

# ORE LINE EXPANSION FROM MINES PERSPECTIVE

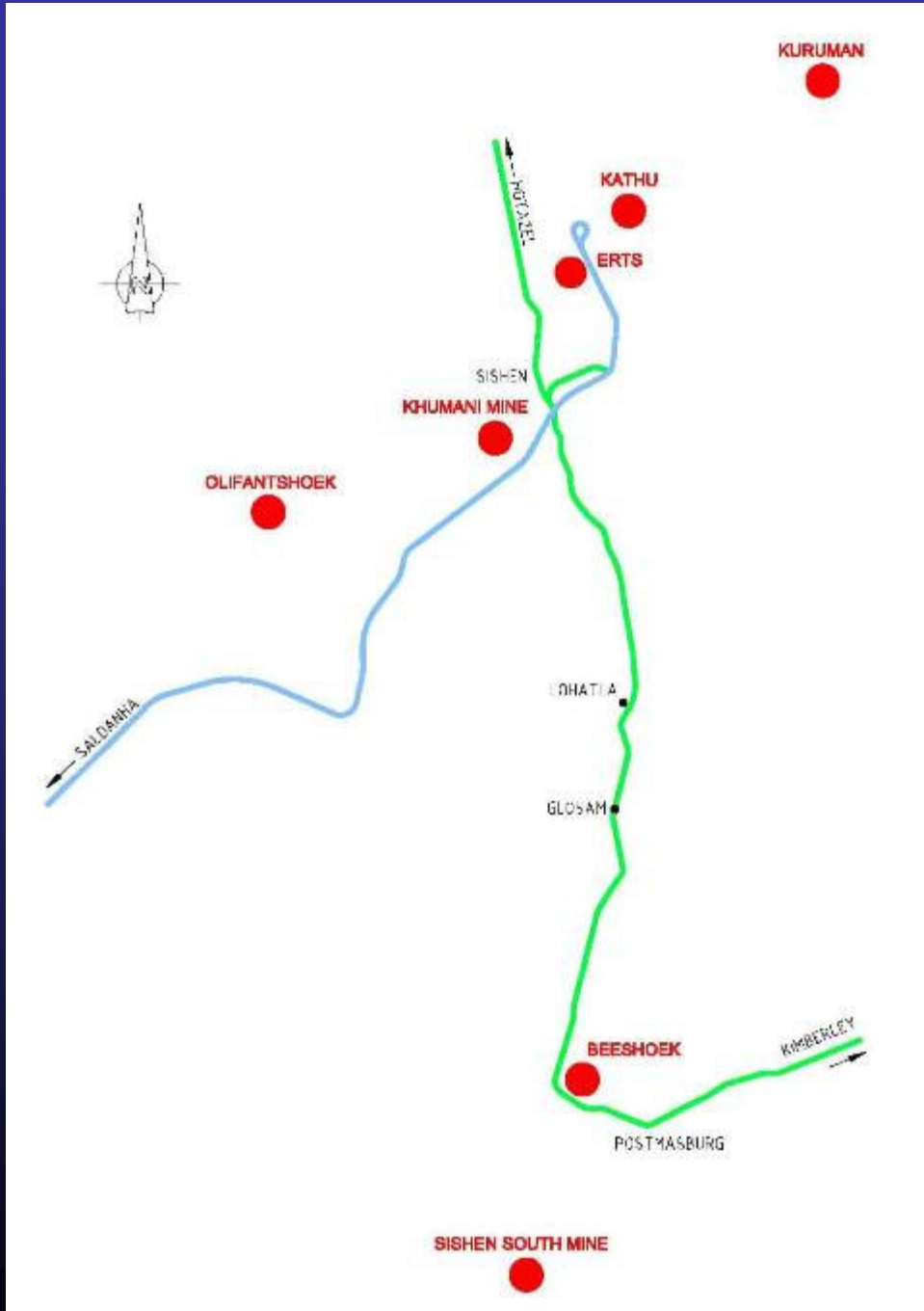
## RAIL RELATED

Presented by: H Bester

R&H Railway Consultants (Pty) Ltd  
(A member of the DAR Group of  
Companies)

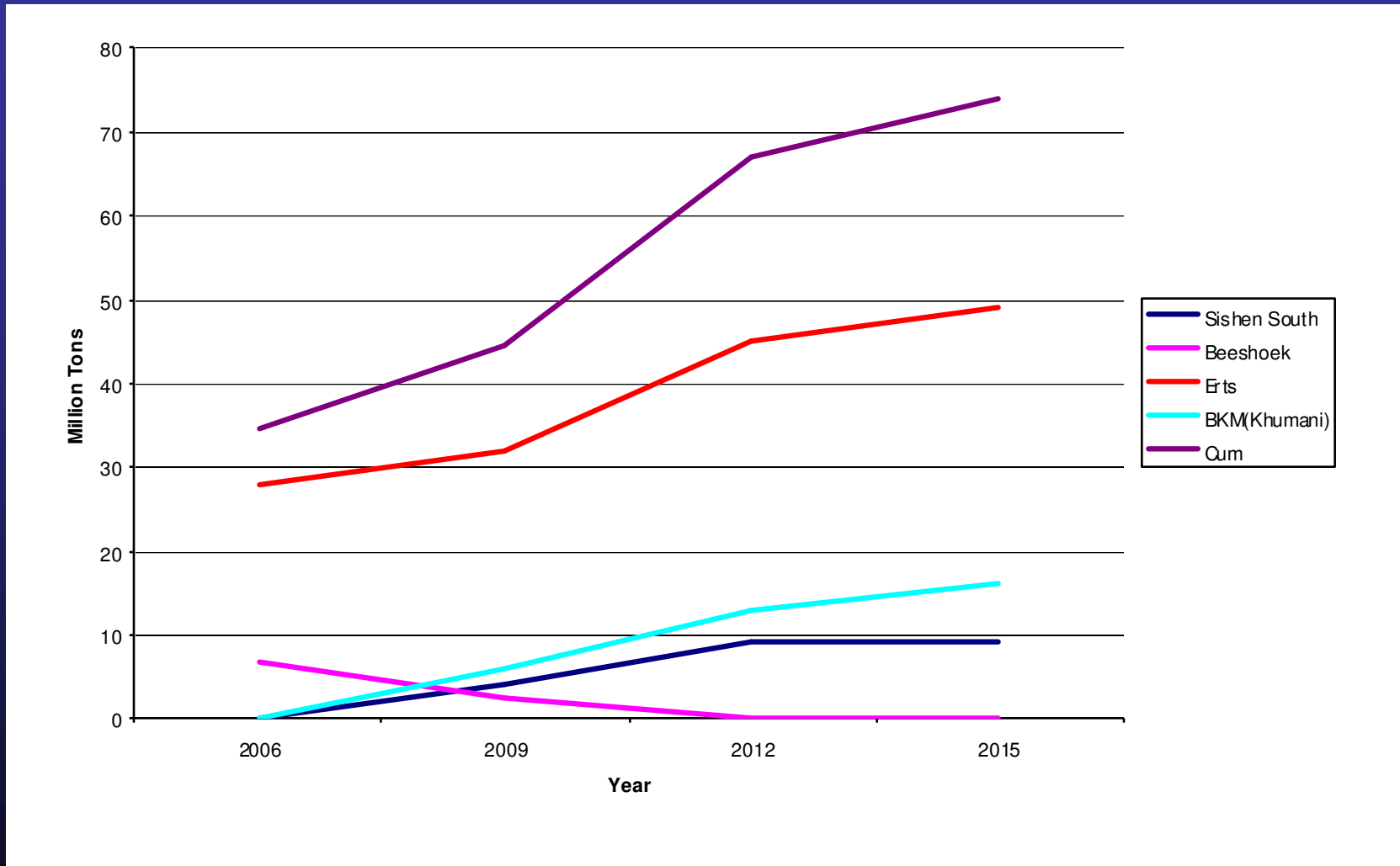
R&H Railway Consultants (Pty) Ltd





# Tonnage Profiles

## Northern Cape Iron Ore



# Dynamic Simulation

Output from dynamic train simulations of importance to mines are:

Turnaround time at Mine required (basically as multiplier of train slot time)

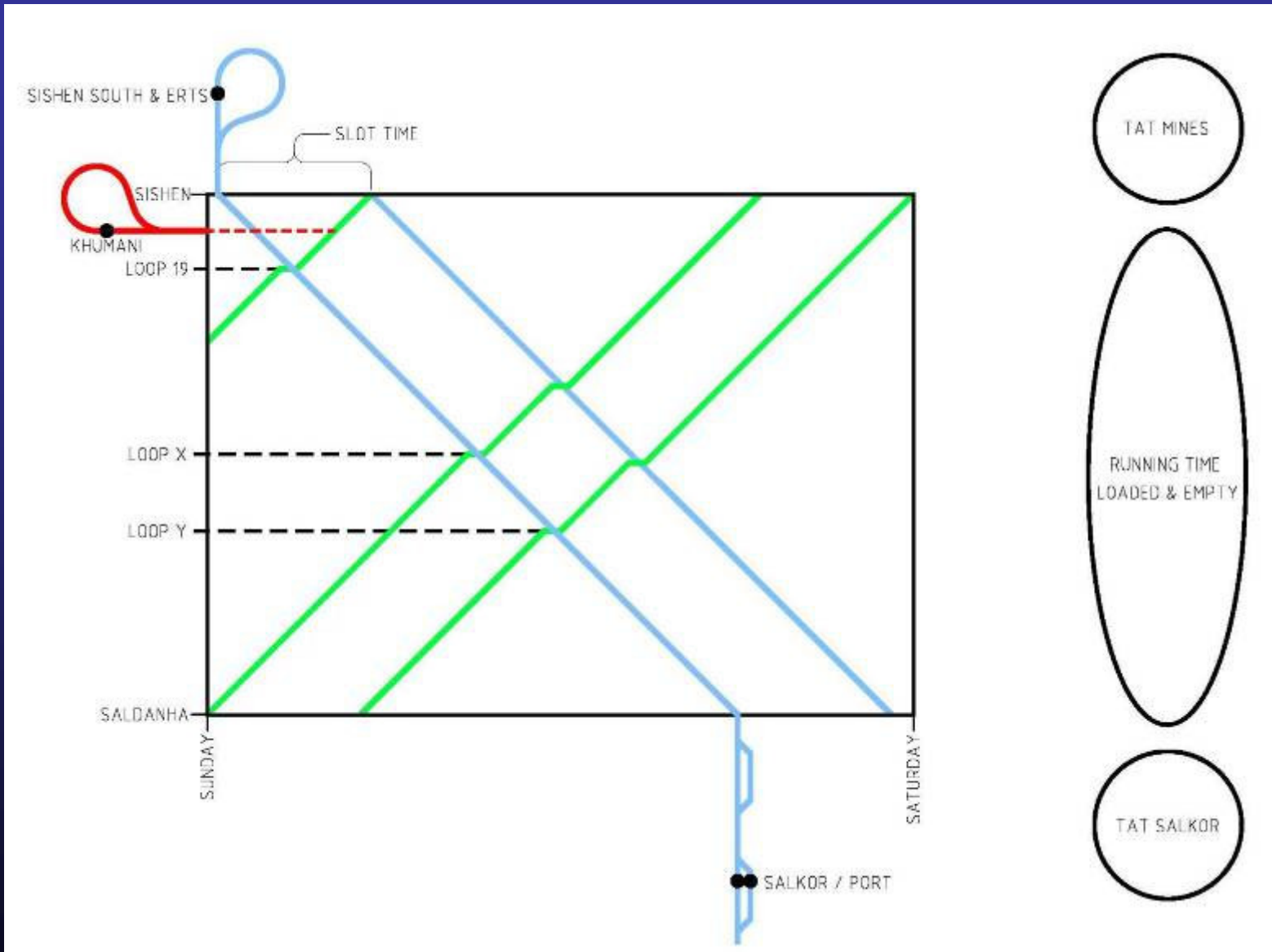
- Time for shunting
- Time for re-fuelling
- Time for brake test
- Time for setting up distributed power
- Shunting out “not-to-goes” outside TAT

Total turnaround time at Mine = x (slot interval)

Train length to be received on Mine property

- 114
- 228 (2 x 114)
- 342 (3 x 114)
- Distribution of locomotives in train (diesel and electric)





# Evaluation of Options

- Based on nett present cost
- Evaluate routes to be taken
  - Infrastructure (axle loading, power, etc)
  - Capacity available
  - Train length restriction
  - New routes
  - Other restrictions
  - Tonnage profile forecast
- Calculate turnaround time
- Calculate rolling stock required
- Mine infrastructure required



# Options

In order to evaluate various alternatives for the conveyance of iron ore from Khumani, Erts and Sishen South area to Salkor, the selection of the most optimal option would be based on practical and economical grounds

## OPTIONS TO EVALUATE

Upgrading existing Beeshoek - Erts Infrastructure for 30t/axle 114 wagon trains:

- Electric & Diesel Locos Option
- Diesel Locos only Option

Direct link to Sishen Saldanha via short link at BKM

Direct link to Sishen Saldanha via link to approx. Km 820

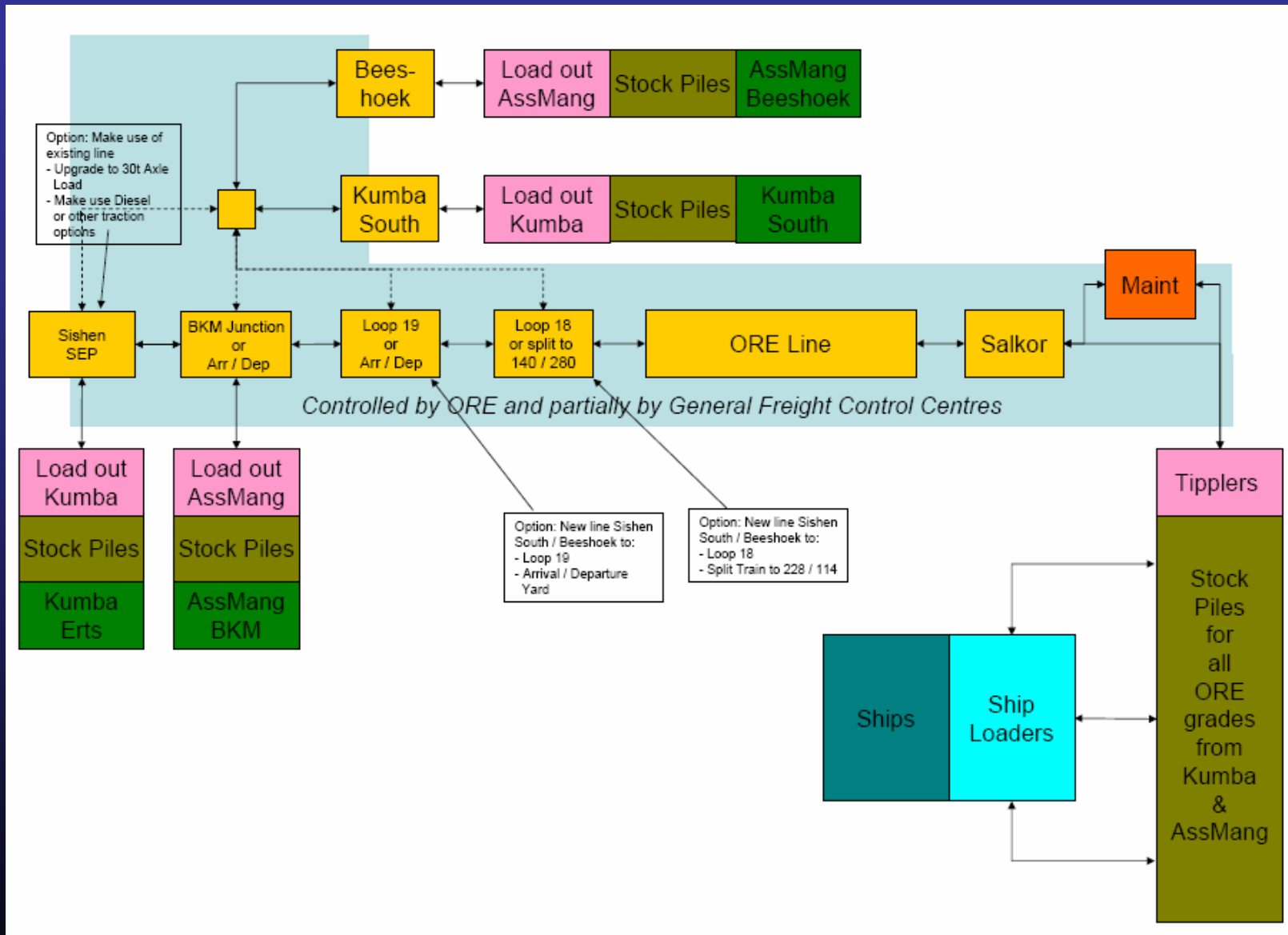
Direct link to Sishen Saldanha via link to Loop 19

## Alternative Options

- Dual Voltage trains from Beeshoek to Erts
- Upgrading OHTE to 50kV AC between Beeshoek and Erts
- Upgrading OHTE to 25kV AC between Beeshoek and Erts



# Evaluation of Options Available to Mines



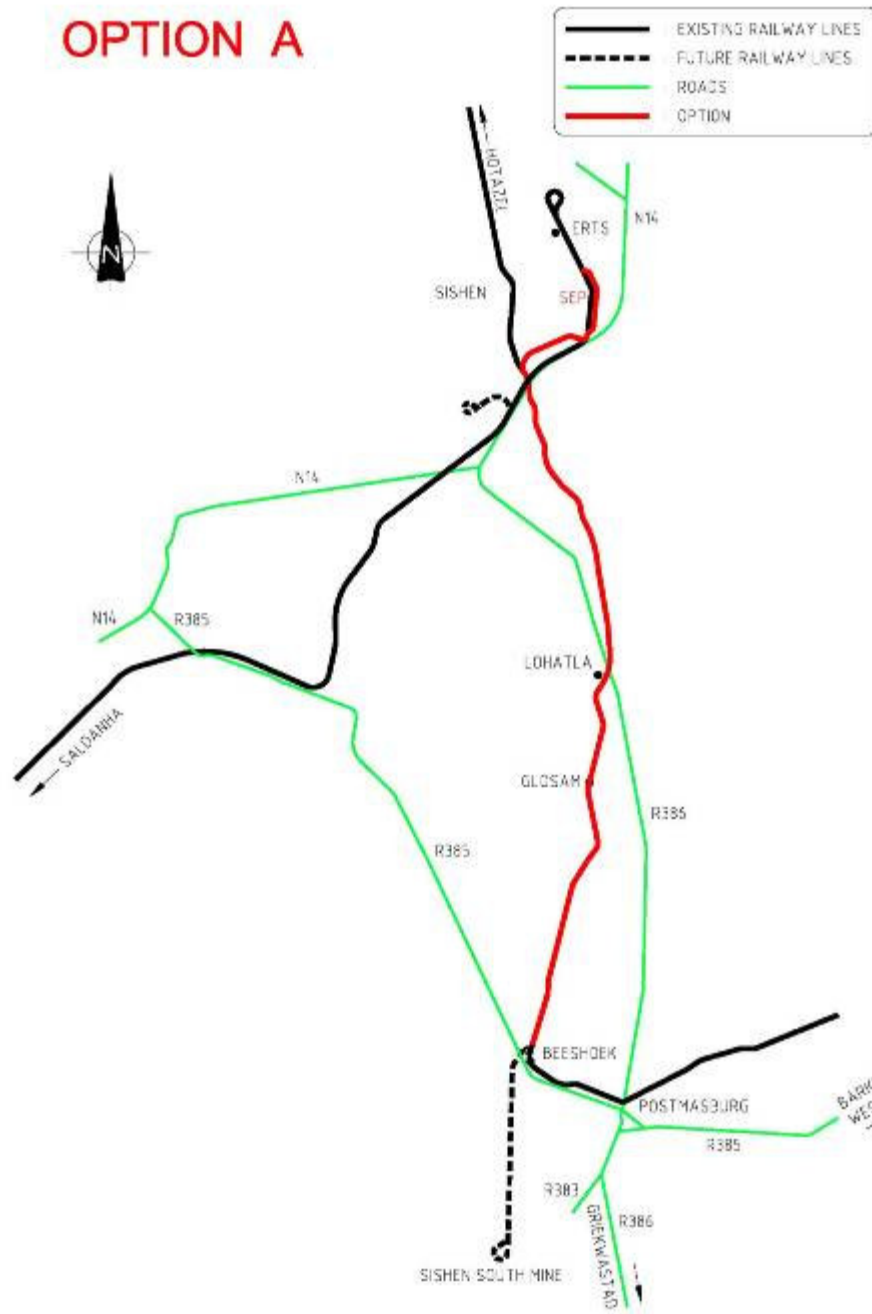


# Basic Assumptions for Evaluation of Options

- ❑ Evaluation is based on 114 wagon train sets on Beeshoek / Erts section. This is also the common block size on all other routes for maximum train length of 342 wagons
- ❑ Evaluations are based on operational and infrastructure/rolling stock upgrade costs between the combined Beeshoek / Sishen South departure yard and loops 18/19, as these locations will be the common interface points for the options evaluated
- ❑ 2 x E Type locomotives are assigned to every 114 train set over the AC section
- ❑ Locomotive requirements on the domestic/GFB line are based on actual requirements
- ❑ Cycle times are based on the total cycle time per train set for each specific route related to the Option evaluated
- ❑ The analysis is based on 50 operational weeks per annum
- ❑ The wagon requirements were derived from the predicted volumes divided by the optimal cycle time per 114 wagon set



# OPTION A

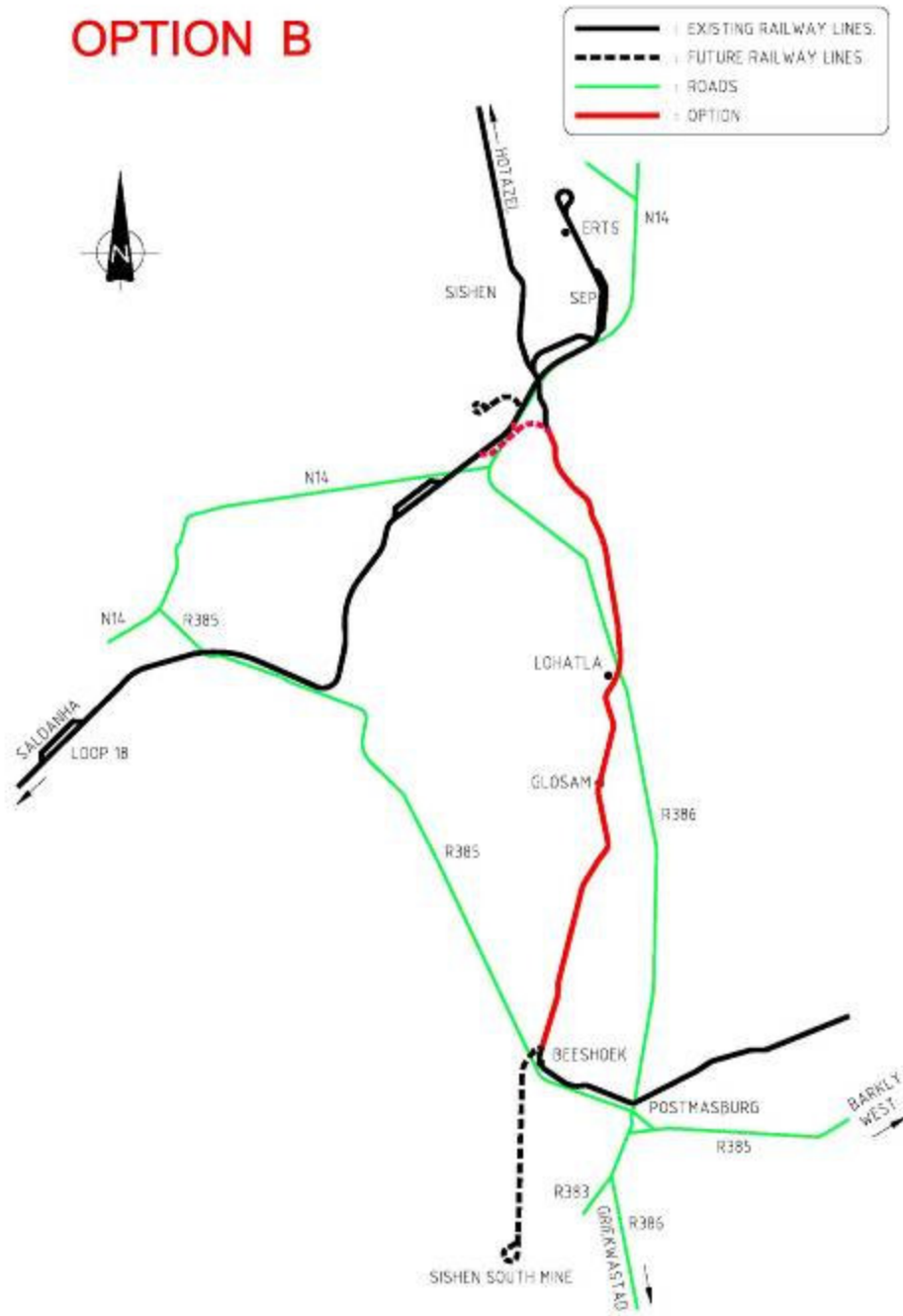


## Option A

- ❑ Beeshoek and Sishen South trains will be dispatched from a yard (Departure Yard) to be constructed close to the Spoornet Main Line
- ❑ The Spoornet Main Line to be upgraded to handle 30 tal (currently 26 tal)
- ❑ Trains from Sishen South and Beeshoek will run as 114 wagon sets from the departure yard to Erts where the trains will be combined with 228 wagons loaded at Sishen Mine
- ❑ Khumani / BKM will receive / despatch 342 wagon trains
- ❑ Evaluations were based on costs in the running of 114 wagon trains between the departure yard close to Sishen South and Beeshoek and loops 18/19, as these loops will be common interface points for the options evaluated



# OPTION B



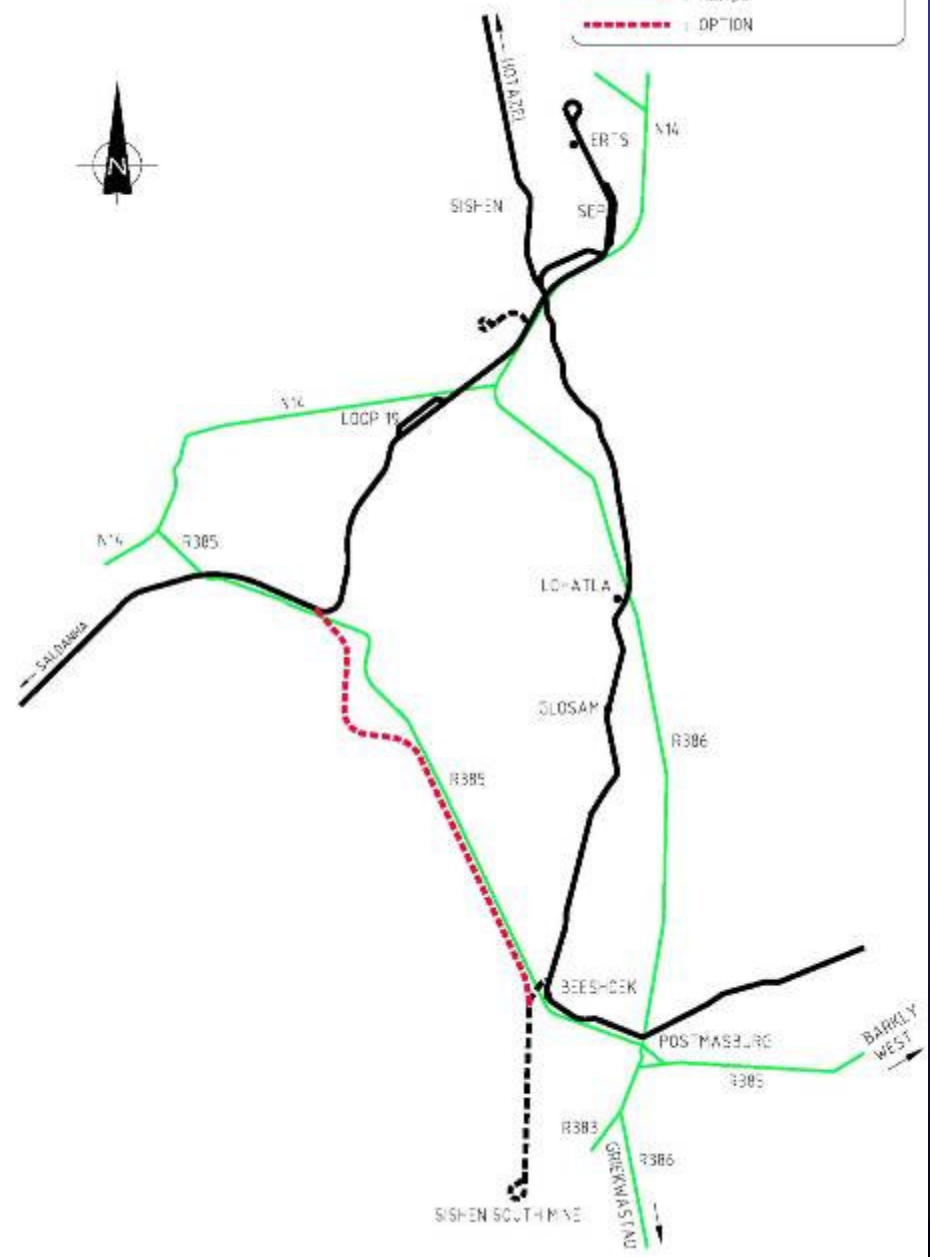
## Option B

- ❑ Similar to Option 1 except for a shorter route that will be created by constructing a short direct link between the Spoornet Main Line and the Sishen Saldanha export line in close proximity to BKM
- ❑ An exchange yard needs to be constructed adjacent to the export line.
- ❑ Only diesel traction was considered for this Option



# OPTION C

- EXISTING RAILWAY LINES
- - - FUTURE RAILWAY LINES
- ROADS
- - - OPTION



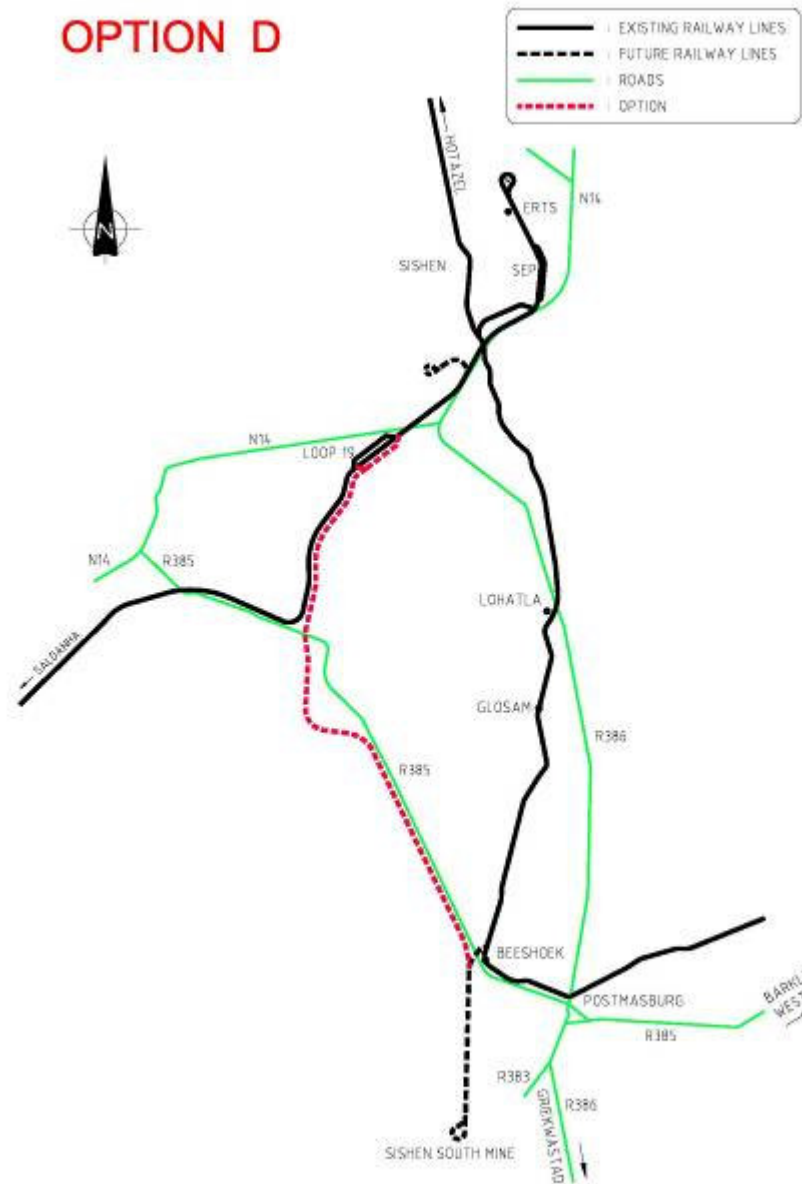
## Option C

Conveyance of iron ore from Beeshoek and Sishen South departure yard via a direct link at km820 on the Sishen Saldanha line

- ❑ Only 342 wagon trains will be accepted on the direct link
- ❑ Trains can still be split at Loop 19 destined for BKM and Erts
- ❑ The direct link will be electrified at 50kV ac
- ❑ The split between Beeshoek and Sishen South will take place at the departure yard
- ❑ Beeshoek will receive a maximum of 114 wagons



# OPTION D





## Option D

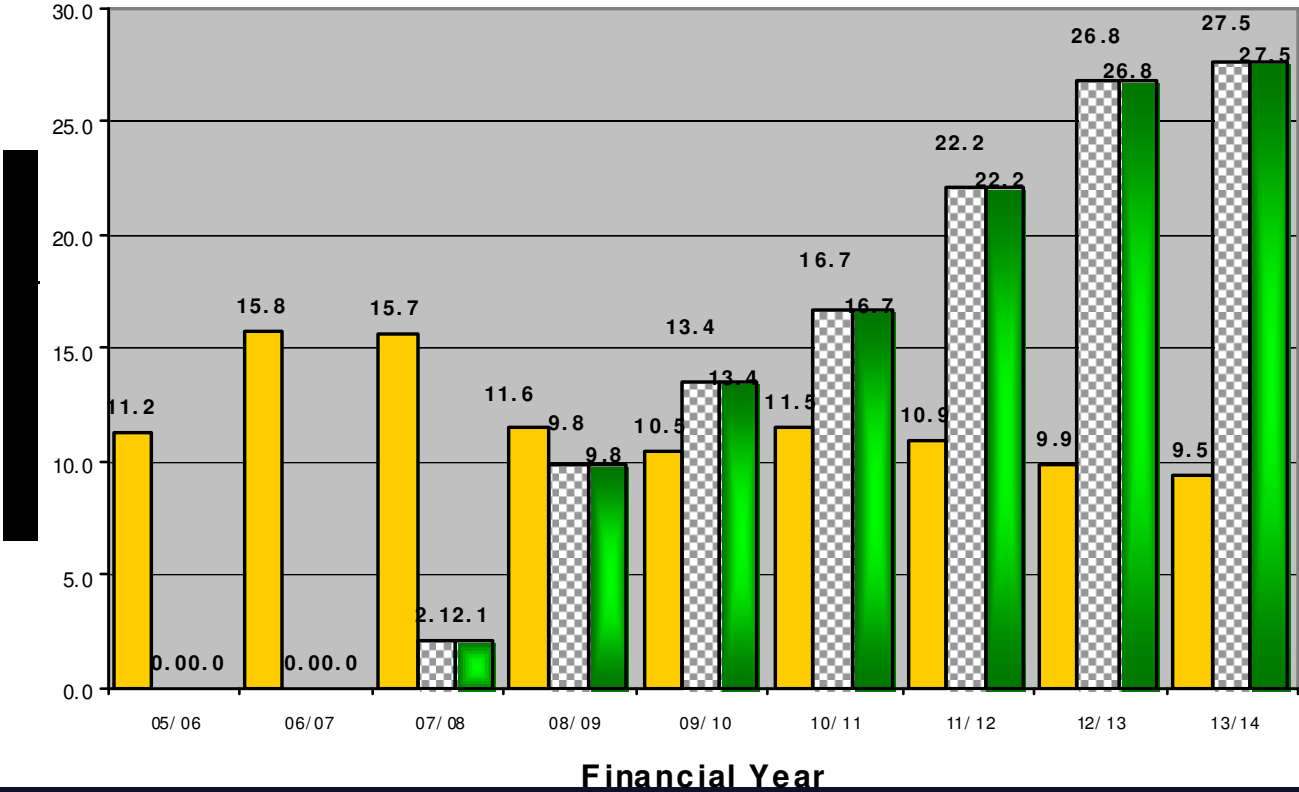
Similar to Option 3 except for the direct link to take-off from Loop 19 instead of km 820

- ❑ From Loop 19, trains can be split into 114/228 or 114/114/114 combinations to be sent to either BKM / Erts or Sishen South / Beeshoek / Sedibeng



# Optimising Split at Loop 19

(Weekly trains: 114 only to BKM)

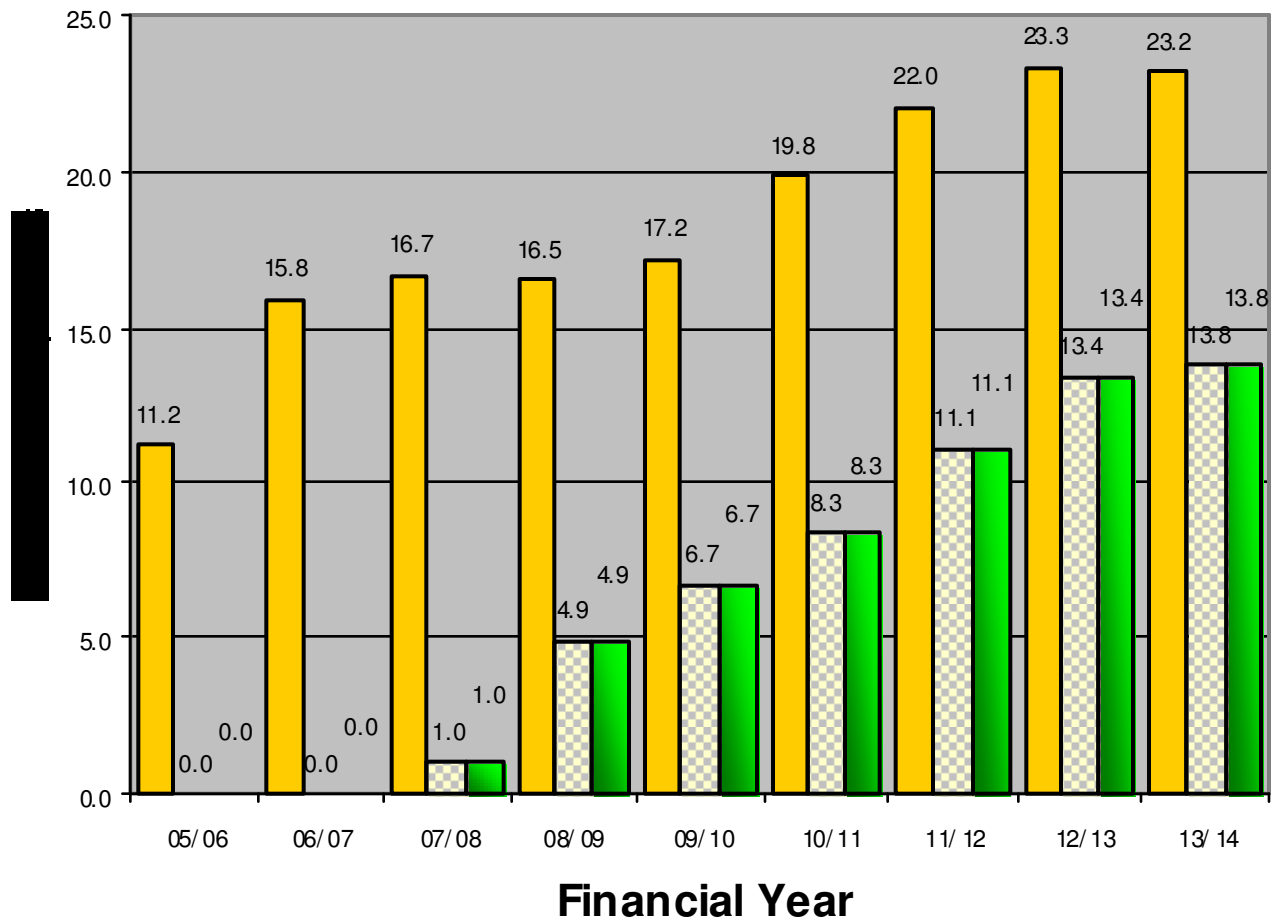


■ Erts (342)
 ■ Erts (228)
 ■ BKM (114)



# Optimising Split at Loop 19

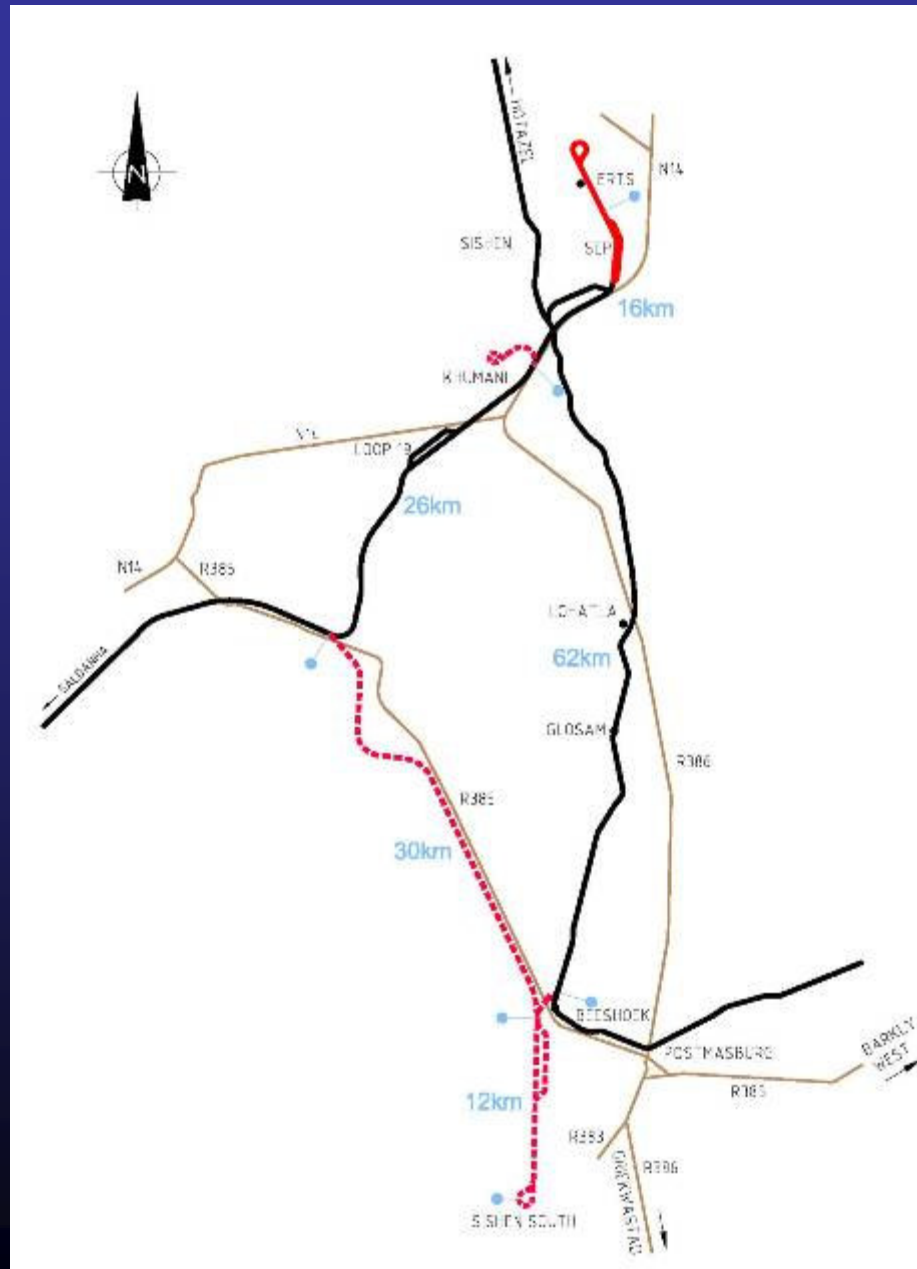
## Weekly trains: 228 only to BKM



■ Erts(342)
 ■ Erts(114)
 ■ BKM (228)



# Route Distances



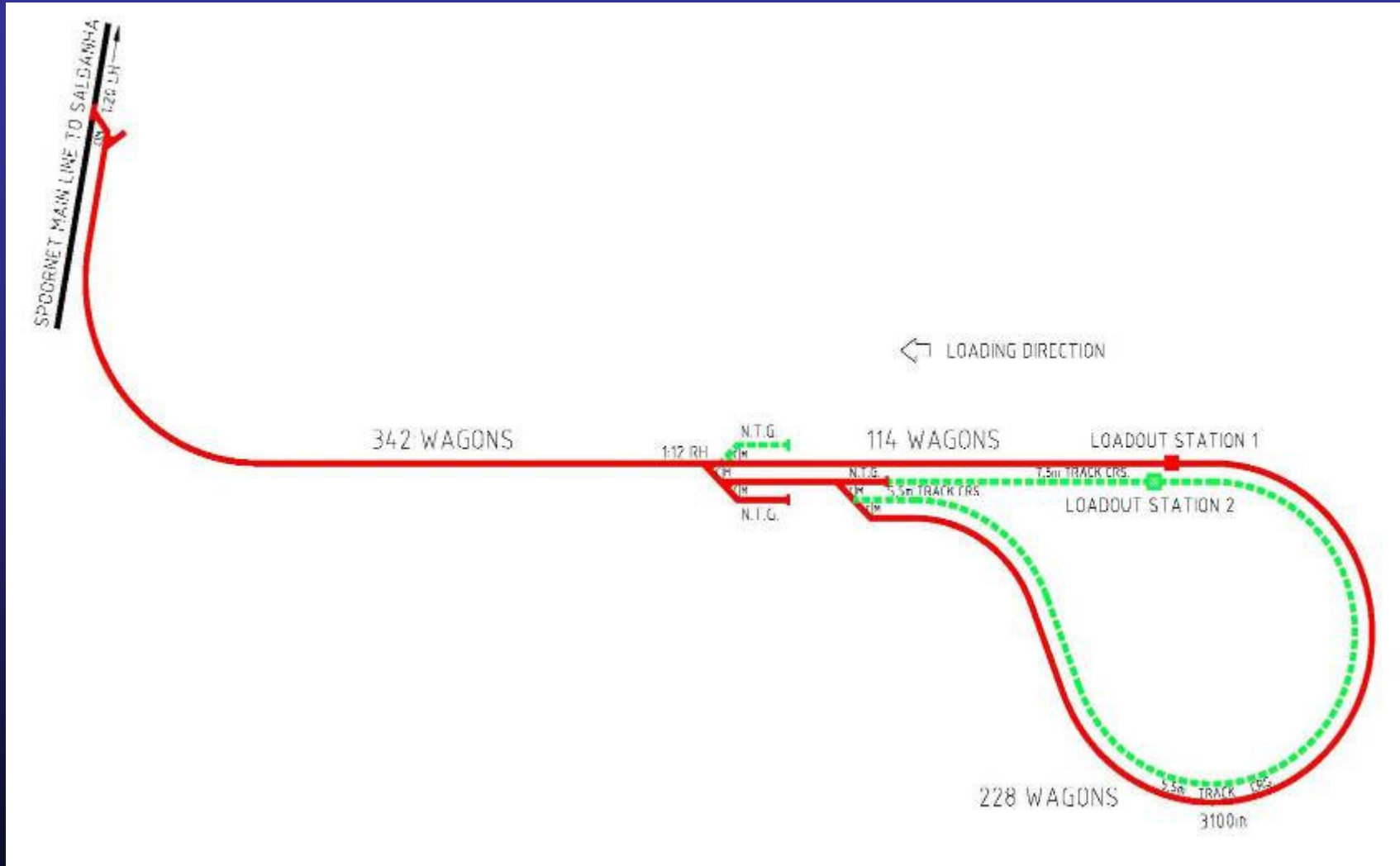
# Running Times and Cycle Times

## Cycle Time: Erts – Salkor (Used as basis for Comparison)

Cycle Time Erts – Salkor	Hours
Empty trip Salkor-Erts, hr	21.2
Loaded trip Erts-Salkor, hr	20.2
Turn around Salkor, hr	9.8
<b>Erts - Salkor Cycle time (Depart Erts-Salkor-Arrival Erts)</b>	<b>51.2</b>
OREX –Kumba (Hand over A1)	0.5
Placing of wagons for loading	0.5
Loading	4.3
Kumba hand over to Spoornet	0.5
Spoornet (Preparation for departure)	0.8
<b>Total Loading time Erts</b>	<b>6.5</b>
<b>Total Cycle Time (Erts Salkor)</b>	<b>57.7</b>
<b>Maximum Cycle Times / train set / annum (Erts-Salkor)</b>	<b>148.49</b>



# Typical Layout at Mines



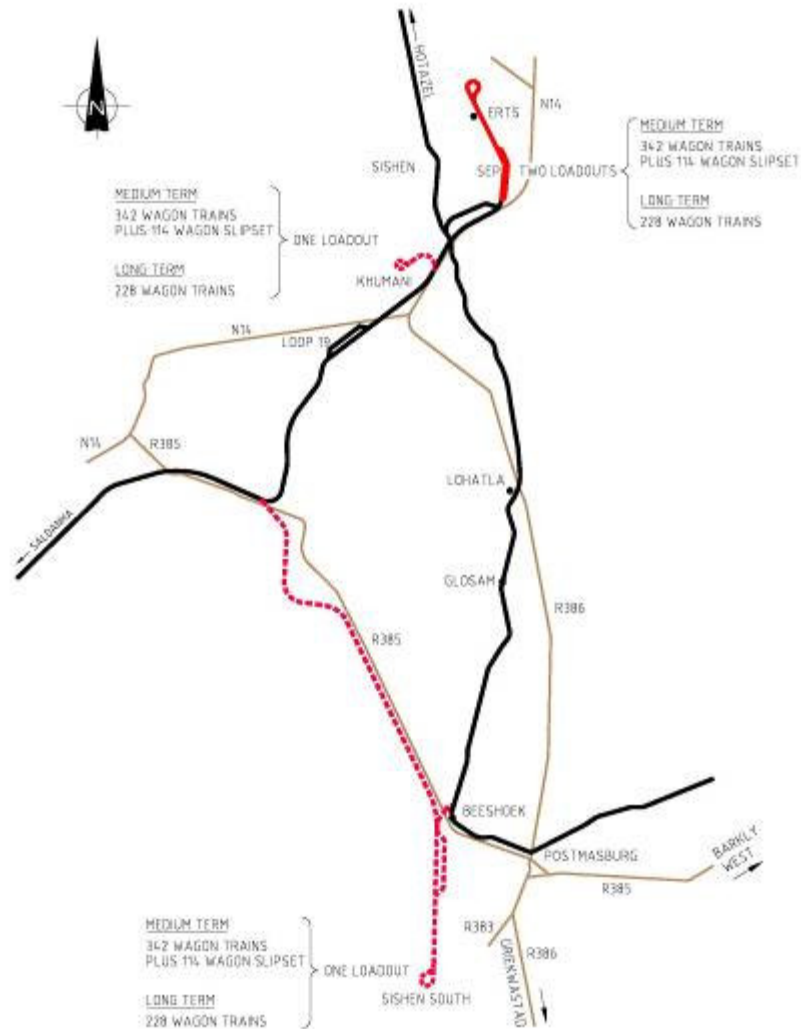
# Turnaround Times at Mines (example)

<u>ACTIVITY</u>	<u>DURATION (min)</u>
Shut down DP Handover to incoming driver	10
Travel to Loadout Station	20
Bin Movement	5
Loading (average 5400 t/hr, 114 wagons)	126
Bin Movement	5
Position 2nd Rake	10
Bin Movement	5
Loading	126
Travel to Yard	20
Make-up 342 wagons	10
Set up DP	45
Brake Test	3

6hr 24min < 6hr 45min  
(slot interval of 2hr 15min x 3)



## NORTHERN CAPE OPTIMISED



### Medium Term

Extended crossing loops (even and uneven to accommodate 342 wagon trains)

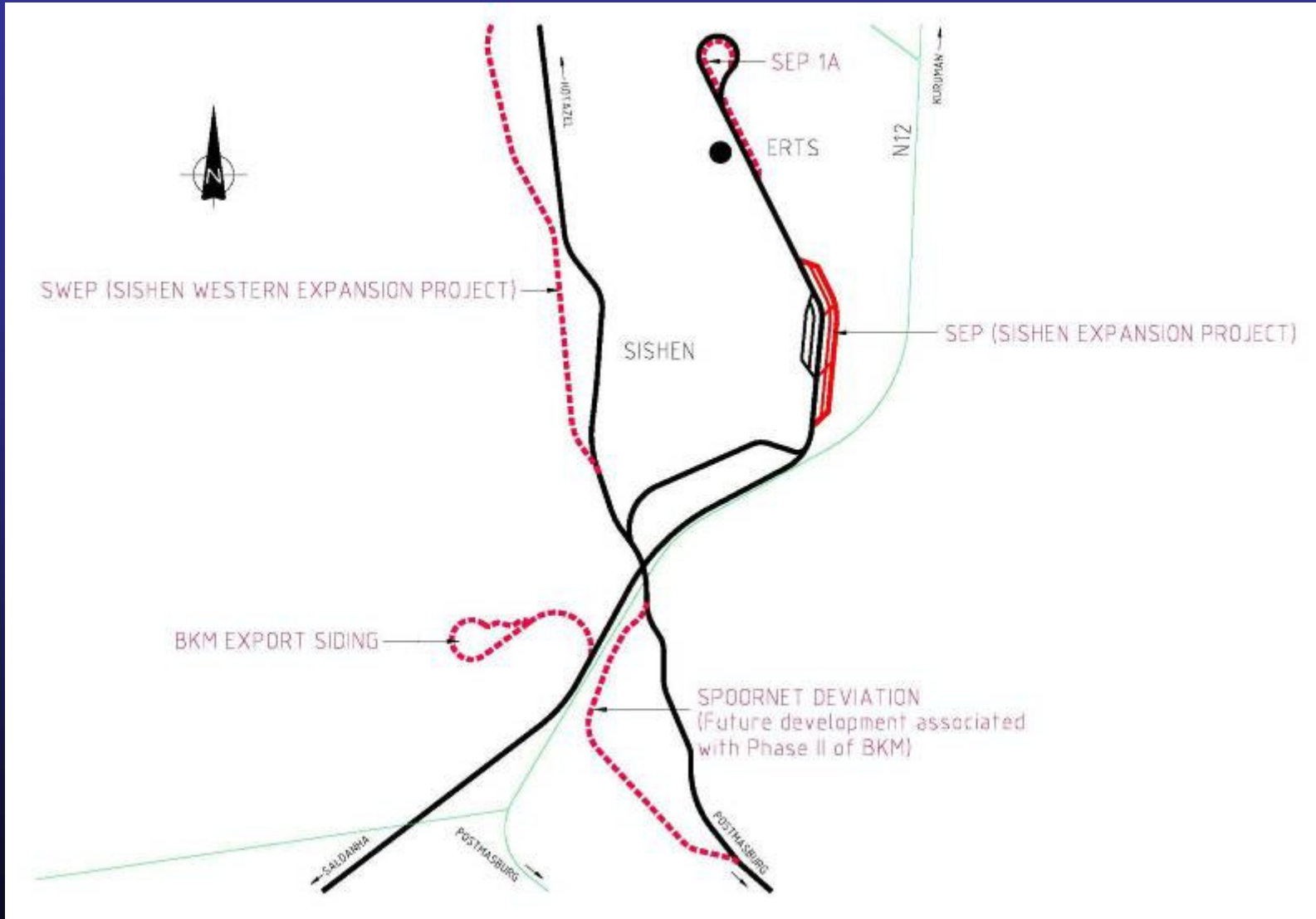
### Long Term

Construct intermediate loops to run 228 wagon trains





# Rail Network (current) Erts & BKM



## Contact Information

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