Site Water Management

Storm water and snowmelt runoff at plant site

- Divert non-contact water away from the plant site
- Collect runoff from the ore and waste rock stockpiles in the pollution control pond and transfer this water to the tailings containment area
- Collect runoff from the remainder of the plant site in the sedimentation pond and release clean water from the sedimentation pond onto the tundra in a controlled manner

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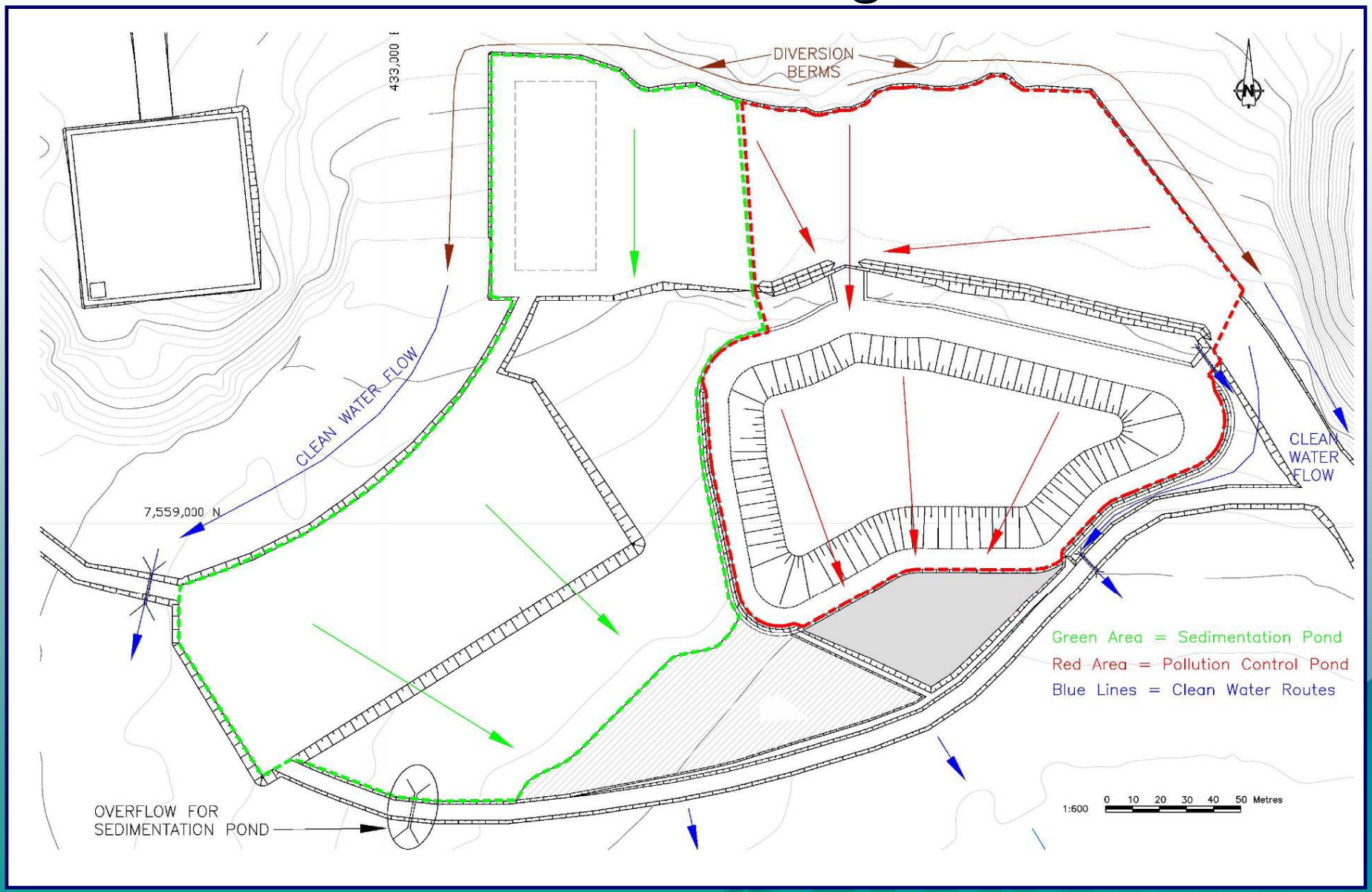
Plant Site Storm Water Management



Site Water Management

Storm Water Runoff at Landfill and Fuel Storage Facilities Site

- Divert non-contact water away from the landfill and fuel storage facilities
- Collect contact water in a sump

Landfill Sump

- Measure water quality and if it meets discharge standard then discharge water onto the tundra in a manner that prevents erosion of the tundra
- If water does not meet standard, then truck water to Tail Lake

Site Water Management

Fuel Storage Containment Area Sumps

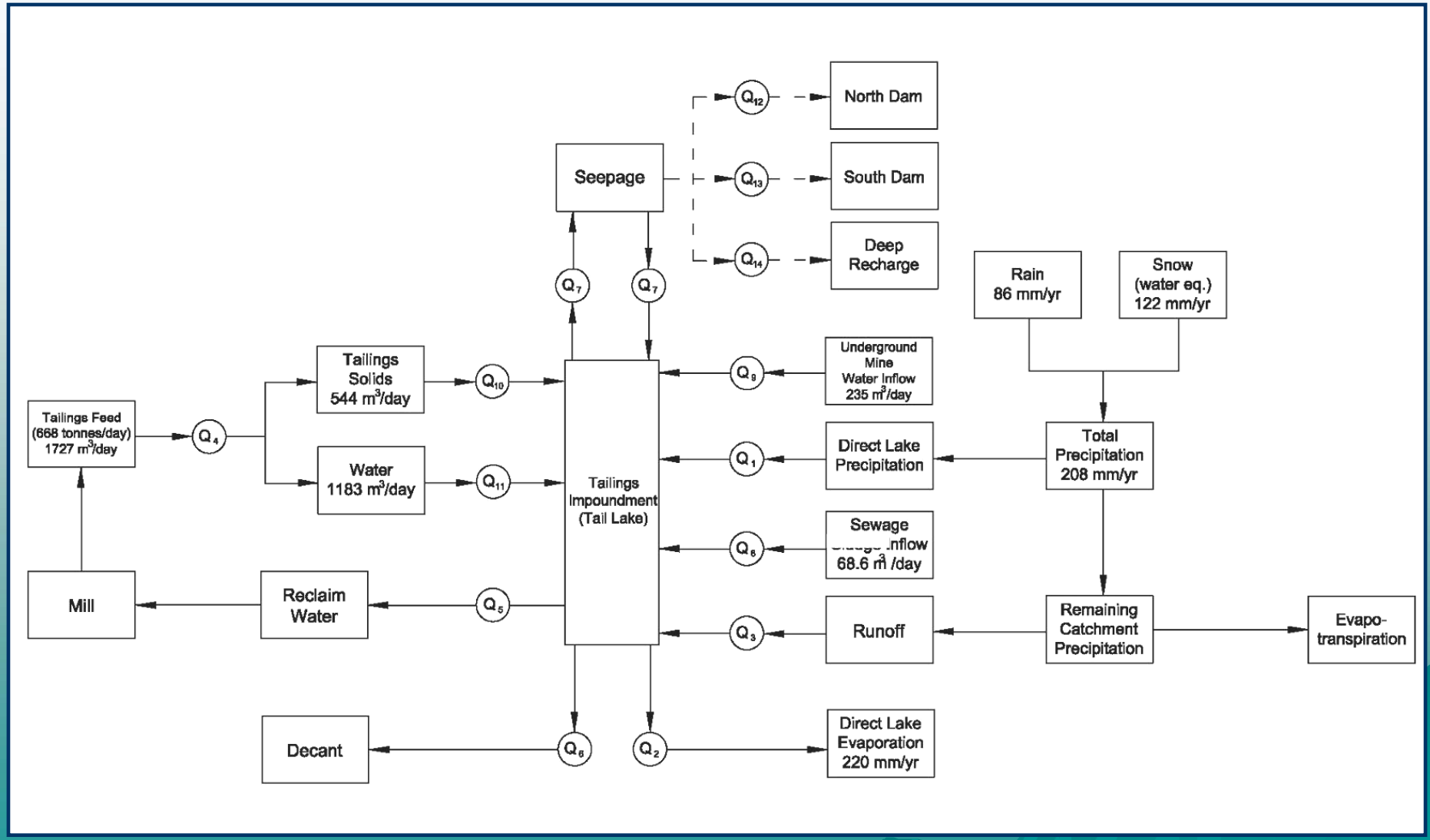
- Filter water through an oil-water separation unit and then discharge “clean” water onto the tundra in a manner that prevents erosion of the tundra
- Sample “clean” water to verify that discharge standards are being met from the oil-water separation unit

Tail Lake Water Management Strategy

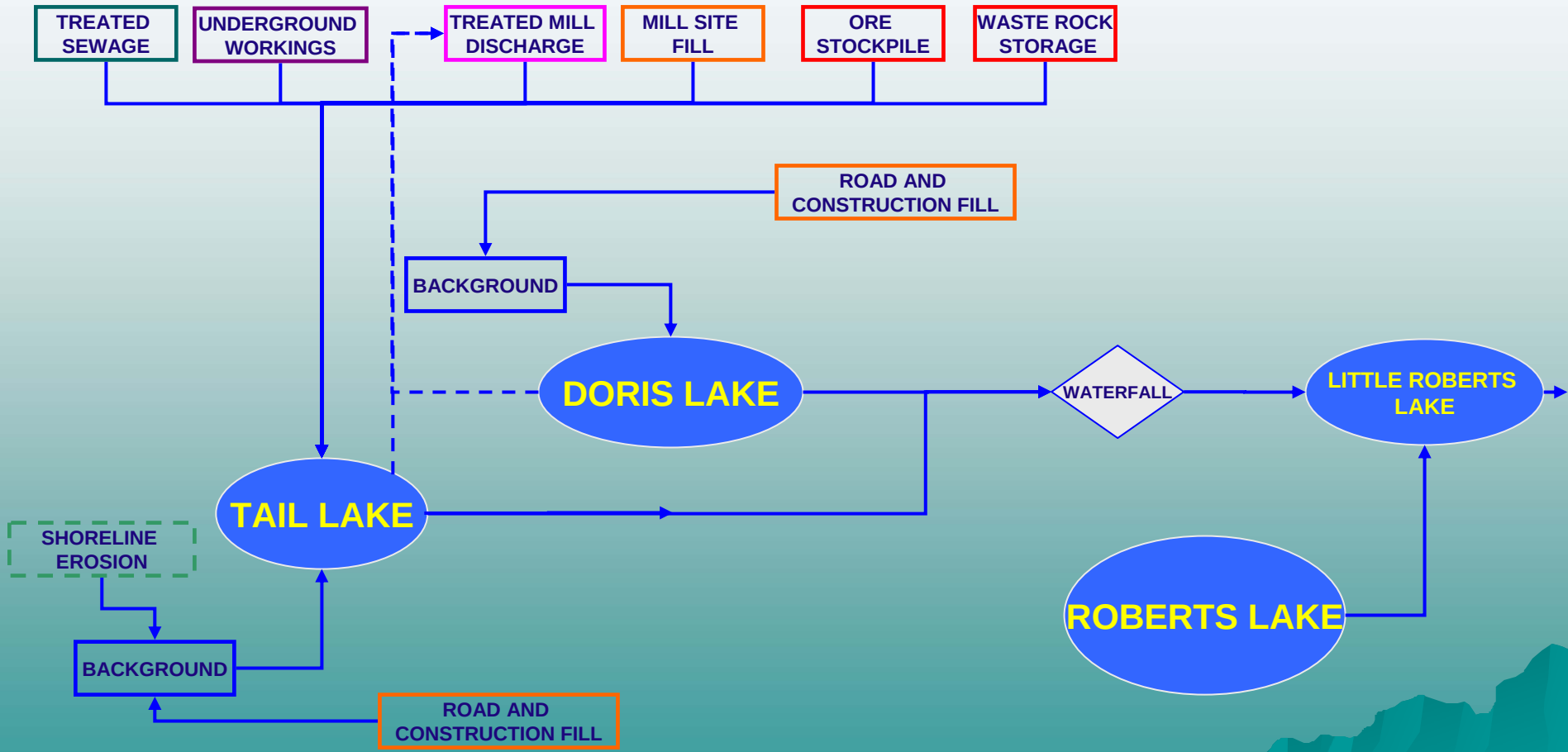
Overview of Water Quality Modelling

- **Purpose of the modelling:**
  - **Assess the potential changes in Tail Lake water quality**
  - **Evaluate discharge strategies and their effects on receiving water quality**

Simplified Tail Lake Water Balance Model



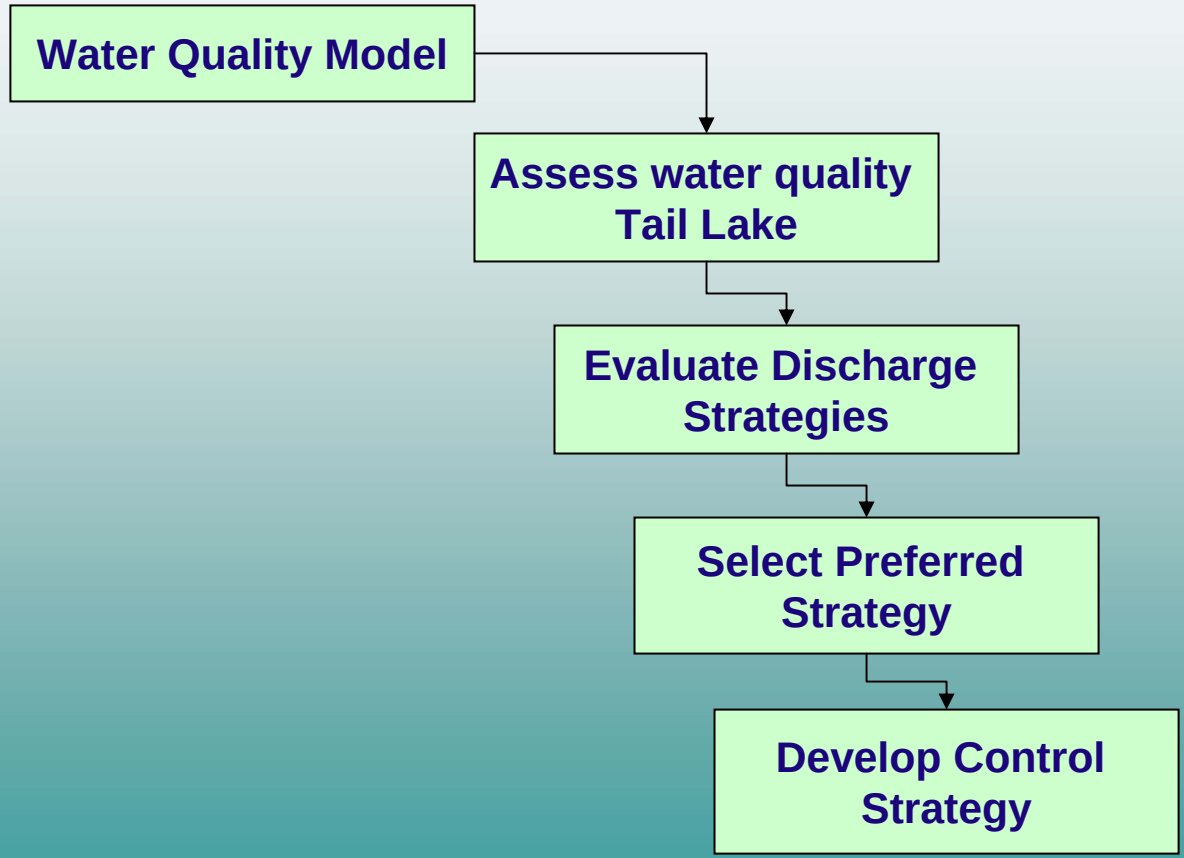
Schematic Water and Load Balance



Contaminant Sources Used in WQ Model

Description	Information
Mill site fill	*Acid base accounting* *Leach extraction, Kinetic testing* *Nutrients (ANFO)*
Ore stockpile	
Waste rock storage area	
Tailings	*Metallurgical testing* *Treatment effluent* *Nutrients (ANFO)*
Sewage effluent	*Supplier performance data*
Underground workings	*Acid base accounting* *Leach extraction, Kinetic testing* *Nutrients (ANFO)*

Development of Discharge Control Strategy



Water Management Control Strategy

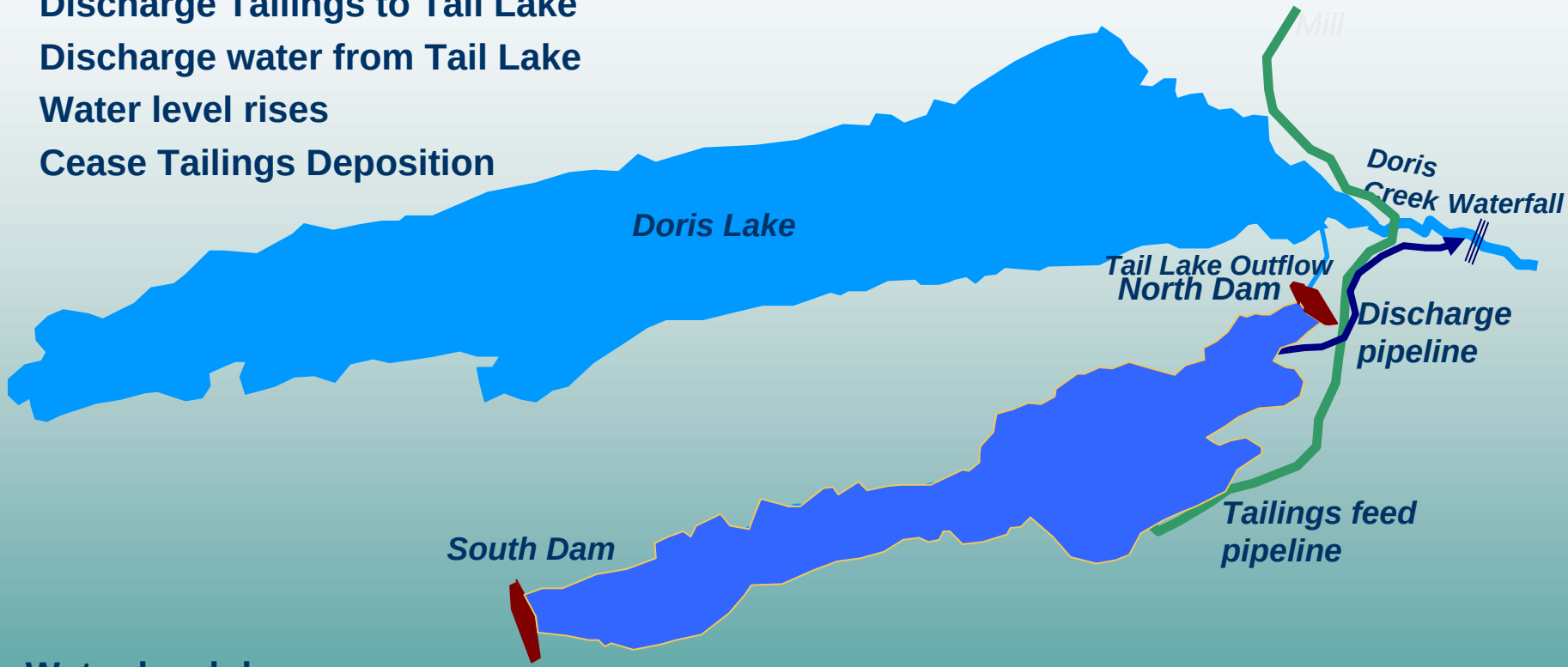
Two Objectives:

- **Meet MMER Criteria before discharge**
- **Meet CCME Guidelines in Doris Creek downstream of waterfall**

While also minimizing the rise of water level in Tail Lake to reduce the risk of shoreline erosion.

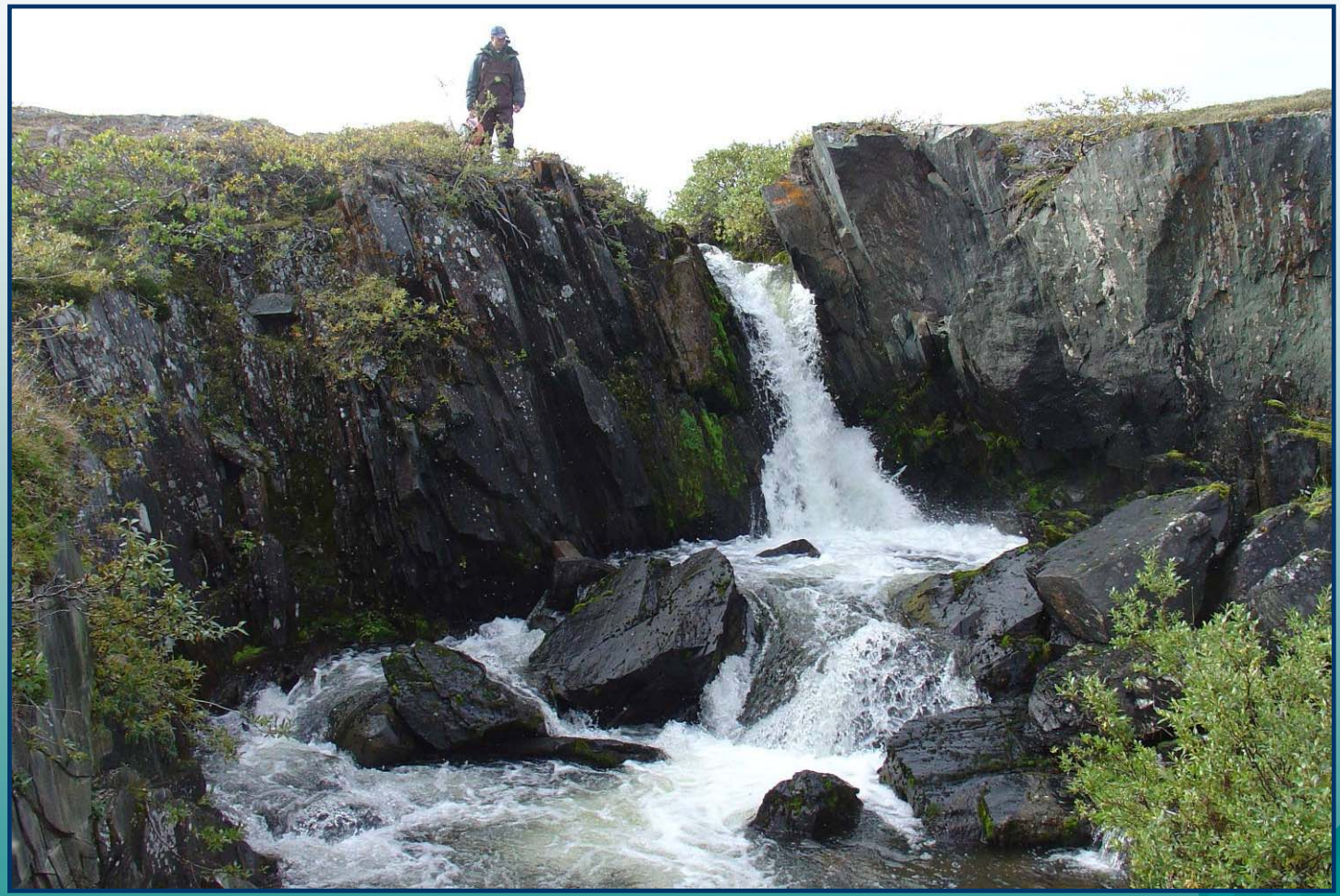
Water Management Control Strategy

- Construct Dams
- Discharge Tailings to Tail Lake
- Discharge water from Tail Lake
- Water level rises
- Cease Tailings Deposition



- Water level decreases
- Breach dam and re-establish outflow

Doris Creek – D/S Waterfall



Control Strategy

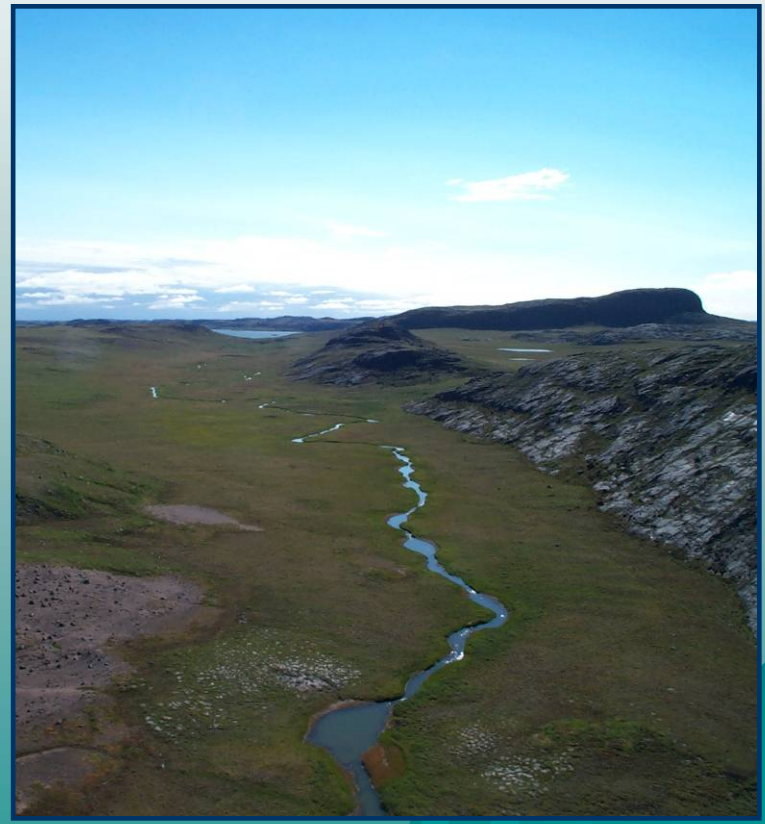
Key Components:

- **Allows for full containment of Tail Lake water if necessary**
- **Continuous flow monitoring**
- **Uses a variable flow discharge pumping system**
- **Monitoring Program**
- **Based on adaptive management**

Control Strategy

Phase 1 – Operational Discharge Management

- **Control Parameters**
  - Monitor Flow Conditions in Doris Creek
  - Monitor Water Quality
    - *Doris Creek upstream*
    - *Tail Lake at intake*
  - Calculate Maximum Allowable Discharge Ratio
  - Calculate Target Discharge Rate
- **Regulate Discharge Flow**
- **Monitor Water Flows and Quality**
  - Assess performance and adjust as required



Calculation of ADVR & TDR

ALLOWABLE DISCHARGE VOLUME RATIO

$ADVR\ (Cu) = (CCME_{Cu} - [Cu]_{DC}) / ([Cu]_{TL} - CCME_{Cu})$

Where:

- $[Cu]_{DC}$ = copper concentration in Doris Creek (mg/L)
- $[Cu]_{TL}$ = copper concentration in Tail Lake (mg/L); and
- $CCME_{Cu}$ – CCME Freshwater Aquatic Guideline for copper (mg/L)

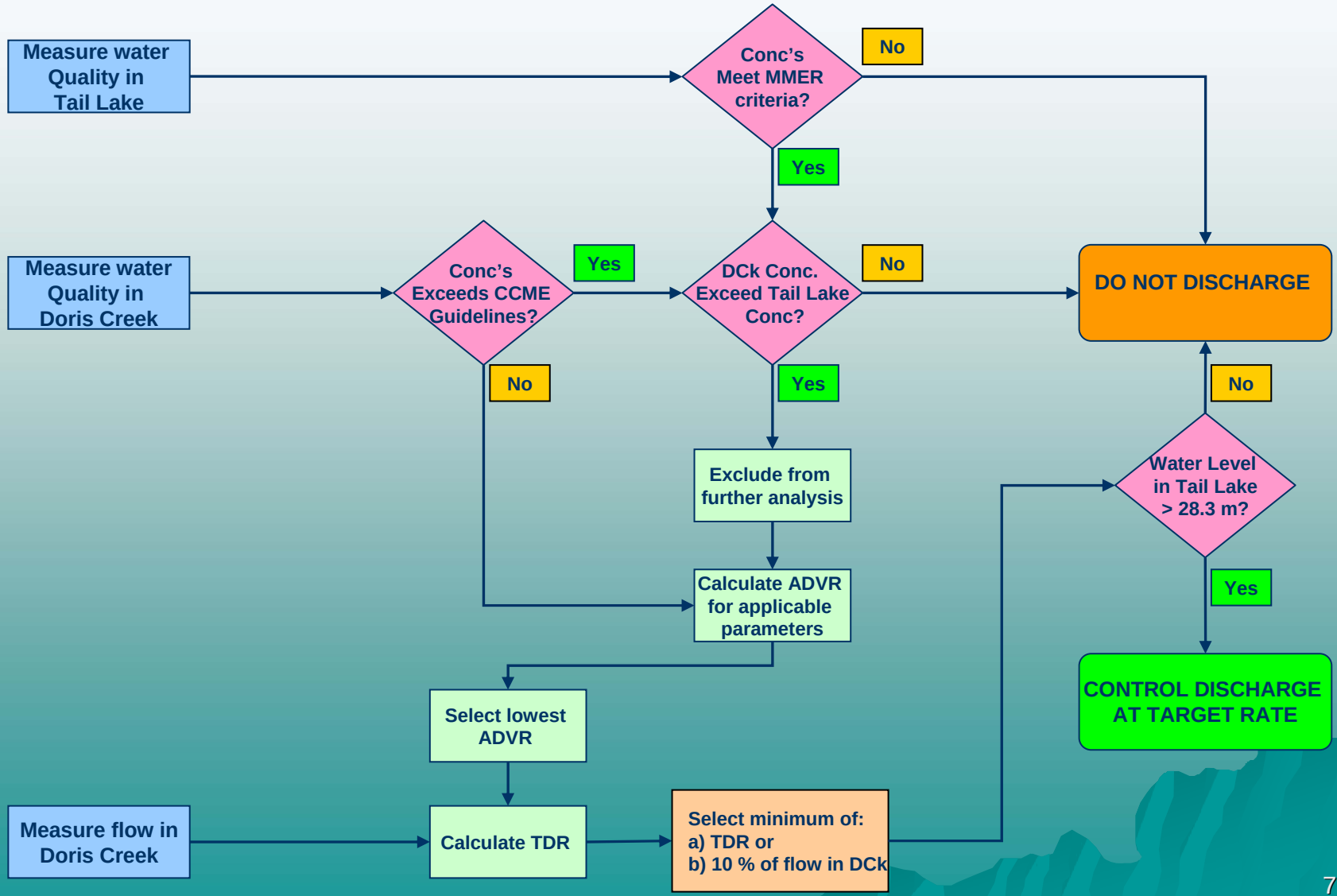
TARGET DISCHARGE RATE

$TDR = Q_{DC} \times 0.8 \times ADVR_{Min}$

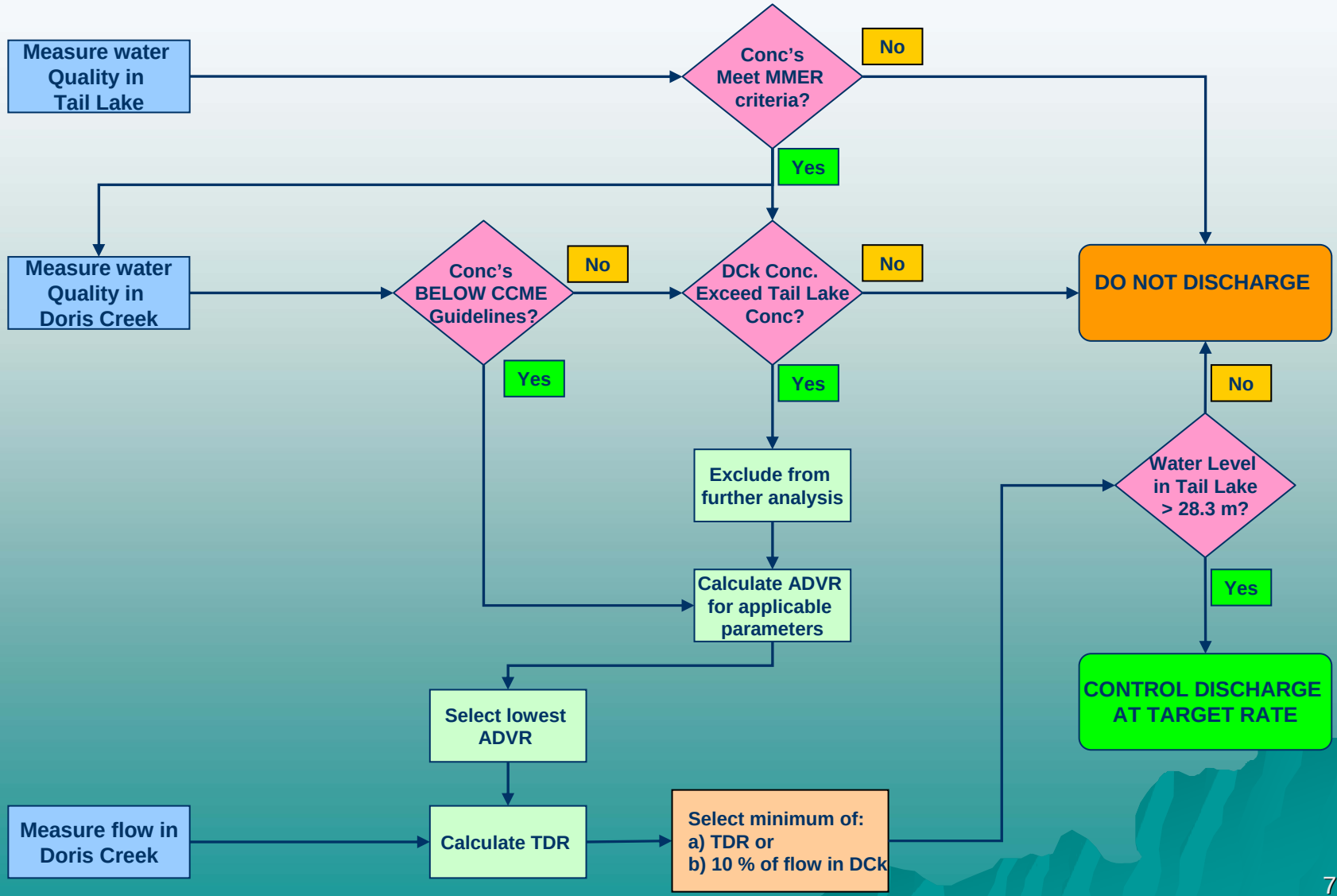
Where:

- Q_{DC} = measured flow in Doris Creek
- $ADVR_{Min}$ – lowest allowable discharge volume ratio

Decision Flow Diagram for Determining Discharge Flow Rate



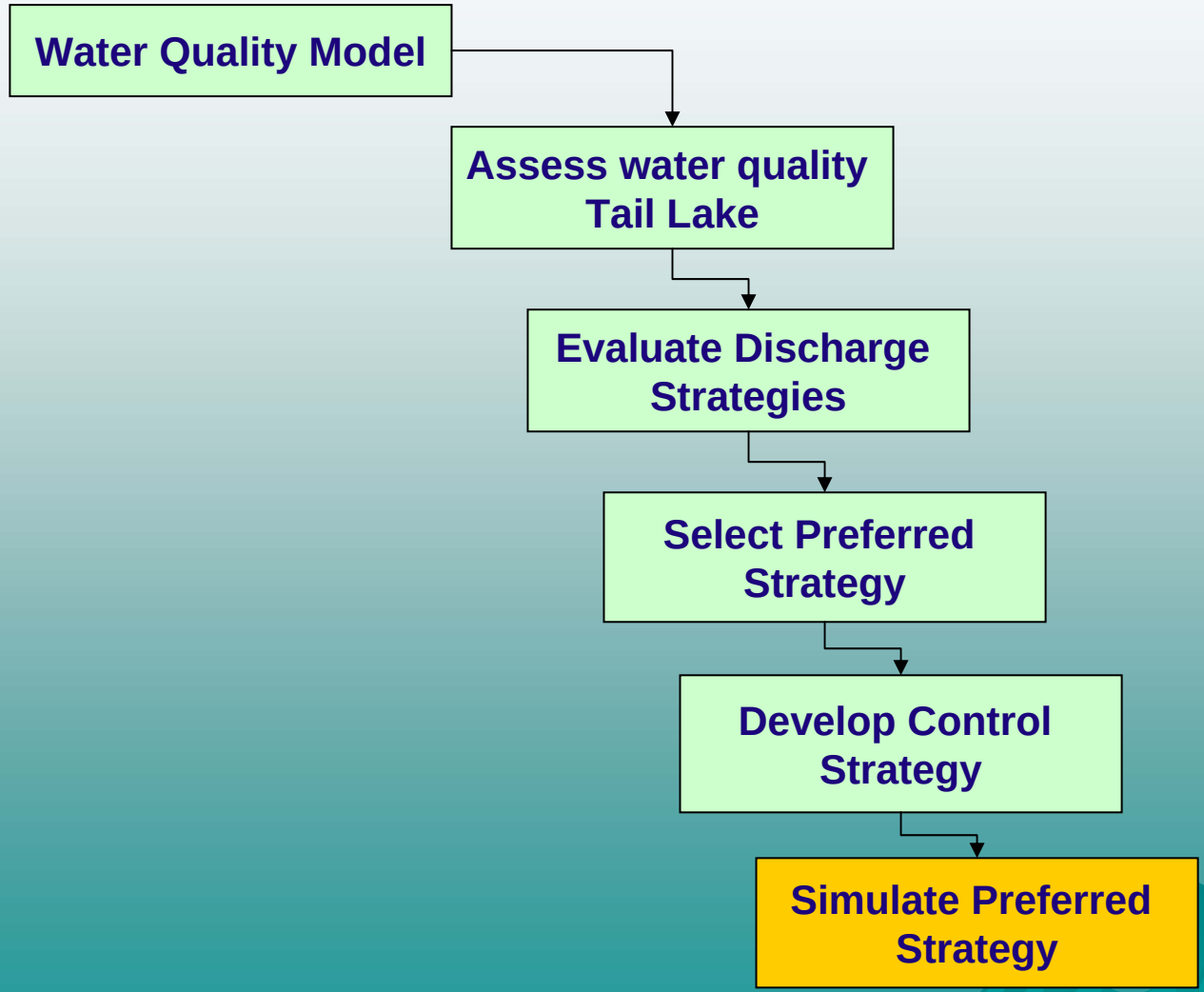
Decision Flow Diagram for Determining Discharge Flow Rate



Water Management Control Strategy:
After Mining Ceases

- **Phase 2 -**
  - **Water Level at Natural Outflow Elevation (~ 3 years after mining ceases)**
  - **The timing of the dam breach is dependant on the protection of downstream aquatic life based on CCME Guidelines and Risk Assessment.**
  - **These conditions are expected to be met between 3 and 7 years after mining ceases**
  - **Environmental effects monitoring will continue post-breaching**

Simulation of Control Strategy



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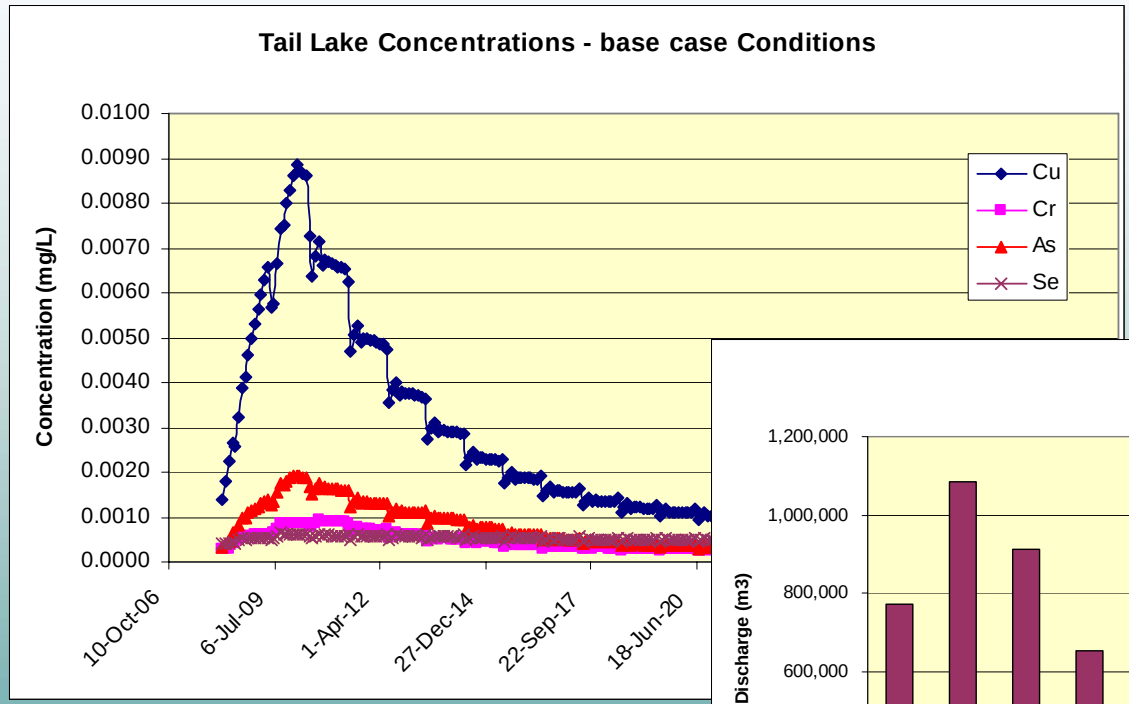

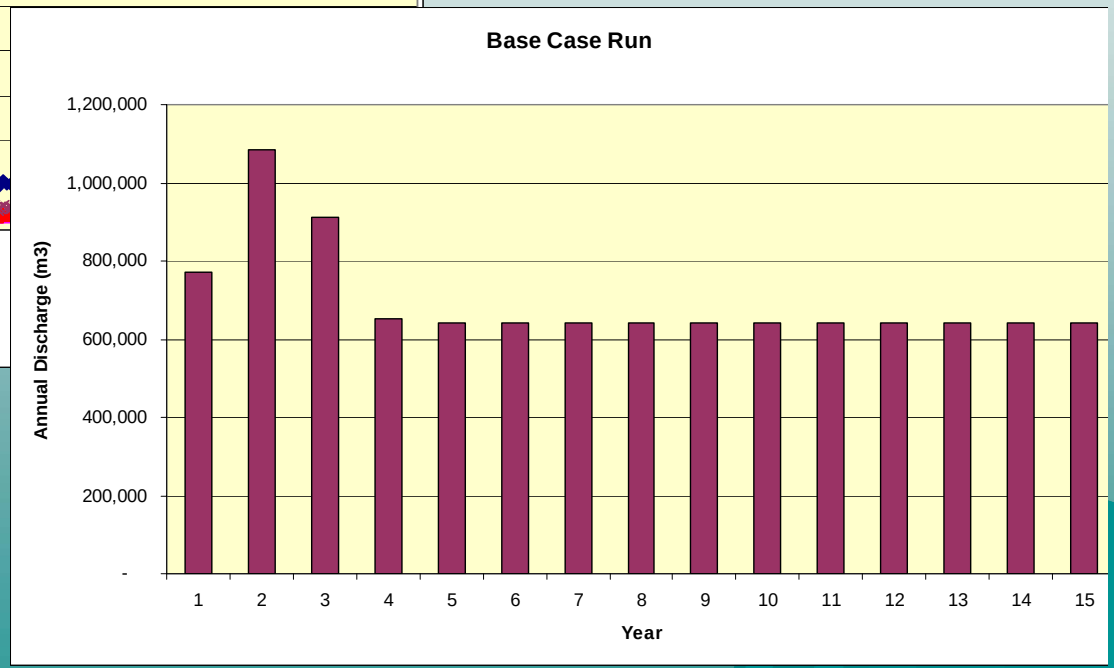

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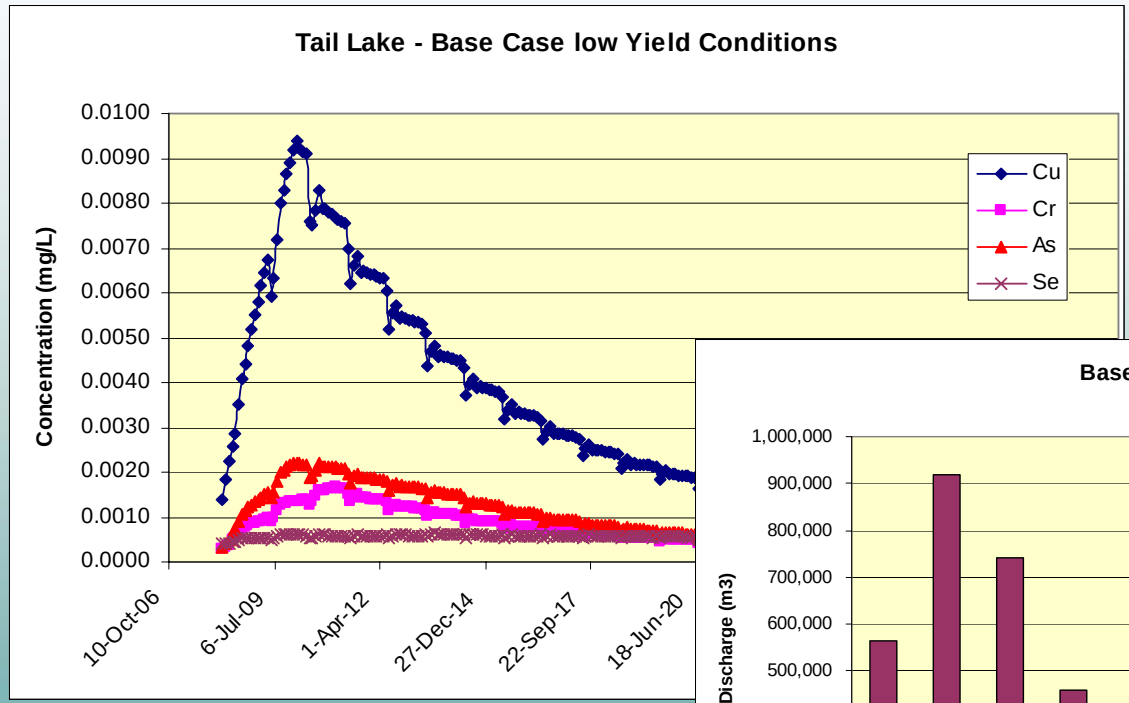
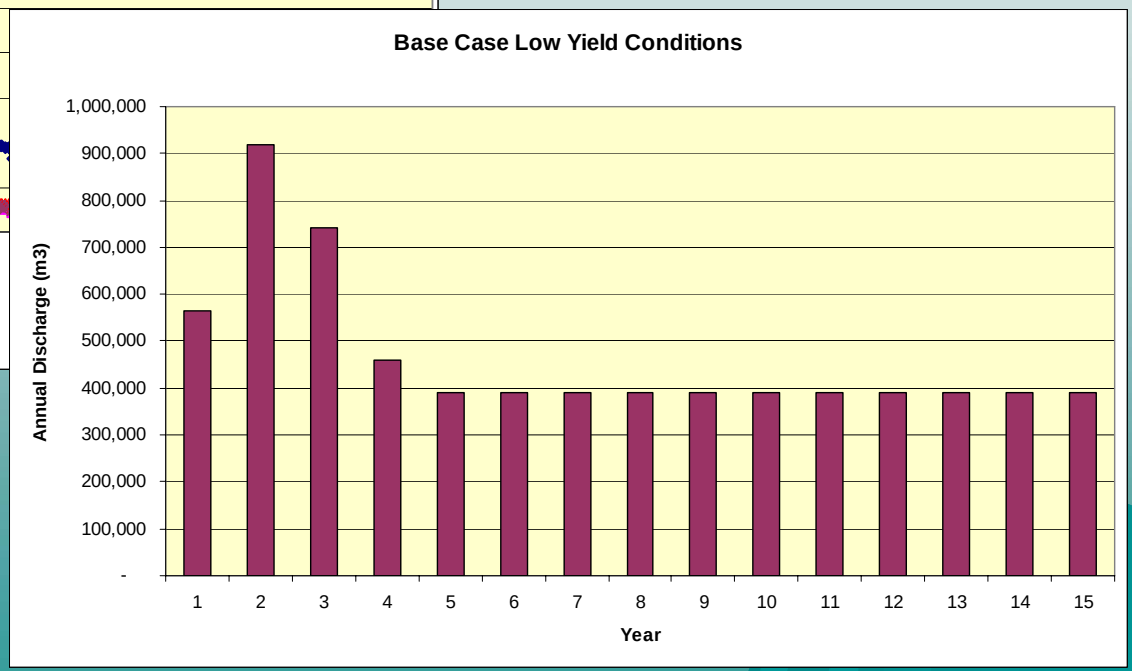
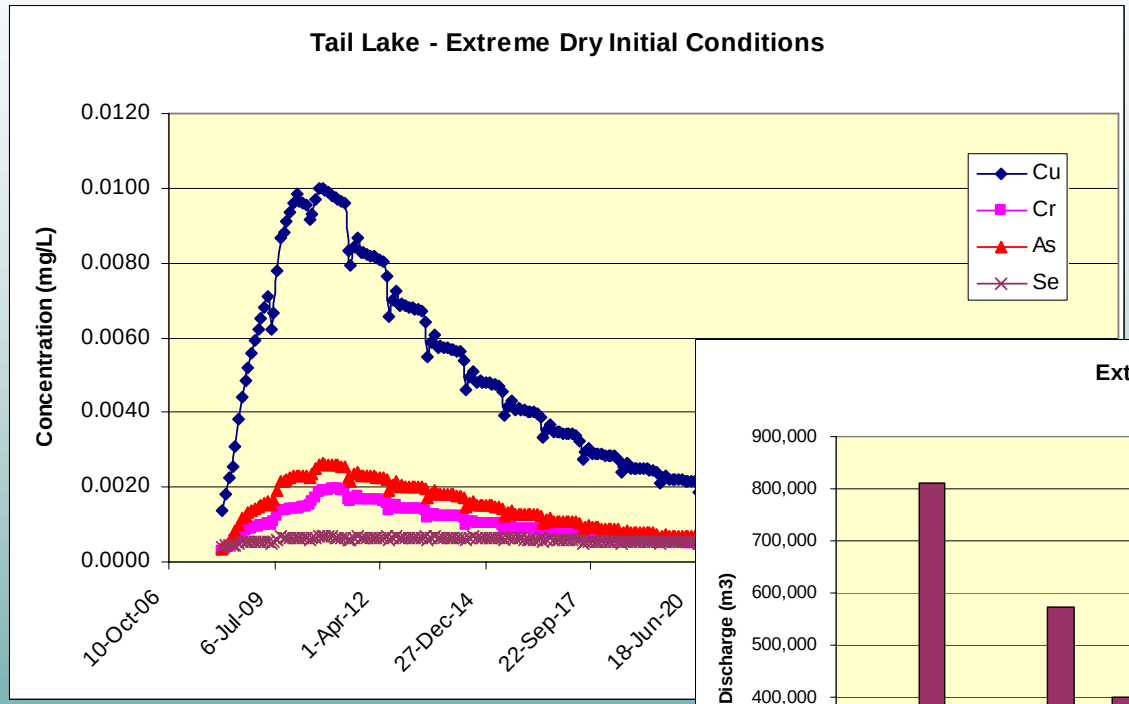
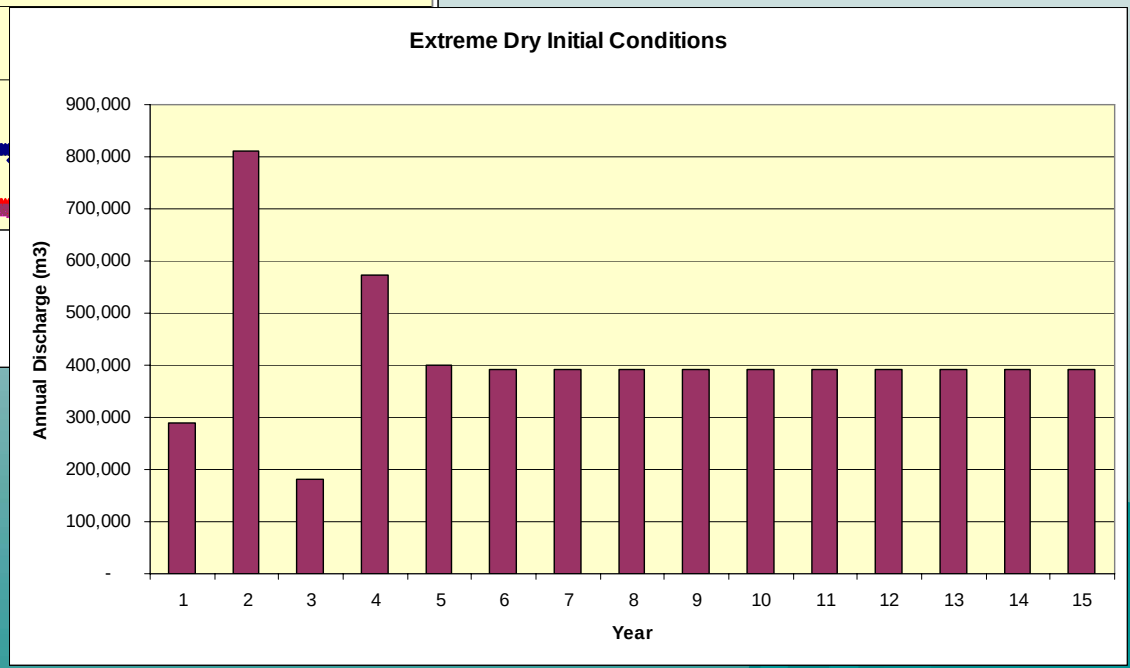




Simulation of Control Strategy





Tail Lake Water Management: Control Strategy

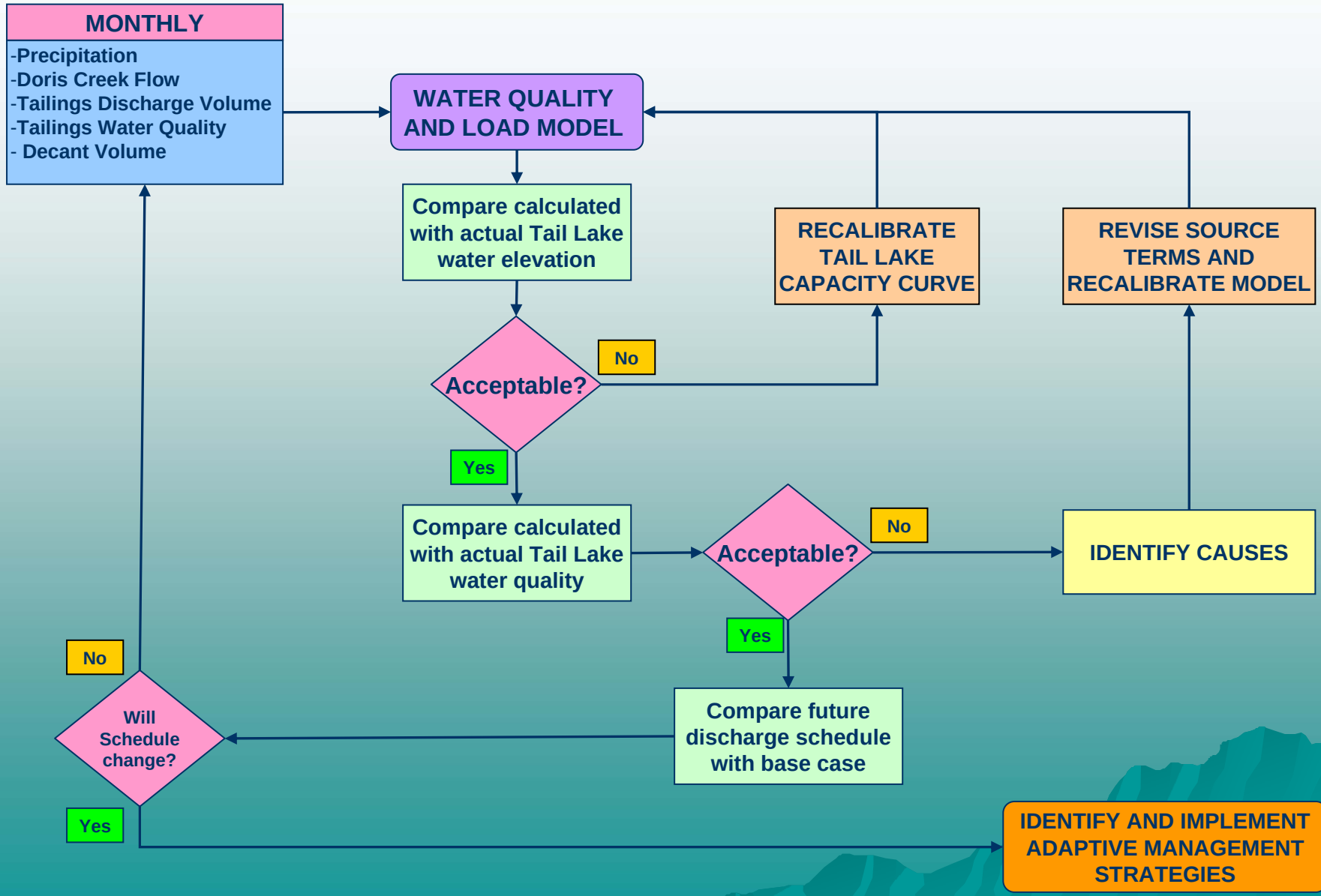
Conclusion:

- Model shows CCME guidelines can be met in Doris Creek
- Flexible – can be adjusted to suit changing conditions
- Minimizes timeframe for closure
- Minimizes water level rise in Tail Lake
- Reduces risk of shoreline erosion
- Uses conventional discharge methods

Operational Use of Model

- Model will not be used to determine or control discharge volumes
- Model shows that water quality will vary with climatic conditions
- Model will be used only to assess potential implications for future water management requirements
- Model will be revised for operational use to allow direct input of climatic and flow data / loadings

Operational Use of Model



Tail Lake Water Quality Model
Verification and Recalibration

Recalibration of the WQ Model:

What is Meant by Acceptable (significant difference)?

- Level of significance for water elevation is 0.1 m
- Level of significance for water quality is a function of actual climatic conditions
  - 20% increase in copper concentration in Tail Lake for "low flow conditions" could extend active management by 1 year
  - > 40 % Increase in copper concentration in Tail Lake for "base case" conditions is required to extend active management by 1 year

Environmental Management System

Environmental Management System

- MHBL has developed an integrated environmental health and safety management system (EHSMS) to encompass all of its operational activities at the Doris North Project site
- Web-site (Miramar intranet) based so accessible to all employees, easier to keep current
- Based on the Principle of:

  PLAN => DO => CHECK => ACT => CHECK AGAIN => ACT

- Continual Improvement

Environmental Protection Plan

- As part of the EHSMS, MHBL has developed an Environmental Protection Plan
- 15 Management Plans, encompassing:
  - Emergency Response & Contingency Plan
  - Air Quality Management
  - Noise Management
  - Waste Rock Management
  - Hazardous Materials Management
  - Explosives Management
  - Landfill Management
  - Landfarm Management
  - Tailings Management
  - Water Management
  - Quality Assurance & Quality Control
  - Mine Closure & Reclamation Planning
  - Monitoring & Follow Up
  - Wildlife Mitigation & Monitoring
  - Heritage Resource Protection
- Plans are “Living” Documents to be updated on a regular ongoing basis

Environmental Performance Monitoring

Environmental Performance Monitoring

- **The Monitoring & Follow Up Plan includes monitoring activity in the following areas**:
  - Air quality and climate monitoring
  - Noise monitoring
  - Hydrology monitoring
  - Site water quality monitoring
  - Geotechnical monitoring
  - Waste rock characterization
  - Aquatic effects monitoring
  - Fish monitoring
  - Vegetation and soil quality monitoring
  - Wildlife monitoring
- **MHBL have proposed an SNP sampling program, including WQ monitoring locations, frequency and parameters to be monitored**
- **MHBL's proposed monitoring programs meet or exceed all legislated and NIRB Project Certificate monitoring requirements**

Monitoring

- MHBL fully supports environmental monitoring & reporting to a level that ensures that the Project is meeting all regulatory requirements and to ensure that impacts are as predicted during EA (verify that mitigation measures are working & trigger adaptive management)

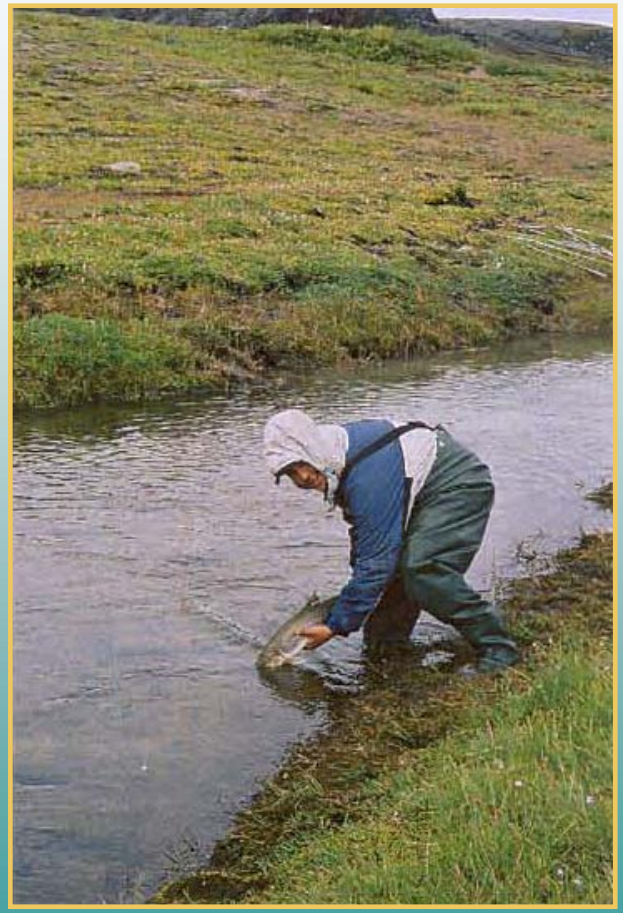
- MHBL is confident that the proposed monitoring programs have been developed to address all of the risks associated with the project

Monitoring

- Some interveners have recommended monitoring beyond that proposed by MHBL
- MHBL asks the Board to consider what monitoring & reporting is required to meet the objectives stated earlier and to hold the line on requiring the collection & reporting of additional data that may be nice to have but does not influence how the mine is regulated
- The Board can always add additional monitoring & reporting requirements to the Water License SNP at any time in the future if conditions demonstrate such a need

Closure and Reclamation Planning

Reclamation Planning



- Mine Closure and Reclamation Plan has been prepared by MHBL
- Reclamation planning has advanced beyond the conceptual level in view of the short mine life
- Project site can be reclaimed so that no perpetual care is required.
  - No long term water treatment or management required
  - Tailing solids will be under a 4 m water cover
  - Cyanide leach residue solids encapsulated in permafrost within the sealed underground mine

What Happens at Mine Closure?

- All access into the UG Mine will be sealed. Mine will remain in a frozen condition (permafrost)
- All ore and waste rock stockpiles will be removed
- Mill will be cleaned out and the mill dismantled
- All chemicals, hydrocarbons & hazardous materials will be removed from site

What Happens at Mine Closure?

- All equipment & buildings no longer needed will be cleaned and dismantled
- Equipment and building material with salvage value will be removed from site by sea lift
- Inert material with no salvage value will be buried in landfill on site
- Tail Lake will be returned to its pre-development water level by breaching the North Dam

Tail Lake Reclamation

- The annual water discharge from Tail Lake will continue in a managed fashion until it can be shown that there will be no impact on downstream aquatic life from an unregulated discharge from the lake (expected to be 3 to 7 years after mining ceases)
- Water level expected to return to pre-development level of 28.3 m ASL in third year following cessation of mining. Annual discharge will then equal the natural runoff into the lake

Tail Lake Reclamation

- Managed discharge will continue. The North Dam will then be breached.
- All tailings solids will be below 24.3 m level. Water cover will be 4 m hence no tailings solids will be exposed to surface after North Dam breached.
- One year before water level reaches 28.3 m level, MHBL will commission a human health and ecological risk assessment to determine when water quality is suitable for unregulated release.

Reclamation: How Long Will It Take?

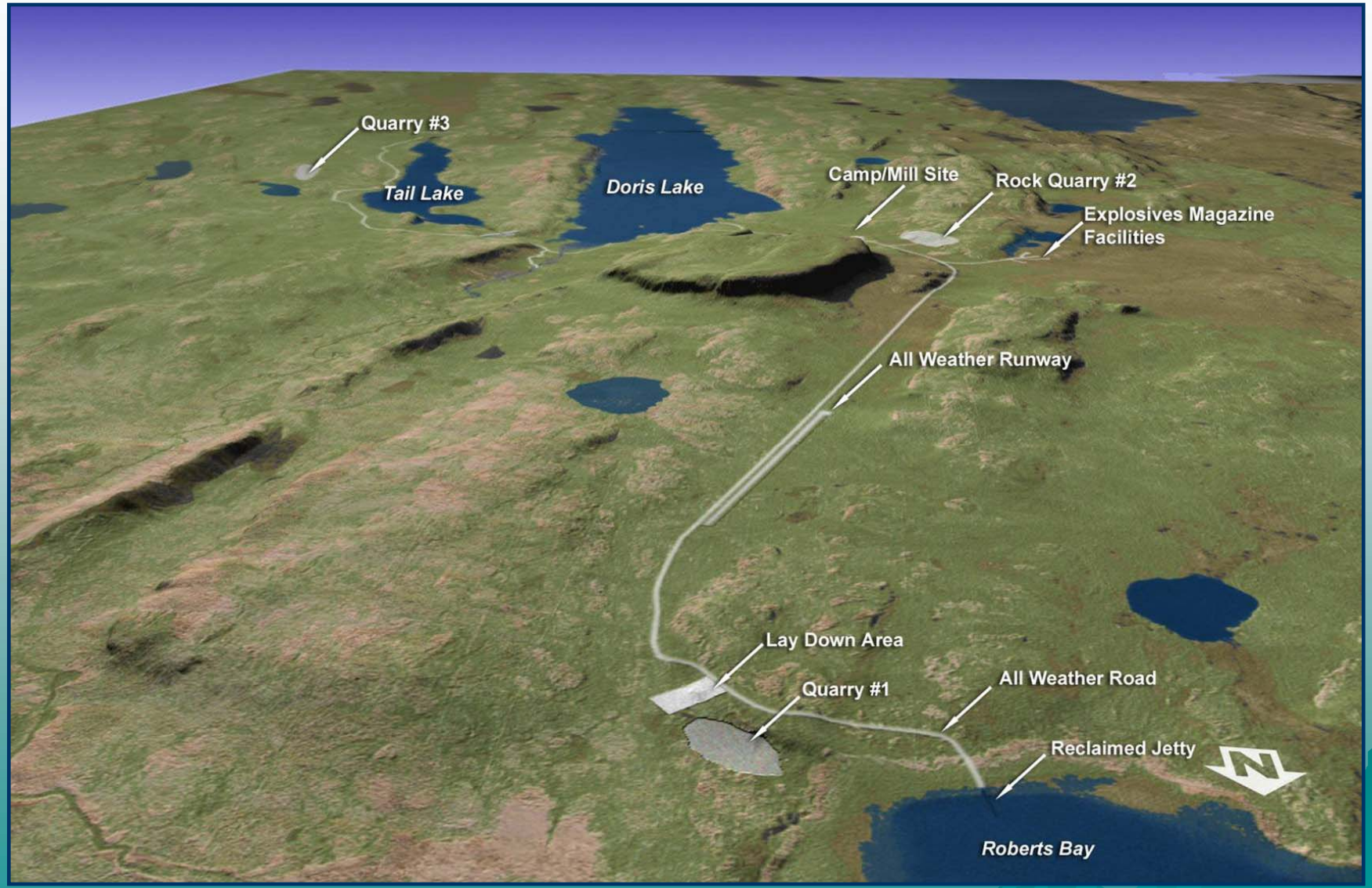
- Removing equipment & buildings will be done over two summers following the mine closure (completed by the end of 2010)
- Closure and reclamation of Tail Lake expected to be completed in 7 years following cessation of mining (2015)
- Post-closure monitoring will continue until it is shown that no environmental harm is happening (expected to be a minimum of 10 years following cessation of mining)

Reclamation: What May Be Left?

- Rock fill building pads & roadways (all rock drains, culverts and bridges will be removed)
- Landfill area buried under a cap of quarry rock
- Reclaimed construction rock quarries
- Roberts Bay jetty fill will be removed so that there is a minimum of 1 m of water cover over the remaining jetty base
- Tail Lake tailings containment area will remain as a flooded shallow lake with an armoured breach through the North Dam
- Fisheries compensation structures in Little Roberts Outflow, Little Roberts Lake, Roberts Bay and in Doris Lake

Depiction of Site after Reclamation

Depiction of Site after Reclamation



Financial Security

Estimated Cost of Reclamation & Post Closure Monitoring

- Cost of Reclamation was estimated by MHBL using both the KIA Reclamation Costing Model and INAC's RECLAIM Costing Model:
  - KIA Model $11.714 Million
  - INAC Model $11.535 Million
  - Both estimates discount future costs at a discount rate of 3%
    (i.e., Costs to be incurred after 2012 such as environmental monitoring and management of Tail Lake after the site has been physically reclaimed)
- INAC independently prepared their own estimate of this cost:
  - INAC Estimate $11.500 Million
  - Includes Future Costs Discounted at 3%
- MHBL worked cooperatively with the KIA to develop the reclamation cost estimate using the KIA Model
- Appears to be consensus that the cost of reclamation is in the order of $11.5 to $12 Million

MHBL Reclamation Cost Estimate

Capital Costs		
COMPONENT TYPE		TOTAL COST
UNDERGROUND MINE		$203,500
TAILINGS	Tail Lake	$2,608,493
BUILDINGS AND EQUIPMENT		$2,172,193
CHEMICALS AND SOIL MANAGEMENT		$406,500
MOBILIZATION/DEMOBILIZATION		$1,123,000
CARE AND MAINTENANCE DURING RECLAMATION		$302,000
SUBTOTAL		$6,815,686
PROJECT MANAGEMENT	15 % of subtotal	$1,022,353
ENGINEERING	10 % of subtotal	$681,569
CONTINGENCY	15 % of subtotal	$1,022,353
GRAND TOTAL - CAPITAL COSTS		$9,541,960
POST-CLOSURE MONITORING COST (NPV at 3%)		$984,231
POST-CLOSURE MONITORING CONTINGENCY 15%		$144,690
Years of post-closure monitoring	10	
POST CLOSURE MONITORING COST OVER 10 YEARS (NPV at 3%)		$1,128,921
POST CLOSURE MAINTENANCE ANNUAL AVERAGE COST		$26,000
Years of post-closure maintenance	200	
Discount Rate for Calc of NPV	3%	
POST CLOSURE MAINTENANCE SINKING FUND		$864,320
GRAND TOTAL CAPITAL AND POST-CLOSURE COSTS		$11,535,201

Estimated Security for Reclamation Liability

- KIA have indicated that they will ask MHBL for $11.7 Million under the Land Lease as reclamation security to protect KIA interests
- INAC have recommended that total reclamation security be $12.3 Million and of that $6.1 Million of this total is for water related reclamation liability
- The INAC recommendation on reclamation liability does not discount future costs. This differs from their past practice applied across the NWT and Nunavut and adds ~ $0.8 Million to the estimate

Double Bonding for Reclamation Liability

- To date INAC and the KIA have been unable to reach an agreement on how security held against reclamation at the Doris North Project could be jointly administered to reclaim the site if MHBL did not meet its obligations
- Hence KIA has indicated that they will seek $11.7 Million in security and INAC have recommended that the NWB seek $6.1 Million in security against water only related reclamation
- This would result in MHBL having to post total security bonds of $17.8 Million against an acknowledged reclamation liability of $11.5 to $12 Million (an excess of $5.8 to $6.3 Million)
- This $6 Million in double bonding is a significant issue to MHBL and to the mining industry as it has the potential to render larger projects to be developed on Inuit Owned Lands to become totally uneconomic

Double Bonding for Reclamation Liability

- Reclamation activities cannot be separated between land and water. They are interrelated.
- Trying to isolate water related reclamation from land related reclamation activities will lead to inefficient reclamation completed at much higher cost (potentially doubles project management, administration, mobilization costs, etc.)
- On a larger scale project this double bonding could add tens of millions of $ to the reclamation bonding requirements
- This makes development of mining projects on IOL unattractive and potentially penalizes Inuit beneficiaries without providing any improvement in protection
- This double bonding issue is unfair to industry and to Inuit and needs to be resolved by the Federal Government. MHBL has been asking both parties to reach some form of agreement for at least two years

Options for Resolving this Double Bonding Issue

- **Option 1:**
  - **INAC would hold the full reclamation security. INAC and KIA would have an agreement covering how they could jointly manage reclamation activity if the proponent fails to meet its reclamation obligation**
- **Option 2:**
  - **INAC hold full reclamation security for the project and in return provide the KIA with an indemnity against liability resulting from the mining company's activity on IOL. INAC and KIA could then have an agreement where they would jointly manage reclamation activity if the proponent failed to meet its reclamation obligation**

Options for Resolving this Double Bonding Issue

- **Option 3:**
  - **INAC and KIA each hold reclamation security that in combination represents the total estimated reclamation liability (i.e., with no overlap). KIA and INAC have an agreement that sets out how they will jointly manage reclamation if the proponent fails to meet its obligations. Both parties provide the other party with an indemnity against additional claims made by the other party against liability resulting from the mining company's activity on IOL**

- **Option 4:**
  - **INAC and KIA would jointly hold the full reclamation security. INAC and KIA would have an agreement covering how they could jointly manage reclamation activity if the proponent fails to meet its reclamation obligation (e.g. Boston)**

Estimate of Water vs. Land Related Reclamation Liability

Division of Water and Land Related Security

Future Costs Discounted at 3%	INAC ESTIMATE		Future Costs Discounted at 3%	MHBL ESTIMATE	
COMPONENT TYPE	LAND LIABILITY	WATER LIABILITY	COMPONENT TYPE	LAND LIABILITY	WATER LIABILITY
UNDERGROUND MINE	$183,500	$0	UNDERGROUND MINE	$163,500	$40,000
TAILINGS	$636,900	$609,600	TAILINGS	$511,332	$2,097,161
ROCK PILE	$0	$35,438	ROCK PILE	$0	$0
BUILDINGS AND EQUIPMENT	$1,855,043	$280,994	BUILDINGS AND EQUIPMENT	$2,117,493	$54,700
CHEMICALS AND SOIL MANAGEMENT		$414,140	CHEMICALS AND SOIL MANAGEMENT	$406,500	$0
POST CLOSURE SITE MAINTENANCE	$646,024	$1,771,856	POST CLOSURE SITE MAINTENANCE	$1,166,320	$0
SUBTOTAL	$3,321,467	$3,112,028	SUBTOTAL	$4,365,145	$2,191,861
PERCENTAGES	51.6%	48.4%	PERCENTAGES	66.6%	33.4%
MOBILIZATION/DEMOBILIZATION	$579,779	$543,221	MOBILIZATION/DEMOBILIZATION	$747,606	$375,394
MONITORING AND MAINTENANCE	$167,790	$157,210	MONITORING AND MAINTENANCE	$751,548	$377,373
PROJECT MANAGEMENT (10%)	$332,147	$311,203	PROJECT MANAGEMENT (15%)	$680,603	$341,750
ENGINEERING (5%)	$166,073	$155,601	ENGINEERING (10%)	$453,736	$227,833
CONTINGENCY (25%)	$830,367	$778,007	CONTINGENCY (15%)	$680,603	$341,750
SUB-TOTAL	$5,397,623	$5,057,270	SUB-TOTAL	$7,679,241	$3,855,961
MARKET PRICE FACTOR ADJUSTMENT (10%)	$539,762	$505,727		$0	$0
DISCOUNTED SPLIT GRAND TOTAL	$5,937,385	$5,562,997	DISCOUNTED SPLIT GRAND TOTAL	$7,679,241	$3,855,961
COMBINED GRAND TOTAL	$11,500,382		COMBINED GRAND TOTAL	$11,535,202	
UNDISCOUNTED SPLIT GRAND TOTAL	$6,206,298	$6,118,768	UNDISCOUNTED SPLIT GRAND TOTAL	$7,738,556	$4,514,694

Double Bonding Issue

- INAC estimates the split between Land and Water liability as ~ 50%:50%
- MHBL sees the split between Land and Water liability as ~ 67%:33%
- Hard to separate land from water liability; Most sensible method is to approach reclamation on a combined approach
- MHBL should not be asked to double bond reclamation liability – Parties holding security need to cooperate
- Without such cooperation Double Bonding will be a significant disincentive to investing in mine development on IOL