

A Framework to Approach Shared Use of Mining Related Infrastructure: Water

Minimizing the mining sector's water footprint and increasing access to [potable]
water supply for communities

November 2013



VALE COLUMBIA CENTER
ON SUSTAINABLE INTERNATIONAL INVESTMENT
A JOINT CENTER OF COLUMBIA LAW SCHOOL AND
THE EARTH INSTITUTE AT COLUMBIA UNIVERSITY

Water is of critical importance to mines and to surrounding communities



Banner in Knysna, South Africa.
Source: www.cactuslouis.com



Source: Ventyx



Indigenous 'water laws' protest in Ecuador, 2010; photo by Lou Gold

What is meant by shared use?

Minimize a mine's footprint



Robinson Lake, Randfontein, SA
Source: www.environment.co.za



Source:
waterpaths.wordpress.com

Leverage mining-related investments in water infrastructure







Source: The Habitat Advocate



Host country water infrastructure needs

African countries on target to meet water MDG by 2015



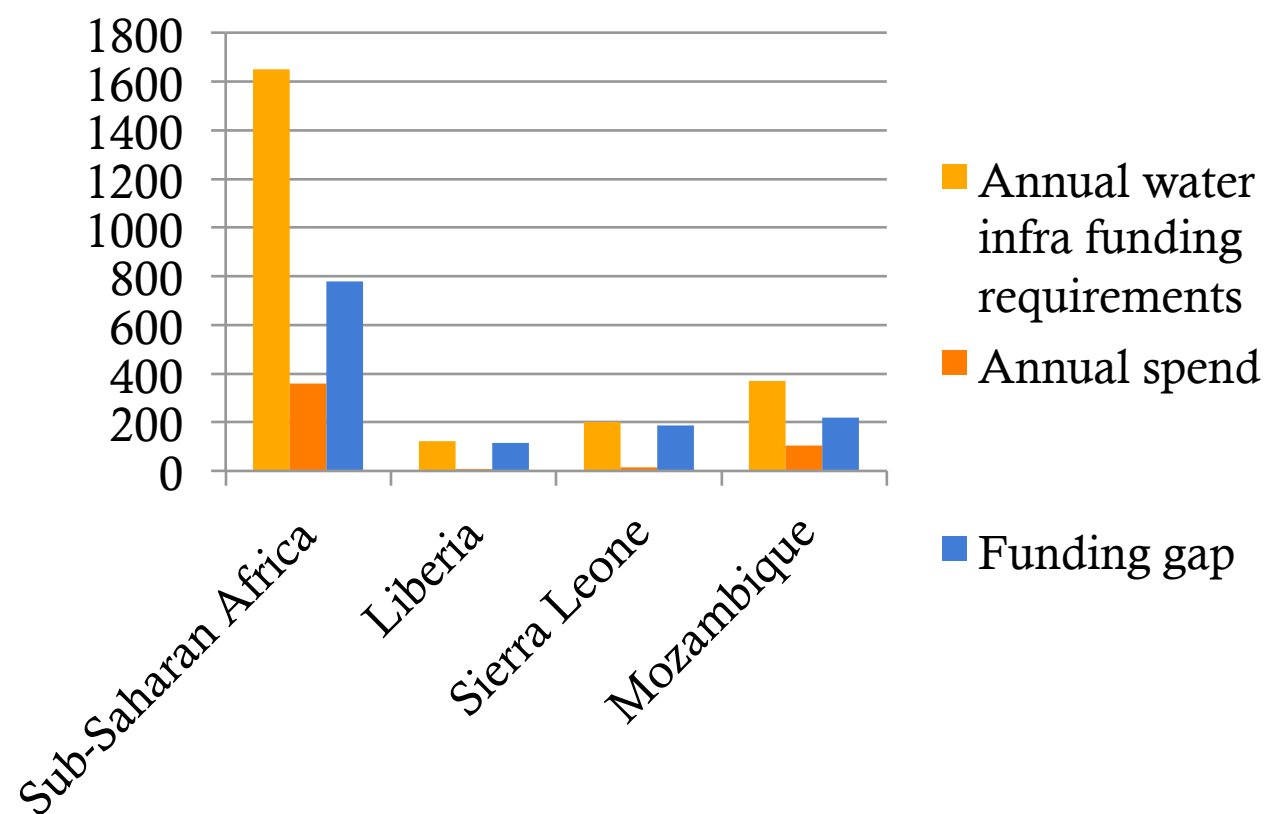
-  On Track: Coverage rate in 2010 was > 95% or was within 5% of the 2010 rate required to meet the target.
-  Progress but insufficient: Coverage rate in 2010 between 5% and 10% of the 2010 rate required to meet the target.
-  Not on Track: Coverage rate in 2010 was the same or lower than in 1990 or below 10% of the 2010 rate required to meet the target.
-  Insufficient data or not applicable: Data was unavailable or insufficient to estimate trends or a progress assessment was not applicable.

Source: Progress on Drinking Water and Sanitation
2012 Update. UNICEF, WHO

















Host country water infrastructure financing gap




AICD: Annual spending in US\$ millions between 2006 – 2015 to meet the water & sanitation MDGs



Water intensity of mining

Figure 1. Water intensity of key minerals and metals

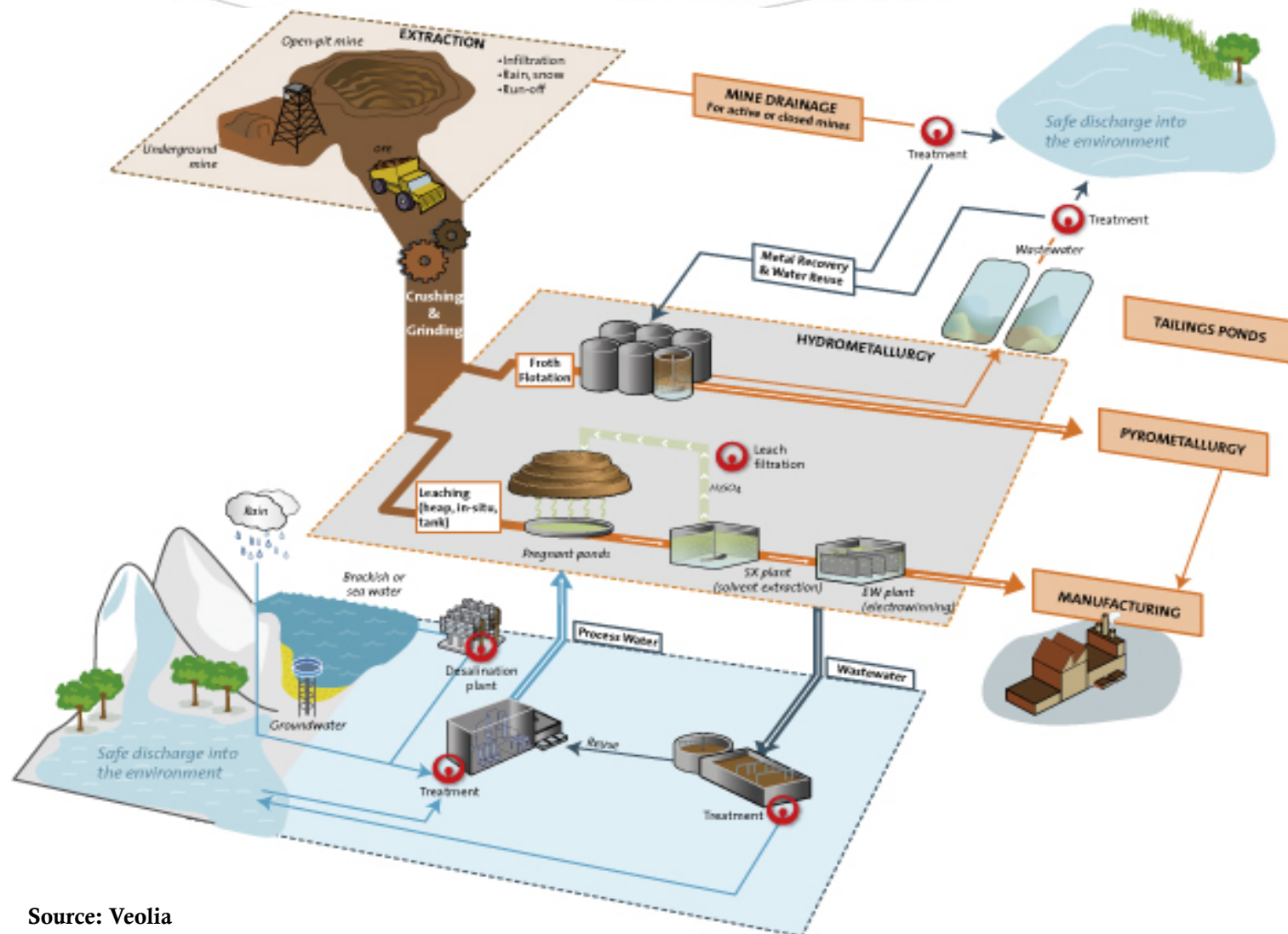
Mineral/metal type	Water use
Coal 	
Copper 	
Diamond 	
Gold 	
Nickel 	
Iron ore 	
Platinum 	

Key:  High  Medium high  Medium low

Source: Frost & Sullivan 2011



Mines need water infrastructure to source and treat water



Source: Veolia



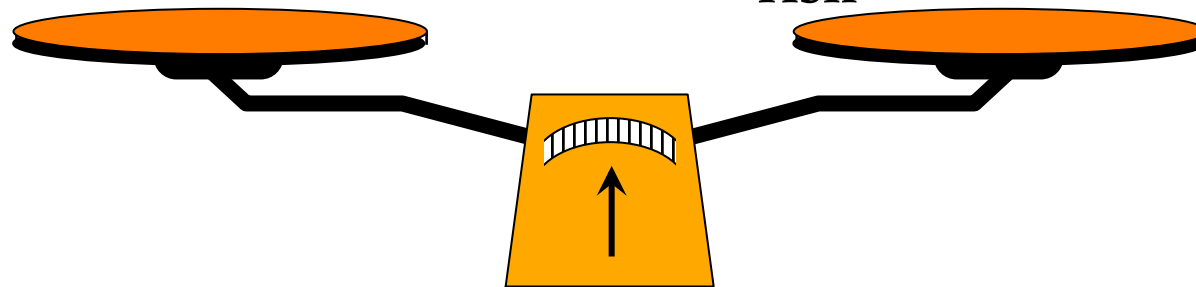
Economic premise for shared use

Benefit for country:

- Minimize the mining sector's water footprint
- Increase access to improved potable water
- Develop the water infrastructure

Potential benefit for mine:

- Increased water supply
- Reduced costs
- Maintain social license to operate
- Minimize reputational risk



Scope of Framework

🔥 **Purpose: To facilitate shared-use**

STEP 1: Assess the Current Situation – What is at Stake?



STEP 2: Identify Operational Synergies



STEP 3: Verify the necessary pre-conditions



STEP 4: Negotiation Points



STEP 1: What determines a mine's water arrangements?

Fresh water availability

Adequacy of public water infrastructure

Cost of water supply

Cost of recycling water/sourcing from alternative locations

- How much fresh water has been allocated, or is available to a mining operation?
- Can mine obtain some or all of its water requirements from an existing Authority? Reliability?
 - At what cost?
- How much water can the mine obtain from recycling/ re-using water, or obtaining it from other sources?



STEP 2: Identify Operational Synergies

Some Shared Infrastructure

- **Mines supply water to communities:**
 - **Excess mine water**
 - **Desalinated water**
 - **Treated community waste water**

Shared Infrastructure

- **Mines as an anchor for investment in water infrastructure**

No Shared Infrastructure

- **Mines collaborate with stakeholders to provide water infrastructure to nearby communities**



Scenario (a) Mines supply excess water to communities

Excess water is supplied from:

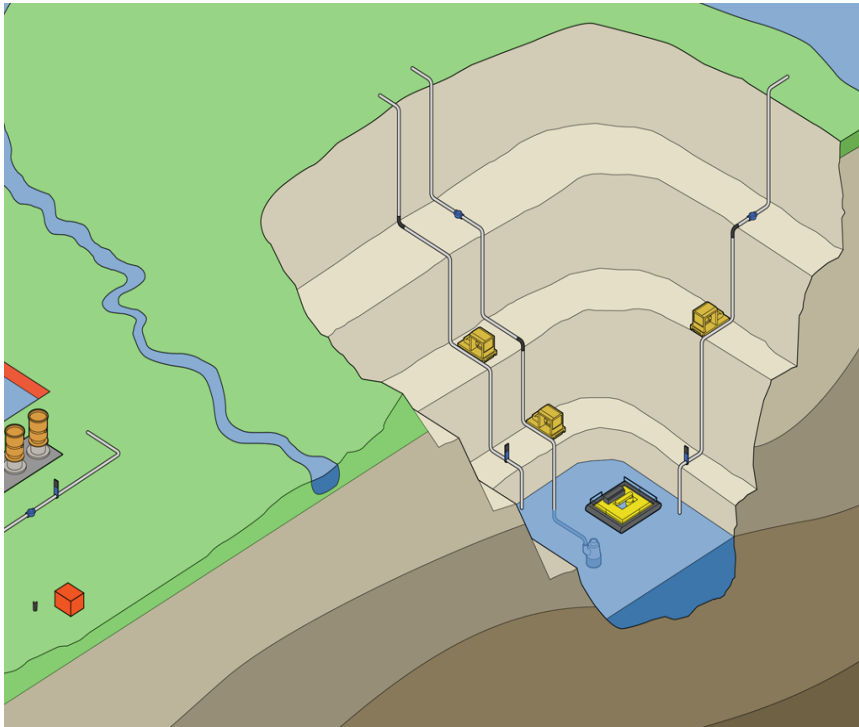
Dewatering

Desalination

Waste water



Scenario (a) i. Mine provides treated water obtained from dewatering

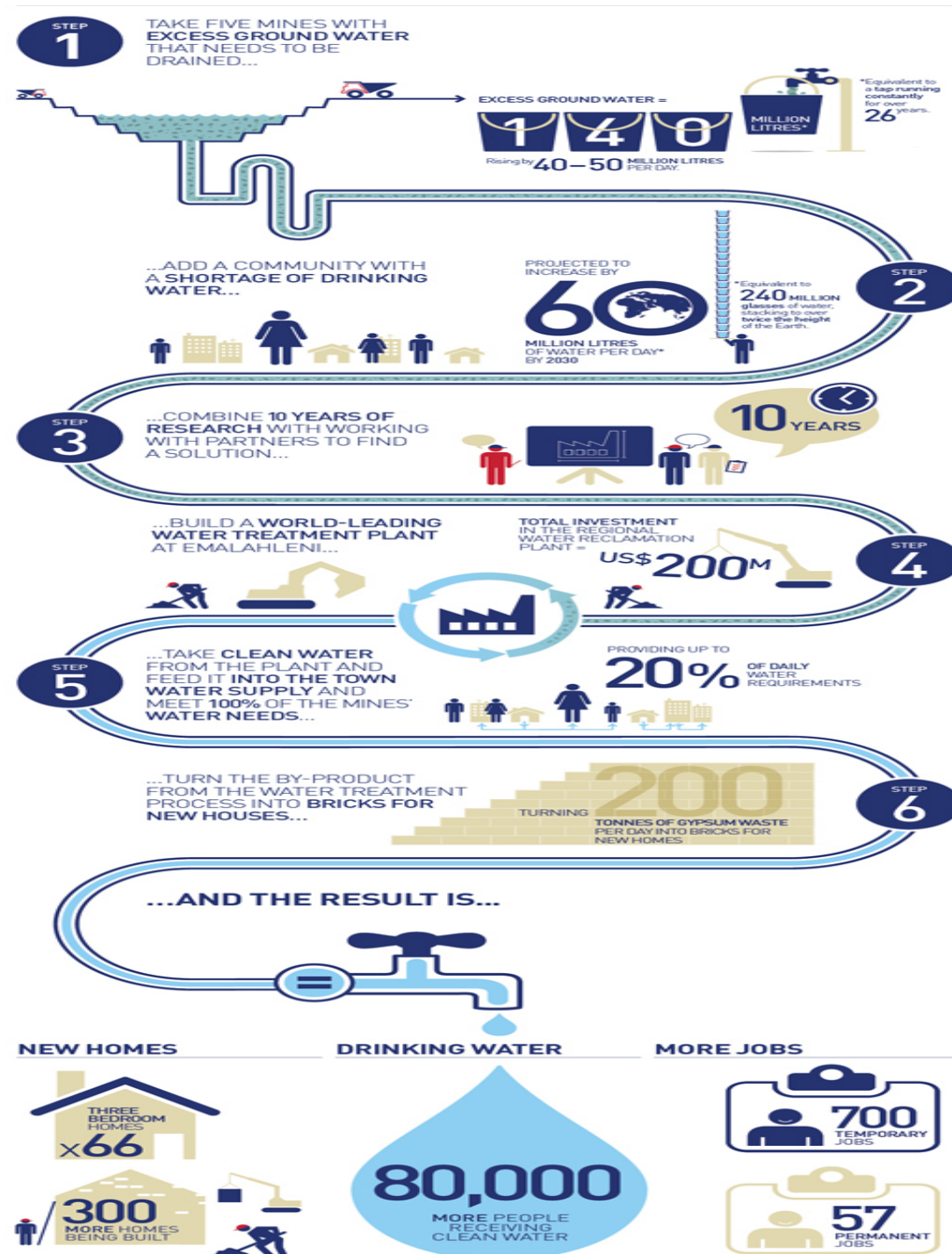


Source: Weir Minerals at www.dewateringexpertise.com



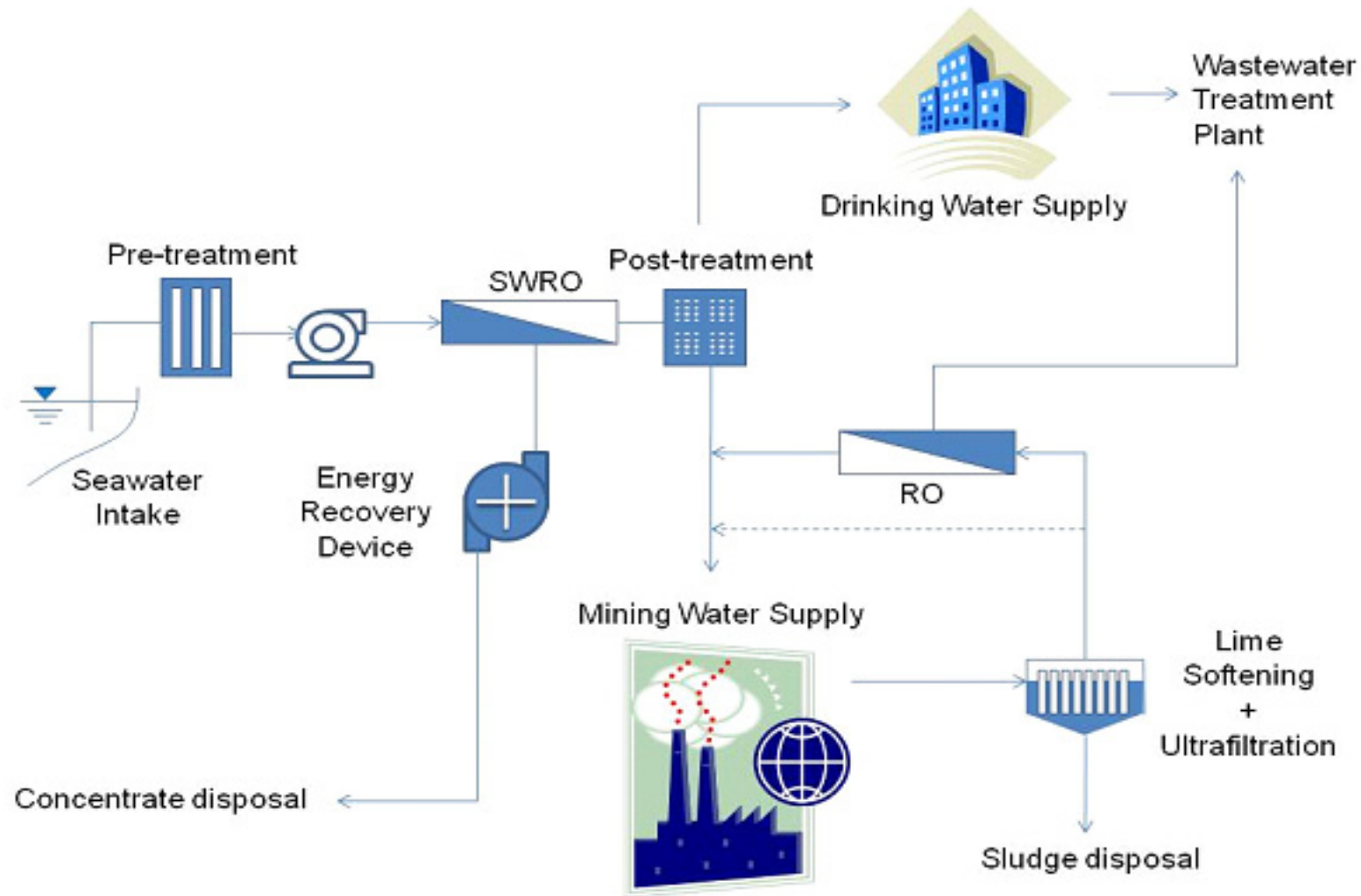
Source: Aquatech Dewatering and Pumping Solutions

E-Mahlahleni Water Reclamation Plant, South Africa

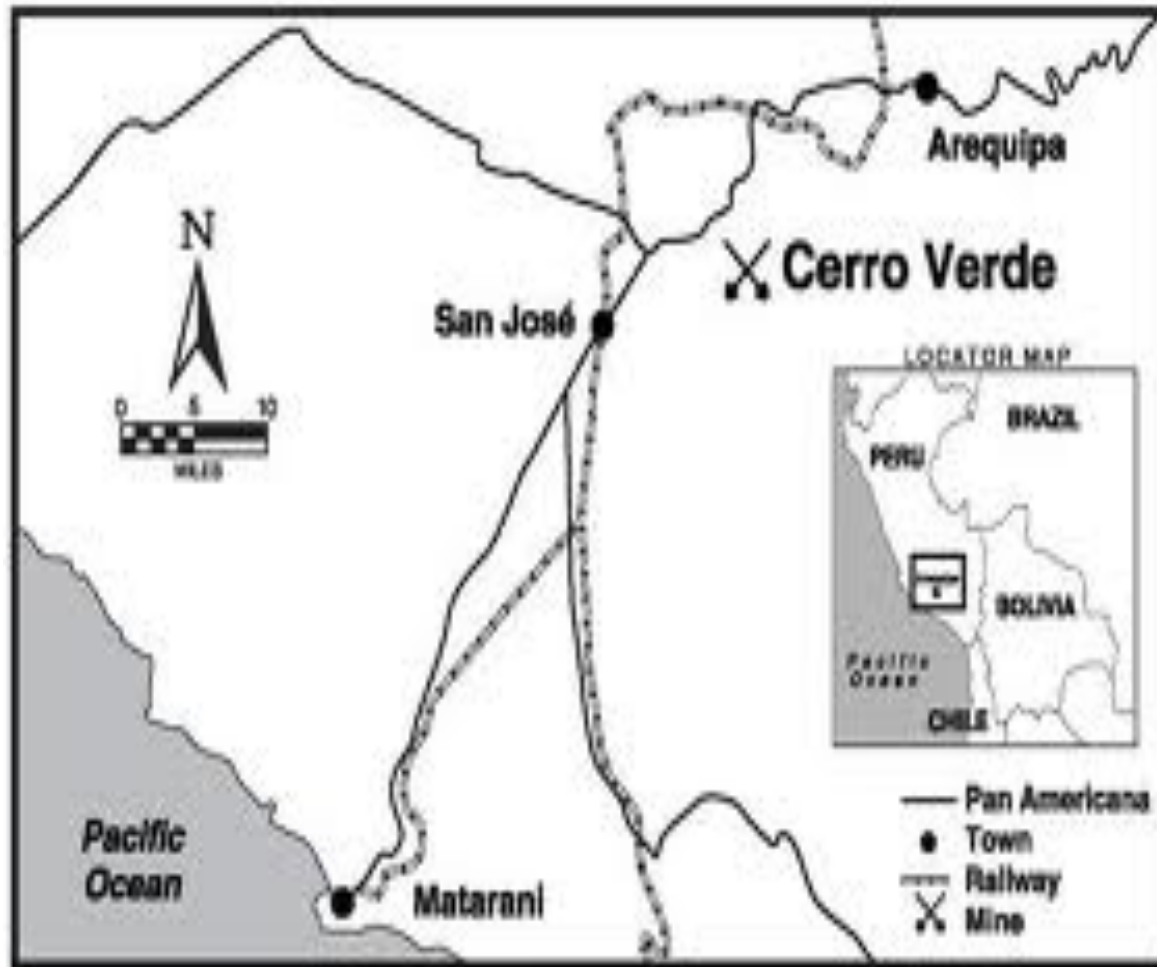


Source: Anglo American's 6-step guide to turning mine water into homes, drinking water and jobs.

Scenario (a) ii. Mine provides excess desalinated water



Scenario (a) iii. Mine provides treated waste water

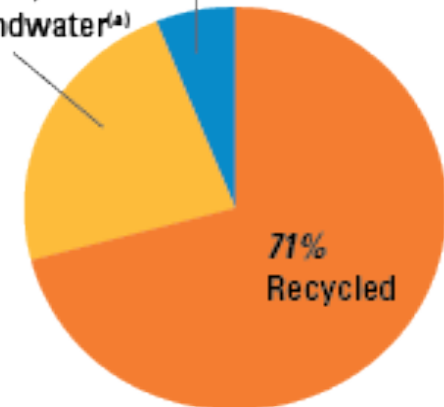


2012 WATER USE BY SOURCE

665 Million Cubic Meters

23%
Surface/
Groundwater^(a)

6%
Storm Water



^(a) Includes 7.7 million cubic meters municipal water, municipal wastewater and water imported from any other industrial or mining facility



Scenario (a): STEPS 3 & 4

Pre-conditions

- **Legal and regulatory framework**
 - Strict environmental regulations
 - Water licensing regime
- **Institutional setting to enforce and monitor water rights**
- **Institutional presence and capacity to supply/ treat water**
- **Mechanisms to ensure water infrastructure is sustainable**

Negotiating Points

- **Amount of excess water**
- **Water Charge**
- **Duration**
- **Who owns and operates the water infrastructure?**
 - In E-Malahleni – Rio Tinto
 - Peru – local water authority



Scenario (b) Mine as an anchor for investment in water infrastructure

From a local authority's perspective

- **Institutional capacity**
- **Water tariff**
- **Consumer demand**

From a mining company's perspective

- **Reduced Costs**
- **Legal Requirement**
- **Social License**
- **But: (1) reliability, (2) water tariff, (3) timing of water supply**



Scenario (b): STEPS 3 & 4

Pre-conditions

- **Legal and regulatory framework**
 - Strict environmental regulations
 - Water licensing regime
- **Institutional setting to enforce and monitor water rights**
- **Institutional presence and capacity to supply water**
- **Water tariff needs to be set to maximize cost recovery**
- **Mechanisms to ensure water infrastructure is sustainable**

Negotiating Points

- **How to ensure reliability of water supply to the mine?**
 - Step-In rights?
- **Alignment of timing with mine operation:**
 - Provision for delays
 - Scheduled and unscheduled maintenance
- **Water supply terms**
 - Water amount
 - Water tariff
- **Post-closure obligations**



Scenario (c) : Mines provide water infrastructure to nearby communities

Where a mine sources its own water, it could also supply water to communities

i. Piped water supply and treatment infrastructure

- Mine rehabilitates, expands, or replicates self-supply options to surrounding communities

ii. Small-scale supply and treatment technologies

- Mine provides small-scale supply and treatment solutions to surrounding communities



Scenario (c) : Mines provide water infrastructure to nearby communities

- Scenario (a)(i): Mine provides piped water supply, treatment and/or storage infrastructure



Source: Rio Tinto

- Scenario (a)(ii): Mine provides small-scale supply and treatment solutions to surrounding communities



Source: www.africanvision.org.uk



Source: Waterhealth International

Scenario (c) Negotiating Points

- ✦ Required by terms of concession agreement, or part of a mining company's CSR program?
- ✦ What is the geographical scope for the infrastructure?
- ✦ Which parties should be involved (government, utility, donors, NGOs)?
- ✦ What are the responsibilities of each party? Who provides the services?
- ✦ Water quality/ water availability/ O&M





www.vcc.columbia.edu



VALE COLUMBIA CENTER
ON SUSTAINABLE INTERNATIONAL INVESTMENT
A JOINT CENTER OF COLUMBIA LAW SCHOOL AND
THE EARTH INSTITUTE AT COLUMBIA UNIVERSITY