Appendix E. Modelled drawdown and depth to water
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation at mining year 1

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

GDA 1994 MGA Zone 54

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SYDNEY
WAGGA WAGGA
MELBOURNE

JACOBS

I:\VESA\Projects\VE23875\Technical\Spatial\mxd\BAL2.0_TS2_opt29\Drawdown from 2014\Rev2\BAL2.0_TS2_opt29_20180101_L1_DD.mxd
BAL2.0 TS2 opt29 modelled drawdown in LPS1 foreshore at mining year 1
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation at mining year 2
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation at mining year 3
BAL2.0 TS2 opt29 modelled drawdown in LPS1 foreshore at mining year 3
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation at mining year 4
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation at mining year 5
BAL2.0 TS2 opt29 modelled drawdown in LPS1 foreshore at mining year 5
BAL2.0 TS2 opt29 modelled drawdown in LPS1 foreshore at mining year 6
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation at mining year 6.3
BAL2.0 TS2 opt29 modelled drawdown in LPS1 FS at mining year 6.3
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation at mining year 7
BAL2.0 TS2 opt29 modelled drawdown in LPS1 foreshore at mining year 7
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation at mining year 7.4
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation at mining year 8
BAL2.0 TS2 opt29 modelled drawdown in LPS1 foreshore at mining year 8
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation 1 year post-mining
BAL2.0 TS2 opt29 modelled drawdown in LPS1 foreshore 1 year post-mining
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation 5 years post-mining
BAL2.0 TS2 opt29 modelled drawdown in LPS1 foreshore 5 years post-mining
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation 10 years post-mining
BAL2.0 TS2 opt29 modelled drawdown in LPS1 foreshore 10 years post-mining
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation 30 years post-mining
BAL2.0 TS2 opt29 modelled drawdown in LPS1 foreshore 30 years post-mining
BAL2.0 TS2 opt29 modelled drawdown in Shepparton Formation 100 years post-mining
BAL2.0 TS2 opt29 modelled drawdown in LPS1 foreshore 100 years post-mining
BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation at mining year 0 (end of construction)
BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore at mining year 0 (end of construction)
BAL2.0 TS2 opt29 modelled depth to water in Olney Formation at mining year 0 (end of construction)

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation at mining year 1

- **Balranald**, Nepean pit limits
- **Haul road**, West Balranald disturbance
- **Lake**, Nepean disturbance
- **Watercourse**, Balranald pit limits
- **Town**, Nepean disturbance
- **Major road**, West Balranald pit limits
- **Minor Road**, West Balranald disturbance
- **River**, Modelled depth to water (m)

**Legend**:
- **High**: 71.6 m
- **Low**: 0.7 m

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore at mining year 1
BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation at mining year 2

- High: 71.6 m
- Low: 0.7 m

Source: Esri, DigitalGlobe, GeoEye, i-cubed,Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore at mining year 2
BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation at mining year 3

Modelled depth to water (m)
- High: 71.6
- Low: 0.7

Town
- Major road
- Minor Road
- Lake
- River
- Watercourse
- EIS offpath injection area
- 3 m modelled depth to water
- Modelled depth to water (m)

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore at mining year 3
BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation at mining year 4
BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore at mining year 4
BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation at mining year 5

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.
BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore at mining year 5

- **Town**
- **Haul road**
- **EIS offpath injection area**
- **3 m modelled depth to water**
- **Modelling depth to water (m)**
  - High: 71.6
  - Low: 0.7
- **Major road**
- **West Balranald pit limits**
- **Modelled depth to water (m)**
- **Minor Road**
- **West Balranald disturbance**
- **Modelling depth to water (m)**
- **Lake**
- **Nepean pit limits**
- **Nepean disturbance**
- **River**
- **Watercourse**
- **BAL2.0 model domain**

BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation at mining year 6

Modelled depth to water (m)
High : 71.6
Low : 0.7

- Town
- Haul road
- EIS offpath injection area
- 3 m modelled depth to water
- Modelled depth to water (m)
- Major road
- West Balranald pit limits
- West Balranald disturbance
- Minor Road
- Lake
- Nepean pit limits
- River
- Nepean disturbance
- Watercourse


GDA 1994 MGA Zone 54

SYDNEY
WAGGA WAGGA
MELBOURNE

BALRANALD

Murray River
Murrumbidgee River
Box Creek
Arumpo Creek
BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore at mining year 6

- **Town**
- **Haul road**
- **EIS offpath injection area**
- **3 m modelled depth to water**
- **Modelled depth to water (m)**
- **High : 71.6**
- **Low : 0.7**

**Features**:
- Lake
- Nepean disturbance
- Nepean pit limits
- River
- Watercourse
- BAL2.0 model domain

The map shows the modelled depth to water in metres at a specific mining year, with high and low values indicated. The BAL2.0 TS2 opt29 model domain is highlighted, along with various geological and infrastructural features such as towns, roads, and watercourses.
BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation at mining year 6.3
BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore at mining year 6.3

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

Modelled depth to water (m)
High : 71.6
Low : 0.7

BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore at mining year 6.3
BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation at mining year 7
BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore at mining year 7
BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation at mining year 7.4
BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation at mining year 8
BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore at mining year 8
BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation 1 year post-mining

Modelled depth to water (m)
High: 71.6
Low: 0.7

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore 10 years post-mining

**Depth to water (m)**
- High: 71.6
- Low: 0.7

**Areas of Interest**
-Town
- Major road
- Minor Road
- Lake
- River
- Watercourse

**Legend**
- Haul road
- West Balranald pit limits
- West Balranald disturbance
- Nepean pit limits
- Nepean disturbance
- EIS offpath injection area
- 3 m modelled depth to water
- BAL2.0 model domain

**Source**
ESRI, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

**GDA 1994 MGA Zone 54**

**Kilometres**
BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation 30 years post-mining

BAL2.0 model domain

EIS offpath injection area

Modelled depth to water (m)

High : 71.6

Low : 0.7

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

GDA 1994 MGA Zone 54
BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore 30 years post-mining

High: 71.6
Low: 0.7

- Town
- Haul road
- Major road
- Minor Road
- Lake
- River
- Watercourse
- EIS offpath injection area
- West Balranald pit limits
- West Balranald disturbance
- Nepean pit limits
- Nepean disturbance
- Modelled depth to water (m)

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

I:

Murray River
Murrumbidgee River
Box Creek
Arumpo Creek
BAL2.0 TS2 opt29 modelled depth to water in Shepparton Formation 100 years post-mining

Modelled depth to water (m)
- High: 71.6
- Low: 0.7

EIS offpath injection area

3 m modelled depth to water

Haul road

Town

Major road

Minor Road

Lake

River

Watercourse

West Balranald pit limits

West Balranald disturbance

Nepean pit limits

Nepean disturbance

BAL2.0 model domain

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.
BAL2.0 TS2 opt29 modelled depth to water in LPS1 foreshore 100 years post-mining
Appendix F. Predicted hydrographs at potential GDE sites
Appendix G. Predicted hydrographs at third party wells
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Shepparton Formation third party wells
Balranald Mineral Sands Project Groundwater Assessment

B02

Modelled

Water level (m AHD)

2014 2016 2018 2020 2022 2024

GW004017

Modelled

Water level (m AHD)

2014 2016 2018 2020 2022 2024

GW036673(3)

Modelled

Water level (m AHD)

2014 2016 2018 2020 2022 2024

GW036866(4)

Modelled

Water level (m AHD)

2014 2016 2018 2020 2022 2024