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Prepared by Mitchell Brooke
Logistics Development Manager

Polokwane Inland Fruit Container Rail Hub

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Preface

Fruit products produced in the greater Limpopo and Zimbabwe region are generally transported to Durban or Cape Town ports to be loaded on Specialized Reefer ships or containerized at port. The fruit is then transported to global markets. Historically fruit products were mostly loaded in Specialized Reefer Ships with a minority of fruit loaded in containers, this has changed in recent years. The majority of fruit products are now loaded in containers. This mode of sea transport has its advantages for fruit growers to reduce transport costs considerably. The development of the integral reefer container has changed the way fruit is packed and loaded, this is so because the container is a cooling mechanism on its own. This omits the necessity for fruit to be transported long distances to ports which would have to be precooled and then be stuffed into containers. The integral container permits fruit to be loaded directly at the production point which can then be cooled within the container while being transported directly to container terminals. The main advantage of this approach is that fruit can be exported at a much lower cost and the cold chain has been proven to be much more efficient[1].

Picture 1: Geographical layout of citrus production

The Western Cape and Eastern Cape regions have capitalized on the advantages of loading fruit in containers either at production point or from cold stores located in near proximity to production. Fruit production in these areas are located closer to ports therefore containers can be collected in port and loaded inland then transported back to port by road rather than rail. There have been attempts to transport empty containers by rail up to Tzaneen and Letsitele to load citrus and avocados at production point. The volume has been relative for the past few years the service has been in operation and in all likelihood may remain stagnant or the service may be discontinued in the future. The main assumption for the fate of the container rail service into Letsitele is the unpredictability of production and market demands from one year to the next. The other factor is the risks associated with transporting time sensitive cargo by rail. The nature of the market requires specific variety types and sizes, this makes it difficult for a single production point to be able to accumulate the requirement to complete a container load. Some of the larger production units have the capacity and capability to do so but are also limited. The fact that there is no central common user facility available to accumulate citrus production from a greater region limits the ability for the service to gain momentum. Polokwane has been considered for this approach which is centrally located to a wider production area and is also located on a main corridor line thereby making the rail service more efficient and cost effective.

[1] Dr MC Dodd – Time and temperature container trials

Container loading methods

Port loaded containers

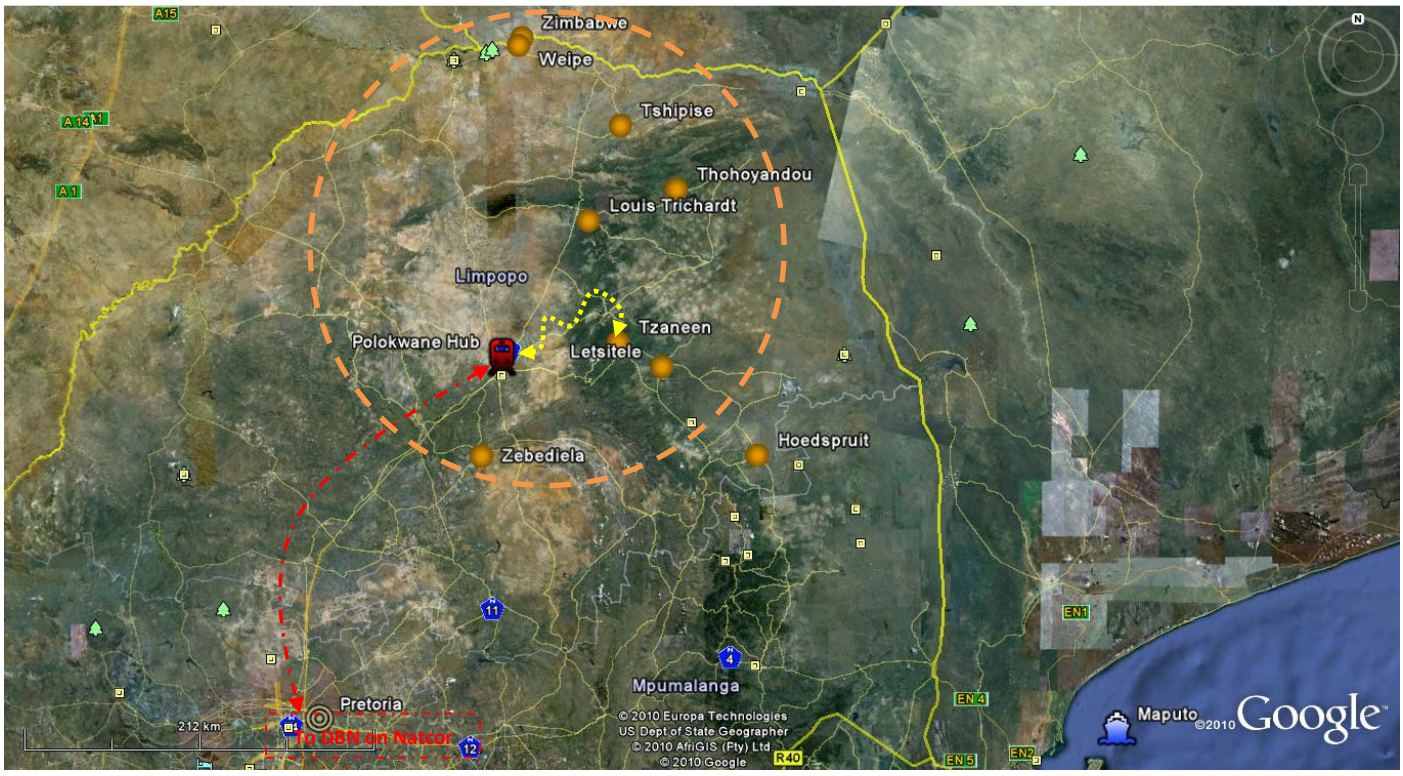
The majority of citrus loaded from the Durban port is loaded by containers, a significant volume of containers are packed at the various port cold stores located around the port. Production points located in KwaZulu Natal, Swaziland, Mpumalanga, Limpopo and Zimbabwe transport citrus by road truck (very small percentage by rail from Letsitele) to Durban. From there citrus is either precooled or loaded from ambient into containers. In most cases exporters or agents would contract space at a specific cold store thus allowing citrus from various suppliers to be consolidated and accumulated at a central point. A container lot can then be loaded to meet a receivers specification where it may be difficult to achieve this from a single supplier. Because of the long distances that production points are located from the port, it is not feasible to collect empty containers from Durban and transport to a production point to be loaded and then brought back to the port. There are a few production points that collect empty containers from Johannesburg and pack directly then transport to the port, but this is a very small volume.

Letsitele container train

Adopted from the avocado industry, the concept permits empty containers to be railed from Durban to Tzaneen where the containers are transferred to road and then sent to production points to be stuffed . This is usually done within a 50km radius of the Tzaneen station but mostly in Letsitele. Once the containers are stuffed they are transported back to Tzaneen and coupled to a power source awaiting the train to transport them to port where they are taken directly to the stack. As stated the potential for this service to expand is hindered not only by the operational problems but also by the lack of the ability to consolidate citrus at a central point. At this point in time the service has only been utilized in Letsitele with expansion only probable by consolidating fruit at a central point, such as Polokwane.

Polokwane fruit hub

Map 2: Geographical layout of Limpopo citrus production



The distinct difference between the current method of railing containers to port compared with the proposed method from the Polokwane hub is the consolidation facility. The benefit of the consolidation facility is that citrus supplied from various production points within the greater Limpopo and Zimbabwe region for various export agents can be consolidated together at a central point. The other distinct advantage is that 26 high

cube pallets (or 28 pallets in some cases) can be transported by road to the Polokwane hub facility and then 20 pallets can be packed into a container and railed directly to port. This allows for greater economies of scale to be achieved. The train set would also not have to travel the extra distance from Polokwane to Tzaneen. Some of the operational constraints that hinder the success of the Letsitele container train can be solved by implementing the Polokwane Hub concept. There are existing facilities at the Polokwane Fresh Produce market that could be utilized for the fruit sector to pack containers inland rather than packing in the port. The transportation costs for production points in this region has risen astronomically in the past few years, this is a significant cost factor for the exportation of fruit products for this region. Transport costs can be reduced by 10% - 20% implementing a concept of this nature.

Break-bulk rail

Apart from container loading there also exists an opportunity to consolidate fruit from this region by road into Polokwane and then reload to rail. This rail is loaded as ambient within 'O' type or CX container type units which are then delivered to port cold stores to be off-loaded. The product is then stuffed into containers at the port or the product can be loaded into Specialized Reefer ships at the fruit terminals. Currently the Letsitele area is the only area that loads break-bulk ambient rail to port cold stores. This has been done successfully for many years; although recently small in proportion to what was transported by rail in years gone by. In Letsitele there is an existing rail shed where fruit is transported by road and then reloaded to rail by forklift truck. The Polokwane hub could be used by growers further north in the surrounding Louis Trichardt, Tshipise, Mussina, Weipe and Zimbabwe areas to transport fruit by road to Polokwane and then re-load to rail for Durban. The Letsitele train would operate as normal and both operations could be linked in Polokwane for Durban. There is however a need to target specific cargo for specific cold stores in Durban for this method of transporting cargo by rail to be successful. The only viable destinations in Durban are FPT, 333 Logistics and Maydon Wharf Fruit Terminals. Specific cargo has been identified as being Japan market fruit where cargo is destined for a contracted facility in Durban which should accept rail. Russia cargo which is shipped break-bulk from FPT berths. All cargo destined for FPT, 333 Logistics and Maydon Wharf Fruit Terminals. These particular facilities are well geared to accept rail and are ideally located to ensure that there are minimal delays from routing sidings in Durban (Bayhead, Congella, Dalbridge and Point).

Benefits of the Polokwane Inland Fruit Hub

1. Fruit can be accumulated from various suppliers from multiple exporters and agents over a greater circumference. Opens up more scope to attract more fruit and more containers per train trip.
2. A greater volume of growers can participate and receive the operational and cost benefits of the service.
3. Packhouses can arrange dedicated trucks to run on a shuttle basis between packhouse and Polokwane hub. Better transport arrangement and better road haulage costs can be achieved. Less damage to high cube pallets as the road portion is reduced considerably. There may be a possibility to load more pallets on a truck thus reducing transport costs.
4. Better container planning can be achieved as the fruit would be pre-accumulated by container lot. As the stock is pre-sorted, exporters and agents can plan operations more effectively.
5. The travel time between Durban and Polokwane will be shorter, this will allow better lead time and more train trips per week. E.g. 3 train trips per week with 40 containers (or more) per trip between weeks 22 – 36 = 1,800 containers and 36,000 pallets. With a higher demand a second train set could be deployed.
6. This opportunity could open the way to research sending containers under ambient on the train and couple to power in the port.
7. The Polokwane hub offers ample yard space for the storing of empty and full containers. Electricity to power containers can be taken from municipal supply which would offer a greater number of containers to be stored.

8. The use of side shifters to off-load and load containers could be eliminated by the use of container gantry cranes. There are container gantry cranes available at the Polokwane hub facility.
9. There is no need to have numerous container trucks in operation as all the container operations are performed within the yard.
10. The accumulation of a specific market e.g. Europe will allow single train lots for a specific ship. The train could be delivered directly to a common stack.
11. The Polokwane hub can be beneficial to all fresh produce commodities and not only to citrus or avocados. There are a variety of fresh produce commodities able to be packed in containers and delivered directly to port for export.
12. The Polokwane hub could be utilized to consolidate and transport break-bulk cargo to port fruit terminals by rail.
13. The full utilization of the Polokwane hub concept could allow for better control and management while reducing transportation costs for growers of the Limpopo and Zimbabwe regions. Transportation costs for these regions are deemed to be unsustainable and is predicted to worsen over time.
14. Less trucks travelling on the national road network and in particular along the N3 to Durban. The CGA completed an assessment and concluded that more than 30,000 citrus trucks trips are made to Durban annually with between 200 – 300 trucks sent per day.
15. Port truck bottlenecking and severe delays can be minimized by reducing the number of road trucks travelling to port.

Polokwane Hub Cost Benefit Summary:

Container Rail Operations

1. Based on 1,800 containers at R15,000 (2010 est) per container = R27m gross earnings from rail activities.
2. Based on 36,000 pallets at R75 per pallet = R2.7m gross earnings from Polokwane hub handling activities.
3. From 36,000 pallets is estimated that Letsitele could provide 20,000 pallets, Limpopo River regions could provide 10,000 pallets and Zimbabwe 6,000 pallets.
    a. Letsitele savings @ R107 per pallet x 20,000 pallets = R2.14m
    b. Limpopo River @ R184 per pallet x 10,000 pallets = R1.84m
    c. Zimbabwe @ R184 per pallets x 6,000 pallets = R1.1m

Break-bulk Rail Operations

1. Limpopo and Zimbabwe via Polokwane
    a. Based on 100 wagons per week x 16 weeks = 1,600 wagons @ R10,000 (2010 est) per wagon = R16m gross earnings from Polokwane rail activities.
    b. Based on 1,600 wagons x 24 pallets per wagon = 38,400 pallets @ R30 handling fee (2010 est.) = R1,15m gross earnings from hub handling activities.
    c. Savings @ R150 per pallet (2010 est.) x 38,400 pallets rail vs. road = R5,8m to the region.

Polokwane rail operations could potentially earn R43m gross earnings per season (2010 est.).

Polokwane hub handling operations could potentially earn R3.85m gross earnings per season (2010 est.).

Polokwane hub concept could potentially save the region in excess of R10.88m per season (2010 est.).

Conclusion

The high cost of transportation from the greater Limpopo and Zimbabwe region is thought to be a considerable contributor to the cost of citrus exports from this area. Transport costs have increased considerably in recent years and is expected to increase further in the short term. Rail transportation is seen as a strategic priority for this region in order to stabilize the cost of transportation. The South African citrus export volume is second largest citrus exporter by volume in the world, the Limpopo region produces the largest volume of citrus production for exportation in South Africa (20% of the countries citrus in grown in Letsitele alone). The Polokwane inland fruit hub concept is fully endorsed by the Citrus Growers Association to reduce transportation costs and increase operational efficiency. The CGA would like to encourage Transnet Freight Rail and the Limpopo Department of Roads and Transport to consider this proposal favourably. Should the proposal be considered it is recommended that a steering committee be formulated with representation by all stakeholders to map out the scope of works for implementation ahead of the 2011 citrus season. A tender process should be applied where various commercial entities can complete the TFR formatted business plan and of those applications, a suitable candidate can be selected to manage the hub and rail operations.

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Table 1: Limpopo Grapefruit and Orange production by week

Sum of Eq Plts	CGA Region	Product					
	Letsitele		Letsitele Total	Limpopo River		Limpopo River Total	Grand Total
Week	GRAPEFRUIT	ORANGES		GRAPEFRUIT	ORANGES		
18	4 000		4 000			0	4 000
19	6 000		6 000			0	6 000
20	6 000		6 000			0	6 000
21	6 000		6 000			0	6 000
22	6 000	2 500	8 500		1 500	1 500	10 000
23	4 000	4 000	8 000		1 500	1 500	9 500
24	2 000	4 000	6 000		3 000	3 000	9 000
25		6 000	6 000		3 000	3 000	9 000
26		8 000	8 000		4 000	4 000	12 000
27		8 000	8 000		4 000	4 000	12 000
28		8 000	8 000		4 000	4 000	12 000
29		12 000	12 000		5 000	5 000	17 000
30		12 000	12 000		5 000	5 000	17 000
31		12 000	12 000		5 000	5 000	17 000
32		10 000	10 000		5 000	5 000	15 000
33		10 000	10 000		4 000	4 000	14 000
34		10 000	10 000		4 000	4 000	14 000
35		8 000	8 000		2 500	2 500	10 500
36		6 000	6 000		2 000	2 000	8 000
Grand Total	**34 000**	**120 500**	**154 500**	**0**	**53 500**	**53 500**	**208 000**

Chart1: South African Transport Cost Statistics

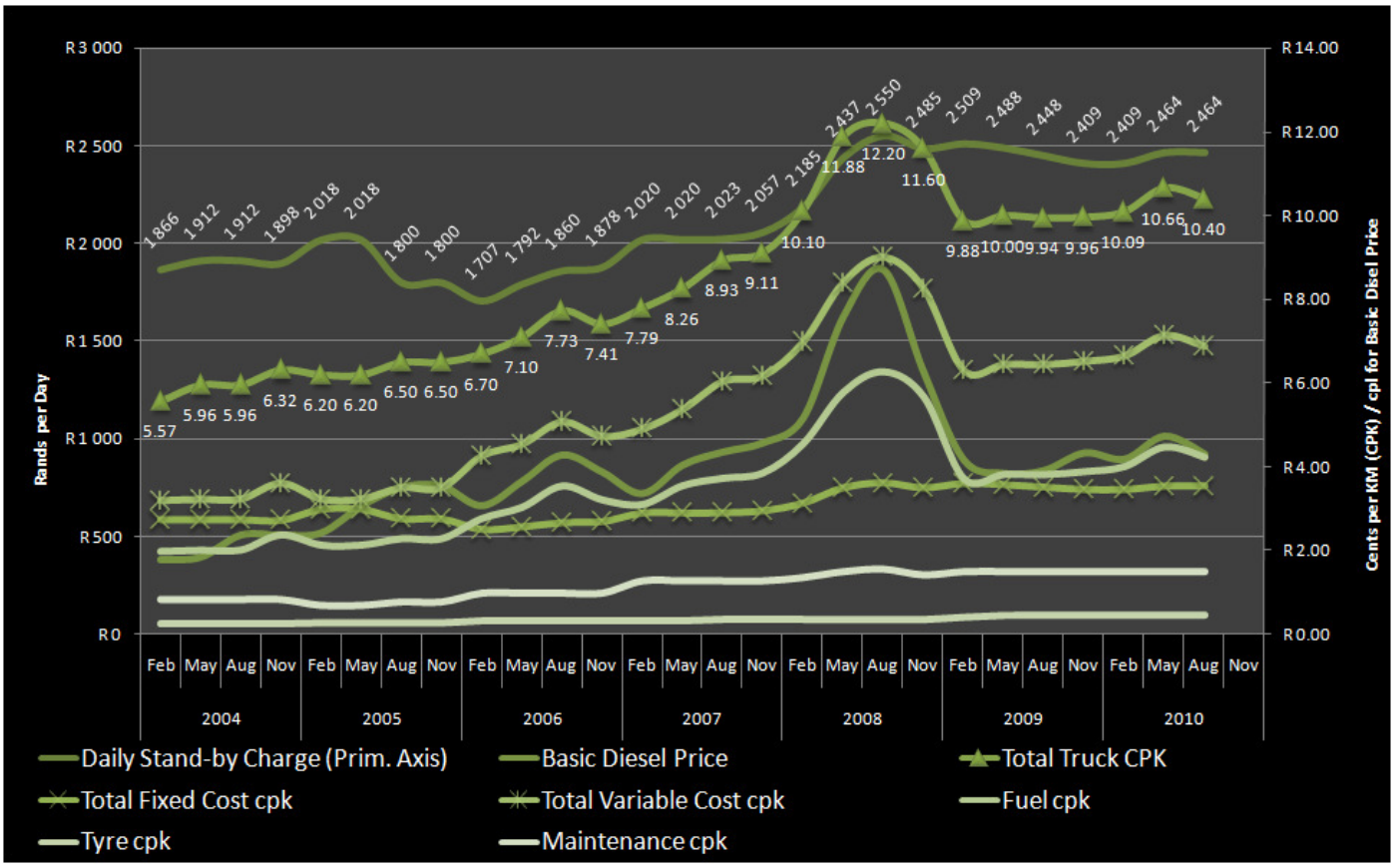

Chart 1: Southern African regional citrus transportation costs 2010

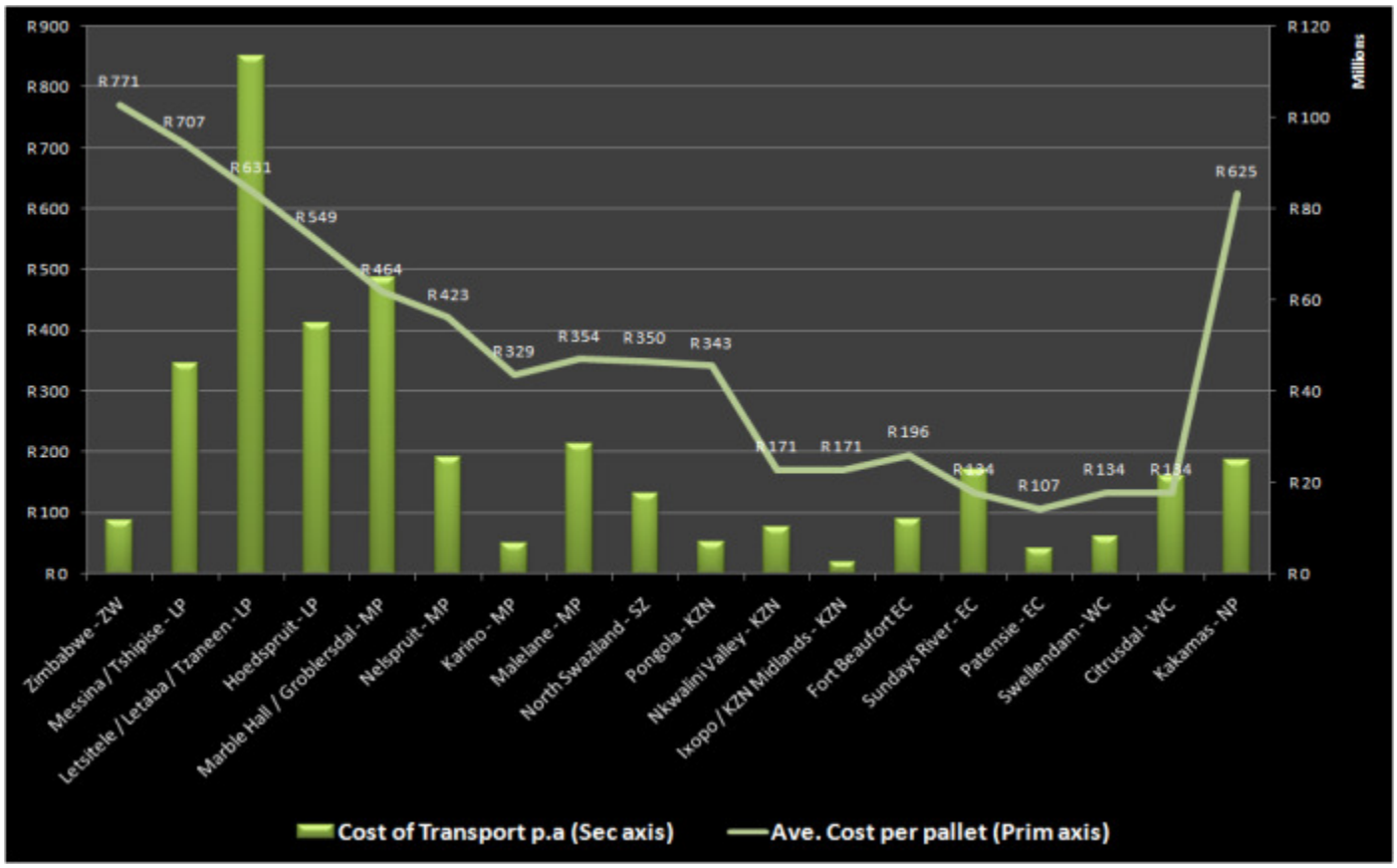

Table 2: Comparative break-bulk rail cost road vs. rail

Road Transport					
Region	**Distance**	**CPK**	**Cost per Truck**	**Ave cost per plt - 28 plts standard**	**Ave cost per plt - 26 plts high cube**
Zimbabwe - ZW	1 200	R 18.00	**R 21 600**	R 771	R 831
Louis Trichardt / Messina / Tshipse - LP	1 100	R 18.00	**R 19 800**	R 707	R 762
Letsitele / Letaba / Tzaneen - LP	1 000	R 18.00	**R 18 000**	R 643	R 692
Rail to Durban via Letsitele					
Region	**Road portion**	**Rail Levies**	**Rail Portion STD / HC**	**Ave cost per plt - 24 plts standard**	**Ave cost per plt - 24 plts high cube**
Zimbabwe - ZW					
Louis Trichardt / Messina / Tshipse - LP					
Letsitele / Letaba / Tzaneen - LP	R 60	R 20	R530 / R560	R 610	R 640
Rail to Durban via Polokwane					
Region	**Road portion**	**Rail Levies**	**Rail Portion STD / HC**	**Ave cost per plt - 24 plts standard**	**Ave cost per plt - 24 plts high cube**
Zimbabwe - ZW	R 275	R 20	R400 / R430	R 695	R 725
Louis Trichardt / Messina / Tshipse - LP	R 250	R 20	R400 / R430	R 670	R 700
Letsitele / Letaba / Tzaneen - LP	R 200	R 20	R400 / R430	R 620	R 650

Notes pertaining to costs reflected in Table 2:

1. Costs are calculated using A15C 15kg cartons.
2. Rail rates have been sourced from rail operators and TFR.
3. Road portion cost for production regions to Polokwane based on average distance and using a CPK value of R30.00 per kilometre. 24 Pallets per truck and includes forklift handling.
4. Rail cost from Polokwane to Durban has been sourced from TFR. Railing to FPT, 333 Logistics and MFT sidings.
5. Rail levies are based on fuel and electricity surcharges and includes insurance.
6. Evidence that a 10% saving can be obtained by trucking fruit from Limpopo River (north of Louis Trichardt) and Zimbabwe regions to Polokwane and loading to Durban by rail.
7. Letsitele rail operations may continue from Letsitele as the current cost is more viable from Letsitele direct.

Table 3: Cost comparison for loading citrus via Polokwane hub

Oranges - A15C 80 cartons per pallet	Letsitele / Zebedelia - Polokwane plus 150km radius							Limpopo River - Polokwane plus 250km radius (Louis Trichardt / Mussina / Tshipise / Weipe)							Zimbabwe - Polokwane plus 300km radius (Beitbridge district)						
	Port Loaded Container			Polokwane Loaded Container by Rail			Diff	Port Loaded Container			Polokwane Loaded Container by Rail			Diff	Port Loaded Container			Polokwane Loaded Container by Rail			Diff
	Total per load	No of plts	Port per pallet	Total per load	No of plts	Inland per pallet		Total per load	No of plts	Port per pallet	Total per load	No of plts	Port per pallet		Total per load	No of plts	Port per pallet	Total per load	No of plts	Port per pallet	
Packhouse to receiving facility Inland / Port	R 18 000	26	R 692	R 4 000	26	R 154		R 22 000	26	R 846	R 6 000	26	R 231		R 24 000	26	R 923	R 8 000	26	R 308	
Container transportation inland to container terminal	R 0	20	R 0	R 15 000	20	R 750		R 0	20	R 0	R 15 000	20	R 750		R 0	20	R 0	R 15 000	20	R 750	
Container transportation port cold store to container termina	R 1 750	20	R 88	R 0	20	R 0		R 1 750	20	R 88	R 0	20	R 0		R 1 750	20	R 88	R 0	20	R 0	
Handling - 7 day storage incusive	R 210	20	R 210	R 75	20	R 75		R 210	20	R 210	R 75	20	R 75		R 210	20	R 210	R 75	20	R 75	
Storage - 3 days additional @ min R30 per day	R 96	20	R 96	R 0				R 96	20	R 96	R 0				R 96	20	R 96	R 0			
Total per pallet			**R 1 085.81**			**R 978.85**	**-R 106.96**			**R 1 239.65**			**R 1 055.77**	**-R 183.88**			**R 1 316.58**			**R 1 132.69**	**-R 183.88**
Total per carton 15kg Telescopic - high cubed 80 cpp			**R 13.57**			**R 12.24**	**-R 1.34**			**R 15.50**			**R 13.20**	**-R 2.30**			**R 16.46**			**R 14.16**	**-R 2.30**

Grapefruit - E15C/D 65 cartons per pallet	Letsitele / Zebedelia - Polokwane plus 150km radius							Limpopo River - Polokwane plus 250km radius (Louis Trichardt / Mussina / Tshipise / Weipe)							Zimbabwe - Polokwane plus 300km radius (Beitbridge district)						
	Port Loaded Container			Polokwane Loaded Container by Rail			Diff	Port Loaded Container			Polokwane Loaded Container by Rail			Diff	Port Loaded Container			Polokwane Loaded Container by Rail			Diff
	Total per load	No of plts	Port per pallet	Total per load	No of plts	Inland per pallet		Total per load	No of plts	Port per pallet	Total per load	No of plts	Inland per pallet		Total per load	No of plts	Port per pallet	Total per load	No of plts	Inland per pallet	
Packhouse to receiving facility Inland / Port	R 18 000	28	R 643	R 4 000	28	R 143		R 22 000	28	R 786	R 6 000	28	R 214		R 24 000	28	R 857	R 8 000	28	R 286	
Container transportation inland to container terminal	R 0	20	R 0	R 15 000	20	R 750		R 0	20	R 0	R 15 000	20	R 750		R 0	20	R 0	R 15 000	20	R 750	
Container transportation port cold store to container termina	R 1 750	20	R 88	R 0	20	R 0		R 1 750	20	R 88	R 0	20	R 0		R 1 750	20	R 88	R 0	20	R 0	
Handling - 7 day storage incusive	R 210	20	R 210	R 75	20	R 75		R 210	20	R 210	R 75	20	R 75		R 210	20	R 210	R 75	20	R 75	
Storage - 3 days additional @ min R30 per day	R 96	20	R 96	R 0				R 96	20	R 96	R 0				R 96	20	R 96	R 0			
Total comparison per pallet			**R 1 036.36**			**R 967.86**	**-R 68.50**			**R 1 179.21**			**R 1 039.29**	**-R 139.93**			**R 1 250.64**			**R 1 110.71**	**-R 139.93**
Total per carton 17kg Telescopic - high cubed 65 cpp			**R 15.94**			**R 14.89**	**-R 1.05**			**R 18.14**			**R 15.99**	**-R 2.15**			**R 19.24**			**R 17.09**	**-R 2.15**

Notes pertaining to costs reflected in Table 3:

1. Only three variable costs differentiate the handling costs of fruit exports 1) the growers cost to transport to a facility being in this case either to Polokwane or to Durban, 2) the cost of handling and storage at a facility and 3) the cost for transporting an empty container to the loading facility and then to a container terminal. All other costs are relatively fixed and are the same no matter the condition.
2. Road transportation costs to Durban port are calculated over an average distance travelled per region using an average cpk value of R18.00 pkm.
3. Road transportation costs from production points to Polokwane are based on Transporting 26 high cube pallets over an average distance per area using a cpk value of R30.00 pkm.
4. An average of R1750 is used for collection, packing and delivering to container terminal for cold stores in Durban.
5. Container rail rate from Polokwane to Durban is an estimated cost based on the cost of the Letsitele service. TFR or the chosen service provider will need to confirm this cost and it must include collection of empty container in Durban, offloading in Polokwane, packing, power and reloading and railing.
6. The handling rate used is a typical Durban cold store handling rate including 7 days storage.
7. The handling rate at the Polokwane site is based on ambient rate including 10 days storage.
8. Storage rate used is typical Durban cold store storage rate per day from day 7 – day 10.