

# Odränerad Analys

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## File Information

Created By: [Petter Karlsson](#)  
Revision Number: 55  
Last Edited By: [Karlsson, Petter](#)  
Date: [2011-05-11](#)  
Time: [08:37:51](#)  
File Name: [V21100\\_odränerad.gsz](#)  
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Last Solved Date: [2011-05-11](#)  
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## Project Settings

Length(L) Units: [meters](#)  
Time(t) Units: [Seconds](#)  
Force(F) Units: [kN](#)  
Pressure(p) Units: [kPa](#)  
Strength Units: [kPa](#)  
Unit Weight of Water: [9.807 kN/m<sup>3</sup>](#)  
View: [2D](#)

## Analysis Settings

### Odränerad Analys (3)

Kind: [SLOPE/W](#)  
Method: [Morgenstern-Price](#)  
Settings  
Apply Phreatic Correction: [No](#)  
Side Function  
Interslice force function option: [Half-Sine](#)  
PWP Conditions Source: [Piezometric Line](#)  
Use Staged Rapid Drawdown: [No](#)  
Slip Surface  
Direction of movement: [Right to Left](#)  
Use Passive Mode: [No](#)  
Slip Surface Option: [Entry and Exit](#)  
Critical slip surfaces saved: 5  
Optimize Critical Slip Surface Location: [Yes](#)  
Tension Crack  
Tension Crack Option: [Tension Crack Line](#)  
Percentage Wet: [0.5](#)  
Tension Crack Fluid Unit Weight: [9.807 kN/m<sup>3</sup>](#)  
FOS Distribution  
FOS Calculation Option: [Constant](#)

## Advanced

Number of Slices: 30  
Optimization Tolerance: 0.01  
Minimum Slip Surface Depth: 0.1 m  
Optimization Maximum Iterations: 2000  
Optimization Convergence Tolerance: 1e-007  
Starting Optimization Points: 8  
Ending Optimization Points: 16  
Complete Passes per Insertion: 1  
Driving Side Maximum Convex Angle: 5 °  
Resisting Side Maximum Convex Angle: 1 °

## Materials

### Crust

Model: Mohr-Coulomb  
Unit Weight: 18 kN/m<sup>3</sup>  
Cohesion: 30 kPa  
Phi: 0 °  
Phi-B: 0 °  
Pore Water Pressure  
Piezometric Line: 1

### CI 1

Model: S=f(datum)  
Unit Weight: 17.2 kN/m<sup>3</sup>  
C-Datum: 28 kPa  
C-Rate of Change: 0 kPa/m  
Limiting C: 0 kPa  
Elevation: 25 m  
Pore Water Pressure  
Piezometric Line: 1

### CI 2

Model: S=f(datum)  
Unit Weight: 17.2 kN/m<sup>3</sup>  
C-Datum: 28 kPa  
C-Rate of Change: 1.81 kPa/m  
Limiting C: 0 kPa  
Elevation: 15 m  
Pore Water Pressure  
Piezometric Line: 1

### CI 3

Model: S=f(datum)  
Unit Weight: 16.6 kN/m<sup>3</sup>  
C-Datum: 28 kPa  
C-Rate of Change: 1.81 kPa/m  
Limiting C: 0 kPa  
Elevation: 15 m

Pore Water Pressure  
Piezometric Line: 1

CI 4

Model:  $S=f(\text{datum})$   
Unit Weight: 17 kN/m<sup>3</sup>  
C-Datum: 28 kPa  
C-Rate of Change: 1.81 kPa/m  
Limiting C: 0 kPa  
Elevation: 15 m  
Pore Water Pressure  
Piezometric Line: 1

CI 5

Model:  $S=f(\text{datum})$   
Unit Weight: 17.2 kN/m<sup>3</sup>  
C-Datum: 28 kPa  
C-Rate of Change: 0 kPa/m  
Limiting C: 0 kPa  
Elevation: 15 m  
Pore Water Pressure  
Piezometric Line: 1

CI 6

Model:  $S=f(\text{datum})$   
Unit Weight: 16.6 kN/m<sup>3</sup>  
C-Datum: 28 kPa  
C-Rate of Change: 1.68 kPa/m  
Limiting C: 0 kPa  
Elevation: 5 m  
Pore Water Pressure  
Piezometric Line: 1

CI 7

Model:  $S=f(\text{datum})$   
Unit Weight: 17 kN/m<sup>3</sup>  
C-Datum: 28 kPa  
C-Rate of Change: 1.68 kPa/m  
Limiting C: 0 kPa  
Elevation: 5 m  
Pore Water Pressure  
Piezometric Line: 1

CI 8

Model:  $S=f(\text{depth})$   
Unit Weight: 16.6 kN/m<sup>3</sup>  
C-Top of Layer: 3 kPa  
C-Rate of Change: 11 kPa/m  
Limiting C: 25 kPa  
Pore Water Pressure  
Piezometric Line: 1

CI 9

Model:  $S=f(\text{depth})$ Unit Weight: 16.6 kN/m<sup>3</sup>

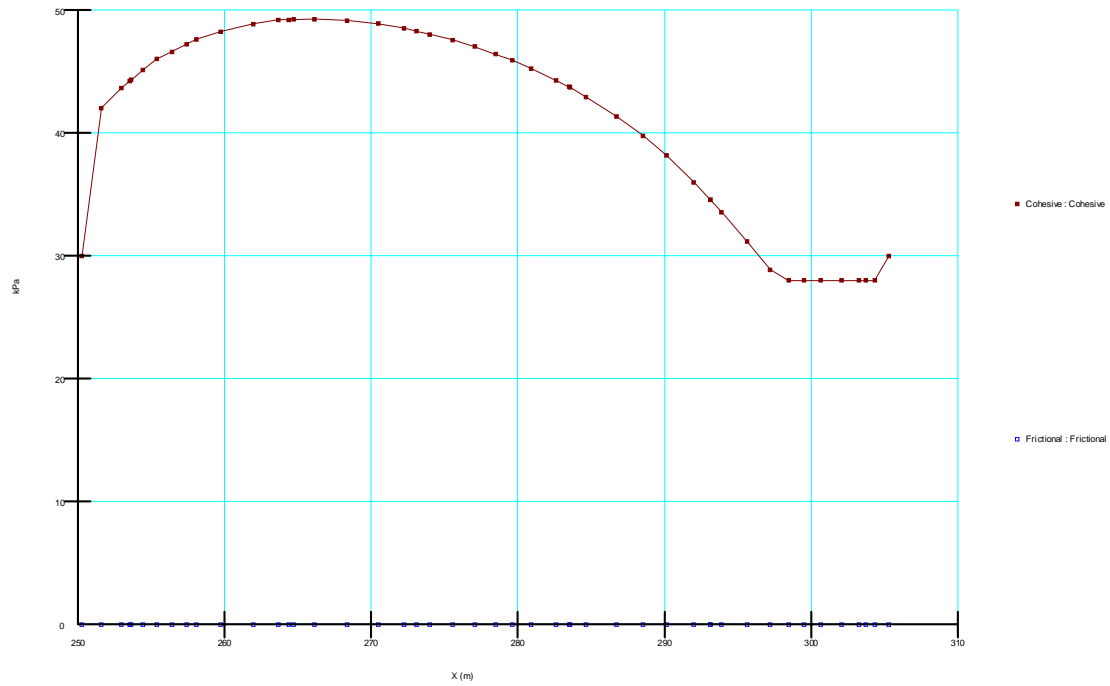
C-Top of Layer: 25 kPa

C-Rate of Change: 1.67 kPa/m

Limiting C: 0 kPa

Pore Water Pressure

Piezometric Line: 1



Figur 1. Kohesion och friktion.



# KLIMATANPASSNING SKREDFÖRUTSÄTTNINGAR I GÖTA ÄLVDALLEN

Sektion: V21100  
 Delområde: Intagan - Ström  
 Analysmetod: Odränerad analys

Slip Surface Option: Entry and Exit  
 Method: Morgenstern-Price  
 PWP Conditions Source: Piezometric Line  
 Date: 2011-05-11  
 Created By: Petter Karlsson  
 Last Edited By: Karlsson, Petter

Skala 1:1000 (A3)

Name: Crust  
 Model: Mohr-Coulomb  
 Unit Weight: 18 kN/m<sup>3</sup>  
 Cohesion: 30 kPa  
 Phi: 0 °

Name: CI 1  
 Model: S=f(datum)  
 Unit Weight: 17.2 kN/m<sup>3</sup>  
 C-Datum: 28 kPa  
 C-Rate of Change: 0 kPa/m  
 Elevation: 25 m

Name: CI 2  
 Model: S=f(datum)  
 Unit Weight: 17.2 kN/m<sup>3</sup>  
 C-Datum: 28 kPa  
 C-Rate of Change: 1.81 kPa/m  
 Elevation: 15 m

Name: CI 3  
 Model: S=f(datum)  
 Unit Weight: 16.6 kN/m<sup>3</sup>  
 C-Datum: 28 kPa  
 C-Rate of Change: 1.81 kPa/m  
 Elevation: 15 m

Name: CI 4  
 Model: S=f(datum)  
 Unit Weight: 17 kN/m<sup>3</sup>  
 C-Datum: 28 kPa  
 C-Rate of Change: 1.81 kPa/m  
 Elevation: 15 m

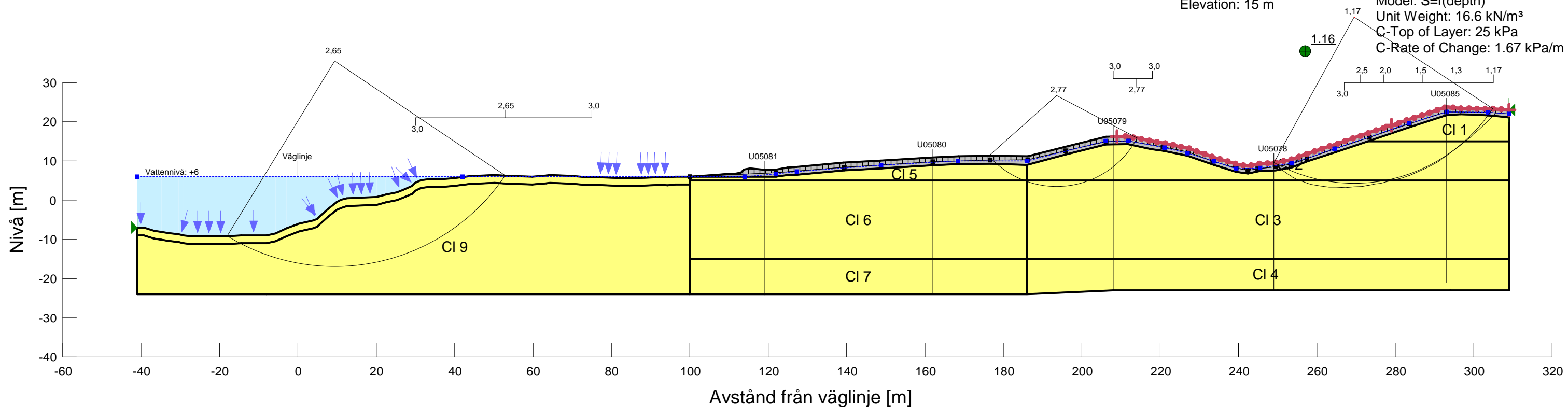
Name: CI 5  
 Model: S=f(datum)  
 Unit Weight: 17.2 kN/m<sup>3</sup>  
 C-Datum: 28 kPa  
 C-Rate of Change: 0 kPa/m  
 Elevation: 15 m

Name: CI 6  
 Model: S=f(datum)  
 Unit Weight: 16.6 kN/m<sup>3</sup>  
 C-Datum: 28 kPa  
 C-Rate of Change: 1.68 kPa/m  
 Elevation: 5 m

Name: CI 7  
 Model: S=f(datum)  
 Unit Weight: 17 kN/m<sup>3</sup>  
 C-Datum: 28 kPa  
 C-Rate of Change: 1.68 kPa/m  
 Elevation: 5 m

Name: CI 8  
 Model: S=f(depth)  
 Unit Weight: 16.6 kN/m<sup>3</sup>  
 C-Top of Layer: 3 kPa  
 C-Rate of Change: 11 kPa/m

Name: CI 9  
 Model: S=f(depth)  
 Unit Weight: 16.6 kN/m<sup>3</sup>  
 C-Top of Layer: 25 kPa  
 C-Rate of Change: 1.67 kPa/m



# Kombinerad Analys

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## File Information

Created By: [Petter Karlsson](#)  
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Last Solved Date: [2011-05-11](#)  
Last Solved Time: [08:27:02](#)

## Project Settings

Length(L) Units: [meters](#)  
Time(t) Units: [Seconds](#)  
Force(F) Units: [kN](#)  
Pressure(p) Units: [kPa](#)  
Strength Units: [kPa](#)  
Unit Weight of Water: [9.807 kN/m<sup>3</sup>](#)  
View: [2D](#)

## Analysis Settings

### Kombinerad Analys

Kind: [SLOPE/W](#)  
Method: [Morgenstern-Price](#)  
Settings  
Side Function  
Interslice force function option: [Half-Sine](#)  
PWP Conditions Source: [Pressure Head Spatial Function](#)  
Pressure Head Spatial Fn.: [Uppmätta värden](#)  
Slip Surface  
Direction of movement: [Right to Left](#)  
Use Passive Mode: [No](#)  
Slip Surface Option: [Entry and Exit](#)  
Critical slip surfaces saved: [5](#)  
Optimize Critical Slip Surface Location: [Yes](#)  
Tension Crack  
Tension Crack Option: [Tension Crack Line](#)  
Percentage Wet: [0.5](#)  
Tension Crack Fluid Unit Weight: [9.807 kN/m<sup>3</sup>](#)  
FOS Distribution  
FOS Calculation Option: [Constant](#)  
Advanced

Number of Slices: 30  
Optimization Tolerance: 0.01  
Minimum Slip Surface Depth: 0.1 m  
Optimization Maximum Iterations: 2000  
Optimization Convergence Tolerance: 1e-007  
Starting Optimization Points: 8  
Ending Optimization Points: 16  
Complete Passes per Insertion: 1  
Driving Side Maximum Convex Angle: 5 °  
Resisting Side Maximum Convex Angle: 1 °

## Materials

### Crust

Model: Combined, S=f(depth)  
Unit Weight: 18 kN/m<sup>3</sup>  
Phi: 30 °  
C-Top of Layer: 0 kPa  
C-Rate of Change: 0 kPa/m  
Cu-Top of Layer: 30 kPa  
Cu-Rate of Change: 0 kPa/m  
C/Cu Ratio: 0.1

### CI 1

Model: Combined, S=f(datum)  
Unit Weight: 17.2 kN/m<sup>3</sup>  
Phi: 30 °  
C-Datum: 0 kPa  
C-Rate of Change: 0 kPa/m  
Cu-Datum: 28 kPa  
Cu-Rate of Change: 0 kPa/m  
C/Cu Ratio: 0.1  
Elevation: 25 m

### CI 2

Model: Combined, S=f(datum)  
Unit Weight: 17.2 kN/m<sup>3</sup>  
Phi: 30 °  
C-Datum: 0 kPa  
C-Rate of Change: 0 kPa/m  
Cu-Datum: 28 kPa  
Cu-Rate of Change: 1.81 kPa/m  
C/Cu Ratio: 0.1  
Elevation: 15 m

### CI 3

Model: Combined, S=f(datum)  
Unit Weight: 16.6 kN/m<sup>3</sup>  
Phi: 30 °  
C-Datum: 0 kPa

C-Rate of Change: 0 kPa/m  
Cu-Datum: 28 kPa  
Cu-Rate of Change: 1.81 kPa/m  
C/Cu Ratio: 0.1  
Elevation: 15 m

## CI 4

Model: Combined,  $S=f(\text{datum})$   
Unit Weight: 17 kN/m<sup>3</sup>  
Phi: 30 °  
C-Datum: 0 kPa  
C-Rate of Change: 0 kPa/m  
Cu-Datum: 28 kPa  
Cu-Rate of Change: 1.81 kPa/m  
C/Cu Ratio: 0.1  
Elevation: 15 m

## CI 5

Model: Combined,  $S=f(\text{datum})$   
Unit Weight: 17.2 kN/m<sup>3</sup>  
Phi: 30 °  
C-Datum: 0 kPa  
C-Rate of Change: 0 kPa/m  
Cu-Datum: 28 kPa  
Cu-Rate of Change: 0 kPa/m  
C/Cu Ratio: 0.1  
Elevation: 15 m

## CI 6

Model: Combined,  $S=f(\text{datum})$   
Unit Weight: 16.6 kN/m<sup>3</sup>  
Phi: 30 °  
C-Datum: 0 kPa  
C-Rate of Change: 0 kPa/m  
Cu-Datum: 28 kPa  
Cu-Rate of Change: 1.68 kPa/m  
C/Cu Ratio: 0.1  
Elevation: 5 m

## CI 7

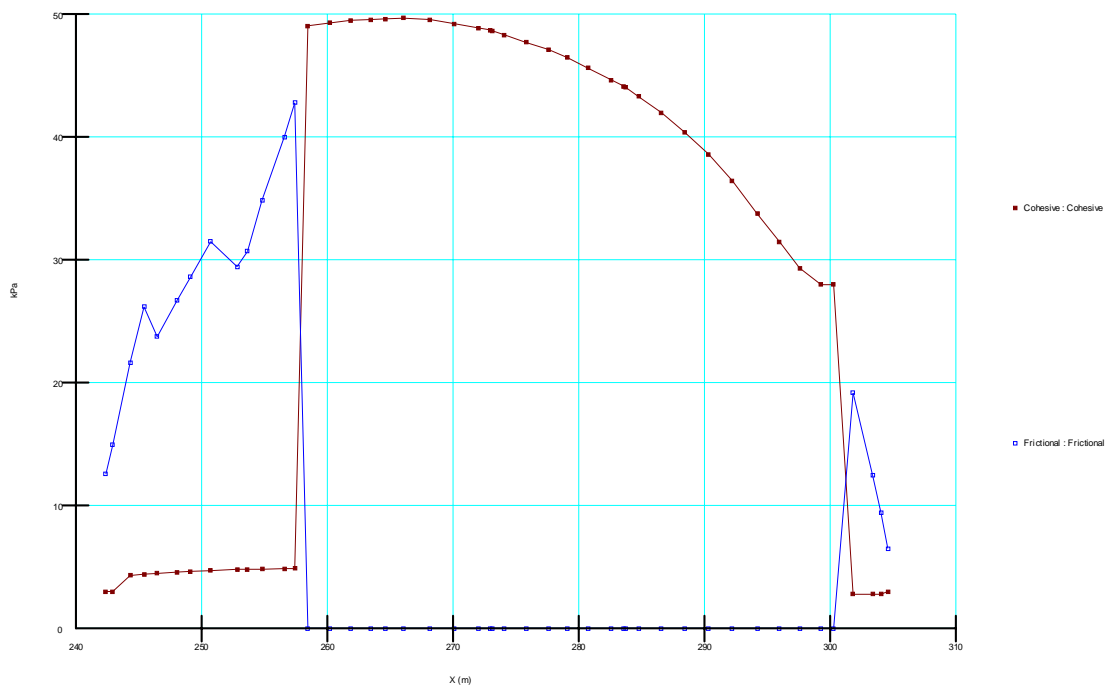
Model: Combined,  $S=f(\text{datum})$   
Unit Weight: 17 kN/m<sup>3</sup>  
Phi: 30 °  
C-Datum: 0 kPa  
C-Rate of Change: 0 kPa/m  
Cu-Datum: 28 kPa  
Cu-Rate of Change: 1.68 kPa/m  
C/Cu Ratio: 0.1  
Elevation: 5 m



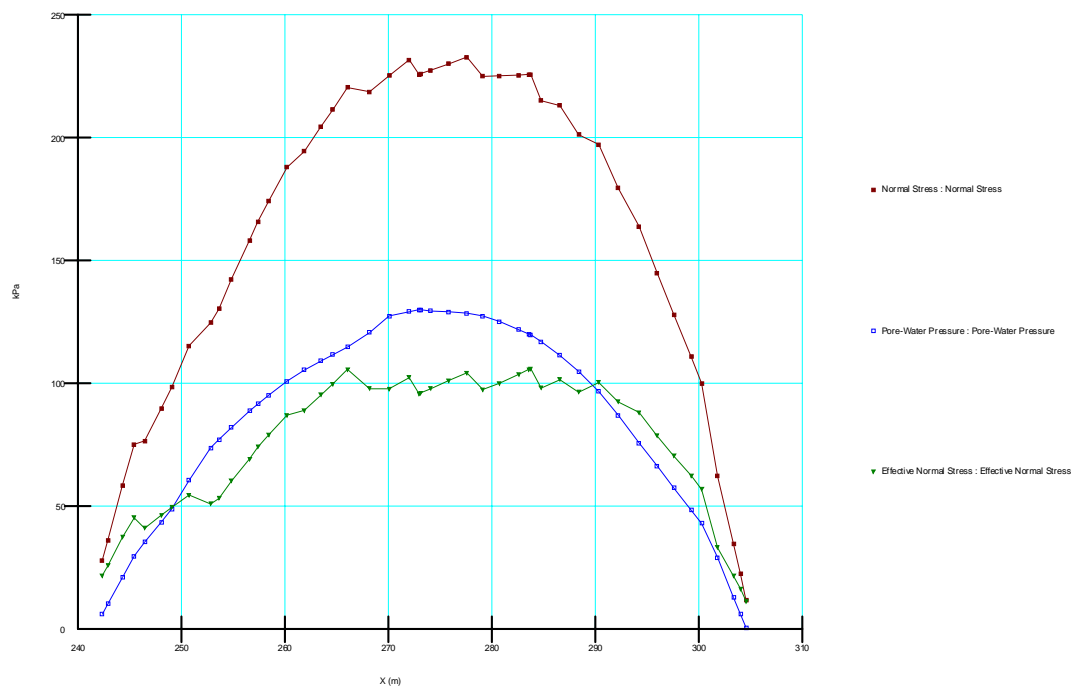
CI 8

Model: Combined,  $S=f(\text{depth})$ Unit Weight:  $16.6 \text{ kN/m}^3$ Phi:  $30^\circ$ C-Top of Layer:  $0 \text{ kPa}$ C-Rate of Change:  $0 \text{ kPa/m}$ Cu-Top of Layer:  $3 \text{ kPa}$ Cu-Rate of Change:  $11 \text{ kPa/m}$ C/Cu Ratio:  $0.1$ 

CI 9

Model: Combined,  $S=f(\text{depth})$ Unit Weight:  $16.6 \text{ kN/m}^3$ Phi:  $30^\circ$ C-Top of Layer:  $0 \text{ kPa}$ C-Rate of Change:  $0 \text{ kPa/m}$ Cu-Top of Layer:  $25 \text{ kPa}$ Cu-Rate of Change:  $1.67 \text{ kPa/m}$ C/Cu Ratio:  $0.1$ 

Figur 1. Kohesion och friktion.



Figur 2. Totalspänning, effektivspänning och portryck.



# KLIMATANPASSNING SKREDFÖRUTSÄTTNINGAR I GÖTA ÄLVDALLEN

Sektion: V21100  
 Delområde: Intagan - Ström  
 Analysmetod: Kombinerad analys

Slip Surface Option: Entry and Exit  
 Method: Morgenstern-Price  
 PWP Conditions Source: Pressure Head Spatial Function  
 Date: 2011-05-11  
 Created By: Petter Karlsson  
 Last Edited By: Karlsson, Petter

## Skala 1:1000 (A3)

Name: Crust  
 Model: Combined, S=f(depth)  
 Unit Weight: 18 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Top of Layer: 30 kPa  
 Cu-Rate of Change: 0 kPa/m  
 C/Cu Ratio: 0.1

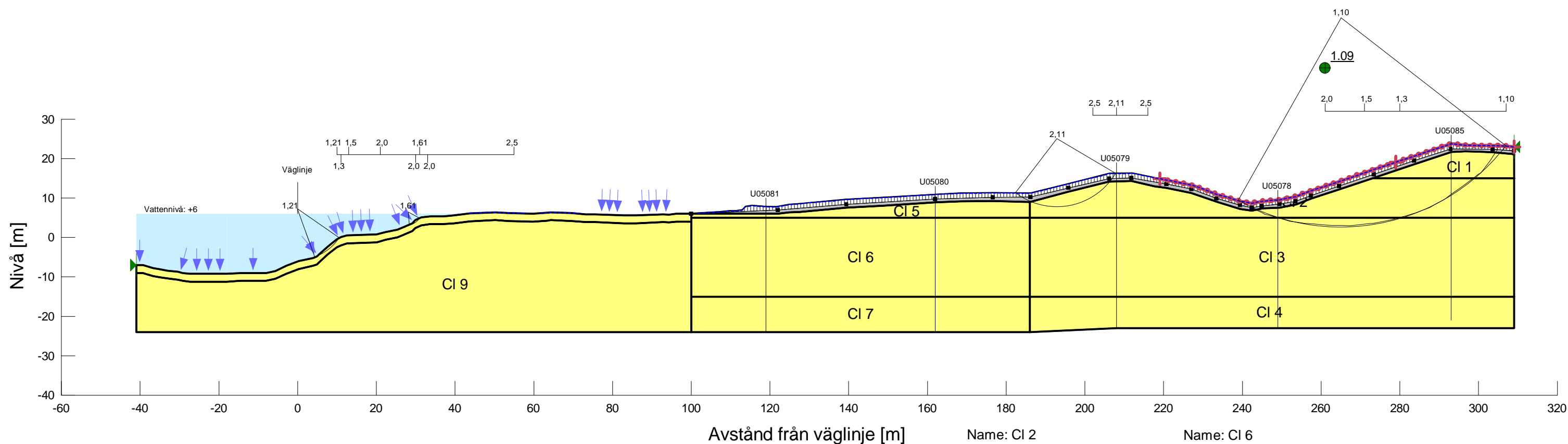
Name: CI 1  
 Model: Combined, S=f(datum)  
 Unit Weight: 17.2 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 0 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 25 m

Name: CI 4  
 Model: Combined, S=f(datum)  
 Unit Weight: 17 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 1.81 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 15 m

Name: CI 5  
 Model: Combined, S=f(datum)  
 Unit Weight: 17.2 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 0 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 15 m

Name: CI 8  
 Model: Combined, S=f(depth)  
 Unit Weight: 16.6 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Top of Layer: 3 kPa  
 Cu-Rate of Change: 11 kPa/m  
 C/Cu Ratio: 0.1

Name: CI 9  
 Model: Combined, S=f(depth)  
 Unit Weight: 16.6 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Top of Layer: 25 kPa  
 Cu-Rate of Change: 1.67 kPa/m  
 C/Cu Ratio: 0.1



Name: CI 2  
 Model: Combined, S=f(datum)  
 Unit Weight: 17.2 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 1.81 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 15 m

Name: CI 3  
 Model: Combined, S=f(datum)  
 Unit Weight: 16.6 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 1.81 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 15 m

Name: CI 6  
 Model: Combined, S=f(datum)  
 Unit Weight: 16.6 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 1.68 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 5 m

Name: CI 7  
 Model: Combined, S=f(datum)  
 Unit Weight: 17 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 1.68 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 5 m



# KLIMATANPASSNING SKREDFÖRUTSÄTTNINGAR I GÖTA ÄLVDALEN

Sektion: V21100  
 Delområde: Intagan - Ström  
 Analysmetod: Kombinerad analys

Slip Surface Option: Entry and Exit  
 Method: Morgenstern-Price  
 PWP Conditions Source: Pressure Head Spatial Function  
 Date: 2011-05-11  
 Created By: Petter Karlsson  
 Last Edited By: Karlsson, Petter

## Skala 1:1000 (A3)

Name: Crust  
 Model: Combined, S=f(depth)  
 Unit Weight: 18 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Top of Layer: 30 kPa  
 Cu-Rate of Change: 0 kPa/m  
 C/Cu Ratio: 0.1

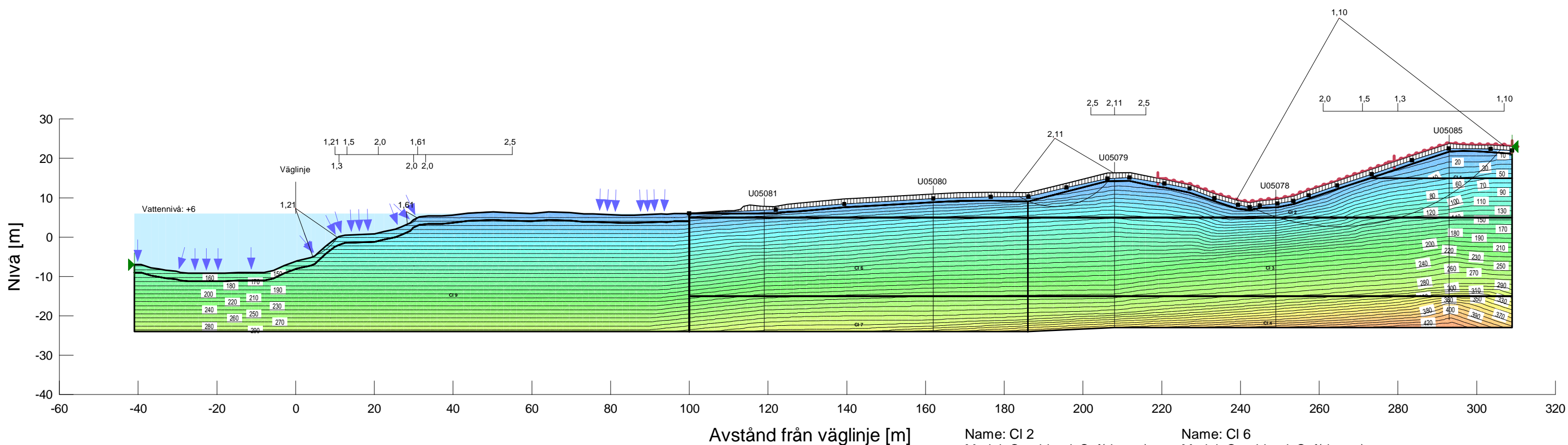
Name: CI 1  
 Model: Combined, S=f(datum)  
 Unit Weight: 17.2 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 0 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 25 m

Name: CI 4  
 Model: Combined, S=f(datum)  
 Unit Weight: 17 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 1.81 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 15 m

Name: CI 5  
 Model: Combined, S=f(datum)  
 Unit Weight: 17.2 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 0 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 15 m

Name: CI 8  
 Model: Combined, S=f(depth)  
 Unit Weight: 16.6 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Top of Layer: 3 kPa  
 Cu-Rate of Change: 11 kPa/m  
 C/Cu Ratio: 0.1

Name: CI 9  
 Model: Combined, S=f(depth)  
 Unit Weight: 16.6 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Top of Layer: 25 kPa  
 Cu-Rate of Change: 1.67 kPa/m  
 C/Cu Ratio: 0.1



Name: CI 2  
 Model: Combined, S=f(datum)  
 Unit Weight: 17.2 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 1.81 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 15 m

Name: CI 3  
 Model: Combined, S=f(datum)  
 Unit Weight: 16.6 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 1.81 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 15 m

Name: CI 6  
 Model: Combined, S=f(datum)  
 Unit Weight: 16.6 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 1.68 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 5 m

Name: CI 7  
 Model: Combined, S=f(datum)  
 Unit Weight: 17 kN/m<sup>3</sup>  
 Phi: 30 °  
 Cu-Datum: 28 kPa  
 Cu-Rate of Change: 1.68 kPa/m  
 C/Cu Ratio: 0.1  
 Elevation: 5 m