ESTABLISHMENT OF TRUCK INN & PUBLIC TRANSPORT FACILITIES IN THE LIMPOPO PROVINCE

PHASE 1

VOLUME 5

GATEWAY FREIGHT LOGISTICS CENTRE

DEPARTMENT OF TRANSPORT

FINAL REPORT
NOVEMBER 2002

VOLUME 5:
ESTABLISHMENT OF TRUCK INN & PUBLIC TRANSPORT TRANSFER FACILTIES: GATEWAY FREIGHT LOGISTICS CENTRE

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1. INTRODUCTION

1.1 PURPOSE OF REPORT

This report focuses on one section of a more comprehensive project relating to the development of truck inn and public transfer facilities in the Limpopo Province. Trade and Investment Limpopo (TIL) embarked upon a terms of reference to develop business plans for such facilities, acting on behalf of the provincial Department of Transport.

The project is conducted in two parts of which the first focused on the identification of potential development sites in the province and the prioritisation thereof.

This interim report follows the prioritisation process and is aimed at the formulation of a conceptual framework and business plan for the development of a freight logistics centre at the Gateway International Airport at Polokwane.

1.2 BACKGROUND AND MOTIVATION

The Limpopo Provincial Government identified Gateway International Airport as a priority for the further development of transport related facilities. This priority was motivated against the background of the importance of this node for the economic development strategy for the Limpopo Province. Details in this respect are given in Section 2.

The contents of this report is guided by the information provided and directives obtained during workshops and other consultation events, particularly the workshop held at Waterpoort during August 2002 where relevant Limpopo provincial departments were represented, facilitated by Trade and Investment Limpopo (TIL) and the project team; and a follow-up meeting held at Gateway where airport officials were also present.

A broad outline of the directives received during the above consultation processes are listed underneath and are elaborated in more detail in the summary of the section that deals with the development perspectives. The workshop at Waterpoort concluded with the following decisions regarding Gateway:

(i) The Gateway conceptual design must be completed with the requirements listed underneath.

(ii) The conceptual design must be based on a “Dry Port” – concept where rail, air and road based services meet with facilities to handle containers and to exchange cargo and to break-up and redistribute cargo.

(iii) A truck-inn facility possibly linked with the fuel station opposite the brewery site or elsewhere.

(iv) Gateway should also accommodate a customs “pre-check” – facility for all traffic to Beit Bridge, with the Polokwane customs offices located at this point.

1.3 APPROACH AND METHODOLOGY

In view of the fact that this interim report is aimed at a the conceptual level only, the methodology relies much on the contents of studies done so far, consultation with relevant role players on the most recent views and ideas, the objectives of the government locally and regionally in terms of economic development and finally to bring all the above broader issues into perspective with the role of freight distribution in the province and how facilities in this respect can support the broader objectives.

The end result is aimed at providing a conceptual development framework for the provision of a freight logistics centre, including truck-inn and traffic control facilities.

The following focus areas are attended to:

- A study of the more recent development initiatives of the airport
- The broader economic development perspectives for the Limpopo Province
- The potential and possible future role of the airport in the broader development context
- The role of a freight logistics centre in support of this comprehensive development strategy.
- The development of standards and requirements for the central distribution facility, facility design procedures and typical physical facility design considerations.
- As part of the above design process and overview is given of elements of the logistics centre including the areas suggested for receiving/dispatch, storage, typical material and handling equipment, support services
- Cost estimates are made for cold storage/distribution, ambient storage/distribution centre.
- Design details given for the truck inn and filling station, with typical physical facility design considerations, details about the accessibility and site characteristics, amenities, the layout of the site, cost implications
- An assessment is also made of the spatial locational issues

An important factor that influences the nature and content of this conceptual report is the current process to compile a comprehensive development framework (master plan) for the entire Gateway as a development node, including the establishment of an IDZ. During a meeting at Gateway with airport and provincial government officials, it was decided that this interim conceptual report regarding the establishment of a logistics centre should serve as input to a more comprehensive nodal development framework.

It follows that the contents of the development framework could have an impact on the proposals contained in this report and adjustments could therefore be made afterwards. In essence this report, once finalized, will form part of the more comprehensive development framework. Final decisions in this respect would therefore also be in terms of the comprehensive development framework after which implementation projects can be initiated.

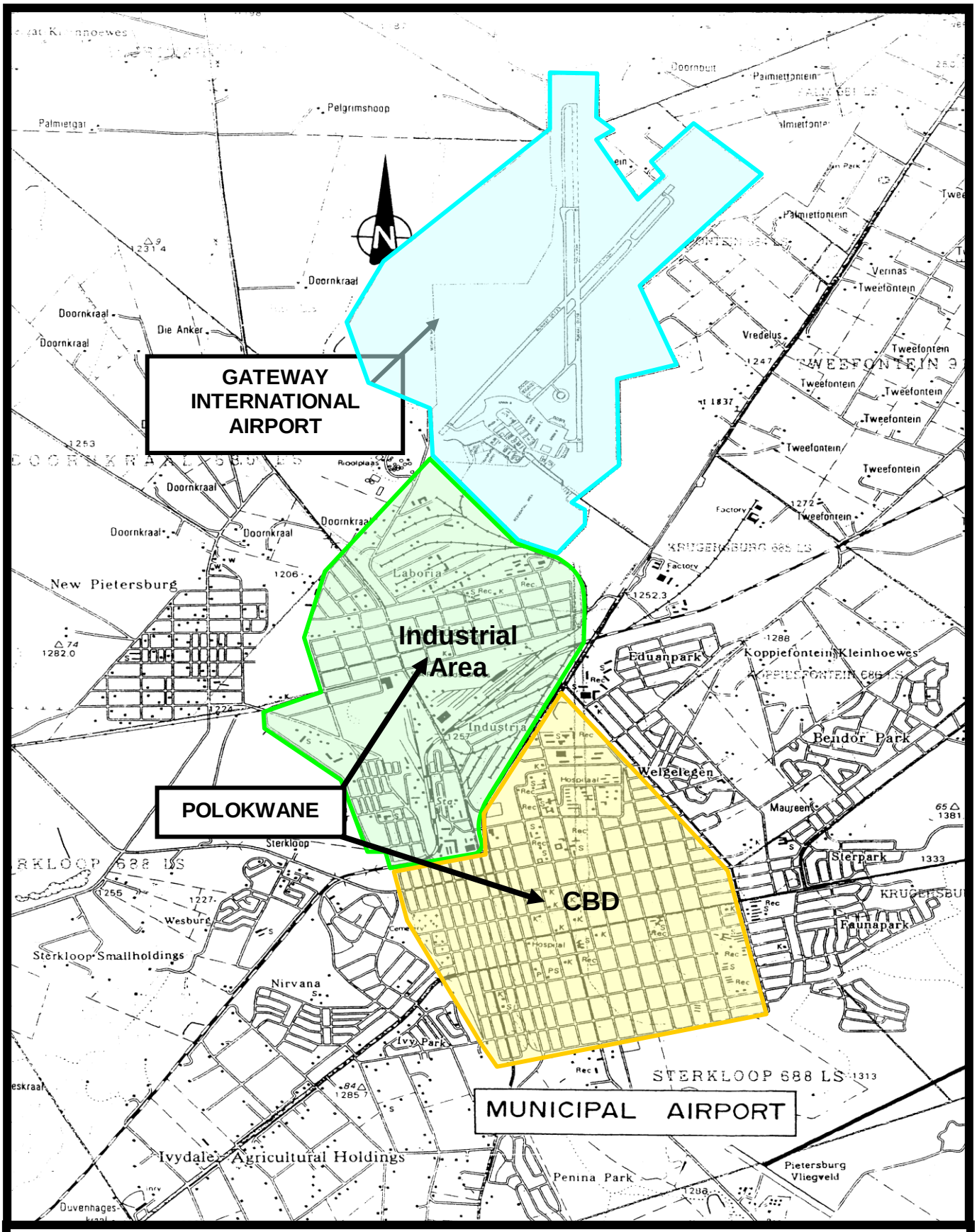
1.4 STUDY AREA

Figure 1 shows the location of the Gateway International Airport within regional context with Polokwane CBD and the industrial areas.

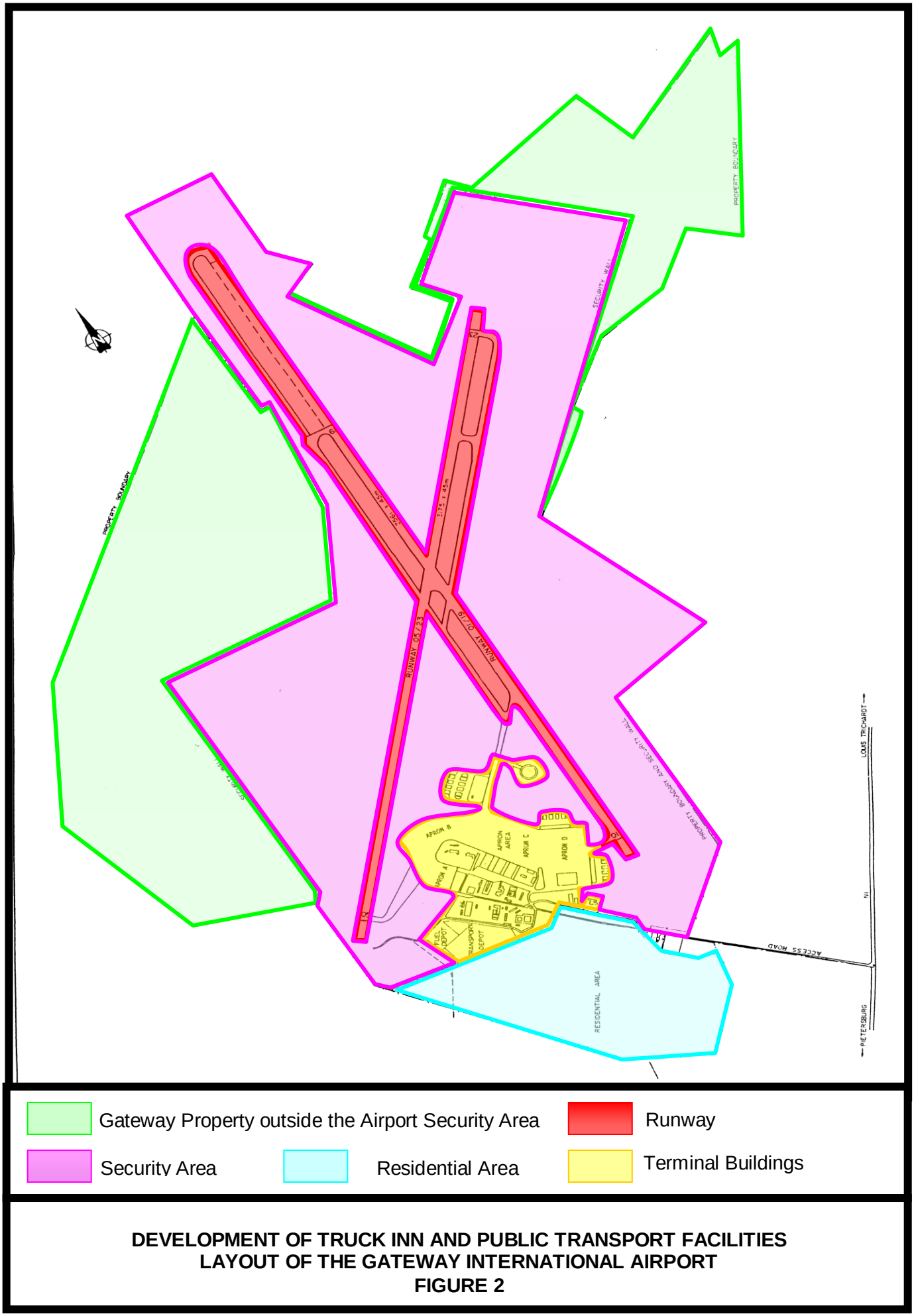
Figure 2 indicates the layout of the Gateway site with the runways, the airport terminals, the security area and the adjacent open land that is part of the entire site but secured from the airport activity areas.

1.5 VISUAL MATERIAL

Visual material of the airport and surrounding areas is contained in Annexure 1.



DEVELOPMENT OF TRUCK INN AND PUBLIC TRANSPORT FACILITIES
THE STUDY AREA
FIGURE 1



DEVELOPMENT OF TRUCK INN AND PUBLIC TRANSPORT FACILITIES
LAYOUT OF THE GATEWAY INTERNATIONAL AIRPORT
FIGURE 2

2. DEVELOPMENT PERSPECTIVES AND REQUIREMENTS

2.1 GATEWAY HISTORIC DEVELOPMENT BACKGROUND

The Gateway International Airport is the “successor” to the former Pietersburg Air Force Base that was vacated by the National Defence Force in the early nineties as part of the Defence Force rationalization program during the transition period when the ANC government took over from the former NP government.

Based on the favourable location of the former Air Force Base on the outskirts the former Pietersburg, together with the role of Pietersburg (Polokwane) as capital city of the Limpopo Province, the infrastructure at the air force base provides an excellent opportunity for this node to become an important economic activity node for the entire region.

The potential for linkages to the rest of Africa and to other international destinations was soon realized, particularly in terms of goods import and exports on a regional basis, with its impacts on employment opportunities and sustainable long term economic growth through the multiplier effect on a multi sectoral basis.

Based on these prospects, negotiations were initiated that eventually led to the transfer of the entire facility to former Northern Province Provincial Government during 1994, hence the birth of Gateway International Airport.

Since the transfer of the facility to Limpopo Province, a number of initiatives were undertaken to upgrade and transform the facility into a regional airport with an international status providing all or most services that are generally undertaken from international airports, even though it is on a very low volume base.

Some of the initiatives were not very successful, yet the motivations and the opportunities behind the ideas remained promising, given the potential of other economic activities which could eventually assist to overcome the main problem of the airport, namely sufficient volumes to become financially feasible to expand the airport.

These initiatives relate to:

- The registration of holding company and subsidiaries to allow the facility to become a commercialised entity.

- The transformation of the entire facility from a military base to a commercialised institution from where scheduled flights are provided and certain maintenance services are provided to the air transport industry.

- The physical redevelopment (or plans to this effect) of the airport to enable higher capacity aeroplanes to use the airport.

- The principle to transform part of the Gateway into an IDZ. As part of this principle the possibility to establish facilities at - or adjacent to the airport that would transform the entire facility into a comprehensive integrated transport zone where air, road and rail services meet and from where cargo could be redistributed along the logistical chain and where warehousing, cooling facilities and a terminal facilities for truckers can be provided.

Some of the initiatives undertaken include an investigation under the auspices of the Airports Company of South Africa (ACSA) that investigated Gateway from an air industry business point of view. The results of this exercise emphasized again the main problem of the airport namely a lack of volumes.

Another study investigated the physical attributes of the airport and particularly possible improvements, an assessment of the current capacities and what is required to enable larger aeroplanes to use the airport to become more feasible from an air transport point of view.

2.2 PROVINCIAL ECONOMIC DEVELOPMENT STRATEGIES

The development of the Gateway International Airport forms part of a more comprehensive economic development strategy for Limpopo. The major elements of this economic development strategy include, inter alia, the identification of – and development of identified corridors in the province, the development of the mining industry particularly along the Dilokong corridor, the agricultural and tourism sectors and also Gateway and Hoedspruit as two international airports.

Whilst the Hoedspruit airport is mainly aimed at the tourism market, the Gateway airport is mainly aimed at cargo exports by air, supported by road and rail feeder services. The cargo exports in turn are mainly directed at agricultural products and therefore without proper logistical facilities within Limpopo Province the full potential of the export program cannot be realized.

Local production are currently dependent on air services via Gauteng airports, mainly Johannesburg International Airport, whilst some doubts exist in terms of sustained capacity in Gauteng to accommodate all such exports.

The distance between Limpopo producing areas and Gauteng is another cause for concern and as a result the full development of Gateway is a strategic decision to safeguard the longer-term strategy to develop the agricultural sector as a main employer and generator of economic activities in the province.

Against this background, the negative sentiments of insufficient volumes to justify any further capital investment should be evaluated against the long-term benefits of a more comprehensive economic development strategy as described above.

2.3 THE ROLE OF GATEWAY

Within the framework of the above comprehensive economic development strategy, the role of Gateway is to provide for the key elements of the logistical chain that would ensure that Limpopo agricultural products, and other industrial production, would reach the international markets as cheaply and quickly as possible and in a good condition.

Whilst the cost effectiveness of the airport is not expected to be on satisfactory levels overnight, other supporting strategies can be formulated to support and sustain the efficiency levels of the airport and therefore to justify and recover additional capital investments into the entire Gateway development node with the airport as the central focus point.

Accordingly a proposed strategy for the development of Gateway is based on the following principles:

(i) “Declare” Gateway as the main logistics activity zone for Limpopo.

(ii) Based on this status, this node must be recognized as the home for all major technical, administrative and regulatory transport activities that could be centralized.

(iii) Whether or not these functions are located or could be located elsewhere, the intention is that the accommodation of these functions at Gateway would support and strengthen the overall level of activity at Gateway and systematically an industrial activity character similar to the areas around Johannesburg International Airport would develop. Accordingly these activities would spill over to the total volume of air cargo and passenger traffic.

(iv) Agricultural produce that is destined for the export market would be the main but not the only commodity to be served by this logistics center. Facilities to handle other non-agricultural commodities should be provided on a demand basis

2.4 GUIDELINES FOR A FREIGHT LOGISTICS CENTRE

Based on the above development principles, the following facilities should be located and developed around Gateway:

(i) From a technical point of view, the following transport related or logistics facilities and services should be established:

- A Logistics Park that focus on warehousing for agricultural production with cold storage facilities and ambient storage for products that do not require cold storage.
- The Logistics Park could also provide floor space for repacking from bulk to smaller quantities or to compile individual consignments of different products.
- Further processing of agricultural products (liquidizing, canning etc.) should be accommodated in the IDZ if it is destined for the export market.
- General warehousing of products that are destined for Polokwane and surrounding areas from Gauteng and other origins can be accommodated at separate facilities in the same Logistics Park. Such commodities have no relevance to air exports and are aimed at serving the local markets.
- A fuel station of a high standard, equivalent to major stations that are found along the national routes.
- A truck inn facility integrated with the fuel station, where security arrangements are on a high level. This truck inn is partly aimed to serve trucking to and from the Logistics Park and the IDZ and partly also for through traffic to Beit Bridge and other opposite destinations.
- Accommodation and recreational facilities for truckers that would allow them to over night outside their trucks without security fears.
- Emergency vehicle maintenance services adjacent to or integrated with the truck inn facility.
- General transport industry service centres such as wheel and tyre outlets etc.
- Courier services.
- General trucking services.

(ii) From an administrative and regulatory point of view, Gateway should become the home for non-technical functions and services accommodating the following public and private sector services and functions:

- The offices of the Department of Transport
- Customs offices for the normal export and import custom services and to pre-check road vehicles towards Beit Bridge.
- Possibly a traffic control centre, provided it is part of a provincial strategy of traffic control centres that would focus on overloading and roadworthy regulations.
- A traffic court.

3. TECHNICAL STANDARDS AND REQUIREMENTS

3.1 INTRODUCTION

The following services / infrastructure are suggested to be developed as part of the freight logistics centre:

(i) Agricultural product distribution facilities:

- Cold Storage
- General Warehousing
- Processing Plant

(ii) Accommodation and service station facilities:

- Truck Inn facility
- Filling Station

(iii) Traffic management and control facilities:

- Traffic Control Centre
- Related Government Offices

These three types of facilities are discussed below.

3.2 CENTRAL LOGISITICS CENTRE (LOGISTICS PARK)

The growing, harvesting, processing, packing and distribution of all agricultural products including meat etc in the Limpopo Province appears to be of a segregated nature. An opportunity therefore exists to investigate a central distribution facility due to economies of scale.

At this conceptual stage of the planning details of the exact volumes and network profile are not essential but eventually when detailed design is done when the exact facility capacities are to be determined, a detailed survey has to be executed amongst the potential users of the facility to access exact requirements and willingness to participate as a partner.

Introducing centralised processing and packing facilities in close proximity to the central distribution facility could further enhance the concept of centralised distribution. The location of this processing facility at either the Logistics Centre or at the IDZ is another issue to be debated. At this stage a processing plant's conceptional plan is not presented due to the vast range of possible requirements that can only be determined once a detailed survey has been conducted. A processing plan can only be formulated when the exact requirements are defined.

The central distribution facility is proposed as the key element of the Logistics Park and a conceptual layout is presented in this section as a hypothetical design to be used as a starting point for further investigation.

It is essentially intended to be used as a short-term storage or cross dock facility to handle all agricultural products, meat products etc. in a temperature controlled or ambient environment which are to be forwarded to the market place across border or other SA regions by air or road.

The products to be handled will be in a pre-packed format, which can be palletised. A unit load handling facility is therefore proposed. The principle of the design will be flexible to adapt to changing requirements.

3.3 DETAILED DESIGN PROCEDURES

3.3.1 Introduction

This design process described in this section is relevant to both ambient and cold room distribution facilities.

Stock control decisions affect the layout and handling system. Further, the facilities plan has to take into account lot size decisions, stock turnover goals and approaches used to deal with seasonal demand affect.

Space and flow requirements will be affected by financial and human resources decisions and will in turn have an impact on the storage, movement, protection and control of stock.

Typically facility planners tend to react to the needs defined by others, rather than to participate in the decision-making that creates the needs. A proactive rather than a reactive role for facility planning is recommended.

In determining the requirements of a facility, the relationship between flow, space and activity must be carefully considered:

- ***Flow*** depends on lot sizes, unit load sizes, material handling equipment, layout arrangement and building configurations.

- ***Space*** is a function of lot sizes, storage system, handling equipment type and size, seasonal demand, stock turn rates, house keeping and building configuration.

- ***Material or personnel flow, environmental considerations, control issues and process requirements define activity relationships***.

It is believed that the mission of these warehouses will be to accumulate and consolidate products from points of production sourced from various farms for combined shipment to common customers or areas.

3.3.2 Procedures

The following is an overview of the standard process required to establish a realistic conceptual design.

- Define the objectives and confirm the scope and schedule in terms of deliverables, cost and assumptions.

- Familiarisation with existing activities, products, logistics flows and generate base data requirements in a questionnaire format detailing ideal format required.

- Establish long-term growth scenario.

- Desktop study of previous reports studies and analyses.

- Client meeting to discuss availability of meaningful data and information required. Collect and manipulate the data, information, and/or drawings through appropriate interviews, meetings and workshops. This will be done for the current situation as well as the growth scenario.

- Generate spreadsheet model, format all base data details and submit to client for approval.

- Manipulate base data into design data, which will form the basis of the system conceptual design. This document requires a client sign-off to agree information to be used for the design.

- Note that the design data will be manipulated in segments for all of the activities.

- Analyse the data and do the conceptual design according to the following parameters (not listed in order of importance):

    - Initial capital investment
    - Operating costs
    - Manpower levels
    - Life expectancy
    - Site limitations
    - Reliability expectations
    - Utilisation requirements
    - Maintenance and service support
    - Performance parameters
    - Upgrade capabilities
    - Return on investment
    - Expansion capabilities
    - Overall system integration
    - Density of storage by unit volume
    - Spares availability
    - Tax write off incentives
    - Generate warehouse management system
    - Manual, mechanical, semi-automatic or automatic preferences

- Space planning of individual functions produced on CAD conceptual design drawings, based on unit sizes, storage systems, materials handling equipment, layout configuration, etc.

- Once the preliminary conceptual design has been completed, various specialist service, system and equipment providers will be approached to ascertain estimated financial implications for budgeting purposes. The following include some of the issues that will be addressed:

    - Implementation planning schedule
    - Lead times for delivery
    - Budget costs
    - Confirmation of performance parameters
    - Risk analysis

- Prepare preliminary report and documentation, comprising:

    - Introduction
    - Scope of work
    - Design data
    - Functional specifications of preferred system
    - Alternative design comparison
    - Budget costing
    - Proposed implementation schedule

- Present preliminary findings in an interactive work session.

- Prepare and present final updated edition of the report with necessary refinement and changes as agreed.

3.4 TYPICAL PHYSICAL FACILITY DESIGN CONSIDERATIONS

The conceptual design of the centralised agricultural product facilities is discussed below. Two conceptual design drawings are attached:

- **Figure 3:** Cold rooms
- **Figure 4:** Ambient store

3.4.1 Overview

It is once again essential to note that this is hypothetical proposal. No site plan is provided, as land availability is not a major problem other than the decision where exactly to locate the facility as optimally as possible (refer to section 4), including the integration and linkage to other facilities.

An important consideration at this early conceptual stage, particularly with regards to the choice on the location and the basic design, is that the facility should be planned and constructed in such a way as to easily expand the operation as the future increase in demand and through put would require.

Freezer and ambient stores combined and a separate ambient store is indicated on attached drawings. If further separations are required due to e.g. possible cross contamination, the facility could be further subdivided into smaller cubicles for the same temperature.

The contamination issue could also influence the choice to locate the processing plant in the IDZ or at the Logistics Centre. The nature of the plants and processes could necessitate the location of the processing plant to be placed at the Logistics Centre.

A computerized warehouse management system should be introduced due to the fact that a first in first out principle should be adhered to for each product handled per customer. Emphasis will be placed on high throughput material handling equipment due to the cross dock/short-term storage nature of the facility.

The internal floor will be 1350 mm higher than the yard area. This is a standard height differential to aid loading and unloading of containers and long haul trailers.

3.4.2 Receiving / Dispatch

The door centres will be at 4000mm to enable drivers to site long vehicles into position with ease. Each door can handle seven vehicles per shift (8hours). The number of doors required should be based on the expected number of vehicles to be handled during the peak operating period.

All doors in the temperature controlled stores will be fitted with seals dock levellers and an air lock to minimise the loss of cold air. This will help to conserve energy costs in the long run. All doors will be fitted with dock levellers, which are devices used to salvage height differences between warehouse and trailer floors. They are hinged on one side to incline or decline to suit the floor differences, allowing a roll-on / roll-off concept to be used.

The open floor area adjacent to the doors will be used for palletising and checking when goods are received. Loads destined for dispatch will be marshalled into this area ready for loading. In addition, cross docking operations will also be handled in this area. Cross docking is the process of receiving, checking, sorting and shipping by passing the storage function.

Insulated panels separate the temperature-controlled stores. An interleading door is provided at the marshalling side of the building, which would only opened when it is required to transfer material handling equipment to wherever it is demanded by the workload.

3.4.3 Storage

The following storage capacities are typical for a facility of this nature – the exact capacities will, however, depend on the type of products stored, peak characteristics, volume of product, seasonal fluctuations of the various products etc.:

- Ambient Store = 1020 Pallet locations all static rack
- Freezer Store = 445 Pallet locations in static rack
  = 540 Pallet locations in deep lane storage
- Cold Store = 440 Pallet locations in static rack
  = 540 Pallet locations in deep lane storage

A combination of static and deep lane racking is proposed. Each location will be labelled with a unique bar code number to aid storage and retrieval processes, in addition to managing the first in first out principle.

An industry norm for this type of product is a pallet and load height of 1200mm high, which has been allowed in the conceptual design. The rack is designed to hold pallets with a maximum load 1000kg each. The retrieval and storage of the pallet loads will be by means of a reach truck, which is specifically designed to operate in confined spaces. The static rack provides 100% accessibility to all pallet loads and is configured in a 5 high assembly.

Cold room/freezer facilities are relatively expensive to operate compared to ambient temperature stores. It is considered good practice to introduce high-density storage methods to obtain a high utilisation in the storage cube. However the final design should be dictated by the product profile in terms of number of products handled and quantity.

The deep lane rack provides a high-density storage module suitable for unit loads. It is particularly suited for bulk storage and cost effective for use in a temperature-controlled facility. Any given lane should be used for similar types of products. A machine commonly known as a mole or radio shuttle will service the deep lane storage rack.

3.4.4 Typical Material and Handling Equipment

A combination of counterbalanced forklifts and reach trucks will be used. Counterbalanced forklift trucks fitted with container masts should be used to handle the loading and unloading of the delivery vehicles. Reach trucks will handle the storage and retrieval of the unit loads to the racks. To comply with contamination and pollution requirements both of these machines should be battery operated to suit the handling of food and the enclosed environment.

Although the initial investment cost is higher when the operating and service cost is considered the overall cost is lower than on an IC powered unit. Reach trucks are used in the store due to their ability to operate in smaller clearances therefore reducing the area required. Both machines would be rated at a lift capacity of 1,5 tons to a reach of 6 500mm high.

As mentioned, a machine commonly known as a mole or radio shuttle services deep lane racks.
This is a relatively simple but effective device self-propelled running on trucks within the rack structure. The machine is handled in the same way as any pallet by the forks of the reach truck for positioning into any lane.

The concept is based on the use of a self-propelled battery operated load carriers that conveys the goods in and out of deep storage tunnels of specially designed racks. It is compatible for use in conjunctions with any reach truck or forklift. Each unit has rechargeable batteries, is operated by wireless remote control and can be quickly and easily transferred between lanes by conventional reach trucks or forklift trucks.

Built in sensors precisely control shuttle parking in the storage tunnels to ensure maximum density of storage. While the radio shuttle transports the load within the racking the truck driver is free to work elsewhere. It has the ability to handle the pallets on a first in first out basis without reorganisation of the pallets. Several radio shuttles can be handled from one radio transmitter.

The exact number of units required for material handling cannot be established until the number of unit load inputs and outputs are established.

3.4.5 Support Services

In a facility such as this, the need for the following support services will inevitably arise:

- Refrigeration plant room.
- Battery charging room.
- Admin offices including change rooms.

Further information is required to space plan these amenities.

3.4.6 Costs Estimate Cold Storage /Distribution

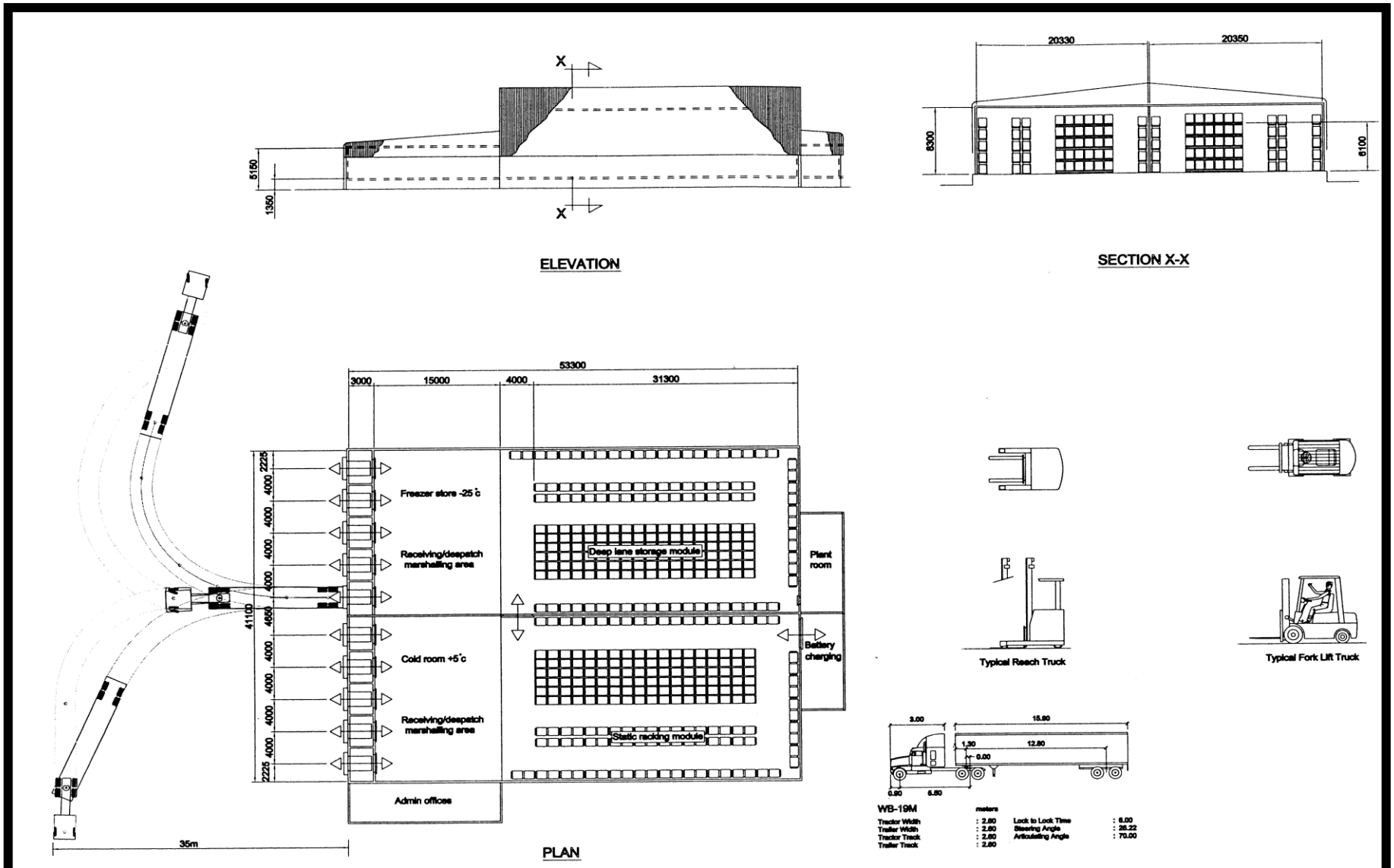
A preliminary cost estimate of a typical cold & freezer storage / distribution centre are given below:

Component	Total
Access route (400 m)	R900 000
Paved area (yard etc)	R480 000
Freezer area	R2 160 000
Cold Room	R2 160 000
Offices	R 560 000
Storage area	R5 600 000
Plant room and battery charging area	R400 000
Material handling equipment (Fork lifts, reach truck, radio shuttle, Static racks/pallet, deep lane storage/pallets etc.)	R3 037 600
Contingencies	R3 059 520
TOTAL	**R18 357 120**

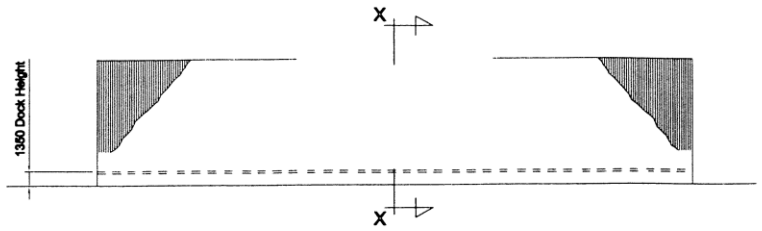
3.4.7 Costs Estimate Ambient Storage / Distribution Centre

A preliminary cost estimate of a typical cold & freezer storage / distribution centre are given below:

Component	**Total**
Access route (400 m)	R900 000
Paved area (yard etc)	R360 000
Storage area / offices etc.	R6 480 000
Material handling equipment (Fork lifts, reach truck, radio shuttle, static racks/pallet)	R2 474 400
Contingencies	R2 042 880
TOTAL	**R12 257 280**

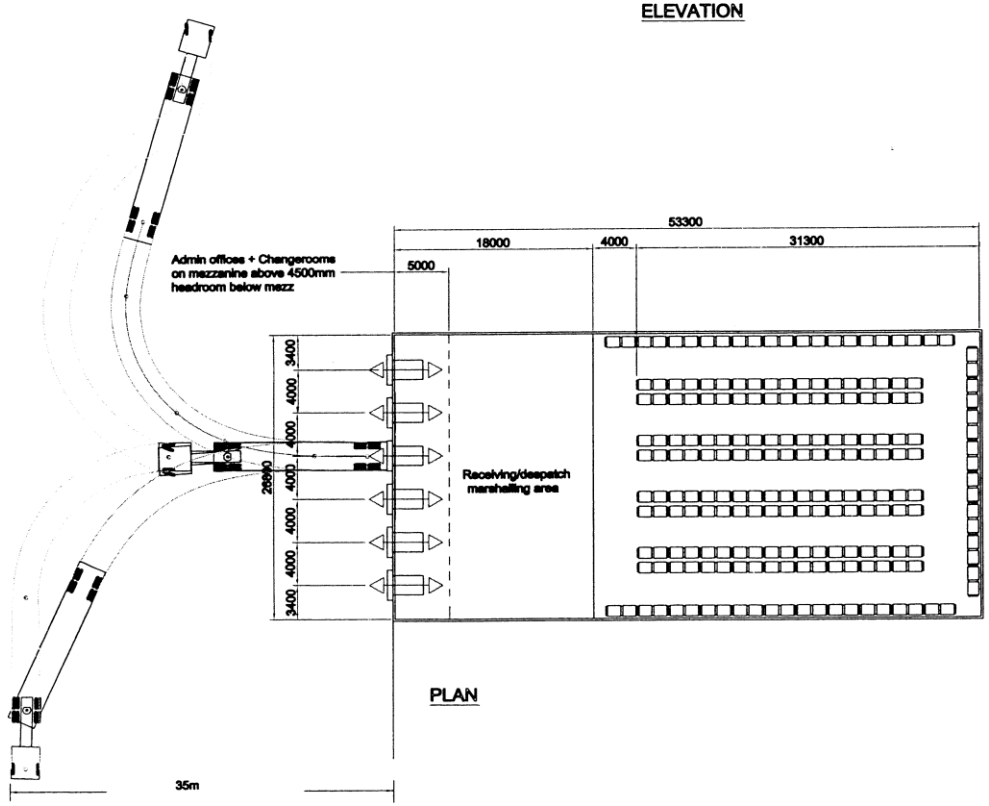


DEVELOPMENT OF TRUCK INN AND PUBLIC TRANSPORT FACILITIES
HYPOTHETICAL CONCEPTUAL DESIGN FOR CENTRALISED AGRICULTURE PRODUCT DISTRIBUTION
FIGURE 3

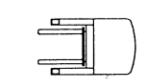


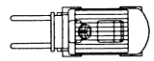
ELEVATION

SECTION X-X

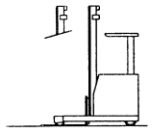


PLAN

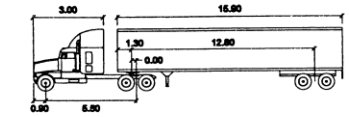




Typical Reach Truck



Typical Fork Lift Truck



WB-19M

	meters		
Tractor Width	: 2.80	Lock to Lock Time	: 6.00
Trailer Width	: 2.80	Steering Angle	: 26.22
Tractor Track	: 2.80	Articulating Angle	: 70.00
Trailer Track	: 2.80		

DEVELOPMENT OF TRUCK INN AND PUBLIC TRANSPORT FACILITIES
HYPOTHETICAL CONCEPTUAL DESIGN FOR CENTRALISED AGRICULTURE PRODUCT DISTRIBUTION – AMBIENT STORE
FIGURE 4

3.5 TRUCK INN AND FILLING STATION

3.5.1 INTRODUCTION

Whilst the development of a filling station could be implemented immediately as a private sector driven initiative, the use of the truck-inn might only become effective once the Logistics Park and the Gateway development node has developed to such an extent that sufficient traffic is generated. Normal traffic on the N1 and the Western Ring Road is however expected to make a filling station a feasible private sector project.

It makes, however, sense to locate the facility as close as possible to the access road to Gateway in order to intercept not only Gateway destined traffic but also local, regional, provincial and international traffic traveling on the N1 and the Western Ring Road.

3.5.2 TYPICAL PHYSICAL FACILITY DESIGN CONSIDERATIONS

3.5.2.1 Positioning

The positioning of the fuel station and the truck inn facility is extremely important because, as a private sector driven project, the financial feasibility will entirely depend on market volume, which in turn is dependent on the traffic volume.

For the purposes of this facility the following considerations are considered:

- If there is a choice to locate the facility on either the west (Dendron side) of the airport or the east (N1 side), then the latter is the obvious choice because of the higher traffic volumes.
- The east side also allows the interception of the access road to the airport and possibly also the traffic on the Western Ring Road.
- Given the obvious choice on the eastern side, access to and from the N1 is a necessity and preferably also from the Western Ring Road and the airport access road.
- Alternative positioning on the N1 is also a possibility, in which case a site close to the SA Brewery factory where the linkage with the road towards the eastern ring road towards Tzaneen could intercept traffic from the east.
- Apart from the traffic volume on the N1 and the other roads, the positioning of the truck in facility should preferably be at the filling station itself. Therefore the normal route of truckers is also important.
- The final positioning of the Bypass Freeway (west or east) is therefore an important consideration or alternatively the ease in which the truck inn site can be accessed from both these two alternatives.

A plot that has the N1, the Western Ring Road and the airport access road as its boundaries, appears to be the best position for the fuel station and the truck inn. Further details in this regard are provided in section 4.

Based on the above, a number of alternative layouts can be considered of which one possible layout of the fuel station and truck inn is shown in the sections that follow.

3.5.2.2 Accessibility

The following criteria should be considered when the facility is designed:

- Access to the facility, considering intersection spacing and future road planning;
- Geometric considerations i.e. sight distance at the proposed access to the site as well as the gradients at the proposed access;

- Available capacity at the proposed access to the site and existing and anticipated type of intersection control (priority-stop, priority–yield, 4-way stop, signalized, or grade separated – the type of control at the access to the facility is a direct function of the traffic volumes on the access route to Gateway, the Western Ring Road and traffic on the N1 and, finally, the intercepted volume of the total traffic.

3.5.2.3 Site Characteristics

The following site characteristics are important:

- Access requirements determined by intersection spacing and the road network;
- Size needed to cater for expected demand, allowing for reasonable growth for a minimum period of 10 years;
- Location of other competing facilities
- Adjacent land use (existing and future planned)
- Ownership of site;
- Existing zoning of site;
- Size, topography and shape of site;
- Availability of services (electrical, sewerage, water, storm water, Telkom
- Environmental considerations – leakage of fuel is a serious threat to the environment and an environmental study should be done for the facility;

3.5.2.4 Amenities

It is proposed that the following minimum facilities be provided at the facility apart from the normal fuel pump and other service facilities associated with a fuel station:

- Toilets, with separate facilities for the public and the personnel;
- Lockers and ablutions for personnel with shower and washing facilities;
- Restaurant and fast food outlet;
- Convenient store;
- Storage rooms with a loading berth;
- Public parking space
- Telephones;
- Other public communications facilities (internet, fax, copier etc.)
- Truck inn staging/parking area
- Low cost accommodation for truckers, with separate ablutions for truckers
- Recreation facilities for truckers (pool tables, TVs, bar, etc. separate from the restaurant)
- Open park area, landscaped;
- Entrance and exit security for the truck staging area– this is one of the most important elements at a truck-inn facility;
- Emergency maintenance services
- First aid equipment and, depending on the volume of trucking, clinic facilities.
- Lighting;
- Offices for the customs pre-check services.
- Direct linkage with access roads to the Logistics Centre, airport and the IDZ, preferably not via the N1.

3.5.2.5 Layout of the Site

A conceptual layout for such a facility is provided as **Figure 5**.

The heavy vehicles travel in a clock-wise direction as making right hand turns with large vehicles enable the driver to see the tail end of the vehicle more easily. Vertical clearances on site should be at least 4.1 metres.

3.5.2.6 Cost Implications

The cost implications of the facility is obviously dependent on the final layout and design, but the costs involved with the facility as shown on **Figure 5** were, however, approximated as follows:

Buildings	**Rate/m^2**	**Total**
Paved areas	R300	R3 300 000
Paved islands	R100	R130 000
Buildings	R4000	R3 900 000
Landscaping	R50	R50 000
Fuel pumps, tanks etc.	-	R3 000 000
Contingencies		R1 038 000
	Total	**R11 418 000**

3.6 TRAFFIC CONTROL CENTRE

The possibility to locate a traffic control centre adjacent to or close to the truck inn and the Logistics Park should be considered carefully. Considerations that would favour such facilities at the Gateway node are the following:

- The fact that the entire Gateway node would systematically become a comprehensive integrated transport development zone and therefore all possible facilities that relates to transport should preferably be located at this node. More details in this respect follow in section 4.
- Polokwane is the capital city of Limpopo and a number of main national and provincial roads run through this city. A traffic and load control facility near Gateway is therefore a strong possibility, also because this node could be a natural destination point.

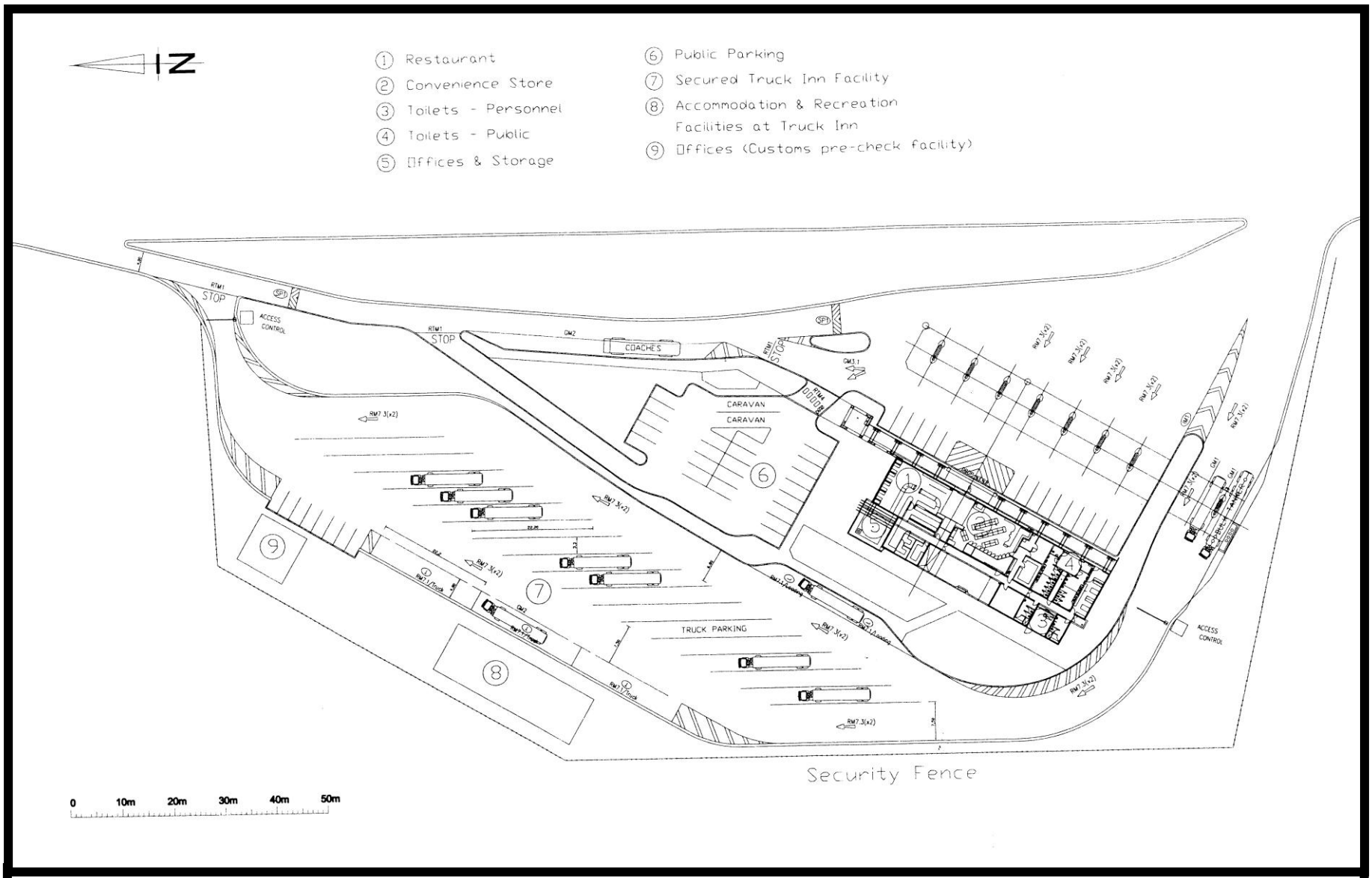
A likely position for the traffic control center would be where the future Western Bypass would meet the N1. See details in section 4, Figure 6

The standards and requirements for a typical Traffic and Load Control Centre are described in detail in the report entitled *"Development of a Traffic Control Centre and a Load Control Centre on the N1 between Musina and Beitbridge"*. The same requirements would apply and the layouts would equally not be different or much different.

If no load control is, however, required the facilities described in the mentioned document could be reduced significantly with the associated saving in costs.

In general the design and specifications shall comply with the relevant SABS or BS specifications and codes of practice and shall conform to good practice for the particular discipline if no applicable specification or code of practice exists.

The permanent infrastructure shall be designed for low maintenance with a 20-year minimum life. All design work and registered professionals or professional firms shall execute compilation of specifications.



DEVELOPMENT OF TRUCK INN AND PUBLIC TRANSPORT FACILITIES
CONCEPTUAL DESIGN FOR TRUCK INN & FILLING STATION
FIGURE 5

4. SPATIAL ORGANIZATION

4.1 LOCAL AND REGIONAL LINKAGES

Figure 6 indicates the road and rail networks in and around Polokwane and in particular the linkages with Gateway.

4.1.1 Rail Network

The rail network consists of the main railway line that runs through the center of Polokwane from Gauteng to the north towards Beit Bridge.

The railway line branches off north of Pietersburg Station at the main shunting yard and provides sideline facilities to the industrial areas north of the CBD including a sideline to Gateway. This sideline is, or was, mainly used to source the airport with fuel. The sideline is currently not used.

Within Gateway provision is made for two possible sidelines of which only one is developed. It is possible to extend the sidelines to serve the plots west and east of Gateway.

4.1.2 Road Network

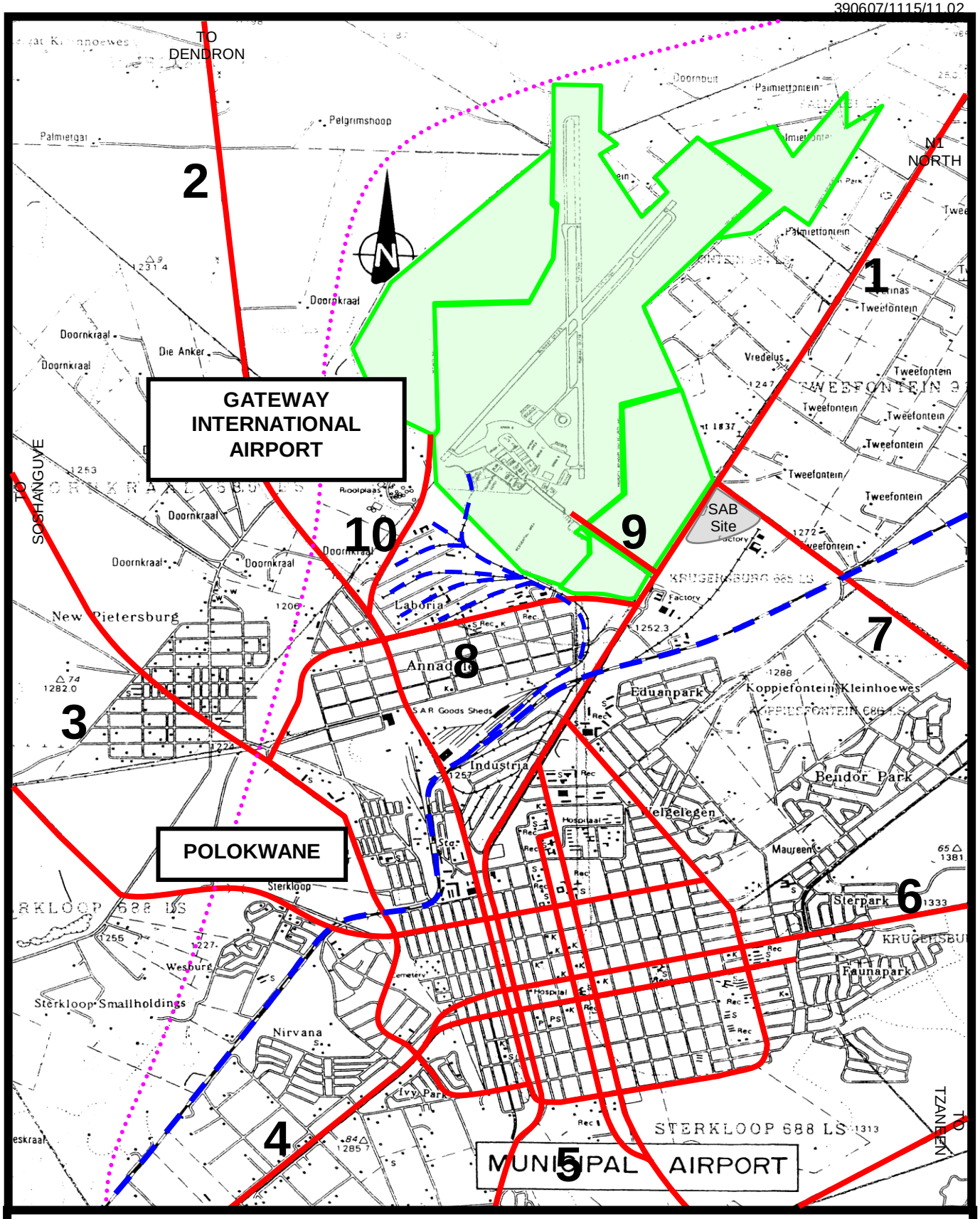
Gateway is well connected with a number of main local arterials, provincial and national routes. These routes are numbered in Figure 6 and listed below:

- **Route 1:** The N1 north towards Beit Bridge
- **Route 2:** The Dendron road
- **Route 3:** Nelson Mandela Drive towards Seshego
- **Route 4:** The N1 south towards Gauteng
- **Route 5:** The routes towards Lebowakgomo and the Dilokong Corridor
- **Route 6:** The provincial road towards Tzaneen and the University of the North
- **Route 7:** The eastern Ring Route connecting the N1 (north) with the Tzaneen road
- **Route 8:** The Western Ring Road that connects Nelson Mandela Drive with the Dendron Road and the N1 North.
- **Route 9:** The access road to the airport.
- **Route 10:** The access road from the Dendron road to the western vacant plot of the Gateway property

From the above description, it is clear that the most important routes that provide access to Gateway is the N1 and the Dendron road that forms a V-shape to the north, whilst the Western Ring Road connects the two main access legs enclosing Westgate.

The Gateway access road leads from the N1 and therefore the most strategic positions from a nodal development point of view would be around the points where the N1, the Western Ring Road and the airport access roads link.

The access road to the western plots of Gateway is equally important, which again leads from the Western Ring Road.



Road Network

Rail Network

Gateway International Airport

Proposed Western Bypass

DEVELOPMENT OF TRUCK INN AND PUBLIC TRANSPORT FACILITIES
ROAD AND RAIL NETWORK
FIGURE 6

4.2 LAYOUT OF GATEWAY

The entire Gateway development node consists of the following individual zones or areas as reflected in Figure 7:

- **Zone A:** The airport itself within a security area that accommodates the airport's terminal buildings, services buildings, the fuel depot, the runways and the open areas adjacent to the runways

- **Zone B:** An area west of the airport that is part of the Gateway property but outside the security area. This area is currently not used or developed at all and which is considered for locating the IDZ.

- **Zone C:** An area north of the airport that is part of the Gateway property but outside the security area. This area is also not used but is held in reserve for runway extensions and should preferably not be used for other purposes.

- **Zone D:** An area between the eastern boundary of the airport and the N1 national road and north of the access road into the airport. This area is government property but not part of the Gateway property. This area is partly used for military purposes but not developed.

- **Zone E:** An area between the airport and the N1 national road, south of the access road into the airport. This area is also government property but not part of Gateway. This area is vacant and not developed at all.

Apart form the above development zones the following areas are also of importance when the positioning of future developments are considered:

- The entire industrial area situated south of Gateway, indicated in green in Figure 1.

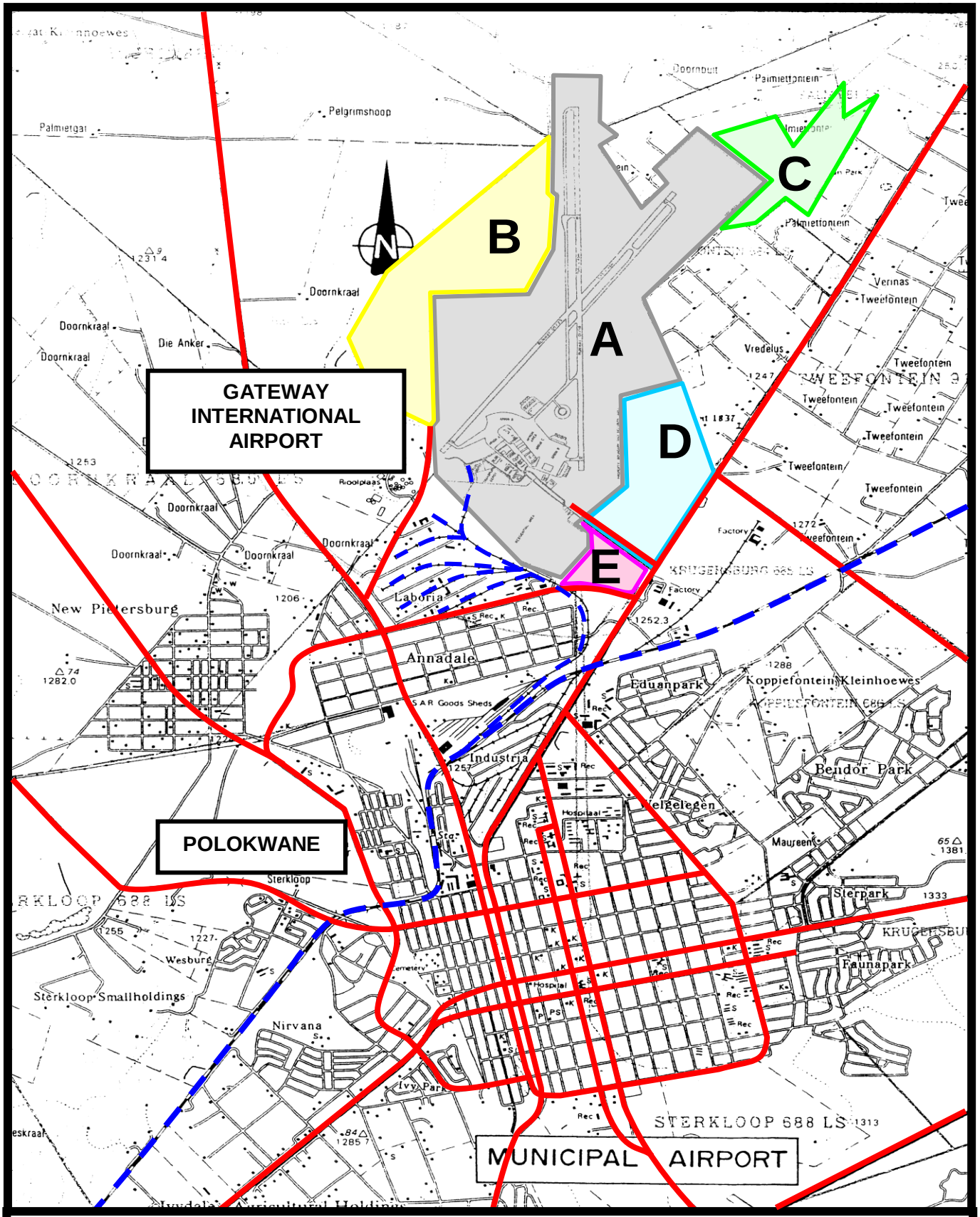
- The Laboria industrial area where rail sidings are provided is of particular importance especially since this area is not fully occupied although most plots are developed. Whenever additional rail sidings become an important consideration for the establishment of either the IDZ or the Logistics Park, the unoccupied capacities within this part of the industrial area must be considered.

- The water works southwest of Gateway could become an impacting factor from an environmental point of view. Refer to section 4.3.6.

- The bird sanctuary that is situated west of Gateway is a conservation area and is also an impacting factor from an environmental point of view. Refer to section 4.3.6.

- The entire river area west of Gateway forms a natural barrier and access can only be provided by means of a bridge.

- The small holding areas north of Gateway are low-density rural areas that should preferably remain as such in view of the fact that these areas would be affected by air traffic noise and it could become risk areas because of air traffic.



DEVELOPMENT OF TRUCK INN AND PUBLIC TRANSPORT FACILITIES
DEVELOPMENT ZONES IN & AROUND THE GATEWAY INTERNATIONAL AIRPORT
FIGURE 7

4.3 EVALUATION OF POTENTIAL DEVELOPMENT SITES

4.3.1 Criteria

The main criteria that are considered for the location of the Logistics Park are the following:

- Proximity to - and access from the site to Gateway
- Accessibility of the site from external destinations, particularly in terms of road and rail networks
- Ownership, availability and cost of the site if it is privately owned.
- Technical criteria such as the size of the land, its slope and the availability of services.
- Environmental and conservation considerations as indicated in previous sections

It speaks for itself that Zones A and C cannot be considered for any other purposes or developments other than what it is currently used for.

The areas that can be considered for the development of the Logistics Centre and other facilities listed in section 2.4 are Zones B, D and E. These areas are evaluated below in terms of the criteria listed above.

4.3.2 Proximity

All three areas are located directly adjacent to Gateway and practically speaking direct linkages can be formed from any of the zones with the airport without any major problem.

It is however important that access be provided through the security wall to ensure quick and easy access, instead of using the outside local road network to enter the airport property.

4.3.3 Accessibility

The analysis of the road and rail networks and the issues mentioned regarding accessibility (see sections 3.5.2 and 4.1) emphasize the strategic importance of the available land on the east of Gateway for locating both the IDZ and the Logistics Park.

Although Zone B at the western side is not inaccessible, the quality of accessibility at the eastern side (Zones D and E) is much more superior particularly because these zones are served by the N1, the airport access road and the Western Ring Road. For these reasons Zones D and E are preferred to Zone B from an accessibility point of view.

It could be argued that the future Bypass Freeway would improve the access to the western side. However this future freeway would also link directly with the Western Ring Road and it would also benefit access to the eastern side because the entire Gateway node is still situated west of the N1 and north west of the CBD that prefers the western bypass alignment to the eastern bypass alignment.

Regardless of the proximity of the future bypass to the western development zone of Gateway, access to this zone could still be problem as conservation and other environmental issues could force access through the current route (see road 10 on Figure 6) for reasons mentioned under 4.3.6.

4.3.4 Ownership

In view of the fact that Zone B is currently part of the current Gateway property, this factor might favour Zone B. However it is a marginal benefit because Zones D and E are also government owned properties and as such it should not pose any problem from an ownership and cost point of view other than administrative arrangements and agreements.

The only real difference could be a time delay that could be resolved through good coordination.

4.3.5 Technical Considerations

Purely from a land size point of view, Zone B is preferred to Zones D and E. However, an assessment should be made with regards to what an optimum land requirement should be for an IDZ and a logistics Park before this issue is valued.

Apart from the land size, Zones D and E are better situated in terms of the availability of bulk services. These zones are situated in the centre of the main industrial areas of Polokwane, whilst Zone B is fairly separated but not out of reach.

From a topographic point of view for all three zones there is also not much difference as all plots are fairly flat and they pose no real difficulty for development.

4.3.6 Environmental Considerations

The water works, the bird sanctuary and the river are situated west of Gateway and are definite impacting factors from an environmental and conservation point of view.

In terms of the water works it could become an impacting factor with the siting of processing plants that are sensitive to contamination impacts (food and other agricultural products).

The bird sanctuary that is situated directly west of Gateway between Zone B and the airport. It is a conservation area and would equally impact on siting decisions, as the sanctuary will be sensitive for any industrial development around it. The access road to Zone B from the freeway will affect the bird sanctuary.

The entire river area west of Gateway is also sensitive to industrial development from an environmental point of view. If there are choices available, both the Logistics Park and the IDZ should preferably avoid these areas.

Based on these considerations, Zone B is not preferred from a conservation and environmental point of view. Zones D and E are more centrally located between many other industrial areas and as such the environmental impacts of using these zones would not be that sensitive.

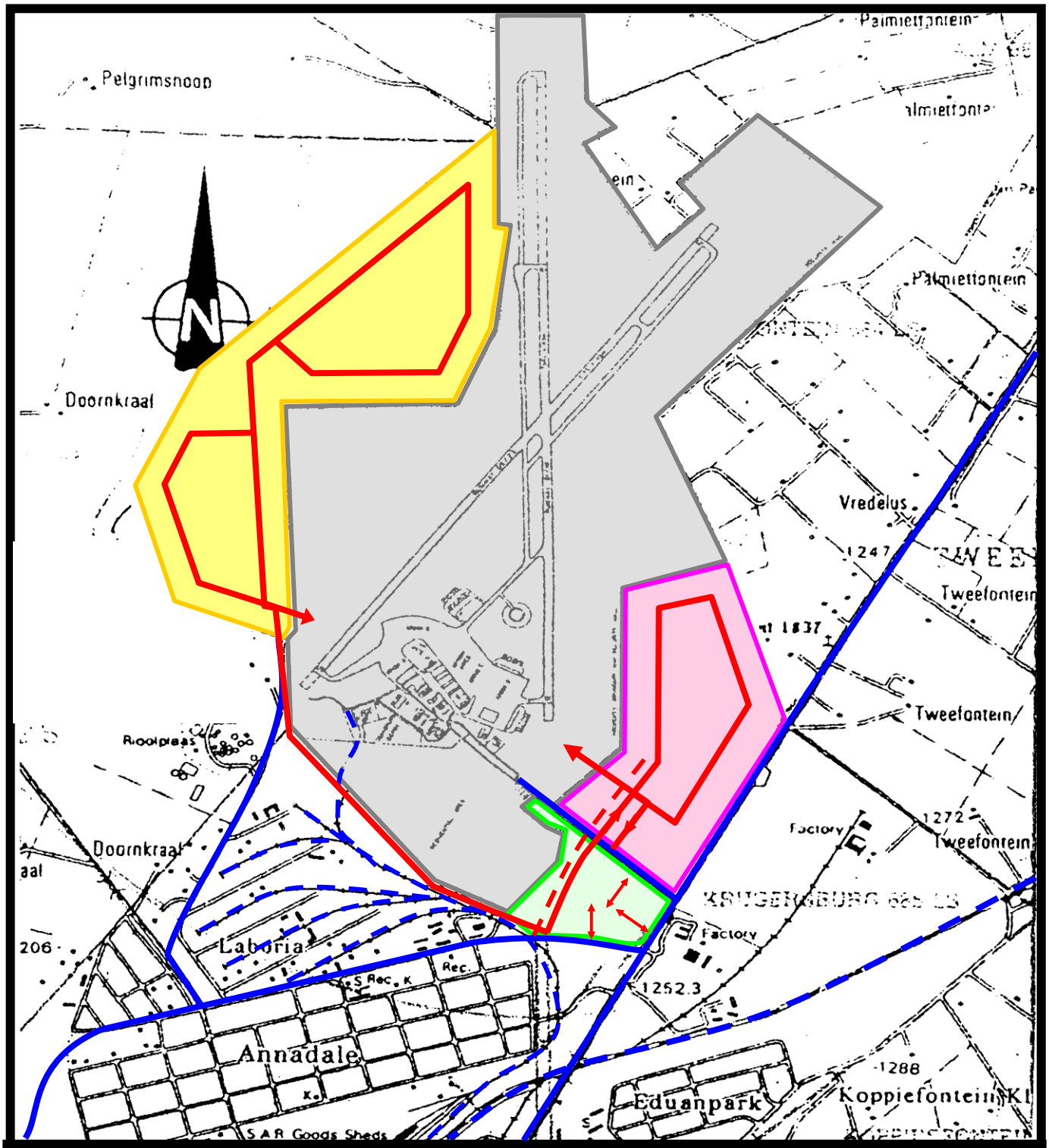
4.4 LAND USE FRAMEWORK FOR PROPOSED DEVELOPMENTS

Two alternative land use frameworks are proposed for the development of the Logistics Park, the truck inn and the filling station, in relation to the development of the IDZ:

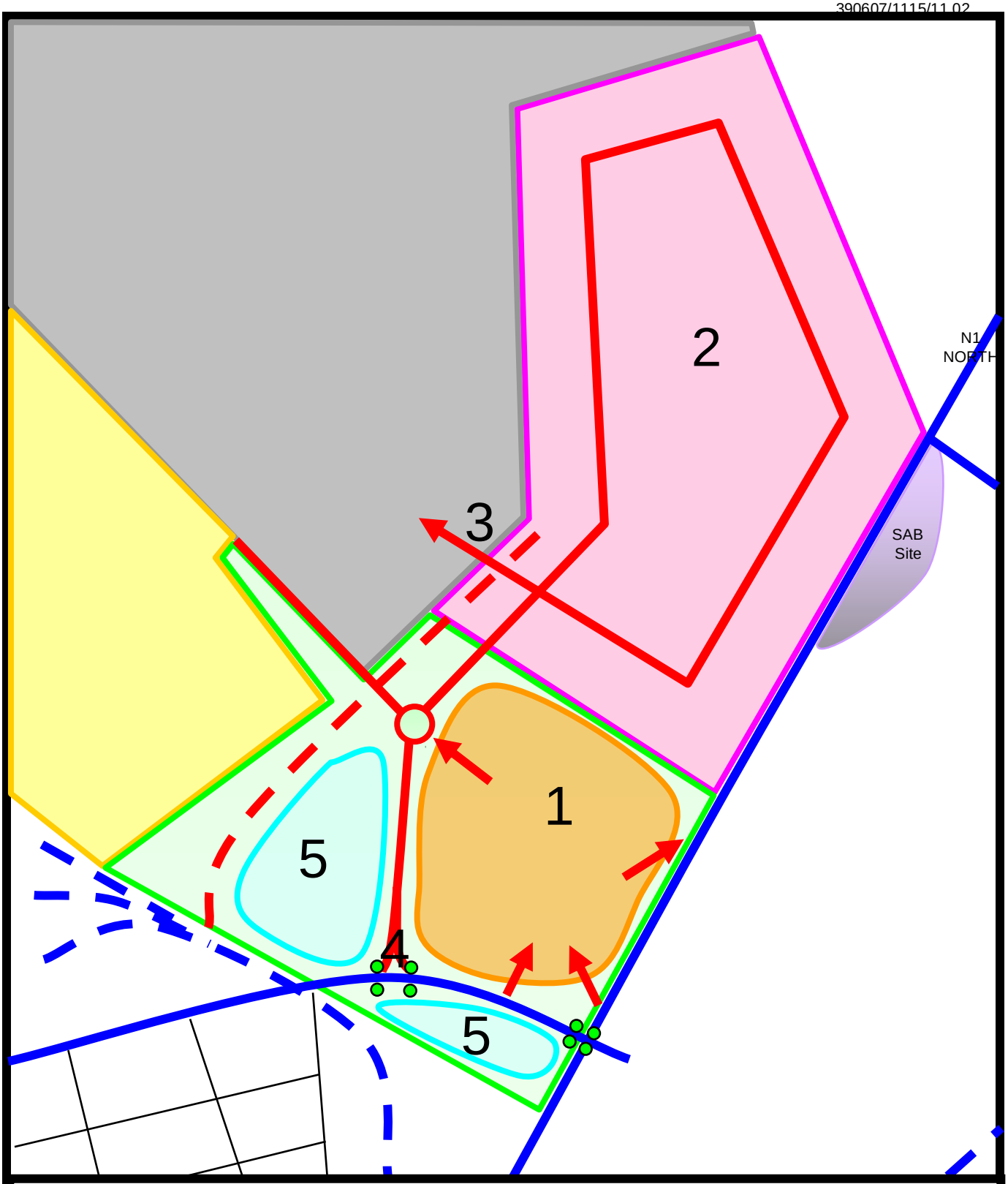
- **Figure 8** suggests the development of Zones B, D and E as three separate plots for the above purposes.

- **Figure 9** focuses mainly on Zones D and E with some structural changes to the plots.

The above two alternatives are described and evaluated below.



DEVELOPMENT OF TRUCK INN AND PUBLIC TRANSPORT FACILITIES
SPATIAL ORGANIZATION OF LOGISTICS PARK: ALTERNATIVE 1
FIGURE 8



DEVELOPMENT OF TRUCK INN AND PUBLIC TRANSPORT FACILITIES
SPATIAL ORGANIZATION OF LOGISTICS PARK: ALTERNATIVE 2
FIGURE 9

4.4.1 Alternative 1

Figure 8 suggests that the Logistics Park be established on Zone D, with the filling station and truck inn facilities on Zone E and the IDZ on Zone B. The characteristics of this alternative are the following:

- This alternative land use framework suggests that the current airport access road would still separate the Logistics Park and the truck inn/filling station, but in an upgraded form.

- Access to the IDZ will be determined by an environmental impact study and the cost of a bridge over the river. Accordingly, access to the IDZ could be provided directly from the future freeway or from the current access road to the water works. It is suggested that the current water works road be upgraded in any event for the interim until the freeway is constructed.

- A new direct link between Zones D/E and Zone B can be considered to avoid using the long route via the Western Ring Road. This route would run on the southern boundary lines of the Gateway property and join Zone E at the southwest corner.

- The extent of the activities between the IDZ and the Logistics Park/truck Inn facility will determine the need and feasibility of this direct linkage. Given sufficient demand, direct linkage should be considered especially when the main access to the IDZ would be provided from the future freeway. In this case linkage between these two areas would be very long and not cost effective, with impacts on the local road network (N1, Ring Road and Freeway).

- This alternative also suggests that direct linkage should be provided between the truck inn facility and the Logistics Park with a short road crossing the airport access road near the airport entrance. This linkage road would avoid trucks using the N1, the Western Ring Road and the traffic signals at the N1/Airport Road.

- A railway sideline linkage from the current sidelines coming from Pietersburg Station can be provided to ensure full integration of all modes. The need and possible use of such a sideline is perhaps questionable because most cargo coming into the Logistics Park would be by road from Limpopo agricultural areas.

- Direct linkage is also provided form the Logistics Park and the IDZ to the loading areas in the airport, from the east and west respectively.

- To allow as much as possible traffic interception for the filling station, access should be allowed from all the roads surrounding the filling station, namely the N1, the Western Ring Road and the airport access road.

4.4.2 Alternative 2

Figure 9 focuses on the eastern zones and considers the development of Zones D and E only for the Logistics Park as part of the IDZ and with the truck inn facility and filling station adjacent to it but not within the IDZ zone. This alternative however does not exclude the future expansion to Zone B as shown in the first alternative proposal. The future demand would dictate this further development.

The requirements and characteristics of this alternative are the following:

- Zones D and E should be consolidated and subdivided again with structural changes and with a new access road to the airport.

- The current access road leading from the N1 with a traffic signal should be closed and transferred to a position leading from the Western Ring Road at the southern boundary of Zone E. The traffic signal should be transferred to this point.

- Based on the above, access to N1 is then "consolidated" at the junction between the Western Ring Road and N1.

- Given the closure of the current access road, the land size utilization of Zone E can be adapted exactly to what is needed for the filling station and the truck inn facility, whilst the area west and south of the truck inn and the new access road can be "re-shaped" to allow for light industrial an commercial land uses as transport related support services.

- The new "re-shaped" Zone D would then accommodate the Logistics Park as part of the IDZ or alternatively subdividing Zone D can separate it.

- Al other requirements stated for Alternative 1 would also apply, referring to access to and from the filling station, the railway sideline, direct access from the IDZ/Logistics Park to the airport

The technical requirements and conceptual design for the filling station, truck inn and the warehousing facilities of the Logistics Park would remain the same for both the two alternatives. The layout or shape of the filling station/truck inn would however be adjusted to fit in with the exact plot size and shape that is eventually decided upon. A detailed planning process would be required once principle approvals on the alternatives are taken.

The major advantage of Alternative 2, i.e. establishing all activities including the IDZ on the eastern side of the airport, is that it offers a more concentrated and integrated development that will be more cost effective. The accessibility of the sites is also better and the activities are located centrally within other industrial areas with direct access to rail as well.

The main disadvantage is possibly the size and room for expansion, although the plot areas to the north next to the N1 provides a solution if the expansion is indeed required eventually.

It is furthermore suggested that parts of Zone B be considered for the establishment of hotel facilities, at a spot that is close to the bird sanctuary and the river. The eastern side of the airport will not suit hotel developments because of the intensive industrial character of the area. Hotel facilities that are adjacent or integrated with natural surroundings such as a river and a bird sanctuary are more appealing and acceptable.

5. BUSINESS PLAN

Following the decisions taken during the Waterpoort workshop and follow up decisions taken at the meeting with airport and provincial officials during October 2002, the contents of this report would first be used as input to the more comprehensive investigation regarding the development of the IDZ and all other related economic development projects, agricultural production etc.

The report on the above, with the inputs of this report would then call for decisions by Cabinet and accordingly pave the way for further detailed design and feasibility exercises on the Logistics Park, the truck inn and the fuel station, its locality etc. A detailed business plan at this stage is therefore academic until the results of the IDZ report that will also address the land uses and locality choices.

The diagram underneath however lists the preliminary issues to be addressed for the Logistics Park, the truck inn and the fuel station, both in terms of further detailed design and feasibility investigations and for implementation purposes. These items have to be reviewed and finalized once the IDZ proposals have been approved.

5.1 ACTION PLAN

The business/action plan for further investigations and implementation is shown in the diagram below.

ACTION/BUSINESS PLAN FOR THE DEVELOPMENT OF GATEWAY LOGISTICS PARK AND TRUCK INN FACILITIES DIAGRAM 1					
	REQUIRED ACTION OR FACILITY	**ACTIONS**	**PRIORITY**	**BUDGET YEAR**	**COST R m.**
1.	Principle approval of the recommendations of Interim Report	• Steering Committee meeting • Consideration of report • Adjustments • Approvals • Submit to Cabinet • Use as input for IDZ and Gateway investigation • Review contents of Interim Report and initiate implementation program with detailed design and feasibility investigation • Identify urgent intervention projects	Urgent	2002/3	-
2.	Initiate Implementation Program	• Implement urgent intervention projects • Detailed design • Feasibility analysis • Implementation budget • Submit for approvals • Review design if necessary • Define individual implementation projects • Project tendering and procurement program	High	2003/2004	Included in Implementation costs below
3.	Management of individual projects	• Implement urgent intervention projects • Implement longer-term development projects: - Contingencies, design, feasibility - Cold Storage - Ambient Store - Truck inn and fuel station	High	2003/2004 2004/2005	R6, 0m R18, 4m R12, 3m R11, 5m

5.2 SUMMARIZED BUDGET REQUIREMENTS

IMPLEMENTATION BUDGET REQUIREMENTS			
FINANCIAL YEAR	**CAPITAL COST**	**Contingencies, Design, etc.**	**TOTAL**
2003/2004		R3, 0m	R3, 0m
2004/2005	R36, 0M	R3, 0m	R39, 0m
TOTAL	**R36, 0m**	**R6, 0m**	**R42, 0m**

6. RECOMMENDATIONS

The following procedural recommendations are made:

(i) The contents of the Interim Report to be approved in principle for consideration as inputs for the more comprehensive study on the establishment of the IDZ.

(ii) The IDZ study to take cognisance of these recommendations.

(iii) The results of the IDZ study then be used for a review of the principle recommendations contained in the interim report and that a detailed design, feasibility and implementation process then be initiated as contained in the proposed business/action plan.

The following technical recommendations for the development of a Logistics Park, truck inn facility and filling station at Gateway:

(iv) The establishment of the Logistics Park, truck inn facility and filling station be positioned at the plots identified on the eastern side of Gateway as indicated in Figure 9

(v) The land use strategy as indicated in Alternative 2, section 4.4.2, be supported as the an integrated framework for the siting of both the IDZ and the Logistics Park/truck inn facility.

(vi) Should the IDZ study indicate the above strategy is not feasible from a land size or any other reason, then the location of the Logistics Park and the truck inn and filling station should still be on Zones D and E on the eastern side.

(vii) The conceptional drawings and technical requirements as set out in section 4 be used as a departure point for further investigation and design of the Logistics Park facilities and the truck inn and filling station.

(viii) A more detailed demand and supply survey is however required to optimise the technical design of these facilities.

ANNEXURE 1
VISUAL MATERIAL OF THE POTENTIAL DEVELOPMENT SITES

- Photo 1: Gateway International
- Photo 2: Gateway International, East Entrance
- Photo 3: Control Tower
- Photo 4: Rail siding at the Gateway Fuel Depot
- Photo 5 & 6: The bunkers guarding the fuel tanks
- Photo 7: Service buildings next to the rail siding
- Photo 8: External fuel tank
- Photo 9: Pipe line from the rail siding into the fuel tanks

GATEWAY

PHOTO 1

PHOTO 2

PHOTO 3

PHOTO 4

PHOTO 5

PHOTO 6

PHOTO 7

PHOTO 8

PHOTO 9