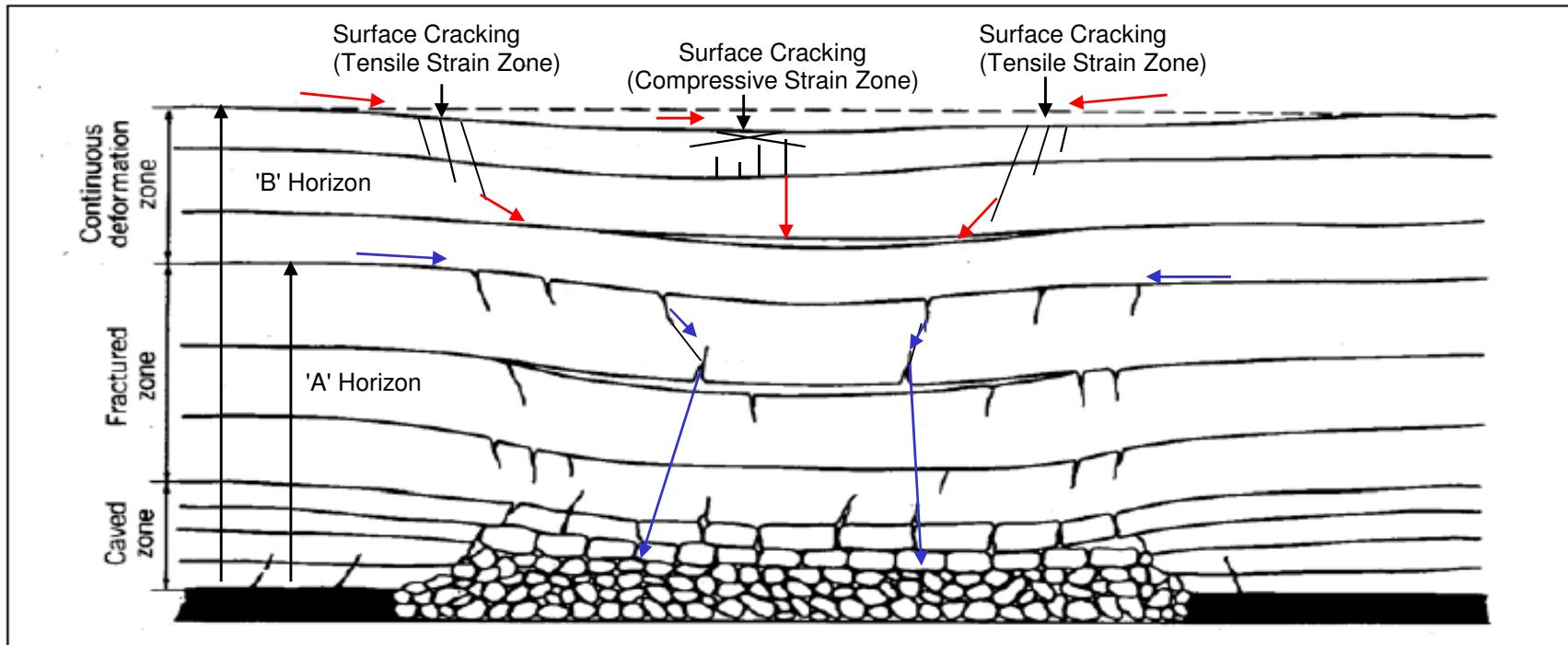


Engineer:	S.Ditton	Client:	West Wallsend Colliery WWD-012/1
Drawn:	S.Ditton		
Date:	18.11.09	Title:	Surface Crack Location Relative to Chain Pillar Ribs due to LWs 22 to 36 at West Wallsend Colliery
Ditton Geotechnical Services Pty Ltd		Scale:	NTS
		Figure No:	40c



Schematic taken from Peng & Chiang, 1984.

Key

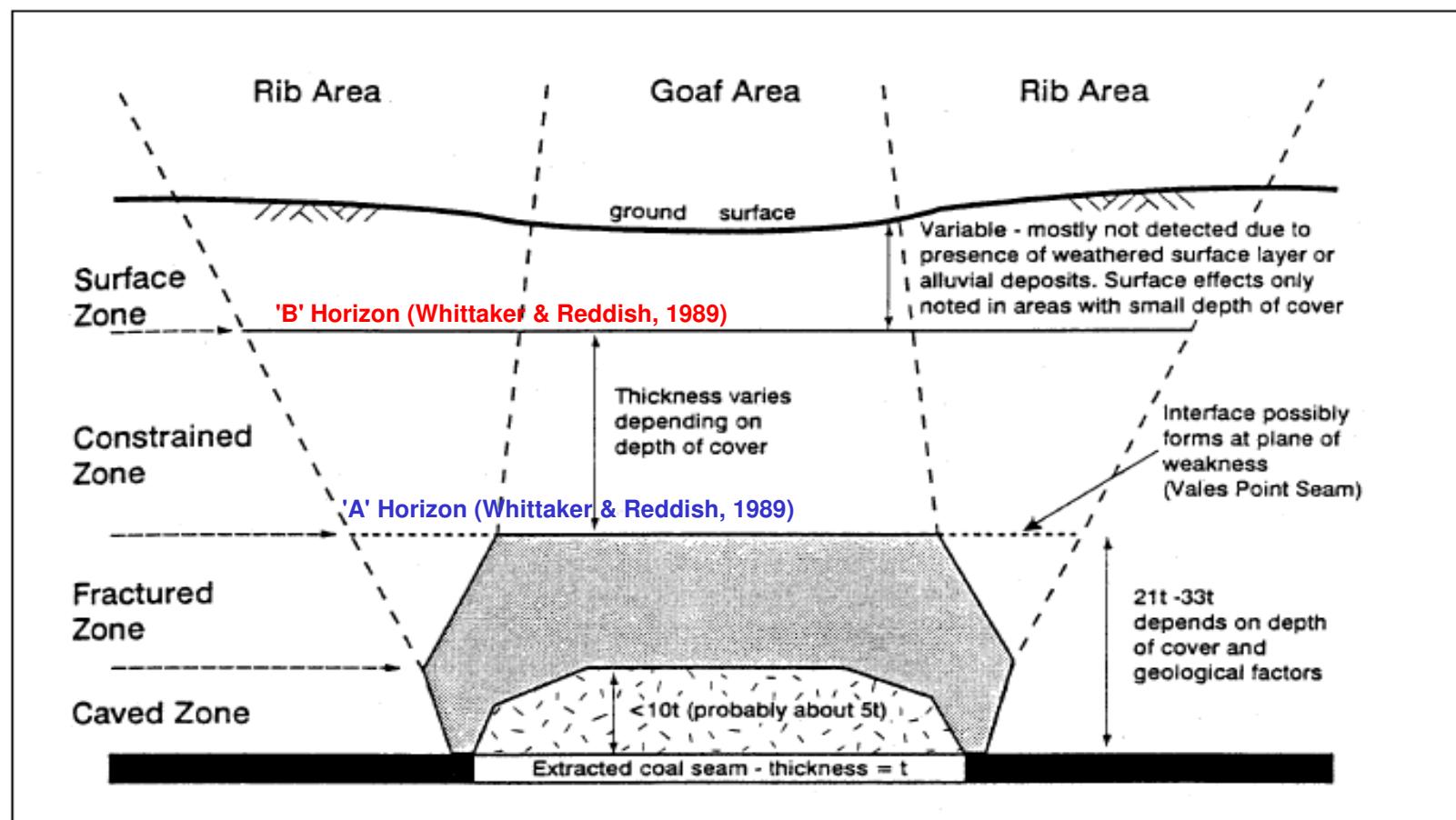
'A' Horizon - Zone of Continuous Crack Connection to Workings (Whittaker and Reddish, 1989)

'B" Horizon - Zone Of Discontinuous Crack Connection to Workings (Whittaker and Reddish, 1989)

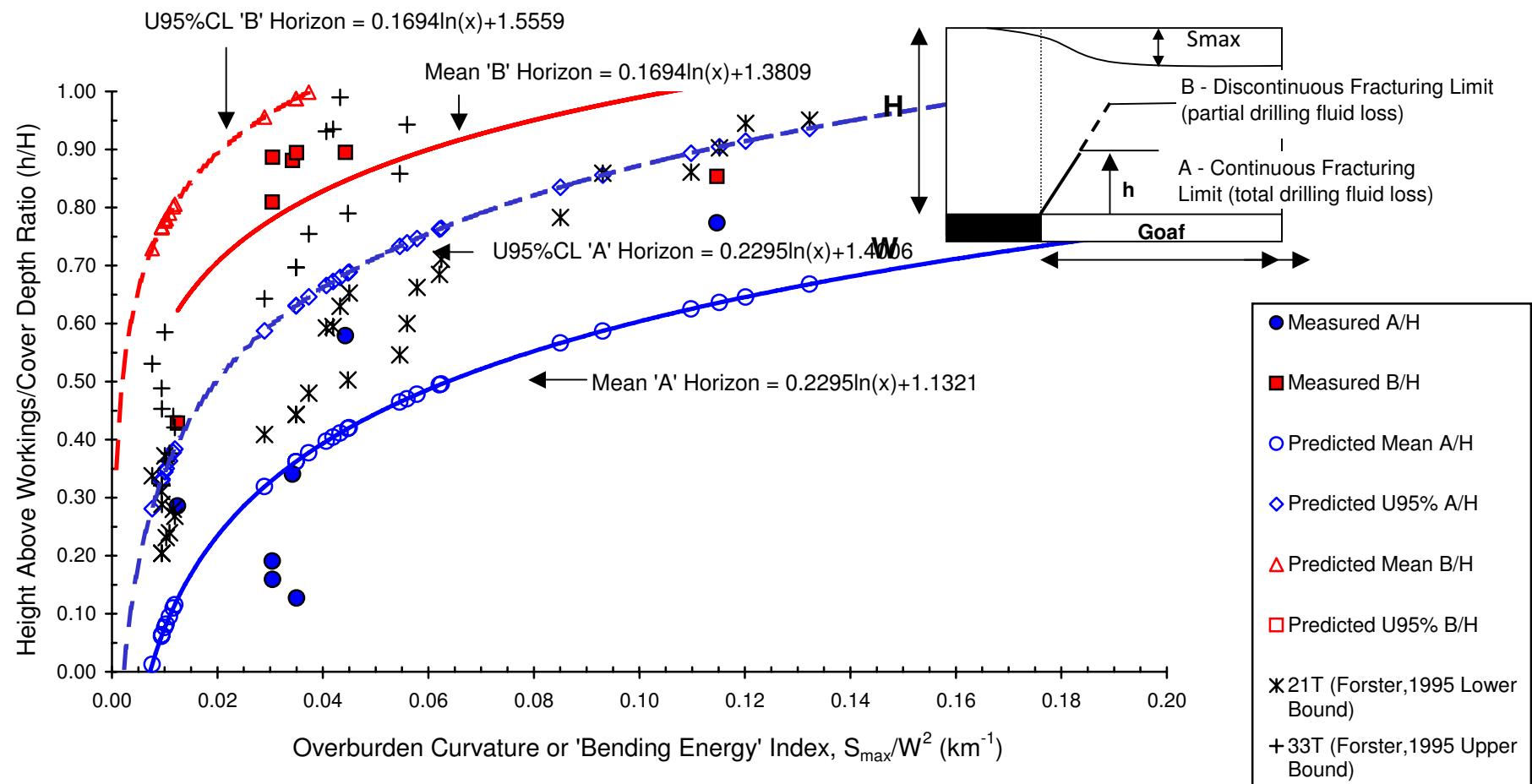
→ Surface water flow path → Sub-surface water flow path

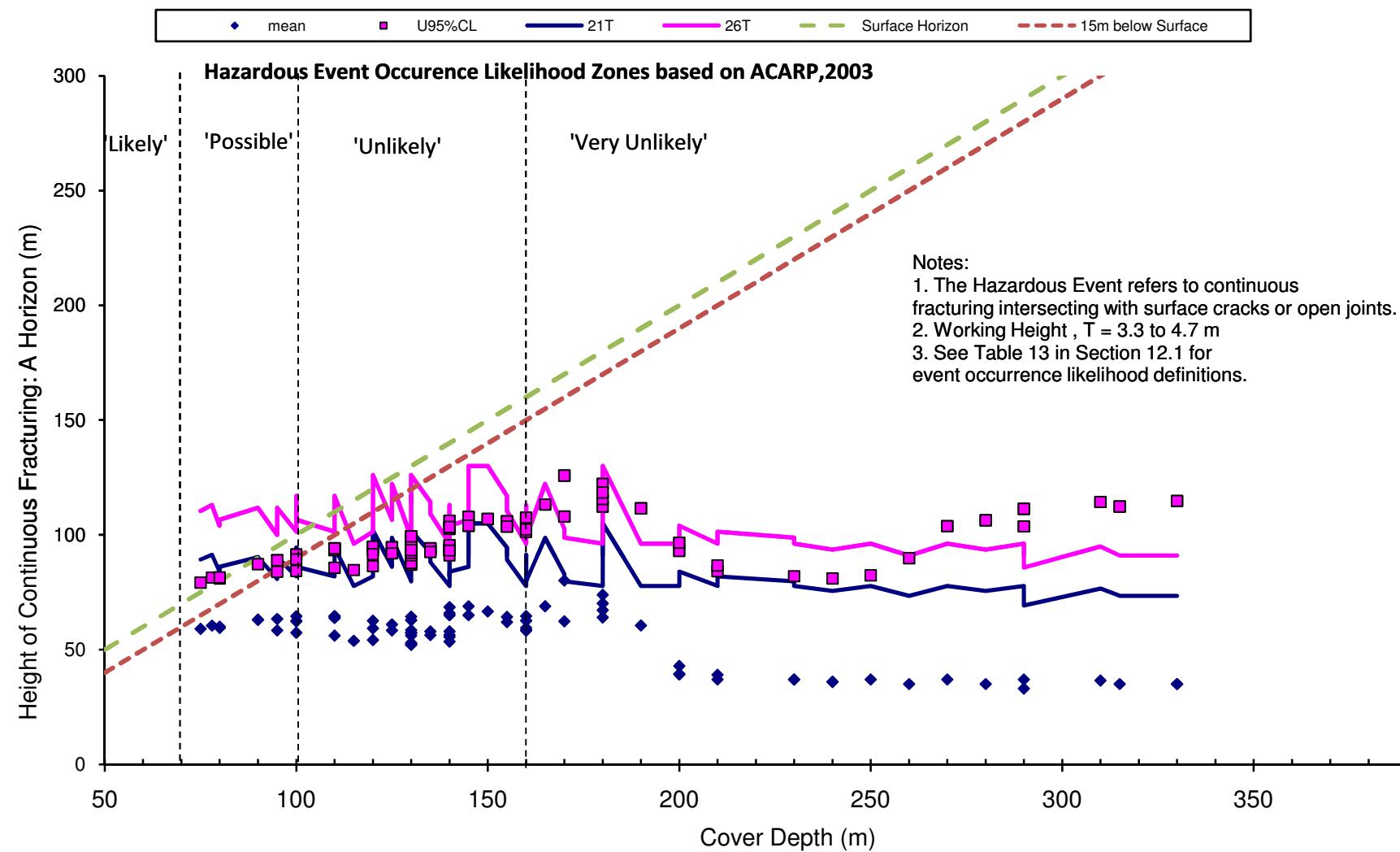
DgS

Engineer:	S.Ditton	Client:	West Wallsend Colliery WWD-012/1
Drawn:	S.Ditton		
Date:	18.11.08	Title:	Schematic Model of Overburden Fracture Zones by Various Researchers
Ditton Geotechnical Services Pty Ltd		Scale:	NTS
			Figure No: 41

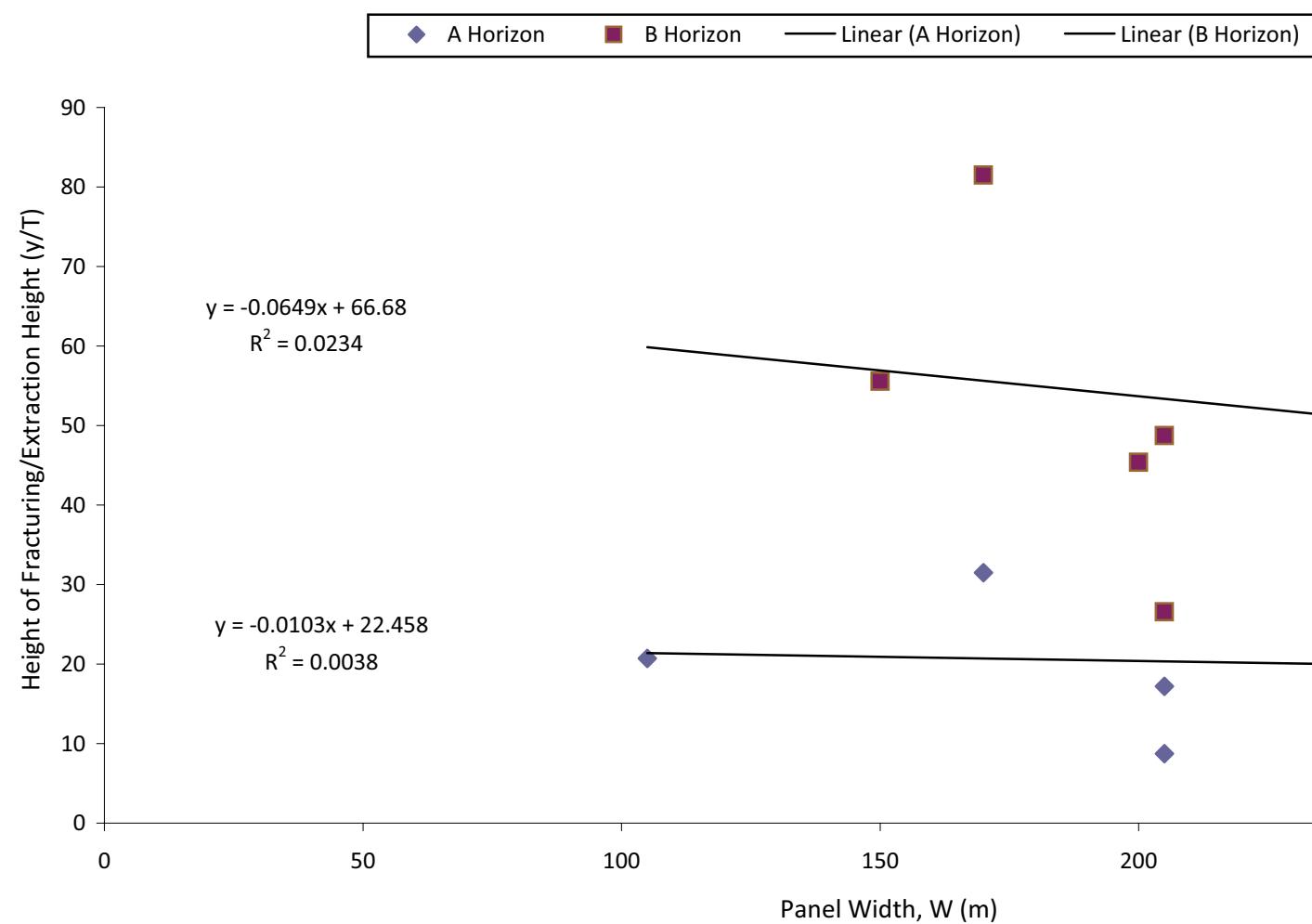


 Ditton Geotechnical Services Pty Ltd	Engineer:	S.Ditton	Client:	West Wallsend Colliery
	Drawn:	S.Ditton		WWD-012/1
	Date:	17.11.08	Title:	Schematic Model of Overburden Fracture Zones in Forster, 1995 Model (based on Piezometric Data Above Total Extraction Panels in the Newcastle Coalfield)
	Scale:	NTS	Figure No:	42

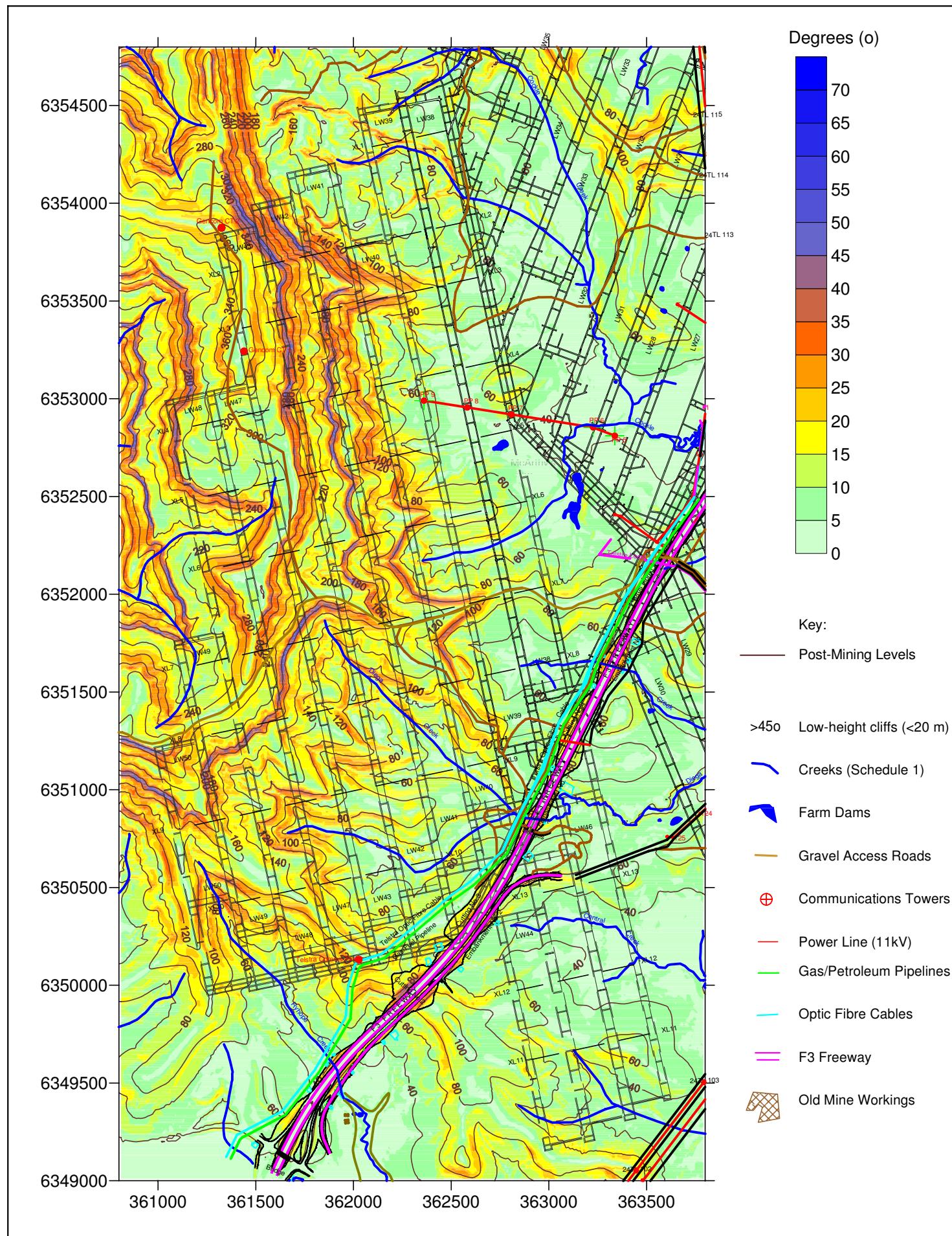




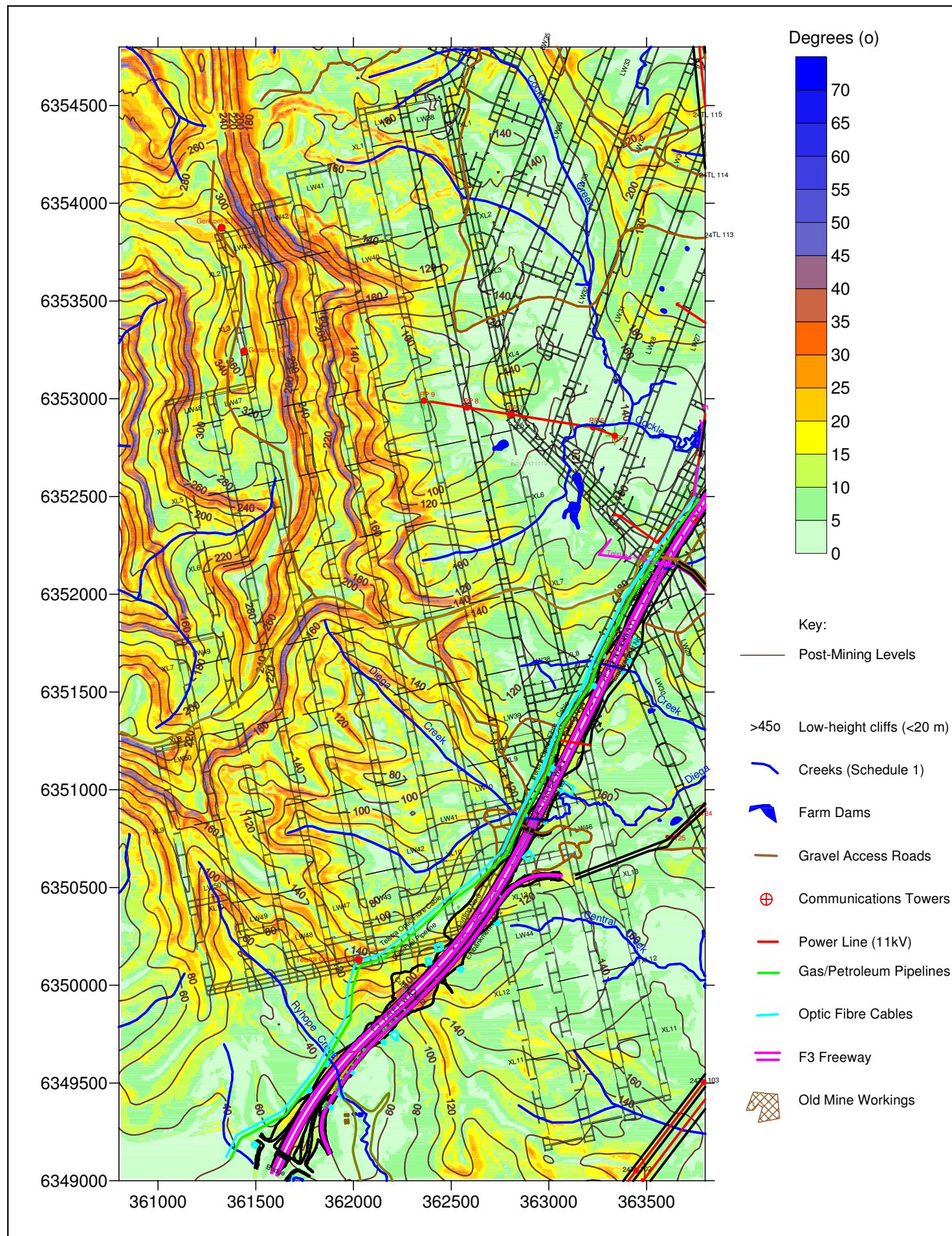
Engineer:	S.Ditton	Client:	West Wallsend Colliery
Drawn:	S.Ditton		WW-012/1
Date:	01.09.09	Title:	Sub-surface Fracture Height above Longwall Panel Workings Prediction Model based on ACARP, 2003 with Predicted Outcomes for the Proposed LWS 38 to 50
Ditton Geotechnical Services Pty Ltd		Scale:	NTS
		Figure No:	44a



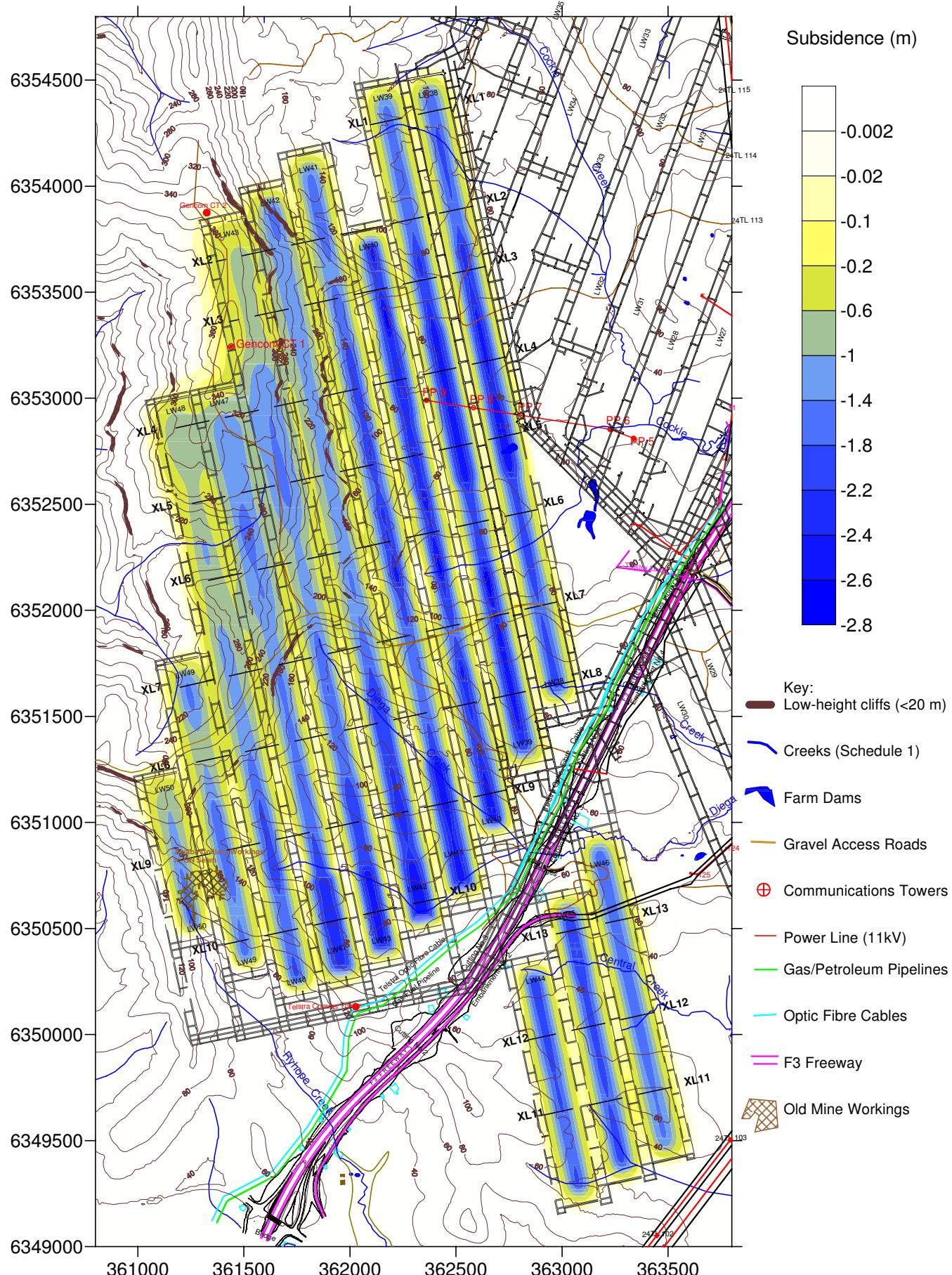
 Ditton Geotechnical Services Pty Ltd	Engineer:	S.Ditton	Client:	West Wallsend Colliery
	Drawn:	S.Ditton		WWD-012/1
	Date:	17.02.09	Title:	Measured Sub-surface Fracture Heights above Longwall Panels v. Panel Width (based on ACARP, 2003 data)
	Ditton Geotechnical Services Pty Ltd		Scale:	NTS
				Figure No: 44b



DgS Ditton Geotechnical Services Pty Ltd	Engineer:	S.Ditton	Client:	West Wallsend Colliery WWD-012/1
	Drawn:	S.Ditton		
	Date:	30.06.09	Title:	Predicted Post-Mining Surface Topography and Slopes (Worst-case) with Surface Features Shown
			Scale:	1:25,000
			Figure No:	45a



DgS Ditton Geotechnical Services Pty Ltd	Engineer:	S.Ditton	Client:	West Wallsend Colliery WWD-012/1
	Drawn:	S.Ditton		
	Date:	30.06.09	Title:	Predicted Post-Mining Slopes (Worst-case) with Cover Depth and Surface Features Shown
	Scale:	1:25,000	Figure No:	45b



DgS

Engineer: S.Ditton

Drawn: S.Ditton

Date: 30.06.09

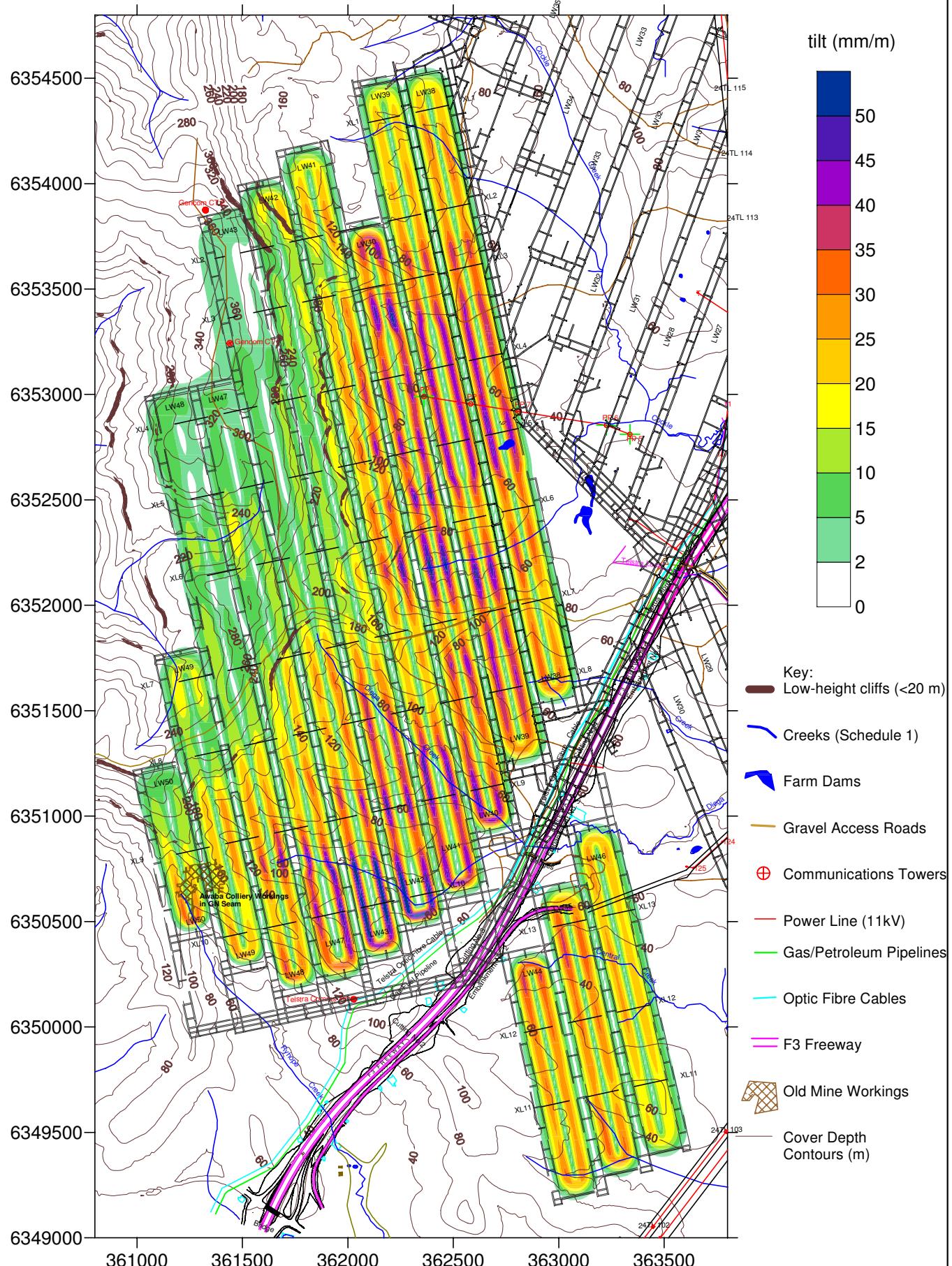
Ditton Geotechnical
Services Pty Ltd

Client: West Wallsend Colliery
WWD-012/1

Title: Predicted Worst-Case Subsidence Contours for Proposed Longwall Layout in Western and Southern Domains with Topographic Contours and Surface Site Features

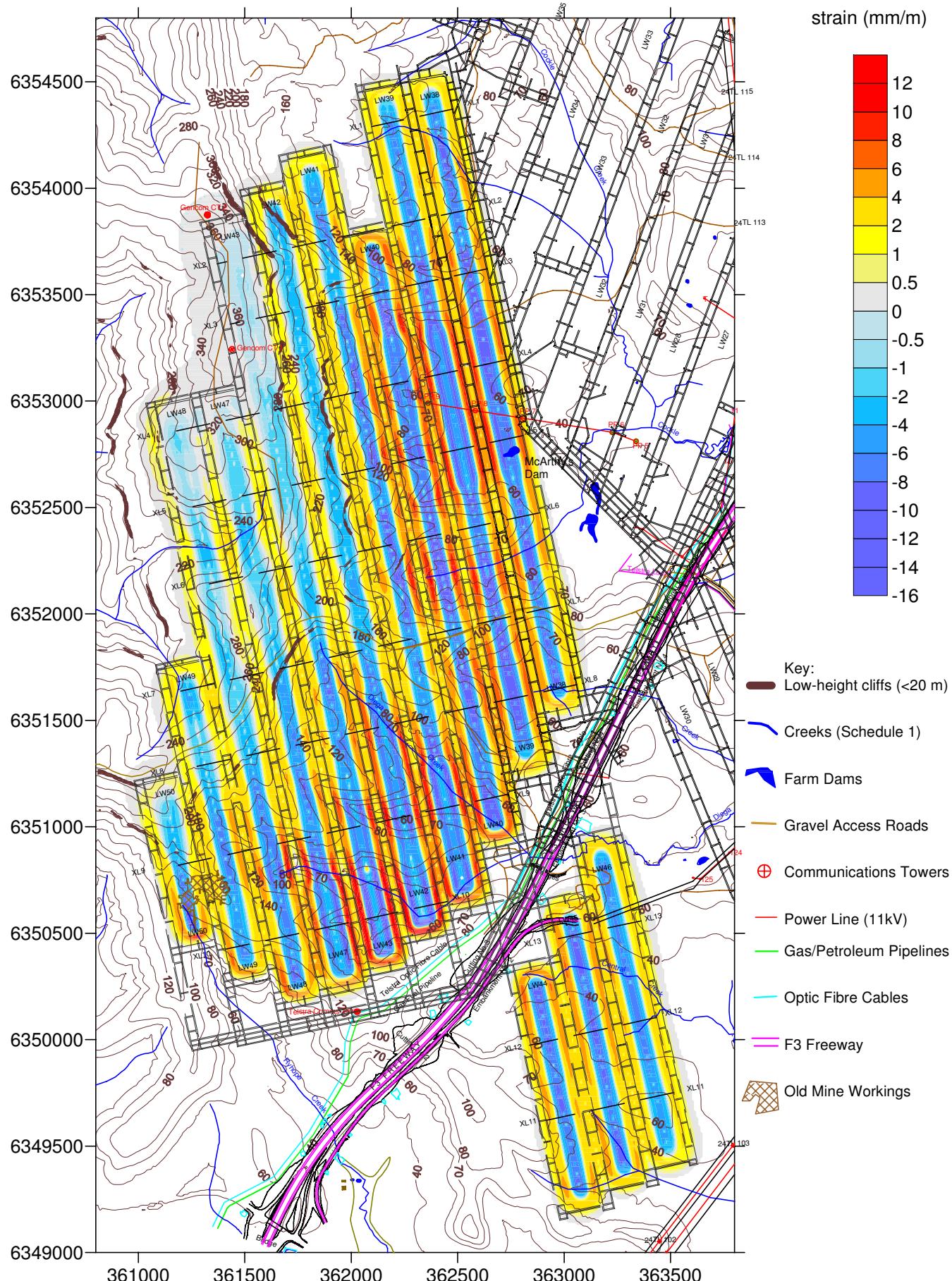
Scale: 1:25,000

Figure No: 46



DgS

Engineer:	S.Ditton	Client:	West Wallsend Colliery WWD-012/1
Drawn:	S.Ditton		
Date:	30.06.09	Title:	Predicted Tilt Contours (based on Worst-Case Subsidence Contours) for Proposed Longwall Layout in Western and Southern Domains with Topographic Contours and Surface Features
Ditton Geotechnical Services Pty Ltd		Scale:	1:25,000
			Figure No: 47



DgS

Engineer: S.Ditton

Drawn: S.Ditton

Date: 30.06.09

Ditton Geotechnical
Services Pty Ltd

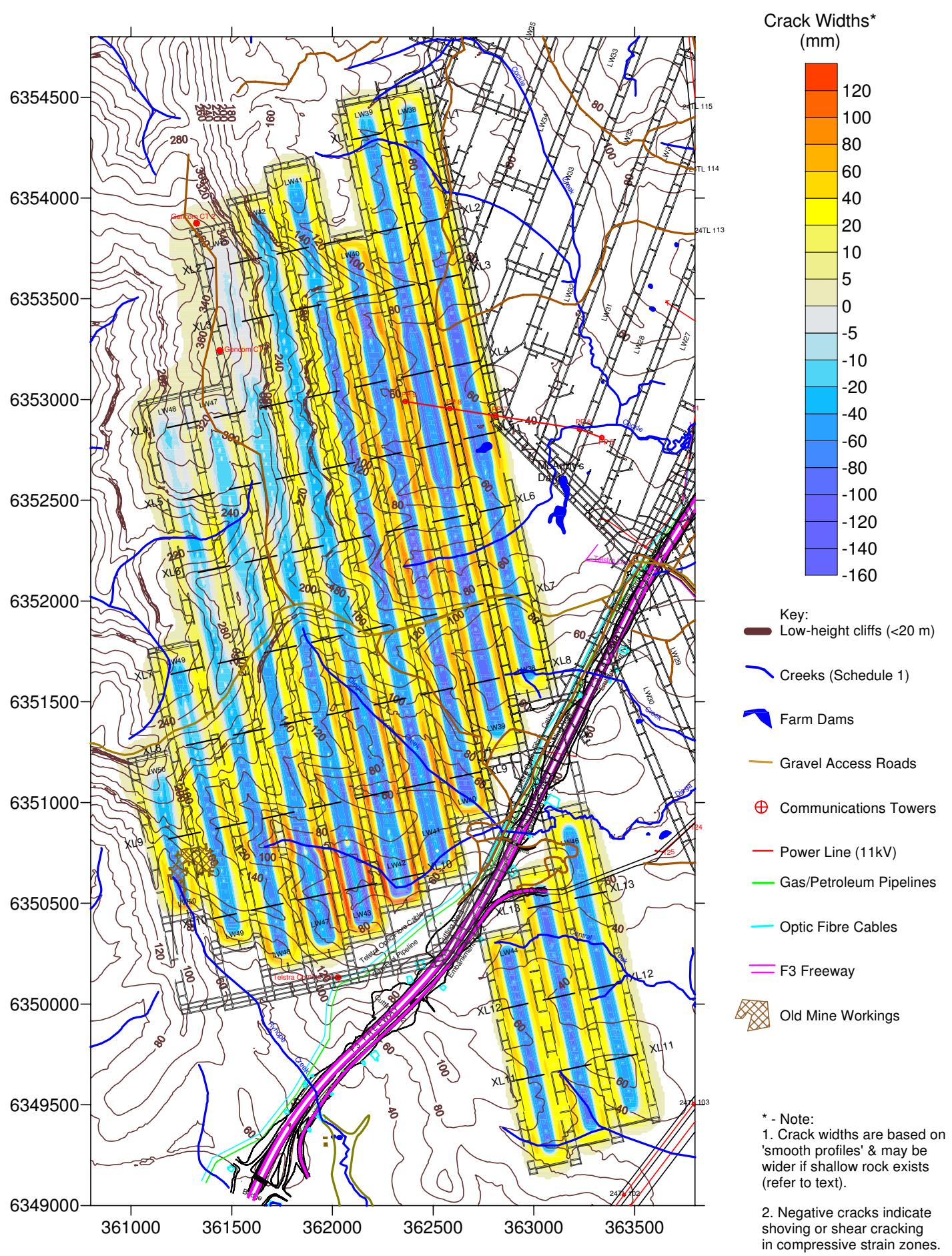
Client: West Wallsend Colliery

WW-012/1

Title: Predicted Principal Strain Contours (based on Worst-Case Subsidence Contours) for Proposed Longwall Layout in Western and Southern Domains with Topographic Contours and Surface Features

Scale: 1:25,000

Figure No: 48



DgS

Engineer: S.Ditton

Drawn: S.Ditton

Date: 30.06.09

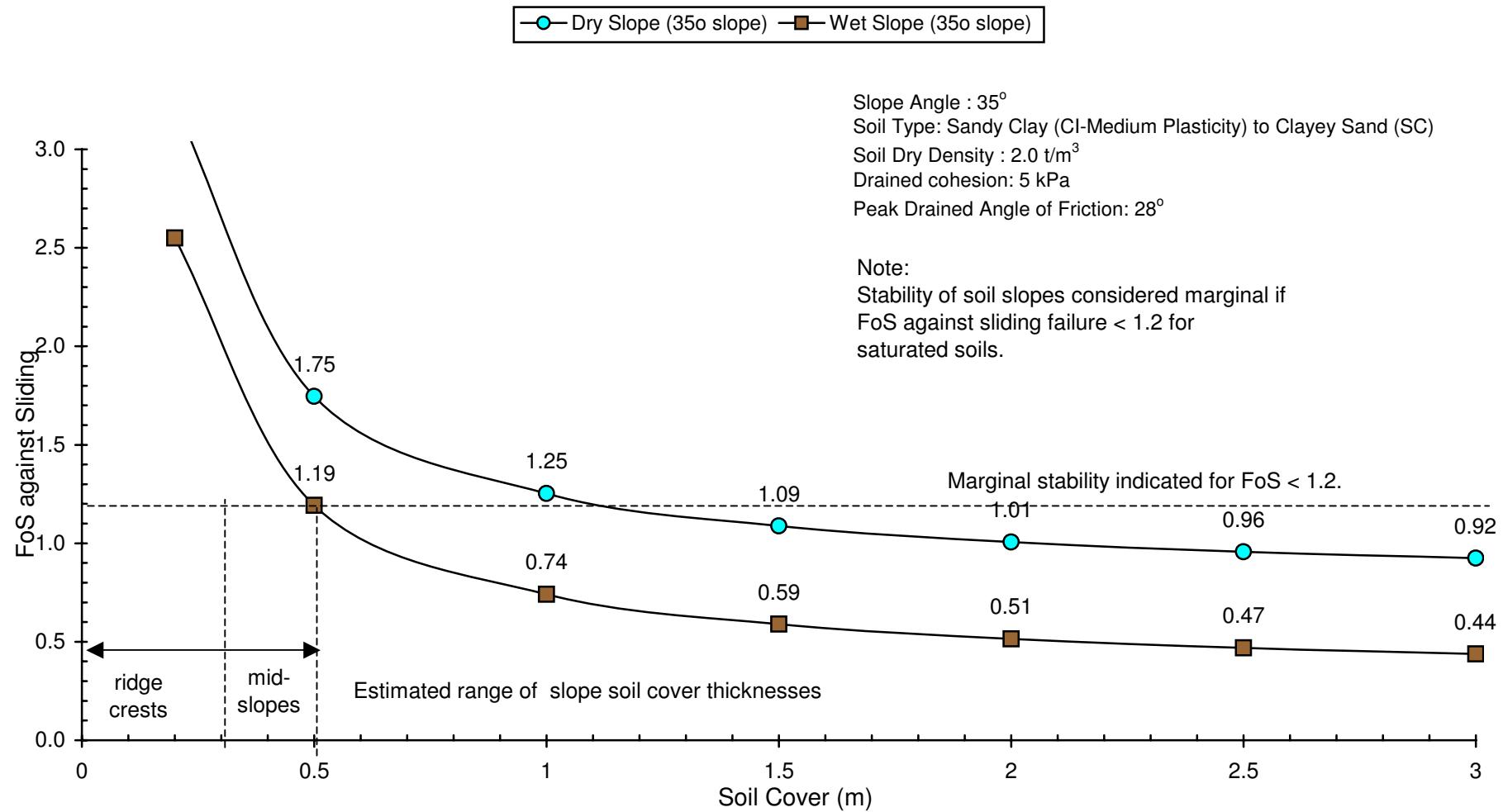
Ditton Geotechnical
Services Pty Ltd

Client: West Wallsend Colliery
WWD-012/1

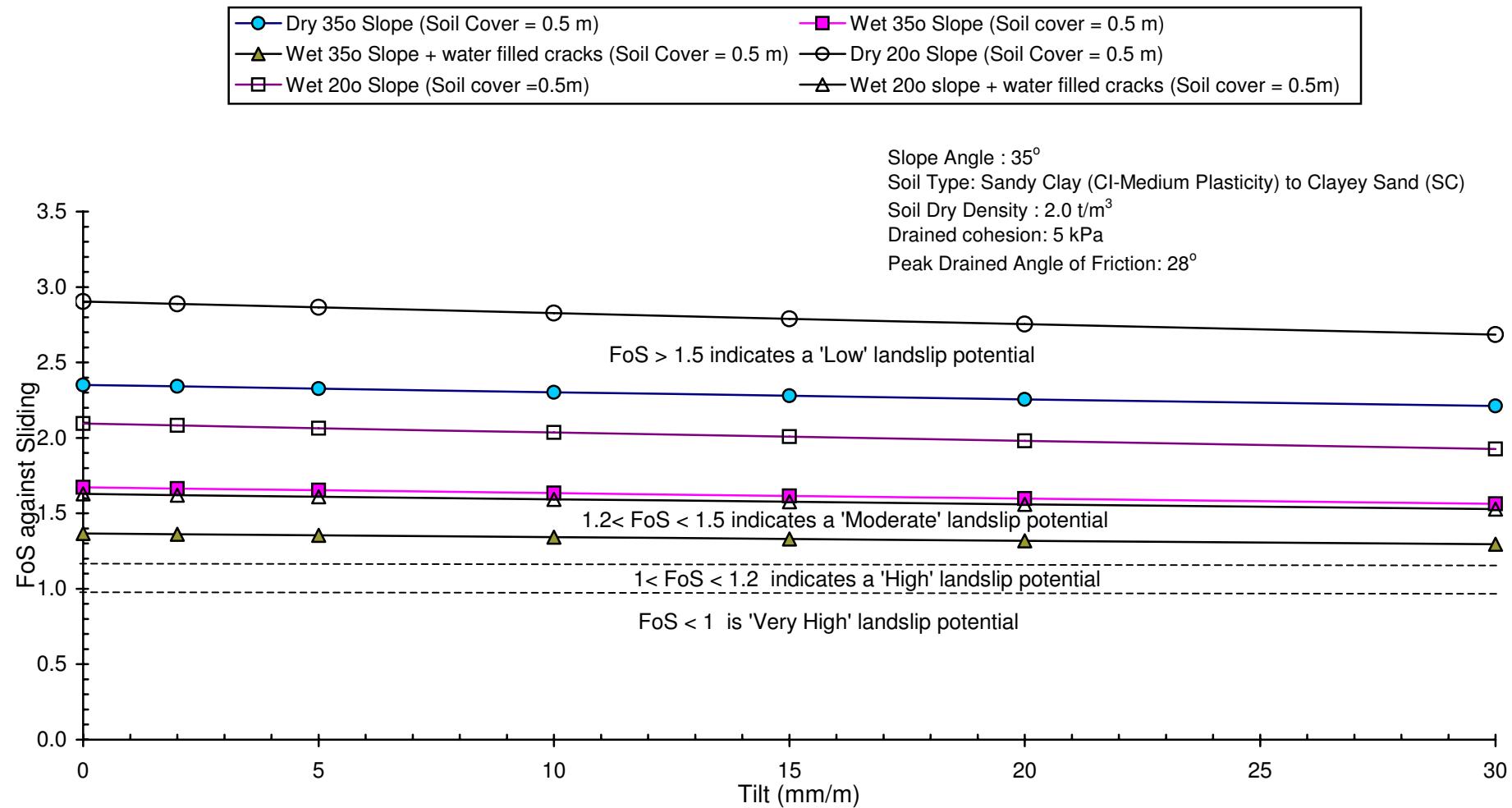
Title: Predicted Potential Surface Crack Widths (based on Worst-Case Subsidence Contours) for Proposed Longwall Layout in Western and Southern Domains and Post Mining Topographic Contours

Scale: 1:25,000

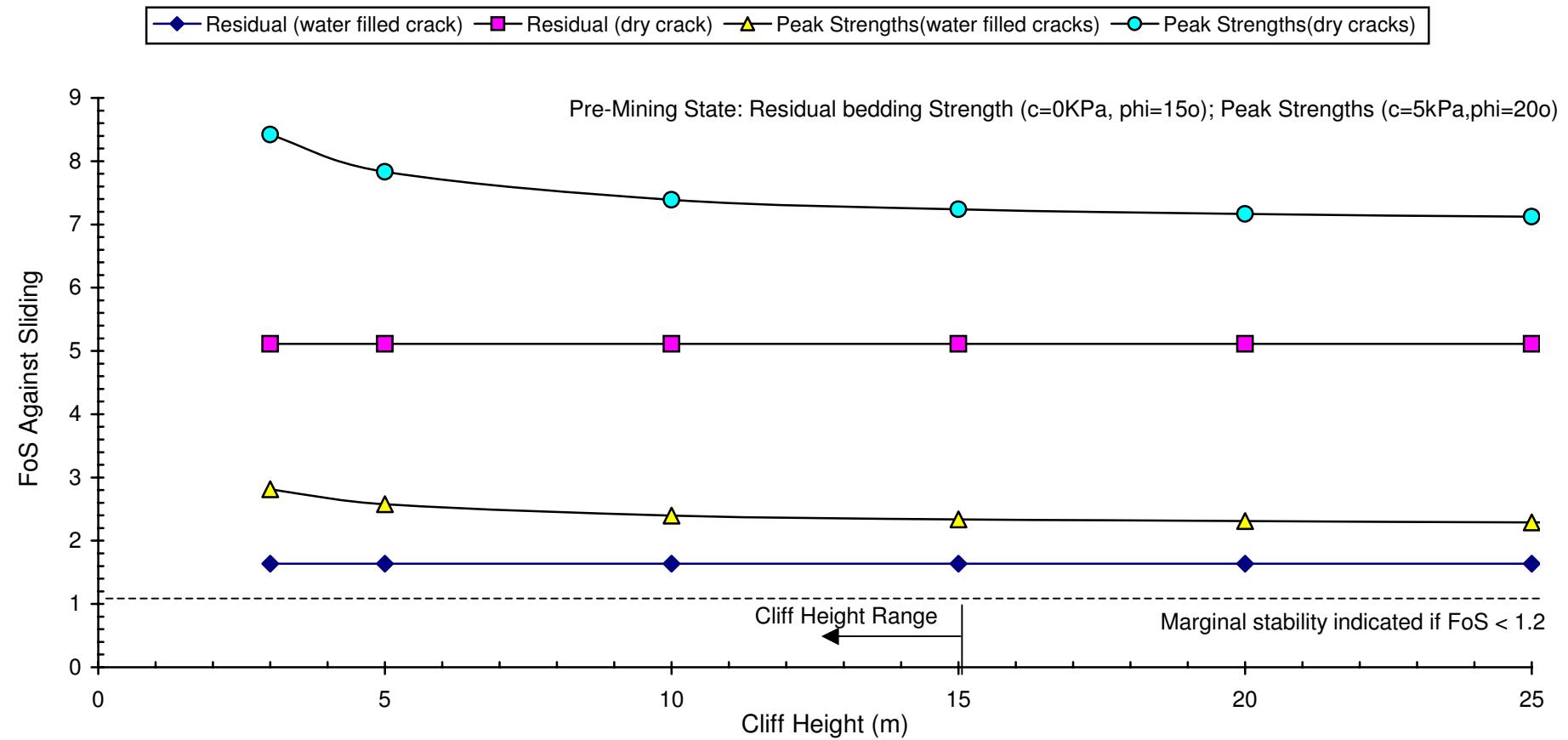
Figure No: 49



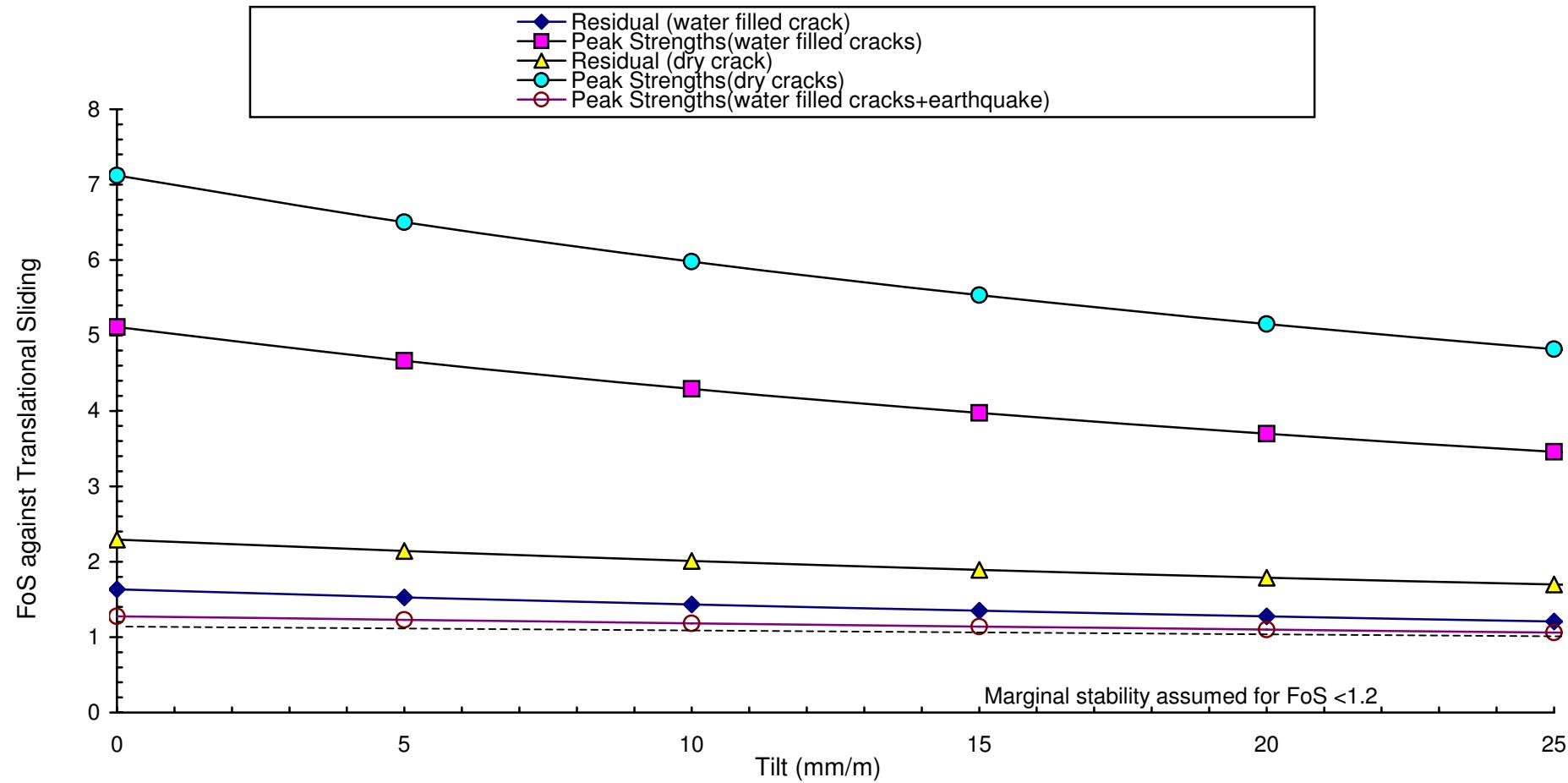
DgS 	Engineer:	S.Ditton	Client:	West Wallsend Colliery
	Drawn:	S.Ditton		WWD-012/1
	Date:	02.02.09	Title:	Calibration Results for Estimating Average Soil Thickness on Mid-Slopes and Observed Stability of 35° Slopes in Western Domain Before Mine Subsidence
	Ditton Geotechnical Services Pty Ltd		Scale:	NTS
			Figure No:	50a



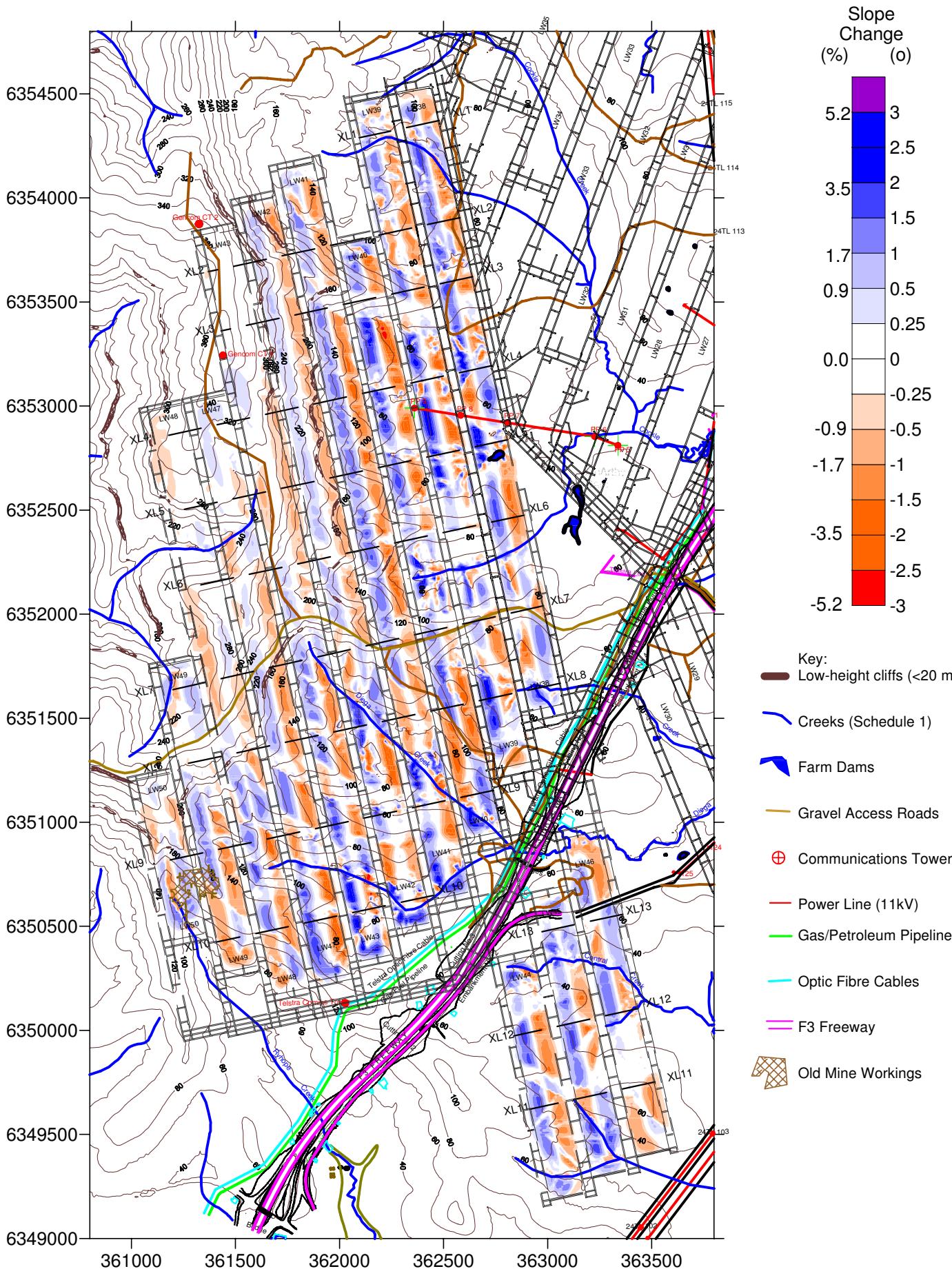
DgS 	Engineer:	S.Ditton	Client:	West Wallsend Colliery			
	Drawn:	S.Ditton		WWD-012/1			
	Date:	02.02.09	Title:	Estimated Factor of Safety Against Sliding of Steep Soil Slopes at West Wallsend Due to Tensile Cracking Through Soil Profile and Range of Predicted Tilt Due to Subsidence			
	Ditton Geotechnical Services Pty Ltd			Scale:	NTS	Figure No:	
						50b	



DgS 	Engineer:	S.Ditton	Client:	West Wallsend Colliery		
	Drawn:	S.Ditton		WWD-012/1		
	Date:	02.02.09	Title:	Calibration Results for Average Cliff Height Properties and Observed Stability in Western Domain Before Mine Subsidence		
	Ditton Geotechnical Services Pty Ltd		Scale:	NTS		Figure No:
						51a



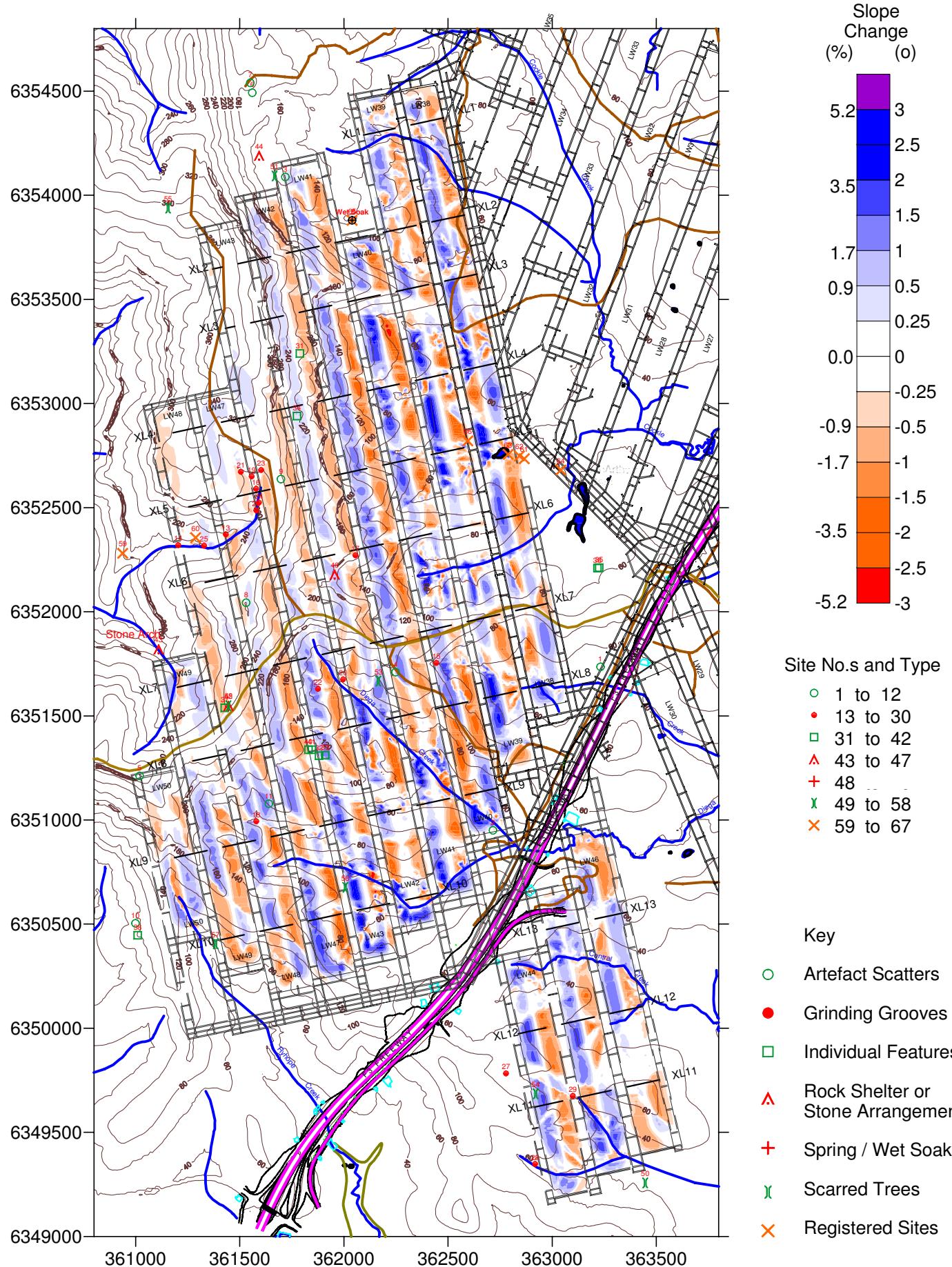
Engineer:	S.Ditton	Client:	West Wallsend Colliery
Drawn:	S.Ditton		WWD-012/1
Date:	02.02.09	Title:	Estimated Factor of Safety Against Sliding of Cliffs at West Wallsend for a Range of Tilt and Tensile Cracking Impacts after Mining
Ditton Geotechnical Services Pty Ltd		Scale:	NTS
		Figure No:	51b



DgS

Engineer: S.Ditton
 Drawn: S.Ditton
 Date: 30.06.09
 Ditton Geotechnical Services Pty Ltd

Client: West Wallsend Colliery WWD-012/1
 Title: Predicted Post-Mining Topography and Surface Gradient Changes (Worst-case) with Surface Features Shown
 Scale: 1:25,000
 Figure No: 52a



DgS

Engineer: S.Ditton

Drawn: S.Ditton

Date: 30.06.09

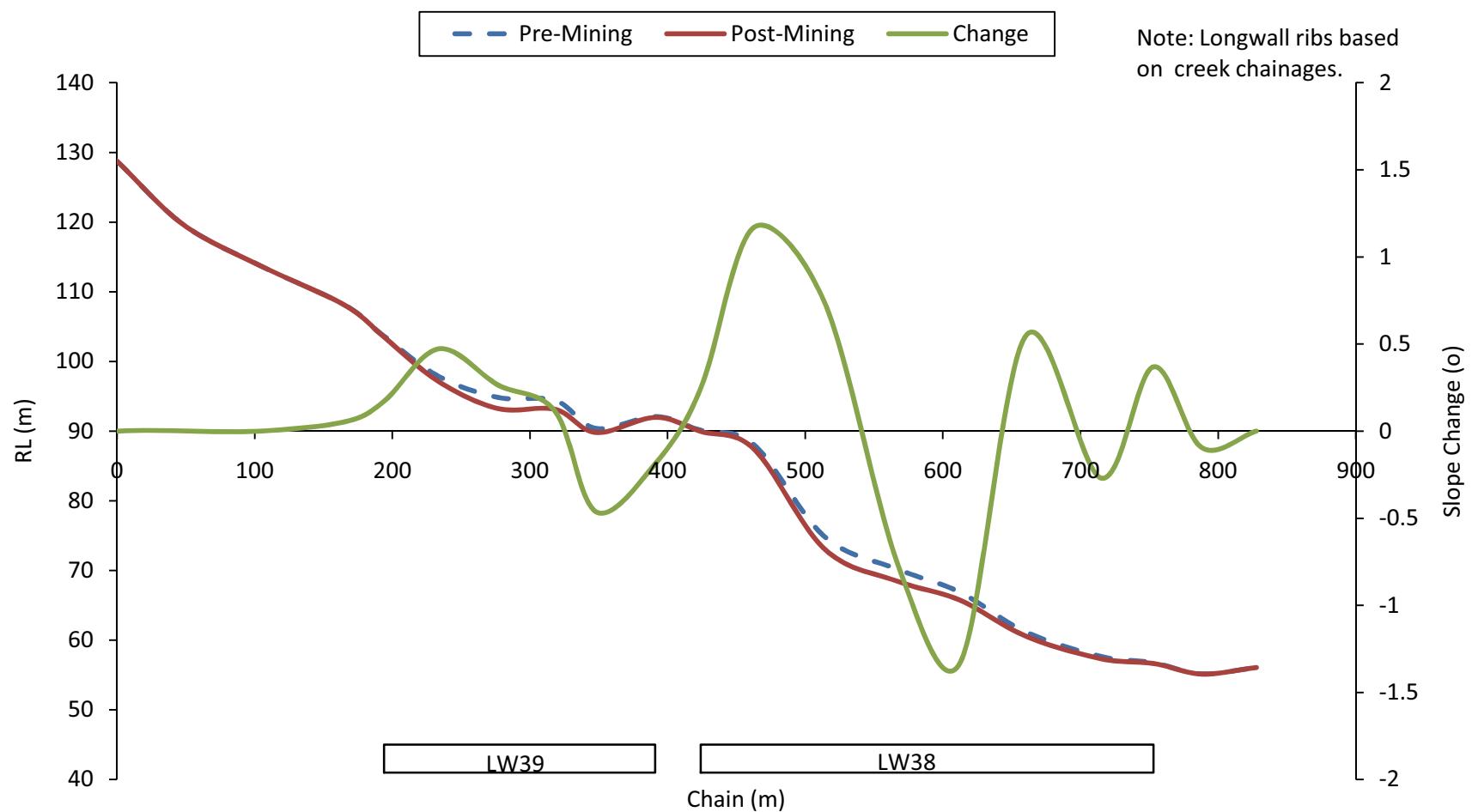
Ditton Geotechnical
Services Pty Ltd

Client: West Wallsend Colliery
WWD-012/1

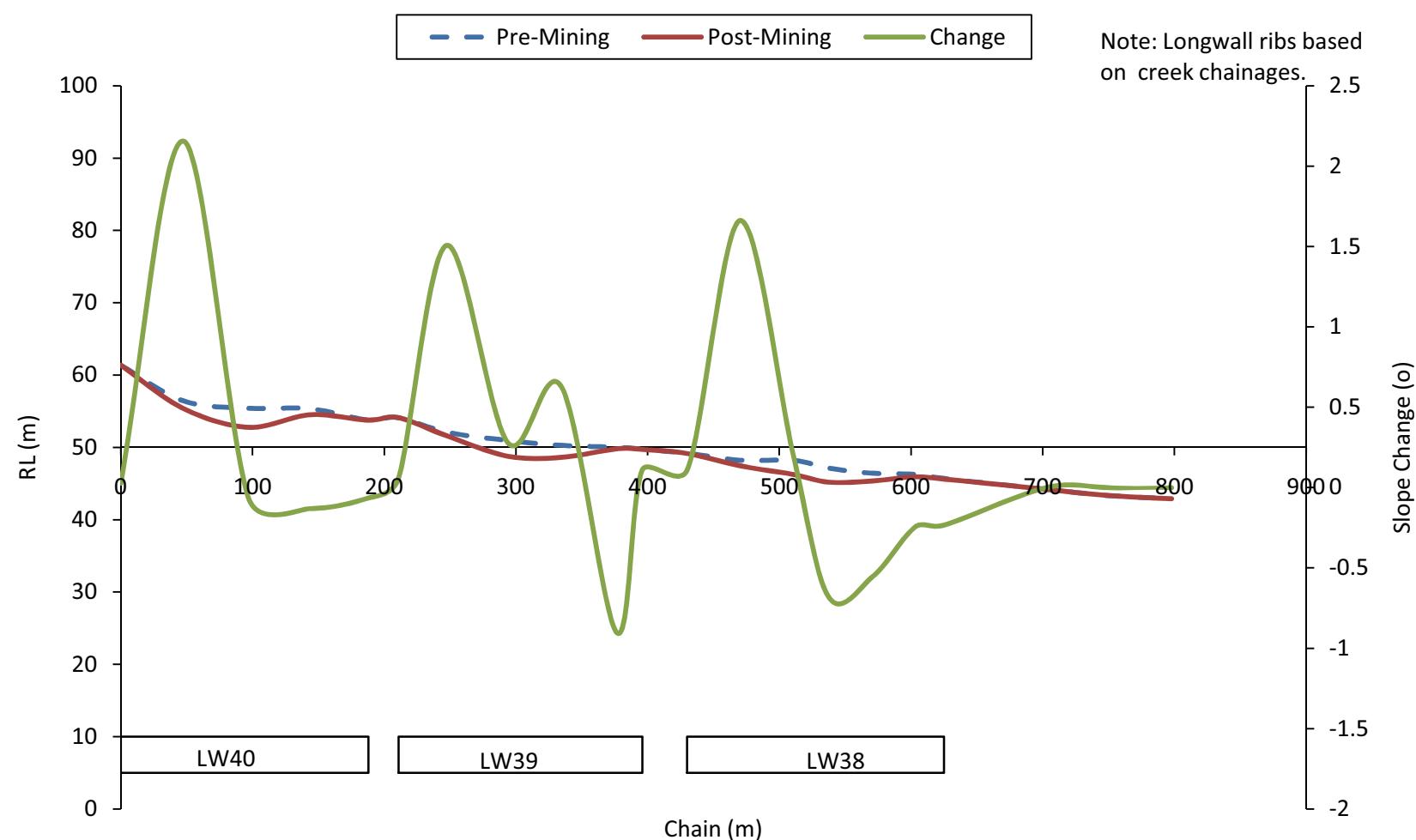
Title: Predicted Post-Mining Topography and Surface Gradient Changes
(Worst-case) with Aboriginal Archaeological Features Shown

Scale: 1:25,000

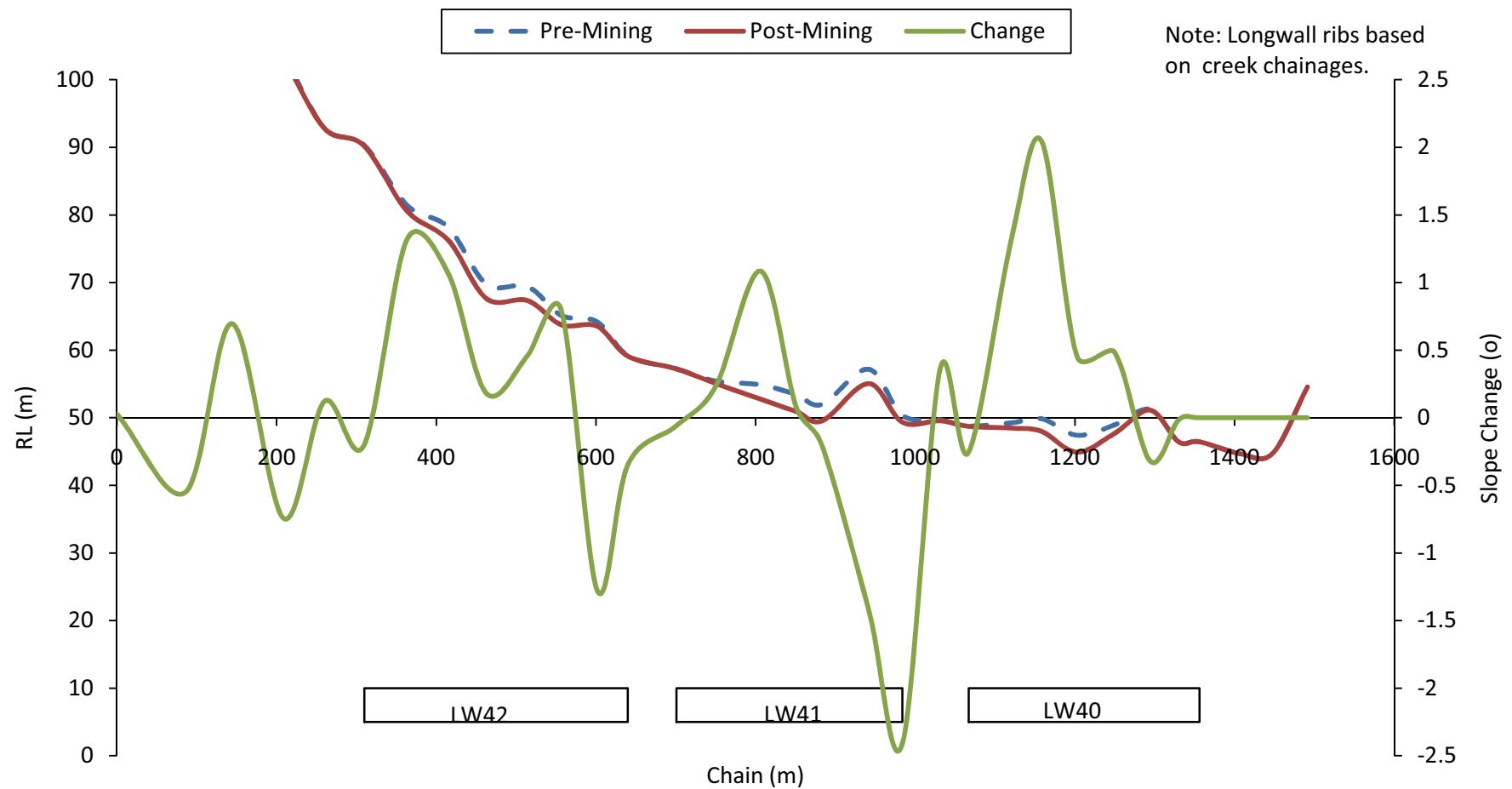
Figure No: 52b



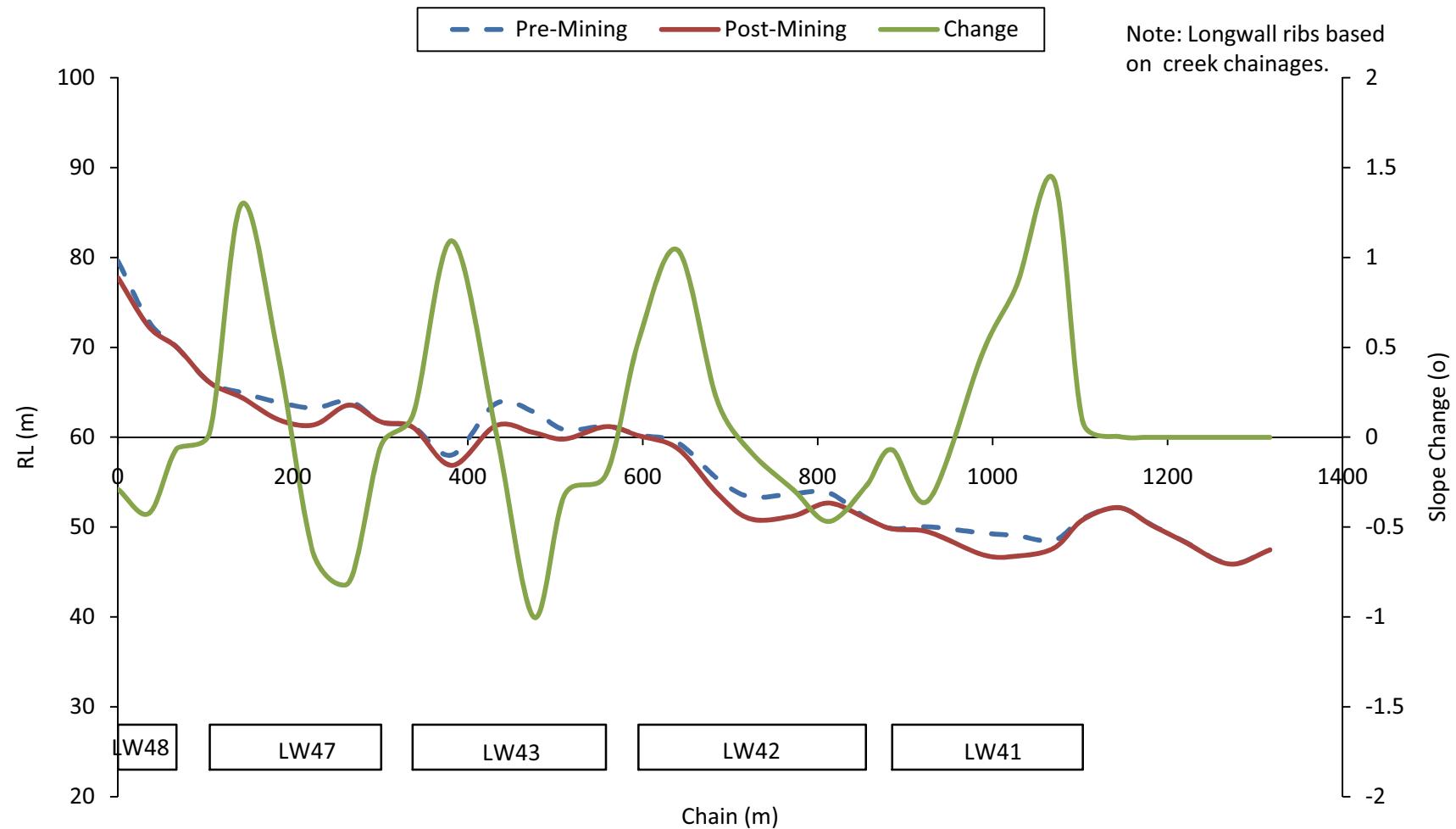
Engineer:	S.Ditton	Client:	West Wallsend Colliery
Drawn:	S.Ditton		WWD-012/1
Date:	30.06.09	Title:	Pre-mining and Predicted Post-Mining Surface Profiles Along Cockle Creek - North Tributary Above LWs 38 to 39 due to Worst-case Mine Subsidence
Ditton Geotechnical Services Pty Ltd		Scale:	NTS
		Figure No:	53a



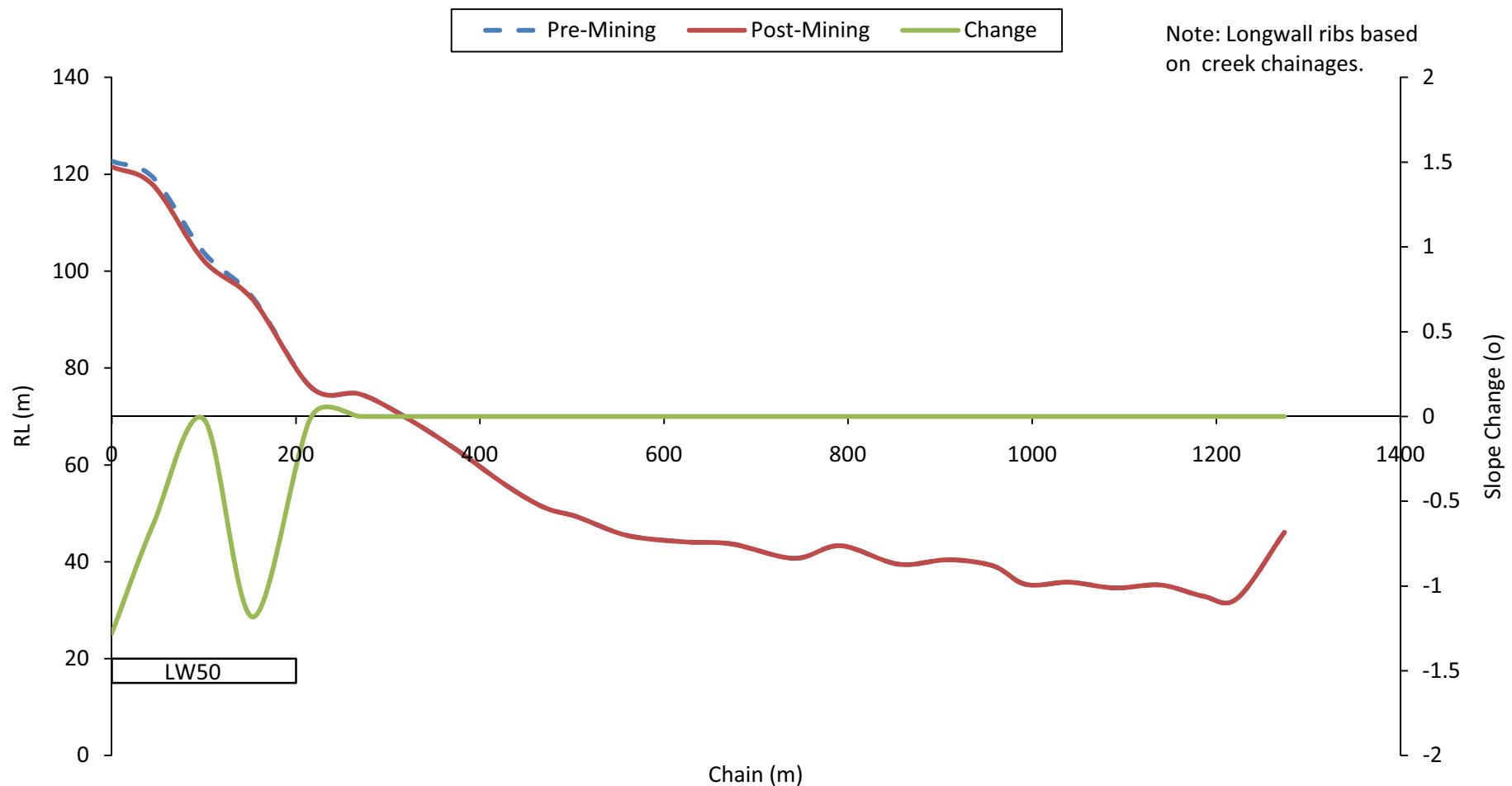
DgS 	Engineer:	S.Ditton	Client:	West Wallsend Colliery
	Drawn:	S.Ditton		WWD-012/1
	Date:	30.06.09	Title:	Pre-mining and Predicted Post-Mining Surface Profiles Along Cockle Creek - South
	Ditton Geotechnical Services Pty Ltd			Tributary Above LWs 38 to 40 due to Worst-case Mine Subsidence
	Scale:	NTS	Figure No:	53b



Engineer:	S.Ditton	Client:	West Wallsend Colliery
Drawn:	S.Ditton		WWD-012/1
Date:	30.06.09	Title:	Pre-mining and Predicted Post-Mining Surface Profiles Along Diega Creek
Ditton Geotechnical Services Pty Ltd		Above LWs 40 to 42 due to Worst-case Mine Subsidence	
		Scale:	NTS
		Figure No:	53c

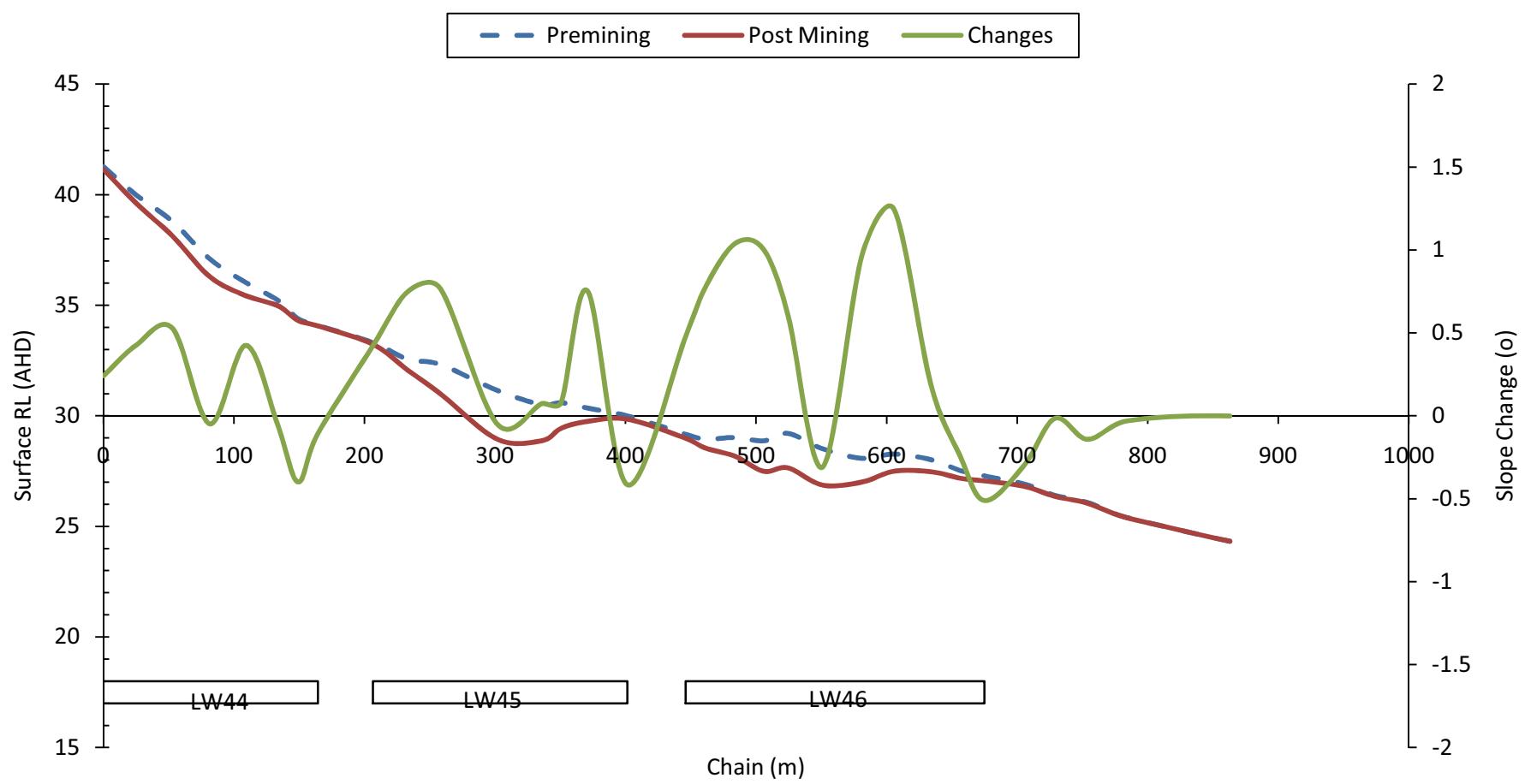


DgS 	Engineer:	S.Ditton	Client:	West Wallsend Colliery		
	Drawn:	S.Ditton		WWD-012/1		
	Date:	30.06.09	Title:	Pre-mining and Predicted Post-Mining Surface Profiles Along Diega Creek - South		
	Ditton Geotechnical Services Pty Ltd			Tributary Above LWs 41 to 43 and 47 to 48 due to Worst-case Mine Subsidence		
	Scale:		NTS	Figure No:		53d



DgS

Engineer:	S.Ditton	Client:	West Wallsend Colliery
Drawn:	S.Ditton		WWD-012/1
Date:	02.02.09	Title:	Pre-mining and Predicted Post-Mining Surface Profiles Along Ryhope Creek
Ditton Geotechnical Services Pty Ltd		Above LW 50 due to Worst-case Mine Subsidence	
		Scale:	NTS
		Figure No:	53e



Engineer:	S.Ditton	Client:	West Wallsend Colliery
Drawn:	S.Ditton		WWD-012/1
Date:	30.06.09	Title:	Pre-mining and Predicted Post-Mining Surface Profiles Along Central Creek
Ditton Geotechnical Services Pty Ltd		Tributary Above LWs 44 to 46 due to Worst-case Mine Subsidence	
		Scale:	NTS
		Figure No:	53f