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
Water is of critical importance to mines and to surrounding communities.

Banner in Knysna, South Africa.
Source: www.cactuslouise.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

Leverage mining-related investments in water infrastructure

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

Source: waterpaths.wordpress.com

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

- Annual water infra funding requirements
- Annual spend
- Funding gap
### Water intensity of mining

#### Figure 1. Water intensity of key minerals and metals

<table>
<thead>
<tr>
<th>Mineral/metal type</th>
<th>Water use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>![Water Intensity Image]</td>
</tr>
<tr>
<td>Copper</td>
<td>![Water Intensity Image]</td>
</tr>
<tr>
<td>Diamond</td>
<td>![Water Intensity Image]</td>
</tr>
<tr>
<td>Gold</td>
<td>![Water Intensity Image]</td>
</tr>
<tr>
<td>Nickel</td>
<td>![Water Intensity Image]</td>
</tr>
<tr>
<td>Iron ore</td>
<td>![Water Intensity Image]</td>
</tr>
<tr>
<td>Platinum</td>
<td>![Water Intensity Image]</td>
</tr>
</tbody>
</table>

Key: 
- ![High Water Intensity Image]
- ![Medium high Water Intensity Image]
- ![Medium low Water Intensity Image]

Source: Frost & Sullivan 2011
Mines need water infrastructure to source and treat water.
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

Economic premise for shared use
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?

- 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: 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

Source: Doosan Hydro Technology
Scenario (a) iii. Mine provides treated waste water

Source: Freeport McMoRan Copper & Gold
## 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