MDLOTI RIVER DEVELOPMENT PROJECT HAZELMERE DAM RAISING

- Works required for raising
- Stability of dam wall
- Further investigation and analysis
- Options for raising
- Cost estimate of options
- Programme for implementation
- Way forward

Hazelmere Dam Raising Works required for raising



- Acquisition of additional land in dam basin
- Stability analysis of dam wall
- Flood routing and spillway capacity
- Design of civil works for dam wall
- Optimisation of type of crest gates
- Design, manufacture and installation of crest gates
- Compliance with environmental authorisation
- Construction of civil works
- Commissioning of project

Hazelmere Dam Raising Stability of dam wall



- Analysis of spillway and non overspill crest was done for 4 loading conditions (normal to extreme).
- Stability analysis determined factors of safety against sliding and overturning of dam wall.
- Values for foundation parameters, applied in previous reports, need to be confirmed by further geological investigation.
- Results to date indicate the dam wall to be unstable against sliding for the raised condition.

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Hazelmere Dam Raising





- Existing geological reports indicate weak layers containing mica rich material between good quality quartsitic sandstone.
- Zero tension at heel of dam wall is imperative for design to ensure stability.
- Further geological investigation is in progress during March 2012 to confirm and/or define design criteria assumptions.

Hazelmere Dam Raising Options for raising



- Investigations indicate 2 viable ways of improving stability of dam wall:
 - Anchor cables through wall into foundation rock, and
 - Mass concrete on downstream face of dam wall.
- Two types of crest gates are being considered:
 - Radial gates installed in the existing 7 openings, and
 - Vertical sliding gates in 14 reduced openings.
- The above options still need to be optimised.





Hazelmere Dam Raising Cost estimate of options



- The budget cost estimate of the various options for raising (including civil works for stability, crest gates, VAT, contingencies and escalation are:
 - Original feasibility cost: R162.3 million
 - Anchor cable option: R370.0 million
 - Mass concrete option: R547.0 million
 - Anchors and concrete: R475.0 million
- The estimate for crest gates and modifications to the dam wall, R190 million, has not been optimised but is considered to be conservative.

Cost estimate of options - Detail

I Land acquisition and fees 25.0 Concrete & Mass Concrete 2 Design & supervision of civil works 17.0 25.0 25.0 25.0 27.0 3 EPC contract for gates 47.0 150.0 150.0 150.0 4 Construction 50.0 40.0 40.0 40.0 4.1 Stability (Incl. 20% Contingency) 0.0 110.0 280.0 210.0 5 Heritage Sites and graves 2.5 6.0 6.0 6.0 6 ECO 2.3 2.3 2.3 2.3 2.3 7 Communication and Liaison 0.5 0.5 0.5 0.5 Sub-total 144.3 358.8 530.8 460.8 Contingencies 13.4 0.0 0.0 0.0 Total (Including 14% VAT) 15.7 358.8 530.8 460.8 Escalation 4.6 11.2 16.2 14.2 Budget 162.3 370.0 547.0 475.0 </th <th>No</th> <th>Details</th> <th>Original</th> <th>Anchors</th> <th>Mass</th> <th>Anchors</th>	No	Details	Original	Anchors	Mass	Anchors
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Total (Including 14% VAT) 157.7 358.8 530.8 460.8 Escalation 4.6 11.2 16.2 14.2 Budget 162.3 370.0 547.0 475.0		Contingencies	13.4	0.0	0.0	0.0
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Hazelmere Dam Raising Programme for implementation



- The current implementation programme, allowing for confirmation of viability, is as follows:
 - Commence design of civil works: June 2012
 - Award contract for civil works: May 2013
 - Award contract for crest gates: November 2012
 - Commence installation of crest gates: May 2013
 - Commissioning of works complete: September 2014
- The above target dates are considered achievable and are based on the confirmation of project viability by the end of May 2012.



- The strategic importance of utilising the available local resource (Mdloti River), compared to importing water from an outside source, should be considered.
- If the project is confirmed to be viable, it can be implemented within 27 months.