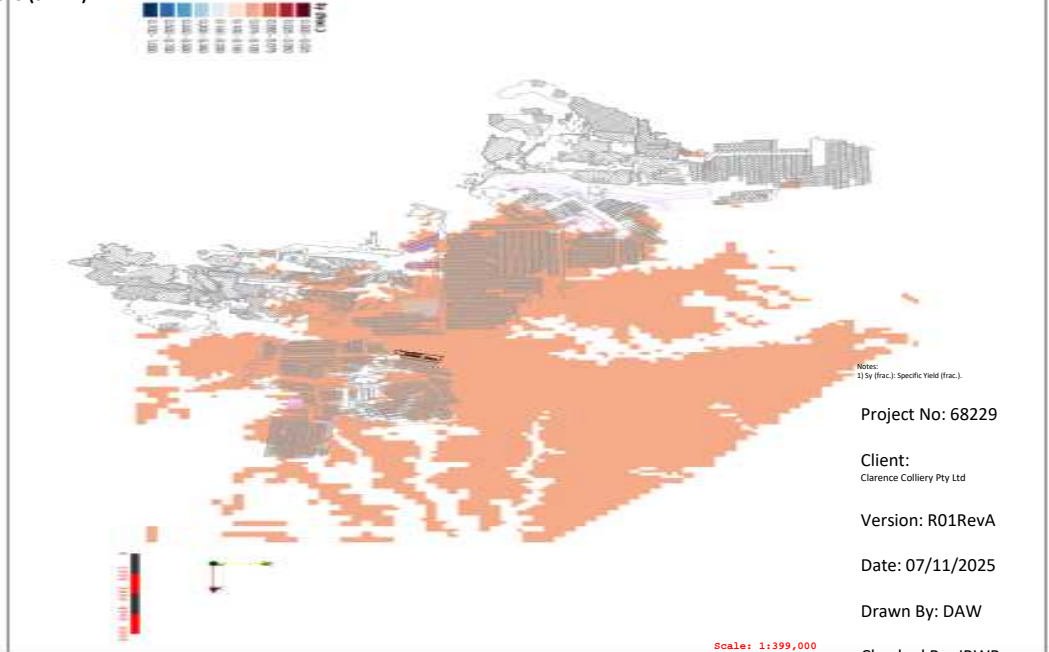
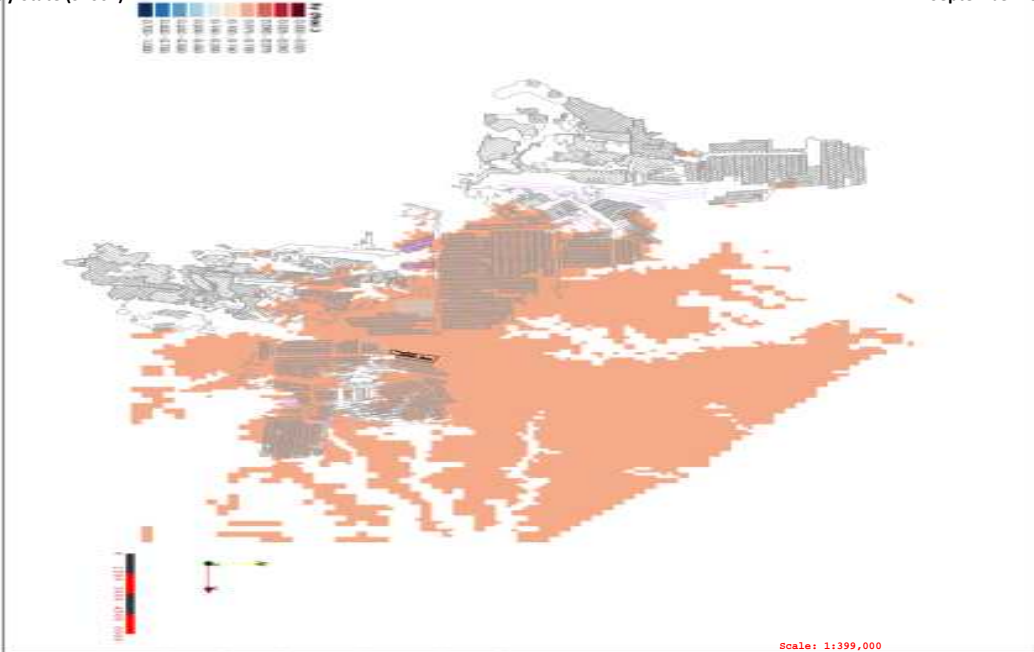


Legend

- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed

Steady-State (SP001):

September 2025 (SP144):



Notes:
1) Sy (frac.): Specific Yield (frac.).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

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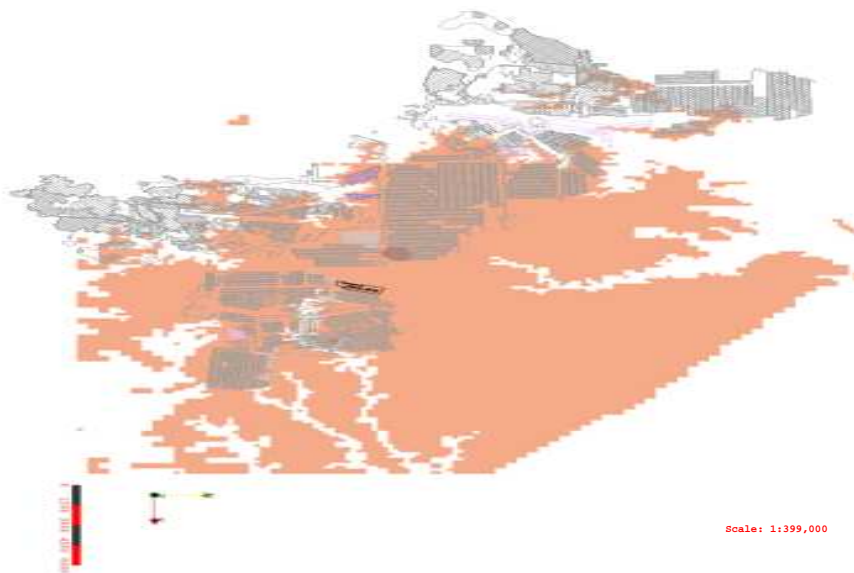
Drawn By: DAW

Checked By: JRWB

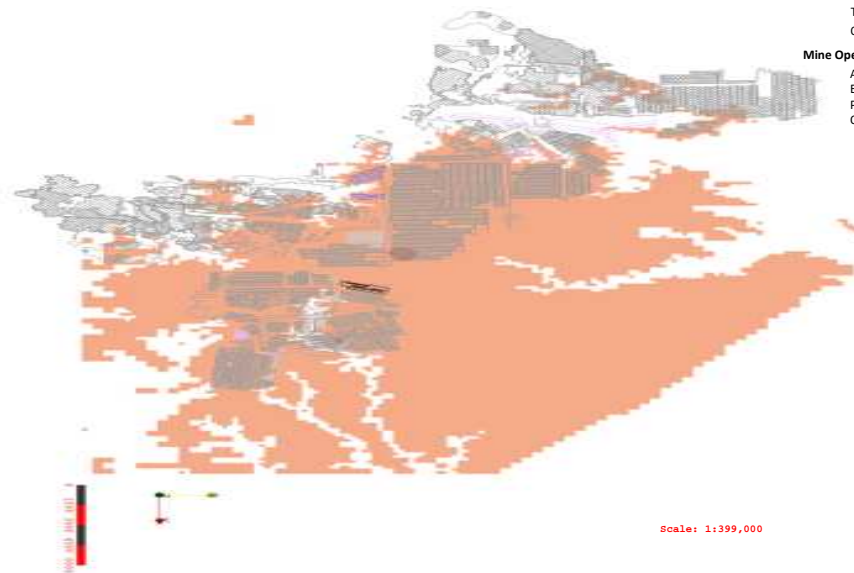
September 2026 (SP148):

December 2049 (SP241):

Figure E1d-13: Modelled Specific Yield (frac.) - Layer 13



Scale: 1:399,000

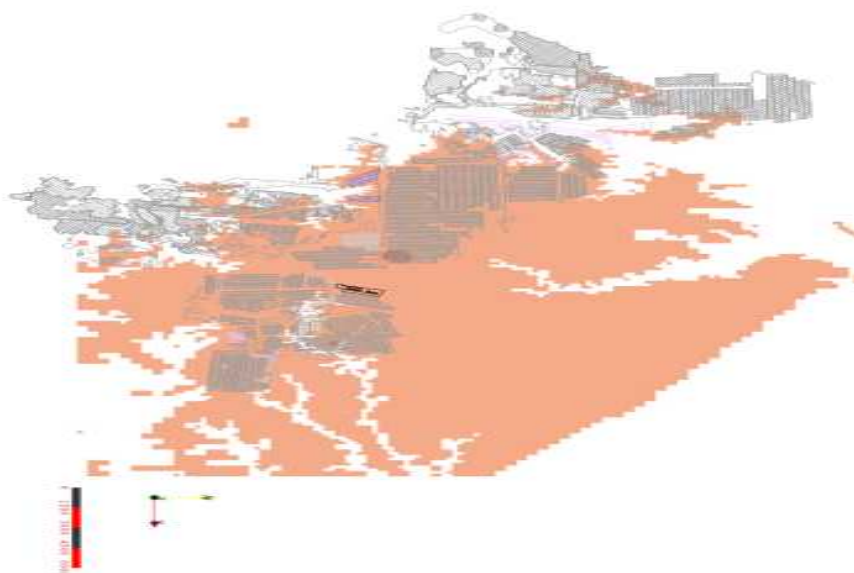


Scale: 1:399,000

Legend

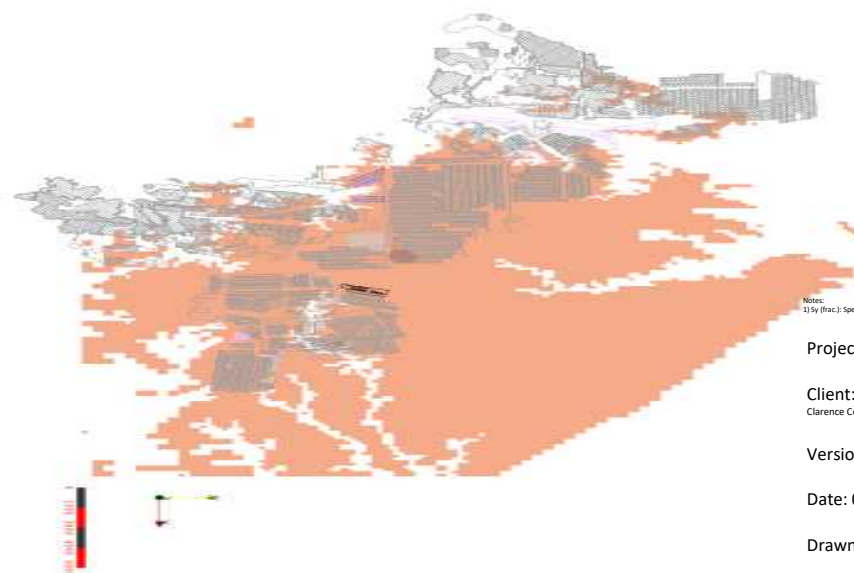
- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed

Steady-State (SP001):



Scale: 1:399,000

September 2025 (SP144):



Scale: 1:399,000

Notes:
 1) Sy (frac.): Specific Yield (frac).

Project No: 68229

Client:
 Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

Checked By: JRWB

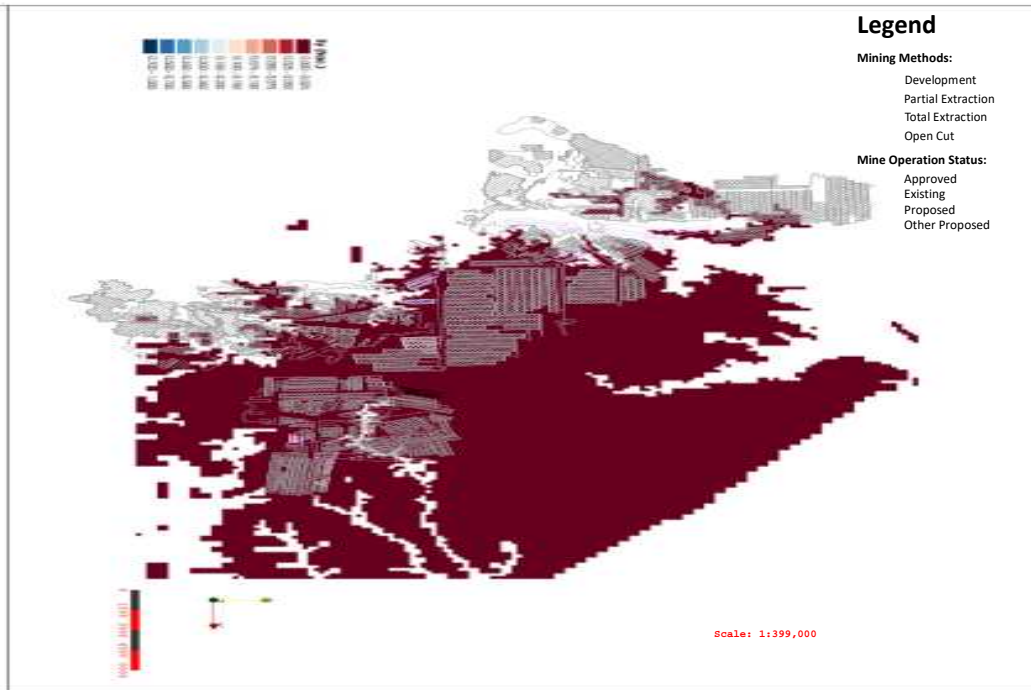
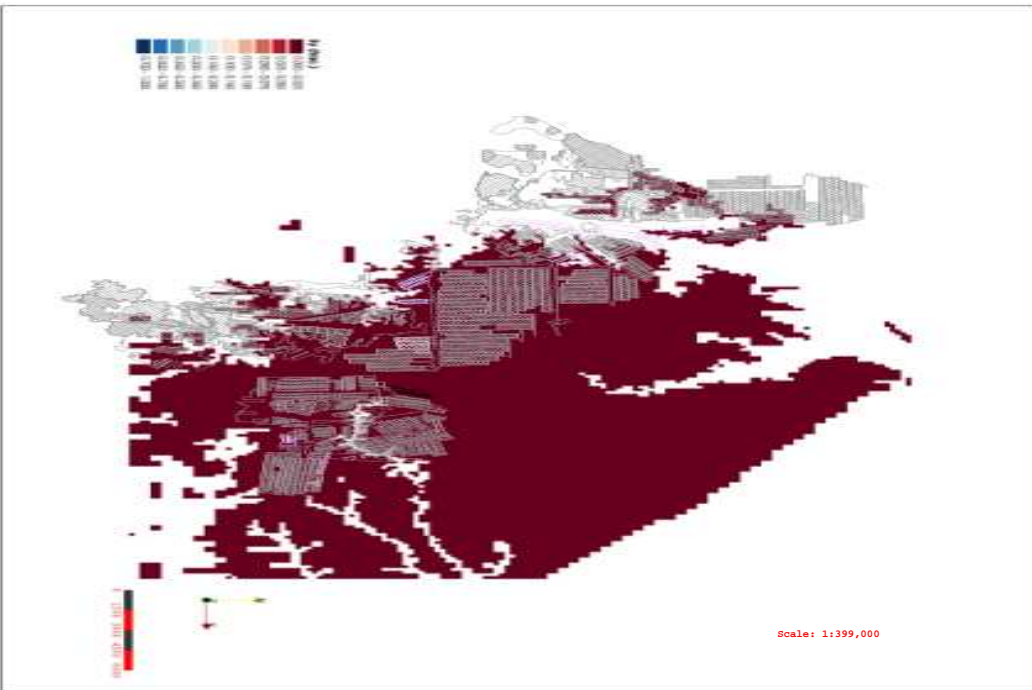
September 2026 (SP148):

December 2049 (SP241):

Figure E1d-14: Modelled Specific Yield (frac.) - Layer 14

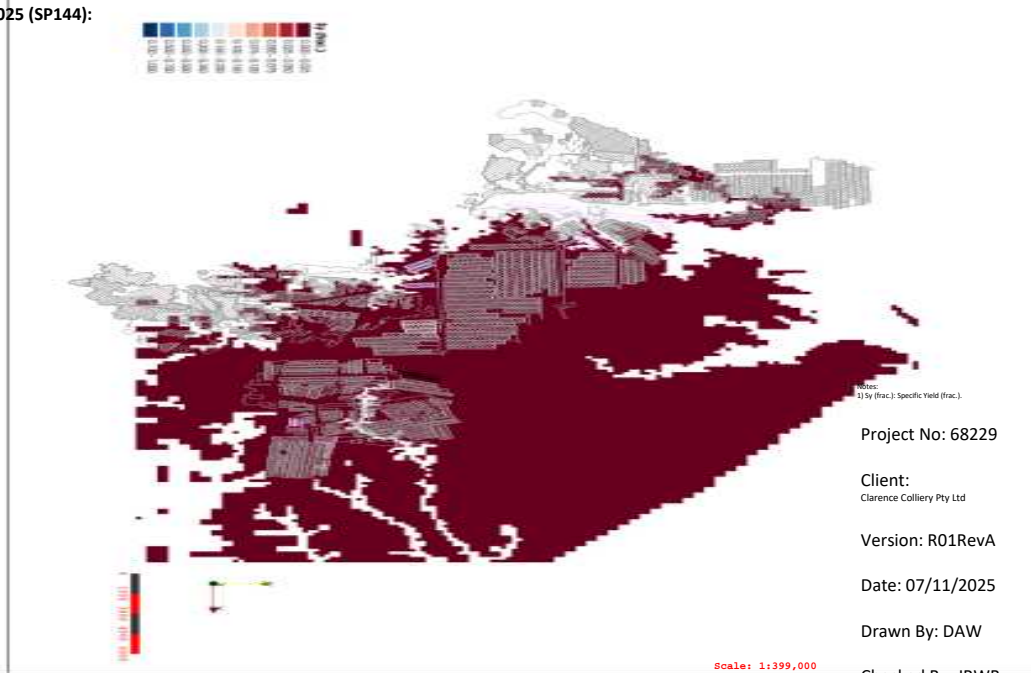
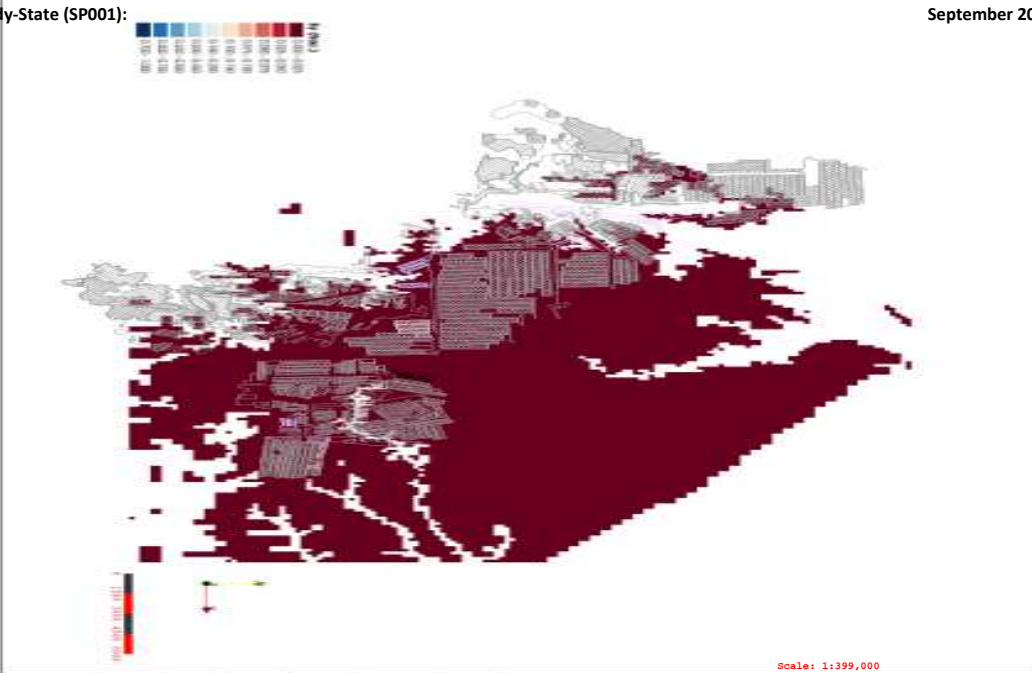
Legend

- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed



Steady-State (SP001):

September 2025 (SP144):



Notes:
1) Sy (frac.): Specific Yield (frac.).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

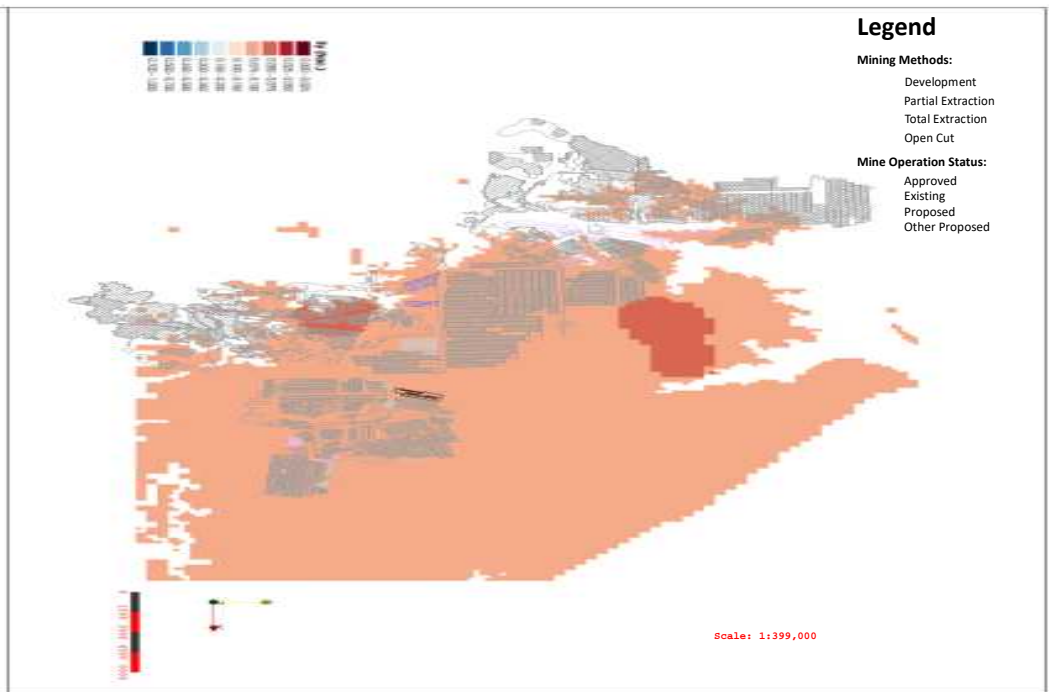
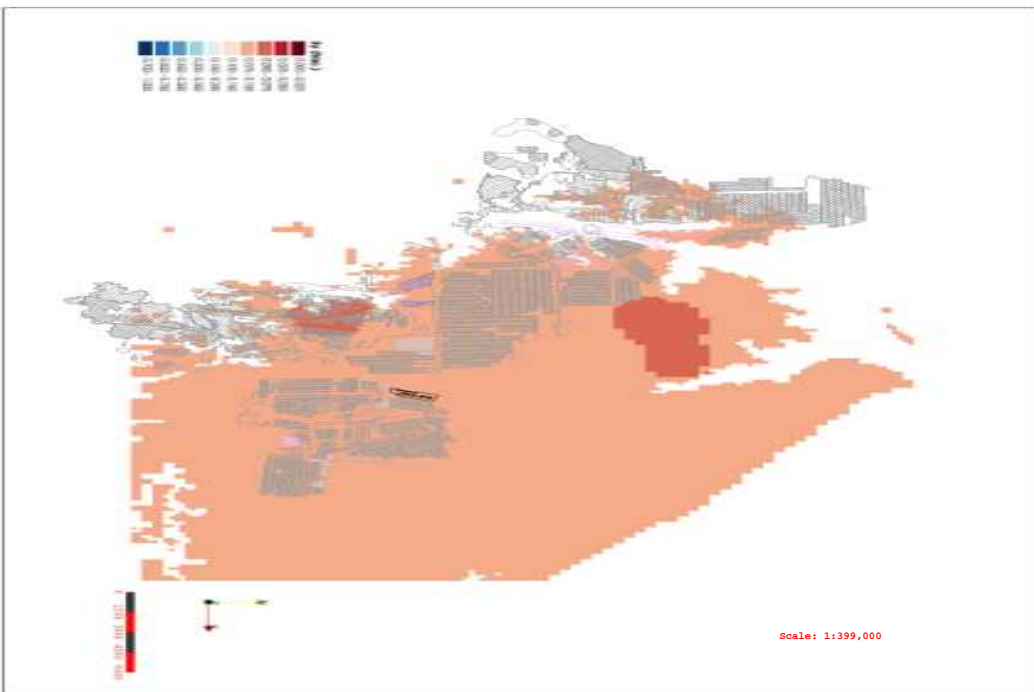
Drawn By: DAW

Checked By: JRWB

September 2026 (SP148):

December 2049 (SP241):

Figure E1d-15: Modelled Specific Yield (frac.) - Layer 15

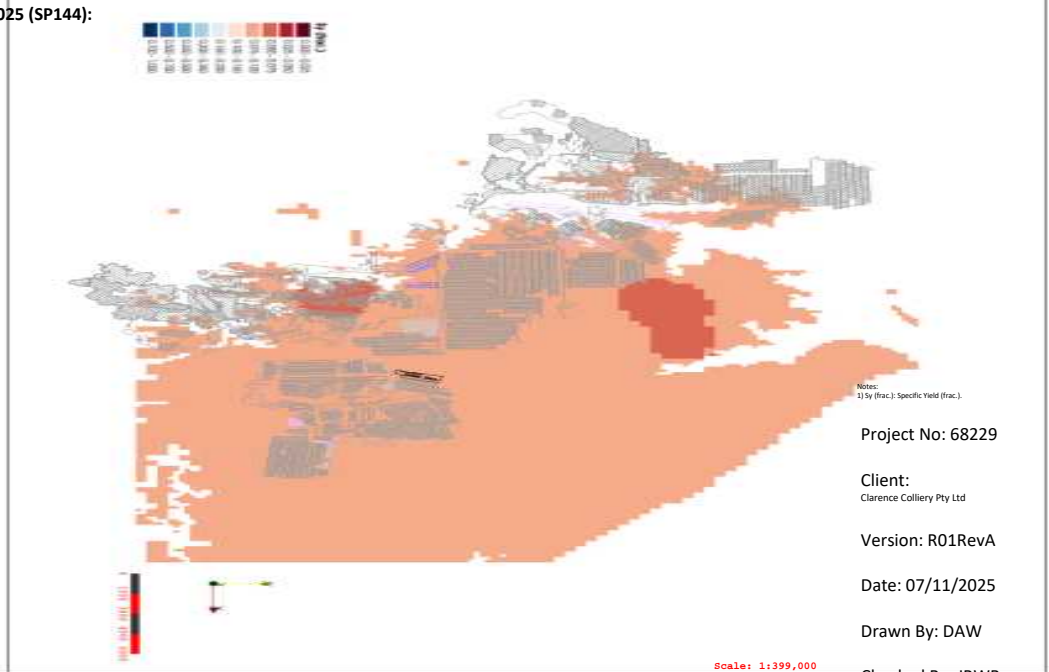
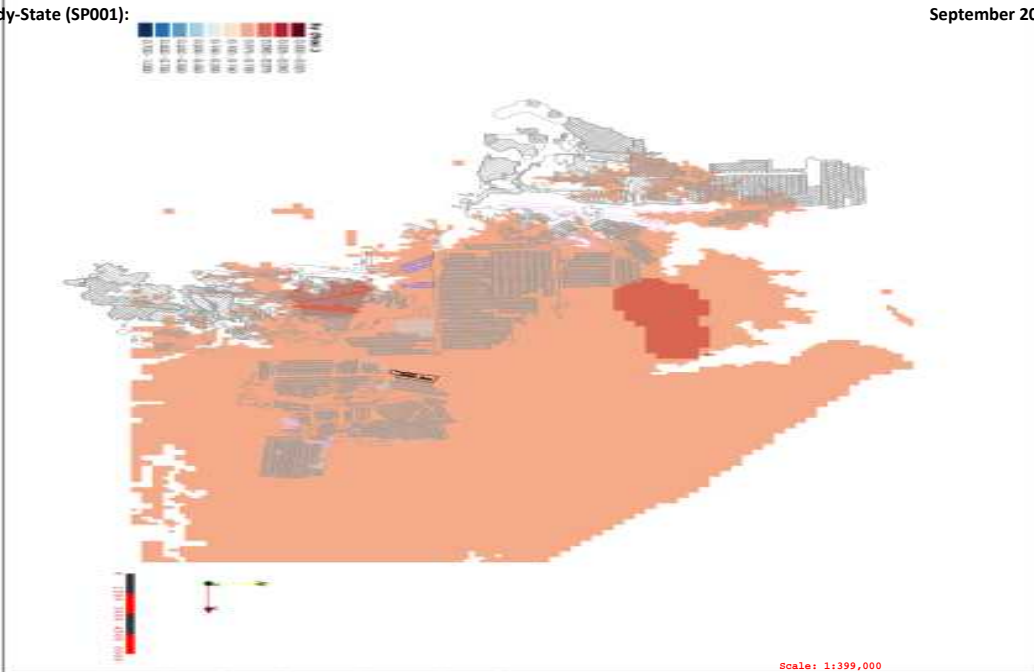


Legend

- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed

Steady-State (SP001):

September 2025 (SP144):



Notes:
1) Sy (frac.): Specific Yield (frac.).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

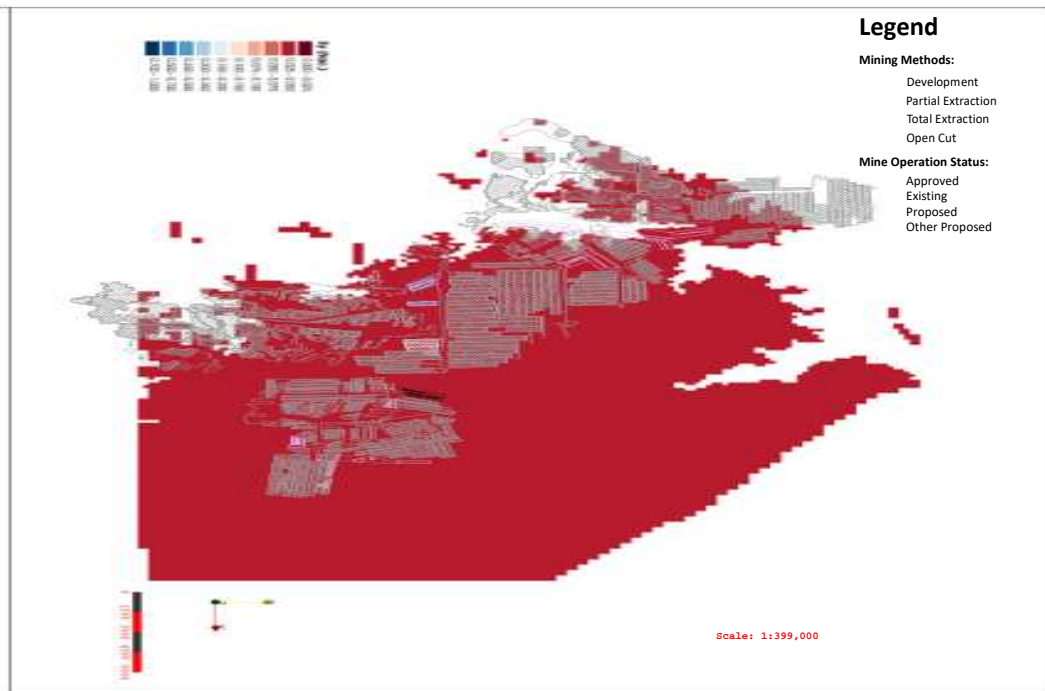
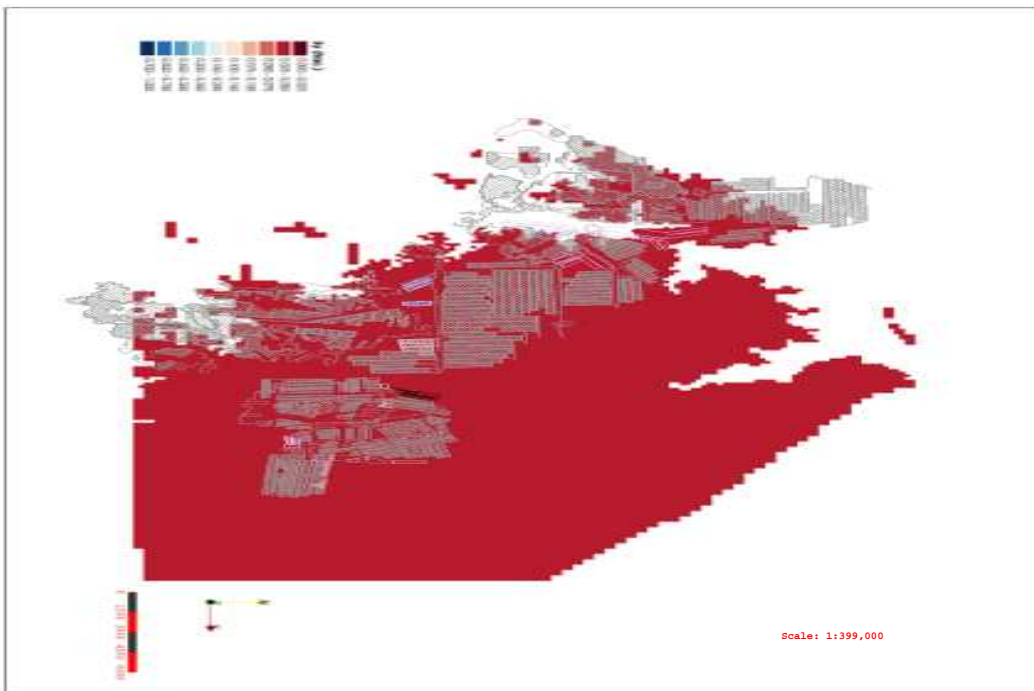
Drawn By: DAW

Checked By: JRWB

September 2026 (SP148):

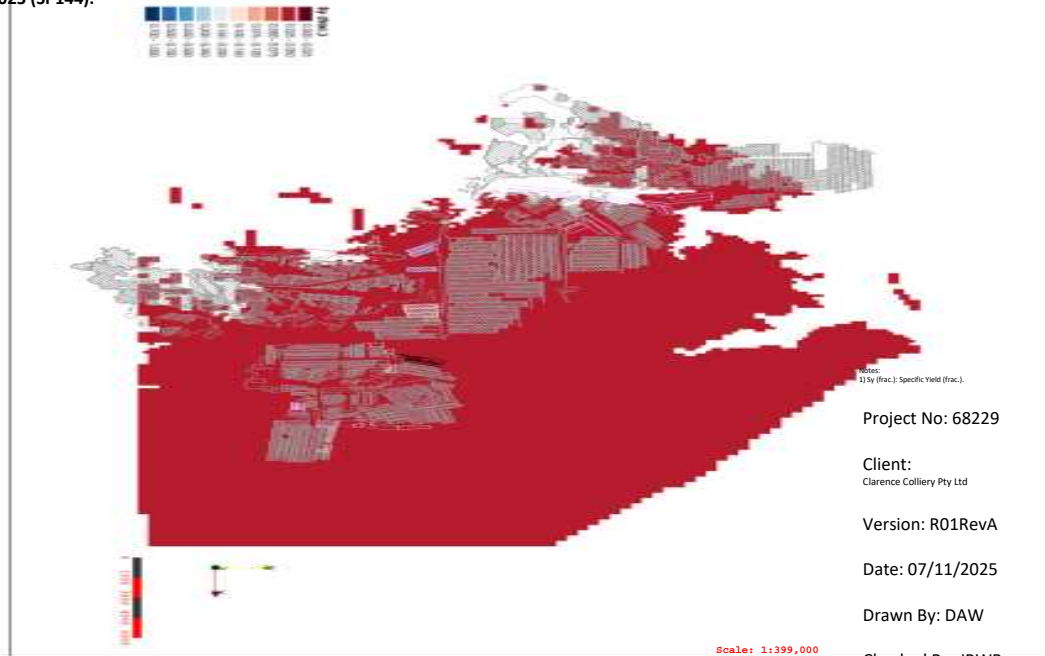
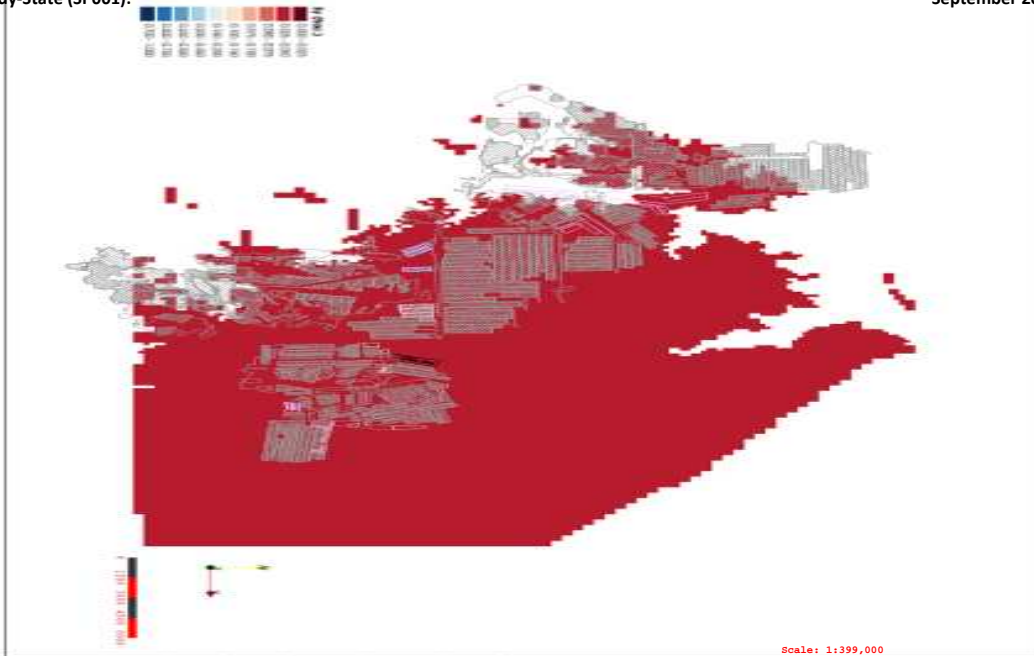
December 2049 (SP241):

Figure E1d-16: Modelled Specific Yield (frac.) - Layer 16



Steady-State (SP001):

September 2025 (SP144):



Notes:
1) Sy (frac.): Specific Yield (frac.).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

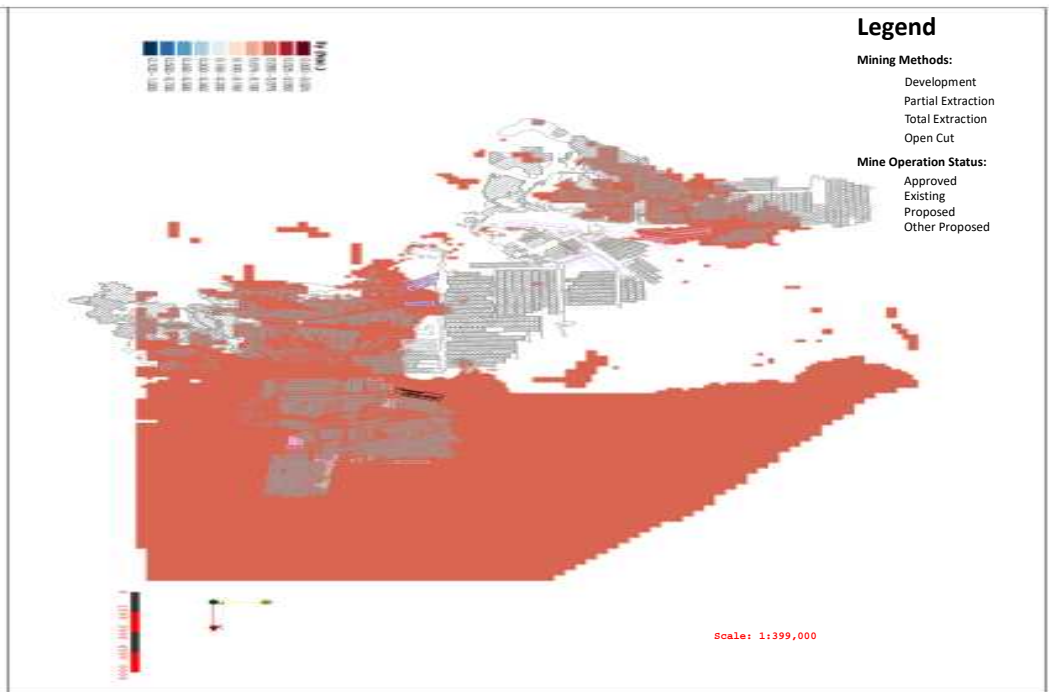
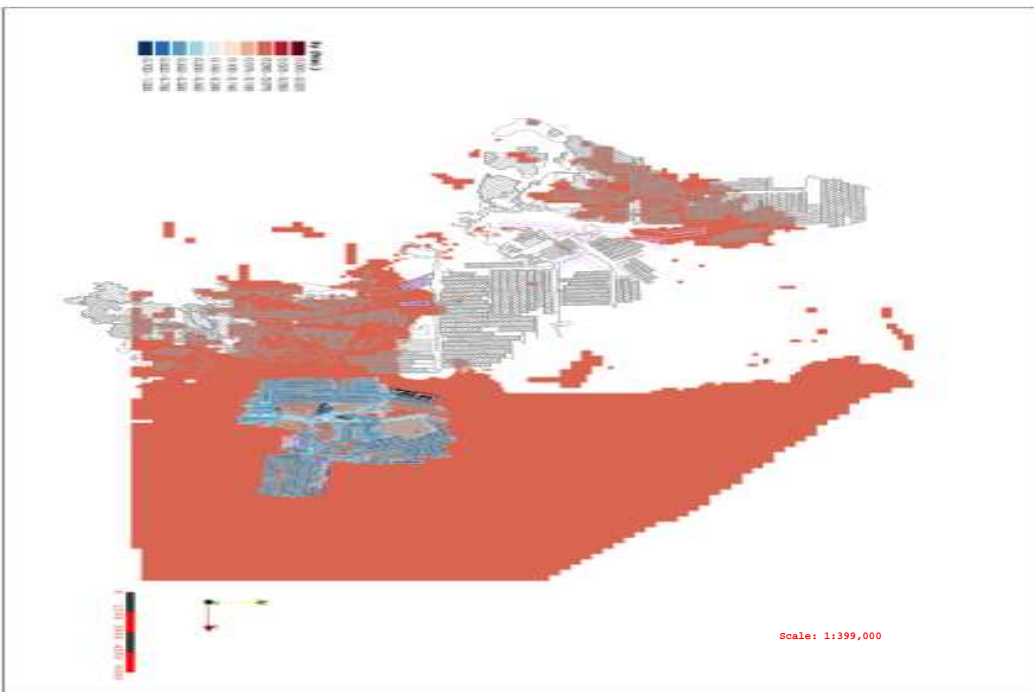
Drawn By: DAW

Checked By: JRWB

September 2026 (SP148):

December 2049 (SP241):

Figure E1d-17: Modelled Specific Yield (frac.) - Layer 17

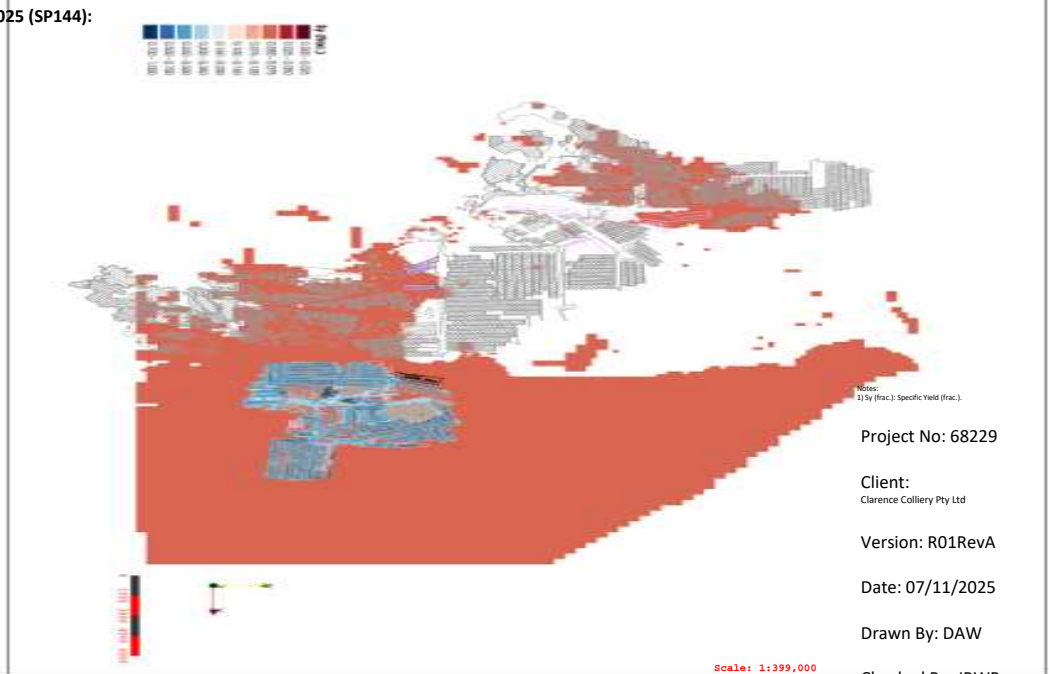
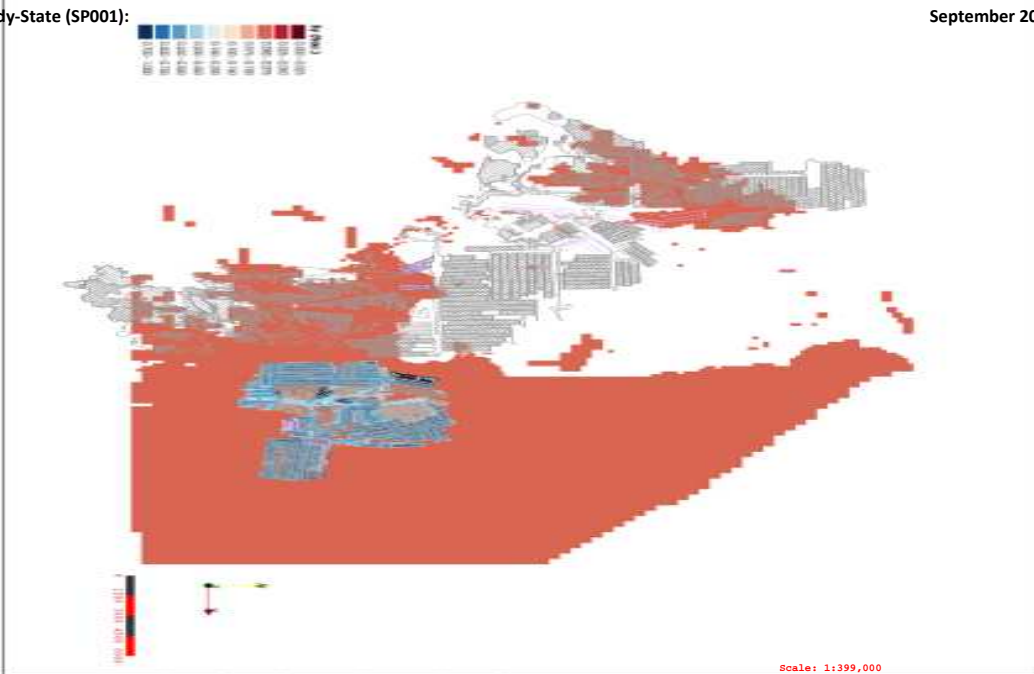


Legend

- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed

Steady-State (SP001):

September 2025 (SP144):



Notes:
1) Sy (frac.): Specific Yield (frac.).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

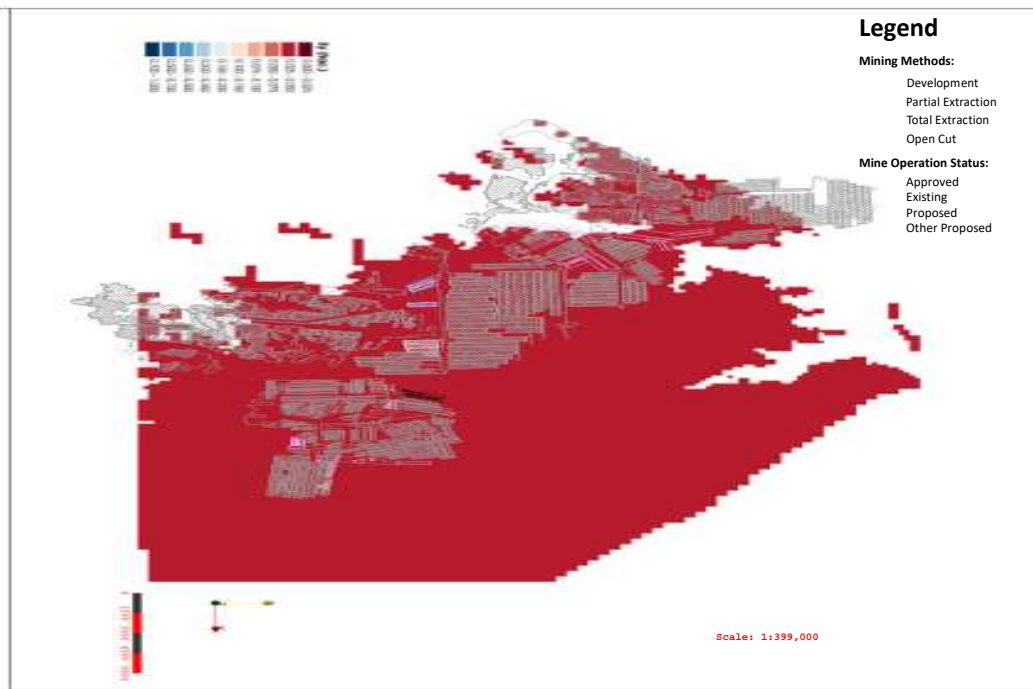
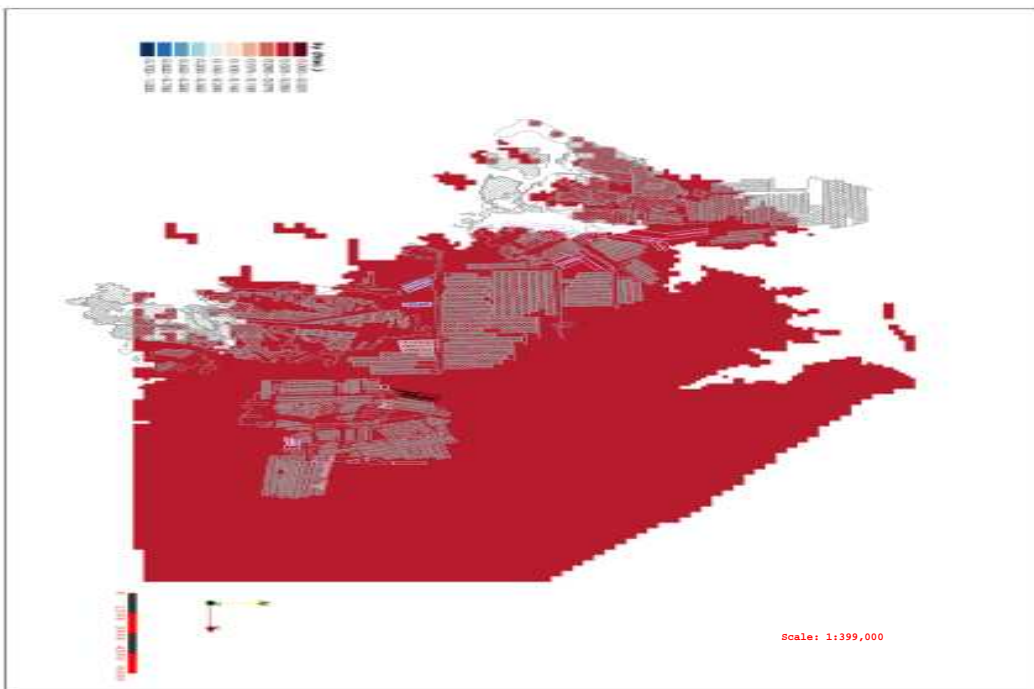
Drawn By: DAW

Checked By: JRWB

September 2026 (SP148):

December 2049 (SP241):

Figure E1d-18: Modelled Specific Yield (frac.) - Layer 18

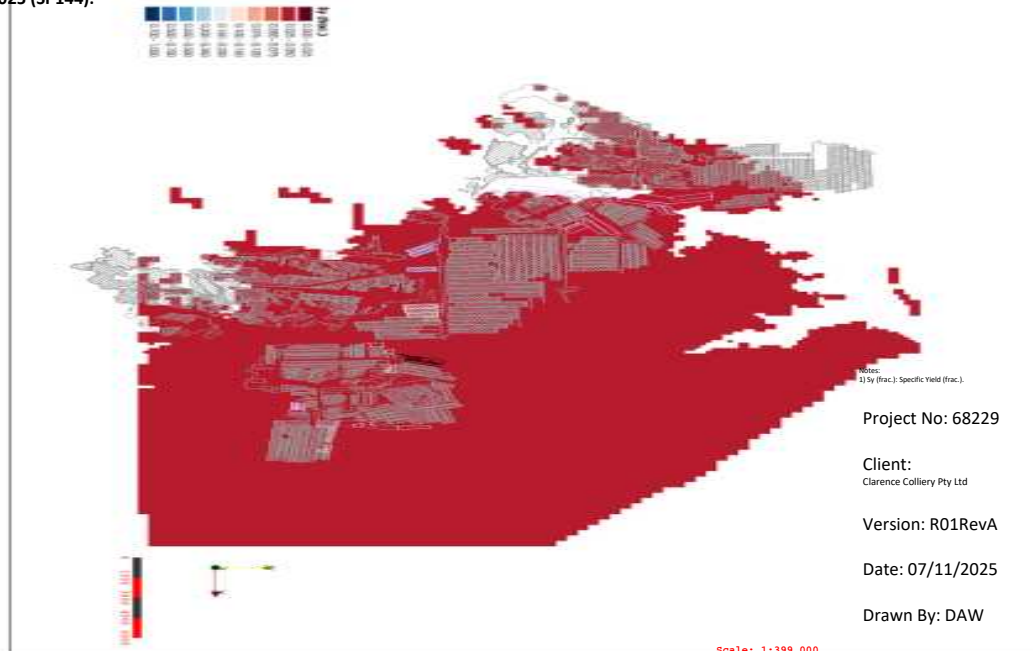
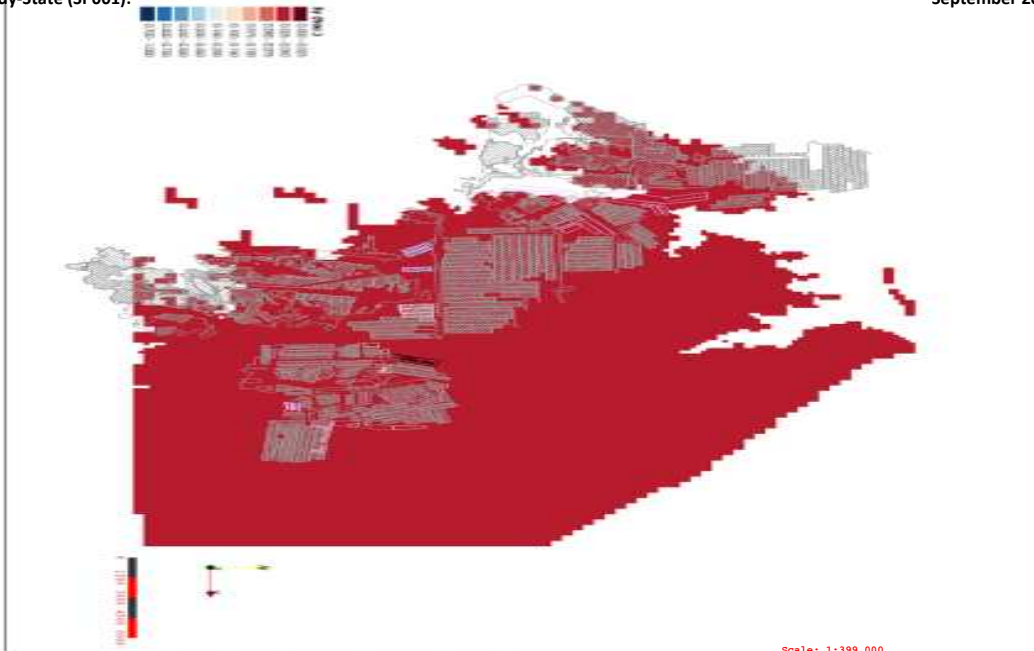


Legend

- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed

Steady-State (SP001):

September 2025 (SP144):



Notes:
1) Sy (frac.): Specific Yield (frac.).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

Checked By: JRWB

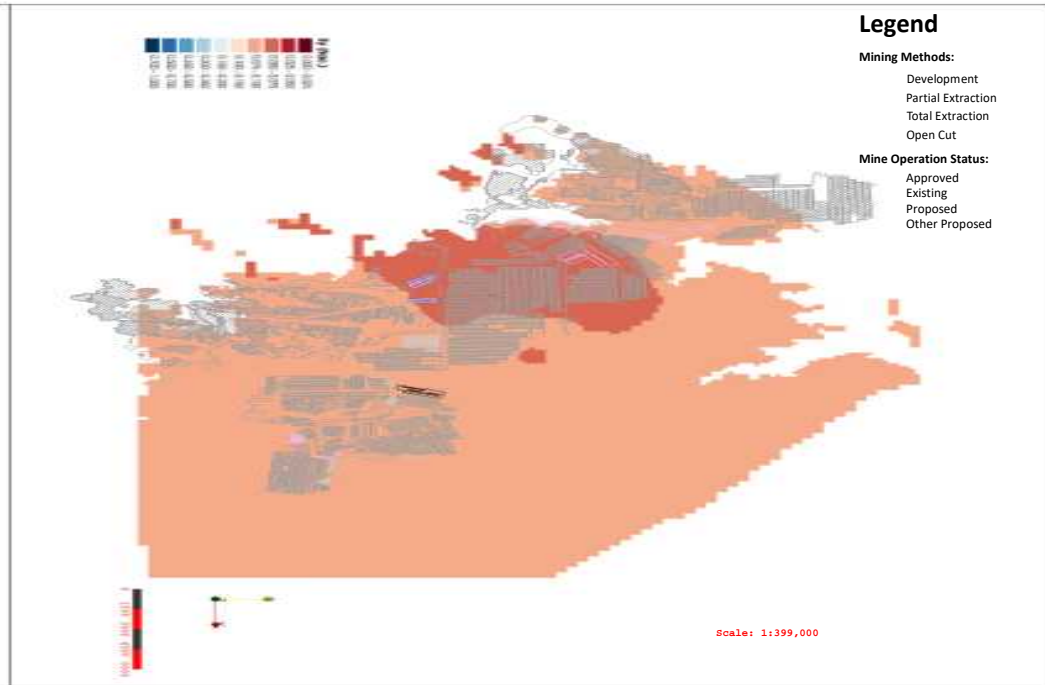
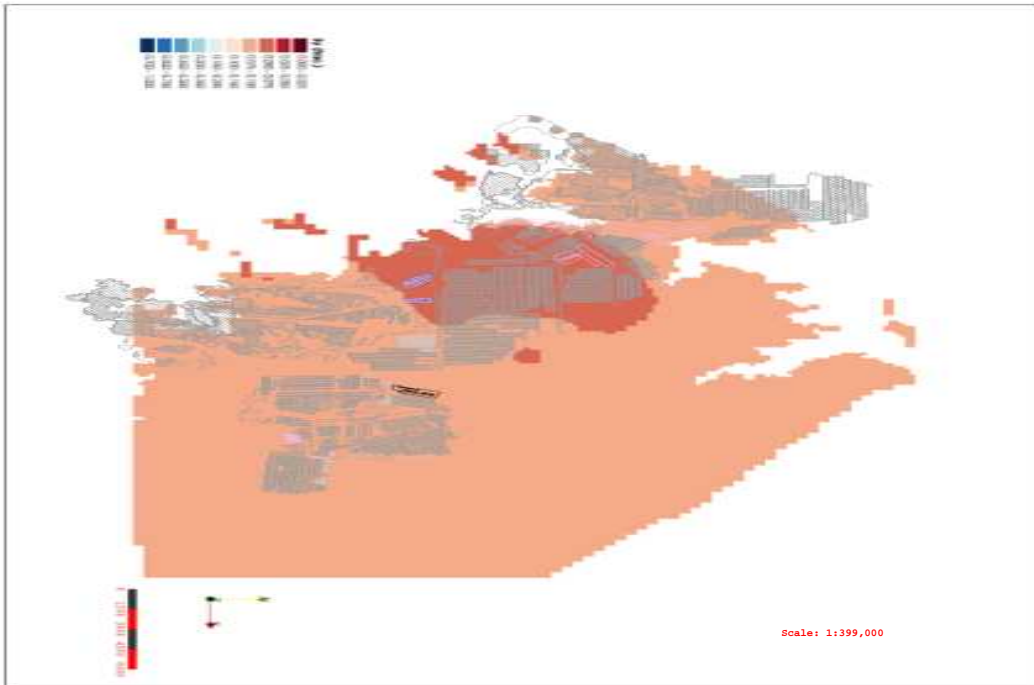
September 2026 (SP148):

December 2049 (SP241):

Figure E1d-19: Modelled Specific Yield (frac.) - Layer 19

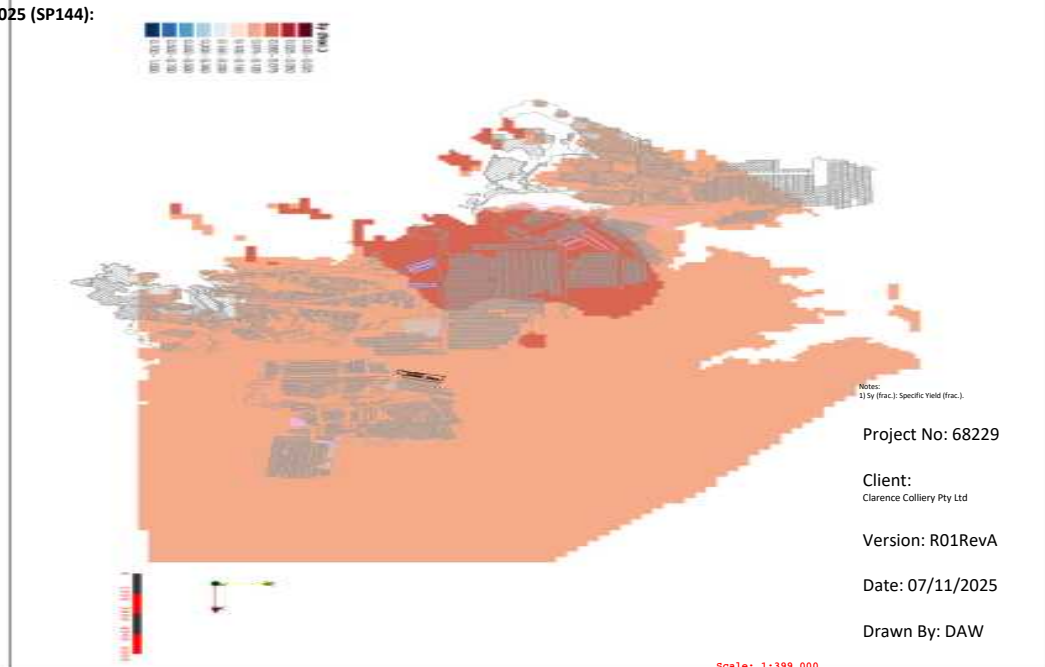
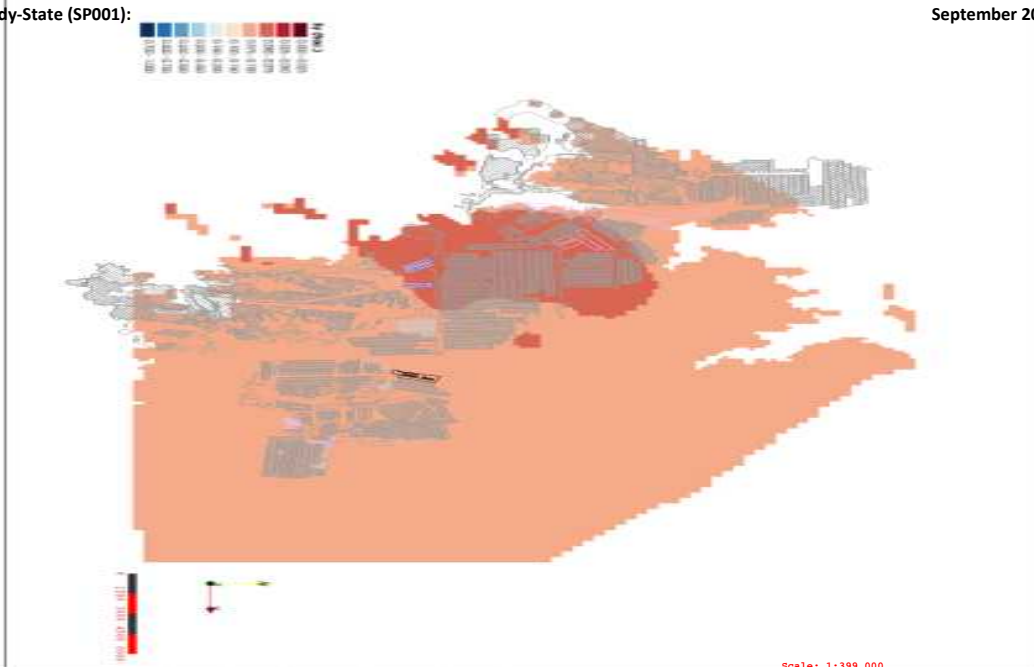
Legend

- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed



Steady-State (SP001):

September 2025 (SP144):



Notes:
1) Sy (frac.): Specific Yield (frac.).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

Checked By: JRWB

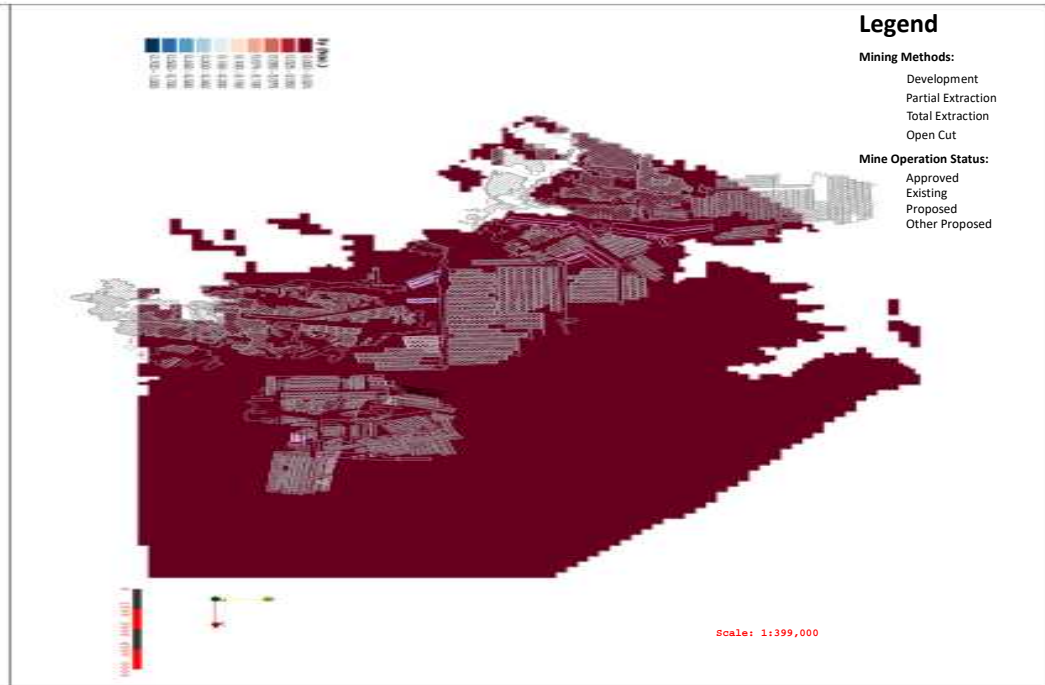
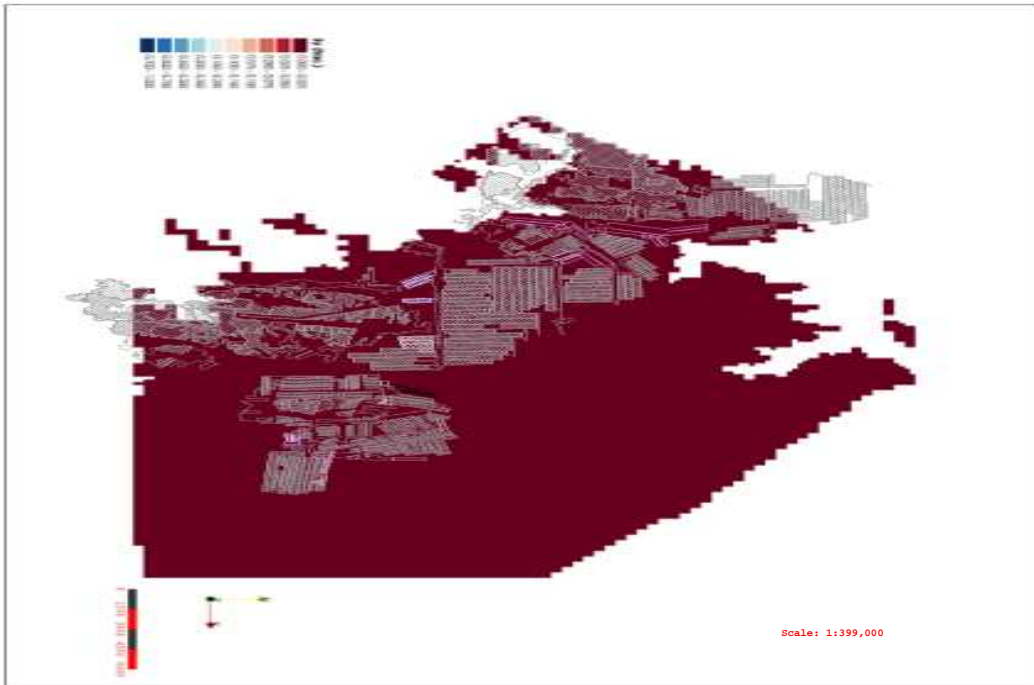
September 2026 (SP148):

December 2049 (SP241):

Figure E1d-20: Modelled Specific Yield (frac.) - Layer 20

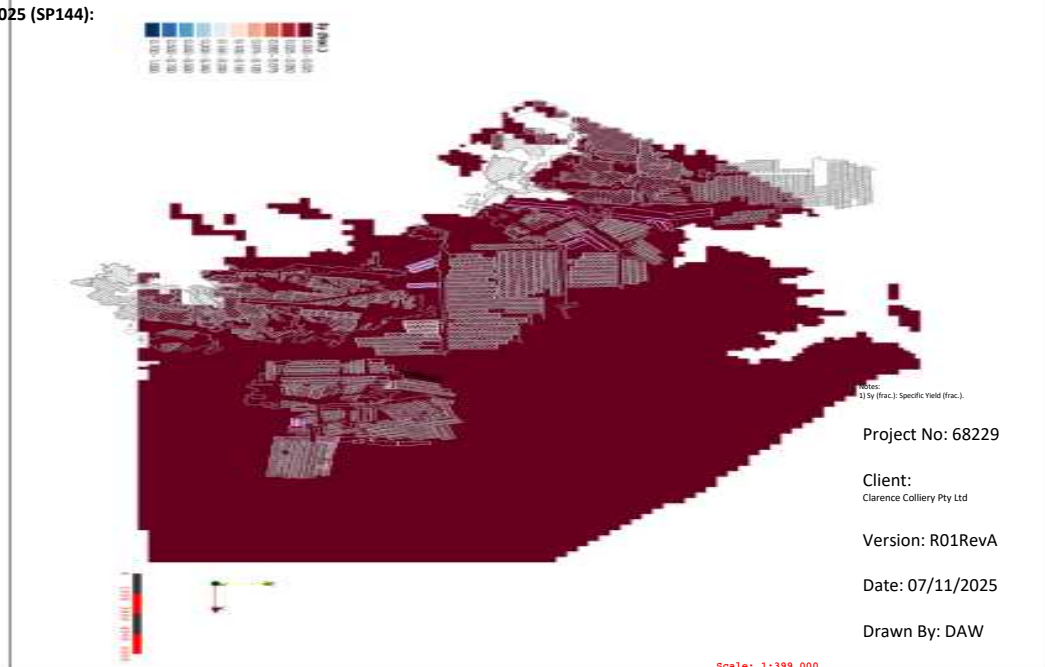
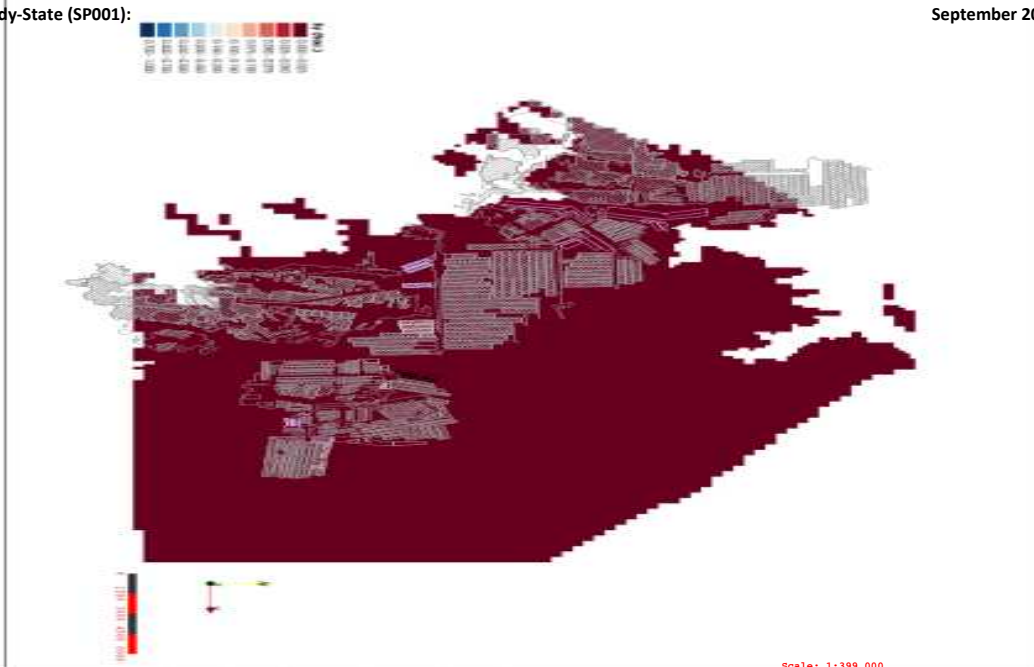
Legend

- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed



Steady-State (SP001):

September 2025 (SP144):



Notes:
 1) Sy (frac.): Specific Yield (frac.).

Project No: 68229

Client:
 Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

Checked By: JRWB

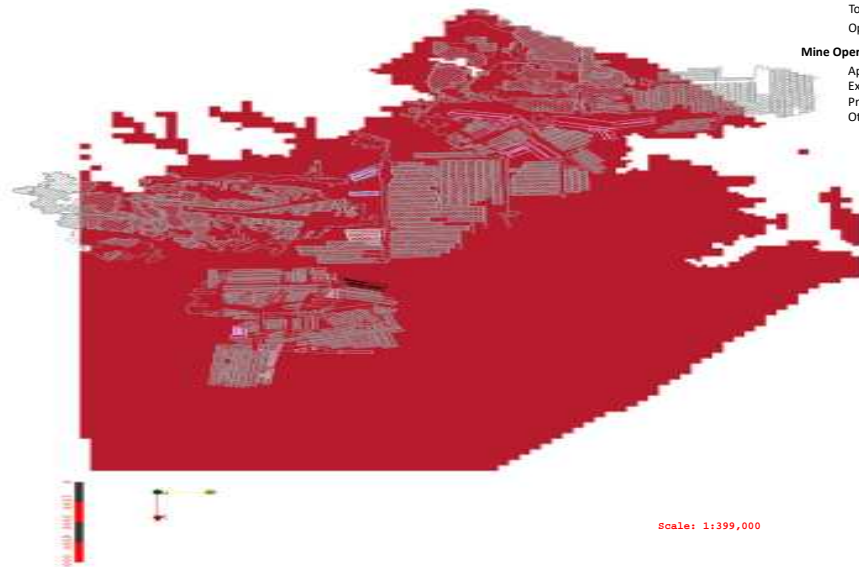
September 2026 (SP148):

December 2049 (SP241):

Figure E1d-21: Modelled Specific Yield (frac.) - Layer 21



Scale: 1:399,000



Scale: 1:399,000

Legend

- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed

Steady-State (SP001):



Scale: 1:399,000

September 2025 (SP144):



Scale: 1:399,000

Notes:
1) Sy (frac.): Specific Yield (frac).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

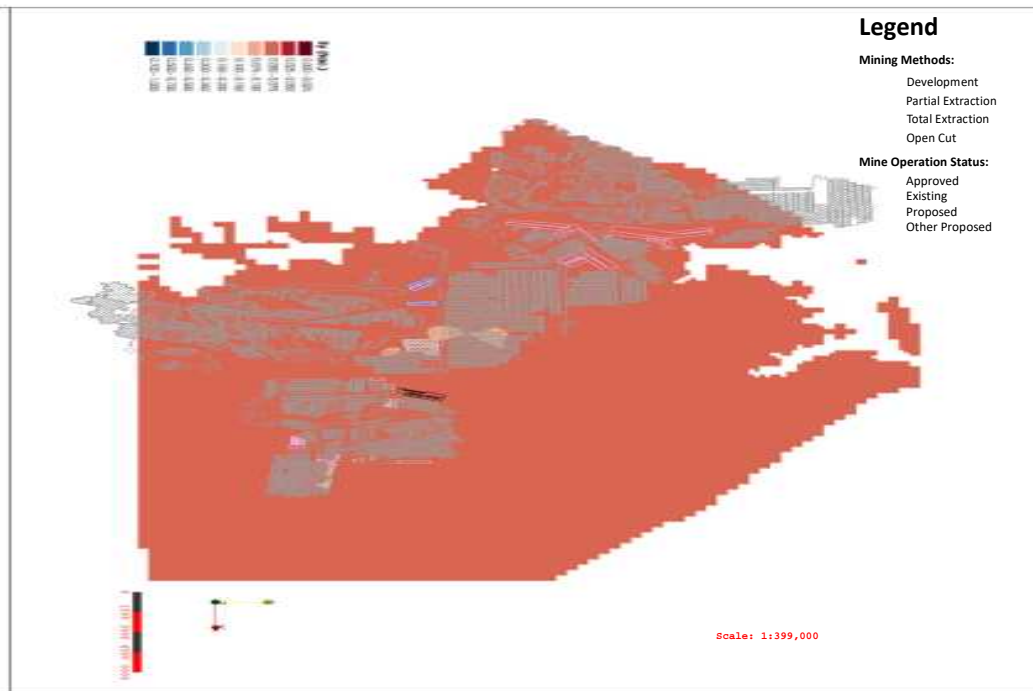
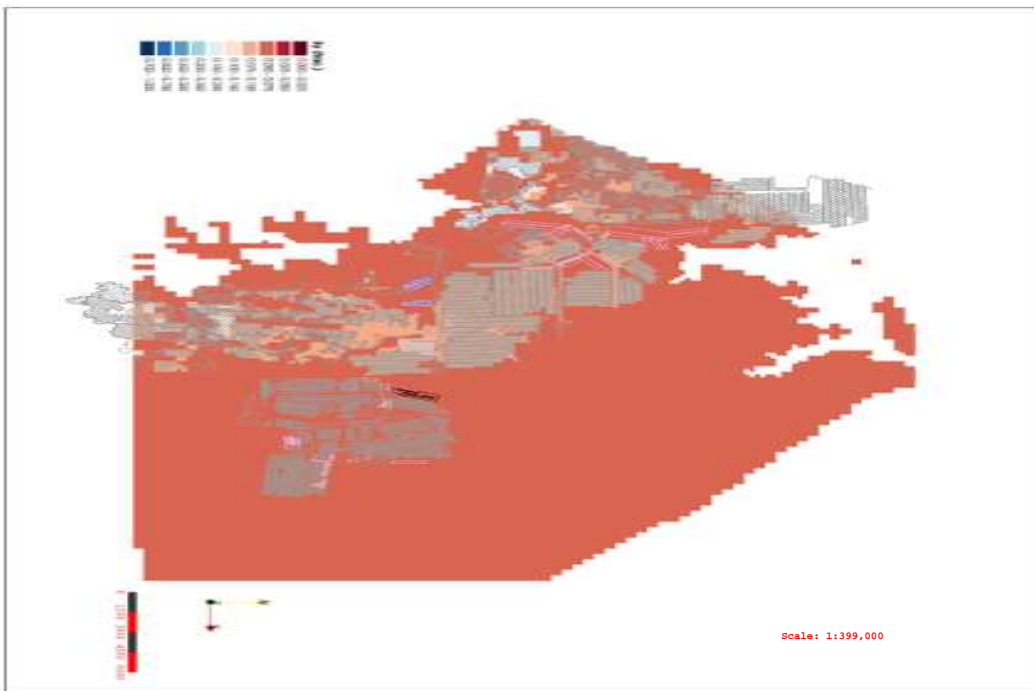
Checked By: JRWB

September 2026 (SP148):

December 2049 (SP241):

Figure E1d-22: Modelled Specific Yield (frac.) - Layer 22



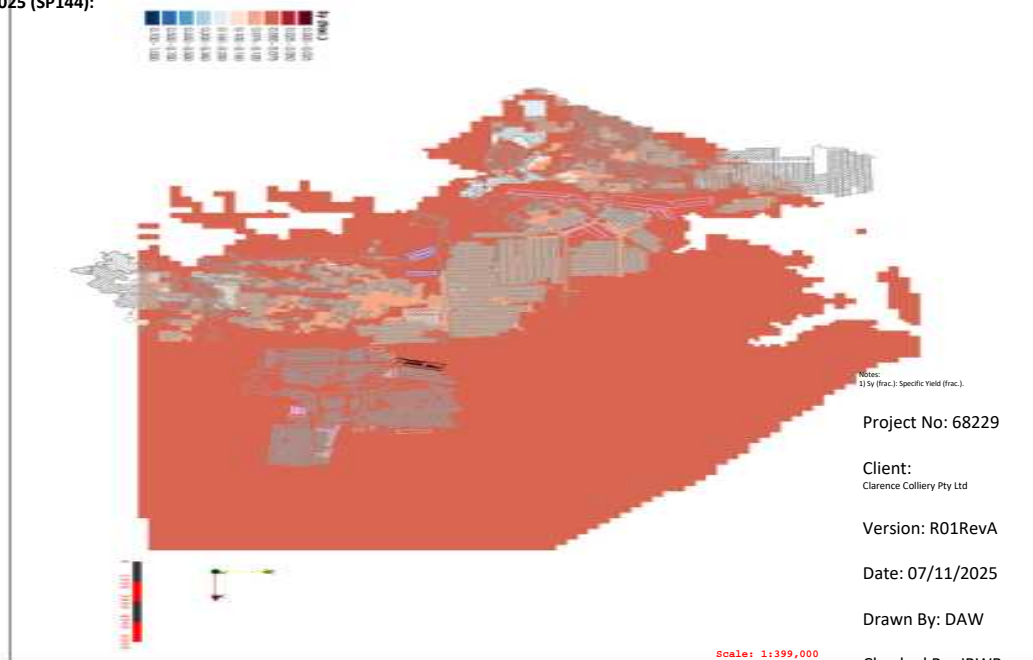
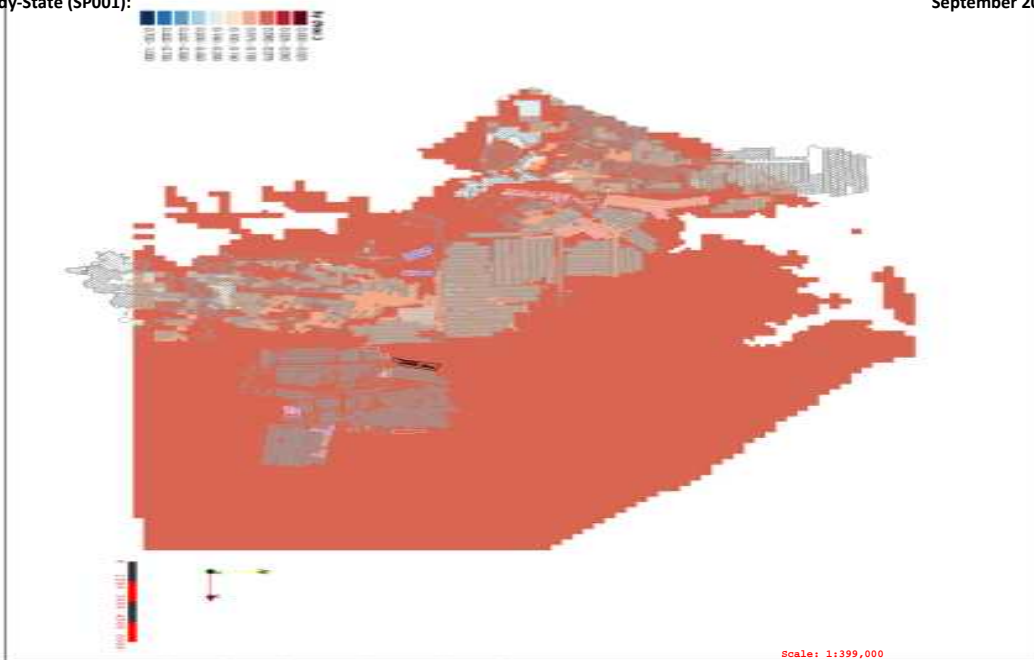


Legend

- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed

Steady-State (SP001):

September 2025 (SP144):



Notes:
1) Sy (frac.): Specific Yield (frac.).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

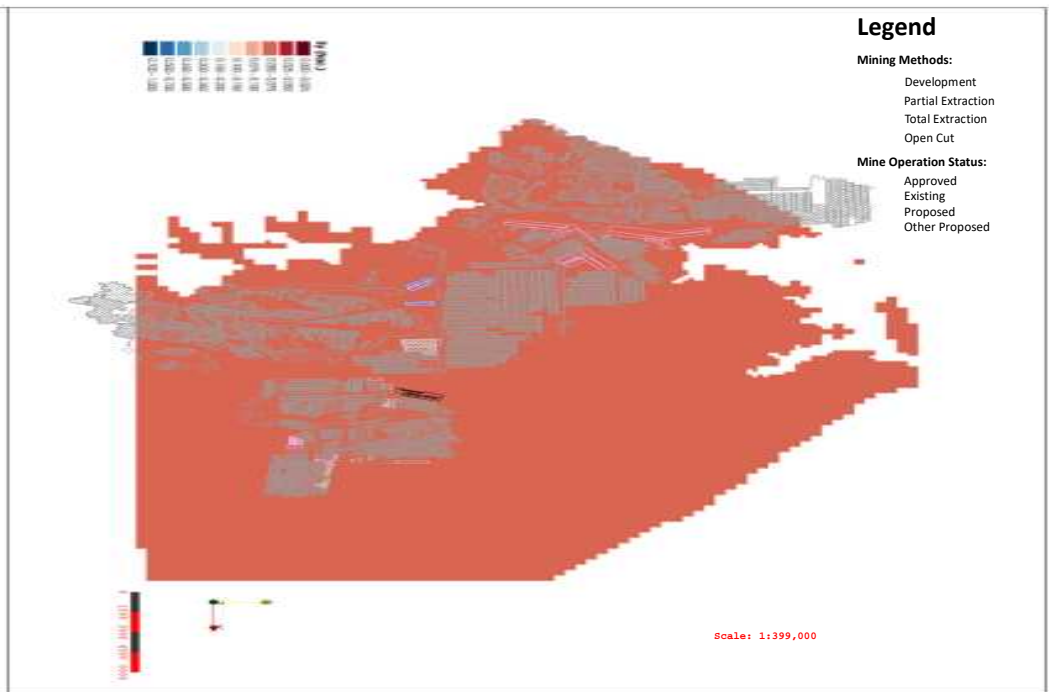
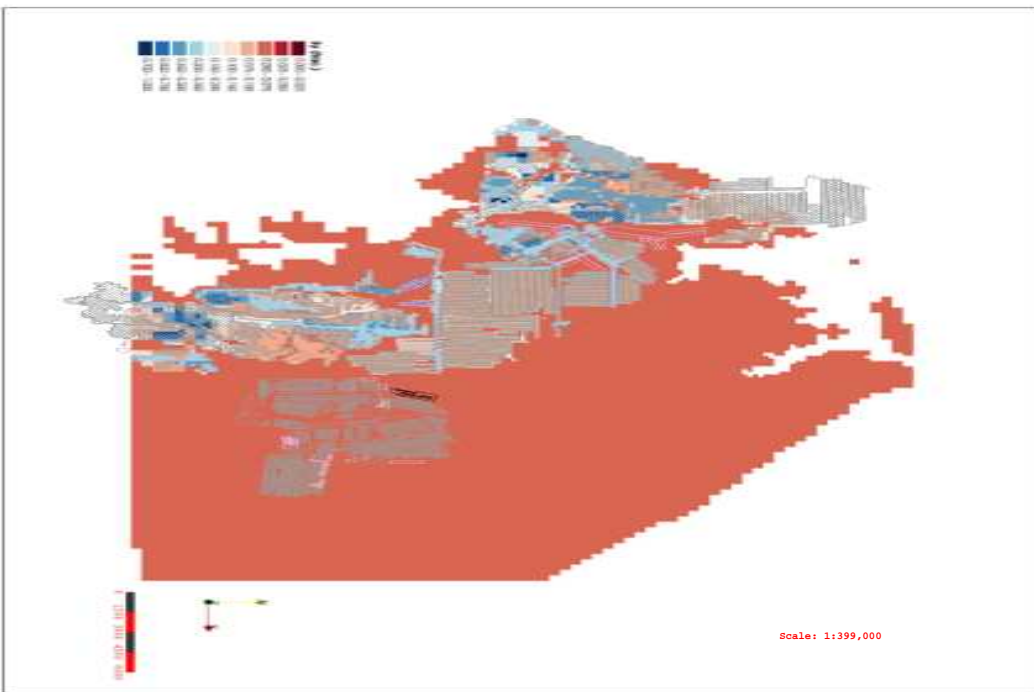
Drawn By: DAW

Checked By: JRWB

September 2026 (SP148):

December 2049 (SP241):

Figure E1d-23: Modelled Specific Yield (frac.) - Layer 23

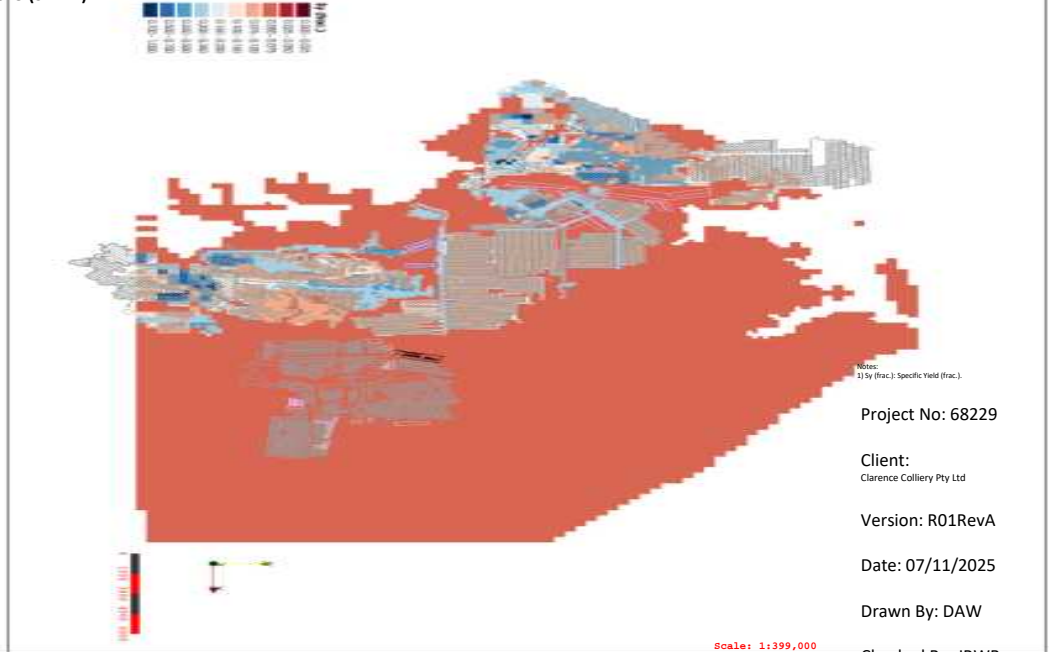
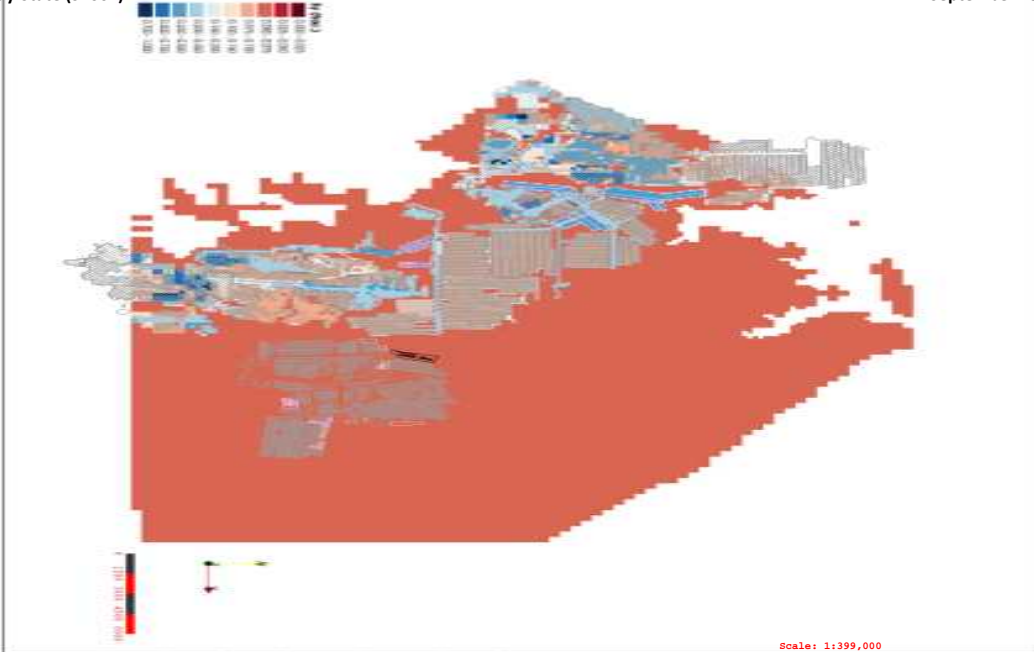


Legend

- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed

Steady-State (SP001):

September 2025 (SP144):



Notes:
1) Sy (frac.): Specific Yield (frac).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

Checked By: JRWB

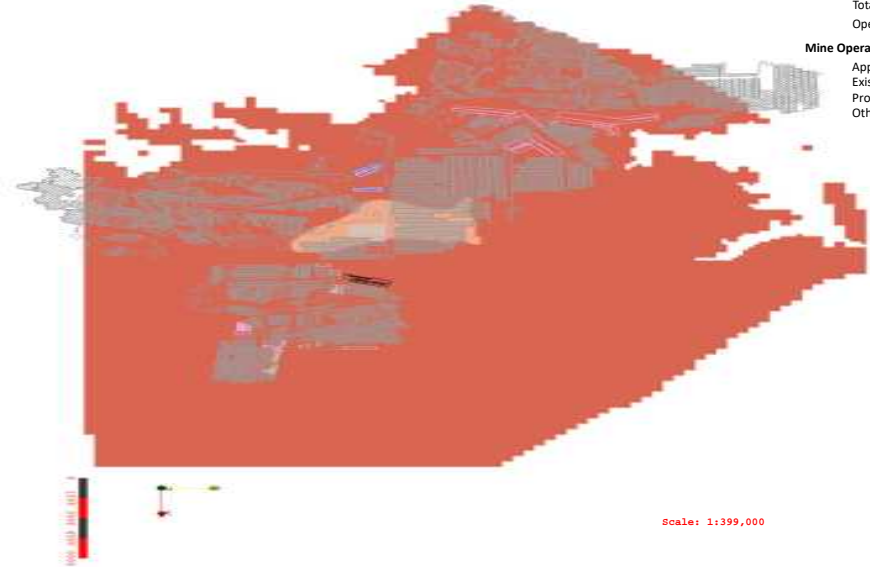
September 2026 (SP148):

December 2049 (SP241):

Figure E1d-24: Modelled Specific Yield (frac.) - Layer 24



Scale: 1:399,000

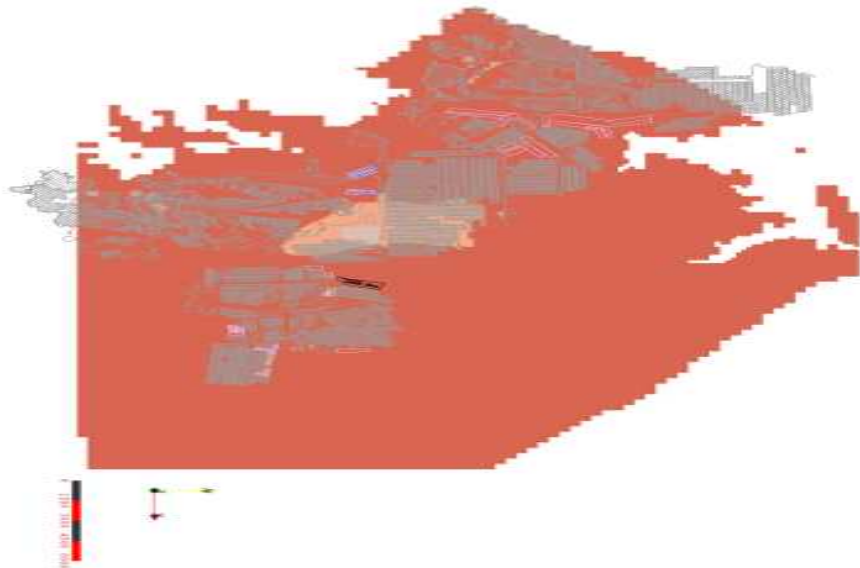


Scale: 1:399,000

Legend

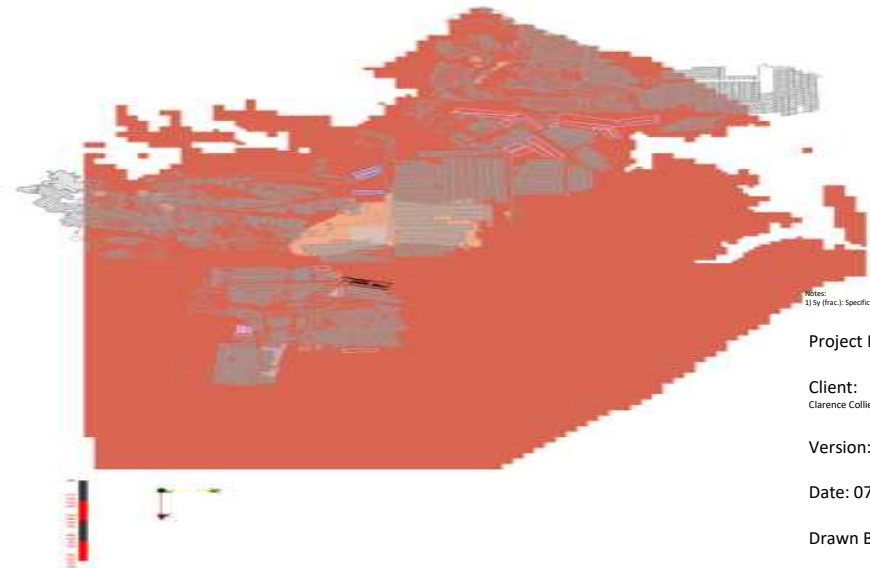
- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed

Steady-State (SP001):



Scale: 1:399,000

September 2025 (SP144):



Scale: 1:399,000

Notes:
1) Sy (frac.): Specific Yield (frac.).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

Checked By: JRWB

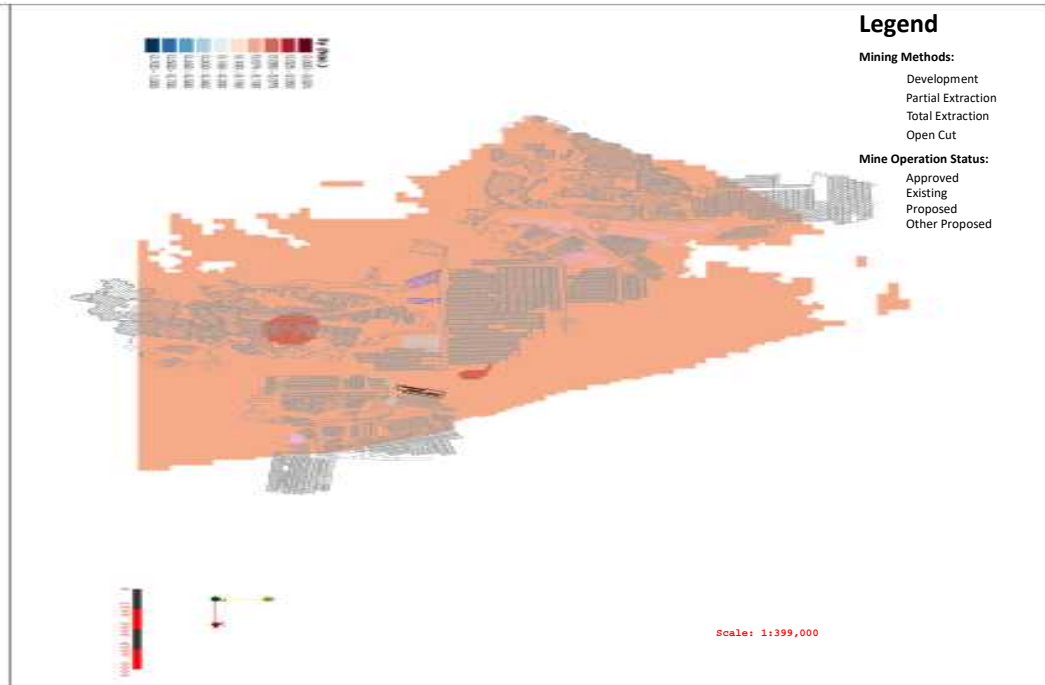
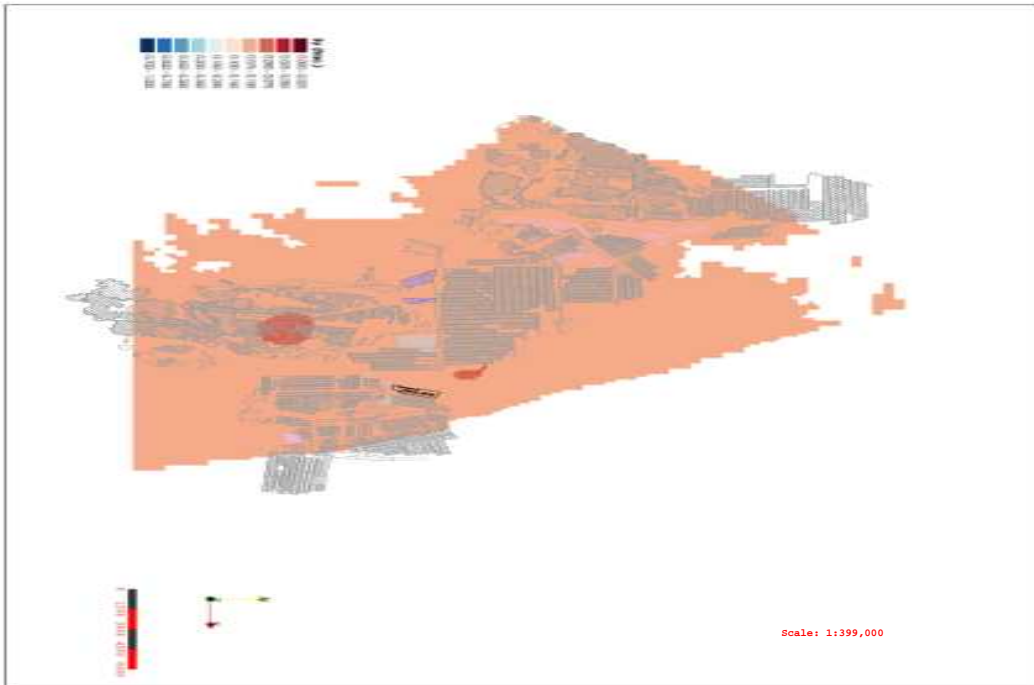
September 2026 (SP148):

December 2049 (SP241):

Figure E1d-25: Modelled Specific Yield (frac.) - Layer 25

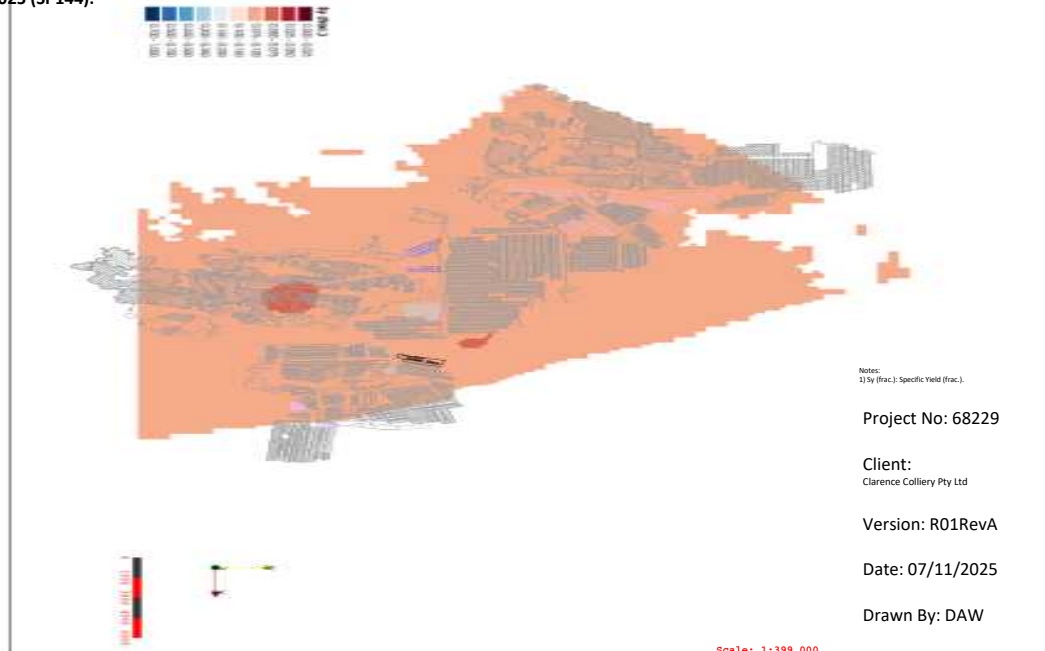
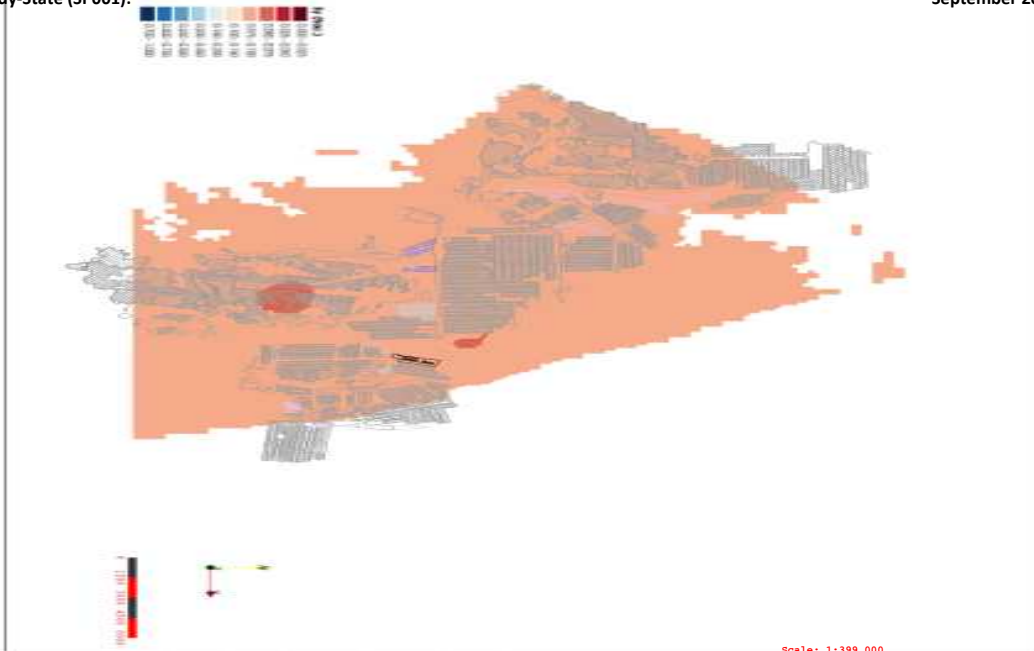
Legend

- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed



Steady-State (SP001):

September 2025 (SP144):



Notes:
1) Sy (frac.): Specific Yield (frac).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

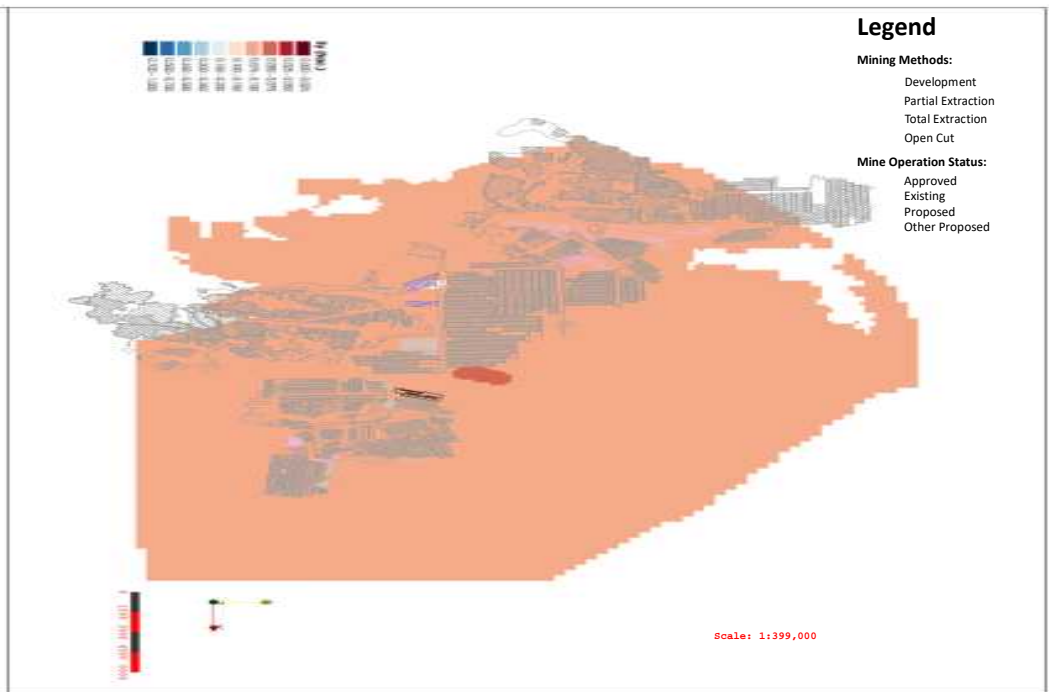
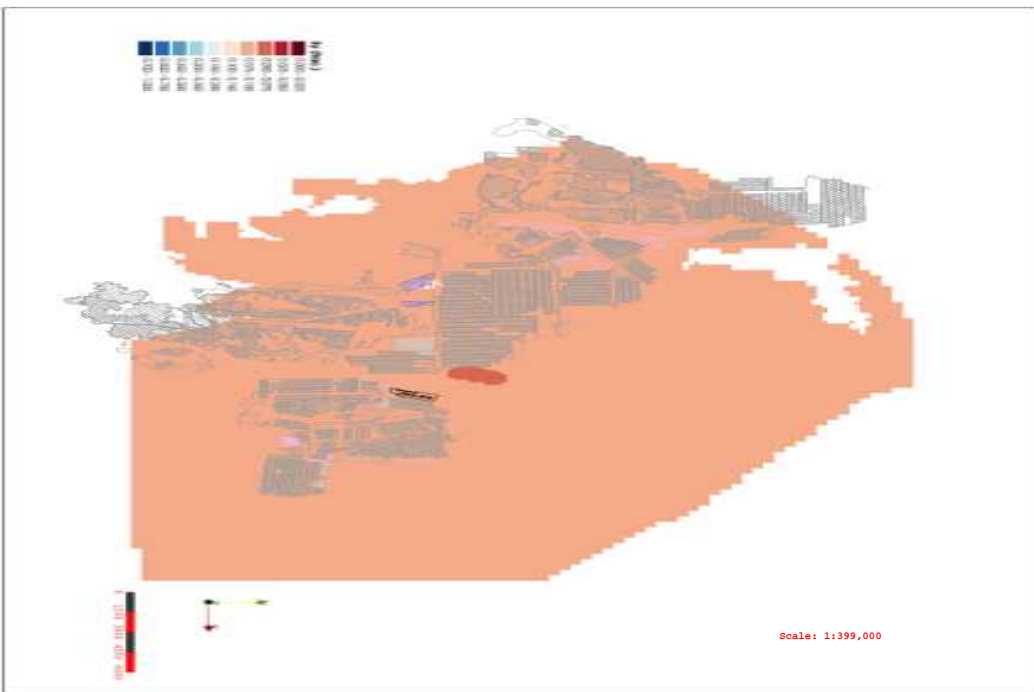
Drawn By: DAW

Checked By: JRWB

September 2026 (SP148):

December 2049 (SP241):

Figure E1d-26: Modelled Specific Yield (frac.) - Layer 26

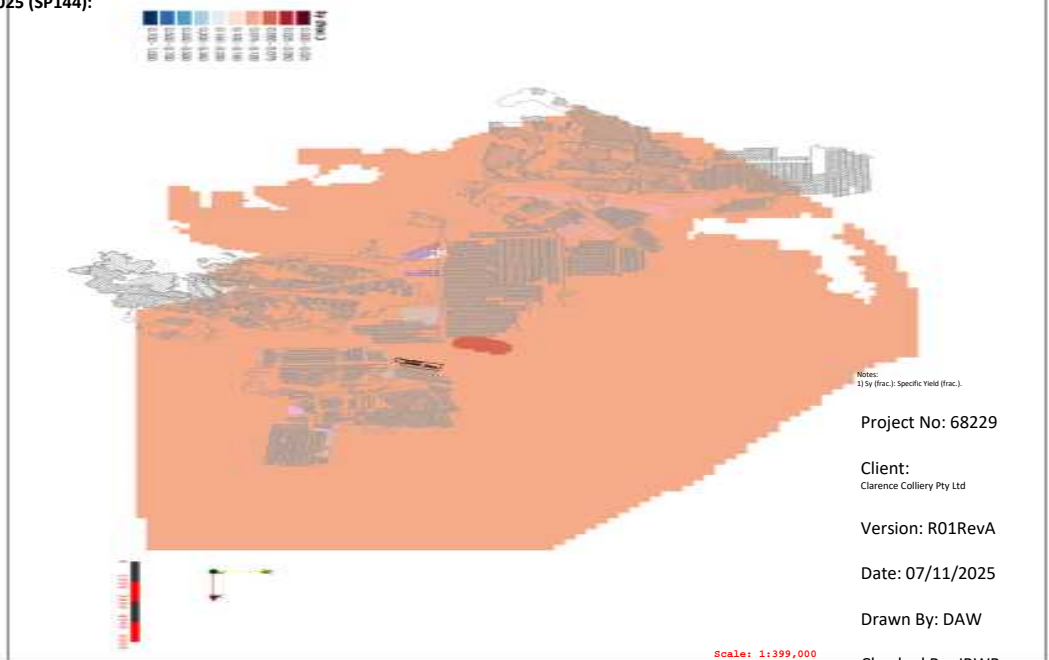
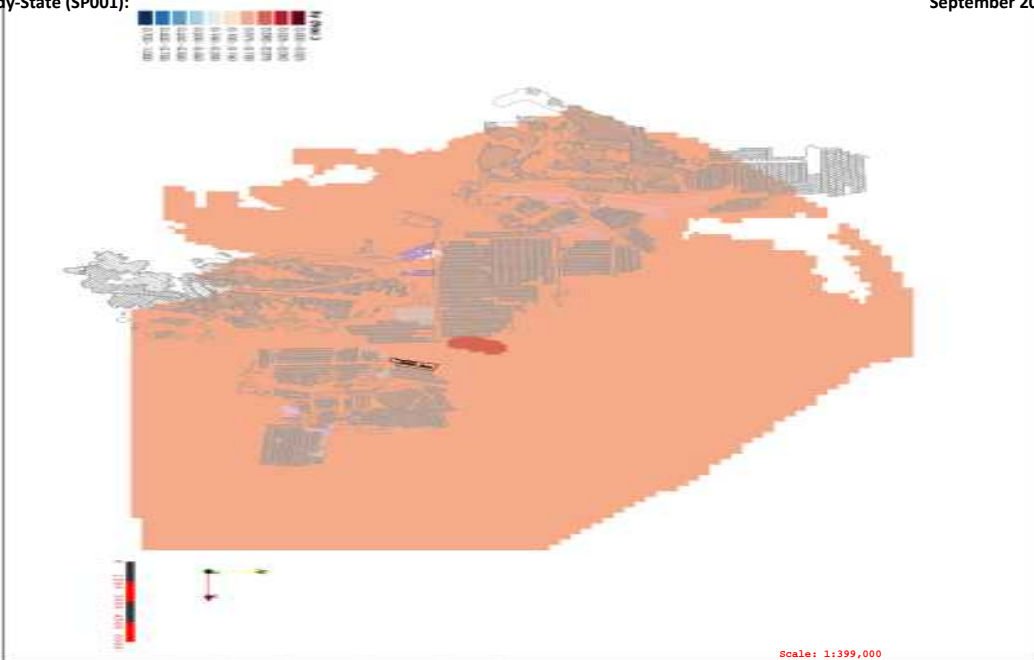


Legend

- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed

Steady-State (SP001):

September 2025 (SP144):



Notes:
1) Sy (frac.): Specific Yield (frac.).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

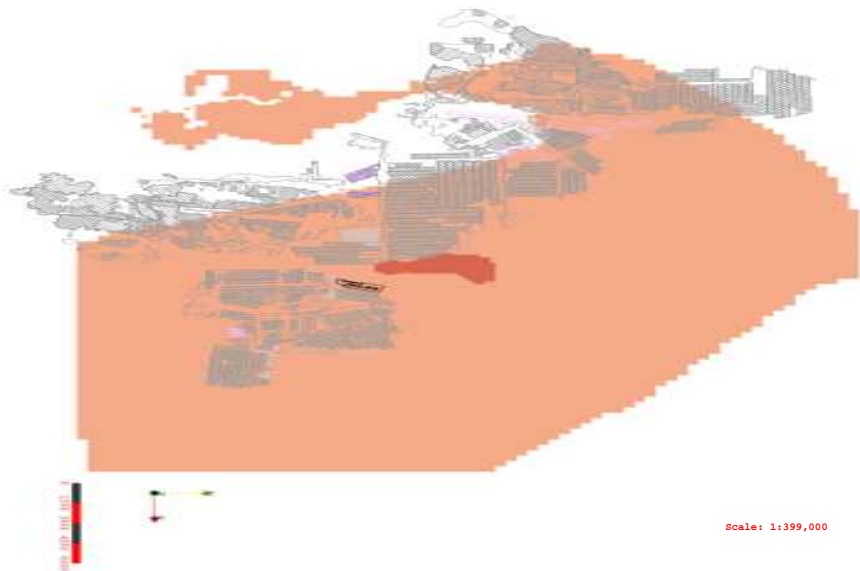
Drawn By: DAW

Checked By: JRWB

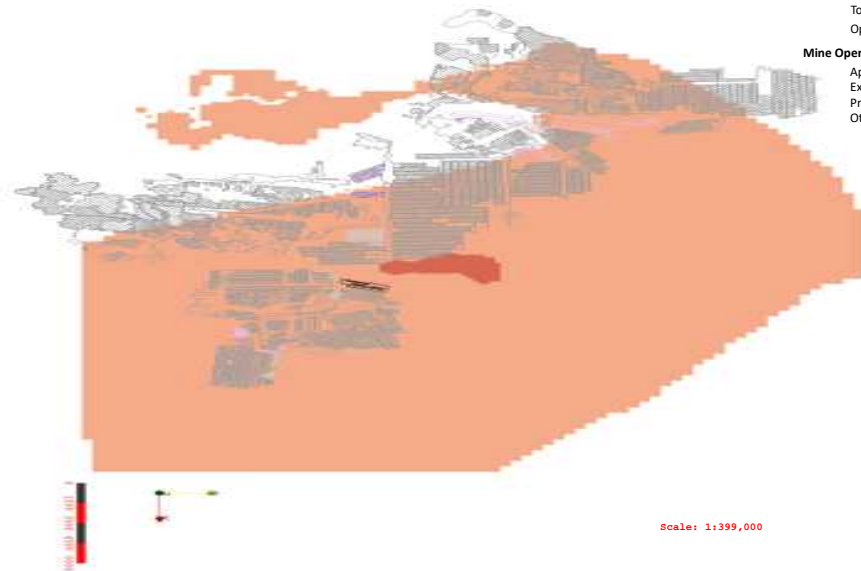
September 2026 (SP148):

December 2049 (SP241):

Figure E1d-27: Modelled Specific Yield (frac.) - Layer 27



Scale: 1:399,000

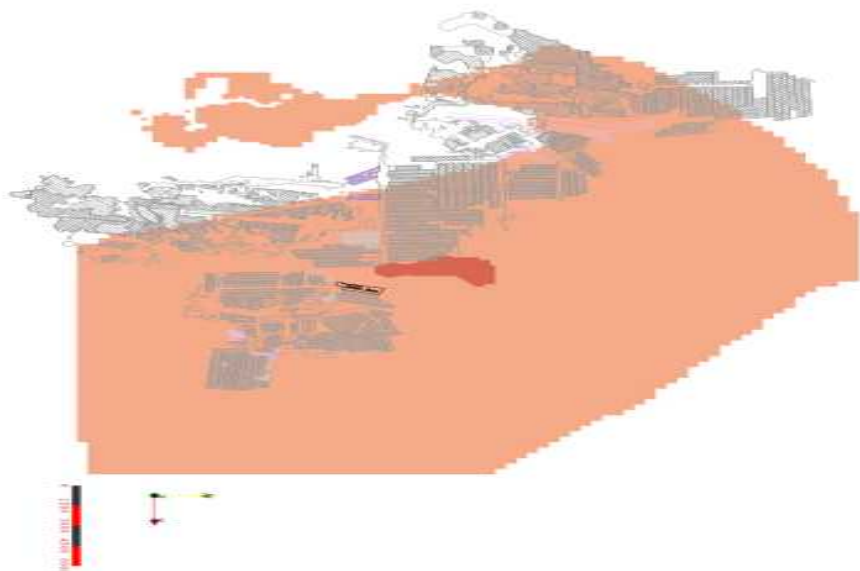


Scale: 1:399,000

Legend

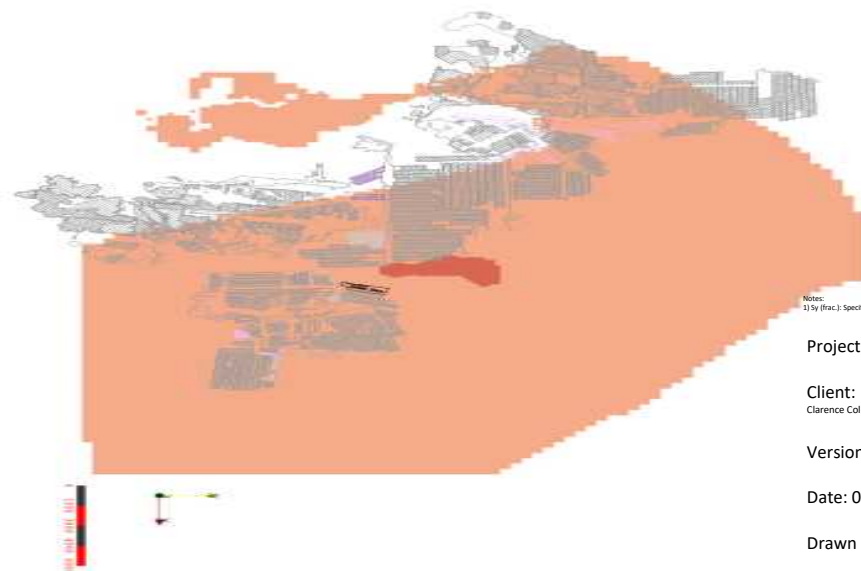
- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed

Steady-State (SP001):



Scale: 1:399,000

September 2025 (SP144):



Scale: 1:399,000

Notes:
1) Sy (frac.): Specific Yield (frac.).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

Checked By: JRWB

September 2026 (SP148):

December 2049 (SP241):

Figure E1d-28: Modelled Specific Yield (frac.) - Layer 28



Scale: 1:399,000



Scale: 1:399,000

Legend

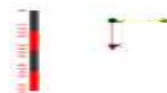
- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed

Steady-State (SP001):



Scale: 1:399,000

September 2025 (SP144):



Scale: 1:399,000

Notes:
1) Sy (frac.): Specific Yield (frac).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

Checked By: JRWB

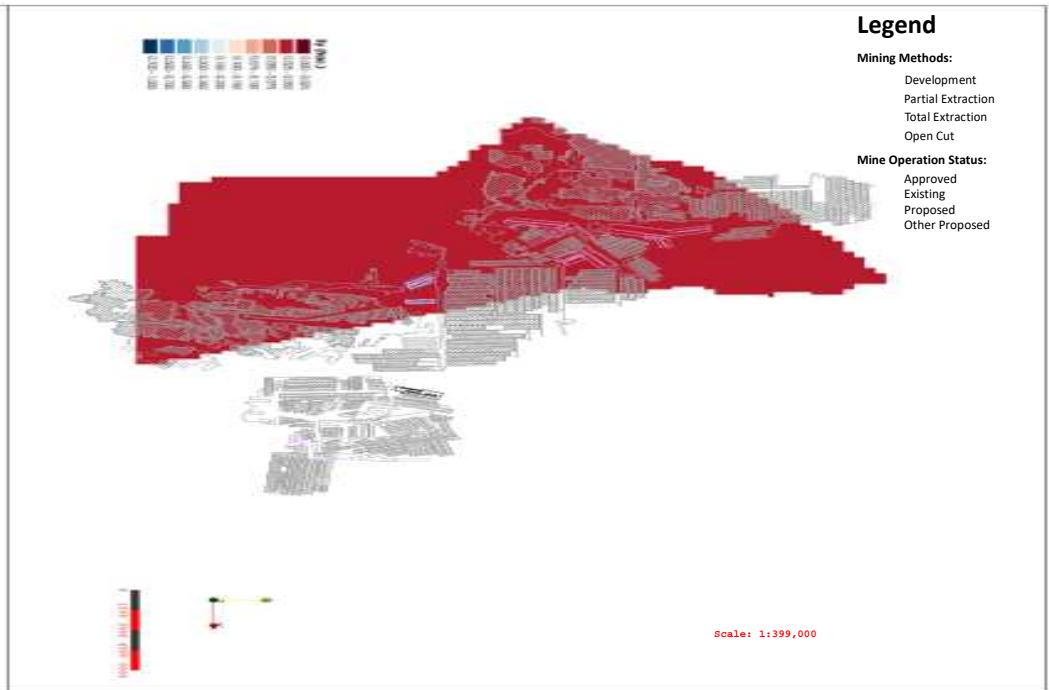
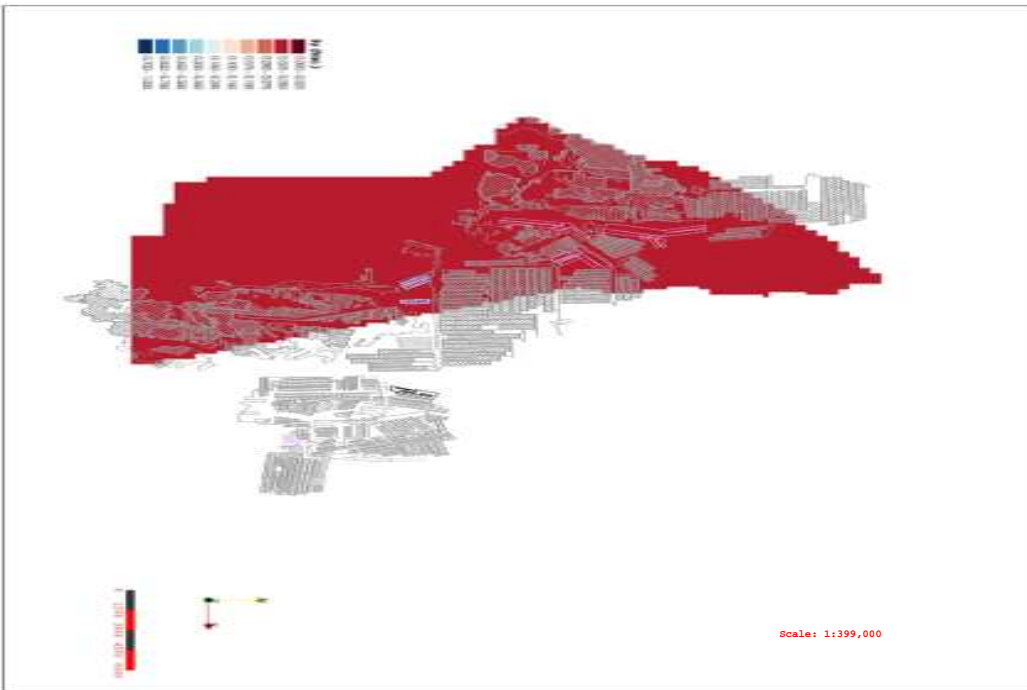
September 2026 (SP148):

December 2049 (SP241):

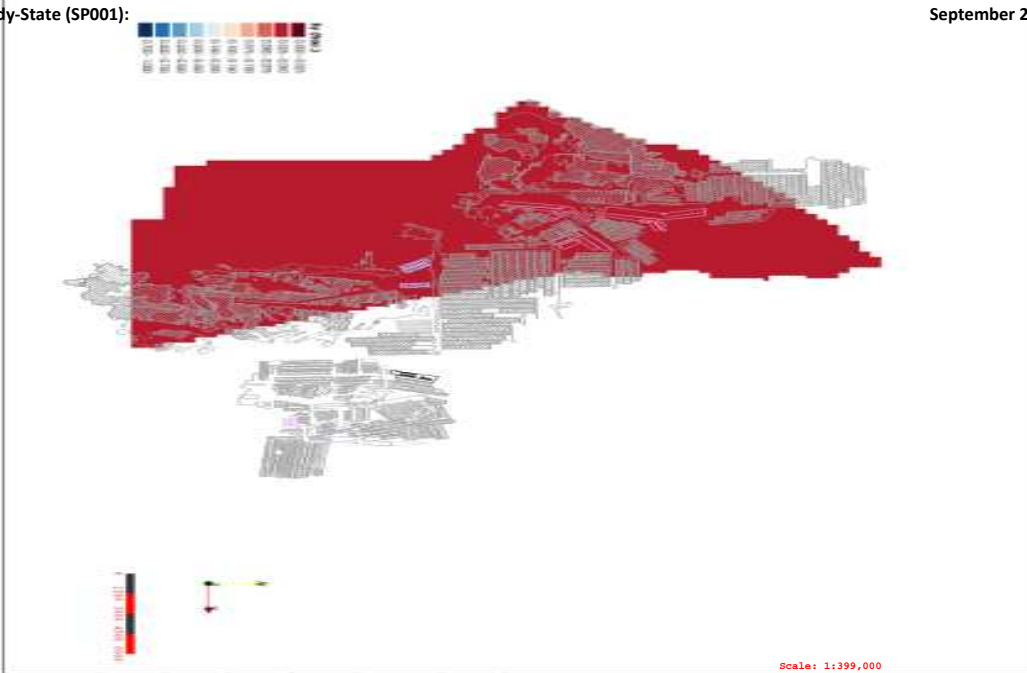
Figure E1d-29: Modelled Specific Yield (frac.) - Layer 29

Legend

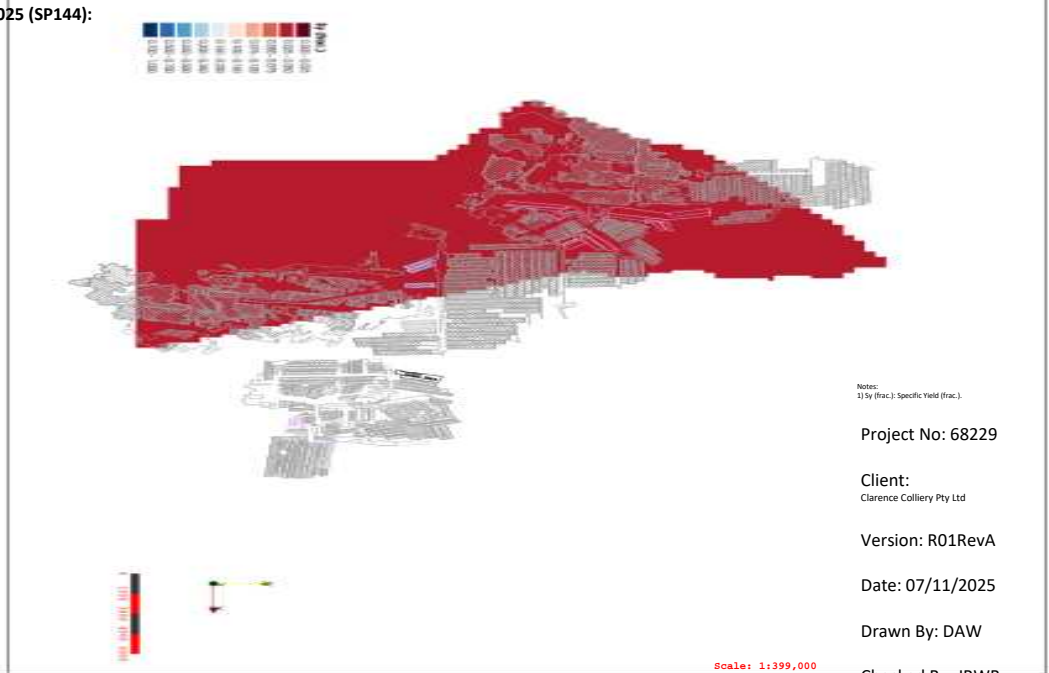
- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed



Steady-State (SP001):



September 2025 (SP144):



Notes:
1) Sy (frac.): Specific Yield (frac).

Project No: 68229

Client:
Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

Checked By: JRWB

September 2026 (SP148):

December 2049 (SP241):

Figure E1d-30: Modelled Specific Yield (frac.) - Layer 30

Appendix F Distribution of Calibration Residuals

Appendix F

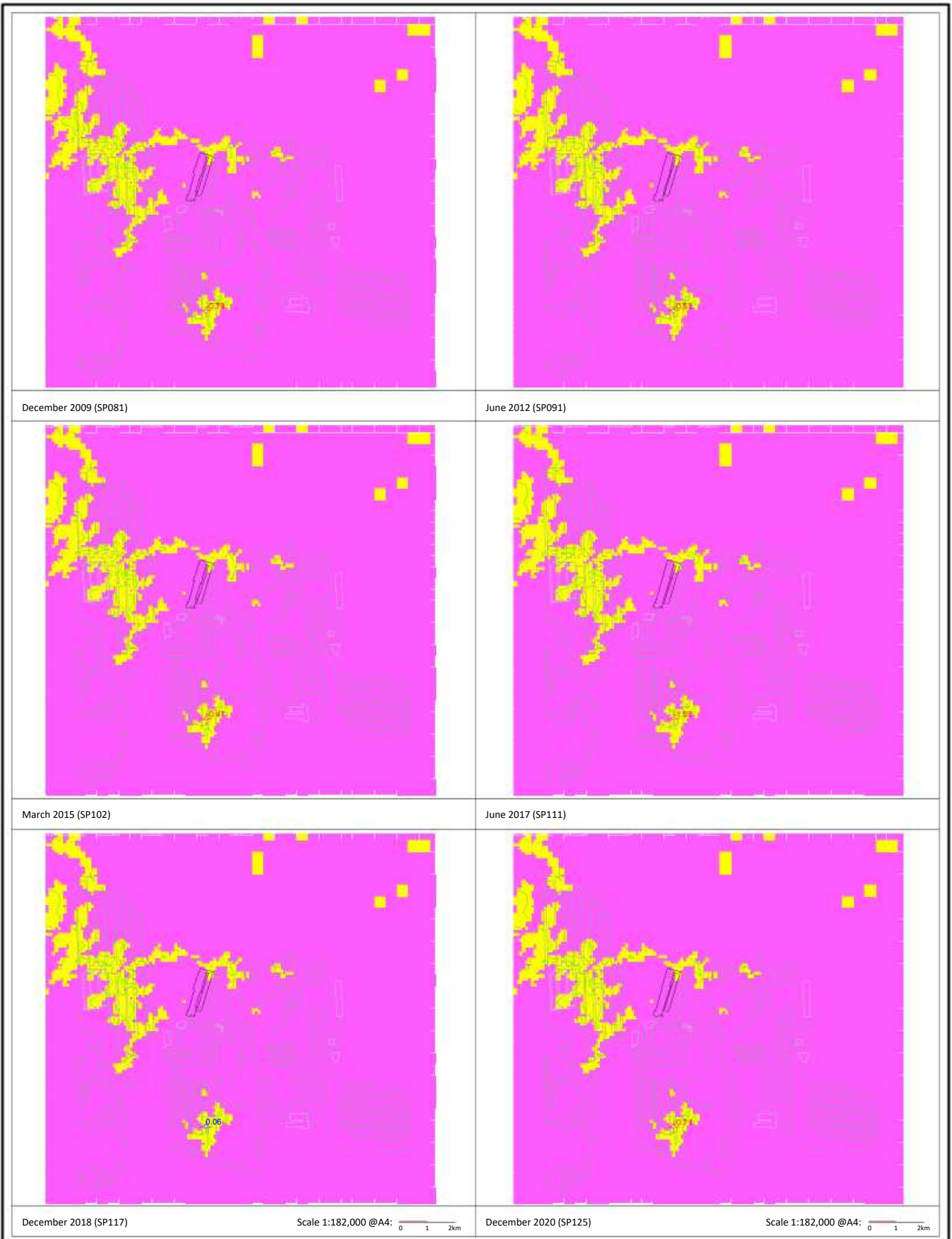
F1. Distribution of Calibration Residuals

The residual, being the difference between modelled and observed groundwater elevation in Layer 01 to Layer 25 in the general vicinity of 918 Panel at each of six selected model output times (output control, .OC).

Output was generated by a custom-developed script, using a TIMEACCURACY (equivalent) of 16, therefore capturing a residual either 16 days before or 16 days after the selected model output time.

The selected stress periods were:

- 31 December 2009 (SP081; TOTIM = 51866)
- 30 June 2012 (SP091; TOTIM = 52778)
- 31 March 2015 (SP102; TOTIM = 53782)
- 30 June 2017 (SP111; TOTIM = 54604)
- 31 December 2018 (SP117; TOTIM = 55153)
- 31 December 2020 (SP125; TOTIM = 55884).



December 2009 (SP081)

June 2012 (SP091)

March 2015 (SP102)

June 2017 (SP111)

December 2018 (SP117)

Scale 1:182,000 @A4: 0 1 2km

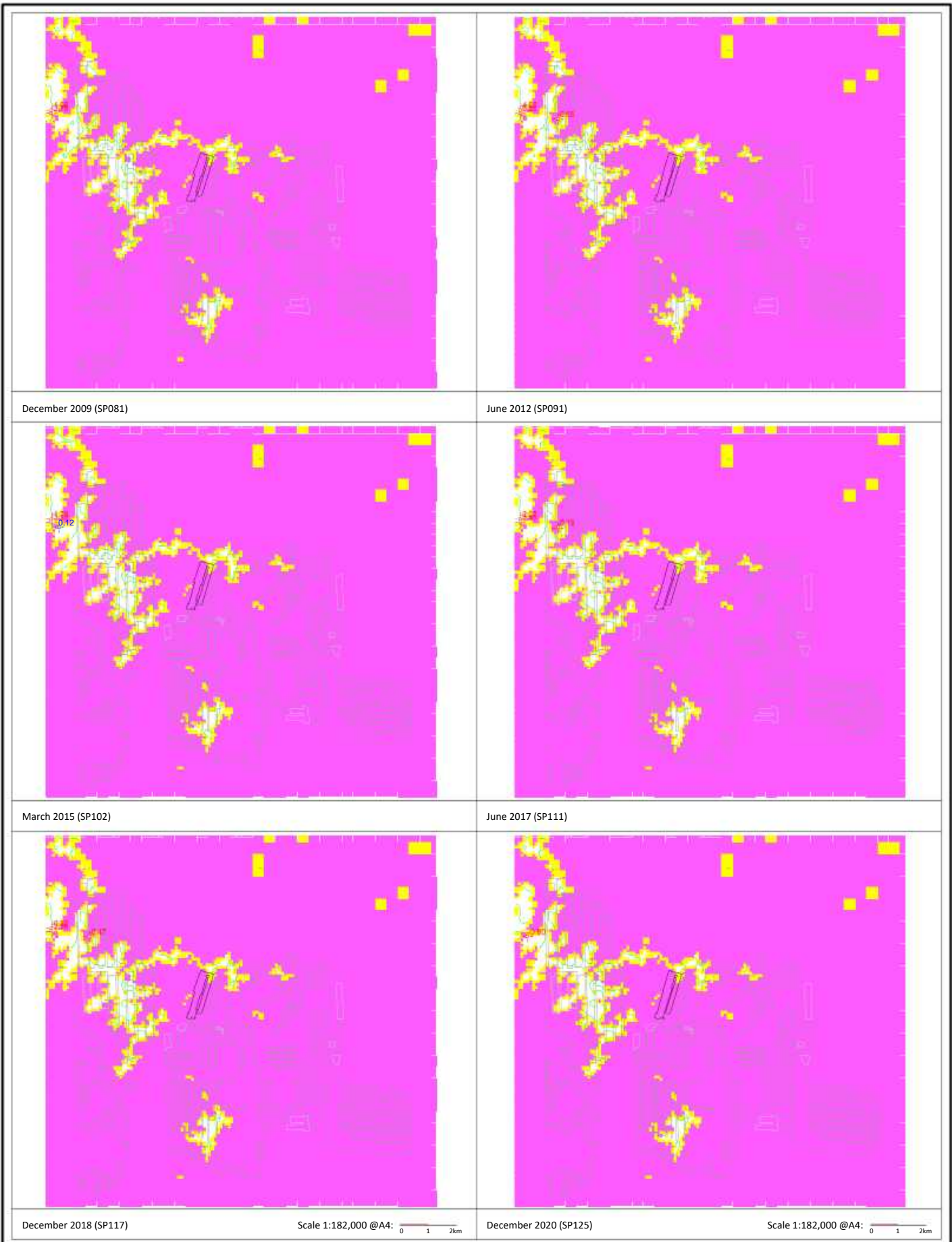
December 2020 (SP125)

Scale 1:182,000 @A4: 0 1 2km

Legend

- | | | |
|---|--|--|
| <p>Mining Methods:</p> <ul style="list-style-type: none"> Development | <p>Model Cell Type:</p> <ul style="list-style-type: none"> Pinched-Out Cells <p>Model Boundary Conditions:</p> <ul style="list-style-type: none"> Drain (DRN) Cells River (RIV) Cells General Head Boundary (GHB) Cells Well (WEL) Cells Constant Head (CHD) Cells No Flow Boundary (NFB) Cells | <p>Model Results:</p> <ul style="list-style-type: none"> Modelled Groundwater Elevation (mAHD) Positive Residual (m) Negative Residual (m) Observation Target |
| <p>Mine Operation Status:</p> <ul style="list-style-type: none"> Approved Existing Proposed Other Proposed | | |

Job No.: 68229		Distribution of Calibration Residual Sandstone (Layer 01)	
Client: Clarence Colliery Pty Ltd			
Version: R01RevA	Date: 07/11/2025		
Drawn By: DAW	Checked By: JRWB	Figure F-01	



Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

Drain (DRN) Cells

River (RIV) Cells

General Head Boundary (GHB) Cells

Well (WEL) Cells

Constant Head (CHD) Cells

No Flow Boundary (NFB) Cells

Model Results:

Modelled Groundwater Elevation (mAHD)

Positive Residual (m)

Negative Residual (m)

Observation Target

Mine Operation Status:

Approved

Existing

Proposed

Other Proposed

Contour Interval: 12mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

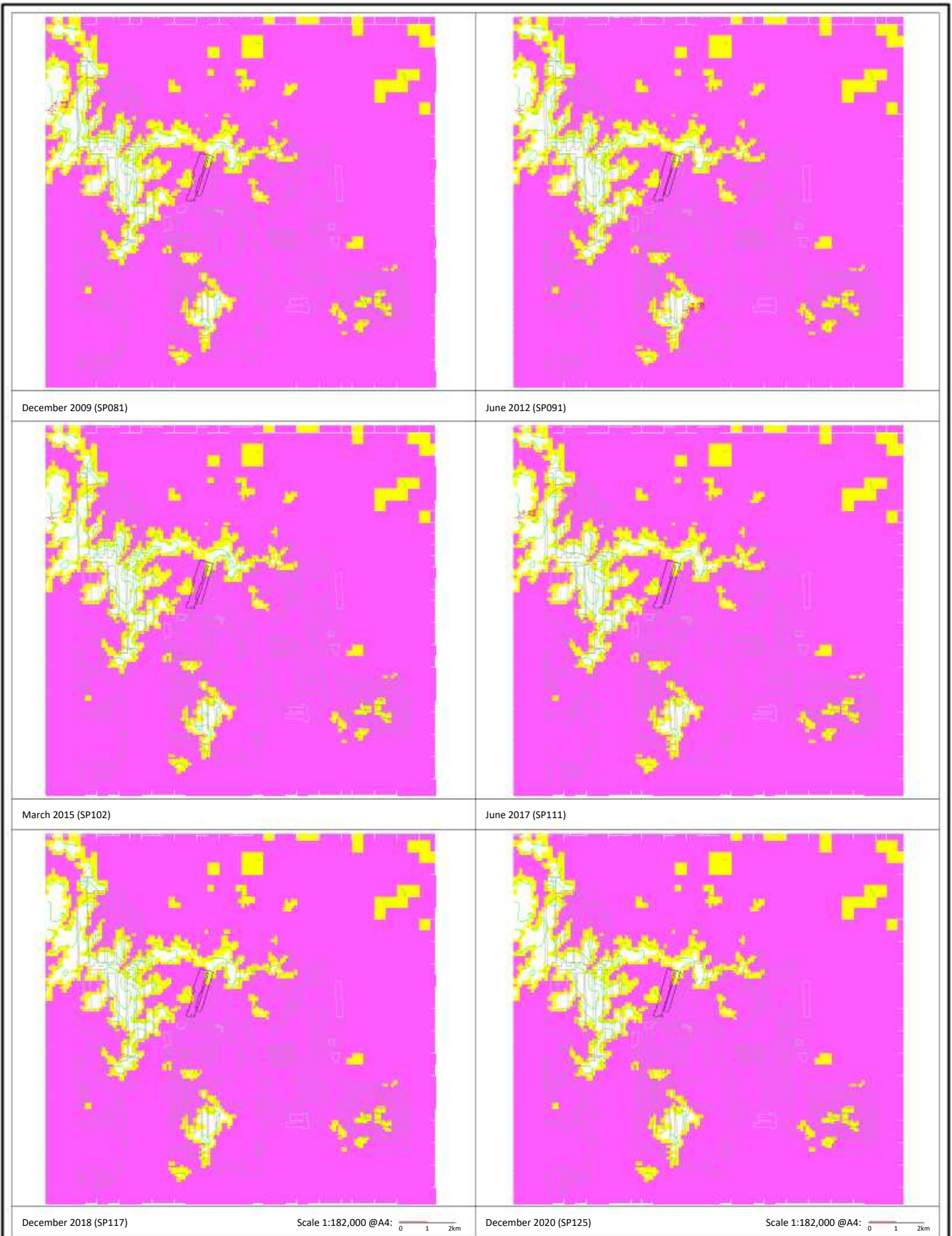
Checked By: JRWB

Distribution of Calibration Residual

Shale (YS1) (Layer 02)

Figure F-02





December 2009 (SP081)

June 2012 (SP091)

March 2015 (SP102)

June 2017 (SP111)

December 2018 (SP117)

Scale 1:182,000 @A4: 0 1 2km

December 2020 (SP125)

Scale 1:182,000 @A4: 0 1 2km

Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

Drain (DRN) Cells

River (RIV) Cells

General Head Boundary (GHB) Cells

Well (WEL) Cells

Constant Head (CHD) Cells

No Flow Boundary (NFB) Cells

Model Results:

Modelled Groundwater Elevation (mAHD)

Positive Residual (m)

Negative Residual (m)

Observation Target

Mine Operation Status:

Approved

Existing

Proposed

Other Proposed

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

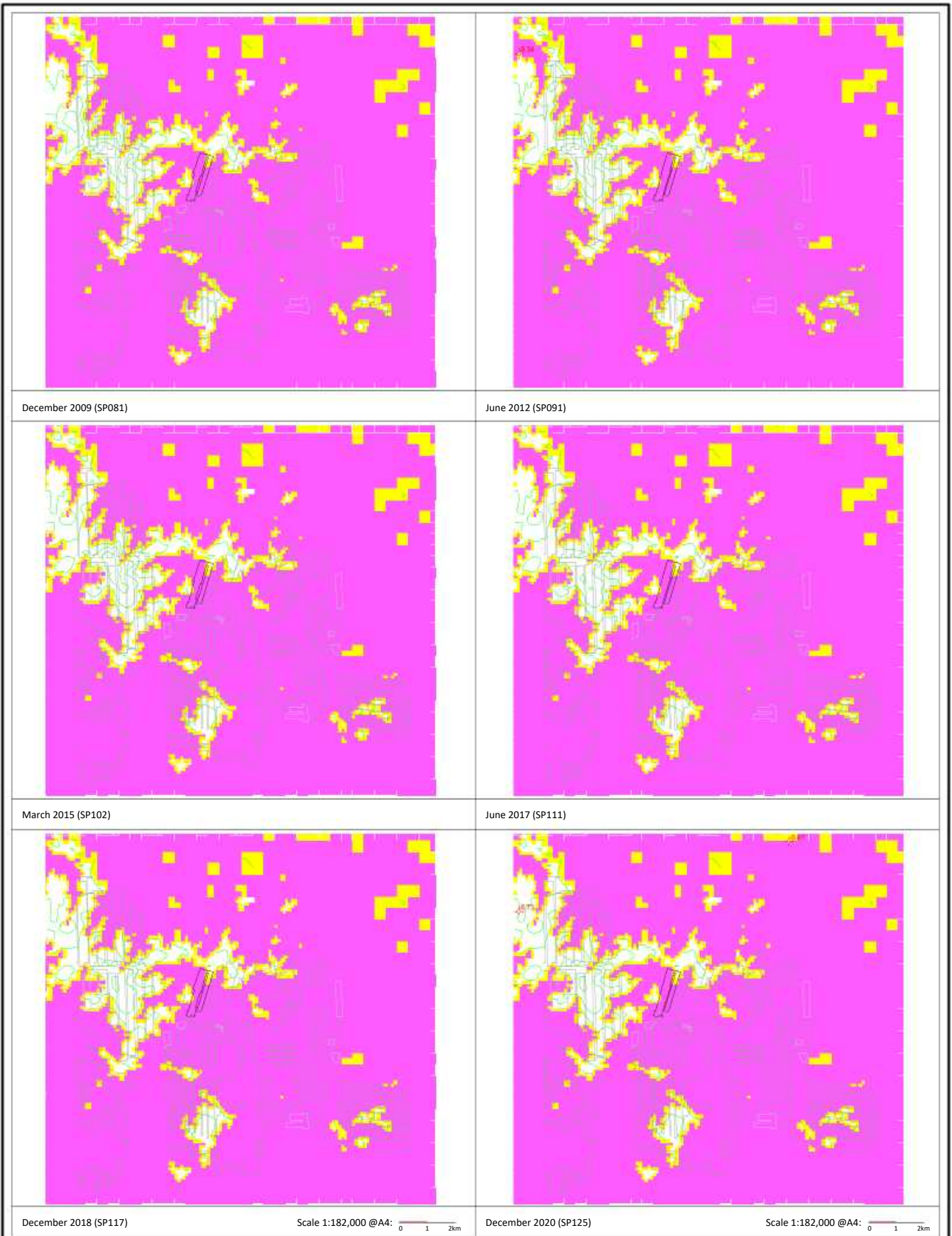
Checked By: JRWB

Distribution of Calibration Residual

Sandstone (Layer 03)

Figure F-03





Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

- Drain (DRN) Cells
- River (RIV) Cells
- General Head Boundary (GHB) Cells
- Well (WEL) Cells
- Constant Head (CHD) Cells
- No Flow Boundary (NFB) Cells

Model Results:

- Modelled Groundwater Elevation (mAHD)
- Positive Residual (m)
- Negative Residual (m)
- Observation Target

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Contour Interval: 12mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

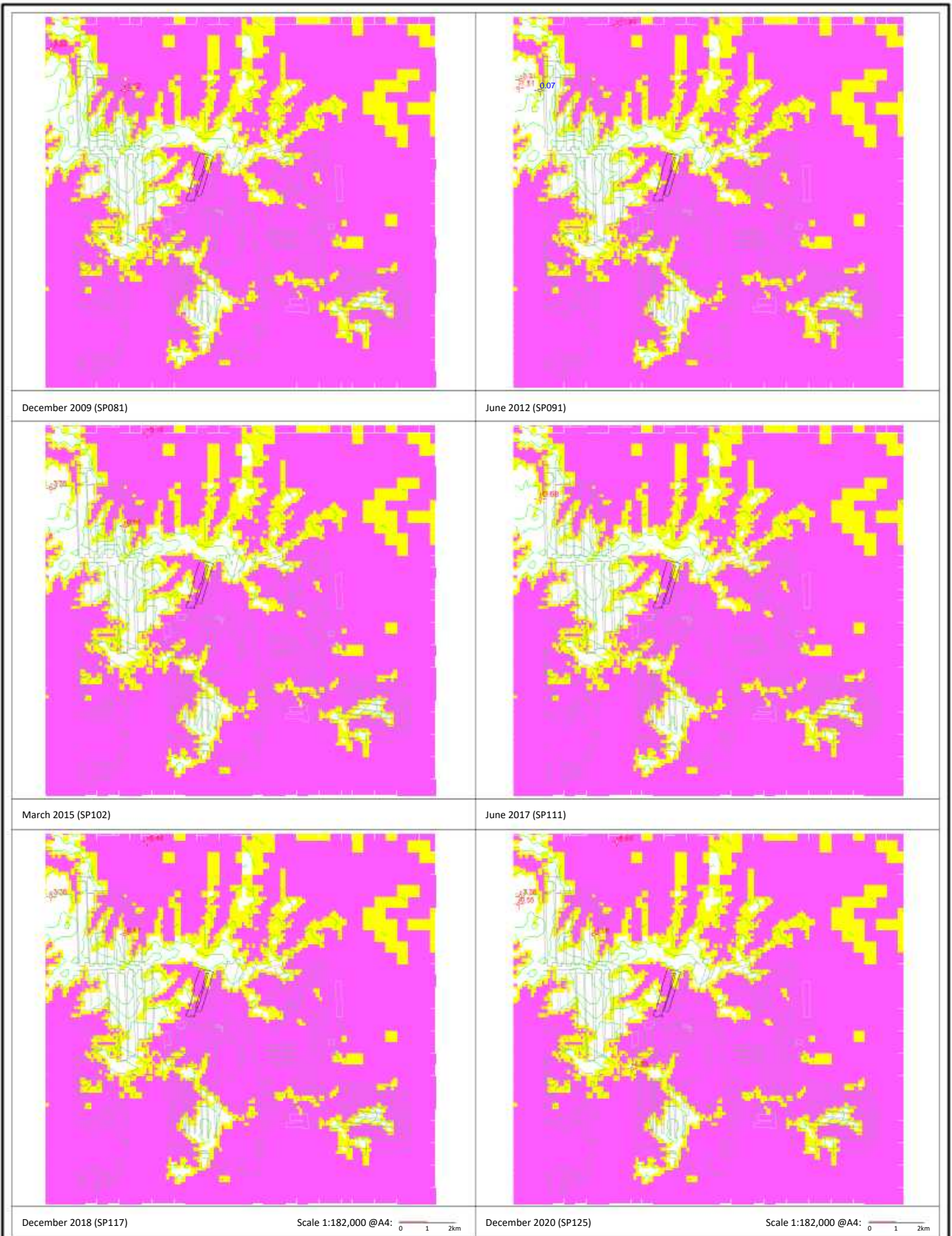
Checked By: JRWB

Distribution of Calibration Residual

Shale (YS2) (Layer 04)

Figure F-04





December 2009 (SP081)

June 2012 (SP091)

March 2015 (SP102)

June 2017 (SP111)

December 2018 (SP117)

Scale 1:182,000 @A4: 0 1 2km

December 2020 (SP125)

Scale 1:182,000 @A4: 0 1 2km

Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Drain (DRN) Cells
River (RIV) Cells
General Head Boundary (GHB) Cells

Well (WEL) Cells
Constant Head (CHD) Cells
No Flow Boundary (NFB) Cells

Model Results:

Modelled Groundwater Elevation (mAHD)
Positive Residual (m)
Negative Residual (m)
Observation Target

Mine Operation Status:
Approved
Existing
Proposed
Other Proposed

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

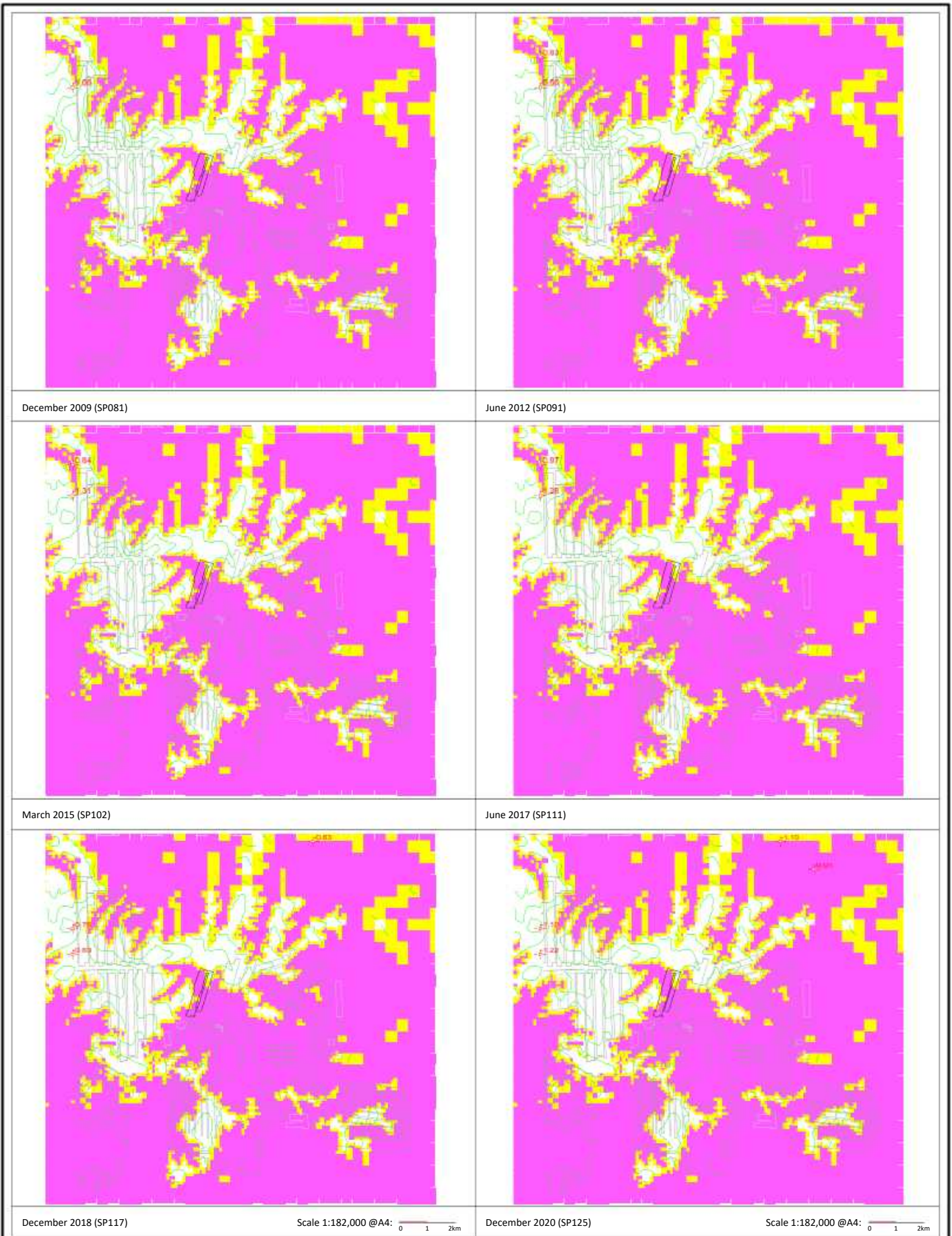
Checked By: JRWB

Distribution of Calibration Residual

Sandstone (Layer 05)

Figure F-05





Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

- Drain (DRN) Cells
- River (RIV) Cells
- General Head Boundary (GHB) Cells
- Well (WEL) Cells
- Constant Head (CHD) Cells
- No Flow Boundary (NFB) Cells

Model Results:

- Modelled Groundwater Elevation (mAHD)
- Positive Residual (m)
- Negative Residual (m)
- Observation Target

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

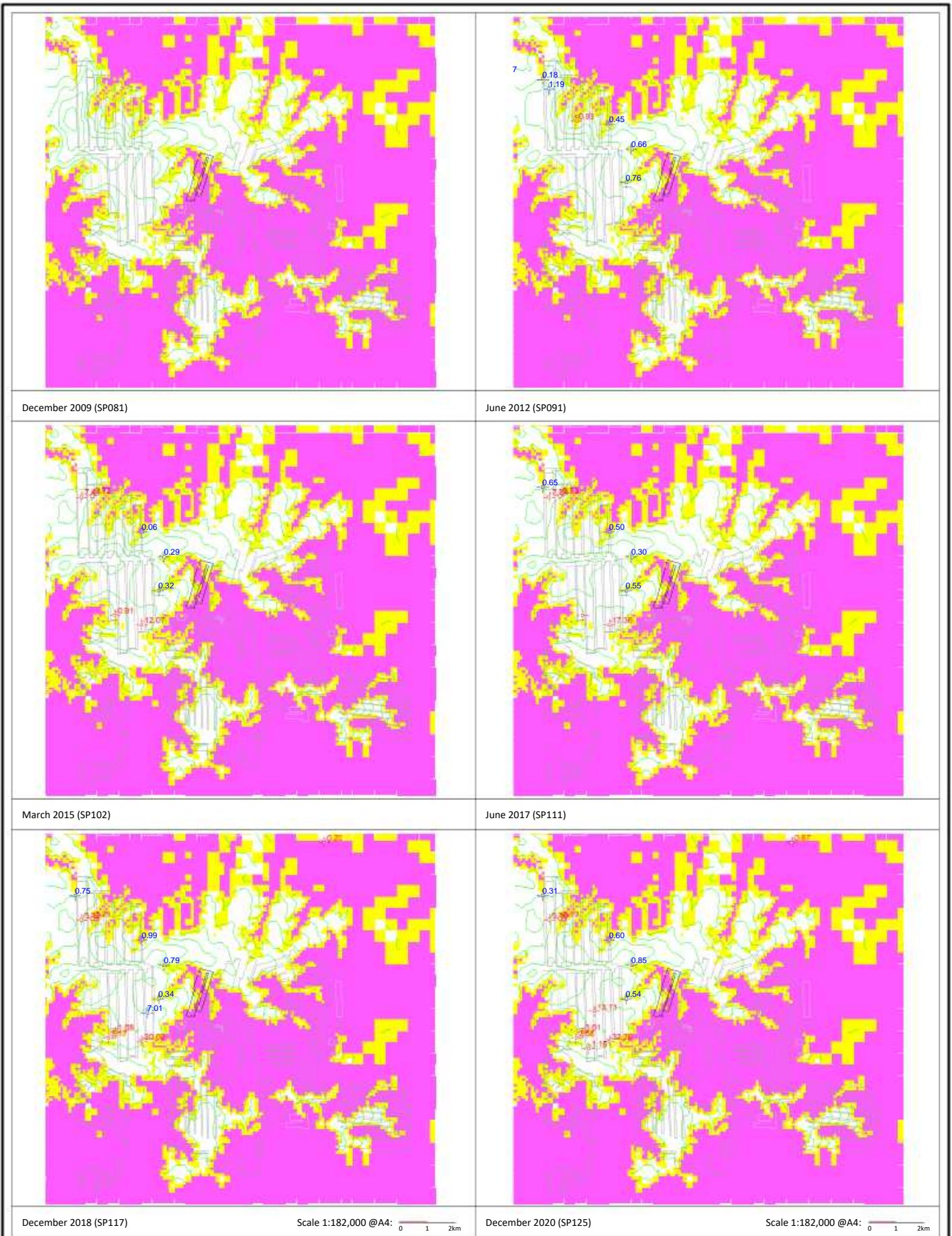
Checked By: JRWB

Distribution of Calibration Residual

Shale (YS3) (Layer 06)

Figure F-06





Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

- Drain (DRN) Cells
- River (RIV) Cells
- General Head Boundary (GHB) Cells
- Well (WEL) Cells
- Constant Head (CHD) Cells
- No Flow Boundary (NFB) Cells

Model Results:

- Modelled Groundwater Elevation (mAHD)
- Positive Residual (m)
- Negative Residual (m)
- Observation Target

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

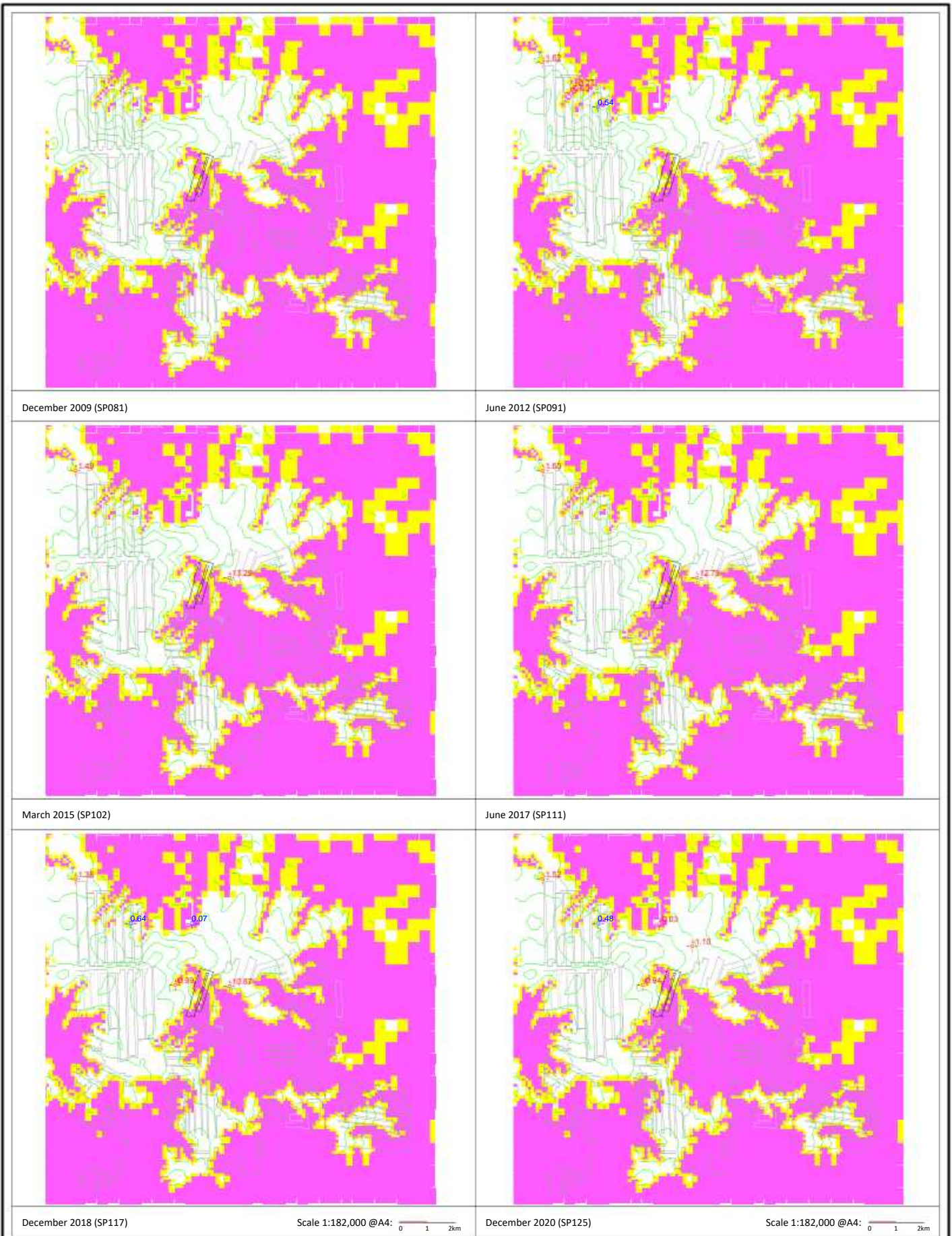
Checked By: JRWB

Distribution of Calibration Residual

Sandstone (Layer 07)

Figure F-07





Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

- Drain (DRN) Cells
- River (RIV) Cells
- General Head Boundary (GHB) Cells
- Well (WEL) Cells
- Constant Head (CHD) Cells
- No Flow Boundary (NFB) Cells

Model Results:

- Modelled Groundwater Elevation (mAHD)
- Positive Residual (m)
- Negative Residual (m)
- Observation Target

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

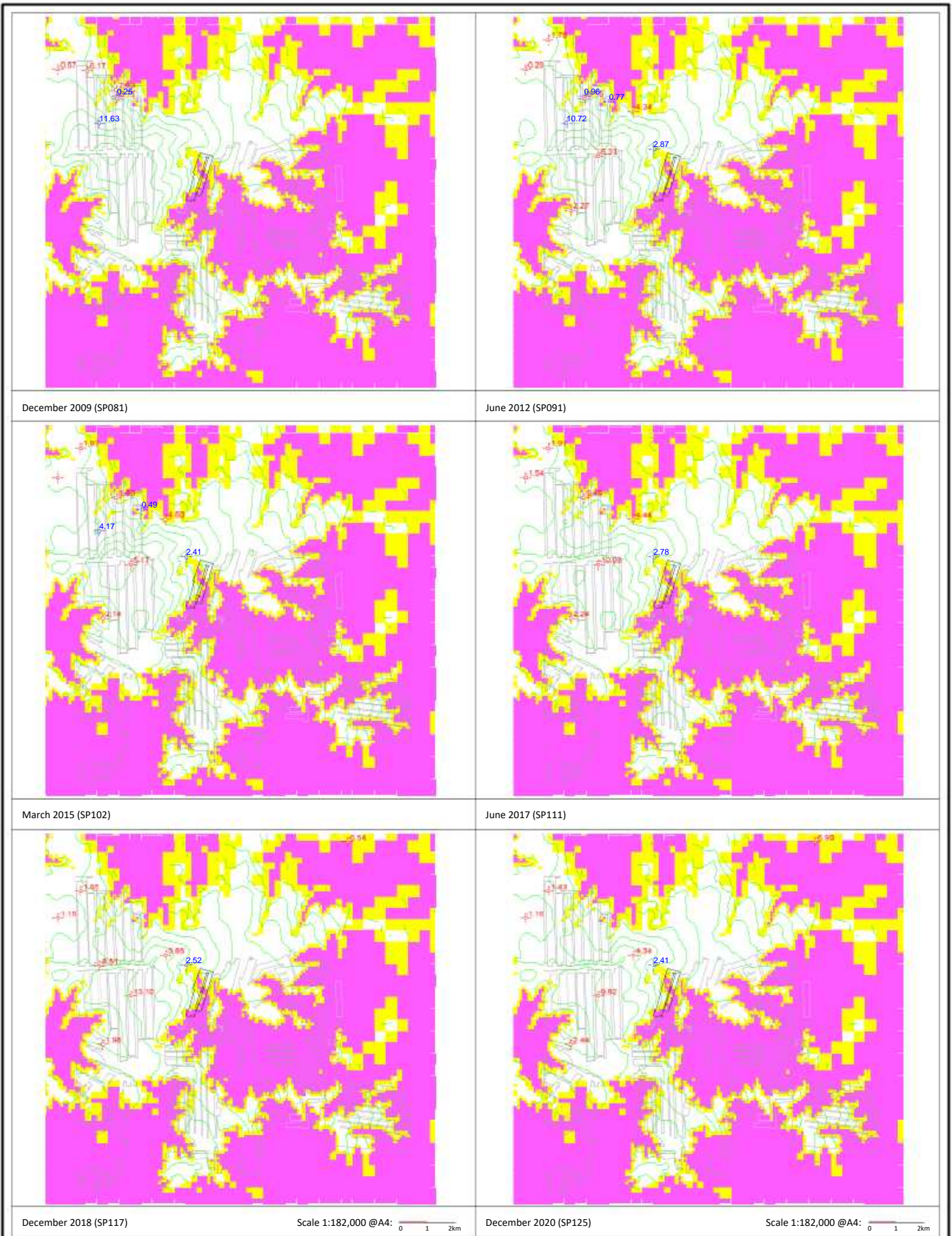
Checked By: JRWB

Distribution of Calibration Residual

Shale (YS4) (Layer 08)

Figure F-08





Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

- Drain (DRN) Cells
- River (RIV) Cells
- General Head Boundary (GHB) Cells
- Well (WEL) Cells
- Constant Head (CHD) Cells
- No Flow Boundary (NFB) Cells

Model Results:

- Modelled Groundwater Elevation (mAHD)
- Positive Residual (m)
- Negative Residual (m)
- Observation Target

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

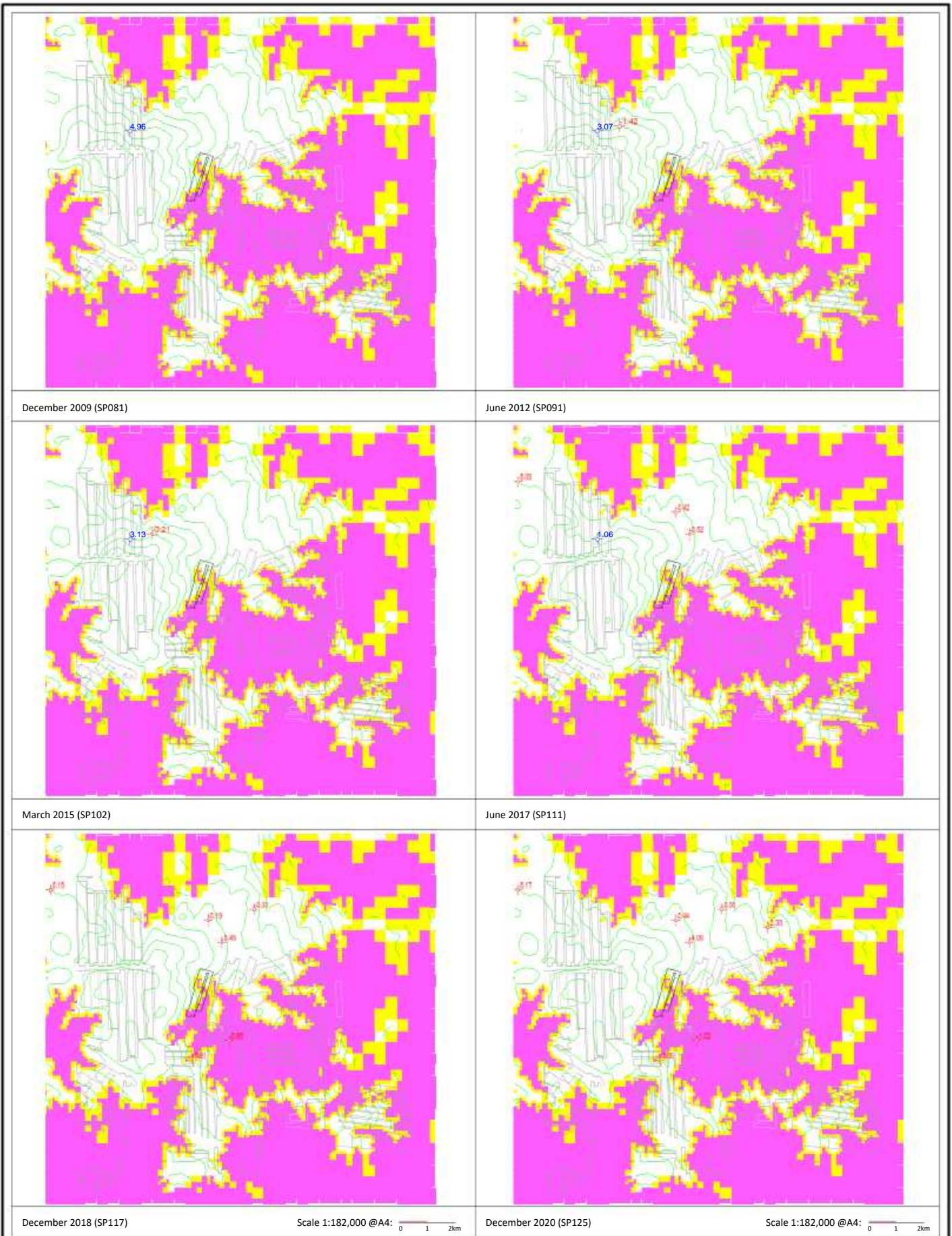
Checked By: JRWB

Distribution of Calibration Residual

Sandstone (Layer 09)

Figure F-09





Legend

- | | | |
|---|--|--|
| <p>Mining Methods:</p> <ul style="list-style-type: none"> Development | <p>Model Cell Type:</p> <ul style="list-style-type: none"> Pinched-Out Cells <p>Model Boundary Conditions:</p> <ul style="list-style-type: none"> Drain (DRN) Cells River (RIV) Cells General Head Boundary (GHB) Cells Well (WEL) Cells Constant Head (CHD) Cells No Flow Boundary (NFB) Cells | <p>Model Results:</p> <ul style="list-style-type: none"> Modelled Groundwater Elevation (mAHD) Positive Residual (m) Negative Residual (m) Observation Target |
| <p>Mine Operation Status:</p> <ul style="list-style-type: none"> Approved Existing Proposed Other Proposed | | |

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

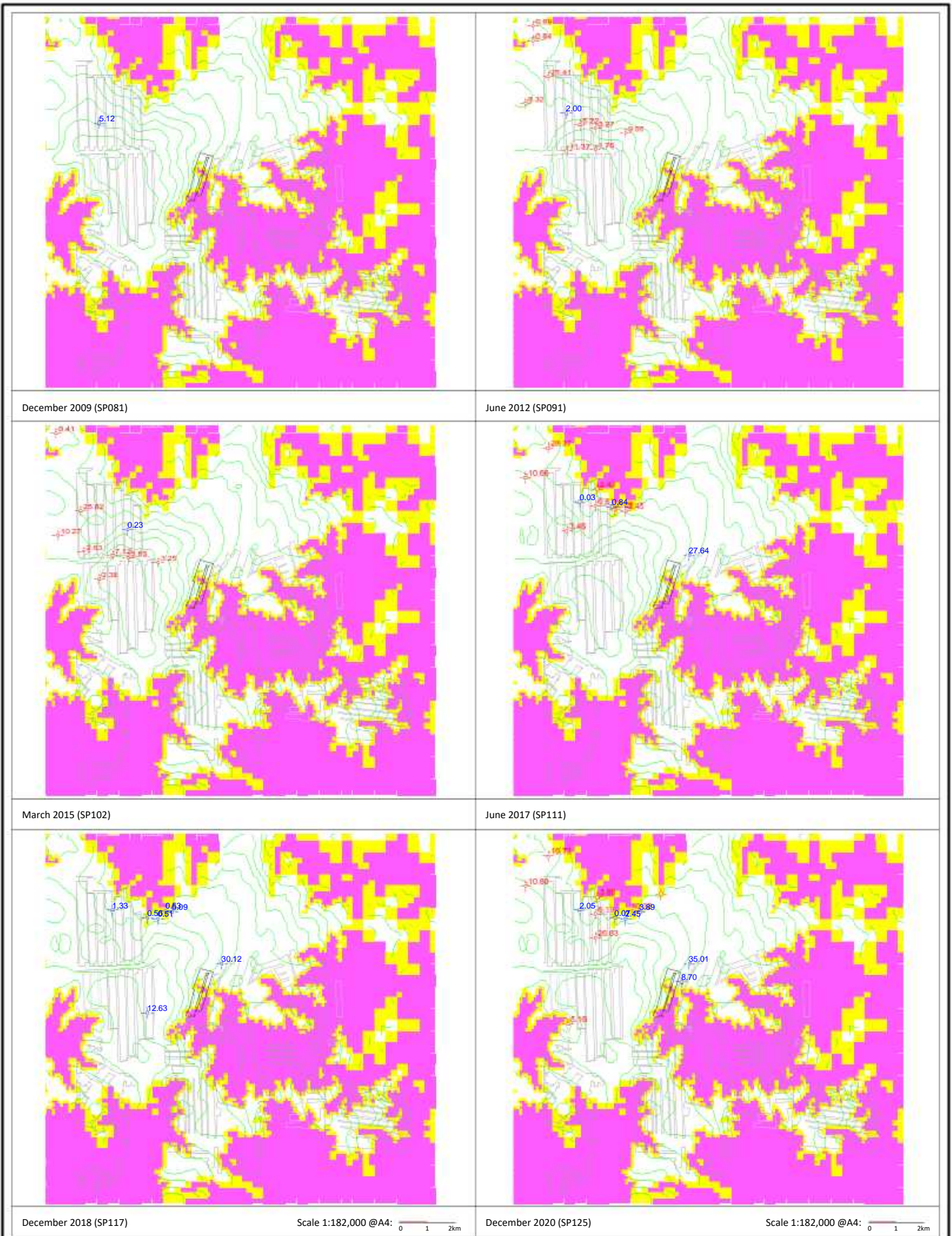
Checked By: JRWB

Distribution of Calibration Residual

Shale (YS5) (Layer 10)

Figure F-10





December 2009 (SP081)

June 2012 (SP091)

March 2015 (SP102)

June 2017 (SP111)

December 2018 (SP117)

Scale 1:182,000 @A4: 0 1 2km

December 2020 (SP125)

Scale 1:182,000 @A4: 0 1 2km

Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

Drain (DRN) Cells

River (RIV) Cells

General Head Boundary (GHB) Cells

Well (WEL) Cells

Constant Head (CHD) Cells

No Flow Boundary (NFB) Cells

Model Results:

Modelled Groundwater Elevation (mAHD)

Positive Residual (m)

Negative Residual (m)

Observation Target

Mine Operation Status:

Approved

Existing

Proposed

Other Proposed

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

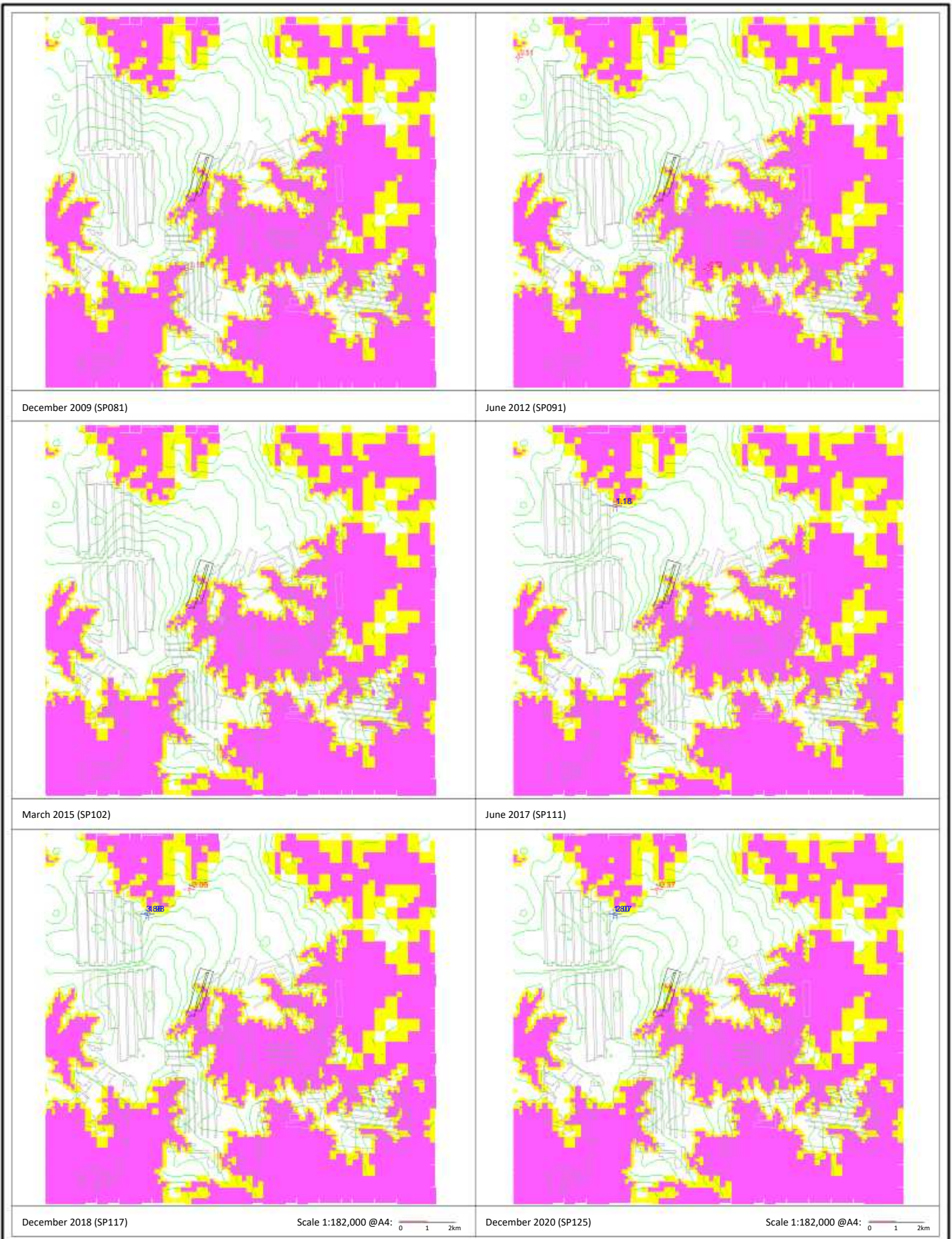
Checked By: JRWB

Distribution of Calibration Residual

Sandstone (Layer 11)

Figure F-11





Legend

Mining Methods:

Development

Model Cell Type:

- Pinched-Out Cells
- Drain (DRN) Cells
- River (RIV) Cells
- General Head Boundary (GHB) Cells
- Well (WEL) Cells
- Constant Head (CHD) Cells
- No Flow Boundary (NFB) Cells

Model Results:

- Modelled Groundwater Elevation (mAHD)
- Positive Residual (m)
- Negative Residual (m)
- Observation Target

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

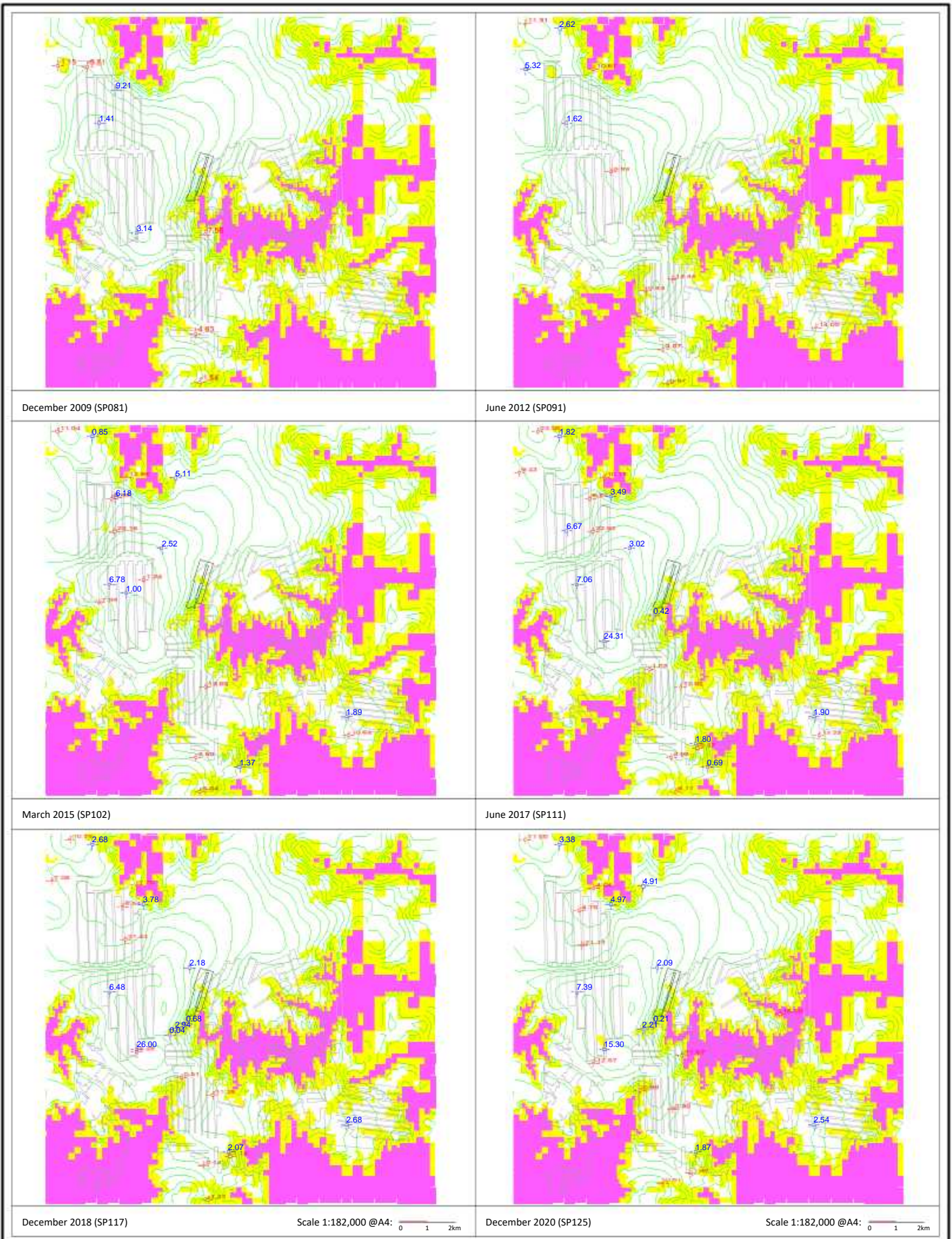
Checked By: JRWB

Distribution of Calibration Residual

Shale (YS6) (Layer 12)

Figure F-12





Legend

- | | | |
|---|--|--|
| <p>Mining Methods:</p> <ul style="list-style-type: none"> Development <p>Mine Operation Status:</p> <ul style="list-style-type: none"> Approved Existing Proposed Other Proposed | <p>Model Cell Type:</p> <ul style="list-style-type: none"> Pinched-Out Cells Drain (DRN) Cells River (RIV) Cells General Head Boundary (GHB) Cells Well (WEL) Cells Constant Head (CHD) Cells No Flow Boundary (NFB) Cells | <p>Model Results:</p> <ul style="list-style-type: none"> Modelled Groundwater Elevation (mAHD) Positive Residual (m) Negative Residual (m) Observation Target |
|---|--|--|

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

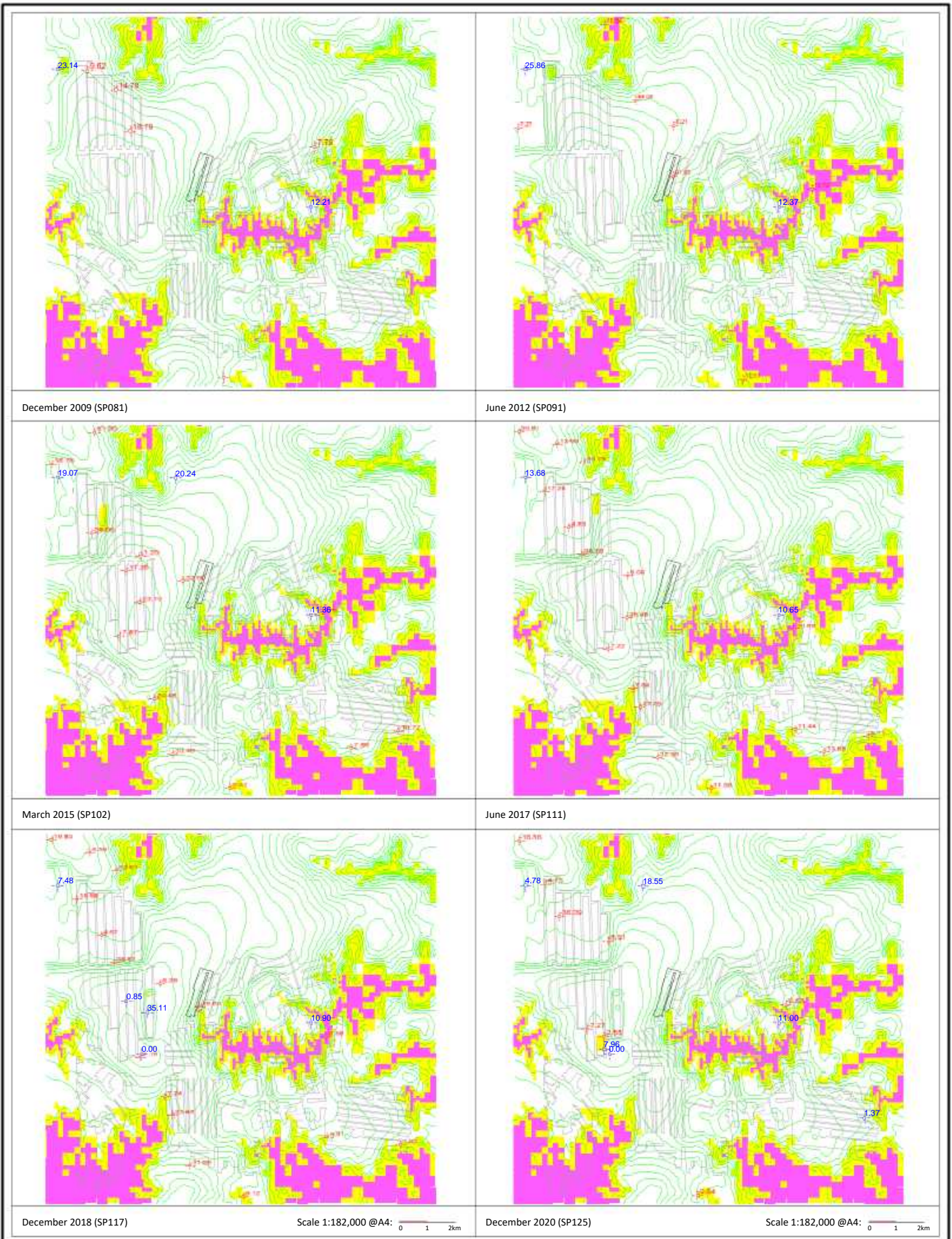
Checked By: JRWB

Distribution of Calibration Residual

Banks Wall Sandstone (Layer 13)

Figure F-13





Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

- Drain (DRN) Cells
- River (RIV) Cells
- General Head Boundary (GHB) Cells
- Well (WEL) Cells
- Constant Head (CHD) Cells
- No Flow Boundary (NFB) Cells

Model Results:

- Modelled Groundwater Elevation (mAHd)
- Positive Residual (m)
- Negative Residual (m)
- Observation Target

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Contour Interval: 10mAHd

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

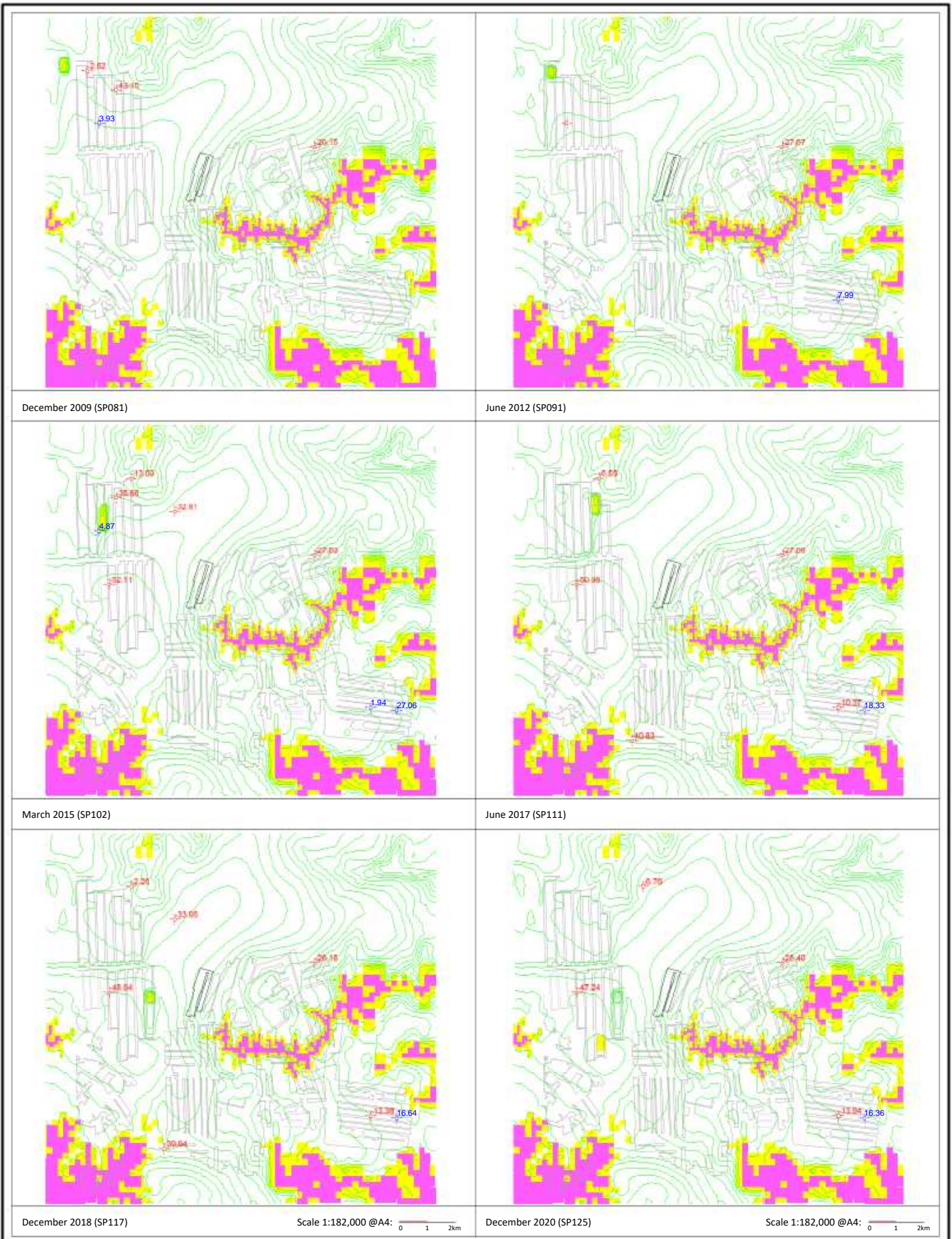
Checked By: JRWB

Distribution of Calibration Residual

Banks Wall Sandstone (Layer 14)

Figure F-14





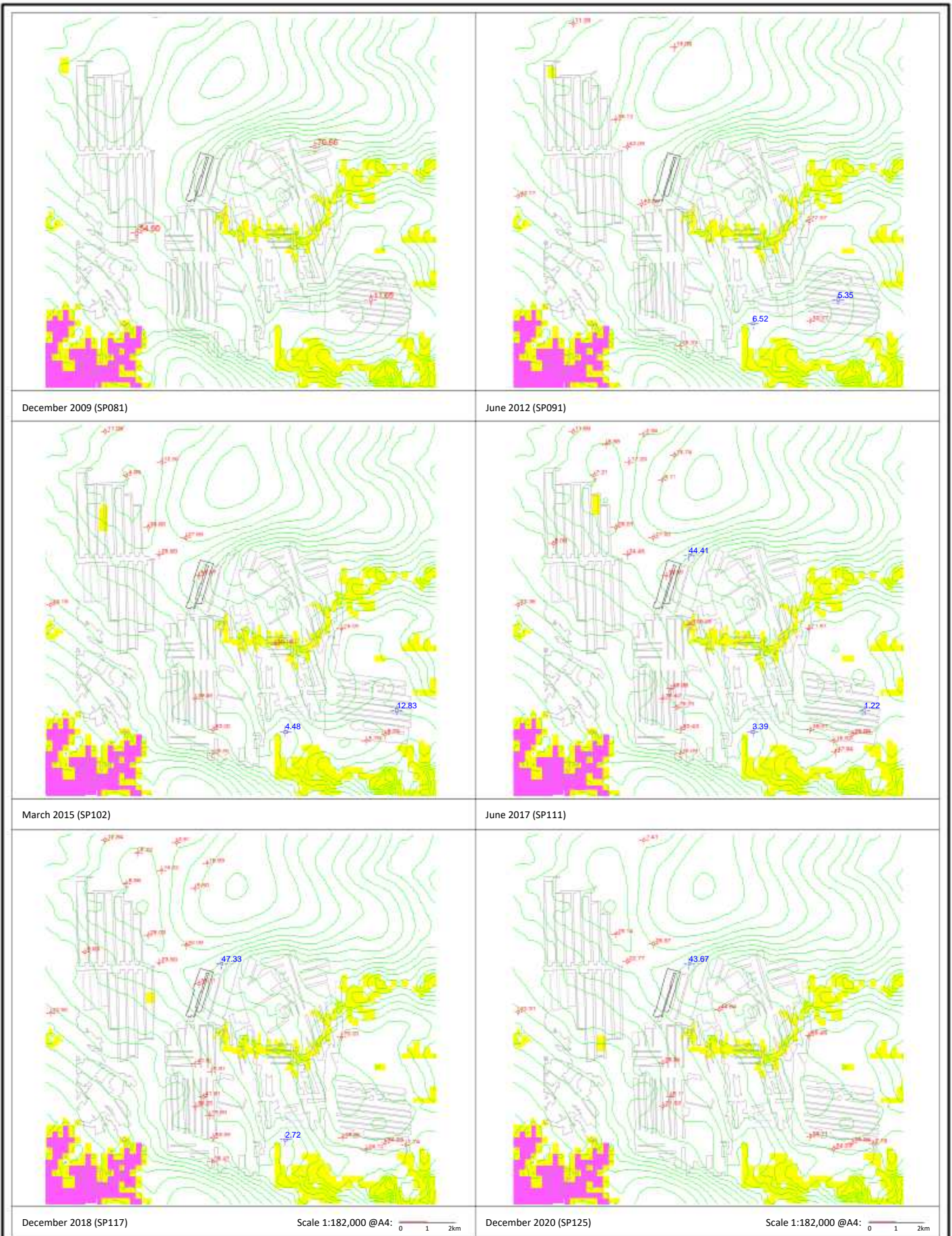
Legend

- | | | |
|---|--|--|
| <p>Mining Methods:</p> <ul style="list-style-type: none"> Development | <p>Model Cell Type:</p> <ul style="list-style-type: none"> Pinched-Out Cells Drain (DRN) Cells River (RIV) Cells General Head Boundary (GHB) Cells Well (WEL) Cells Constant Head (CHD) Cells No Flow Boundary (NFB) Cells | <p>Model Results:</p> <ul style="list-style-type: none"> Modelled Groundwater Elevation (mAHD) Positive Residual (m) Negative Residual (m) Observation Target |
| <p>Mine Operation Status:</p> <ul style="list-style-type: none"> Approved Existing Proposed Other Proposed | | |

Job No.: 68229
 Client: Clarence Colliery Pty Ltd
 Version: R01RevA Date: 07/11/2025
 Drawn By: DAW Checked By: JRWB

Distribution of Calibration Residual
 Mount York Claystone (Layer 15)
 Figure F-15





December 2009 (SP081)

June 2012 (SP091)

March 2015 (SP102)

June 2017 (SP111)

December 2018 (SP117)

Scale 1:182,000 @A4: 0 1 2km

December 2020 (SP125)

Scale 1:182,000 @A4: 0 1 2km

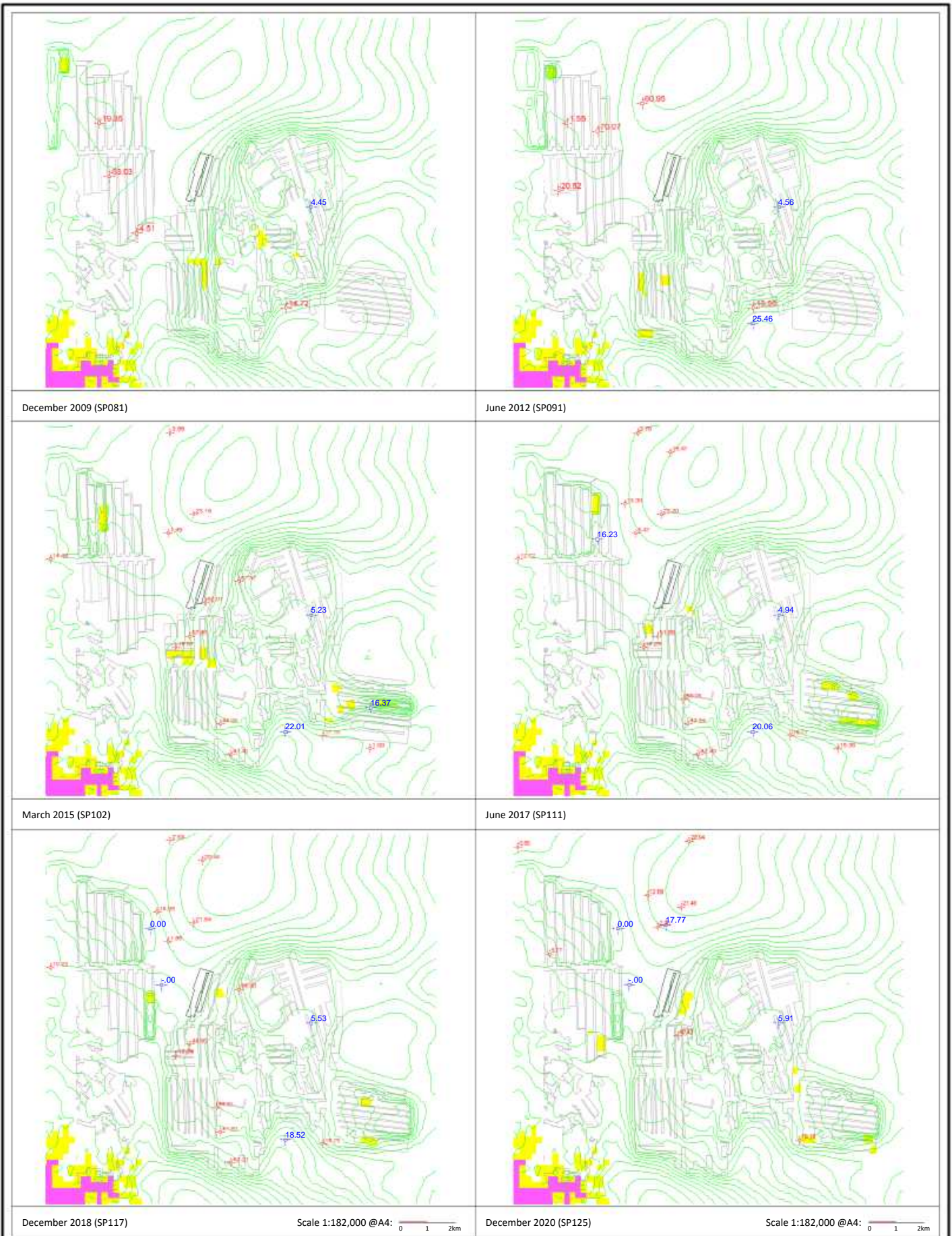
Legend

- | | | |
|---|--|--|
| <p>Mining Methods:</p> <ul style="list-style-type: none"> Development | <p>Model Cell Type:</p> <ul style="list-style-type: none"> Pinched-Out Cells <p>Model Boundary Conditions:</p> <ul style="list-style-type: none"> Drain (DRN) Cells River (RIV) Cells General Head Boundary (GHB) Cells Well (WEL) Cells Constant Head (CHD) Cells No Flow Boundary (NFB) Cells | <p>Model Results:</p> <ul style="list-style-type: none"> Modelled Groundwater Elevation (mAHd) Positive Residual (m) Negative Residual (m) Observation Target |
| <p>Mine Operation Status:</p> <ul style="list-style-type: none"> Approved Existing Proposed Other Proposed | | |

Contour Interval: 10mAHd

Job No.: 68229		Distribution of Calibration Residual Burra-Moko Head SandStone (Layer 16)
Client: Clarence Colliery Pty Ltd		
Version: R01RevA	Date: 07/11/2025	
Drawn By: DAW	Checked By: JRWB	Figure F-16





Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

- Drain (DRN) Cells
- River (RIV) Cells
- General Head Boundary (GHB) Cells
- Well (WEL) Cells
- Constant Head (CHD) Cells
- No Flow Boundary (NFB) Cells

Model Results:

- Modelled Groundwater Elevation (mAHD)
- Positive Residual (m)
- Negative Residual (m)
- Observation Target

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

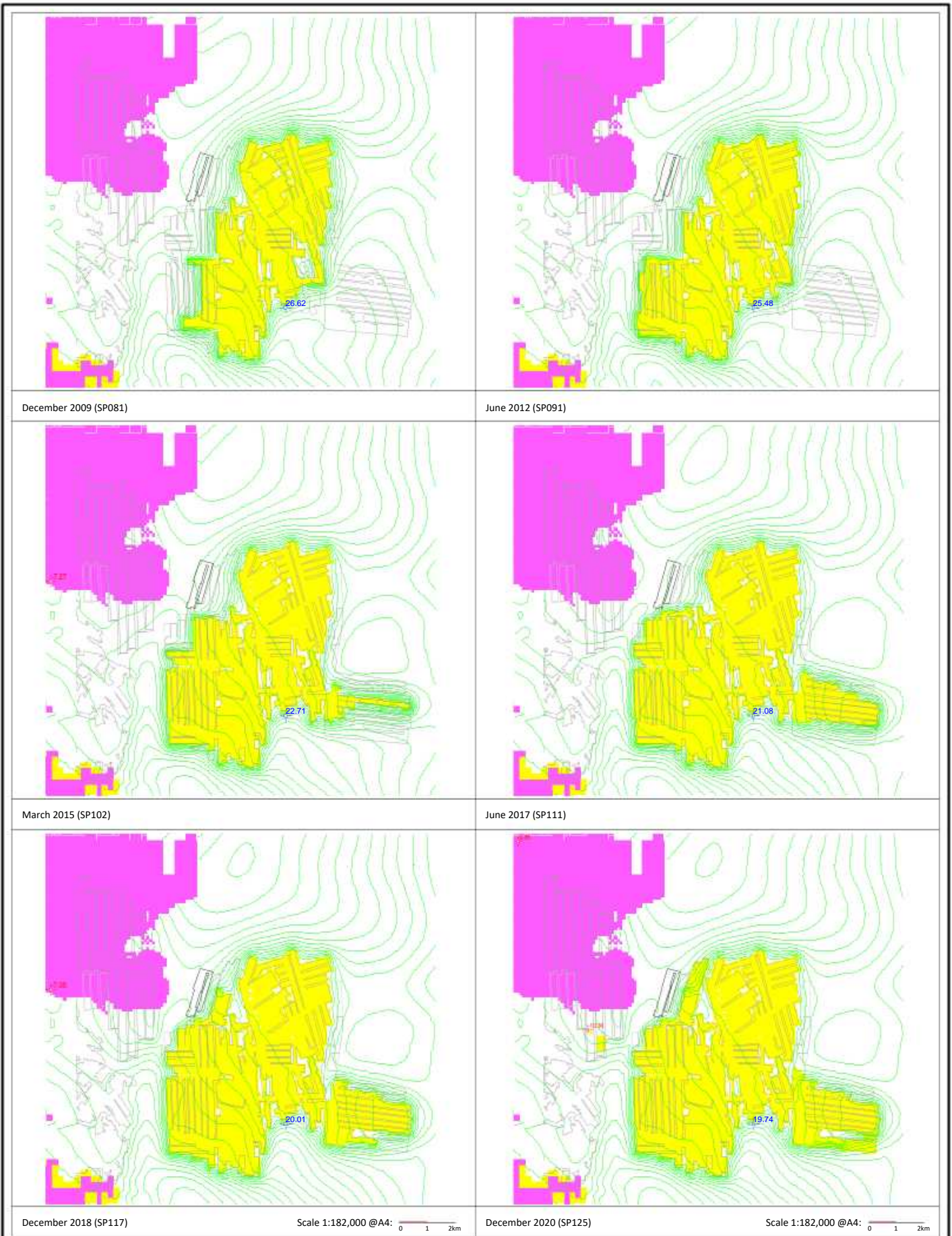
Checked By: JRWB

Distribution of Calibration Residual

Caley Formation (Layer 17)

Figure F-17





Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

- Drain (DRN) Cells
- River (RIV) Cells
- General Head Boundary (GHB) Cells
- Well (WEL) Cells
- Constant Head (CHD) Cells
- No Flow Boundary (NFB) Cells

Model Results:

- Modelled Groundwater Elevation (mAHD)
- Positive Residual (m)
- Negative Residual (m)
- Observation Target

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

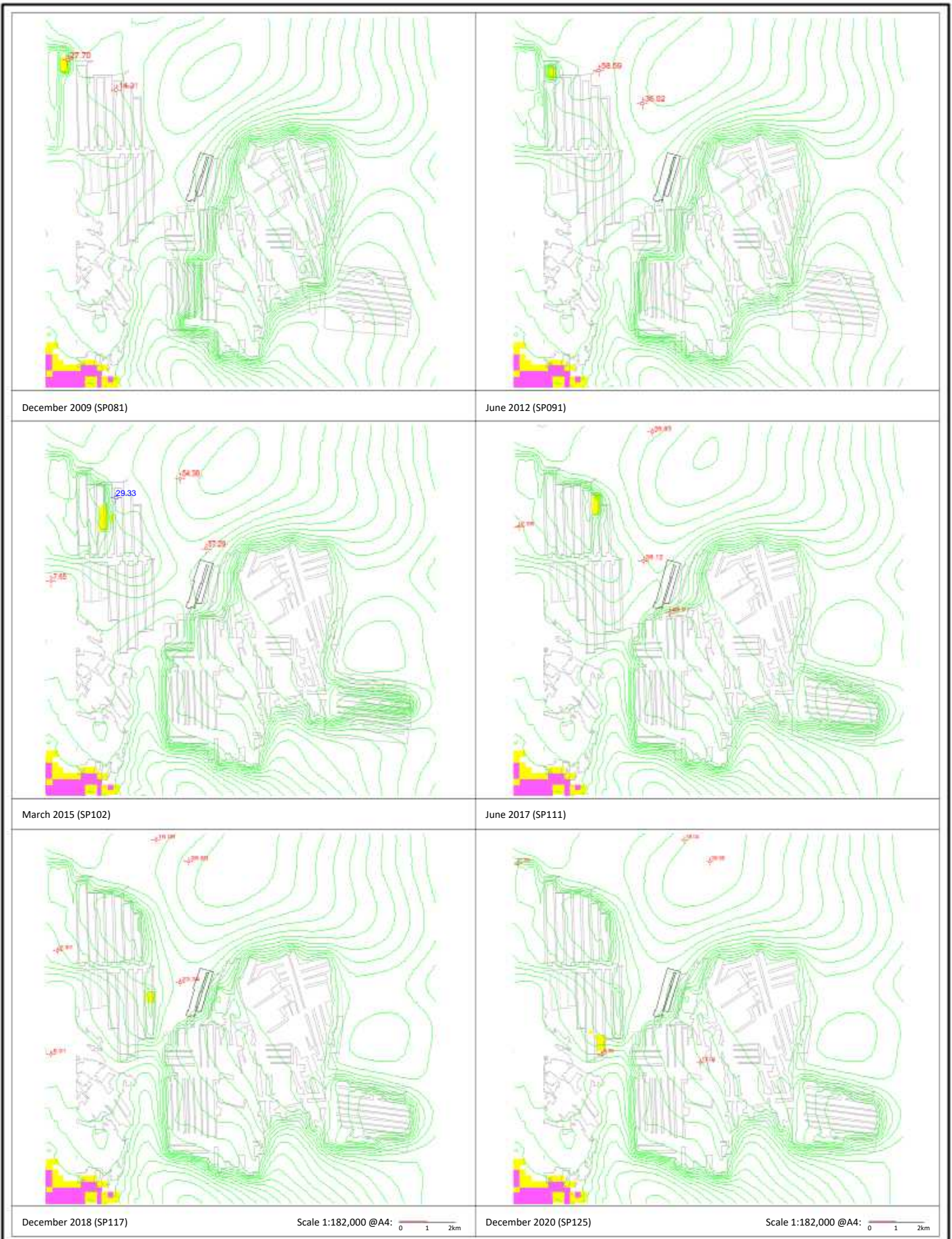
Checked By: JRWB

Distribution of Calibration Residual

Katoomba Seam (Layer 18)

Figure F-18





Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

Drain (DRN) Cells

River (RIV) Cells

General Head Boundary (GHB) Cells

Well (WEL) Cells

Constant Head (CHD) Cells

No Flow Boundary (NFB) Cells

Model Results:

Modelled Groundwater Elevation (mAHd)

Positive Residual (m)

Negative Residual (m)

Observation Target

Mine Operation Status:

Approved

Existing

Proposed

Other Proposed

Contour Interval: 10mAHd

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

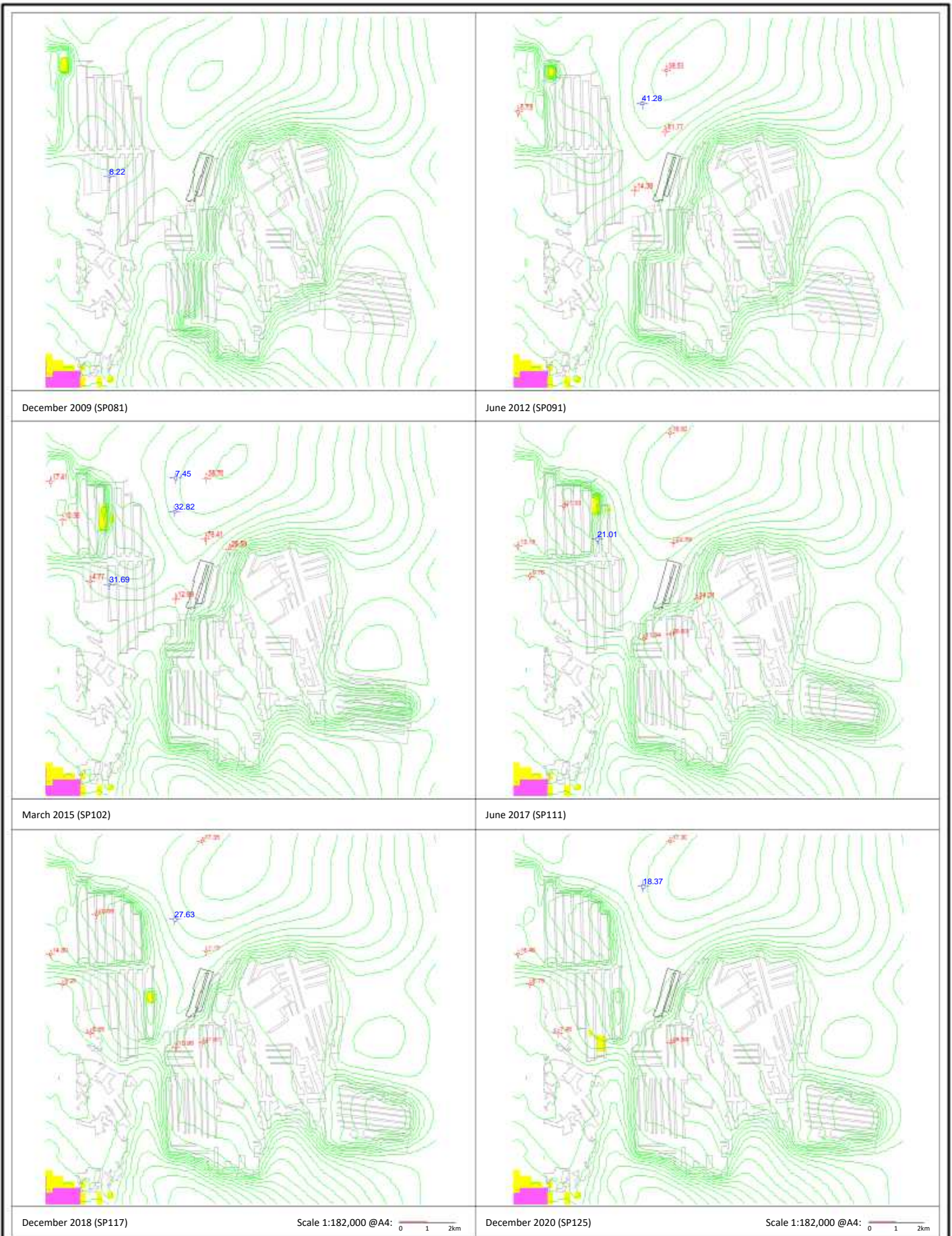
Checked By: JRWB

Distribution of Calibration Residual

Farmers Creek Formation (Layer 19)

Figure F-19





Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

- Drain (DRN) Cells
- River (RIV) Cells
- General Head Boundary (GHB) Cells
- Well (WEL) Cells
- Constant Head (CHD) Cells
- No Flow Boundary (NFB) Cells

Model Results:

- Modelled Groundwater Elevation (mAHD)
- Positive Residual (m)
- Negative Residual (m)
- Observation Target

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

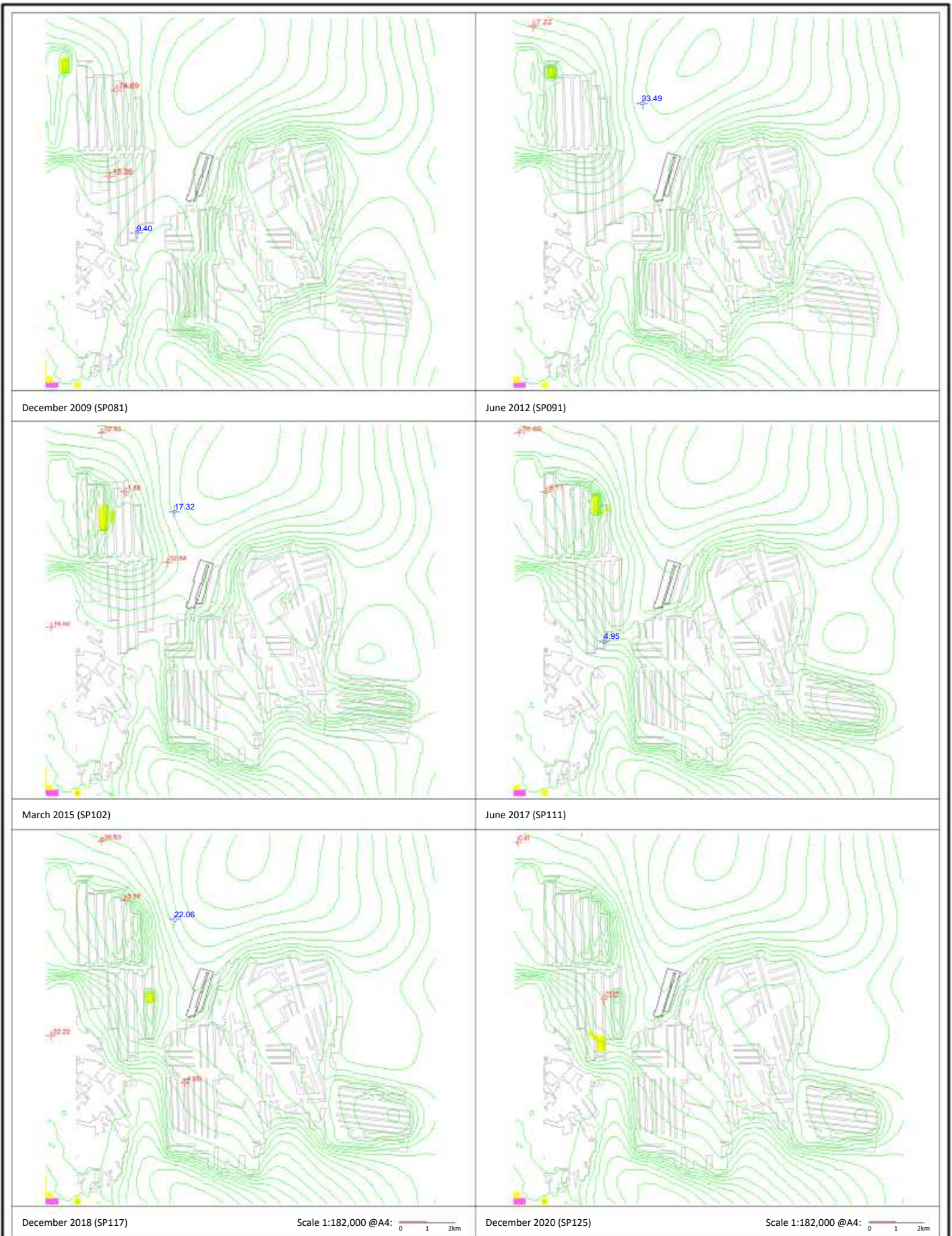
Checked By: JRWB

Distribution of Calibration Residual

Gap Sandstone (Layer 20)

Figure F-20





Legend

Mining Methods:

Development

Model Cell Type:

- Pinched-Out Cells
- Drain (DRN) Cells
- River (RIV) Cells
- General Head Boundary (GHB) Cells
- Well (WEL) Cells
- Constant Head (CHD) Cells
- No Flow Boundary (NFB) Cells

Model Results:

- Modelled Groundwater Elevation (mAHd)
- Positive Residual (m)
- Negative Residual (m)
- Observation Target

Mine Operation Status:

Approved
Existing
Proposed
Other Proposed

Contour Interval: 10mAHd

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Drawn By: DAW

Date: 07/11/2025

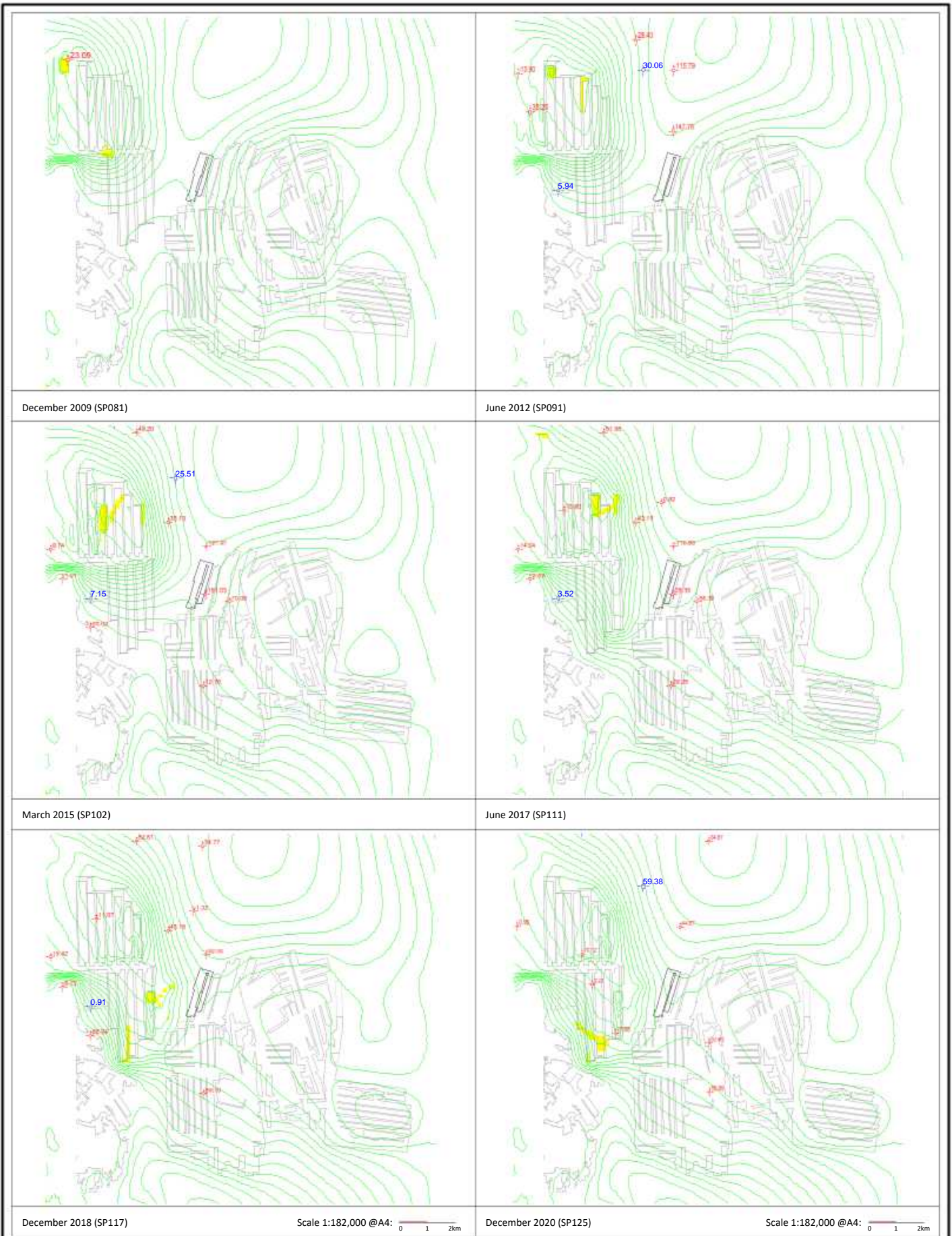
Checked By: JRWB

Distribution of Calibration Residual

Denman Formation (Layer 21)

Figure F-21





Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

Drain (DRN) Cells

River (RIV) Cells

General Head Boundary (GHB) Cells

Well (WEL) Cells

Constant Head (CHD) Cells

No Flow Boundary (NFB) Cells

Model Results:

Modelled Groundwater Elevation (mAH)

Positive Residual (m)

Negative Residual (m)

Observation Target

Mine Operation Status:

Approved

Existing

Proposed

Other Proposed

Contour Interval: 10mAH

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

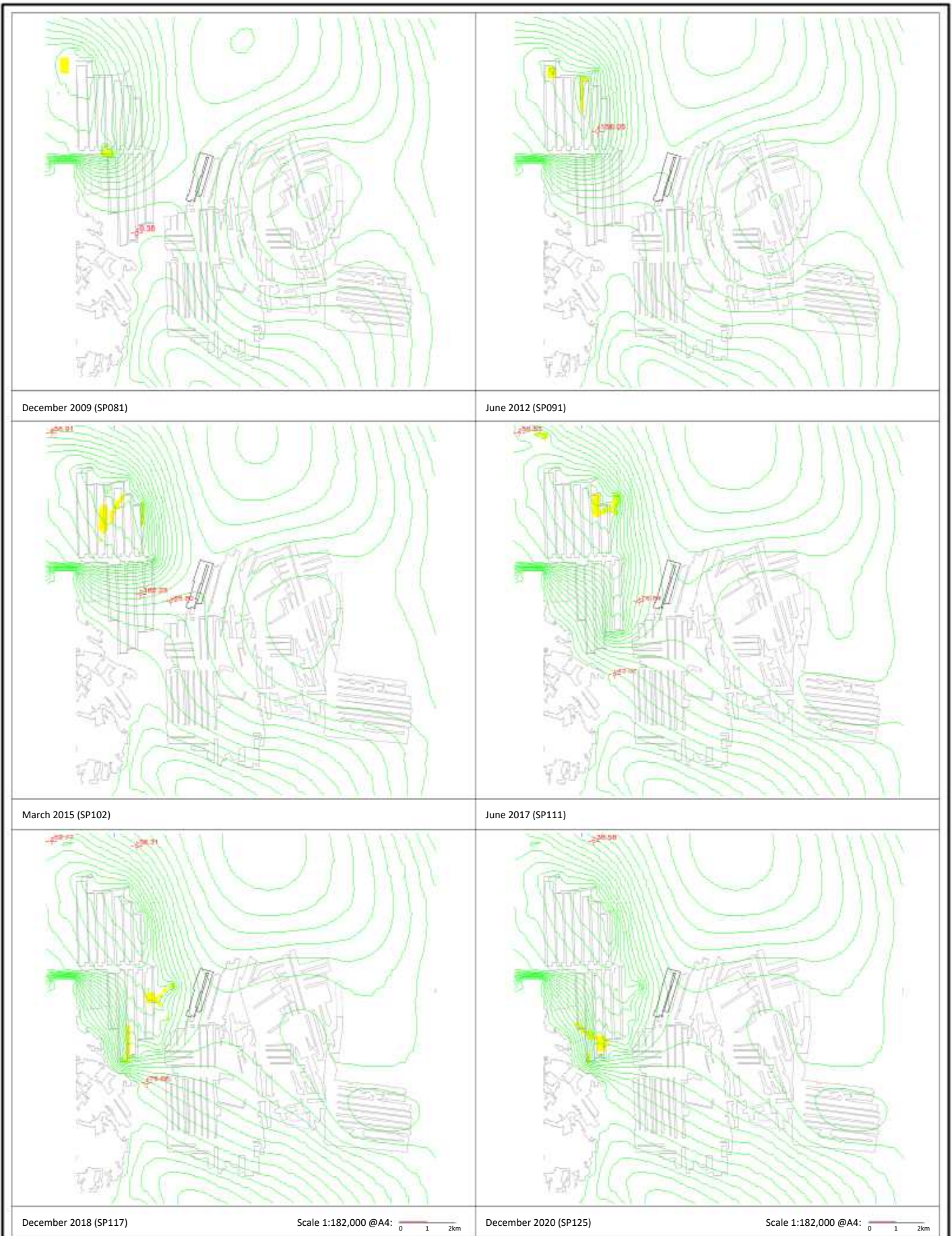
Checked By: JRWB

Distribution of Calibration Residual

Long Swamp Formation (Layer 22)

Figure F-22





December 2009 (SP081)

June 2012 (SP091)

March 2015 (SP102)

June 2017 (SP111)

December 2018 (SP117)

Scale 1:182,000 @A4: 0 1 2km

December 2020 (SP125)

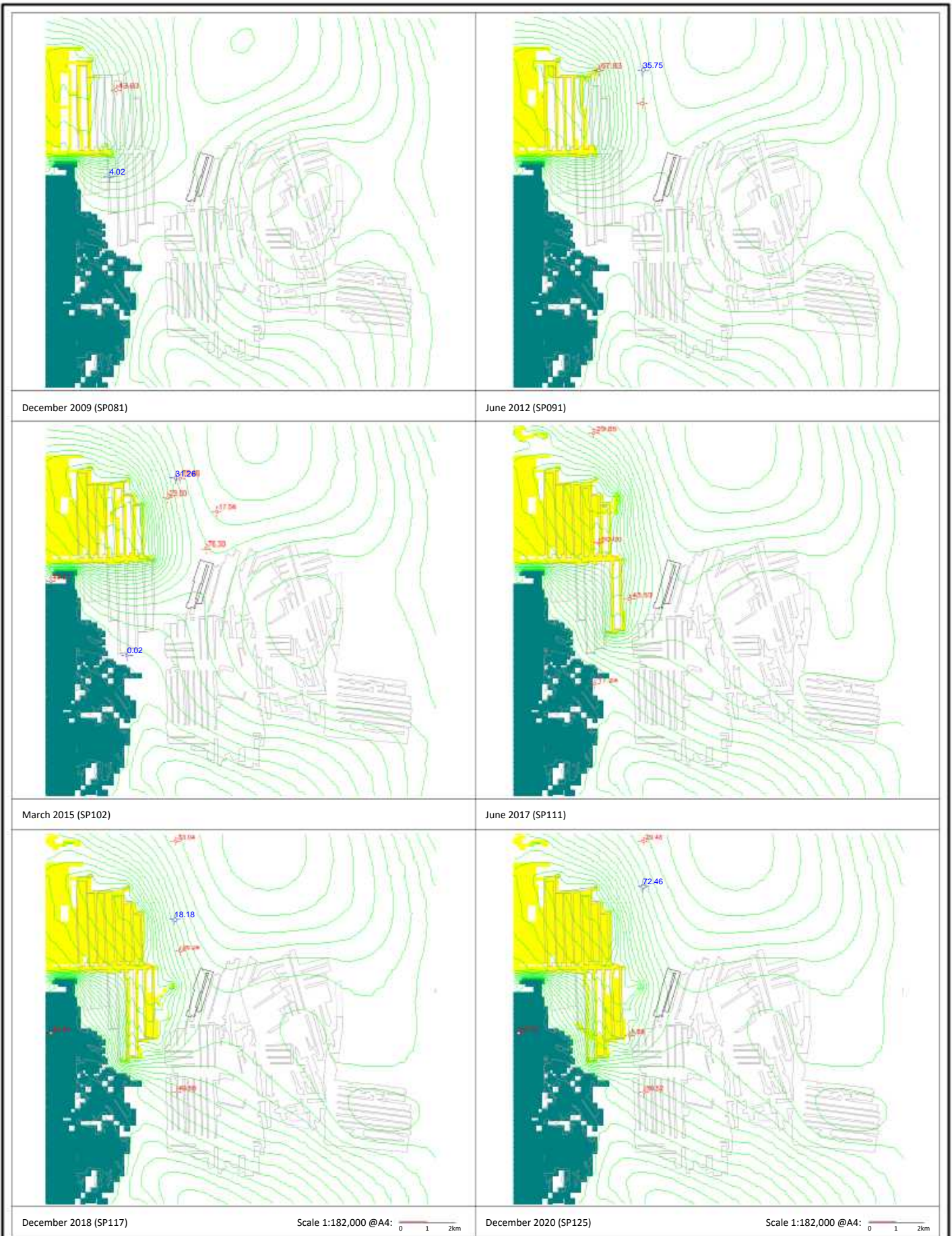
Scale 1:182,000 @A4: 0 1 2km

Legend		
Mining Methods:	Model Cell Type:	Model Results:
Development	Pinched-Out Cells	Modelled Groundwater Elevation (mAHD)
	Model Boundary Conditions:	Positive Residual (m)
	Drain (DRN) Cells	Negative Residual (m)
	River (RIV) Cells	Observation Target
Mine Operation Status:	General Head Boundary (GHB) Cells	
Approved	Well (WEL) Cells	
Existing	Constant Head (CHD) Cells	
Proposed	No Flow Boundary (NFB) Cells	
Other Proposed		

Job No.: 68229	
Client: Clarence Colliery Pty Ltd	
Version: R01RevA	Date: 07/11/2025
Drawn By: DAW	Checked By: JRWB

Distribution of Calibration Residual
 Blackmans Flat Conglomerate (Layer 23)

Figure F-23



Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

- Drain (DRN) Cells
- River (RIV) Cells
- General Head Boundary (GHB) Cells
- Well (WEL) Cells
- Constant Head (CHD) Cells
- No Flow Boundary (NFB) Cells

Model Results:

- Modelled Groundwater Elevation (mAHD)
- Positive Residual (m)
- Negative Residual (m)
- Observation Target

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

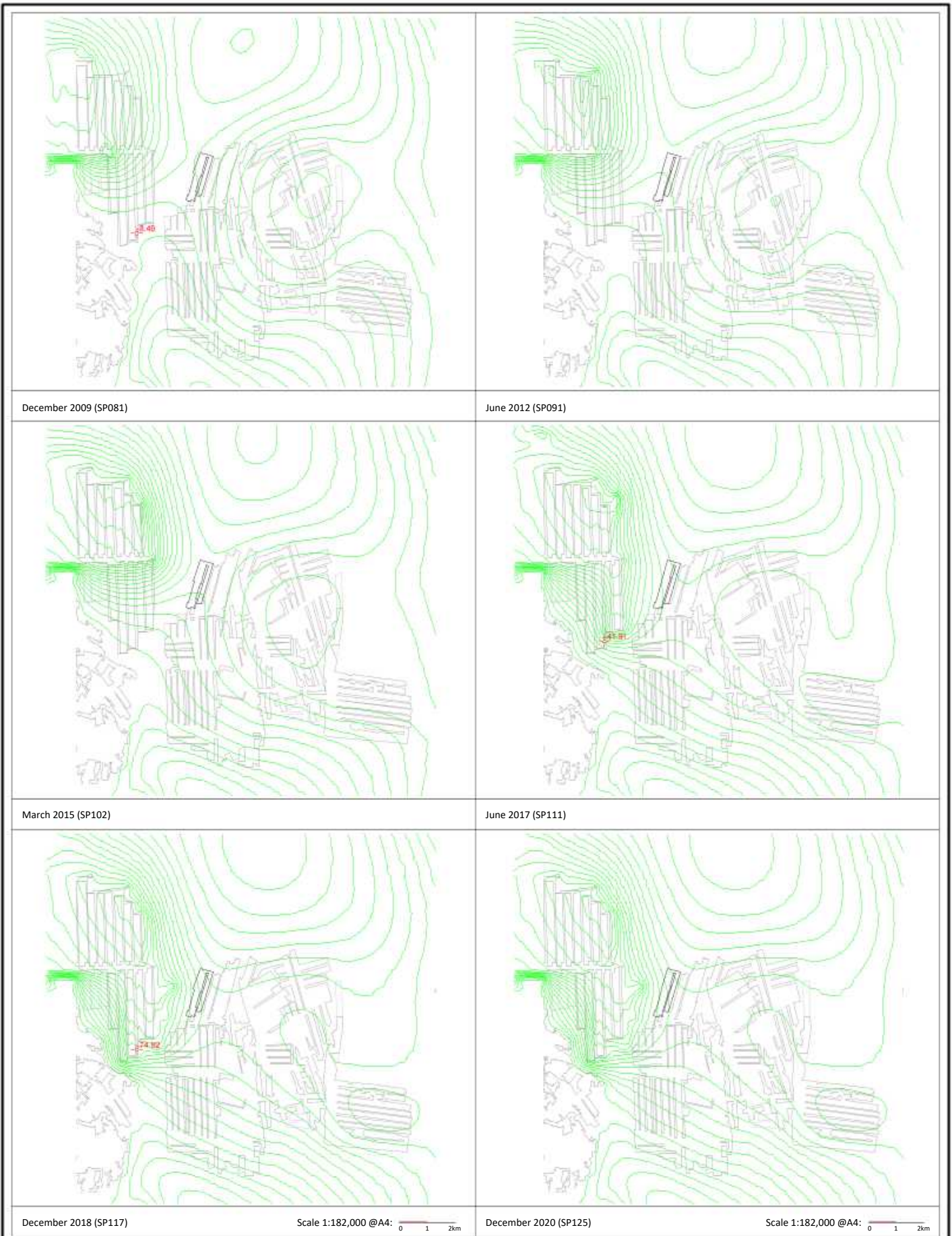
Checked By: JRWB

Distribution of Calibration Residual

Lithgow Seam (Layer 24)

Figure F-24





Legend

Mining Methods:

Development

Model Cell Type:

Pinched-Out Cells

Model Boundary Conditions:

Drain (DRN) Cells

River (RIV) Cells

General Head Boundary (GHB) Cells

Well (WEL) Cells

Constant Head (CHD) Cells

No Flow Boundary (NFB) Cells

Model Results:

Modelled Groundwater Elevation (mAHD)

Positive Residual (m)

Negative Residual (m)

Observation Target

Mine Operation Status:

Approved

Existing

Proposed

Other Proposed

Contour Interval: 10mAHD

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

Checked By: JRWB

Distribution of Calibration Residual

Marangaroo Conglomerate (Layer 25)

Figure F-25



Appendix G Relative Parameter Uncertainty Variance Reduction

Appendix G

This appendix presents relative parameter uncertainty variance reduction of various parameter groups (refer Section 4.13). The categorisation of relative parameter uncertainty variance reduction is presented in the Nomenclature.

Relative parameter uncertainty variance reduction was generated by GENLINPRED (Watermark Numerical Computing, 2024).

There are multiple parameter groups. Output from GENLINPRED is presented in this appendix, according to parameter group.

G1. Horizontal Hydraulic Conductivity, Kh, Pilot Points

Figure G1-1 presents the relative parameter uncertainty variance reduction for Kh Pilot Points, with Figure G1-2 presenting the same output, but limited to a relative parameter uncertainty variance reduction of 0.4.

From Figure G1-1 and Figure G1-2, almost all Pilot Points reduce parameter uncertainty variance, as is expected. i.e. there are few Pilot Points where relative parameter uncertainty variance reduction is less than 0.05, which would imply that the value they adopt is not informed by model calibration.

It is noted that GENLINPRED is superior to parameter identifiability used in previous reports on this numerical groundwater model, since GENLINPRED takes into account the effect of the covariance matrix. i.e. the covariance matrix was present during model calibration previously, just that parameter identifiability does not take that into account when deducing its 'rating' from zero to one.

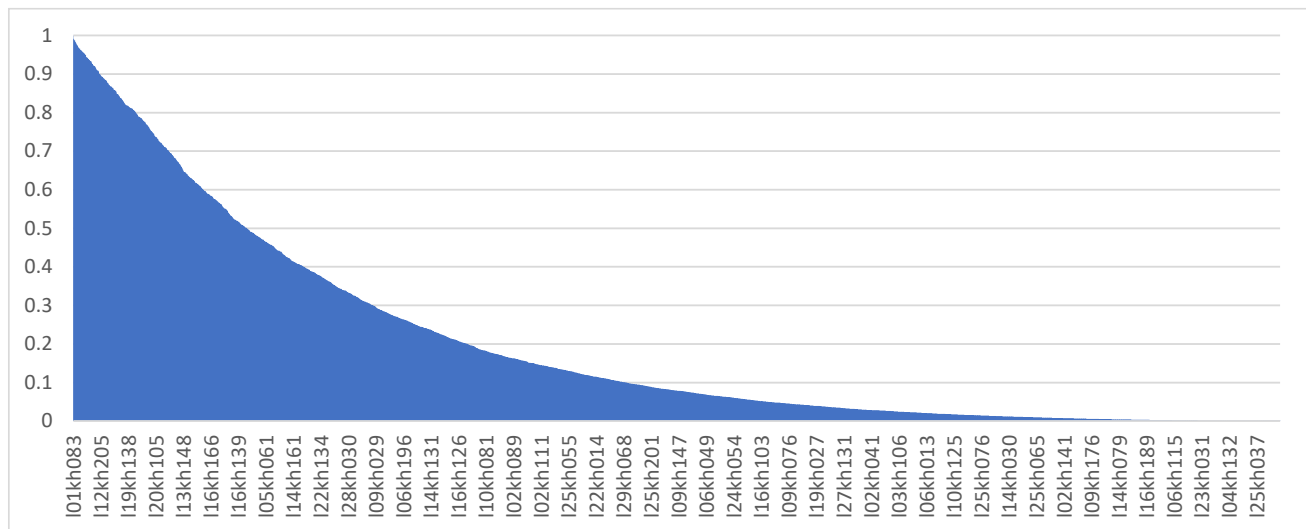


Figure G1-1: Relative parameter uncertainty variance reduction – Kh Pilot Points

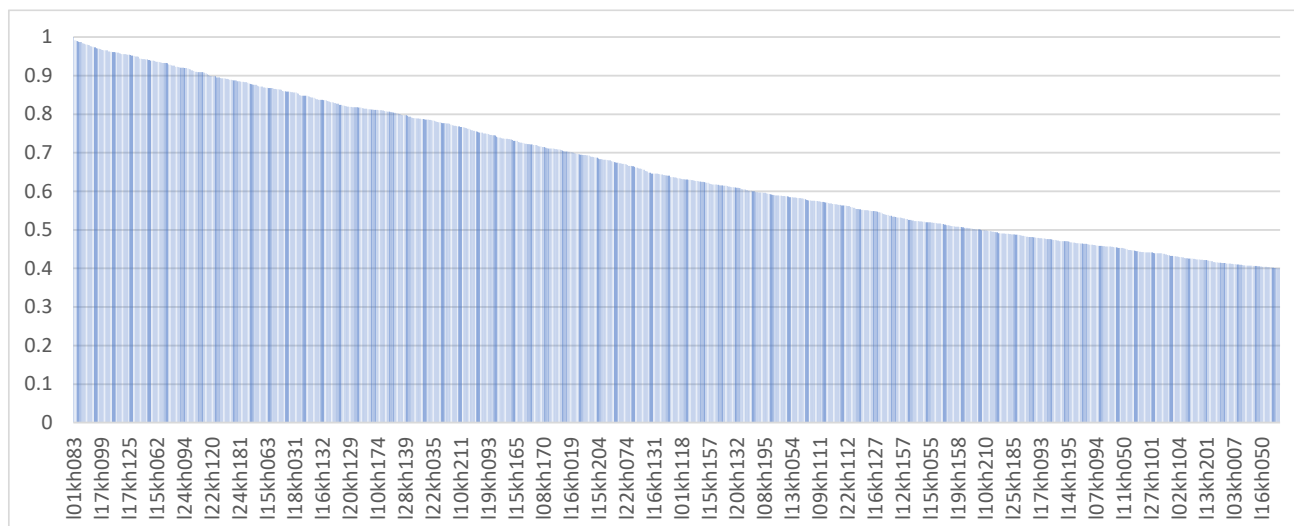


Figure G1-2: Relative parameter uncertainty variance reduction (greater than 0.4) – Kh Pilot Points

G2. Unsaturated Parameter Warping Factor

Figure G2-1 presents the relative parameter uncertainty variance reduction of the warping factor applied to unsaturated parameters derived from the custom-developed script (input of which was Kh Pilot Points).

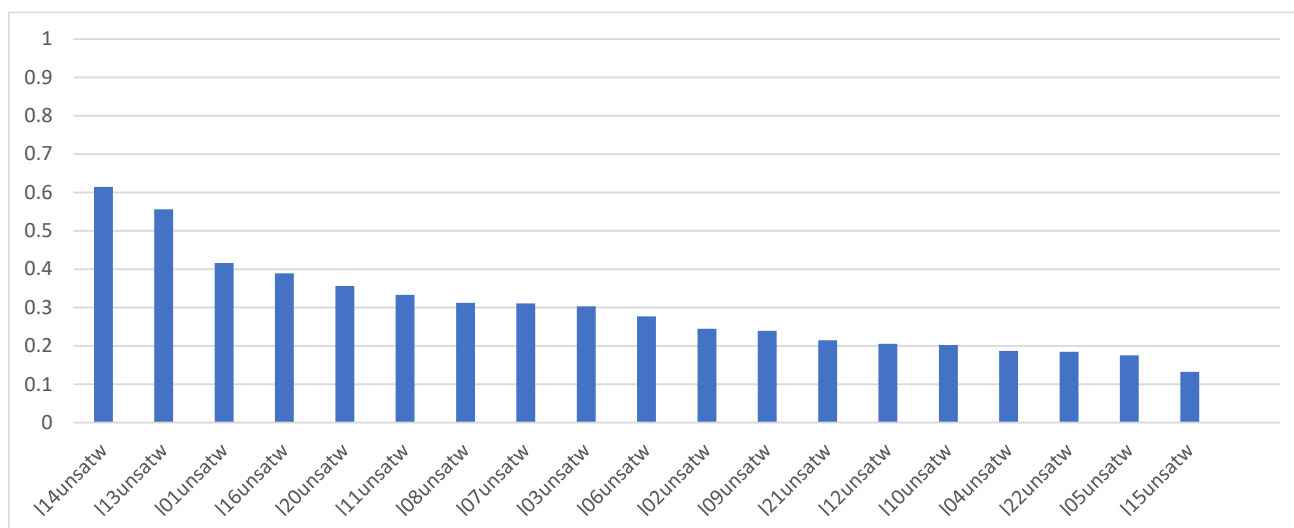


Figure G2-1: Relative parameter uncertainty variance reduction – Unsaturated Parameters Warping Factor

From Figure G2-1, the relative parameter uncertainty variance reduction is medium (being between 0.2 and 0.4).

G3. Vertical Hydraulic Conductivity Warping Factor, KvF, Pilot Points

Figure G3-1 and Figure G3-2 presents relative parameter uncertainty variance reduction for the warping factor Pilot Points of vertical hydraulic conductivity, Kv.

From Figure G3-1 and Figure G3-2, the relative parameter uncertainty variance reduction is small to medium for some, with most being negligible.

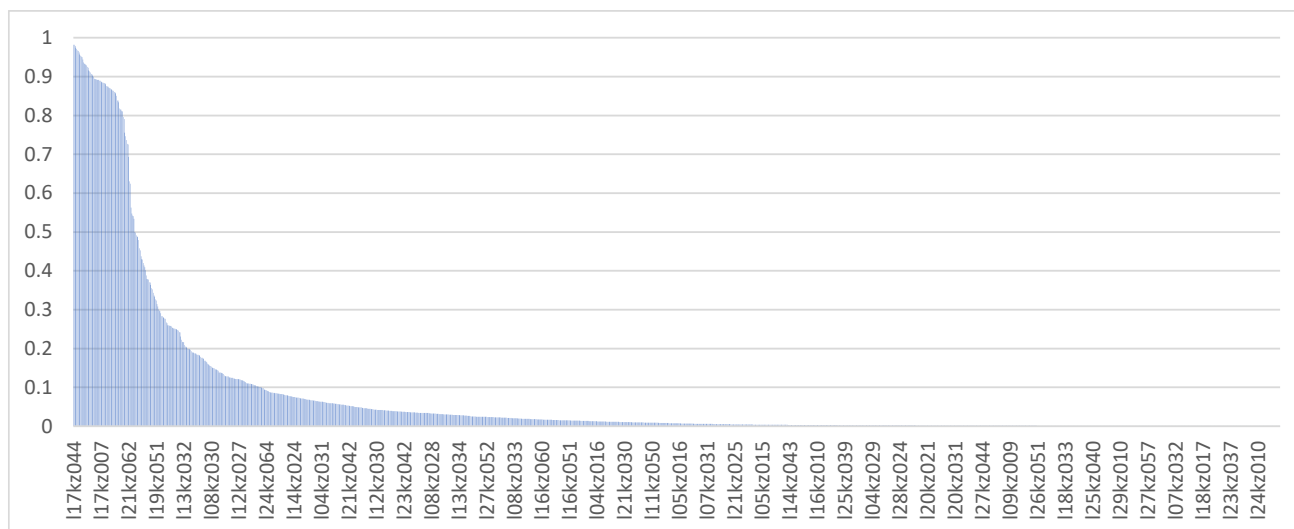


Figure G3-1: Relative parameter uncertainty variance reduction – Kv Warping Factor Pilot Points

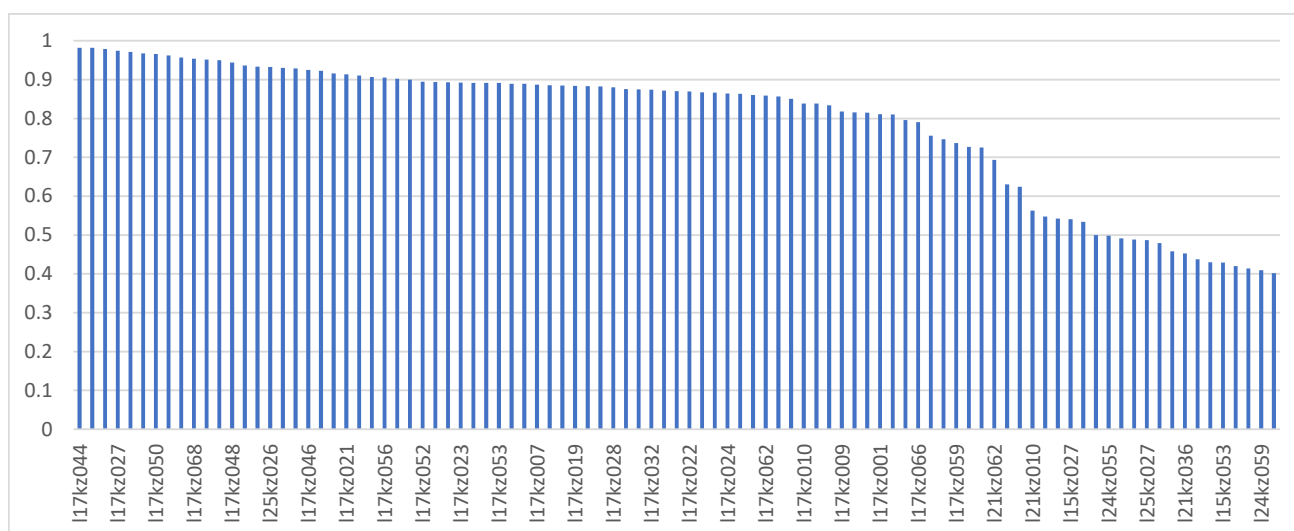


Figure G3-2: Relative parameter uncertainty variance reduction (greater than 0.4) – Kv Warping Factor Pilot Points

G4. Specific Storage Warping Factor, SsF, Pilot Points

Figure G4-1 presents the relative parameter uncertainty variance reduction for scaling factor Pilot Points of specific storage, Ss.

From Figure G4-1, the relative parameter uncertainty variance reduction is small for some Pilot Points, but is negligible for almost all of the Pilot Points. This implies that the calibration process did not particularly inform the value of the warping factor.

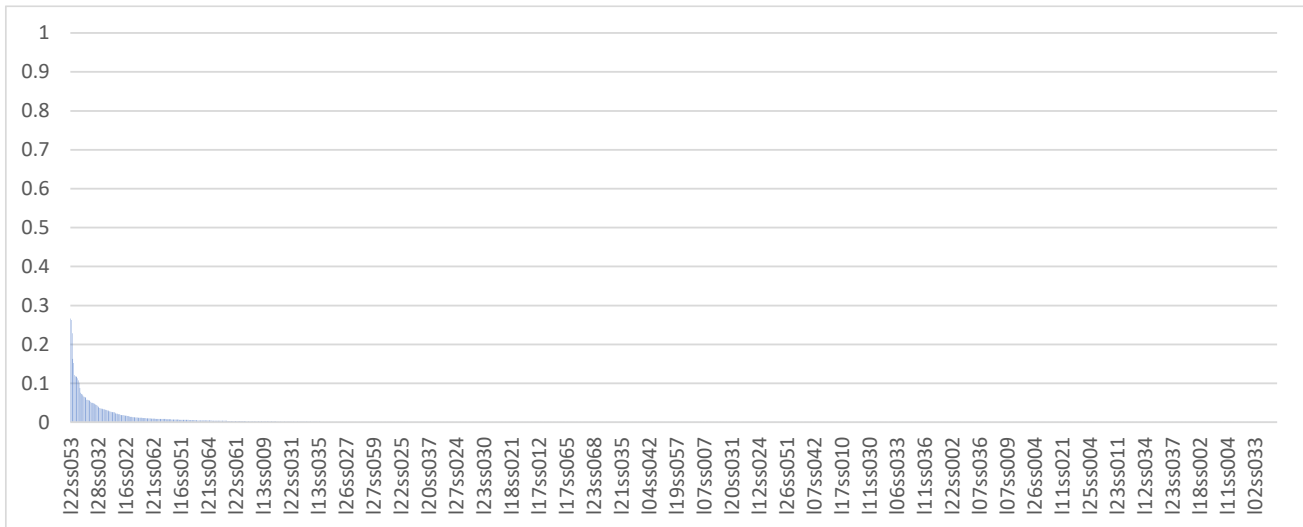


Figure G4-1: Relative parameter uncertainty variance reduction – Ss Warping Factor Pilot Points

G5. Specific Yield Warping Factor, SsF, Pilot Points

Figure G5-1 and Figure G5-2 present the relative parameter uncertainty variance reduction for warping factor Pilot Points of specific yield, Sy.

From Figure G5-1 and Figure G5-2, the relative parameter uncertainty variance reduction is small to medium for some Pilot Points, but is negligible for most of the Pilot Points.

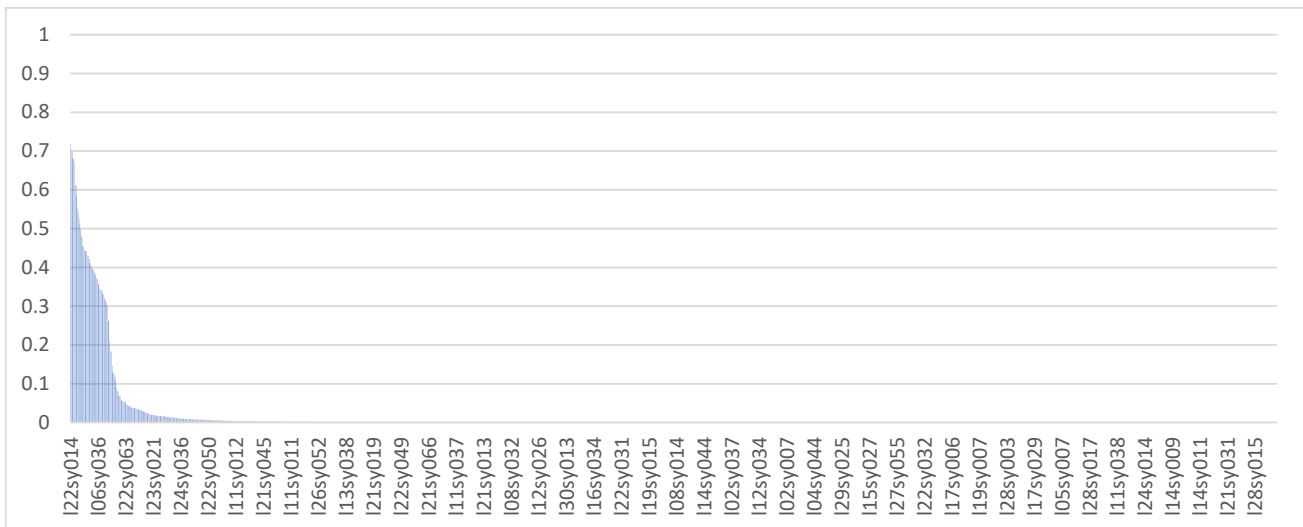


Figure G5-1: Relative parameter uncertainty variance reduction – Sy Warping Factor Pilot Points

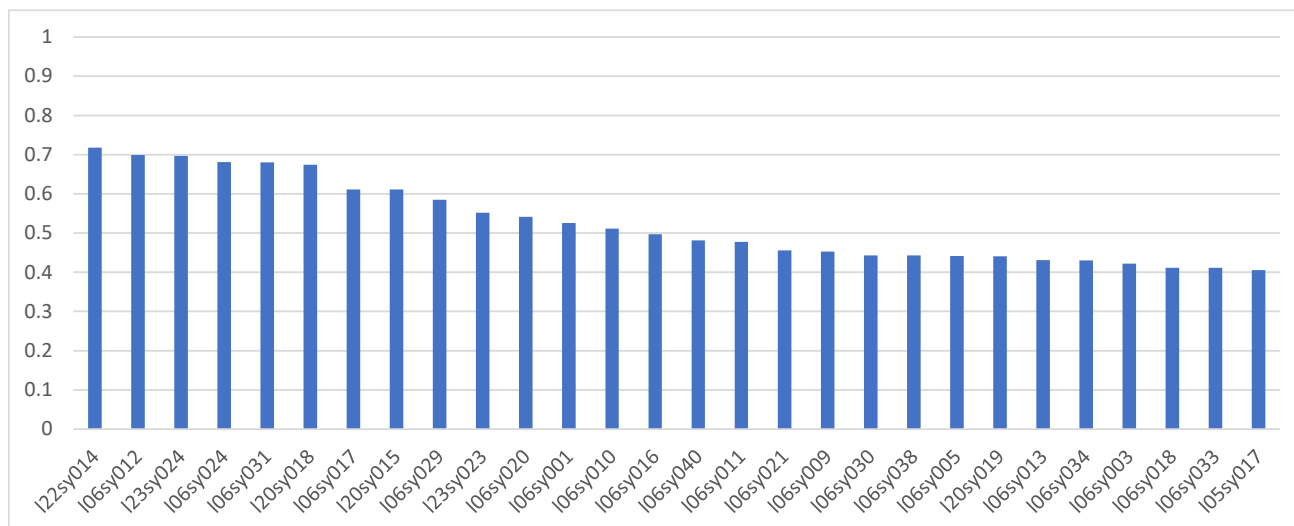


Figure G5-2: Relative parameter uncertainty variance reduction (greater than 0.4) – Sy Warping Factor Pilot Points

G6. Lineament Vertical Hydraulic Conductivity, Kv for Type1 and Sequential Multipliers of Kv (Type 2 to Type 1 and Type 3 to Type 2)

Figure G6-1 presents the relative parameter uncertainty variance reduction for lineament vertical hydraulic conductivity, Kv of Type 1 lineaments. As presented in the main body of the report, the value of vertical hydraulic conductivity, Kv for Type 2 lineaments was derived from the value specified for Type 1 lineaments, using a multiplier. The value of vertical hydraulic conductivity of Type 3 lineaments was, in turn, derived from the value of Type 2. i.e. sequential multipliers, was used in PEST, rather than treating these as independent variables, since that could lead to a conceptual inconsistency.

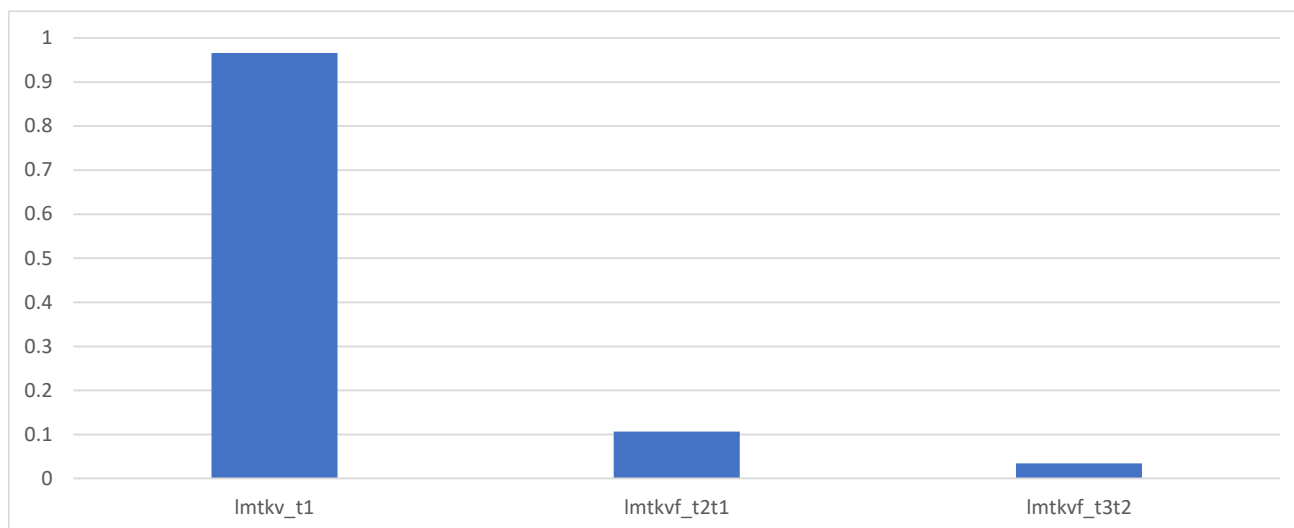


Figure G6-1: Relative parameter uncertainty variance reduction – Kv (Type 1) and Sequential Multipliers (Type 2 to Type 1 and Type 3 to Type2)

G7. Depth-dependent modifiers

Figure G7-1 presents the relative parameter uncertainty variance reduction for depth-dependent hydraulic property modifiers with respect to ‘Ground Surface’ and ‘Top of Group’.

From Figure G7-1, the relative parameter uncertainty variance reduction is large for several of the depth-

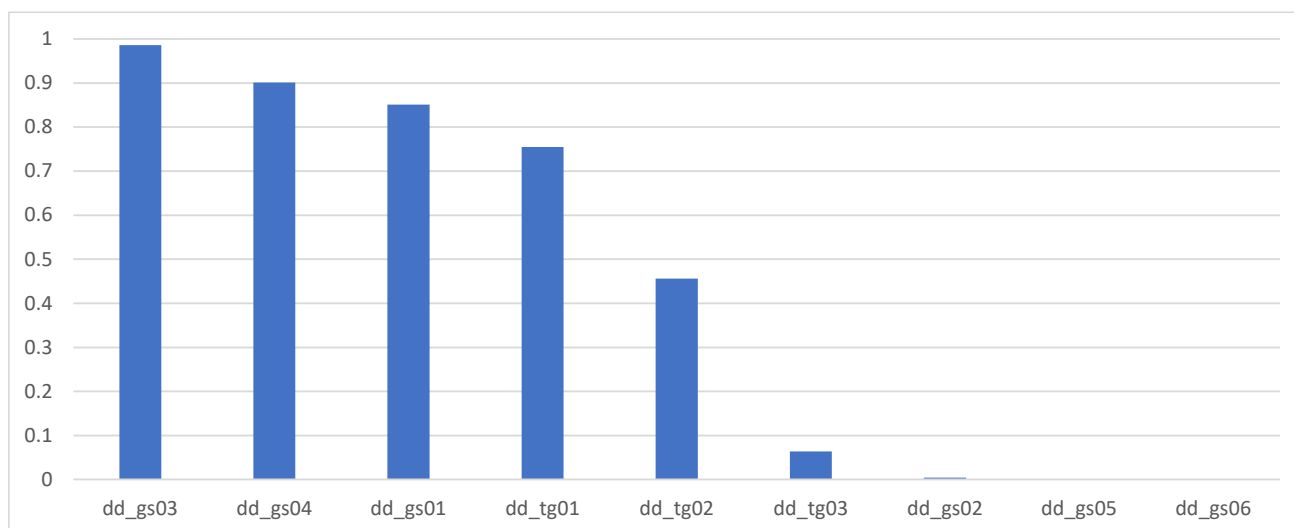


Figure G7-1: Relative parameter uncertainty variance reduction – Depth-Dependent Hydraulic Property Modifiers

dependent modifier groups and is small to negligible for others.

G8. Recharge Factor, RCHF, Pilot Points

Figure G8-1 presents the relative parameter uncertainty variance reduction for recharge factor, RCHF, Pilot Points.

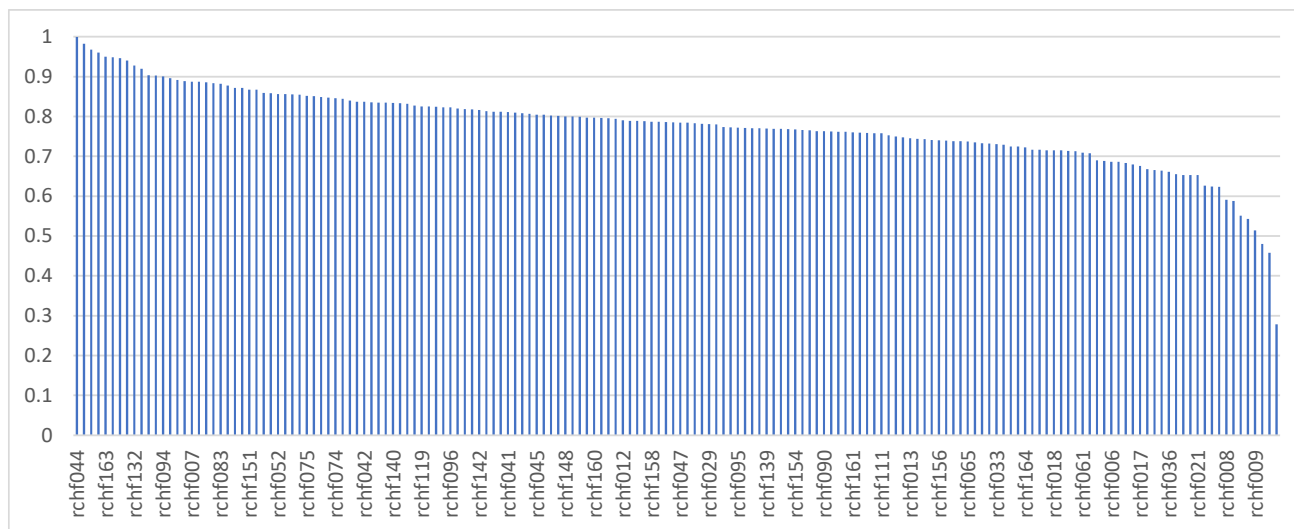


Figure G8-1: Relative parameter uncertainty variance reduction – Recharge Factor, RCHF, Pilot Points

From Figure G8-1, the relative parameter uncertainty variance reduction is large for almost all Pilot Points. This implies that the sensitivity of these parameters during model calibration is high.

G9. Enhanced Recharge Additive Factors

Figure G9-1 presents the relative parameter uncertainty variance reduction of the additive factors (decimal component only) applied to recharge factor derived from Pilot Points.

From Figure G9-1, the relative parameter uncertainty variance reduction is negligible to small.

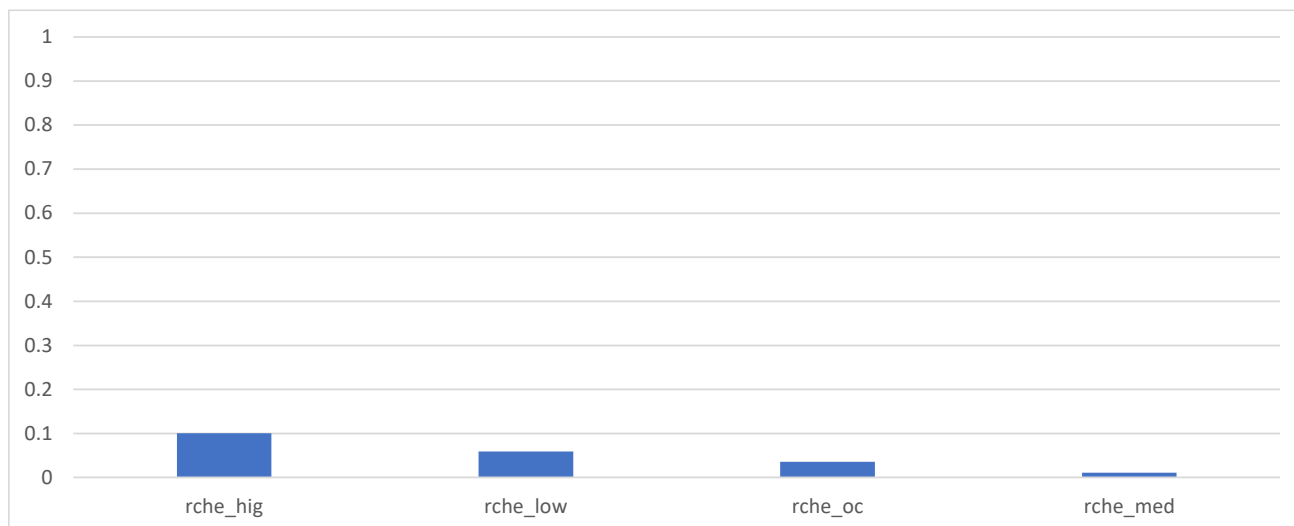


Figure G9-1: Relative parameter uncertainty variance reduction – Enhanced Recharge Additive Factors

G10. Evapotranspirative Factor, EVTF, Pilot Points

Figure G10-1 and Figure G10-2 present the relative parameter uncertainty variance reduction for Pilot Points used for evapotranspirative factor, EVTF.

From Figure G10-1 and Figure G10-2, the relative parameter uncertainty variance reduction is small to medium for most Pilot Points, but is small to negligible for the remainder.

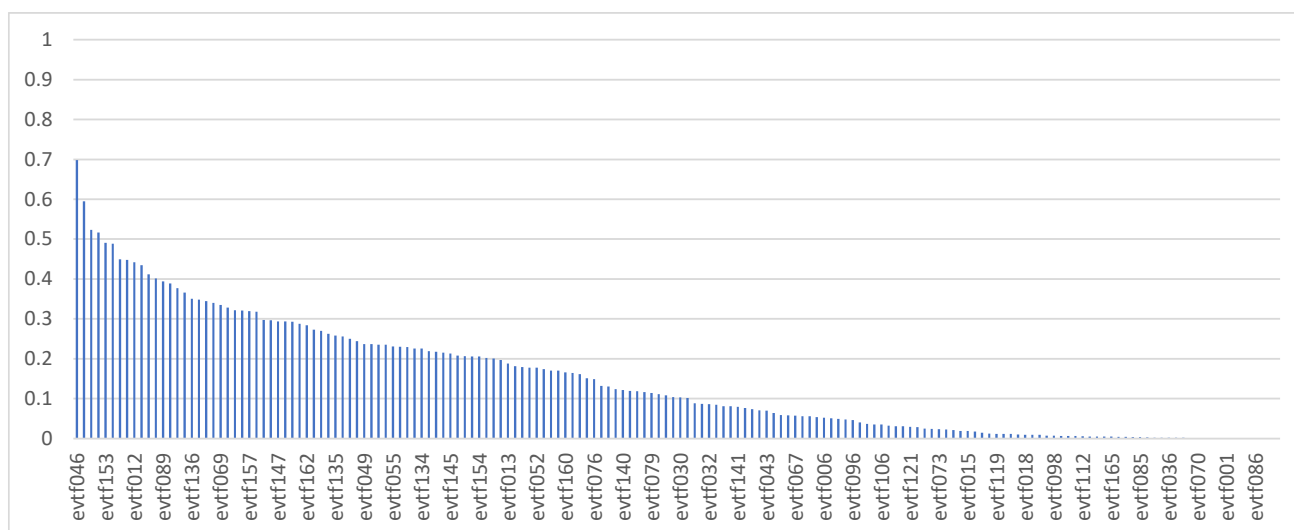


Figure G10-1: Relative parameter uncertainty variance reduction – Evapotranspirative Factor, EVTF, Pilot Points

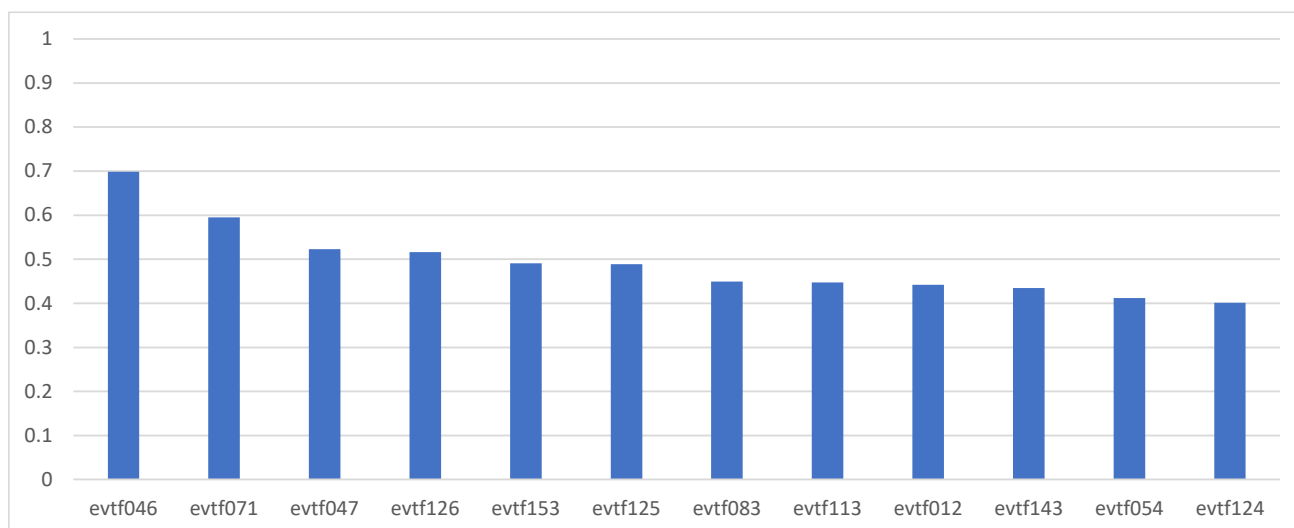


Figure G10-2: Relative parameter uncertainty variance reduction (greater than 0.4) – Evapotranspirative Factor, EVTf, Pilot Points

G11. Extinction Depth, ED, Pilot Points

Figure G11-1 and Figure G11-2 present the relative parameter uncertainty variance reduction for Pilot Points for extinction depth, ED.

From Figure G11-1 and Figure G11-2, the relative parameter uncertainty variance reduction is small to medium for about 30% of the Pilot Points and is negligible (less than 0.1) for the remainder. This implies that the numerical groundwater model is not sensitive to extinction depth in most of the groundwater model domain.

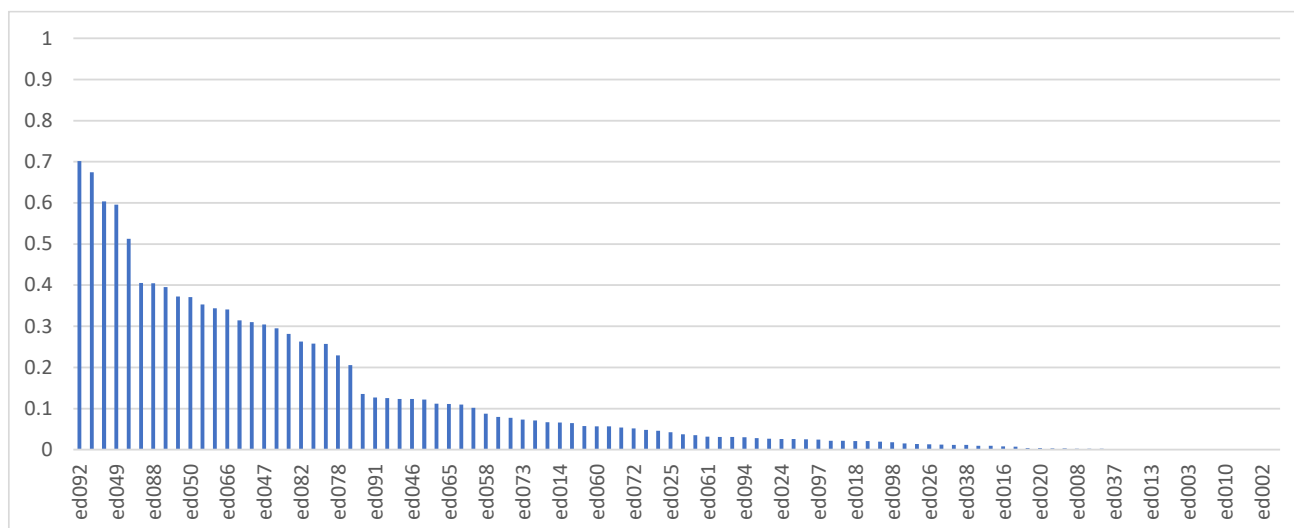


Figure G11-1: Relative parameter uncertainty variance reduction – Extinction Depth, ED, Pilot Points

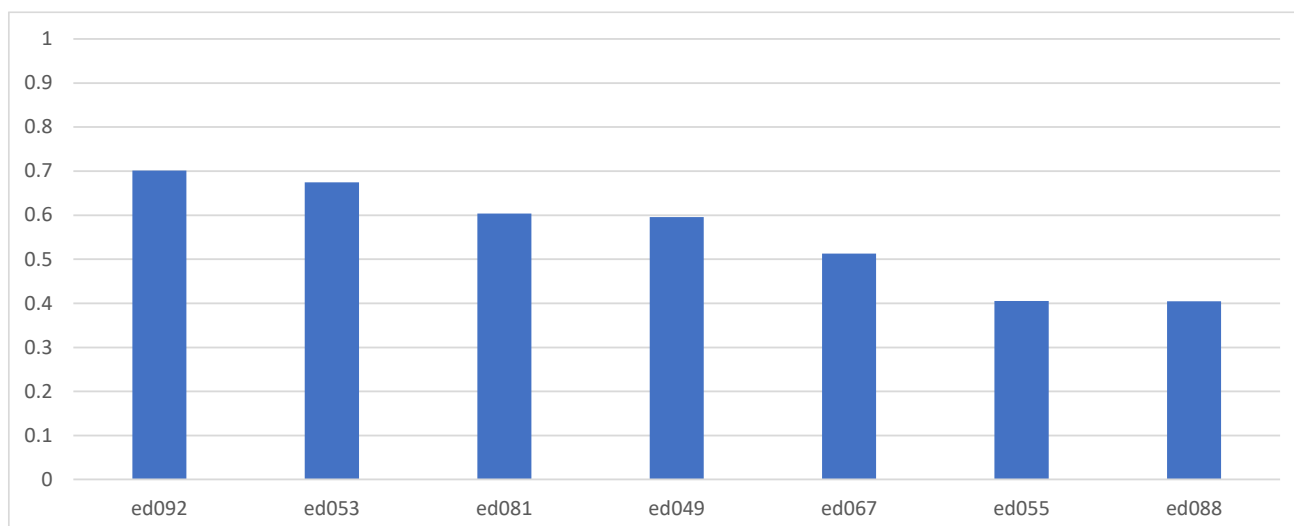


Figure G11-2: Relative parameter uncertainty variance reduction (greater than 0.4) – Extinction Depth, ED, Pilot Points

G12. River Streambed Hydraulic Conductivity

Figure G12-1 presents the relative parameter uncertainty variance reduction for the hydraulic conductivity of the streambed of river boundary condition cells.

From Figure G12-1, the relative parameter uncertainty variance reduction is negligible for all parameters.

This is expected, since river boundary conditions are not close to mining operations (being along the Upper Cocks River and along the Wolgan Valley), hence are not impacted by mining, nor is their monitoring in their vicinity, with respect to the calibration dataset.

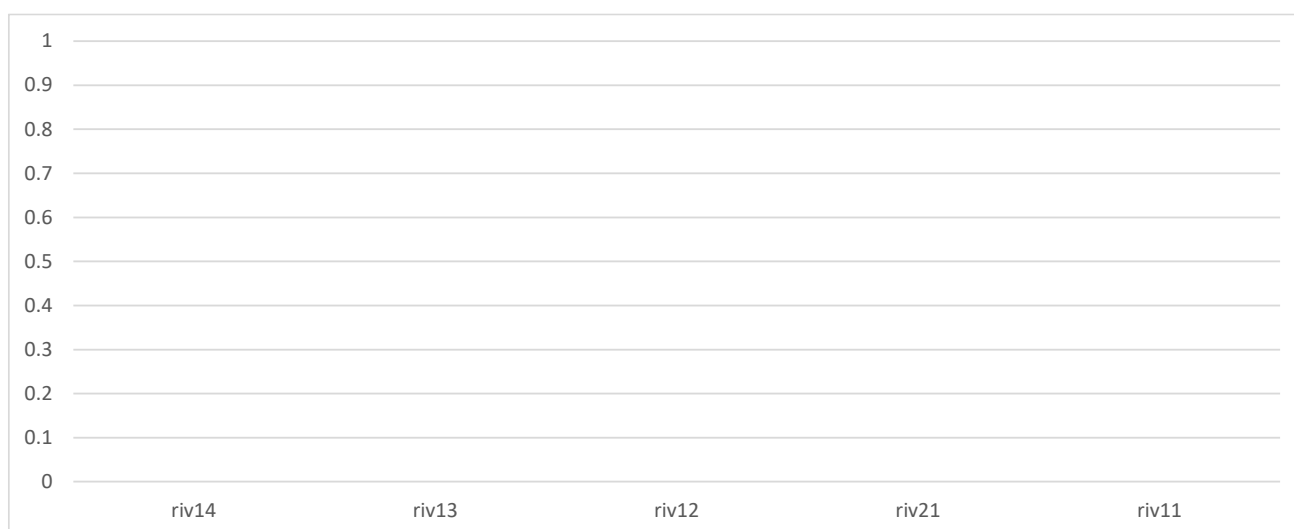


Figure G12-1: Relative parameter uncertainty variance reduction – River Streambed Hydraulic Conductivity

G13. General Head Boundary Condition Parameters

Figure G13-1 presents the relative parameter uncertainty variance reduction for parameters used with General Head Boundary Conditions. Those parameters include head adjustment and conductance adjustment parameters (regional throughflow) at the periphery of the numerical groundwater model.

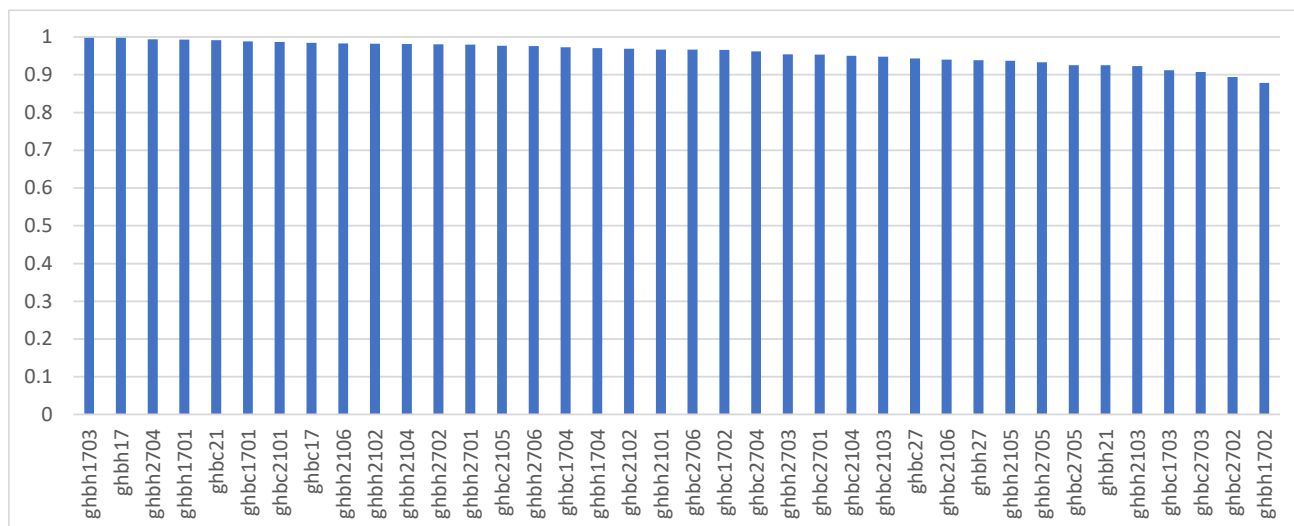


Figure G13-1: Relative parameter uncertainty variance reduction – General Head Boundary Condition Parameters

As noted in the main body of the report, the general head boundary used to represent the State Mine Complex was fixed (both with respect to specific head and the values of conductance).

From Figure G13-1, the relative parameter uncertainty variance reduction is large for all parameters, which suggests their values lead to changes in the model that can be compared against the calibration dataset. The results presented in Figure G13-1 imply that regional throughflow is important in the groundwater model.

G14. Time-Varying Material Parameters

Figure G14-1 and Figure G14-2 presents the relative parameter uncertainty variance reduction of time-varying material parameters. These parameters pertain to subsidence model, amendment of empirically based/regression equations as well as minimum and maximum hydraulic conductivity values.

From Figure G14-1 and Figure G14-2, the relative parameter uncertainty variance reduction of most parameters is large (more than 0.4), with the remainder being medium (between 0.2 and 0.4) to negligible (less than 0.05).

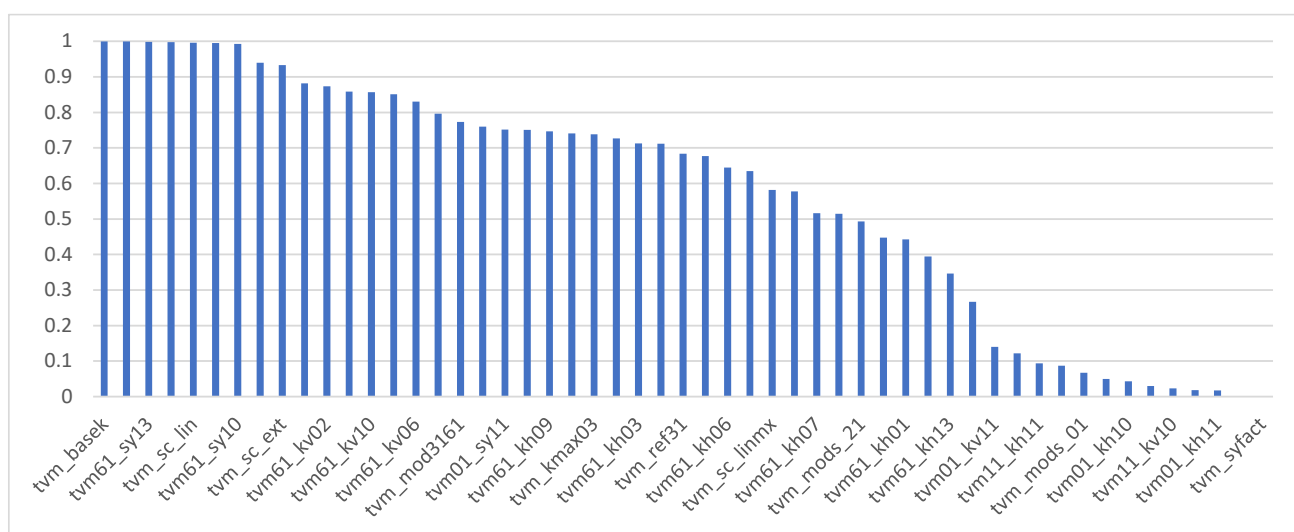


Figure G14-1: Relative parameter uncertainty variance reduction – Time-Varying Material Parameters

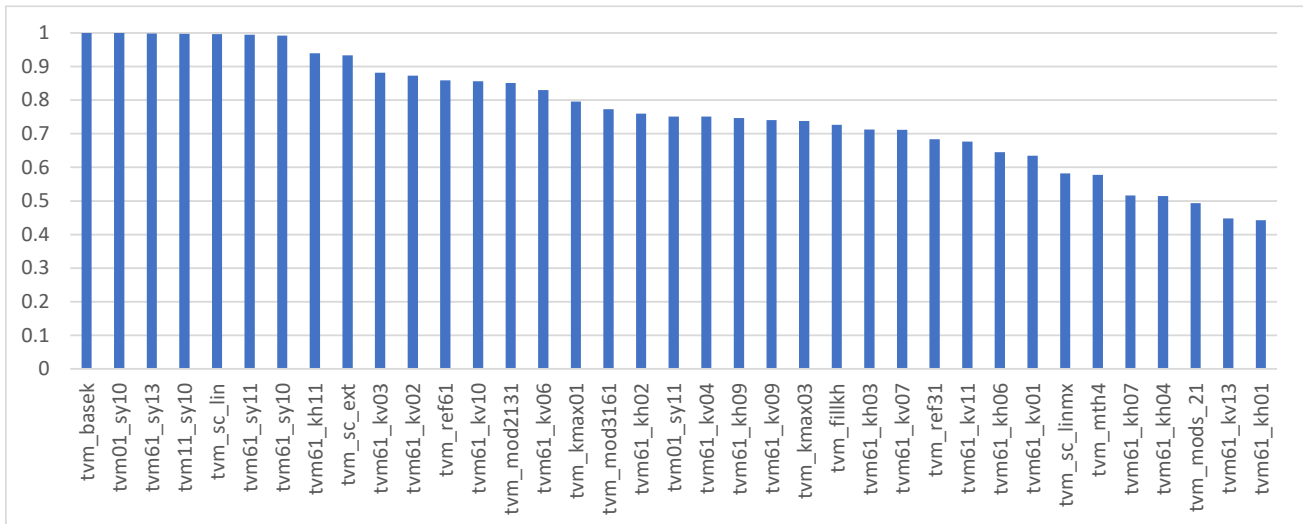


Figure G14-2: Relative parameter uncertainty variance reduction (greater than 0.4) – Time-Varying Material Parameters

G15. Tammetta, HA2 for Model Mining Method 2 Pilot Point Adjustment Factors

Figure G15-1 presents the relative parameter uncertainty variance reduction for the adjustment factors (as Pilot Points) of Tammetta’s Height of top of Zone A, H_{A2} , for Model Mining Method 2 (Partial Extraction). As presented in Section 4.11.1, the equation adopted in this model was based on fitting ‘Special H’ data in Tammetta (2013).

From Figure G15-1, the relative parameter uncertainty variance reduction of these Pilot Points is large. This implies that changes to these parameter values leads to changes in model output that can be compared to the calibration observation dataset.

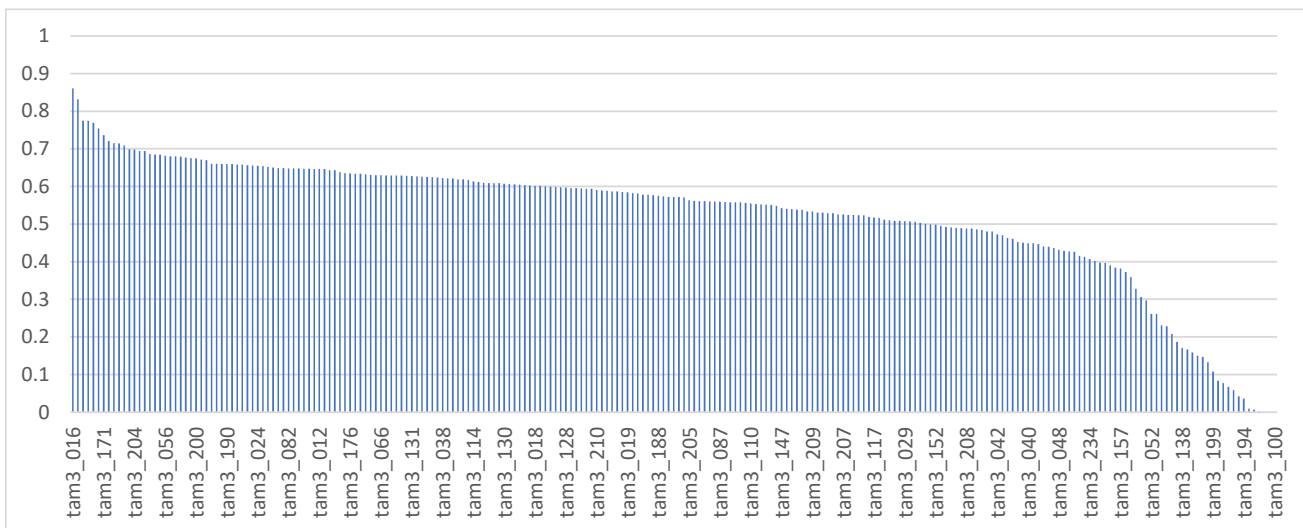


Figure G15-1: Relative parameter uncertainty variance reduction – Tammetta, HA2 for Model Mining Method 2 Pilot Point Adjustment Factors

G16. Tammetta, HA2 for Model Mining Method 5 Pilot Point Adjustment Factors

Figure G16-1 presents the relative parameter uncertainty variance reduction of the adjustment factor (as Pilot Point) to Tammetta’s Height of top of Zone A, H_{A2} , for Model Mining Method 2 (Longwall Extraction).

From Figure G16-1, the relative parameter uncertainty variance reduction is large most of these Pilot Points.

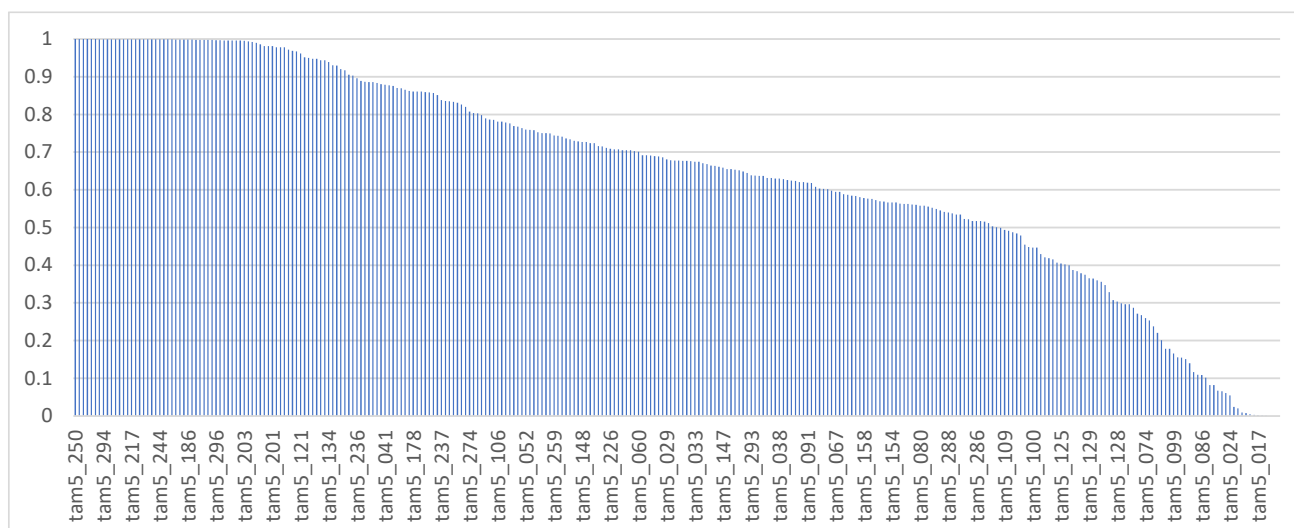


Figure G16-1: Relative parameter uncertainty variance reduction – Tammetta, HA2 for Model Mining Method 5 Pilot Point Adjustment Factors

G17. Drain Boundary Condition – General Parameters

Figure G17-1 presents the relative parameter uncertainty variance reduction of sequential multipliers of streambed hydraulic conductivity of ephemeral watercourses, the streambed hydraulic conductivity of ephemeral waterbodies, the conductance of general open cut dewatering and the conductance of seepage faces.

From Figure G17-1, the relative parameter uncertainty variance reduction is large except for general open cut dewatering (as these were historical, prior to commencement of monitoring; and there are few areas of this activity in the model) and the streambed hydraulic conductivity of ephemeral waterbodies.

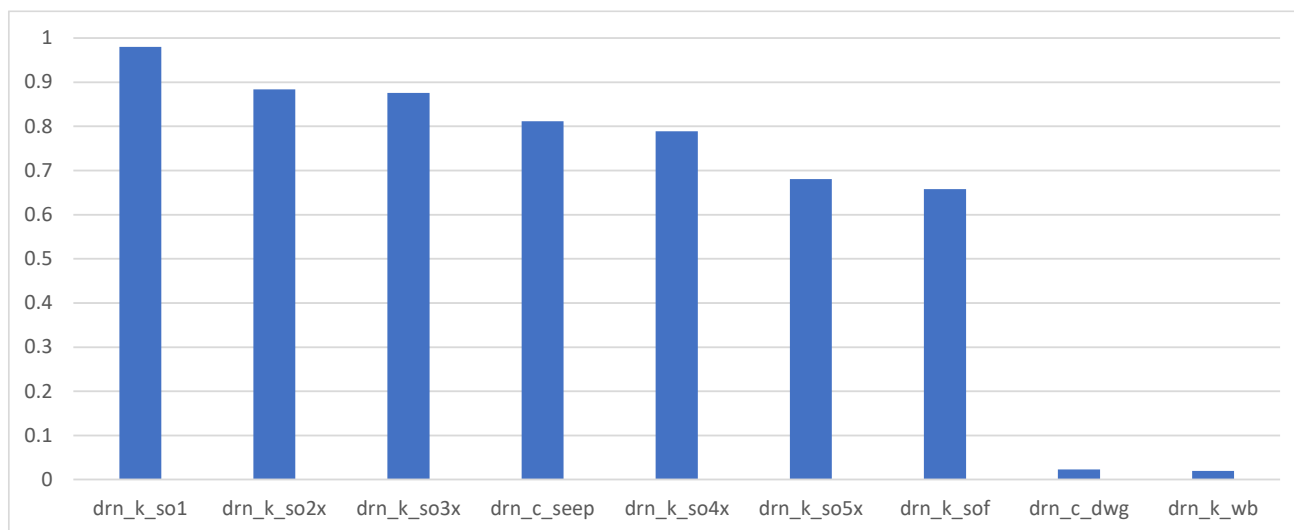


Figure G17-1: Relative parameter uncertainty variance reduction – Drain Boundary Condition – General Parameters

G18. Drain Boundary Condition Conductance – Stacked Drains

Figure G18-1 presents the relative parameter uncertainty variance reduction of the conductance of the top and bottom of the Stacked Drains.

From Figure G18-1, the values of these parameters are sensitive in the model, which is expected.

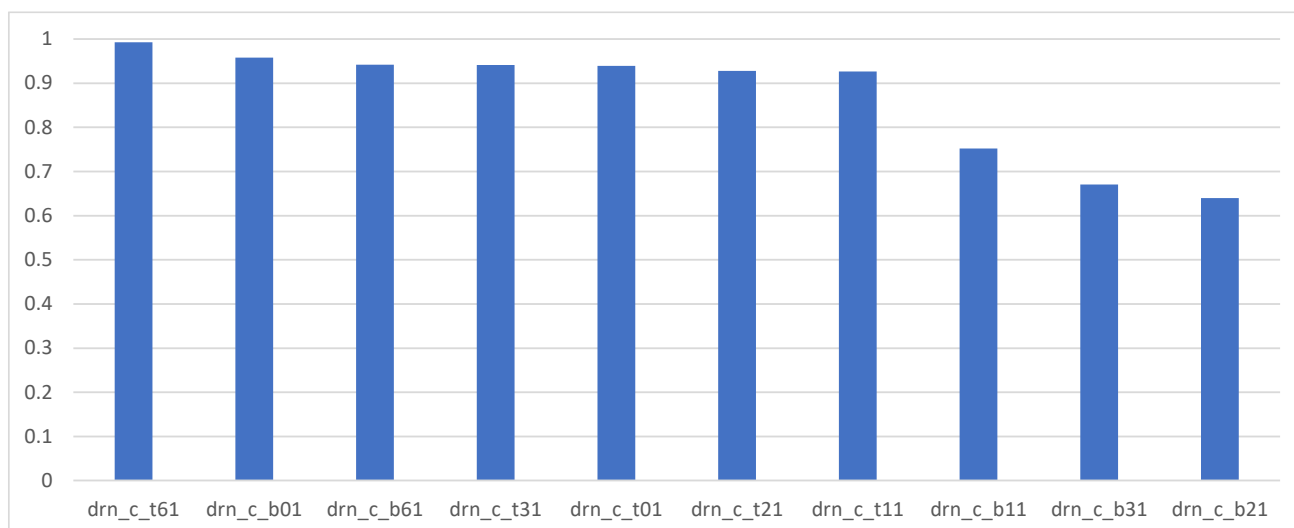


Figure G18-1: Relative parameter uncertainty variance reduction – Drain Boundary Condition Conductance – Stacked Drains

G19. Drain Boundary Condition Conductance – Mine Water Management

Figure G19-1 presents the relative parameter uncertainty variance reduction of conductance values for drain boundary conditions used in mine water management cells. Relevant parameters were Model Mining Method 1 (Development; drn_mwm01, drn_mwm11), Model Mining Method 2 (Partial Extraction; drn_mwm21), Model Mining Method 4 (Total Extraction; drn_mwm31) and Model Mining Method 5 (Longwall Extraction; drn_mwm61).

From Figure G19-1, the relative parameter uncertainty variance reduction of conductance of drain boundary conditions used to represent mine water management ranged between large (more than 0.4) and small (between 0.05 and 0.20).

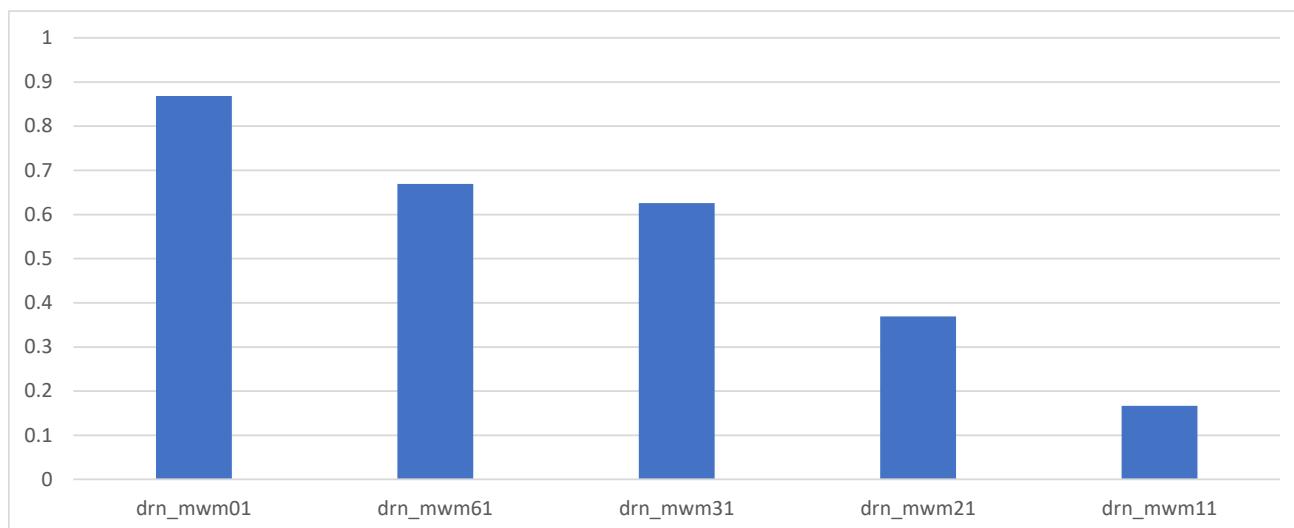


Figure G19-1: Relative parameter uncertainty variance reduction – Drain Boundary Condition Conductance – Mine Water Management

G20. Drain Boundary Condition Conductance Scaling Factors of Surface Water Reaches

Figure G20-1 presents the relative parameter uncertainty variance reduction of scaling factors applied to the drain boundary condition conductance of surface water reaches.

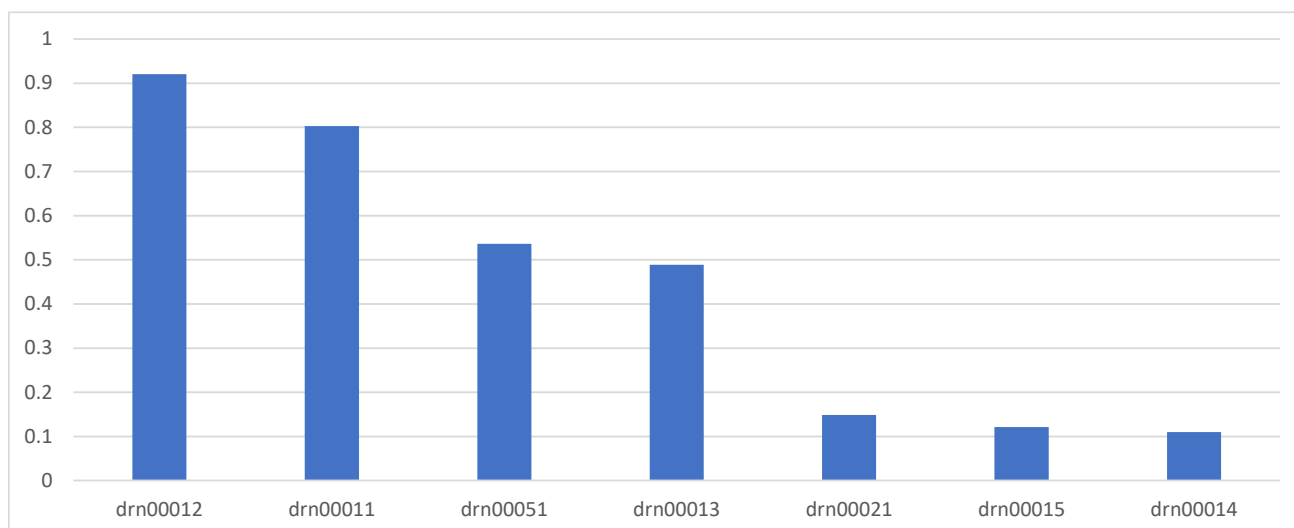


Figure G20-1: Relative parameter uncertainty variance reduction – Drain Boundary Condition Conductance Scaling Factors – Surface Water Reaches

From Figure G20-1, the relative parameter uncertainty variance reduction is large for first, second and third order (Strahler Order) watercourses, and is small for fourth and fifth order watercourses (primarily because there are fewer of these, and are they are away from mining activity (and hence observation)).

From Figure G20-1, the scaling factor of conductance of surface overland flow (drn00051) is large and is small for ephemeral waterbodies (drn00021) is small.

G21. Drain Boundary Condition Conductance Scaling Factors of Seepage Face Reaches

Figure G21-1 presents the relative parameter uncertainty variance reduction of scaling factors of conductance of drain boundary conditions representing seepage faces in the groundwater model.

In Figure G21-1, the parameter naming convention is: drn00102 is Layer 02 through to drn00128 is Layer 28. It is noted that there were no seepage faces applied in Layer 01, Layer 29 or Layer 30.

From Figure G21-1, the relative parameter uncertainty variance reduction ranges between small and large.

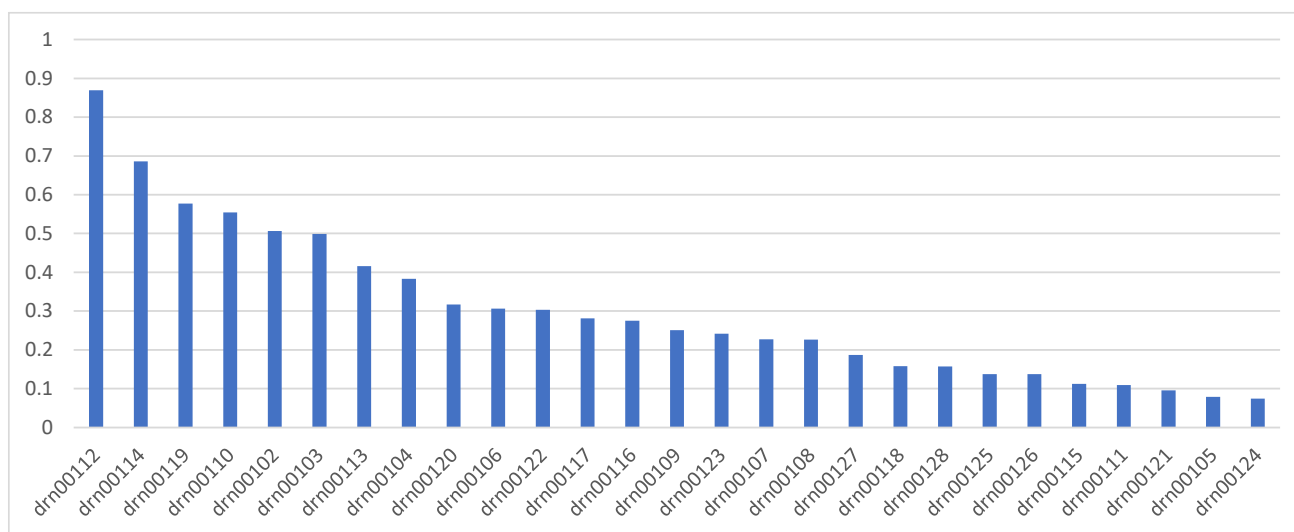


Figure G21-1: Relative parameter uncertainty variance reduction – Drain Boundary Condition Conductance Scaling Factors – Seepage Faces

G22. Drain Boundary Condition Conductance Scaling Factors of Stacked Drain Reaches

Figure G22-1 and Figure G22-2 present the relative parameter uncertainty variance reduction of scaling factors to the conductance applied to drain boundary conditions – Stacked Drains.

From Figure G22-1 and Figure G22-2, approximately 30% of the reaches have a large relative parameter uncertainty variance reduction, with most being small (between 0.05 and 0.20) and some being negligible (less than 0.05).

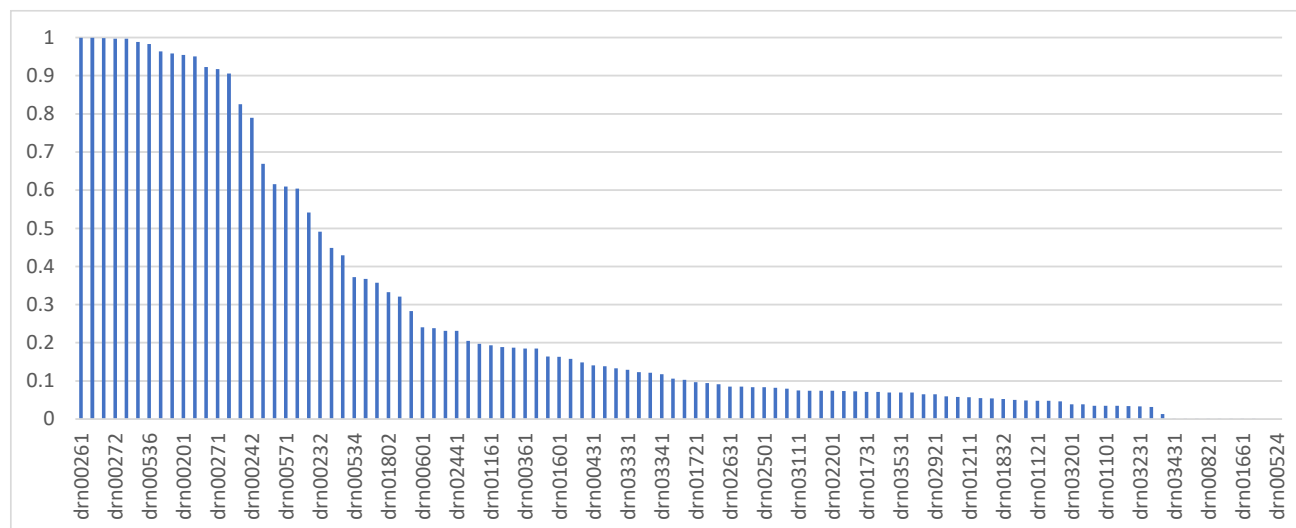


Figure G22-1: Relative parameter uncertainty variance reduction – Drain Boundary Condition Conductance Scaling Factors – Stacked Drains

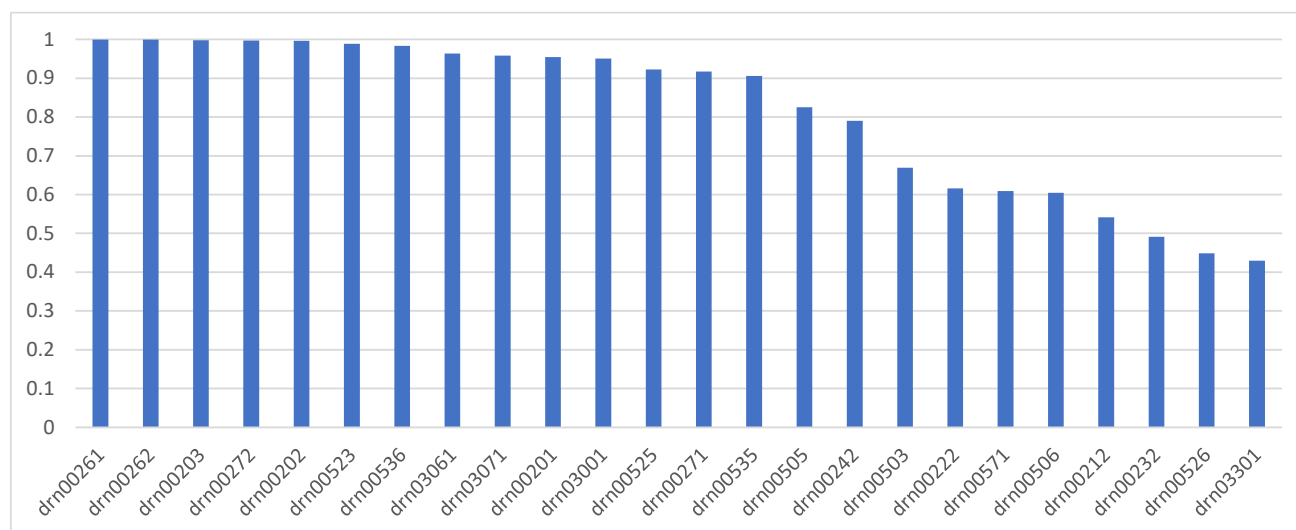


Figure G22-2: Relative parameter uncertainty variance reduction (greater than 0.4) – Drain Boundary Condition Conductance Scaling Factors – Stacked Drains

G23. Drain Boundary Condition Conductance Scaling Factors of Mine Water Management Reaches

Figure G23-1 and Figure G23-2 present the relative parameter uncertainty variance reduction of scaling factors of drain boundary condition conductances that represent ongoing mine water management.

From Figure G23-1 and Figure G23-2, most of the scaling factors have a medium to large relative parameter uncertainty variance reduction, with most of the remainder being a small relative parameter uncertainty variance reduction.

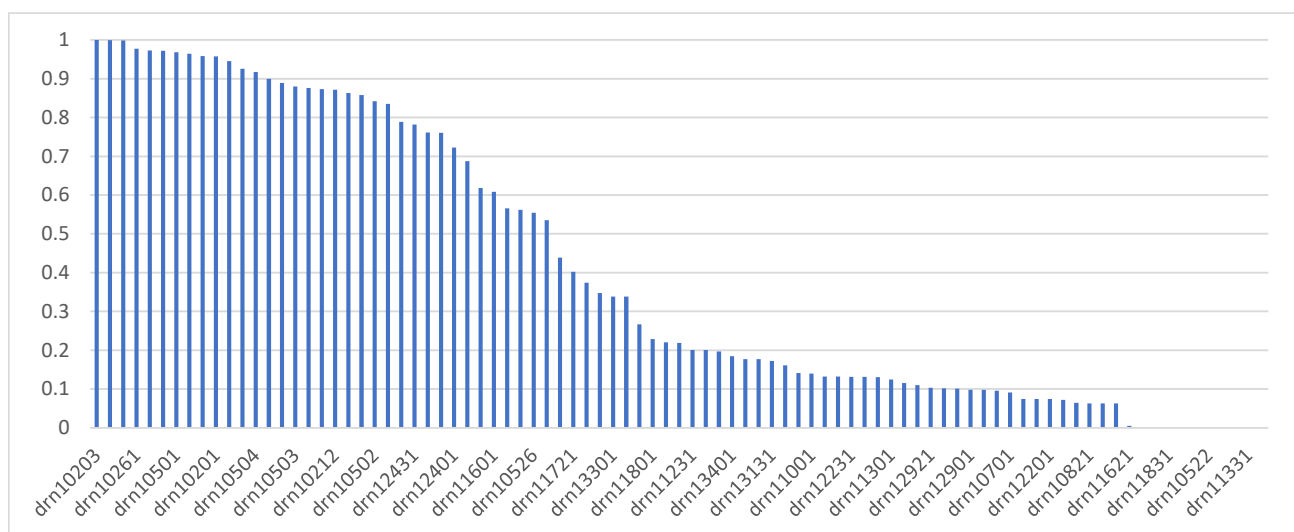


Figure G23-1: Relative parameter uncertainty variance reduction – Drain Boundary Condition Conductance Scaling Factors – Mine Water Management

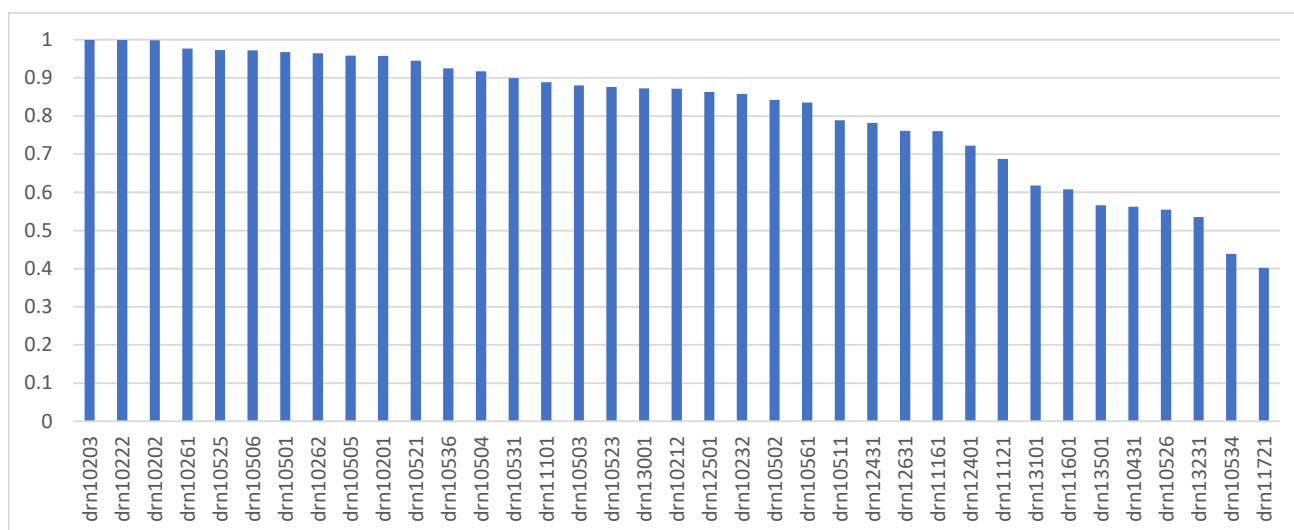


Figure G23-2: Relative parameter uncertainty variance reduction (greater than 0.4) – Drain Boundary Condition Conductance Scaling Factors – Mine Water Management

Appendix H Scenario Analysis – Mine Design Parameters

Appendix H

H1. Scenario Analysis – Mine Design Parameters

As presented in **Section 4.16**, stochastic simulations were prepared for Prediction Period using only ‘mine design parameters’. As explained in **Section 4.16**, the parameters that were allowed to vary pertained to the representation of mining operation in the model, with all other parameters held constant (FIXED).

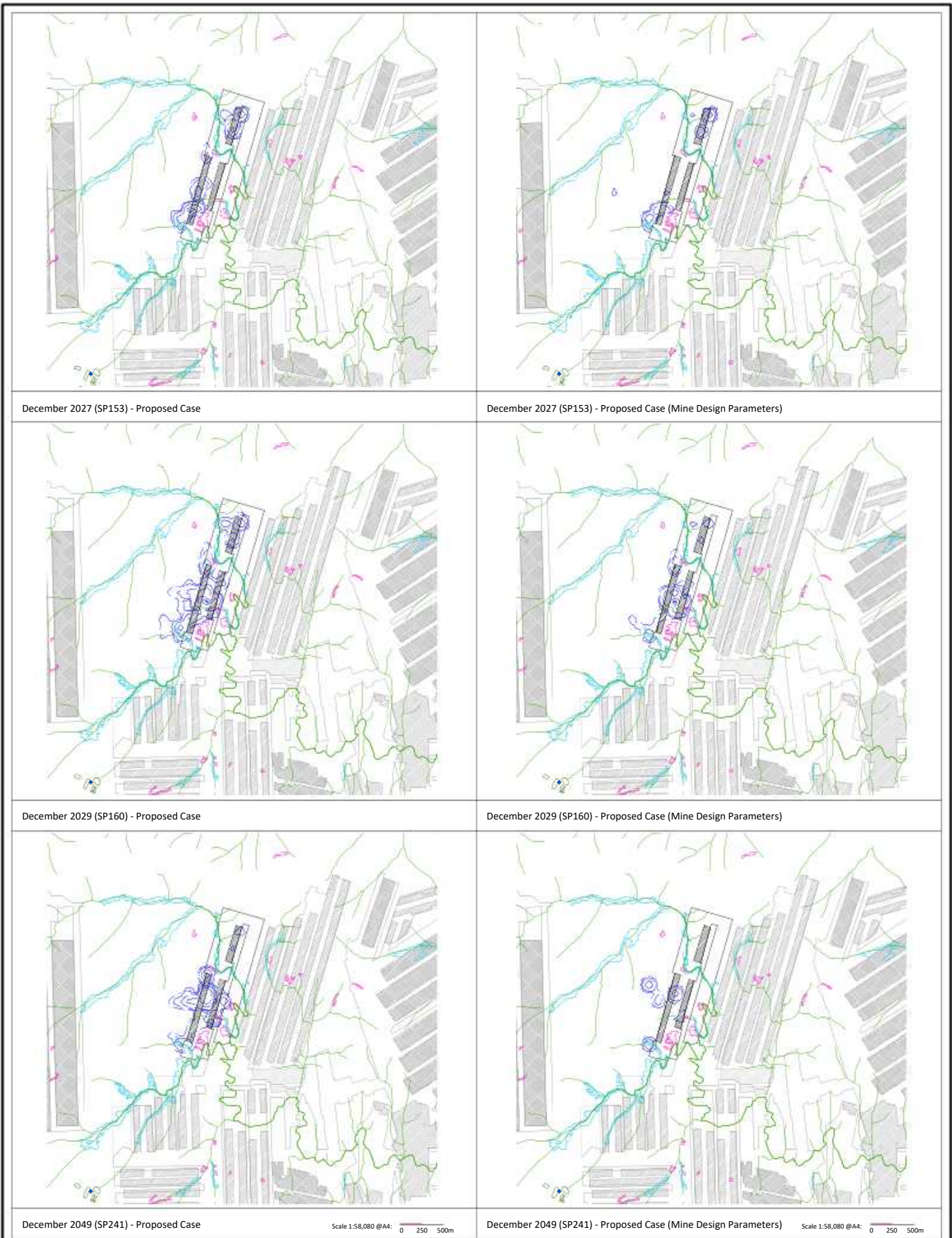
Figure H-1 presents the 10th percentile and 90th percentile ranked change in groundwater elevation of the highest active node, in the Mount York Claystone (Layer 15) and in the Katoomba Seam (Layer 18) in the vicinity of 918 Panel at three output times:

- 31 December 2027 (end of SP153)
- 31 December 2029 (end of SP160)
- 31 December 2049 (end of SP241).

In **Figure H-1**, for the 10th percentile change in groundwater elevation contours for “Proposed Case – Mine Design Parameters” are all slightly within the “Proposed Case”. This makes sense, because the ‘maximum drawdown’ is due to the influence of ‘mine design parameters’.

In **Figure H-1**, for the 90th percentile change in groundwater elevation contours, there is a significant difference between the “Proposed Case – Mine Design Parameters” and the “Proposed Case”. This is because ‘other-than-mine design parameters’ are important in the ‘minimum drawdown’ output.

To expand on the explanation, in **Figure H-1**, the difference between 10th and 90th percent change in groundwater elevation for “Proposed Case – Mine Design Parameters” is small. This is different to the difference between 10th and 90th percent change in groundwater elevation for “Proposed Case”, which is medium.



December 2027 (SP153) - Proposed Case

December 2027 (SP153) - Proposed Case (Mine Design Parameters)

December 2029 (SP160) - Proposed Case

December 2029 (SP160) - Proposed Case (Mine Design Parameters)

December 2049 (SP241) - Proposed Case

Scale 1:58,080 @A4: 0 250 500m

December 2049 (SP241) - Proposed Case (Mine Design Parameters)

Scale 1:58,080 @A4: 0 250 500m

Legend

- | | | |
|---|---|--|
| <p>Mining Methods:</p> <ul style="list-style-type: none"> Development Partial Extraction Total Extraction Open Cut <p>Mine Operation Status:</p> <ul style="list-style-type: none"> Approved Existing Proposed Other Proposed | <p>Hydrology:</p> <ul style="list-style-type: none"> 50 Newnes Plateau Shrub Swamp (EEC) 51 Newnes Plateau Hanging Swamp (EEC) Watercourse Waterbody <p>Groundwater Works:</p> <ul style="list-style-type: none"> Groundwater Work (Industrial, irrigation and stock and domestic) Water Access Licence | <p>Model Results:</p> <ul style="list-style-type: none"> Modelled Change in Groundwater Elevation (m) |
|---|---|--|

Contour Intervals: 0.5m, 0.2m, 0.5m, 1m, 2m, 5m, 10m, 20m, 50m, 100m (as relevant)

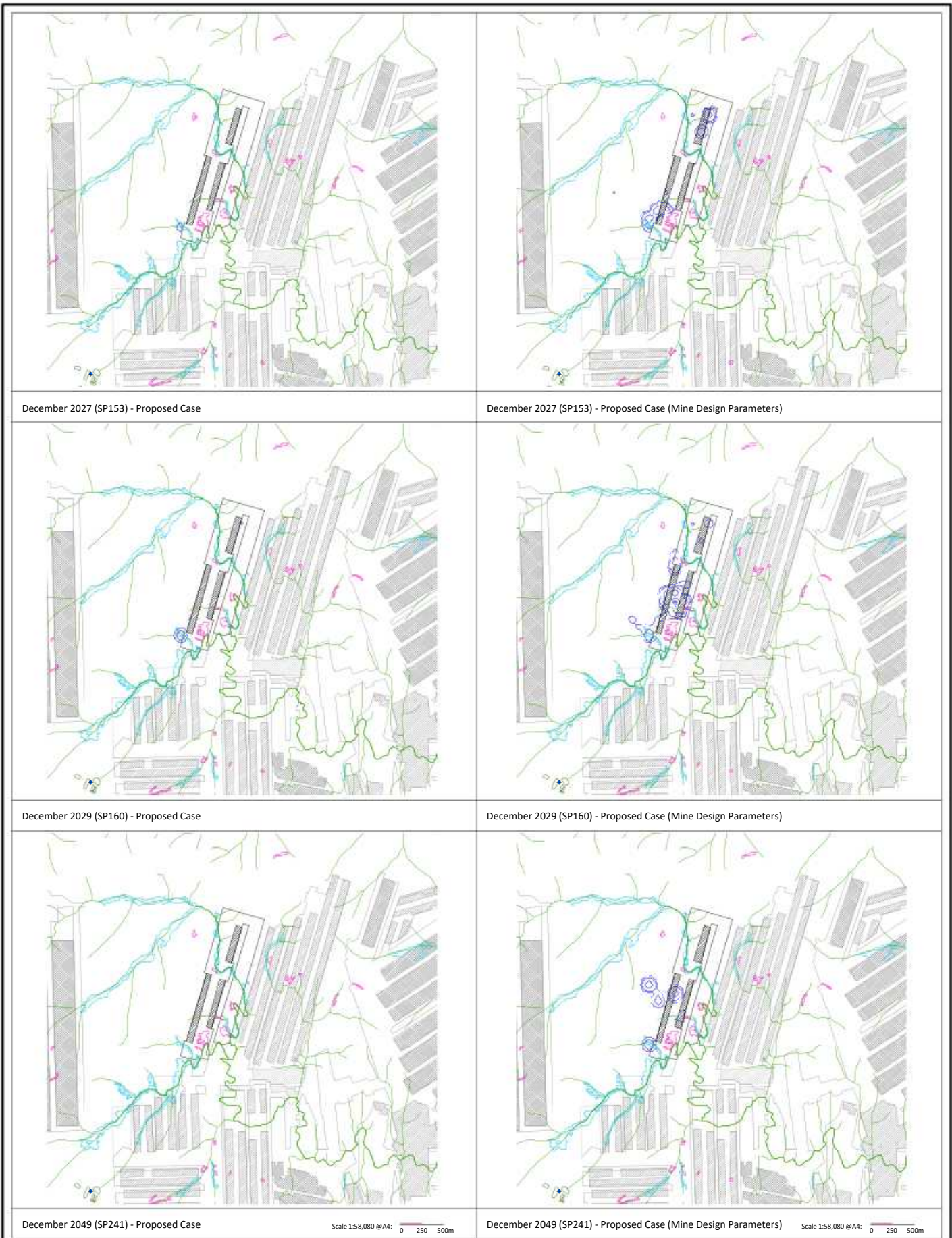
Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevD Date: 12/02/2026

Drawn By: DAW Checked By: JRWB

Change in Groundwater Elevation (m) - Mine Design Parameters
 Proposed Case minus Approved Case
 Highest Active Node (10th Percentile)



December 2027 (SP153) - Proposed Case

December 2027 (SP153) - Proposed Case (Mine Design Parameters)

December 2029 (SP160) - Proposed Case

December 2029 (SP160) - Proposed Case (Mine Design Parameters)

December 2049 (SP241) - Proposed Case

Scale 1:58,080 @A4: 0 250 500m

December 2049 (SP241) - Proposed Case (Mine Design Parameters)

Scale 1:58,080 @A4: 0 250 500m

Legend

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Hydrology:

- 50 Newnes Plateau Shrub Swamp (EEC)
 - 51 Newnes Plateau Hanging Swamp (EEC)
 - Watercourse
 - Waterbody
- Groundwater Works:**
- Groundwater Work (Industrial, irrigation and stock and domestic)
 - Water Access Licence

Model Results:

- Modelled Change in Groundwater Elevation (m)

Contour intervals: 0.5m, 0.2m, 0.5m, 1m, 2m, 5m, 10m, 20m, 50m, 100m (as relevant)

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevD

Date: 12/02/2026

Drawn By: DAW

Checked By: JRWB

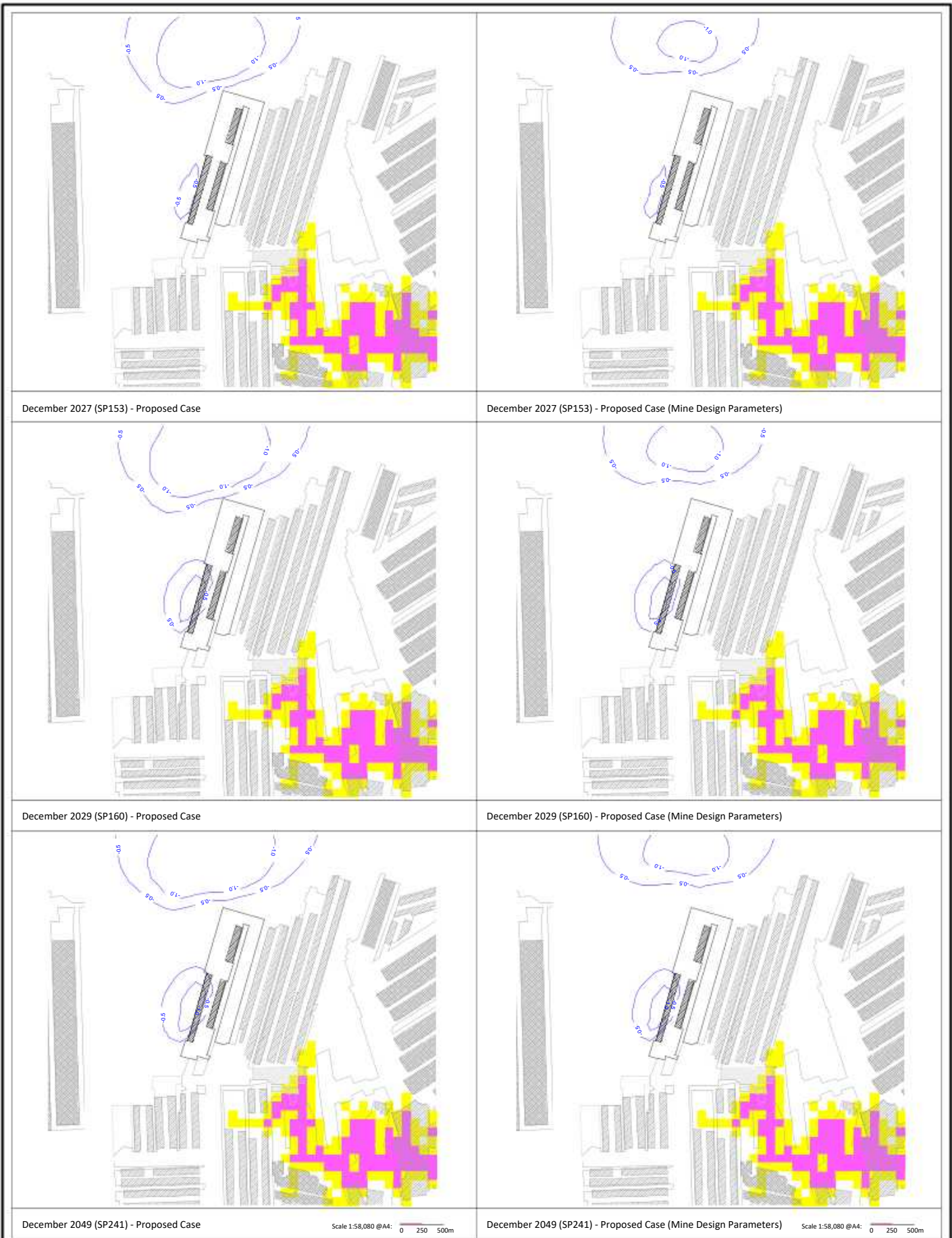
Change in Groundwater

Elevation (m) - Mine Design Parameters
Proposed Case minus Approved Case

Highest Active Node (90th Percentile)

Figure H-01b





December 2027 (SP153) - Proposed Case

December 2027 (SP153) - Proposed Case (Mine Design Parameters)

December 2029 (SP160) - Proposed Case

December 2029 (SP160) - Proposed Case (Mine Design Parameters)

December 2049 (SP241) - Proposed Case

Scale 1:58,080 @A4: 0 250 500m

December 2049 (SP241) - Proposed Case (Mine Design Parameters)

Scale 1:58,080 @A4: 0 250 500m

Legend

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Model Cell Type:

- Pinched-Out Cells
- Drain (DRN) Cells

Model Results:

- Modelled Change in Groundwater Elevation (m)

Contour Interval: 0.5m, -1m, -2m, -5m, -10m, -20m, -50m, -100m (as relevant)

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Drawn By: DAW

Date: 07/11/2025

Checked By: JRWB

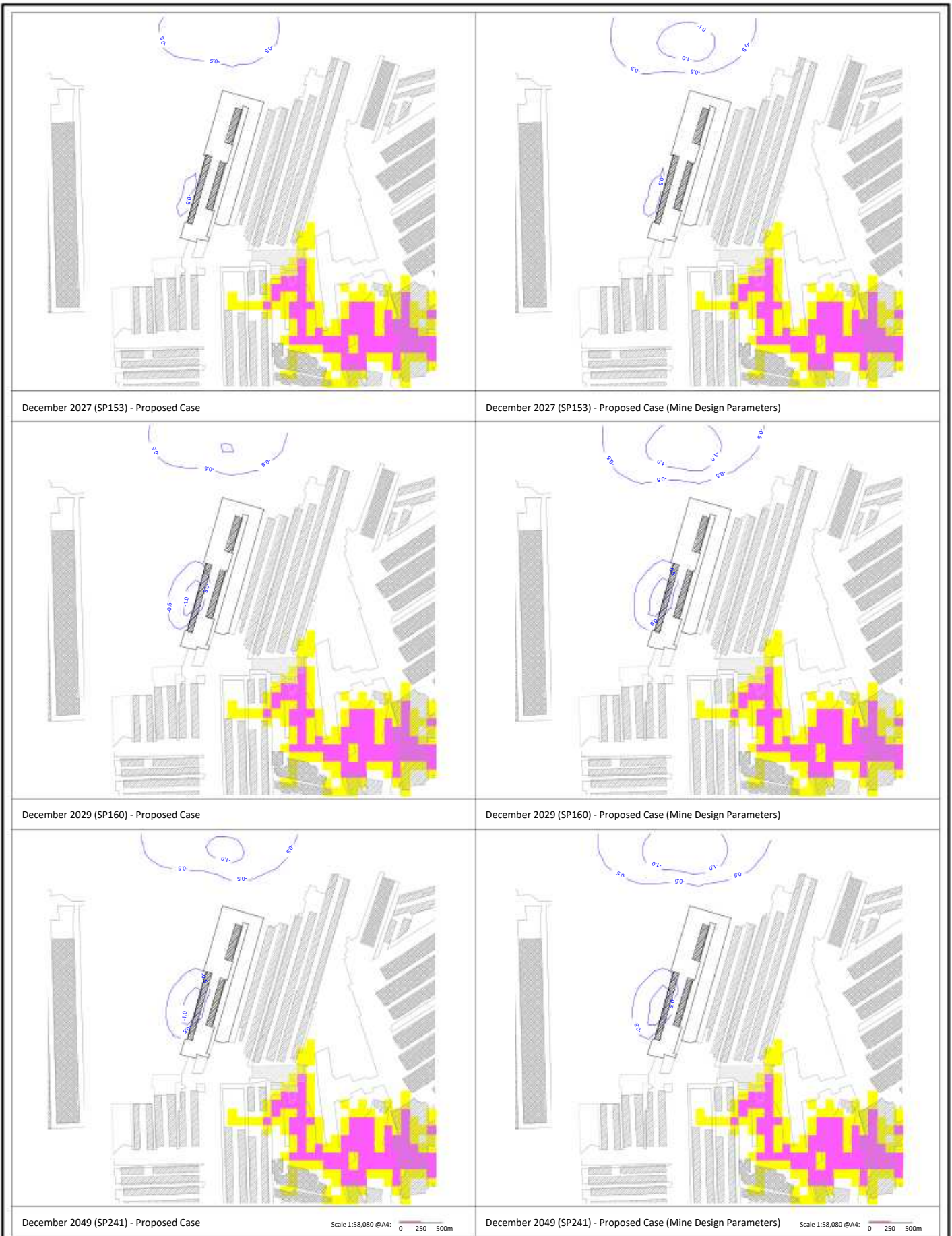
Change in Groundwater

Elevation (m) - Mine Design Parameters
Proposed Case minus Approved Case

Mount York Claystone (Layer 15)
(10th Percentile)

Figure H-01c





December 2027 (SP153) - Proposed Case

December 2027 (SP153) - Proposed Case (Mine Design Parameters)

December 2029 (SP160) - Proposed Case

December 2029 (SP160) - Proposed Case (Mine Design Parameters)

December 2049 (SP241) - Proposed Case

Scale 1:58,080 @A4: 0 250 500m

December 2049 (SP241) - Proposed Case (Mine Design Parameters)

Scale 1:58,080 @A4: 0 250 500m

Legend

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Model Cell Type:

- Pinched-Out Cells
- Drain (DRN) Cells

Model Results:

- Modelled Change in Groundwater Elevation (m)

Contour Intervals: 0.5m, 1m, 2m, 5m, 10m, 20m, 50m, 100m (as relevant)

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Drawn By: DAW

Date: 07/11/2025

Checked By: JRWB

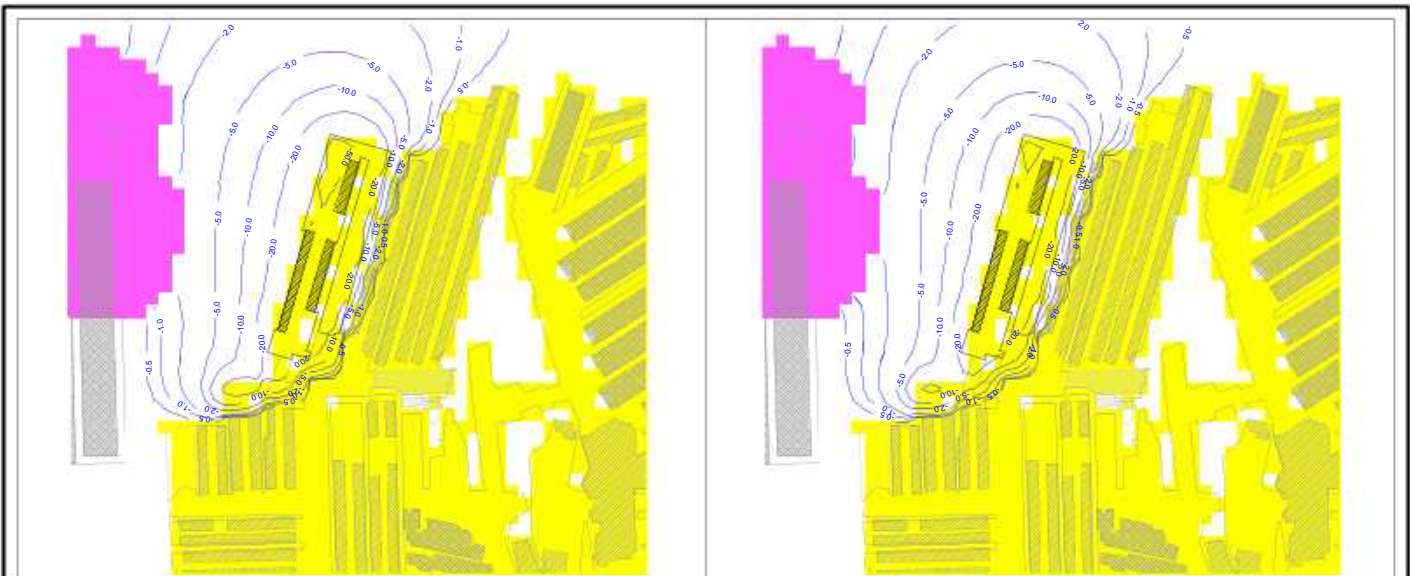
Change in Groundwater

Elevation (m) - Mine Design Parameters
Proposed Case minus Approved Case

Mount York Claystone (Layer 15)
(90th Percentile)

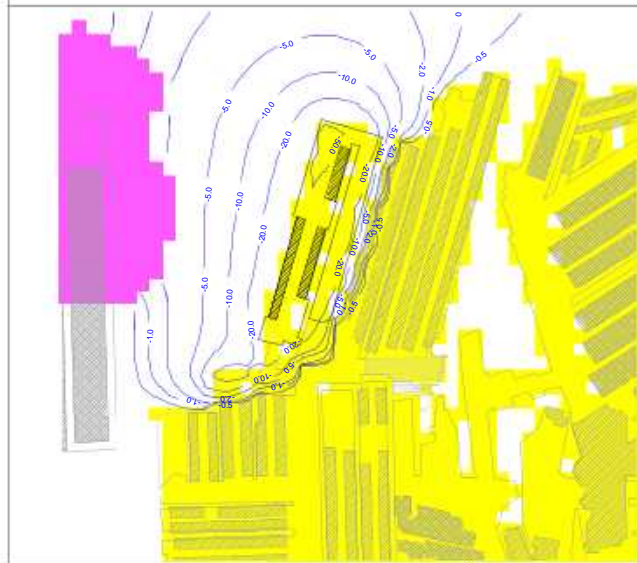
Figure H-01d





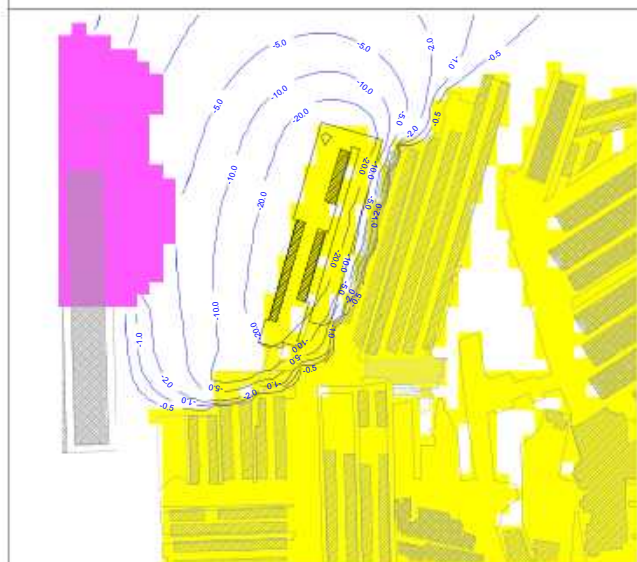
December 2027 (SP153) - Proposed Case

December 2027 (SP153) - Proposed Case (Mine Design Parameters)



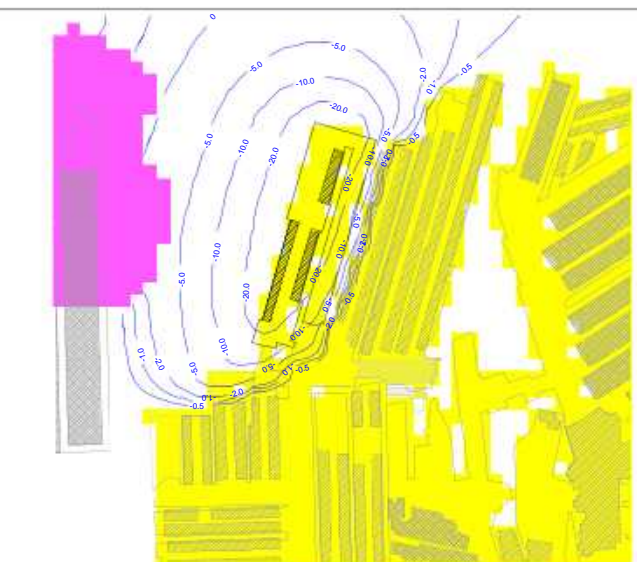
December 2029 (SP160) - Proposed Case

December 2029 (SP160) - Proposed Case (Mine Design Parameters)



December 2049 (SP241) - Proposed Case

Scale 1:58,080 @A4: 0 250 500m



December 2049 (SP241) - Proposed Case (Mine Design Parameters)

Scale 1:58,080 @A4: 0 250 500m

Legend

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Model Cell Type:

- Pinched-Out Cells
- Drain (DRN) Cells

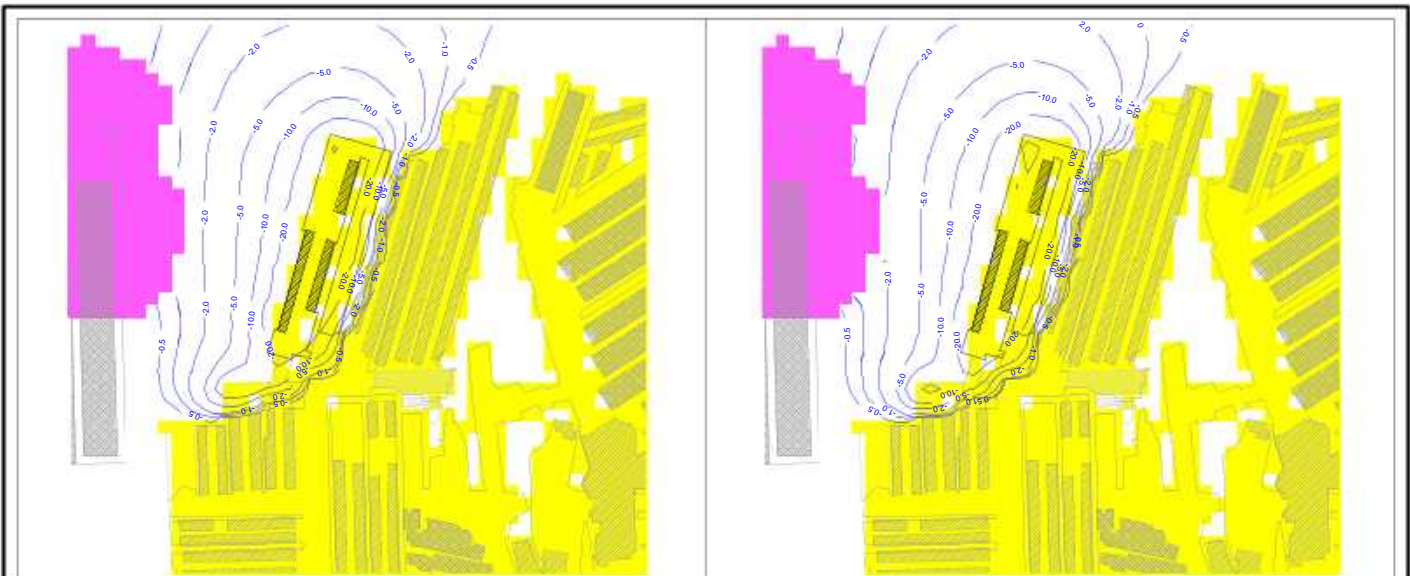
Model Results:

- Modelled Change in Groundwater Elevation (m)

Contour Interval: 0.5m, -1m, -2m, -5m, -10m, -20m, -50m, -100m (as relevant)

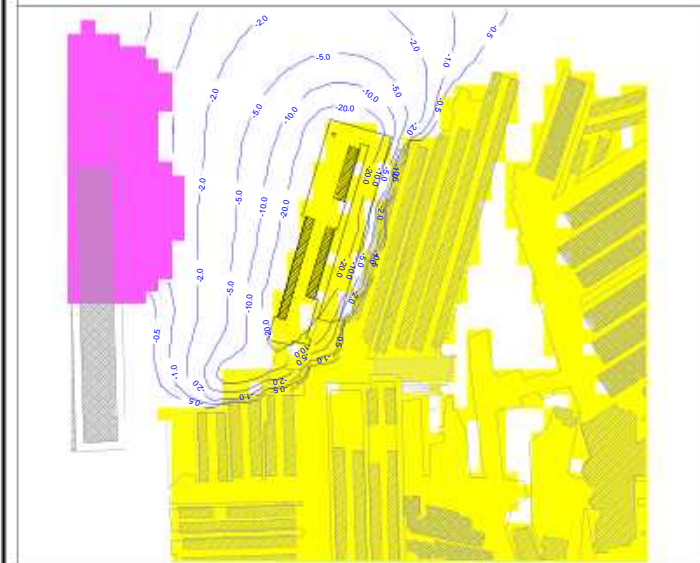
Job No.: 68229		Change in Groundwater Elevation (m) - Mine Design Parameters Proposed Case minus Approved Case Katoomba Seam (Layer 18) (10th Percentile)
Client: Clarence Colliery Pty Ltd		
Version: R01RevA	Date: 07/11/2025	
Drawn By: DAW	Checked By: JRWB	Figure H-01e





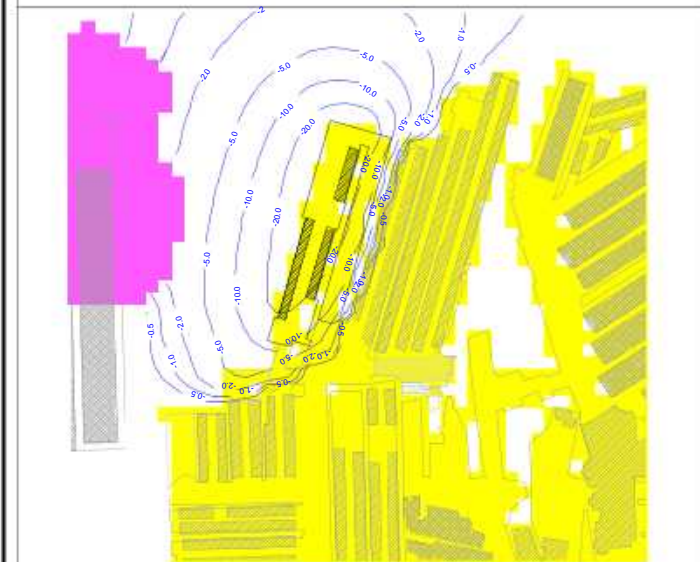
December 2027 (SP153) - Proposed Case

December 2027 (SP153) - Proposed Case (Mine Design Parameters)



December 2029 (SP160) - Proposed Case

December 2029 (SP160) - Proposed Case (Mine Design Parameters)



December 2049 (SP241) - Proposed Case

Scale 1:58,080 @A4: 0 250 500m

December 2049 (SP241) - Proposed Case (Mine Design Parameters)

Scale 1:58,080 @A4: 0 250 500m

Legend

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Model Cell Type:

- Pinched-Out Cells
- Drain (DRN) Cells

Model Results:

- Modelled Change in Groundwater Elevation (m)

Contour Interval: 0.5m, 1m, 2m, 5m, 10m, 20m, 50m, 100m (as relevant)

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Drawn By: DAW

Date: 07/11/2025

Checked By: JRWB

Change in Groundwater

Elevation (m) - Mine Design Parameters
Proposed Case minus Approved Case

Katoomba Seam (Layer 18)
(90th Percentile)

Figure H-01f



Appendix I Uncertainty Analysis Convergence

Appendix I

I1. Uncertainty Analysis Convergence

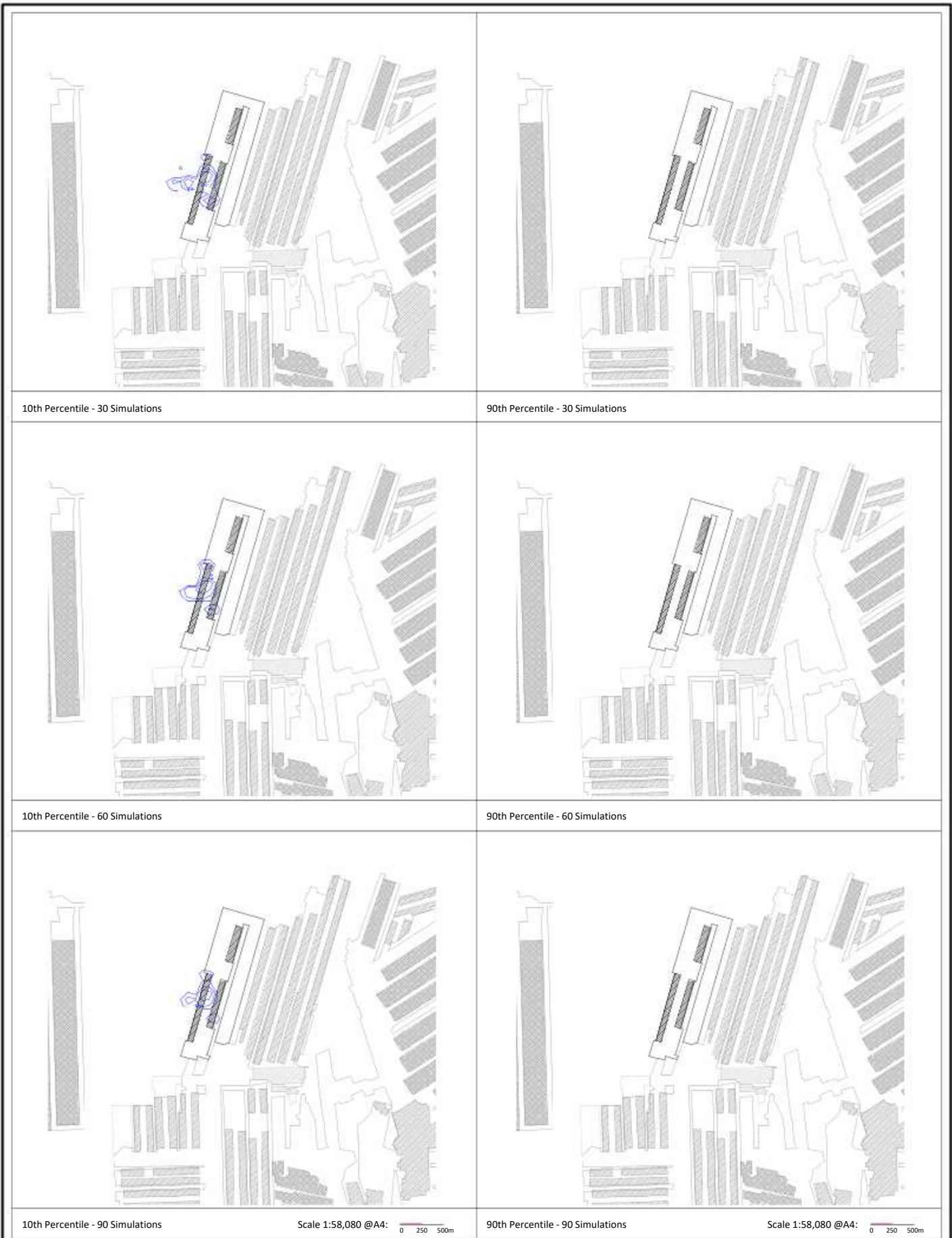
As identified in the Explanatory Note on Uncertainty Analysis in Groundwater Modelling (IESC, 2023a), it is necessary to demonstrate that uncertainty analysis simulations have ‘converged’.

Convergence is demonstrated by presenting a model outcome, in this case, change to groundwater elevation, using progressively increasing number of simulations. After a certain number of simulations, generally about 200, the model outcome is the same.

Figure J-1 presents the 10th percentile and 90th percentile ranked change in groundwater elevation of the highest active node, the Mount York Claystone (Layer 15) and the Katoomba Seam (Layer 18) in the vicinity of 918 Panel as at 31 December 2049 (end of SP241).

The 10th% and 90th% ranked output are presented for 30, 60, 90, 150, 210, 286 simulations.

From **Figure J-1**, convergence of the 10th percentile and 90th percentile ranked change in groundwater elevation of the highest active node, the Mount York Claystone (Layer 15) and the Katoomba Seam (Layer 18), is demonstrated relative rapidly and certainly within 210 simulations.



10th Percentile - 30 Simulations

90th Percentile - 30 Simulations

10th Percentile - 60 Simulations

90th Percentile - 60 Simulations

10th Percentile - 90 Simulations

Scale 1:58,080 @A4:



90th Percentile - 90 Simulations

Scale 1:58,080 @A4:



Legend

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Model Cell Type:

- Pinched-Out Cells
- Drain (DRN) Cells

Model Results:

- Modelled Change in Groundwater Elevation (m)

Contour Interval: 0.5m, 1m, 2m, 5m, 10m, 20m, 50m, 100m (as relevant)

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

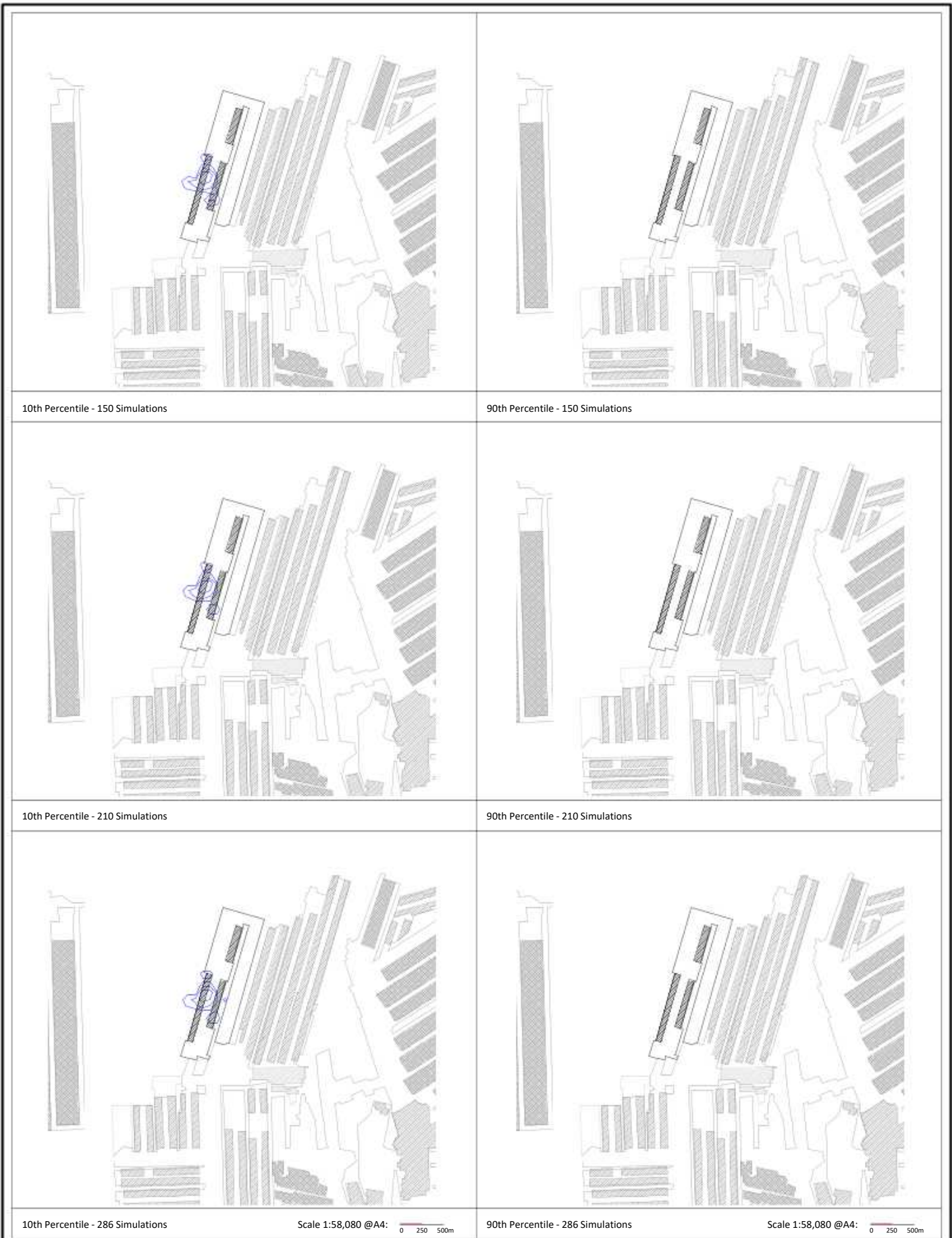
Checked By: JRWB

**Uncertainty Analysis Convergence
Change in Groundwater Elevation (m)
- December 2049 (SP241)**

Highest Active Node
(30, 60, 90 Simulations)

Figure I-01a





Legend

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Model Cell Type:

- Pinched-Out Cells
- Model Boundary Conditions:**
- Drain (DRN) Cells

Model Results:

- Modelled Change in Groundwater Elevation (m)

Contour Interval: 0.5m, 1m, 2m, 5m, 10m, 20m, 50m, 100m (as relevant)

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

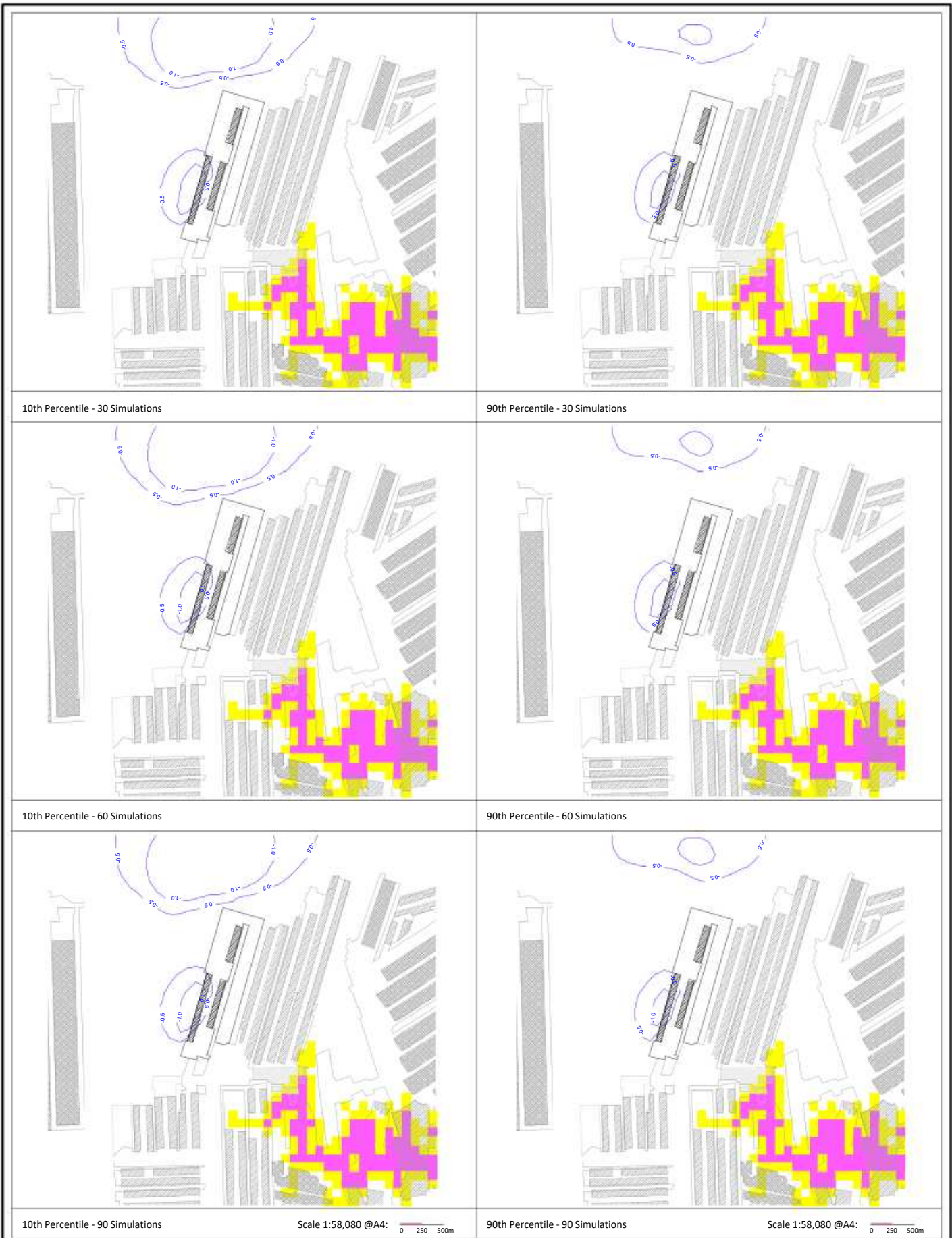
Checked By: JRWB

**Uncertainty Analysis Convergence
Change in Groundwater Elevation (m)
- December 2049 (SP241)**

Highest Active Node
(150, 210, 286 Simulations)

Figure I-01b





10th Percentile - 30 Simulations

90th Percentile - 30 Simulations

10th Percentile - 60 Simulations

90th Percentile - 60 Simulations

10th Percentile - 90 Simulations

Scale 1:58,080 @A4: 0 250 500m

90th Percentile - 90 Simulations

Scale 1:58,080 @A4: 0 250 500m

Legend

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Model Cell Type:

- Pinched-Out Cells
- Drain (DRN) Cells

Model Results:

- Modelled Change in Groundwater Elevation (m)

Contour Interval: 0.5m, 1m, 2m, 5m, 10m, 20m, 50m, 100m (as relevant)

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

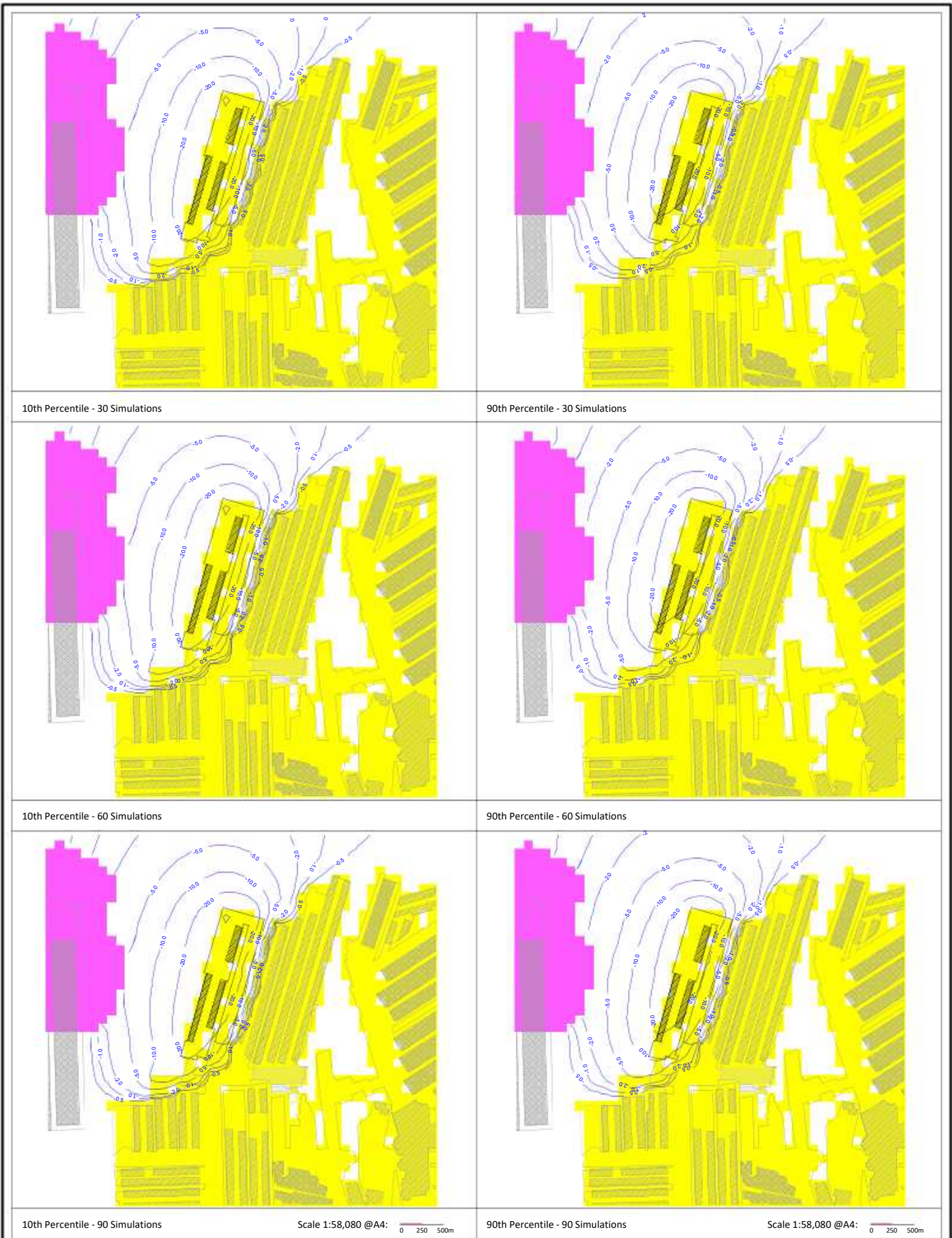
Checked By: JRWB

**Uncertainty Analysis Convergence
Change in Groundwater Elevation (m)
- December 2049 (SP241)**

Mount York Claystone (Layer 15)
(30, 60, 90 Simulations)

Figure I-01c





10th Percentile - 30 Simulations

90th Percentile - 30 Simulations

10th Percentile - 60 Simulations

90th Percentile - 60 Simulations

10th Percentile - 90 Simulations

Scale 1:58,080 @A4: 0 250 500m

90th Percentile - 90 Simulations

Scale 1:58,080 @A4: 0 250 500m

Legend

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Model Cell Type:

- Pinched-Out Cells
- Drain (DRN) Cells

Model Results:

- Modelled Change in Groundwater Elevation (m)

Contour Interval: 0.5m, 1m, 2m, 5m, 10m, 20m, 50m, 100m (as relevant)

Job No.: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA

Date: 07/11/2025

Drawn By: DAW

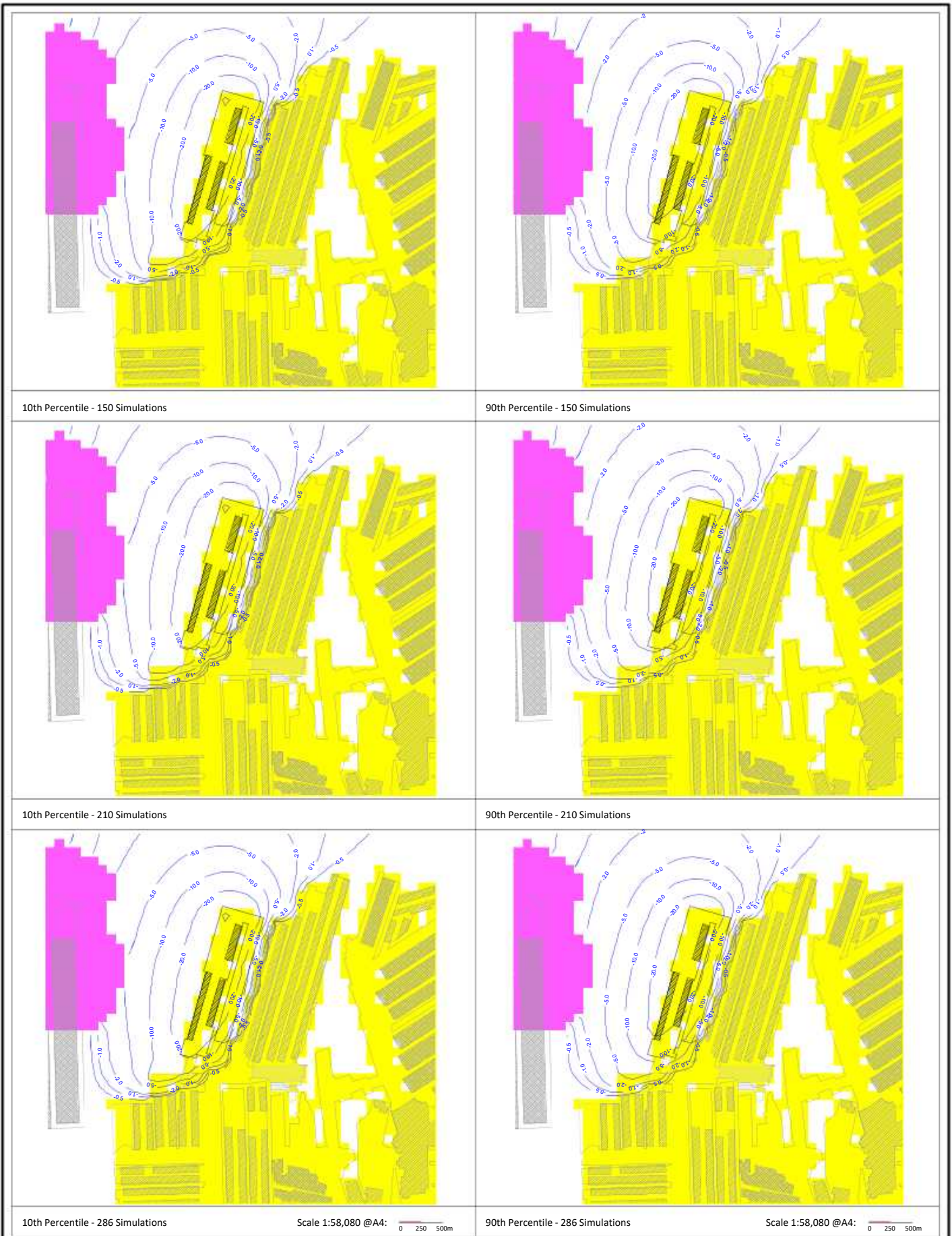
Checked By: JRWB

**Uncertainty Analysis Convergence
Change in Groundwater Elevation (m)
- December 2049 (SP241)**

Katoomba Seam (Layer 24)
(30, 60, 90 Simulations)

Figure I-01e





Legend

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Model Cell Type:

- Pinched-Out Cells
- Drain (DRN) Cells

Model Results:

- Modelled Change in Groundwater Elevation (m)

Contour Interval: 0.5m, 1m, 2m, 5m, 10m, 20m, 50m, 100m (as relevant)

Job No.: 68229		Uncertainty Analysis Convergence Change in Groundwater Elevation (m) - December 2049 (SP241)
Client: Clarence Colliery Pty Ltd		
Version: R01RevA	Date: 07/11/2025	Katoomba Seam (Layer 24) (150, 210, 286 Simulations)
Drawn By: DAW	Checked By: JRWB	Figure I-01f



Appendix J Groundwater Hydrographs – Deterministic

Appendix J

J1. Groundwater Hydrographs – Deterministic

Modelled and observed groundwater elevation (interpolated and multilevel) hydrographs were extracted in the vicinity of 918 Panel.

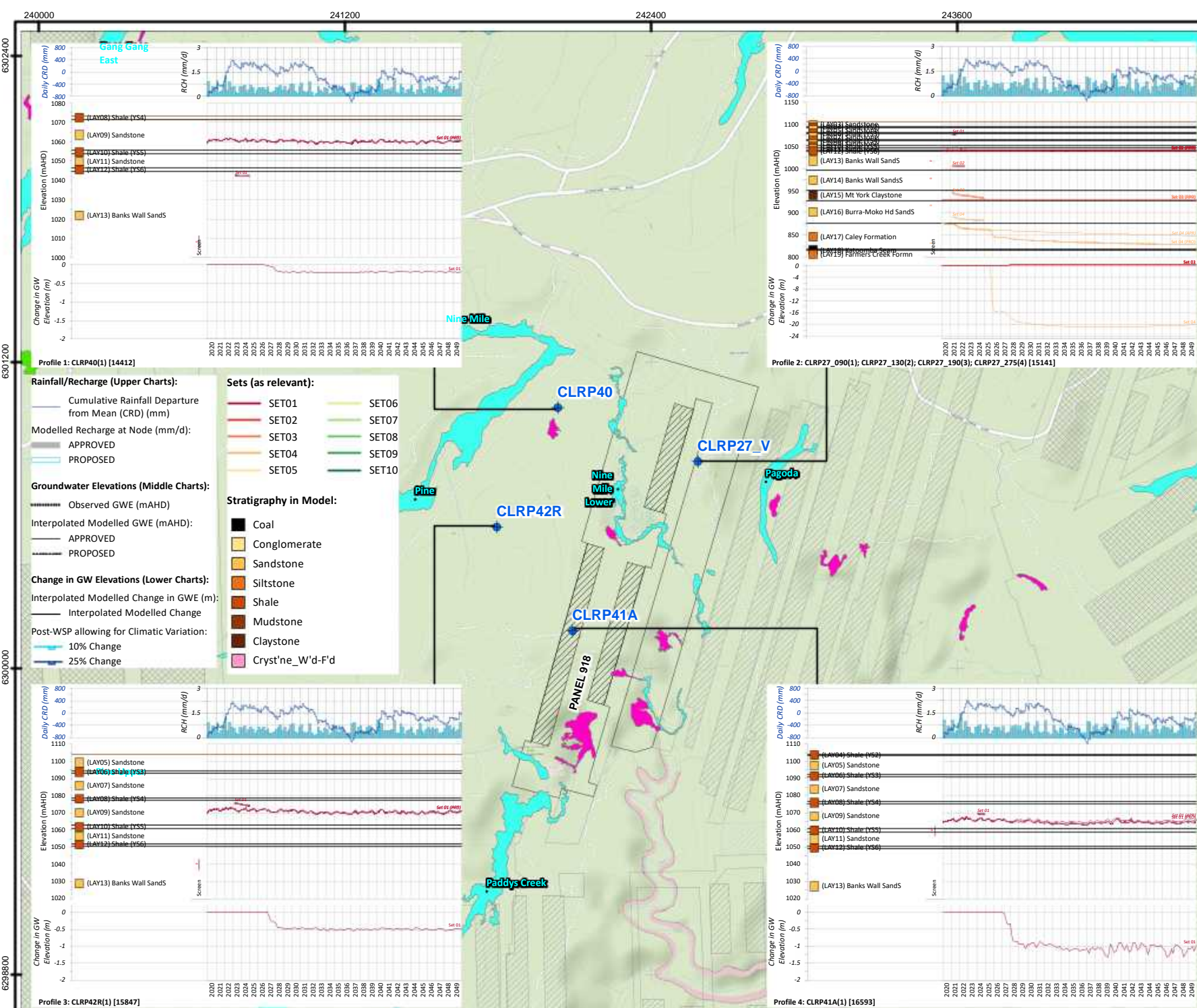
Output is presented at the following locations:

- CLRP40, CLRP27_V, CLRP42R and CLRP41A
- CLRP29_V, CLRP28, CLRP18_V and CLRP22_V
- GW099052, GW09905, GW099054, CSP9, CLRP31 and CSP8
- CSP1, PG1, CSP2 and PG2
- CSP6, CSP34, PSE1 and PSE2
- CSP36, L01Node 16613, CSP4 and CSP35.

For groundwater hydrographs, a three-dimensional interpolation of model output was used, as detailed in **Section 4.12.4.4**.

Multilevel groundwater hydrographs were also extracted from the Proposed Case and Approved Case simulations for each of the locations, whereby model output is presented in multiple aquifers/aquitards, as times-series, on a vertical elevation scale, thereby demonstrating vertical gradient, as available. Multilevel groundwater hydrographs also feature the change in groundwater elevation between the Proposed Case and Approved Case.

As detailed in **Section 4.12.4.4**, displayed above the groundwater elevation (interpolated and multilevel) hydrographs is the cumulative rainfall departure from mean (CRD), in millimetres (mm), for each model output location. The modelled recharge, in millimetres per day (mm/day) for each stress period, is also presented for each model output location for both the Approved Case and the Proposed Case

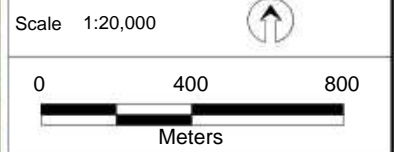


- Legend:**
- Model Output Locations
- Mining Methods:**
- Development
 - Partial Extraction
 - Total Extraction
 - Open Cut
- Mine Operation Status:**
- Approved
 - Existing
 - Proposed
 - Other Proposed
- Swamps by MU Name (Clarence, 2025bc):**
- 50 Newnes Plateau Shrub Swamp (EEC)
 - 51 Newnes Plateau Hanging Swamp (EEC)
 - 52 Newnes Plateau Rush - Sedge - Snow Gum Hollow Wooded Heath (EEC)

Notes:
 1) GWE: Groundwater Elevation.
 2) CRD Trace dates from 01/01/2010 - 31/12/2049.



Job No: 68229
 Client: Clarence Colliery Pty Ltd
 Version: R01RevA Date: 22-Oct-2025
 Drawn By: DAW Checked By: JRWB

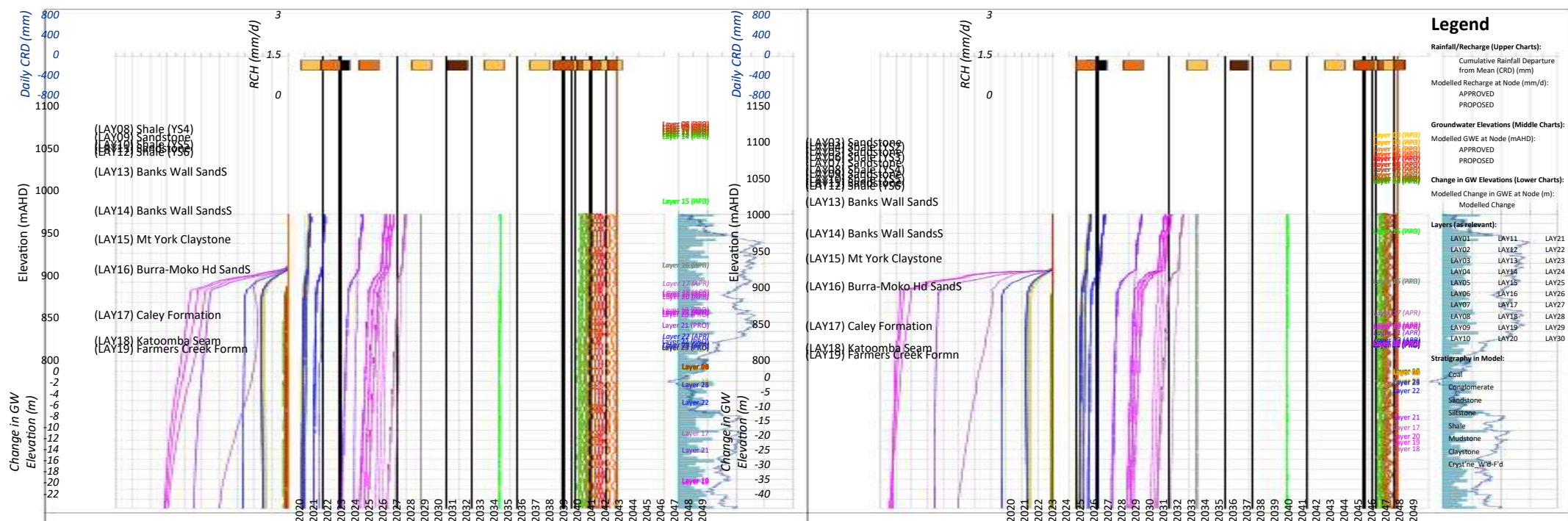


Coord. Sys. GDA 1994 MGA Zone 56

**Groundwater Hydrographs
 (Prediction Period, Simulation0):**

- CLRP40
- CLRP27_V
- CLRP42R
- CLRP41A

FIGURE: J-01a



Legend

Rainfall/Recharge (Upper Charts):
 Cumulative Rainfall Departure from Mean (CRD) (mm)
 Modelled Recharge at Node (mm/d):
 APPROVED
 PROPOSED

Groundwater Elevations (Middle Charts):
 Modelled GWE at Node (mAHD):
 APPROVED
 PROPOSED

Change in GW Elevations (Lower Charts):
 Modelled Change in GWE at Node (m):
 Modelled Change

Layers (as relevant):

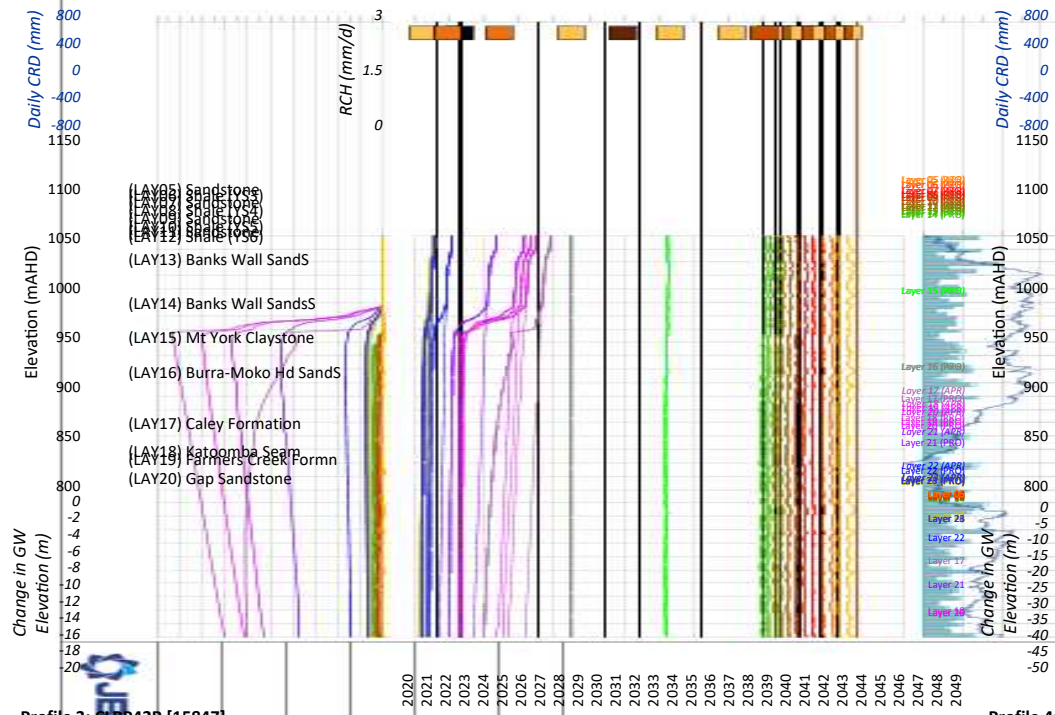
LAY01	LAY11	LAY21
LAY02	LAY12	LAY22
LAY03	LAY13	LAY23
LAY04	LAY14	LAY24
LAY05	LAY15	LAY25
LAY06	LAY16	LAY26
LAY07	LAY17	LAY27
LAY08	LAY18	LAY28
LAY09	LAY19	LAY29
LAY10	LAY20	LAY30

Stratigraphy in Model:

- Coal
- Conglomerate
- Sandstone
- Siltstone
- Shale
- Mudstone
- Claystone
- Crystalline W&F-D

Profile 1: CLRP40 [14412]

Profile 2: CLRP27_V [15141]



Profile 3: CLRP42R [15847]

Profile 4: CLRP41A [16593]

Notes:
 1) GWE Group Water Elevations
 2) CRD Trace dates from 01/01/2020 to 31/12/2049

Project No: 68229

Client:
 Clarence Colliery Pty Ltd

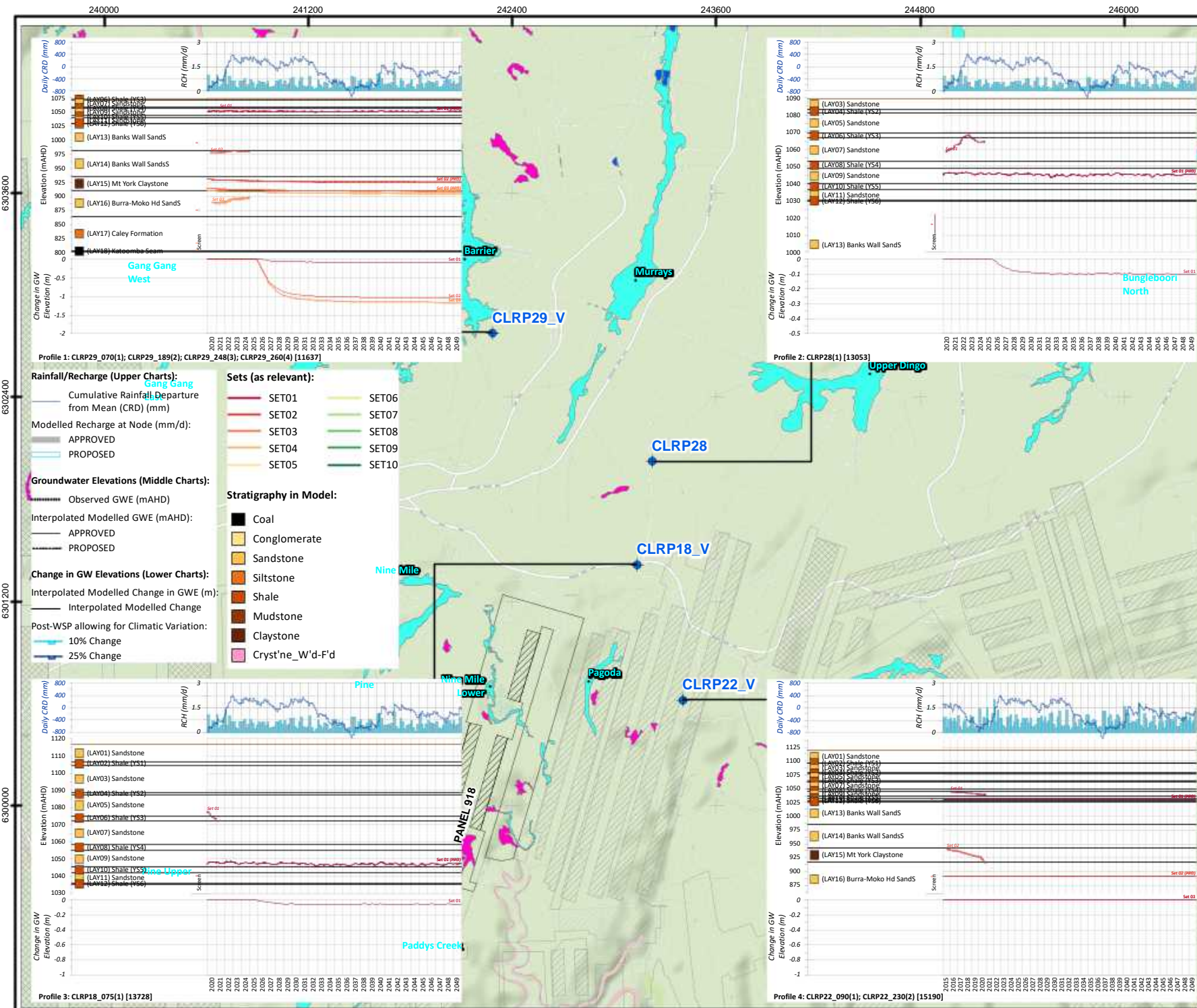
Version: R01RevA

Date: 21/10/2025

Drawn By: DAW

Checked By: JRWB

Figure J-01b: Multilevel Groundwater Hydrographs (Prediction Period Simulation0) - CLRP40, CLRP27_V, CLRP42R, CLRP41A



Legend:

- Model Output Locations

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Swamps by MU Name (Clarence, 2025bc):

- 50 Newnes Plateau Shrub Swamp (EEC)
- 51 Newnes Plateau Hanging Swamp (EEC)
- 52 Newnes Plateau Rush - Sedge - Snow Gum Hollow Wooded Heath (EEC)

Notes:
 1) GWE: Groundwater Elevation.
 2) CRD Trace dates from 01/01/2010 - 31/12/2049.



Job No: 68229
 Client: Clarence Colliery Pty Ltd
 Version: R01RevA Date: 24-Oct-2025
 Drawn By: DAW Checked By: JRWB

Scale 1:30,000

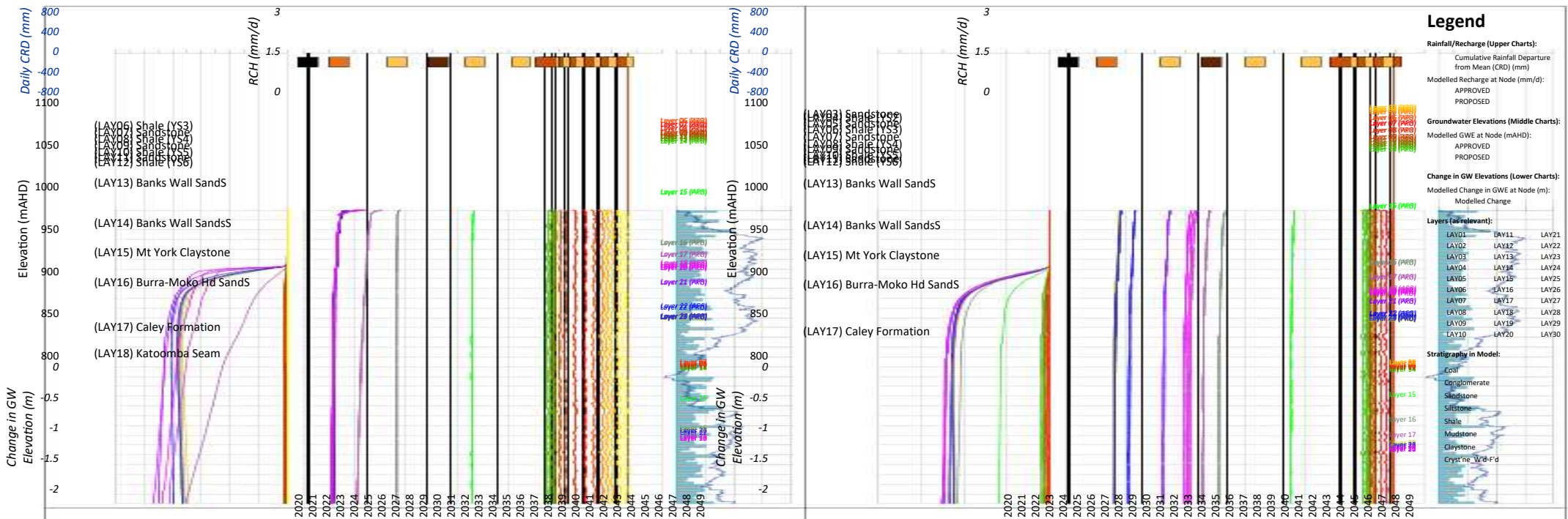
0 500 1,000
Meters

Coord. Sys. GDA 1994 MGA Zone 56

Groundwater Hydrographs (Prediction Period, Simulation0):

- CLRP29_V
- CLRP28
- CLRP18_V
- CLRP22_V

FIGURE: J-02a



Legend

Rainfall/Recharge (Upper Charts):
 Cumulative Rainfall Departure from Mean (CRD) (mm)
 Modelled Recharge at Node (mm/d):
 APPROVED
 PROPOSED

Groundwater Elevations (Middle Charts):
 Modelled GWE at Node (mAHD):
 APPROVED
 PROPOSED

Change in GW Elevations (Lower Charts):
 Modelled Change in GWE at Node (m):
 Modelled Change

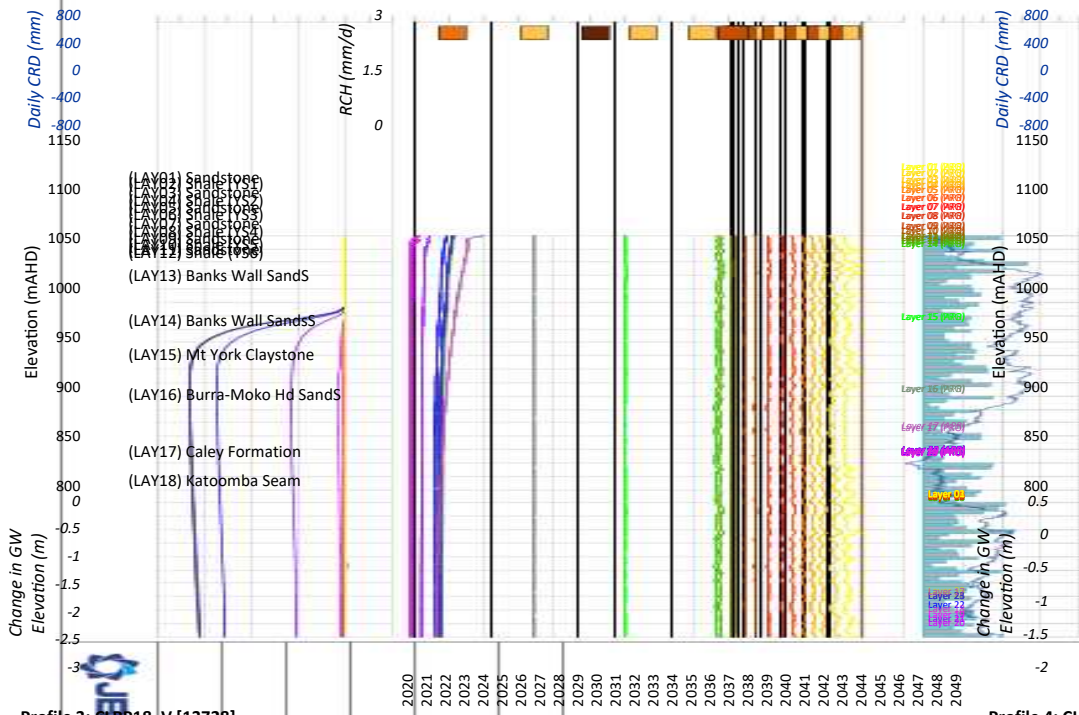
Layers (as relevant):

LAY01	LAY11	LAY21
LAY02	LAY12	LAY22
LAY03	LAY13	LAY23
LAY04	LAY14	LAY24
LAY05	LAY15	LAY25
LAY06	LAY16	LAY26
LAY07	LAY17	LAY27
LAY08	LAY18	LAY28
LAY09	LAY19	LAY29
LAY10	LAY20	LAY30

Stratigraphy in Model:
 Coal
 Conglomerate
 Sandstone
 Siltstone
 Shale
 Mudstone
 Claystone
 Crystalline W.D-F.d

Profile 1: CLRP29_V [11637]

Profile 2: CLRP28 [13053]



Profile 3: CLRP18_V [13728]

Profile 4: CLRP22_V [15190]

Notes:
 1) GWE: Groundwater Elevations
 2) CRD Trace starts from 01/01/2010 7:11:12/2049

Project No: 68229

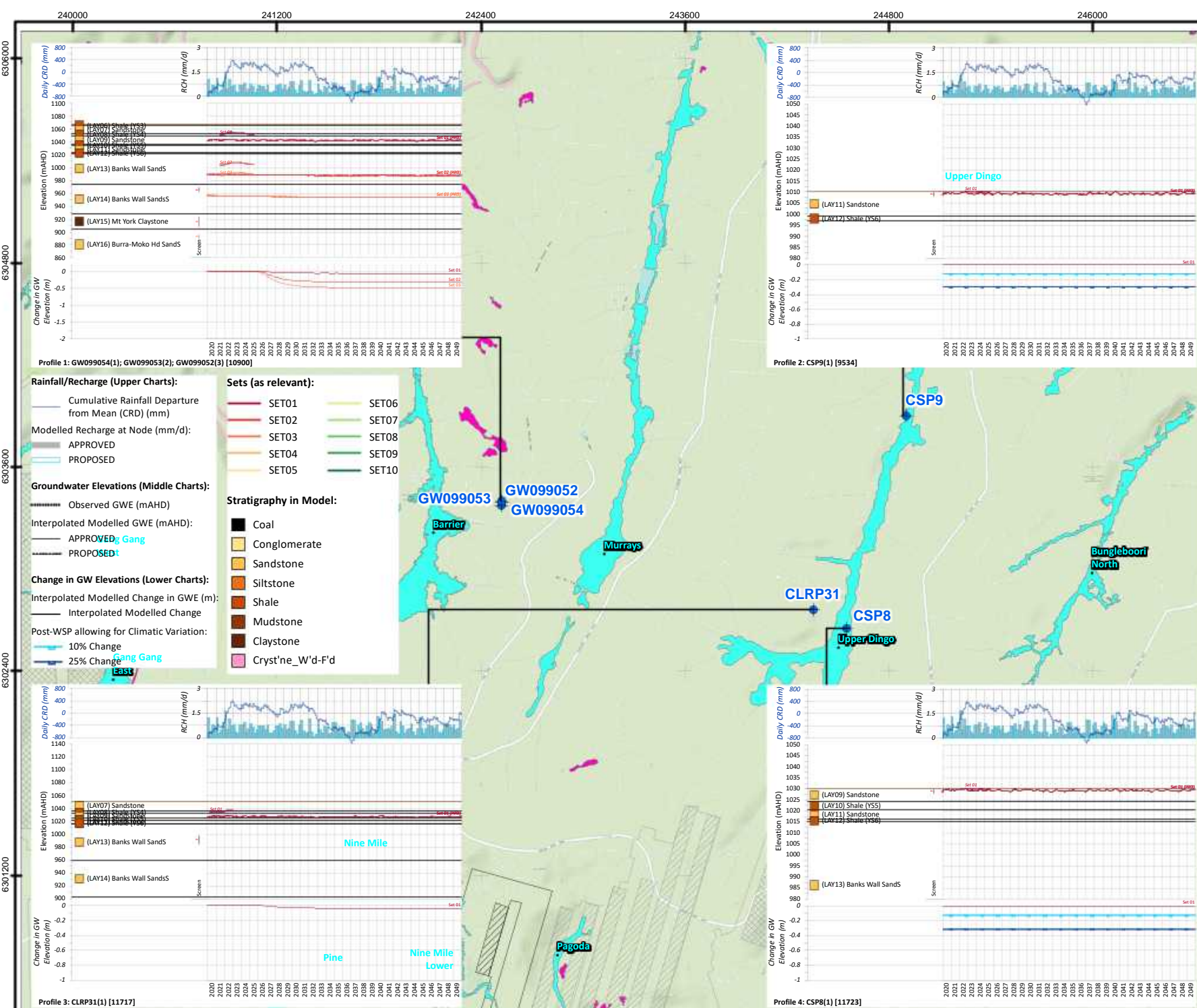
Client:
 Clarence Colliery Pty Ltd

Version: R01RevA

Date: 21/10/2025

Drawn By: DAW

Checked By: JRWB



Legend:

- Model Output Locations

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Swamps by MU Name (Clarence, 2025bc):

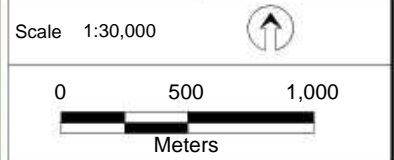
- 50 Newnes Plateau Shrub Swamp (EEC)
- 51 Newnes Plateau Hanging Swamp (EEC)
- 52 Newnes Plateau Rush - Sedge - Snow Gum Hollow Wooded Heath (EEC)

Notes:

- GWE: Groundwater Elevation.
- 10% and 25% threshold calculated based on model output between 01/01/2011 and 31/12/2021.
- CRD Trace dates from 01/01/2010 - 31/12/2049.



Job No: 68229
 Client: Clarence Colliery Pty Ltd
 Version: R01RevA Date: 24-Oct-2025
 Drawn By: DAW Checked By: JRWB

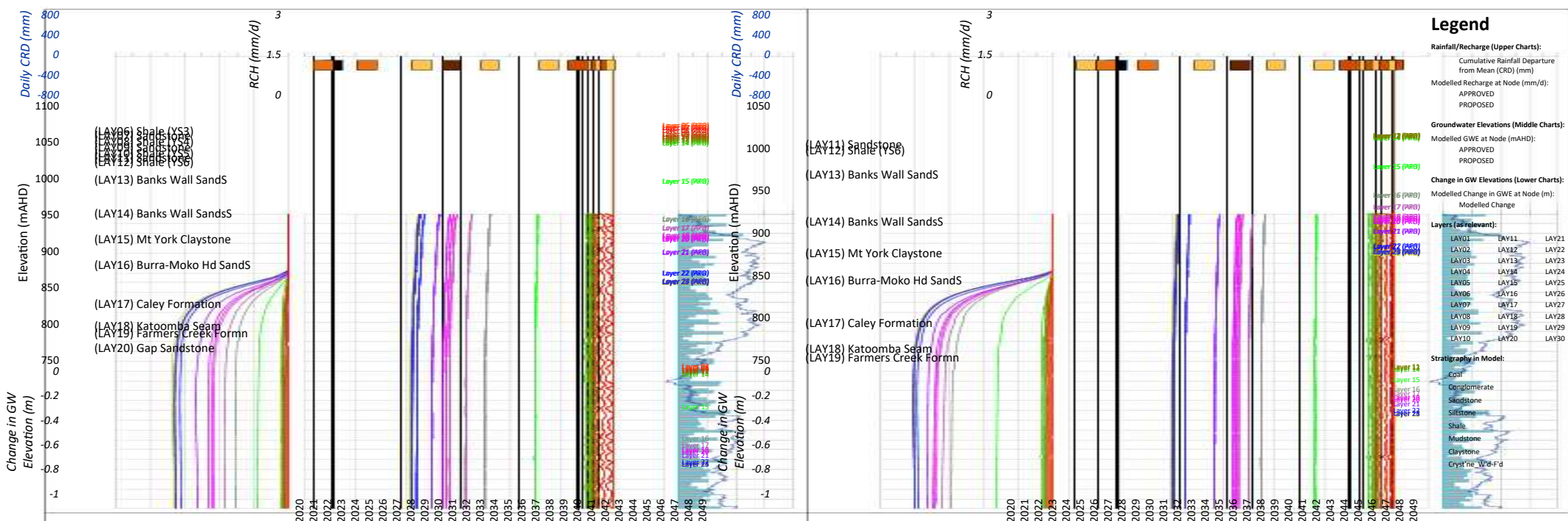


Coord. Sys. GDA 1994 MGA Zone 56

Groundwater Hydrographs (Prediction Period, Simulation0):

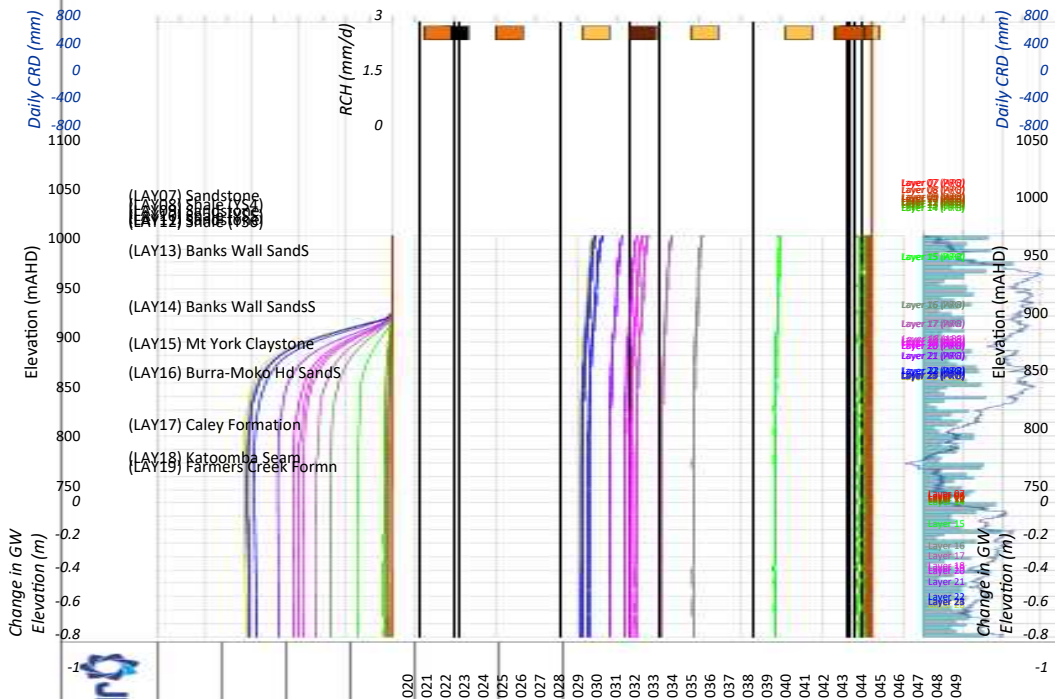
- GW09905X
- CSP9
- CLRP31
- CSP8

FIGURE: J-03a



Profile 1: GW09905X [10900]

Profile 2: CSP9 [9534]



Profile 3: CLRP31 [11717]

Profile 4: CSP8 [11723]

Legend

Rainfall/Recharge (Upper Charts):
 Cumulative Rainfall Departure from Mean (CRD) (mm)
 Modelled Recharge at Node (mm/d):
 APPROVED
 PROPOSED

Groundwater Elevations (Middle Charts):
 Modelled GWE at Node (mAHD):
 APPROVED
 PROPOSED

Change in GW Elevations (Lower Charts):
 Modelled Change in GWE at Node (m):
 Modelled Change

Layers (as relevant):

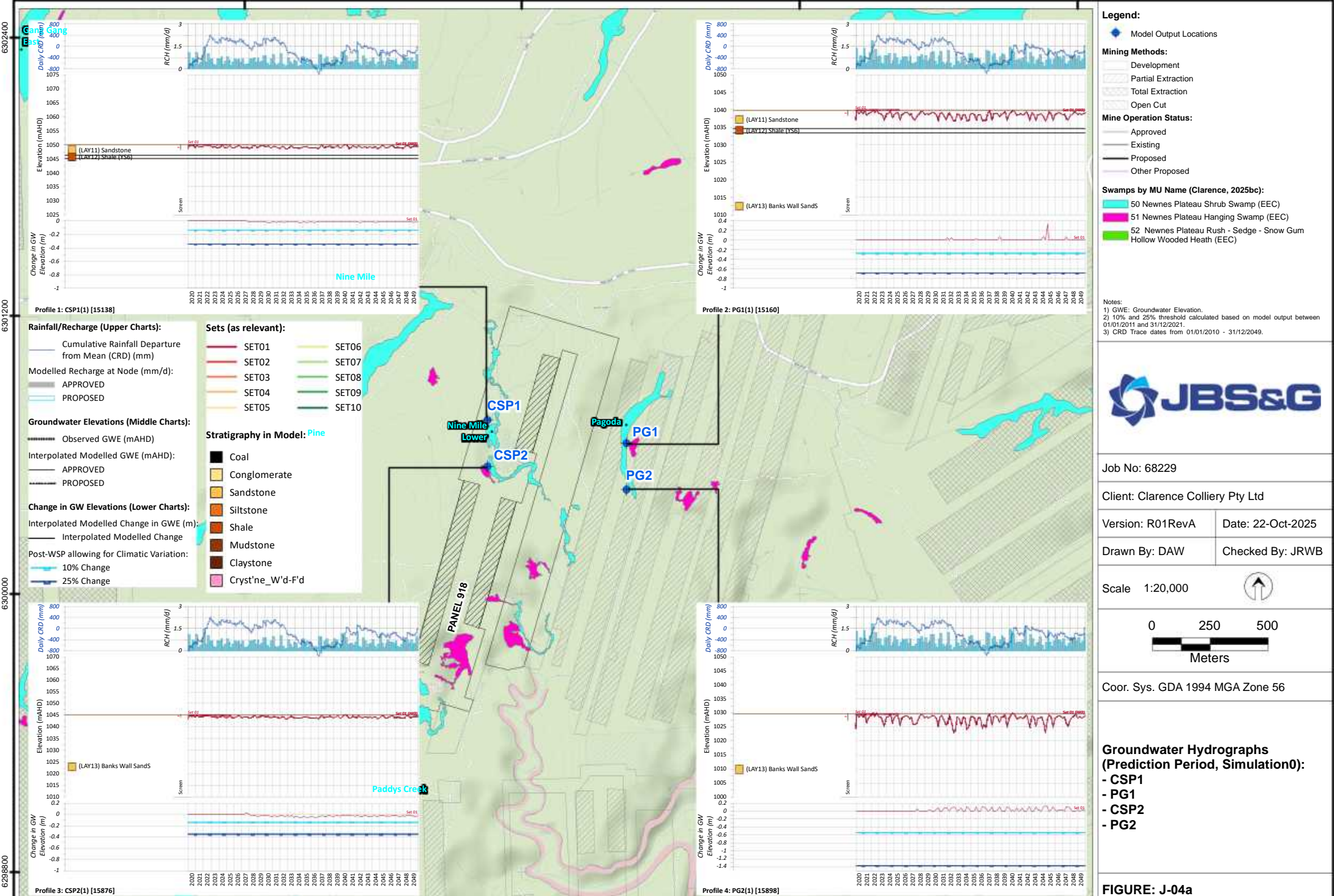
LAY01	LAY11	LAY21
LAY02	LAY12	LAY22
LAY03	LAY13	LAY23
LAY04	LAY14	LAY24
LAY05	LAY15	LAY25
LAY06	LAY16	LAY26
LAY07	LAY17	LAY27
LAY08	LAY18	LAY28
LAY09	LAY19	LAY29
LAY10	LAY20	LAY30

Stratigraphy in Model:

- Coal
- Layer 12
- Layer 15
- Layer 16
- Layer 17
- Layer 18
- Layer 19
- Layer 21
- Layer 22
- Sandstone
- Siltstone
- Shale
- Mudstone
- Claystone
- Crystalline W.D-F.D

Notes:
 1) GWE: Groundwater Elevations
 2) CRD Trace starts from 01/01/2020 - 31/12/2049.

Figure J-03b: Multilevel Groundwater Hydrographs (Prediction Period Simulation0) - GW09905X, CSP9, CLRP31, CSP8



Legend:

- Model Output Locations

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Swamps by MU Name (Clarence, 2025bc):

- 50 Newnes Plateau Shrub Swamp (EEC)
- 51 Newnes Plateau Hanging Swamp (EEC)
- 52 Newnes Plateau Rush - Sedge - Snow Gum Hollow Wooded Heath (EEC)

Notes:

- 1) GWE: Groundwater Elevation.
- 2) 10% and 25% threshold calculated based on model output between 01/01/2011 and 31/12/2021.
- 3) CRD Trace dates from 01/01/2010 - 31/12/2049.



Job No: 68229
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 Version: R01RevA Date: 22-Oct-2025
 Drawn By: DAW Checked By: JRWB

Scale 1:20,000

0 250 500 Meters

Coord. Sys. GDA 1994 MGA Zone 56

Groundwater Hydrographs (Prediction Period, Simulation0):

- CSP1
- PG1
- CSP2
- PG2

FIGURE: J-04a

Rainfall/Recharge (Upper Charts):

- Cumulative Rainfall Departure from Mean (CRD) (mm)
- Modelled Recharge at Node (mm/d): APPROVED, PROPOSED

Groundwater Elevations (Middle Charts):

- Observed GWE (mAHD)
- Interpolated Modelled GWE (mAHD): APPROVED, PROPOSED

Change in GW Elevations (Lower Charts):

- Interpolated Modelled Change in GWE (m): Interpolated Modelled Change
- Post-WSP allowing for Climatic Variation: 10% Change, 25% Change

Sets (as relevant):

- SET01
- SET02
- SET03
- SET04
- SET05
- SET06
- SET07
- SET08
- SET09
- SET10

Stratigraphy in Model: Pine

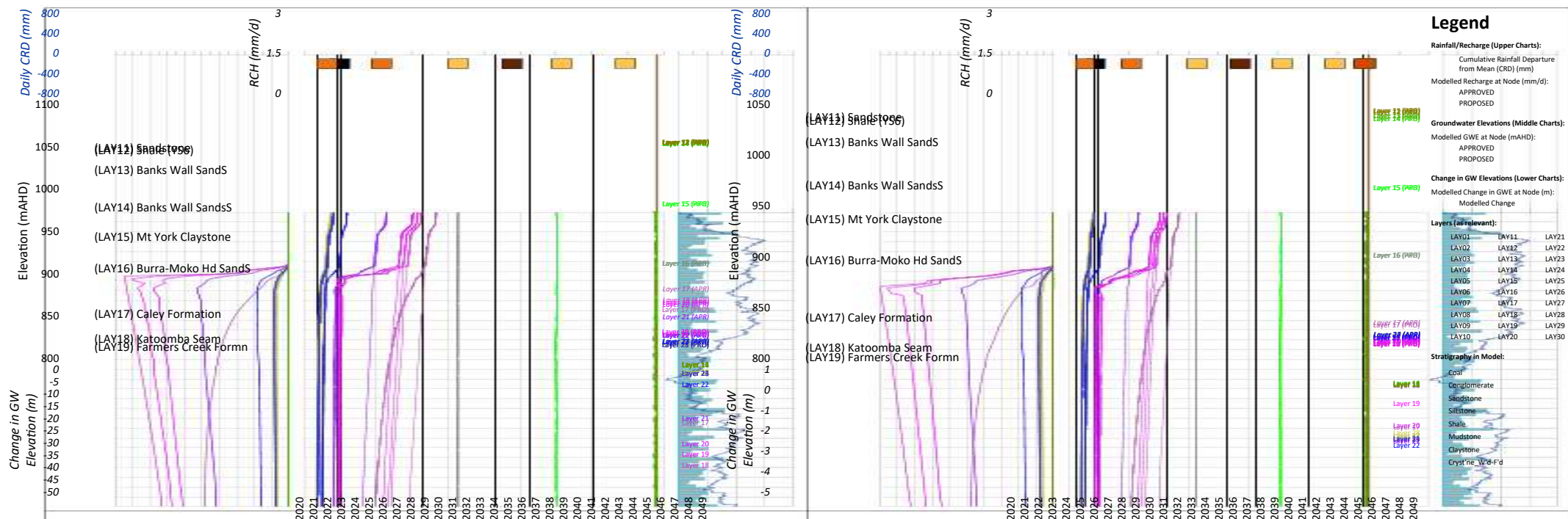
- Coal
- Conglomerate
- Sandstone
- Siltstone
- Shale
- Mudstone
- Claystone
- Cryst'n_e_W'd-F'd

Profile 1: CSP1(1) [15138]

Profile 2: PG1(1) [15160]

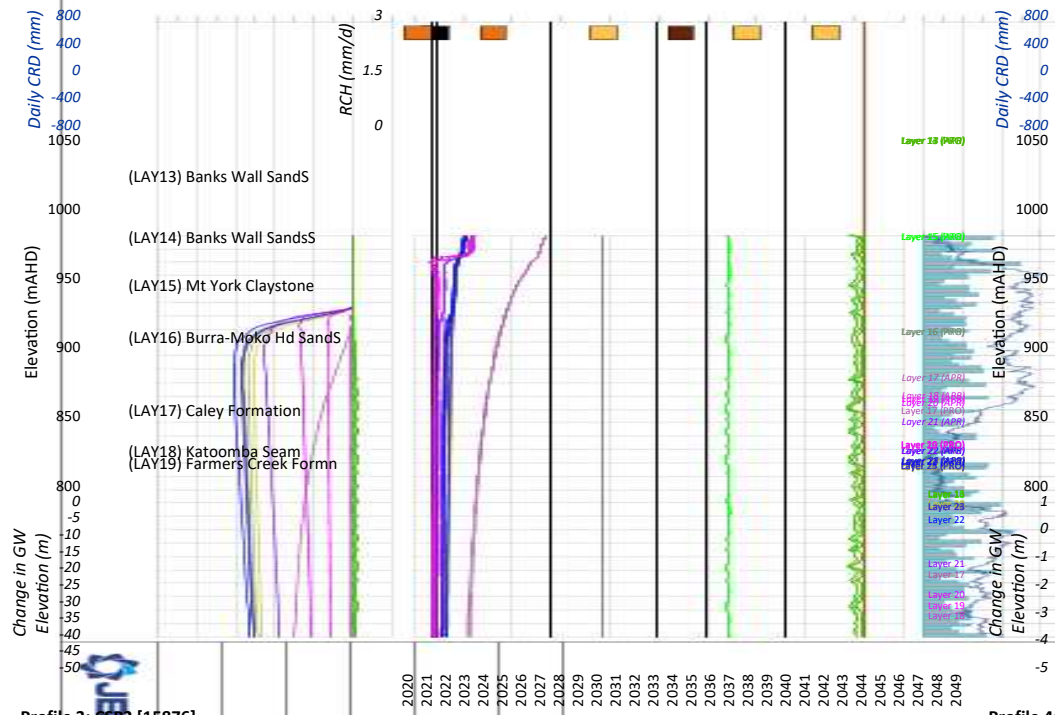
Profile 3: CSP2(1) [15876]

Profile 4: PG2(1) [15898]



Profile 1: CSP1 [15138]

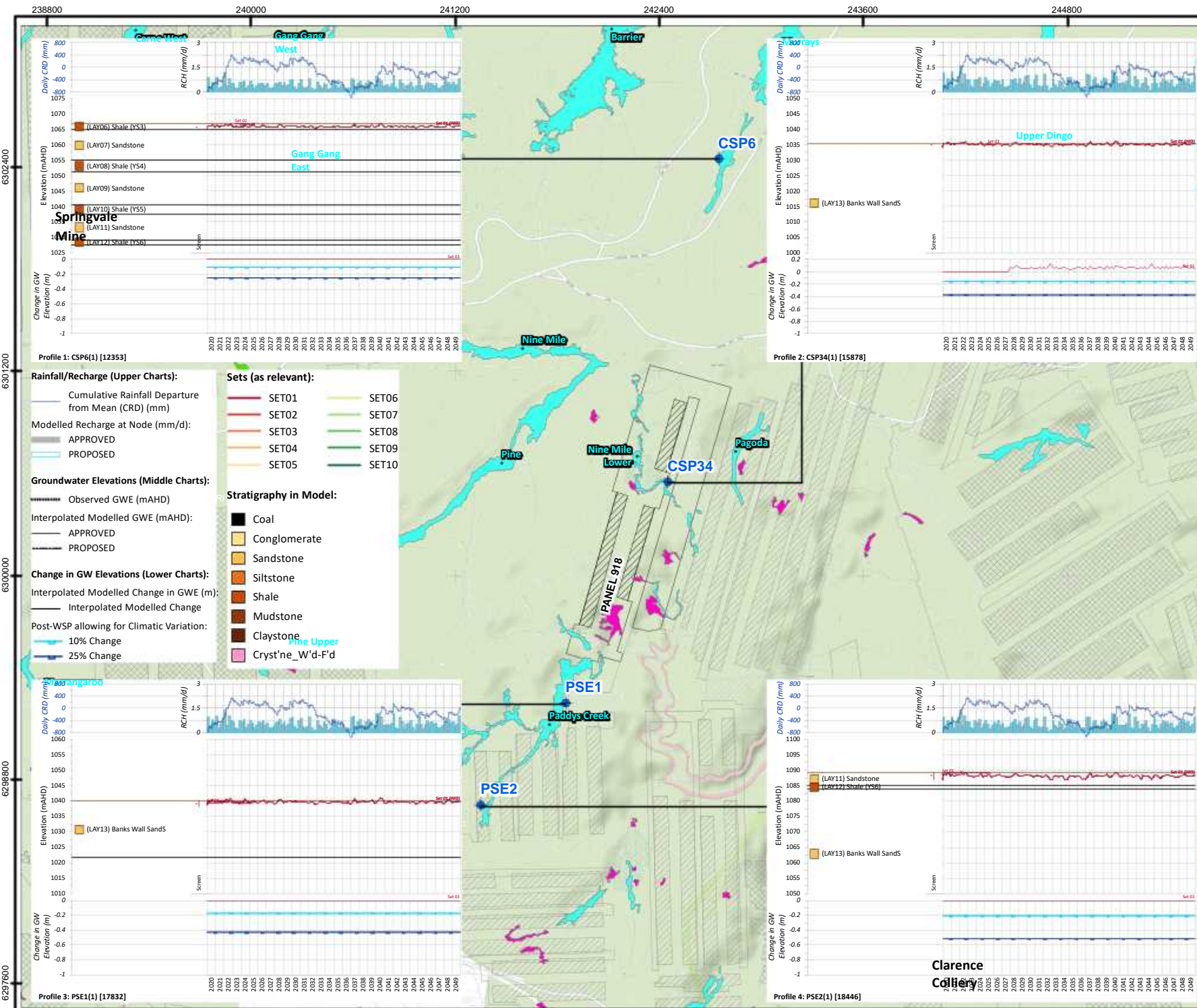
Profile 2: PG1 [15160]



Profile 3: CSP2 [15876]

Profile 4: PG2 [15898]

Figure J-04b: Multilevel Groundwater Hydrographs (Prediction Period Simulation0) - CSP1, PG1, CSP2, PG2



Legend:

- Model Output Locations

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Swamps by MU Name (Clarence, 2025bc):

- 50 Newnes Plateau Shrub Swamp (EEC)
- 51 Newnes Plateau Hanging Swamp (EEC)
- 52 Newnes Plateau Rush - Sedge - Snow Gum Hollow Wooded Heath (EEC)

Notes:

- 1) GWE: Groundwater Elevation.
- 2) 10% and 25% threshold calculated based on model output between 01/01/2011 and 31/12/2021.
- 3) CRD Trace dates from 01/01/2010 - 31/12/2049.

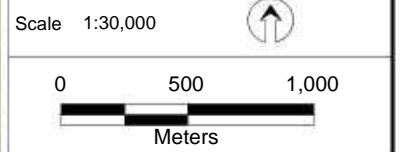


Job No: 68229

Client: Clarence Colliery Pty Ltd

Version: R01RevA Date: 24-Oct-2025

Drawn By: DAW Checked By: JRWB

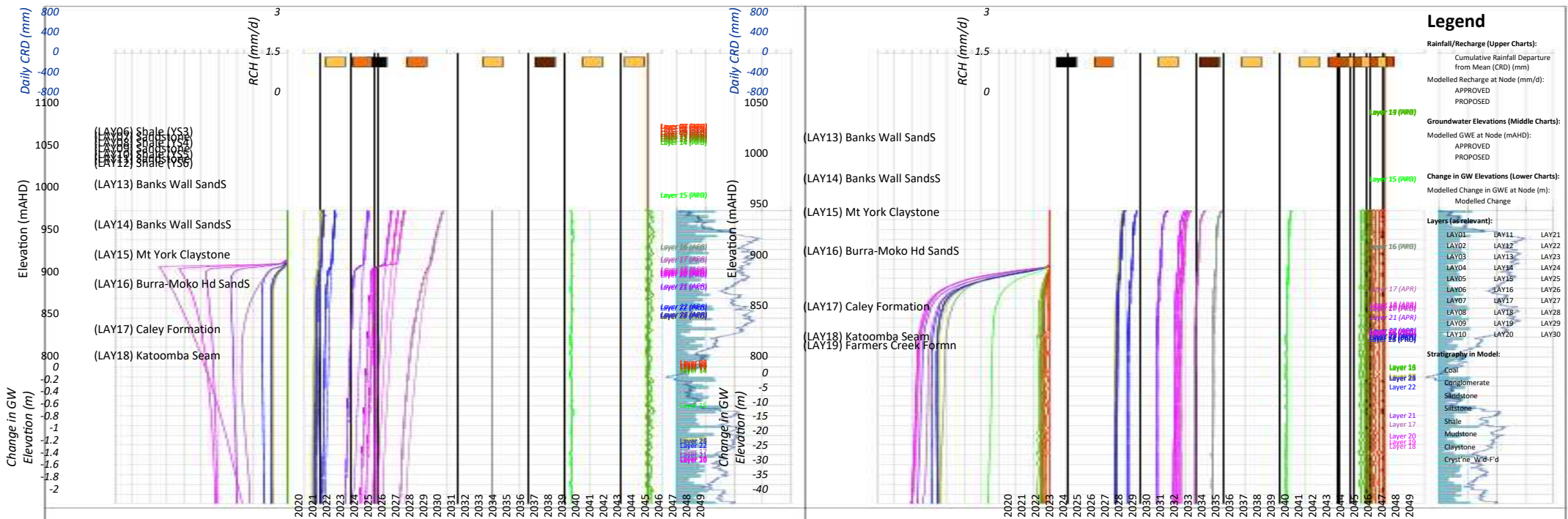


Coord. Sys. GDA 1994 MGA Zone 56

Groundwater Hydrographs (Prediction Period, Simulation0):

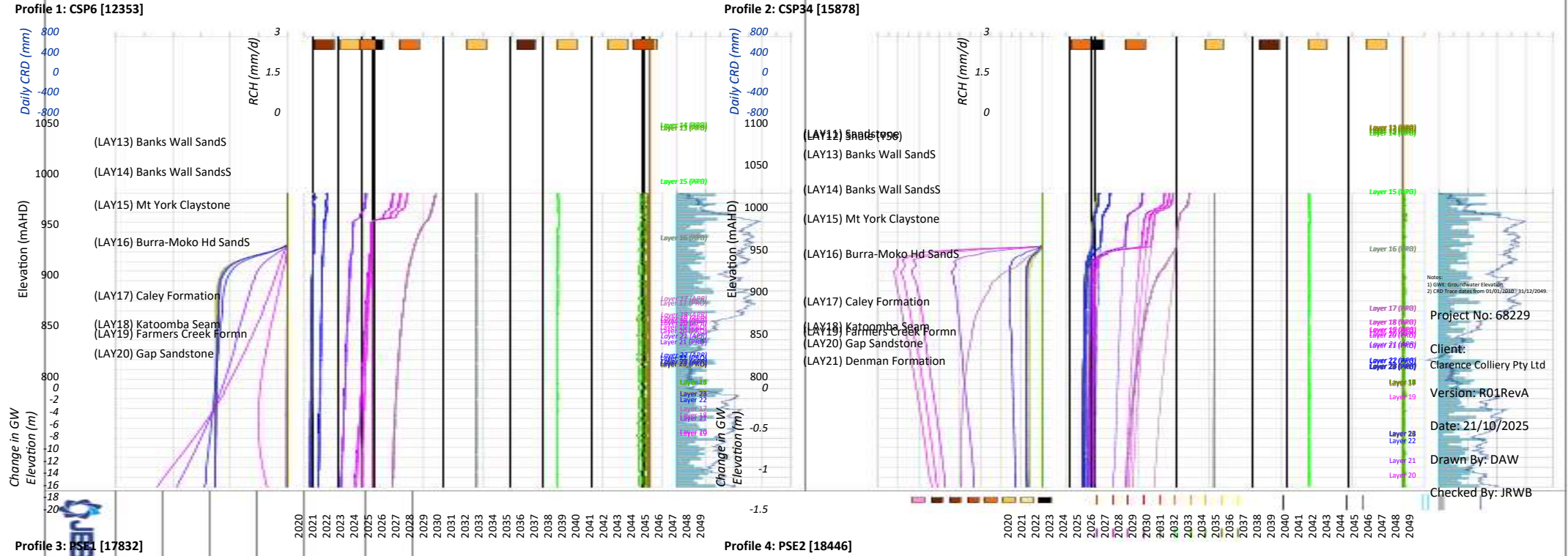
- CSP6
- CSP34
- PSE1
- PSE2

FIGURE: J-05a



Legend

- Rainfall/Recharge (Upper Charts):**
- Cumulative Rainfall Departure from Mean (CRD) (mm)
 - Modelled Recharge at Node (mm/d): APPROVED, PROPOSED
- Groundwater Elevations (Middle Charts):**
- Modelled GWE at Node (mAHD): APPROVED, PROPOSED
- Change in GW Elevations (Lower Charts):**
- Modelled Change in GWE at Node (m): Modelled Change
- Layers (as relevant):**
- | | | |
|-------|-------|-------|
| LAY01 | LAY11 | LAY21 |
| LAY02 | LAY12 | LAY22 |
| LAY03 | LAY13 | LAY23 |
| LAY04 | LAY14 | LAY24 |
| LAY05 | LAY15 | LAY25 |
| LAY06 | LAY16 | LAY26 |
| LAY07 | LAY17 | LAY27 |
| LAY08 | LAY18 | LAY28 |
| LAY09 | LAY19 | LAY29 |
| LAY10 | LAY20 | LAY30 |
- Stratigraphy in Model:**
- Coal
 - Conglomerate
 - Sandstone
 - Siltstone
 - Shale
 - Mudstone
 - Claystone
 - Crystine W/d-F/d



Notes:
 1) GWE Group: Water Elevations
 2) CRD Trace: Starts from 01/01/2010 to 31/12/2049.

Project No: 68229

Client:
Clarence Colliery Pty Ltd

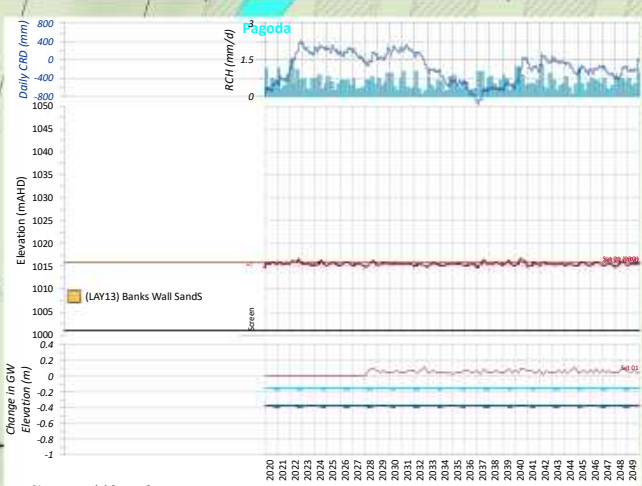
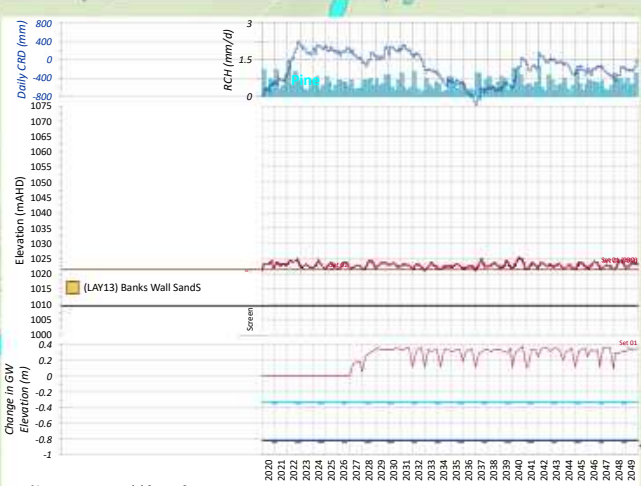
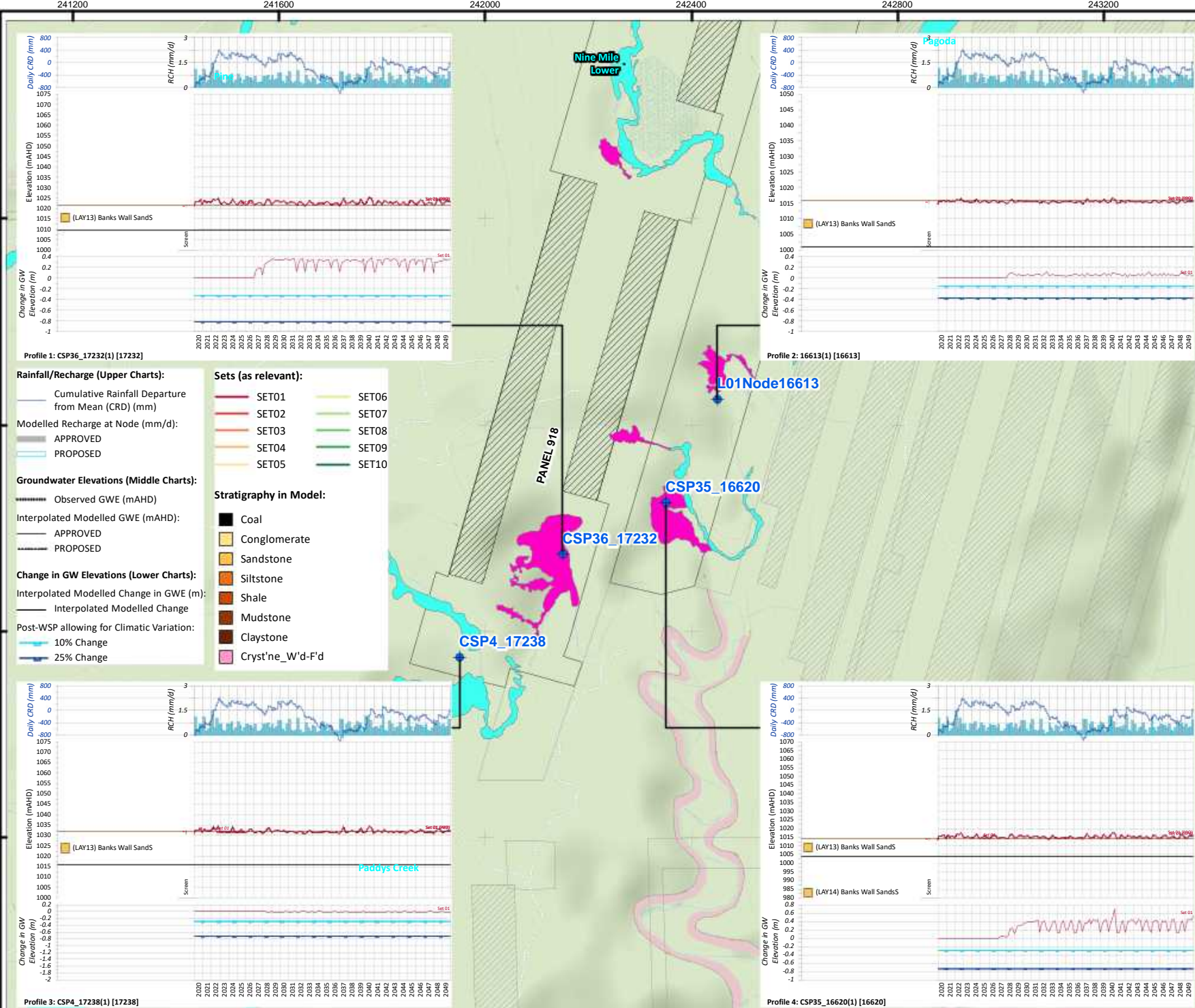
Version: R01RevA

Date: 21/10/2025

Drawn By: DAW

Checked By: JRWB

Figure J-05B: Multilevel Groundwater Hydrographs (Prediction Period Simulation0) - CSP6, CSP34, PSE1, PSE2



Profile 1: CSP36_17232(1) [17232]

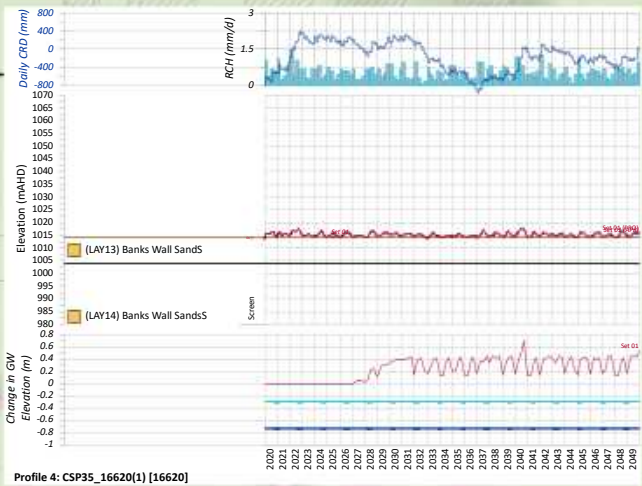
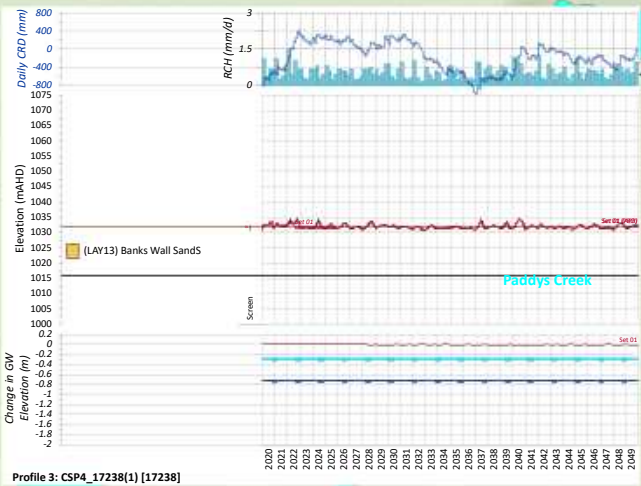
Rainfall/Recharge (Upper Charts):
 Cumulative Rainfall Departure from Mean (CRD) (mm)
 Modelled Recharge at Node (mm/d): APPROVED, PROPOSED

Groundwater Elevations (Middle Charts):
 Observed GWE (mAHD)
 Interpolated Modelled GWE (mAHD): APPROVED, PROPOSED

Change in GW Elevations (Lower Charts):
 Interpolated Modelled Change in GWE (m): Interpolated Modelled Change
 Post-WSP allowing for Climatic Variation: 10% Change, 25% Change

Sets (as relevant):
 SET01, SET02, SET03, SET04, SET05, SET06, SET07, SET08, SET09, SET10

Stratigraphy in Model:
 Coal, Conglomerate, Sandstone, Siltstone, Shale, Mudstone, Claystone, Cryst'n'e_W'd-F'd



Legend:

- Model Output Locations

Mining Methods:

- Development
- Partial Extraction
- Total Extraction
- Open Cut

Mine Operation Status:

- Approved
- Existing
- Proposed
- Other Proposed

Swamps by MU Name (Clarence, 2025bc):

- 50 Newnes Plateau Shrub Swamp (EEC)
- 51 Newnes Plateau Hanging Swamp (EEC)
- 52 Newnes Plateau Rush - Sedge - Snow Gum Hollow Wooded Heath (EEC)

Notes:

- 1) GWE: Groundwater Elevation.
- 2) 10% and 25% threshold calculated based on model output between 01/01/2011 and 31/12/2021.
- 3) CRD Trace dates from 01/01/2010 - 31/12/2049.
- 4) Observations are translated, to be representative, of the centre of each cell for purpose of comparison.



Job No: 68229
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Version: R01RevA Date: 27-Oct-2025
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Scale 1:10,000

Coord. Sys. GDA 1994 MGA Zone 56

Groundwater Hydrographs (Prediction Period, Simulation0):

- CSP36
- L01Node16613
- CSP4
- CSP35

FIGURE: J-06a

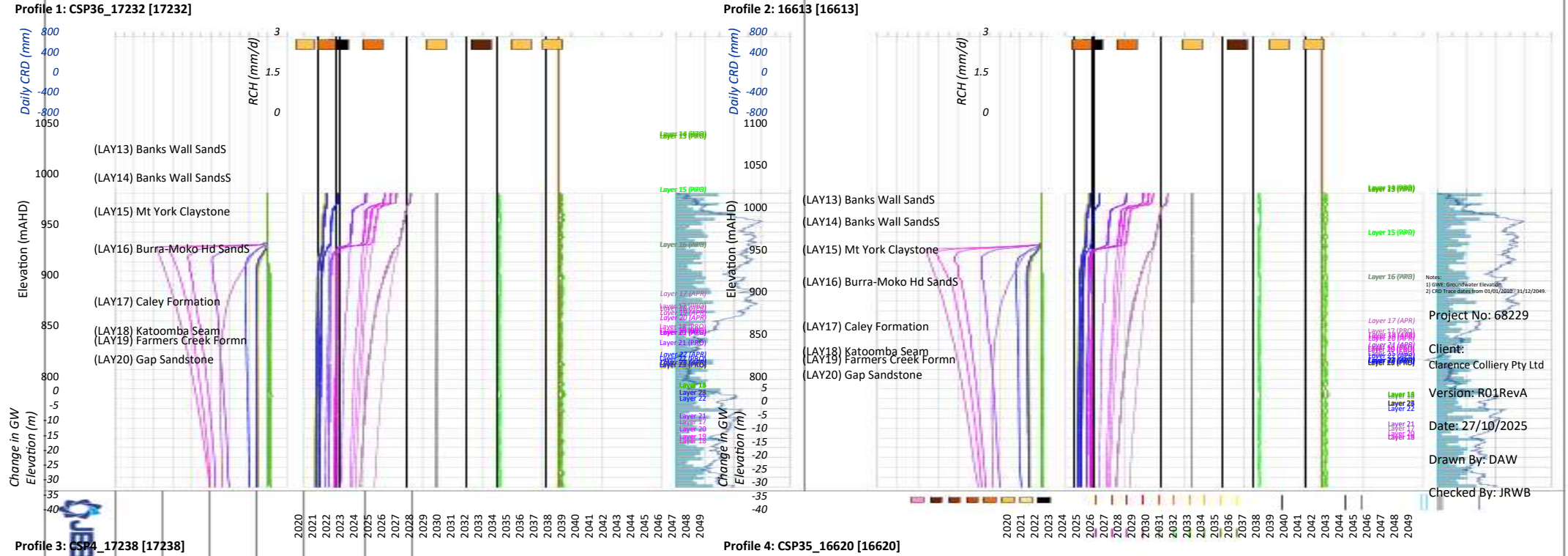
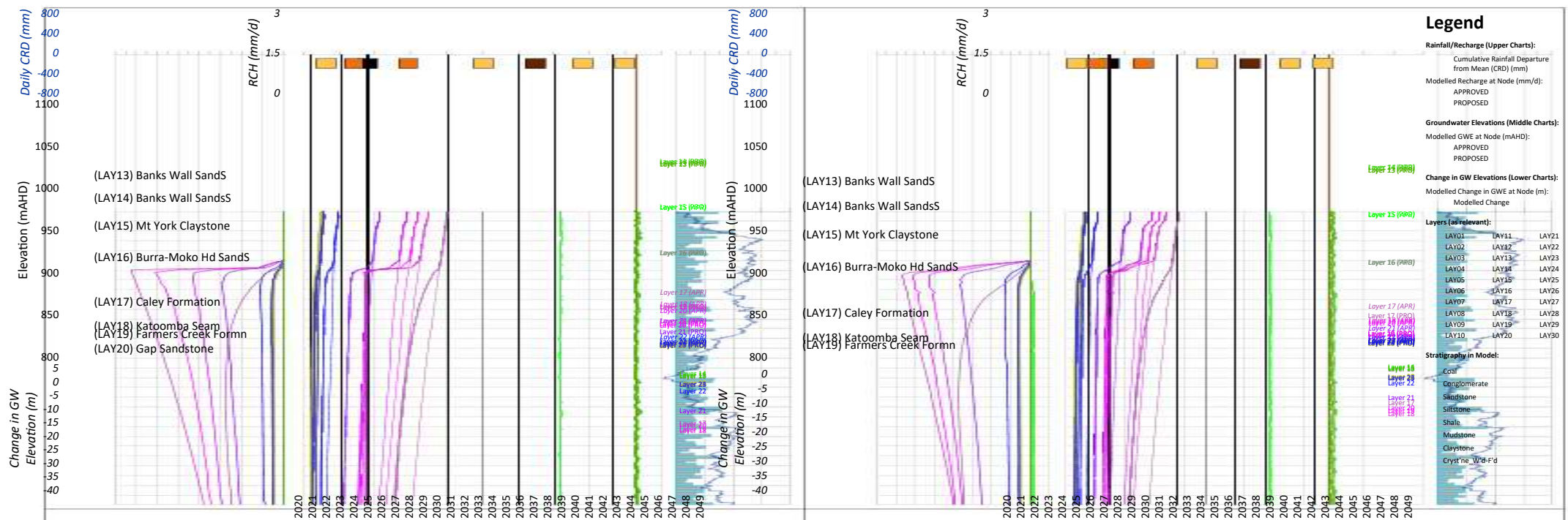


Figure J-06a: Multilevel Groundwater Hydrographs (Prediction Period Simulation0) - CSP36, L01Node16613, CSP4, CSP35

Appendix K PEST Control File

Appendix K

K1. PEST Control File

This appendix presents the PEST control file (.PST).

The file presents the calibrated parameter values.

It is noted that superfluous entries such as headers and observation data have been deleted from the printout.

Appendix L PEST Parameter Uncertainty File

Appendix L

L1. PEST Parameter Uncertainty File

This appendix presents the PEST parameter uncertainty file (.UNC).

The file presents the calibrated standard deviations used for non-Covariance matrix parameters.



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Document Status

Rev No.	Author	Reviewer Name	Approved for Issue		
			Name	Signature	Date
A	Dr Justin Bell, David Wilson	Dr Justin Bell	Dr Justin Bell	DRAFT	12 November 2025
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0	Dr Justin Bell	Dr Justin Bell	Dr Justin Bell		13 February 2026
1	Dr Justin Bell	Dr Justin Bell	Dr Justin Bell		23 April 2026



Adelaide

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Byron Bay NSW 2481
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Gold Coast

Yugambah Country | Level 2/14
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Hobart

Muwinina Country | Level 2,
137 Liverpool Street, Hobart, TAS 7000
T: 03 6208 3700

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Wurundjeri Country | Level 19,
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Perth

Whadjuk Country | Allendale Square,
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Gadigal Country | Level 8,
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T: 02 8245 0300

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Dharawal Country | Level 1,
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