



## Public Works and Infrastructures

- Hollow Glen Dam
  - Built in 1960
  - Dam made of compacted granular material
  - Crest elevation 104.2m
  - Slopes varying from 30 to 45
  - Ranking has changed from HIGH (A) to MEDIUM (C)
  - Safety factor ranging from 1.79 (upstream) to 1.00-1.35 (downstream)
  - Exfiltration at the bottom on 1/3 of the length
  - No seismic risk
  - Undetermined risk of soil liquefaction
  - Overflow would result in catastrophic rupture (2 hours)
- Dam regulated by Beamish Dam



## Public Works and Infrastructures

- Beamish Dam
  - Shutter dam built in 1949
  - Two massive concrete shoulders on either side
  - One guard rail on each shoulder to receive the shutters
  - Blocked guard rails to prevent enhancement
- Regulated by two pipes (CSP, 1350 mm)
  - Under Beamish Road
  - Separated by a massive concrete and granular block, approximately 1 m
  - Rutted and cracked in some areas
  - No trash boom or grid
- Kelly Dam



## Public Works and Infrastructures

- Kelly Road Regulation 814-12
  - Reprocessing work done in-place
  - Technical safety advice given by Cima+
  - Railings non-compliant
  - Temporary enhancement performed by a contractor
  - Cost estimate \$58,223\$; estimate from Cima+



## Public Works and Infrastructures

- Schedule of events
  - March 4, 2013 - Call for tenders
  - April 4 - Receipt of tenders
  - April 16 - Chelsea Resolution 101-13, recommendation from CIMA
  - April 18 - MRC awards contract to CIMA
  - April 19 - Intermunicipal agreement between MRC and Chelsea
  - April 29 – Regulation 183-13, request to MAMROT
  - May 1 – Chelsea and CIMA startoff meeting
  - May 28 - Nomination of a representative, Patrick Laliberté
  - June 28S. Mougeot, Acceptation du MAMROT
  - July 15 – CIMA corrected report
  - July 15 – CIMA complementary advice: Beamish Dam

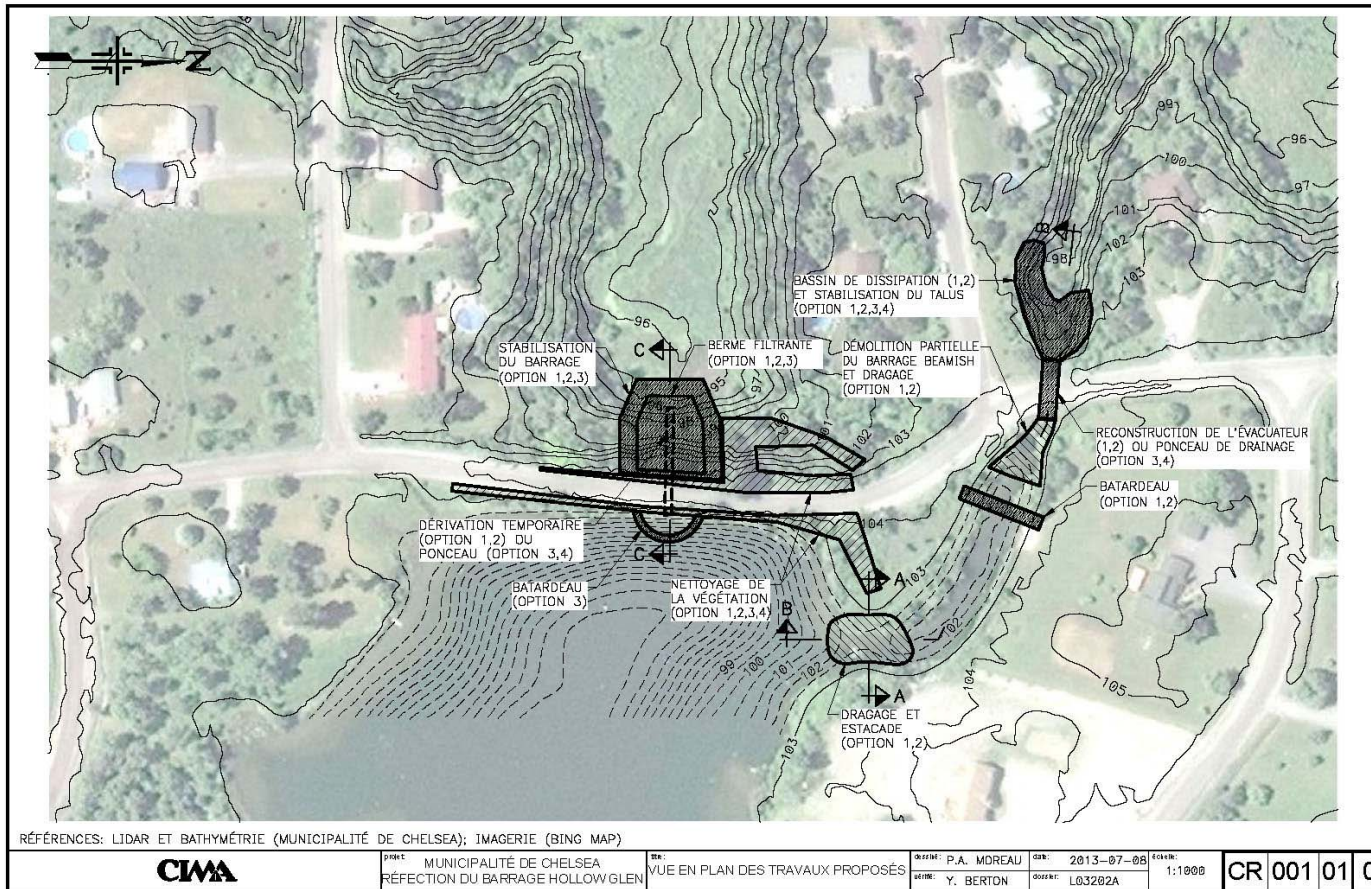


# Location of Operations





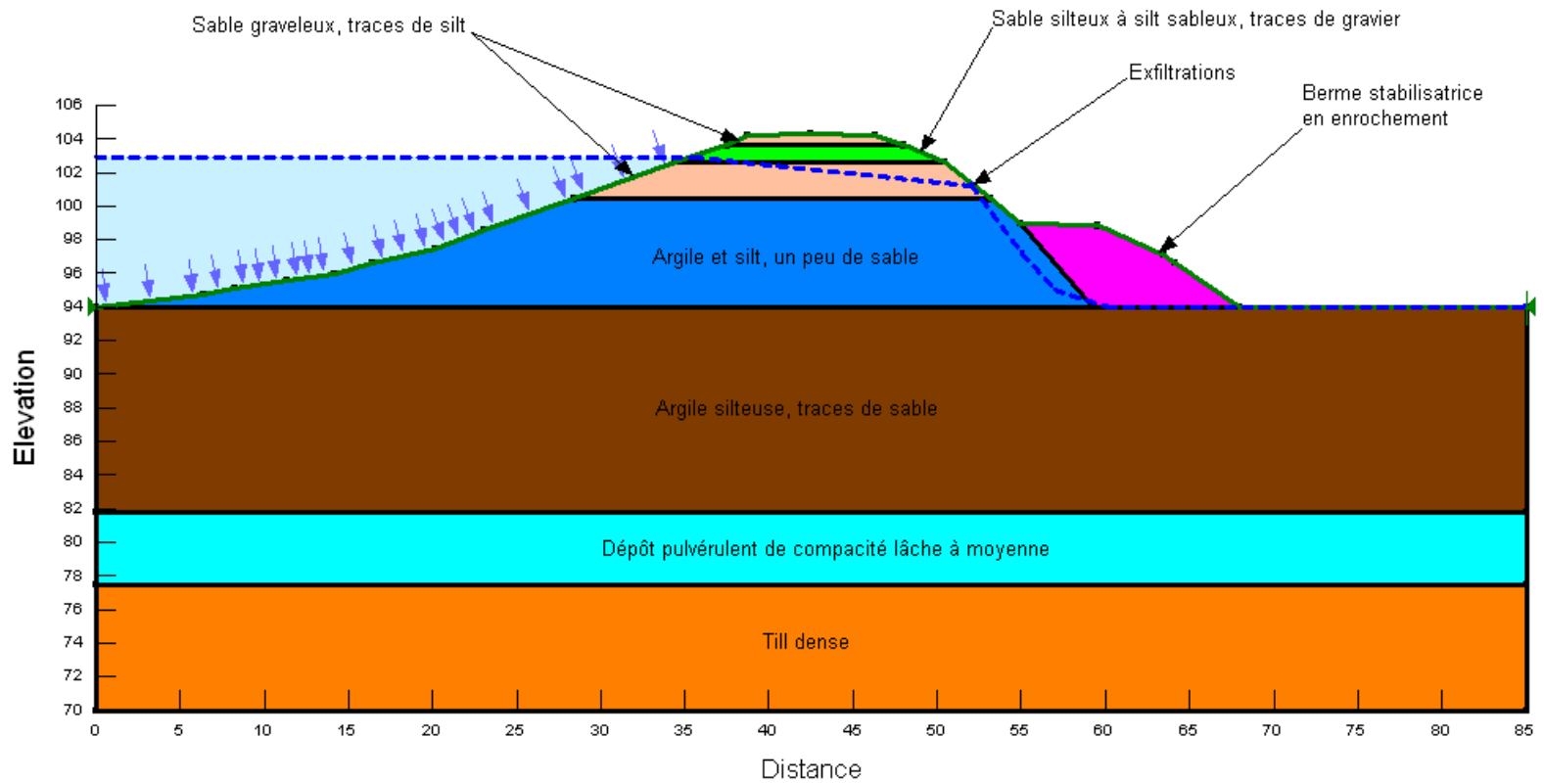
# Work to be done





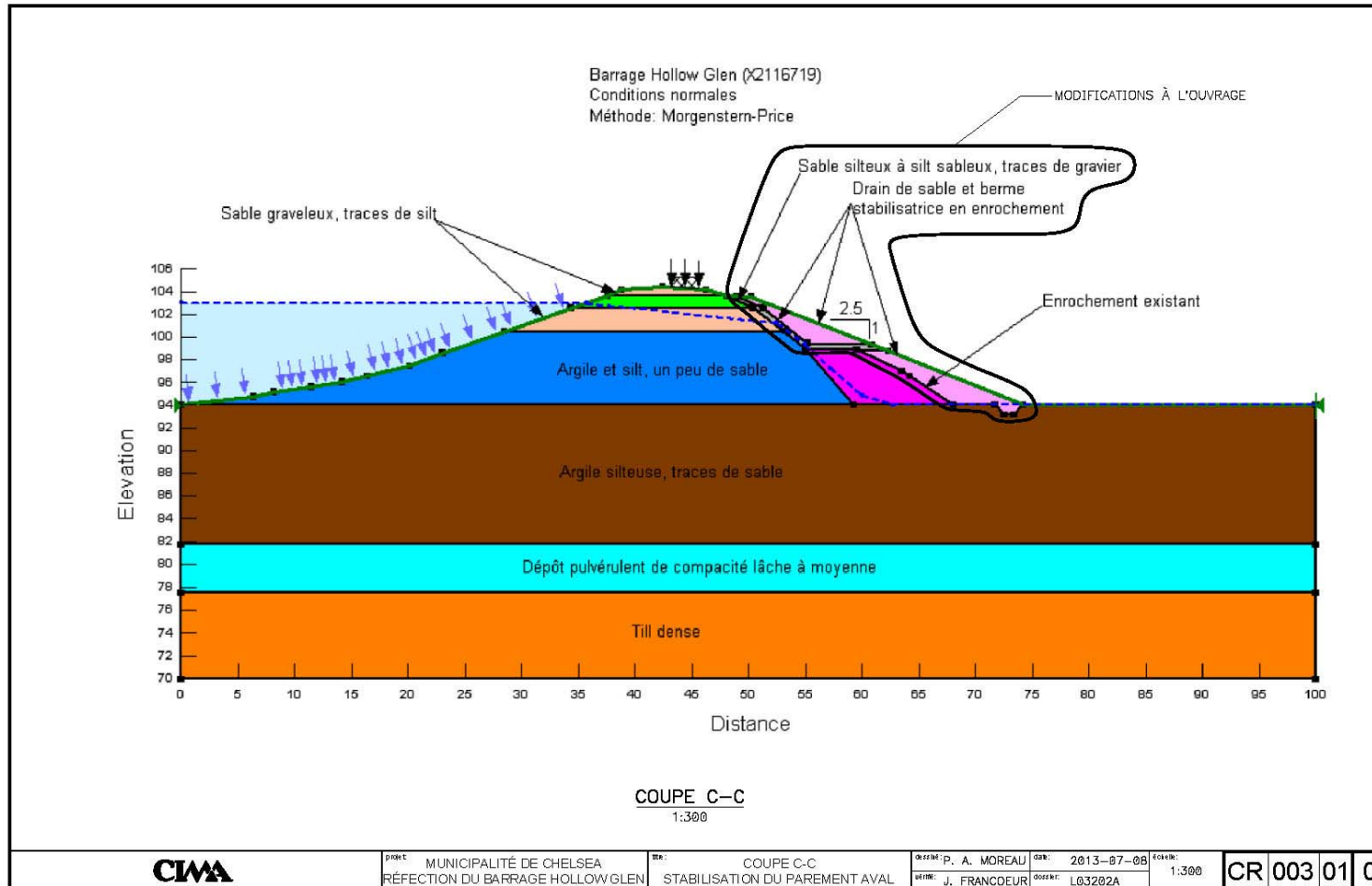
# Current Structure

Barrage Hollow Glen (X2116719)





# Proposed structure



**CMA**

PROJET: MUNICIPALITÉ DE CHELSEA  
RÉFÉCTION DU BARRAGE HOLLOW GLEN

OBJET: COUPE C-C  
STABILISATION DU PAREMENT AVAL

DESIGNÉ: P. A. MOREAU  
DÉSIGNÉ: J. FRANCOEUR

DATE: 2013-07-08  
DOSSIER: L63202A

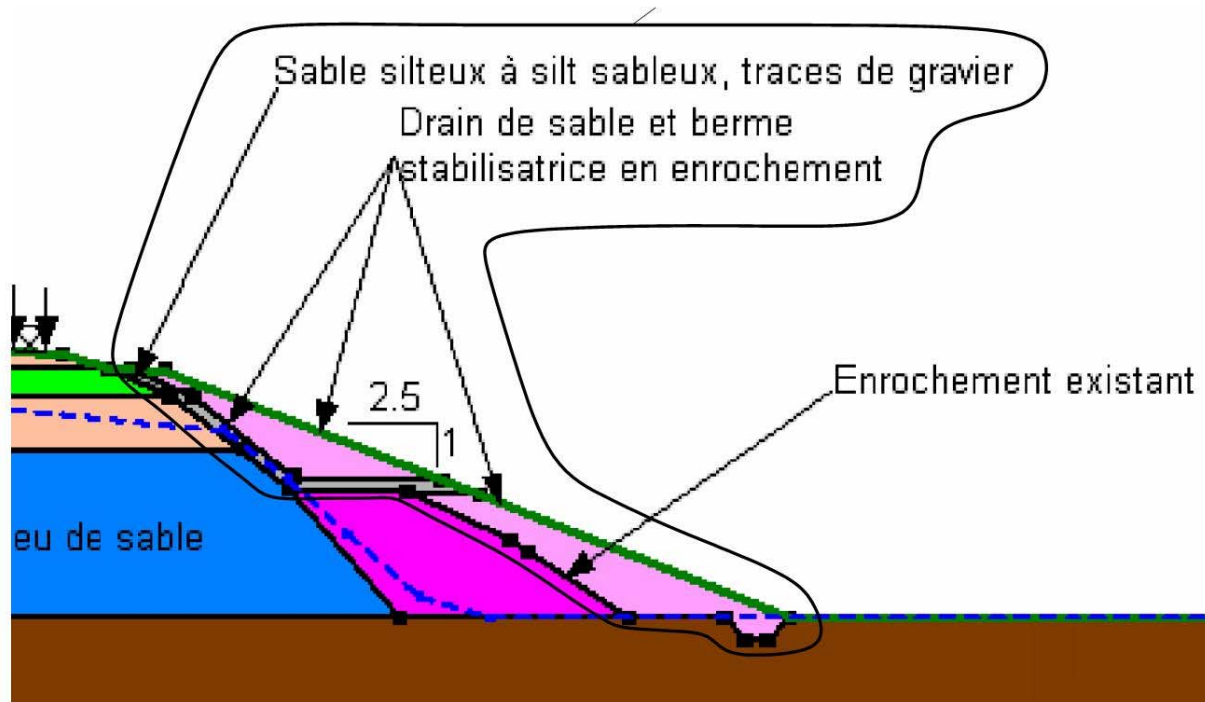
ÉCHELLE: 1:300

CR 003 01 0



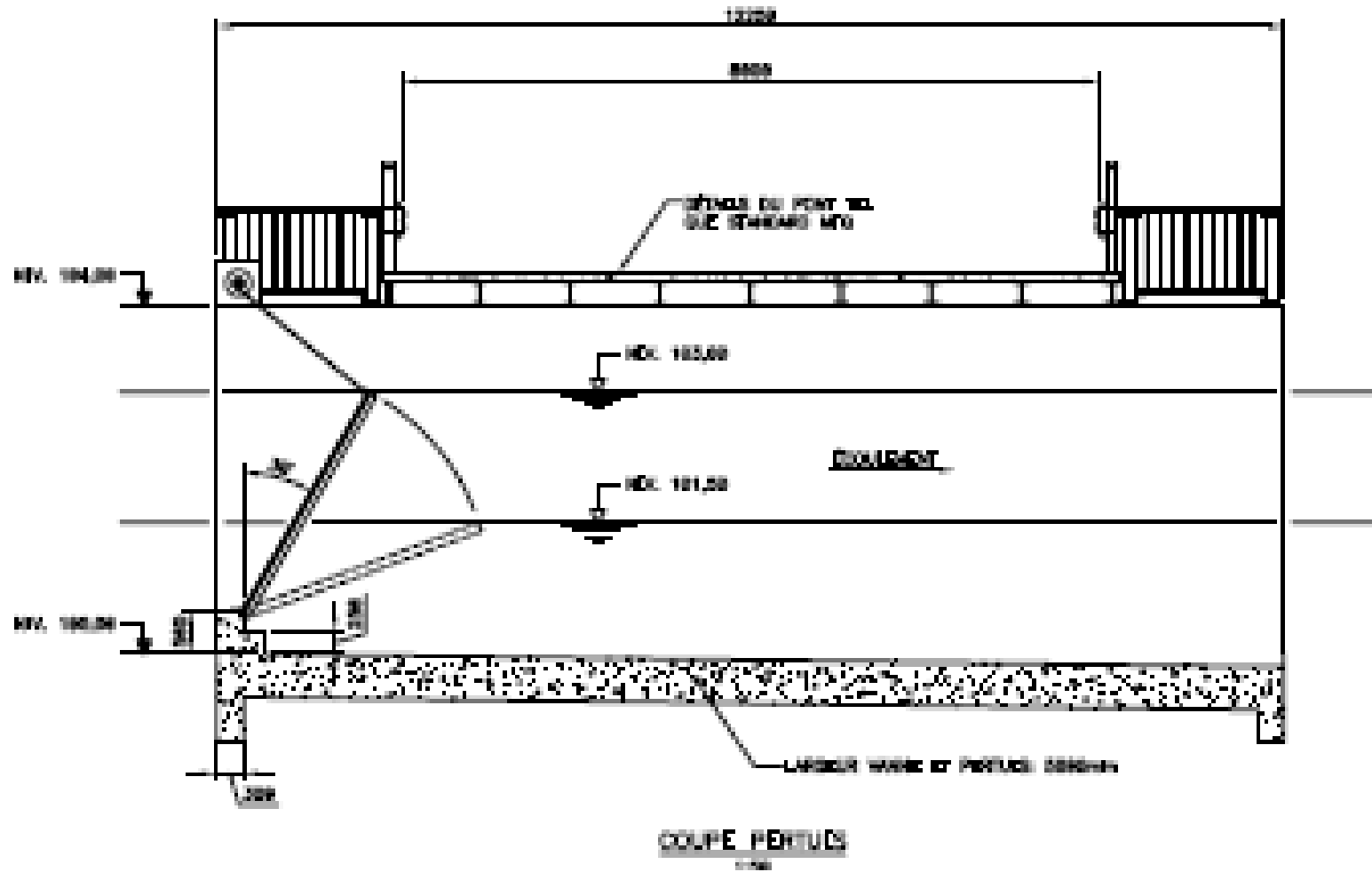


# Stabilisation works





# Works at Outflow - Option 1





## Option 1: Bring to 103.0 m

Advantages	Drawbacks
Varied range of operation	Operation required in severe flooding
No winter draining	Operation required in wetlands
Direct relation between valve/lake	Work on private property
Reliable valve	
Resilient system	
\$807,119	



## Installation of Valves







## Option 2: Bring to 102.0 m

Advantages	Drawbacks
Varied range of operation	Reliable operation between 101.5 and 102.0
No winter draining	Work required in wetlands
Direct relation between valve/lake	Work on private property
Reliable valve	Possible habitat loss
Resilient system	Loss of value of residences
\$693,741	



# Culvert in the dam - Option 3



COUPE PONCEAU DANS LE CORPS PRINCIPAL DU BARRAGE  
1/2000



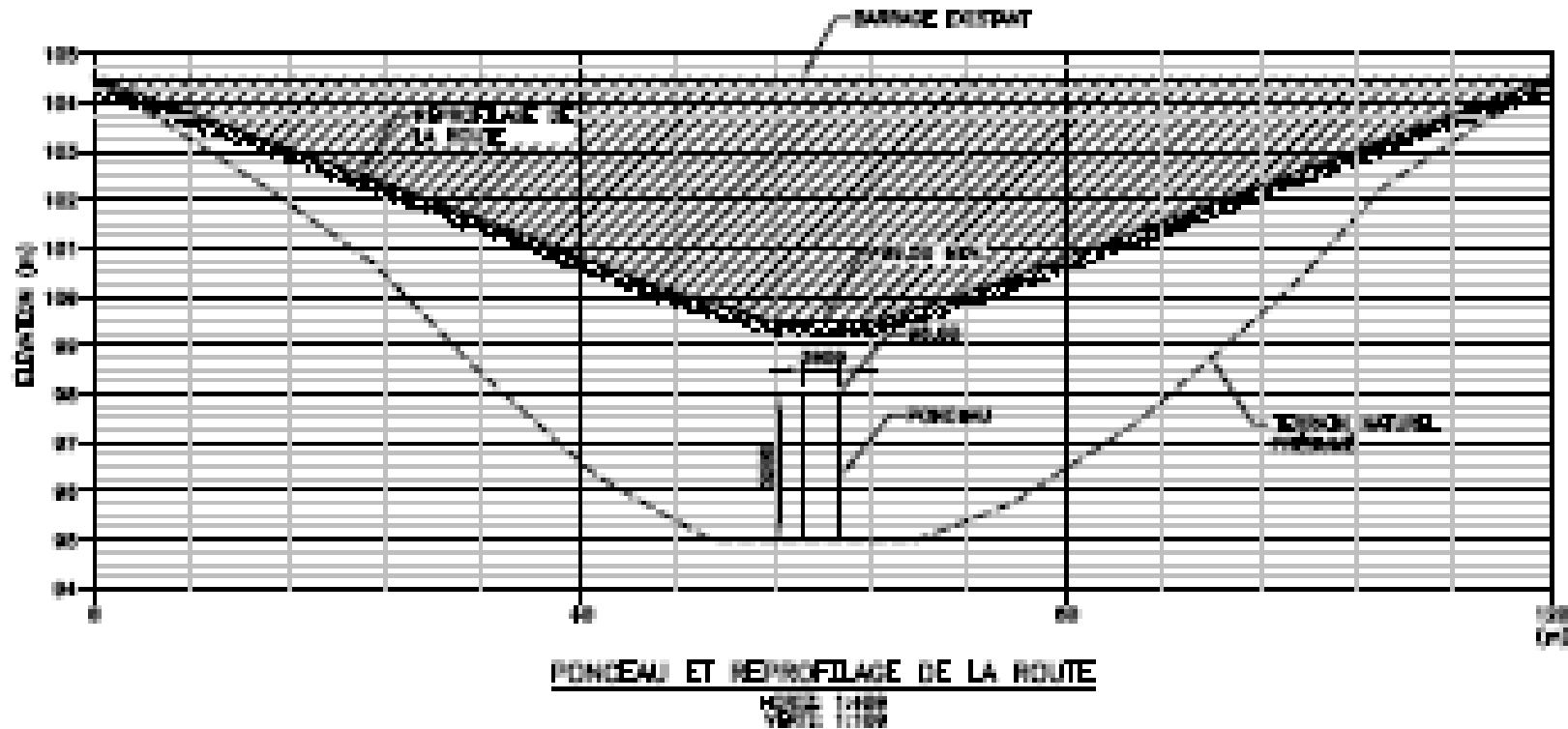
## Option 3 – Bring to 101.0 m

Advantages	Drawbacks
No operation	Low lake
No winter draining	Low range of operation
No slope protection	Significant cofferdam required
	Loss of habitat for wildlife and plants
	Loss of value for residences
\$647,143	





# Option 4 – Dismantle the Dam





## Option 4 – Dismantle the Dam

Advantages	Drawbacks
No operation	Drying up of Lac Mountains
No winter draining	Loss of habitat for wildlife and plants
No slope protection	Significant stabilization work
Declassification of dam	Loss of value of properties
\$596,859	



## Summary of Options

- Option 4
  - Expensive, facilitates avoidance of regulatory requirements, loss of property value
- Option 3
  - Expensive, significant drop in lake level, loss of property value
- Option 2
  - Status quo, dissatisfaction of residents, significant costs
- Option 1 Recommended by CIMA
  - Most expensive option, but also the most flexible. The small cost difference in relation to the other options does not overshadow the advantages
  - Sectoral tax: marginal cost difference between Option 1 and Option 4



## Comparative Costs Table

Composantes	Option 1	Option 2	Option 3	Option 4
	Niveau d'opération de 103,0 m	Niveau d'opération de 102,0 m	Niveau d'opération de 101,0 m	Démantèlement du barrage
1. Travaux dans le canal d'amenée (estacade, dragage et démolition barrage Beamish)	21 450 \$	21 450 \$	Non requis	Non requis
2. Nouvel évacuateur et/ou correction à l'évacuation existant et correction au canal d'évacuation	314 271 \$	256 471 \$	198 367 \$	335 348 \$
3. Contrôle des exfiltrations et stabilité du barrage	249 511 \$	217 684 \$	178 940 \$	Non requis
4. Divers (environnement, contrôle de l'eau)	52 807 \$	52 807 \$	134 268 \$	136 477 \$
5. Organisation du chantier (10%)	63 804 \$	54 841 \$	51 158 \$	47 183 \$
6. Contingence (15%)	105 276 \$	90 488 \$	84 410 \$	77 851 \$
<b>TOTAL (Coûts de construction) :</b>	<b>807 119 \$</b>	<b>693 741 \$</b>	<b>647 142 \$</b>	<b>596 859 \$</b>





## CIMA Recommendation

- Option 1
- Bring the lake level to 103.0 m elevation
- Better control of lake waters
- The cost difference is not sufficient to overshadow the benefits of the enjoyment of the lake and the satisfaction of its users