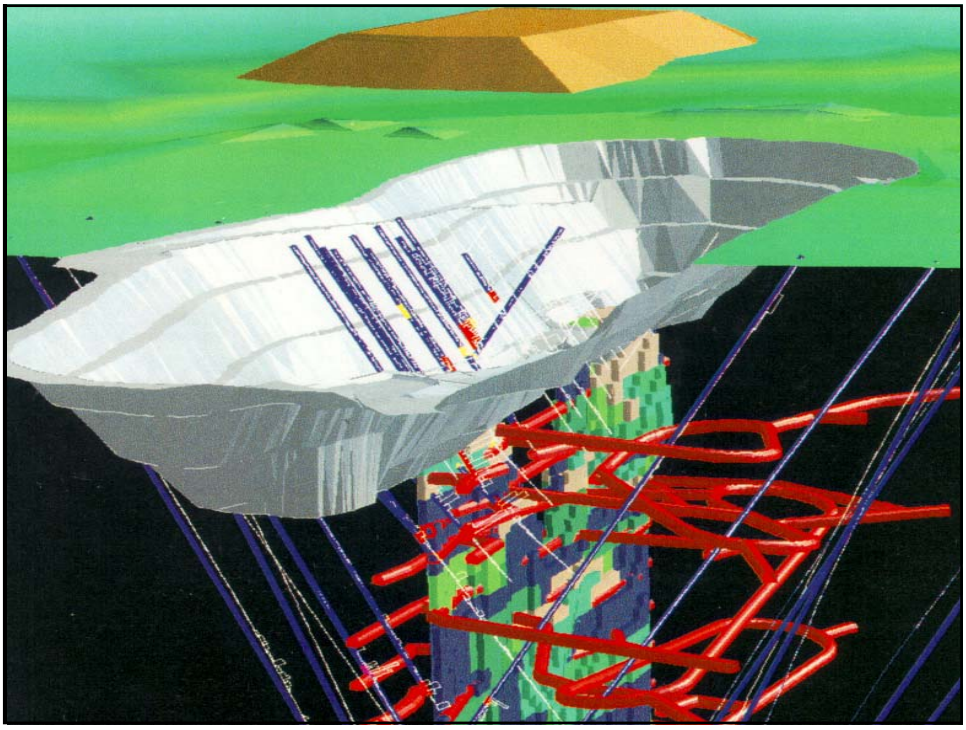
MINE LIFE CYCLE

MINERALS AND METALS LIFE CYCLE

A mine is a business operation which recovers natural mineral products of value to society:



- **all shapes and sizes (e.g. surface or underground)**

  e.g. typical medium sized underground mine:
  - **Rs 12,000 million capital**
  - **Rs 120 million profit / year**
  - **300 workforce**
  - **30 year life**
  - **10 years to find and prove**
  - **3 years to construct**

Managed:

- **profitably (influenced by market forces)**
- **responsibly and safely**
- **committed to workforce, community, environment**
- **driven by geologists & engineers**

THE MINE LIFE CYCLE:

discovery,

development,

production,

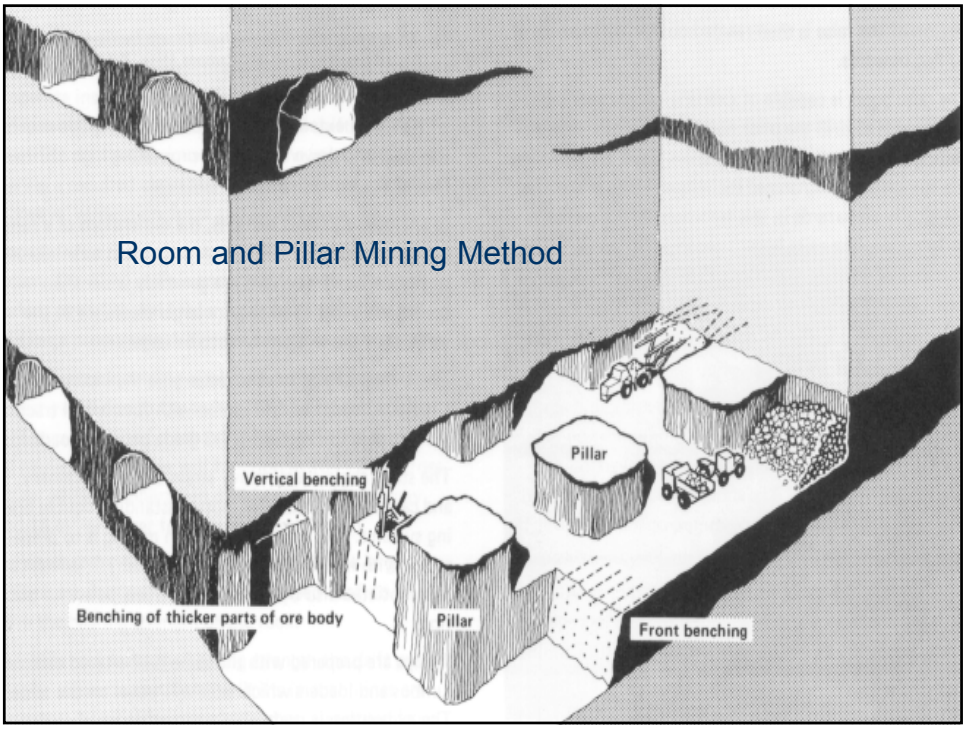
closure,

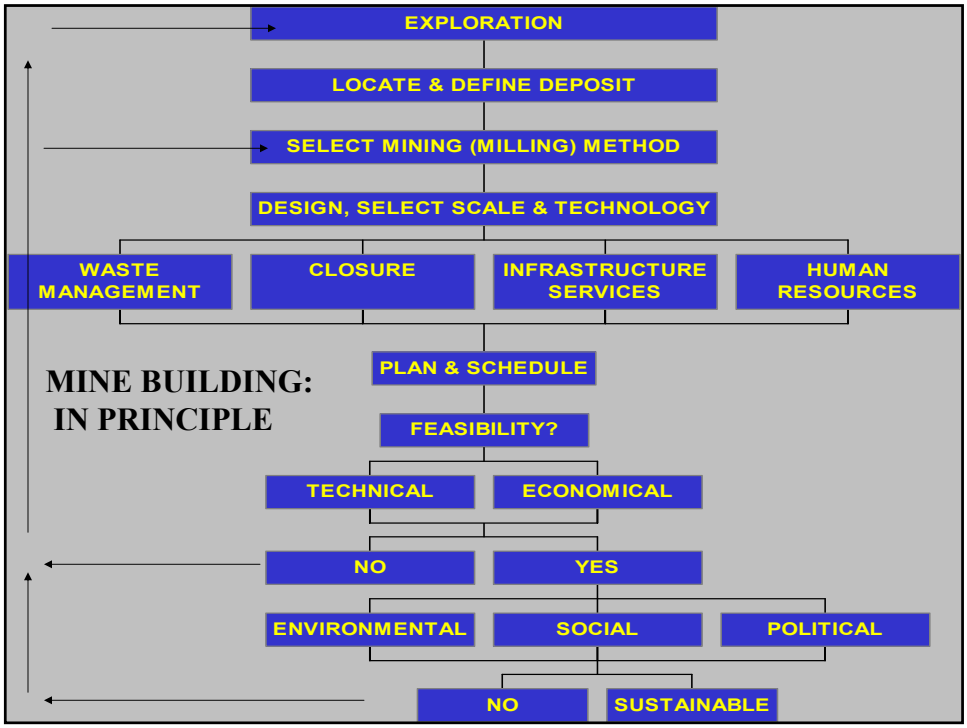
reclamation

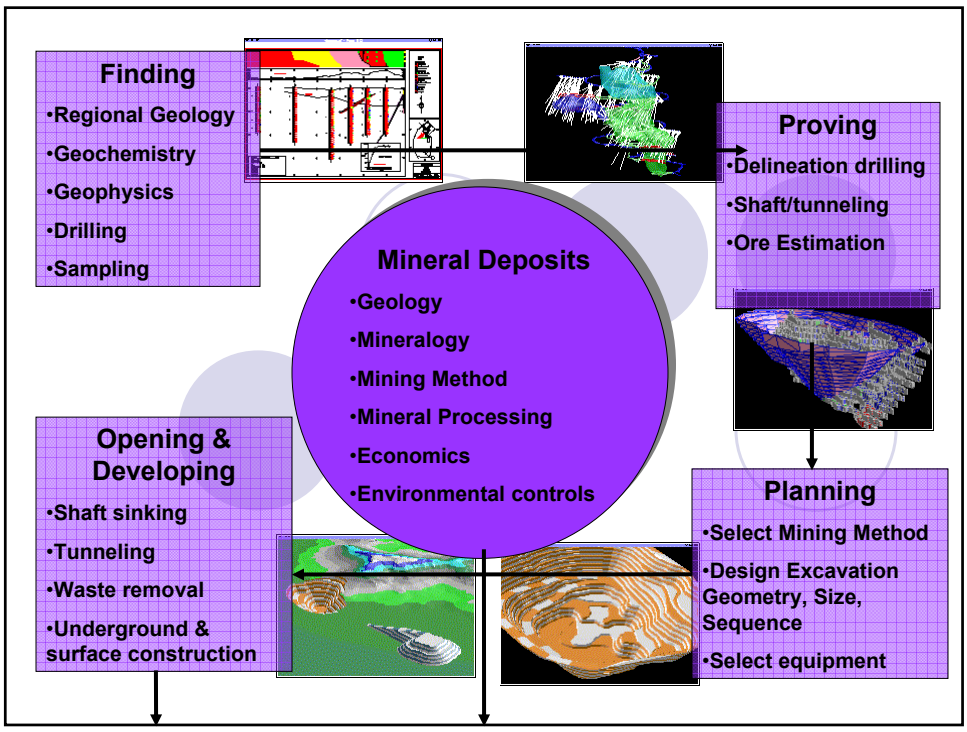
Artist's impression of planned open pit and mill.

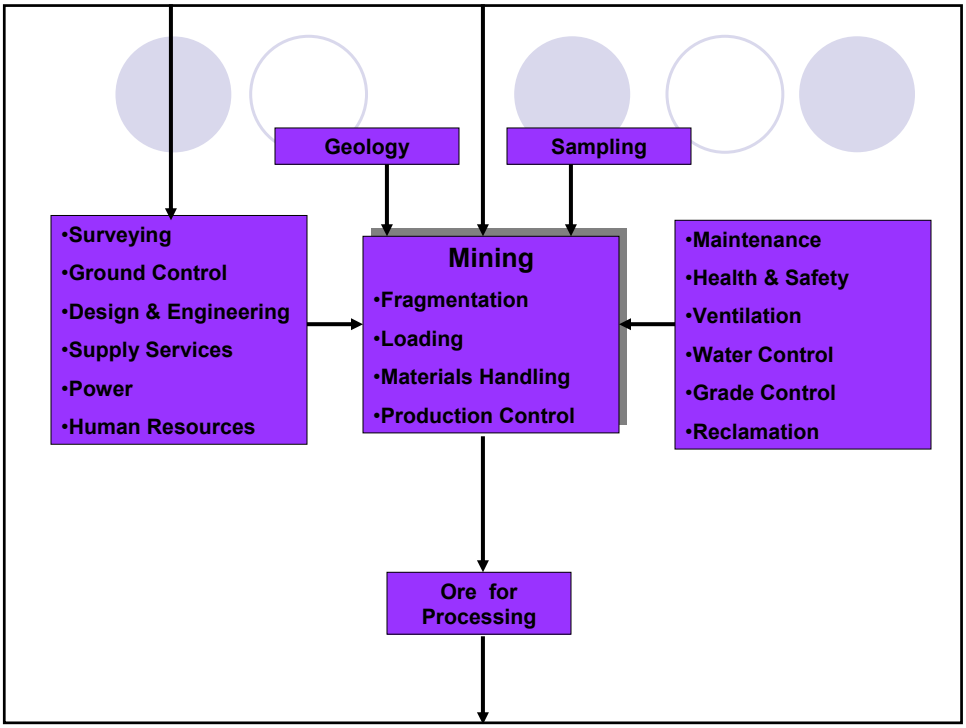
Artist's impression of eventual reclaimed mine site.

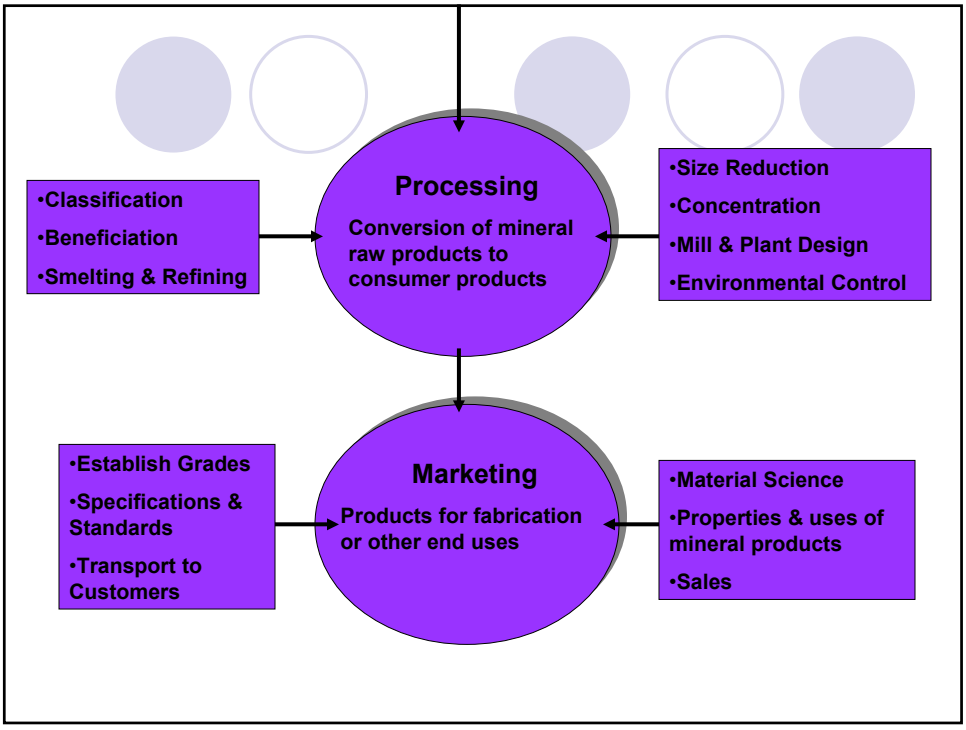

Surface coal mining operations, loading coal and loading waste rock,.
Cable shovel, front end loaders,off-highway truck, bulldozers,
supervisor's truck


Room and Pillar Mining Method
Pillar
Vertical benching
Benching of thicker parts of ore body
Pillar
Front benching


EXPLORATION
LOCATE & DEFINE DEPOSIT
SELECT MINING (MILLING) METHOD
DESIGN, SELECT SCALE & TECHNOLOGY
WASTE MANAGEMENT
CLOSURE
INFRASTRUCTURE SERVICES
HUMAN RESOURCES
MINE BUILDING: IN PRINCIPLE
PLAN & SCHEDULE
FEASIBILITY?
TECHNICAL
ECONOMICAL
NO
YES
ENVIRONMENTAL
SOCIAL
POLITICAL
NO
SUSTAINABLE

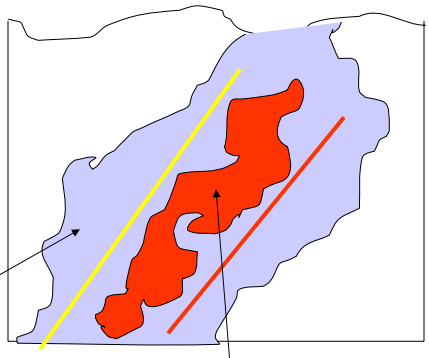

Finding
•Regional Geology
•Geochemistry
•Geophysics
•Drilling
•Sampling
Proving
•Delineation drilling
•Shaft/tunneling
•Ore Estimation
Mineral Deposits
•Geology
•Mineralogy
•Mining Method
•Mineral Processing
•Economics
•Environmental controls
Opening & Developing
•Shaft sinking
•Tunneling
•Waste removal
•Underground & surface construction
Planning
•Select Mining Method
•Design Excavation Geometry, Size, Sequence
•Select equipment

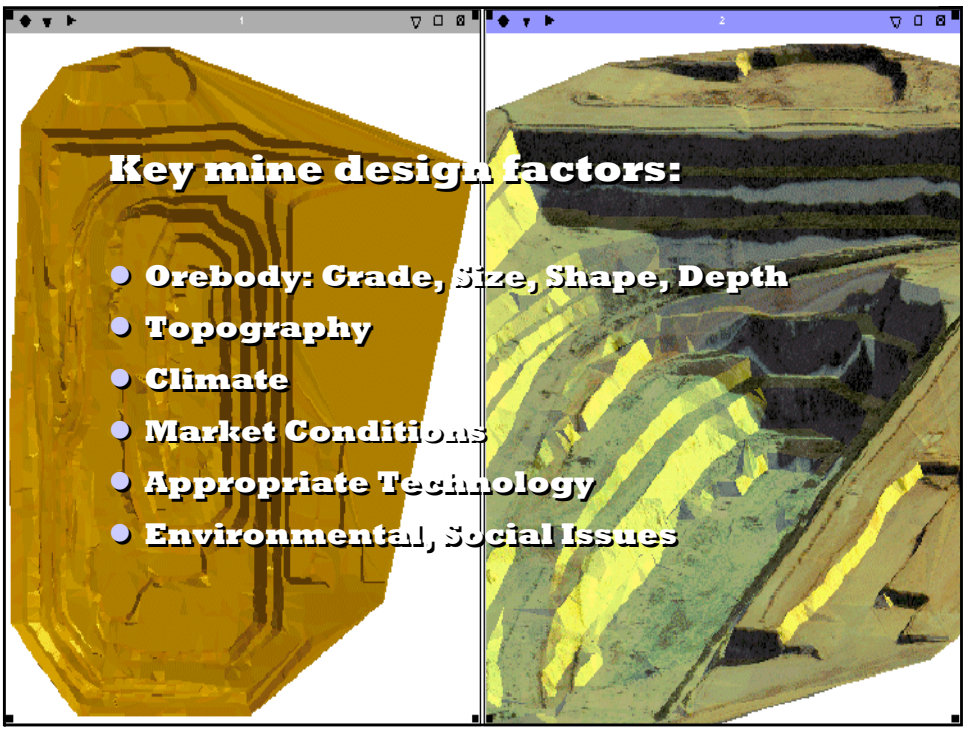

Geology
Sampling
•Surveying
•Ground Control
•Design & Engineering
•Supply Services
•Power
•Human Resources
Mining
•Fragmentation
•Loading
•Materials Handling
•Production Control
•Maintenance
•Health & Safety
•Ventilation
•Water Control
•Grade Control
•Reclamation
Ore for Processing


•Classification
•Beneficiation
•Smelting & Refining
Processing
Conversion of mineral raw products to consumer products
•Size Reduction
•Concentration
•Mill & Plant Design
•Environmental Control
•Establish Grades
•Specifications & Standards
•Transport to Customers
Marketing
Products for fabrication or other end uses
•Material Science
•Properties & uses of mineral products
•Sales

Mineral Deposits and Orebodies

- **A Mineral Deposit is a geologic occurrence of minerals in relatively concentrated form.**
- **An Orebody is a Mineral Deposit that has sufficient value that it can be mined at a profit.**





How do we measure our performance?

Key parameters are:

- **Dilution:**

  How much waste rock is mined with the ore.

- **Recovery:**

  How much of the orebody cannot be recovered

- **Costs, Productivity**

- **Safety, Environmental, Social impact measures**