

# Railbelt Large Hydroelectric

House Energy Committee – Karahnjukar Hydroelectric Project;  
Federal Energy Regulatory Commission Licensing

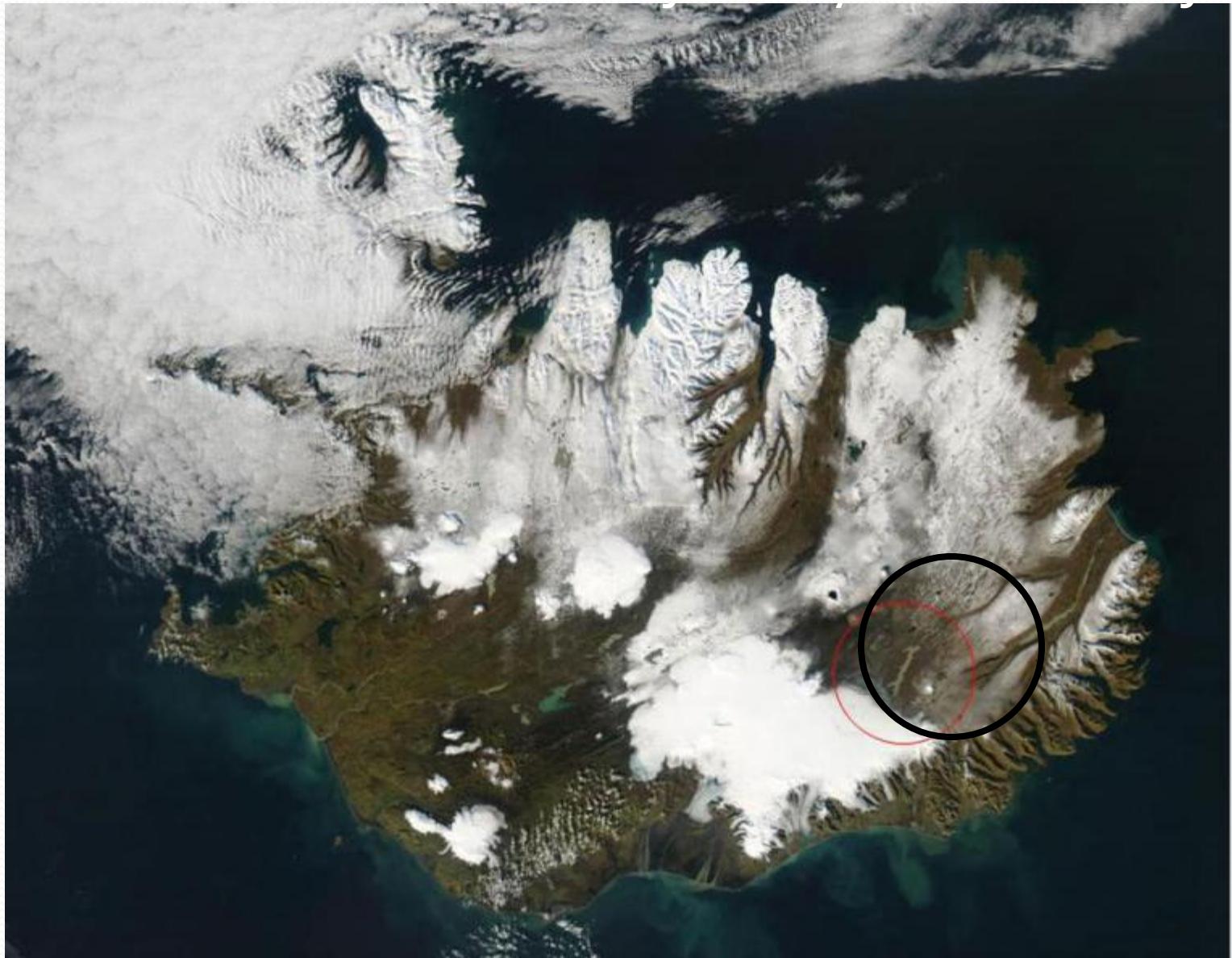
Prepared by Alaska Energy Authority 2/17/2011



# Kárahnjúkar Hydro Project



# Project Location - Iceland



# The Source – The Glacier

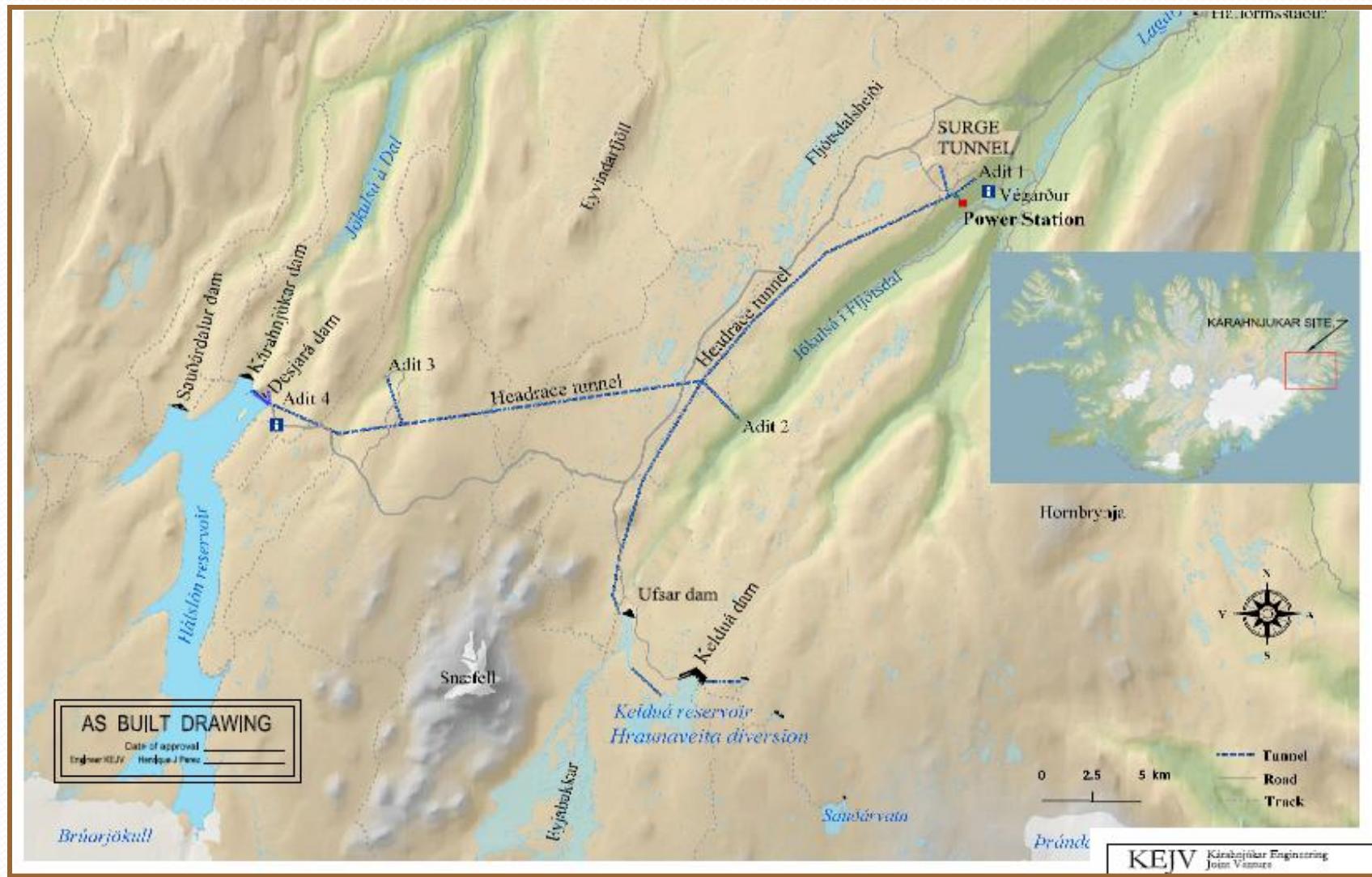


# Háslón Reservoir, 2007



Inlet capacity	6x115 MW
Gross head	600 m
Energy production	4.600 GWh/a
Rated discharge	144 m <sup>3</sup> /s
Drainage area	1.806 km <sup>2</sup>
7	7
á rahnjú kar dam:	-7,6 m
Le	200 m
	700 m
	625 m a.s.l.
Area	57 km <sup>2</sup>
Storage	2.100 GL
á dam:	Desjú8
	1.100 m

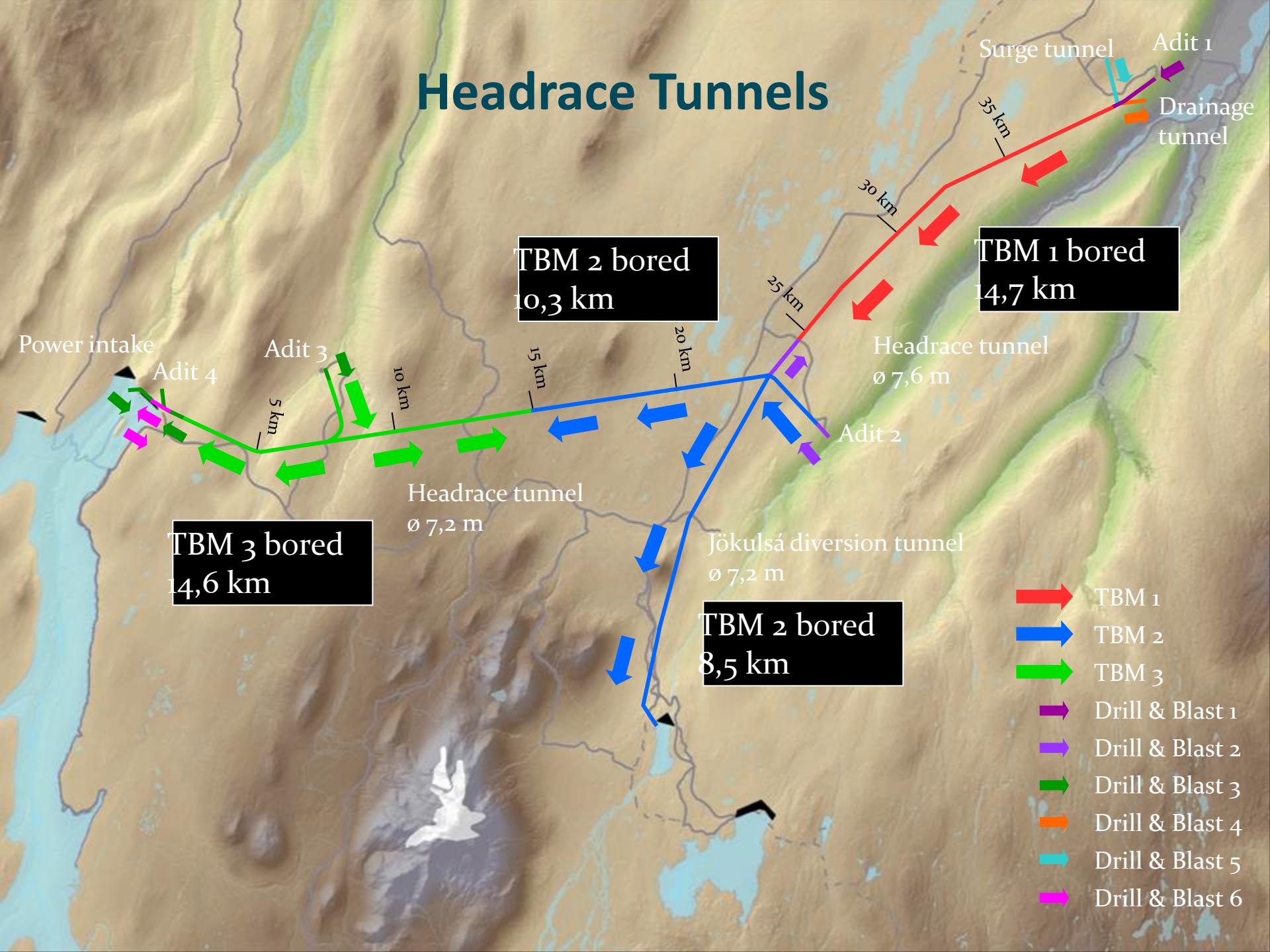
# Kárahnjúkar Hydro Project



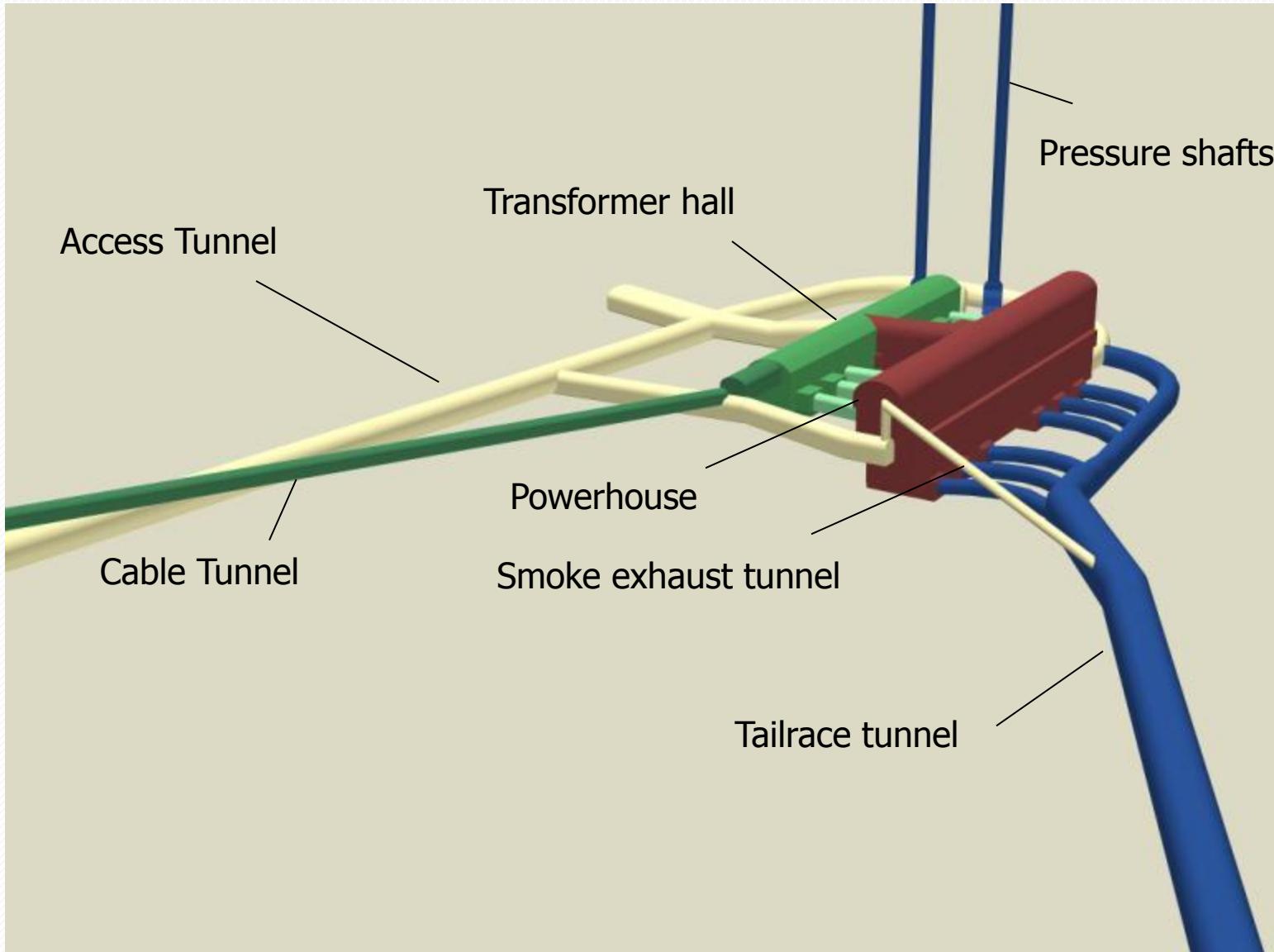
# Tunnel Boring Machine (TBM 3)



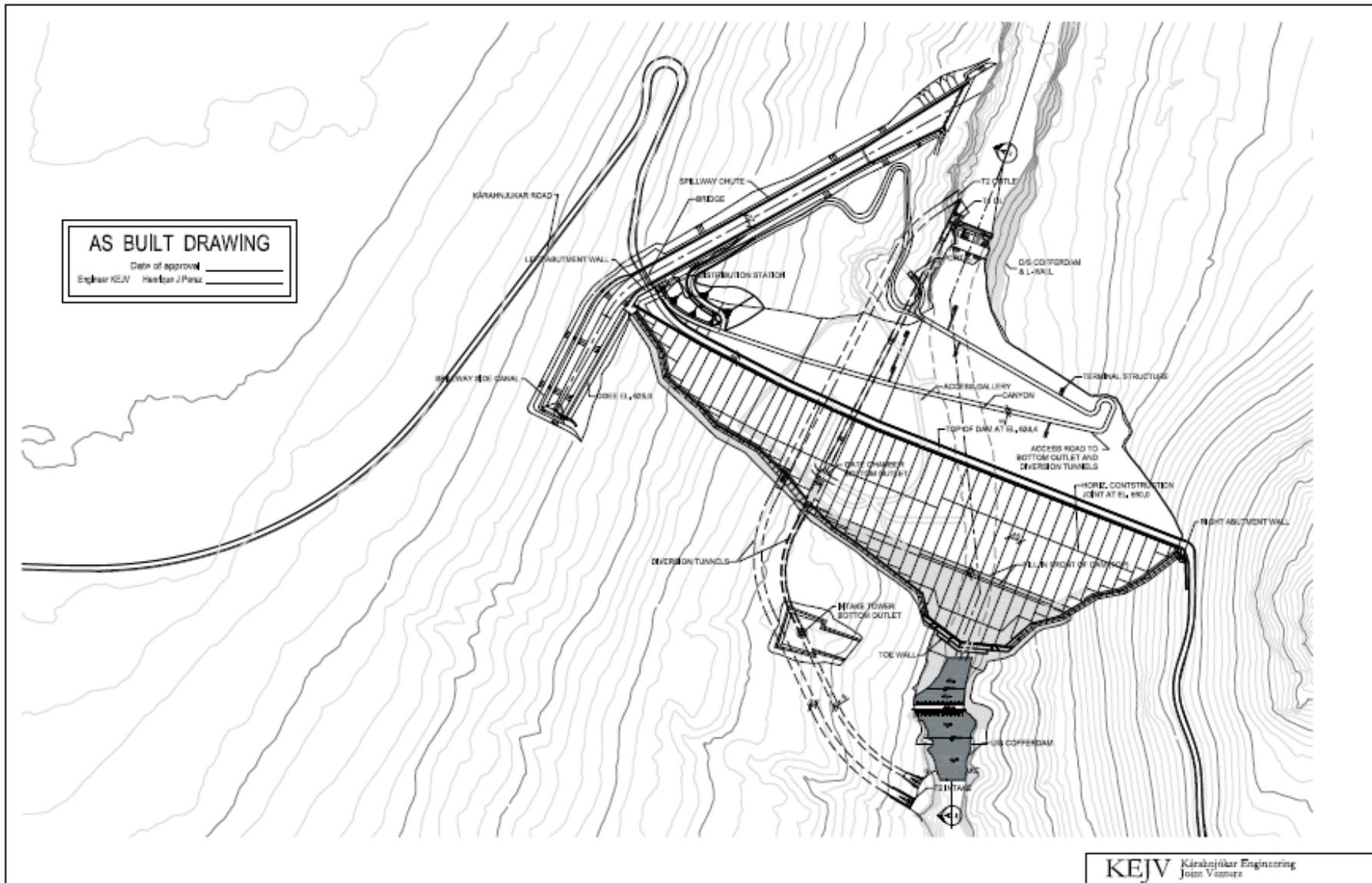
# Headrace Tunnels



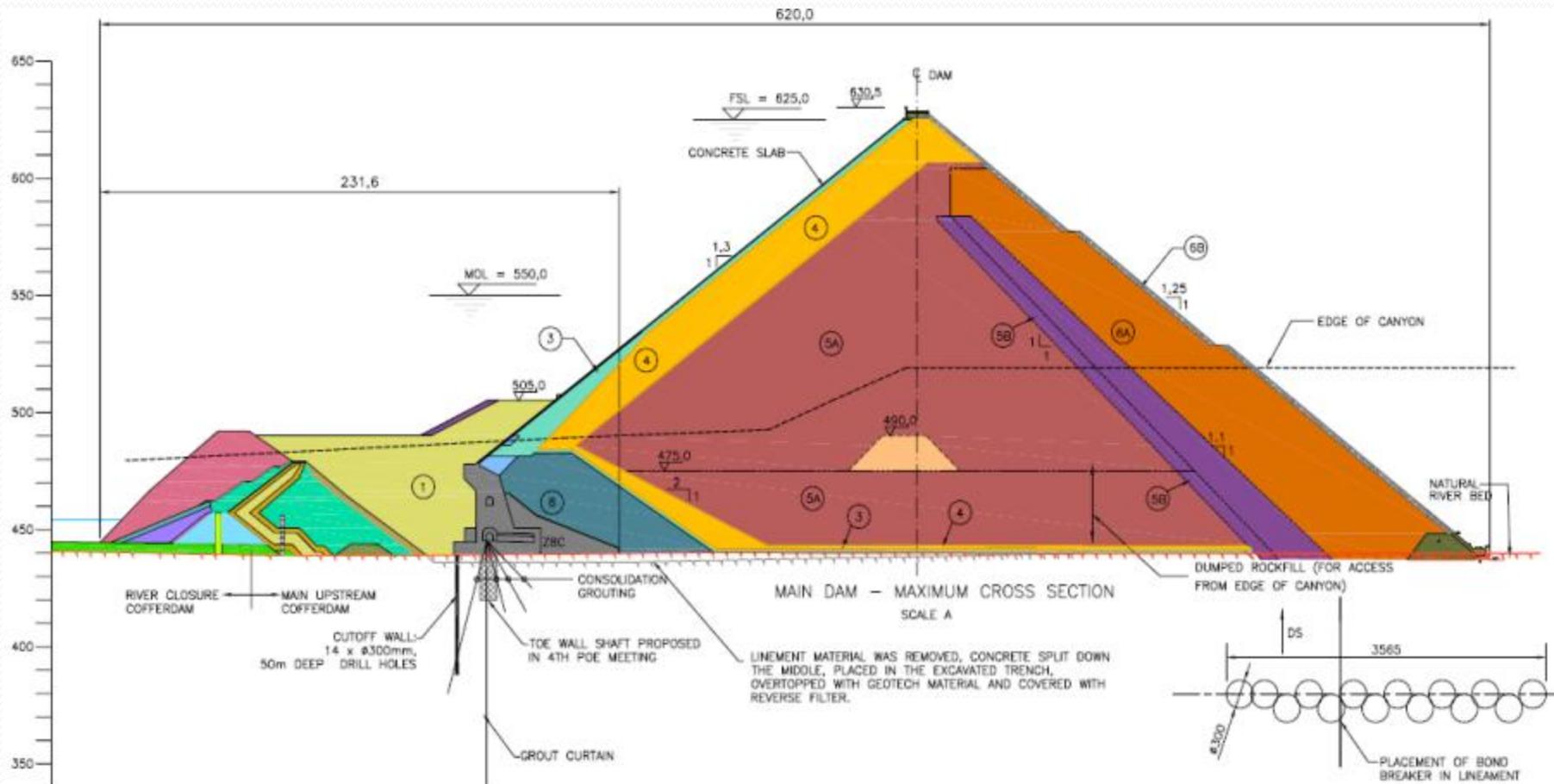
# Underground structures



# General Layout of Main Dam



# Main Dam Cross Section



# Kárahnjúkar Powerhouse



# Challenges and Solutions

- **Mobilization in Remote Area**
- **Jökuldalur Canyon: Construction of Toe Wall**
- **Jökuldalur Canyon: Dam Fill**
- **Plinth Construction**
- **Face Slab Construction**
- **Conclusion**



# Mobilization: Challenges

Remote Area

Arrange Accommodation for >1200 persons

Erect Plants and Workshops

River Diversion & Dam Excavation

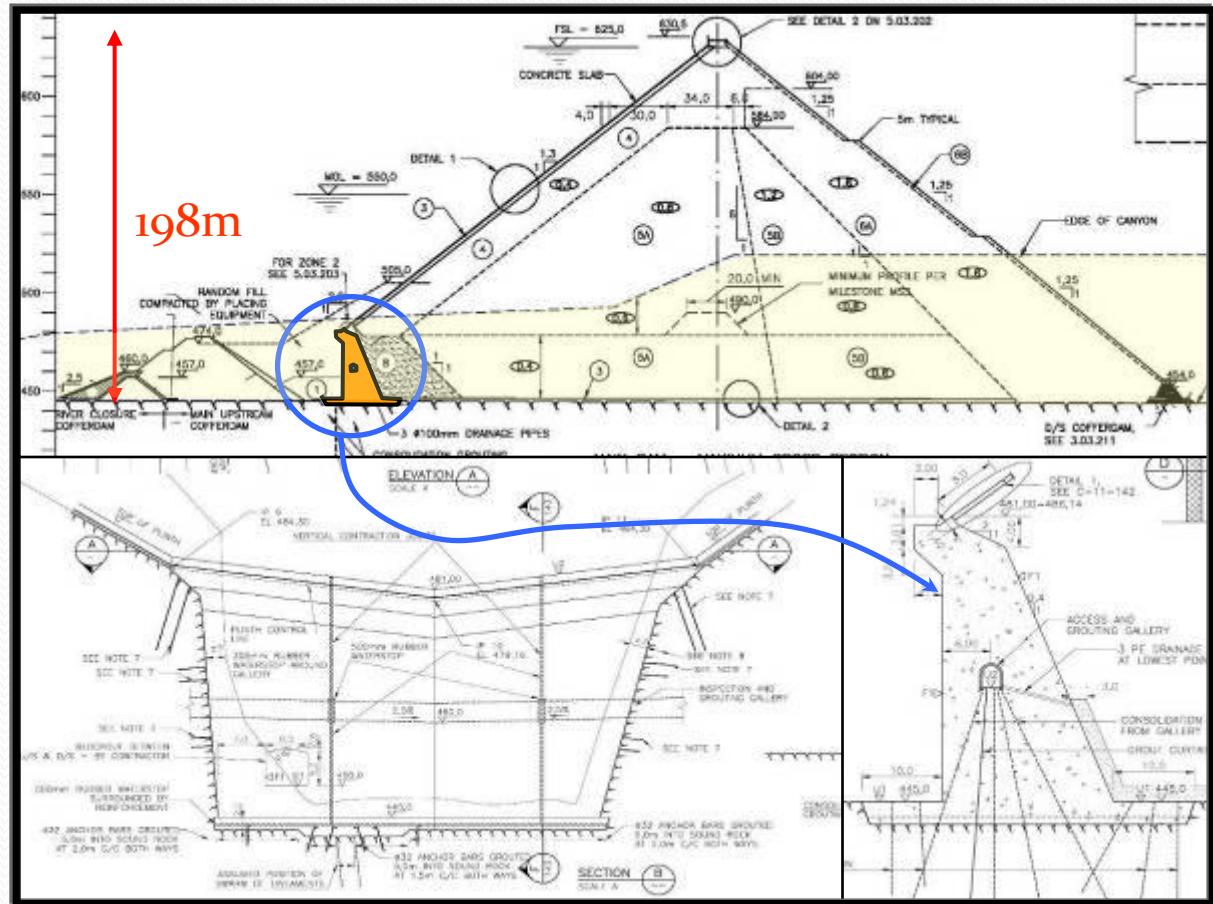


# Construction camp at Kárahnjúkar Dam Site



# Jökuldalur Canyon: Challenges

# Toe Wall Construction



# Jökuldalur Canyon: Solutions

## Toe Wall Construction

- Concrete Distribution
- Winterizing
- Toe Wall Completed



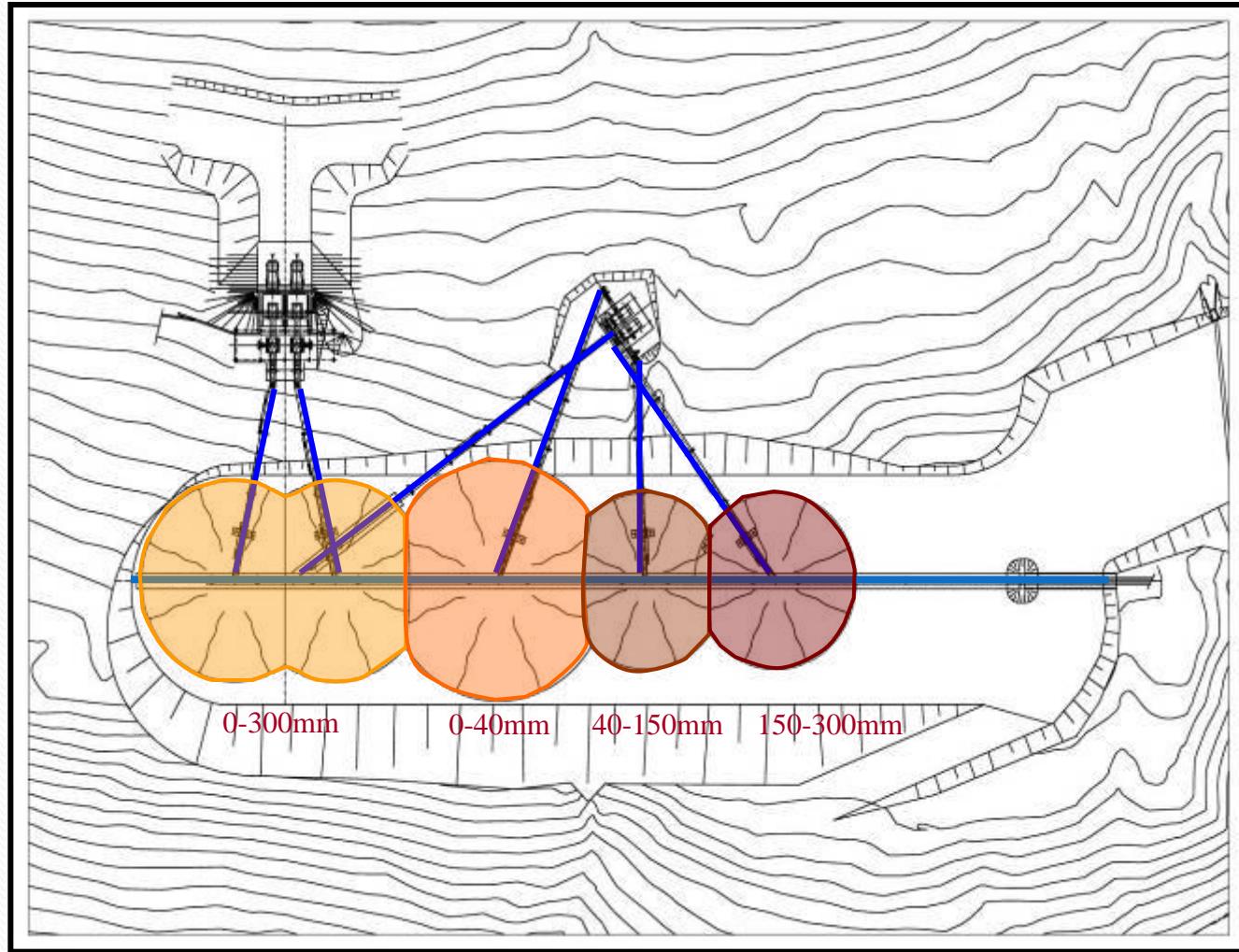
# Jökuldalur Canyon: Challenges

Dam Fill



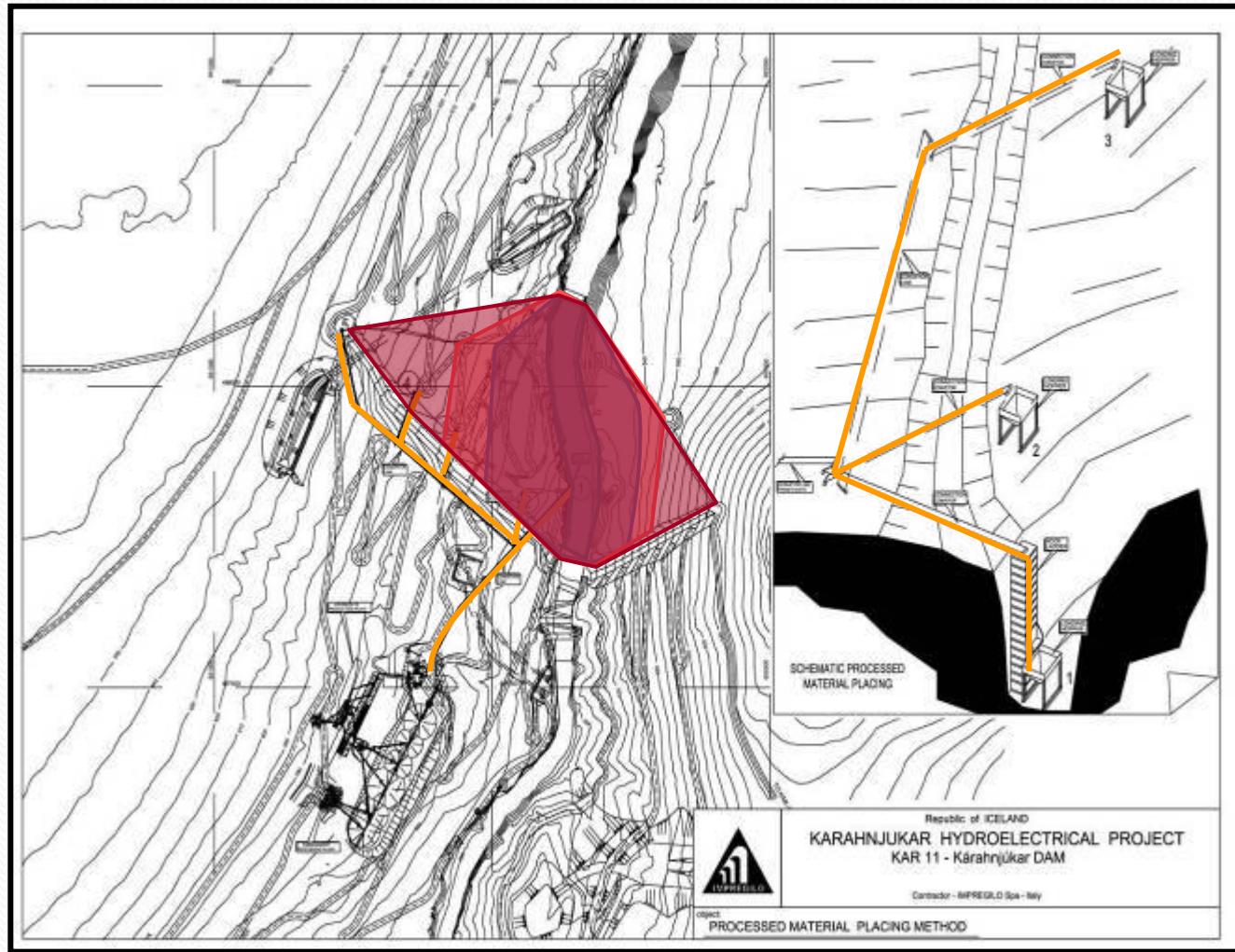
# Jökuldalur Canyon: Solutions

Dam Fill



# Jökuldalur Canyon: Solutions

Dam Fill



Steep Slope and Arctic Weather



# Plinth Construction: Challenges



# Plinth Construction: Solutions

## Steep Slope and Arctic Weather

Rockfall protection

Erect protective shelter

Winterizing

HOT AIR



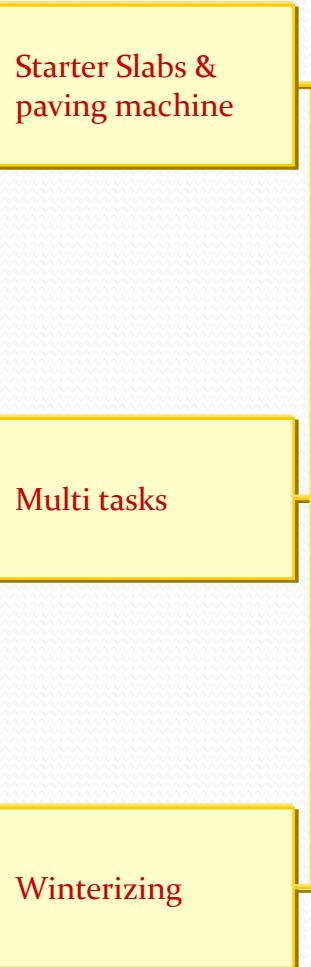
# Face Slab Construction: Challenges

Schedule and Arctic Weather



# Face Slab Construction: Solutions

## Schedule and Arctic Weather





February 2006



June 2006



# Winter 2008



# Kelduá Dam



# Conclusions

The Main Challenge was Time !!!



# FERC Licensing

# Susitna Licensing through the Federal Energy Regulatory Commission (FERC)

## PRELIMINARY PERMIT

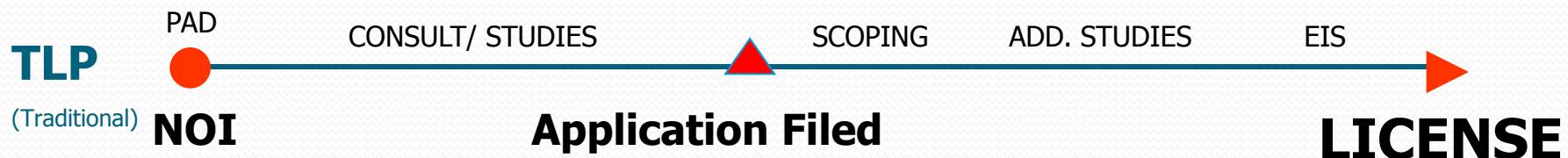
- Does not authorize construction or any land-disturbing activities
- Issued for a term up to 3 years
- Reserves site for permit holder; includes progress reports
- No dam or land ownership required

## LICENSE

- Authorizes construction and operation of a hydropower project
- Issued for a term up to 50 years
- Includes measures to protect the environment
- Requires that licensee has or obtains ownership or easement on project lands and waters

# Licensing Process Comparison

NOI – Notice of Intent;  
PAD – Preliminary Application Document;  
EIS – Environmental Impact Statement;  
PDEA – Preliminary Draft Environmental Assessment



# Typical Licensing Process

## INTEGRATED LICENSING PROCESS

### PRE-FILING

Applicant files Initial  
Proposal and Information  
Document

FERC Holds Scoping  
Meetings and Solicits  
Public Comment

Applicant conducts  
studies, if needed

Applicant Prepares  
Application

### POST-FILING

Applicant Files Application:  
Proposal, Effects, And  
Mitigation Measures

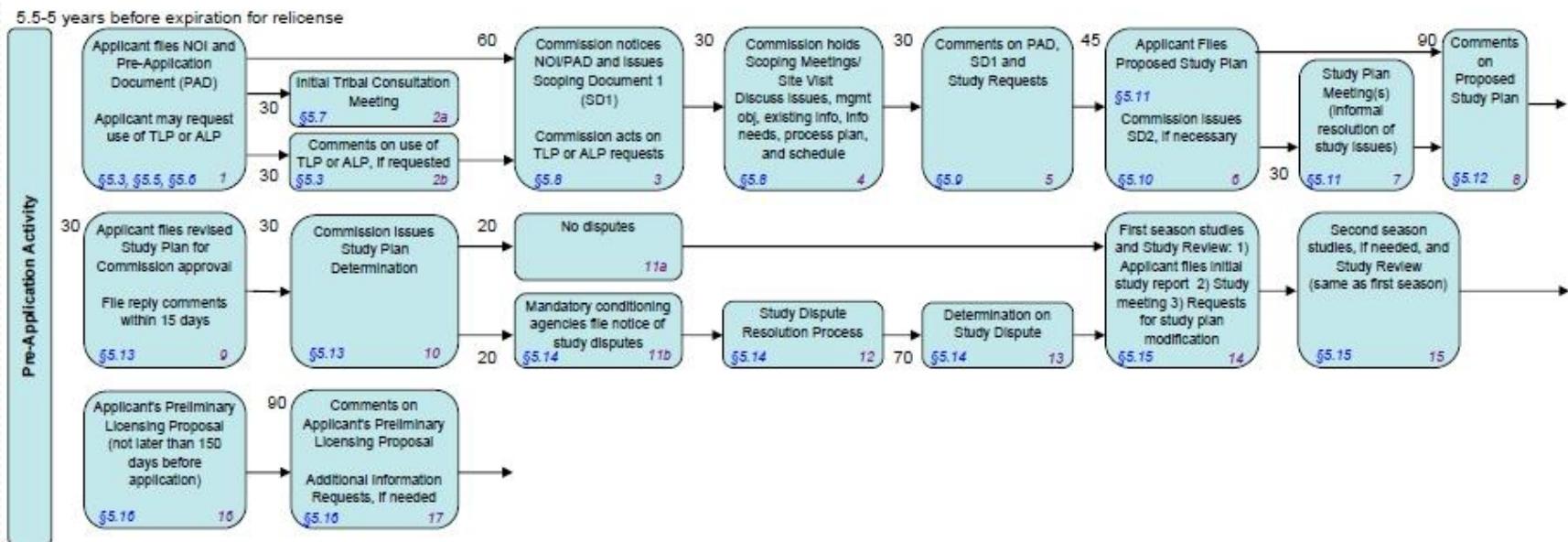
FERC Reviews and  
Solicits Public Comment

FERC Issues Environmental  
Document and Solicits  
Public Comment

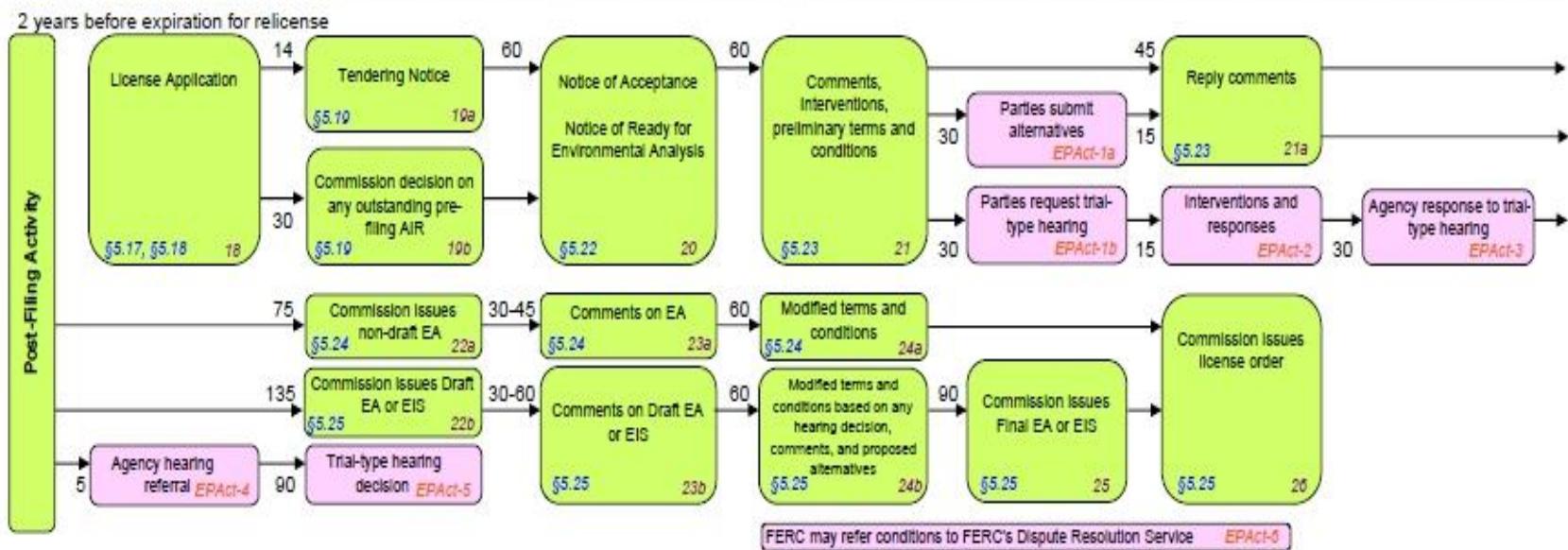
FERC Issues  
License Order



# Pre Filing Activity

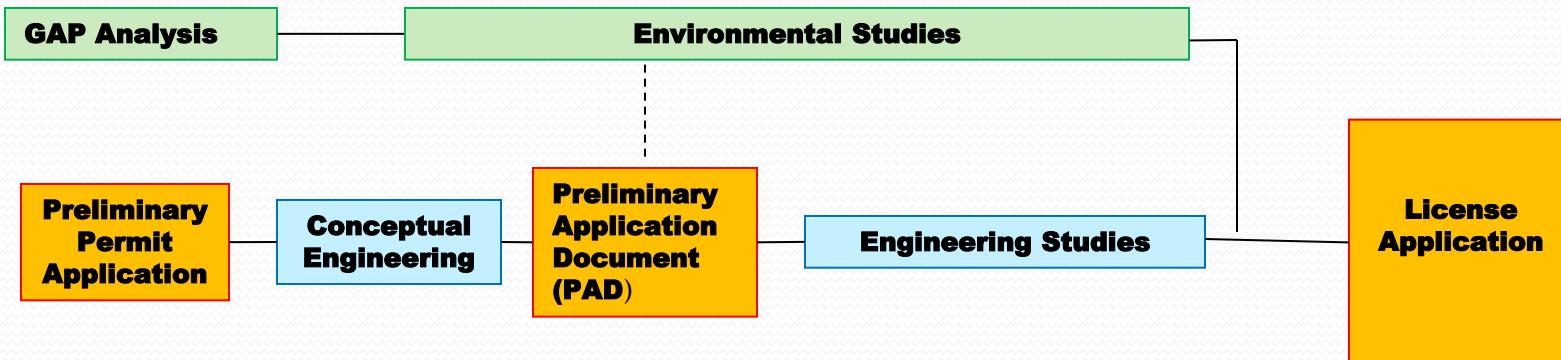


# Post Filing Activity



# AEA's Licensing Strategy

- Early Engagement of Resource Agencies and Other Stakeholders to Identify Critical Study Needs
- Maximizing Use of 1980s Environmental Study Work (Gap Analysis) to Minimize Time and Cost of New Studies
- Strong Commitment to Environmental Protection and Enhancement Measures



# FERC Oversight Roles Affecting Power Cost

	FERC's Role
Need for Project	FERC EIS includes cost comparison between Project and Alternative Power Sources
Project Development Costs	License articles affect cost of Project construction – mainly related to environmental mitigation costs
Wholesale Power Costs	FERC will issue License regardless of what Project power costs
Power Cost to Consumers	None