Other	7 031	6 047	-984	-14%
Total	**108 070**	**91 221**	**-16 848**	**-16%**

3.6 Considerations in using the Freight Demand Model data

The WCFDM was one of the main sources of data used in the study. During the stakeholder engagement process, the following key considerations were raised regarding the use of the WCFDM data:

a. The need to consider the Origin and Destination (OD) pairs that are linked by rail. Intermodal terminals are more appropriately located where there are opportunities for rail to be effectively used in the transportation of commodities. Demand addressed by an intermodal terminal would be significant, if large volumes move to or from other locations to the terminal site by rail.

b. **Distances from the origins of freight** – in investigating the locations of intermodal terminals based on the demand data from the WCFDM, it was important to consider the distances over which freight would be transported. While certain areas may generate significant demand, some of it may be transported locally, making it unlikely that there would be the need for the transfer of such freight to rail, which is normally used over long distances. As a result, only freight that was transported over distances of at least 500 km between rail-linked OD pairs was considered in this study. While the distance at which rail becomes more feasible than other modes vary, depending on the freight flow typologies of a specific region, the rail economic fundamentals of flows in the Western Cape region indicate that 500 km is optimal. There may be deviations from this minimum for certain OD pairs, but for the purpose of this high-level concept study, 500 km is sufficient in informing broad strategic decisions on intermodal terminals.

c. **Consideration of differences between imports or exports and domestic freight –** imports and exports generally result in dense freight because of their movement along routes

to the port. On the other hand, domestic freight is from one catchment to another, and may not result in densities that are as high as those for imports and exports.

d. **Freight density** – as described in the paragraph above, freight density, based on the volume of freight and the size of the catchment area is an important consideration in the location of intermodal terminals. Higher freight density increases the demand that a location is likely to address, improving the viability of an intermodal terminal at that location.

4 Regional Prioritisation

This step involved identifying and shortlisting regions in the Western Cape, which were prioritised as potential locations of the intermodal terminals.

The regional prioritisation was based on the information from the background study in Chapter 2 and the inputs from the stakeholder engagement process described in Chapter 3.

The prioritisation was conducted in four steps, described below:

a. **Prioritisation based on economic activity –** this involved ranking the Western Cape regions, based on the information on their current economic activity and projected economic growth, focusing on the agriculture and agri-processing sectors, which are projected to contribute towards most of the province's growth as described in Section 3.1.
b. **Prioritisation based on growth potential** – this involved ranking the Western Cape regions, based on their perceived growth potential as described in the GPS. While growth potential was considered, its impact was less important than that of projected economic growth. This was because of the long-term nature of growth potential and the possibility that certain potential may never be realised.
c. **Prioritisation based on the demand from the WCFDM** - this involved ranking the Western Cape regions, based on the demand from the WCFDM, which will be addressed by intermodal terminals. From a freight and intermodal terminal perspective, WCFDM prioritization was based on economic rail principles, considering product/commodity uniformity[4], terminal density, line density, distance, and value of freight. For intermodal terminals in this study, the largest singular uniformity was considered, which is palletized freight irrespective of the commodity type.
d. **Consideration of other factors** – this involved the assessment of other factors such as the existence of rail and road infrastructure in the regions. For rail, this involved assessing the core network in the regions and the services currently provided by TFR.

The findings of the regional prioritisation are described in the sections below.

[4] Havenga, J.H., de Bod, A., Simpson, Z.P., Swarts, S. & Witthöft, I.E., 2021. A proposed freight and passenger road-to-rail strategy for South Africa. [Helsinki]: UNU-WIDER

4.1 Prioritisation based on projected economic activity

The prioritisation of regions, based on economic activity was informed by the GVA of the regions, focusing on the agriculture and agri-processing sectors. The ranking was based on the information provided in Figure 3-3, which showed that the Garden Route had the largest Agriculture, forestry, and fishing GVA, followed by the West Coast and the Cape Winelands.

Although fishing is part of the agriculture, forestry, and fishing GVA, once fish products are manufactured as part of the agri-processing sector, it becomes processed foods. While a commodity like this is possibly suitable for intermodal, the processed fish requires significant cold storage to ensure that it remains frozen. By default, processed fish either ends up in the cold supply chain or it is for export, meaning it is unsuitable for an intermodal terminal. Therefore, the impact of fishing in the context of the intermodal terminal is negligible.

To take the size of the regions into consideration, given its likely impact on the concentration of economic activity, which is important in determining the viability of transport initiatives, the ranking was based on the average GVA per unit area. The project team was aware of the possibility of biases in this approach, considering that economic activity in certain areas could be highly concentrated in a few locations, making it possible for a case to be developed for providing intermodal terminals for these areas, even when the average GVA per unit area of the whole region is small. For this concept stage, the average GVA approach was sufficient and could be refined at later stages.

Table 4-1: Regional ranking, based on GVA per unit area

Rank	Region (District)	2020 total agriculture, forestry, and fishing GVA (ZAR)	Total area (km²)	2020 agriculture, forestry, and fishing GVA/unit area (ZAR/km²)
High	Garden Route	7 457 million	23 331	319 617
High	Cape Winelands	6 384 million	21 473	297 303
Medium	West Coast	6 476 million	31 119	208 104
Medium	Overberg	2 186 million	12 241	178 580
Low	Central Karoo	483 million	38 854	1 2431

The ranking, based on the 2020 average GVA per unit area is shown in Table 4-1 below. For simplicity, a High (1), Medium (2), Low (3) scale[5] was used for the ranking. The ranking of regions, based on their economic activity, weighted by area is shown in Figure 4-1.

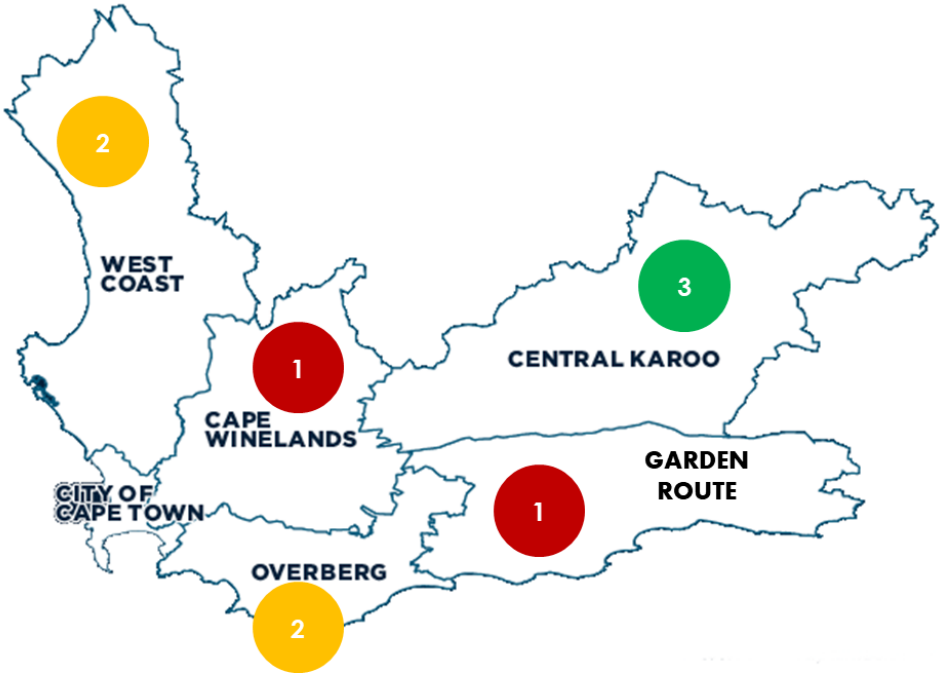

Figure 4-1: Regional prioritisation, based on current economic activity

Garden Route has the highest rank, both before and after weighting by area. West Coast and Cape Winelands have similar agriculture, forestry, and fishing GVA's, but the Cape Winelands has a smaller area, resulting in higher average concentration of the economic value of the sector.

Overberg and Central Karoo have the lowest ranks before and after weighting by area.

4.2 Prioritisation based on growth potential

Prioritisation, based on growth potential was based on the inputs from the 2018 GPS. The current classification of regions as having high, medium, low growth potential as shown in Figure 3-4 informed the ranking.

The ranking is shown in Figure 4-2 below.

[5] For this purpose, High, Medium, and Low are based on the value in comparison to other sites.

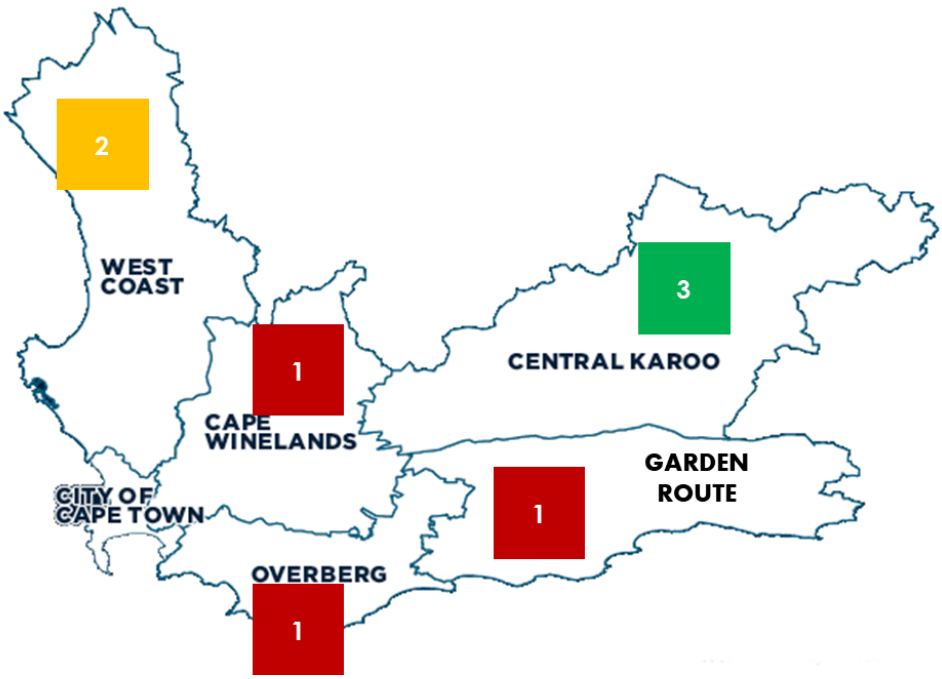

Figure 4-2: Regional prioritisation, based on growth potential

Based on the growth potential of settlements in the regions, Cape Winelands, Garden Route, and Overberg regions have high overall regional growth potential. West Coast has medium growth potential, while the Central Karoo has low growth potential.

4.3 Prioritisation based on the demand from the WCFDM

While the Western Cape is known as an agricultural region, with the agriculture and agri-processing sectors expected to be the province's biggest economic drivers and areas of growth, the sectors present considerable limitations when looking at intermodal transport solutions. By default, most agriculture commodities are not suitable for an intermodal terminal, which require commodities that can be palletised and containerised. Therefore, the WCFDM prioritisation was not limited to agriculture and agri-processing but rather all commodities that can be palletised and containerised for transportation by rail.

It is also important to clarify that the agri-processing terminology can be troublesome and a cause of confusion. Agri-processing can refer to any manufactured product with an agriculture product as an input in its processing. Examples of these are beverages and processed food, which by their packaging and inland transport requirements are palletised cargo, therefore included and suitable for intermodal terminals. Commodities like animal feed and wood products such as logs, and paper are also agri-processed products but fall under their respective commodity groups such as animal feed and wood products. Fishing is part of the agricultural sector but once fish products are manufactured as part of the agri-processing sector, it becomes processed foods.

In light of WCFDM methodology, the WCFDM prioritisation is not based on agriculture and agri-processing but rather on all products that can be palletised and containerised. Although current volumes were used in the prioritisation, it was noted that the prioritisation results do not change when future projections are considered.

Data from the WCFDM was analysed to identify origins and destination for freight transported using the rail mode. One of the rail economic principles[6] is the uniformity of freight and therefore all the freight flows were limited to palletized cargo. To ensure the analyses was limited to realistic terminal locations, freight was also only included in the input data if the district is connected by the core rail network (core to core). To evaluate the different locations, a catchment area of 25 km was used between both origin and destinations with a minimum distance of 500km between them, as illustrated in Figure 4-3.

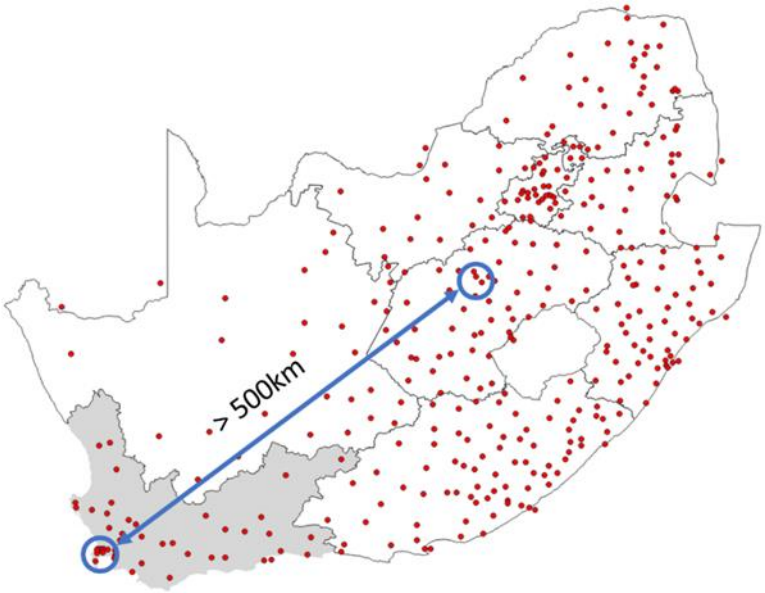

Figure 4-3: Overview of the approach to FDM data analysis

All the possible origin and destination combinations were evaluated on this basis described above. FDM districts close to each other were considered to fall within each other's catchment areas. The total number of FDM district pairs with a potential of at least 10 000 tonnes per annum were counted for all the possible locations (FDM districts) in the Western Cape. For example, the Malmesbury district's O-D flows are shown to illustrate the methodology. Figure 4-4 shows a line for each O-D pair for the Malmesbury district catchment area before the clustering methodology is applied. The clustering looks at all different

[6] Havenga, J.H., de Bod, A., Simpson, Z.P., Swarts, S. & Witthöft, I.E., 2021. A proposed freight and passenger road-to-rail strategy for South Africa. [Helsinki]: UNU-WIDER

combinations of districts with Malmesbury district and groups the O-D flows (strings) together if they fall within the pair's catchment area.

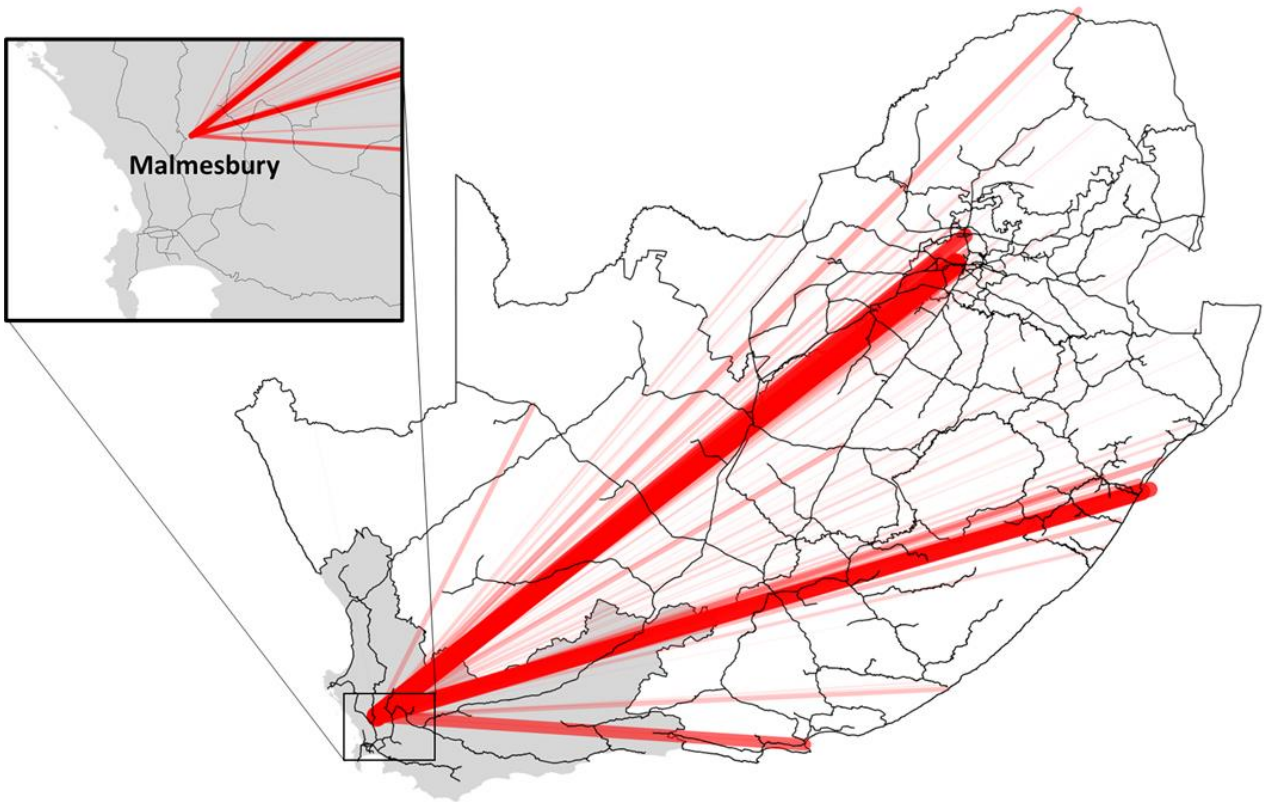

Figure 4-4: Illustration of the pairing methodology

These pairs were then counted and presented in Table 4-2 below if the freight between the pairs is more than 10 000 tonnes per annum. There are 27 pairs for the Malmesbury district with more than 10 000 tonnes of freight per annum being moved between the catchment areas.

This was repeated for all the districts of the Western Cape and informs the clustering of districts to determine the terminal catchments and size. The details of the types of commodities included in the pairs are provided in Appendix A, which also considers the link between freight and economic activity considering the study's objective of locating intermodal terminals to support economic development.

Table 4-2: Number pairs including each district with more than 10 000 tonnes per annum[7]

District Name	District Label	Region	Catchment pairs with > 10 000 tonnes	Potential terminal allocation
Cape	103	Cape Metro	169	Cape Metro
Goodwood	102	Cape Metro	158	Cape Metro
Mitchell's Plain	106	Cape Metro	158	Cape Metro
Bellville	101	Cape Metro	153	Cape Metro
Kuilsrivier	107	Cape Metro	153	Cape Metro
Wynberg	105	Cape Metro	129	Cape Metro
Port Cape	191	Cape Metro	92	Cape Metro
Stellenbosch	109	Cape Winelands	90	Somerset West
Simonstown	104	Cape Metro	60	Cape Metro
Wellington	112	Cape Winelands	45	Paarl
Paarl	108	Cape Winelands	45	Paarl
Somerset West	110	Cape Metro	39	Somerset West
Strand	111	Cape Metro	39	Somerset West
Malmesbury	132	West Coast	27	Malmesbury
Worcester	130	Cape Winelands	19	Worcester
Vredenburg	134	West Coast	12	Vredenburg
Laingsburg	140	Central Karoo	7	N/A
Port Mossel Bay	193	Garden Route	6	Mossel Bay
Mossel Bay	120	Garden Route	6	Mossel Bay
Montagu	127	Garden Route	3	N/A
Beaufort West	139	Central Karoo	2	N/A
Ceres	126	Cape Winelands	1	N/A
Piketberg	133	West Coast	1	N/A

Excluding locations in the Cape Metro, locations that are part of catchment pairs with more than 10 000 tonnes of freight flowing between them are in the Cape Winelands, followed by West Coast. Such locations are limited in the Garden Route, Overberg, and Central Karoo regions.

[7] The table includes all relevant locations in the Western Cape, but locations outside the City of Cape Town are more important for this study.

The results of the prioritisation based on the WCFDM inputs are as shown in Figure 4-5 below.

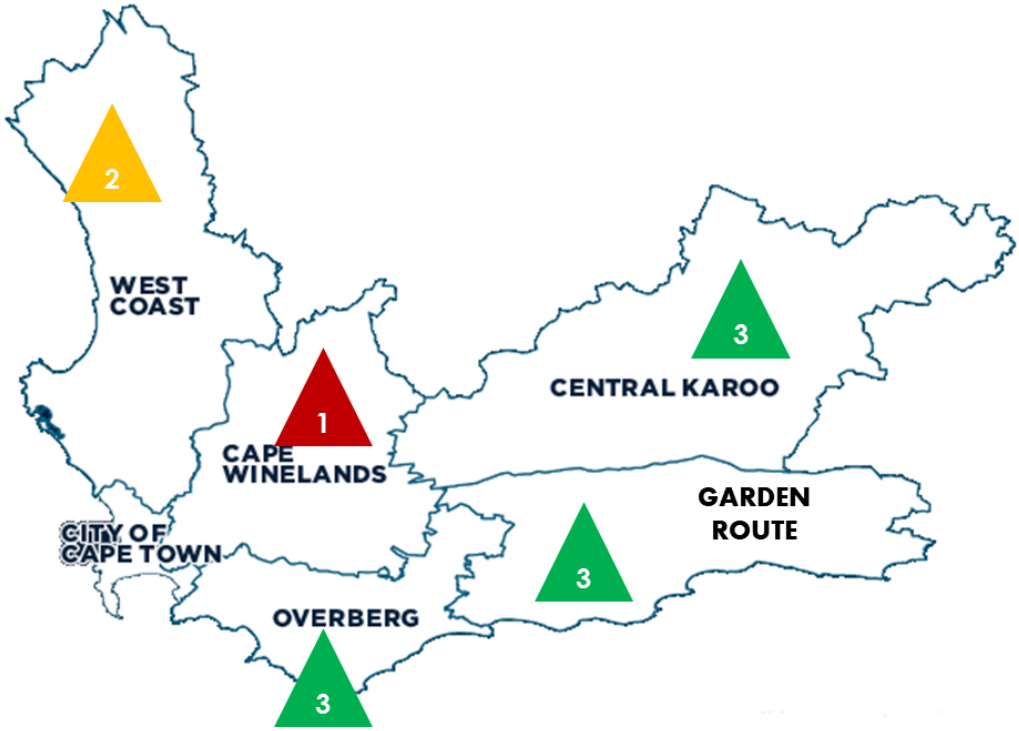

Figure 4-5: Regional prioritisation based on WCFDM data

4.4 Initial composite regional ranking

A composite regional ranking was developed from combining the rankings of the regions, based on the criteria described above. The ranking is summarised in Table 4-3 below.

Table 4-3: Initial composite regional ranking

Region	Economic activity ranking	Growth potential ranking	WCFDM (demand) raking	Initial overall ranking
West Coast	2	2	2	2
Cape Winelands	1	1	1	1
Garden Route	1	1	3	2
Overberg	2	1	3	2
Central Karoo	3	3	3	3

For easy of reference, the initial composite ranking is shown in Figure 4-6. The initial prioritisation shows that locations in the Garden Route and Cape Winelands regions are worth prioritising in

the short- to medium term, based on the extent of economic activity, growth potential and current demand in these areas. It is important to highlight that the prioritisation is a guide only and does not prevent the development of intermodal terminals in other areas such as the West Coast, Overberg, or Central Karoo, if local needs make this necessary. For planning purposes, as intended in this concept study, there is a case for prioritising Cape Winelands and Garden Route regions in further work or even the allocation of resources and investments related to intermodal facilities.

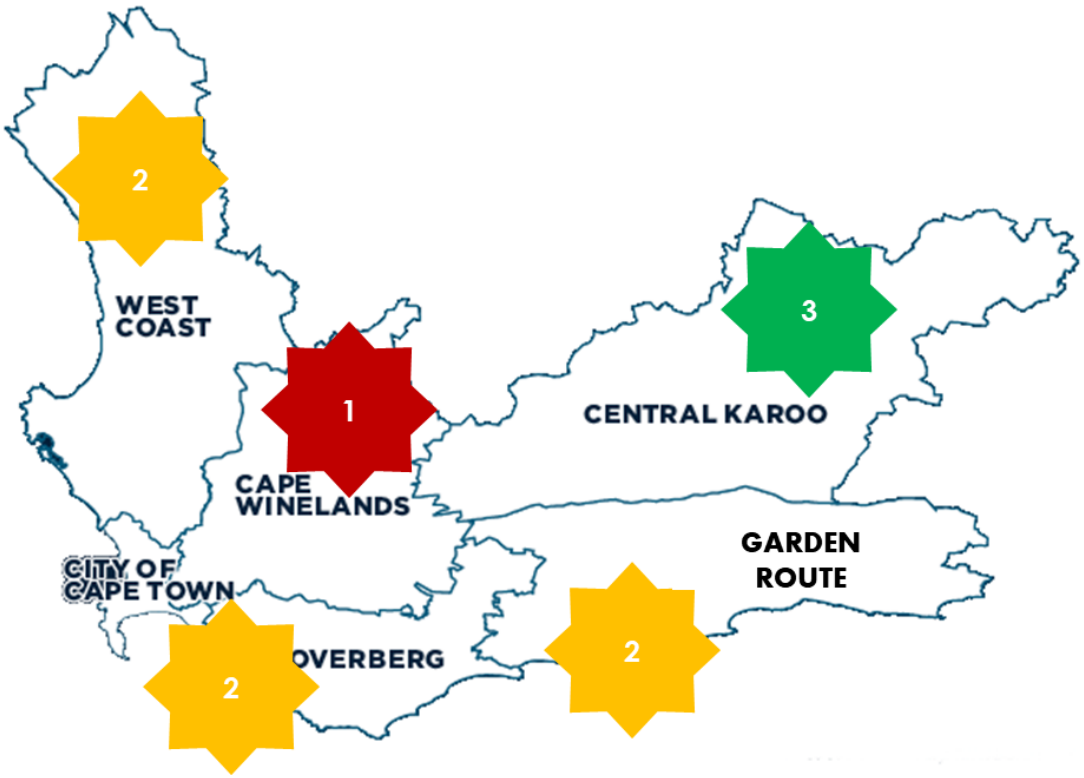

Figure 4-6: Initial composite prioritisation

In addition to the factors investigated for the initial prioritisation in Figure 4-6, other factors were investigated as described below.

4.5 Infrastructure considerations

4.5.1 Rail Infrastructure

As described in Section 2.3.1, the key rail lines in the Western Cape are:

i. The Sishen – Saldana iron-ore line; and
ii. The Gauteng – Cape Town line.

The Sishen – Saldanha iron ore line predominantly stretches across the West Coast and provides opportunities for links to intermodal terminals in that region. The iron-ore line is however, mainly used for the transportation of iron ore, which could limit its usefulness for general freight as

intended for the intermodal terminals. Besides, the line has a direct link to the Saldanha terminal, which currently has limited container capacity, reducing its utility for general containerised freight. The location of the iron-ore line, therefore, does not improve the prioritisation of the West Coast. There are, however, other lines that provide connectivity in the West Coast region, including the Bredasdorp line and the Saldanha - Cape Town line, which could be useful in linking the region to the Port of Cape Town and to other corridors such as the Gauteng – Cape Town corridor.

The Gauteng – Cape Town line passes directly through the Cape Winelands, which strengthens the case for prioritising the location of intermodal terminals in that region, considering the volumes of freight transported on this line, some originating from the Cape Winelands. In addition, this line has a direct link with the Port of Cape Town, which makes it more suitable for the transportation of general, containerised freight. Although the Gauteng – Cape Town line also passes through the Central Karoo, this does not result in the prioritisation of this region because most of the freight on the line only passes through the region and does not have origins or destinations within the region. This is supported by the outcomes of the O-D pairs from the WCFDM in Section 4.3.

Besides the two lines above, there is another line that connects the Port of Cape Town and Mossel Bay, branching off the Gauteng – Cape Town line in Worcester. This line could, therefore, link Cape Winelands and areas in the Garden Route region.

Overberg region has access to the Overberg branch line, linking Cape Town and Bredasdorp, passing through the Cape Winelands as shown below.

Figure 4-7: The Overberg branch line

Based on the description of the rail network above, all Western Cape regions have access to the core rail network. Cape Winelands, however, has the best connectivity to the rail infrastructure in the Western Cape, considering that most of the key lines for general freight pass though the region, resulting in a large potential catchment area for freight. In addition, the Gauteng – Cape Town corridor, the busiest corridor in the Western Cape passes through the Cape Winelands. This strengthens the case for prioritising locations in the region.

As described in Section 3.4, there are several infrastructure projects of significance that Transnet is developing, which could present opportunities for synergies with the development of intermodal terminals in the Western Cape. These projects include:

1. Consideration for a terminal along the Paarl – Franschhoek branch line that could address demand from several large packhouse under development in the Franschhoek area.
2. The scoping for a facility at Ashton, which could serve the surrounding areas, including the Robertson agricultural hub.
3. Investigations into the use of Transnet land parcel in Worcester to provide logistics services to the agriculture sector.
4. A tender for the facility at Elgin was put out to the market, with no respondents. It is understood that Transnet intends to readvertise the tender. The Elgin terminal already has facilities such as cold storage and packing lines, which makes it attractive for investors.
5. Identification of locations for terminals in the West Coast, working with the support of stakeholders such as Bergrivier Municipality.
6. The reclassification of lines from being core to being branch lines, including the lines from Caledon to Bredasdorp, and from Worcester to Port Elizabeth (via Mossel Bay), for which concessions will be investigated.

4.5.2 Special Economic Zones

Western Cape province has two SEZs. These developments could strengthen the case for providing terminals in that region. Currently, there are, however limited rail services to these areas, especially for general freight, which may limit the usefulness of intermodal terminals.

For Atlantis SEZ, the rail line from the location to Cape Town is currently out of service, which could impact the provision of an intermodal terminal in the area. There are ongoing considerations for the rehabilitation of this line and a feasibility study for the rehabilitation work is underway. It is uncertain whether the study will proceed, and the rehabilitation will be subject to the findings of the feasibility study, making it not possible to base planning on this work. Considering this, the location of SEZs in the West Coast region, currently does not contribute significantly towards the prioritisation of this region.

Furthermore, there could opportunities for links between areas in the West Coast and the Port of Cape Town to be achieved through intermodal terminal in the Cape Winelands. In the past, there were considerations for locating an intermodal terminal at Atlantis, which would have a similar role as that of Belcon. At that time, the proposal was to divert traffic from the N1 to the Atlantis area using the R304, linking the Cape Winelands with the West Coast. The proposal was not taken forward because of the limited capacity of the R304 to handle traffic from the N1 and the increased distance that traffic from the N1 would travel to get to Atlantis. This made the location less favourable than Belcon, resulting in Belcon being selected.

There could, however, be opportunities to apply this thinking in reverse, allowing freight from the West Coast to be transported to a location in the Cape Winelands, from where it will be transported to Cape Town. The volume of freight from the West Coast will be less than that from the N1 corridor, limiting the impact of the capacity challenges of infrastructure such as the R304.

4.5.3 Waste-on-rail opportunities

The transportation of waste by rail presents opportunities to generate additional demand that could make intermodal terminals viable, where sufficient volumes of transportable waste already exist. An overview of the volumes of waste in the Western Cape is shown in Figure 4-8 below.

Figure 4-8: Western Cape Waste Freight Volumes

Most of the waste is generated in the Cape Town Metropolitan Region, which is not included in the scope of this study. It is, however, possible that the intermodal terminals provided outside

the Cape Town Metropolitan Region could become offloading and transfer points for waste originating in the Metropolitan Region.

As shown in Figure 4-8, the volumes of waste are generally much less than the volumes of general freight. The total volumes of waste were estimated in the WCFDM and are shown below, together with other types of general freight in the province.

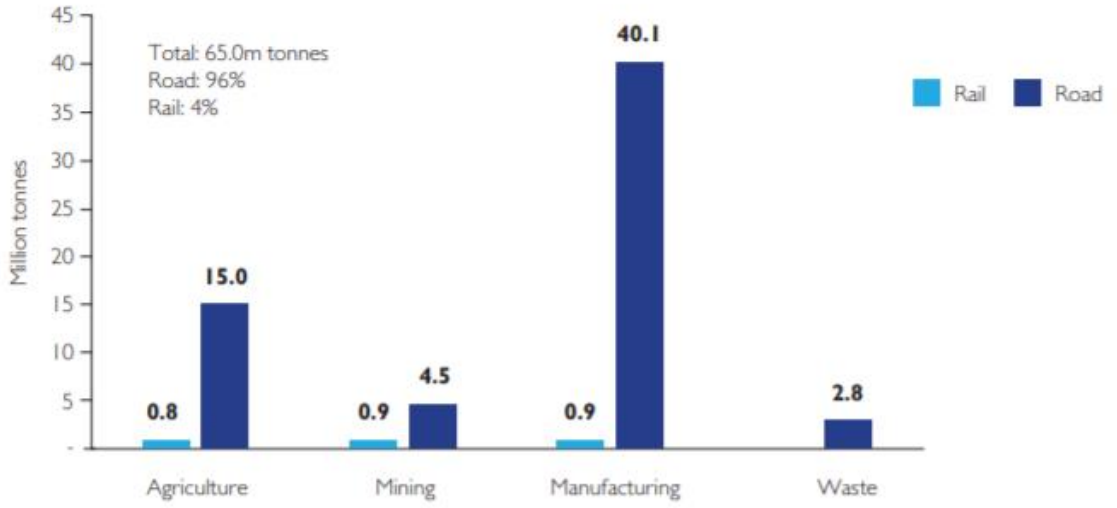

Figure 4-9: Western Cape General Freight Volumes for 2019 (Western Cape Government, 2022)

Considering the low volumes of waste, compared to other types of freight, it is unlikely that waste will present a strong business case to significantly influence decisions on the location of intermodal terminals. During stakeholder engagements, there were considerations of making waste the anchor commodity for intermodal terminals. An example of such a project was considered in Mossel Bay in 2017. At that time, the Garden Route Municipality was working towards the creation of a centralised landfill site for municipal waste at a site adjacent to PetroSA in Mossel Bay. Considering that the rail line between Mossel Bay and Worcester runs adjacent to this site, the site was suitable for a waste-on-rail solution. Transnet Freight Rail was considering collaboration with all the municipalities in the region to introduce a solution of moving the solid waste by rail to the landfill site, which could result in cost savings for the municipalities and address the challenges from the shortage of landfill space. The intermodal transfer facilities at the location would then enable the loading of any containers from road to rail and vice versa, creating rail freight opportunities for any business in the district, even those without direct railway sidings. The status of this project was not certain at the time of completing the study. It, however, provides an important starting point for the investigation into intermodal terminals in the Garden Route.

In other locations, the development of waste-on-rail projects requires that the waste volumes increase significantly. In addition, the economic value of waste is currently low, which impacts

the business case for facilities that are solely based on meeting the waste on rail needs. In the short to medium term, it is likely that waste on rail will be a spin-off from the provision of intermodal facilities for other types of general freight in most locations.

4.6 Regional prioritisation conclusions

The regional prioritisation conducted in the sections above showed that based on economic data, growth potential and demand data from the WCFDM, Cape Winelands region clearly presents the best opportunities for intermodal terminals. It ranks high in all the three areas assessed, suggesting that investment into intermodal terminals in the region will have the most significant impact and economic return. In addition, Cape Winelands region has good connectivity to the rail network, considering that the main rail corridor, CAPCOR, in the Western Cape passes through the region.

Besides the factors described above, Cape Winelands region has additional advantages, including its central location, which could make it possible to link an intermodal terminal in that region to other regions. There could be opportunities to link West Coast and Cape Winelands regions via the R304. In addition, the rail line linking Cape Town and Mossel Bay branches off the Gauteng – Cape Town line in Worcester, linking Cape Winelands region with the Garden Route.

An additional advantage of an intermodal terminal in Cape Winelands is the potential role in supplementing Belcon or its future replacement, assisting in mitigating freight traffic on the N1, on which most of the road freight to and from Cape Town is transported.

The regional prioritisation is a guideline, informing the areas that are worth focusing on. It does not imply that there are no opportunities for intermodal terminals in the other regions. For the localised site selection, and future additional work, the focus would be on the areas that have greater potential, based on the prioritisation, but other locations could be investigated as needs arise or other information that justify their prioritisation becomes available.

5 Localised site selection

This step involved the lower-level analysis of potential locations in the prioritised regions. As shown in Table 4-2, initial identification of lower-level locations was conducted in the assessment of potential locations based on information on the information in the WCFDM. This was based on:

a. Rail connectivity between O-D pairs.
b. Freight volumes flowing between the O-D pairs, considering flows of at least 500 km, and 25 km catchment areas for the O-D pairs.

In this section, these considerations will be augmented by additional information on the following, where this is known:

a. The availability of land in the potential locations.
b. Accessibility to the road network.

In addition, reference was made to information from similar studies in which proposals for the provision of terminals at certain locations were made. The indicative locations of terminals are shown in Table 5-1.

Table 5-1: Indicative intermodal terminal locations

Terminal Catchment	Region	Current (2020) Total tonnes[8] (million)	Current (2020) volumes – Indicative terminal area needed (ha)	Future (2051) total tonnes[9] (million)	Future (2051) volumes – Indicative terminal area needed (ha)
Somerset West	Cape Winelands	0.6	5.5	1.2	12.0
Paarl	Cape Winelands	0.6	6.4	1.4	14.1
Malmesbury	West Coast	0.4	3.5	0.8	7.7
Worcester	Cape Winelands	0.3	2.9	0.6	6.3
Vredenburg	West Coast	0.3	2.5	0.5	5.2
Mossel Bay	Garden Route	0.2	1.6	0.3	3.4

[8] These are current volumes (2020 data)
[9] 31-year future projection for 2051

Table 5-1 shows the current and future volumes as well as indicative terminal areas based on the current and future volumes. As the intermodal study will only be constructed and subsequently, operational in the medium to long term, it therefore implies that future projections will be taken into consideration in sizing the terminal.

The locations are described below.

a. **Somerset West** – an intermodal terminal in Somerset West can address demand from areas that fall under the Cape Metro e.g., Somerset West and Strand, and those in the Cape Winelands e.g., Stellenbosch. Somerset West has good connectivity to N2 and R44. The N2 will allow for potential links to other areas such as the Overberg region, addressing some of the road freight from these areas and diverting it before it reaches Cape Town. The availability of land for an intermodal terminal at Somerset West and the extent of rail services to and from the area will need confirmation.
b. **Paarl** – located centrally within the Cape Winelands, and in proximity to the N1 and CAPCOR, Paarl has significant potential for an intermodal terminal that could support economic development in the region and assist in the shift of suitable road freight on the N1 to rail. Paarl is linked to other parts of the Cape Winelands and the Western Cape through several major roads that pass through or near the location, including R44, R45, R312 and R301, which results in a significant catchment area. The availability of land for a terminal in Paarl is, however, subject to confirmation, although initial indications show that this is unlikely to be a major constraint. Paarl is also close to Klapmuts, which was considered for a feasibility study on an intermodal terminal in the Greater Cape RSIF. A location in Paarl could fulfil the need initially identified for Klapmuts, while also supplementing the Cape Metro facility at Belcon or its future replacement, if its relocation to Kraaifontein currently under investigation is feasible.
c. **Malmesbury -** Malmesbury is well connected to the rest of the West Coast through roads such as R315, R45, R302 and N7, which pass through the town. In addition, the Bitterfontein line runs past the Malmesbury area, providing rail network connectivity. The analysis of freight inflows and outflows for Malmesbury showed that it is, by far, the most significant node in the West Coast. This was confirmed by the analysis of its O-D pairing, making this an important location for the placement of an intermodal terminal.
d. **Worcester** – as described in Section 3.2.2, the Greater Cape Metro RSIF includes a proposal of a study to determine the feasibility of a 'freight transport transfer station' in Worcester to promote intermodalism and to investigate the feasibility of developing a freight hub in Worcester. The potential location was to the east of the town between N1 and the existing rail marshalling yard / industrial area. The hub was to serve as an intermodal transfer facility and logistics hub. The basis for this proposal was not clear from the information reviewed for this study, but it aligns with the proposed prioritisation

of the Cape Winelands. Besides, the 2014 GPS included a proposal to establish an intermodal terminal in Worcester as one of the initiatives to support the development of the surrounding areas.

In consultations with DEDAT and Transnet, Worcester was mentioned as a location that has received significant attention as a possible location for an intermodal terminal in the Western Cape. During these engagements, other reasons for considering Worcester included the availability of land that could be used for the intermodal terminal. It is, however, not clear whether this land belongs to Transnet or the local municipality.

Worcester is strategically located at, or near, the intersection of key rail lines and roads in the Western Cape, making it likely that the location could address the needs of a large freight catchment area, covering areas in other regions such as the West Coast, Garden Route, and Central Karoo. In addition, of all the areas in the Cape Winelands, Worcester has the highest incoming and outgoing agriculture and agri-processing freight demand, making it a suitable location for an intermodal terminal. The high demand may be the result of Worcester's strong connectivity to several areas and could be confirmation that the freight from a large catchment area passes through the town.

e. **Vredenburg –** the town of Vredenburg is already an important transportation and commercial hub for the West Coast. It is strategically located to link the West Coast with areas further in the Northern Cape with the Port of Cape of Town, where this is necessary for the shipment of freight for export or imports landing at the port. Vredenburg has a well-developed network of roads, including R45 and R399, making it accessible to those who wish to use an intermodal terminal in the town. The availability of land for an intermodal terminal in Vredenburg, however, requires confirmation.

f. **Mossel Bay** – Mossel Bay is linked to Cape Town through the Mossel Bay line and has a well-established rail system developed to provide services to the PetroSA refinery and Port of Mossel Bay. As described in Section 3.3, there were considerations of developing an intermodal terminal near the PetroSA refinery, aimed at providing waste-on-rail services initially and later expand to enable the transportation of any containerised freight. This project is mentioned in the Garden Route's RSIF. Work on this project could be the basis for developing an intermodal terminal in Mossel Bay, providing services to areas around the Garden Route. In addition, the Garden Route RSIF includes a proposal to investigate the establishment of an SEZ for the Mossel Bay area to support PetroSA. If established such a development could strengthen the case for an intermodal terminal in Mossel Bay.

The prioritisation of the locations above is a guide, based on the information available for the concept study and does not preclude the assessment of the other sites, should further information indicate that other sites should be prioritised. The six locations above will be the

initial area of focus for additional work to be conducted on the intermodal terminals. Other locations discussed during the stakeholder engagement process, e.g., Ashton have not been prioritised at this stage because of limited indicative potential based on the information available, but these can be revisited if further information suggests a compelling case for locating intermodal terminals at these locations.

6 Next steps and further work

The analysis conducted in this study has provided a guideline set of locations for consideration in the development of intermodal terminals in the Western Cape to support the economic development of areas outside the Cape Metropolitan Region. The findings of the study will inform ongoing planning of the freight transport network, including alignment with other plans such as RSIFs, SPDFs, and ITPs.

Considering this, the main next step is to take the study findings to the stakeholders responsible for the development of the plans mentioned above. The aim of this is to get further input and buy-in for the proposals in the study. After receiving buy-in, the next step is to discuss how best to achieve the alignment between the study proposals and the plans developed by the stakeholders, including identifying proposed and ongoing projects that could present opportunities for collaboration to take the development of intermodal terminals forward.

Certain locations proposed in the study have previously been considered in other plans. As a result, it is important to discuss the progress that has been made on work towards the development of the sites and how stakeholders who proposed this work could work with the Western Cape Government to take the proposals forward.

Subject to alignment, buy-in and agreement to collaborate, further work is required to develop the thinking in the study. Further work may include more detailed assessment of the proposed, prioritised sites, focusing on factors such as:

a. The availability of land and the ownership of the land. This process could address the alignment of the proposal for intermodal terminals with local spatial plans.
b. Detailed assessment of the capacity and condition of existing road and rail infrastructure, and other infrastructure such as bulk water and power supply. Where an improvement to infrastructure or the provision of new infrastructure is required, the cost implications of this should be investigated to understand whether this makes certain locations unviable.
c. Initial discussions with potential users to determine an accurate market size for the intermodal terminals. While demand from the WCFDM was used to develop an understanding of the potential of the sites, businesses generating this demand may not be keen on using the intermodal terminals for other reasons such as the perceived quality of rail services and the need to avoid multiple handling of freight. Understanding user

needs would be important in evaluating the viability of intermodal terminals at the proposed locations.

d. The impact of the intermodal terminals on the local economy, including trade-offs with other potential uses of the land, for example, property development. Preferably, intermodal terminals should be developed at the proposed locations if these have a positive impact on the economy, after considering the opportunity costs of not using the land for other types of development. The current proposal to relocate Belcon to another site was made because of the potential for other land-use opportunities around Bellville.
e. Legislation that could impact the location of intermodal terminals at the sites, including environmental legislation.
f. The risk of heavy vehicle congestion around the intermodal terminals, which could impact the flow of traffic, especially at locations near urban centres.
g. Business and funding models for the development of the terminals, including the potential for Public Private Partnerships (PPPs).

The approach to a future detailed assessment will be discussed with stakeholders but could include the development of pre-feasibility or feasibility studies of the locations. Subject to information on work that other stakeholders may have done, certain information could already be available, which could reduce the extent of the additional analysis needed.

7 Bibliography

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Appendix A – Details of the WCFDM inputs

This appendix provides more detail on the freight transported between the O-D pairs identified through the analysis of the WCFDM data. It provides more information on the commodities included in this freight and whether it is made up of imports, exports, or domestic goods.

One of the main objectives of the study was to locate intermodal terminals to support economic growth, making it necessary to understand the potential link between the freight transported and the economic activity in the regions. This is analysed later in this appendix.

Details of palletizable commodities considered in the study

The list of commodities used in the WCFDM input data are summarised below. This includes all districts and distances.

CARGO TYPE	**Palletized**
Flow	**CC**
	Values
COMMODITY NAME	**Sum of 2020 Road tons**
Processed Foods	8 543 252.80
Beverages	2 704 713.96
Fish and seafood	264 585.08
Pharmaceutical Products	188 978.07
Eggs (poultry)	147 717.78
Motor Vehicle Parts & Accessories	129 712.59
Tobacco Products	3 131.50
Grand Total	11 982 091.78

More detail on the freight, showing its classification based on whether it is import, export or domestic freight is provided in the section below.

Breakdown of import, export, and domestic freight

A breakdown of the domestic, import and export totals for all the districts is provided in this section.

	All			Palletized		
District	**Import**	**Export**	**Domestic**	**Import**	**Export**	**Domestic**
Cape	378,716	230,227	15,283,516	24,351	55,795	1,524,758
Goodwood	141,395	30,947	4,187,616	14,070	12,584	667,354
Mitchell's Plain	237,864	25,568	3,902,234	47,544	21,861	1,451,795
Bellville	411,714	81,163	7,615,541	21,408	24,958	1,014,547
Kuilsrivier	304,197	25,550	3,213,085	64,264	3,146	1,035,783
Wynberg	184,484	58,005	4,934,113	24,091	33,265	1,223,190
Port Cape	5,155,530	2,491,858	-	424,830	561,593	-
Stellenbosch	46,137	81,966	1,630,937	8,084	24,124	486,739
Simonstown	48,056	6,233	512,164	10,239	4,365	229,395
Wellington	42,978	21,103	781,401	6,365	12,610	224,815
Paarl	217,185	149,015	3,651,591	13,473	27,466	644,924
Somerset West	45,456	79,120	1,425,839	7,365	3,486	198,421
Strand	34,610	4,707	447,316	4,790	2,566	92,177
Malmesbury	322,766	75,858	3,501,327	14,799	11,509	498,858
Worcester	82,904	138,220	2,055,266	6,441	17,975	393,007
Vredenburg	181,950	246,564	2,707,329	9,528	14,723	343,197
Laingsburg	37,601	9,127	408,472	6,102	6,641	235,116
Port Mossel Bay	-	18,638	-	-	-	-
Mossel Bay	241,231	29,785	1,311,718	8,485	6,581	234,199
Montagu	13,401	62,817	417,290	5,502	4,784	178,939
Beaufort West	125,145	2,113	526,342	5,430	329	101,549

Ceres	31,082	333,769	788,047	4,468	1,761	122,442
Piketberg	308,701	87,636	1,807,608	3,726	6,616	196,876
	8,593,102	**4,289,989**	**61,108,752**	**735,356**	**858,738**	**11,098,080**

The details of the streams that contribute towards the freight in the table above are shown below.

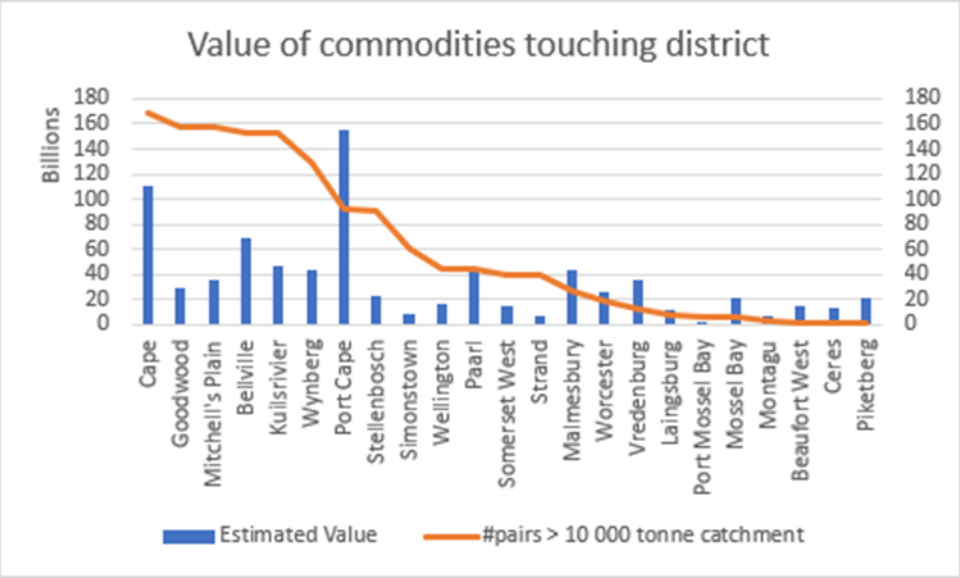
District	All	Domestic	Import	Export
Cape	169	154	31	27
Goodwood	158	154	4	6
Mitchell's Plain	158	154	4	6
Bellville	153	149	4	6
Kuilsrivier	153	149	4	6
Wynberg	129	125	2	6
Port Cape	92	58	29	25
Stellenbosch	90	87	2	5
Simonstown	60	59	2	3
Wellington	45	44	2	0
Paarl	45	44	2	0
Somerset West	39	38	2	0
Strand	39	38	2	0
Malmesbury	27	25	0	0
Worcester	19	17	0	0
Vredenburg	12	9	0	0
Laingsburg	7	7	0	0
Port Mossel Bay	6	4	0	0
Mossel Bay	6	4	0	0
Montagu	3	1	0	0
Beaufort West	2	0	0	0
Ceres	1	0	0	0
Piketberg	1	0	0	0

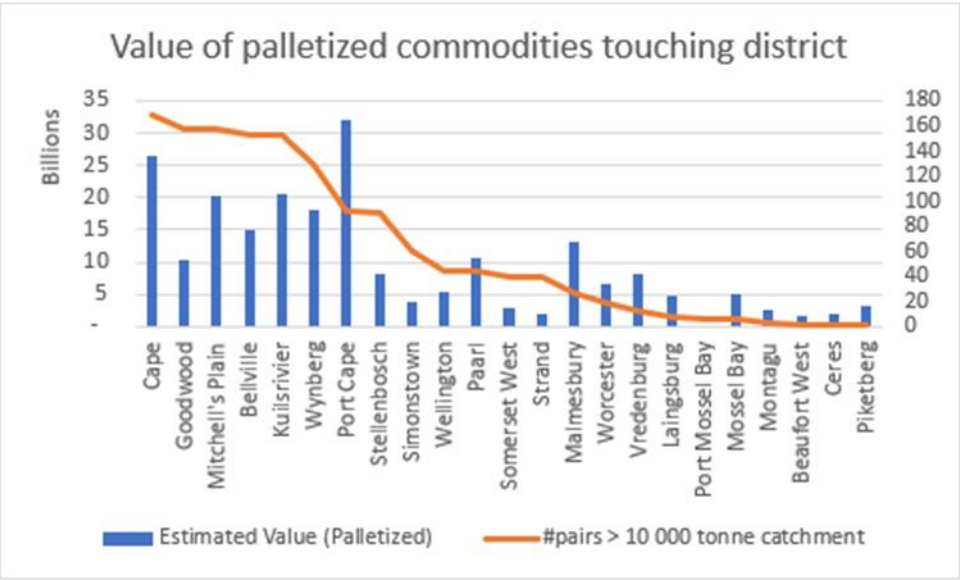
It is worth noting that some catchment areas will have an 'abundance' of freight for example the 'Cape' district cluster has 169 strings (representing O-D pairs) of more than 10 000 tonnes when all segmentations in terms of import export and domestic are considered together. When they are split, it has 212 strings (154 domestic, 31 import and 27 export). On the other end of the spectrum if imports, exports, and domestic freight is considered apart from each other, then Beaufort West, Ceres and Piketberg with 2, 1 and 1 strings, respectively fall away because they are comprised of flows of all three types.

Indicative economic activity informed by the WCFDM

Besides informing the potential locations for intermodal terminals, based on the number of origin and destination (O-D) pairs from the WCFDM data analysis also provides some insights into economic activity in the regions, based on the estimated value of commodities transported between the O-D pairs.

Regarding the economic activity of the districts, below are graphs showing the estimated value of all the commodities touching each district (tonnes multiplied by an estimated value per tonne), used as a proxy for economic activity. This is not using any clustering and refers only to a single district. It is not a value-add approach and therefore, it is not necessarily an accurate representation of the economic activity of each district as it also excludes any tertiary sector activities.

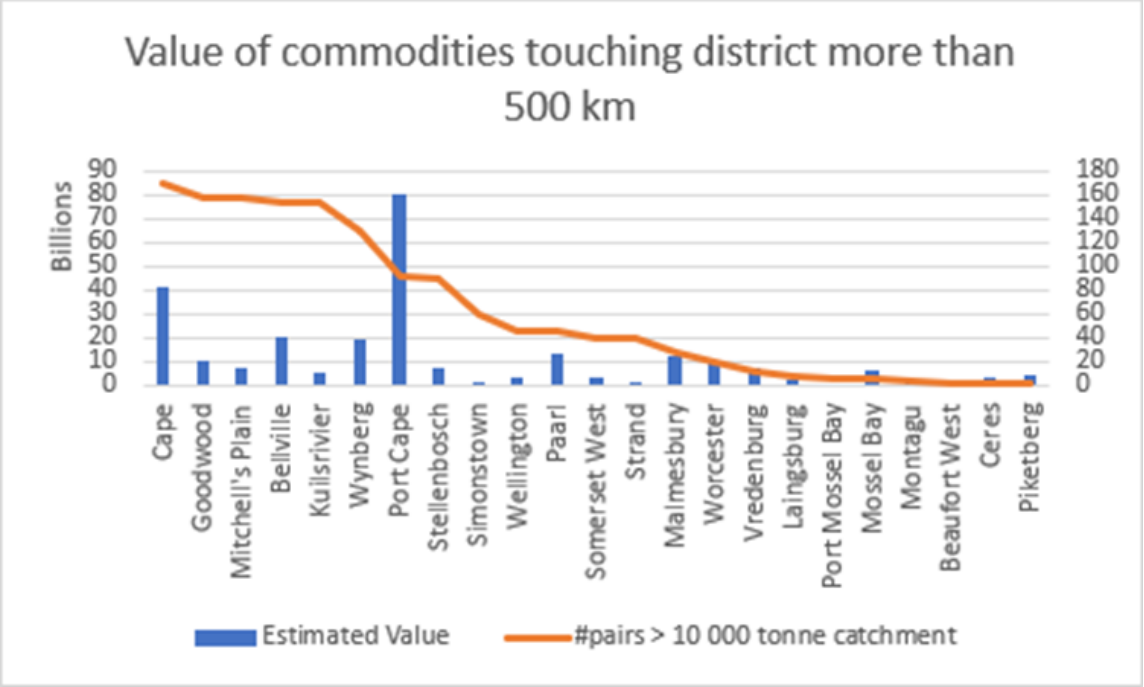


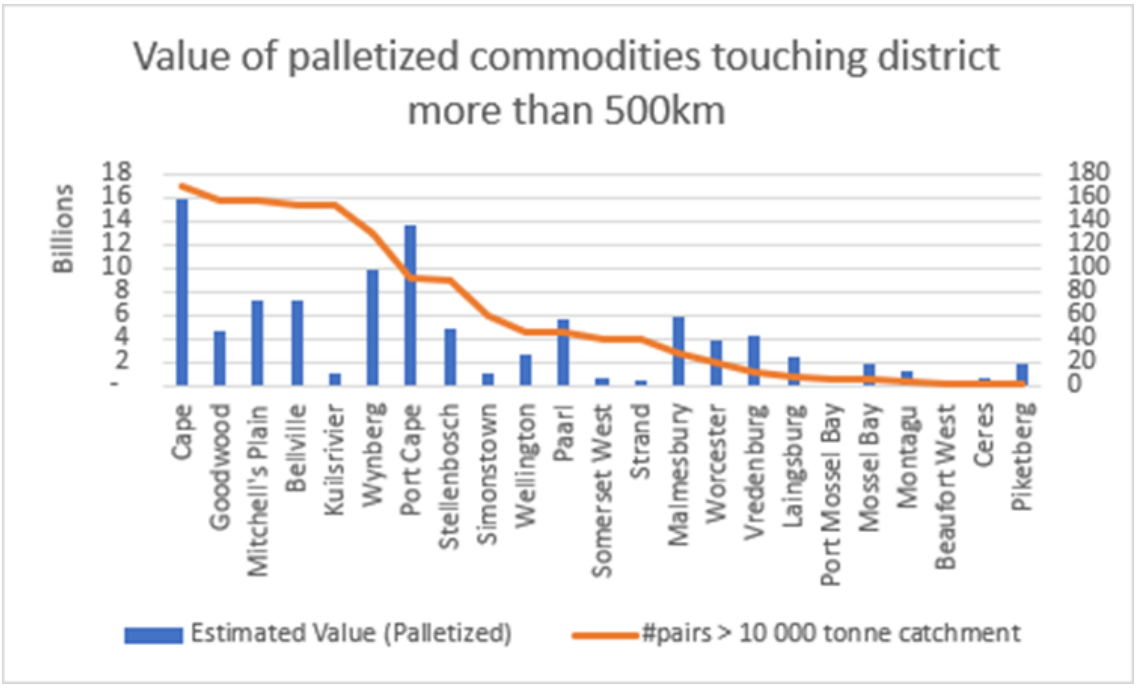


The indicative economic activity is highest in the Cape district and surrounding areas, notably around the Port of Cape Town, Mitchells Plain and Kuilsrivier, which is a reasonable outcome, considering the significance of the Cape Metro as a centre for economic activity in the Western Cape.

Based on the simplistic analysis conducted above, there is a level of correlation between the number of O-D pairs and the indicative economic activity, given that the smaller the number of O-D pairs, the lower the indicative economic activity. This correlation is not perfect, for example, certain districts e.g., Port Cape have high indicative economic activity than certain districts with more O-D pairs. This may be the result of the differences in the value of commodities transported in the districts or the total volumes of freight e.g., a district may have fewer O-D pairs, yet these pairs will have catchments in which significantly more than 10 000 tonnes of freight are transported per year.

The same results are in the graphs below, but where it is freight touching the district which travels more than 500km. In these graphs, the proxied economic activity also seems to be somewhat correlated with the number of pairs per cluster, centred around that district.





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