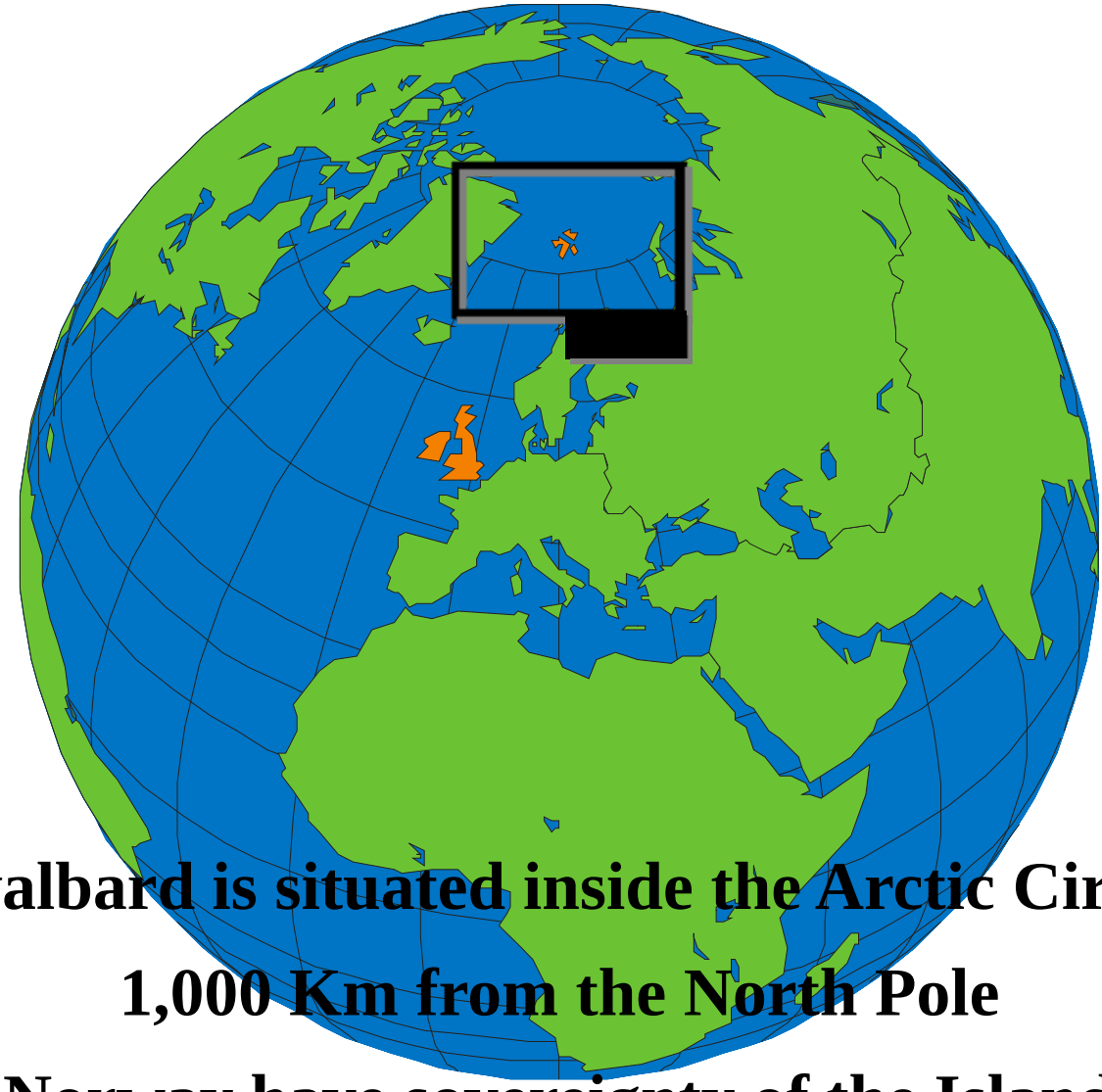
Store Norske Spitsbergen Grubekompani

Mining on Top of the World

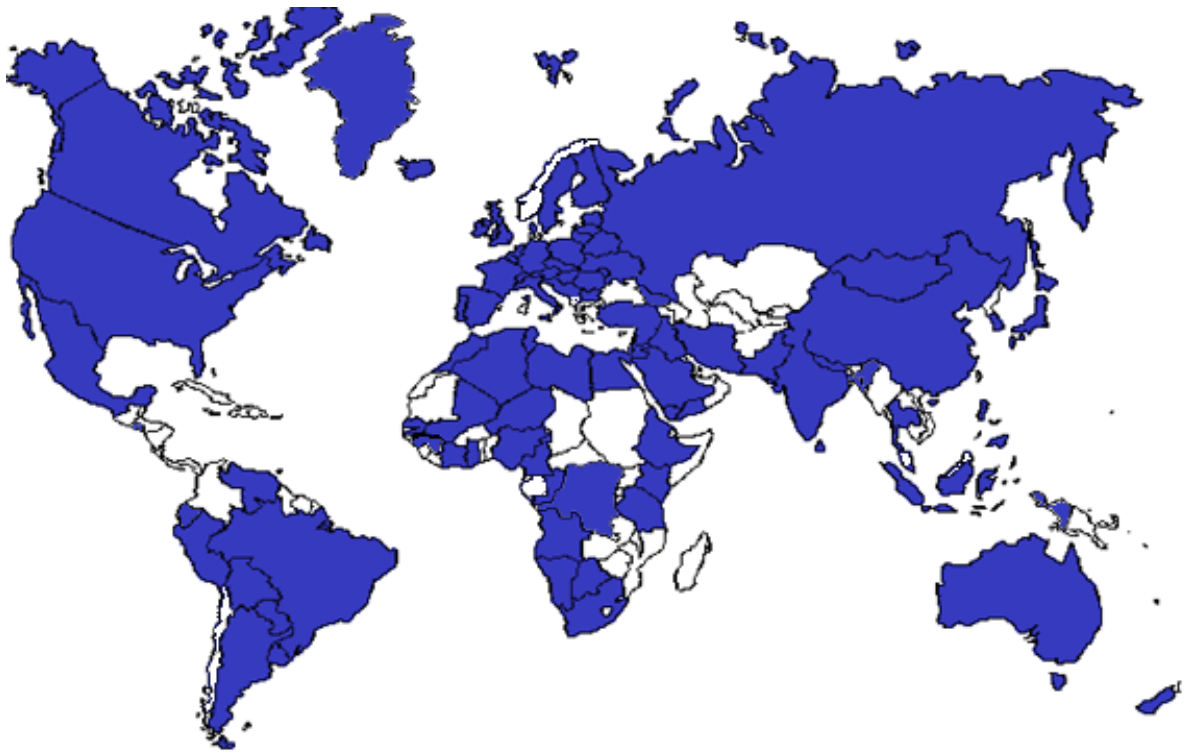


Mining on Top of the World

Svalbard is situated inside the Arctic Circle

1,000 Km from the North Pole

Norway have sovereignty of the Island



The Store Norske group

- **Founded in 1916**
  The only coal manufacturer in Norway
- **The oldest mining company on Spitsbergen**
- **320 employees**
- **316 claims**
- **2006 km^2 properties**
- **2 coalmines; mine No 7 and Svea Nord**

SNSG – Key Figures 2004:

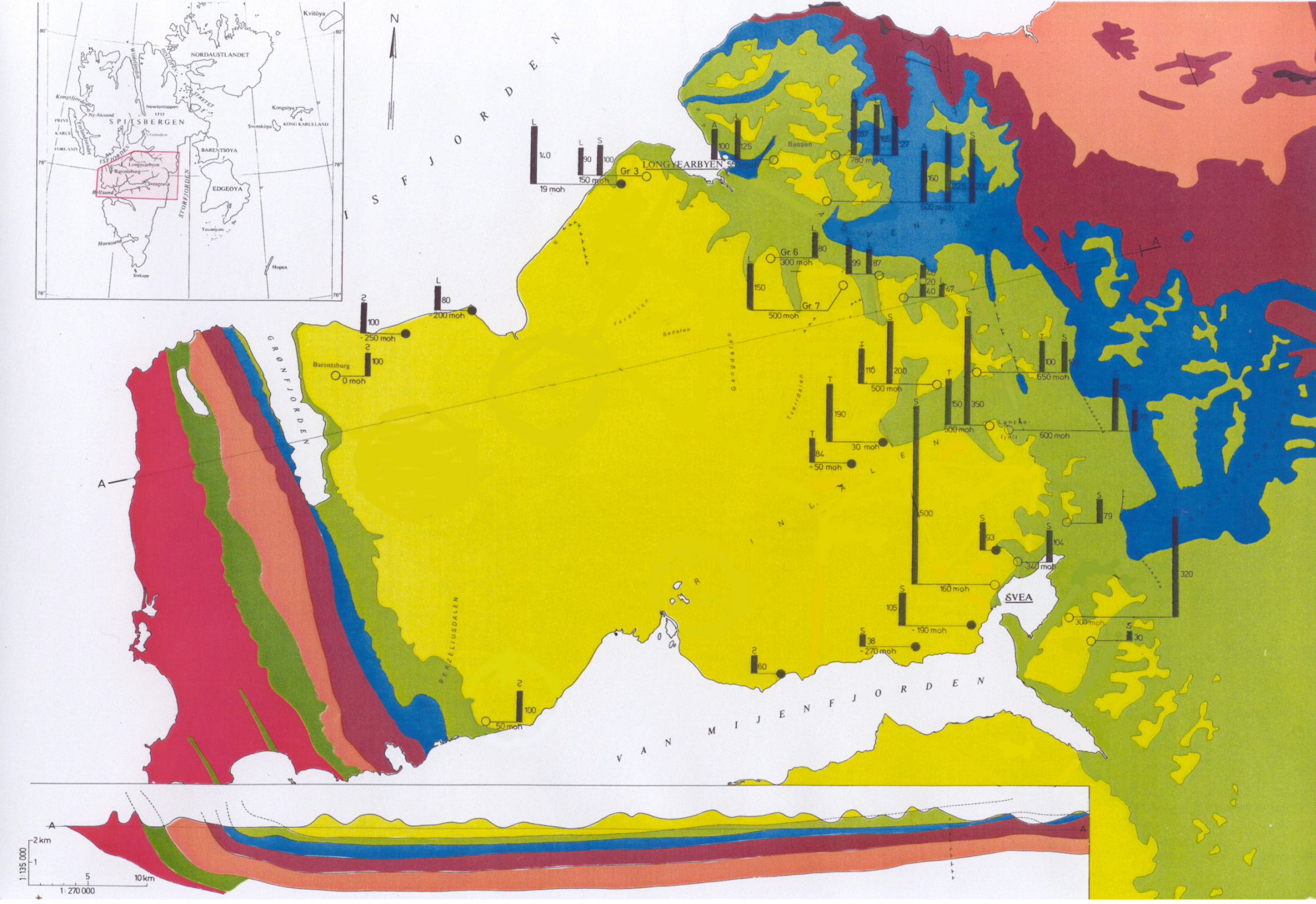
- **Coal Sales:** **2,87 Mt**
- **Turnover:** **1 309 MNOK**
- **Profit before taxes:** **221 MNOK**
- **Profit after taxes:** **200 MNOK**


Longyearbyen
Sveagruva
NORDAUSTLANDET
AUSTFONNA
KONG KARLS LAND
ERIK ERIKSENSTRETET
OLGASTRETET
EDGEØYA
STORFJORDBANKEN
STORFJORDEN
HINLOPENSTRETET
Kongsøya
Svenskøya
Wilhelmøya
Hopen
PRINS KARLS FORLAND
ISFJORDEN
NORDENSKIÖLD LAND
BELLSUND
SØRKAPP

Longyearbyen

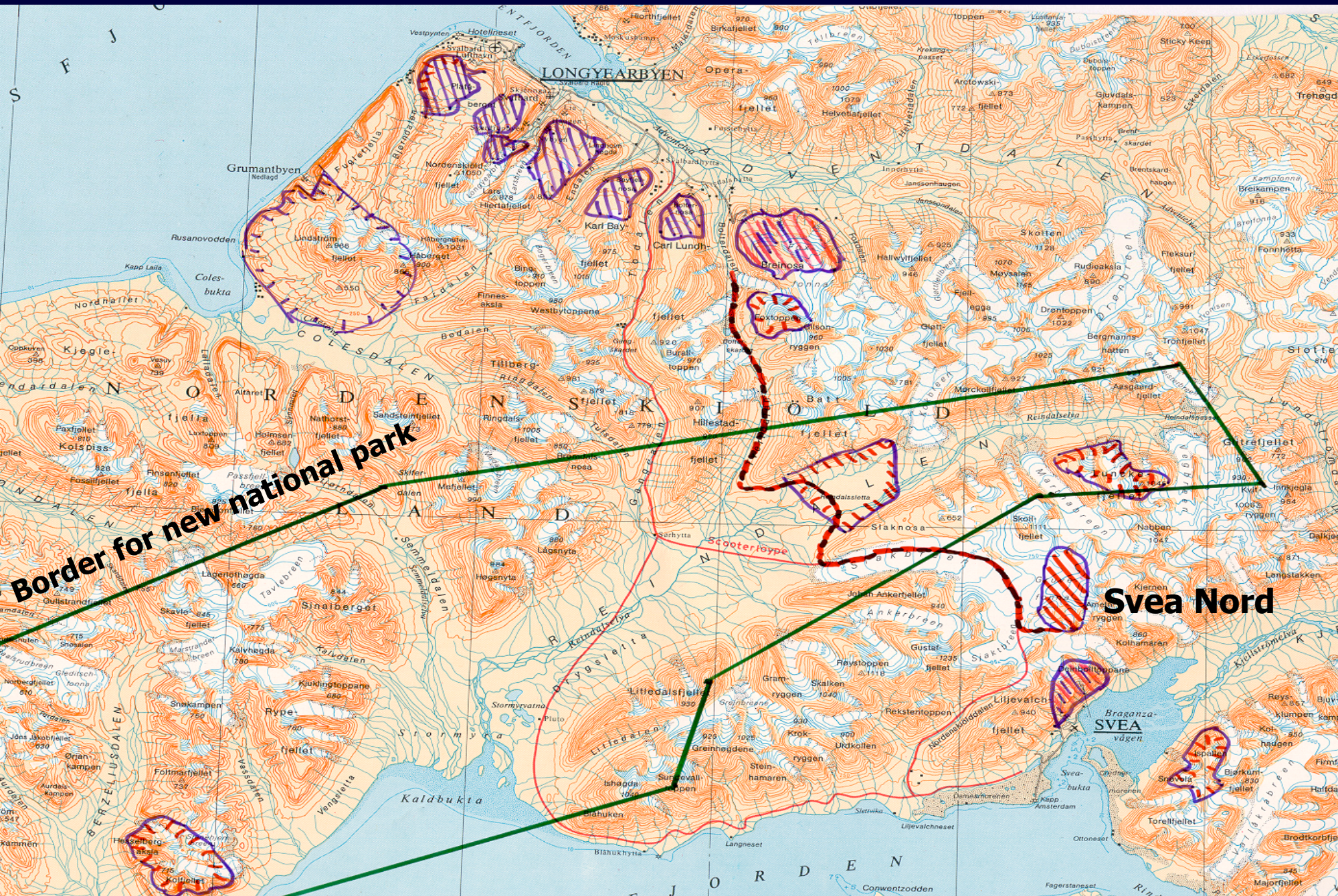
1900 citizens, school from 5 to 16 year, university, church, hospital, postoffice, shops, governor, police, swimmingpool, indoor trainingfacilities, 3 hotels, head office SNSG and 5 PUBS
3 kilometers to airport, one flight to mainland Norway a day (1h.30m with Boeing 737)

Svea



Store Norske Spitsbergen Grubekompani

Known reserves – Nordenskiold land



Communication with the rest of the world

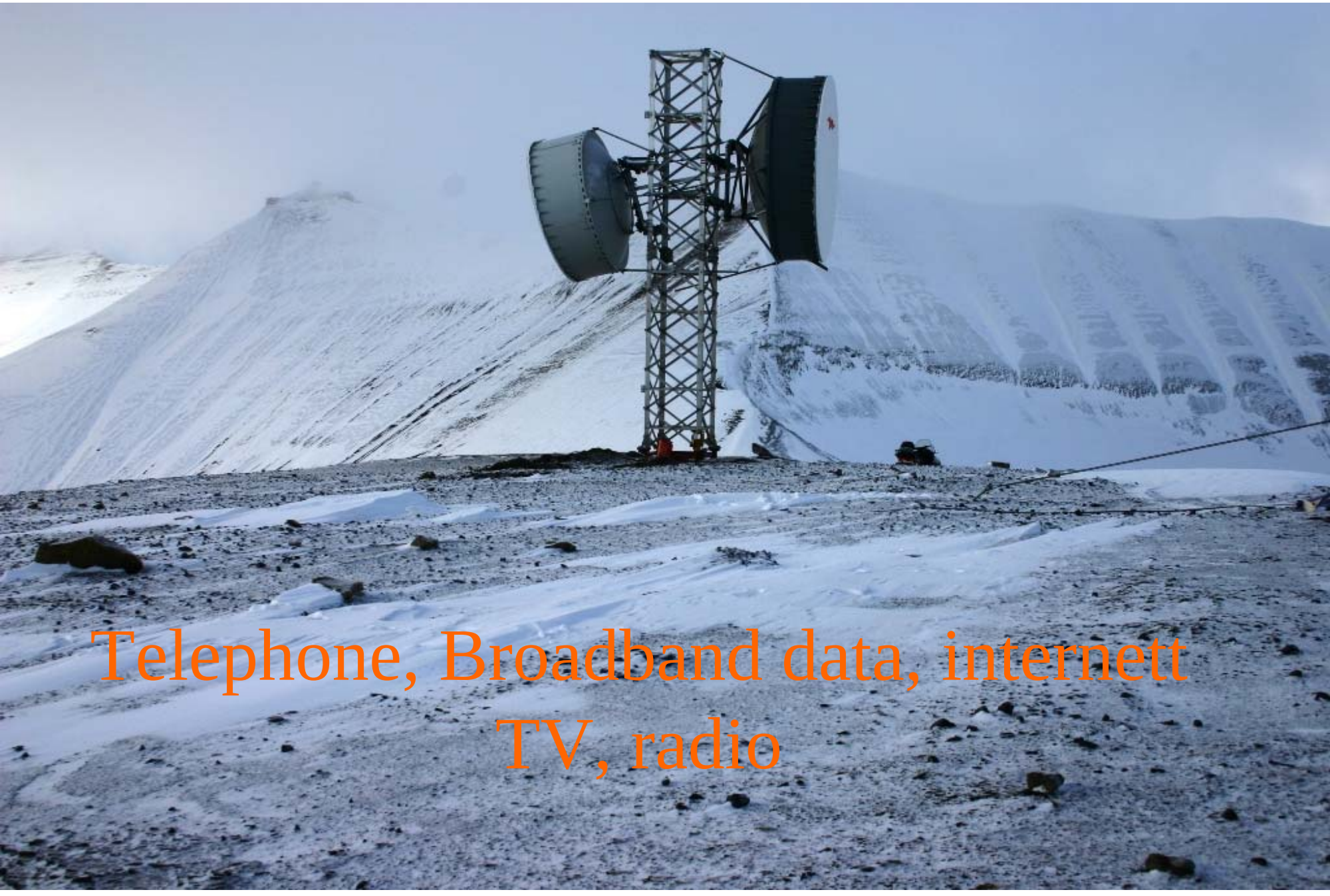
- Aeroplane
- Snowmobile
- Bulldozer
- Boat
- Ski
- Legs

15 minutes from Longyearbyen

27 minutes – 24 hours


24 hours


10 hours to Longyearbyen (summer)
up to 7 days (winter)


Telephone, Broadband data, internett
TV, radio

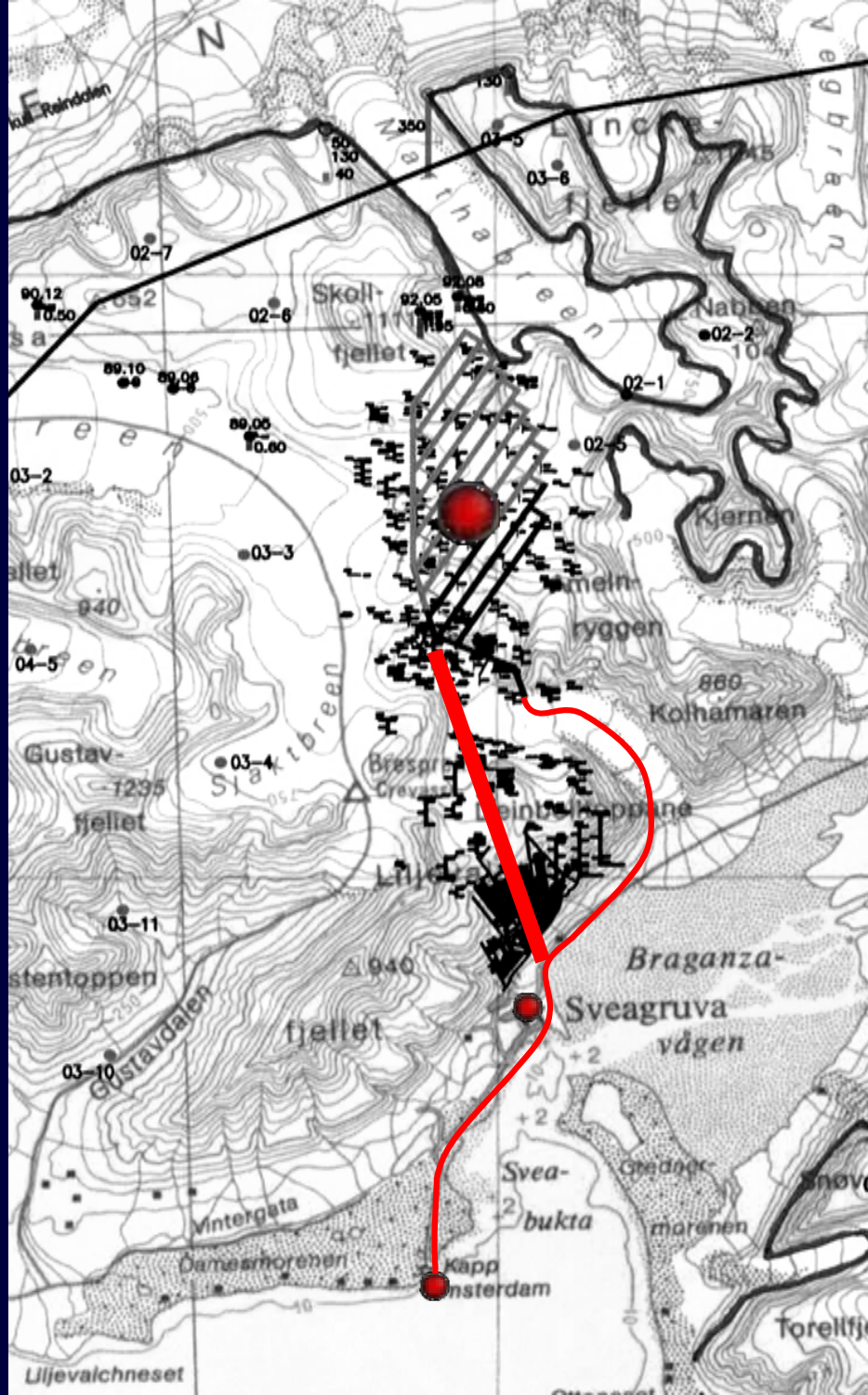

POLSTEAM

Island allmost closing the inlet of the fjord to Svea, makes the ice staying until first week july

Svea Nord

- 20 Mt remaining core seam
- Seam thickness 2,8 – 4,5 m
- Cutting height: 3,7 meter
- Dist mine - quay: 12 km
- 2004: New tunnel 5,8 km
- Production: 20 000 tonn /day
- Remaining resources in Svea area to 2025

Shipping season: July - November



Svea Nord - Overview

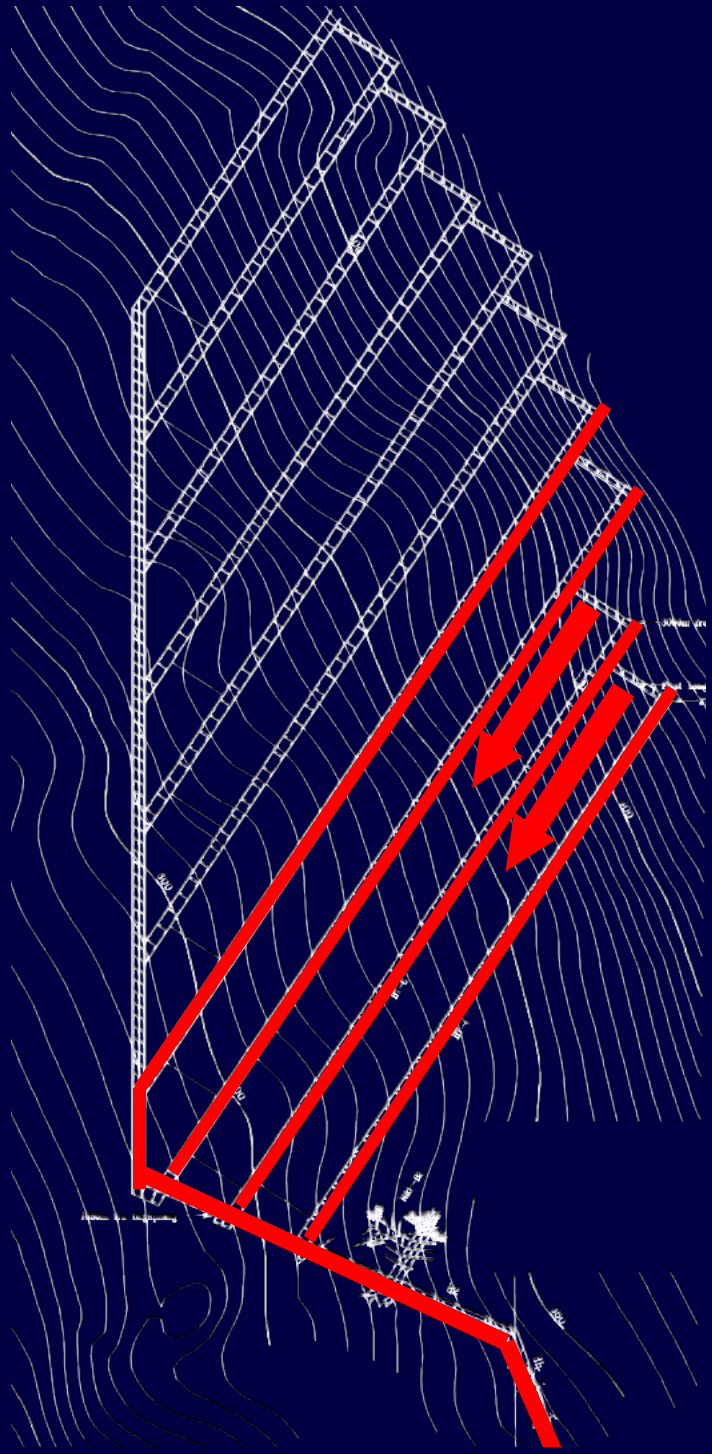
Longwalls: 9

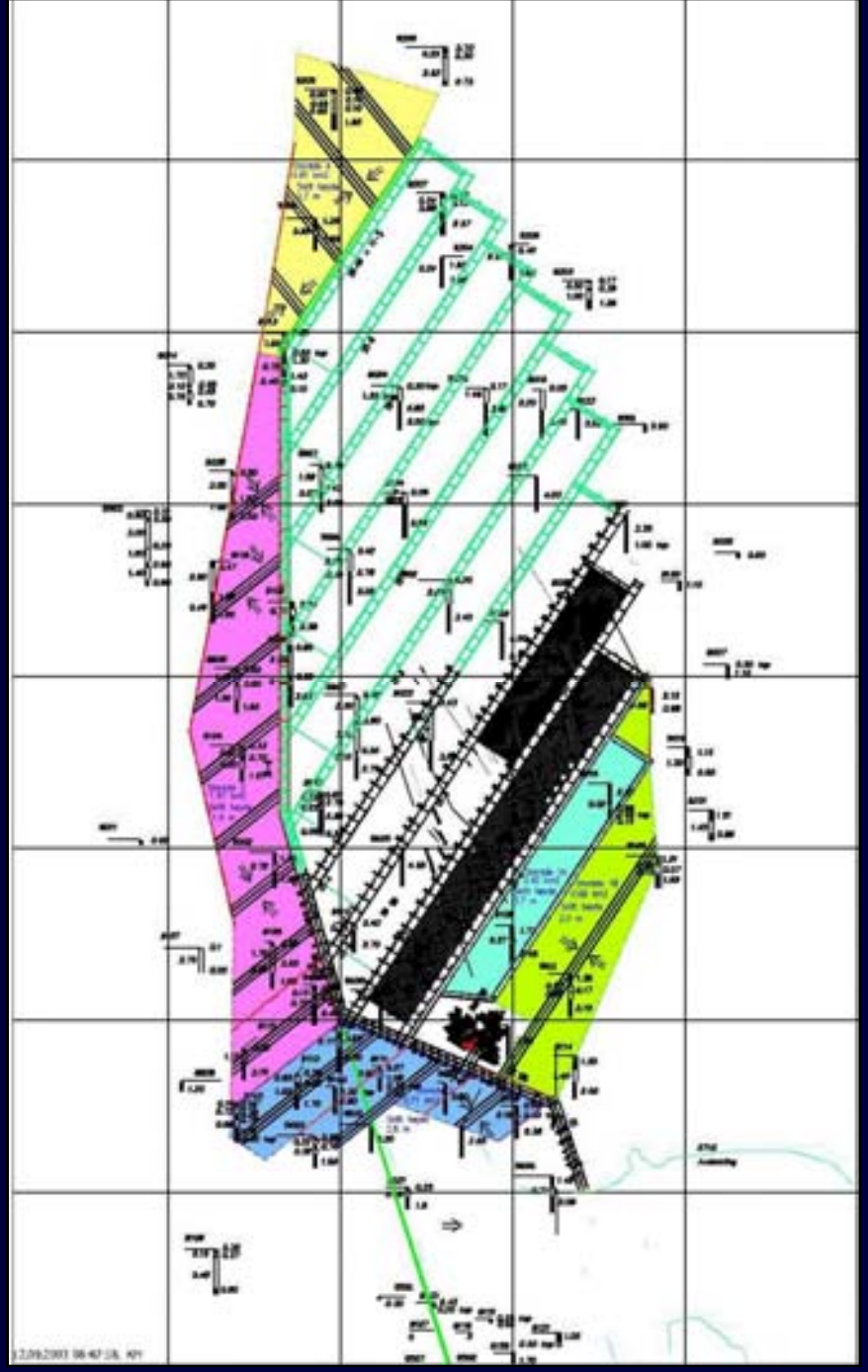
Panel lengths: 1,6 – 3,4 km

Panel width: 250 m

Development: ***Continuous miners***

Main production: ***Longwall***





Mine Map

Transport Roadway

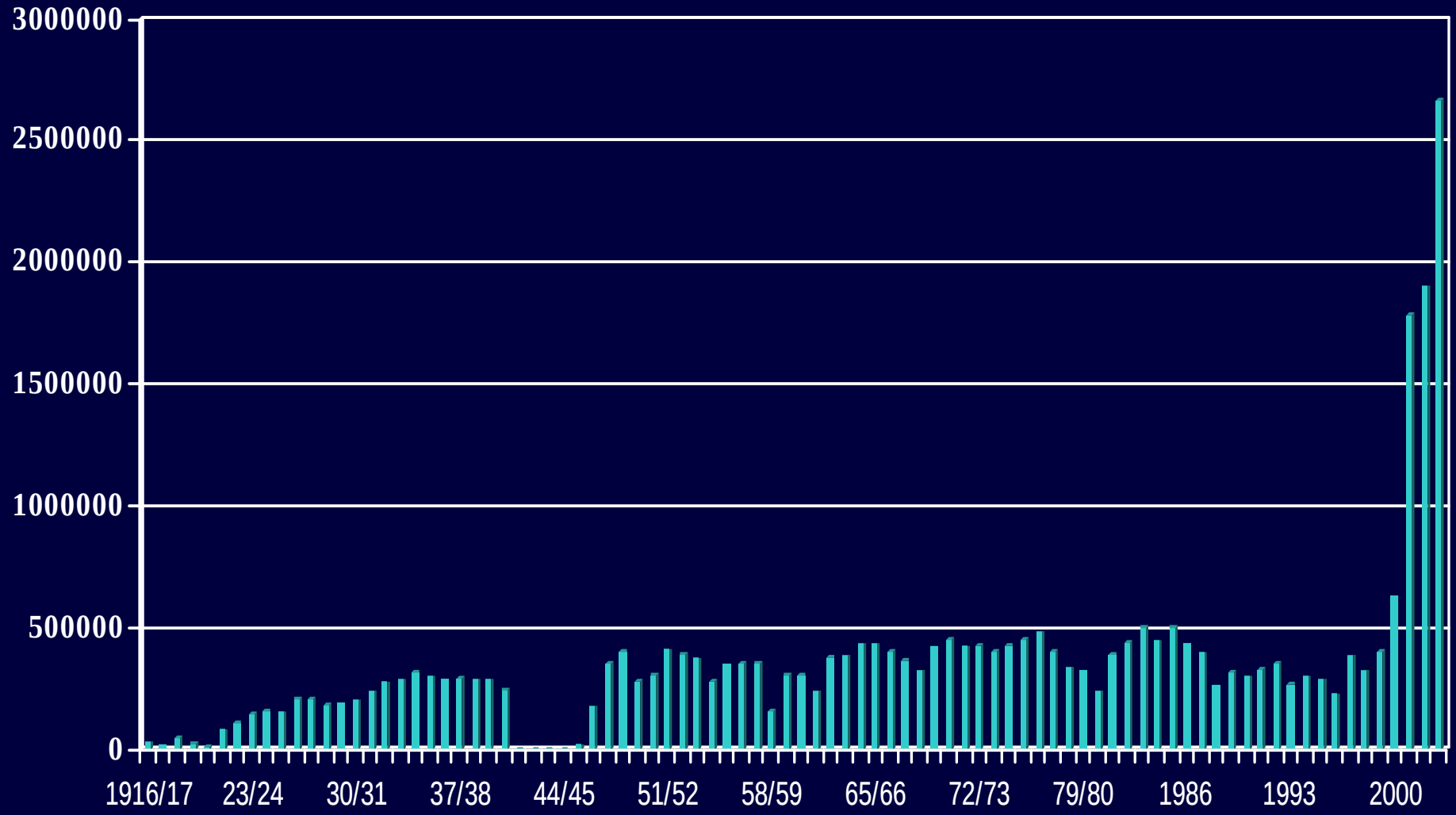
Main Entrance Tunnel

Development 1999 - 2004

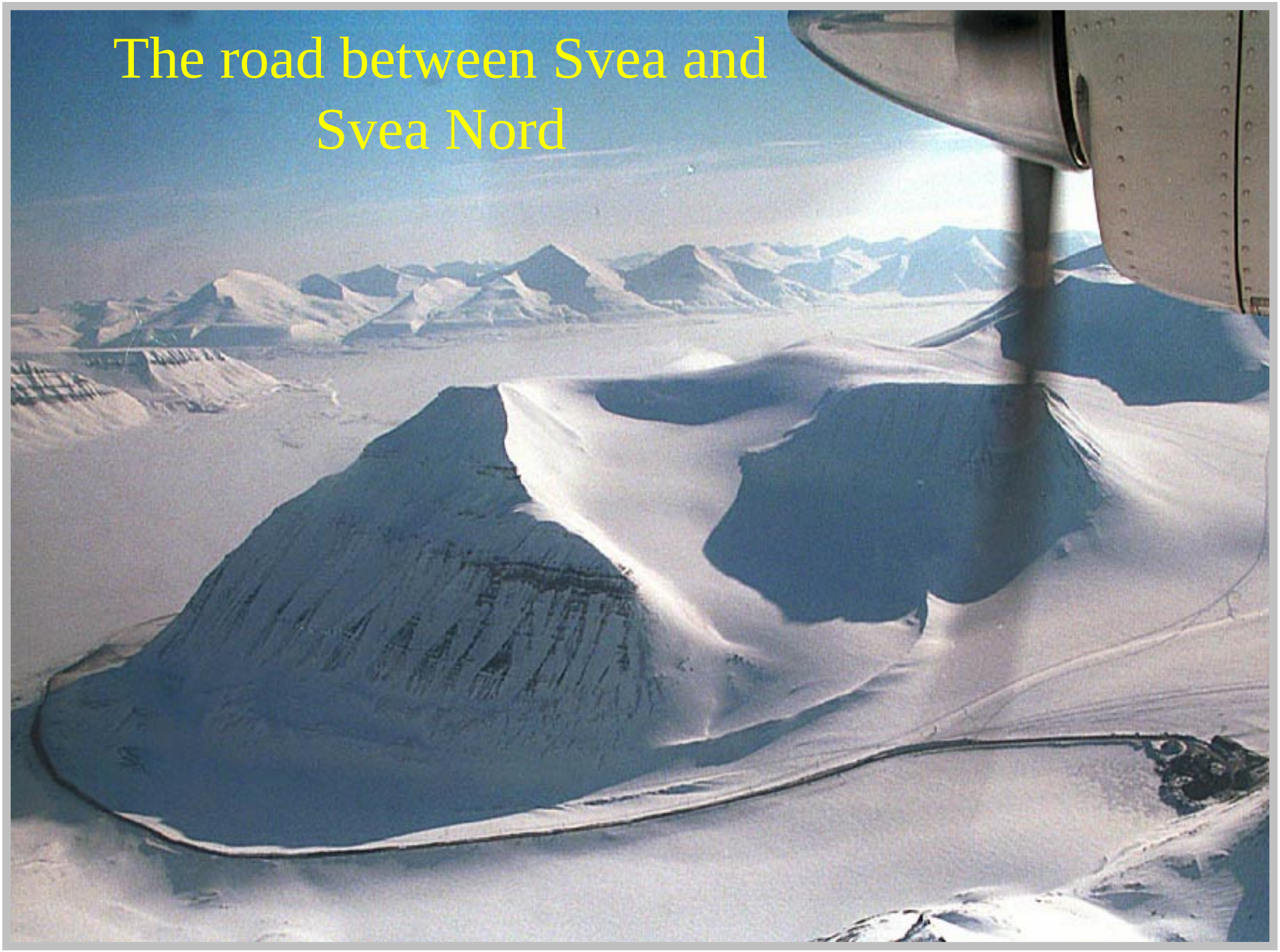
År	1999	2000	2001	2002	2003	2004
Production (1000 tons)	404	632	1 788	2 132	3 001	2 900
No of employees	226	223	248	225	233	265
Coal sales CIF (MNOK)	104	202	530	683	936	1 310
1000 tonn/employee	1 788	2 834	7 210	9 476	12 880	10 940
Damages with absence	10	11	19	4	4	9
Illness related absence	6,8 %	7,0 %	7,1 %	6,2 %	8,8 %	6 %
Result before gov subsidy (MNOK)	(87)	(176)	(133)	63	78	217
Subsidy (MNOK)	87	154	136	-	-	-
Depreciation	30	97	136	31	62	82

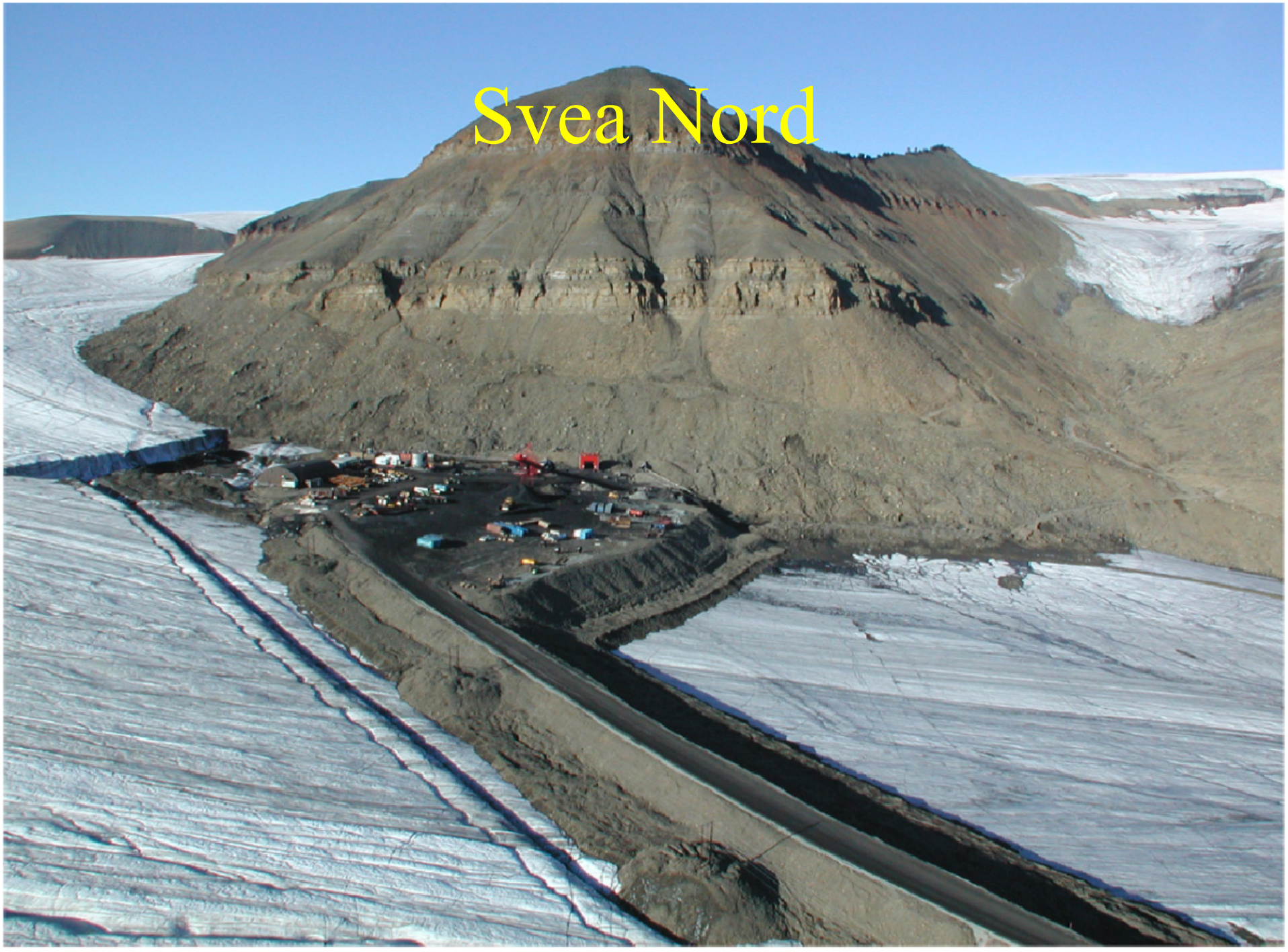
	1999-2004
Turnover growth	1170 %
Productivity growth	685 %

Production 1916 - 2003

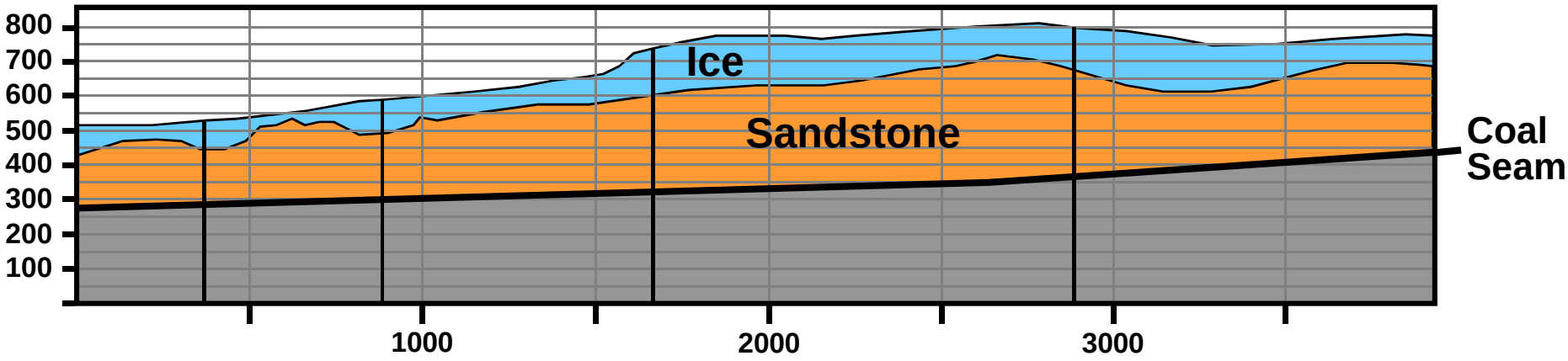


Under mountains and glaciers


The road between Svea and
Svea Nord

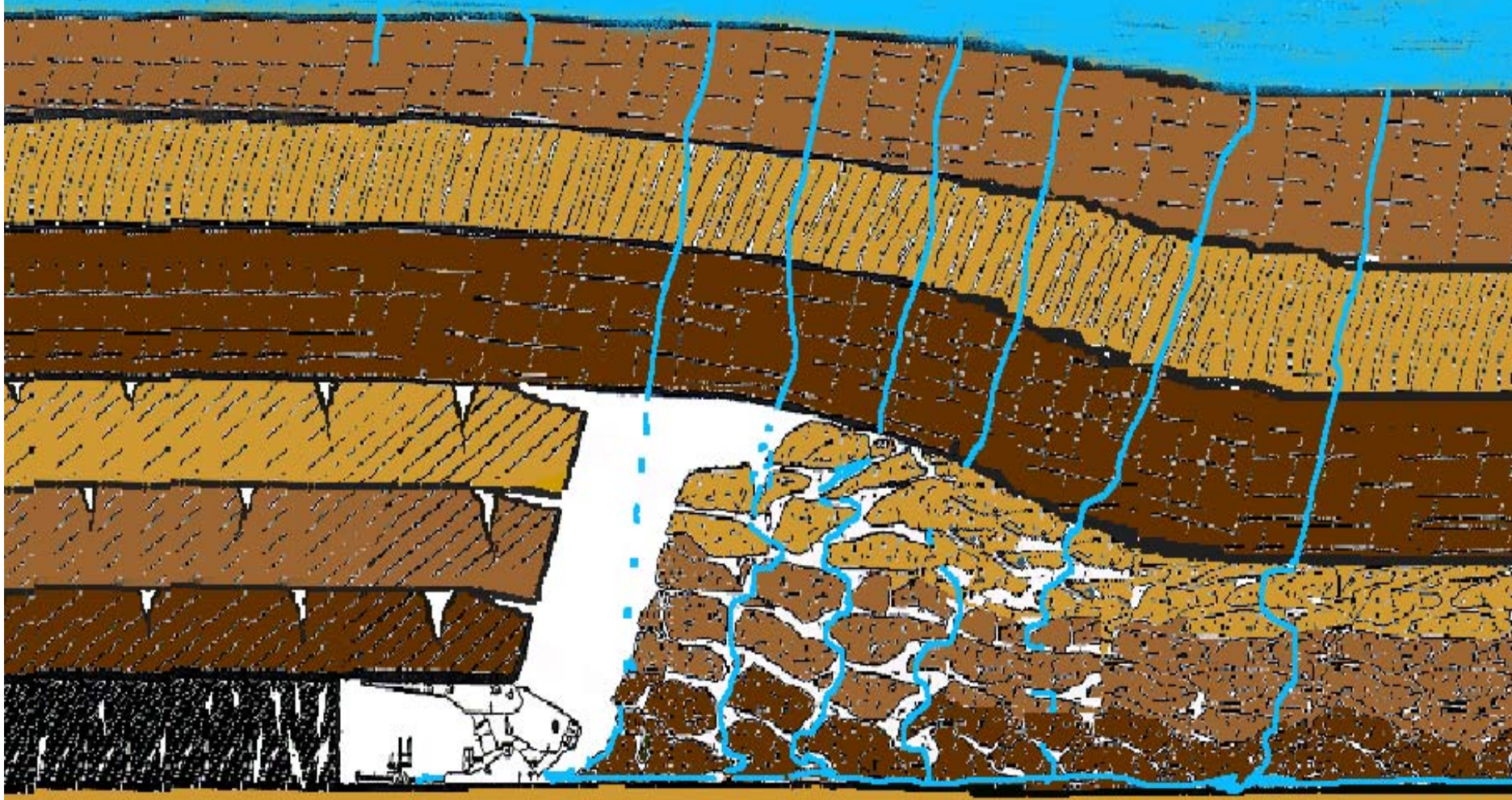

Svea Nord

Cross Section Showing Ice Cap



- **Stratigraphy column**
  - **Ice : 0 - 280 metres**
  - **Sandstone : 50 - 300 metres**
  - **Coal : 3 – 5 metres**

Water penetrate through cracks caused by Longwall mining



Water flooding the mine

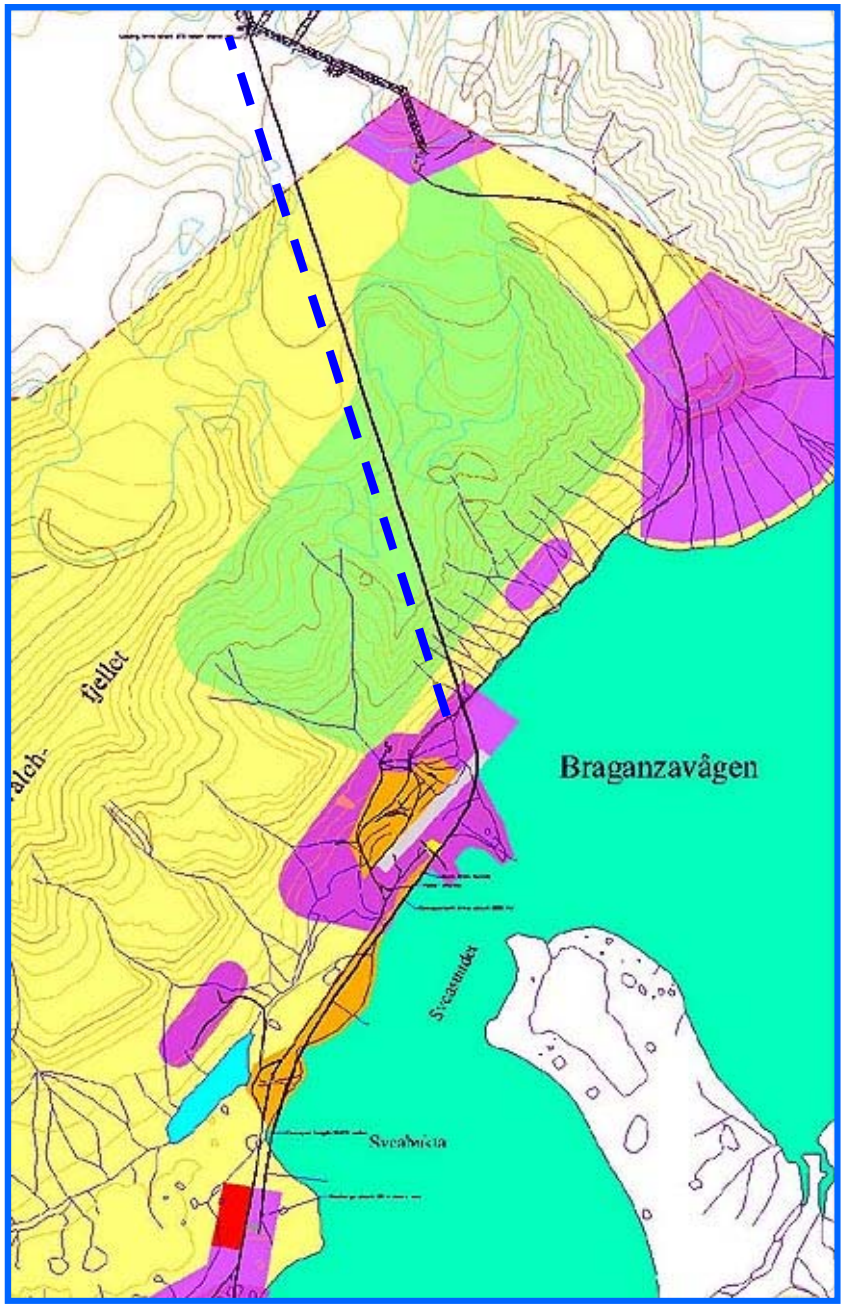
- **Longwall stoppes for 2 months a year, from the middle of july to middle of september**

Water flooding

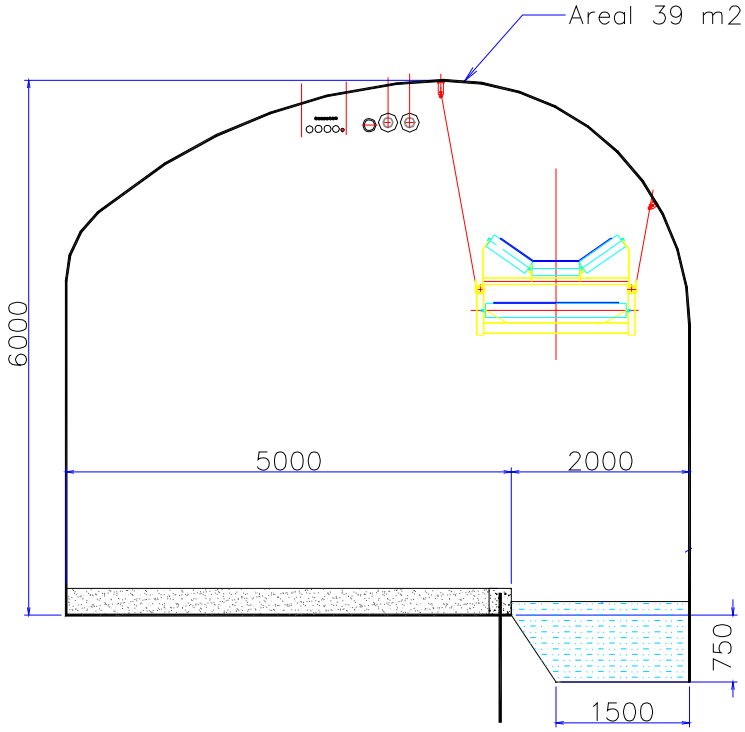
- **Permanent capacity : 6,000 m3/hour**

Tunnel

- **Length : 5.6 km**
- **Roadway : 6m x 7m**
- **Gradient : 2.6 deg's**
- **Opend for transport : Spring 2004**
- **Remaining longwalls: 7**



Tunnel

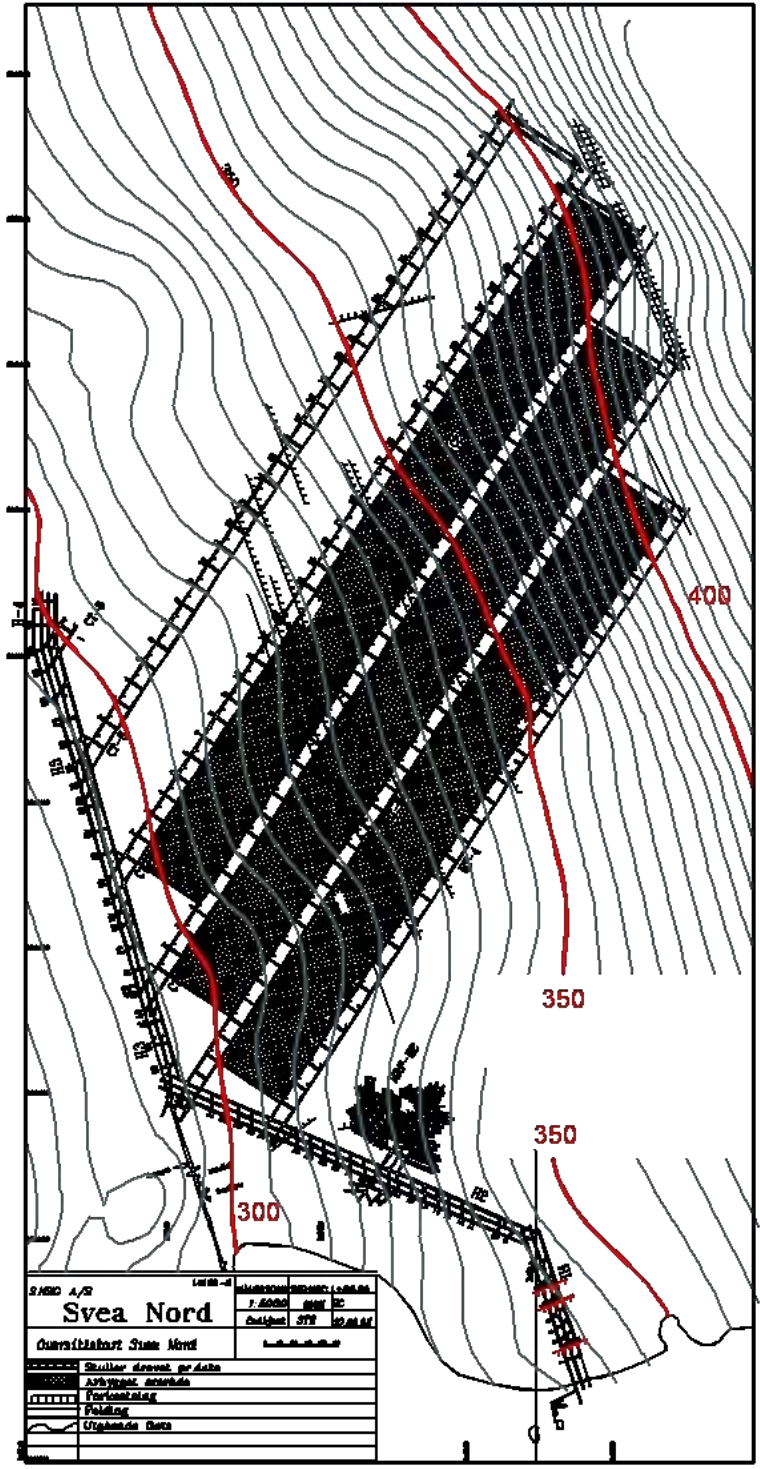


- **ADVANTAGES OF THE TUNNEL**
- **Lover cost of transport**
- **Mine flooding no problem, water runs out of the mine without pumping**
- **Safer and easier transport of men & equipment to the mine**
- **Emergency exit**
- **Power cables**
- **Communication cables**
- **Water-supply**
- **Transport of coal**
- **Tunnel is below the coal-seam**
- **Natural ventilation**


www.snsk.no Fri Aug 5 16:28:17 2005
30. July 2005, the fire in Svea Nord

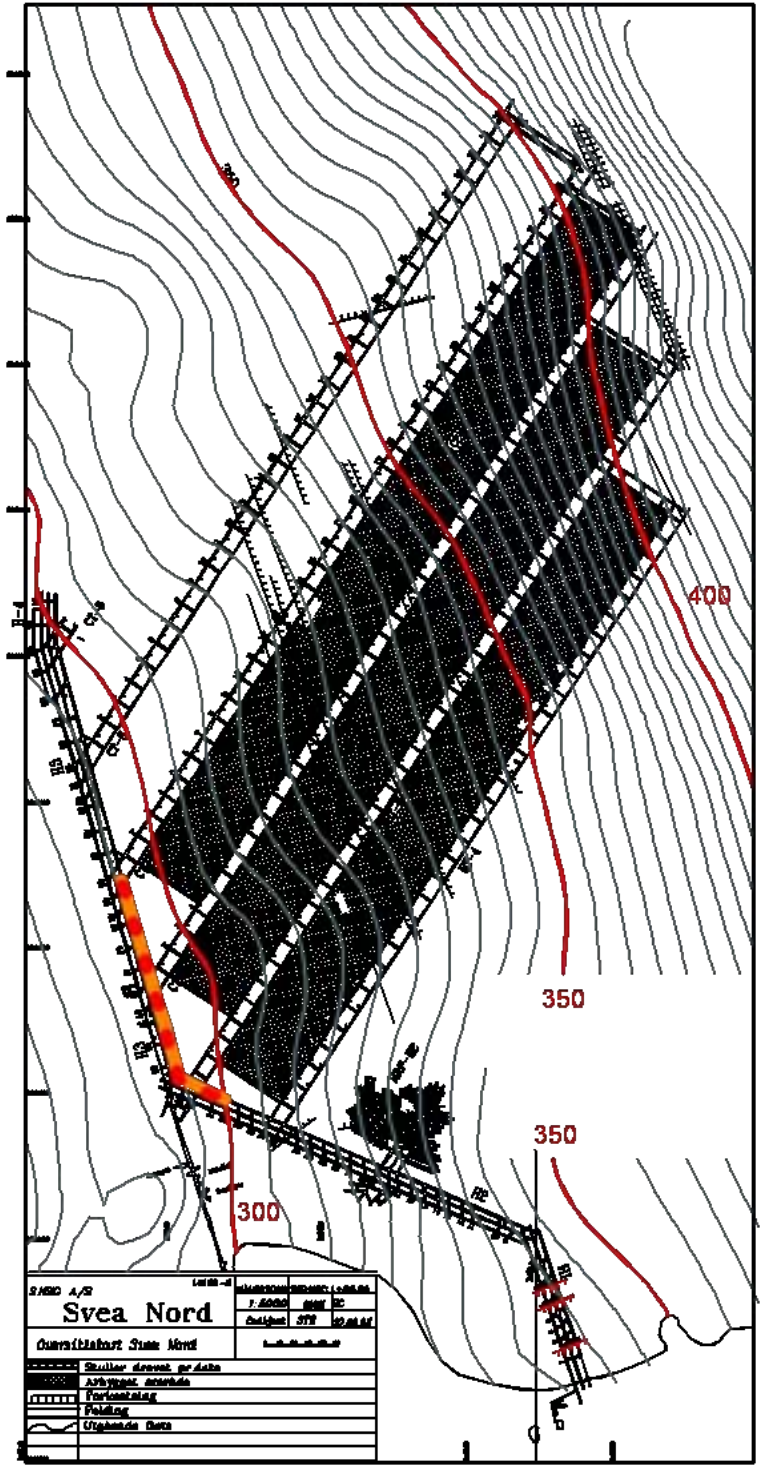
Development map

(Hatched areas depleted)



Fire – early phase

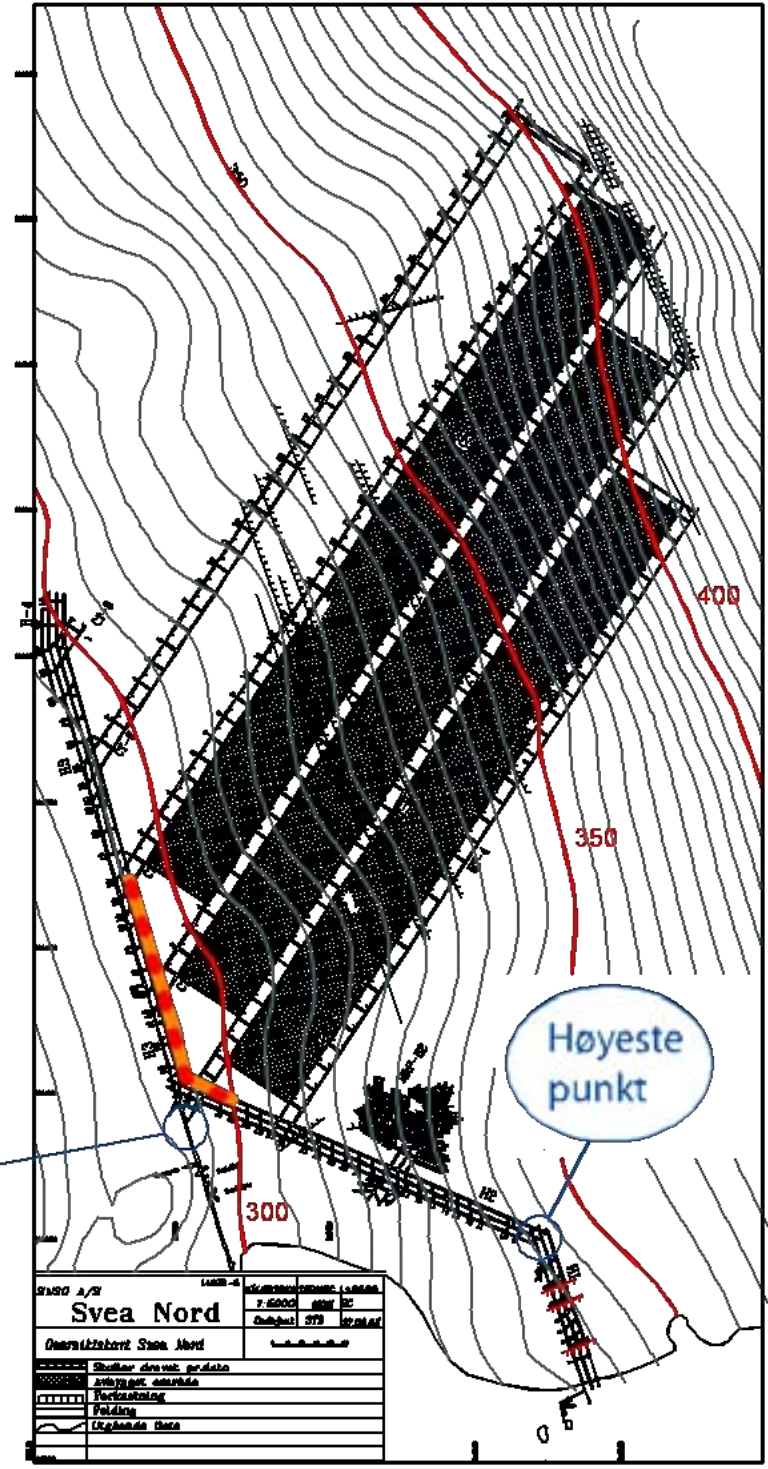
- 06:48 Am - High CO level detected by sensor in crossgate 36, main entrance H3-C
- 06:50 Am – Alarm sounded, All evacuated
- Fire spread over crossgates 39-47
- 22 Pm – Fire spreads to crossgate 33
- No explosions detected



Topography

Lowest point, tunnel c+284

Highest point, main entrance c+340

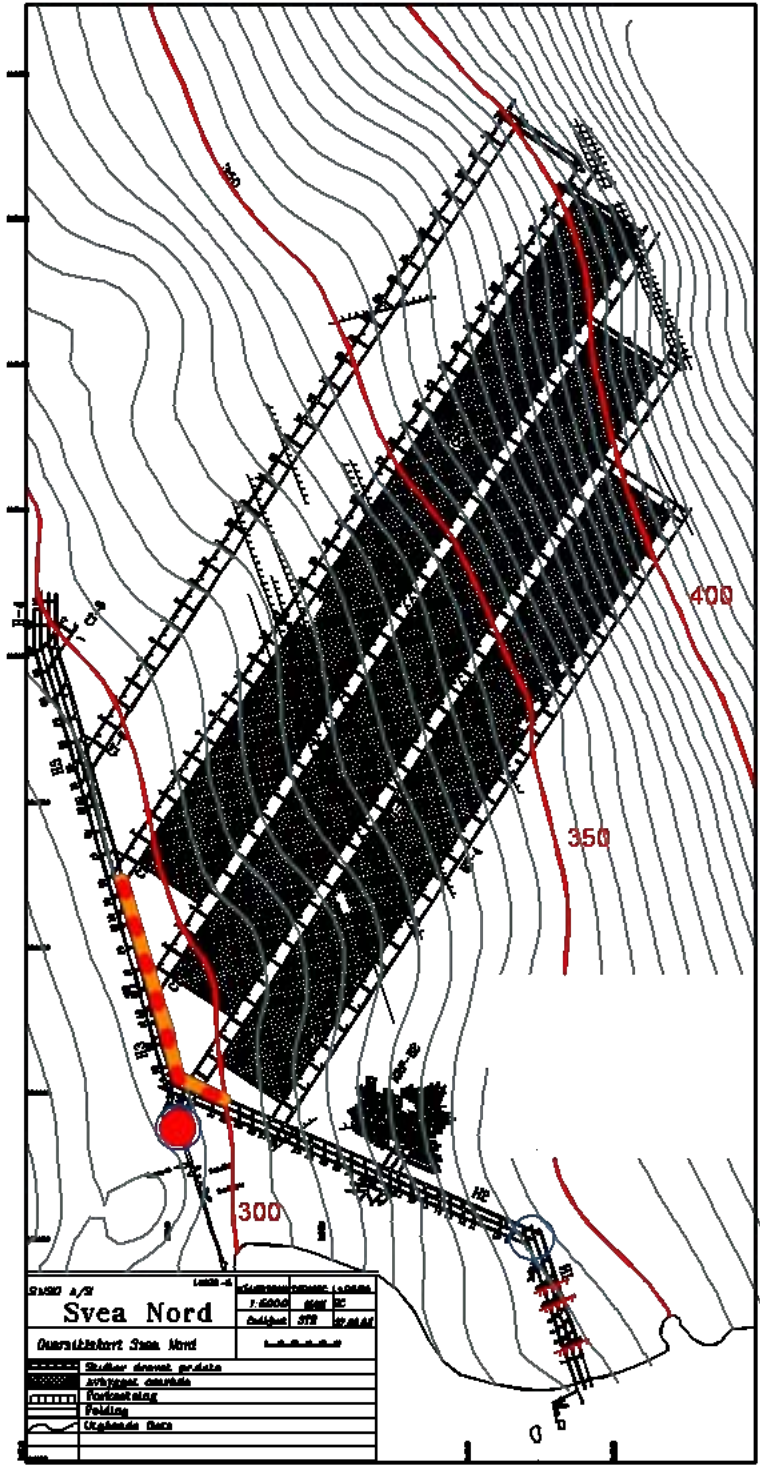


Fire Fighting

Dam built at lowest point

Concrete wall under construction

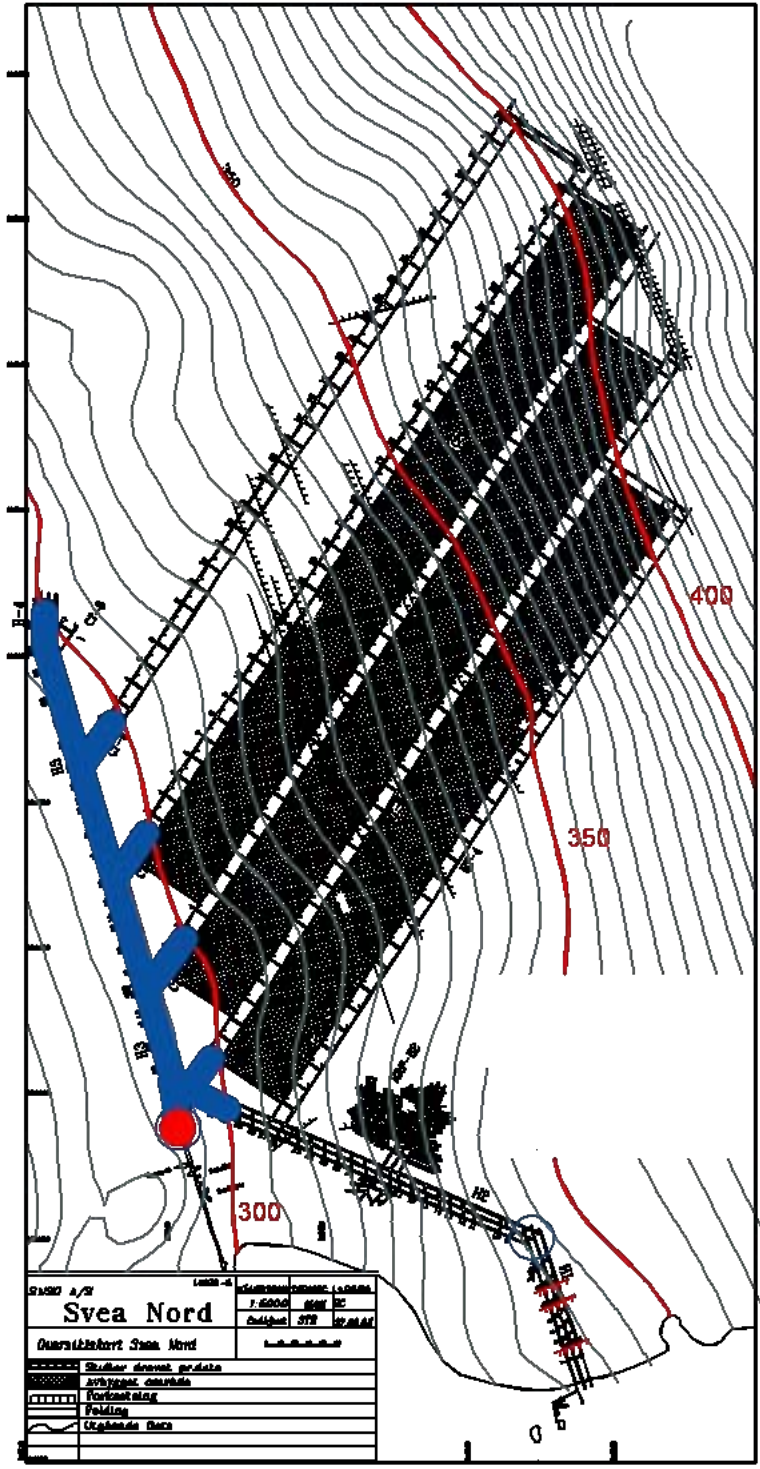
Mine flooded by glacier water, 2000 cu m /h



Flooding phase 1

Increasing water level to c+300

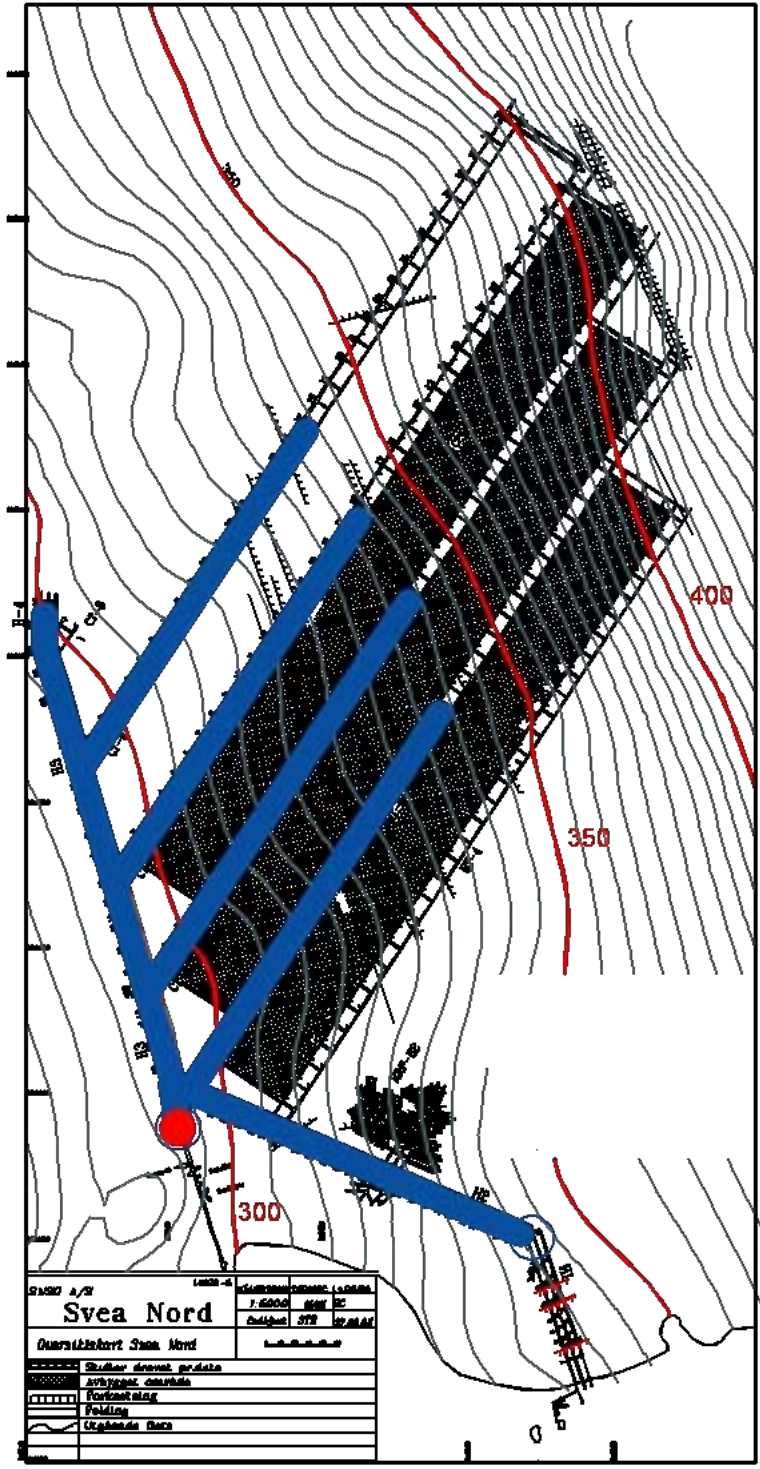
Floods all known affected areas



Flooding phase 2

Filling to c+340

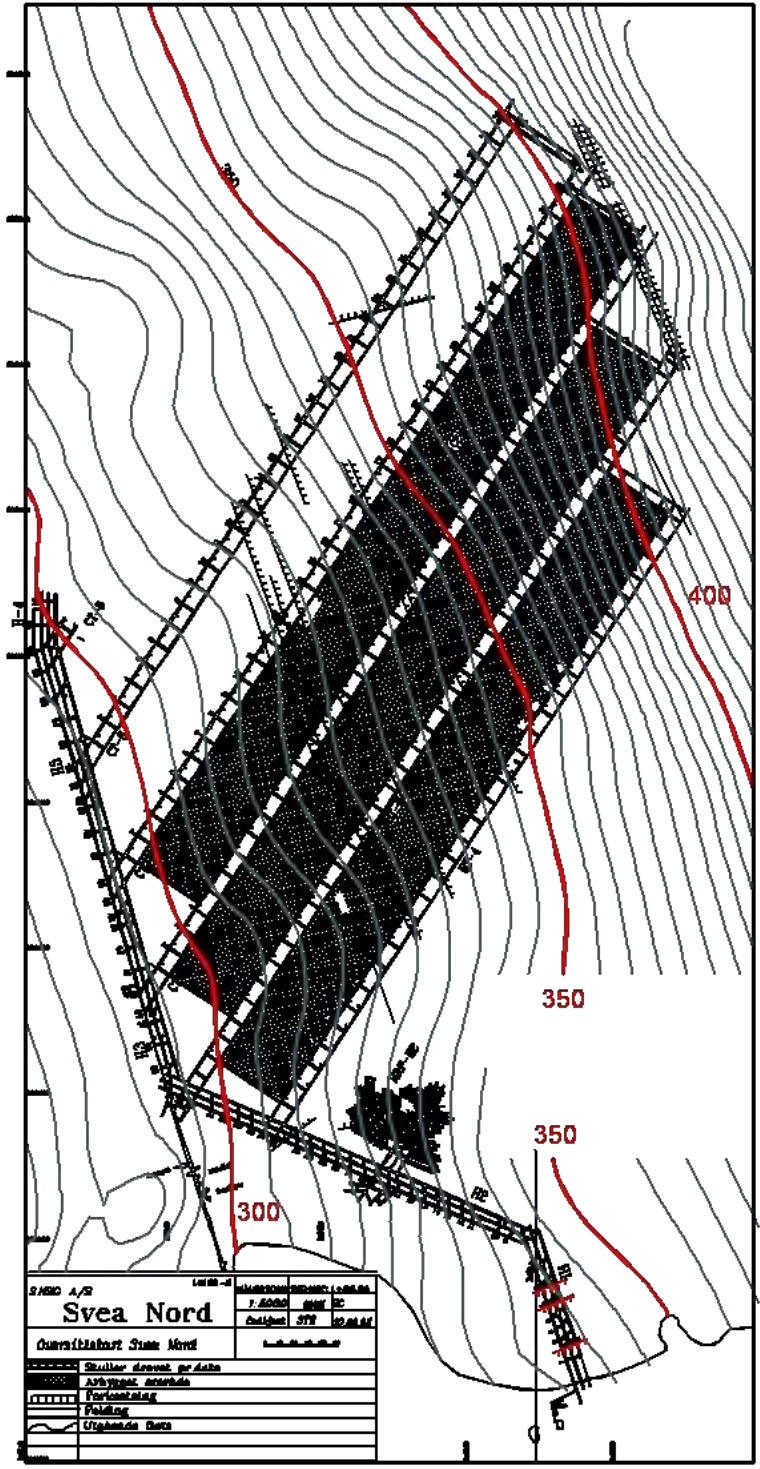
Development areas and main entrance flooded



Damages

- From fire
- From flooding

- Equipment losses
- Repair costs
- Sales and production



Global SteamExfire Inertisation Services, Mackay, QLD

- GAG jet engine
- Steam 85°C
- CO_2
- 7.sept finnished after 3 weeks inertisation
- Fire extinguished

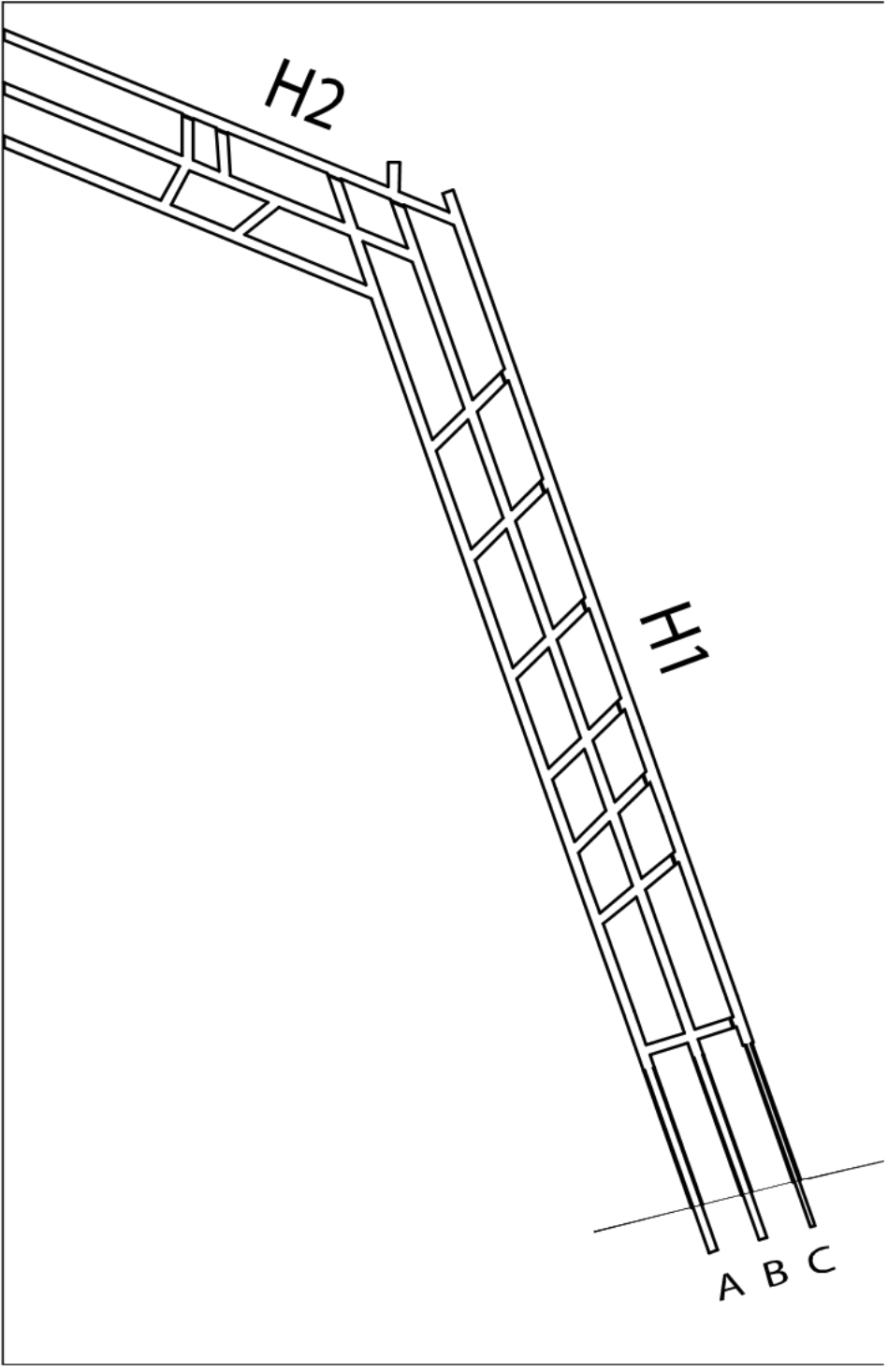
INERTISATION CAUSES PROBLEMS

- Because of the hot steam the permafrost over the mine entrance melts
- Mine entrance collapses
- 2 weeks delay while taking the moraine away


SWEDBANK

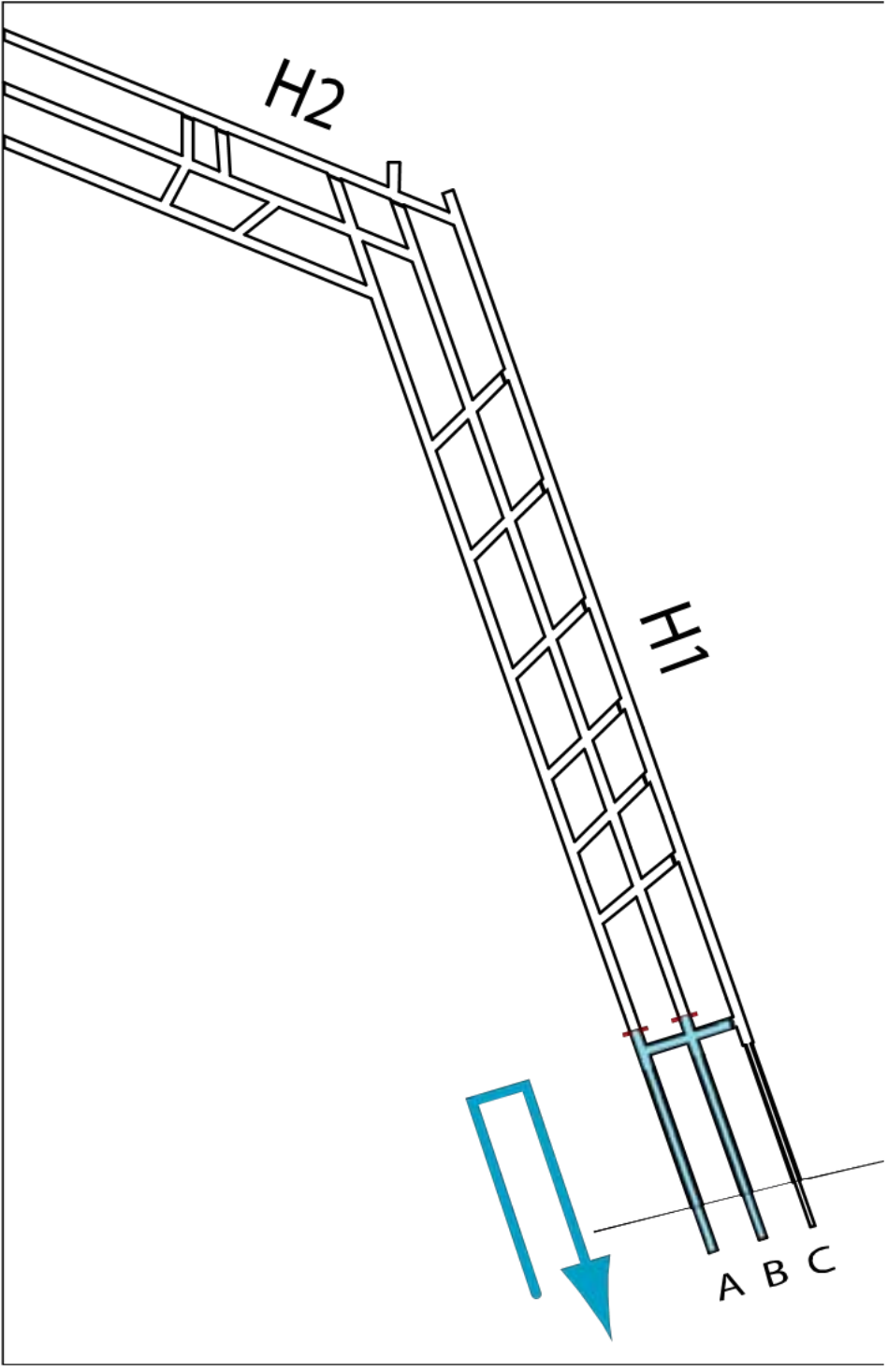
Re-entering the mine

- Through the mine from the glacier
- Through the tunnel

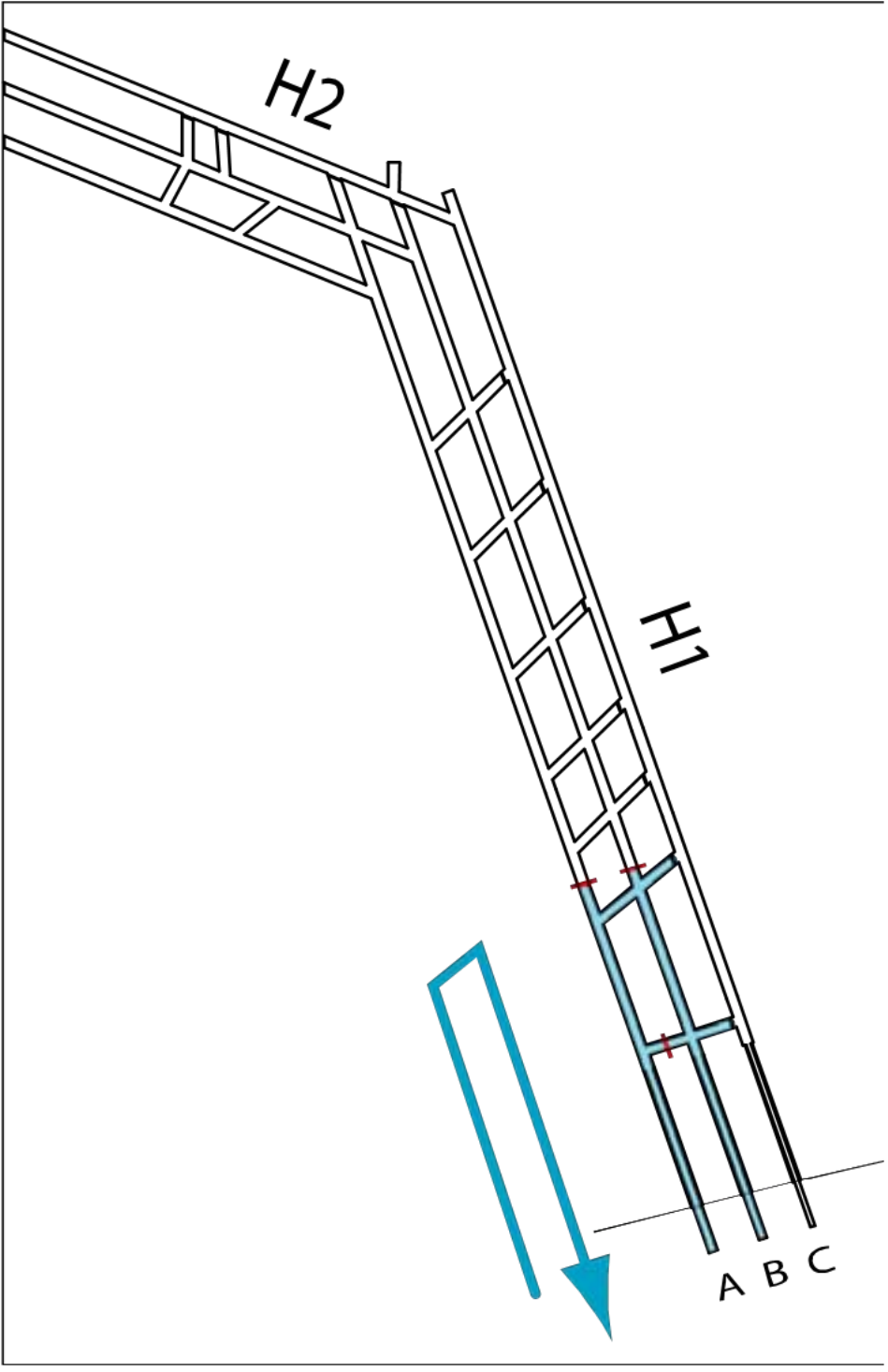


Tekst

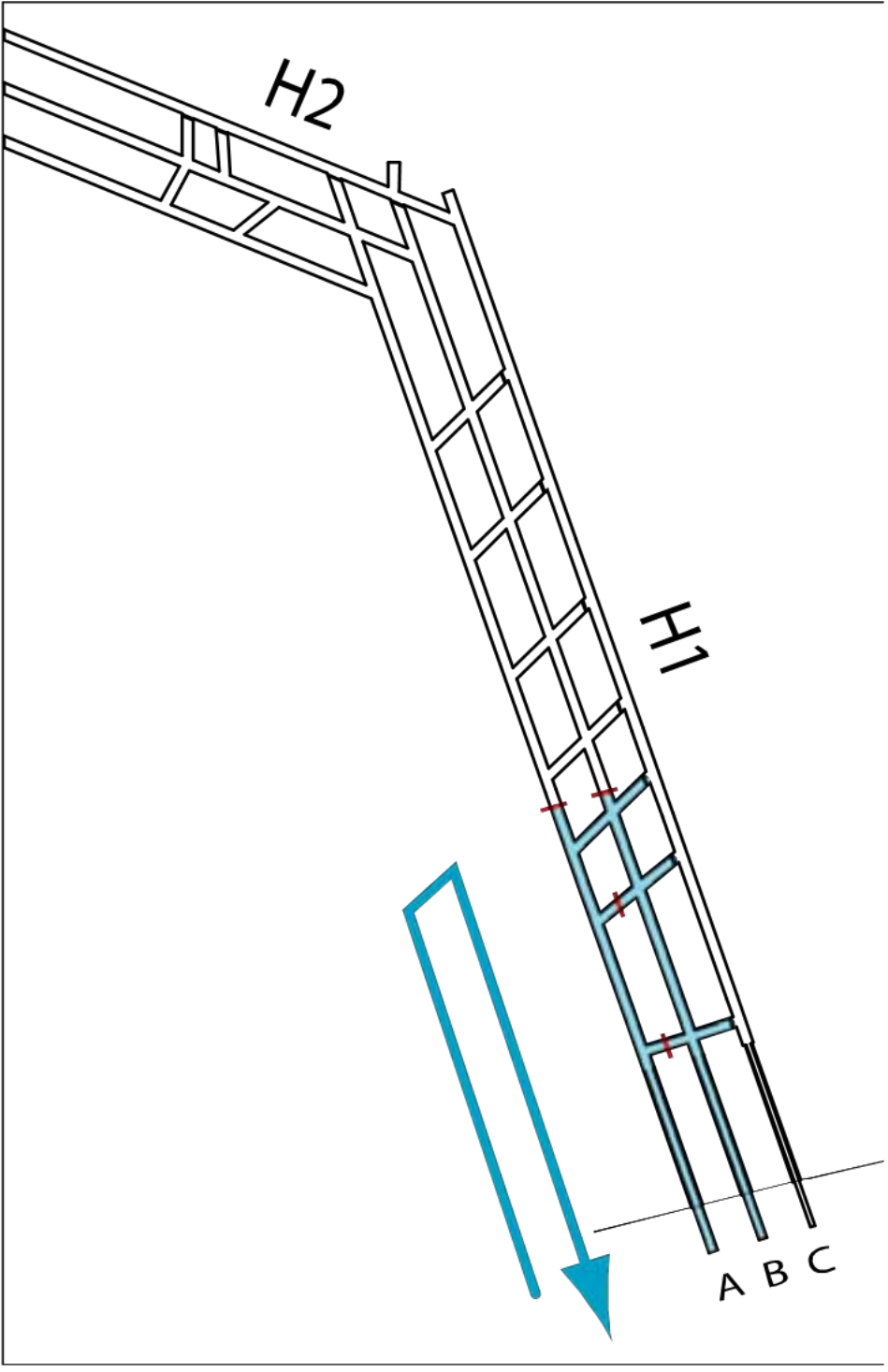
- Re-entering through the mine
- Establish fresh air base outside the mine entrance
- Establish watersuply



- Enter through A and seal off A and B inside crosscut 1
- Return air out B
- Checking the entered area for hot spots and securing it against rock fall.



- Same procedure
- Some minor rockfalls
- Much humidity in the air
- Waterdams on the floor



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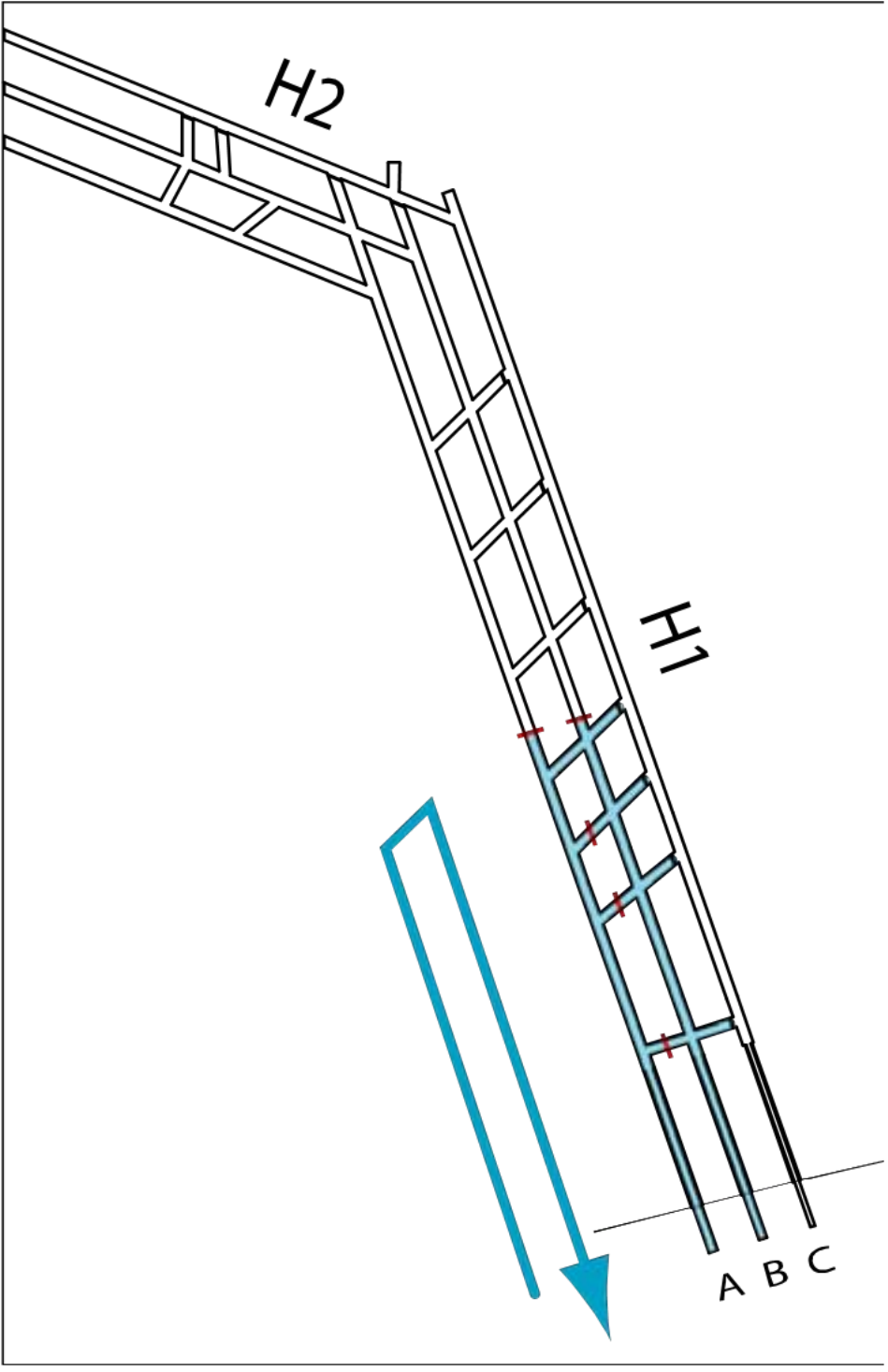
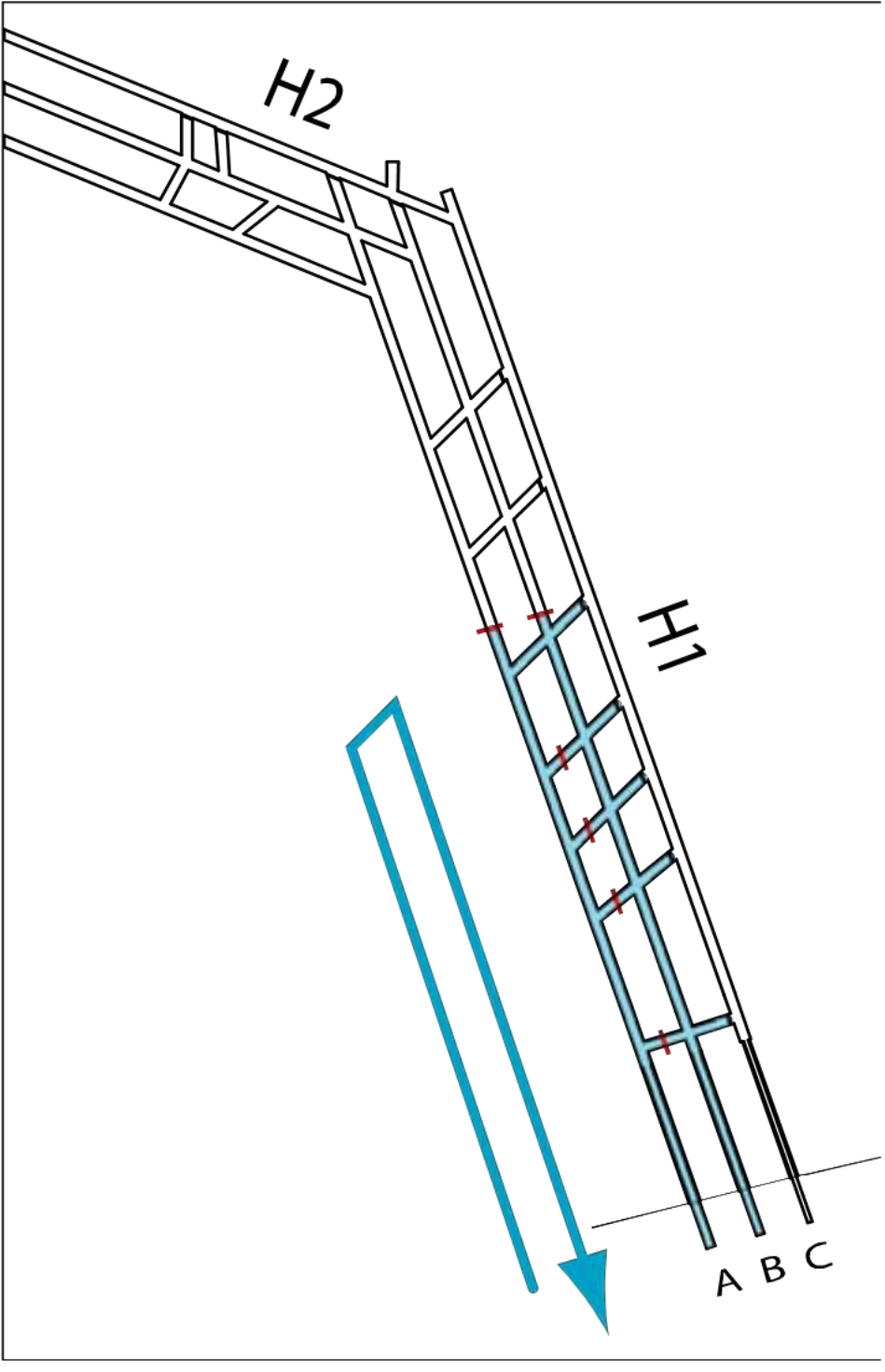
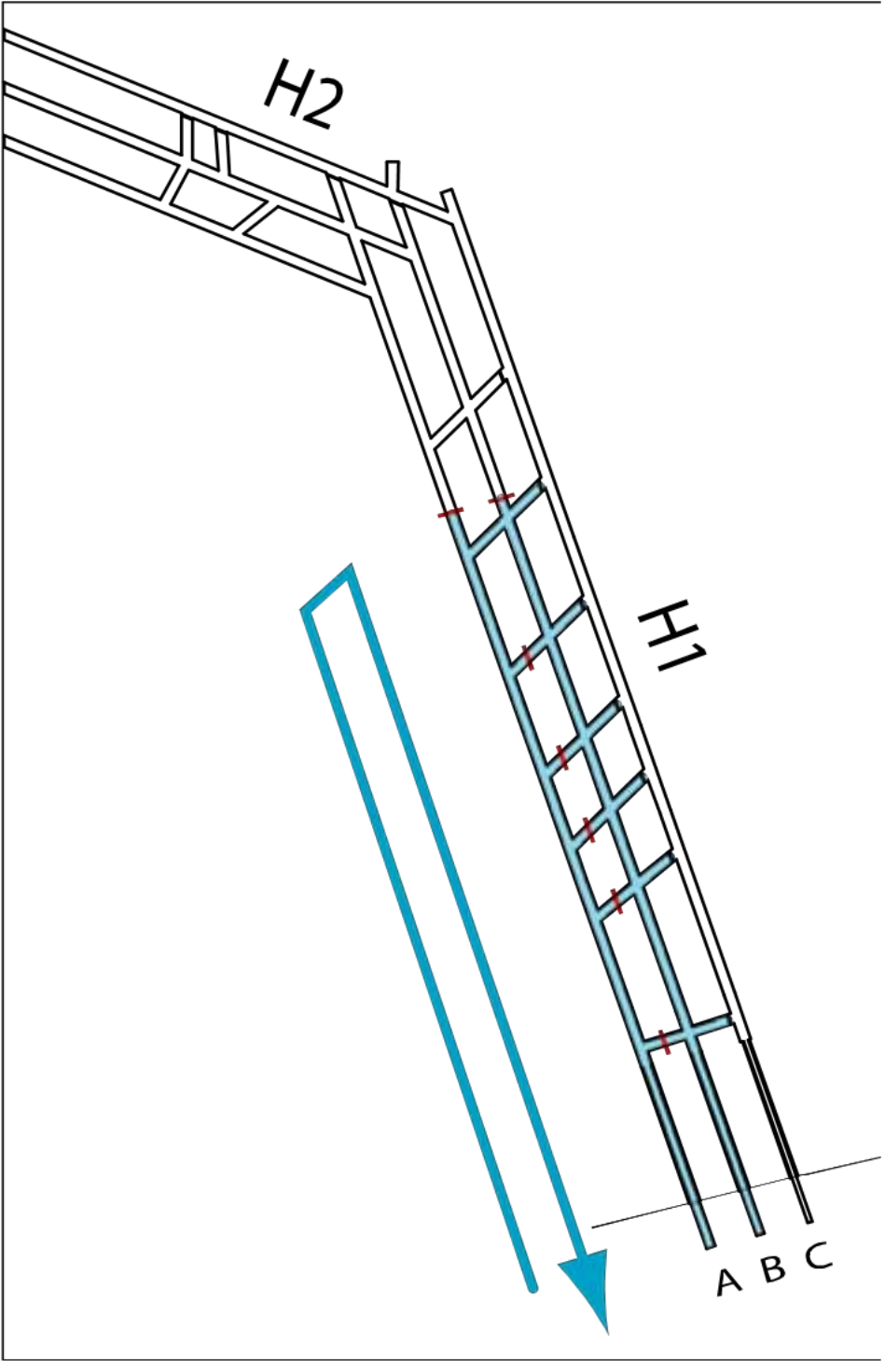
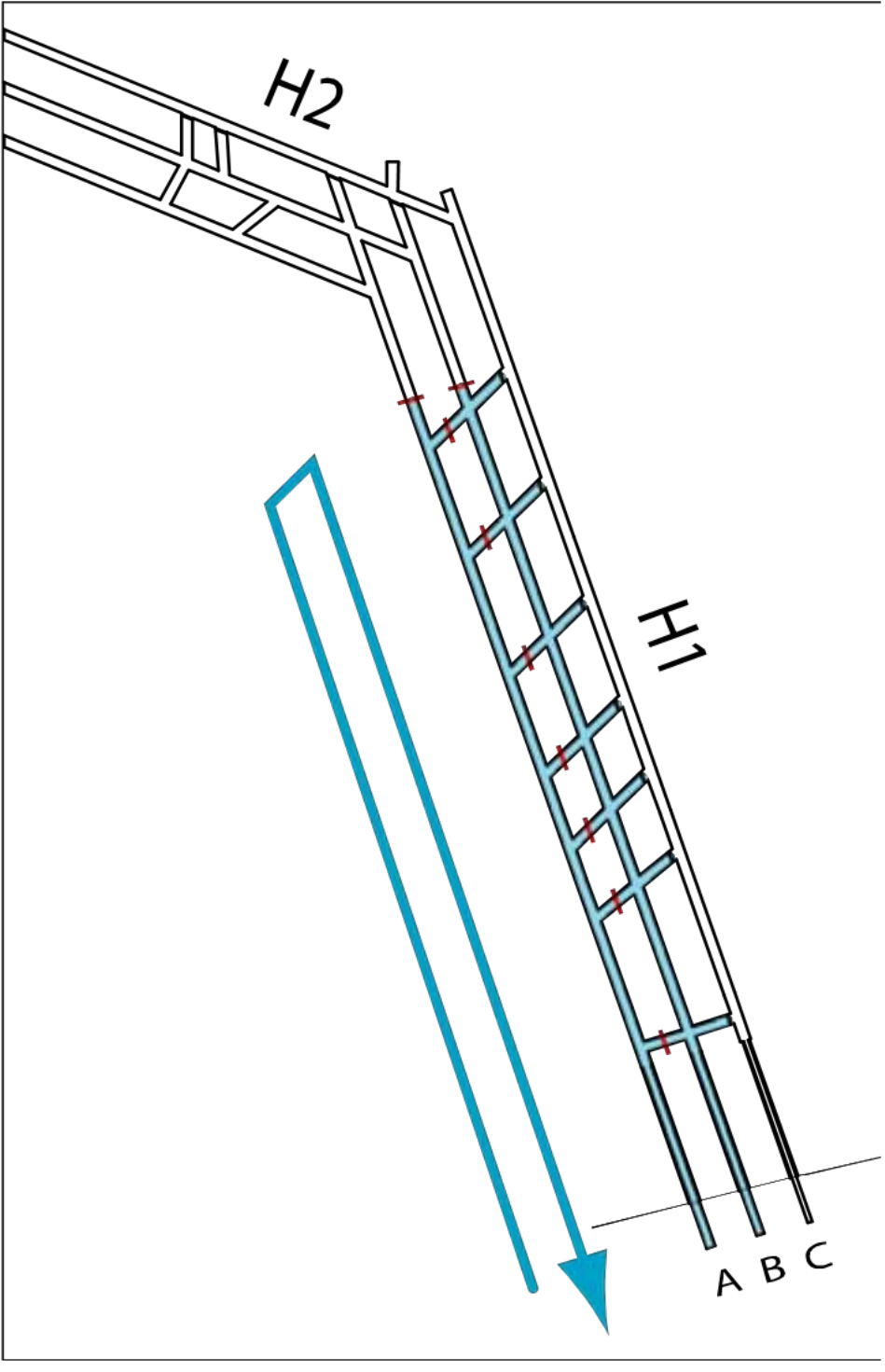
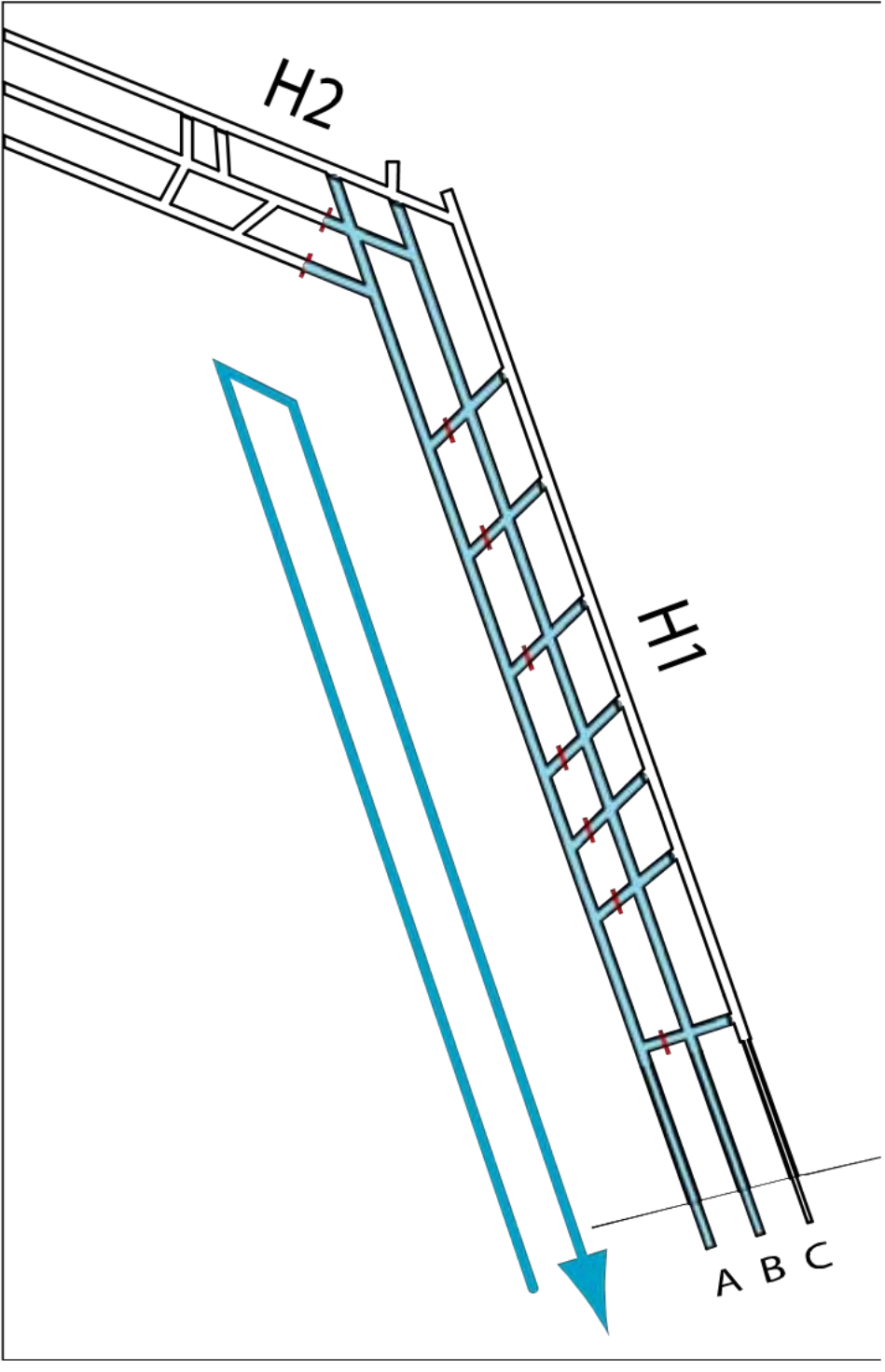

H2
H1
A B C

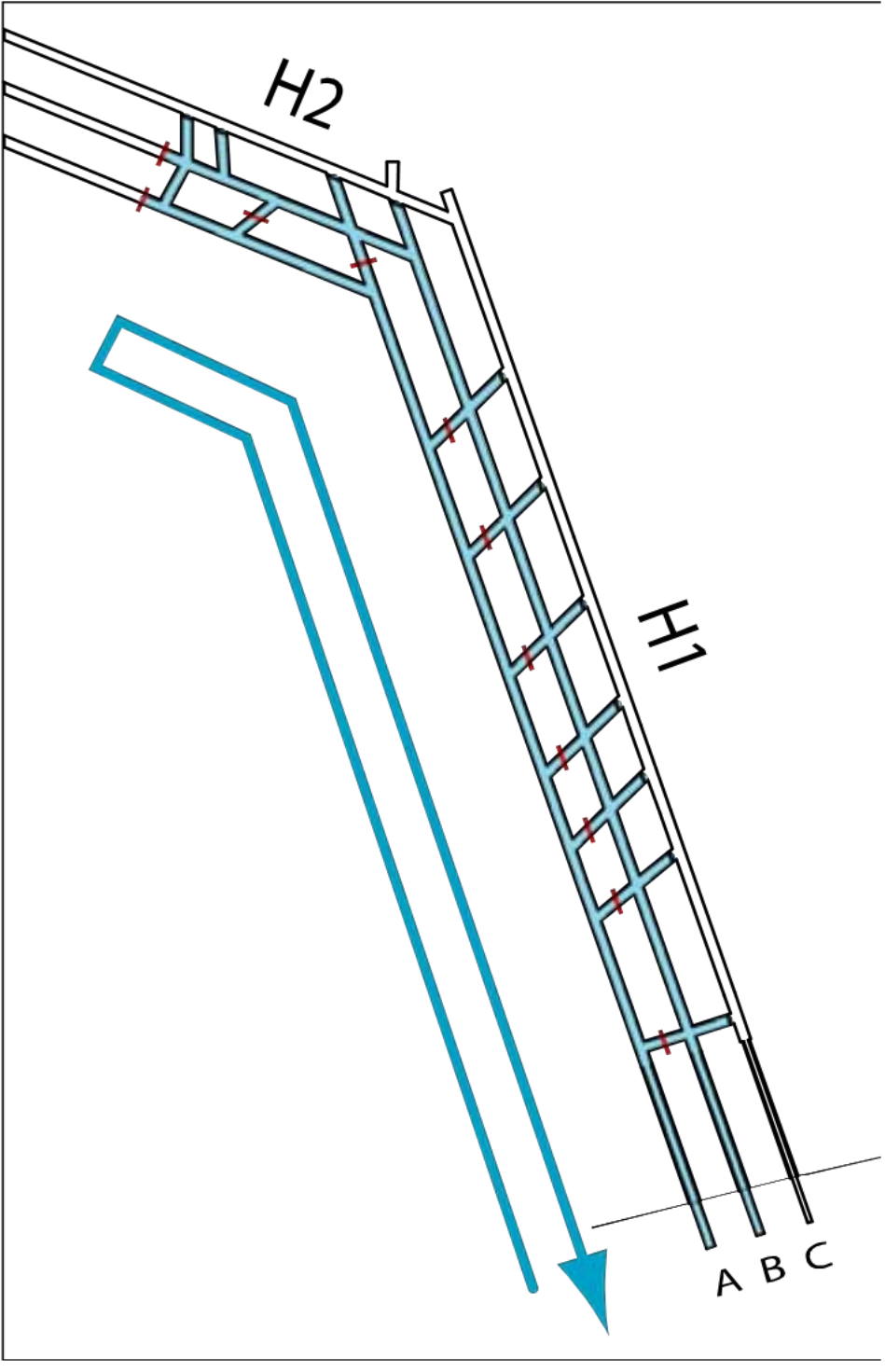

H2
H1
A B C


H2
H1
A B C

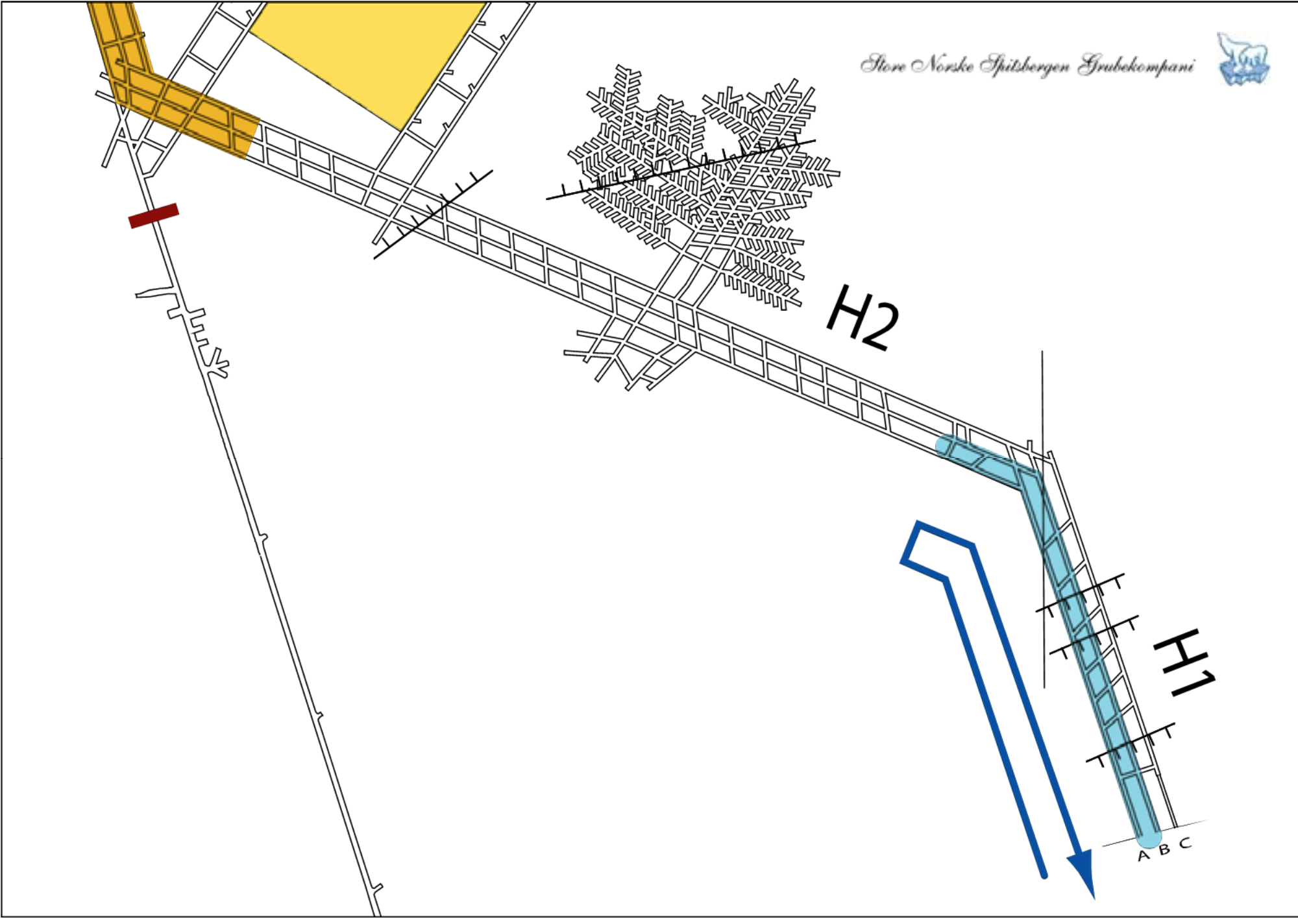

H2
H1
A B C



- So far everything OK in A and B

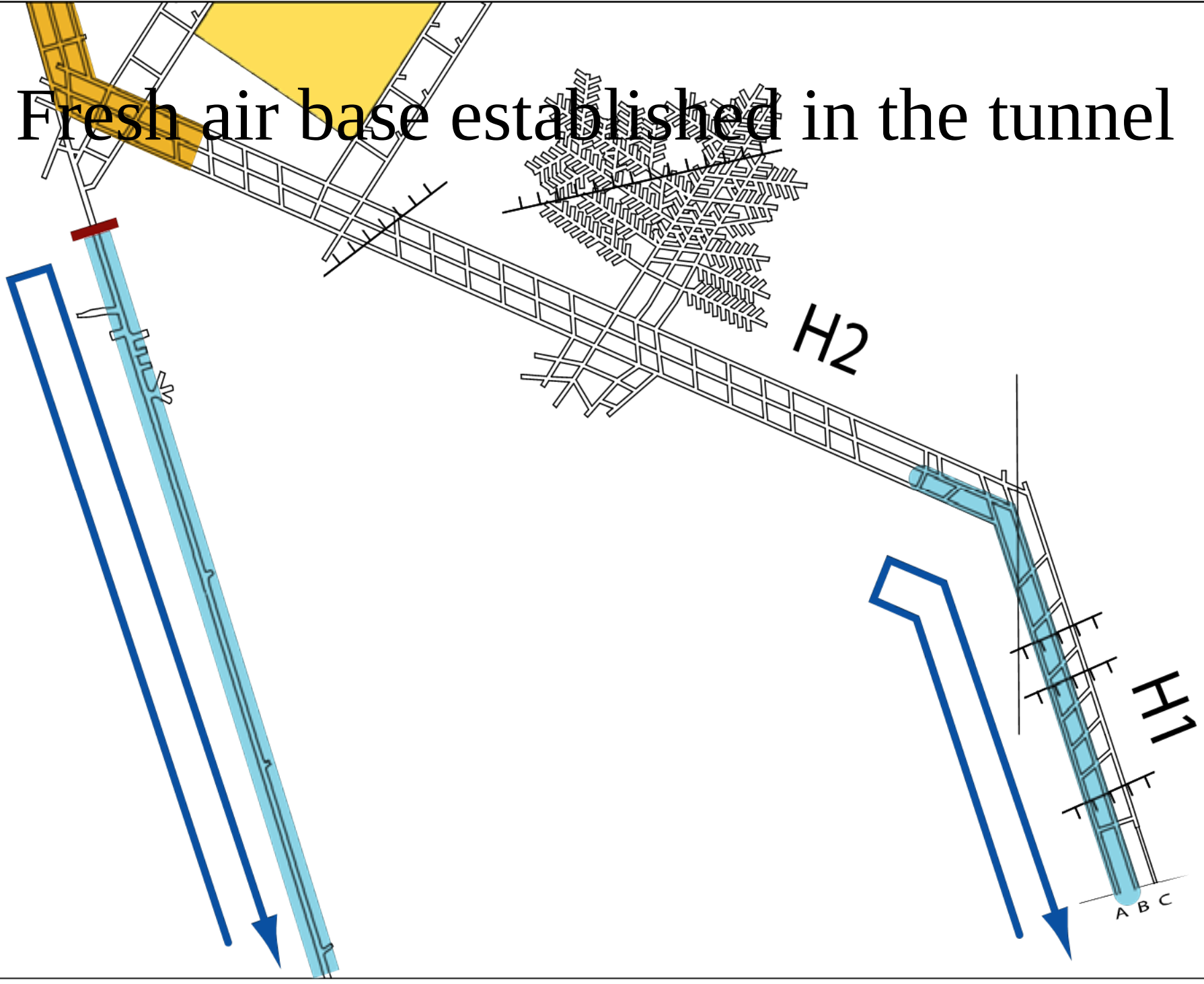


- Water in A and B stopping the re-entering this way
- Establishing pumps to get the water out

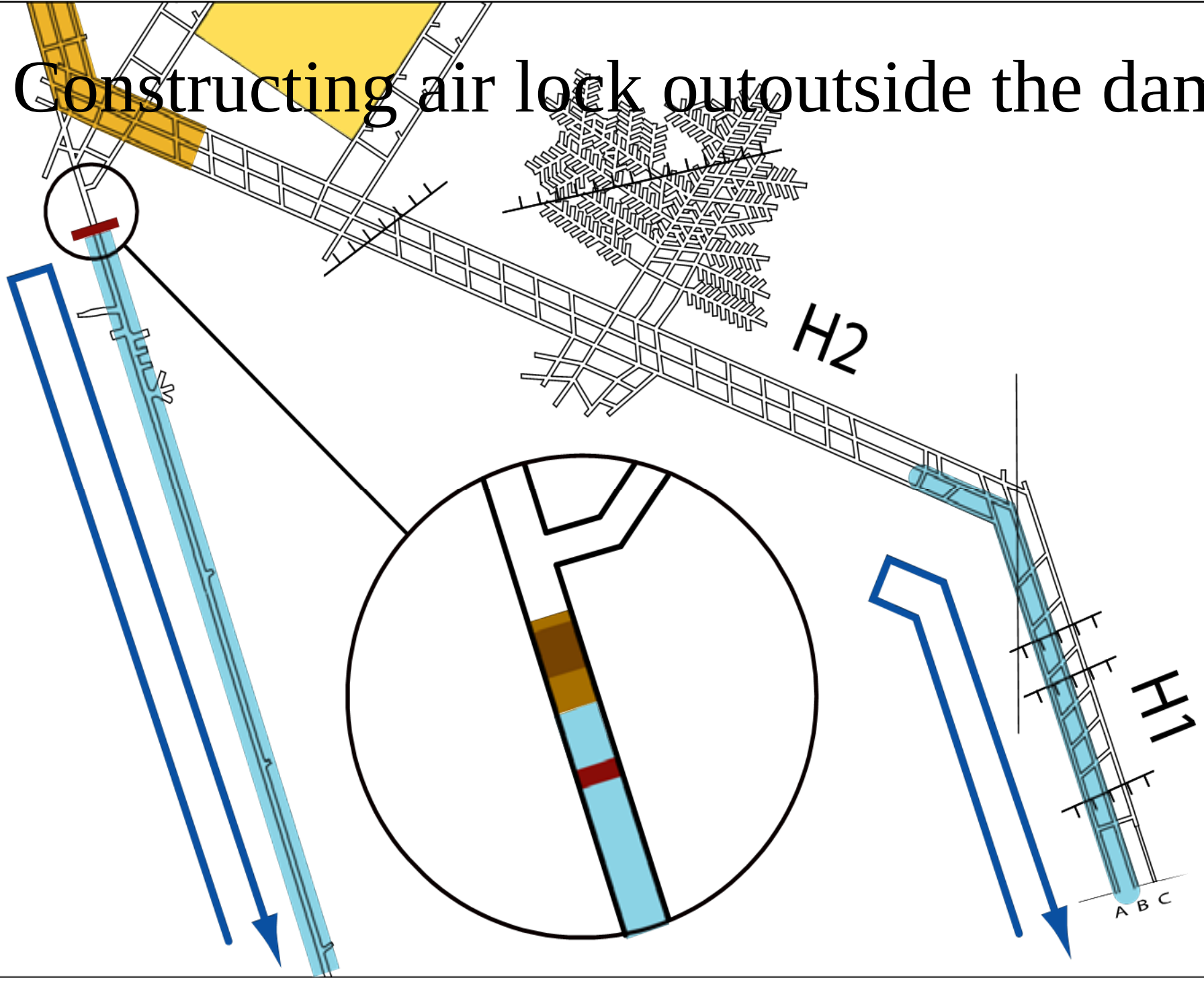

Store Norske Spitsbergen Grubekompani
H2
H1
A B C

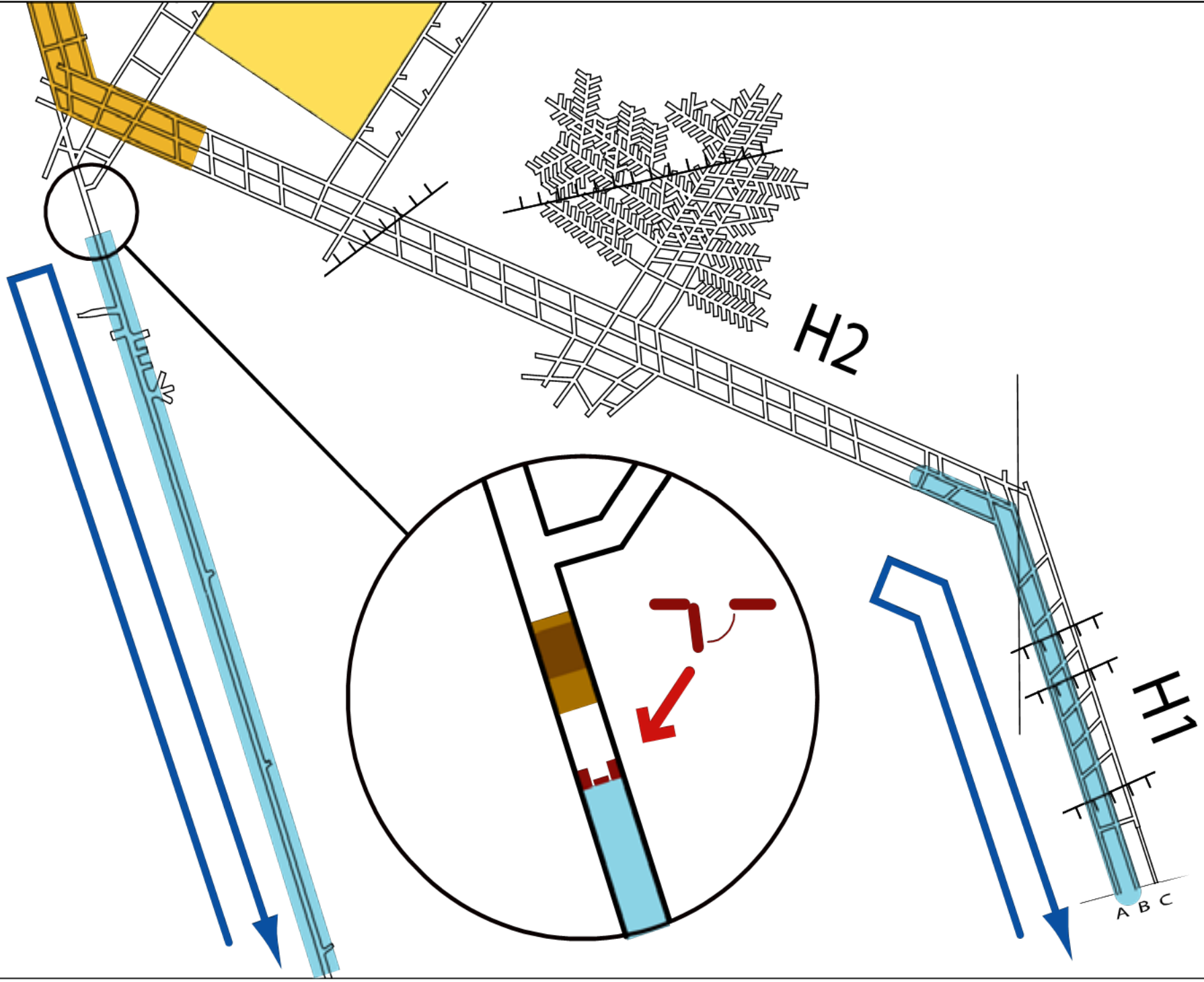
Re-entering through tunnel

Fresh air base established in the tunnel

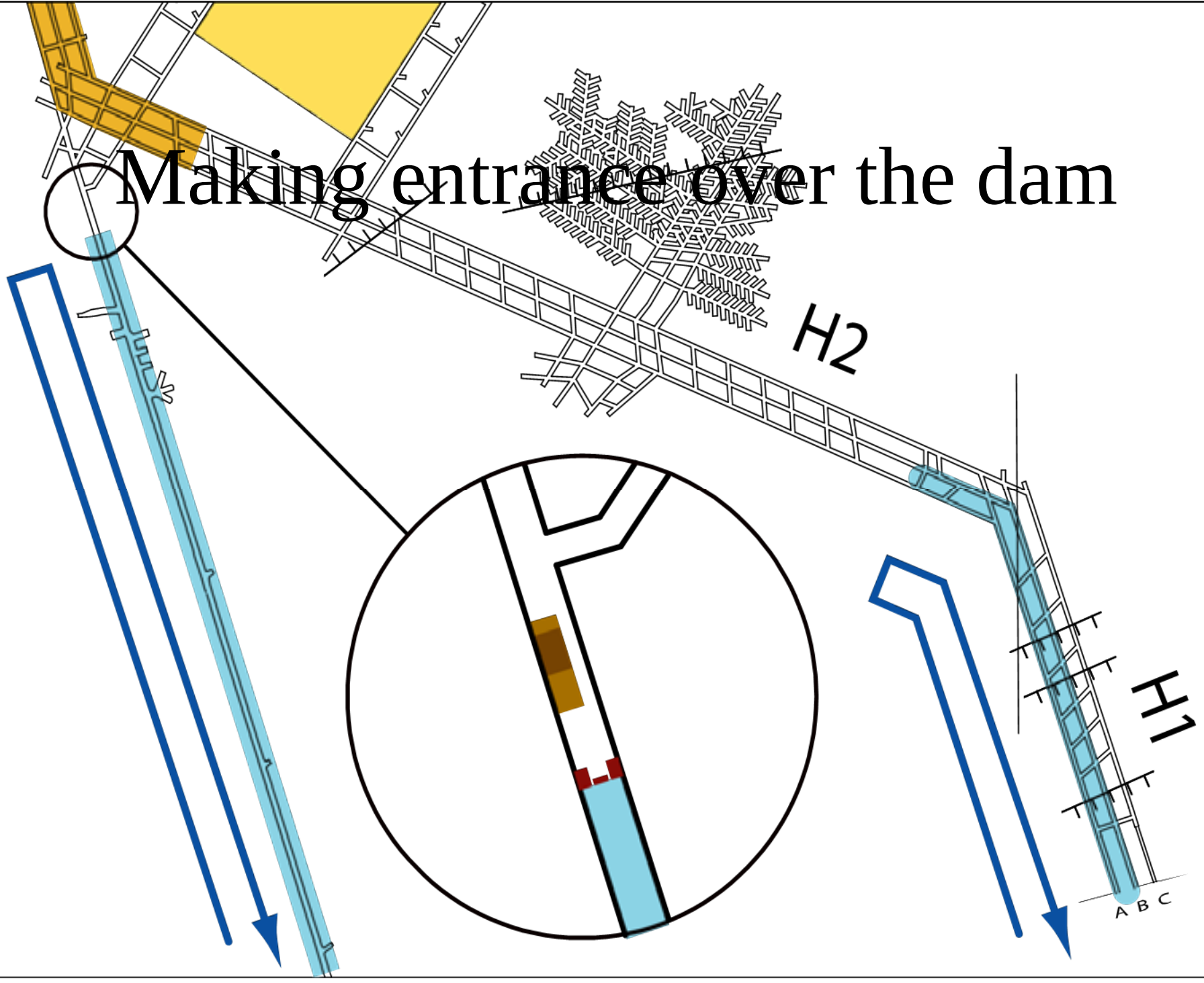


Constructing air lock outoutside the dam

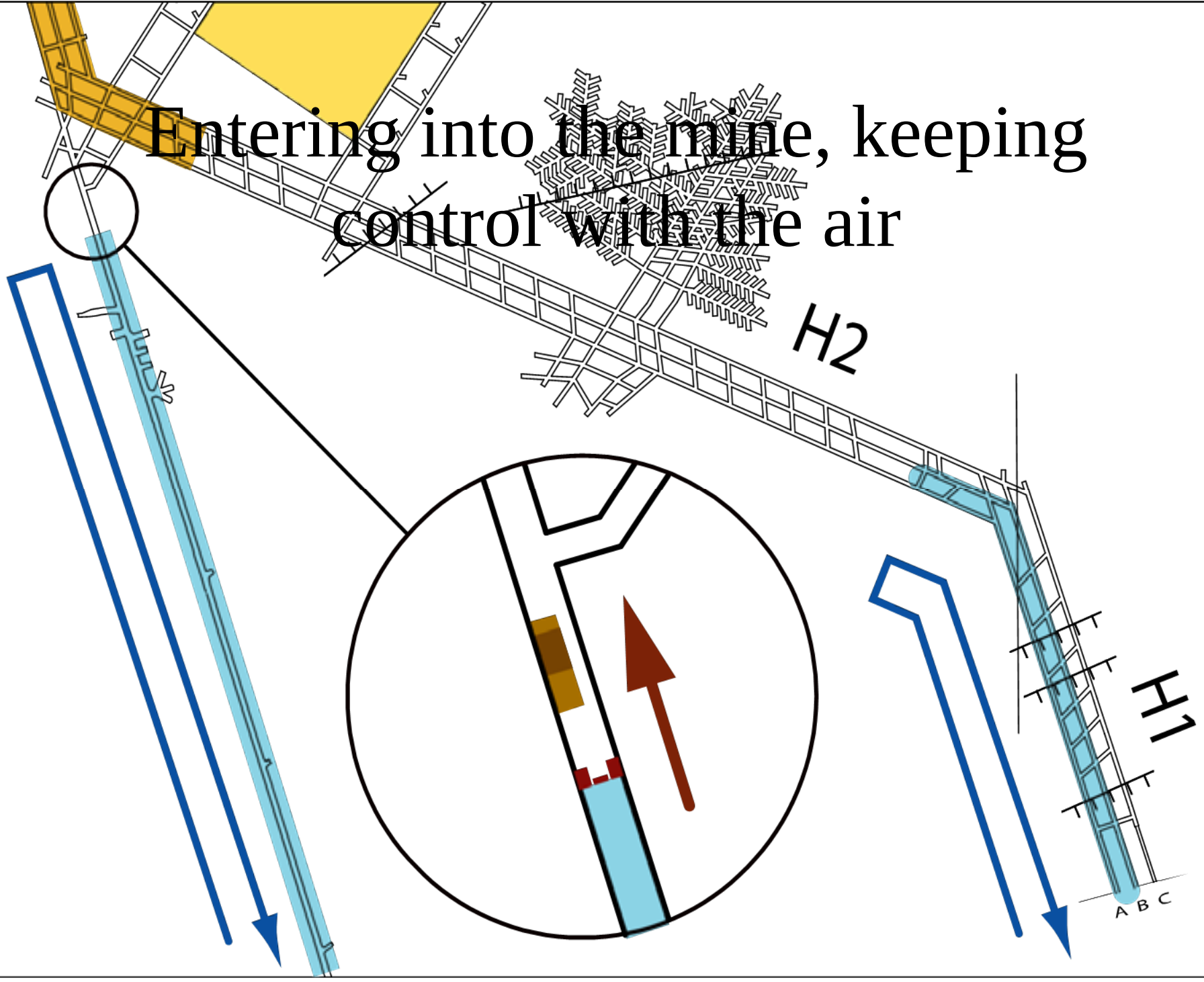


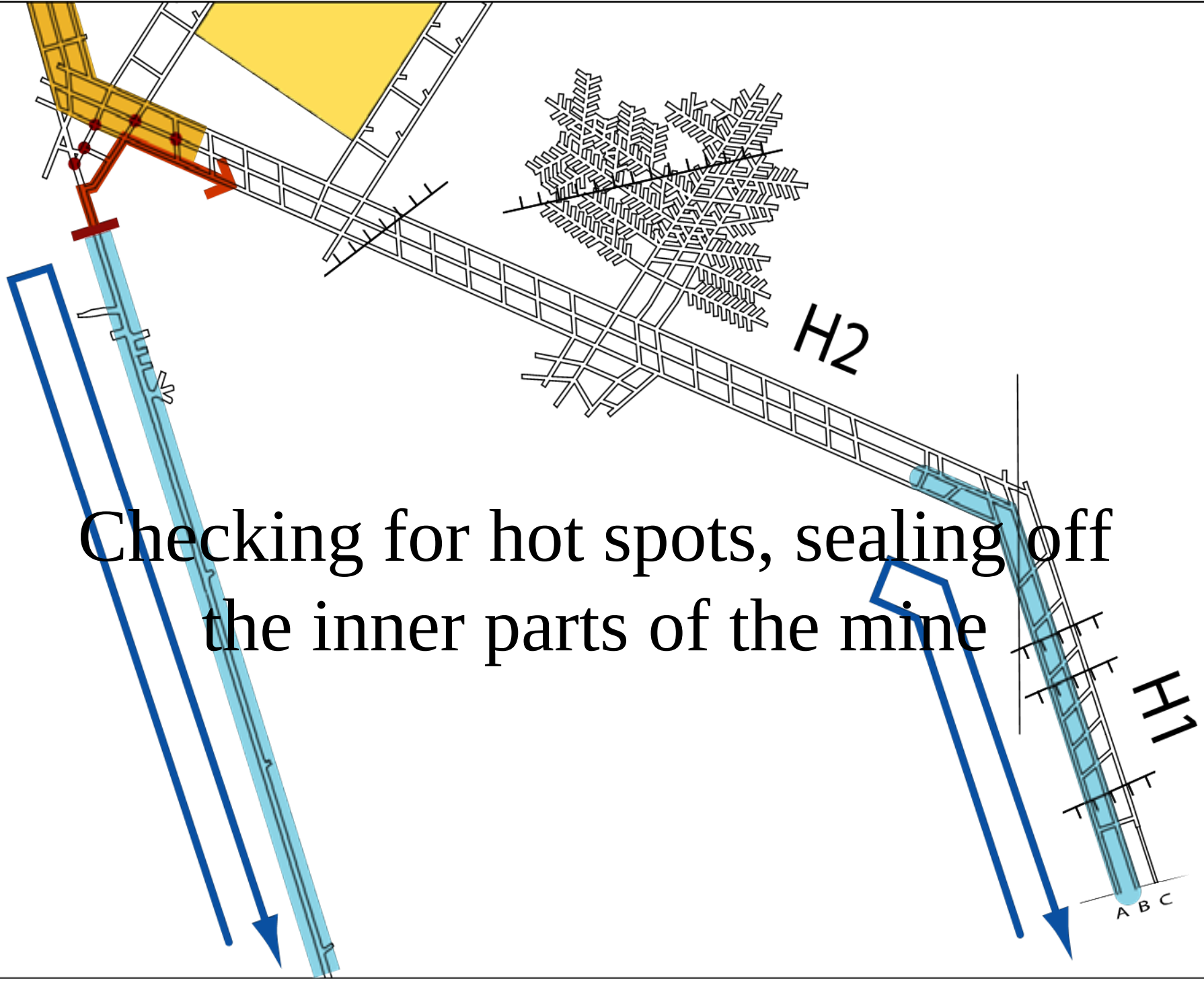

H2
H1
A B C

Making entrance over the dam

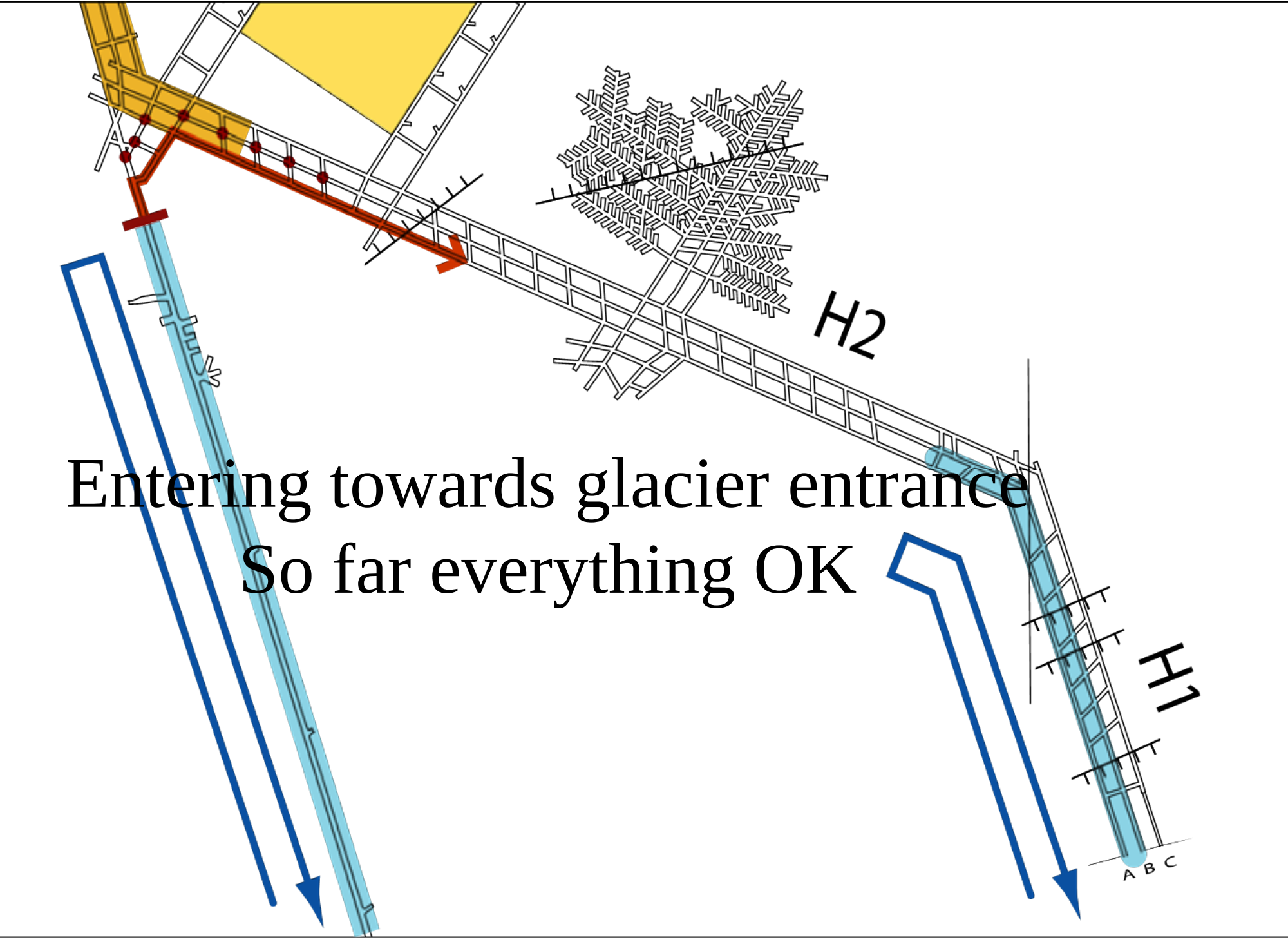


Entering into the mine, keeping control with the air



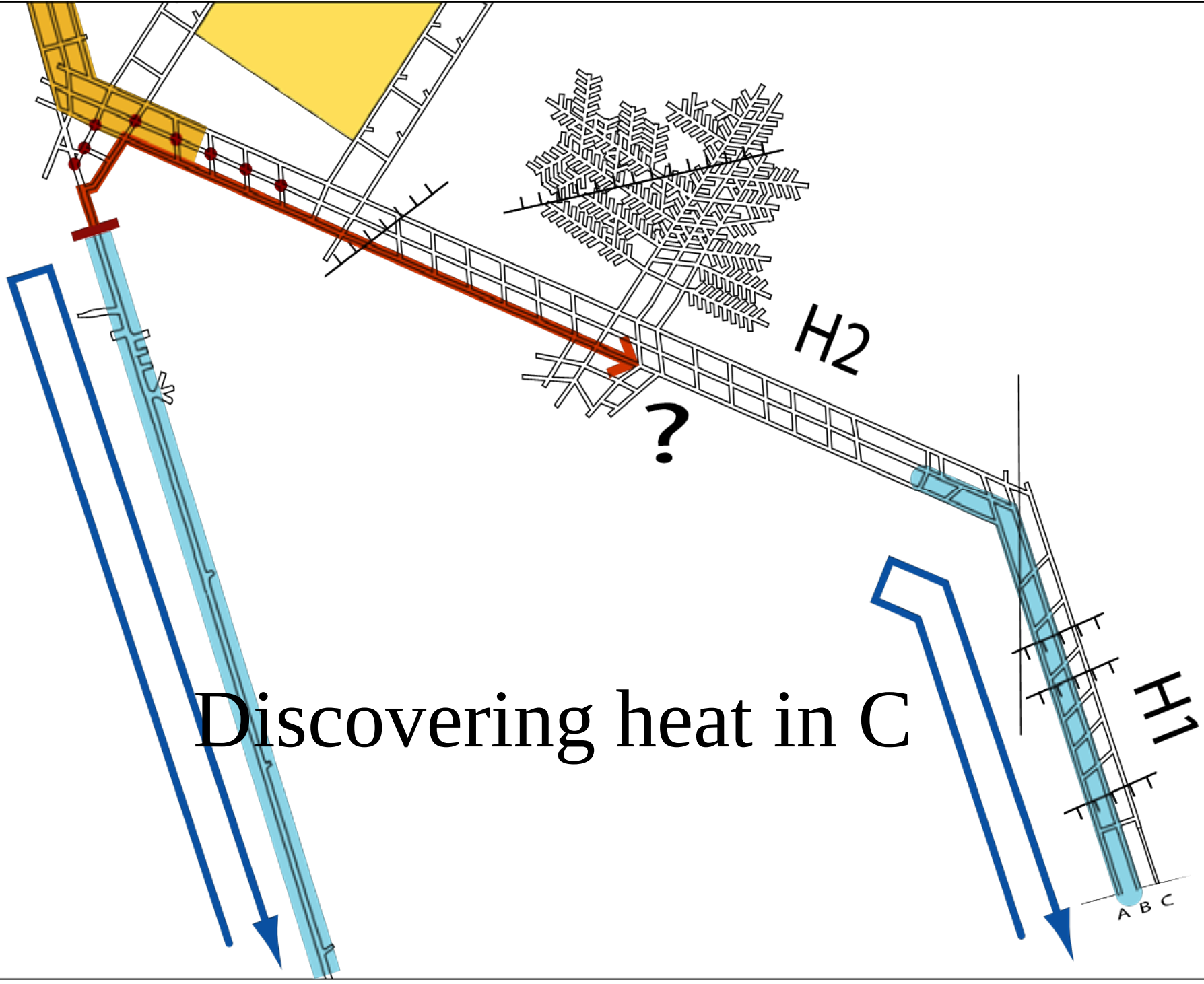


Checking for hot spots, sealing off the inner parts of the mine



Entering towards glacier entrance

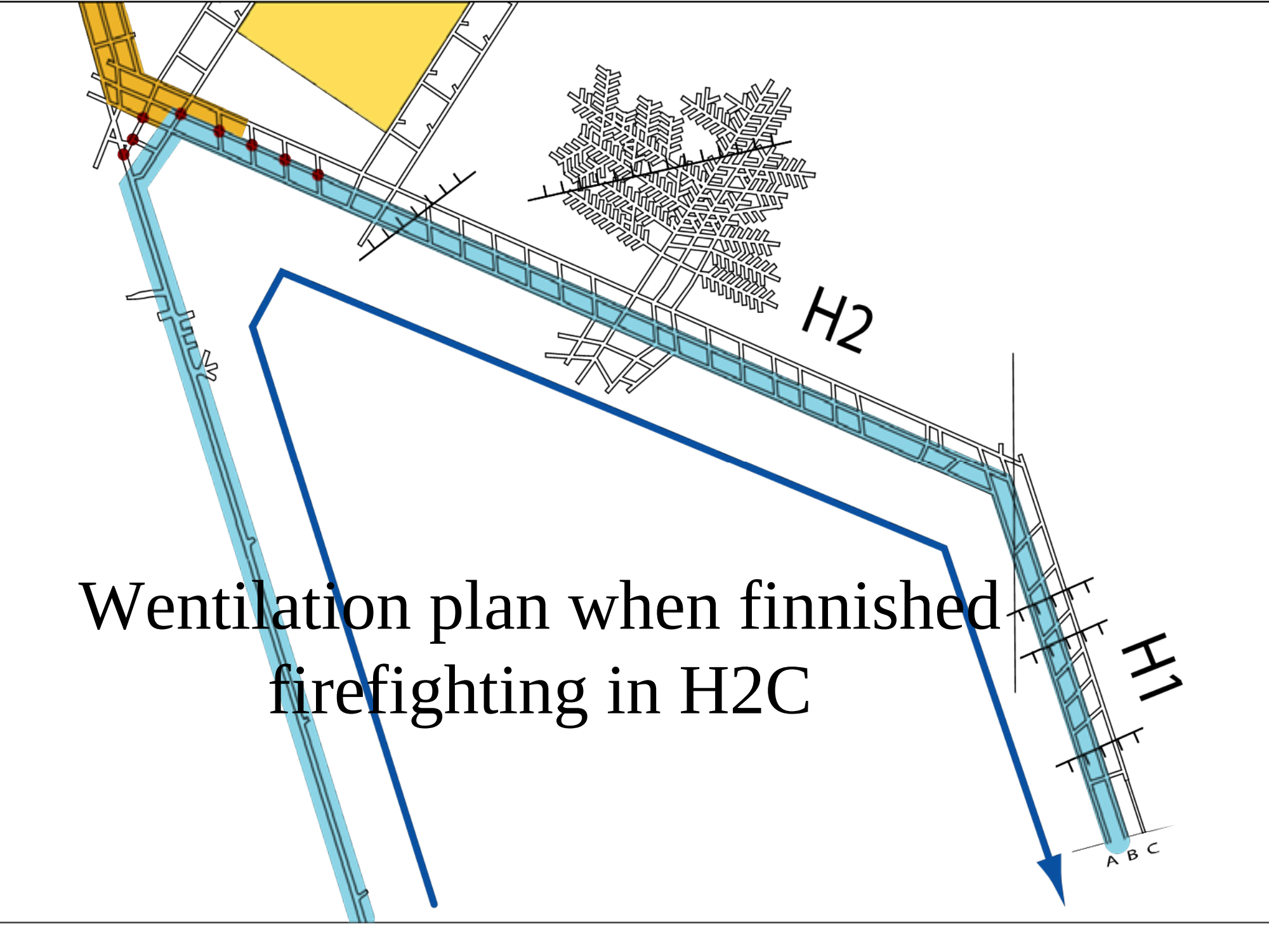
So far everything OK



Discovering heat in C

Situation now

- Fire-fighting from crosscut 25 to 14 in H2
- Lanses with watersupply put through all walls in the crosscuts between B and C too control the fire
- Building dams in every crosscut from 25 to 14

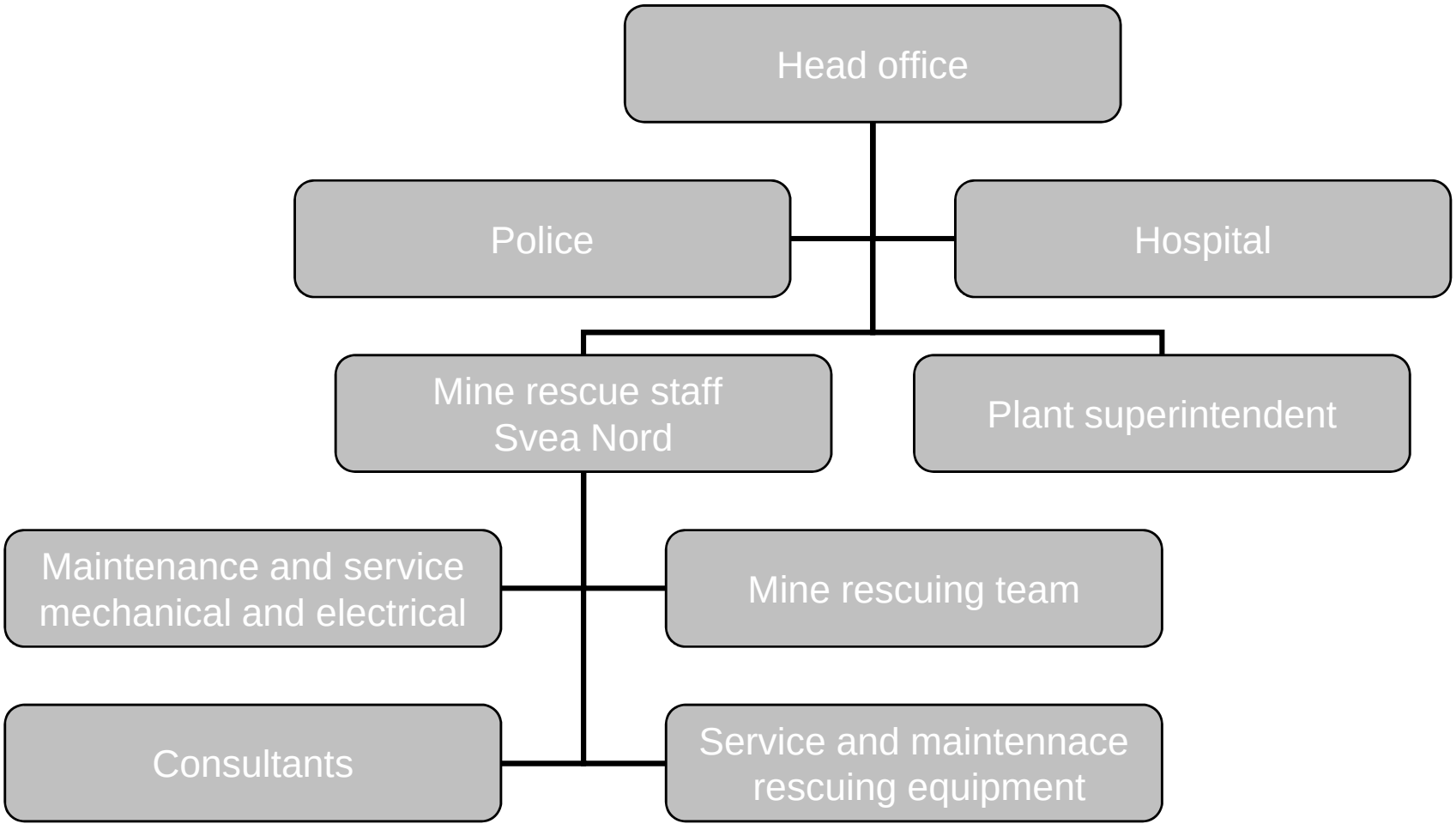


Wentilation plan when finnished firefighting in H2C

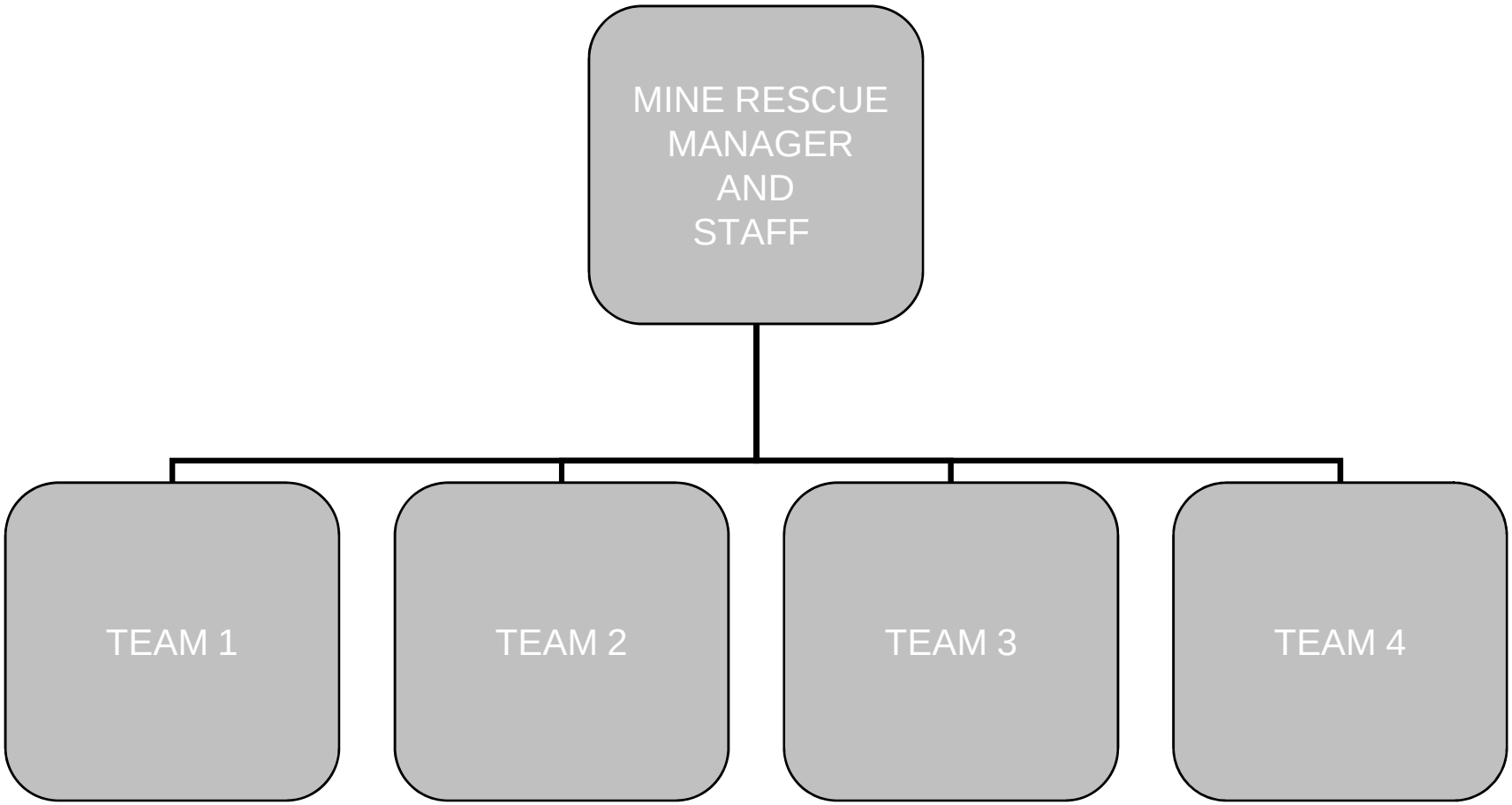
The effort

- Has gone on for about 2 months
- Will probably go on until christmas

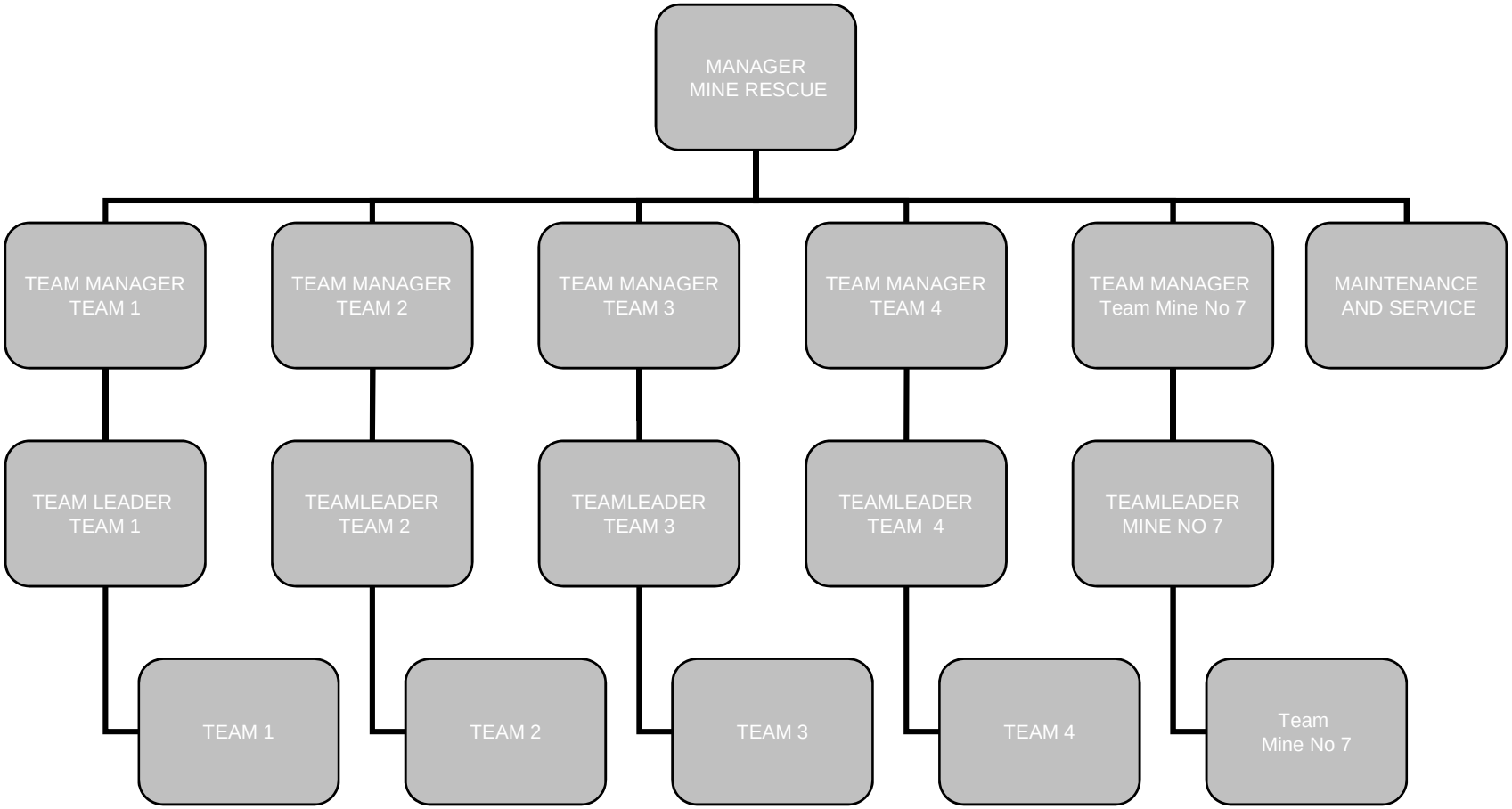
RESCUE ORGANIZATION



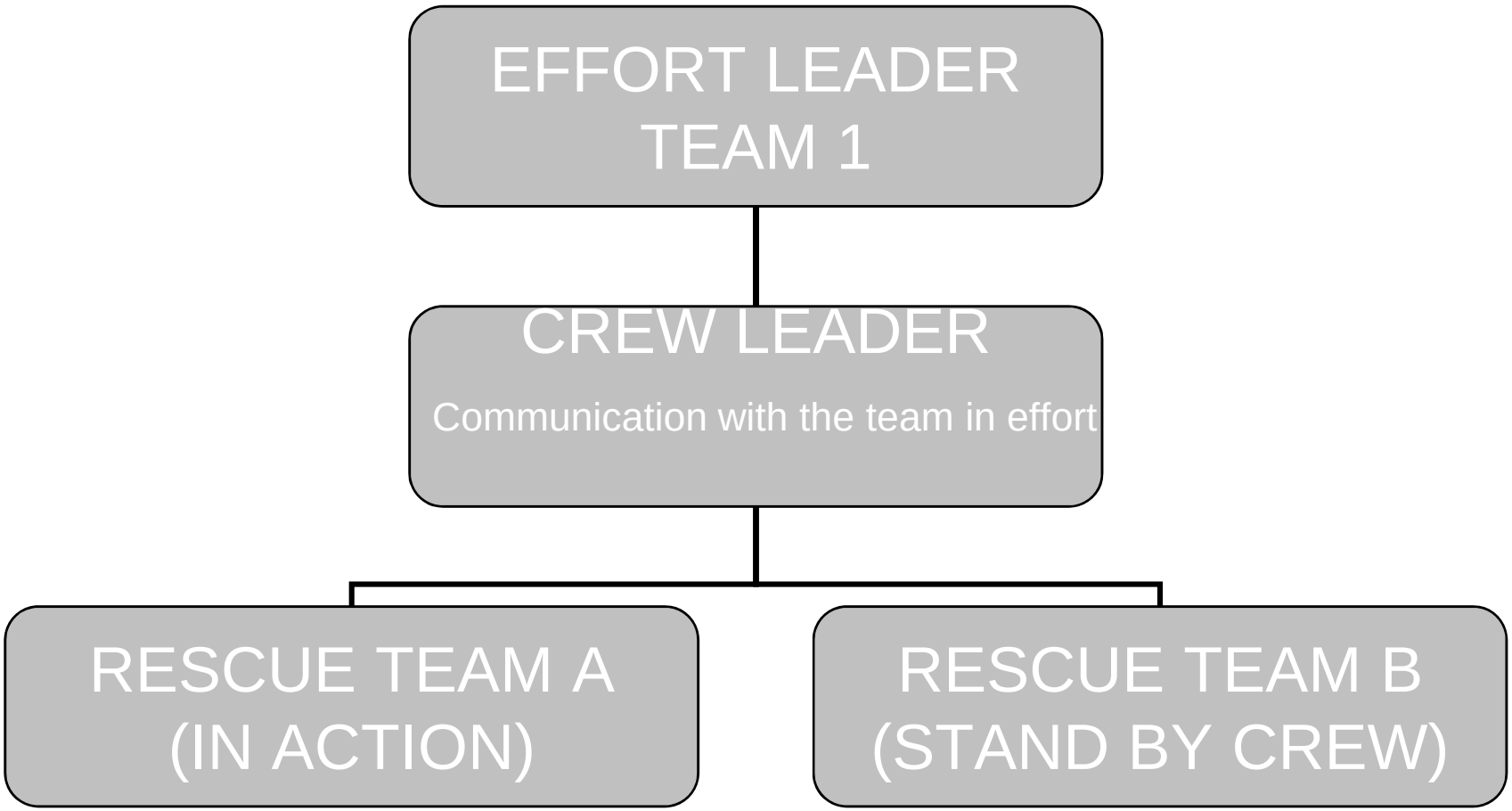
RESCUE ORGANIZATION



MINE RESCUE TEAM ORGANIZATION



FRESH AIR BASE



The Mine Rescue Team

- 1 Manager
- 21 Effort / Teamleaders
- 51 Rescue crew
- 6 Maintenance

Demands and training for the crew

- Intereview
- Physical test
- Medical test
- 5 days basic training
- 3 days first aid training
- 4 times with practice
- 3 days additional training for the leaders

The working period for the rescue teams

- One week in Svea, working 7 days.
- One week off.
- 12 hour shifts.
- 2 periods of effort each up to 2 hours.
- 2 periods standby service at fresh air base.
- Resting and eating outside the mine.
- Control by nurse ore doctor if needed after each shift.

Mine rescue equipment

- 2 dedicated vehicles
- 3 sets complete clothing to all the members
- 62 PSS BG4
- 30 PSS 90 and 100
- 40 BG 174 (reserve)
- 40 Pac Ex (methane and oxygen)
- 12 X-am 7000 (multigas measuring instrument)
- 5 Multiwarn 2
- 4 kits m-Comm communication (each 1 base unit, 3 handsets and 2 km wire)

Special challenges

- Logistics
  - Long distance to the shop.
  - Special equipment with long time of delivery.
  - Large consumption of equipment critical to the effort
    - Using up to 50 CO2 absorbers a day, we have used 2000 at 1th November and will have used 5-6000 before Christmas.
    - Drager makes normally 80 a day and about 10000 a year and we have got all their stock.

Special challenges

- Maintenance the equipment
  - Service personell from Drager every week
  - Training of more personnel for maintenance
- Training of more personnel to the rescuing teams


ACL

Fresh air base in the tunnel

Fresh air base, communication with the rescue team


Stand by crew

Fresh air base, PSS BG4

Fresh air base; charging station

Tove is testing the BG4 and all other breathing apparatuses and masks

Personal masks for all members of the mine rescuing teams (about 75 masks)


40 Pac Ex
Dräger
Pac Ex 2
OK
Methan / Methane


acer
V771

REGISTRATION OF THE USERS OF ALL EQUIPMENT


FINN SOLVANG A/S
5 MULTIWARN II


30 PSS 90 and 100


OXYGENPUMP
Dräger
N
Dräger


Charging, service and testing gasmeassuring devices

The workshop with Otto and Willy


62 BG4

ICE PRODUCTION


20-50 CO2 ABSORBERS A DAY


12 X-am 7000


Training the mine rescuing team
outside the mine can sometimes be a
challenge


THANK YOU FOR YOUR ATTENTION !