
# Diamond Resource Reconciliation In a Mature Black Cave

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PetraDiamonds

# Presentation Outline

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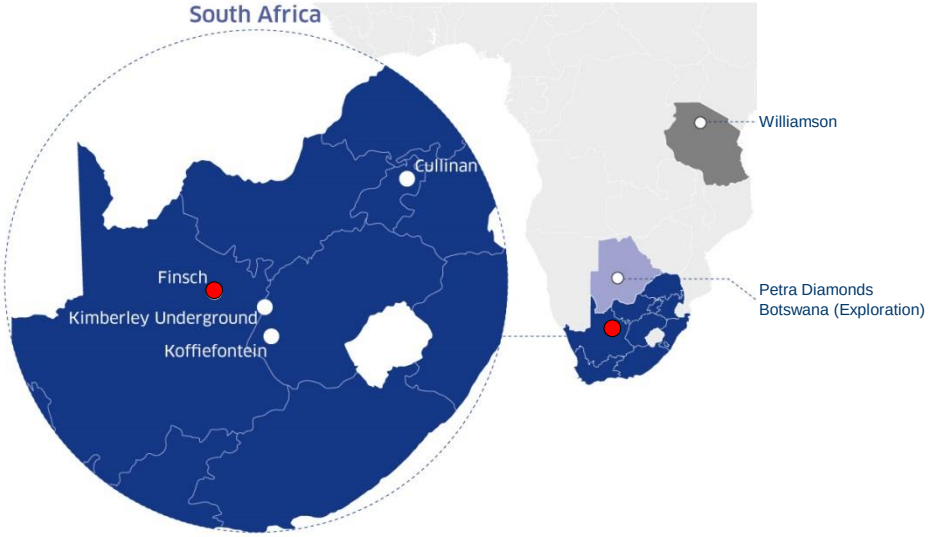
- Introduction
- Mining Block Layout
- Reconciliation Process
  - Survey Reconciliation
  - Draw Control Reconciliation
  - Depletion model calibration
- Resource Classification
  - Use of Confidence Intervals
- Conclusion

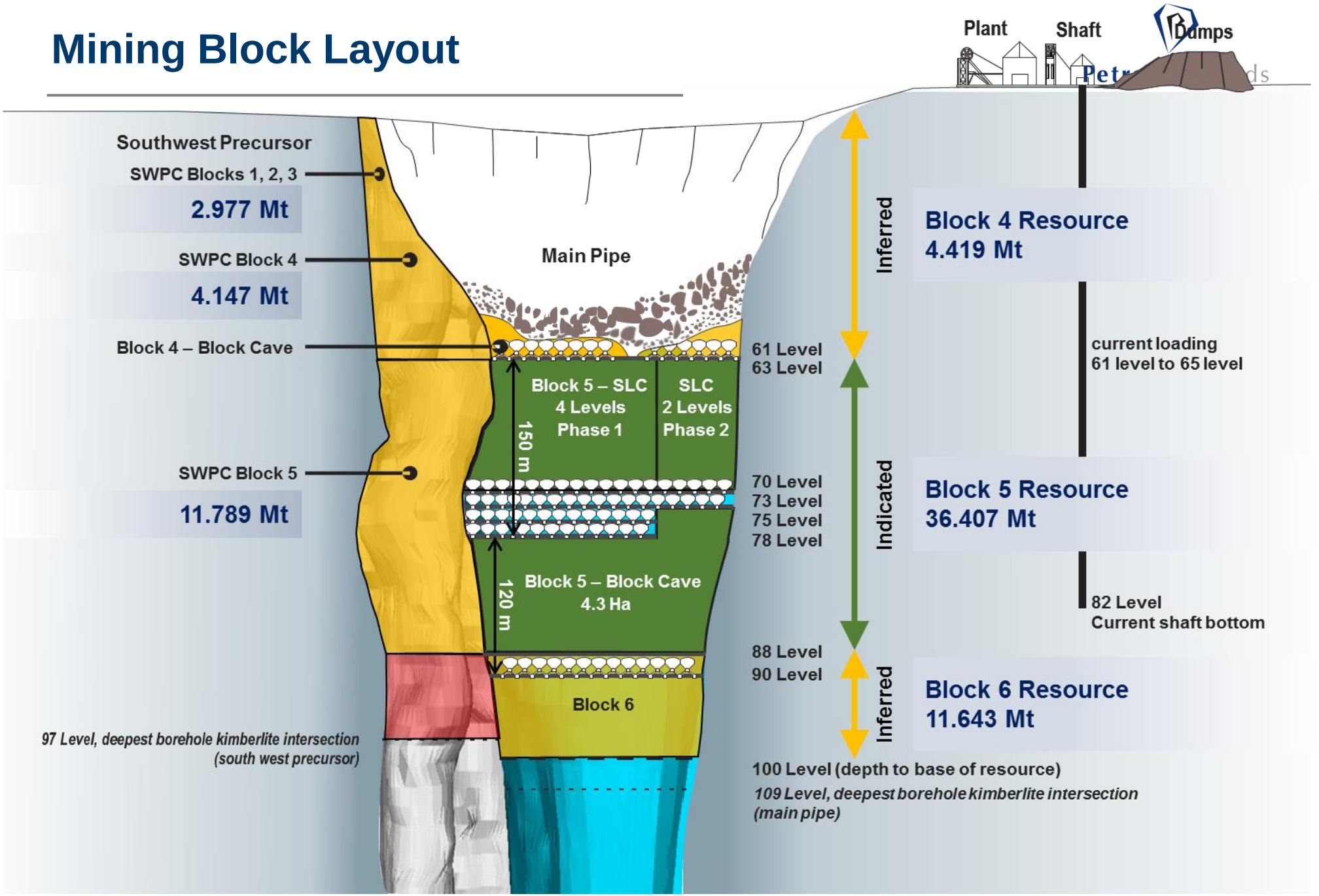



# Finsch Mine Overview

- South Africa's second largest diamond mine by production
- World-class operation with best-in-class infrastructure and modern plant
- Produced 126 Mct in its 40+ year life
- Average production of ca. 2 Mct per annum over last 5 years
- Current production from underground (Block Cave & Sublevel Cave)
- Major Probable Reserve of 25.66 Mct

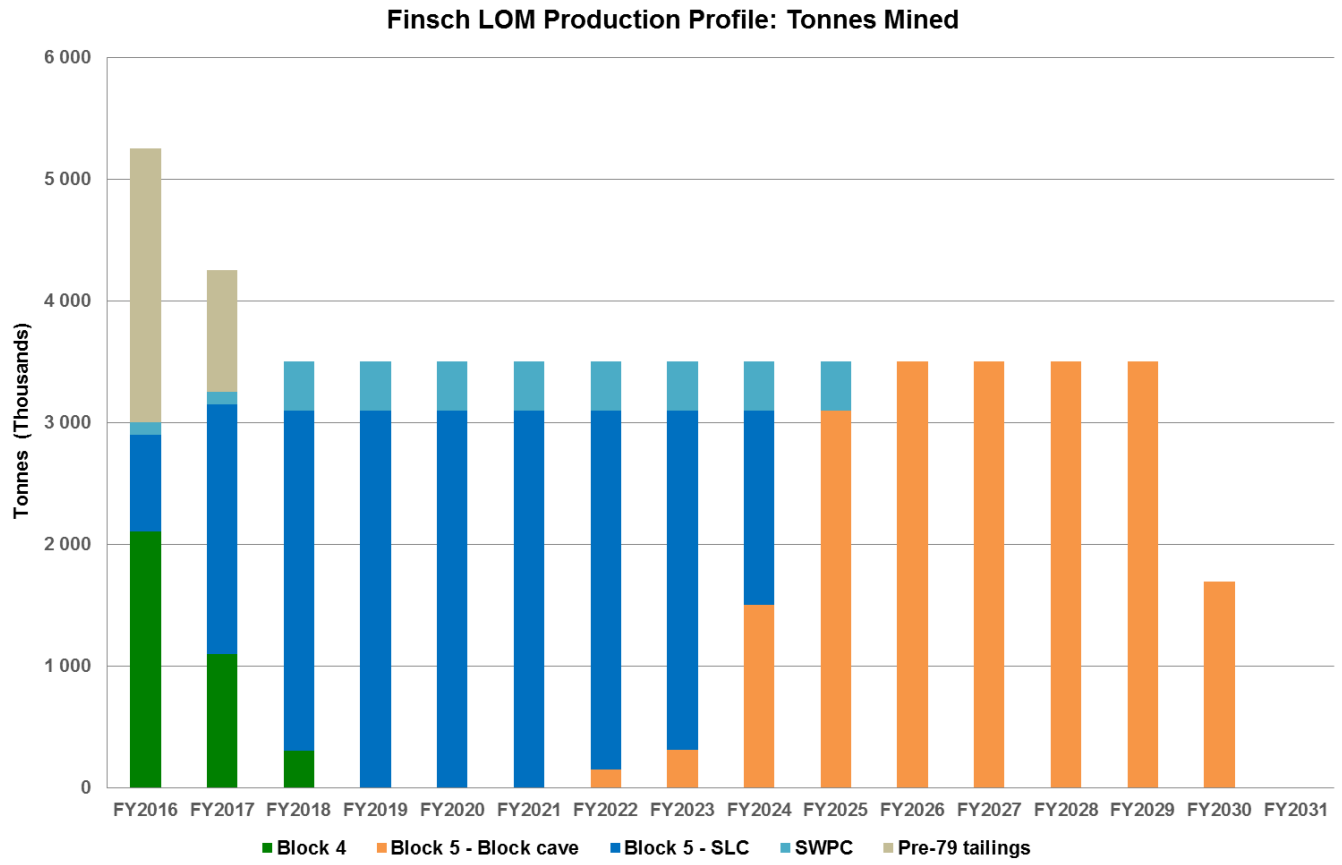


# Mining Block Layout



# Life of Mine Production Profile

- Current production from mature block cave (Block 4)
- Sublevel cave (Block 5) infrastructure and ore development being established
- Underground production to ramp up to 3.5 Mt per annum
- Life of mine plan extends to 2030 and includes Block 5 below current SLC



# Survey Reconciliation

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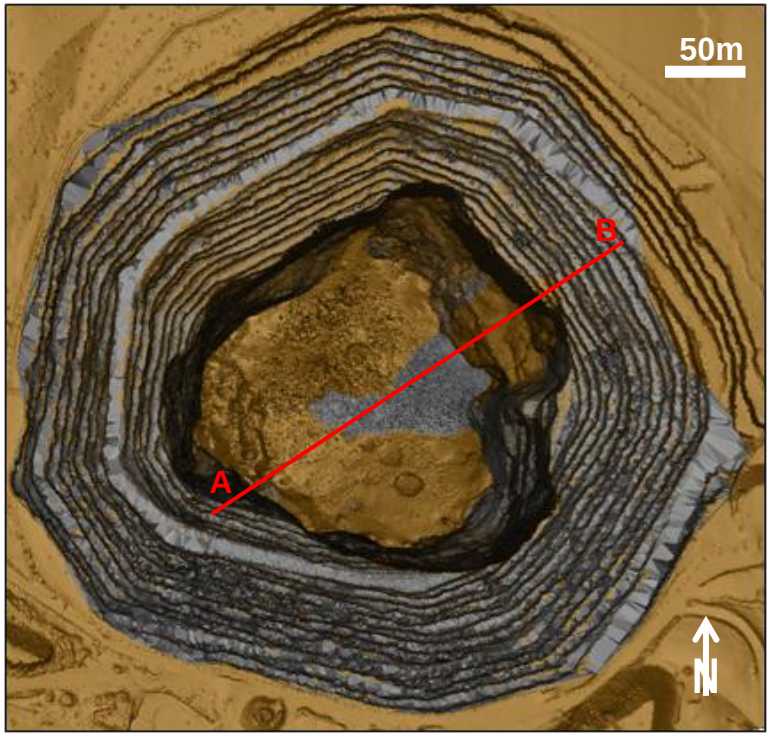
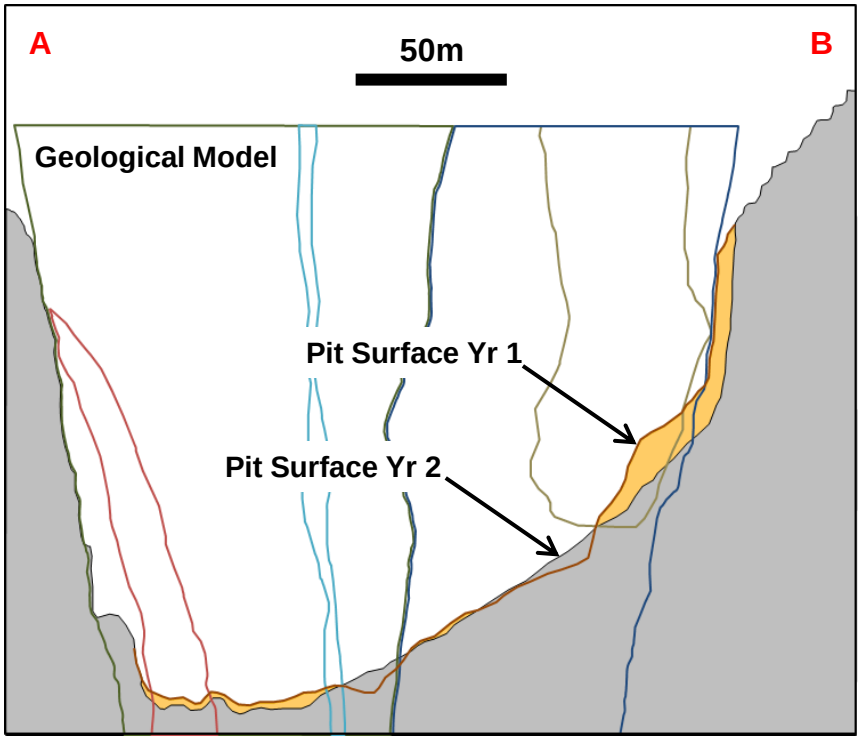
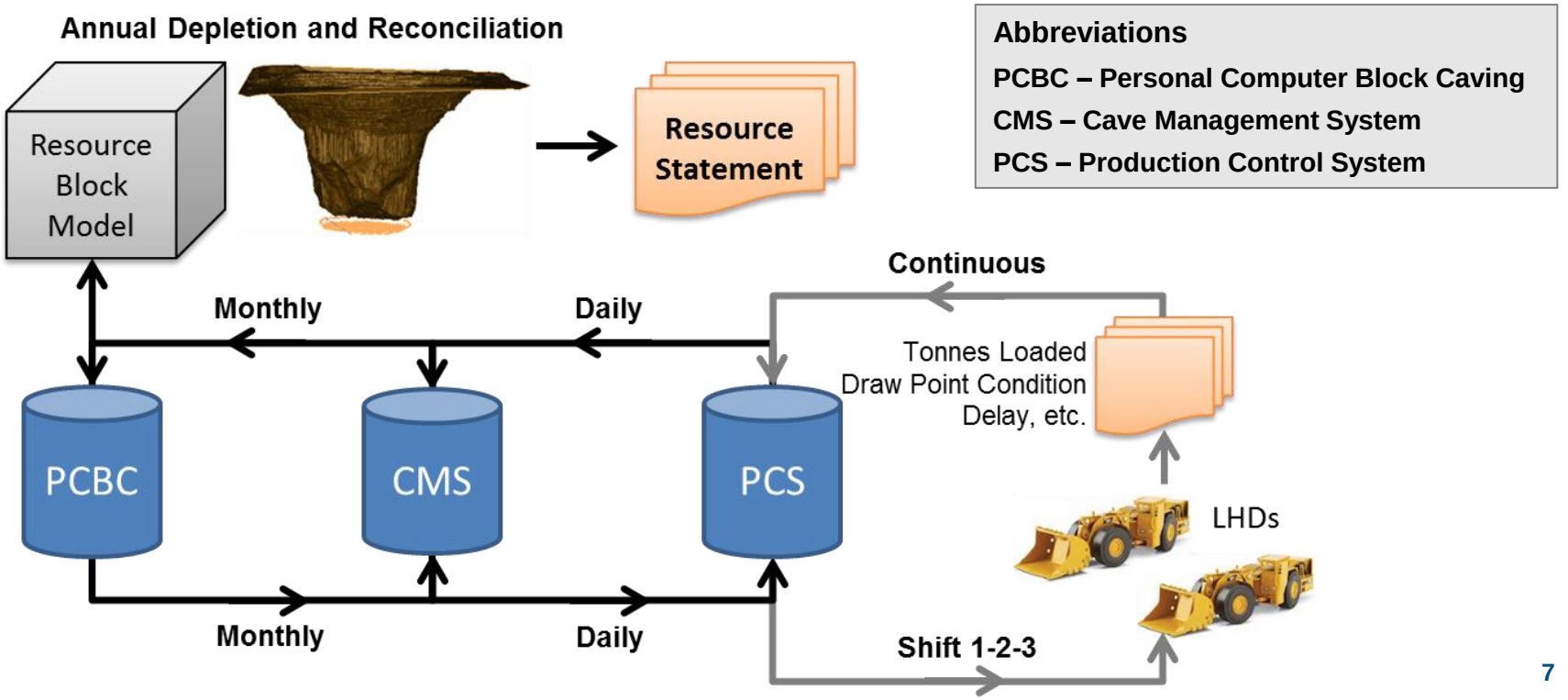
- Lidar pit scans utilised to quantify pit sidewall failures
- Provides accurate measure of material movement at pit bottom (*broken pot*)
- Volume depletion from the 3D geological model allows accurate relocation of failed material from the upper blocks to the broken pot at pit bottom for each facies
- Historically failure material included as homogenous layer of ore & waste at pit bottom
- Failed material will mix with Block 4 ore and report to the block cave draw points



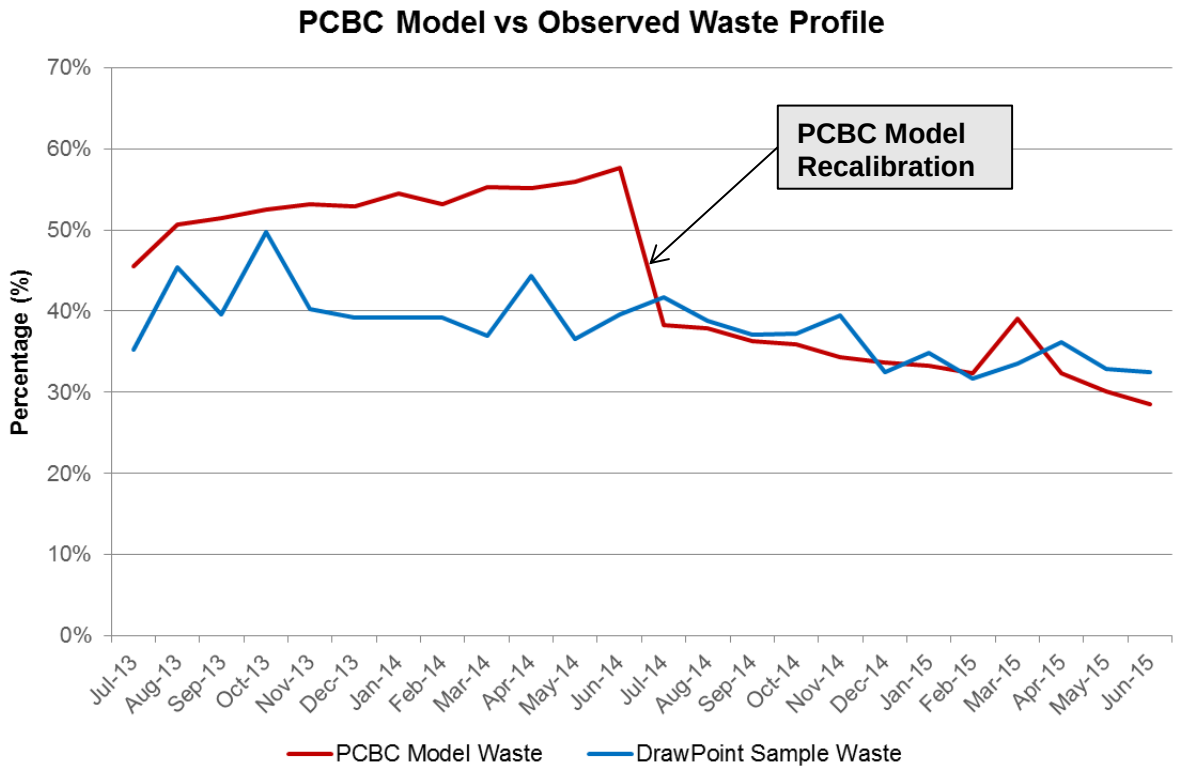
# Draw Control System (Depletion)

- Planning, scheduling & depletion managed through integrated draw control system
- PCBC applies caving and material mixing algorithms to the Resource model
  - Predicts material movement through the cave based on model constraints and depletion strategy
  - Produces LOM and monthly production schedule
  - Provides mined grade and material mix per draw point based on actual tonnes drawn



# PCBC Depletion Model Calibration

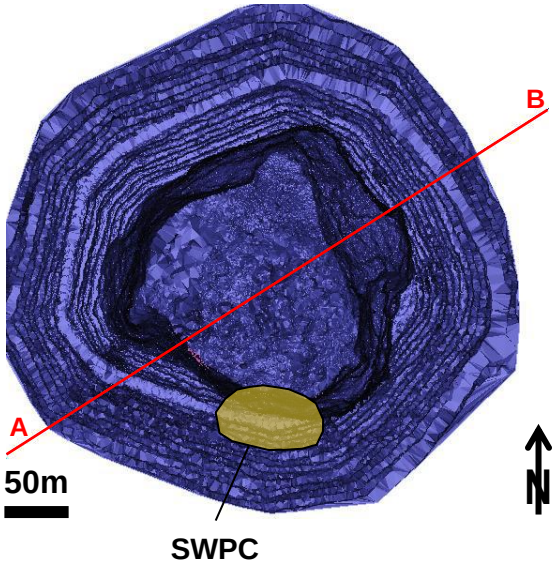
- Deviations between PCBC model predictions and actual observations started to occur mid-2013
  - Over-estimation of waste ingress, resulting in under-prediction of grade
  - Deterioration in spatial grade distribution information
- PCBC model recalibrated in order to:
  - Align predicted waste with visual observation
  - Align remnant pit material with survey reconciliation



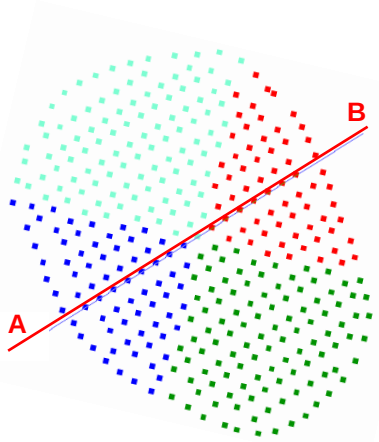
# PCBC Depletion Model Calibration

- Pit scan information showed more material at pit bottom than PCBC model predicted
- Pit divided into quadrants to improve accuracy of reconciliation of pit failure material
- Good agreement between actual and estimated pit bottom profiles obtained post calibration
- Improved accuracy of accounting for Precursor (Inferred Resource) failure material
- Depleted draw cones in the PCBC model immerged near the end of the life of the cave
- Required grade to be interpolated into infilled areas
- At this point (near 97% depletion) spatial distribution of grade and rock type bears little resemblance to the original Resource model

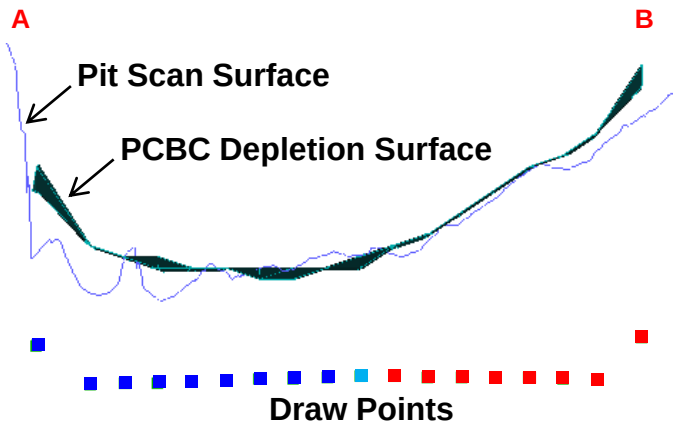
**Pit Scan Surface**




**Draw point quadrants**

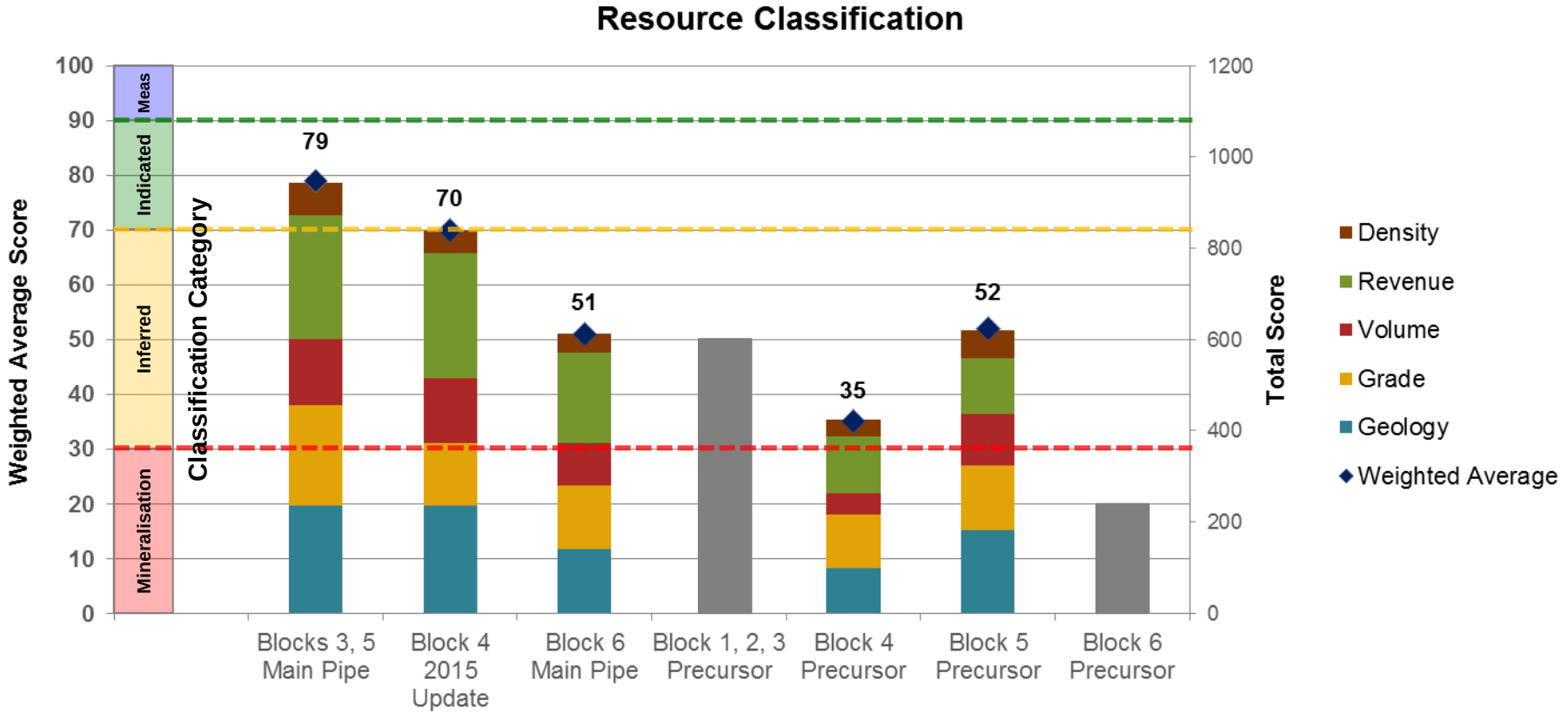



**Section**



# Resource Classification

- Resources classified on a multiple scorecard system (5 Resource individual models)
- Relies on the quantity & quality of geoscientific information underpinning the estimate
- Problematic: Movement of the ore through a block cave can be predicted but not tracked accurately
- Block 4 classification reduced due to:
  - Reduced confidence in grade continuity
  - Inferred Resources (Precursors) included in pit bottom “broken pot”



# Production Data & Confidence Intervals

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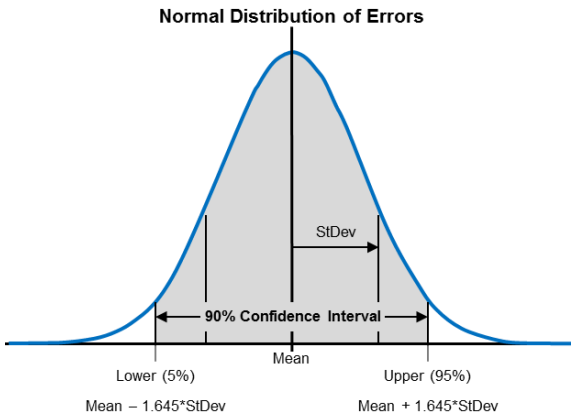
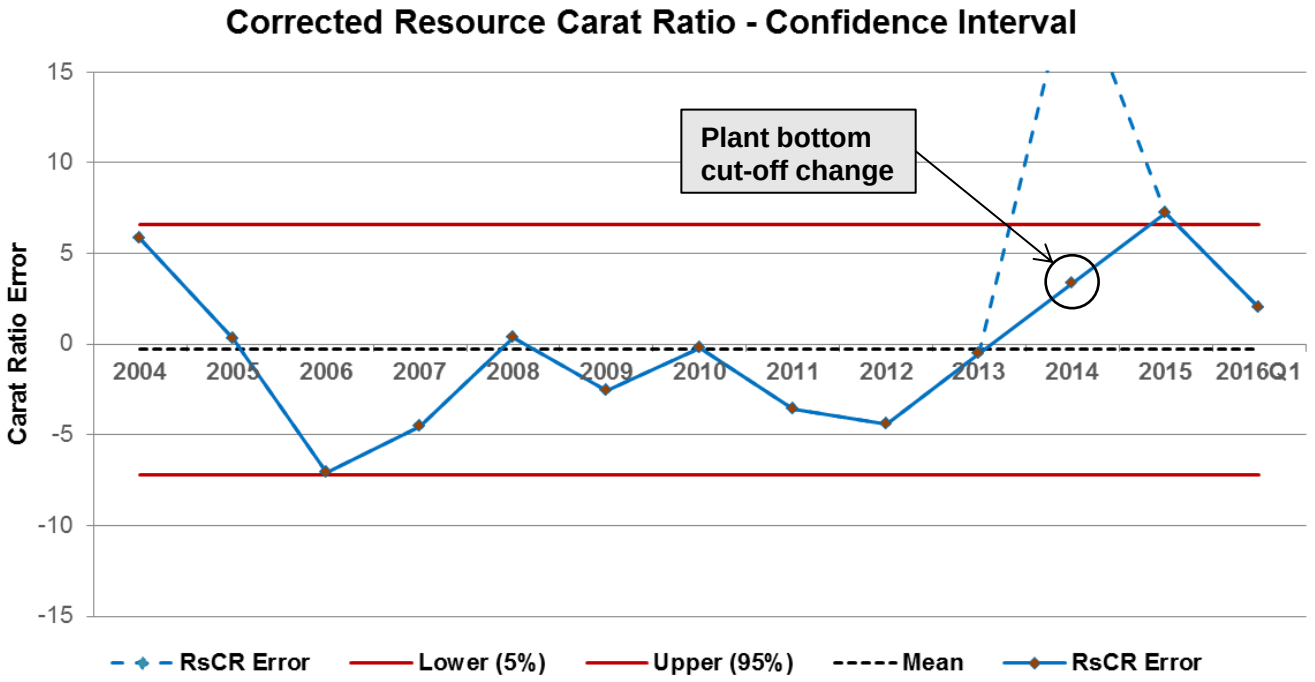
- Production data used to verify Resource confidence
- Resource carat ratio applied as measure of performance
  - $RsCR_{err} = \frac{Actual\ ct - Expected\ ct}{Expected\ ct}$
- Expected accuracy of Indicated Resource:
  - ±15% with 90% confidence on annual production periods



# Conclusion

- Accurate Resource reconciliation paramount when block cave approaching end of life
- Mining method used during production can alter the original Resource estimate
- Current classification system reliant on the quality and spatiality of geoscientific information used in the original Resource estimate
- In specific circumstances, Resource classification systems should make provision for the inclusion of production results to verify the level of confidence in the Resource
- This is currently not strictly in accordance with the SAMREC code

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## Thank You